Town of Londonderry Planning Board
268B Mammoth Road - Moose Hill Conference
Agenda
March 4, 2026
7:00 p.m.

I. Call to Order

II. Administrative Board Work

A. Approval of Minutes

B. Regional Impact Determinations

C. Discussions with Town Staff

III. Master Plan Public Hearing

A. Public hearing to consider the adoption of the Town of Londonderry Master Plan, pursuant to RSA 674:2 and RSA 675:6. The proposed Master Plan is a comprehensive planning document intended to guide the future growth, development, and conservation of the Town of Londonderry and includes the required chapters as set forth in RSA 674:2, including but not limited to the Vision, Land Use, Housing, Transportation, Economic Development, and Natural Resources. The proposed Master Plan is available for public inspection during normal business hours at the Planning Department,268B Mammoth Road,2nd floor Town Hall, Planning & Economic Development Department and online on the Town's website at https://www.londonderrynh.gov/362/Ma

IV. Old Business

A. Public hearing for an application for formal review of a subdivision of Map 10 Lot 41 to create a new 12- acre lot on Pillsbury and Gilcreast Road. 15 Pillsbury Road, Map 10, Lot 41 zoned Agricultural Residential (AR-1) and Woodmont Commons Planned Unit Development (PUD). Procopio Companies (Applicant) & Pillsbury Realty Development, LLC (Owner). (Continued from December 3, 2025 and January 7, 2026) Applicant has requested continuance to April 1, 2026

Documents:

IV.B 15 Pillsbury - Sub 4.12 boundary plan F.pdf
IV.B 15 Pillsbury Rd Proposed Subdivision Application and Checklist_Redacted.pdf

IV.B Subdivision Staff Memo_15 Pillsbury 01.07.26_final.pdf

B. Public hearing for an application for formal review of a site plan and conditional use permit for 250 single family cottage court style dwellings along with associated site improvements. 36 Pillsbury Road (Map 10, Lot 42) zoned Agricultural Residential (AR-1) and Woodmont Commons Planned Unit Development (PUD). Procopio Companies (Applicant) & Pillsbury Realty Development, LLC (Owner). (Continued from December 3, 2025 and January 7, 2026) Applicant has requested continuance to April 1, 2026

Documents:

IV.C Thornton Hill - Site Plan Application and Checklist_Redacted.pdf
IV.C Thornton Hill - Site Plan - Drainage Report - Planning Board Submission.pdf
IV.C Thornton Hill - Site Plan Review Set - Planning Board Submission.pdf
IV.C Site Plan Staff Memo_36 Pillsbury 01.07.26_final.pdf

V. New Plans/Conceptual Plans

A. Public hearing on an application for a formal review of a site plan to construct 60 single family condominiums along with associated site plan improvements. 44 Pillsbury Road (Map 10, Lot 15) Zoned Woodmont Commons PUD (PUD-1) and Agricultural Residential (AR-1), Pillsbury Realty Development, LLC (owner) and Procopio Enterprises, Inc. (applicant). (Applicant has requested continuance to April 1, 2026)

Documents:

Rosecrans Drive - 44 Pillsbury - Site Plans.pdf
Rosecrans Drive - 44 Pillsbury - Drainage Report.pdf

B. Public hearing on an application for formal review of a site plan for renovation of an existing building to add a restaurant and associated parking in support of an agritourism operation at 230 Mammoth Road (Map 06, Lot 21), zoned Agricultural-Residential (AR-1). MHO Acquisition, LLC, (owner/applicant).

Documents:

Macks Apples Formal Site Plan Application 02.12.26Redacted.pdf
Macks Apples_Staff Memo_sp_03.04.26.pdf

VI. Other Business

A. Rules of Procedure

VII. Adjournment

Revised to show applications that have requsted continuance.

DEVINE MILLIMET

ATTORNEYS AT LAW

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November 13, 2025

Londonderry Planning Board
268B Mammoth Road
Londonderry, New Hampshire 03053

RE: 15 Pillsbury Road (the "Property") – Subdivision Plan Application
Waiver Request – Subdivision Plan Regulations Section 4.12 and Checklist Item V.2

Dear Londonderry Planning Board members:

As part of the subdivision plan application process for the Property, a waiver from the Subdivision Plan Regulations, Section 4.12 and Checklist Item V.2 to not provide a boundary plan is requested.

The criteria for granting the waiver from the subdivision plan regulations are as follows:

> **6.04 WAIVERS**: In a case when the strict application of these regulations would cause practical difficulty, the Board may waive specific plan requirements where the Board has determined that such a waiver will not affect the purpose and intent of these regulations. The Applicant shall submit in writing a "request for waiver" to the Board citing the specific regulation and the reason the regulation cannot be met. Any waiver granted shall be shown on the Final Plan.

This request is justified as the subdivision involves the creation of a small 12 acre lot from 15 Pillsbury Road (Map 10 Lot 41), a 132 acre property as part of the Woodmont Commons Planned Unit Development. The entirety of this parcel (Map 10 Lot 41) was delineated as part of a Subdivision Plan (Map 10 Lot 41) Woodmont Commons Planned Unit Development dated July 23, 2020 and last revised on March 4, 2021, prepared by Hayner/Swanson, Inc., owner/applicant Pillsbury Realty Development, LLC which is recorded at the Rockingham County Registry of Deeds as Plan No. 42670. The strict application of these regulations would cause practical difficulties due to the size and shape of the lot as well as the cost and engineering work needed to produce the boundary plan for 132 acres. The granting of this waiver will not affect the purpose and intent of these regulations as the subdivision plan will delineate the boundary lines of the proposed lot in relation to the 132 acre parcel along Duck Pond and Gilcreast and Pillsbury Roads.

We request your consideration for approval of this waiver request.

Thank you.

Sincerely,

/s/ Laura J. Gandia

Laura J. Gandia

Docusign Envelope ID: 7FE3CA01-683D-4FEB-9882-2D3EAC038316

EXHIBIT 5

LONDONDERRY PLANNING BOARD
SUBDIVISION APPLICATION & CHECKLIST

❑ **Design Review** ■ **Formal Application**

All information provided and submitted with this Application Checklist shall conform to the Londonderry Site Plan Regulations. **Please note that the Planning Board may not accept and consider the application complete if the required items as outlined in the checklist are missing from the submittal.**

I. General Information:

A. Name of Project: 15 Pillsbury Road Subdivision

B. Location of Project: Pillsbury Road (street) | 41 (Map) | 105 (lot)

PUD-1 (zoning)

C. Owner:

Name: Pillsbury Realty Development, LLC

Address: [redacted]

Phone:

Fax:

E-Mail: [redacted]

Signature:

D. Applicant:

Name: Procopio Enterprises, Inc.

Address: [redacted]

Phone:

Fax:

E-Mail:

Signature:

E. Design Firm:
Name: Vanasse Hangen Brustlin, Inc. (VHB)

Address: [redacted] H 03110

Phone:

Fax:

E-Mail:

F. Name of Licensed Land Surveyor: Michael Hammer, LLS, PLS
(in responsible charge)
Signature:

G. Name of Licensed Professional Engineer: N/A: No Improvements Proposed
(in responsible charge)
Signature:

H. Name of Certified Soil Scientist: N/A, no SSSM prepared

I. Name of Certified Wetland Scientist: Jake Tinus, CWS, CPESC

J. Date of Submittal to Planning Department: November 13th, 2025

II. General Requirements (All Applications):

		Provided	N/A
1.	Executed Subdivision Formal Application Request Form (Exhibit 2)	☒	☐
2.	Executed Subdivision Design Review Request Form (Exhibit 3)	☐	☒
3.	Complete abutters list	☒	☐
4.	All Required Fees	☒	☐
5.	Four (4) sets of plans and electronic "PDF" plans (12 sets if electronic plans not possible) submitted with all required information in accordance with the site plan regulations and this checklist	☒	☐
6.	Copies of any proposed easement deeds, protective Covenants or other legal documents	☒	☐
7.	Any waiver request(s) submitted with justification in writing	☒	☐
8.	Technical reports and supporting documents (see Sections X & XI of this checklist)	☒	☐
9.	Completed Subdivision Application Checklist	☒	☐

		Provided	N/A
10.	Letter explaining how DRC comments have been addressed and two (2) sets of highlighted, revised drawings (applicable if pre-application design review process was followed).	☐	■

III. General Plan Information (All Plans):

1.	Size and presentation of sheet(s) per requirements of the subdivision regulations	■	☐
2.	Title block information:		
	a. Drawing title	■	☐
	b. Name of site plan	☐	■
	c. Location of site plan	■	☐
	d. Tax map & lot #s of subject parcel(s)	■	☐
	e. Name & address of owner(s)	■	☐
	f. Date of plan	■	☐
	g. Scale of plan	■	☐
	h. Sheet number	■	☐
	i. Name, address, & telephone number of design firm	■	☐
	j. Name and address of Applicant	■	☐
3.	Revision block	■	☐
4.	Planning Board approval block provided on appropriate sheets (Cover sheet, boundary plans only)	■	☐
5.	Certification block (for engineer, surveyor, soil scientist, or wetland scientist)	■	☐
6.	Match lines (if any)	☐	■

IV. Title Sheet:
(may be consolidated with Boundary Plan)

1.	The following notes shall be provided:		
	a. Purpose of plan	■	☐
	b. Tax map and lot #s of all subject parcels	■	☐
	c. Area (existing & proposed) of subject parcel(s)	■	☐
	d. Zoning designation of subject parcel(s)	■	☐
	e. Min. lot area, frontages & setback dimensions	■	☐
	f. Existing and proposed use	■	☐
	g. Sanitary sewer source (name of provider (company) if offsite)	■	☐
	h. Water supply source (name of provider (company) if offsite)	■	☐
	i. Zoning variances/special exceptions with conditions	☐	■
	j. List FEMA sheet(s) used to identify 100-year flood elevation. (Note if no flood zone present as applicable)	■	☐
	k. List of required permits and permit approval numbers	☐	■
	l. List of Planning Board waivers (if applicable)	■	☐
	m. Note identifying # of bedrooms per dwelling for residential use	☐	■

			Provided	N/A	
	n.	Phasing notes, as required, under Section 4.18i as applicable	☐	■	
	o.	Note identifying which plans are to be recorded and which are on file at the town	■	☐	
	p.	Note the following: "If, during construction, it becomes apparent that deficiencies exist in the approved design drawings, the Owner shall be required to correct the deficiencies to meet the requirements of the regulations at no expense to the Town."	☐	■	
	q.	Note the following: "If, during construction, it becomes apparent that additional erosion control measures are required to stop any erosion on the construction site due to actual site conditions, the Owner shall be required to install the necessary erosion protection at no expense to the Town.	☐	■	
	r.	Note the following: "All materials and methods of construction shall conform to Town of Londonderry Subdivision Regulations and the latest edition of the New Hampshire Department of Transportation's Standard Specifications for Road & Bridge Construction."	☐	■	
2.		Tax map sketch plan (or detail) showing proposed lot configuration at a scale 1" = 400'	■	☐	
3.		Vicinity plan (at a scale of 1"=2500')	☐	■	
4.		Plan index indicating all sheets	■	☐	
V.		**Boundary Plan (Subdivision, Consolidation and Lot Line Adjustment:**			
1.		Surveyor's certification stamped and signed by LLS	■	☐	
2.		Boundary of entire property by metes and bounds	☐	☐	Waiver Request Enclosed
3.		Proposed lot configuration defined by metes and bounds	■	☐	
4.		Boundary monuments:			
	a.	Monuments found	■	☐	
	b.	Monuments to be set	■	☐	
5.		Map # and Lot #, name addresses, and zoning of all abutting land owners	■	☐	
6.		Existing streets:			
	a.	Name labeled	■	☐	
	b.	Status noted or labeled	■	☐	
	c.	Right-of-way dimensioned	■	☐	
	d.	Pavement width dimensioned	■	☐	
7.		Municipal boundaries (if any)	☐	■	
8.		Existing easements (identified by type)	☐	■	

		Provided	N/A
9.	Proposed easements defined by metes & bounds. Check each type of proposed easement applicable to this application:		
	a. Drainage easement(s)	☐	■
	b. Slope easement(s)	☐	■
	c. Utility easement(s)	■	☐
	d. Temporary easement(s) (such as temporary turnaround)	☐	■
	e. No-cut zone(s), including those along streams & wetlands (as may be requested by the Conservation Commission)	☐	■
	f. Vehicular & pedestrian access easement(s)	☐	■
	g. Visibility easements	☐	■
	h. Fire pond/cistern easement(s)	☐	■
	i. Roadway widening easement(s)	☐	■
	j. Walking trail easement(s)	☐	■
	k. Other easement(s) _____ Note type(s) _____	☐	■
10.	Designation of each proposed lot (by map & lot #s as provided by the assessor)	■	☐
11.	Area of each lot (in acres & square feet):		
	a. Existing lot(s)	■	☐
	b. Proposed lot(s)	■	☐
12.	North Arrow	■	☐
13.	Locus map (at a scale of 1" = 2,500)	■	☐
14.	Limits of wetlands & CO District Boundary	■	☐
15.	Wetland delineation:		
	a. Wetland delineation criteria & Certification	☐	■
16.	Owner(s) signature(s)	■	☐
17.	Proposed streets:		
	a. Name(s) labeled	☐	■
	b. Width of right-of-way dimensioned	☐	■
18.	All required setbacks (including any applicable buffers)	■	☐
19.	Physical features:		
	a. Existing features -- Buildings	☐	■
	Wells	☐	■
	Septic systems	☐	■
	Stonewalls	☐	■
	Paved drives	■	☐
	Gravel drives	■	☐
20.	Location & name (if any) of any streams or waterbodies	■	☐
21.	Location & elevation(s) of 100-year flood zone per FEMA Flood Insurance Study or as determined by drainage study	■	☐
22.	Location of existing overhead utility lines, poles, towers, etc.	■	☐

		Provided	N/A	
23.	Plan and deed references	■	☐	
24.	Zoning District boundary lines (if any)	■	☐	
VI.	**Topographical/HISS Plan Requirements):**			
1.	Surveyor's stamp and signature by LLS	■	☐	
2.	Boundary of entire property to be subdivided	☐	☐	Waiver Request Enclosed
3.	Proposed lot configuration defined by metes and bounds	■	☐	
4.	Boundary monuments:			
	a. Monuments found	■	☐	
	b. Monuments to be set	■	☐	
5.	Map # and lot #, name addresses, and zoning of all abutting land owners	■	☐	
6.	Existing streets:			
	a. Name labeled	■	☐	
	b. Status noted or labeled	■	☐	
	c. Right-of-way dimensioned	■	☐	
	d. Pavement width dimensioned	■	☐	
7.	Municipal boundaries (if any)	☐	■	
8.	Existing easements (identified by type)	☐	■	
9.	Proposed easements defined by metes & bounds. Check each type of proposed easement applicable to this application:			
	a. Drainage easement(s)	☐	■	
	b. Slope easement(s)	☐	■	
	c. Utility easement(s)	■	☐	
	d. Temporary easement(s) (such as temporary turnaround)	☐	■	
	e. No-cut zone(s) along streams & wetlands (as may be requested by the Conservation Commission)	☐	■	
	f. Vehicular & pedestrian access easement(s)	☐	■	
	g. Visibility easements	☐	■	
	h. Fire pond/cistern easement(s)	☐	■	
	i. Roadway widening easement(s)	☐	■	
	j. Walking trail easement(s)	☐	■	
	k. Other easement(s) _____ Note type(s) _____	☐	■	
10.	Designation of each proposed lot (by map & lot #s as provided by the assessor)	■	☐	
11.	Area of each lot (in acres & square feet):			
	a. Existing lot(s)	☐	■	
	b. Proposed lot(s)	■	☐	
12.	North arrow	■	☐	

		Provided	N/A
13.	Locus map (at a scale of 1" = 2,500) shown	☑	☐
14.	Limits of wetlands	☑	☐
15.	Wetland delineation:		
	a. Wetland delineation criteria	☑	☐
	b. Wetland scientist certification	☑	☐
16.	Owner(s) signature(s)	☐	☑
17.	Proposed streets:		
	a. Name(s) labeled	☐	☑
	b. Width of right-of-way dimensioned	☐	☑
	c. Pavement width dimensioned	☐	☑
18.	All required setbacks (including any applicable buffers)	☑	☐
19.	Physical features (Existing Features):		
	a. Buildings	☐	☑
	b. Wells	☐	☑
	c. Septic systems	☐	☑
	d. Stone walls	☐	☑
	e. Paved drives	☑	☐
	f. Gravel drives	☑	☐
20.	Location & name (if any) of any streams or waterbodies	☑	☐
21.	Location & elevation(s) of 100-year flood zone per FEMA Flood Insurance Study or as determined by drainage study	☑	☐
22.	Location of existing overhead utility lines, poles, towers, etc.	☑	☐
23.	Plan and deed references	☐	☑
24.	Two-foot contour interval topography shown over all subject parcels	☑	☐
25.	Source and datum of topographic information (USGS required)	☑	☐
26.	Show at least one benchmark per sheet (min.) and per 5 acres (min.) of total site area	☑	☐
27.	USDA-SCS soil survey information (where municipal sewer is to be provided)	☑	☐
28.	Location, type, size & inverts of the following (as applicable):		
	a. Existing water systems	☑	☐
	b. Existing sewer systems	☑	☐
	c. Existing drainage systems	☑	☐
	d. Existing utilities	☑	☐

		Provided	N/A
29.	4K Areas with test pits on all proposed lots (meeting NHDES & Town setback requirements)	☐	■
30.	Location of all water wells with protective radii as required by the NHDES (meeting Town and NHDES setback requirements)	☐	■
31.	Existing treelines	■	☐
32.	Existing ledge outcroppings & other significant natural features	■	☐
33.	HISS requirements:		
	a. Criteria for HISS delineation	☐	■
	b. Soil scientist certification on plan (if HISS required)	☐	■
	c. HISS mapping shown over all subject parcels (where no municipal sewer exists)	☐	■
34.	Plan as submitted to the NHDES	☐	■
VII.	**Improvement Plans (Stamped by Engineer Licensed in NH):**		
1.	Grading and Drainage:		
	a. Existing topography (two-foot contour interval minimum)	☐	■
	b. Proposed contours	☐	■
	c. Existing spot elevations	☐	■
	d. Proposed spot elevations	☐	■
	e. Existing edge of pavement	☐	■
	f. Proposed edge of pavement	☐	■
	g. Existing curb line	☐	■
	h. Proposed curb line	☐	■
	i. Existing buildings and structures	☐	■
	j. Proposed buildings and structures	☐	■
	k. Existing retaining walls	☐	■
	l. Proposed retaining walls	☐	■
	m. Existing stone walls	☐	■
	n. Reconstructed stone walls	☐	■
	o. Existing treeline	☐	■
	p. Proposed treeline	☐	■
	q. Benchmarks	☐	■
	r. Existing drainage systems:		
	1.) Pipes/culverts (each location):		
	i. Type	☐	■
	ii. Size	☐	■
	iii. Length and slope	☐	■
	iv. Inverts	☐	■
	v. End sections/Headwalls	☐	■
	2.) Structures (catchbasins, drain manholes, special structures):		
	i. Location (sta. and off-set)	☐	■
	ii. Type	☐	■
	iii. Size	☐	■
	iv. Rim Elevations	☐	■
	v. Inverts	☐	■

		Provided	N/A
3.)	Swales/Ditches/Waterways:		
i.	Flow arrows (direction of flow)	☐	■
ii.	Topography	☐	■
iii.	Spot elevations	☐	■
t.	Proposed Drainage Systems:		
1.)	Pipes/culverts (each location):		
i.	Type	☐	■
ii.	Size	☐	■
iii.	Length and slope	☐	■
iv.	Inverts	☐	■
v.	End sections/headwalls	☐	■
vi.	Identify minimum cover and location	☐	■
vii.	Outlet erosion protection	☐	■
2.)	Structures (catchbasins, drain manholes, special structures):		
i.	Location (sta. and off-set)	☐	■
ii.	Type	☐	■
iii.	Size	☐	■
iv.	Rim elevations	☐	■
v.	Inverts	☐	■
3.)	Swales/ditches/waterways:		
i.	Flow arrows (direction of flow)	☐	■
ii.	Grading	☐	■
iii.	Spot elevations	☐	■
iv.	Erosion protection (riprap, matting, etc.)	☐	■
u.	Temporary erosion protection during construction:		
1.)	Silt fence, haybales, etc.	☐	■
2.)	Matting, mulch, etc.	☐	■
2. Utilities:			
a.	Existing sanitary sewer system:		
1.)	Pipes:		
i.	Type	☐	■
ii.	Size	☐	■
iii.	Length and slope	☐	■
2.)	Structures:		
i.	Location (sta. and off-set)	☐	■
ii.	Type	☐	■
iii.	Size	☐	■
iv.	Rim elevations	☐	■
v.	Inverts	☐	■
b	Proposed sanitary sewer system:		
1.)	Pipes (gravity):		
i.	Type	☐	■
ii.	Size	☐	■
iii.	Length and slope	☐	■
iv.	Separation (18" below water)	☐	■
v.	Identify minimum cover and locations	☐	■

			Provided	N/A
2.)	Force Main:			
	i.	Type	☐	■
	ii.	Size	☐	■
	iii.	Direction of flow (flow arrows)	☐	■
	iv.	Bends and thrust blocking	☐	■
	v.	Air relief valves and structures	☐	■
	vi.	Clean-out structures	☐	■
	vii.	Identify minimum cover and locations	☐	■
3.)	Structures:			
	i.	Location (sta. and off-set)	☐	■
	ii.	Type	☐	■
	iii.	Size	☐	■
	iv.	Rim elevations	☐	■
	v.	Inverts	☐	■
4.)	Service laterals to each individual lot:			
	i.	Type	☐	■
	ii.	Size	☐	■
	iii.	Length and slope	☐	■
	iv.	Separation (18" below water)	☐	■
	v.	Minimum cover and locations identified	☐	■
	vi.	Location of connection	☐	■
c.	Existing Water System:			
1.)	Pipes:			
	i.	Type	☐	■
	ii.	Size	☐	■
2.)	Hydrants		☐	■
3.)	Valves		☐	■
4.)	Bends and thrust blocks		☐	■
5.)	Tees		☐	■
d.	Proposed Water System:			
1.)	Pipes:			
	i.	Type	☐	■
	ii.	Size	☐	■
2.)	Hydrants			
	i.	Locations approved by Fire Department	☐	■
3.)	Valves		☐	■
4.)	Bends and thrust blocks		☐	■
5.)	Tees		☐	■
e.	Existing Gas Lines:			
1.)	Pipes:			
	i.	Type	☐	■
	ii.	Size	☐	■
2.)	Valves		☐	■
f.	Proposed Gas Lines:			
1.)	Pipes:			
	i.	Type	☐	■
	ii.	Size	☐	■
2.)	Valves		☐	■

	Provided	N/A
3.) Services to each lot	☐	■
g. Telephone/Electrical/Cable:		
1.) U-poles	☐	■
2.) Pedestals/transformers	☐	■
3.) Overhead lines	☐	■
4.) Underground lines	☐	■
5.) Services to each lot	☐	■
3. Roadways:		
a. Plan and profile drawings (stamped by engineer licensed in NH)	☐	■
1.) All items required above under a. Grading and Drainage	☐	■
2.) All items required above under b. Utilities	☐	■
3.) Profile grid (station and elevation) with horizontal To vertical scale (ratio = 10:1) and datum	☐	■
4.) Existing grade profile	☐	■
5.) Proposed profile:		
i. PVIs (station and elevation)	☐	■
ii. PVCs (station and elevation)	☐	■
iii. PVTs (station and elevation)	☐	■
iv. Length of vertical curve	☐	■
v. K-values	☐	■
vi. Tangent slopes	☐	■
vii. Drainage system	☐	■
viii. Sewer system	☐	■
ix. Water system	☐	■
x. Crest stations identified (stations and elevations)	☐	■
xi. Sag station identified (stations and elevations)	☐	■
xii. Existing and proposed grades at fifty (50) foot stations	☐	■
6.) Road intersection (equation of stations)	☐	■
7.) Label street name	☐	■
8.) Right-of-way lines	☐	■
9.) Easement lines:		
i. Drainage	☐	■
ii. Sewer	☐	■
iii. Visibility	☐	■
iv. Utility	☐	■
v. Access	☐	■
vi. Slope	☐	■
10.) Wetlands Mapping:		
i. Wetland limits identified	☐	■ Included in Boundary Plans
ii. Impact area identified in square feet for each individual location	☐	■
11.) Driveway shown to each individual lot (with grading and culverts if required)	☐	■

		Provided	N/A
12.)	Centerline geometry including:		
	i. Bearings and distances labeled	☐	■
	ii. Tangents	☐	■
	iii. Curve data	☐	■
	iv. PC's	☐	■
	v. PT's	☐	■
13.)	Pavement:		
	i. Width	☐	■
	ii. Corner radius (edge of pavement)	☐	■
	iii. Curbing	☐	■
14.)	Existing and proposed lot lines	☐	■
15.)	Lot designations	☐	■
16.)	Underdrain location (beginning and end stations)	☐	■
17.)	Guardrail Location (beginning and end stations, off-set)	☐	■
18.)	Traffic control signs (stop, street, etc.)	☐	■
19.)	Pavement markings	☐	■

VIII. Construction Detail Drawings:

Note: Construction details to conform with NHDOT Standards & Specifications for Roads & Bridges, Town of Londonderry Department of Public Works requirements, and Subdivision Regulations

1.	Typical cross-section of pavement	☐	■
2.	Typical driveway apron detail	☐	■
3.	Curbing detail	☐	■
4.	Guardrail detail	☐	■
5.	Sidewalk detail	☐	■
6.	Traffic signs and pavement markings	☐	■
7.	Typical underdrain trench detail	☐	■
8.	Drainage structure(s):		
	a. Catchbasin (including frame and grate)	☐	■
	b. Manhole (including frame and cover)	☐	■
	c. Outlet structure (detention basins)	☐	■
	d. Headwalls	☐	■
	e. Flared end sections	☐	■
9.	Outlet protection riprap apron	☐	■
10.	Level spreader	☐	■
11.	Treatment swale	☐	■
12.	Typical section at detention basin	☐	■

		Provided	N/A
13.	Typical pipe trench:		
	a. Drainage	☐	■
	b. Sewer	☐	■
	c. Water	☐	■
	d. Utilities	☐	■
14.	Sewer structures:		
	a. Manholes (including frame and cover, inverts)	☐	■
	b. Drop manholes	☐	■
	c. Special structures (pump stations, blowoffs, etc.)	☐	■
	d. Pipe manhole joint details	☐	■
15.	Typical sewer lateral service connection detail	☐	■
16.	Typical chimney detail	☐	■
17.	Project specific sewer details (sleeves, etc.)	☐	■
18.	Typical sewer notes (as per NHDES and Sewer Division requirements)	☐	■
19.	Hydrant detail	☐	■
20.	Thrust block details	☐	■
21.	Valve box detail	☐	■
22.	Typical water connection service detail	☐	■
23.	Erosion control details:		
	a. Haybale barriers at waterways	☐	■
	b. Silt fence	☐	■
	c. Stone check dam	☐	■
	d. Stone construction entrance	☐	■
	e. Inlet filter basket	☐	■
	f. Haybale barrier at catchbasin	☐	■
24.	Notes:		
	a. General notes as required by the Department of Public Works	☐	■
	b. Construction sequence	☐	■
	c. Erosion control notes	☐	■
	d. Turf establishment notes	☐	■
	e. Sewer construction notes (as required by Sewer Ordinance)	☐	■
	f. Water system construction notes (as required by local water company)	☐	■

IX. Cross-Sections:

1.	Roadway cross sections at 50-foot intervals	☐	■
2.	Roadway cross sections at culvert locations (inlet/outlet)	☐	■

		Provided	N/A
3.	Scale of sections at 1" = 5' H & V	☐	■
4.	Existing & finish centerline grades	☐	■
5.	Proposed pavement, crushed gravel and bank run gravel limits	☐	■
6.	Right-of-way and easement limits	☐	■
7.	Roadway & shoulder cross slopes	☐	■
8.	Embankment slopes	☐	■
9.	Underdrains	☐	■
10.	Drainage piping and structures	☐	■
11.	Sewer piping and structures	☐	■
12. Utilities:			
	a. Water lines	☐	■
	b. Gas lines	☐	■
	c. Telephone/electric/cable	☐	■
13.	Guardrail	☐	■

X. Supporting Documentation:

1.	Lot sizing calculations	☐	■
2.	Test pit/perc.test data	☐	■
3.	Stormwater management report including the following:		
	a. Table of contents	☐	■
	b. Narrative statement (including conclusions)	☐	■
	c. Summary table comparing existing and post-development conditions	☐	■
	d. Summary table of data for each pipe & piping system:		
	1.) Discharge	☐	■
	2.) Depth of flow	☐	■
	3.) Velocity	☐	■
	e. Summary table of data for each swale & channel:		
	1.) Discharge	☐	■
	2.) Depth of flow	☐	■
	3.) Velocity	☐	■
	f. Project location plan (on USGS quadrangle)	☐	■
	g. Watershed area plan for existing condition	☐	■
	h. Watershed area plan for post-development condition	☐	■
	i. Runoff calculations for existing & post-development conditions	☐	■
	j. Flood routing calculations for each detention basin	☐	■

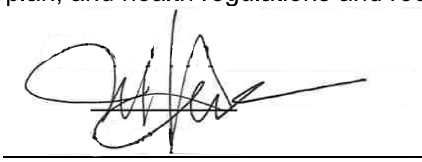
			Provided	N/A
	k.	Design for water quality treatment facilities (level spreaders, treatment swales, etc.)	☐	■
	l.	Riprap design calculations	☐	■
	m.	Report stamped by licensed professional engineer in NH	☐	■
4.	Traffic Impact Analysis:			
	a.	Traffic Impact analysis as required by Section 3.14	☐	■
5.	Fiscal impact study provided (if required)		☐	■
6.	Off-site improvements:			
	a.	Design plans included in the project drawings	☐	■
	b.	Arrangements and agreements	☐	■
	c.	Easements	☐	■
7.	Utility clearance letters (as applicable):			
	a.	Electric	☐	■
	b.	Telephone	☐	■
	c.	Cable television	☐	■
	d.	Gas	☐	■
	e.	Water	☐	■
	f.	Sewer	☐	■
8.	Other project-specific information as required by the Design Review Committee (DRC)		☐	■

XI. Required Project Permits (as applicable to applications):

		Provided	N/A	App Submitted
1.	NHDES subdivision approval	☐	■	☐
2.	NHDES site-specific approval	☐	■	☐
3.	NHDES wetlands permit	☐	■	☐
4.	NHDES sewer discharge permit	☐	■	☐
5.	NHDES water supply permit	☐	■	☐
6.	NHDES dam permit	☐	■	☐
7.	NHDOT driveway permit	☐	■	☐
8.	Londonderry ZBA variance(s)/special exception(s)	☐	■	☐
9.	Londonderry sewer discharge permit	☐	■	☐
10.	Army Corps of Engineers	☐	■	☐
11.	Federal Aviation Administration	☐	■	☐
12.	Other federal, state or local permits (if applicable) for project	☐	■	☐

XII. Acknowledgment and Signature:

The undersigned acknowledges he/she has read and understands all of the Town's current zoning, subdivision, site plan, and health regulations and requirements for obtaining all required local, state, and federal permits.



(Signature of person preparing plans)

Michael Hammer, LLS, PLS

(Name)

Bedford Geomatics Manager

(Title)

11/13/2025

(Date)

Town of Londonderry, New Hampshire

Planning & Economic Development Department 603-432-1100
268B Mammoth Road 603-432-1128
Town Hall – 2nd Floor www.londonderrynh.org

Planning – Zoning – Economic Development – Conservation

MEMORANDUM

TO: Planning Board

FROM: Kellie Caron, Deputy Town Manager & Director of Economic Development

DATE: January 7, 2026

RE: Public hearing on an application for formal review of a subdivision 15 Pillsbury Road, (Map 10 Lot 41, Zoned AR-1 and Woodmont PUD), Pillsbury Realty Development, LLC (Owner) and Procopio Enterprises, Inc. (Applicant).

The Applicant proposes to subdivide an approximately 132-acre parcel at 15 Pillsbury Road, creating a new ±12-acre lot as part of the wider Woodmont Commons PUD. The site is located along Pillsbury Road adjacent to the intersection of Pillsbury Road and Gilcreast Road and is abutting residential uses.

The Board will need to consider action on completeness, waiver request, and the subdivision plan application.

Completeness: There is one outstanding checklist items which the applicant has requested a waiver from. Additionally, some required permits may remain under review or are otherwise addressed in the Engineering & Environmental Services Department and HTA Memorandum dated December 3, 2025(the "Engineering Memo"). Issuance of these permits should remain or become conditions of approval.

I believe the application includes sufficient information to allow the board to proceed with consideration and to make an informed decision, and therefore recommend the Board accept the application as complete.

1. Checklist V.2/LSR 4.12 Boundary Plan
   The Applicant has requested a waiver from the requirement to submit a full boundary plan for the entire 132-acre parcel. The subdivision plan delineates the proposed lot lines relative to the parent parcel, meeting the intent of the regulations for review purposes.

Waivers:
The Applicant is requesting the following waiver:

1. Checklist V.2/LSR 4.12 Boundary Plan

The Applicant has requested a waiver from the requirement to submit a full boundary plan for the entire 132-acre parcel. The subdivision plan delineates the proposed lot lines relative to the parent parcel, meeting the intent of the regulations for review purposes.

Staff recommends that that the Board vote with respect to any requested waivers utilizing the criteria from RSA 674:36 and Londonderry Subdivision and Regulations Section 6.04 as noted below:

In a case when the strict application of these regulations would cause practical difficulty, the Board may waive specific plan requirements where the Board has determined that such a waiver will not affect the purpose and intent of these regulations. The Applicant shall submit in writing a "request for waiver" to the Board citing the specific regulation and the reason the regulation cannot be met. Any waiver granted shall be shown on the Final Plan.

1. Staff Comments

The Engineering Memo dated December 3, 2025, is incorporated herein by reference. I recommend the Board condition any approval on the comments set forth therein, except as may be modified by decision of the Board.

A. *Planning Comments.* The Applicant has meaningfully addressed initial review comments and provided sufficient in-formation for subdivision review. Key planning observations include:

- The proposed subdivision is consistent with the Woodmont Commons PUD Master Plan framework and supports the long-term land use configuration envisioned for this area.
- The creation of the new ±12-acre lot enables future phasing of development while maintaining adequate land area and frontage for the residual parcel.
- Lot configuration and boundaries are clearly depicted, and abutter information, locus, and zoning data are appropriately provided.
- No new utilities or construction activities are proposed as part of this subdivision; future development will require separate site plan review and permitting.
- The proposed subdivision does not conflict with natural resource protection areas identified in the PUD, and no new impacts are created by the lot split.
- The Applicant has worked collaboratively with the Town to identify and discuss easements needed to facilitate future intersection and corridor improvements within the Pillsbury Road corridor.

B. Design Review Comments

This application was submitted as 'formal' and did not go through a round of 'design review'. Below are the comments from the Design Review Committee (DRC). All other design review comment sheets or meeting minutes are also attached for reference.

- **Conservation Commission Comment:** No comments.
- **Heritage Commission Comment:** Recommended as presented for both properties.
- **Assessing Department:** Only 4.778 acres of original parcel is in current use as unproductive wetlands. This is not subject to a land use change tax. Address for new parcel subject to Addressing Committee approval.

- **Fire Department:** The Fire Department has no objections to the subdivision at this time.
- **Police Department:** The PD has No Comment on this item.
- **Tax Collector:** The only taxes due are the second half of 2025 due 12/19.

If the Board wishes to discuss these comments, I encourage it to inquire of the Applicant. The DRC comments are also included in the conditions of approval.

2. Recommendation

At this time, we (Town and Propcopio) are still awaiting and working through additional information related to the off-site improvements, including the cost estimate, draft agreement language addressing off-site improvements and easements, and supporting diagrams and engineered materials as discussed in the meeting with Town Staff and Procopio on 12/22/25. The draft agreement will also require review by the Town's legal counsel.
Given the status of the outstanding items, staff is recommending a continuance to allow sufficient time for a complete and thorough review of the materials referenced above.

Staff recommend the Planning Board **CONTINUE** this application to February 4, 2026.

MEMORANDUM

To: Planning Board

Date: December 3, 2025

From: Planning and Economic Development
Engineering and Environmental Services
Hoyle, Tanner & Associates, Inc.

Re: 15 Pillsbury Road Subdivision Plan
Londonderry, New Hampshire
Tax Map 10, Lot 41

Owner: Pillsbury Realty Development, LLC
Applicant: Procopio Enterprises, Inc.

Procopio Enterprises, LLC submitted plans and supporting information for the above-referenced project. The Town's engineering consultant, Hoyle, Tanner and Associates, Inc. reviewed the submitted plans and information.

Based upon the documents received and reviewed, and based upon the understanding that no infrastructure is proposed as part of this application, we offer the following comments:

Checklist Items:

1. The Applicant should provide the following plan information:
   a. Address of the subject parcel to the plans per Checklist Item III.2.c. and LSR 4.02.C.
   b. Date of the plans per Checklist Item III.2.f. and LSR 4.02.F.
   c. Sheet numbers per Checklist Item III.2.h. and LSR 4.03.H.

2. The Applicant should provide the area (existing and proposed) of the subject parcels per Checklist item IV.1.c.

3. The Applicant should provide a 1"=400' tax map (in addition to the vicinity plan) as shown in Exhibit 6 per Checklist Item IV.2. and LSR 4.15.

4. The Applicant should dimension the right-of way of streets per Checklist Item V.6.c., Checklist Item VI.6.c., LSR 4.12.C.6.iii., and LSR 4.17.A.6.iii.

5. The Applicant should label the metes and bounds for the proposed water easement per Checklist Item V.9., Checklist Item VI.9., LSR 4.12.C.9., and LSR 4.17.A.9. Additionally, the Applicant should discuss the need for any additional easements along Gilcreast & Pillsbury Roads.

Design Review Items :

1. The Applicant has requested a **waiver** from the Town of Londonderry Subdivision Regulations (LSR) Section 4.12 and Checklist Item V.2 to not provide a boundary plan. The Applicant has noted that this waiver is intended for the remaining parcel Map 10 Lot 41, not the proposed parcel Map 10 Lot 41-105. We have reviewed under the understanding that the waiver applies only to the remaining Map 10 Lot 41 parcel only.

2. The Applicant should note the requested planning board waivers on the plans per LSR 4.11.L.

3. The Applicant should show the Shoreland Protection Boundary, if any, on the plans per LSR 4.12.C.25.

4. The Applicant should show the location of the noted benchmarks and provide the required number (one per 5 acres) on the plans per LSR 4.17.A.25.

5. The Applicant has provided soil data on the plans but not a site-specific soil map as required by LSR 4.17. The Applicant should provide the source of the soil information shown per LSR 4.17.A.32.

6. The Applicant shall provide a deed for the proposed easement per LSR 4.18.C.

7. In General Note 9, the Applicant has noted that the "contemplated" use is open space. The Applicant should propose a definitive proposed use such that conformance with all regulations can be determined.

8. The Applicant should note which PUD Subarea the lot is in and indicate for what subarea and lot type the frontage and setback dimensions are from.

9. The Applicant should correct the spelling of Gilcreast Road on the plan and in the notes on both sheets.

10. The Applicant should properly endorse the Survey Endorsement on both sheets and ensure that the seal does not obstruct the endorsement language.

11. The Applicant should address the DRC Comments.

12. The Applicant should revise Note #3 on the *Subdivision Plan of Land*, and Note #2 on the *Topographic Plan of Land* to indicate that both sheets will be on file with the Town of Londonderry Planning Department.

13. Based upon the documents received and reviewed and based upon the understanding that no infrastructure is proposed as part of this application, Note #7 should be removed from the Subdivision Plan of Land.

14. Note #1 should be corrected on both sheets to properly reference the correct parcel and to indicate the proposed area of the new Lot (12.19 Acres).

Board Action Items:

The following waiver should be considered:

The Applicant has requested a **waiver** from the Town of Londonderry Subdivision Regulations (LSR) Section 4.12 and Checklist Item V.2 to not provide a boundary plan.

Design Review Committee

Assessing Department Comment Sheet

Project: 15 Pillsbury Road Subdivision
Location: 15 Pillsbury Road Subdivision Map 10 Lot 41
Date: 11/17/2025

Please send comments by 11/24/2025

Please Return Comments to Alecia LaFlamme alaflamme@londonderrynh.gov Thank you.

Is any of the subject property in Current Use: ☐ Yes ☐ No

Are there any particular concerns regarding the following items?
(Check item of concern, explain below)

☐ Street Numbering ☐ Street Naming
☐ Lot Numbers ☐ Fiscal Impact

Please fill out the following for all subdivision applications creating new lots:

Existing Map and Lot/Street Address: _____

Proposed Map and Lot/Street Address: _____

_____

_____

Comments:

Only 4.778 acres of original parcel is in current use as unproductive wetlands. This is not subject to a land use change tax.
Address for new parcel subject to Addressing Committee approval

Submitted by: _____ Date: _____

Design Review Committee

Conservation Commission Comment Sheet

Project: 15 Pillsbury Road Subdivision
Location: 15 Pillsbury Road Map 10 Lot 41
Date: 11/17/2025

Please send comments by 11/24/2025

Please Return Comments to Alecia LaFlamme alaflamme@londonderrynh.gov Thank you.

	Yes	No	N/A	
Are there wetlands on the site?	[x]	[ ]	[ ]	
Are they high quality wetlands?	[x]	[ ]	[ ]	
Will they be impacted?	[ ]	[x]	[ ]	
Could the impacts be mitigated?	[ ]	[ ]	[x]	
Are there other important natural resources?	[ ]	[ ]	[ ]	unknown
Will they be impacted?	[ ]	[ ]	[ ]	
Could the impacts be mitigated?	[ ]	[ ]	[ ]	

Comments:

No Comments

Submitted by: _____ Date: 11-25-25

Design Review Committee

Fire Department
Comment Sheet

Project: 15 Pillsbury Road Subdivision
Location: 15 Pillsbury Road Map 10 Lot 41
Date: 11/17/2025

Please send comments by 11/24/2025

Please Return Comments to Alecia LaFlamme alaflamme@londonderrynh.gov Thank you.

Are there any particular concerns regarding the following items? (Check item of concern, explain below)

- ☐ Access into the site
- ☐ Circulation within the site
- ☐ Road/Driveway design
- ☐ Availability of water
- ☐ Other issues (explain below)
- ☐ Water lines
- ☐ Fire Hydrants
- ☐ Lighting of site
- ☐ Access to sides/rear of building

Comments:

The Fire Department has no objections to the subdivision at this time.

Submitted by: _____ Date: _____

Outlook

RE: DRC Comments for 15 Pillsbury Road

From Jason Y. Breen <jbreen@londonderrynhpd.gov>
Date Mon 12/1/2025 12:11 PM
To Alecia LaFlamme <alaflamme@londonderrynh.gov>

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

No. the PD has 'No Comment' on this.

Thank you

Deputy Chief Jason Y. Breen
Londonderry Police Department
268A Mammoth Road
Londonderry, NH 03053
Office: (603) 432-1107
jbreen@londonderrynhpd.gov

From: Alecia LaFlamme <alaflamme@londonderrynh.gov>
Sent: Wednesday, November 26, 2025 4:48 PM
To: Jason Y. Breen <jbreen@londonderrynhpd.gov>
Subject: Re: DRC Comments for 15 Pillsbury Road

[CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe]

Jason did you want me to send you anything else on this one?

I believe at this time it just creates a new 12-acre lot from 15 Pillsbury with frontage on Pillsbury and Gilcreast Road.

Let me know, and I will get more information from staff here in planning if needed.

Thank you
Have a wonderful Thanksgiving!

Alecia LaFlamme
Land Use Assistant
Town of Londonderry, New Hampshire
Office: (603) 432-1100, ext. 122

From: Jason Y. Breen <jbreen@londonderrynhpd.gov>
Sent: Wednesday, November 26, 2025 10:45 AM
To: Alecia LaFlamme <alaflamme@londonderrynh.gov>
Subject: RE: DRC Comments for 15 Pillsbury Road

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Alecia,

Sorry I meant to reply to you sooner. Frankly, I don't see what is being proposed here as it appears to just be an overview of the property in the attachment. I am probably wrong, but I do not have any comment at this time, seeing how I am unsure what I am looking at.

Thank you.

Deputy Chief Jason Y. Breen
Londonderry Police Department
268A Mammoth Road
Londonderry, NH 03053
Office: (603) 432-1107
jbreen@londonderrynhpd.gov

From: Alecia LaFlamme <alaflamme@londonderrynh.gov>
Sent: Monday, November 17, 2025 5:26 PM
Cc: Kellie Caron <kcaron@londonderrynh.gov>; John Trottier <jtrottier@londonderrynh.gov>; Kristan Farr <kfarr@londonderrynh.gov>
Subject: DRC Comments for 15 Pillsbury Road

[CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe]

We have received a Formal Application for the 15 Pillsbury Road Map 10 Lot 41.

Please see attached for the DRC comment sheets and the plan set. Could I please have your comments sent by November 24, this is a Formal Application for our upcoming December 3rd planning board meeting.

Hard copies of the plans are available in the planning office.

Thank you,

Alecia LaFlamme

Land Use Assistant

Town of Londonderry, New Hampshire

Office: (603) 432-1100, ext. 122

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This message contains confidential information and is intended only for the individual(s) addressed in the message. If you are not the named addressee, you should not disseminate, distribute, or copy this e-mail. If you are not the intended recipient, you are notified that disclosing, distributing, or copying this e-mail is strictly prohibited.

Londonderry Police Department

Disclaimer

This message contains confidential information and is intended only for the individual(s) addressed in the message. If you are not the named addressee, you should not disseminate, distribute, or copy this e-mail. If you are not the intended recipient, you are notified that disclosing, distributing, or copying this e-mail is strictly prohibited.

Londonderry Police Department

Design Review Committee

Tax Collector
Comment Sheet

Project: 15 Pillsbury Road Subdivision
Location:15 Pillsbury Road Map 10 Lot 41
Date:11/17/2025

Please send comments by 11/24/2025 .

Please Return Comments to Alecia LaFlamme alaflamme@londonderrynh.gov Thank you.

Are Taxes Paid to Date? [X] Yes [ ] No

Comments:The only taxes due ar the 2025 Second half due on 12/19

Submitted by: _____ Date: _____

Londonderry Heritage/Historic District Commission Meeting
November 20, 2025 - 7:00 P.M.
Sunnycrest Conference Room
Draft Minutes

A. **Open Meeting:** Vice-Chairman Art Rugg called the meeting to order at 7:00 pm. The following were present: Acting Chairman Art Rugg, Sue Joudrey, John Mahon, David Colglazier, Ex-Officio Ted Combes, and Alternate Commissioner Jim Butler. Absent: Alternate Commissioners Laura Schenkman, David Ellis, and Megan Thompson. The Chair appointed J. Butler to vote in place of the open Commissioner position. Town Planner Kristan Farr and Administrative Service Director Kirsten Hildonen.

B. **Approval of minutes from prior meeting:** S. Joudrey made a motion to approve the minutes of the October 23, 2025, meeting; J. Butler seconded. The motion passed 5-0 with 1 abstention (D. Colglazier).

C. **Public Input:** None.

D. **Site plan for 62 single-family, 3-bedroom condominium homes along with associated site improvements. 44 Pillsbury Road (Map 10, Lot 15), Zoned Woodmont Commons PUD (PUD-1) and Agricultural Residential (AR-1). Pillsbury Realty Development LLC (owner) and Procopio Companies (applicant).**

E. **Subdivision of Map 10 Lot 41 to create a new 12 acre lot on Pillsbury and Gilcreast Road. 15 Pillsbury Road, Map 10, Lot 41 zoned Agricultural Residential (AR-1) and Woodmont Commons Planned Unit Development (PUD). Procopio Companies (Applicant) & Pillsbury Realty Development, LLC (Owner).**
Will Nuccio, Procopio Companies, et alia, presented both applications. 44 Pillsbury Road's design is rustic in nature incorporating orchards, open meadow areas, and manicured grasses. J. Butler and others suggested that the maintenance of apple trees, particularly along Pillsbury Road, would be desirable. Signage will be similar to that previously approved for 36 Pillsbury Road. Crushed granite walking paths will be featured throughout the property and will also connect to the adjacent development. With respect to the architecture of the buildings, the applicant desires to be cohesive with the adjacent development at 36 Pillsbury Road. Colors will vary to include grays, dusky green, and other colors featured in Londonderry's Look Book. Several Commissioners discussed the number of panes in the planned double-hung windows and the potential inclusion of shutters. There is no current plan to put houses on 15 Pillsbury Road. There is a well-maintained walking trail on this parcel.
Action: Recommended as presented for both properties. The Planning Board should consider reviewing windows and potential shutters and review a more finalized plan for the buildings at 44 Pillsbury Road.

F. **Subdivision to divide one 49.473 acre lot into two lots resulting in a new 15.316 acre lot with a 34.157 acre lot remaining. 162 Litchfield Road (Map 14 Lot 39) zoned Gateway Business (GB) District. Purpose Energy-Londonderry LLC (Applicant), Nicholas F Codner Trust 2012 (Owner).**

G. **Site plan and conditional use permit for 8,937 square feet of permanent wetland impacts and 348 square feet of temporary impacts along with 117,210 square feet of buffer impacts, for the construction of a resource recovery center and associated site improvements. 162 Litchfield Road, (Map 14, Lot 39) zoned Gateway Business (GB) District. Purpose Energy-Londonderry LLC (Applicant), Nicholas F Codner Trust 2012 (Owner).**
Nicholas Golan of TF Moran presented for both applications. This is the proposed location for the Southern New Hampshire Green Energy campus. This campus is composed of three industrial buildings with access off North Wentworth Road. A small employee parking area is included to meet the need of the limited staff required at this highly automated facility. Parking for inbound and outbound trucking is adjacent to the de-packaging building. There is extensive underground piping interconnecting all three buildings with connections to both Liberty's gas lines and Stonyfield Yogurt. A lighting plan and a limited landscape plan were included with the presentation. Several stone walls will be impacted and T. Combes suggested that these walls be moved to the property's boundaries versus pulverizing them on site. Discussion of allowing residents to drop off compostable food waste will be shared with this property's ownership. The buildings themselves feature exterior insulated

LONDONDERRY PLANNING BOARD
SITE PLAN APPLICATION & CHECKLIST

Planning Department Date Stamp

❑ **Design Review** ■ **Formal Application**

All information provided and submitted with this Application Checklist shall conform to the Londonderry Site Plan Regulations. ***Please note that the Planning Board may not accept and consider the application complete if the required items as outlined in the checklist are missing from the submittal.***

❑ Site Plan Amendment

I. General Information:

A. Project Name: Thornton Hill — 10 (Map) — 42 (Lot)

B. Project Location: 36 Pillsbury Road, Londonderry, NH — Zone: PUD-1

C. Primary Contact: Will Nuccio — Phone: 857-445-2012

■ Applicant ❑ Owner ❑ Engineer/Surveyor — E-Mail: [redacted]

D. Applicant's Name: Procopio Enterprises, Inc.

Address: [redacted] State: MA Zip: 01949

Phone: [redacted] Mail: [redacted]

Applicant Signature: Signed by: [redacted] 96198F84C7344FE... Date: 11/13/2025

E. Owner's Name: Pillsbury Realty Development, LLC

Address [redacted] City: Hudson State: NH Zip: 03051

Phone: _____ Fax: _____ E-Mail: [redacted]

Owner's Signature: Signed by: Kevin Smith E746E121820B463... Date: 11/13/2025

F. Engineer/Surveyor (Firm Name): Vanasse Hangen Brustlin, Inc. (VHB)

Address: [redacted] Zip: 03110

Phone: [redacted] Fax: _____ E-Mail: [redacted]

1) Name of Licensed Land Surveyor: Michael Hammer, LLS, PLS

Signature:

2) Name of Licensed Professional Engineer: Dave Fenstermacher, PE

Signature:

3) Name of Certified Soil Scientist: Sherrie Trefry, CCS

4) Name of Certified Wetland Scientist: Jake Tinus, CWS, CPESC

5) Name of Licensed Traffic Engineer: Jenn Conley, PE

G. Lot Area (SF) 4,101,435 Existing Building Footprint (SF): 0 Proposed Addition (SF) 219,107 (Cumulative)

☐ Change or ☐ Additional Use(s): _____

Site Plan Application Checklist

■ Additional Pavement (SF): 681,714 ■ Other Modification: See Compliance Alternative

II. General Requirements (All Applications):

		Provided	N/A	
1.	Executed Site Plan Application Form	■		
2.	Complete Abutters list, 3 sets mailing labels	■		
3.	Application Fees	q		Previously Paid, Feb. 2025
4.	Four (4) sets of plans and electronic "PDF" plans (See #11)	■		See #11
5.	Copies of proposed easement deeds, protective covenants or other legal documents	q	q	
6.	Waiver request(s) with justifications	q	q	1 Waiver Request, included
7.	Technical reports and supporting documents (Drainage report, Traffic Study, etc.)	■	q	
8.	Completed Site Plan Application Checklist	■		
9..	Escrow Agreement and Fees	q	q	
10..	Conditional Use Permit request(s) with justifications per Zoning	q	■	
11.	Response Letter to DRC Review and 2 highlighted plans (Plans may substitute for 2 sets required in #4 above)	■	q	

III. General Plan Information (All Plans):

		Provided	N/A
1.	Size and presentation of sheet(s) per requirements of the site plan regulations	q	
2.	Title block information:		
	a. Drawing title	■	
	b. Name of site plan	q	
	c. Location of site plan	q	
	d. Tax map & lot #s of subject parcel(s)	q	
	e. Name & address of owner(s)	q	
	f. Date of plan	q	
	g. Scale of plan	q	
	h. Sheet number	q	
	i. Name, address, & telephone number of design firm	■	
	j. Name and address of Applicant	■	
3.	Revision block	■	
4.	Planning Board approval block provided on appropriate sheets (Cover sheet, site plan, landscape plan only)	q	
5.	Certification block (for engineer, surveyor, soil scientist, or wetland scientist)	■	
6.	Match lines (if any)	■	q

Site Plan Application Checklist

IV. **Master Site Plan Sheet**: (Applicant may provide separate Title Sheet)

			Provided	N/A	
1.	The following notes shall be provided:				
	a.	Purpose of plan	■		
	b.	Tax map and lot #s of all subject parcels	■		
	c.	Area (existing & proposed) of subject parcel(s)	■		
	d.	Zoning designation of subject parcel(s)	■		
	e.	Min. lot area, frontages & setback dimensions	■		
	f.	Existing and proposed uses	■		
	g.	Parking calculations, as outlined in the Regulations	■		
	h.	% green area, as outlined in the Zoning Ordinance	■		
	i.	% building coverage, as outlined in the Zoning Ordinance	■		
	j.	Sanitary sewer source (name of provider company if offsite)	■		
	k.	Water supply source (name of provider company if offsite)	■		
	l.	Zoning variances/special exceptions with conditions	☐	☐	See compliance alternative
	m.	List FEMA sheet(s) used to identify 100-year flood elevation. (Note if no flood zone present as applicable)	■		
	n.	List of required permits and permit approval numbers	■	☐	
	o.	List of Planning Board waivers and Conditional Use Permits with Regulation or Ordinance section reference (if applicable)	■	☐	
	p.	Note identifying which plans are on file at the Town	■	☐	
	q.	Note the following: "If, during construction, it becomes apparent that deficiencies exist in the approved design drawings, the Owner shall be required to correct the deficiencies to meet the requirements of the regulations at no expense to the Town."	■	☐	
	r.	Note the following: "If, during construction, it becomes apparent that additional erosion control measures are required to stop any erosion on the construction site due to actual site conditions, the Owner shall be required to install the necessary erosion protection at no expense to the Town."	■	☐	
	s.	Note the following: "All materials and methods of construction shall conform to Town of Londonderry Site Plan Regulations and the latest edition of the New Hampshire Department of Transportation's Standard Specifications for Road & Bridge Construction."	■	☐	
	t.	Note the following: "In accordance with Section 6.01 of the Londonderry Site Plan Regulations and RSA § 676:13, all improvements specified on these site plans shall be constructed, completed, and inspected and approved by the Town of Londonderry prior to the issuance of a certificate of occupancy."	■	☐	

	u.	For sites requiring off-site improvements, note the following: "In accordance with Section 6.01 of the Londonderry Site Plan Regulations and RSA § 676:12, all off-site improvements specified on these site plans shall be constructed, completed, and inspected and approved by the Town of Londonderry (and/or the NHDOT, if applicable) prior to the issuance of a certificate of occupancy."	■	q
2.		Vicinity plan (at a scale of 1"=2500')	■	
3.		Plan index indicating all sheets	■	q

V. **Existing Conditions Plan:**

			Provided	**N/A**
1.		Surveyor's certification stamped and signed by LLS	■	
2.		Boundary of entire property by metes and bounds	■	q
3.		Boundary monuments:		
	a.	Monuments found	■	q
	b.	Monuments to be set	■	■
4.		Map # and Lot #, name addresses, and zoning of all abutting land owners	■	
5.		Existing streets:		
	a.	Name labeled	■	q
	b.	Status noted or labeled	■	q
	c.	Right-of-way dimensioned	■	q
	d.	Pavement width dimensioned	■	q
6.		Municipal boundaries (if any)	q	■
7.		Existing easements (identified by type)	■	q
8.		North arrow	■	
9.		Locus map (at a scale of 1" = 2,500)	■	
10.		Limits of wetlands & CO District Boundary	■	q
11.		Wetland delineation criteria & Certification	■	q
12.		SCS Soils (Boundary & Type)	■	
13.		Owner(s) signature(s)	■	
14.		All required setbacks (including any applicable buffers)	■	
15.		Existing physical features:		
		Buildings	■	q
		Wells	q	■
		Septic systems	■	q
		Stone walls	■	q
		Paved drives	■	q
		Gravel drives	■	q
16.		Location & name (if any) of any streams or waterbodies	■	q
17.		Location & elevation(s) of 100-year flood zone per FEMA Flood Insurance Study or as determined by drainage study	■	q
18.		Location of existing overhead utility lines, poles, towers, etc.	■	q
19.		Plan and deed references	■	q
20.		Zoning District boundary lines (if any)	■	q

Site Plan Application Checklist

VI. **Improvement Plans (Grading Plan, Utility Plan, etc. and Stamped by Engineer Licensed in NH):**

			Provided	N/A
1.	**Grading and Drainage Plan:**			
	a.	Existing topography (two-foot contour interval minimum)	☐	☐
	b.	Proposed contours	☐	☐
	c.	Existing spot elevations	☐	☐
	d.	Proposed spot elevations	☐	☐
	e.	Existing edge of pavement	☐	☐
	f.	Proposed edge of pavement	☐	☐
	g.	Existing curb line	☐	☐
	h.	Proposed curb line	☐	☐
	i.	Existing buildings and structures	☐	☐
	j.	Proposed buildings and structures	☐	☐
	k.	Existing retaining walls	☐	☐
	l.	Proposed retaining walls	☐	☐
	m.	Existing stone walls	☐	☐
	n.	Proposed and reconstructed stone walls	☐	☐
	o.	Wetland Mapping		
		1.) Wetland limits identified	☐	☐
		2.) Impact Area in square feet for each individual location	☐	☐
		3.) Mitigation areas (as may be required)	☐	☐
	p.	Existing treeline	☐	☐
	q.	Proposed treeline	☐	☐
	r.	Benchmarks	☐	☐
	s.	Existing drainage systems:		
		1) Pipes/culverts (each location):		
		i. Type	☐	☐
		ii. Size	☐	☐
		iii. Length and slope	☐	☐
		iv. Inverts	☐	☐
		v. End sections/Headwalls	☐	☐
		2) Structures (catch basins, drain manholes, special structures):		
		i. Location (station and off-set)	☐	☐
		ii. Type	☐	☐
		iii. Size	☐	☐
		iv. Rim Elevations	☐	☐
		v. Inverts	☐	☐
		3) Swales/Ditches/Waterways:		
		i. Flow arrows (direction of flow)	☐	☐
		ii. Topography	☐	☐
		iii. Spot elevations	☐	☐
	t.	Proposed Drainage Systems:		
		1) Pipes/culverts (each location):		
		i. Type	☐	☐
		ii. Size	☐	☐
		iii. Length and slope	☐	☐
		iv. Inverts	☐	☐
		v. End sections/headwalls	☐	☐
		vi. Identify minimum cover and location	☐	☐
		vii. Outlet erosion protection	☐	☐

Site Plan Application Checklist

			Provided	N/A
2)	Structures (catchbasins, drain manholes, special structures):			
	i.	Location (sta. and off-set)	■	q
	ii.	Type	■	q
	iii.	Size	■	q
	iv.	Rim elevations	■	q
	v.	Inverts	■	q
3)	Swales/ditches/waterways:			
	i.	Flow arrows (direction of flow)	■	q
	ii.	Grading	■	q
	iii.	Spot elevations	■	q
	iv.	Erosion protection (riprap, matting, etc.)	■	q
u.	Temporary erosion protection during construction:			
1)	Silt fence, haybales, etc.		■	q
2)	Matting, mulch, etc.		■	q
v.	Tree protection for existing areas and/or individual trees 15” in diameter or greater		■	q
w.	Plan note stating that the edge of the Conservation Overlay District and Non-Distubance Zones shall be appropriately delineated in the field prior to construction		■	q

2. Utilities Plan:

			Provided	N/A
a.	Existing sanitary sewer system:			
1)	Pipes:			
	i.	Type	q	■
	ii.	Size	q	■
	iii.	Length and slope	q	■
2)	Structures:			
	i.	Location (sta. and off-set)	q	■
	ii.	Type	q	■
	iii.	Size	q	■
	iv.	Rim elevations	q	■
	v.	Inverts	q	■
b.	Proposed sanitary sewer system:			
1)	Pipes (gravity):			
	i.	Type	■	q
	ii.	Size	■	q
	iii.	Length and slope	■	q
	iv.	Separation (18" below water)	■	q
	v.	Identify minimum cover and locations	■	q
2)	Force Main:			
	i.	Type	q	■
	ii.	Size	q	■
	iii.	Direction of flow (flow arrows)	q	■
	iv.	Bends and thrust blocking	q	■
	v.	Air relief valves and structures	q	■
	vi.	Clean-out structures	q	■
	vii.	Identify minimum cover and locations	q	■
3)	Structures:			
	i.	Location (sta. and off-set)	■	q
	ii.	Type	■	q
	iii.	Size	■	q
	iv.	Rim elevations	■	q
	v.	Inverts	■	q
4)	Service laterals to each individual lot:			
	i.	Type	■	q

			Provided	N/A
	ii.	Size	■	q
	iii.	Length and slope	■	q
	iv.	Separation (18" below water)	■	q
	v.	Minimum cover and locations identified	■	q
	vi.	Location of connection	■	q
c.	Existing Water System:			
1)	Pipes:			
	i.	Type	■	q
	ii.	Size	■	q
2)	Hydrants		■	q
3)	Valves		■	q
4)	Bends and thrust blocks		■	q
5)	Tees		■	q
d.	Proposed Water System:			
1)	Pipes:			
	i.	Type	■	q
	ii.	Size	■	q
2)	Hydrants			
	i.	Locations approved by Fire Department	■	q
3)	Valves		■	q
4)	Bends and thrust blocks		■	q
5)	Tees		■	q
e.	Existing Gas Lines:			
1)	Pipes:			
	i.	Type	■	q
	ii.	Size	■	q
2)	Valves		■	q
f.	Proposed Gas Lines:			
1)	Pipes:			
	i.	Type	q	■
	ii.	Size	q	q
2)	Valves		q	■
3)	Services to each lot		q	■
g.	Telephone/Electrical/Cable:			
1)	U-poles		■	q
2)	Pedestals/transformers		■	q
3)	Overhead lines		■	q
4)	Underground lines		q	q
5)	Services to each lot		■	q

} Project to be electric only, no gas proposed.

3. **Roadways:** If streets are to be built as part of a site plan (e.g., for a multi-family residential site plan), then the design of such streets shall comply with Section 3.09 of the Londonderry Subdivision Regulations, please see Subdivision Application Checklist.

VII. **Landscape Plan (Section 3.09):**

		Provided	N/A
1.	General Information		
a.	Native Plants as suggested by Appendix LS1	■	q
b.	No use of Invasive materials as listed in Appendix LS2	■	q
c.	Plant materials meet winter hardiness requirement	■	q

Site Plan Application Checklist

			Provided	N/A
	d.	Proposed materials are of proper caliper or height	■	q
	e.	Stone walls incorporated into Landscape Plan	■	q
	f.	Existing vegetation preservation (no-cut) areas described by metes and bounds and monumented	■	q
	g.	Landscaping Calculations	■	q
	h.	Plant Schedule	■	q
	I.	Landscaping Details	■	q
	j.	Tree Protection Detail	■	q
	k.	Note on Plan stating No Plant Conflicts with Snow Storage Areas, Light Fixtures, Underground Utilities	■	q
	l.	Note on Plan stating No Landscaping Conflicts with Sight Distance	■	q
	m.	Submit a Landscape Master Sheet for Review (Landscaping, site features, snow storage, light poles, detention basin edges, grading, utilities)	■	q
2.	Parking Lot Landscaping			
	a.	Interior landscaping percentage based on Section 3.11e	q	■
	b.	Interior shade trees @ 1 per 15 parking spaces	q	■
	c.	Perimeter shade trees @ 1 per 20 parking spaces OR 1 per 50 feet of perimeter with buffer required	q	■
	d.	Screening provides proper vertical opacity per Section 3.11e	q	■

VIII. Illumination Plan & Lighting Details (Section 3.13):

		Provided	N/A
1.	Full Cut-Off Fixtures with plan note stating all lights are full cut-off fixtures as required	■	q
2.	Shielded, downcast building/external signage lighting	■	q
3.	No direct light source at residential property lines	■	q
4.	Plan to scale with illumination levels shown in footcandles	q	q
5.	Specification (details) for all proposed lighting fixtures including photometric data, designation as IESNA “cut-off” fixtures, Color Rendering Index (CRI) of all lamps (bulbs), and other descriptive information about fixtures	q	q
6.	Proposed mounting height of all exterior lighting fixtures	■	q
7.	Illumination levels not to exceed 0.2 footcandles at any property line (Except at driveway intersections per Regulations)	q	q
8.	Gas Station Canopies to meet requirements of Appendix Light 2	q	■

IX. Building Design & Renderings (Section 3.12):

1.	Building Elevations/Renderings in compliance with Section 3.13	■	q
2.	Signage renderings/details	■	q
3.	Large Retail Establishments - Comply with Section 3.13H	q	■

Site Plan Application Checklist

X. Construction Detail Drawings:

Note: ***Construction details to conform with NHDOT Standards & Specifications for Roads & Bridges, Town of Londonderry Department of Public Works requirements, and Subdivision & Site Plan Regulations***

		Provided	N/A
1.	Typical cross-section of pavement	☐	☐
2.	Typical driveway apron detail	☐	☐
3.	Curbing detail	☐	☐
4.	Guardrail detail	☐	☐
5.	Sidewalk detail	☐	☐
6.	Traffic signs and pavement markings	☐	☐
7.	Typical underdrain trench detail	☐	☐
8.	Drainage structure(s):		
	a. Catchbasin (including frame and grate)	☐	☐
	b. Manhole (including frame and cover)	☐	☐
	c. Outlet structure (detention basins)	☐	☐
	d. Headwalls	☐	☐
	e. Flared end sections	☐	☐
9.	Outlet protection riprap apron	☐	☐
10.	Level spreader	☐	☐
11.	Treatment swale	☐	☐
12.	Typical section at detention basin	☐	☐
13.	Typical pipe trench:		
	a. Drainage	☐	☐
	b. Sewer	☐	☐
	c. Water	☐	☐
	d. Utilities	☐	☐
14.	Sewer structures:		
	a. Manholes (including frame and cover, inverts)	☐	☐
	b. Drop manholes	☐	☐
	c. Special structures (pump stations, blowoffs, etc.)	☐	☐
	d. Pipe manhole joint details	☐	☐
15.	Typical sewer lateral service connection detail	☐	☐
16.	Project specific sewer details (sleeves, etc.)	☐	☐
17.	Typical sewer notes (per NHDES & Sewer Div. requirements)	☐	☐
18.	Hydrant detail	☐	☐
19.	Thrust block details	☐	☐
20.	Valve box detail	☐	☐
21.	Typical water connection service detail	☐	☐
22.	Erosion control details:		
	a. Haybale barriers at waterways	☐	☐
	b. Silt fence	☐	☐
	c. Stone check dam	☐	☐
	d. Stone construction entrance	☐	☐
	e. Inlet filter basket	☐	☐
	f. Haybale barrier at catchbasin	☐	☐

24.	Notes:			
	a.	General notes as required by the Department of Public Works	■	q
	b.	Construction sequence	■	q
	c.	Erosion control notes	■	q
	d.	Turf establishment notes	■	q
	e.	Sewer construction notes (as required by Sewer Ordinance)	■	q
	f.	Water system construction notes (as required by local water company)	q	q
25.	Tree protection details		■	q

XI. Supporting Documentation:

			Provided	N/A	
1.	Traffic Impact Analysis:				Previously submitted, August 19, 2025
	a.	Traffic Impact analysis as required by Section 3.14	■	q	
2.	Stormwater management report including the following:				
	a.	Table of contents	■	q	
	b.	Narrative statement (including conclusions)	■	q	
	c.	Summary table comparing existing and post-development conditions	■	q	
	d.	Summary table of data for each pipe & piping system:			
		1.) Discharge	■	q	
		2.) Depth of flow	■	q	
		3.) Velocity	■	q	
	e.	Summary table of data for each swale & channel:			
		1.) Discharge	■	q	
		2.) Depth of flow	■	q	
		3.) Velocity	■	q	
	f.	Project location plan (on USGS quadrangle)	■	q	
	g.	Watershed area plan for existing condition	■	q	
	h.	Watershed area plan for post-development condition	■	q	
	i.	Runoff calculations for existing & post-development conditions	■	q	
	j.	Flood routing calculations for each detention basin	■	q	
	k.	Design for water quality treatment facilities (level spreaders, treatment swales, etc.)	■	q	
	l.	Riprap design calculations	■	q	
	m.	Report stamped by licensed professional engineer in NH	■	q	
3.	Fiscal impact study provided (if required)		q	■	
4.	Off-site improvements:				
	a.	Design plans included in the project drawings	■	q	
	b.	Arrangements and agreements	q	■	
	c.	Easements	q	■	
5.	Utility clearance letters (as applicable):				
	a.	Electric	q	q	
	b.	Telephone	q	q	
	c.	Cable television	q	q	
	d.	Gas	q	q	
	e.	Water	q	q	
	f.	Sewer	q	q	Pending Review, Londonderry Engineering Dept.
6.	Other project-specific information as required by the Design Review Committee (DRC)		q	■	

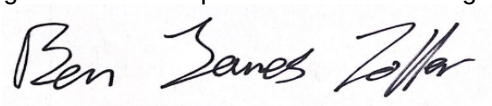
Site Plan Application Checklist

XII. Required Project Permits (as applicable to applications):

		Provided	N/A	App Submitted	
1.	NHDES site-specific approval	q	■	q	
2.	NHDES wetlands permit	q	q	q	
3.	NHDES sewer discharge permit	q	q	q	To be submitted
4.	NHDES water supply permit	q	q	q	To be submitted
5.	NHDES dam permit	q	■	q	
6.	NHDOT driveway permit	q	■	q	
7.	Londonderry ZBA variance(s)/special exception(s)	q	q	q	See compliance alternative
8.	Londonderry sewer discharge permit	q	q	q	To be submitted
9.	Army Corps of Engineers	q	■	q	
10.	Federal Aviation Administration	q	■	q	
11.	Other federal, state or local permits (if applicable) for project	q	q	q	Submitted: NHDES AoT To Be Submitted: NHDES Sewer Connection Permit

XIII. Acknowledgment and Signature:

The undersigned acknowledges he/she has read and understands all of the Town's current zoning, subdivision, site plan, and health regulations and requirements for obtaining all required local, state, and federal permits. .



(Signature of person preparing plans)

Benjamin J. Zoller, PE
(Name)

Site/Civil Engineer, VHB
(Title)

02/19/2025
(Date)

Thornton Hill

36 Pillsbury Road, Londonderry, NH

PREPARED FOR

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November 13th, 2025



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- Web GIS Printouts
- Aerial Photograph of the Site
- BMP Worksheets
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- Geotechnical Test Pits & Location Plan
- Contech Filterra Information
- Hovey Road Drainage Worksheet

Appendix B: Hydrologic Calculations
- Existing Conditions: Project Site
- Existing Conditions: Hovey Road
- Proposed Conditions: Project Site

Appendix C: Hydraulic Calculations
- Storm Drain Piping Calculations: Project Site
- Storm Drain Piping Calcualtions: Hovey Road
- Riprap Apron/Energy Dissipation Calculations

Appendix D: Soil Investigations
- 36 Pillsbury Site Specific Soil Survey
- Hovey Road NRCS Web Soil Survey

Appendix E: Snow Storage Plan and Calculations
Appendix F: Inspection & Maintenance Manual
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1

Introduction

This report has been prepared by VHB to provide a brief description of existing and proposed drainage areas, design methodology, soil characteristics, and a summary of peak discharge rates for the project area.

The 94.15–acre Site is located along Pillsbury Road in Londonderry, New Hampshire (see Figure 1: Site Location Map). The Site is bounded by an unimproved section of Spring Road, and the Pinkerton Cemetery to the north, Pillsbury Road and abutting properties to the south, Hovey Road and abutting properties to the east, and abutting properties to the west. The Site is located within the surface watershed of the Merrimack River. Wetland Resources on the Site include roughly 8.5 acres of protected wetlands, as well as an intermittent stream, approximately 3,200 feet in length. Both the intermittent stream and wetlands present on site are not wet year-round, and periodically contain water after large storm events. The intermittent stream is an excavated drainage ditch, not a naturally occurring topographical feature.

The Site is presently vacant and was previously occupied by an apple orchard. Under existing conditions, stormwater runoff flows across orchard tree rows, wooded areas, and open grass pastures, mostly in a southerly direction, towards Pillsbury Road. Several gently sloped areas throughout the site have developed into wetland networks, which are not perpetually wet but do show signs of a frequent water presence. Some runoff is collected and routed via a manmade ditch, (which is now classified as an intermittent stream), that stretches roughly 3,200 feet from the interior of the site to the northern edge of Pillsbury Road. Stormwater runoff continues south under Pillsbury Road, mostly through two existing drainage culverts. These culverts eventually outfall into a large pond, named the 'Duck Swamp', which was identified to be a wetland over 10 acres by the Londonderry Wetlands Study Committee in 1991. A ridge line also exists along the eastern third of the subject property, and some stormwater flows east towards Hovey Road as well.

The proposed development of the site includes the construction of 250 freestanding residential dwelling units, arranged in 'clusters' around communal open spaces. In addition to these residential units, an accessory amenity and management building is to be constructed to serve the proposed development. Various outdoor amenities are proposed as well, such as recreational fields and an interconnecting network or walking trails. Under proposed conditions, stormwater runoff will be conveyed to stormwater detention and treatment measures, via drainage structures, closed drainage infrastructure and open channel drainage swales. Once stormwater runoff is appropriately treated and detained, it will be released through various outfall structures and routed towards either the wetland network, existing drainage culverts, or into existing public

drainage structures. Two stormwater detention basins are proposed to connect to the existing Londonderry drainage network in Hovey Road, via existing inlet structures. Because of this, the Town of Londonderry's Engineering Director has requested an additional analysis be carried out of the existing public storm drain network in Hovey Road. This analysis is further detailed in the appendices, and Section 2.4. Wherever possible existing drainage and grading patterns were maintained in the proposed design. Additionally, water quality and quantity control measures such as rain gardens, vegetated swales, surface sand filters, detention basins and manufactured treatment devices have been designed to protect the surrounding natural resources from potential stormwater runoff impacts.

A hydrologic model was developed to evaluate the existing and proposed drainage conditions on the Site. The results of the analyses indicate that there is no increase in peak discharge rates between the pre- and post-development conditions for the 2, 10, 25 and 50-year storm events. The pre- and post-development peak discharge rates are presented in the Stormwater Management Impacts Section of this report.

2

Existing Conditions

2.1 Description of Contributing Areas

The study area for the development is located within the Beaver Brook watershed. Most runoff from the study site flows into Duck Pond, which is a surface water body that outfalls into Beaver Brook. The existing drainage area is approximately 100-acres in size and is mostly sloped from north to south, with elevations ranging from 372' up to 482'. The area is currently undeveloped and ground cover consists of orchard, open grass and brush, dense woodland, and gravel-to-dirt roads.

The study area has been divided into 11 drainage areas that discharge into one of 6 design points. 3 of these existing drainage areas are offsite and discharge drainage into the project site. 2 of these 3 offsite drainage areas are existing detention basins from the Pinkerton & Pillsbury Cemeteries, which have outfalls directly entering the project site. The Town of Londonderry has provided stormwater runoff information for both discharge points, in the form of drainage design manuals from the original design of these detention basins.

The design points include two existing culverts at Pillsbury Road, two along the properties' edge adjacent to Hovey Road, one on the southeastern portion of the site's property edge, and one in a woodland near an adjacent residential neighborhood, in the vicinity of Kitt Lane.

Table 1 on the following page summarizes the study area and its characteristics.

Table 1 Drainage Area Characteristics Summary (Existing Conditions)

Design Point		Sub-Area(s)		Area (Acres)	Tc (Min.)	CN
DP-1	Existing 18" Culvert	EX-1	Existing Subcatchment 1	22.27	24.9	61
		EX-4	Existing Subcatchment 4	33.50	22.1	72
		EX-8	Existing Subcatchment 8	12.48	32.5	70
		OS-1	Offsite Subcatchment 1	6.35	19.2	58
		OS-2	Offsite Subcatchment 2	N/A[1]		
		OS-3	Offsite Subcatchment 3	N/A[1]		
DP-2	Existing 12" Culvert	EX-2	Existing Subcatchment 2	6.37	10.4	60
DP-3	Hovey Road[2]	EX-3	Existing Subcatchment 3	9.09	21.1	64
DP-4	Spring Road	EX-5	Existing Subcatchment 5	5.25	12.2	72
DP-5	Offsite	EX-7	Existing Subcatchment 7	1.67	8.9	71
DP-6	North Hovey Road[2]	EX-6	Existing Subcatchment 6	3.53	7.9	72
Total				100.51	n/a	67*

* Weighted CN Value

[1] Drainage design manuals were provided by the Town of Londonderry for the Pinkerton and Pillsbury Cemeteries. Two stormwater detention basins outfall into the project site, so hydrograph data was manually entered to represent these Sub-Areas for every respective storm event in this report's analysis.

[2] Drainage analysis was conducted separately for Hovey Road's subsurface public storm drain network. Subcatchments that drain towards DP-3 & DP-6 are analyzed to determine existing condition peak-runoff rates only.

2.2 Soil Conditions

The study area is comprised of several different soil types as defined by the Natural Resources Conservation Service (NRCS). As part of the required site investigations before development on the project site can occur, a Site Specific Soil Investigation was performed onsite, in October of 2024. The findings of that report are listed in Table 2, below, and is included in this Report's Appendices. Table 2, Soil Types, lists the designations, names, and hydrologic soil groups of the soils located within the study area. The Appendices contain a copy of the NRCS Web Soil Survey mapping and soil types found within the study area.

Table 2 Soil Types

Soil Designation	Soil Name	Hydrologic Soil Group
89A	Chatfield	B
89B	Chatfield	B
89C	Chatfield	B
89D	Chatfield	B
62A	Charlton	B
62B	Charlton	B
62C	Charlton	B
62D	Charlton	B
199C/ccabb	Dump of Organic Material	B
199D/ccabb	Dump of Organic Material	B
86A	Hollis	C
86B	Hollis	C
86C	Hollis	C
200A/hahde	Udorthents	E (undetermined)
200D/hahde	Udorthents	C
514B/P	Leicester	C
656A/P	Ridgebury	C
656B/P	Ridgebury	C
500A/ccacc	Udorthents	C
500B/ccacc, ccecc, ccccc	Udorthents	C
500C/ccecc	Udorthents	C
500D/ccebb, cccbc	Udorthents	C
550E/ccebb	Udorthents	C
500E/cccbc	Udorthents	C
600A/fcccd, fcecd, fcccd	Endoaquents	D
600D/fcccd, fcecd, fcccd	Endoaquents	D
600E/fcccd	Endoaquents	D
600B/fcecd	Endoaquents	D
600C/fcecd	Endoaquents	D
600B/fcccd	Endoaquents	D
44A	Montauk	C
44B	Montauk	C
44C	Montauk	C
199A/haade	Dumps, bark chips, organics	E (undetermined)

Source: Site Specific Soils Mapping Report 36 Pillsbury Road – VHB, 2024

2.3 Existing Hydrologic Flow Patterns

Stormwater runoff from the existing study area flows mostly in a southerly direction, towards Pillsbury Road. Some stormwater also flows towards Hovey Road, and a small portion of stormwater runoff flows north towards an undeveloped stretch of Spring Road, in the vicinity of Kitt Lane. An existing, man-made intermittent stream is located entirely within the project site, and helps to convey drainage south towards existing culverts underneath Pillsbury Road.

The following describes the existing stormwater flow patterns for each of the sub areas.

- Sub Area EX-1 flows in a southerly direction, towards Design Point 1, which is an existing 18" culvert underneath Pillsbury Road.
- Sub Area EX-2 flows in a southerly direction, towards Design Point 2, which is an existing 12" culvert underneath Pillsbury Road.
- Sub Area EX-3 flows to the east, towards Design Point 3, Hovey Road. Some of this stormwater runoff enters the Town of Londonderry's existing storm sewer network.
- Sub Area EX-4 flows in a southerly direction, via the existing intermittent stream, towards Design Point 1 (previously described). This intermittent stream is constricted by an existing 18" RCP culvert, which forms the delineation between EX-4 and EX-8.
- Sub Area EX-5 flows to the northwest, towards Design Point 4, an undeveloped section of Spring Road, in the vicinity of Kitt Lane.
- Sub Area EX-6 flows to the east, toward Design Point 6, the northern section of Hovey Road, adjacent to the project site.
- Sub Area EX-7 flows south, toward Design Point 5, the project site's property line near an adjacent residential lot.
- Sub Area EX-8 flows south, toward the existing intermittent stream, which conveys drainage further south to Design Point 1, an existing 18" culvert under Pillsbury Road.
- Sub Area OS-1 flows in an easterly direction, into the existing intermittent stream, and eventually to Design Point 1. This sub area encompasses offsite stormwater runoff that enters the project site.
- Sub Area OS-2 & OS-3 are the nearby Pillsbury and Pinkerton Cemeteries, which discharge stormwater runoff by way of two detention basins. Stormwater runoff from these basins eventually enters the intermittent stream, and leaves the site as Design Point 1

2.4 Hovey Road Drainage Analysis

As requested by the Town of Londonderry's Director of Engineering, a separate drainage analysis has been completed for a section of Hovey Road. The drainage area analyzed is immediately adjacent to the project, as well as further south towards Hovey Road's intersection with Pillsbury Road. The purpose of this analysis is to evaluate areas that contribute stormwater runoff to existing catch basins within Town ROW, as well as to perform a pipe capacity analysis to understand whether the existing system is at capacity and ensure that proposed outlet connections from 36 Pillsbury BMPs are not overwhelming the network.

Additional survey work was conducted to collect catch basin grate, structure invert, and drain pipe size & slope information. Impervious and pervious land coverages were determined, and a hydrologic model was developed to evaluate existing drainage conditions in this area. See Figure 5-1 for delineations of drainage sub areas that were analyzed.

The following describes the existing stormwater flow patterns for each of the sub areas.

- Sub Area Ex-1 flows in a southerly direction, into an existing catch basin, located on the western edge of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-2 flows in a southeasterly direction, towards two existing catch basins, located on either side of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-3 flows in a northerly direction, towards two existing catch basins, located on either side of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-4 flows in a northerly direction, towards two existing catch basins, located on either side of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-5 flows in a northerly direction, towards three existing catch basins, located on the northern and southern edges of Hovey Road. Runoff enters these catch basins, and is conveyed by the Londonderry public storm drain network.
- Sub Area EX-6 flows in an easterly direction, towards three catch basins, located on the northerly and southerly edges of Hovey Road. Runoff enters these catch basins, and is conveyed by the Londonderry public storm drain network.
- Sub Area EX-7 flows in an easterly direction, towards a catch basin on the southern edge of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-8 flows in an easterly direction, towards three catch basins, located on the northerly and southerly edges of Hovey Road. Runoff enters these catch basins, and is conveyed by the Londonderry public storm drain network.
- Sub Area EX-9 flows in an easterly direction, towards a catch basin on the southerly edge of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-10 flows in an easterly direction, towards two catch basins, located on either side of Hovey Road, where runoff enters the Londonderry public storm drain network.
- Sub Area EX-11 flows in a southerly direction, where it enters one of two catch basins, located on either side of Hovey Road. Runoff from this sub area, along with all other sub areas in this analysis, is discharged from the network into a flared end structure, via an 18" RCP pipe. This outfall is Design Point 1.

› Sub Area Ex-12 flows in a southerly direction, towards a catch basin on the western edge of Hovey Road, where runoff enters the Londonderry public storm drain network. This catch basin is Design Point 2.

Table 3 below summarizes the studies area and it's characteristics.

Table 3 Hovey Road Drainage Area Characteristics Summary (Existing Conditions)

Design Point	Sub-Area(s)		Area (Acres)	Tc (Min.)	CN
DP-1 Network Outfall (FES)	EX-1	Existing Subcatchment 1	2.60	6.2	76
	EX-2	Existing Subcatchment 2	1.93	15.1	73
	EX-3	Existing Subcatchment 3	3.88	24.9	69
	EX-4	Existing Subcatchment 4	2.35	21.1	66
	EX-5	Existing Subcatchment 5	1.36	10.2	65
	EX-6	Existing Subcatchment 6	1.37	12.4	65
	EX-7	Existing Subcatchment 7	0.12	6.2	79
	EX-8	Existing Subcatchment 8	0.451	9.0	65
	EX-9	Existing Subcatchment 9	0.74	8.8	62
	EX-10	Existing Subcatchment 10	0.36	5.0	64
	EX-11	Existing Subcatchment 11	0.16	7.0	73
DP-2 Existing Catch Basin	EX-12	Existing Subcatchment 12	5.78	15.4	76
Total			21.09	n/a	71*

* Weighted CN Value

Because the project's Site Specific Soil Survey was already completed for the project site, the NRCS Web Soil Survey was utilized to determine soil types and hydrologic characteristics for drainage sub areas in this existing Hovey Road drainage analysis. The Soil Survey is a product of the Natural Resources Conservation Service (NRCS), and can be found in Appendix D. Table 4 below summarizes the soil designations, with their respective names and hydrologic soil groups, that were found onsite.

Table 4 Hovey Road Soil Types

Soil Designation	Soil Name	Hydrologic Soil Group
29B	Woodbridge Loam	C
43D	Canton Loam	B
140B	Chatfield-Holis-Canton Complex	B
140C	Chatsfield-Holis-Canton Complex	B
446A	Scituate-Newfields Complex	C
446B	Scituate-Newfields Complex	C
547A	Wapole Loam	A

Source: Soil Resource Report for Rockingham County, New Hampshire – NRCS, 2025

Once drainage areas were analyzed, the existing flows within the subsurface storm drain system could be estimated. The Rational Method and Bentley StormCAD were utilized for pipe capacity calculations, producing information on various pipes' full flow capacity, flow during the 25-year storm event, etc.

The storm drain capacity calculations for existing runoff flows in the Hovey Road public storm drain network are included in the appendices.

3

Proposed Conditions

3.1 Description of Contributing Areas

The proposed development for the study area includes the construction of 250 residential dwelling units, as well as an accessory amenity and management building. The residential units will be freestanding buildings arranged in 'Clusters' around communal open spaces. Landscaping, drainage improvements, indoor and outdoor amenity space, a recreational walkway network, and erosion control measures are also proposed (see Figure 6: Proposed Conditions Drainage Area Plan).

The proposed conditions sub-areas are comprised of the same 100.51 acre study area represented in the existing conditions drainage analysis. The proposed development will add approximately 16 acres of impervious area to the site with the remaining areas of the development covered with landscaping, grass, and/or existing vegetation.

Table 3 summarizes the proposed sub areas and their characteristics.

Table 5 Drainage Area Characteristics Summary (Proposed Conditions)

Design Point		Sub-Area(s)		Area (Acres)	Tc (Min.)	CN
DP-1	Existing 18" Culvert	PR-12	Proposed Subcatchment 12	0.67	6.1	72
		PR-14	Proposed Subcatchment 14	10.64	21.2	73
		PR-15	Proposed Subcatchment 15	3.14	12.4	72
		PR-16	Proposed Subcatchment 16	0.68	7.1	71
		PR-17	Proposed Subcatchment 17	1.75	11.4	71
		PR-18	Proposed Subcatchment 18	2.25	6.0	85
		PR-19	Proposed Subcatchment 19	5.06	6.0	84
		PR-20	Proposed Subcatchment 20	5.20	9.1	79
		PR-21	Proposed Subcatchment 21	6.46	30.1	69
		PR-23	Proposed Subcatchment 23	2.76	7.3	65
		PR-24	Proposed Subcatchment 24	0.41	6.0	61
		OS-1	Offsite Subcatchment 1	6.35	19.2	58
		OS-2	Offsite Subcatchment 2	N/A[1]		
		OS-3	Offsite Subcatchment 3	N/A[1]		
DP-2	Existing 12" Culvert	PR-1	Proposed Subcatchment 1	5.91	9.4	60
		PR-2	Proposed Subcatchment 2	4.31	7.8	61
		PR-4	Proposed Subcatchment 4	3.76	6.0	63
		PR-5	Proposed Subcatchment 5	4.77	6.0	70
		PR-6	Proposed Subcatchment 6	4.22	6.0	75
		PR-7	Proposed Subcatchment 7	9.26	6.0	81
		PR-8	Proposed Subcatchment 8	6.49	10.1	77
DP-3	Hovey Road[2]	PR-3	Proposed Subcatchment 3	1.14	6.0	72
		PR-10	Proposed Subcatchment 10	4.35	6.0	73
		PR-11	Proposed Subcatchment 11	4.27	6.0	80
DP-4	Spring Road	PR-22	Proposed Subcatchment 22	4.76	10.1	72
DP-5	Offsite	PR-9	Proposed Subcatchment 9	1.41	6.0	69
DP-6	North Hovey Road[2]	PR-13	Proposed Subcatchment 13	2.69	7.4	71
Total				100.51	n/a	72*

* Weighted CN Value

1 Drainage design manuals were provided by the Town of Londonderry for the Pinkerton and Pillsbury Cemeteries. Two stormwater detention basins outfall into the project site, so hydrograph data was manually entered to represent these Sub-Areas for every respective storm event in this report's analysis.

2 Drainage analysis was conducted separately for Hovey Road's subsurface public storm drain network. Subcatchments that drain towards DP-3 & DP-6 are analyzed to determine existing condition peak-runoff rates only.

3.2 Proposed Hydrologic Flow Patterns

The proposed development has been designed to direct the stormwater runoff from the site's impervious areas into an a network of detention basins and rain gardens. Runoff from the remaining areas within the study area will generally maintain their existing flow patterns.

The following describes the proposed stormwater flow patterns for each of the sub areas.

- Sub Area PR-1 flows in a southerly direction, towards Design Point 2.
- Sub Area PR-2 flows in a southerly direction, towards Design Point 2. Runoff is routed through Basin 1P.
- Sub Area PR-3 flows in a southeasterly direction, towards Design Point 3. Runoff is undetained, and flows offsite onto Hovey Road's ROW.
- Sub Area PR-4 flows in a southerly direction, towards Design Point 2, via a proposed drainage swale (R-3) and Basins 1P & 2P.
- Sub Area PR-5 flows in a southwesterly direction, towards Design Point 1. Runoff is collected into Basin 3P, routed through Swale 4R, then Basins 1P & 2P, and finally into Design Point-1.
- Sub Area PR-6 flows in a southwesterly direction, and is routed to Basin 4P. Runoff is then routed to Swale 6R, which outfalls into Basins 1P & 2P, then to Design Point-1.
- Sub Area PR-7 flows in a southwesterly direction, and is routed to Basin 5P. Runoff is then routed to Swale 7R, which outfalls into Basins 1P & 2P, then to Design Point-1.
- Sub Area PR-8 flows in a southerly direction, and is routed to Basin 6P, which outfalls into Basins 1P & 2P, then to Design Point-1.
- Sub Area PR-9 flows in an easterly direction, and eventually exits the project site towards Design Point 5, the project site's edge, shared with an abutting residential lot.
- Sub Area PR-10 flows in an easterly direction, and is routed to Basin 7P. Runoff then outfalls into an existing drainage structure, within the Town of Londonderry's storm drain network, towards Design Point 3.
- Sub Area PR-11 flows in an easterly direction, and is routed through Basin 11P before eventually exist the project site at an existing drainage structure, within the Town of Londonderry's storm drain network, towards Design Point 3.
- Sub Area PR-12 flows in a southerly direction, and is routed through a proposed wetland crossing, then outfalling directly into Sub Area PR-21. Runoff then flows into the existing drainage Swale 13R. Swale 13R flows through a proposed stream crossing, then is enevtually discharged offsite at Design Point 1, via Swale 15R.
- Sub Area PR-13 flows in an easterly direction, discharging towards Hovey Road, at a drainage structure in Londonderry's storm drain network, taken to be Design Point 6.
- Sub Area PR-14 is a large centrally located area that encompasses large portions of the wetland network. It flows in a southerly direction, outfalling into the existing stream. After passing under a proposed stream crossing, runoff flows through Swale 13R, though another stream crossing, into Swale 15R, and is finally discharged offsite at Design Point 1.
- Sub Area PR-15 flows in a southerly direction, outfalling into the existing stream, R-1. The stream carries runoff towards it's discharge offsite at DP-1.

- Sub Area PR-16 flows in a southerly direction, towards 3 wetland crossings. Runoff flows into Swale 16R, which is located within Sub Area PR-14. Runoff then flows through various stream crossings, Swales 13R & 15R, and then is finally discharged offsite at Design Point 1.
- Sub Area PR-17 flows in a southwesterly direction, and collecting into a proposed drainage structure. Stormwater outfall from the adjacent cemetery basins (represented as OS-2 & OS-3), also flows through PR-17 and into the same proposed drainage structure. Runoff then proceeds into Swale 16R, (through Sub Area PR-14), through various stream crossings, through Swales 13R & 15R, and is finally discharged offsite at Design Point 1.
- Sub Area PR-18 flows in a southerly direction, and is routed to Basin 8P. Runoff then flows through various stream crossings. Runoff is then carried through Swales 13R & 15R, and is finally discharged offsite at Design Point 1.
- Sub Area PR-19 flows in a southerly direction, and is routed to and detained at Basin 9P. Basin 9P outfalls into Swale 21R, which is within Sub Area PR-21. Runoff then enters the existing stream and crosses under a proposed stream crossing, then through Swale 15R, and finally discharging offsite at Design Point 1.
- Sub Area PR-20 flows in a southerly direction, and is routed to Basin 10P. Drainage then outfalls into the existing drainage ditch, represented by Swale 22R. This swale is within Sub Area PR-14. Runoff then flows through various wetland & stream crossings, then Swales 13R & 15R, before finally being discharged offsite at Design Point 1.
- Sub Area PR-21 is an undetained area on the western edge of the project site. It flows in a southerly direction, and into Swale 13R. Runoff then flows through a stream crossing, into Swale 15R, and is discharged offsite at Design Point 1.
- Sub Area PR-22 flows in a northerly direction, and eventually exits the project site at Design Point 4, an unimproved section of Spring Road.
- Sub Area PR-23 is an undetained area on the western edge of the project site, near Pillsbury Road. It flows in a southerly direction and is discharged offsite at Design Point 1.
- Sub Area PR-24 is the footprint of Stormwater BMP 2P, along with a limited area of pervious ground. Runoff in this sub area eventually outfalls at Design Point-1.
- Sub Area OS-1 flows in an easterly direction, into the existing intermittent stream, and eventually to Design Point 1. This sub area encompasses offsite stormwater runoff that enters the project site.
- Sub Area OS-2 & OS-3 are the nearby Pillsbury and Pinkerton Cemeteries, which discharge stormwater runoff by way of two detention basins. Stormwater runoff from these basins eventually enters the intermittent stream and leaves the site through Design Point 1.

The proposed development will add approximately 15.8 acres of impervious area to the project site. As a result, the peak stormwater runoff rates increase from pre- to post-development conditions. These increases in peak runoff rates will be mitigated by use of a network of rain gardens, detention basins and swales. These stormwater rain gardens and basins will mitigate the increased runoff rates by restricting stormwater outflow from the storage areas through the use of outlet control structures. The purpose and functions of the outlet control structures will be discussed in more detail later in this report. In addition to the detention basins and rain gardens being proposed, runoff swales will provide a limited reduction in peak stormwater runoff rates as well.

4

Methodology & Design Criteria

VHB used two separate methodologies to evaluate the hydrologic and hydraulic impacts for proposed development's stormwater runoff. VHB analyzed the proposed development's hydrologic impacts using the Soil Conservation Service (SCS) Technical Release 20 (TR-55) methodology and analyzed the development's hydraulic characteristics using the Rational Method to determine the flow rates used in the storm drain piping calculations. The following section summarizes the design parameters/constraints that were used during the drainage design for this development under the SCS and Rational Methodologies. Additionally, this section summarizes the methodology used for the development's proposed erosion control and stormwater treatment methods.

4.1 Hydrologic Model Description

VHB analyzed the proposed developments stormwater runoff impacts using the SCS TR-20 methodology. The hydrologic program HydroCAD, as developed by HydroCAD Software Solutions, LLC., was utilized to compute and develop the stormwater runoff model. HydroCAD's SCS TR-20 program is designed to model complex watersheds, such as the watershed analyzed in this report. The complexity of the watershed has been based on multiple land uses (surface conditions) with varying soil conditions and inter-connected sub-watersheds reflecting complex hydrologic flow patterns.

4.1.1 Design Storms

VHB analyzed the proposed stormwater impacts for the 2, 10, 25, and 50-year design storms. These rainfall events are based on a 24-hour storm duration using a Type III distribution curve. The appendices contain copies of the rainfall data charts used in the calculations.

4.1.2 Curve Number

VHB developed weighted curve numbers for each sub-area based on the different ground covers and hydrologic soil group types found within each area. The curve numbers were based on the SCS TR-55 methodology and are included in hydrologic calculations.

4.1.3 Travel Times & Time of Concentration

VHB calculated the Travel Times (Tt) and the Time of Concentrations (Tc) for each of the individual sub-areas using the hydraulically most distant point within each area. A minimum time of 6 minutes was used in the calculations. The Tt's and Tc's were based on SCS TR-55 methodology and are included in hydrologic calculations.

4.2 Hydraulic Calculations (Storm Drain Piping System)

VHB used the rational method to develop the flows used in the design the development's subsurface storm drain piping system. The drainage system was sized based on a 25 year design storm under pressurized flow conditions. VHB used the following design parameters and criteria to design the system:

- Minimum Pipe Size: 18 inches
- Pipe Flow Velocity Range: 2-10 feet per second (fps)
- HDPE Pipe Coefficient of Friction: 0.013
- Minimum Time of Concentration (Tc): 6 minutes
- Runoff Coefficients: 0.61 or 0.74 for open space (soil groups B or C, respectively)
- Runoff Coefficients: 0.58 or 0.71 for meadowlands (soil groups B or C, respectively)
- Runoff Coefficients: 0.56 or 0.70 for undisturbed wetlands (soil groups B or C, respectively)
- Runoff coefficients: 0.85 or 0.89 for gravel walking paths (soil groups B or C, respectively)
- Runoff Coefficient: 0.98 for pavement and roofs
- Design Software: StormCAD (Bentley)

The storm drain piping calculations are included in the appendices.

4.3 Stormwater Detention

The proposed development increases the amount of impervious area from that of the existing conditions; as a result, the runoff curve numbers will increase for the proposed conditions. The higher curve numbers will increase the calculated stormwater runoff rate from that of the existing site, therefore, stormwater detention has been proposed for this project. The various detention areas will mitigate the increased stormwater runoff rates by using outlet control structures to reduce the proposed stormwater discharge rates from the site. The proposed drainage swales will provide limited peak runoff reductions as well. Additionally, most detention areas have been designed as an extended detention basins that will provide stormwater treatment for the majority of the proposed development's stormwater runoff by retaining the runoff from the 2-year, 24 hour storm event and slowly discharging it over a 24- to 40-hour period. Where extended basins were impractical for treating runoff from impervious surfaces, Manufactured Treatment Devices (MTDs) are proposed. These will be described in in further detail in Section 5.1

VHB used the following design parameters and criteria to design the detention areas:

- Side Slopes: 3:1 (maximum)
- Design Storms: 1, 2, 10, 25, 50-year, 24-hour storm events

- Extended Detention Time: 24 to 40 hours
- Infiltration Rates: 2.5 inches per hour through extended detention sand filters. (Note, the Town of Londonderry does not allow infiltration to groundwater, and extended detention basins will be lined with geotextile fabric to prevent infiltration to groundwater.

Refer to the appendices for further information and design calculations.

Table 6 Detention Basin Characteristics Summaries

Basin 1P Characteristics		Proposed
Storage Volume		109,259 cf
Maximum Storage Height		396.0 ft
Peak Water Elevation	2 Year	391.6
	10 Year	393.0
	25 Year	394.3
	50 Year	394.8

Basin 2P Characteristics		Proposed
Storage Volume		28,961 cf
Maximum Storage Height		388.0 ft
Peak Water Elevation	2 Year	383.7
	10 Year	384.4
	25 Year	385.3
	50 Year	386.9

Basin 3P Characteristics		Proposed
Storage Volume		16,710 cf
Maximum Storage Height		448.60 ft
Peak Water Elevation	2 Year	444.2
	10 Year	445.7
	25 Year	446.6
	50 Year	447.6
Extended Detention Time (2-year storm)		24.1 hrs

Basin 4P Characteristics		Proposed
Storage Volume		10,317 cf
Maximum Storage Height		452.2 ft
Peak Water Elevation	2 Year	449.7
	10 Year	450.6
	25 Year	450.9
	50 Year	451.2
Extended Detention Time (2-year storm)		24.1 hrs

Basin 5P Characteristics		Proposed
Storage Volume		18,711 cf
Maximum Storage Height		453.2 ft
Peak Water Elevation	2 Year	451.3
	10 Year	451.8
	25 Year	452.0
	50 Year	452.2
Extended Detention Time (2-year storm)		25.8 hrs

Basin 6P Characteristics		Proposed
Storage Volume		15,230 cf
Maximum Storage Height		407.1 ft
Peak Water Elevation	2 Year	405.0
	10 Year	405.7
	25 Year	405.9
	50 Year	406.0
Extended Detention Time (2-year storm)		26.9 hrs

Basin 7P Characteristics		Proposed
Storage Volume		15,583 cf
Maximum Storage Height		450.0 ft
Peak Water Elevation	2 Year	447.3
	10 Year	447.8
	25 Year	448.4
	50 Year	449.0
Extended Detention Time (2-year storm)		24.2 hrs

Basin 8P Characteristics		Proposed
Storage Volume		6,508 cf
Maximum Storage Height		439.5 ft
Peak Water Elevation	2 Year	437.8
	10 Year	438.1
	25 Year	438.3
	50 Year	438.5
Extended Detention Time (2-year storm)		29.7 hrs

Basin 9P Characteristics		Proposed
Storage Volume		29,341 cf
Maximum Storage Height		457.2 ft
Peak Water Elevation	2 Year	446.6
	10 Year	446.9
	25 Year	447.1
	50 Year	447.4
Extended Detention Time (2-year storm)		60.6 hrs

Basin 10P Characteristics		Proposed
Storage Volume		11,693 cf
Maximum Storage Height		458.4 ft
Peak Water Elevation	2 Year	456.3
	10 Year	456.6
	25 Year	456.9
	50 Year	457.3
Extended Detention Time (2-year storm)		24.2 hrs

Basin 11P Characteristics		Proposed
Storage Volume		7,845 cf
Maximum Storage Height		456.0 ft
Peak Water Elevation	2 Year	454.2
	10 Year	454.7
	25 Year	454.9
	50 Year	455.0
Extended Detention Time (2-year storm)		27.0 hrs

4.3.1 Outlet Control Structures

The stormwater that discharges from the detention areas will be controlled through outlet control structures. The outlet control structure has been designed to reduce the peak outflow rates from the detention area for the design storm events.

The detention area has also been designed with an overflow outlet to handle emergency overflow conditions (i.e., malfunctioning or clogging of inlets) and consists of an emergency riprap stone-protected overflow spillway set below the top of the proposed berm.

Details of the Outlet Structure and Overflow Spillway are shown on the Detail Sheets of the project's Site Plans. The Town of Londonderry specifies how outlet structures should be configured, and the design of the outlet control structures is compliant with these specifications to the maximum extent practical.

4.4 Riprap Outlet Protection

VHB sized the riprap outlet protection using Chapter 4, Section 4-6.6, Outlet Protection of the New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection& Design, December 2008, NHDES. The following design parameters represent the minimum acceptable riprap apron dimensions used for design (refer to the appendices for design computations):

- Apron Width: 10 feet
- Apron Length: 10 feet
- Median Stone Diameter: 0.5 feet
- Depth of Stone: 12 inches (minimum)

4.5 Base Calculations (WQV & WQF)

Water Quality Volume (WQV), and Water Quality Flow (WQF) calculations were performed in accordance with the New Hampshire DES Chapter Env-Wq 1500 – Alteration of Terrain. See Appendix A for specific BMP worksheets, as they pertain to subsurface sand filters and the use of Contech Filterra Manufactured Treatment Devices.

5

Stormwater Management Impacts / Conclusion

5.1 Stormwater Quantity Mitigation

Under the proposed conditions, the peak flow rates were calculated for the 2, 10, 25 and 50 year storm events. The peak runoff rates for the proposed conditions, in the absence of mitigation, are anticipated to increase over the existing condition rates. These peak flow increases are to be reduced to near current or under current peak runoff rates at Design Points 1, 2, & 3 by routing the runoff through the proposed detention areas. Due to the proposed site grading, the area contributing runoff to Design Point 4 will be smaller than the contributing area in the existing condition, so peak runoff rates are anticipated to be less at that point. The proposed development will incorporate a stormwater collection system that will capture runoff from impervious areas by means of deep sump (3' deep) catch basins, as well as overland flow in open channel swales and sheet flow across open spaces, and will then direct runoff to the proposed detention area.

The detention area is designed to attenuate site runoff by utilizing restrictive outlet control structure that will cause excess runoff to be temporarily detained within the detention area. The outlet control structure for the detention area includes restrictive outlet control devices and an emergency overflow spillway. The outlet structure will meter outflow rates from the detention area, such that the outflow will be equal to or below the existing flow rates for the design storm events. Table 7 provides a summary of the peak stormwater runoff rates from the proposed development.

Table 7 Peak Stormwater Runoff Rate Summary

Design Point		Condition	Peak Flow for Given Storm (cfs) 1-yr	2-yr	10-yr	25-yr	50-yr
1	Existing 18" Culvert	Existing	12.9	22.6	71.9	119.5	167.4
		Proposed	7.8	12.9	53.0	103.4	163.1
2	Existing 12" Culvert	Existing	0.4	1.0	5.4	10.1	15.1
		Proposed	0.3	0.9	5.2	9.7	14.5
3	Hovey Road	Existing	1.0	2.2	7.9	13.6	19.5
		Proposed	1.0	1.4	7.1	13.0	18.4
4	Spring Road	Existing	2.1	3.5	8.8	13.5	18.2
		Proposed	2.0	3.4	8.5	13.1	17.6
5	Offsite	Existing	0.7	1.1	3.0	4.6	6.2
		Proposed	0.5	0.9	2.5	4.0	5.5
6	North Hovey Road	Existing	1.6	2.7	6.8	10.5	14.1
		Proposed	1.1	1.9	5.0	7.8	10.8

5.2 Stormwater Quality Mitigation – Best Management Practices (BMPs)

The proposed Stormwater Management System contains several Best Management Practices (BMPs) that will provide treatment of site generated stormwater runoff.

The proposed BMPs are described below:

5.2.1 Catch Basins with Sumps

Stormwater from the paved surfaces on-site will be collected in deep sump (3-foot) catch basins. Catch basin sumps are effective pollution control devices for removal of large particulate and adsorbed pollutants. Catch basins with sumps are designed to collect sediment particles that are the largest constituents of the pollutant load in urban runoff. Regular maintenance and cleaning of catch basins is required to assure adequate performance of these structures.

5.2.2 Extended Detention Basins

Extended detention basins are designed to temporarily hold stormwater runoff from up to a 2-year storm event for 24 to 40 hours. This extended detention time allows for particulates to settle out of the runoff prior to discharge. By detaining stormwater for at least 24 hours, up to 90% TSS removal is possible. The appendices contain the back-up design information and extended detention time calculation for the proposed basin(s).

5.2.3 Contech Filterra Manufactured Treatment Devices

Contech Filterra Manufactured Treatment Devices (MTDs) are prefabricated structures that are placed alongside impervious surfaces (typically paved roadways), and collect stormwater runoff from these impervious surfaces. Runoff then infiltrates through various layers within the structure, such as organic material, soils with strong porosity characteristics, sand, and gravel. 4' x 8' units are capable of handling up to 0.245-cfs and providing up to an 80% total suspended solids (TSS) removal rate for the design storm.

5.2.4 Energy Dissipators

Energy dissipators (i.e., riprap stone protection) will be constructed below outlets of all pipes in the stormwater management system. The energy dissipators will allow the concentrated runoff from the drainage system to be discharged at non-erosive velocities to protect the receiving water resources. The appendices contain design information and calculations for the energy dissipators.

5.3 Erosion Control Measures

5.3.1 Temporary Erosion Control

During construction of the proposed development, the contractor shall be responsible for installation and maintenance of temporary sedimentation and erosion control measures to prevent off-site tracking and waterborne loss of earth sediment and debris. The specific measures proposed as a part of the project plan are shown in the Site Plan Package on the Sedimentation and Erosion Control Plan and the Erosion Control Details.

Removal of temporary erosion control measures will be prohibited until paving has been installed and vegetation (grass) is well established.

5.3.2 Permanent Erosion Control

At the completion of construction, all soils will be permanently stabilized by one or more of the following measures:

- **Parking/Access:** Driveways, parking areas and access roads will be stabilized with bituminous concrete pavement.
- **Landscaped Areas:** All disturbed areas, not permanently stabilized by pavement or buildings, will be covered with bark mulch, stone, sod or a minimum of [six (6)] inches of topsoil and seeded.
- **Pipe Outlets:** Scour protection (riprap) shall be constructed at the headwall outlet to prevent scouring.

Additionally, all catch basins will be constructed with deep sumps to collect sediment from parking areas and access roads.

5.4 Conclusion

By implementing standard stormwater management techniques, the proposed development can successfully mitigate its impacts on peak stormwater runoff rates. Furthermore, stormwater quality issues can be addressed through the proposed implementation of standard practices (i.e., extended detention basins, deep sump catch basins, manufactured treatment devices, etc.) that are accepted by the NH Department of Environmental Services Alteration of Terrain Bureau.

6

Figures

Figure 1: Site Location Map

Figure 2: Existing Conditions Color Coded Soil Plan

Figure 3: Proposed Conditions Color Coded Soil Plan

Figure 4: Existing Conditions Drainage Area Plan

Figure 5: Hovey Road Existing Conditions Drainage Area Plan

Figure 6: Proposed Conditions Drainge Area Plan

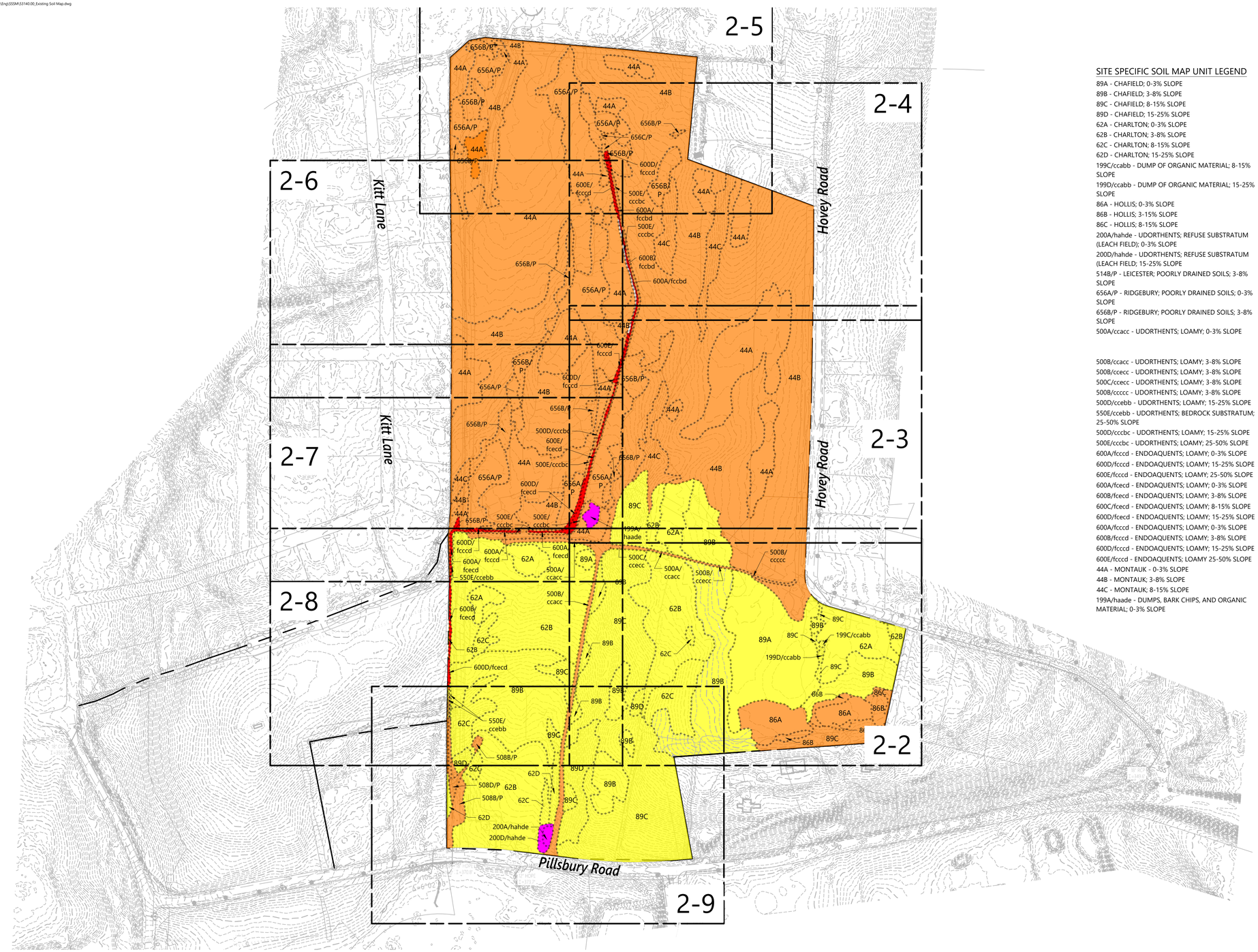


0 1000 2000 Feet

Site Location Map
36 Pillsbury Road
Londonderry, NH

Figure 1

February 2025



SITE SPECIFIC SOIL MAP UNIT LEGEND

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199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
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4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

Figure 2-1: Overall Existing Color Coded Soil Map

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

0 100 200 400 Feet

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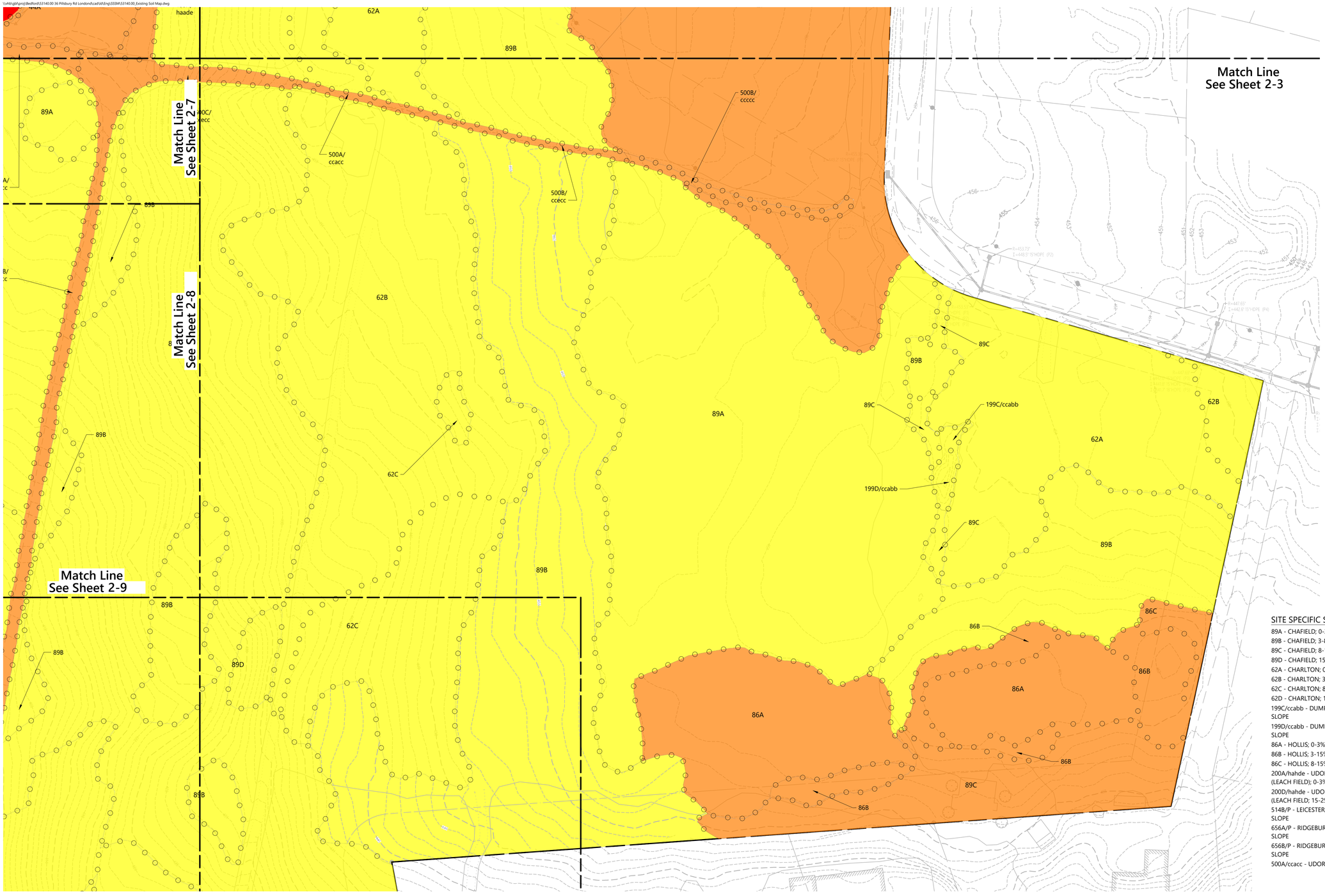

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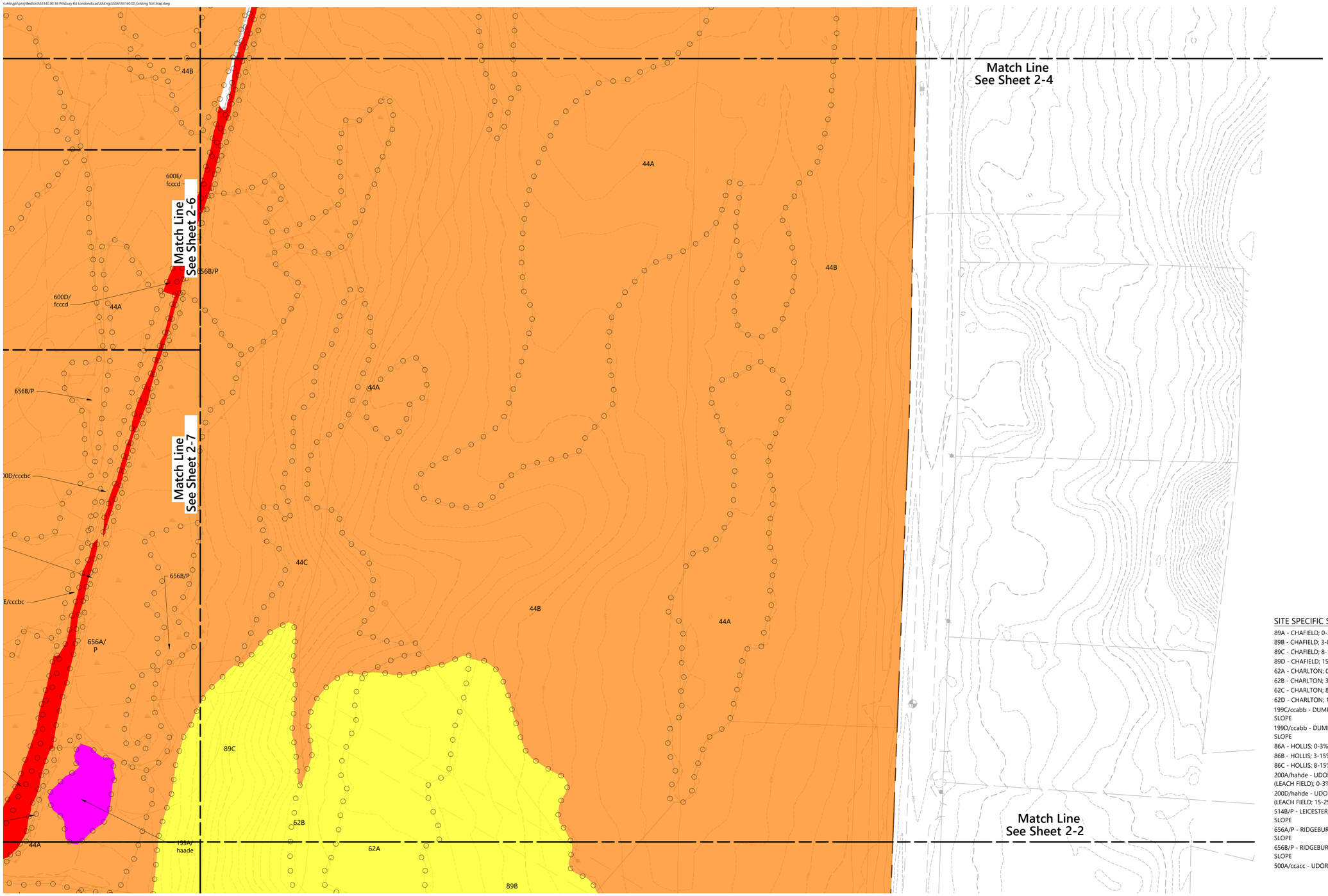
Figure 2-2: Existing Color Coded Soil Map

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

0 25 50 100 Feet

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Existing Soil Map.dwg



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0 25 50 100 Feet

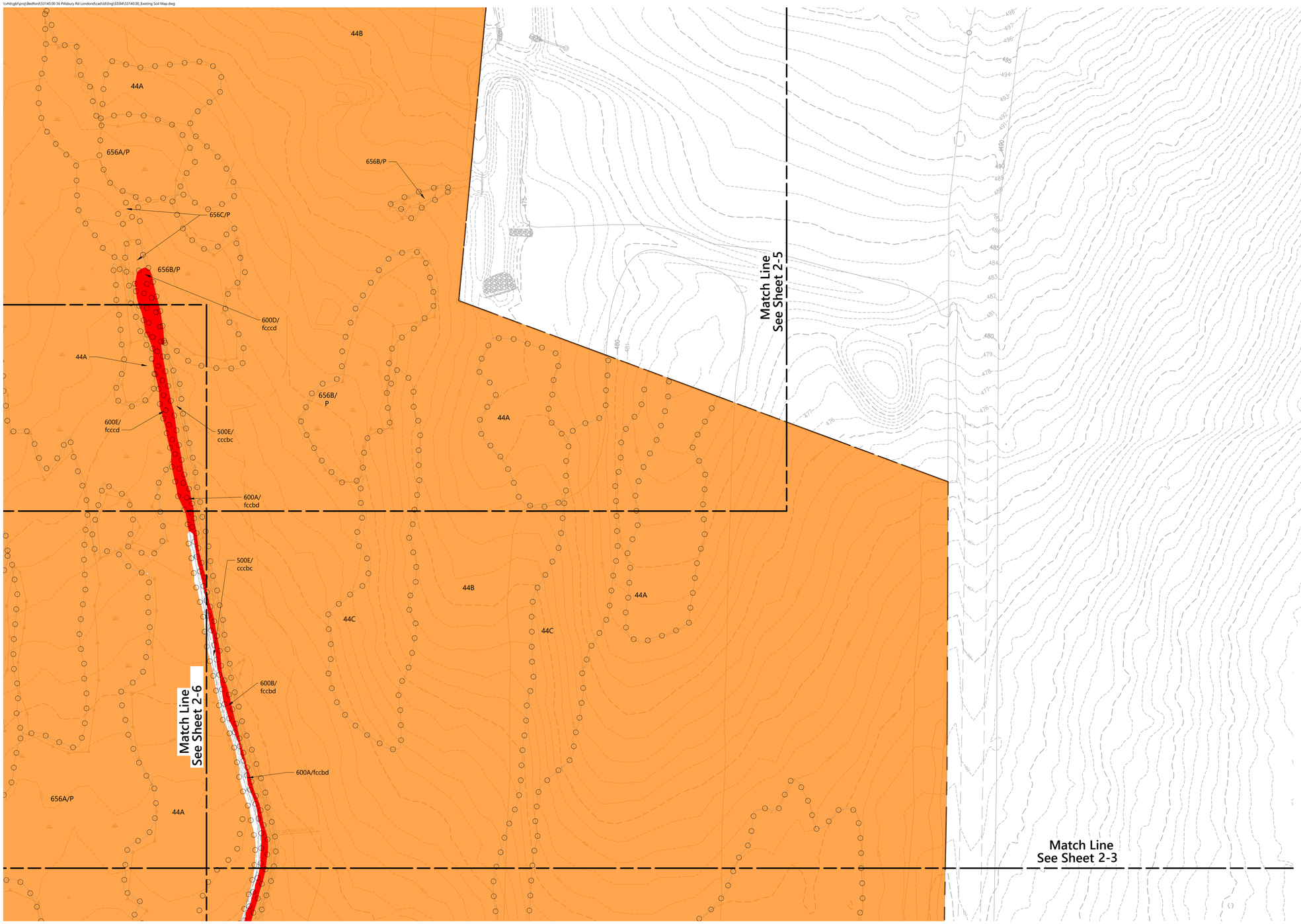
Figure 2-3: Existing Color Coded Soil Map

36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Existing Soil Map.dwg



Legend

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- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
2. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
3. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Figure 2-4: Existing Color Coded Soil Map

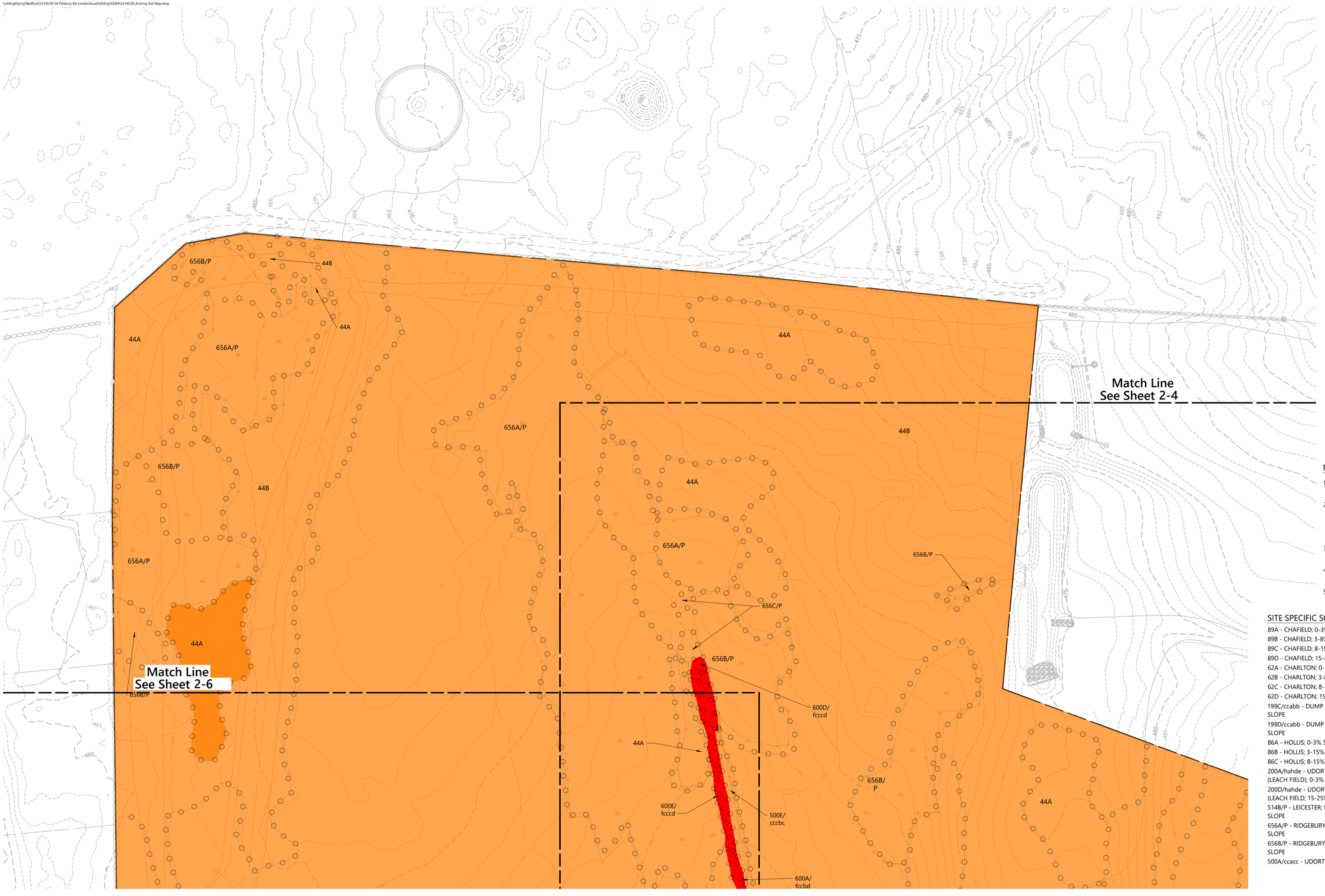
36 Pillsbury Road

Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\civil\Eng\SSSM\53140.00_Existing Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
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4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

0 25 50 100 Feet

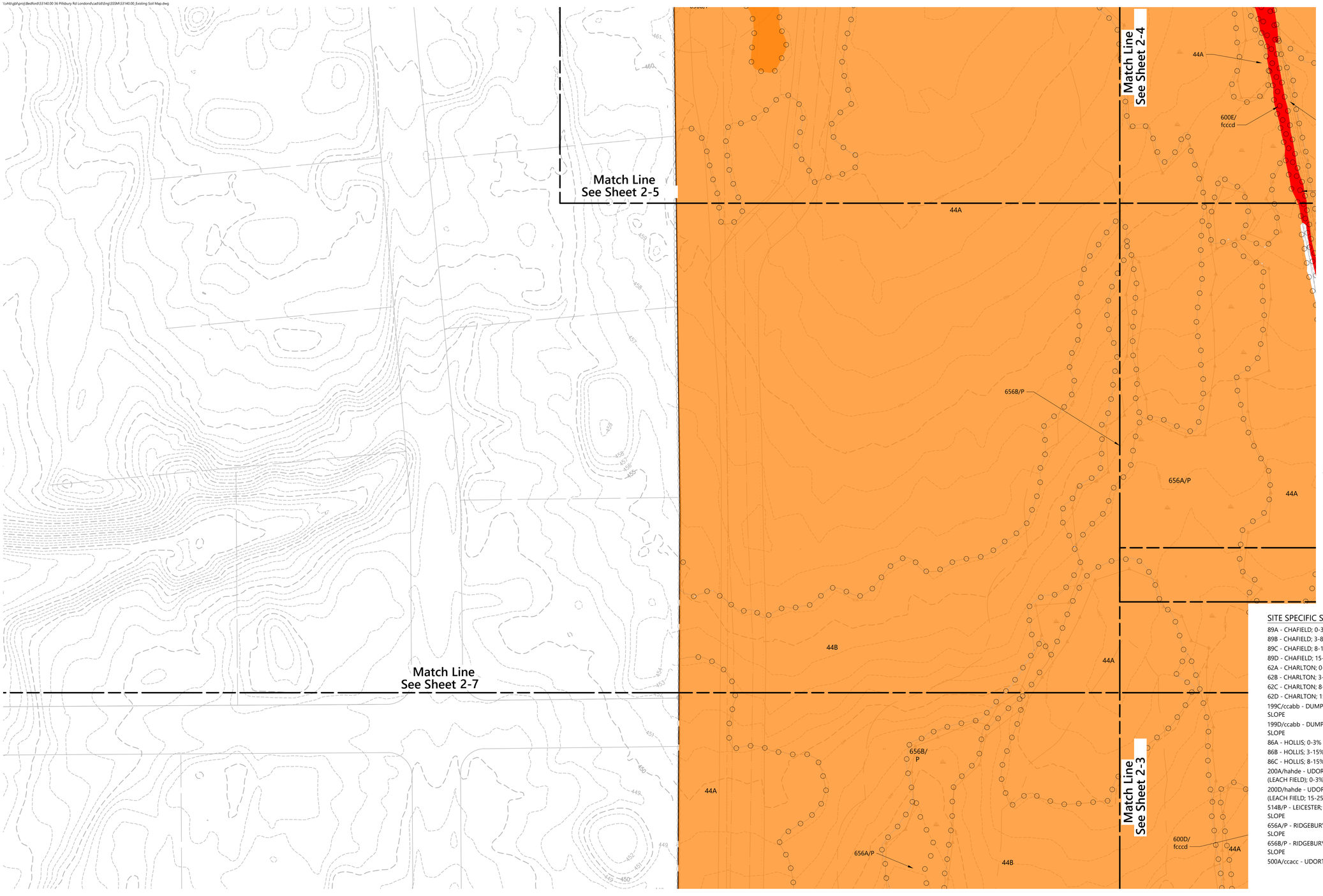
Figure 2-5: Existing Color Coded Soil Map

36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Existing Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
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3. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Figure 2-6: Existing Color Coded Soil Map

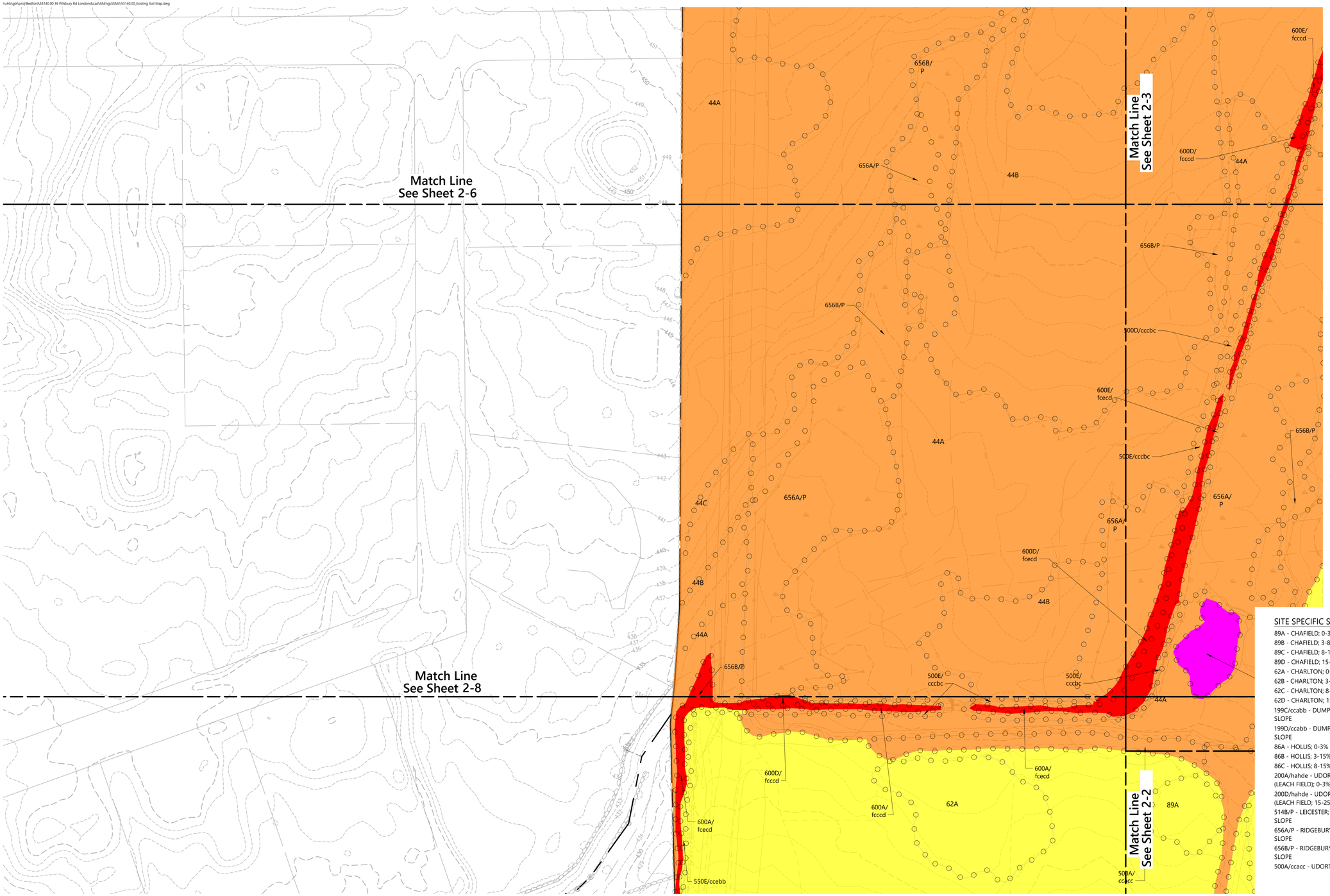
36 Pillsbury Road

Londonderry, NH

Source: 9 + %
Prepared for: 1 + ' (6 $ R 7 $ S S O L F D W L R Q
Date: 1 R Y H P E H U

0 25 50 100 Feet

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Existing Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

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5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
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600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
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44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Figure 2-7Existing Color Coded Soil Map

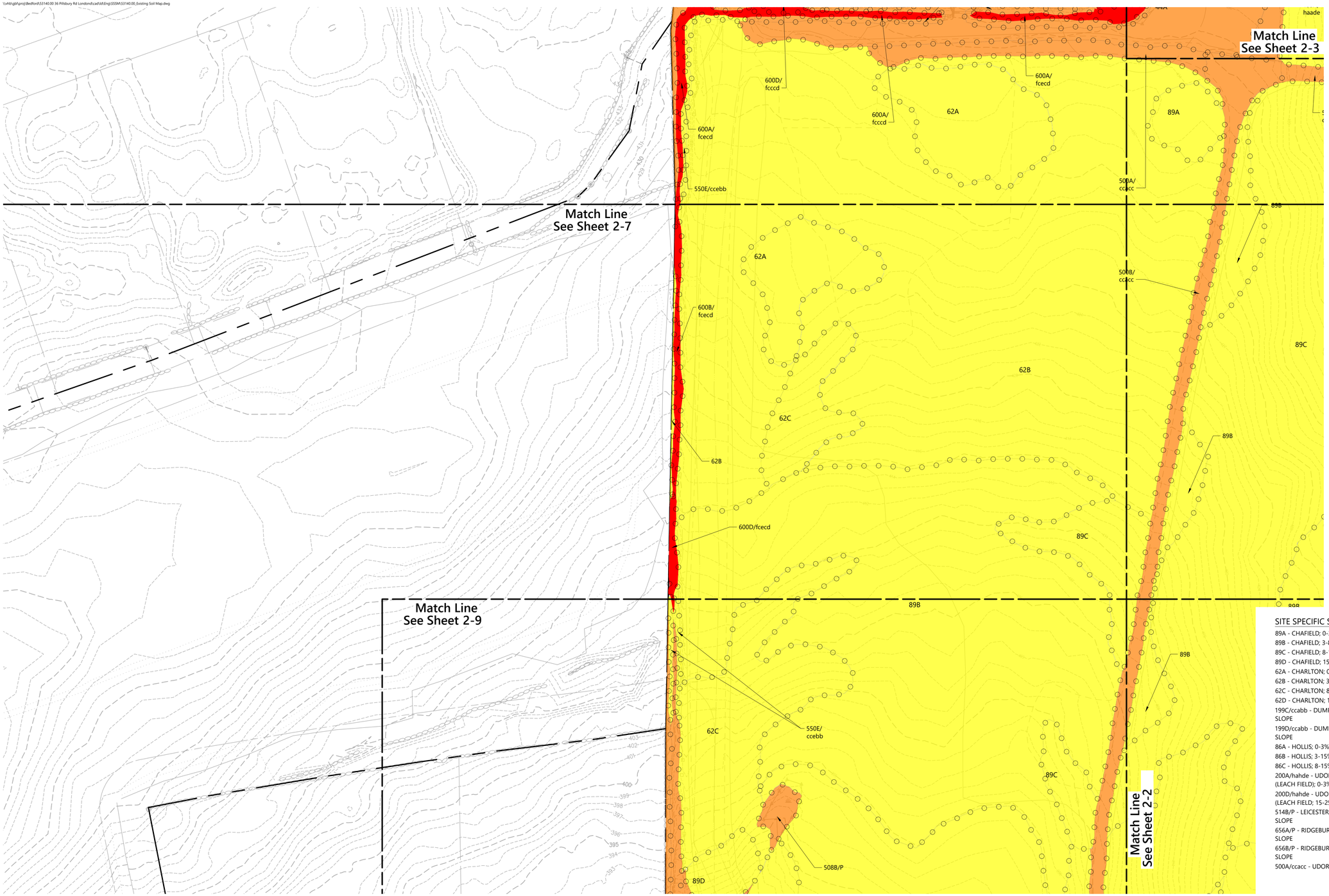
36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

0 25 50 100 Feet

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\civil\Eng\SSSM\53140.00_Existing Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

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SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
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600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
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44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

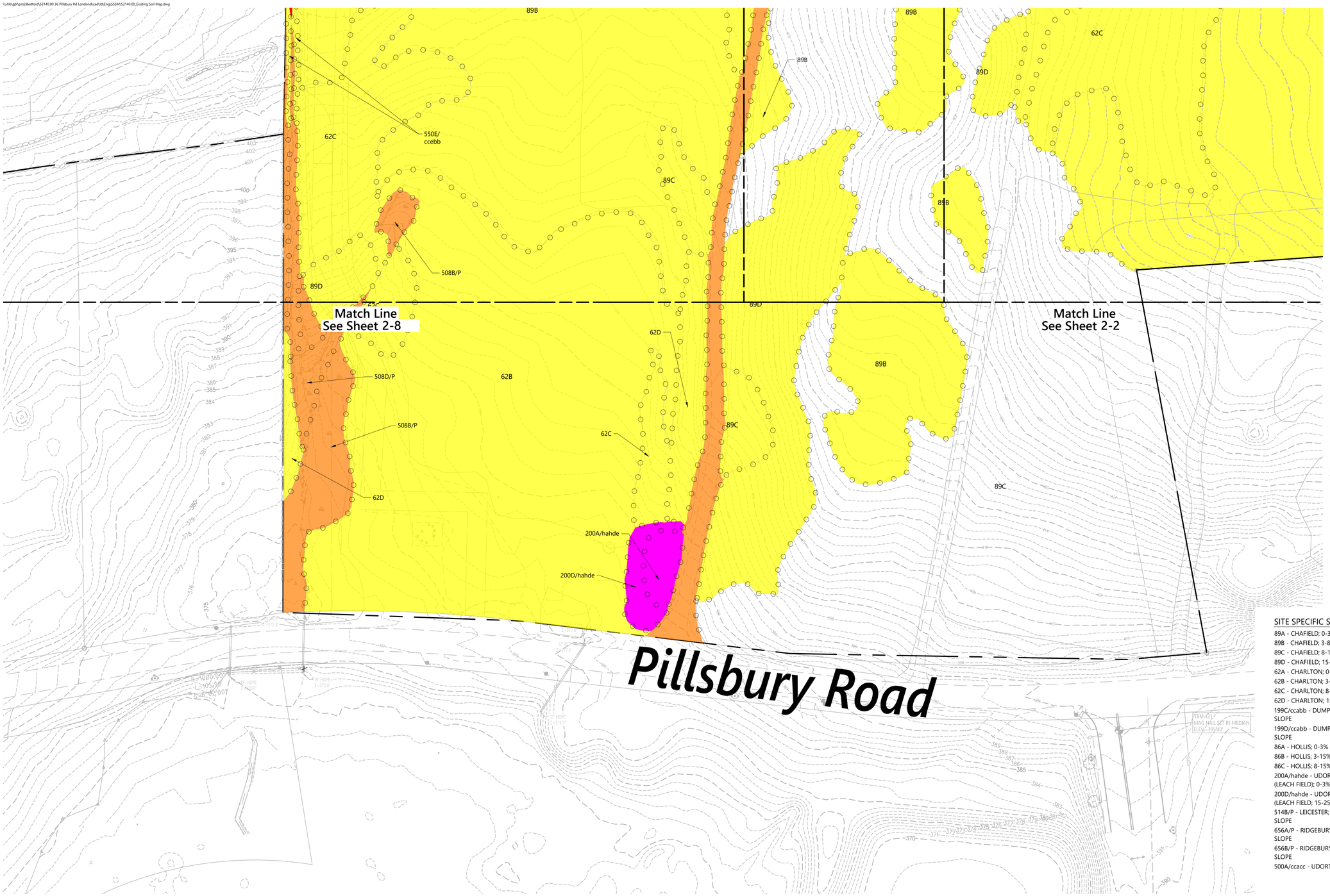
Figure 2-8: Existing Color Coded Soil Map

36 Pillsbury Road

Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
2. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
3. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

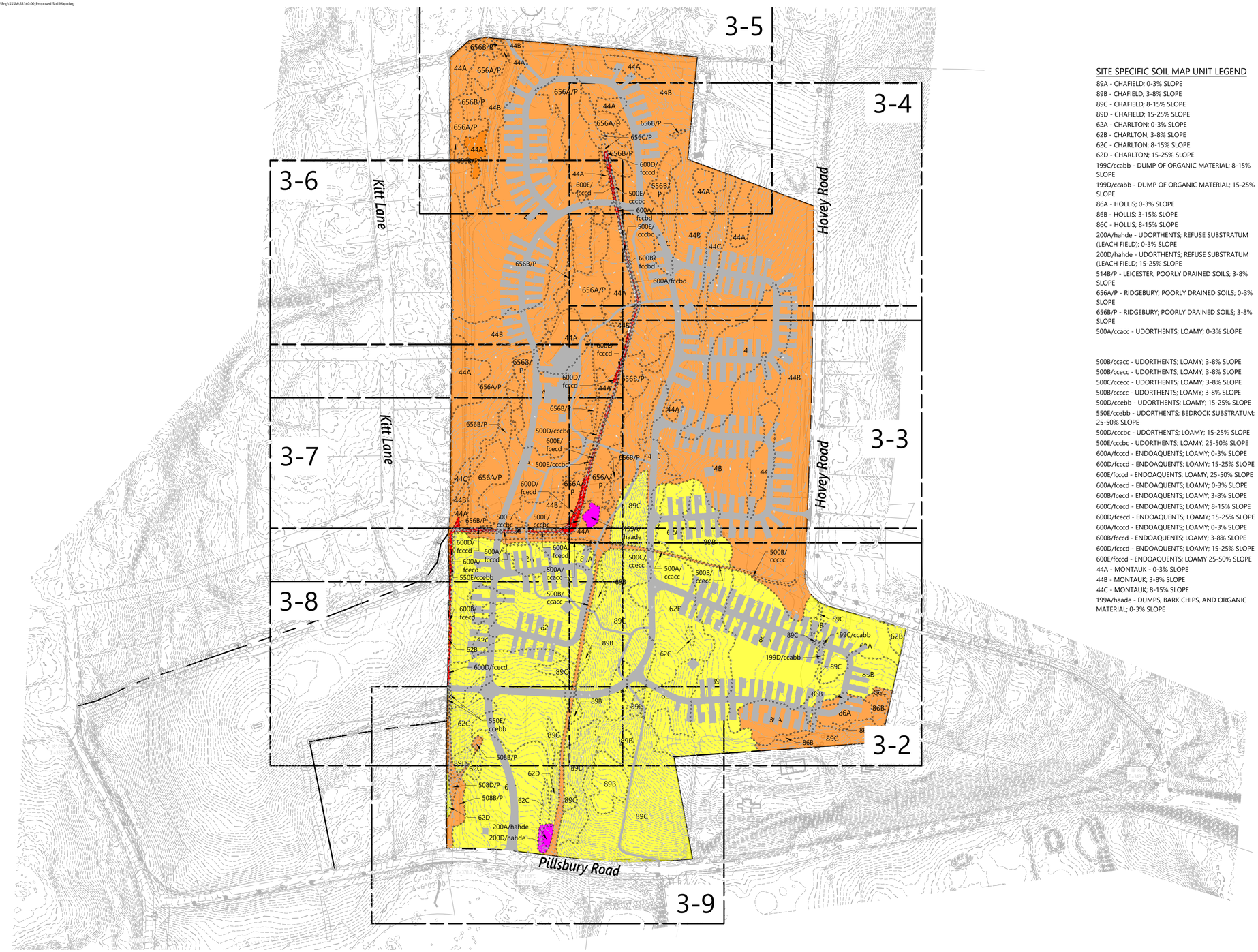
0 25 50 100 Feet

Figure 2-9: Existing Color Coded Soil Map

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Proposed Soil Map.dwg



SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE

500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/ccccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/ccccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
2. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
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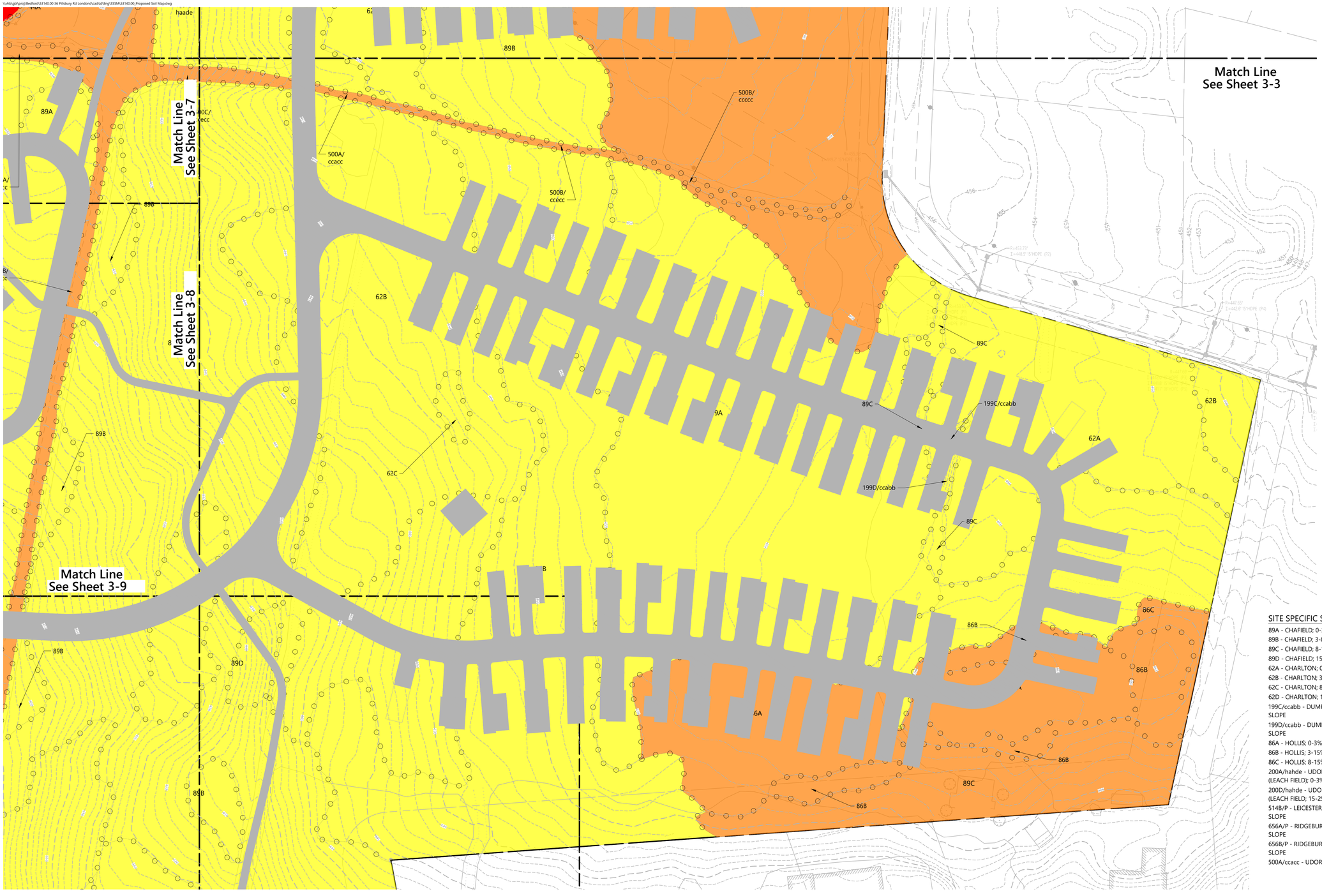
4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

Figure 3-1: Overall Proposed Color Coded Soil Map

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

0 100 200 400 Feet



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

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5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/cceec - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/cceec - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
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600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
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44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

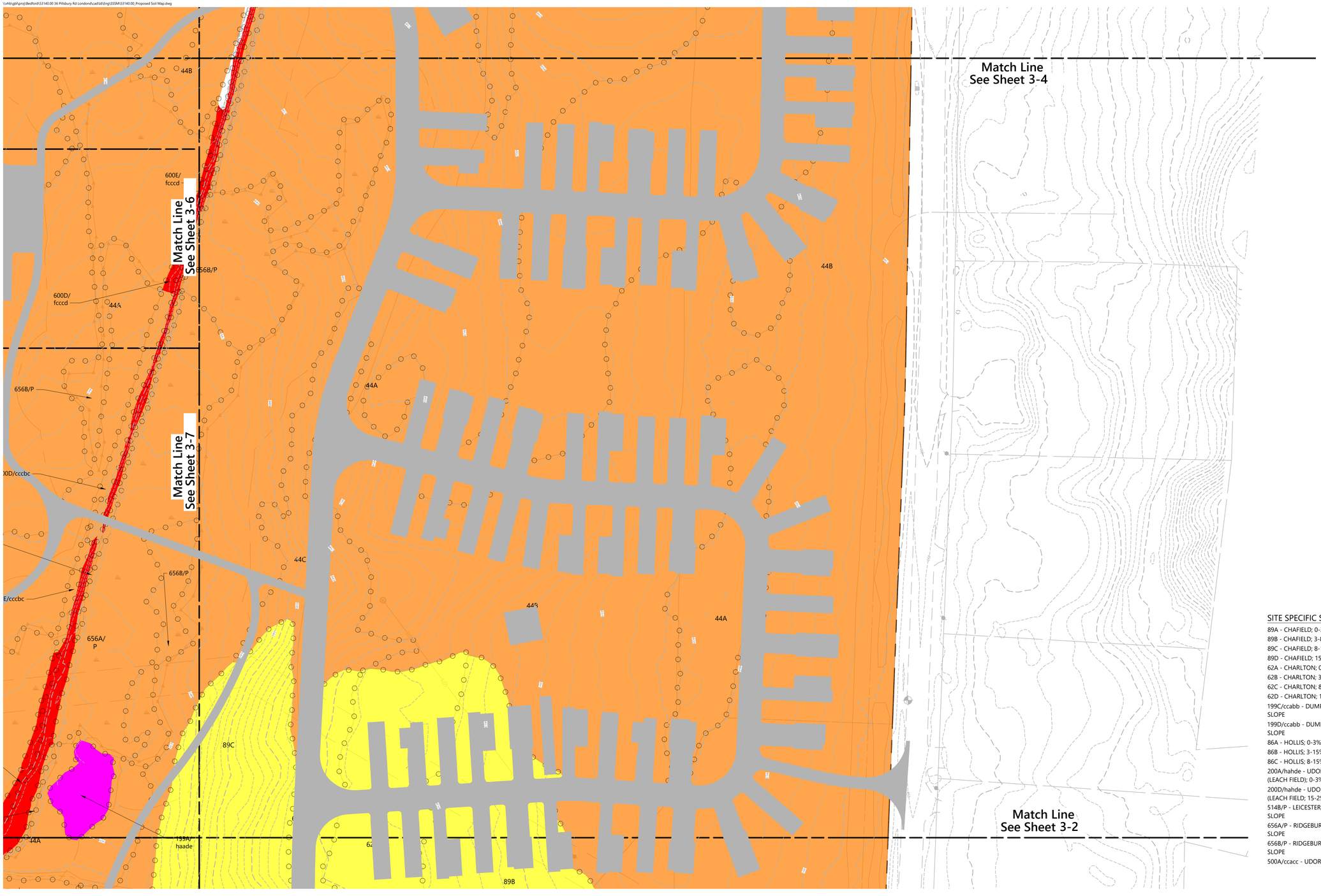
Figure 3-2: Proposed Color Coded Soil Map

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

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5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
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600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
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44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

0 25 50 100 Feet

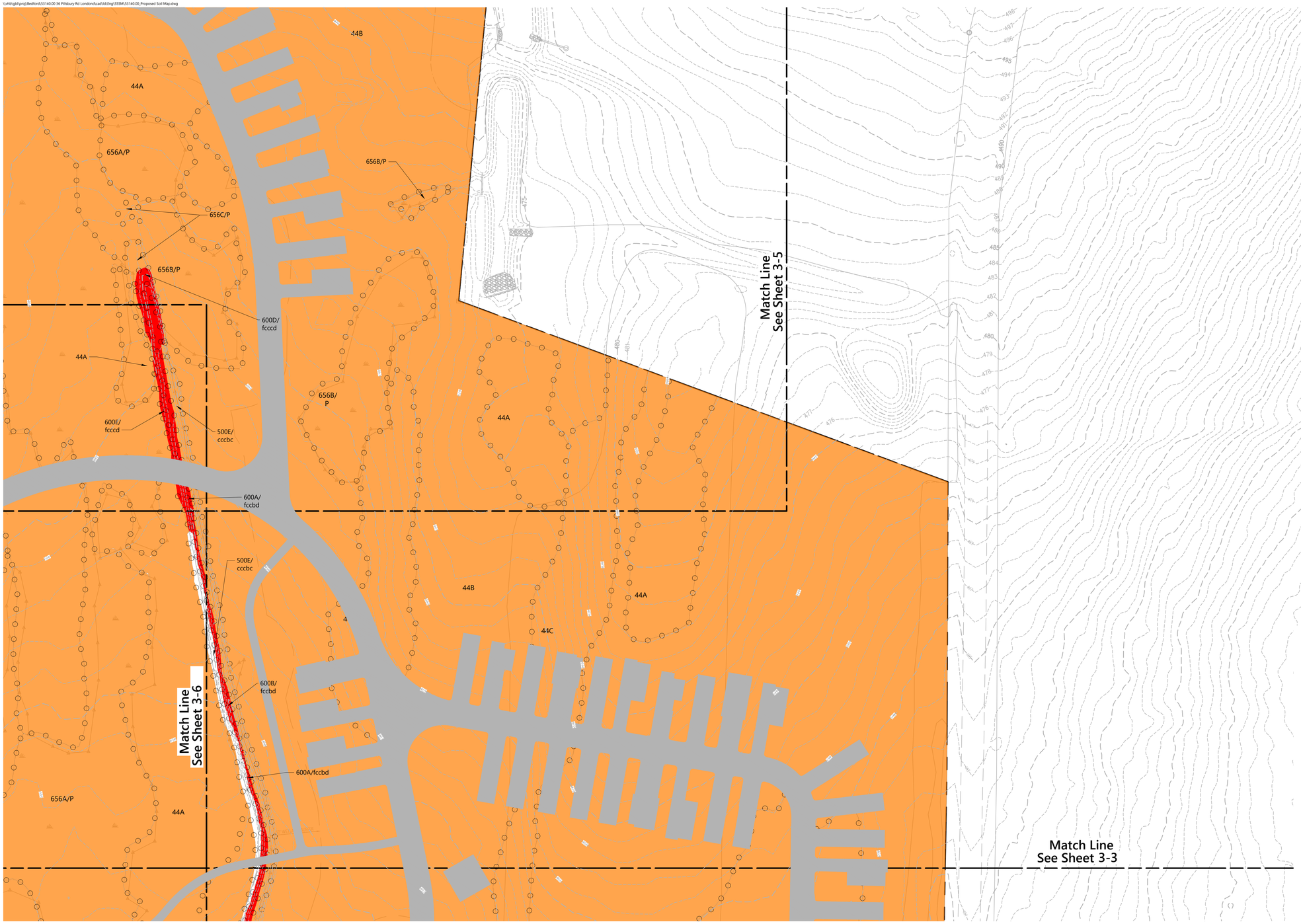
Figure 3-3: Proposed Color Coded Soil Map

36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

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SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
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500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
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44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

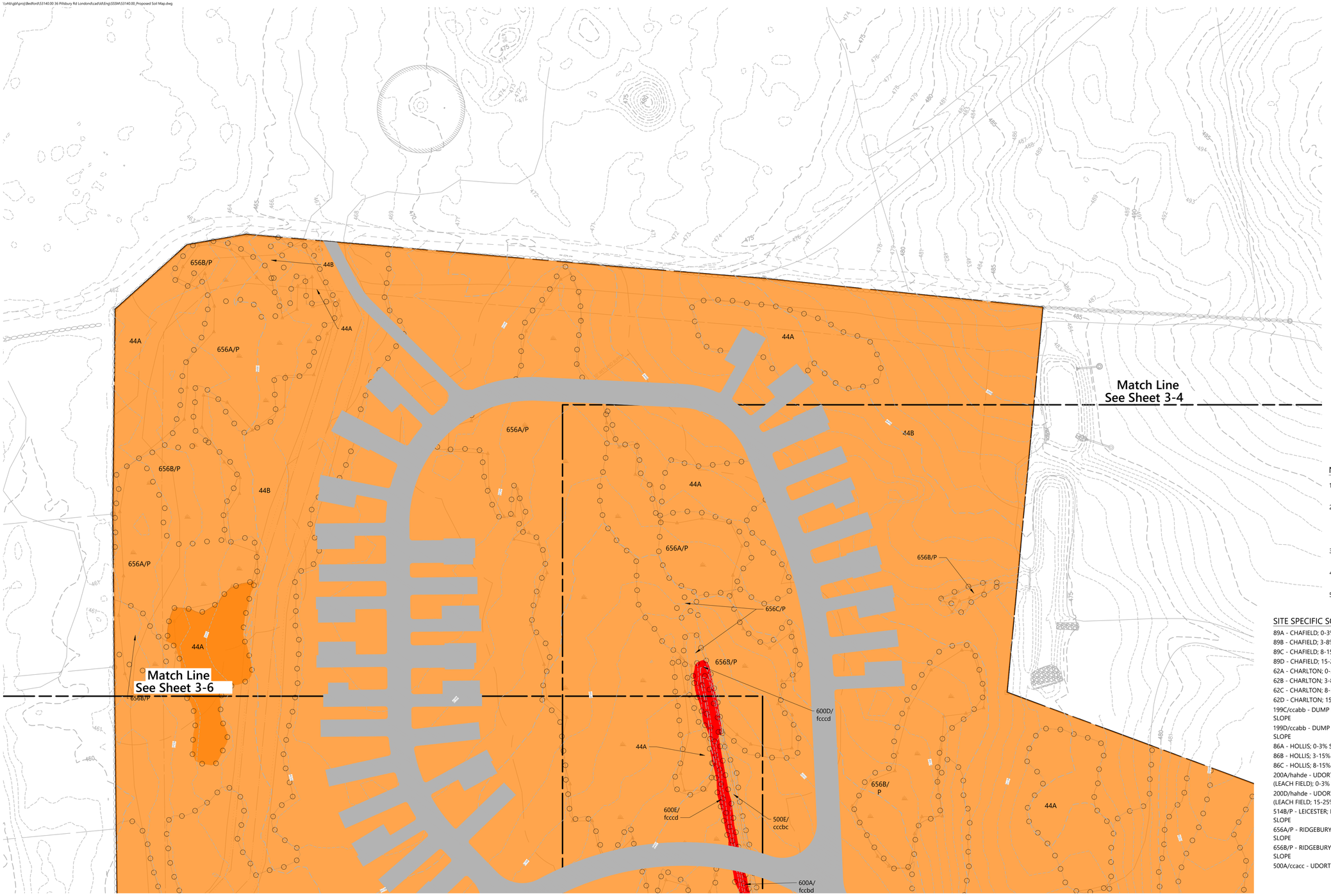
Figure 3-4: Proposed Color Coded Soil Map

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
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4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Figure 3-5: Proposed Color Coded Soil Map

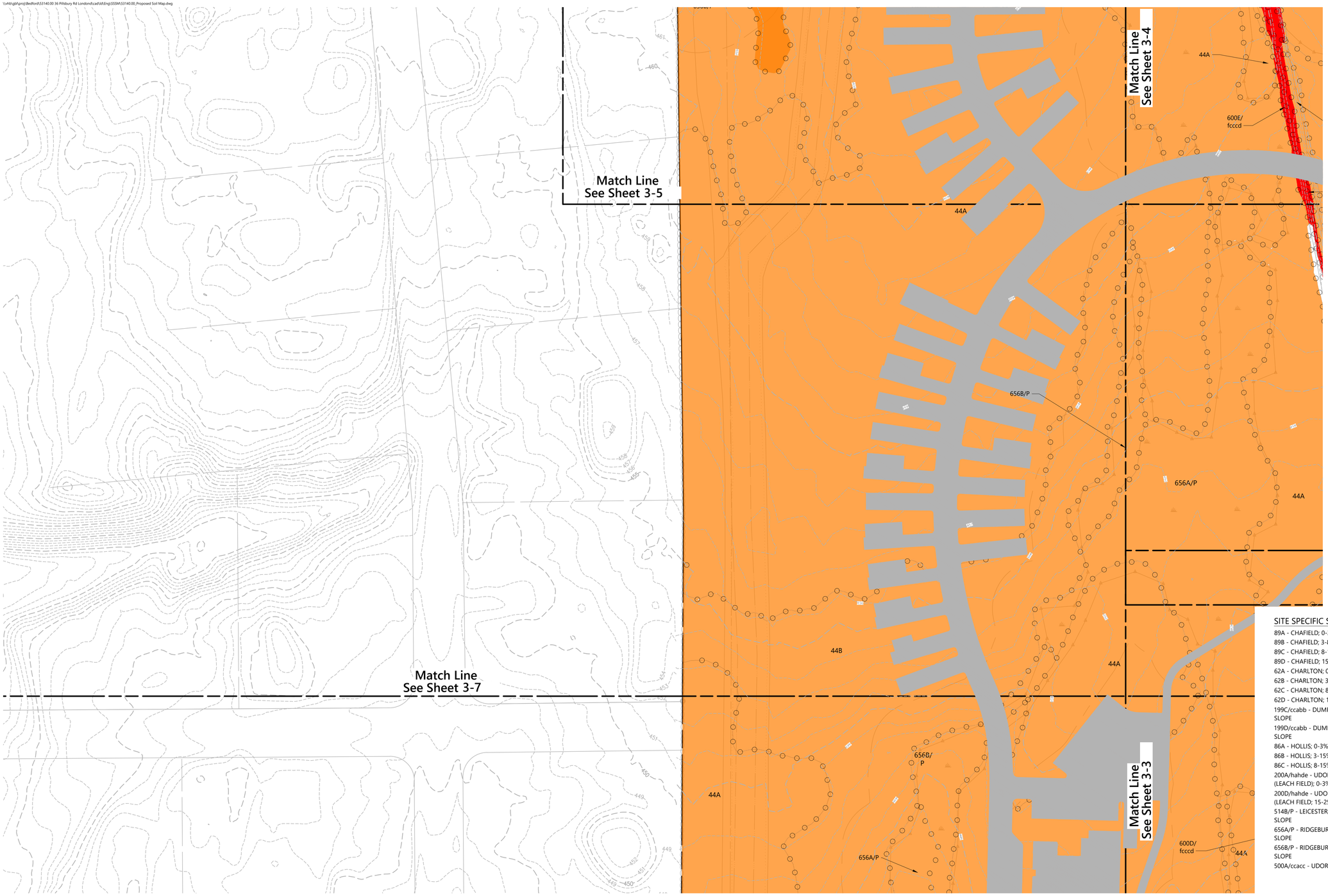
36 Pillsbury Road

Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\civil\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
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4. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
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44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Figure 3-6: Proposed Color Coded Soil Map

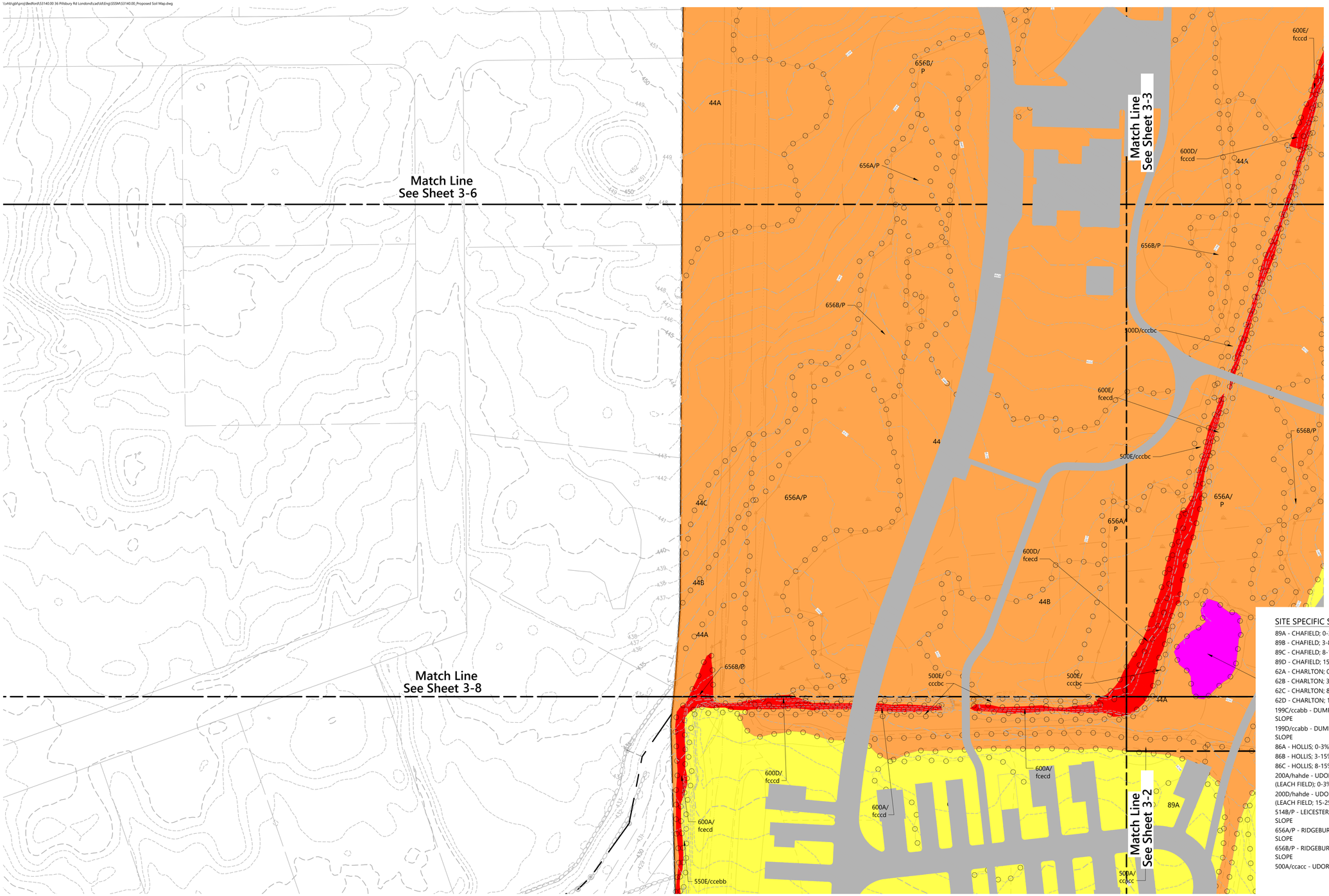
36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

0 25 50 100 Feet

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\sit\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

1. THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.
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5. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
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44A - MONTAUK - 0-3% SLOPE
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44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

0 25 50 100 Feet

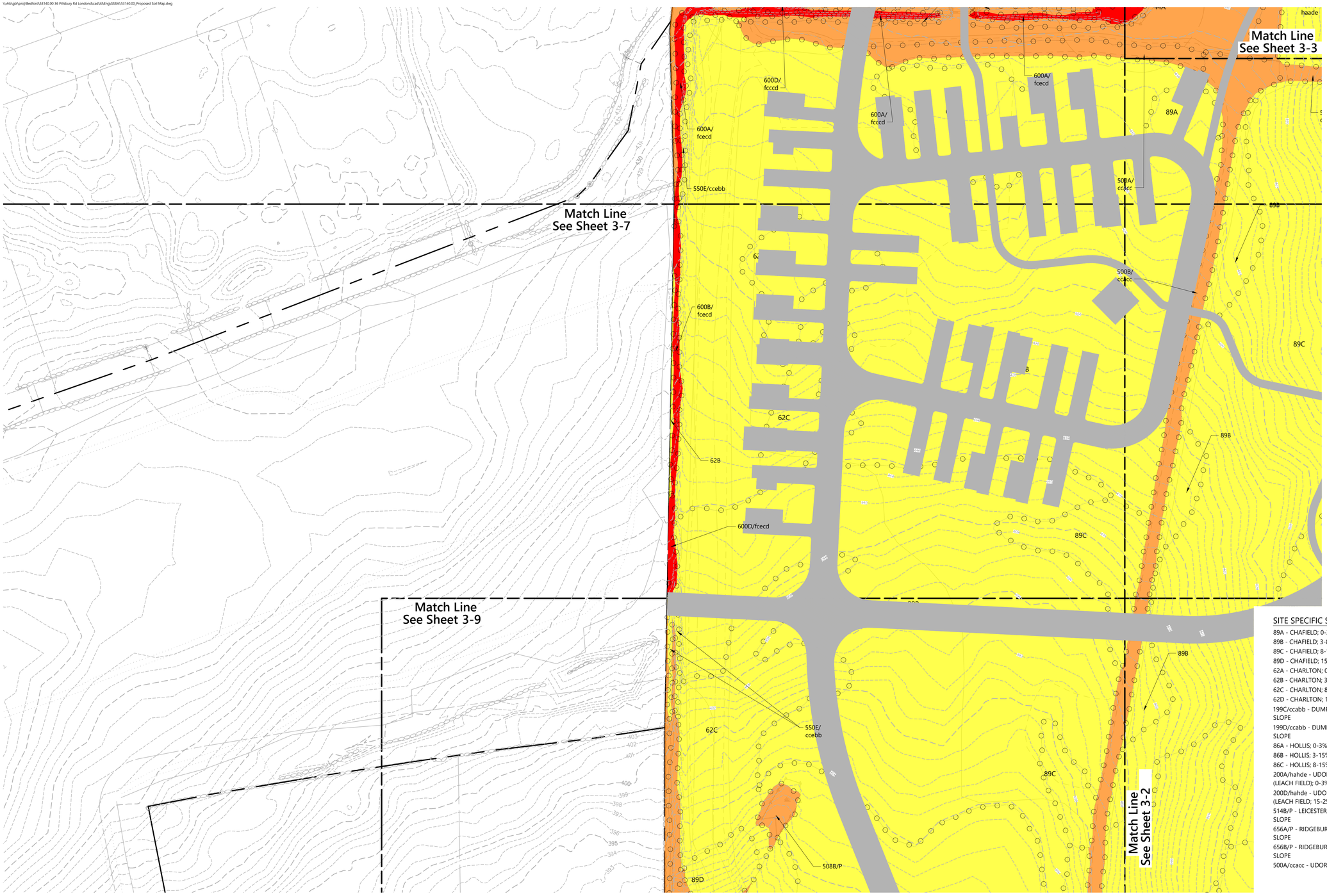
Figure 3-7Proposed Color Coded Soil Map

36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\civil\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

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SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/cceec - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/cceec - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
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600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

0 25 50 100 Feet

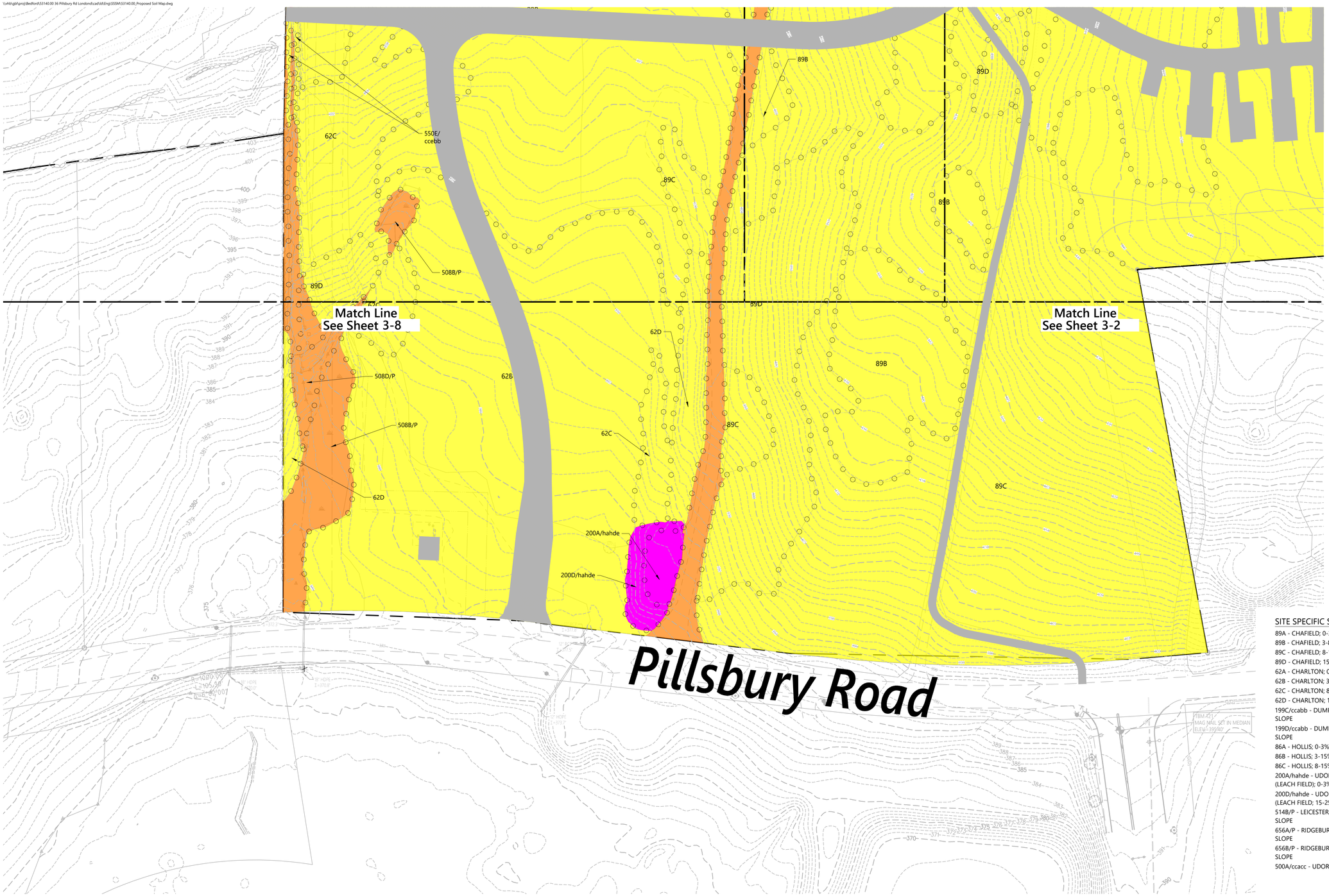
Figure 3-8: Proposed Color Coded Soil Map

36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\civil\Eng\SSSM\53140.00_Proposed Soil Map.dwg



Legend

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

NOTES:

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SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
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44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

Figure 3-9: Proposed Color Coded Soil Map

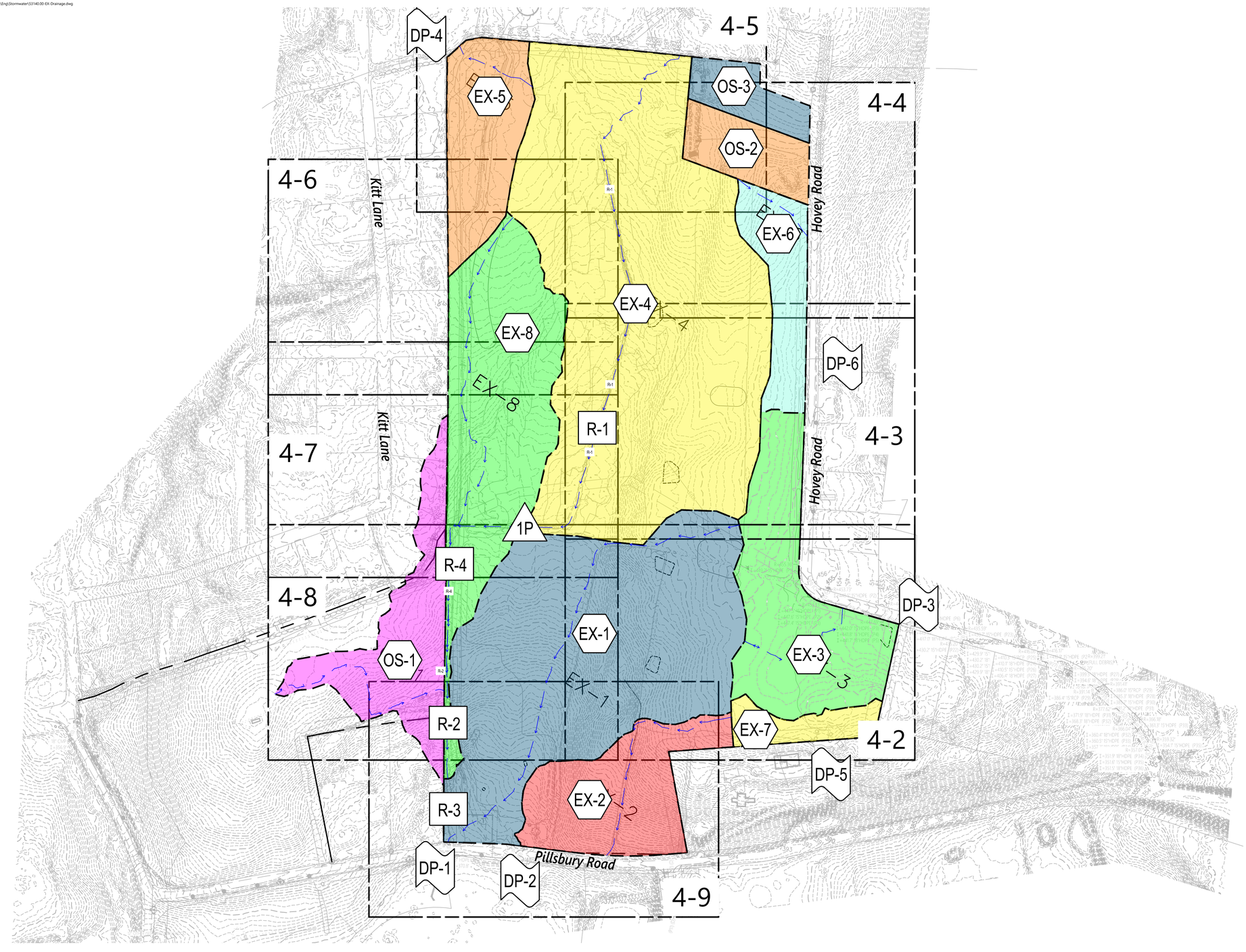
36 Pillsbury Road

Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\civil\Eng\Stormwater\53140.00-EX-Drainage.dwg



Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

Figure 4-1: Overall Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 100 200 400 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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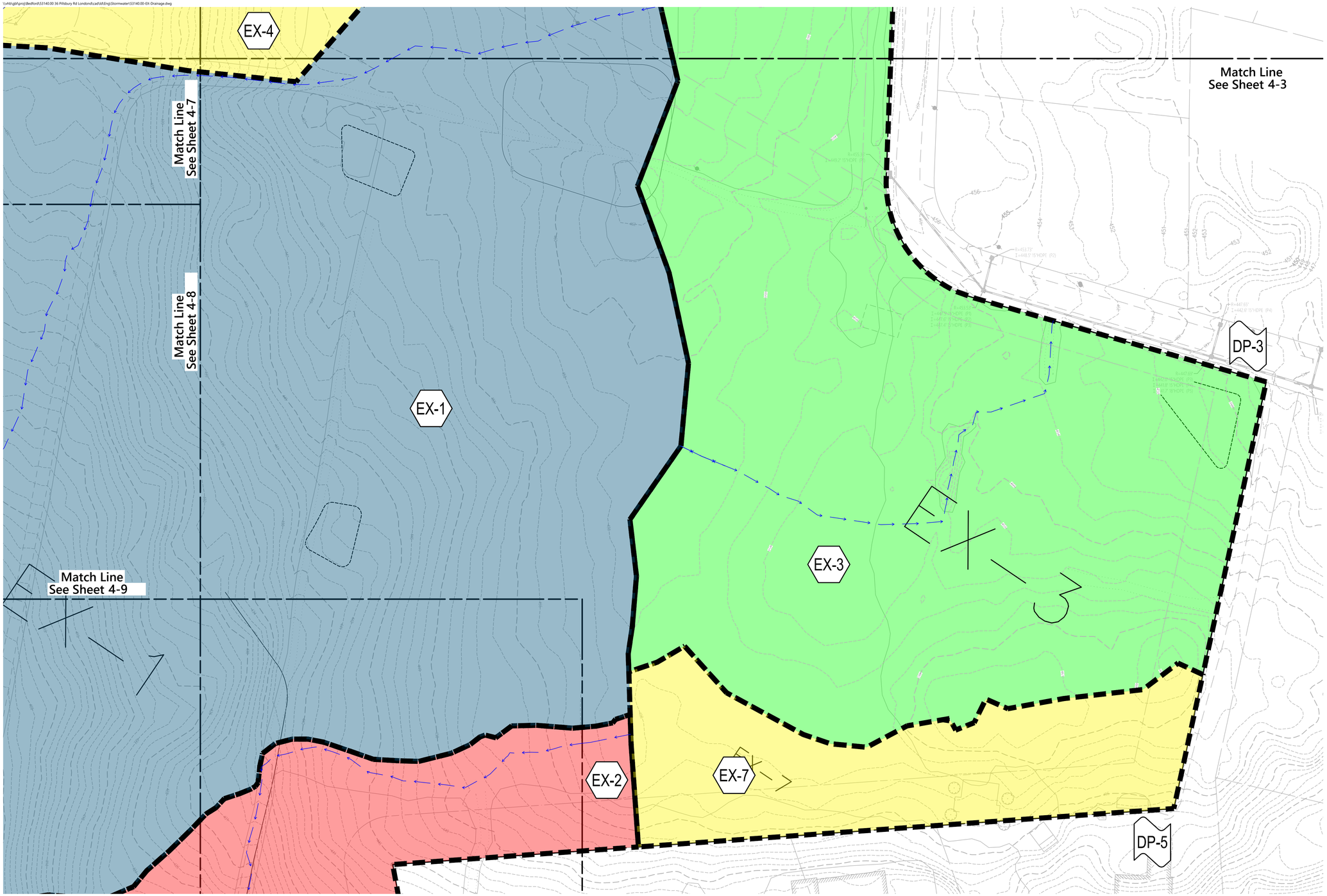

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

0 25 50 100 Feet

Figure 4-2: Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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Match Line
See Sheet 4-4

Match Line
See Sheet 4-6

Match Line
See Sheet 4-7

Match Line
See Sheet 4-2

R-1

R-1

DP-6

EX-6

EX-4

EX-3

EX-1

EX-4

Legend

SYMBOLS

X — DESIGN POINT

X — DRAINAGE AREA DESIGNATION

X — POND

X — REACH

LINETYPES

DRAINAGE AREA BOUNDARY

TIME OF CONCENTRATION FLOW LINE

0 25 50 100 Feet

Figure 4-3: Existing Conditions Drainage Plan

36 Pillsbury Road

Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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OS-3

OS-2

EX-4

R-1

EX-6

EX-4

Match Line
See Sheet 4-5

Match Line
See Sheet 4-6

Match Line
See Sheet 4-3

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

0 25 50 100 Feet

Figure 4-4: Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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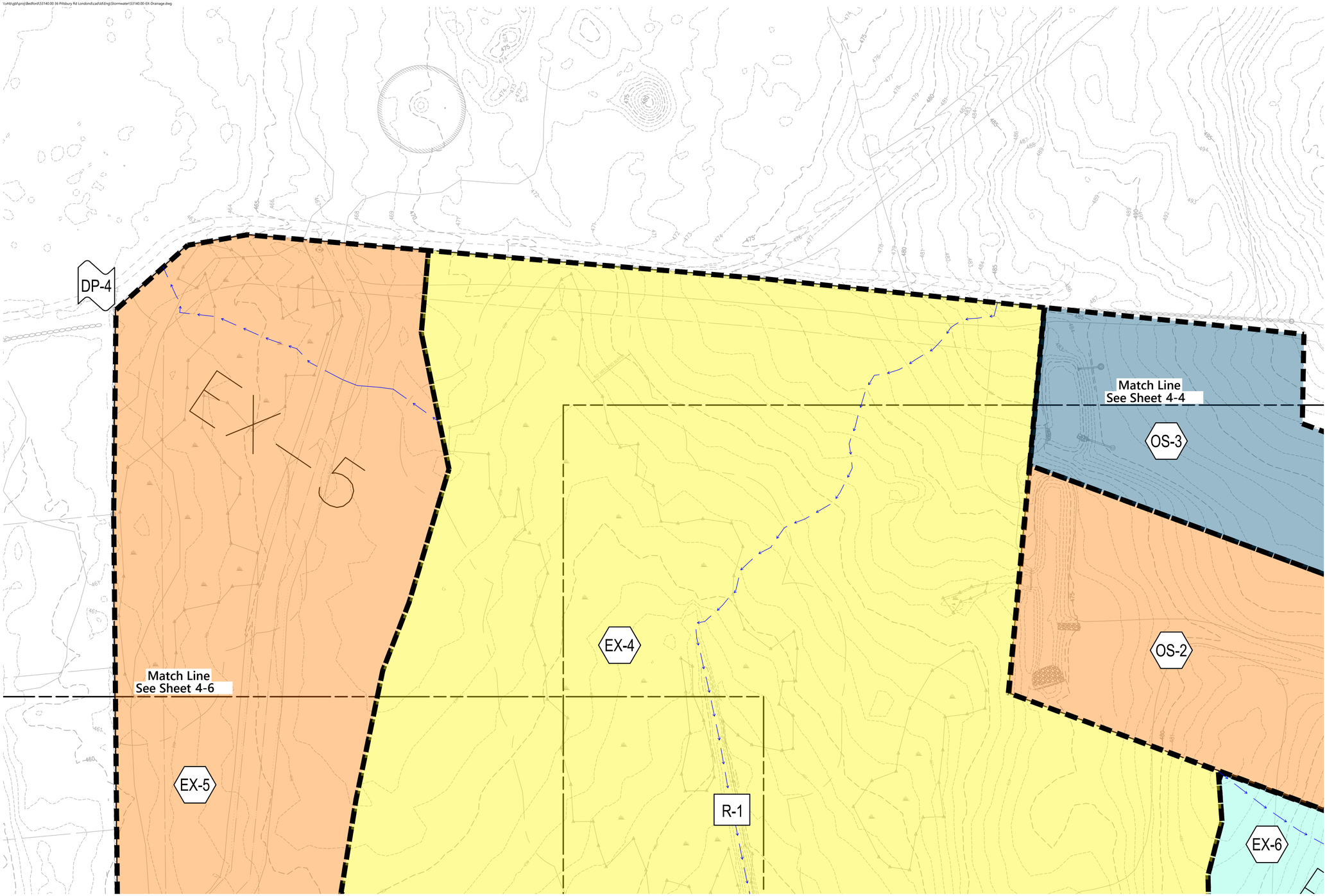

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

Figure 4-5: Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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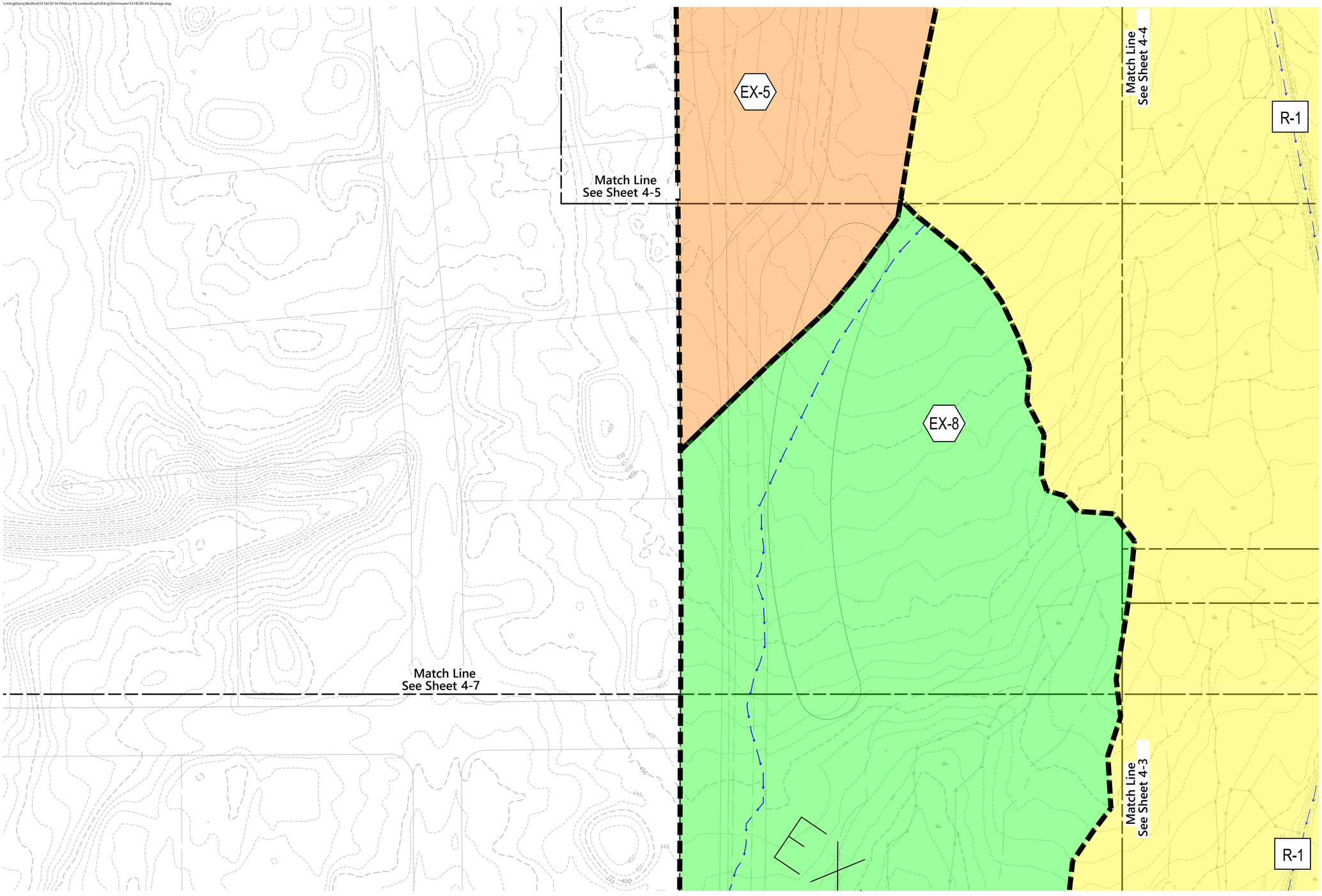

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

Figure 4-6: Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

0 25 50 100 Feet

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Match Line
See Sheet 4-6

Match Line
See Sheet 4-3

Match Line
See Sheet 4-8

Match Line
See Sheet 4-2

EX-8

EX-8

R-1

R-1

OS-1

1P

EX-1

Legend

SYMBOLS

- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND
- REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

Figure 4-7Existing Conditions Drainage Plan

36 Pillsbury Road

Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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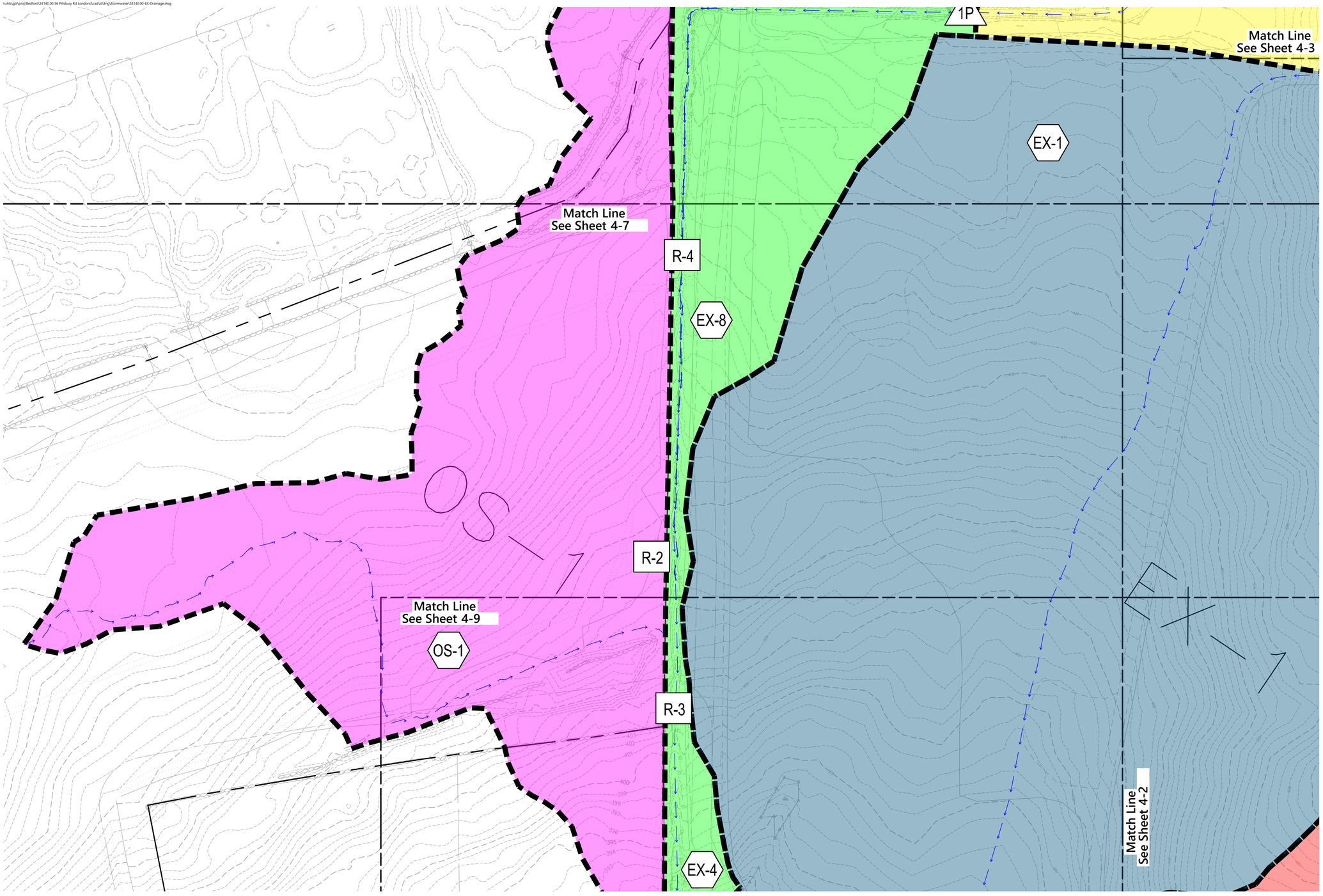

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

Figure 4-8: Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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OS-1
R-3
EX-4
Match Line
See Sheet 4-8
EX-1
EX-2
Match Line
See Sheet 4-2
DP-1
DP-2
Pillsbury Road

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE

Figure 4-9: Existing Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **NHDES - AoT Application**
Date: **November 2025**

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Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- CATCH BASIN

Figure 5: Hovey Road Existing Conditions Drainage Plan

Hovey Road
Londonderry, NH

0 100 200 Feet

Source: **VHB**
Prepared for: **RTC**
Date: **November 2025**

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Legend

SYMBOLS

- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND
- REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-1: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 200 400 Feet

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

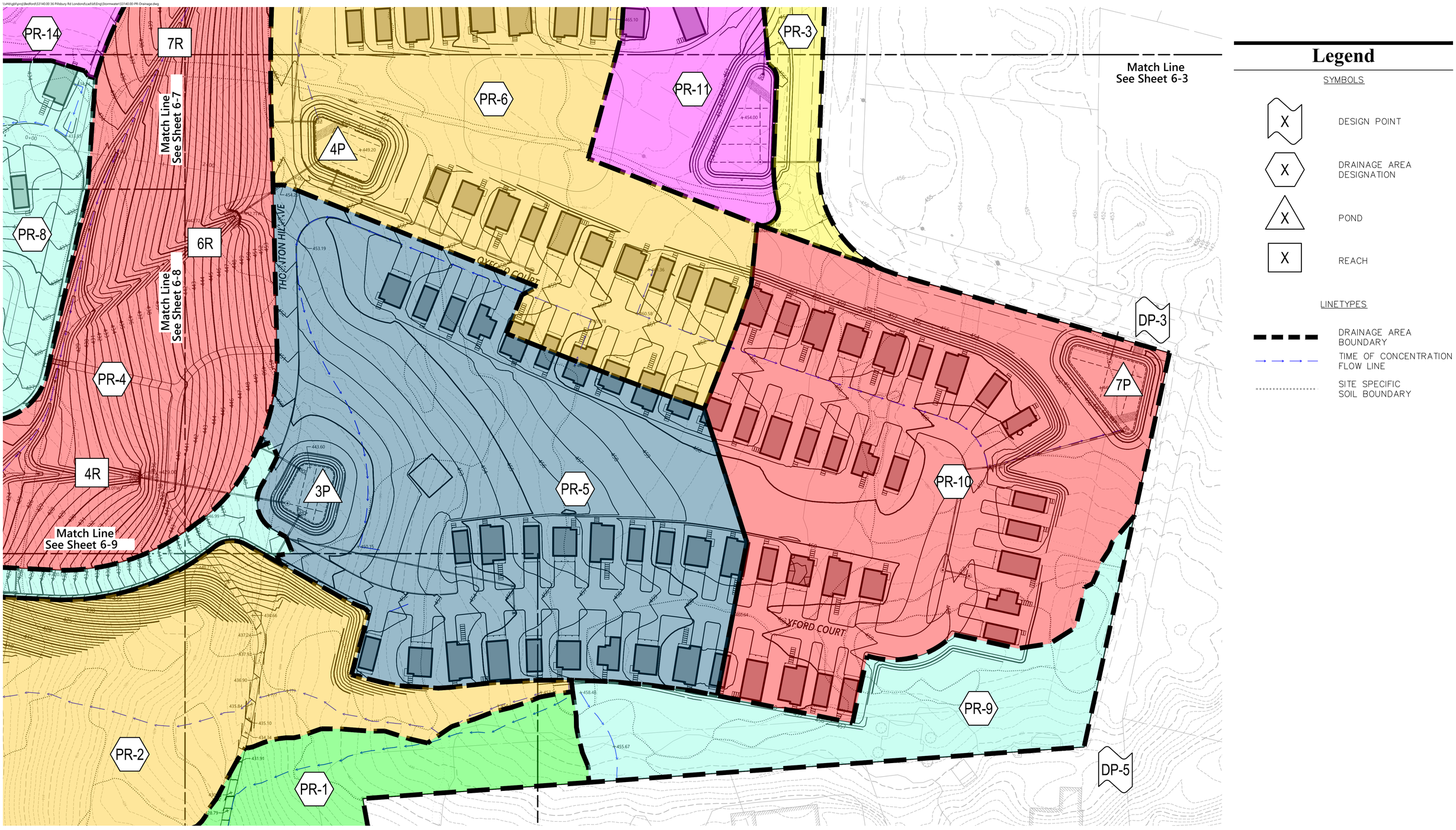

Figure 6-2: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

Source: VHB
Prepared for: Site Plan Application
Date: November 2025

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PR-20
10P
16R
PR-14
PR-18
PR-7
PR-13
PR-11
PR-3
PR-6
PR-4
7R
5P
DP-6
Match Line
See Sheet 6-4
Match Line
See Sheet 6-6
Match Line
See Sheet 6-7
Match Line
See Sheet 6-2

Legend

SYMBOLS

- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND
- REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-3: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

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OS-6
OS-5
2R
PR-15
PR-17
PR-20
PR-19
PR-14
PR-13
PR-7
16R
10P

Match Line
See Sheet 6-5

Match Line
See Sheet 6-6

Match Line
See Sheet 6-3

Legend

SYMBOLS

- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND
- REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-4: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

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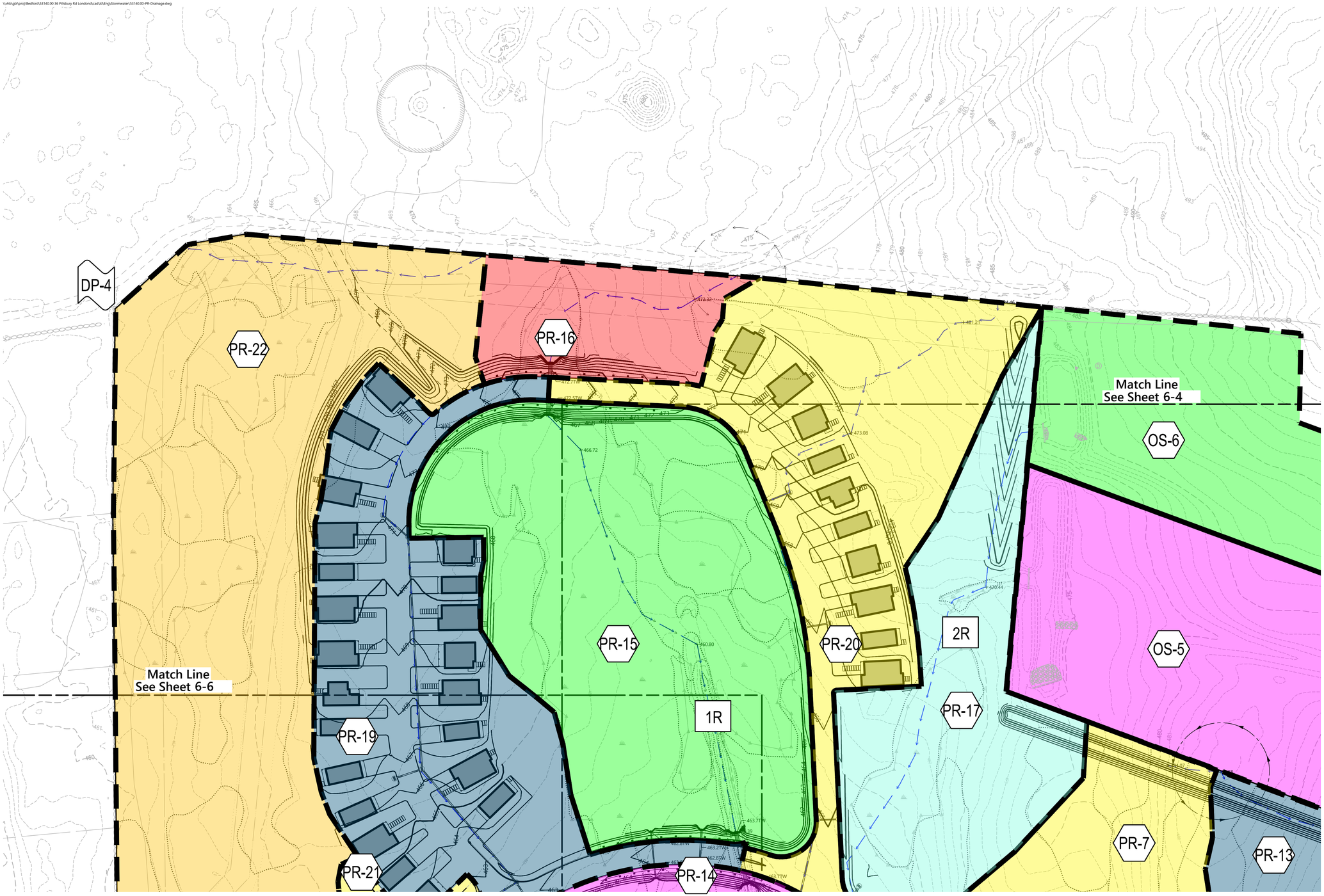

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-5: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

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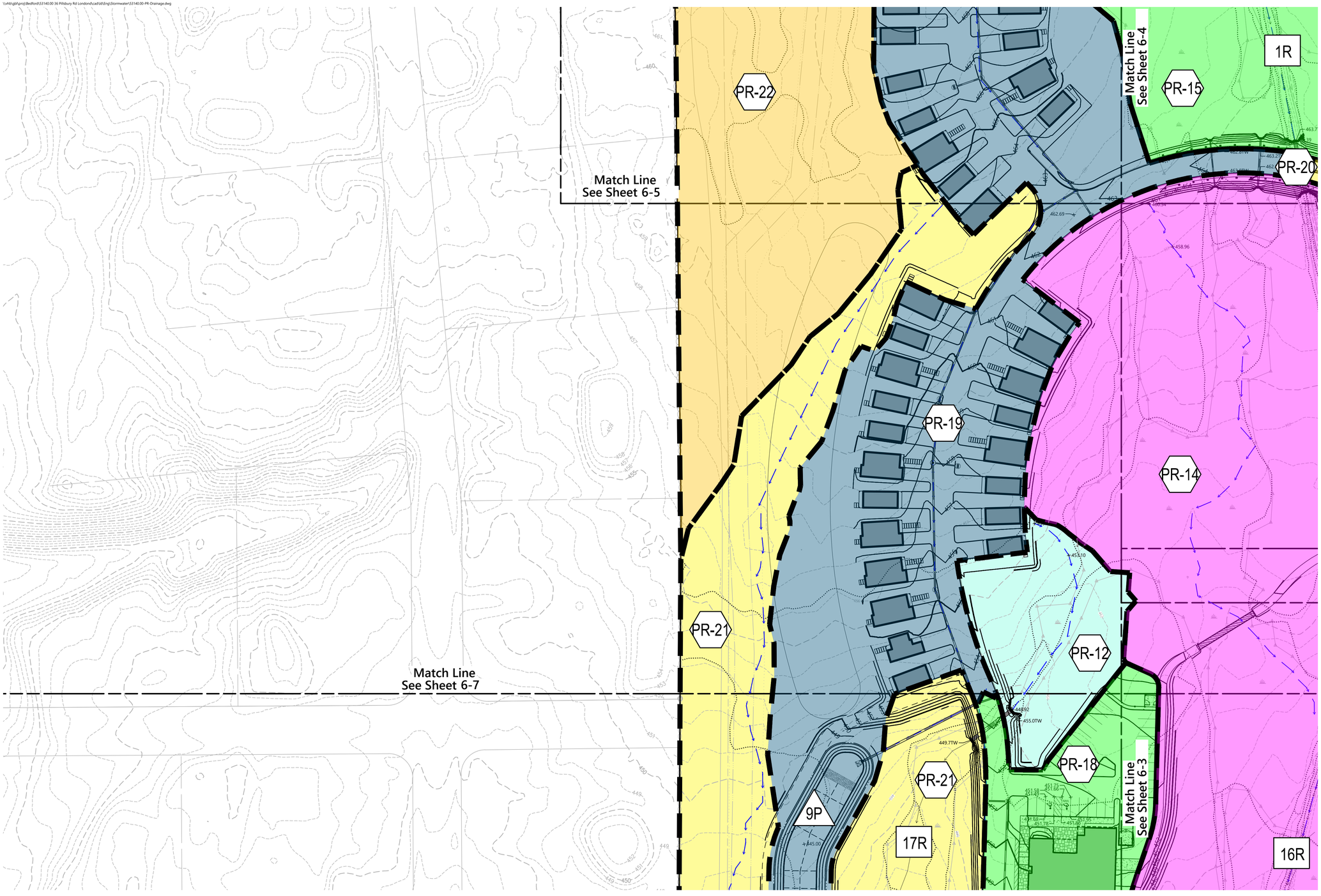

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-6: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

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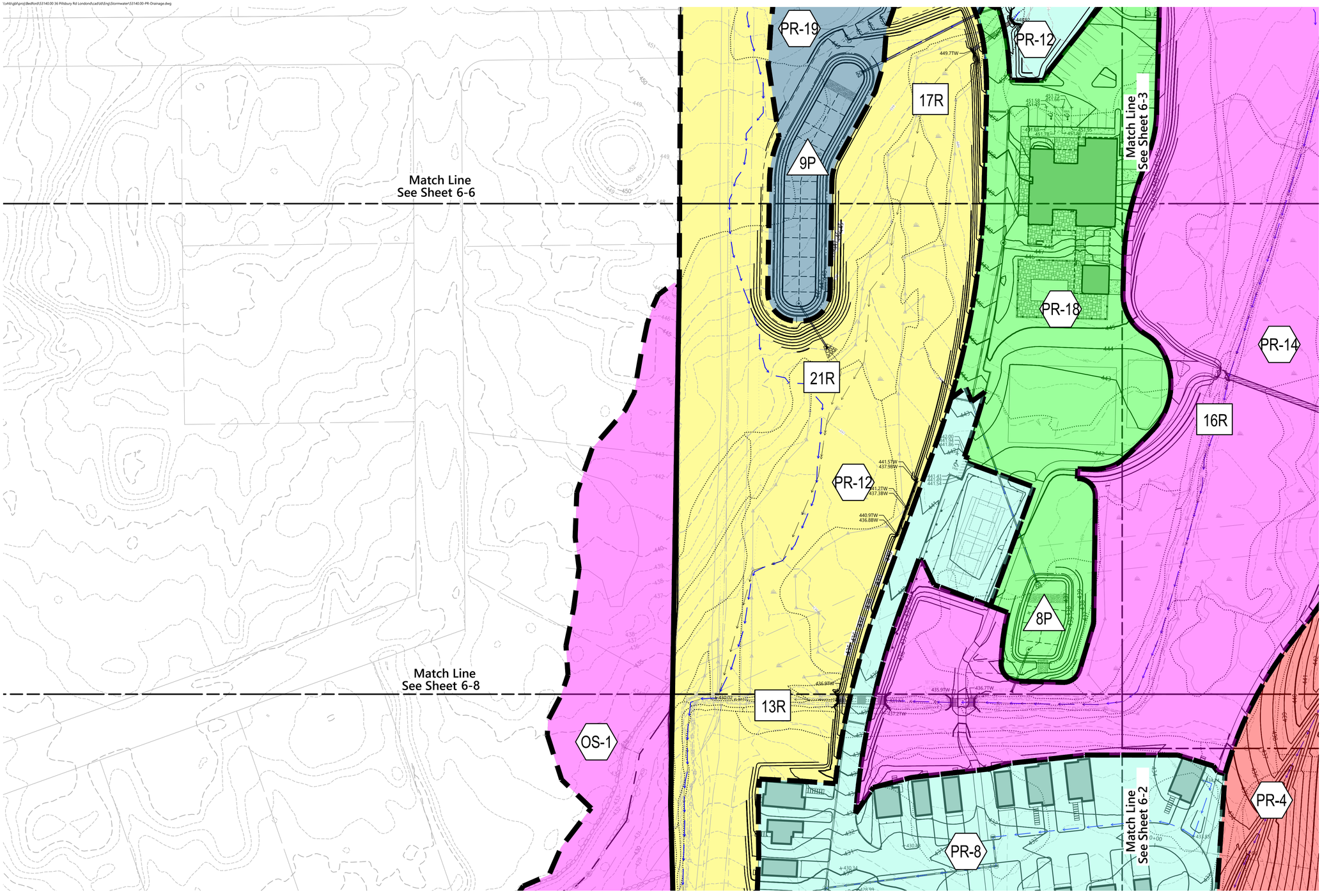

Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-7: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\dt\Eng\Stormwater\53140.00-PR-Drainage.dwg

Match Line
See Sheet 6-7

Match Line
See Sheet 6-3

Match Line
See Sheet 6-9

Match Line
See Sheet 6-2

OS-1
PR-21
PR-8
PR-14
PR-4
PR-1
PR-23
PR-24
PR-2
16R
13R
7R
6R
4R
5R
15R
6P
1P

Legend

SYMBOLS

- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND
- REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

0 25 50 100 Feet

Figure 6-8: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

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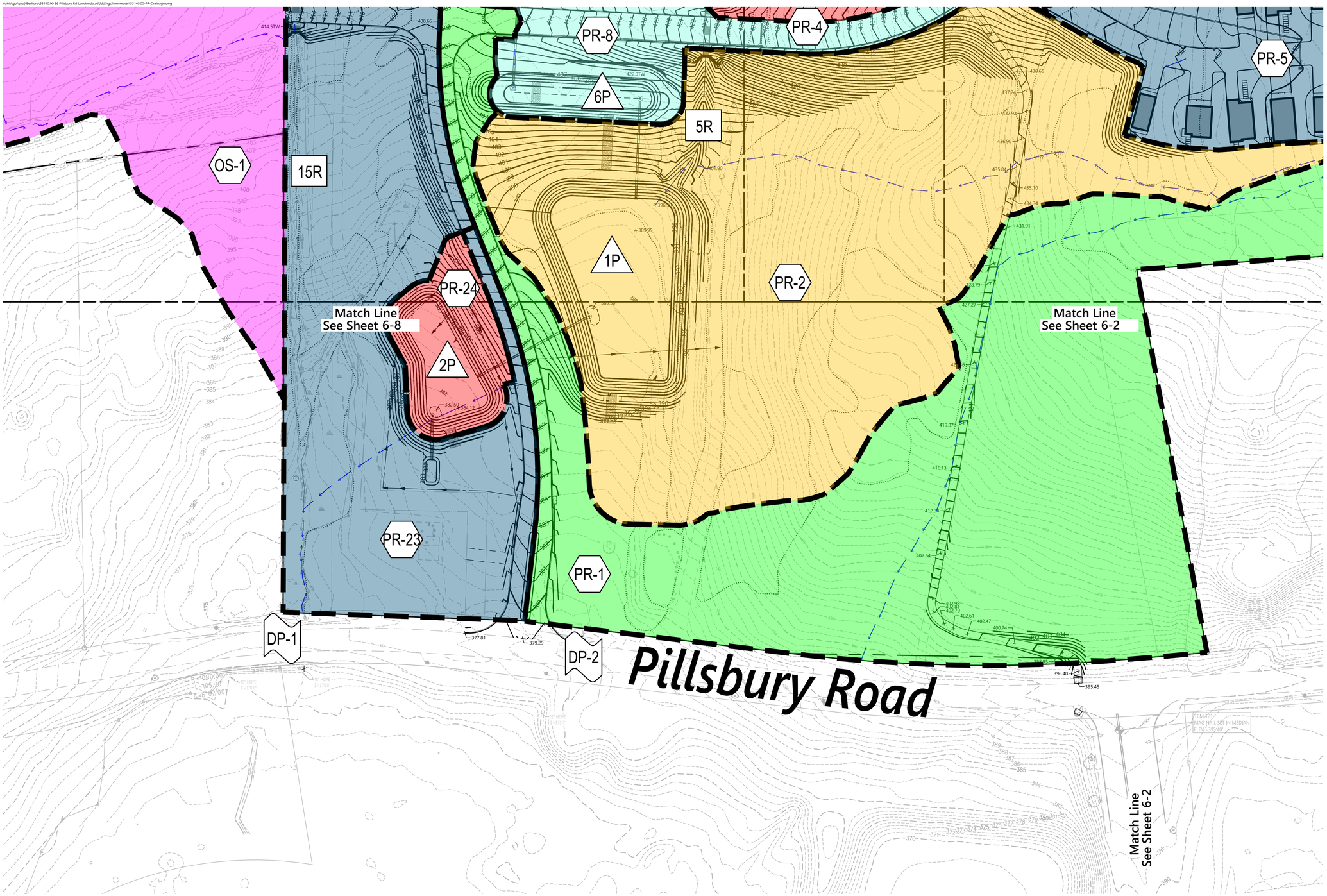


Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Figure 6-9: Overall Proposed Conditions Drainage Plan

36 Pillsbury Road
Londonderry, NH

0 25 50 100 Feet

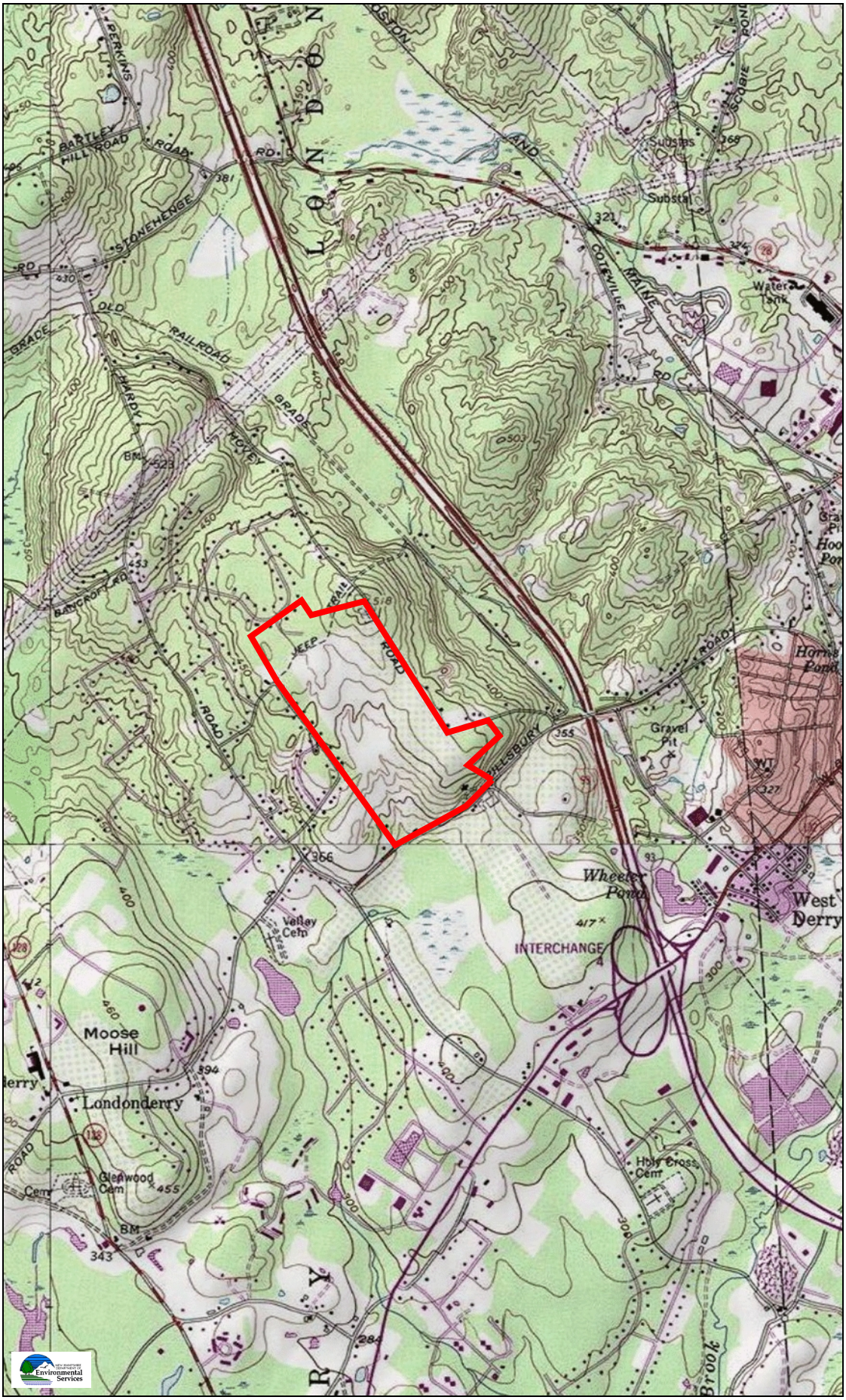
Source: **VHB**
Prepared for: **Site Plan Application**
Date: **November 2025**

Appendix A: Support Data

- USGS Map
- Web GIS Printouts
- Aerial Photograph of the Site
- BMP Worksheets
- Rainfall Data
- Geotechnical Test Pits & Location Plan
- Contech Filterra Information
- Hovey Road Drainage Worksheet

USGS Map

USGS Map



Legend

Map Scale

1: 25,000

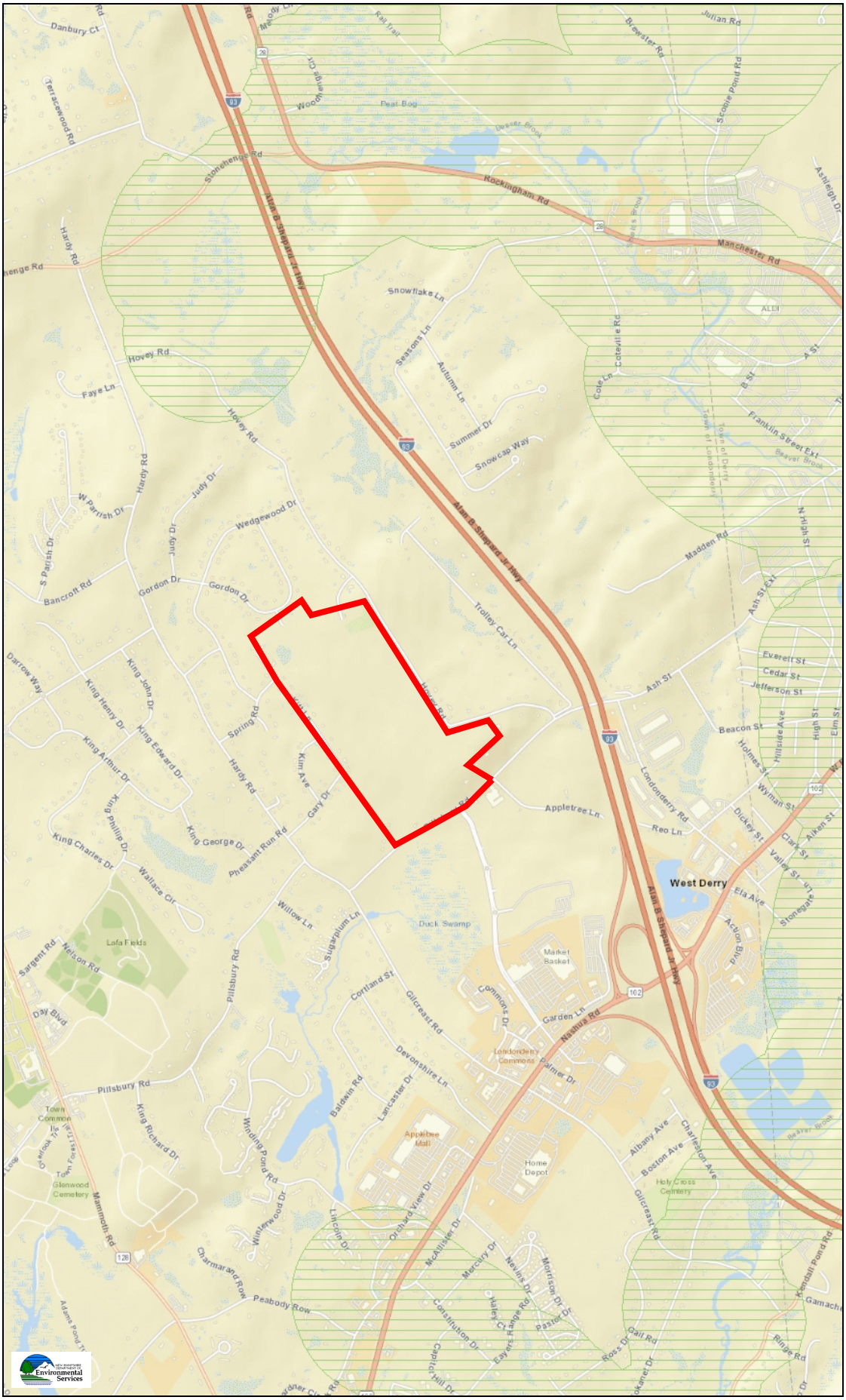
© NH DES, http://des.nh.gov

Map Generated: 10/30/2024

Notes

Web GIS Printouts

AoT Surface Water Impairments



Legend

Surface Waters with Impairn with Quarter Mile Buffer

Map Scale

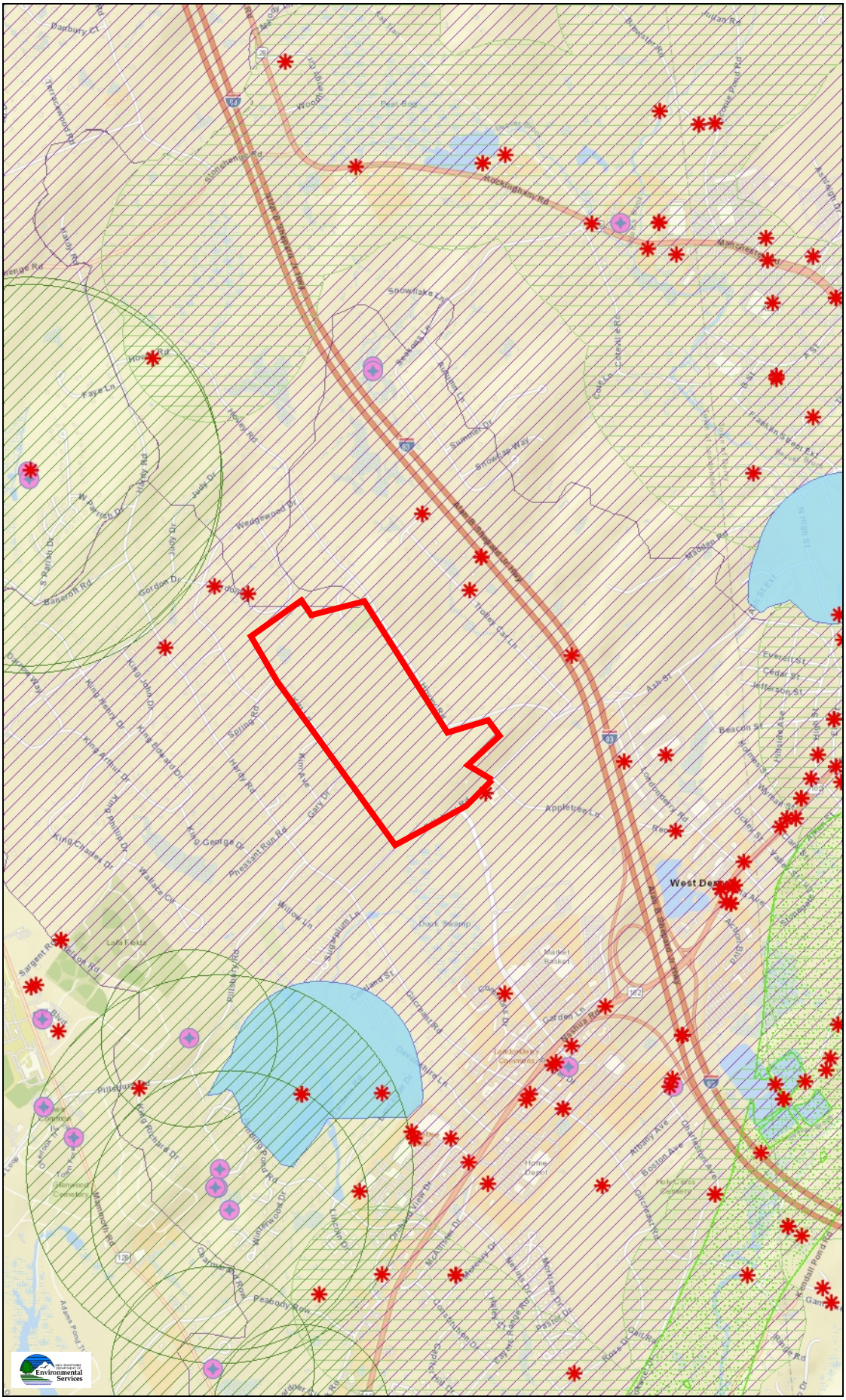
1: 25,000

© NH DES, http://des.nh.gov

Map Generated: 10/30/2024

Notes

AoT Screening Layers



Legend

- Remediation Sites
- Coastal and Great Bay Regi Communities
- Designated Rivers Quarterm Buffer
- Public Water Supply Wells
- Groundwater Classification A GA1
- Groundwater Classification A GA2
- Water Supply Intake Protect Areas
- Wellhead Protection Areas
- Class A Lakes with a Quarte Buffer
- Class A - All Features
- All Lakes, with a Quarter Mil Buffer
- Outstanding Resource Wate Watersheds
- Surface Waters with Impairm with Quarter Mile Buffer
- Watersheds with Chloride Impairments

Map Scale

1: 25,000

© NH DES, http://des.nh.gov

Map Generated: 10/30/2024

Notes

Aerial Photograph of the Site

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Eng\Stormwater\53140.00-Site Location Map.dwg



0 500 1000 2000 Feet

Site Aerial Map
36 Pillsbury Road
Londonderry, NH

December 2024

BMP Worksheets

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Pond 3P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
4.77	ac	A = Area draining to the practice	
1.37	ac	A_I = Impervious area draining to the practice	
0.29	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.31	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.47	ac-in	WQV= 1" x Rv x A	
5,342	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,335	cf	25% x WQV (check calc for sediment forebay volume)	
4,006	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
445.00	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.20	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
14.84	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
440.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
440.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
444.80	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
444.80	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
(4.80)	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
(4.80)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
447.60	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
448.60	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
16,710	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 3P: Sand Filter #3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
442.10	**2,579**	0
442.20	2,579	77
442.30	2,579	155
442.40	2,579	232
442.50	2,579	309
442.60	2,579	387
442.70	2,579	464
442.80	2,579	542
442.90	2,579	619
443.00	2,579	696
443.10	2,579	774
443.20	2,579	851
443.30	2,579	928
443.40	2,579	1,006
443.50	2,579	1,083
443.60	2,579	1,161
443.70	2,579	1,421
443.80	2,579	1,688
443.90	2,579	1,960
444.00	2,579	2,238
444.10	2,579	2,522
444.20	2,579	2,812
444.30	2,579	3,108
444.40	2,579	3,410
444.50	2,579	3,718
444.60	2,579	4,033
444.70	2,579	4,354
444.80	2,579	4,681
444.90	2,579	5,015
445.00	2,579	5,355
445.10	2,579	5,702
445.20	2,579	6,055
445.30	2,579	6,415
445.40	2,579	6,782
445.50	2,579	7,155
445.60	2,579	7,536
445.70	2,579	7,923
445.80	2,579	8,318
445.90	2,579	8,719
446.00	2,579	9,128
446.10	2,579	9,543
446.20	2,579	9,966
446.30	2,579	10,397
446.40	2,579	10,834
446.50	2,579	11,279
446.60	2,579	11,732
446.70	2,579	12,192
446.80	2,579	12,660
446.90	2,579	13,135
447.00	2,579	13,619
447.10	2,579	14,110
447.20	2,579	14,608
447.30	2,579	15,115
447.40	2,579	15,630
447.50	2,579	16,153
447.60	2,579	16,684
447.70	2,579	17,223
447.80	2,579	17,770
447.90	2,579	18,326
448.00	2,579	18,890
448.10	2,579	19,463
448.20	2,579	20,044
448.30	2,579	20,633
448.40	2,579	21,231
448.50	2,579	21,838
448.60	2,579	**22,454**

WQV = 5,342 CF

Stage-Discharge for Pond 3P: Sand Filter #3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
442.10	0.0	0.0	0.0
442.20	0.6	0.6	0.0
442.30	0.6	0.6	0.0
442.40	0.6	0.6	0.0
442.50	0.6	0.6	0.0
442.60	0.6	0.6	0.0
442.70	0.6	0.6	0.0
442.80	0.6	0.6	0.0
442.90	0.6	0.6	0.0
443.00	0.6	0.6	0.0
443.10	0.6	0.6	0.0
443.20	0.6	0.6	0.0
443.30	0.6	0.6	0.0
443.40	0.6	0.6	0.0
443.50	0.6	0.6	0.0
443.60	0.6	0.6	0.0
443.70	0.6	0.6	0.0
443.80	0.6	0.6	0.0
443.90	0.6	0.6	0.0
444.00	0.6	0.6	0.0
444.10	0.6	0.6	0.0
444.20	0.6	0.6	0.0
444.30	0.6	0.6	0.0
444.40	0.6	0.6	0.0
444.50	0.6	0.6	0.0
444.60	0.6	0.6	0.0
444.70	0.6	0.6	0.0
444.80	0.6	0.6	0.0
444.90	0.6	0.6	0.0
445.00	0.6	0.6	0.0
445.10	0.6	0.6	0.0
445.20	0.6	0.6	0.0
445.30	0.6	0.6	0.0
445.40	1.8	1.8	0.0
445.50	2.3	2.3	0.0
445.60	2.7	2.7	0.0
445.70	3.0	3.0	0.0
445.80	3.3	3.3	0.0
445.90	3.5	3.5	0.0
446.00	3.8	3.8	0.0
446.10	4.0	4.0	0.0
446.20	4.2	4.2	0.0
446.30	4.4	4.4	0.0
446.40	4.6	4.6	0.0
446.50	4.7	4.7	0.0
446.60	4.9	4.9	0.0
446.70	5.1	5.1	0.0
446.80	5.2	5.2	0.0
446.90	5.4	5.4	0.0
447.00	5.5	5.5	0.0
447.10	5.7	5.7	0.0
447.20	5.8	5.8	0.0
447.30	5.9	5.9	0.0
447.40	6.1	6.1	0.0
447.50	6.2	6.2	0.0
447.60	6.3	6.3	0.0
447.70	7.2	6.5	0.8
447.80	8.8	6.6	2.2
447.90	10.8	6.7	4.1
448.00	13.3	6.8	6.5
448.10	16.2	6.9	9.3
448.20	19.6	7.0	12.5
448.30	22.9	7.1	15.8
448.40	26.5	7.3	19.2
448.50	30.3	7.4	22.9
448.60	**34.3**	**7.5**	**26.8**

WQV = 0.6 CFS

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Pond 4P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
4.22	ac	A = Area draining to the practice	
1.51	ac	A_I = Impervious area draining to the practice	
0.36	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.37	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.57	ac-in	WQV= 1" x Rv x A	
5,699	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,425	cf	25% x WQV (check calc for sediment forebay volume)	
4,274	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
450.30	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.20	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
15.83	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
446.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
446.50	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
445.80	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
445.80	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
0.70	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
0.70	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
451.10	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
452.10	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
10,317	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
24.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 4P: Sand Filter #4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
447.70	3,604	0
447.75	3,604	54
447.80	3,604	108
447.85	3,604	162
447.90	3,604	216
447.95	3,604	270
448.00	3,604	324
448.05	3,604	378
448.10	3,604	432
448.15	3,604	487
448.20	3,604	541
448.25	3,604	595
448.30	3,604	649
448.35	3,604	703
448.40	3,604	757
448.45	3,604	811
448.50	3,604	865
448.55	3,604	919
448.60	3,604	973
448.65	3,604	1,027
448.70	3,604	1,081
448.75	3,604	1,135
448.80	3,604	1,189
448.85	3,604	1,243
448.90	3,604	1,297
448.95	3,604	1,352
449.00	3,604	1,406
449.05	3,604	1,460
449.10	3,604	1,514
449.15	3,604	1,568
449.20	**3,604**	1,622
449.25	3,604	1,803
449.30	3,604	1,986
449.35	3,604	2,170
449.40	3,604	2,357
449.45	3,604	2,545
449.50	3,604	2,736
449.55	3,604	2,928
449.60	3,604	3,121
449.65	3,604	3,317
449.70	3,604	3,515
449.75	3,604	3,714
449.80	3,604	3,916
449.85	3,604	4,119
449.90	3,604	4,324
449.95	3,604	4,531
450.00	3,604	4,740
450.05	3,604	4,951
450.10	3,604	5,164
450.15	3,604	5,379
450.20	3,604	5,595
450.25	3,604	5,814
450.30	3,604	6,035
450.35	3,604	6,258
450.40	3,604	6,482
450.45	3,604	6,709
450.50	3,604	6,938
450.55	3,604	7,168
450.60	3,604	7,401
450.65	3,604	7,636
450.70	3,604	7,873
450.75	3,604	8,112
450.80	3,604	8,353
450.85	3,604	8,596
450.90	3,604	8,841
450.95	3,604	9,088
451.00	3,604	9,337
451.05	3,604	9,589
451.10	3,604	9,842
451.15	3,604	10,098
451.20	3,604	10,356
451.25	3,604	10,616
451.30	3,604	10,878
451.35	3,604	11,142
451.40	3,604	11,408
451.45	3,604	11,677
451.50	3,604	11,948
451.55	3,604	12,221
451.60	3,604	12,496
451.65	3,604	12,773
451.70	3,604	13,053
451.75	3,604	13,335
451.80	3,604	13,619
451.85	3,604	13,905
451.90	3,604	14,194
451.95	3,604	14,485
452.00	3,604	14,778
452.05	3,604	15,074
452.10	3,604	**15,371**

WQV = 5,699 CF

Stage-Discharge for Pond 4P: Sand Filter #4

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
447.70	0.0	0.0	0.0
447.75	0.6	0.6	0.0
447.80	0.6	0.6	0.0
447.85	0.6	0.6	0.0
447.90	0.6	0.6	0.0
447.95	0.6	0.6	0.0
448.00	0.7	0.7	0.0
448.05	0.7	0.7	0.0
448.10	0.7	0.7	0.0
448.15	0.7	0.7	0.0
448.20	0.7	0.7	0.0
448.25	0.7	0.7	0.0
448.30	0.8	0.8	0.0
448.35	0.8	0.8	0.0
448.40	0.8	0.8	0.0
448.45	0.8	0.8	0.0
448.50	0.8	0.8	0.0
448.55	0.8	0.8	0.0
448.60	0.8	0.8	0.0
448.65	0.8	0.8	0.0
448.70	0.8	0.8	0.0
448.75	0.8	0.8	0.0
448.80	0.8	0.8	0.0
448.85	0.8	0.8	0.0
448.90	0.8	0.8	0.0
448.95	0.8	0.8	0.0
449.00	0.8	0.8	0.0
449.05	0.8	0.8	0.0
449.10	0.8	0.8	0.0
449.15	0.8	0.8	0.0
449.20	0.8	0.8	0.0
449.25	0.8	0.8	0.0
449.30	0.8	0.8	0.0
449.35	0.8	0.8	0.0
449.40	0.8	0.8	0.0
449.45	0.8	0.8	0.0
449.50	0.8	0.8	0.0
449.55	0.8	0.8	0.0
449.60	0.8	0.8	0.0
449.65	0.8	0.8	0.0
449.70	0.8	0.8	0.0
449.75	0.8	0.8	0.0
449.80	0.8	0.8	0.0
449.85	0.8	0.8	0.0
449.90	0.8	0.8	0.0
449.95	0.8	0.8	0.0
450.00	0.8	0.8	0.0
450.05	0.8	0.8	0.0
450.10	0.8	0.8	0.0
450.15	0.8	0.8	0.0
450.20	0.8	0.8	0.0
450.25	0.8	0.8	0.0
450.30	0.8	0.8	0.0
450.35	1.1	1.1	0.0
450.40	1.5	1.5	0.0
450.45	2.0	2.0	0.0
450.50	2.7	2.7	0.0
450.55	3.4	3.4	0.0
450.60	4.2	4.2	0.0
450.65	5.1	5.1	0.0
450.70	6.0	6.0	0.0
450.75	7.0	7.0	0.0
450.80	8.1	8.1	0.0
450.85	9.2	9.2	0.0
450.90	10.4	10.4	0.0
450.95	11.6	11.6	0.0
451.00	12.9	12.9	0.0
451.05	13.9	13.9	0.0
451.10	14.4	14.4	0.0
451.15	14.8	14.8	0.0
451.20	15.2	15.2	0.0
451.25	15.9	15.6	0.3
451.30	16.7	16.0	0.8
451.35	17.8	16.3	1.4
451.40	18.7	16.5	2.2
451.45	19.7	16.5	3.1
451.50	20.7	16.6	4.1
451.55	21.9	16.6	5.3
451.60	23.2	16.7	6.5
451.65	24.6	16.7	7.8
451.70	26.1	16.8	9.3
451.75	27.7	16.8	10.9
451.80	29.4	16.9	12.5
451.85	31.1	16.9	14.1
451.90	32.8	17.0	15.8
451.95	34.5	17.0	17.5
452.00	36.3	17.1	19.2
452.05	38.2	17.2	21.1
452.10	**40.1**	**17.2**	**22.9**

WQV = 0.8 CFS

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Pond 5P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
9.26	ac	A = Area draining to the practice	
2.99	ac	A_I = Impervious area draining to the practice	
0.32	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.34	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
3.15	ac-in	WQV= 1" x Rv x A	
11,449	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,862	cf	25% x WQV (check calc for sediment forebay volume)	
8,587	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
451.15	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
1.50	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
4.24	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
446.60	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
446.60	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
447.25	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
444.59	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
2.01	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
(0.65)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
452.17	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
453.20	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
11,449	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
NO	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 5P: Sand Filter #5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
447.75	**4,500**	0
447.85	4,500	135
447.95	4,500	270
448.05	4,500	405
448.15	4,500	540
448.25	4,500	675
448.35	4,500	810
448.45	4,500	945
448.55	4,500	1,080
448.65	4,500	1,215
448.75	4,500	1,350
448.85	4,500	1,485
448.95	4,500	1,620
449.05	4,500	1,755
449.15	4,500	1,890
449.25	4,500	2,025
449.35	4,500	2,479
449.45	4,500	2,941
449.55	4,500	3,410
449.65	4,500	3,887
449.75	4,500	4,373
449.85	4,500	4,866
449.95	4,500	5,368
450.05	4,500	5,878
450.15	4,500	6,396
450.25	4,500	6,922
450.35	4,500	7,457
450.45	4,500	8,000
450.55	4,500	8,551
450.65	4,500	9,111
450.75	4,500	9,680
450.85	4,500	10,258
450.95	4,500	10,844
451.05	4,500	11,439
451.15	4,500	12,043
451.25	4,500	12,656
451.35	4,500	13,279
451.45	4,500	13,910
451.55	4,500	14,550
451.65	4,500	15,200
451.75	4,500	15,859
451.85	4,500	16,527
451.95	4,500	17,205
452.05	4,500	17,892
452.15	4,500	18,589
452.25	4,500	19,295
452.35	4,500	20,011
452.45	4,500	20,737
452.55	4,500	21,473
452.65	4,500	22,218
452.75	4,500	22,974
452.85	4,500	23,740
452.95	4,500	24,515
453.05	4,500	25,301
453.15	4,500	**26,097**

WQV = 11,449 CF

Stage-Discharge for Pond 5P: Sand Filter #5

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
447.75	0.0	0.0	0.0
447.85	0.5	0.5	0.0
447.95	0.5	0.5	0.0
448.05	0.6	0.6	0.0
448.15	0.6	0.6	0.0
448.25	0.6	0.6	0.0
448.35	0.6	0.6	0.0
448.45	0.7	0.7	0.0
448.55	0.7	0.7	0.0
448.65	0.7	0.7	0.0
448.75	0.7	0.7	0.0
448.85	0.8	0.8	0.0
448.95	0.8	0.8	0.0
449.05	0.8	0.8	0.0
449.15	0.8	0.8	0.0
449.25	0.8	0.8	0.0
449.35	0.9	0.9	0.0
449.45	0.9	0.9	0.0
449.55	0.9	0.9	0.0
449.65	0.9	0.9	0.0
449.75	0.9	0.9	0.0
449.85	0.9	0.9	0.0
449.95	1.0	1.0	0.0
450.05	1.0	1.0	0.0
450.15	1.0	1.0	0.0
450.25	1.0	1.0	0.0
450.35	1.0	1.0	0.0
450.45	1.0	1.0	0.0
450.55	1.0	1.0	0.0
450.65	1.0	1.0	0.0
450.75	1.0	1.0	0.0
450.85	1.0	1.0	0.0
450.95	1.0	1.0	0.0
451.05	1.0	1.0	0.0
451.15	1.5	1.5	0.0
451.25	3.4	3.4	0.0
451.35	6.2	6.2	0.0
451.45	9.6	9.6	0.0
451.55	13.4	13.4	0.0
451.65	17.8	17.8	0.0
451.75	22.6	22.6	0.0
451.85	27.7	27.7	0.0
451.95	33.2	33.2	0.0
452.05	39.1	39.1	0.0
452.15	45.3	45.3	0.0
452.25	48.3	48.0	0.3
452.35	50.0	48.6	1.4
452.45	52.3	49.1	3.1
452.55	55.0	49.7	5.3
452.65	58.1	50.2	7.8
452.75	61.6	50.8	10.9
452.85	65.4	51.3	14.1
452.95	69.3	51.8	17.5
453.05	73.4	52.3	21.1
453.15	**77.7**	**52.9**	**24.8**

WQV = 1.5 CFS

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Pond 6P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
6.49	ac	A = Area draining to the practice	
2.78	ac	A_I = Impervious area draining to the practice	
0.43	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.44	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
2.83	ac-in	WQV= 1" x Rv x A	
10,260	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,565	cf	25% x WQV (check calc for sediment forebay volume)	
7,695	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
405.20	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.70	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
8.14	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
401.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
401.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
401.54	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
401.54	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
(0.54)	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
(0.54)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
406.03	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
407.10	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
15,230	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
24.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
NO	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 6P: Sand Filter #6

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
401.50	**2,990**	0
401.60	2,990	90
401.70	2,990	179
401.80	2,990	269
401.90	2,990	359
402.00	2,990	449
402.10	2,990	538
402.20	2,990	628
402.30	2,990	718
402.40	2,990	807
402.50	2,990	897
402.60	2,990	987
402.70	2,990	1,076
402.80	2,990	1,166
402.90	2,990	1,256
403.00	2,990	1,346
403.10	2,990	1,649
403.20	2,990	1,963
403.30	2,990	2,285
403.40	2,990	2,617
403.50	2,990	2,959
403.60	2,990	3,311
403.70	2,990	3,672
403.80	2,990	4,044
403.90	2,990	4,426
404.00	2,990	4,818
404.10	2,990	5,221
404.20	2,990	5,635
404.30	2,990	6,059
404.40	2,990	6,494
404.50	2,990	6,941
404.60	2,990	7,398
404.70	2,990	7,867
404.80	2,990	8,347
404.90	2,990	8,839
405.00	2,990	9,343
405.10	2,990	9,859
405.20	2,990	10,387
405.30	2,990	10,927
405.40	2,990	11,479
405.50	2,990	12,044
405.60	2,990	12,621
405.70	2,990	13,211
405.80	2,990	13,815
405.90	2,990	14,431
406.00	2,990	15,060
406.10	2,990	15,702
406.20	2,990	16,358
406.30	2,990	17,028
406.40	2,990	17,711
406.50	2,990	18,409
406.60	2,990	19,120
406.70	2,990	19,845
406.80	2,990	20,585
406.90	2,990	21,339
407.00	2,990	22,107
407.10	2,990	**22,891**

WQV = 10,260 CF

Stage-Discharge for Pond 6P: Sand Filter #6

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
401.50	0.0	0.0	0.0
401.60	0.3	0.3	0.0
401.70	0.3	0.3	0.0
401.80	0.4	0.4	0.0
401.90	0.4	0.4	0.0
402.00	0.5	0.5	0.0
402.10	0.5	0.5	0.0
402.20	0.6	0.6	0.0
402.30	0.6	0.6	0.0
402.40	0.6	0.6	0.0
402.50	0.7	0.7	0.0
402.60	0.7	0.7	0.0
402.70	0.7	0.7	0.0
402.80	0.7	0.7	0.0
402.90	0.7	0.7	0.0
403.00	0.7	0.7	0.0
403.10	0.7	0.7	0.0
403.20	0.7	0.7	0.0
403.30	0.7	0.7	0.0
403.40	0.7	0.7	0.0
403.50	0.7	0.7	0.0
403.60	0.7	0.7	0.0
403.70	0.7	0.7	0.0
403.80	0.7	0.7	0.0
403.90	0.7	0.7	0.0
404.00	0.7	0.7	0.0
404.10	0.7	0.7	0.0
404.20	0.7	0.7	0.0
404.30	0.7	0.7	0.0
404.40	0.7	0.7	0.0
404.50	0.7	0.7	0.0
404.60	0.7	0.7	0.0
404.70	0.7	0.7	0.0
404.80	0.7	0.7	0.0
404.90	0.7	0.7	0.0
405.00	0.7	0.7	0.0
405.10	0.7	0.7	0.0
405.20	0.7	0.7	0.0
405.30	0.7	0.7	0.0
405.40	2.0	2.0	0.0
405.50	4.4	4.4	0.0
405.60	7.4	7.4	0.0
405.70	11.1	11.1	0.0
405.80	15.2	15.2	0.0
405.90	19.8	19.8	0.0
406.00	24.8	24.8	0.0
406.10	30.1	30.1	0.0
406.20	36.6	35.8	0.8
406.30	39.3	37.1	2.2
406.40	41.5	37.4	4.1
406.50	44.1	37.7	6.5
406.60	47.3	38.0	9.3
406.70	50.8	38.3	12.5
406.80	54.3	38.6	15.8
406.90	58.1	38.9	19.2
407.00	62.1	39.2	22.9
407.10	**66.2**	**39.4**	**26.8**

WQV = 0.7 CFS

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Pond 7P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
4.35	ac	A = Area draining to the practice	
1.35	ac	A_I = Impervious area draining to the practice	
0.31	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.33	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.43	ac-in	WQV= 1" x Rv x A	
5,200	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,300	cf	25% x WQV (check calc for sediment forebay volume)	
3,900	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
447.25	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.30	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
9.63	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
443.83	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
443.83	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
446.35	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
446.35	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
(2.52)	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
(2.52)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
449.00	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
450.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
15,583	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 7P: Sand Filter #7

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
445.00	3,992	0
445.05	3,992	60
445.10	3,992	120
445.15	3,992	180
445.20	3,992	240
445.25	3,992	299
445.30	3,992	359
445.35	3,992	419
445.40	3,992	479
445.45	3,992	539
445.50	3,992	599
445.55	3,992	659
445.60	3,992	719
445.65	3,992	778
445.70	3,992	838
445.75	3,992	898
445.80	3,992	958
445.85	3,992	1,018
445.90	3,992	1,078
445.95	3,992	1,138
446.00	3,992	1,198
446.05	3,992	1,257
446.10	3,992	1,317
446.15	3,992	1,377
446.20	3,992	1,437
446.25	3,992	1,497
446.30	3,992	1,557
446.35	3,992	1,617
446.40	3,992	1,677
446.45	3,992	1,737
446.50	8,401	1,796
446.55	8,442	2,018
446.60	8,483	2,241
446.65	8,524	2,467
446.70	8,566	2,695
446.75	8,607	2,924
446.80	8,649	3,156
446.85	8,691	3,390
446.90	8,733	3,626
446.95	8,776	3,864
447.00	8,818	4,104
447.05	8,861	4,347
447.10	8,904	4,591
447.15	8,947	4,838
447.20	8,990	5,087
447.25	9,034	5,338
447.30	9,078	5,591
447.35	9,122	5,846
447.40	9,166	6,104
447.45	9,210	6,364
447.50	9,254	6,626
447.55	9,299	6,890
447.60	9,344	7,157
447.65	9,389	7,425
447.70	9,434	7,696
447.75	9,480	7,969
447.80	9,525	8,245
447.85	9,571	8,523
447.90	9,617	8,803
447.95	9,663	9,085
448.00	9,709	9,370
448.05	9,756	9,657
448.10	9,803	9,946
448.15	9,850	10,238
448.20	9,897	10,532
448.25	9,944	10,829
448.30	9,991	11,127
448.35	10,039	11,428
448.40	10,087	11,732
448.45	10,135	12,038
448.50	10,183	12,346
448.55	10,232	12,657
448.60	10,280	12,970
448.65	10,329	13,286
448.70	10,378	13,604
448.75	10,427	13,925
448.80	10,477	14,248
448.85	10,526	14,573
448.90	10,576	14,901
448.95	10,626	15,231
449.00	10,676	15,564
449.05	10,726	15,900
449.10	10,777	16,238
449.15	10,827	16,578
449.20	10,878	16,921
449.25	10,929	17,267
449.30	10,981	17,615
449.35	11,032	17,966
449.40	11,084	18,319
449.45	11,136	18,675
449.50	11,188	19,033
449.55	11,240	19,395
449.60	11,292	19,758
449.65	11,345	20,125
449.70	11,397	20,494

WQV = 5,200 CF

Stage-Discharge for Pond 7P: Sand Filter #7

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
445.00	0.0	0.0	0.0
445.05	0.2	0.2	0.0
445.10	0.2	0.2	0.0
445.15	0.2	0.2	0.0
445.20	0.2	0.2	0.0
445.25	0.2	0.2	0.0
445.30	0.2	0.2	0.0
445.35	0.2	0.2	0.0
445.40	0.2	0.2	0.0
445.45	0.2	0.2	0.0
445.50	0.2	0.2	0.0
445.55	0.2	0.2	0.0
445.60	0.2	0.2	0.0
445.65	0.2	0.2	0.0
445.70	0.2	0.2	0.0
445.75	0.2	0.2	0.0
445.80	0.2	0.2	0.0
445.85	0.2	0.2	0.0
445.90	0.2	0.2	0.0
445.95	0.2	0.2	0.0
446.00	0.2	0.2	0.0
446.05	0.2	0.2	0.0
446.10	0.2	0.2	0.0
446.15	0.2	0.2	0.0
446.20	0.2	0.2	0.0
446.25	0.2	0.2	0.0
446.30	0.3	0.3	0.0
446.35	0.3	0.3	0.0
446.40	0.3	0.3	0.0
446.45	0.3	0.3	0.0
446.50	0.3	0.3	0.0
446.55	0.3	0.3	0.0
446.60	0.3	0.3	0.0
446.65	0.3	0.3	0.0
446.70	0.3	0.3	0.0
446.75	0.3	0.3	0.0
446.80	0.3	0.3	0.0
446.85	0.3	0.3	0.0
446.90	0.3	0.3	0.0
446.95	0.3	0.3	0.0
447.00	0.3	0.3	0.0
447.05	0.3	0.3	0.0
447.10	0.3	0.3	0.0
447.15	0.3	0.3	0.0
447.20	0.3	0.3	0.0
447.25	0.3	0.3	0.0
447.30	0.3	0.3	0.0
447.35	0.4	0.4	0.0
447.40	0.7	0.7	0.0
447.45	1.1	1.1	0.0
447.50	1.5	1.5	0.0
447.55	1.9	1.9	0.0
447.60	2.4	2.4	0.0
447.65	3.0	3.0	0.0
447.70	3.6	3.6	0.0
447.75	4.2	4.2	0.0
447.80	4.5	4.5	0.0
447.85	4.7	4.7	0.0
447.90	4.9	4.9	0.0
447.95	5.1	5.1	0.0
448.00	5.3	5.3	0.0
448.05	5.5	5.5	0.0
448.10	5.6	5.6	0.0
448.15	5.8	5.8	0.0
448.20	5.9	5.9	0.0
448.25	6.1	6.1	0.0
448.30	6.3	6.3	0.0
448.35	6.4	6.4	0.0
448.40	6.5	6.5	0.0
448.45	6.7	6.7	0.0
448.50	6.8	6.8	0.0
448.55	7.0	7.0	0.0
448.60	7.1	7.1	0.0
448.65	7.2	7.2	0.0
448.70	7.3	7.3	0.0
448.75	7.5	7.5	0.0
448.80	7.6	7.6	0.0
448.85	7.7	7.7	0.0
448.90	7.8	7.8	0.0
448.95	8.0	8.0	0.0
449.00	8.1	8.1	0.0
449.05	8.5	8.2	0.3
449.10	9.1	8.3	0.8
449.15	9.8	8.3	1.4
449.20	10.6	8.4	2.2
449.25	11.5	8.4	3.1
449.30	12.6	8.5	4.1
449.35	13.8	8.5	5.3
449.40	15.0	8.5	6.5
449.45	16.4	8.6	7.8
449.50	17.9	8.6	9.3
449.55	19.5	8.7	10.9
449.60	21.3	8.7	12.5
449.65	22.9	8.7	14.1
449.70	24.6	8.8	15.8

WQV = 0.3 CFS

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Pond 8P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
2.25	ac	A = Area draining to the practice	
1.00	ac	A_I = Impervious area draining to the practice	
0.44	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.45	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.01	ac-in	WQV= 1" x Rv x A	
3,675	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
919	cf	25% x WQV (check calc for sediment forebay volume)	
2,757	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
437.45	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.70	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
2.92	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
435.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
435.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
432.70	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
432.70	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
2.30	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
2.30	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
438.45	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
439.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
6,508	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
24.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 8P: Amenity Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
435.50	3,048	0
435.55	3,048	46
435.60	3,048	91
435.65	3,048	137
435.70	3,048	183
435.75	3,048	229
435.80	3,048	274
435.85	3,048	320
435.90	3,048	366
435.95	3,048	411
436.00	3,048	457
436.05	3,048	503
436.10	3,048	549
436.15	3,048	594
436.20	3,048	640
436.25	3,048	686
436.30	3,048	732
436.35	3,048	777
436.40	3,048	823
436.45	3,048	869
436.50	3,048	914
436.55	3,048	960
436.60	3,048	1,006
436.65	3,048	1,052
436.70	3,048	1,097
436.75	3,048	1,143
436.80	3,048	1,189
436.85	3,048	1,234
436.90	3,048	1,280
436.95	3,048	1,326
437.00	**3,048**	1,372
437.05	3,048	1,525
437.10	3,048	1,680
437.15	3,048	1,836
437.20	3,048	1,994
437.25	3,048	2,154
437.30	3,048	2,315
437.35	3,048	2,479
437.40	3,048	2,643
437.45	3,048	2,810
437.50	3,048	2,978
437.55	3,048	3,148
437.60	3,048	3,319
437.65	3,048	3,493
437.70	3,048	3,668
437.75	3,048	3,845
437.80	3,048	4,023
437.85	3,048	4,203
437.90	3,048	4,385
437.95	3,048	4,569
438.00	3,048	4,755
438.05	3,048	4,942
438.10	3,048	5,131
438.15	3,048	5,322
438.20	3,048	5,515
438.25	3,048	5,710
438.30	3,048	5,906
438.35	3,048	6,105
438.40	3,048	6,305
438.45	3,048	6,507
438.50	3,048	6,711
438.55	3,048	6,917
438.60	3,048	7,124
438.65	3,048	7,334
438.70	3,048	7,545
438.75	3,048	7,759
438.80	3,048	7,974
438.85	3,048	8,191
438.90	3,048	8,410
438.95	3,048	8,631
439.00	3,048	8,855
439.05	3,048	9,080
439.10	3,048	9,307
439.15	3,048	9,536
439.20	3,048	9,766
439.25	3,048	9,999
439.30	3,048	10,234
439.35	3,048	10,471
439.40	3,048	10,710
439.45	3,048	10,951
439.50	3,048	**11,195**

WQV = 2,757 CF

Stage-Discharge for Pond 8P: Amenity Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
435.50	0.0	0.0	0.0
435.55	0.2	0.2	0.0
435.60	0.3	0.3	0.0
435.65	0.3	0.3	0.0
435.70	0.3	0.3	0.0
435.75	0.3	0.3	0.0
435.80	0.4	0.4	0.0
435.85	0.4	0.4	0.0
435.90	0.4	0.4	0.0
435.95	0.5	0.5	0.0
436.00	0.5	0.5	0.0
436.05	0.5	0.5	0.0
436.10	0.5	0.5	0.0
436.15	0.5	0.5	0.0
436.20	0.6	0.6	0.0
436.25	0.6	0.6	0.0
436.30	0.6	0.6	0.0
436.35	0.6	0.6	0.0
436.40	0.6	0.6	0.0
436.45	0.7	0.7	0.0
436.50	0.7	0.7	0.0
436.55	0.7	0.7	0.0
436.60	0.7	0.7	0.0
436.65	0.7	0.7	0.0
436.70	0.7	0.7	0.0
436.75	0.7	0.7	0.0
436.80	0.7	0.7	0.0
436.85	0.7	0.7	0.0
436.90	0.7	0.7	0.0
436.95	0.7	0.7	0.0
437.00	0.7	0.7	0.0
437.05	0.7	0.7	0.0
437.10	0.7	0.7	0.0
437.15	0.7	0.7	0.0
437.20	0.7	0.7	0.0
437.25	0.7	0.7	0.0
437.30	0.7	0.7	0.0
437.35	0.7	0.7	0.0
437.40	0.7	0.7	0.0
437.45	0.7	0.7	0.0
437.50	0.7	0.7	0.0
437.55	0.7	0.7	0.0
437.60	0.7	0.7	0.0
437.65	0.7	0.7	0.0
437.70	0.7	0.7	0.0
437.75	0.7	0.7	0.0
437.80	0.7	0.7	0.0
437.85	0.9	0.9	0.0
437.90	1.4	1.4	0.0
437.95	1.9	1.9	0.0
438.00	2.5	2.5	0.0
438.05	3.3	3.3	0.0
438.10	4.1	4.1	0.0
438.15	5.0	5.0	0.0
438.20	5.9	5.9	0.0
438.25	6.9	6.9	0.0
438.30	8.0	8.0	0.0
438.35	9.1	9.1	0.0
438.40	10.3	10.3	0.0
438.45	11.5	11.5	0.0
438.50	12.7	12.7	0.0
438.55	14.1	13.8	0.3
438.60	15.0	14.2	0.8
438.65	16.1	14.7	1.4
438.70	17.3	15.1	2.2
438.75	18.6	15.4	3.1
438.80	20.0	15.8	4.1
438.85	21.5	16.2	5.3
438.90	23.0	16.6	6.5
438.95	24.6	16.8	7.8
439.00	26.2	16.9	9.3
439.05	27.9	17.0	10.9
439.10	29.7	17.1	12.5
439.15	31.4	17.2	14.1
439.20	33.1	17.3	15.8
439.25	34.9	17.4	17.5
439.30	36.8	17.5	19.2
439.35	38.7	17.6	21.1
439.40	40.7	17.7	22.9
439.45	42.7	17.8	24.8
439.50	**44.7**	**17.9**	**26.8**

WQV = 0.7 CFS

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Pond 9P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
5.06	ac	A = Area draining to the practice	
2.13	ac	A_I = Impervious area draining to the practice	
0.42	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.43	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
2.17	ac-in	WQV= 1" x Rv x A	
7,877	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,969	cf	25% x WQV (check calc for sediment forebay volume)	
5,908	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
445.45	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.20	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
21.88	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
443.00	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
443.00	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
439.90	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
439.90	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
3.10	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
3.10	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
447.34	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
448.40	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
29,094	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
NO	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 9P: Cluster E Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
443.50	8,762	0
443.55	8,762	131
443.60	8,762	263
443.65	8,762	394
443.70	8,762	526
443.75	8,762	657
443.80	8,762	789
443.85	8,762	920
443.90	8,762	1,051
443.95	8,762	1,183
444.00	8,762	1,314
444.05	8,762	1,446
444.10	8,762	1,577
444.15	8,762	1,709
444.20	8,762	1,840
444.25	8,762	1,971
444.30	8,762	2,103
444.35	8,762	2,234
444.40	8,762	2,366
444.45	8,762	2,497
444.50	8,762	2,629
444.55	8,762	2,760
444.60	8,762	2,891
444.65	8,762	3,023
444.70	8,762	3,154
444.75	8,762	3,286
444.80	8,762	3,417
444.85	8,762	3,549
444.90	8,762	3,680
444.95	8,762	3,811
445.00	17,524	3,943
445.05	17,602	4,383
445.10	17,681	4,827
445.15	17,760	5,275
445.20	17,840	5,727
445.25	17,920	6,183
445.30	18,000	6,643
445.35	18,080	7,106
445.40	18,161	7,574
445.45	18,243	8,046
445.50	18,324	8,522
445.55	18,406	9,003
445.60	18,488	9,487
445.65	18,571	9,975
445.70	18,654	10,468
445.75	18,737	10,965
445.80	18,821	11,465
445.85	18,905	11,970
445.90	18,990	12,480
445.95	19,074	12,993
446.00	19,159	13,511
446.05	19,245	14,033
446.10	19,331	14,559
446.15	19,417	15,090
446.20	19,503	15,625
446.25	19,590	16,164
446.30	19,677	16,708
446.35	19,765	17,255
446.40	19,853	17,808
446.45	19,941	18,365
446.50	20,030	18,926
446.55	20,119	19,491
446.60	20,208	20,061
446.65	20,297	20,636
446.70	20,387	21,215
446.75	20,478	21,798
446.80	20,568	22,387
446.85	20,659	22,979
446.90	20,751	23,576
446.95	20,843	24,178
447.00	20,935	24,784
447.05	21,027	25,395
447.10	21,120	26,011
447.15	21,213	26,631
447.20	21,307	27,256
447.25	21,400	27,886
447.30	21,495	28,520
447.35	21,589	29,159
447.40	21,684	29,803
447.45	21,779	30,451
447.50	21,875	31,104
447.55	21,971	31,762
447.60	22,067	32,425
447.65	22,164	33,093
447.70	22,261	33,765
447.75	22,358	34,443
447.80	22,456	35,125
447.85	22,554	35,812
448.20	23,250	40,760
448.25	23,350	41,487
448.30	23,452	42,219
448.35	23,553	42,956
448.40	**23,655**	**43,698**

WQV = 7,877 CF

Stage-Discharge for Pond 9P: Cluster E Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
443.50	0.0	0.0	0.0
443.55	0.1	0.1	0.0
443.60	0.1	0.1	0.0
443.65	0.1	0.1	0.0
443.70	0.1	0.1	0.0
443.75	0.1	0.1	0.0
443.80	0.1	0.1	0.0
443.85	0.1	0.1	0.0
443.90	0.1	0.1	0.0
443.95	0.1	0.1	0.0
444.00	0.1	0.1	0.0
444.05	0.1	0.1	0.0
444.10	0.1	0.1	0.0
444.15	0.1	0.1	0.0
444.20	0.1	0.1	0.0
444.25	0.1	0.1	0.0
444.30	0.1	0.1	0.0
444.35	0.1	0.1	0.0
444.40	0.1	0.1	0.0
444.45	0.1	0.1	0.0
444.50	0.1	0.1	0.0
444.55	0.1	0.1	0.0
444.60	0.1	0.1	0.0
444.65	0.1	0.1	0.0
444.70	0.1	0.1	0.0
444.75	0.1	0.1	0.0
444.80	0.1	0.1	0.0
444.85	0.1	0.1	0.0
444.90	0.1	0.1	0.0
444.95	0.1	0.1	0.0
445.00	0.1	0.1	0.0
445.05	0.1	0.1	0.0
445.10	0.1	0.1	0.0
445.15	0.2	0.2	0.0
445.20	0.2	0.2	0.0
445.25	0.2	0.2	0.0
445.30	0.2	0.2	0.0
445.35	0.2	0.2	0.0
445.40	0.2	0.2	0.0
445.45	0.2	0.2	0.0
445.50	0.2	0.2	0.0
445.55	0.2	0.2	0.0
445.60	0.2	0.2	0.0
445.65	0.2	0.2	0.0
445.70	0.2	0.2	0.0
445.75	0.2	0.2	0.0
445.80	0.2	0.2	0.0
445.85	0.2	0.2	0.0
445.90	0.2	0.2	0.0
445.95	0.2	0.2	0.0
446.00	0.2	0.2	0.0
446.05	0.2	0.2	0.0
446.10	0.2	0.2	0.0
446.15	0.2	0.2	0.0
446.20	0.2	0.2	0.0
446.25	0.2	0.2	0.0
446.30	0.2	0.2	0.0
446.35	0.2	0.2	0.0
446.40	0.2	0.2	0.0
446.45	0.2	0.2	0.0
446.50	0.2	0.2	0.0
446.55	0.2	0.2	0.0
446.60	0.2	0.2	0.0
446.65	0.7	0.7	0.0
446.70	1.5	1.5	0.0
446.75	2.6	2.6	0.0
446.80	3.9	3.9	0.0
446.85	5.3	5.3	0.0
446.90	7.0	7.0	0.0
446.95	8.7	8.7	0.0
447.00	10.6	10.6	0.0
447.05	12.6	12.6	0.0
447.10	14.7	14.7	0.0
447.15	17.0	17.0	0.0
447.20	17.3	17.3	0.0
447.25	17.4	17.4	0.0
447.30	17.5	17.5	0.0
447.35	17.6	17.6	0.0
447.40	17.7	17.7	0.0
447.45	18.1	17.8	0.3
447.50	18.7	17.9	0.8
447.55	19.5	18.0	1.4
447.60	20.4	18.1	2.2
447.65	21.4	18.2	3.1
447.70	22.5	18.3	4.1
447.75	23.7	18.4	5.3
447.80	25.0	18.5	6.5
447.85	26.5	18.6	7.8
448.20	38.6	19.3	19.2
448.25	40.5	19.4	21.1
448.30	42.4	19.5	22.9
448.35	44.4	19.6	24.8
448.40	**46.5**	**19.7**	**26.8**

WQV = 0.2 CFS

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **Pond 10P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
5.20	ac	A = Area draining to the practice	
1.54	ac	A_I = Impervious area draining to the practice	
0.30	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.32	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.65	ac-in	WQV= 1" x Rv x A	
5,975	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,494	cf	25% x WQV (check calc for sediment forebay volume)	
4,481	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
456.20	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.90	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
3.69	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	≤ 72-hrs
452.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
452.50	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
444.55	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
444.55	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	≥ 1'
7.95	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	≥ 1'
7.95	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	≥ 1'
457.32	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
458.40	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	← yes
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	< 10 ac
11,693	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ 75%WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet		Note what sheet in the plan set contains the filter course specification.	
W	Yes/No	Access grate provided?	← yes

If a bioretention area is proposed:			
NO	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 10P: Cluster D Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
453.70	3,889	0
453.75	3,889	58
453.80	3,889	117
453.85	3,889	175
453.90	3,889	233
453.95	3,889	292
454.00	3,889	350
454.05	3,889	408
454.10	3,889	467
454.15	3,889	525
454.20	3,889	583
454.25	3,889	642
454.30	3,889	700
454.35	3,889	758
454.40	3,889	817
454.45	3,889	875
454.50	3,889	933
454.55	3,889	992
454.60	3,889	1,050
454.65	3,889	1,108
454.70	3,889	1,167
454.75	3,889	1,225
454.80	3,889	1,283
454.85	3,889	1,342
454.90	3,889	1,400
454.95	3,889	1,458
455.00	3,889	1,517
455.05	3,889	1,575
455.10	3,889	1,633
455.15	3,889	1,692
455.20	**3,889**	1,750
455.25	3,889	1,945
455.30	3,889	2,143
455.35	3,889	2,341
455.40	3,889	2,542
455.45	3,889	2,745
455.50	3,889	2,949
455.55	3,889	3,155
455.60	3,889	3,364
455.65	3,889	3,574
455.70	3,889	3,785
455.75	3,889	3,999
455.80	3,889	4,215
455.85	3,889	4,432
455.90	3,889	4,651
455.95	3,889	4,873
456.00	3,889	5,096
456.05	3,889	5,321
456.10	3,889	5,548
456.15	3,889	5,777
456.20	3,889	6,008
456.25	3,889	6,240
456.30	3,889	6,475
456.35	3,889	6,712
456.40	3,889	6,951
456.45	3,889	7,191
456.50	3,889	7,434
456.55	3,889	7,679
456.60	3,889	7,926
456.65	3,889	8,174
456.70	3,889	8,425
456.75	3,889	8,678
456.80	3,889	8,933
456.85	3,889	9,190
456.90	3,889	9,449
456.95	3,889	9,710
457.00	3,889	9,973
457.05	3,889	10,238
457.10	3,889	10,505
457.15	3,889	10,774
457.20	3,889	11,046
457.25	3,889	11,320
457.30	3,889	11,595
457.35	3,889	11,873
457.40	3,889	12,153
457.45	3,889	12,435
457.50	3,889	12,720
457.55	3,889	13,006
457.60	3,889	13,295
457.65	3,889	13,585
457.70	3,889	13,879
457.75	3,889	14,174
457.80	3,889	14,471
457.85	3,889	14,771
457.90	3,889	15,073
457.95	3,889	15,377
458.00	3,889	15,683
458.05	3,889	15,992
458.10	3,889	16,302
458.15	3,889	16,616
458.20	3,889	16,931
458.25	3,889	17,249
458.30	3,889	17,569
458.35	3,889	17,891
458.40	3,889	**18,215**

WQV = 5,975 CF

Stage-Discharge for Pond 10P: Cluster D Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
453.70	0.0	0.0	0.0
453.75	0.6	0.6	0.0
453.80	0.6	0.6	0.0
453.85	0.6	0.6	0.0
453.90	0.6	0.6	0.0
453.95	0.6	0.6	0.0
454.00	0.7	0.7	0.0
454.05	0.7	0.7	0.0
454.10	0.7	0.7	0.0
454.15	0.7	0.7	0.0
454.20	0.7	0.7	0.0
454.25	0.7	0.7	0.0
454.30	0.8	0.8	0.0
454.35	0.8	0.8	0.0
454.40	0.8	0.8	0.0
454.45	0.8	0.8	0.0
454.50	0.8	0.8	0.0
454.55	0.8	0.8	0.0
454.60	0.8	0.8	0.0
454.65	0.9	0.9	0.0
454.70	0.9	0.9	0.0
454.75	0.9	0.9	0.0
454.80	0.9	0.9	0.0
454.85	0.9	0.9	0.0
454.90	0.9	0.9	0.0
454.95	0.9	0.9	0.0
455.00	0.9	0.9	0.0
455.05	0.9	0.9	0.0
455.10	0.9	0.9	0.0
455.15	0.9	0.9	0.0
455.20	0.9	0.9	0.0
455.25	0.9	0.9	0.0
455.30	0.9	0.9	0.0
455.35	0.9	0.9	0.0
455.40	0.9	0.9	0.0
455.45	0.9	0.9	0.0
455.50	0.9	0.9	0.0
455.55	0.9	0.9	0.0
455.60	0.9	0.9	0.0
455.65	0.9	0.9	0.0
455.70	0.9	0.9	0.0
455.75	0.9	0.9	0.0
455.80	0.9	0.9	0.0
455.85	0.9	0.9	0.0
455.90	0.9	0.9	0.0
455.95	0.9	0.9	0.0
456.00	0.9	0.9	0.0
456.05	0.9	0.9	0.0
456.10	0.9	0.9	0.0
456.15	0.9	0.9	0.0
456.20	0.9	0.9	0.0
456.25	1.2	1.2	0.0
456.30	1.9	1.9	0.0
456.35	2.7	2.7	0.0
456.40	3.7	3.7	0.0
456.45	4.8	4.8	0.0
456.50	6.0	6.0	0.0
456.55	7.3	7.3	0.0
456.60	8.7	8.7	0.0
456.65	10.2	10.2	0.0
456.70	11.8	11.8	0.0
456.75	13.5	13.5	0.0
456.80	15.2	15.2	0.0
456.85	16.1	16.1	0.0
456.90	16.3	16.3	0.0
456.95	16.4	16.4	0.0
457.00	16.5	16.5	0.0
457.05	16.6	16.6	0.0
457.10	16.7	16.7	0.0
457.15	16.8	16.8	0.0
457.20	16.9	16.9	0.0
457.25	17.0	17.0	0.0
457.30	17.1	17.1	0.0
457.35	17.2	17.2	0.0
457.40	17.3	17.3	0.0
457.45	17.7	17.4	0.3
457.50	18.3	17.5	0.8
457.55	19.1	17.6	1.4
457.60	20.0	17.7	2.2
457.65	21.0	17.8	3.1
457.70	22.1	17.9	4.1
457.75	23.3	18.0	5.3
457.80	24.6	18.1	6.5
457.85	26.1	18.2	7.8
457.90	27.6	18.3	9.3
457.95	29.3	18.4	10.9
458.00	31.1	18.5	12.5
458.05	32.8	18.6	14.1
458.10	34.5	18.7	15.8
458.15	36.3	18.8	17.5
458.20	38.2	18.9	19.2
458.25	40.1	19.0	21.1
458.30	42.0	19.1	22.9
458.35	44.1	19.2	24.8
458.40	**46.1**	**19.3**	**26.8**

WQV = 0.9 CFS

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Pond 11P - Surface Sandfilter**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
2.10	ac	A = Area draining to the practice	
0.57	ac	A_I = Impervious area draining to the practice	
0.27	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.29	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.62	ac-in	WQV= 1" x Rv x A	
2,243	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
561	cf	25% x WQV (check calc for sediment forebay volume)	
1,683	cf	75% x WQV (check calc for surface sand filter volume)	
		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
454.00	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.30	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
4.15	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
451.33	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
451.33	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
444.55	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
444.55	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
-	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
6.78	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
6.78	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
455.00	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
456.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
7,845	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
24.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
W	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Stage-Area-Storage for Pond 11P: Sand Filter #11

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
452.50	5,087	0
452.55	5,087	76
452.60	5,087	153
452.65	5,087	229
452.70	5,087	305
452.75	5,087	382
452.80	5,087	458
452.85	5,087	534
452.90	5,087	610
452.95	5,087	687
453.00	5,087	763
453.05	5,087	839
453.10	5,087	916
453.15	5,087	992
453.20	5,087	1,068
453.25	5,087	1,145
453.30	5,087	1,221
453.35	5,087	1,297
453.40	5,087	1,373
453.45	5,087	1,450
453.50	5,087	1,526
453.55	5,087	1,602
453.60	5,087	1,679
453.65	5,087	1,755
453.70	5,087	1,831
453.75	5,087	1,908
453.80	5,087	1,984
453.85	5,087	2,060
453.90	5,087	2,137
453.95	5,087	2,213
454.00	10,174	2,289
454.05	10,220	2,545
454.10	10,266	2,802
454.15	10,312	3,063
454.20	10,359	3,325
454.25	10,405	3,590
454.30	10,452	3,857
454.35	10,499	4,126
454.40	10,546	4,398
454.45	10,594	4,672
454.50	10,642	4,949
454.55	10,690	5,228
454.60	10,738	5,509
454.65	10,786	5,793
454.70	10,834	6,079
454.75	10,883	6,367
454.80	10,932	6,658
454.85	10,981	6,952
454.90	11,031	7,248
454.95	11,080	7,546
455.00	11,130	7,847
455.05	11,180	8,151
455.10	11,230	8,457
455.15	11,280	8,765
455.20	11,331	9,076
455.25	11,382	9,389
455.30	11,433	9,705
455.35	11,484	10,024
455.40	11,535	10,345
455.45	11,587	10,669
455.50	11,639	10,995
455.55	11,691	11,324
455.60	11,743	11,655
455.65	11,795	11,989
455.70	11,848	12,326
455.75	11,901	12,666
455.80	11,954	13,008
455.85	12,007	13,352
455.90	12,060	13,700
455.95	12,114	14,050
456.00	**12,168**	**14,402**

WQV = 2,243 CF

Stage-Discharge for Pond 11P: Sand Filter #11

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
452.50	0.0	0.0	0.0
452.55	0.2	0.2	0.0
452.60	0.2	0.2	0.0
452.65	0.2	0.2	0.0
452.70	0.2	0.2	0.0
452.75	0.2	0.2	0.0
452.80	0.2	0.2	0.0
452.85	0.2	0.2	0.0
452.90	0.2	0.2	0.0
452.95	0.2	0.2	0.0
453.00	0.2	0.2	0.0
453.05	0.2	0.2	0.0
453.10	0.2	0.2	0.0
453.15	0.2	0.2	0.0
453.20	0.2	0.2	0.0
453.25	0.2	0.2	0.0
453.30	0.2	0.2	0.0
453.35	0.2	0.2	0.0
453.40	0.2	0.2	0.0
453.45	0.2	0.2	0.0
453.50	0.2	0.2	0.0
453.55	0.2	0.2	0.0
453.60	0.2	0.2	0.0
453.65	0.2	0.2	0.0
453.70	0.2	0.2	0.0
453.75	0.2	0.2	0.0
453.80	0.3	0.3	0.0
453.85	0.3	0.3	0.0
453.90	0.3	0.3	0.0
453.95	0.3	0.3	0.0
454.00	0.3	0.3	0.0
454.05	0.3	0.3	0.0
454.10	0.3	0.3	0.0
454.15	0.3	0.3	0.0
454.20	0.3	0.3	0.0
454.25	0.3	0.3	0.0
454.30	0.3	0.3	0.0
454.35	0.3	0.3	0.0
454.40	0.3	0.3	0.0
454.45	0.3	0.3	0.0
454.50	0.3	0.3	0.0
454.55	0.5	0.5	0.0
454.60	0.9	0.9	0.0
454.65	1.5	1.5	0.0
454.70	2.1	2.1	0.0
454.75	2.9	2.9	0.0
454.80	3.7	3.7	0.0
454.85	4.6	4.6	0.0
454.90	5.5	5.5	0.0
454.95	6.5	6.5	0.0
455.00	7.6	7.6	0.0
455.05	9.0	8.7	0.3
455.10	10.7	9.9	0.8
455.15	12.1	10.6	1.4
455.20	12.9	10.7	2.2
455.25	13.9	10.8	3.1
455.30	15.0	10.9	4.1
455.35	16.2	10.9	5.3
455.40	17.5	11.0	6.5
455.45	18.9	11.1	7.8
455.50	20.5	11.2	9.3
455.55	22.1	11.3	10.9
455.60	23.9	11.3	12.5
455.65	25.5	11.4	14.1
455.70	27.3	11.5	15.8
455.75	29.0	11.6	17.5
455.80	30.9	11.6	19.2
455.85	32.8	11.7	21.1
455.90	34.7	11.8	22.9
455.95	36.7	11.9	24.8
456.00	**38.7**	**11.9**	**26.8**

WQV = 0.3 CFS

Rainfall Data

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	42.880 degrees North
Longitude	71.356 degrees West
Elevation	130 feet
Date/Time	Thu Jan 16 2025 15:15:11 GMT-0500 (Eastern Standard Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.41	0.51	0.67	0.84	1.05	**1yr**	0.72	1.00	1.22	1.54	1.94	2.47	2.69	**1yr**	2.18	2.58	3.00	3.67	4.28	**1yr**
2yr	0.33	0.50	0.63	0.83	1.04	1.30	**2yr**	0.89	1.19	1.51	1.89	2.36	2.95	3.27	**2yr**	2.61	3.14	3.64	4.34	4.95	**2yr**
5yr	0.39	0.60	0.75	1.01	1.29	1.64	**5yr**	1.11	1.49	1.91	2.39	2.99	3.73	4.17	**5yr**	3.30	4.01	4.63	5.47	6.18	**5yr**
10yr	0.43	0.68	0.86	1.17	1.53	1.96	**10yr**	1.32	1.77	2.28	2.87	3.58	4.46	5.01	**10yr**	3.95	4.82	5.55	6.51	7.32	**10yr**
25yr	0.51	0.82	1.04	1.43	1.90	2.47	**25yr**	1.64	2.21	2.88	3.64	4.56	5.65	6.41	**25yr**	5.00	6.16	7.07	8.20	9.16	**25yr**
50yr	0.58	0.93	1.19	1.67	2.25	2.95	**50yr**	1.95	2.62	3.46	4.38	5.47	6.76	7.71	**50yr**	5.99	7.42	8.48	9.77	10.86	**50yr**
100yr	0.66	1.07	1.38	1.96	2.67	3.52	**100yr**	2.30	3.10	4.14	5.24	6.55	8.10	9.30	**100yr**	7.17	8.94	10.19	11.65	12.88	**100yr**
200yr	0.75	1.23	1.59	2.29	3.17	4.20	**200yr**	2.73	3.68	4.96	6.29	7.86	9.70	11.21	**200yr**	8.59	10.78	12.24	13.89	15.29	**200yr**
500yr	0.91	1.50	1.96	2.84	3.97	5.30	**500yr**	3.42	4.62	6.27	7.97	9.97	12.32	14.36	**500yr**	10.91	13.81	15.62	17.55	19.18	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.42	0.57	0.70	0.86	**1yr**	0.61	0.84	1.08	1.35	1.65	2.20	2.54	**1yr**	1.94	2.44	2.71	3.15	3.82	**1yr**
2yr	0.31	0.48	0.59	0.80	0.99	1.18	**2yr**	0.85	1.15	1.35	1.77	2.26	2.81	3.13	**2yr**	2.49	3.01	3.50	4.19	4.76	**2yr**
5yr	0.36	0.55	0.68	0.94	1.19	1.41	**5yr**	1.03	1.38	1.59	2.07	2.64	3.46	3.72	**5yr**	3.06	3.57	4.18	4.99	5.64	**5yr**
10yr	0.39	0.61	0.75	1.05	1.36	1.60	**10yr**	1.17	1.56	1.81	2.33	2.96	3.98	4.21	**10yr**	3.53	4.05	4.77	5.71	6.37	**10yr**
25yr	0.45	0.69	0.86	1.22	1.61	1.87	**25yr**	1.39	1.83	2.13	2.72	3.44	4.79	4.96	**25yr**	4.24	4.77	5.68	6.84	7.42	**25yr**
50yr	0.50	0.76	0.94	1.35	1.82	2.11	**50yr**	1.57	2.07	2.42	3.07	3.87	5.50	5.64	**50yr**	4.87	5.42	6.52	7.85	8.27	**50yr**
100yr	0.55	0.84	1.05	1.51	2.08	2.39	**100yr**	1.79	2.34	2.75	3.47	4.34	5.46	6.39	**100yr**	4.84	6.14	7.48	9.02	9.24	**100yr**
200yr	0.61	0.92	1.17	1.69	2.36	2.69	**200yr**	2.04	2.63	3.11	3.92	4.90	6.09	7.29	**200yr**	5.39	7.01	8.60	10.40	10.27	**200yr**
500yr	0.71	1.06	1.36	1.97	2.81	3.17	**500yr**	2.42	3.10	3.68	4.62	5.74	6.99	8.67	**500yr**	6.19	8.33	10.38	12.58	11.83	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.57	0.76	0.94	1.09	**1yr**	0.81	1.07	1.23	1.63	2.07	2.72	2.84	**1yr**	2.41	2.74	3.37	4.13	4.78	**1yr**
2yr	0.34	0.53	0.65	0.88	1.08	1.28	**2yr**	0.93	1.25	1.45	1.89	2.42	3.12	3.48	**2yr**	2.76	3.35	3.83	4.56	5.24	**2yr**
5yr	0.42	0.65	0.81	1.11	1.41	1.63	**5yr**	1.22	1.60	1.87	2.40	3.03	4.04	4.66	**5yr**	3.57	4.48	5.09	6.01	6.77	**5yr**
10yr	0.51	0.78	0.97	1.35	1.75	1.99	**10yr**	1.51	1.94	2.26	2.87	3.62	5.00	5.87	**10yr**	4.43	5.64	6.34	7.43	8.33	**10yr**
25yr	0.66	1.00	1.24	1.77	2.33	2.58	**25yr**	2.01	2.52	2.93	3.65	4.56	6.67	7.97	**25yr**	5.90	7.67	8.48	9.82	11.00	**25yr**
50yr	0.79	1.20	1.49	2.15	2.89	3.15	**50yr**	2.49	3.08	3.56	4.39	5.43	8.28	10.08	**50yr**	7.33	9.69	10.55	12.10	13.58	**50yr**
100yr	0.96	1.45	1.82	2.63	3.60	3.85	**100yr**	3.11	3.76	4.33	5.27	6.48	11.47	12.71	**100yr**	10.15	12.22	13.10	14.95	16.81	**100yr**

Test Pits & Location Plan

LEGEND

APPROXIMATE LOCATION OF TEST PITS PERFORMED BY MC SERVICES, LLC, UNDER THE DIRECTION OF GEOTECHNICAL CONSULTANTS, INC. ON 8 AND 9 AUGUST 2024.

BASE PLAN TAKEN FROM AN ELECTRONIC COPY OF A DRAWING ENTITLED "LONDONDERRY SITE PLAN" PREPARED BY OTHERS, DATED 22 APRIL 2024.

GCI Project No. 2245561

Geotechnical Consultants, Inc.
201 Boston Post Road West
Marlborough, MA 01752
(508)229-0900 FAX (508)229-2279

LOCATION PLAN

(feet) 0 150 300

August 2024

36 Pillsbury Road
Londonderry, New Hampshire

FIGURE 3.

LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 1**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: To:		**Surface El.**	
0 – 1.0'	TOPSOIL: Dark brown, sandy loam containing roots.		
1.0' – 1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.		
1.5' – 2.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt.		
	End of test pit at ~2.5 feet bgs. Refusal on Bedrock.		
Water Level:	No groundwater was observed within the excavation.		
Remarks:	EQUIPMENT: CAT 314		

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 2**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: To:		**Surface El.**	

From:	To:	Description
0	1.5'	TOPSOIL: Dark brown, sandy loam containing roots.
1.5'	4.5'	NATURAL SAND: Light brown, medium to ine sad, some coarse to fine gravel, littleilt, trace roots.
4.5	8.0'	NATURAL SAND: Dark brown, coarse to fine sand and gravel, little silt, trace roots, cobbles and boulders.
		End of test pit at ~8.0 feet bgs. Refusal on Bedrock.

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 3**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: / To:		**Surface El.**	
0 – 1.0'	TOPSOIL: Dark brown, sandy loam containing roots.		
1.0' – 1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.		
1.5' – 3.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt.		
	End of test pit at ~3.0 feet bgs. Refusal on Bedrock.		
Water Level:	No groundwater was observed within the excavation.		
Remarks:	EQUIPMENT: CAT 314		

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 4**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: To:		**Surface El.**	

From:	To:	
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.
1.5'	3.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt, cobbles (weathered rock).
		End of test pit at ~3.0 feet bgs. Refusal on Bedrock.

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 5**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: To:		**Surface El.**	

From:	To:	
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.
1.5'	2.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt.
		End of test pit at ~2.5 feet bgs. Refusal on Bedrock.

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 6** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	3.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt, cobbles (weathered rock).	
		End of test pit at ~3.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 7**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: / To:		**Surface El.**	
0 – 1.0'	TOPSOIL: Dark brown, sandy loam containing roots.		
1.0' – 2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots, cobbles (weathered bedrock).		
	End of test pit at ~2.0 feet bgs. Refusal on Bedrock.		
Water Level:	No groundwater was observed within the excavation.		
Remarks:	EQUIPMENT: CAT 314		

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 8** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	5.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt.	
		End of test pit at ~5.5 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 9** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	7.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt.	
		End of test pit at ~7.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 10** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	3.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt, trace roots, cobbles (weathered rock).	
		End of test pit at ~3.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 11** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little to trace silt, trace roots, cobbles (weathered rock).	
		End of test pit at ~2.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 12** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	5.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt, cobbles (weathered rock).	
		End of test pit at ~5.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 13**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: / To:		**Surface El.**	
0 – 1.0'	TOPSOIL: Dark brown, sandy loam containing roots.		
1.0' – 1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.		
1.5' – 5.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt, cobbles (weathered rock).		
	End of test pit at ~5.0 feet bgs. Refusal on Bedrock.		
Water Level:	No groundwater was observed within the excavation.		
Remarks:	EQUIPMENT: CAT 314		

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 14** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	0.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
0.5'	1.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.0'	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 15** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	0.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
0.5'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	5.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~5.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 16** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots.	
2.0'	8.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~8.0 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 17** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots.	
2.0'	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 18** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots.	
2.0'	11.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 19** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots.	
2.0'	11.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 20** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots.	
2.0'	11.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 21** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	0.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
0.5'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	10.5'	NATURAL SAND: Light brown to orange, coarse to fine sand and gravel, trace silt.	
		End of test pit at ~10.5 feet bgs. (Could not penetrate dense sand with bucket)	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 22** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	2.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
2.0'	4.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, trace silt, traces of roots.	
4.0'	11.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 23** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	0.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
0.5'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	11.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt, cobbles.	
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 24** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt, cobbles.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 25** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	2.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
2.0'	3.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots, cobbles.	
3.5'	8.0'	NATURAL SAND: Light brown, coarse to fine sand and gravel, trace silt, cobbles.	
8.0'	11.0'	NATURAL SAND: Gray, coarse to fine sand, some coarse to fine gravel, some silt.	
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)	
Water Level:		Groundwater was observed seeping into the excavation at depth of approximately 8 feet bgs.	
Remarks:		EQUIPMENT: CAT 314	

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Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 26** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	0.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
0.5'	1.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.0'	7.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
7.0'	9.0'	SILT: Light brown, silt, some clay, little coarse to fine gravel, little fine sand.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 27** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	3.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
3.0'	5.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt.	
5.0'	10.0'	SILT: Light brown, silt, some clay, little coarse to fine gravel, little fine sand.	
		End of test pit at ~10.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 28** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.) From:	To:	Description	Designation: TP 29 GCI Job #: 2245561 Surface El.
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt, cobbles.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	8-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 30** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 31** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.5'	6.0'	NATURAL SAND: Light brown, coarse to fine sand and gravel, little silt.	
6.0'	8.0'	SILT: Light gray silt and medium to fine sand.	
		End of test pit at ~8.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 32** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	2.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
2.0'	3.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
3.0'	5.0'	FILL: Light brown to brown, coarse to fine sand, some coarse to fine gravel, little silt, roots. Fill layer encountered abandoned pvc pipe.	
5.0'	7.0'	NATURAL SAND: Light brown, coarse to fine sand and gravel, little silt.	
7.0'	9.5'	SILT AND SAND: Light brown to gray, silt and fine sand, littche coarse to fine gravel.	
		End of test pit at ~9.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 33** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.5'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	8.0'	NATURAL SAND: Light brown, fine sand, some silt, little coarse to medium sand, little coarse fine gravel.	
		End of test pit at ~8.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's
		Designation:	**TP 34**
STRATUM (ft.)	**Description**	**GCI Job #:**	2245561
From: / To:		**Surface El.**	

From:	To:	
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.
2.0'	11.0'	NATURAL SAND: Light brown to white, fine sand, some silt, little coarse to medium sand, little coarse to fine gravel.
		End of test pit at ~11.0 feet bgs. (Could not penetrate dense sand with bucket)

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 35** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	2.5'	NATURAL SAND: Light brown, coarse to fine sand and gravel, trace silt, cobbles.	
		End of test pit at ~2.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 36** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	5.5'	NATURAL SAND: Brown to orange, coarse to fine sand and gravel, trace silt.	
		End of test pit at ~5.5 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 37** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	4.3'	NATURAL SAND: Brown to orange, coarse to fine sand and gravel, trace silt.	
		End of test pit at ~4.3 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 38** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	3.5'	NATURAL SAND: Brown to orange, coarse to fine sand and gravel, trace silt.	
		End of test pit at ~3.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 39** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	4.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, trace silt.	
		End of test pit at ~4.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 40** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	2.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
2.0'	3.5'	NATURAL SAND: Brown to orange, coarse to fine sand and gravel, trace silt, cobbles (weathered bedrock).	
		End of test pit at ~3.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 41** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	3.0'	NATURAL SAND: Brown to orange, coarse to fine sand and gravel, some silt.	
		End of test pit at ~3.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 42** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
		End of test pit at ~1.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 43** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	7.0'	FILL: Dark brown, medium to fine sand, some silt, some coarse to fine gravel, contains roots, tree stumps and loam.	
7.0'	9.0'	NATURAL SAND: Light brown, coarse to fine sand and gravel, some silt.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 44** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	6.5'	NATURAL SAND: Brown, coarse to fine sand, some coarse to fine gravel, little silt.	
		End of test pit at ~6.5 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 45** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	5.0'	NATURAL SAND: Light brown to orange, coarse to fine sand, some coarse to fine gravel, some silt.	
		End of test pit at ~5.0 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 46** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	4.0'	FILL: Brown, coarse to fine sand and gravel, trace loam, contains concrete, metal, cobbles and boulders. A concrete slab was encountered in the fill layer with a thickness of approximately 6" from 3.5' to 4.0'.	
4.0'	9.0'	NATURAL SAND: Brown, coarse to fine sand and gravel, some silt.	
		End of test pit at ~9.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 47** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	1.5'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
1.5'	6.0'	NATURAL SAND: Light brown, coarse to fine sand, little coarse to fine gravel, little silt.	
		End of test pit at ~6.0 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 48** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	5.0'	NATURAL SAND: Light brown to orange, coarse to fine sand, some coarse to fine gravel, little silt.	
5.0'	7.5'	NATURAL SAND: Light brown to gray, medium to fine sand, some silt, little coarse to fine gravel, cobbles.	
		End of test pit at ~7.5 feet bgs. Refusal on Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 49** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.5'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.5'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	7.5'	NATURAL SAND: Light brown to gray, medium to fine sand, some silt, little coarse to fine gravel.	
		End of test pit at ~7.5 feet bgs. Refusal on Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 50** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	7.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt.	
		End of test pit at ~7.5 feet bgs. Refusal on probable Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 51** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	9.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt.	
		End of test pit at ~9.0 feet bgs. Refusal on probable Bedrock.	
Water Level:		No groundwater was observed within the excavation.	
Remarks:		EQUIPMENT: CAT 314	

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 52** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	8.0'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt, cobbles.	
		End of test pit at ~8.0 feet bgs. Refusal on probable Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

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LOG OF TEST PITS

Project:	36 Pillsbury Rd	**Date:**	9-Aug-24
Location:	Londonderry, New Hampshire	**Weather:**	Sunny, 80's

STRATUM (ft.)		**Description**	**Designation:** **TP 53** **GCI Job #:** 2245561
From:	To:		**Surface El.**
0	1.0'	TOPSOIL: Dark brown, sandy loam containing roots.	
1.0'	2.0'	SUBSOIL: Orange to brown, medium to fine sand, some coarse to fine gravel, little silt, traces of roots.	
2.0'	8.5'	NATURAL SAND: Light brown, coarse to fine sand, some coarse to fine gravel, little silt, cobbles.	
		End of test pit at ~8.5 feet bgs. Refusal on probable Bedrock.	

Water Level: No groundwater was observed within the excavation.

Remarks:

EQUIPMENT: CAT 314

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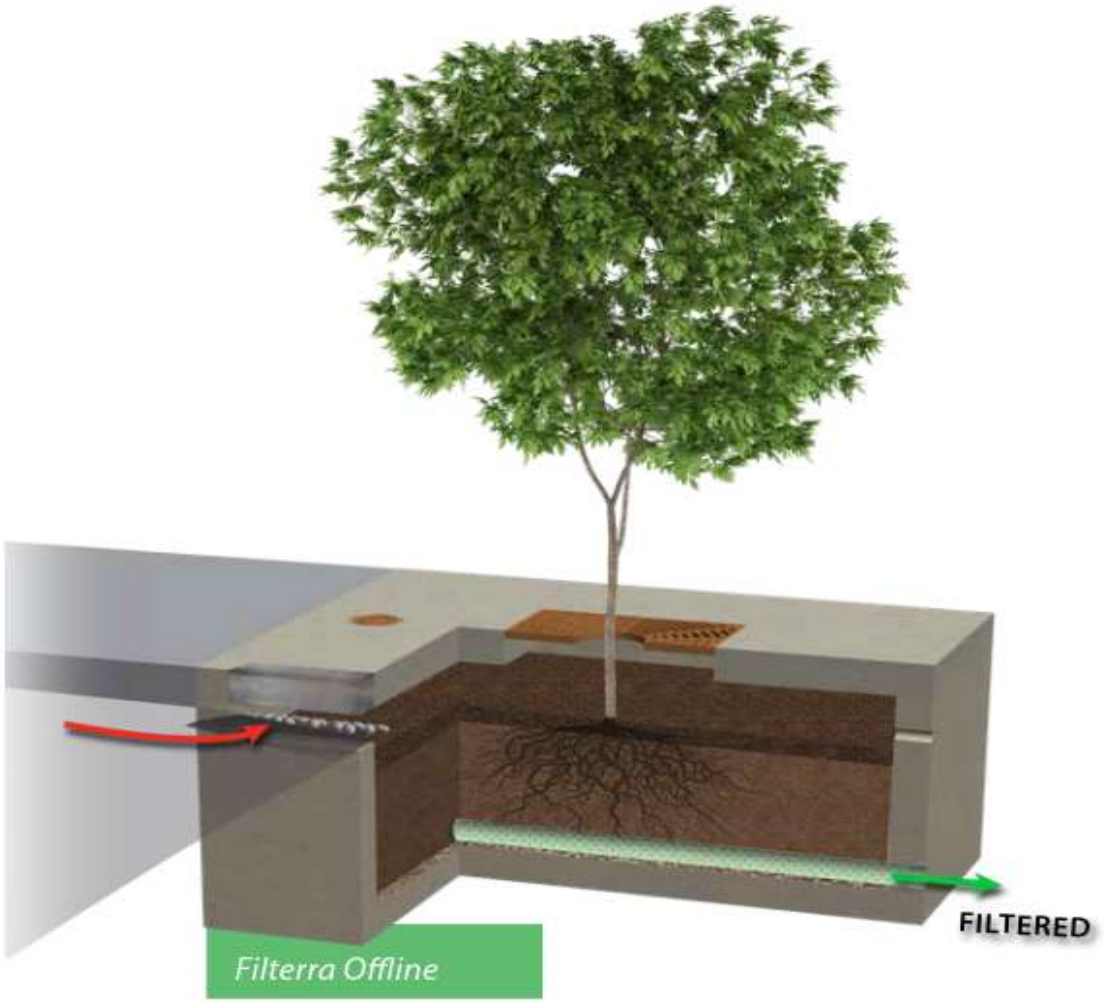
Contech Filterra Information

Contech Filterra
New Hampshire Sizing Quick Reference Table

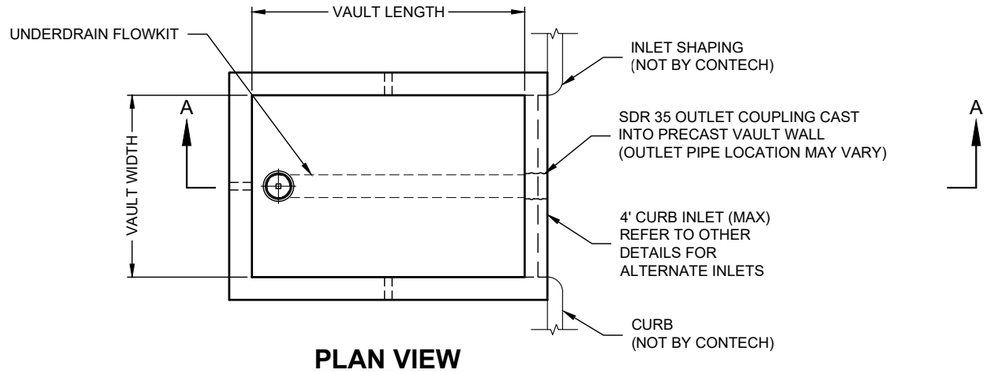
	Size	Max Area (ac)	Max Area (sf)	CN	Tc (min)	WQ Inflow (cfs)	Outflow (cfs)
1.0" Rainfall (Type II)	4x4	0.065	2,853	98	6	0.08	0.05
	4x6	0.098	4,280	98	6	0.12	0.08
	4x8	0.131	5,706	98	6	0.17	0.10
	6x6	0.147	6,420	98	6	0.19	0.12
	6x8	0.197	8,560	98	6	0.25	0.16
	6x10	0.246	10,700	98	6	0.31	0.19
	6x12	0.295	12,840	98	6	0.37	0.23
	7x13	0.373	16,228	98	6	0.47	0.29

	Size	Max Area (ac)	Max Area (sf)	CN	Tc (min)	WQ Inflow (cfs)	Outflow (cfs)
1.0" Rainfall (Type III)	4x4	0.095	4,140	98	6	0.08	0.05
	4x6	0.143	6,210	98	6	0.12	0.08
	4x8	0.190	8,280	98	6	0.17	0.10
	6x6	0.214	9,315	98	6	0.19	0.12
	6x8	0.285	12,421	98	6	0.25	0.16
	6x10	0.356	15,526	98	6	0.31	0.19
	6x12	0.428	18,631	98	6	0.37	0.23
	7x13	0.541	23,548	98	6	0.47	0.29

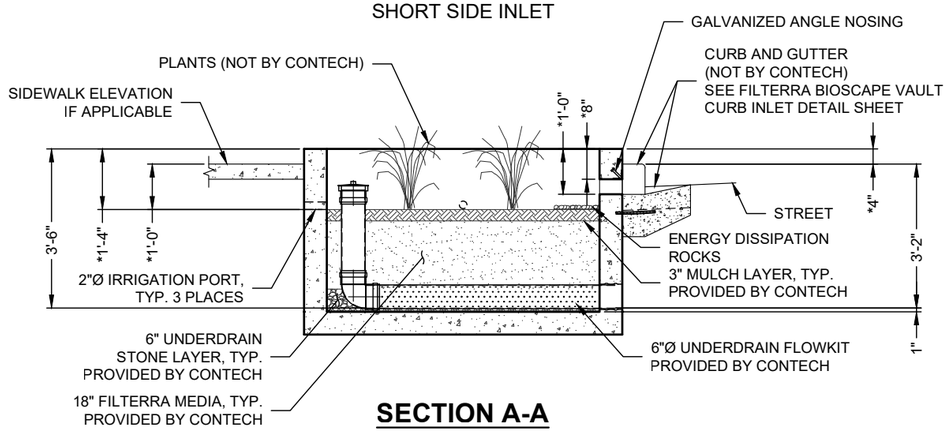


Bypass via downstream catch basin.

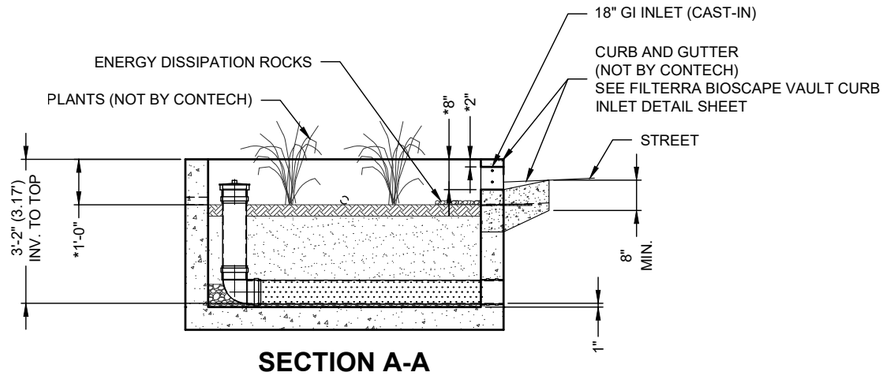
DIMENSIONS PRECEDED BY " * " ARE CRITICAL AND MAY NOT BE MODIFIED WITHOUT CONSULTING CONTECH



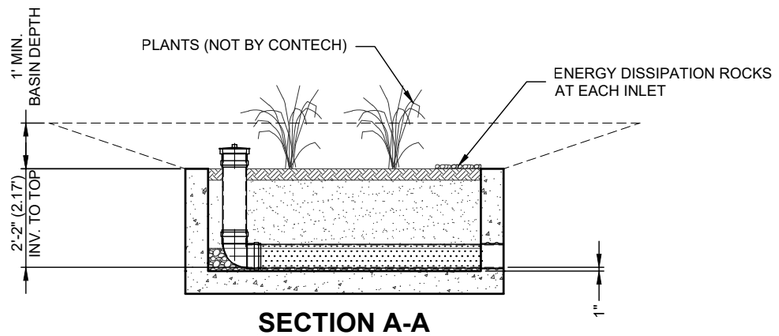
PLAN VIEW
SHORT SIDE INLET



SECTION A-A
SLOTTED THROAT INLET



SECTION A-A
GREEN INFRASTRUCTURE INLET - TOP FLUSH WITH TOP OF CURB, NOT INTENDED FOR SIDEWALK APPLICATIONS



SECTION A-A
BASIN - CURB INLET OR PIPE INLETS OPTIONAL

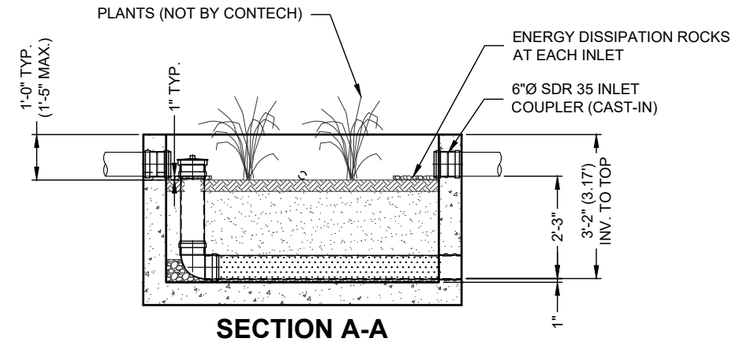
FTBSV-HC CONFIGURATION

(OPTIONS: BASIN "-B", GREEN INFRASTRUCTURE (GI) INLET "-I", PIPE INLET "-P", SLOTTED THROAT INLET "-T")

VAULT SIZE (L x W)	MEDIA AREA (SF)	LONG SIDE INLET DESIG. / PART NO.	SHORT SIDE INLET DESIG. / PART NO.	AVAILABILITY	OUTLET PIPE DIA	MIN. NO. OF INLET PIPES (-P ONLY)
4 x 4	16	FTBSV0404-HC	FTBSV0404-HC	ALL	6" SDR 35	1
6 x 4	24	FTBSV0604-HC	FTBSV0406-HC	ALL	6" SDR 35	1
8 x 4	32	FTBSV0804-HC	FTBSV0408-HC	ALL (EXCEPT DE,MD,NJ,PA,VA,WV)	6" SDR 35	1
7.83 x 4.5	35	FTBSV078045-HC	FTBSV045078-HC	DE,MD,NJ,PA,VA.WV ONLY	6" SDR 35	1
6 x 6	36	FTBSV0606-HC	FTBSV0606-HC	ALL (EXCEPT CA, TX)	6" SDR 35	1
8 x 6	48	FTBSV0806-HC	FTBSV0608-HC	ALL	6" SDR 35	1
10 x 6	60	FTBSV1006-HC	FTBSV0610-HC	ALL (EXCEPT CA, TX)	6" SDR 35	2
8 x 8	64	FTBSV0808-HC	FTBSV0808-HC	CA, TX ONLY	6" SDR 35	2
12 x 6	72	FTBSV1206-HC	FTBSV0612-HC	ALL (EXCEPT TX)	6" SDR 35	2
10 x 8	80	FTBSV1008-HC	FTBSV0810-HC	CA, TX ONLY	6" SDR 35	2
13 x 7	91	FTBSV1307-HC	FTBSV0713-HC	ALL (EXCEPT CA, TX)	6" SDR 35	2
12 x 8	96	FTBSV1208-HC	FTBSV0812-HC	CA, TX ONLY	6" SDR 35	2
14 x 8	112	FTBSV1408-HC†	N/A	ALL	6" SDR 35	3
16 x 8	128	FTBSV1608-HC†	N/A	ALL (EXCEPT OR,WA)	6" SDR 35	3
15 x 9	135	FTBSV1509-HC†	N/A	OR,WA ONLY	6" SDR 35	3
18 x 8	144	FTBSV1808-HC†	N/A	CALL CONTECH	6" SDR 35	3
20 x 8	160	FTBSV2008-HC†	N/A	CALL CONTECH	6" SDR 35	4
22 x 8	176	FTBSV2208-HC†	N/A	CALL CONTECH	6" SDR 35	4

†UTILIZES (2) CURB OPENINGS WITH MIN 1' SPACING

INTERNAL PIPE CONFIGURATION MAY VARY DEPENDING ON VAULT SIZE



SECTION A-A
PIPE INLET

filterra
FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

AS WITH ALL OPEN TOP BIORETENTION SYSTEMS, FILTERRA BIOSCAPE IS OPEN TO THE ATMOSPHERE WITH A MEDIA SURFACE RECESSED BELOW FINISHED GRADE. CONTRACTOR OR OWNER IS RESPONSIBLE FOR PROVIDING ANY REQUIRED SAFETY MEASURES AROUND SYSTEM PERIMETER. TO MAINTAIN AESTHETICS, REMOVAL OF HEAVY STORMWATER DEBRIS MAY BE NECESSARY BETWEEN REGULAR FILTERRA SYSTEM MAINTENANCE EVENTS.

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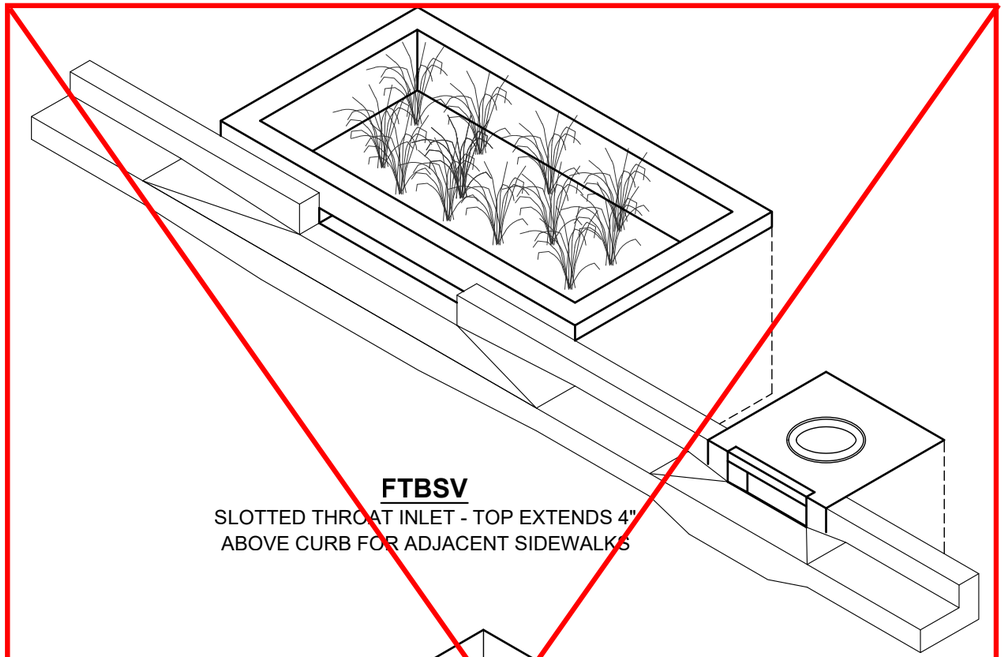
9100 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

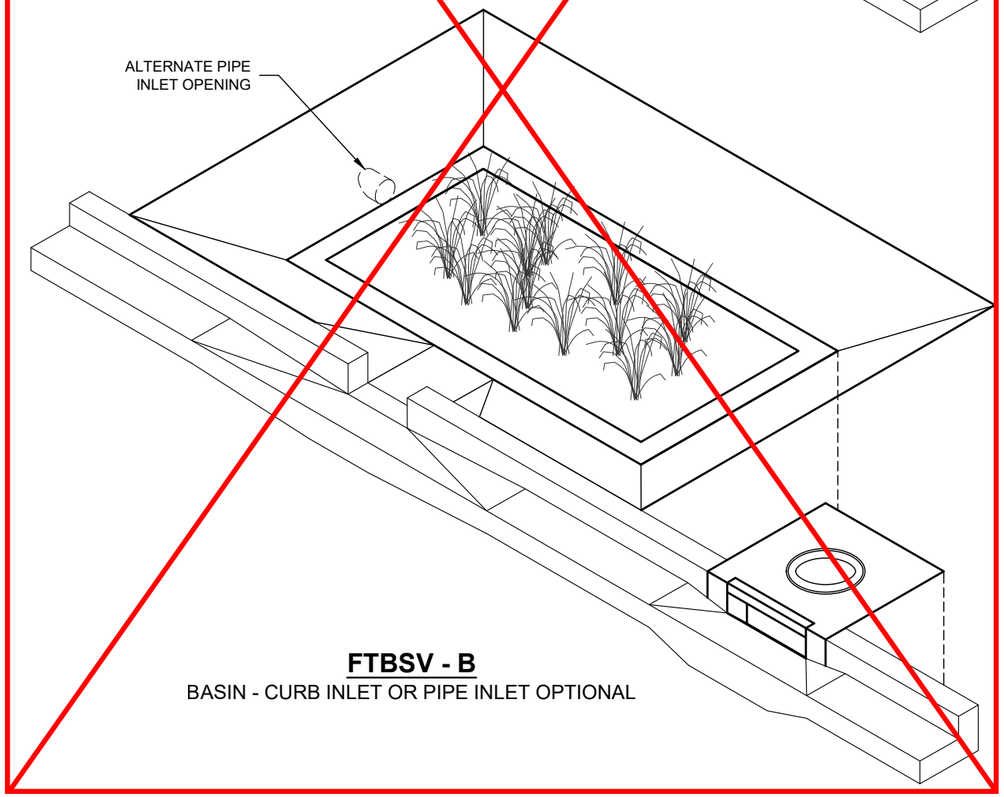
FILTERRA BIOSCAPE VAULT OFFLINE HC (FTBSV-HC) CONFIGURATION DETAILS

I:\COMMON\CAD\TREATMENT\54 FILTERRA\40 STANDARD DRAWINGS\IN PROCESS\STD DETAILS\FTBSV-HC (NJ ONLY) - FILTERRA BIOSCAPE VAULT OFFLINE CONFIG DTL.DWG 3/15/2023 5:31 PM



FTBSV

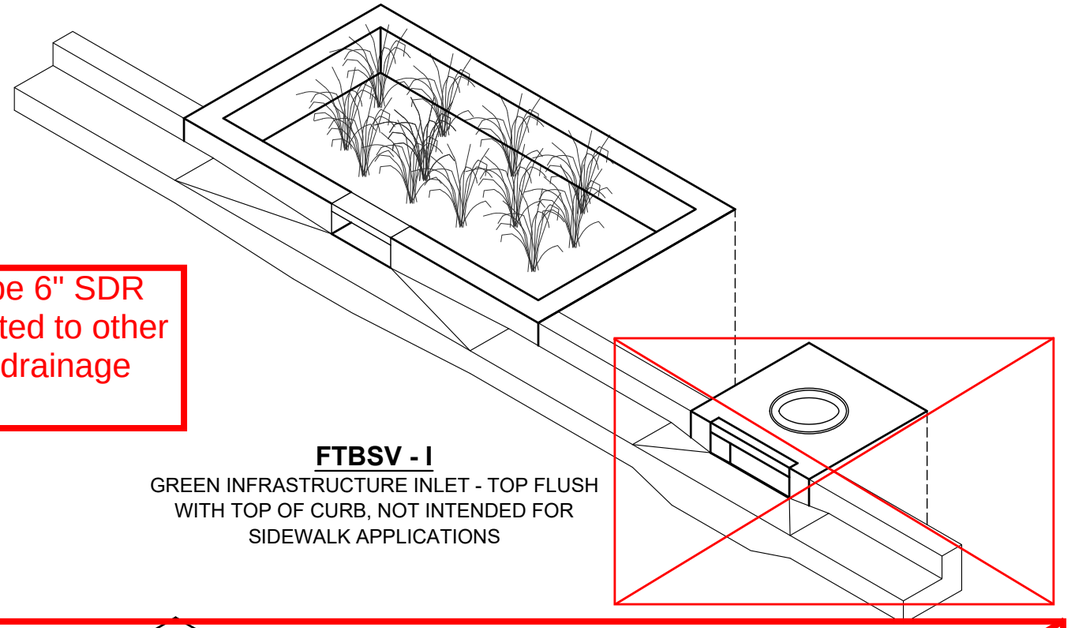
SLOTTED THROAT INLET - TOP EXTENDS 4" ABOVE CURB FOR ADJACENT SIDEWALKS



FTBSV - B

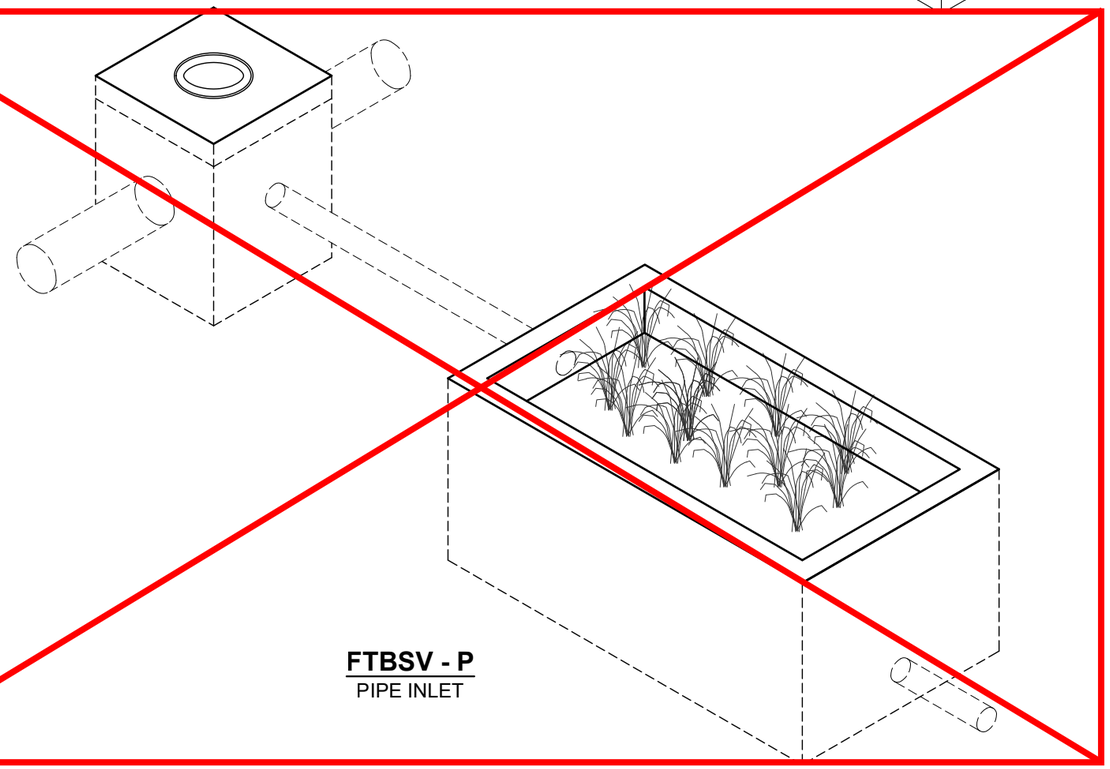
BASIN - CURB INLET OR PIPE INLET OPTIONAL

Vault outfall to be 6" SDR 35 pipe, not routed to other catch basins or drainage structures.



FTBSV - I

GREEN INFRASTRUCTURE INLET - TOP FLUSH WITH TOP OF CURB, NOT INTENDED FOR SIDEWALK APPLICATIONS



FTBSV - P

PIPE INLET

filterra

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FILTERRA BIOSCAPE VAULT OFFLINE HC (FTBSV-HC) SITE LAYOUT DETAILS

I:\COMMON\CAD\TREATMENT\54 FILTERRA\40 STANDARD DRAWINGS\IN PROCESS\STD DETAILS\FTBSV-HC (NJ ONLY) - FILTERRA BIOSCAPE VAULT OFFLINE CONFIG DTL.DWG 3/15/2023 5:31 PM

The sizing table corresponding to the available system models is noted below:

Table 1. Filterra® HC MTFRs and Maximum Allowable Drainage Areas

	Available Filterra® Media Bay Sizes (feet)	Effective Filtration Treatment Area (ft^2)	Treatment Flow Rate (cfs)	Maximum Allowable Drainage Area (ac)
Standard Configuration Filterra and Filterra Biosape Vaults	4x4	16	0.111	0.40
	4x6 or 6x4	24	0.167	0.60
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	0.245	0.89
	6x6	36	0.250	0.91
	6x8 or 8x6	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	6x12 or 12x6	72	0.500	1.81
	7x13 or 13x7	91	0.632	2.29
	14x8	112	0.778	2.82
	16x8	128	0.889	3.22
	18x8	144	1.000	3.62
	20x8	160	1.111	4.03
	22x8	176	1.222	4.43
Peak Diversion Filterra Vaults	4x4	16	0.111	0.40
	4.5x5.83 (Nominal 4x6)	26.24	0.182	0.66
	6x4	24	0.167	0.60
	6x6	36	0.250	0.91
	6x8	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	7x10	70	0.486	1.76
	8x10.5	84	0.583	2.11
	8x12.5	100	0.694	2.52
	Custom and/or Filterra Bioscape	Media Area in ft^2	0.00694 * (Media Area in ft^2)	0.0252 * (Media Area in ft^2)

Filterra Bioscape Owner's Manual

(No Precast Vault Provided)

filterra®

Bioscape®

CONTECH®
ENGINEERED SOLUTIONS

This Owner's Manual applies to Filterra Bioscape ONLY (Filterra installed directly into an excavated basin or other customer provided container, such as a large cast-in-place vault).







filterra® Bioscape®

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Filterra Plant Selection Overview 5

Warranty Overview 5

Routine Maintenance Guidelines 5

Plant Care 7

Maintenance Visit Procedure 8

Maintenance Checklist 10

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CONTECH® ENGINEERED SOLUTIONS

Introduction

Thank you for your purchase of the Filterra® Bioscape® System. Filterra® is a specially engineered stormwater treatment system incorporating high performance biofiltration media to remove pollutants from stormwater runoff. The system's biota (vegetation and soil microorganisms) then further breakdown and absorb captured pollutants. All components of the system work together to provide a sustainable long-term solution for treating stormwater runoff.

Included with your purchase is a Supervised Activation service as well as a 1-year warranty from delivery of the system. In some cases, a Final Site Assessment (assessment of unit condition, mulch replacement, debris removal and pruning) may also be included for systems smaller than 1000 sf in size. Check your order documentation for further information.

Filterra® Bioscape® systems should not be activated until the site is stabilized to prevent construction related runoff from entering and contaminating the system. For Filterra® Bioscape® systems installed within an excavated basin, Contech provides an erosion control sock around the perimeter to provide an extra layer of protection. However, these protection devices are intended as a best practice and cannot fully prevent contamination. It is the purchaser's responsibility to provide adequate measures to prevent construction related runoff from entering the Filterra® Bioscape® system.

Design and Installation

Each project presents different scopes for the use of Filterra® Bioscape® systems. Information and help may be provided to the design engineer during the planning process. Correct Filterra® Bioscape® sizing (by rainfall region) is essential to predict pollutant removal rates for a given area. The engineer shall submit calculations for approval by the local jurisdiction. The contractor is responsible for the correct installation of Filterra® Bioscape® systems as shown in approved plans. A comprehensive installation manual is available from Contech.

Activation Overview

Activation of the Filterra® Bioscape® system is a procedure completed by the contractor to place the system into working condition. This involves the following items:

- Installation of the Filterra® Bioscape® underdrain system
- Installation of the Filterra® media layer
- Planting of the system's vegetation
- Placement of pretreatment mulch layer using mulch certified for use in Filterra® systems



Minimum Requirements

The minimum requirements for Filterra® Bioscape®Activation are as follows:

1. The purchaser must have sourced vegetation meeting the requirements outlined in the Filterra® Bioscape® Activation Package
2. A pre-construction meeting is required to discuss site requirements, logistics planning and activation FAQ and red flags.
3. The site landscaping must be fully stabilized, i.e. full landscaping installed and some grass cover (not just straw and seed) is required to reduce sediment transport. Construction debris and materials should be removed from surrounding area.
4. Final paving must be completed. Final paving ensures that paving materials will not enter and contaminate the Filterra® system during the paving process, and that the plant will receive runoff from the drainage area, assisting with plant survival for the Filterra® system.
5. All immediate upstream and downstream structures should be placed with piping into the system already installed for connection during activation.

An Activation Checklist is included in the Filterra® Bioscape® Activation Package to ensure proper conditions are met for Activation. A charge of $1500.00 will be invoiced for each Supervised Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation.

Filterra Plant Selection Overview

A Plant List is available on the Contech website highlighting recommended plants for Filterra® Bioscape® systems in your area. Keep in mind that plants are subject to availability due to seasonality. Plants installed in the Filterra® Bioscape® system shall be container-grown plants (max 15 gallon) from nursery stock and will be immature in height and spread at Activation. It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra® Bioscape® system. The "Filterra® Bioscape® Activation Package" document is included as an appendix and discusses proper selection of the plants within Filterra® Bioscape® systems.

Warranty Overview

Refer to the Contech® Engineered Solutions LLC Stormwater Treatment System LIMITED WARRANTY for further information. The following conditions may void the Filterra® Bioscape® system's warranty and waive the manufacturer provided Final Site Assessment (if applicable):

- Unauthorized activation or performance of any of the items listed in the activation overview without Contech supervision or input
- Removal of any Filterra® system components
- Failure to prevent construction related runoff from entering the Filterra® system
- Failure to properly store and protect any Filterra® components (including media and underdrain stone) that are shipped separately to the site

Routine Maintenance Guidelines

With proper routine maintenance, the biofiltration media within the Filterra® Bioscape® system should last as long as traditional bioretention media. Routine maintenance can be provided by certified maintenance providers listed on the Contech website. Training can also be provided to other stormwater maintenance or landscape providers.

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons to maintain are:

- Avoiding legal challenges from your jurisdiction's maintenance enforcement program.
- Prolonging the expected lifespan of your Filterra® media.
- Avoiding more costly media replacement.
- Helping reduce pollutant loads leaving your property.

Simple maintenance of the Filterra® Bioscape® is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The unit will recycle and accumulate pollutants within the biomass, but is also subjected to other materials entering the inlet. This may include trash, silt and leaves etc. which will be contained above the mulch layer. Too much silt may inhibit the Filterra's flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

When to Maintain?

Maintenance visits are typically scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally recommended; In regions with less rainfall often only (1) one visit per annum is sufficient. Varying land uses can affect maintenance frequency; e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Manufacturer and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the maintenance provider of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology.

Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not included as part of the Final Site Assessment (if applicable). Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra® (where the cleaned runoff drains to, such as drop inlet) and block off the throat of the Filterra®. The Supplier should be informed immediately.

Maintainenance Visit Summary

Maintenance visits are typically scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

1. Inspection of Filterra® Bioscape® and surrounding area
2. Removal of erosion control stones
3. Removal of debris, trash and mulch
4. Removal and disposal of erosion control sock from system perimeter (should be completed at 6 month or 12 month maintenance depending upon site characteristics). A new erosion control sock is no longer needed after the first year.
5. Mulch replacement
6. Plant health evaluation and pruning or replacement as necessary
7. Clean area around Filterra®
8. Complete paperwork

Plant Care for Filterra® Systems

After Activation, the Contractor is responsible for proper care of the vegetation until the site is handed over to the Owner. After that, it is the Site Owner's responsibility to care for the vegetation. Contech recommends the following care for the plants:

1. To prevent transplant shock (especially if planting takes place in the hot season), it may be necessary to prune some of the foliage to compensate for reduced root uptake capacity. This is accomplished by pruning away some of the smaller secondary branches or a main scaffold branch if there are too many. Too much foliage relative to the root ball can dehydrate and damage the plant.
2. Plant staking may be required.
3. With all trees/shrubs, remove dead, diseased, crossed/rubbing, sharply crotched branches or branches growing excessively long or in wrong direction compared to majority of branches.
4. Contech recommends irrigation of the Filterra® Vegetation. The following guidance will help to ensure the vegetation is properly irrigated.

Irrigation Recommendations:

- Each Filterra® system must receive adequate irrigation to ensure survival of the living system during periods of drier weather.
- Irrigation sources include rainfall runoff from downspouts and/or gutter flow, applied water through the tree grate or in some cases from an irrigation system with emitters installed during construction.
- At Activation: Apply about one (cool climates) to two (warm climates) gallons of water per inch of trunk diameter over the root ball.
- During Establishment: In common with all plants, each Filterra® plant will require more frequent watering during the establishment period. One inch of applied water per week for the first three months is recommended for cooler climates (2 to 3 inches for warmer climates). If the system is receiving rainfall runoff from the drainage area, then irrigation may not be needed. Inspection of the soil moisture content can be evaluated by gently brushing aside the mulch layer and feeling the soil. Be sure to replace the mulch when the assessment is complete. Irrigate as needed**.
- Established Plants: Established plants have fully developed root systems and can access the entire water column in the media. Therefore irrigation is less frequent but requires more applied water when performed. For a mature system assume 3.5 inches of available water within the media matrix. Irrigation demand can be estimated as 1" of irrigation demand per week. Therefore if dry periods exceed 3 weeks, irrigation may be required.

*** Five gallons per square yard approximates 1 inch of water. Therefore for a 6' x 6 foot Filterra® approximately 20-60 gallons of applied water is needed. To ensure even distribution of water it needs to be evenly sprinkled over the entire surface of the filter bed, with special attention to make sure the root ball is completely wetted. NOTE: if needed, measure the time it takes to fill a five gallon bucket to estimate the applied water flow rate. Then calculate the time needed to irrigate the Filterra®, For example is the flow rate of the sprinkler is 5 gallons/minute then it would take 12 minutes to irrigate a 6'x6' filter.*

Plant Replacement:

In some cases, plants will require replacement. Please follow the procedures below to ensure a properly functioning Filterra® system.

1. Remove the existing plant, and leave as much of the Filterra® media in place as possible.
2. Select a replacement per the Filterra® Bioscape® Activation Package.
3. Prior to removing the plant from the container, ensure the soil moisture is sufficient to maintain the integrity of the root ball. If needed, pre-wet the container plant.
4. Cut away any roots which are growing out of the container drain holes.
5. Plant(s) should be carefully removed from the pot by gently pounding on the sides of the container with the fist to loosen root ball. Then carefully slide out. Do not lift plant(s) by trunk as this can break roots and cause soil to fall off. Extract the root ball in a horizontal position and support it to prevent it from breaking apart. Alternatively, the pot can be cut away to minimize root ball disturbance.
6. Excavate a hole with a diameter 4" greater than the root ball, gently place the plant(s).
7. Plant the tree/shrub/grass with the top of the root ball 1" above surrounding media to allow for settling.
8. All plants should have the main stem centered in the tree grate (where applicable) upon completion of installation.
9. Reinstall or add mulch to a depth of 3" per Contech's mulch specifications for Filterra® systems.

Maintenance Visit Procedure

Keep sufficient documentation of maintenance actions to predict location specific maintenance frequencies and needs. An example Maintenance Report is included in this manual.

1. Inspection of Filterra and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes | no
Is Bypass Clear	yes | no

If yes answered to any of these observations, record with close-up photograph (numbered).

2. Removal of erosion control stones

- Set aside erosion control stones for reuse after mulch has been replaced.
- Dig out silt (if any) and mulch and remove trash & foreign items.

Record on Maintenance Report the following:

Is scour present around the inlet areas? yes | no

If answering yes, consider adding additional erosion control stone.

3. Removal of debris, trash and mulch

- After removal of mulch and debris, measure distance from the top of the Filterra engineered media soil to the top of the top slab. Compare the measured distance to the distance shown on the approved Contract Drawings for the system. Add Filterra media (not top soil or other) to bring media up as needed to distance indicated on drawings.

Record on Maintenance Report the following:

Silt/Clay	yes | no
Bypass Clear	yes | no
Leaves	yes | no
# of Buckets Removed	_____

4. Removal and Disposal of Erosion Control Sock

- Remove and dispose of erosion control sock if site conditions allow (site should be fully stabilized). Erosion control sock is no longer needed after 1-year post activation.

5. Mulch Replacement

- Add mulch evenly across entire system to a depth of three inches.

6. Vegetation health evaluation and pruning

- Examine the vegetation health and replace if necessary. Prune vegetation to encourage growth in the correct directions. Since Filterra® Bioscape® systems can contain many plants, only notation of individual damaged or unhealthy plants is necessary.
  - » Record on Maintenance Report the following:
  - » Vegetation Health
  - » Vegetation Damage

Document damaged or unhealthy plants with photographs.

7. Clean side slopes and area around the Filterra Bioscape system

- Remove all trash and debris to be disposed of appropriately.

8. Complete paperwork

- Complete Maintenance Report. Some jurisdictions require submission of maintenance reports in accordance with approvals. It is the responsibility of the owner to comply with local regulations.



Maintenance Tools, Safety Equipment and Supplies

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing, barricades when working in close proximity to traffic and safety hats, glasses, and shoes.

Most visits require minor trash removal and a full replacement of mulch. Mulch should be a double shredded, hardwood variety.

Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into Filterra.	Inlet should be free of obstructions allowing free distributed flow of water into Filterra.	Sediments and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover.	Trash and debris should be removed and mulch cover raked level. Ensure bark nugget mulch is not used.
Mulch Cover	"Ponding" of water on mulch cover.	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover.	Recommend contact manufacturer and replace mulch as a minimum.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact manufacturer for advice.
Vegetation	Plant growth excessive.	Plants should be appropriate to the species and location of Filterra.		Trim/prune plants in accordance with typical landscaping and safety needs.
Maintenance is ideally to be performed twice annually.				

Filterra Inspection & Maintenance Log

Filterra System Size/Model:_____ **Location:** _____

Date	Mulch & Debris Removed	Depth of Mulch Added	Mulch Brand	Vegetation Species	Issues with System	Comments
1/1/17	*5 – 5 gal Buckets*	*3"*	*Lowe's Premium Brown Mulch*	*Galaxy Magnolia*	*- Standing water in downstream structure*	*- Removed blockage in downstream structure*

Appendix 1 – Filterra® Bioscape® Activation Package

FILTERRA® BIOSCAPE® ACTIVATION PACKAGE

(No Precast Vaults Provided)

CONTECH® ENGINEERED SOLUTIONS

It is the purchaser's responsibility to Activate the Filterra Bioscape System and provide adequate measures to prevent construction related runoff from entering the Filterra Bioscape system.

Included with your purchase is Supervised Activation of the Filterra system by the manufacturer as well as a 1-year warranty from delivery of the system. The purchaser must ensure that the site is acceptable for Filterra Bioscape Activation. A checklist (included as page 2 of this document must be completed and submitted to the Contech Activation Coordinator. The minimum requirements for Filterra Bioscape Activation are as follows:

1. The purchaser must have sourced vegetation meeting the requirements outlined in "Plant Selection for Filterra Systems" below.
2. A pre-construction meeting is required to discuss site requirements, logistics planning and activation FAQ and red flags.
3. The site landscaping must be fully stabilized, i.e. full landscaping installed and some grass cover (not just straw and seed) is required to reduce sediment transport. Construction debris and materials should be removed from surrounding area.
4. Final paving must be completed. Final paving ensures that paving materials will not enter and contaminate the Filterra system during the paving process, and that the plant will receive runoff from the drainage area, assisting with plant survival for the Filterra system.
5. All immediate upstream and downstream structures should be placed with piping into the system already installed for connection during activation.



Plant Selection for Filterra® Bioscape® Systems

All Filterra systems require vegetation for proper long-term performance. As indicated in the Filterra Bioscape Activation Package, the Contractor is responsible for sourcing the proper vegetation prior to Supervised Activation. Contech or a Contech representative will supervise installation the vegetation during the Activation process.

Contractors must ensure the vegetation meets the following 3 requirements:

1. Select plant(s) as specified in the engineering plans and specifications AND that are listed on Contech's Configuration Specific Plant Lists.
2. All plants MUST be container-grown in nursery containers no larger than 15 gallons. Crated and/or Ball/Burlap plants are NOT permitted.
3. Quantities should be selected based on plant palette options found starting on page 3 of this document.

If Contech or Contech's representative shows up for Supervised Activation and any of the 3 requirements above are not met, Activation cannot be performed and the Contractor will be billed a $1,500 Unprepared Site fee*.

* *UNPREPARED SITE FEE NOTE: A charge of $1500.00 will be invoiced for each activation visit requested by customer where Contech determines that the site does not meet the conditions required for Activation AND/OR acceptable plants are not provided by the contractor.*

Filterra® Contractor Activation Checklist

Requested Activation Date: _____ System Designation: _____

Project Name: _____

Site Contact Name: _____ Site Contact Phone/Email: _____

Site Owner/End User Name: _____ Site Owner/End User Phone/Email: _____

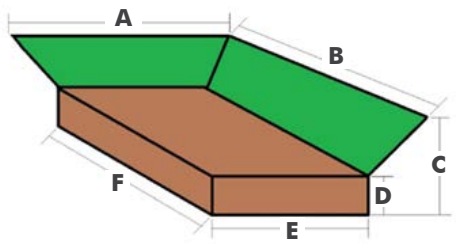
Please complete the following checklist, sign, date, and submit with your activation request to your Contech Project Consultant. Along with the checklist, fill out the as-built dimensions of the Filterra Bioscape system excavation(s), and attach photos of the Filterra Bioscape excavation(s). This information is essential to ensure the proper amount of material is provided.

Checklist:

- ☐ Upstream drainage area to Filterra Bioscape system is stabilized.
- ☐ Filterra Bioscape excavated per plan dimensions to bottom of Filterra underdrain stone depth. Surface area of media area must match order quantities.
- ☐ If additional depth of drain rock is required per site plans, additional drain rock is installed to the Filterra Bioscape underdrain pipe elevation.
- ☐ Excavation sides vertical from bottom of excavation to top of mulch (Approximately 34" when 6" underdrain is utilized).
- ☐ Excavation sides maximum slope 3:1 from top of mulch to finished grade.
- ☐ Side slopes above top of mulch elevation stabilized with sod or other slope stabilization.
- ☐ Bioscape Inlet (BSI) structure or other inlet/bypass structure installed and properly backfilled with maximum 3:1 slopes to top of mulch elevation.
- ☐ Inflow pipe(s) connected from BSI or other inlet structure to edge of Filterra Bioscape system excavation.
- ☐ Outflow pipe(s) connected from edge of Filterra Bioscape system excavation to downstream structure.
- ☐ Outflow pipe(s) are SDR35, properly sized per site plan underdrain pipe size(s).
- ☐ Excavation is dry and free from construction related sediment and debris.
- ☐ Bottom of excavation is properly scarified.
- ☐ Excavation is accessible by standard construction equipment.
- ☐ Plants have been purchased in accordance with the guidance in "Plant Selection for Filterra Bioscape Systems"
- ☐ Photos attached.

NOTE: Please ensure that all of the above conditions have been met prior to activation request. A mobilization fee (minimum $1000.00) applies for each activation visit requested by Customer where Contech determines that the site does not meet the above conditions suitable for activation.

As-Built Dimensions



A.	OVERALL EXCAVATION WIDTH:	_____FT
B.	OVERALL EXCAVATION LENGTH:	_____FT
C.	OVERALL EXCAVATION HEIGHT:	_____FT
D.	FILTERRA BED HEIGHT:	_____FT
E.	FILTERRA MEDIA BED WIDTH:	_____FT
F.	FILTERRA MEDIA BED LENGTH:	_____FT

Signature _____ Date _____

* *UNPREPARED SITE FEE NOTE: A charge of $1500.00 will be invoiced for each activation visit requested by customer where Contech determines that the site does not meet the conditions required for Activation AND/OR acceptable plants are not provided by the contractor.*

Filterra® Bioscape Plant Palettes

KEY: (refer to plant lists for species sizing)



A. EXTRA SMALL GRASS
- Up to 2′ mature spread
- 1-2 gallon typical (1 gal. minimum)

B. SMALL GRASS/SHRUB
- 2′-4′ mature spread
- 1-7 gallon typical

C. MEDIUM SHRUB
- 4′-6′ mature spread
- 1-7 gallon typical

D. LARGE SHRUB OR EXTRA LARGE SHRUB OR TREE
- 6′ mature spread and greater, 30′ max. mature height
- Up to 15 gallon maximum

NOTE: *For larger vaults and in-ground Filterra Bioscape systems, palettes can be scaled (i.e. Qty 6 of the 175 SF Palette can be used for a 1056 SF Filterra Bioscape).*

MIX & MATCH SUBSTITUTION OPTIONS:

1 Large Shrub or Extra Large Shrub or Tree
- 2 Medium Shrubs
- 4 Small Grass/SHrubs
- 12 Extra Small Grasses

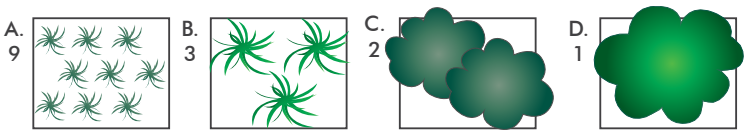
1 Medium Shrub
- 2 Small Grass/Shrubs
- 6 Extra Small Grasses

1 Small Grass/Shrub
- 3 Extra Small Grasses

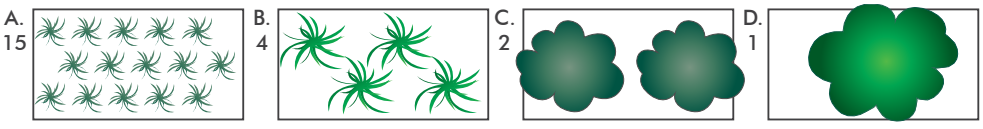
25 SF example



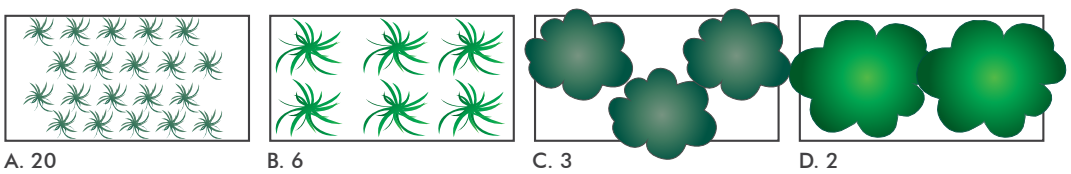
50 SF example



75 SF example

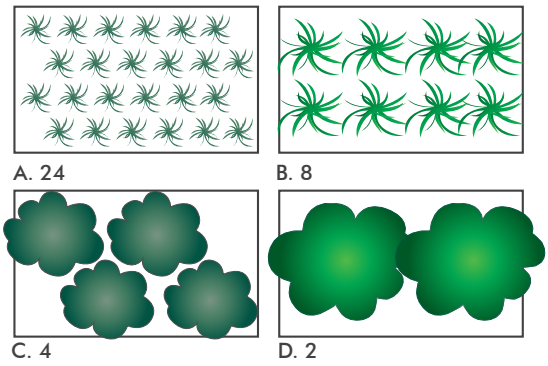


100 SF example



* *UNPREPARED SITE FEE NOTE: A charge of $1500.00 will be invoiced for each activation visit requested by customer where Contech determines that the site does not meet the conditions required for Activation AND/OR acceptable plants are not provided by the contractor.*

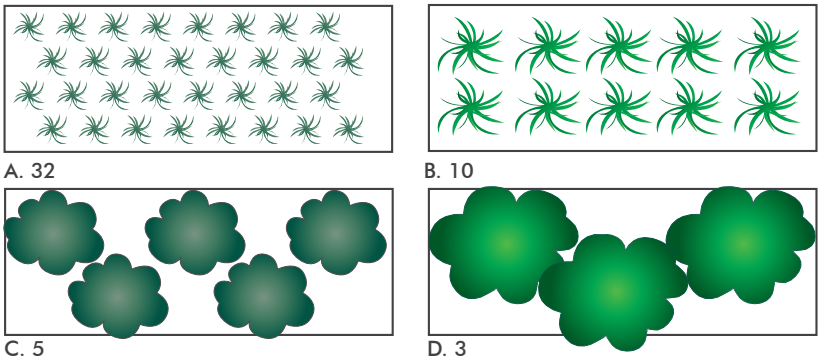
125 SF example



A. 24 B. 8

C. 4 D. 2

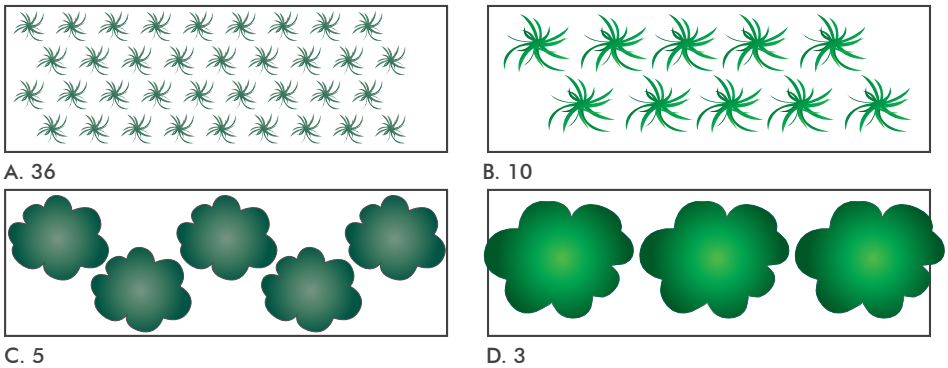
150 SF example



A. 32 B. 10

C. 5 D. 3

175 SF example



A. 36 B. 10

C. 5 D. 3

In some cases, Contech may consider alternate plant species as approved by the Product Manager. Please list the plant name in the space below and submit this sheet to your Contech Activation Coordinator. If the plant species is approved, either the Product Manager or the Activation Coordinator will sign the form and return to you for inclusion with your Activation Checklist.

Requested Plant Species: _____ Approved: _____

Date: _____

* *UNPREPARED SITE FEE NOTE: A charge of $1500.00 will be invoiced for each activation visit requested by customer where Contech determines that the site does not meet the conditions required for Activation AND/OR acceptable plants are not provided by the contractor.*

PDF 1/23

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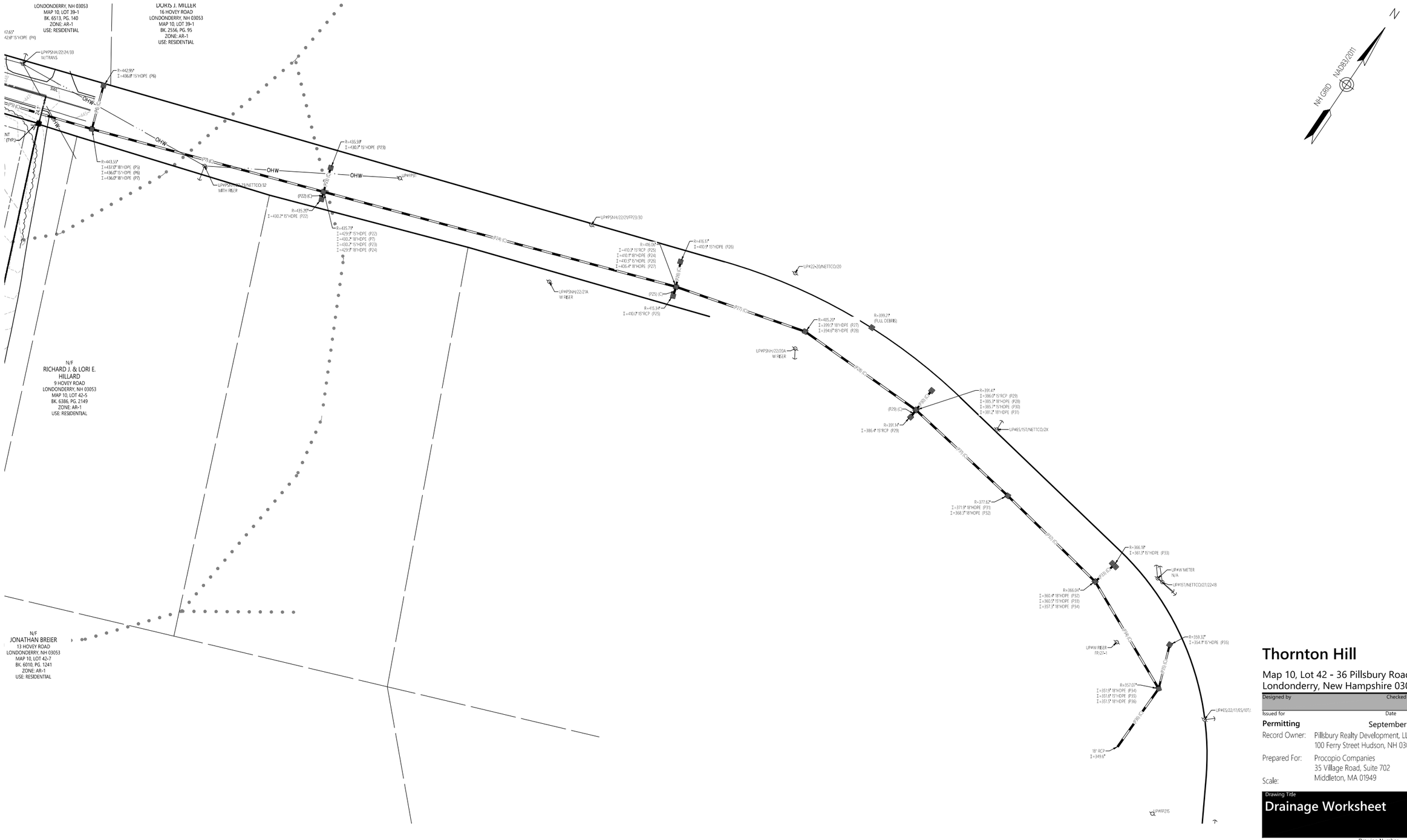
Hovey Road Drainage Worksheet



Certification

I HEREBY REPORT THAT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE. INFORMATION, AND BELIEF: THIS PLAN WAS PREPARED FROM A FIELD SURVEY SUPERVISED BY ME AND MADE IN CONFORMANCE WITH THE STANDARDS PROMULGATED IN NH LAN 500 FOR A STANDARD PROPERTY SURVEY AND MEETS THE ACCURACY STANDARD FOR AN URBAN CLASS REAL PROPERTY SURVEY.

Benchmarks

1. TBM 112 - MAG NAIL SET IN PAVEMENT ON HOVEY ROAD, ELEV.=458.60'
2. TBM 121 - MAG NAIL SET IN MEDIAN ON MICHELS WAY, ELEV.=395.40'

No.	Revision	Date	Appvd.
1	RESPONSE TO TOWN COMMENTS	6/13/2025	MJH

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by	Checked by
Issued for	**Date**
Permitting	September 9, 2025

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street Hudson, NH 03051

Prepared For: Procopio Companies
35 Village Road, Suite 702
Middleton, MA 01949

Scale:

Drawing Title
Drainage Worksheet

Drawing Number

Sheet of

Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
603.391.3900 • FAX 603.518.7495

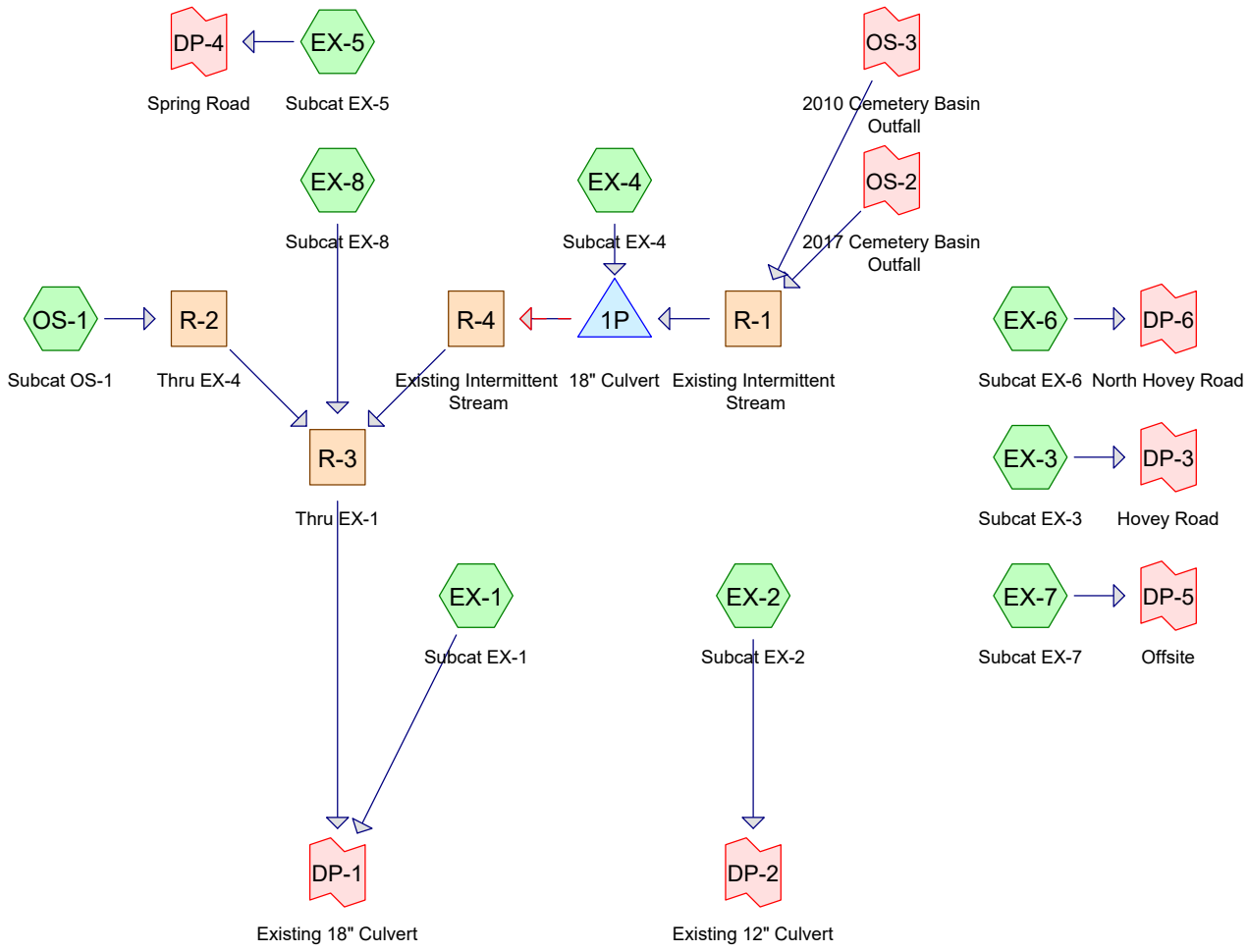
Project Number **53140.00**

Saved Monday, June 9, 2025 5:04:20 PM PQUERTIN Plotted Tuesday, September 9, 2025 2:29:06 PM Paul Guertin

Appendix B: Hydrologic Calculations

- Existing Conditions: Project Site
- Existing Conditions: Hovey Road
- Proposed Conditions: Project Site

Existing Conditions: Project Site



Subcat Reach Pond Link

Routing Diagram for 53140.00-EX
Prepared by VHB, Inc, Printed 11/7/2025
HydroCAD® 10.20-5c s/n 01038 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.47	2
2	2-YR	Type III 24-hr		Default	24.00	1	2.95	2
3	10-YR	Type III 24-hr		Default	24.00	1	4.46	2
4	25-YR	Type III 24-hr		Default	24.00	1	5.65	2
5	50-YR	Type III 24-hr		Default	24.00	1	6.76	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.95	61	>75% Grass cover, Good, HSG B (EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8, OS-1)
11.15	74	>75% Grass cover, Good, HSG C (EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8)
0.23	80	>75% Grass cover, Good, HSG D (EX-2, EX-4, EX-8)
0.38	96	Gravel surface, HSG B (EX-1, EX-2, EX-3, EX-4)
0.47	96	Gravel surface, HSG C (EX-1, EX-2, EX-3, EX-4)
0.00	96	Gravel surface, HSG D (EX-2)
5.95	55	Woods, Good, HSG B (EX-1, EX-2, EX-3, EX-5, EX-7, EX-8, OS-1)
3.49	70	Woods, Good, HSG C (EX-1, EX-3, EX-4, EX-5, EX-7, EX-8, OS-1)
0.10	77	Woods, Good, HSG D (EX-8)
16.63	58	Woods/grass comb., Good, HSG B (EX-1, EX-2, EX-4, EX-8, OS-1)
42.74	72	Woods/grass comb., Good, HSG C (EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-8)
0.41	79	Woods/grass comb., Good, HSG D (EX-2, EX-4, EX-8)
100.51	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
41.91	HSG B	EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8, OS-1
57.86	HSG C	EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8, OS-1
0.74	HSG D	EX-2, EX-4, EX-8
0.00	Other	
100.51		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=22.27 ac 0.00% Impervious Runoff Depth=0.19"
Flow Length=1,922' Tc=24.9 min CN=61 Runoff=1.3 cfs 0.35 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=6.37 ac 0.00% Impervious Runoff Depth=0.17"
Flow Length=934' Tc=10.4 min CN=60 Runoff=0.4 cfs 0.09 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=9.09 ac 0.00% Impervious Runoff Depth=0.26"
Flow Length=560' Tc=21.1 min CN=64 Runoff=1.0 cfs 0.20 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=33.50 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=2,209' Tc=22.1 min CN=72 Runoff=10.7 cfs 1.43 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=5.25 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=348' Tc=12.2 min CN=72 Runoff=2.1 cfs 0.22 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=3.53 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=359' Tc=7.9 min CN=72 Runoff=1.6 cfs 0.15 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=1.67 ac 0.00% Impervious Runoff Depth=0.48"
Flow Length=199' Tc=8.9 min CN=71 Runoff=0.7 cfs 0.07 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=12.48 ac 0.00% Impervious Runoff Depth=0.44"
Flow Length=2,527' Tc=32.5 min CN=70 Runoff=2.7 cfs 0.46 af

Subcatchment OS-1: Subcat OS-1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=0.13"
Flow Length=904' Tc=19.2 min CN=58 Runoff=0.2 cfs 0.07 af

Reach R-1: Existing Intermittent Stream Avg. Flow Depth=0.13' Max Vel=0.60 fps Inflow=0.8 cfs 0.27 af
n=0.080 L=1,720.0' S=0.0170 '/' Capacity=255.8 cfs Outflow=0.5 cfs 0.27 af

Reach R-2: Thru EX-4 Avg. Flow Depth=0.05' Max Vel=0.76 fps Inflow=0.2 cfs 0.07 af
n=0.080 L=344.0' S=0.0812 '/' Capacity=378.8 cfs Outflow=0.2 cfs 0.07 af

Reach R-3: Thru EX-1 Avg. Flow Depth=0.67' Max Vel=2.12 fps Inflow=11.6 cfs 2.23 af
n=0.080 L=254.0' S=0.0311 '/' Capacity=314.0 cfs Outflow=11.6 cfs 2.23 af

Reach R-4: Existing Intermittent Stream Avg. Flow Depth=0.56' Max Vel=2.23 fps Inflow=9.2 cfs 1.70 af
n=0.080 L=1,252.1' S=0.0409 '/' Capacity=297.4 cfs Outflow=8.8 cfs 1.70 af

Pond 1P: 18" Culvert Peak Elev=434.13' Storage=2,989 cf Inflow=10.7 cfs 1.70 af
Primary=9.2 cfs 1.70 af Secondary=0.0 cfs 0.00 af Outflow=9.2 cfs 1.70 af

Link DP-1: Existing 18" Culvert Inflow=12.9 cfs 2.58 af
Primary=12.9 cfs 2.58 af

Link DP-2: Existing 12" Culvert Inflow=0.4 cfs 0.09 af
Primary=0.4 cfs 0.09 af

Link DP-3: Hovey Road Inflow=1.0 cfs 0.20 af
Primary=1.0 cfs 0.20 af

Link DP-4: Spring Road Inflow=2.1 cfs 0.22 af
Primary=2.1 cfs 0.22 af

Link DP-5: Offsite Inflow=0.7 cfs 0.07 af
Primary=0.7 cfs 0.07 af

Link DP-6: North Hovey Road Inflow=1.6 cfs 0.15 af
Primary=1.6 cfs 0.15 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=0.2 cfs 0.12 af
Area= 2.53 ac 31.91% Imperv. Primary=0.2 cfs 0.12 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=0.6 cfs 0.15 af
Area= 1.67 ac 29.54% Imperv. Primary=0.6 cfs 0.15 af

Total Runoff Area = 100.51 ac Runoff Volume = 3.03 af Average Runoff Depth = 0.36"
100.00% Pervious = 100.51 ac 0.00% Impervious = 0.00 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=22.27 ac 0.00% Impervious Runoff Depth=0.35"
Flow Length=1,922' Tc=24.9 min CN=61 Runoff=3.4 cfs 0.64 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=6.37 ac 0.00% Impervious Runoff Depth=0.32"
Flow Length=934' Tc=10.4 min CN=60 Runoff=1.0 cfs 0.17 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=9.09 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=560' Tc=21.1 min CN=64 Runoff=2.2 cfs 0.34 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=33.50 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=2,209' Tc=22.1 min CN=72 Runoff=17.7 cfs 2.17 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=5.25 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=348' Tc=12.2 min CN=72 Runoff=3.5 cfs 0.34 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=3.53 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=359' Tc=7.9 min CN=72 Runoff=2.7 cfs 0.23 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=1.67 ac 0.00% Impervious Runoff Depth=0.73"
Flow Length=199' Tc=8.9 min CN=71 Runoff=1.1 cfs 0.10 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=12.48 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=2,527' Tc=32.5 min CN=70 Runoff=4.8 cfs 0.71 af

Subcatchment OS-1: Subcat OS-1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=0.26"
Flow Length=904' Tc=19.2 min CN=58 Runoff=0.6 cfs 0.14 af

Reach R-1: Existing Intermittent Stream Avg. Flow Depth=0.14' Max Vel=0.63 fps Inflow=0.8 cfs 0.30 af
n=0.080 L=1,720.0' S=0.0170 '/' Capacity=255.8 cfs Outflow=0.5 cfs 0.30 af

Reach R-2: Thru EX-4 Avg. Flow Depth=0.12' Max Vel=1.22 fps Inflow=0.6 cfs 0.14 af
n=0.080 L=344.0' S=0.0812 '/' Capacity=378.8 cfs Outflow=0.6 cfs 0.14 af

Reach R-3: Thru EX-1 Avg. Flow Depth=0.89' Max Vel=2.48 fps Inflow=19.4 cfs 3.32 af
n=0.080 L=254.0' S=0.0311 '/' Capacity=314.0 cfs Outflow=19.3 cfs 3.32 af

Reach R-4: Existing Intermittent Stream Avg. Flow Depth=0.73' Max Vel=2.60 fps Inflow=15.4 cfs 2.47 af
n=0.080 L=1,252.1' S=0.0409 '/' Capacity=297.4 cfs Outflow=14.1 cfs 2.47 af

Pond 1P: 18" Culvert Peak Elev=435.04' Storage=7,067 cf Inflow=17.7 cfs 2.47 af
Primary=12.3 cfs 2.42 af Secondary=3.1 cfs 0.05 af Outflow=15.4 cfs 2.47 af

Link DP-1: Existing 18" Culvert Inflow=22.6 cfs 3.96 af
Primary=22.6 cfs 3.96 af

Link DP-2: Existing 12" Culvert Inflow=1.0 cfs 0.17 af
Primary=1.0 cfs 0.17 af

Link DP-3: Hovey Road Inflow=2.2 cfs 0.34 af
Primary=2.2 cfs 0.34 af

Link DP-4: Spring Road Inflow=3.5 cfs 0.34 af
Primary=3.5 cfs 0.34 af

Link DP-5: Offsite Inflow=1.1 cfs 0.10 af
Primary=1.1 cfs 0.10 af

Link DP-6: North Hovey Road Inflow=2.7 cfs 0.23 af
Primary=2.7 cfs 0.23 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=0.3 cfs 0.14 af
Area= 2.53 ac 31.91% Imperv. Primary=0.3 cfs 0.14 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=0.6 cfs 0.15 af
Area= 1.67 ac 29.54% Imperv. Primary=0.6 cfs 0.15 af

Total Runoff Area = 100.51 ac Runoff Volume = 4.84 af Average Runoff Depth = 0.58"
100.00% Pervious = 100.51 ac 0.00% Impervious = 0.00 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=22.27 ac 0.00% Impervious Runoff Depth=1.06"
Flow Length=1,922' Tc=24.9 min CN=61 Runoff=14.7 cfs 1.96 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=6.37 ac 0.00% Impervious Runoff Depth=1.00"
Flow Length=934' Tc=10.4 min CN=60 Runoff=5.4 cfs 0.53 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=9.09 ac 0.00% Impervious Runoff Depth=1.24"
Flow Length=560' Tc=21.1 min CN=64 Runoff=7.9 cfs 0.94 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=33.50 ac 0.00% Impervious Runoff Depth=1.79"
Flow Length=2,209' Tc=22.1 min CN=72 Runoff=44.4 cfs 5.00 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=5.25 ac 0.00% Impervious Runoff Depth=1.79"
Flow Length=348' Tc=12.2 min CN=72 Runoff=8.8 cfs 0.78 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=3.53 ac 0.00% Impervious Runoff Depth=1.79"
Flow Length=359' Tc=7.9 min CN=72 Runoff=6.8 cfs 0.53 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=1.67 ac 0.00% Impervious Runoff Depth=1.72"
Flow Length=199' Tc=8.9 min CN=71 Runoff=3.0 cfs 0.24 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=12.48 ac 0.00% Impervious Runoff Depth=1.65"
Flow Length=2,527' Tc=32.5 min CN=70 Runoff=12.7 cfs 1.71 af

Subcatchment OS-1: Subcat OS-1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=0.88"
Flow Length=904' Tc=19.2 min CN=58 Runoff=3.6 cfs 0.47 af

Reach R-1: Existing Intermittent Stream Avg. Flow Depth=0.30' Max Vel=1.00 fps Inflow=2.6 cfs 0.68 af
n=0.080 L=1,720.0' S=0.0170 '/' Capacity=255.8 cfs Outflow=1.9 cfs 0.68 af

Reach R-2: Thru EX-4 Avg. Flow Depth=0.33' Max Vel=2.23 fps Inflow=3.6 cfs 0.47 af
n=0.080 L=344.0' S=0.0812 '/' Capacity=378.8 cfs Outflow=3.6 cfs 0.47 af

Reach R-3: Thru EX-1 Avg. Flow Depth=1.56' Max Vel=3.37 fps Inflow=57.6 cfs 7.86 af
n=0.080 L=254.0' S=0.0311 '/' Capacity=314.0 cfs Outflow=57.5 cfs 7.86 af

Reach R-4: Existing Intermittent Stream Avg. Flow Depth=1.31' Max Vel=3.59 fps Inflow=44.4 cfs 5.68 af
n=0.080 L=1,252.1' S=0.0409 '/' Capacity=297.4 cfs Outflow=41.7 cfs 5.68 af

Pond 1P: 18" Culvert Peak Elev=435.48' Storage=10,630 cf Inflow=44.7 cfs 5.68 af
Primary=13.5 cfs 4.47 af Secondary=30.9 cfs 1.20 af Outflow=44.4 cfs 5.68 af

Link DP-1: Existing 18" Culvert Inflow=71.9 cfs 9.82 af
Primary=71.9 cfs 9.82 af

Link DP-2: Existing 12" Culvert Inflow=5.4 cfs 0.53 af
Primary=5.4 cfs 0.53 af

Link DP-3: Hovey Road Inflow=7.9 cfs 0.94 af
Primary=7.9 cfs 0.94 af

Link DP-4: Spring Road Inflow=8.8 cfs 0.78 af
Primary=8.8 cfs 0.78 af

Link DP-5: Offsite Inflow=3.0 cfs 0.24 af
Primary=3.0 cfs 0.24 af

Link DP-6: North Hovey Road Inflow=6.8 cfs 0.53 af
Primary=6.8 cfs 0.53 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=1.9 cfs 0.48 af
Area= 2.53 ac 31.91% Imperv. Primary=1.9 cfs 0.48 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=0.9 cfs 0.20 af
Area= 1.67 ac 29.54% Imperv. Primary=0.9 cfs 0.20 af

Total Runoff Area = 100.51 ac Runoff Volume = 12.16 af Average Runoff Depth = 1.45"
100.00% Pervious = 100.51 ac 0.00% Impervious = 0.00 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=22.27 ac 0.00% Impervious Runoff Depth=1.78"
Flow Length=1,922' Tc=24.9 min CN=61 Runoff=26.7 cfs 3.29 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=6.37 ac 0.00% Impervious Runoff Depth=1.70"
Flow Length=934' Tc=10.4 min CN=60 Runoff=10.1 cfs 0.90 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=9.09 ac 0.00% Impervious Runoff Depth=2.02"
Flow Length=560' Tc=21.1 min CN=64 Runoff=13.6 cfs 1.53 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=33.50 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=2,209' Tc=22.1 min CN=72 Runoff=68.4 cfs 7.56 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=5.25 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=348' Tc=12.2 min CN=72 Runoff=13.5 cfs 1.19 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=3.53 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=359' Tc=7.9 min CN=72 Runoff=10.5 cfs 0.80 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=1.67 ac 0.00% Impervious Runoff Depth=2.62"
Flow Length=199' Tc=8.9 min CN=71 Runoff=4.6 cfs 0.36 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=12.48 ac 0.00% Impervious Runoff Depth=2.53"
Flow Length=2,527' Tc=32.5 min CN=70 Runoff=20.0 cfs 2.63 af

Subcatchment OS-1: Subcat OS-1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=1.54"
Flow Length=904' Tc=19.2 min CN=58 Runoff=7.1 cfs 0.82 af

Reach R-1: Existing Intermittent Stream Avg. Flow Depth=0.44' Max Vel=1.27 fps Inflow=5.0 cfs 0.89 af
n=0.080 L=1,720.0' S=0.0170 '/' Capacity=255.8 cfs Outflow=3.9 cfs 0.89 af

Reach R-2: Thru EX-4 Avg. Flow Depth=0.48' Max Vel=2.77 fps Inflow=7.1 cfs 0.82 af
n=0.080 L=344.0' S=0.0812 '/' Capacity=378.8 cfs Outflow=7.0 cfs 0.82 af

Reach R-3: Thru EX-1 Avg. Flow Depth=1.98' Max Vel=3.84 fps Inflow=93.4 cfs 11.90 af
n=0.080 L=254.0' S=0.0311 '/' Capacity=314.0 cfs Outflow=93.2 cfs 11.90 af

Reach R-4: Existing Intermittent Stream Avg. Flow Depth=1.68' Max Vel=4.11 fps Inflow=70.2 cfs 8.45 af
n=0.080 L=1,252.1' S=0.0409 '/' Capacity=297.4 cfs Outflow=67.3 cfs 8.45 af

Pond 1P: 18" Culvert Peak Elev=435.77' Storage=13,176 cf Inflow=70.8 cfs 8.45 af
Primary=14.2 cfs 5.78 af Secondary=56.1 cfs 2.67 af Outflow=70.2 cfs 8.45 af

Link DP-1: Existing 18" Culvert Inflow=119.5 cfs 15.19 af
Primary=119.5 cfs 15.19 af

Link DP-2: Existing 12" Culvert Inflow=10.1 cfs 0.90 af
Primary=10.1 cfs 0.90 af

Link DP-3: Hovey Road Inflow=13.6 cfs 1.53 af
Primary=13.6 cfs 1.53 af

Link DP-4: Spring Road Inflow=13.5 cfs 1.19 af
Primary=13.5 cfs 1.19 af

Link DP-5: Offsite Inflow=4.6 cfs 0.36 af
Primary=4.6 cfs 0.36 af

Link DP-6: North Hovey Road Inflow=10.5 cfs 0.80 af
Primary=10.5 cfs 0.80 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=3.2 cfs 0.64 af
Area= 2.53 ac 31.91% Imperv. Primary=3.2 cfs 0.64 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=1.9 cfs 0.24 af
Area= 1.67 ac 29.54% Imperv. Primary=1.9 cfs 0.24 af

Total Runoff Area = 100.51 ac Runoff Volume = 19.08 af Average Runoff Depth = 2.28"
100.00% Pervious = 100.51 ac 0.00% Impervious = 0.00 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=22.27 ac 0.00% Impervious Runoff Depth=2.53"
Flow Length=1,922' Tc=24.9 min CN=61 Runoff=39.3 cfs 4.70 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=6.37 ac 0.00% Impervious Runoff Depth=2.44"
Flow Length=934' Tc=10.4 min CN=60 Runoff=15.1 cfs 1.29 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=9.09 ac 0.00% Impervious Runoff Depth=2.82"
Flow Length=560' Tc=21.1 min CN=64 Runoff=19.5 cfs 2.14 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=33.50 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=2,209' Tc=22.1 min CN=72 Runoff=92.1 cfs 10.12 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=5.25 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=348' Tc=12.2 min CN=72 Runoff=18.2 cfs 1.59 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=3.53 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=359' Tc=7.9 min CN=72 Runoff=14.1 cfs 1.07 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=1.67 ac 0.00% Impervious Runoff Depth=3.52"
Flow Length=199' Tc=8.9 min CN=71 Runoff=6.2 cfs 0.49 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=12.48 ac 0.00% Impervious Runoff Depth=3.42"
Flow Length=2,527' Tc=32.5 min CN=70 Runoff=27.3 cfs 3.56 af

Subcatchment OS-1: Subcat OS-1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=2.25"
Flow Length=904' Tc=19.2 min CN=58 Runoff=10.8 cfs 1.19 af

Reach R-1: Existing Intermittent Stream Avg. Flow Depth=0.58' Max Vel=1.48 fps Inflow=8.0 cfs 1.09 af
n=0.080 L=1,720.0' S=0.0170 '/' Capacity=255.8 cfs Outflow=6.2 cfs 1.09 af

Reach R-2: Thru EX-4 Avg. Flow Depth=0.61' Max Vel=3.16 fps Inflow=10.8 cfs 1.19 af
n=0.080 L=344.0' S=0.0812 '/' Capacity=378.8 cfs Outflow=10.8 cfs 1.19 af

Reach R-3: Thru EX-1 Avg. Flow Depth=2.32' Max Vel=4.18 fps Inflow=129.0 cfs 15.96 af
n=0.080 L=254.0' S=0.0311 '/' Capacity=314.0 cfs Outflow=128.8 cfs 15.96 af

Reach R-4: Existing Intermittent Stream Avg. Flow Depth=1.98' Max Vel=4.49 fps Inflow=95.8 cfs 11.21 af
n=0.080 L=1,252.1' S=0.0409 '/' Capacity=297.4 cfs Outflow=92.5 cfs 11.21 af

Pond 1P: 18" Culvert Peak Elev=436.02' Storage=15,605 cf Inflow=96.7 cfs 11.21 af
Primary=14.5 cfs 6.89 af Secondary=81.9 cfs 4.32 af Outflow=95.8 cfs 11.21 af

Link DP-1: Existing 18" Culvert Inflow=167.4 cfs 20.65 af
Primary=167.4 cfs 20.65 af

Link DP-2: Existing 12" Culvert Inflow=15.1 cfs 1.29 af
Primary=15.1 cfs 1.29 af

Link DP-3: Hovey Road Inflow=19.5 cfs 2.14 af
Primary=19.5 cfs 2.14 af

Link DP-4: Spring Road Inflow=18.2 cfs 1.59 af
Primary=18.2 cfs 1.59 af

Link DP-5: Offsite Inflow=6.2 cfs 0.49 af
Primary=6.2 cfs 0.49 af

Link DP-6: North Hovey Road Inflow=14.1 cfs 1.07 af
Primary=14.1 cfs 1.07 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=5.1 cfs 0.80 af
Area= 2.53 ac 31.91% Imperv. Primary=5.1 cfs 0.80 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=2.8 cfs 0.29 af
Area= 1.67 ac 29.54% Imperv. Primary=2.8 cfs 0.29 af

Total Runoff Area = 100.51 ac Runoff Volume = 26.13 af Average Runoff Depth = 3.12"
100.00% Pervious = 100.51 ac 0.00% Impervious = 0.00 ac

Summary for Subcatchment EX-1: Subcat EX-1

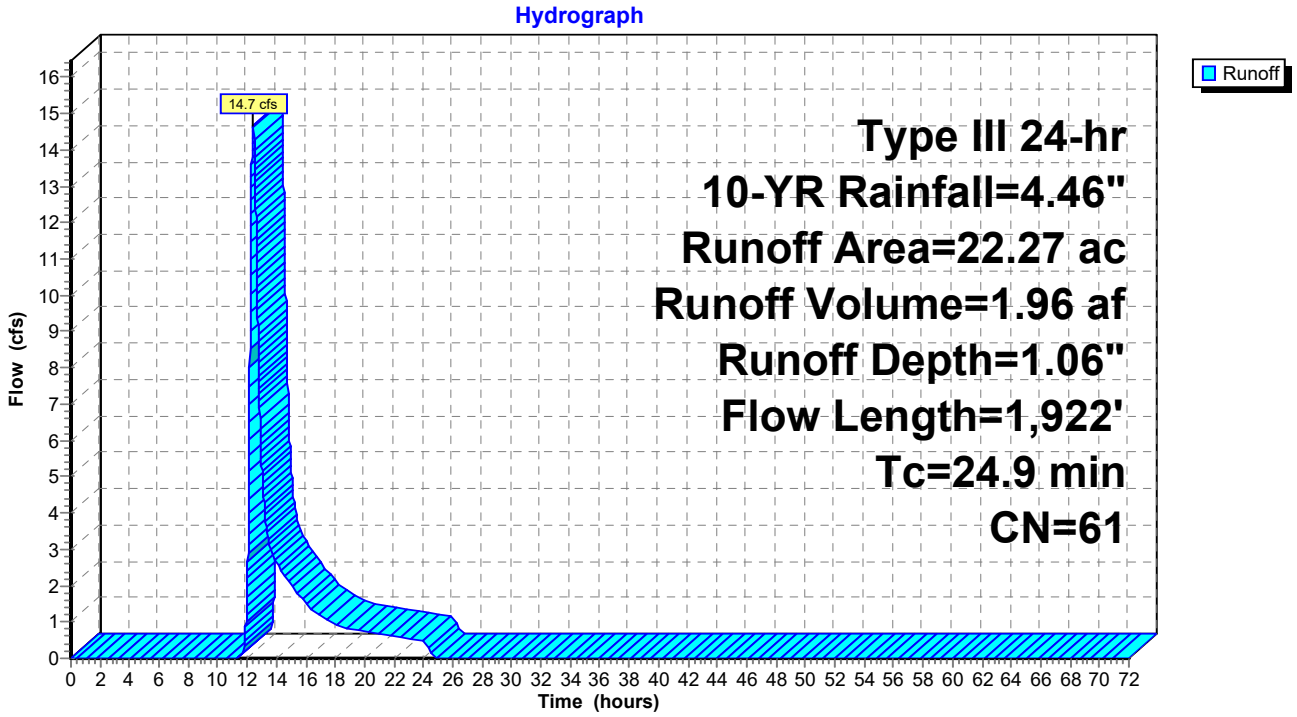
Runoff = 14.7 cfs @ 12.40 hrs, Volume= 1.96 af, Depth= 1.06"
Routed to Link DP-1 : Existing 18" Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
11.72	61	>75% Grass cover, Good, HSG B
0.59	74	>75% Grass cover, Good, HSG C
0.19	96	Gravel surface, HSG B
0.29	96	Gravel surface, HSG C
0.10	55	Woods, Good, HSG B
0.00	70	Woods, Good, HSG C
9.10	58	Woods/grass comb., Good, HSG B
0.28	72	Woods/grass comb., Good, HSG C
22.27	61	Weighted Average
22.27		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0344	0.18		**Sheet Flow, Grass Good Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
4.4	312	0.0285	1.18		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
1.2	306	0.0733	4.36		**Shallow Concentrated Flow, Shallow Concentrated Gravel** Unpaved Kv= 16.1 fps
7.1	684	0.0531	1.61		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
5.0	383	0.0338	1.29		**Shallow Concentrated Flow, Shallow Concentrated Woods/Gras** Short Grass Pasture Kv= 7.0 fps
1.3	109	0.0418	1.43		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
1.1	78	0.0535	1.16		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
24.9	1,922	Total			

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

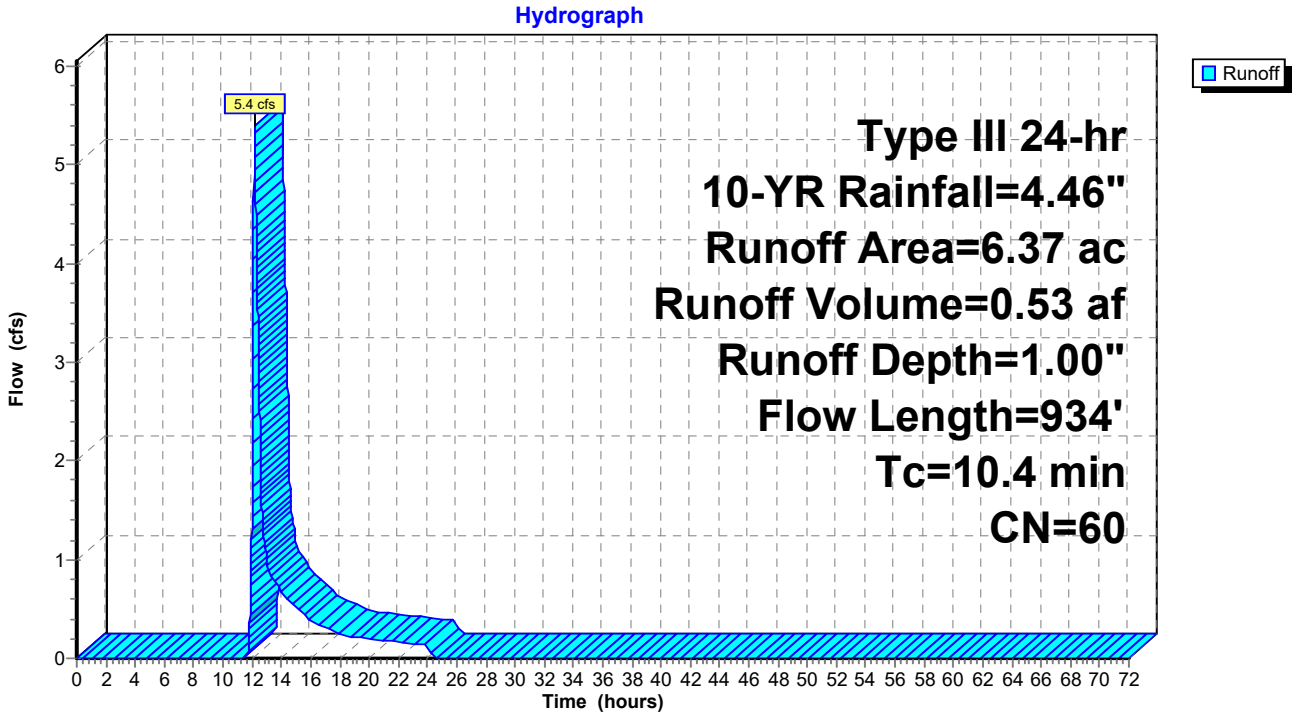
Runoff = 5.4 cfs @ 12.17 hrs, Volume= 0.53 af, Depth= 1.00"
Routed to Link DP-2 : Existing 12" Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.69	61	>75% Grass cover, Good, HSG B
0.06	74	>75% Grass cover, Good, HSG C
0.11	80	>75% Grass cover, Good, HSG D
0.17	96	Gravel surface, HSG B
0.11	96	Gravel surface, HSG C
0.00	96	Gravel surface, HSG D
0.37	55	Woods, Good, HSG B
4.84	58	Woods/grass comb., Good, HSG B
0.01	72	Woods/grass comb., Good, HSG C
0.01	79	Woods/grass comb., Good, HSG D
6.37	60	Weighted Average
6.37		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0290	0.16		**Sheet Flow, Grass Good Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
3.2	341	0.0631	1.76		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
2.1	543	0.0744	4.39		**Shallow Concentrated Flow, Shallow Concentrated Gravel** Unpaved Kv= 16.1 fps
10.4	934	Total			

Subcatchment EX-2: Subcat EX-2



Summary for Subcatchment EX-3: Subcat EX-3

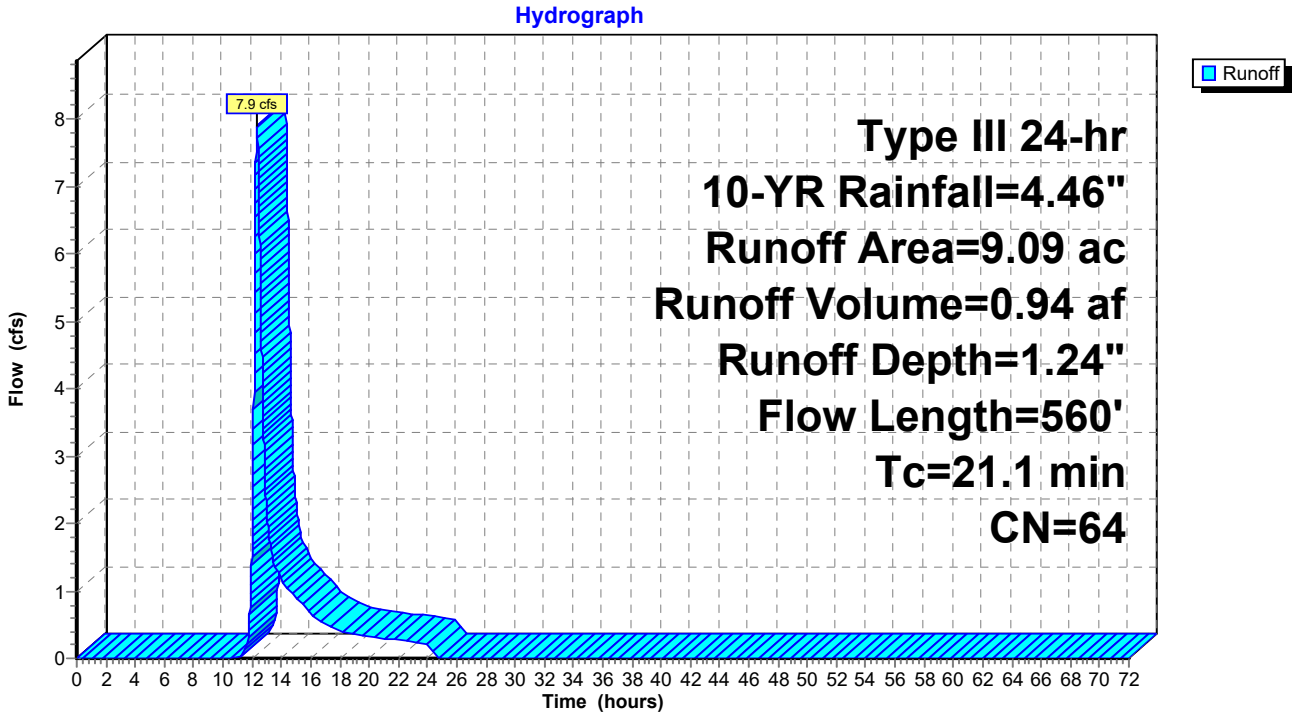
Runoff = 7.9 cfs @ 12.32 hrs, Volume= 0.94 af, Depth= 1.24"
Routed to Link DP-3 : Hovey Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
2.24	61	>75% Grass cover, Good, HSG B
0.99	74	>75% Grass cover, Good, HSG C
0.01	96	Gravel surface, HSG B
0.06	96	Gravel surface, HSG C
2.72	55	Woods, Good, HSG B
0.61	70	Woods, Good, HSG C
2.46	72	Woods/grass comb., Good, HSG C
9.09	64	Weighted Average
9.09		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0106	0.11		**Sheet Flow, Sheet Grass Flow** Grass: Short n= 0.150 P2= 2.90"
3.1	169	0.0170	0.91		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
9.7	285	0.0095	0.49		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
0.7	56	0.0063	1.28		**Shallow Concentrated Flow, Shallow Concentrated Gravel** Unpaved Kv= 16.1 fps
21.1	560	Total			

Subcatchment EX-3: Subcat EX-3



Summary for Subcatchment EX-4: Subcat EX-4

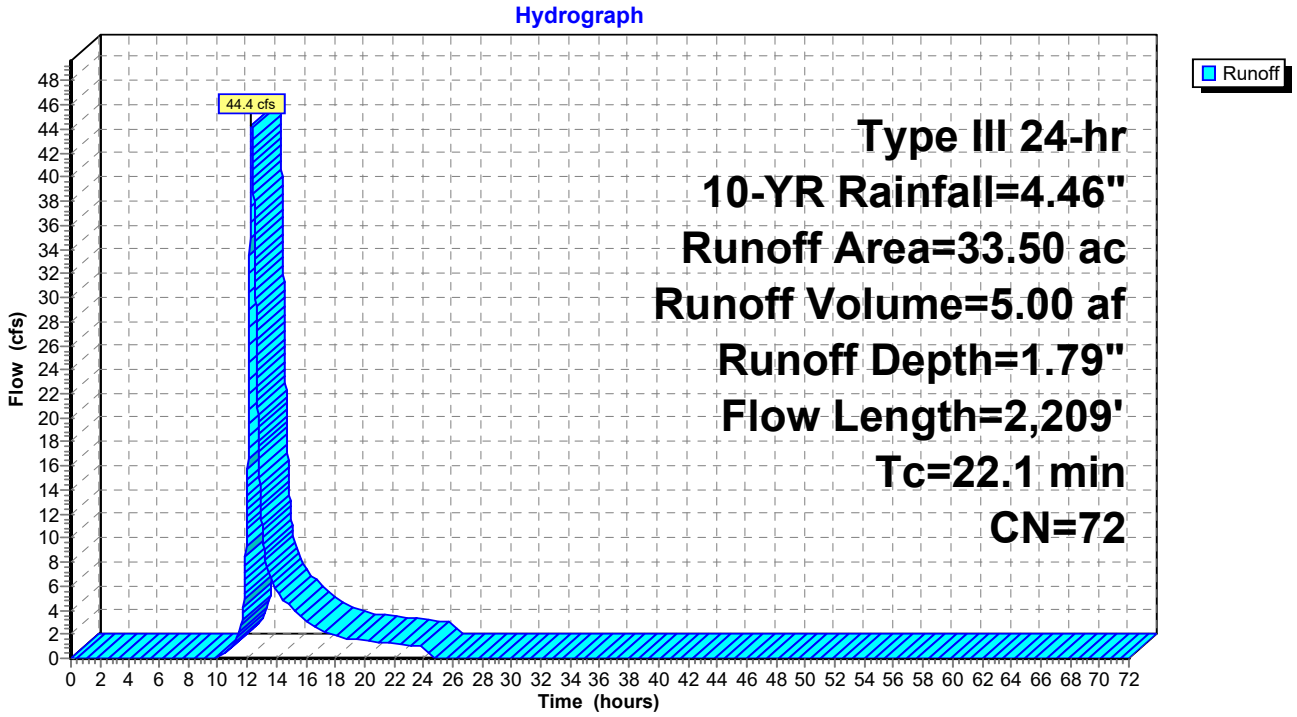
Runoff = 44.4 cfs @ 12.32 hrs, Volume= 5.00 af, Depth= 1.79"
Routed to Pond 1P : 18" Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.53	61	>75% Grass cover, Good, HSG B
7.71	74	>75% Grass cover, Good, HSG C
0.11	80	>75% Grass cover, Good, HSG D
0.01	96	Gravel surface, HSG B
0.02	96	Gravel surface, HSG C
0.39	70	Woods, Good, HSG C
0.01	58	Woods/grass comb., Good, HSG B
23.38	72	Woods/grass comb., Good, HSG C
0.36	79	Woods/grass comb., Good, HSG D
33.50	72	Weighted Average
33.50		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0838	0.11		**Sheet Flow, Woods Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
5.0	388	0.0342	1.29		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0762	1.93		**Shallow Concentrated Flow, Shallow Concentrated Wetland** Short Grass Pasture Kv= 7.0 fps
9.4	1,721	0.0170	3.04	66.54	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=3.00' D=2.50' Z= 2.3 '/' Top.W=14.50' n= 0.080 Earth, long dense weeds
22.1	2,209	Total			

Subcatchment EX-4: Subcat EX-4



Summary for Subcatchment EX-5: Subcat EX-5

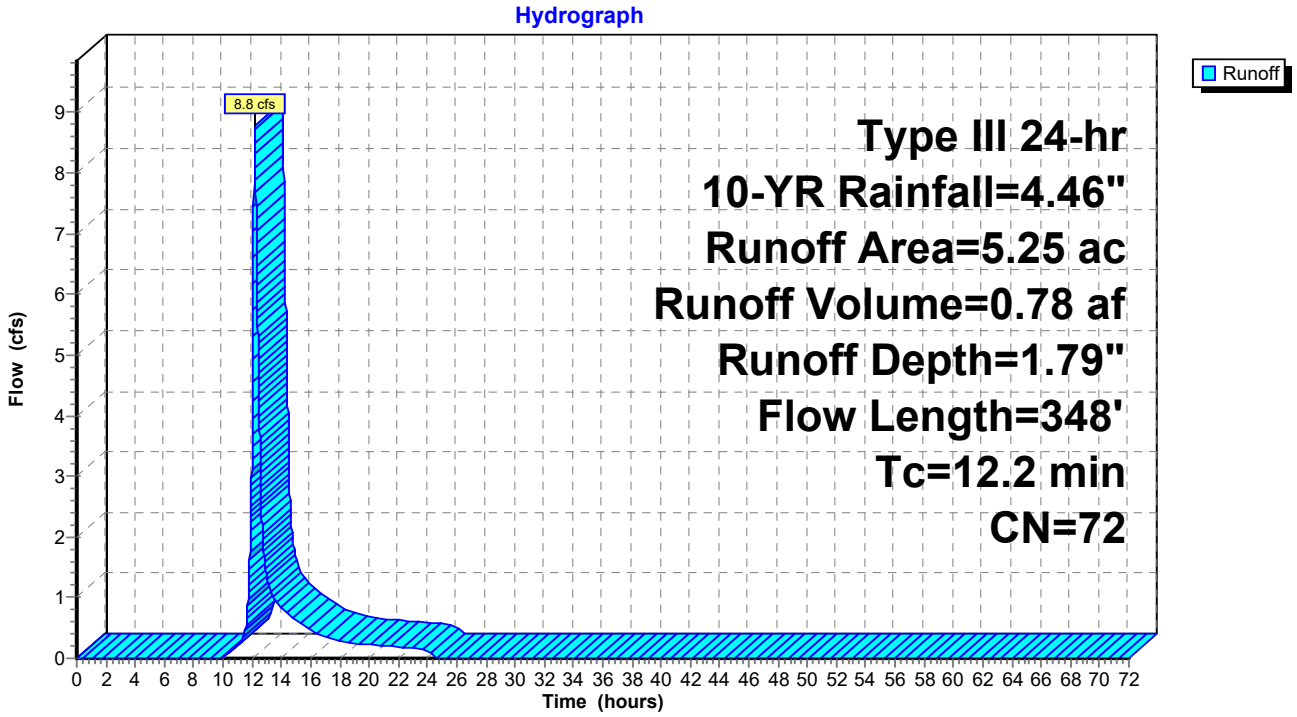
Runoff = 8.8 cfs @ 12.18 hrs, Volume= 0.78 af, Depth= 1.79"
Routed to Link DP-4 : Spring Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.00	61	>75% Grass cover, Good, HSG B
0.00	74	>75% Grass cover, Good, HSG C
0.00	55	Woods, Good, HSG B
0.69	70	Woods, Good, HSG C
4.56	72	Woods/grass comb., Good, HSG C
5.25	72	Weighted Average
5.25		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0134	0.12		**Sheet Flow, Grass Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
0.6	51	0.0372	1.35		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.6	31	0.0177	0.93		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.3	10	0.0090	0.66		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
2.1	119	0.0181	0.94		**Shallow Concentrated Flow, Shallow Concentrated Wetlands** Short Grass Pasture Kv= 7.0 fps
0.8	48	0.0221	1.04		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.9	39	0.0190	0.69		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
12.2	348	Total			

Subcatchment EX-5: Subcat EX-5



Summary for Subcatchment EX-6: Subcat EX-6

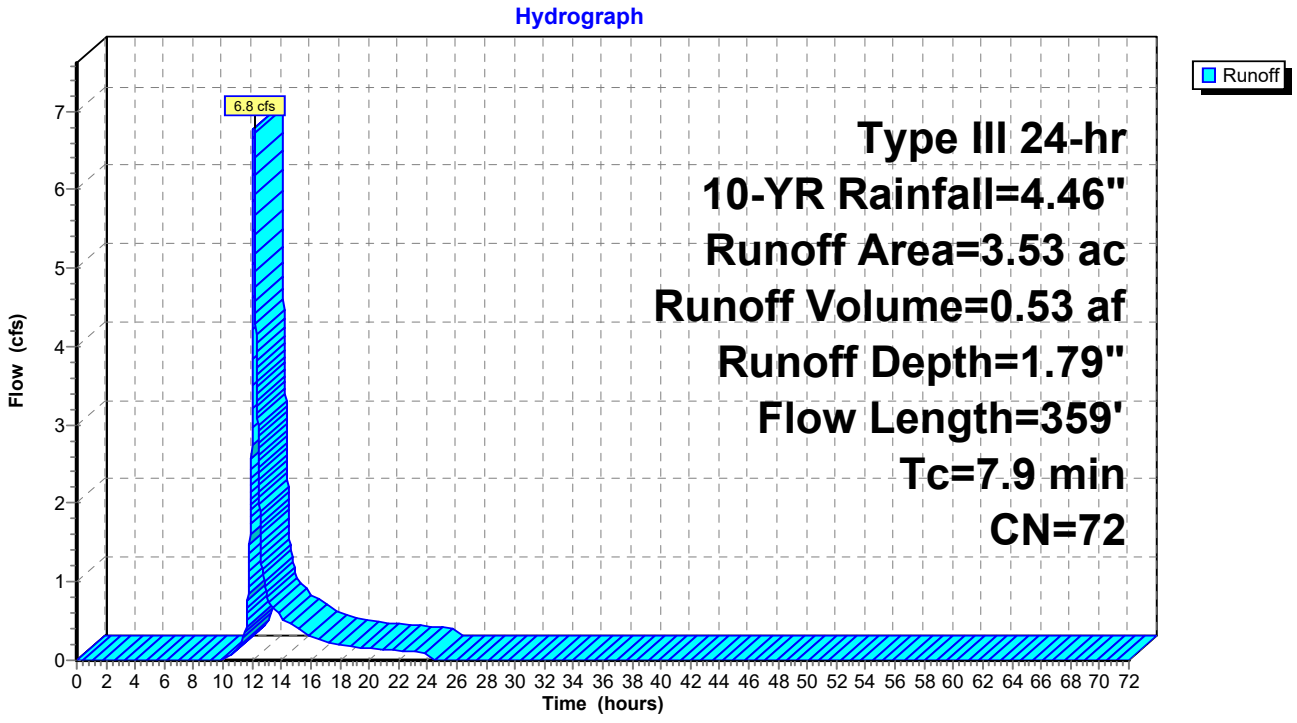
Runoff = 6.8 cfs @ 12.12 hrs, Volume= 0.53 af, Depth= 1.79"
Routed to Link DP-6 : North Hovey Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.00	61	>75% Grass cover, Good, HSG B
0.84	74	>75% Grass cover, Good, HSG C
2.69	72	Woods/grass comb., Good, HSG C
3.53	72	Weighted Average
3.53		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0346	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.90"
3.2	309	0.0544	1.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.9	359	Total			

Subcatchment EX-6: Subcat EX-6



Summary for Subcatchment EX-7: Subcat EX-7

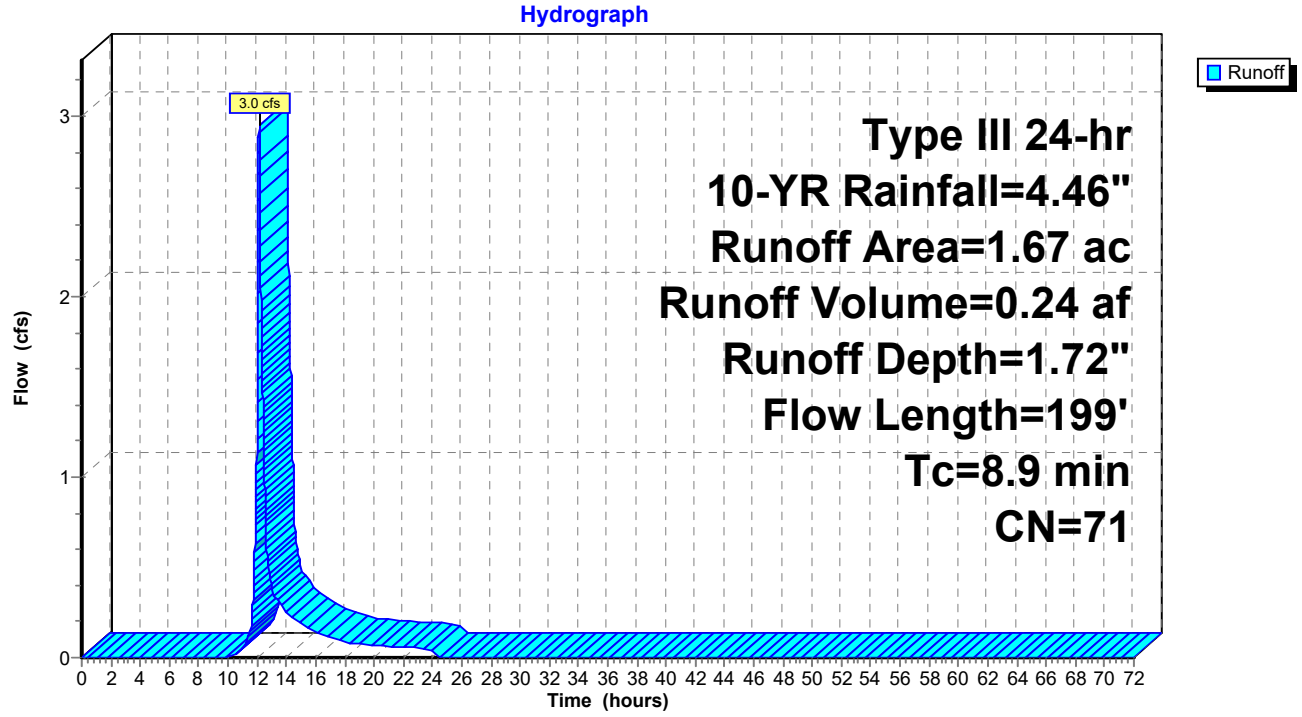
Runoff = 3.0 cfs @ 12.13 hrs, Volume= 0.24 af, Depth= 1.72"
Routed to Link DP-5 : Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.11	61	>75% Grass cover, Good, HSG B
0.78	74	>75% Grass cover, Good, HSG C
0.06	55	Woods, Good, HSG B
0.72	70	Woods, Good, HSG C
1.67	71	Weighted Average
1.67		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	50	0.0166	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.90"
1.9	116	0.0214	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	33	0.0382	0.98		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.9	199	Total			

Subcatchment EX-7: Subcat EX-7



Summary for Subcatchment EX-8: Subcat EX-8

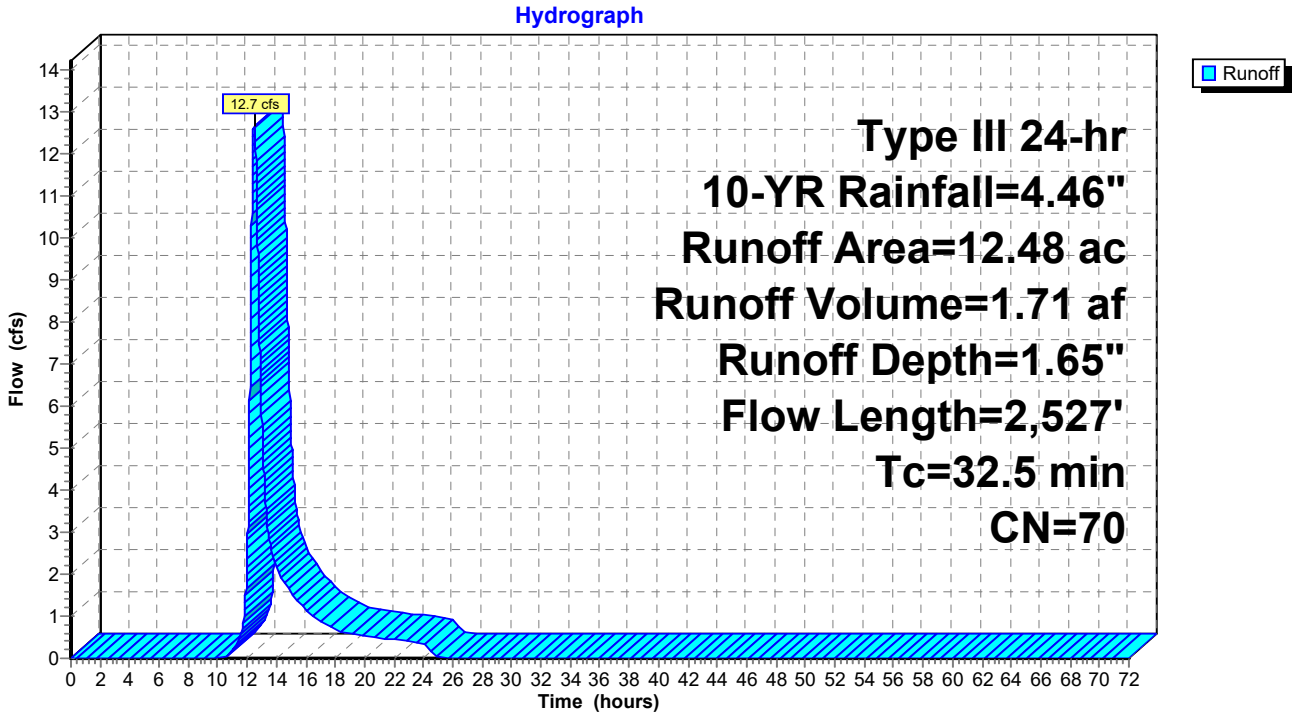
Runoff = 12.7 cfs @ 12.47 hrs, Volume= 1.71 af, Depth= 1.65"
Routed to Reach R-3 : Thru EX-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.69	61	>75% Grass cover, Good, HSG B
0.17	74	>75% Grass cover, Good, HSG C
0.02	80	>75% Grass cover, Good, HSG D
0.36	55	Woods, Good, HSG B
1.07	70	Woods, Good, HSG C
0.10	77	Woods, Good, HSG D
0.67	58	Woods/grass comb., Good, HSG B
9.37	72	Woods/grass comb., Good, HSG C
0.04	79	Woods/grass comb., Good, HSG D
12.48	70	Weighted Average
12.48		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0264	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.90"
23.2	1,461	0.0224	1.05		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.0	1,016	0.0331	4.24	92.85	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.50' Z= 2.3 '/' Top.W=14.50' n= 0.080
32.5	2,527	Total			

Subcatchment EX-8: Subcat EX-8



Summary for Subcatchment OS-1: Subcat OS-1

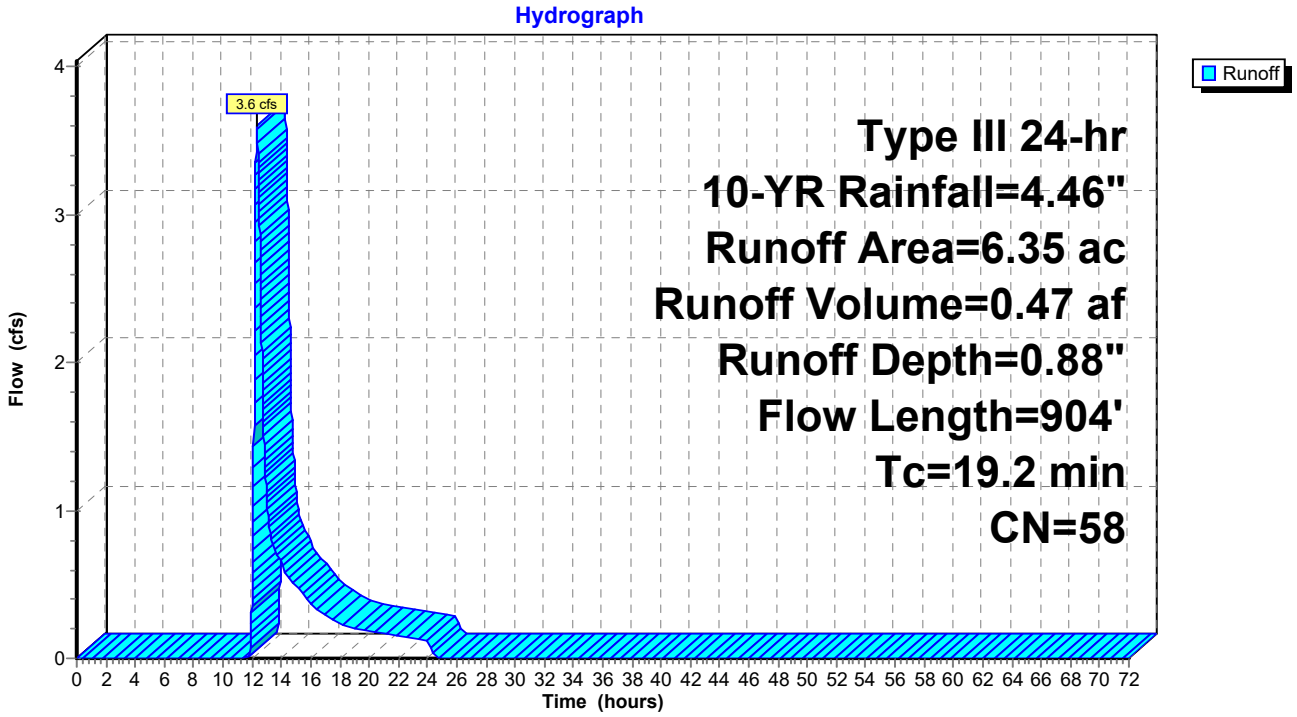
Runoff = 3.6 cfs @ 12.32 hrs, Volume= 0.47 af, Depth= 0.88"
Routed to Reach R-2 : Thru EX-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.98	61	>75% Grass cover, Good, HSG B
2.34	55	Woods, Good, HSG B
0.01	70	Woods, Good, HSG C
2.01	58	Woods/grass comb., Good, HSG B
6.35	58	Weighted Average
6.35		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0511	0.21		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.90"
6.3	357	0.0183	0.95		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.4	162	0.0719	1.88		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
7.4	335	0.0229	0.76		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
19.2	904	Total			

Subcatchment OS-1: Subcat OS-1



Summary for Reach R-1: Existing Intermittent Stream

Inflow Area = 4.20 ac, 30.97% Impervious, Inflow Depth = 1.94" for 10-YR event
Inflow = 2.6 cfs @ 12.50 hrs, Volume= 0.68 af
Outflow = 1.9 cfs @ 12.97 hrs, Volume= 0.68 af, Atten= 26%, Lag= 28.1 min
Routed to Pond 1P : 18" Culvert

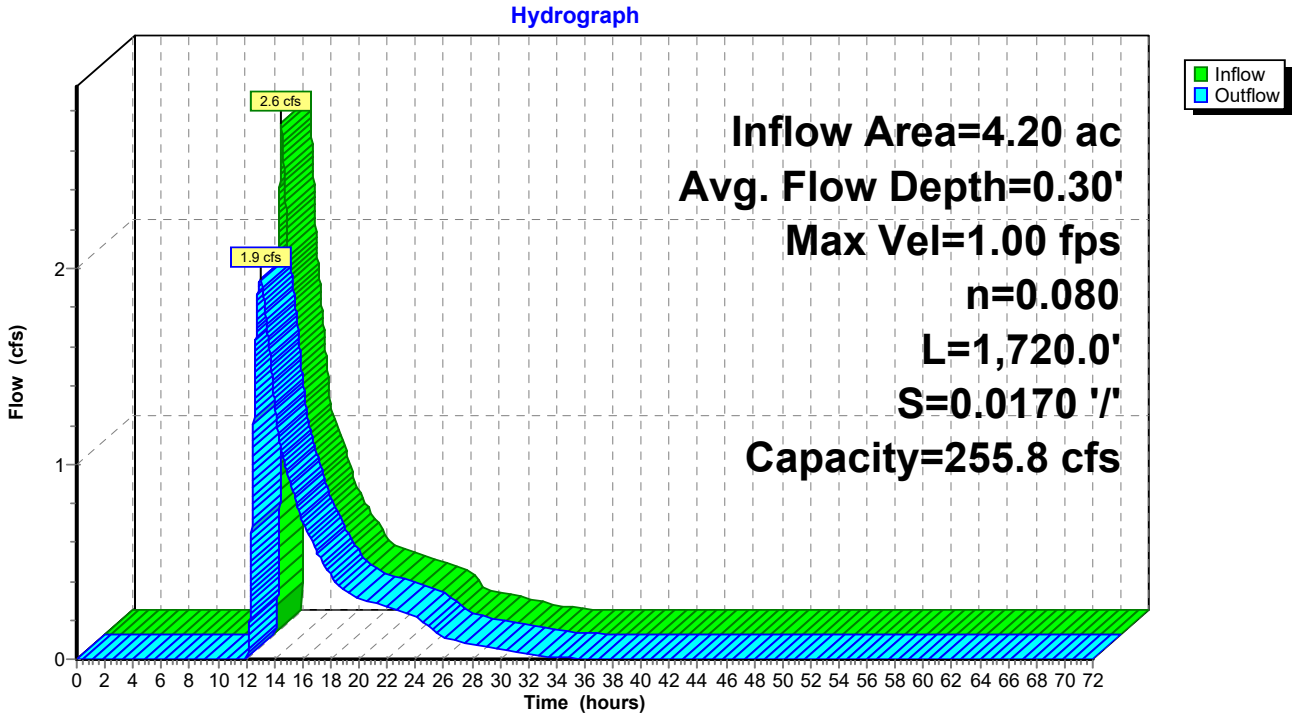
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.00 fps, Min. Travel Time= 28.6 min
Avg. Velocity = 0.42 fps, Avg. Travel Time= 68.0 min

Peak Storage= 3,344 cf @ 12.97 hrs
Average Depth at Peak Storage= 0.30' , Surface Width= 7.21'
Bank-Full Depth= 4.00' Flow Area= 60.2 sf, Capacity= 255.8 cfs

5.84' x 4.00' deep channel, n= 0.080
Side Slope Z-value= 2.3 '/' Top Width= 24.24'
Length= 1,720.0' Slope= 0.0170 '/'
Inlet Invert= 461.50', Outlet Invert= 432.20'



Reach R-1: Existing Intermittent Stream



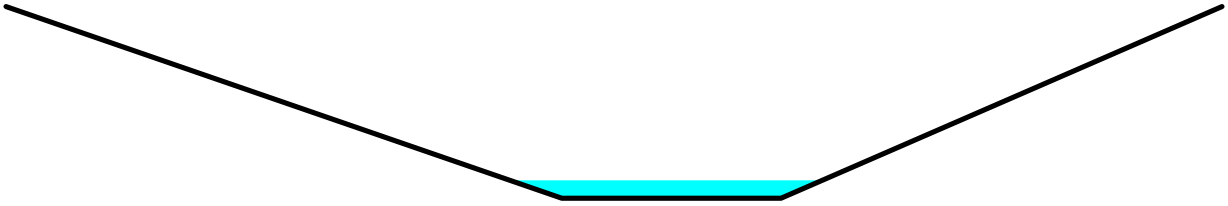
Summary for Reach R-2: Thru EX-4

Inflow Area = 6.35 ac, 0.00% Impervious, Inflow Depth = 0.88" for 10-YR event
Inflow = 3.6 cfs @ 12.32 hrs, Volume= 0.47 af
Outflow = 3.6 cfs @ 12.36 hrs, Volume= 0.47 af, Atten= 1%, Lag= 2.3 min
Routed to Reach R-3 : Thru EX-1

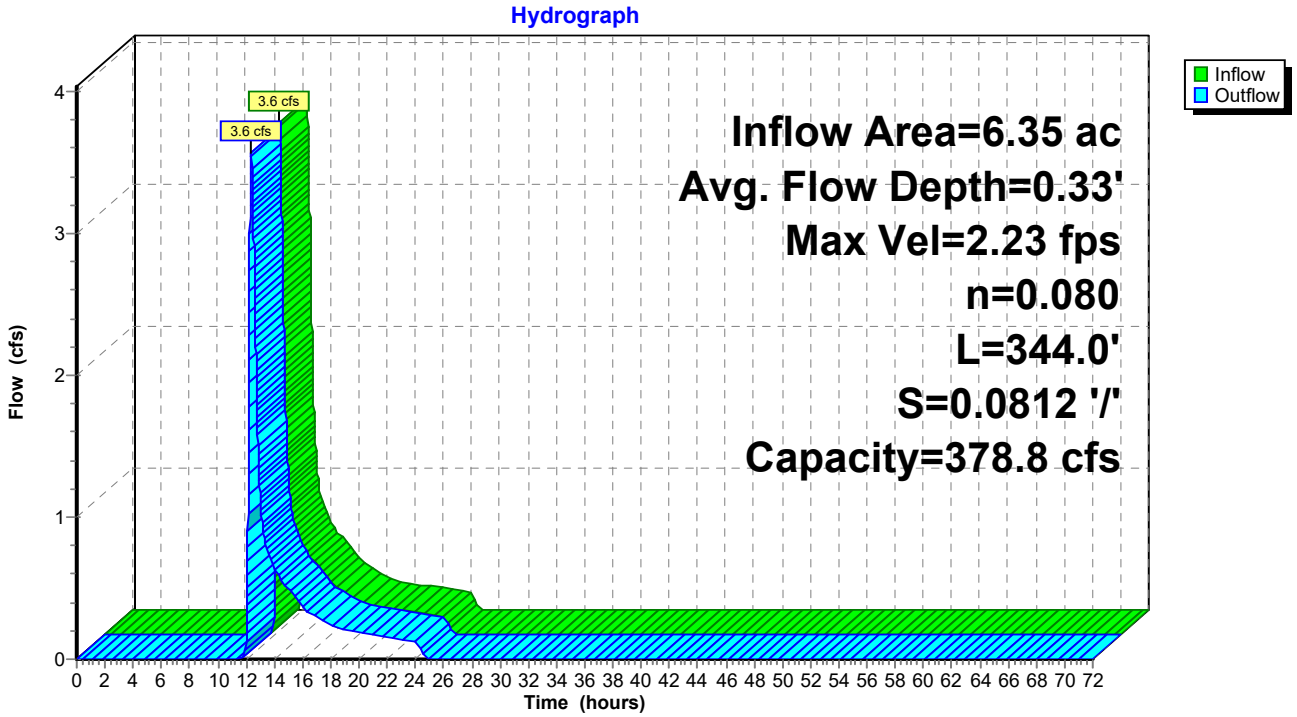
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.23 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 6.1 min

Peak Storage= 550 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 5.71'
Bank-Full Depth= 3.50' Flow Area= 45.9 sf, Capacity= 378.8 cfs

4.00' x 3.50' deep channel, n= 0.080
Side Slope Z-value= 2.9 2.3 '/' Top Width= 22.20'
Length= 344.0' Slope= 0.0812 '/'
Inlet Invert= 407.96', Outlet Invert= 380.02'



Reach R-2: Thru EX-4



Summary for Reach R-3: Thru EX-1

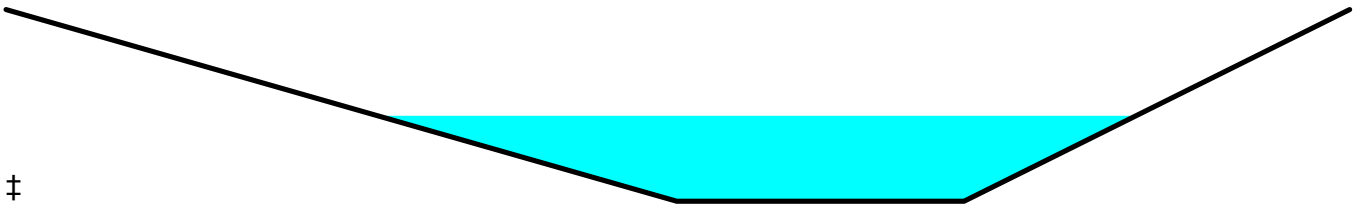
[62] Hint: Exceeded Reach R-2 OUTLET depth by 1.43' @ 12.47 hrs
[62] Hint: Exceeded Reach R-4 OUTLET depth by 0.27' @ 12.57 hrs

Inflow Area = 56.53 ac, 2.30% Impervious, Inflow Depth = 1.67" for 10-YR event
Inflow = 57.6 cfs @ 12.44 hrs, Volume= 7.86 af
Outflow = 57.5 cfs @ 12.46 hrs, Volume= 7.86 af, Atten= 0%, Lag= 0.9 min
Routed to Link DP-1 : Existing 18" Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.37 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 5.5 min

Peak Storage= 4,336 cf @ 12.46 hrs
Average Depth at Peak Storage= 1.56' , Surface Width= 15.85'
Bank-Full Depth= 3.50' Flow Area= 59.6 sf, Capacity= 314.0 cfs

6.00' x 3.50' deep channel, n= 0.080
Side Slope Z-value= 4.0 2.3 '/' Top Width= 28.05'
Length= 254.0' Slope= 0.0311 '/'
Inlet Invert= 380.20', Outlet Invert= 372.30'



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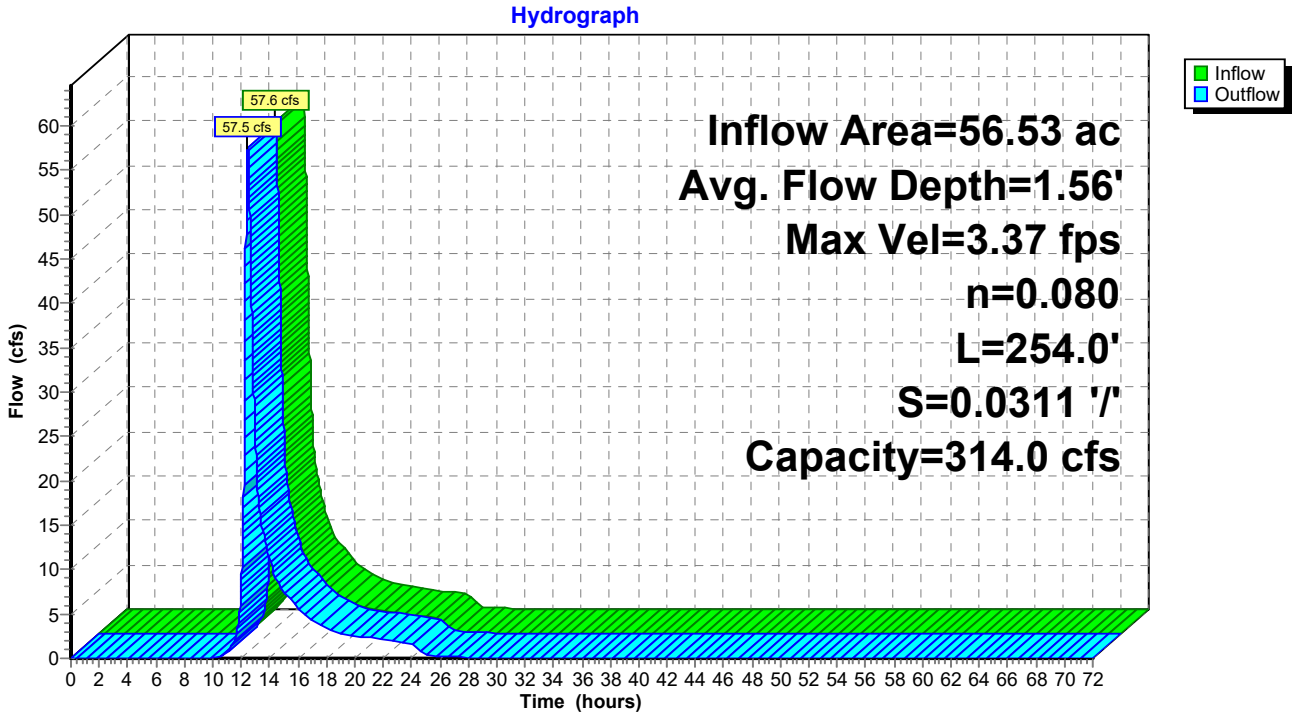
Reach R-3: Thru EX-1



Summary for Reach R-4: Existing Intermittent Stream

Inflow Area = 37.70 ac, 3.45% Impervious, Inflow Depth = 1.81" for 10-YR event
Inflow = 44.4 cfs @ 12.35 hrs, Volume= 5.68 af
Outflow = 41.7 cfs @ 12.44 hrs, Volume= 5.68 af, Atten= 6%, Lag= 5.0 min
Routed to Reach R-3 : Thru EX-1

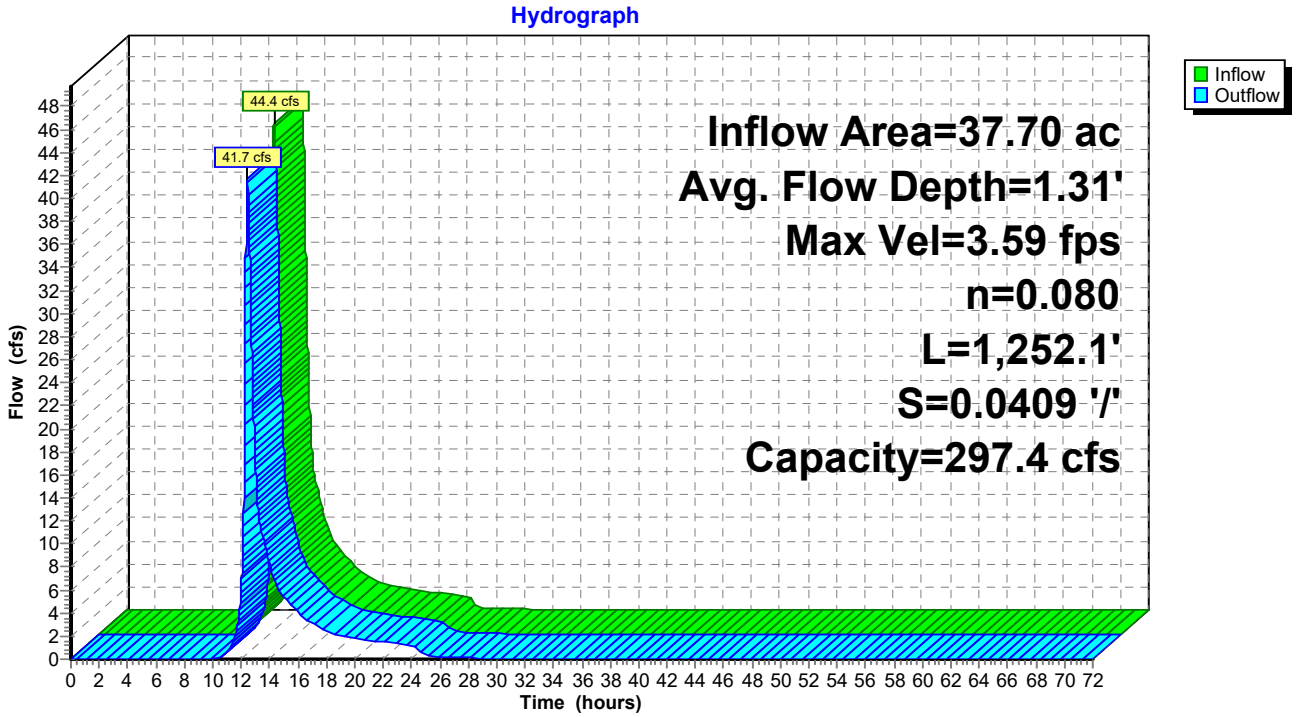
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.59 fps, Min. Travel Time= 5.8 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 25.4 min

Peak Storage= 14,540 cf @ 12.44 hrs
Average Depth at Peak Storage= 1.31' , Surface Width= 11.87'
Bank-Full Depth= 3.50' Flow Area= 48.6 sf, Capacity= 297.4 cfs

5.84' x 3.50' deep channel, n= 0.080
Side Slope Z-value= 2.3 '/' Top Width= 21.94'
Length= 1,252.1' Slope= 0.0409 '/'
Inlet Invert= 431.40', Outlet Invert= 380.20'



Reach R-4: Existing Intermittent Stream



Summary for Pond 1P: 18" Culvert

[62] Hint: Exceeded Reach R-1 OUTLET depth by 3.16' @ 12.31 hrs

Inflow Area = 37.70 ac, 3.45% Impervious, Inflow Depth = 1.81" for 10-YR event
Inflow = 44.7 cfs @ 12.32 hrs, Volume= 5.68 af
Outflow = 44.4 cfs @ 12.35 hrs, Volume= 5.68 af, Atten= 1%, Lag= 1.9 min
Primary = 13.5 cfs @ 12.35 hrs, Volume= 4.47 af
Routed to Reach R-4 : Existing Intermittent Stream
Secondary = 30.9 cfs @ 12.35 hrs, Volume= 1.20 af
Routed to Reach R-4 : Existing Intermittent Stream

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 435.48' @ 12.35 hrs Surf.Area= 8,582 sf Storage= 10,630 cf

Plug-Flow detention time= 4.8 min calculated for 5.68 af (100% of inflow)
Center-of-Mass det. time= 4.7 min (886.8 - 882.1)

Volume	Invert	Avail.Storage	Storage Description
#1	432.20'	16,449 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

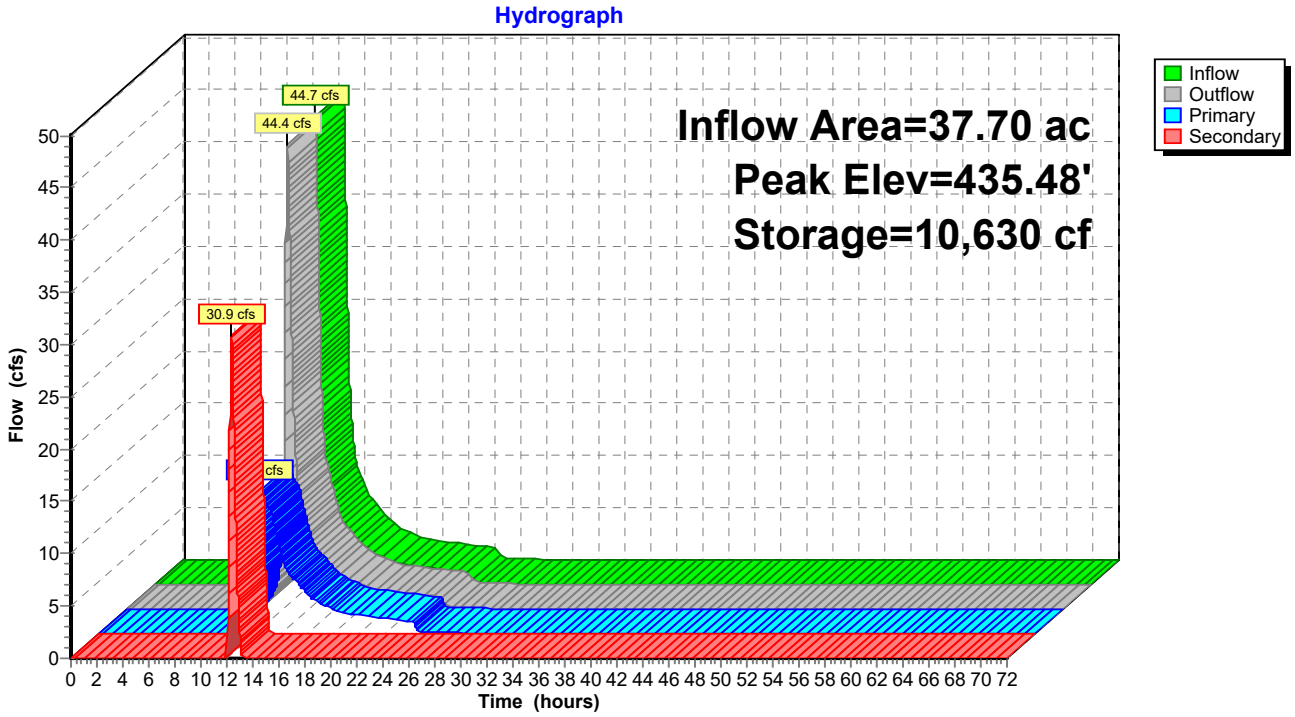
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
432.20	582	257.0	0	0	582
433.00	711	261.1	516	516	849
434.00	3,666	579.0	1,997	2,513	22,106
434.90	4,543	589.7	3,687	6,201	23,232
435.00	7,392	902.1	591	6,792	60,318
436.10	10,244	999.1	9,657	16,449	75,031

Device	Routing	Invert	Outlet Devices
#1	Primary	432.20'	**18.0" Round Culvert** L= 27.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 432.20' / 431.40' S= 0.0296 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	434.90'	**26.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=13.5 cfs @ 12.35 hrs HW=435.48' TW=432.65' (Dynamic Tailwater)
1=Culvert (Inlet Controls 13.5 cfs @ 7.66 fps)

Secondary OutFlow Max=30.9 cfs @ 12.35 hrs HW=435.48' TW=432.65' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 30.9 cfs @ 2.04 fps)

Pond 1P: 18" Culvert

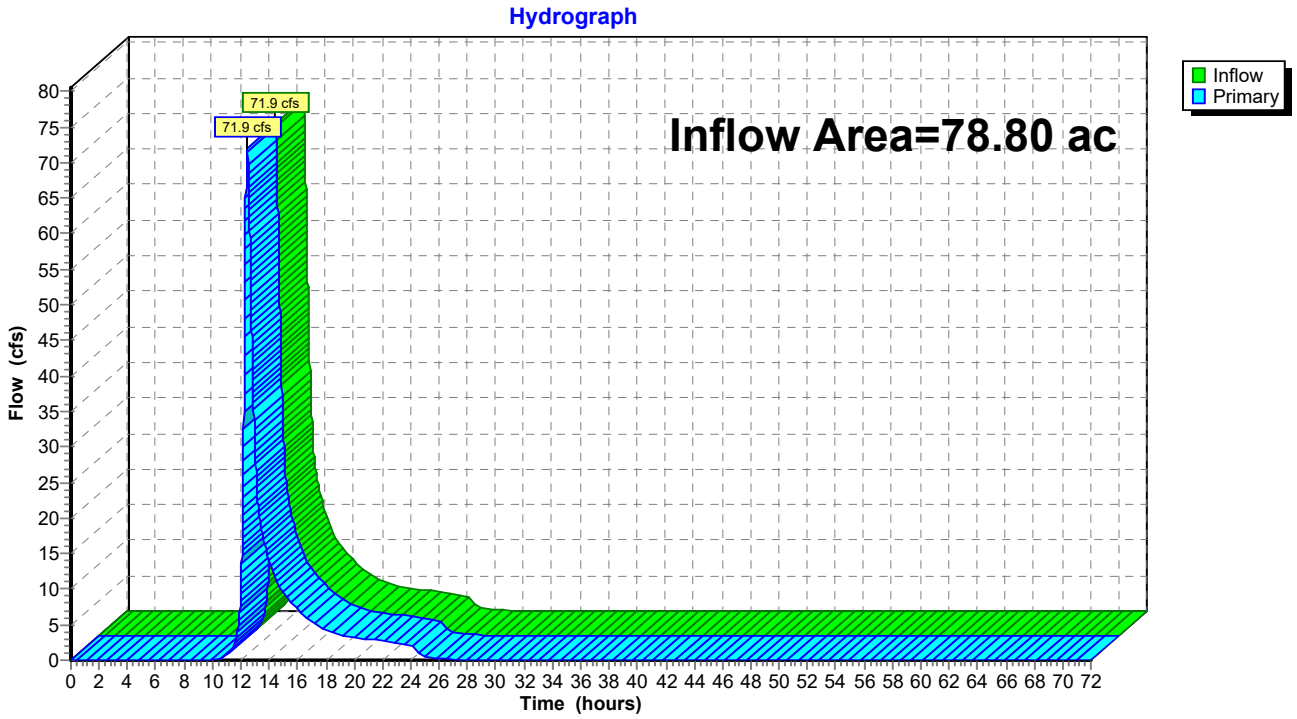


Summary for Link DP-1: Existing 18" Culvert

Inflow Area = 78.80 ac, 1.65% Impervious, Inflow Depth = 1.50" for 10-YR event
Inflow = 71.9 cfs @ 12.45 hrs, Volume= 9.82 af
Primary = 71.9 cfs @ 12.45 hrs, Volume= 9.82 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Existing 18" Culvert

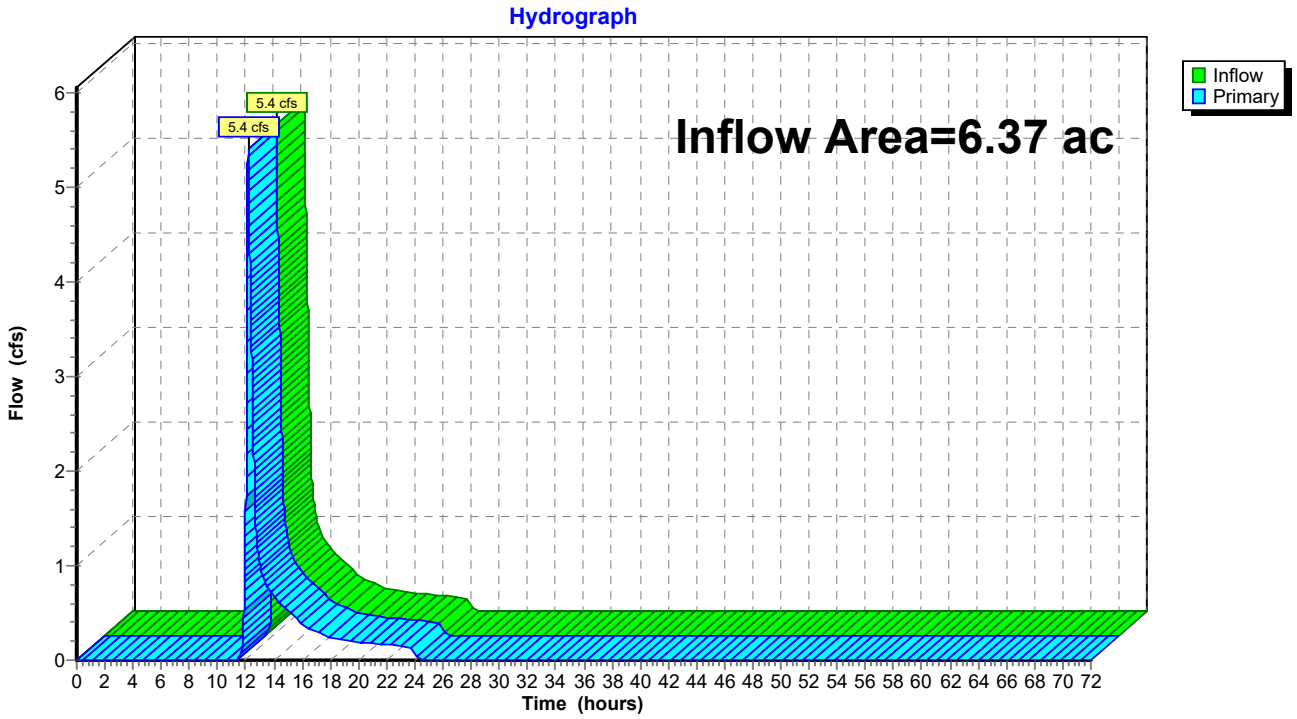


Summary for Link DP-2: Existing 12" Culvert

Inflow Area = 6.37 ac, 0.00% Impervious, Inflow Depth = 1.00" for 10-YR event
Inflow = 5.4 cfs @ 12.17 hrs, Volume= 0.53 af
Primary = 5.4 cfs @ 12.17 hrs, Volume= 0.53 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Existing 12" Culvert

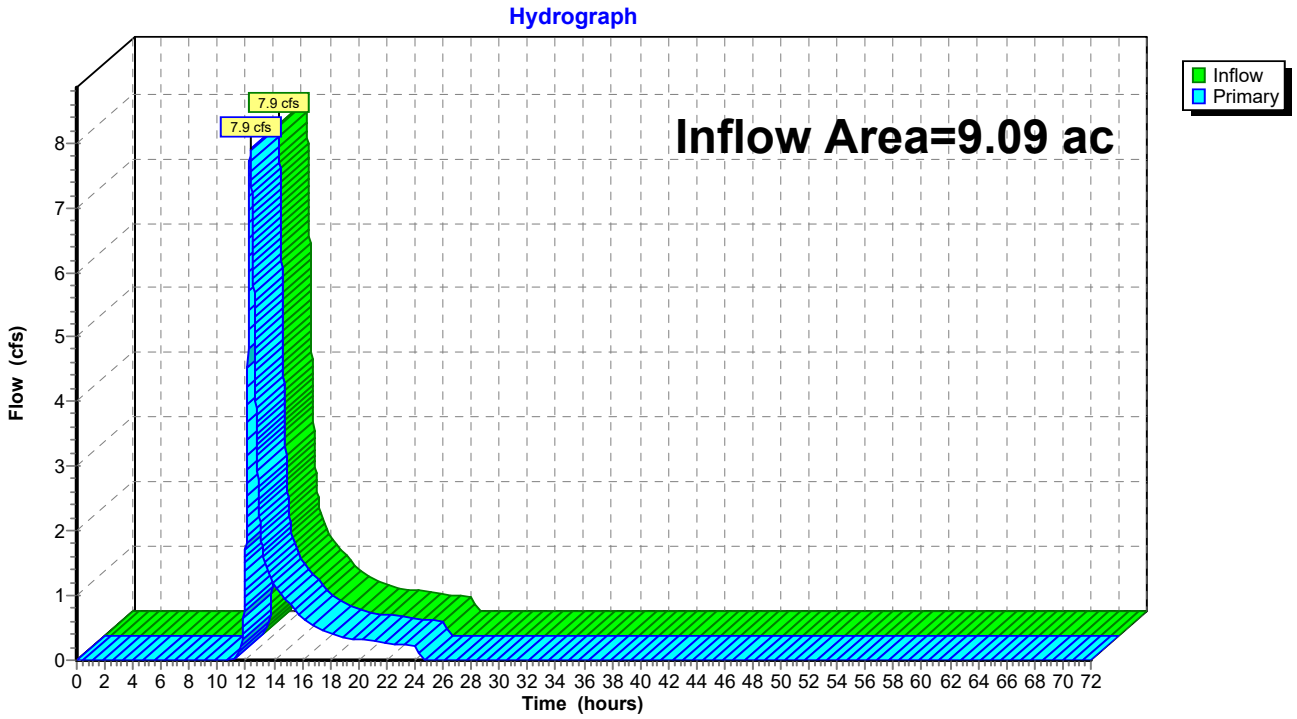


Summary for Link DP-3: Hovey Road

Inflow Area = 9.09 ac, 0.00% Impervious, Inflow Depth = 1.24" for 10-YR event
Inflow = 7.9 cfs @ 12.32 hrs, Volume= 0.94 af
Primary = 7.9 cfs @ 12.32 hrs, Volume= 0.94 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-3: Hovey Road

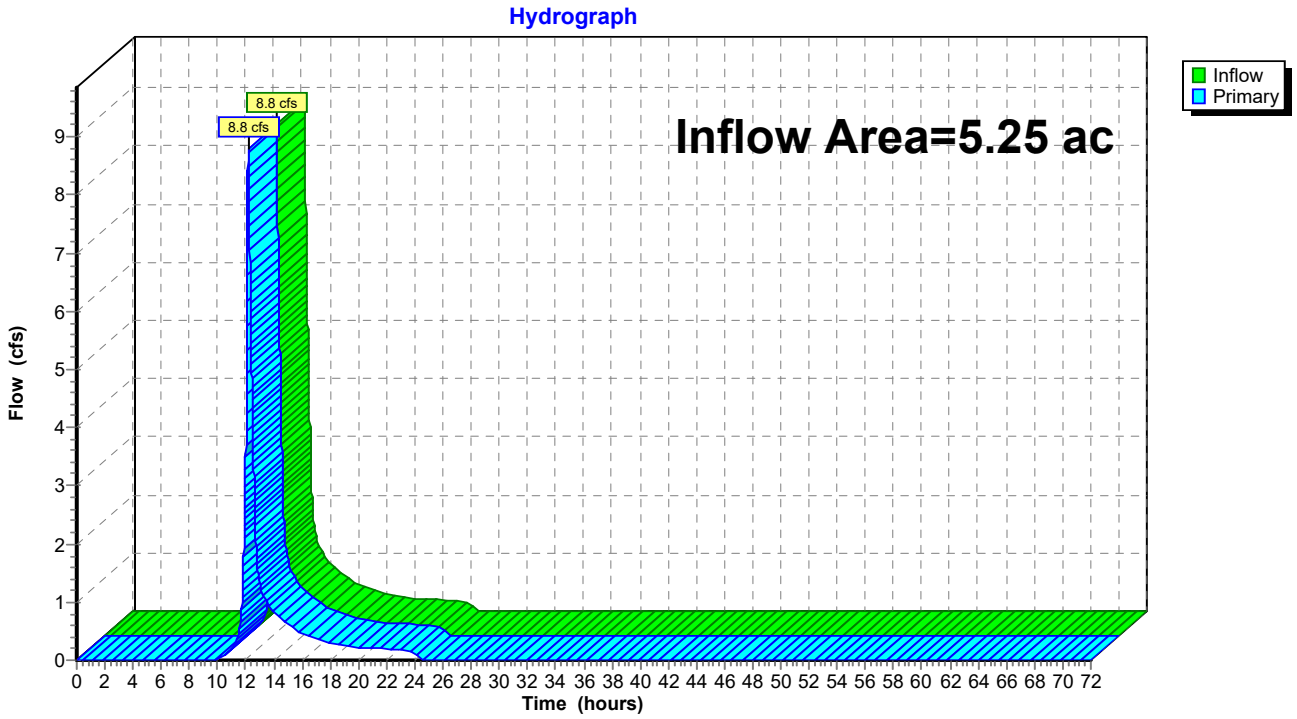


Summary for Link DP-4: Spring Road

Inflow Area = 5.25 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 8.8 cfs @ 12.18 hrs, Volume= 0.78 af
Primary = 8.8 cfs @ 12.18 hrs, Volume= 0.78 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-4: Spring Road

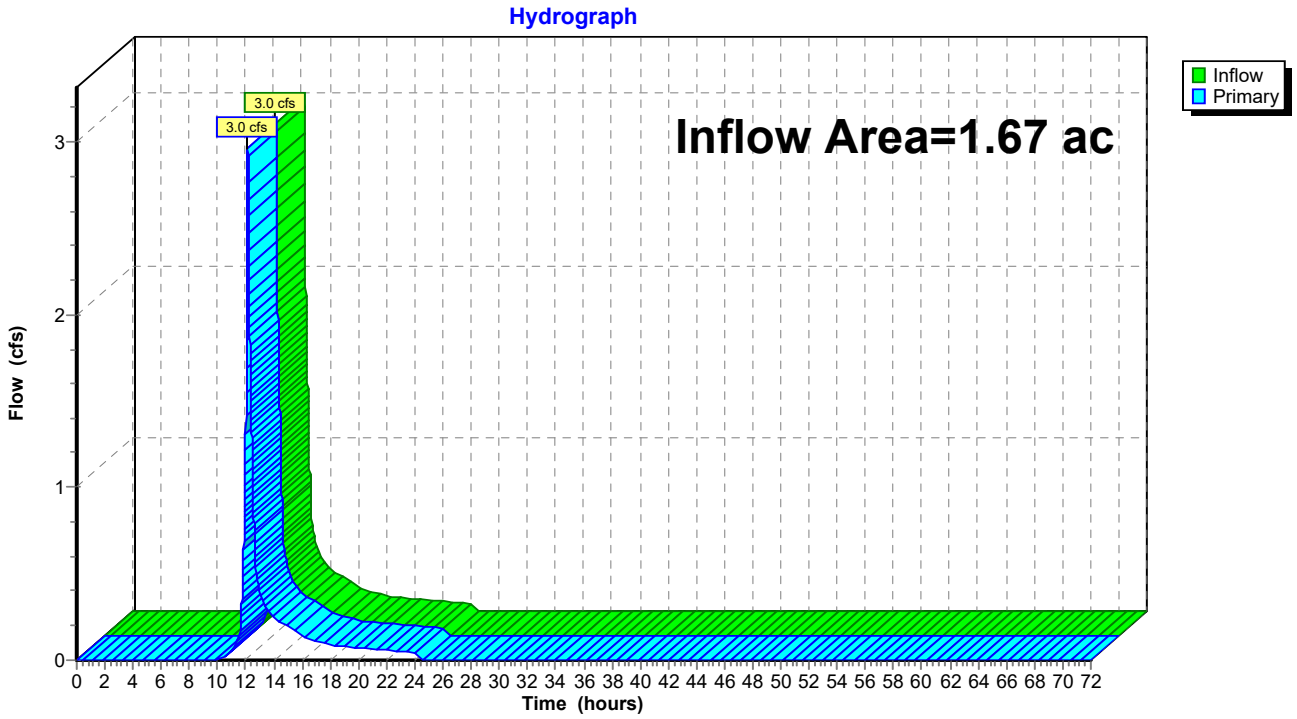


Summary for Link DP-5: Offsite

Inflow Area = 1.67 ac, 0.00% Impervious, Inflow Depth = 1.72" for 10-YR event
Inflow = 3.0 cfs @ 12.13 hrs, Volume= 0.24 af
Primary = 3.0 cfs @ 12.13 hrs, Volume= 0.24 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-5: Offsite

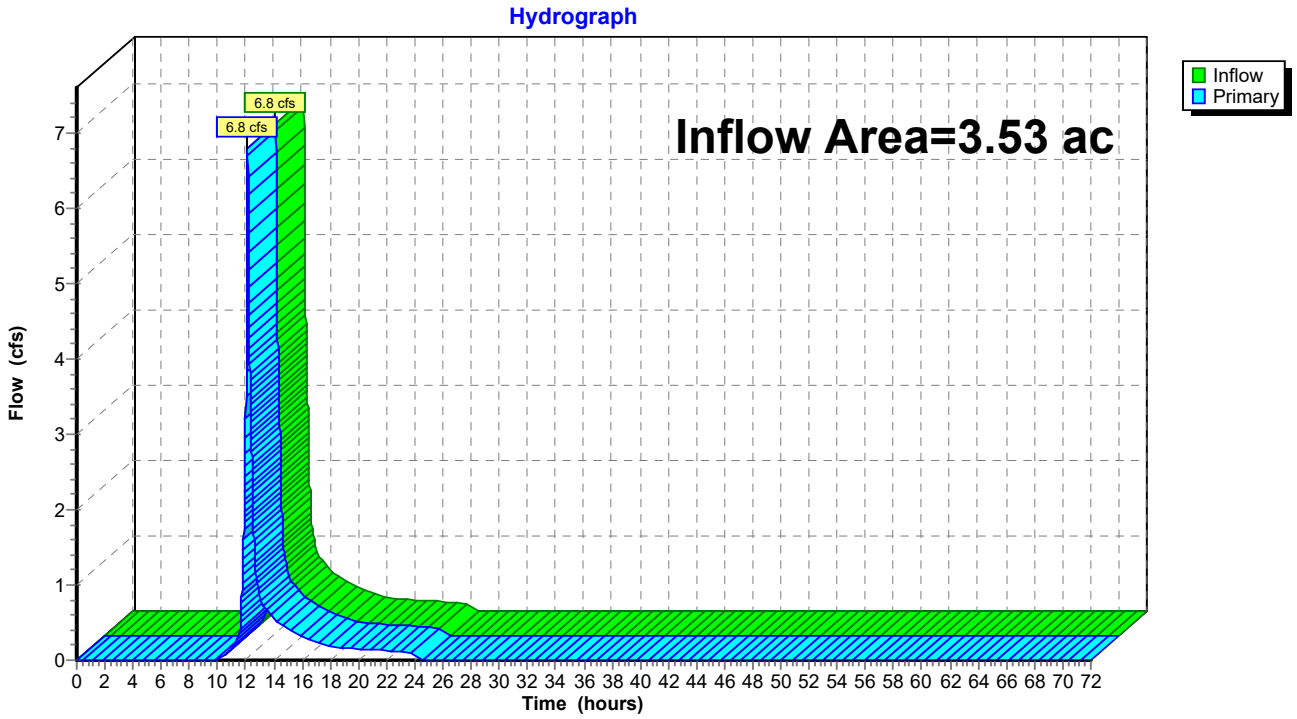


Summary for Link DP-6: North Hovey Road

Inflow Area = 3.53 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 6.8 cfs @ 12.12 hrs, Volume= 0.53 af
Primary = 6.8 cfs @ 12.12 hrs, Volume= 0.53 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-6: North Hovey Road



Summary for Link OS-2: 2017 Cemetery Basin Outfall

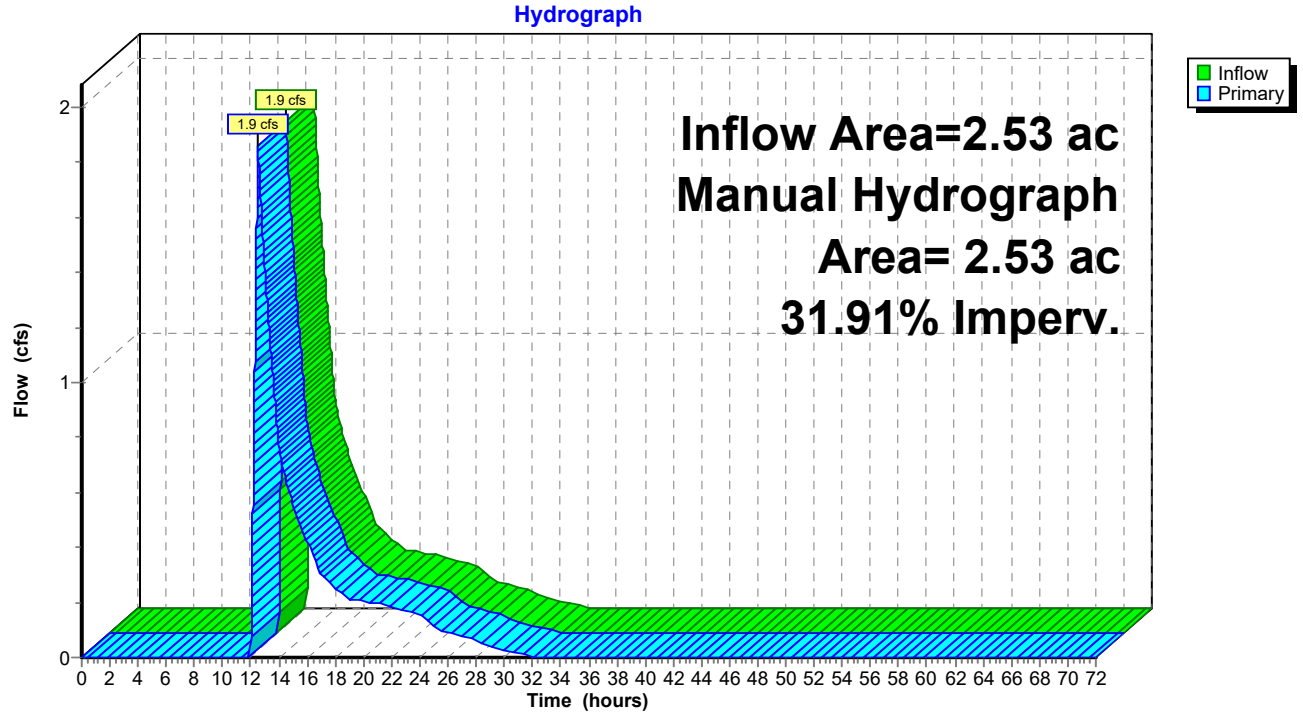
Inflow Area = 2.53 ac, 31.91% Impervious, Inflow Depth = 2.27" for 10-YR event
Inflow = 1.9 cfs @ 12.50 hrs, Volume= 0.48 af
Primary = 1.9 cfs @ 12.50 hrs, Volume= 0.48 af, Atten= 0%, Lag= 0.0 min
Routed to Reach R-1 : Existing Intermittent Stream

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

10-YR 129 Point manual hydrograph, To= 0.00 hrs, dt= 0.25 hrs, Area= 2.53 ac, 31.91% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93
1.86	1.63	1.40	1.23	1.07	0.91	0.75	0.70	0.65	0.60
0.55	0.51	0.47	0.44	0.42	0.40	0.37	0.34	0.30	0.29
0.28	0.27	0.25	0.24	0.23	0.22	0.21	0.21	0.21	0.21
0.21	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.18	0.18
0.18	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.14	0.12
0.11	0.10	0.10	0.09	0.09	0.09	0.08	0.08	0.08	0.07
0.07	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03
0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	

Link OS-2: 2017 Cemetery Basin Outfall



Summary for Link OS-3: 2010 Cemetery Basin Outfall

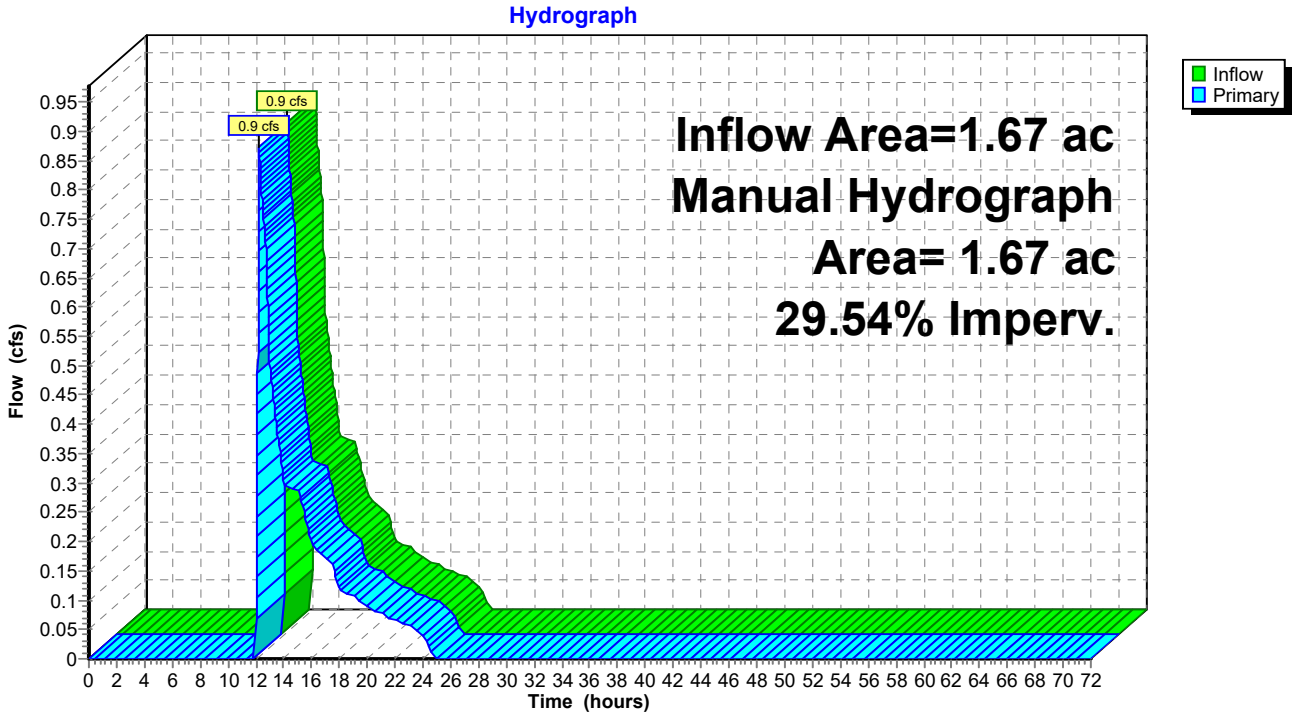
Inflow Area = 1.67 ac, 29.54% Impervious, Inflow Depth = 1.43" for 10-YR event
Inflow = 0.9 cfs @ 12.25 hrs, Volume= 0.20 af
Primary = 0.9 cfs @ 12.25 hrs, Volume= 0.20 af, Atten= 0%, Lag= 0.0 min
Routed to Reach R-1 : Existing Intermittent Stream

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

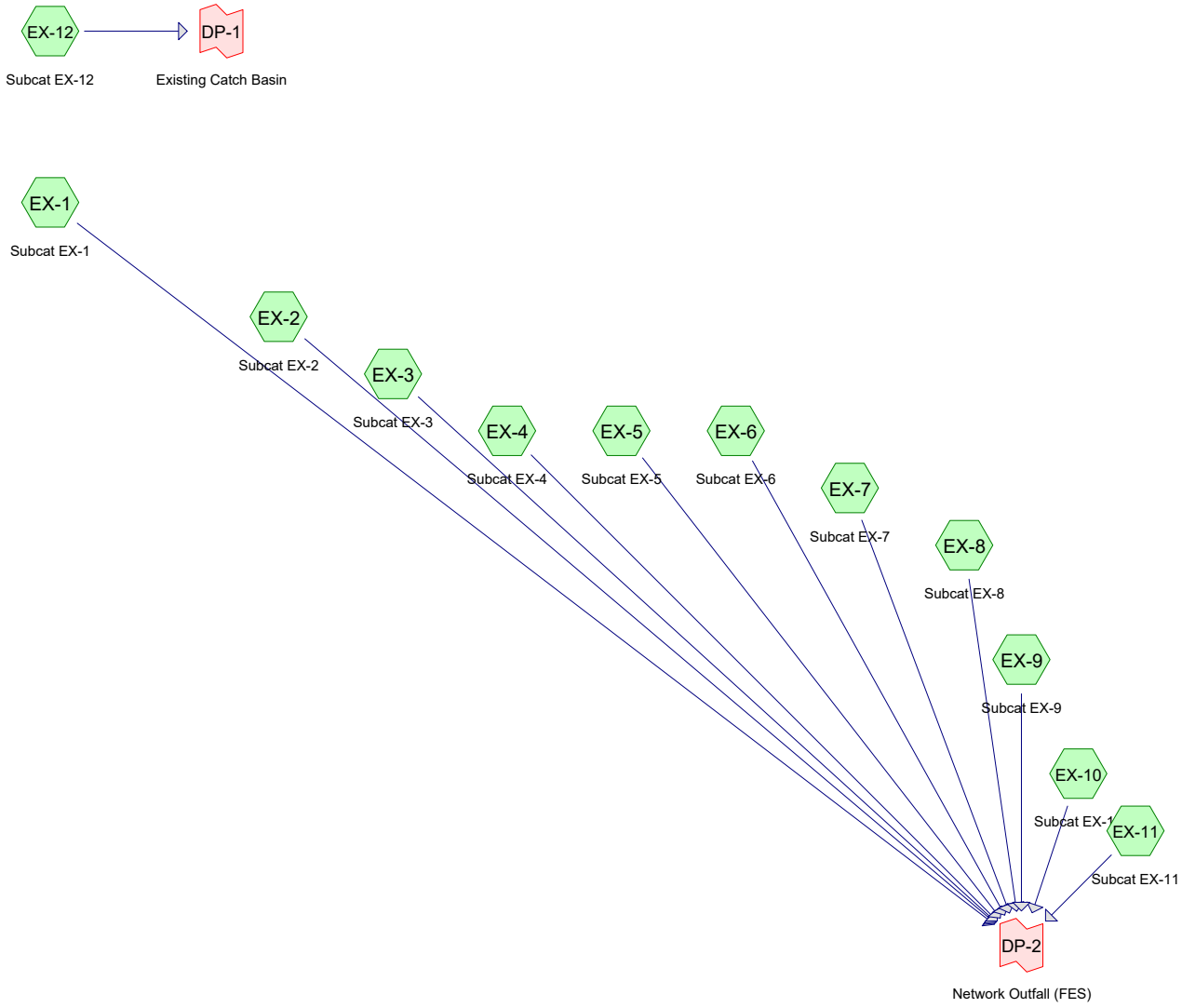
10-YR 102 Point manual hydrograph, To= 0.00 hrs, dt= 0.25 hrs, Area= 1.67 ac, 29.54% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87
0.76	0.70	0.50	0.45	0.40	0.35	0.30	0.29	0.29	0.29
0.29	0.27	0.25	0.22	0.20	0.19	0.18	0.18	0.17	0.17
0.16	0.14	0.12	0.11	0.11	0.11	0.11	0.10	0.10	0.09
0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.06
0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.00
0.00	0.00								

Link OS-3: 2010 Cemetery Basin Outfall



Existing Conditions: Hovey Road



Subcat Reach Pond Link

Routing Diagram for 5314044-EX-Hovey-CBs
Prepared by VHB, Inc, Printed 11/7/2025
HydroCAD® 10.20-5c s/n 01038 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.47	2
2	2-YR	Type III 24-hr		Default	24.00	1	2.95	2
3	10-YR	Type III 24-hr		Default	24.00	1	4.46	2
4	25-YR	Type III 24-hr		Default	24.00	1	5.65	2
5	50-YR	Type III 24-hr		Default	24.00	1	6.76	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.699	65	2 acre lots, 12% imp, HSG B (EX-10, EX-11, EX-5, EX-6, EX-7, EX-8, EX-9)
0.682	77	2 acre lots, 12% imp, HSG C (EX-1, EX-2, EX-3, EX-4, EX-5)
1.615	61	>75% Grass cover, Good, HSG B (EX-10, EX-11, EX-12, EX-2, EX-3, EX-4, EX-9)
4.293	74	>75% Grass cover, Good, HSG C (EX-1, EX-12, EX-2, EX-3, EX-4)
0.004	85	Gravel roads, HSG B (EX-2)
0.063	89	Gravel roads, HSG C (EX-2, EX-3)
0.006	98	Paved roads w/curbs & sewers, HSG A (EX-11)
0.948	98	Paved roads w/curbs & sewers, HSG B (EX-10, EX-11, EX-12, EX-4, EX-5, EX-6, EX-7, EX-8, EX-9)
1.175	98	Paved roads w/curbs & sewers, HSG C (EX-1, EX-12, EX-2, EX-3, EX-4, EX-5)
0.000	30	Woods, Good, HSG A (EX-11)
3.356	55	Woods, Good, HSG B (EX-10, EX-11, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8, EX-9)
2.095	70	Woods, Good, HSG C (EX-1, EX-2, EX-3, EX-4, EX-5)
0.001	58	Woods/grass comb., Good, HSG B (EX-2)
5.153	72	Woods/grass comb., Good, HSG C (EX-1, EX-12, EX-2)
21.090	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.006	HSG A	EX-11
7.623	HSG B	EX-10, EX-11, EX-12, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8, EX-9
13.461	HSG C	EX-1, EX-12, EX-2, EX-3, EX-4, EX-5
0.000	HSG D	
0.000	Other	
21.090		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=2.598 ac 12.26% Impervious Runoff Depth=0.68"
Flow Length=1,206' Tc=6.2 min CN=76 Runoff=1.86 cfs 0.146 af

Subcatchment EX-10: Subcat EX-10 Runoff Area=0.356 ac 19.03% Impervious Runoff Depth=0.26"
Flow Length=312' Tc=5.0 min CN=64 Runoff=0.05 cfs 0.008 af

Subcatchment EX-11: Subcat EX-11 Runoff Area=0.158 ac 40.64% Impervious Runoff Depth=0.55"
Flow Length=296' Tc=7.0 min CN=73 Runoff=0.08 cfs 0.007 af

Subcatchment EX-12: Subcat EX-12 Runoff Area=5.777 ac 14.82% Impervious Runoff Depth=0.68"
Flow Length=774' Tc=15.4 min CN=76 Runoff=3.09 cfs 0.326 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=1.931 ac 5.15% Impervious Runoff Depth=0.55"
Flow Length=617' Tc=15.1 min CN=73 Runoff=0.79 cfs 0.089 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=3.879 ac 3.90% Impervious Runoff Depth=0.41"
Flow Length=824' Tc=24.9 min CN=69 Runoff=0.84 cfs 0.132 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=2.352 ac 7.44% Impervious Runoff Depth=0.31"
Flow Length=551' Tc=21.1 min CN=66 Runoff=0.36 cfs 0.062 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=1.359 ac 14.53% Impervious Runoff Depth=0.29"
Flow Length=502' Tc=10.2 min CN=65 Runoff=0.20 cfs 0.032 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=1.369 ac 17.92% Impervious Runoff Depth=0.29"
Flow Length=505' Tc=12.4 min CN=65 Runoff=0.20 cfs 0.033 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=0.121 ac 54.36% Impervious Runoff Depth=0.82"
Flow Length=160' Tc=6.2 min CN=79 Runoff=0.11 cfs 0.008 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=0.451 ac 18.73% Impervious Runoff Depth=0.29"
Flow Length=286' Tc=9.0 min CN=65 Runoff=0.07 cfs 0.011 af

Subcatchment EX-9: Subcat EX-9 Runoff Area=0.738 ac 12.02% Impervious Runoff Depth=0.21"
Flow Length=394' Tc=8.8 min CN=62 Runoff=0.07 cfs 0.013 af

Link DP-1: Existing Catch Basin Inflow=3.09 cfs 0.326 af
Primary=3.09 cfs 0.326 af

Link DP-2: Network Outfall (FES) Inflow=3.40 cfs 0.540 af
Primary=3.40 cfs 0.540 af

Total Runoff Area = 21.090 ac Runoff Volume = 0.866 af Average Runoff Depth = 0.49"
88.55% Pervious = 18.676 ac 11.45% Impervious = 2.414 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=2.598 ac 12.26% Impervious Runoff Depth=0.98"
Flow Length=1,206' Tc=6.2 min CN=76 Runoff=2.83 cfs 0.213 af

Subcatchment EX-10: Subcat EX-10 Runoff Area=0.356 ac 19.03% Impervious Runoff Depth=0.45"
Flow Length=312' Tc=5.0 min CN=64 Runoff=0.13 cfs 0.013 af

Subcatchment EX-11: Subcat EX-11 Runoff Area=0.158 ac 40.64% Impervious Runoff Depth=0.83"
Flow Length=296' Tc=7.0 min CN=73 Runoff=0.13 cfs 0.011 af

Subcatchment EX-12: Subcat EX-12 Runoff Area=5.777 ac 14.82% Impervious Runoff Depth=0.98"
Flow Length=774' Tc=15.4 min CN=76 Runoff=4.70 cfs 0.473 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=1.931 ac 5.15% Impervious Runoff Depth=0.83"
Flow Length=617' Tc=15.1 min CN=73 Runoff=1.28 cfs 0.133 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=3.879 ac 3.90% Impervious Runoff Depth=0.64"
Flow Length=824' Tc=24.9 min CN=69 Runoff=1.51 cfs 0.208 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=2.352 ac 7.44% Impervious Runoff Depth=0.52"
Flow Length=551' Tc=21.1 min CN=66 Runoff=0.72 cfs 0.102 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=1.359 ac 14.53% Impervious Runoff Depth=0.48"
Flow Length=502' Tc=10.2 min CN=65 Runoff=0.47 cfs 0.055 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=1.369 ac 17.92% Impervious Runoff Depth=0.48"
Flow Length=505' Tc=12.4 min CN=65 Runoff=0.45 cfs 0.055 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=0.121 ac 54.36% Impervious Runoff Depth=1.15"
Flow Length=160' Tc=6.2 min CN=79 Runoff=0.16 cfs 0.012 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=0.451 ac 18.73% Impervious Runoff Depth=0.48"
Flow Length=286' Tc=9.0 min CN=65 Runoff=0.16 cfs 0.018 af

Subcatchment EX-9: Subcat EX-9 Runoff Area=0.738 ac 12.02% Impervious Runoff Depth=0.38"
Flow Length=394' Tc=8.8 min CN=62 Runoff=0.17 cfs 0.023 af

Link DP-1: Existing Catch Basin Inflow=4.70 cfs 0.473 af
Primary=4.70 cfs 0.473 af

Link DP-2: Network Outfall (FES) Inflow=6.02 cfs 0.843 af
Primary=6.02 cfs 0.843 af

Total Runoff Area = 21.090 ac Runoff Volume = 1.315 af Average Runoff Depth = 0.75"
88.55% Pervious = 18.676 ac 11.45% Impervious = 2.414 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=2.598 ac 12.26% Impervious Runoff Depth=2.10"
Flow Length=1,206' Tc=6.2 min CN=76 Runoff=6.32 cfs 0.454 af

Subcatchment EX-10: Subcat EX-10 Runoff Area=0.356 ac 19.03% Impervious Runoff Depth=1.24"
Flow Length=312' Tc=5.0 min CN=64 Runoff=0.49 cfs 0.037 af

Subcatchment EX-11: Subcat EX-11 Runoff Area=0.158 ac 40.64% Impervious Runoff Depth=1.87"
Flow Length=296' Tc=7.0 min CN=73 Runoff=0.33 cfs 0.024 af

Subcatchment EX-12: Subcat EX-12 Runoff Area=5.777 ac 14.82% Impervious Runoff Depth=2.10"
Flow Length=774' Tc=15.4 min CN=76 Runoff=10.55 cfs 1.010 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=1.931 ac 5.15% Impervious Runoff Depth=1.87"
Flow Length=617' Tc=15.1 min CN=73 Runoff=3.12 cfs 0.300 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=3.879 ac 3.90% Impervious Runoff Depth=1.57"
Flow Length=824' Tc=24.9 min CN=69 Runoff=4.22 cfs 0.509 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=2.352 ac 7.44% Impervious Runoff Depth=1.37"
Flow Length=551' Tc=21.1 min CN=66 Runoff=2.32 cfs 0.269 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=1.359 ac 14.53% Impervious Runoff Depth=1.31"
Flow Length=502' Tc=10.2 min CN=65 Runoff=1.66 cfs 0.148 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=1.369 ac 17.92% Impervious Runoff Depth=1.31"
Flow Length=505' Tc=12.4 min CN=65 Runoff=1.56 cfs 0.149 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=0.121 ac 54.36% Impervious Runoff Depth=2.34"
Flow Length=160' Tc=6.2 min CN=79 Runoff=0.33 cfs 0.024 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=0.451 ac 18.73% Impervious Runoff Depth=1.31"
Flow Length=286' Tc=9.0 min CN=65 Runoff=0.57 cfs 0.049 af

Subcatchment EX-9: Subcat EX-9 Runoff Area=0.738 ac 12.02% Impervious Runoff Depth=1.12"
Flow Length=394' Tc=8.8 min CN=62 Runoff=0.77 cfs 0.069 af

Link DP-1: Existing Catch Basin Inflow=10.55 cfs 1.010 af
Primary=10.55 cfs 1.010 af

Link DP-2: Network Outfall (FES) Inflow=17.21 cfs 2.032 af
Primary=17.21 cfs 2.032 af

Total Runoff Area = 21.090 ac Runoff Volume = 3.042 af Average Runoff Depth = 1.73"
88.55% Pervious = 18.676 ac 11.45% Impervious = 2.414 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=2.598 ac 12.26% Impervious Runoff Depth=3.08"
Flow Length=1,206' Tc=6.2 min CN=76 Runoff=9.33 cfs 0.667 af

Subcatchment EX-10: Subcat EX-10 Runoff Area=0.356 ac 19.03% Impervious Runoff Depth=2.02"
Flow Length=312' Tc=5.0 min CN=64 Runoff=0.84 cfs 0.060 af

Subcatchment EX-11: Subcat EX-11 Runoff Area=0.158 ac 40.64% Impervious Runoff Depth=2.80"
Flow Length=296' Tc=7.0 min CN=73 Runoff=0.50 cfs 0.037 af

Subcatchment EX-12: Subcat EX-12 Runoff Area=5.777 ac 14.82% Impervious Runoff Depth=3.08"
Flow Length=774' Tc=15.4 min CN=76 Runoff=15.61 cfs 1.483 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=1.931 ac 5.15% Impervious Runoff Depth=2.80"
Flow Length=617' Tc=15.1 min CN=73 Runoff=4.76 cfs 0.451 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=3.879 ac 3.90% Impervious Runoff Depth=2.44"
Flow Length=824' Tc=24.9 min CN=69 Runoff=6.72 cfs 0.790 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=2.352 ac 7.44% Impervious Runoff Depth=2.18"
Flow Length=551' Tc=21.1 min CN=66 Runoff=3.86 cfs 0.428 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=1.359 ac 14.53% Impervious Runoff Depth=2.10"
Flow Length=502' Tc=10.2 min CN=65 Runoff=2.81 cfs 0.238 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=1.369 ac 17.92% Impervious Runoff Depth=2.10"
Flow Length=505' Tc=12.4 min CN=65 Runoff=2.64 cfs 0.240 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=0.121 ac 54.36% Impervious Runoff Depth=3.37"
Flow Length=160' Tc=6.2 min CN=79 Runoff=0.48 cfs 0.034 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=0.451 ac 18.73% Impervious Runoff Depth=2.10"
Flow Length=286' Tc=9.0 min CN=65 Runoff=0.97 cfs 0.079 af

Subcatchment EX-9: Subcat EX-9 Runoff Area=0.738 ac 12.02% Impervious Runoff Depth=1.85"
Flow Length=394' Tc=8.8 min CN=62 Runoff=1.38 cfs 0.114 af

Link DP-1: Existing Catch Basin Inflow=15.61 cfs 1.483 af
Primary=15.61 cfs 1.483 af

Link DP-2: Network Outfall (FES) Inflow=27.62 cfs 3.136 af
Primary=27.62 cfs 3.136 af

Total Runoff Area = 21.090 ac Runoff Volume = 4.619 af Average Runoff Depth = 2.63"
88.55% Pervious = 18.676 ac 11.45% Impervious = 2.414 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 EX-1: Subcat EX-1 Runoff Area=2.598 ac 12.26% Impervious Runoff Depth=4.04"
Flow Length=1,206' Tc=6.2 min CN=76 Runoff=12.23 cfs 0.876 af

Subcatchment EX-10: Subcat EX-10 Runoff Area=0.356 ac 19.03% Impervious Runoff Depth=2.82"
Flow Length=312' Tc=5.0 min CN=64 Runoff=1.20 cfs 0.084 af

Subcatchment EX-11: Subcat EX-11 Runoff Area=0.158 ac 40.64% Impervious Runoff Depth=3.73"
Flow Length=296' Tc=7.0 min CN=73 Runoff=0.67 cfs 0.049 af

Subcatchment EX-12: Subcat EX-12 Runoff Area=5.777 ac 14.82% Impervious Runoff Depth=4.04"
Flow Length=774' Tc=15.4 min CN=76 Runoff=20.51 cfs 1.947 af

Subcatchment EX-2: Subcat EX-2 Runoff Area=1.931 ac 5.15% Impervious Runoff Depth=3.73"
Flow Length=617' Tc=15.1 min CN=73 Runoff=6.38 cfs 0.600 af

Subcatchment EX-3: Subcat EX-3 Runoff Area=3.879 ac 3.90% Impervious Runoff Depth=3.32"
Flow Length=824' Tc=24.9 min CN=69 Runoff=9.22 cfs 1.073 af

Subcatchment EX-4: Subcat EX-4 Runoff Area=2.352 ac 7.44% Impervious Runoff Depth=3.02"
Flow Length=551' Tc=21.1 min CN=66 Runoff=5.42 cfs 0.591 af

Subcatchment EX-5: Subcat EX-5 Runoff Area=1.359 ac 14.53% Impervious Runoff Depth=2.92"
Flow Length=502' Tc=10.2 min CN=65 Runoff=3.98 cfs 0.330 af

Subcatchment EX-6: Subcat EX-6 Runoff Area=1.369 ac 17.92% Impervious Runoff Depth=2.92"
Flow Length=505' Tc=12.4 min CN=65 Runoff=3.75 cfs 0.333 af

Subcatchment EX-7: Subcat EX-7 Runoff Area=0.121 ac 54.36% Impervious Runoff Depth=4.37"
Flow Length=160' Tc=6.2 min CN=79 Runoff=0.61 cfs 0.044 af

Subcatchment EX-8: Subcat EX-8 Runoff Area=0.451 ac 18.73% Impervious Runoff Depth=2.92"
Flow Length=286' Tc=9.0 min CN=65 Runoff=1.37 cfs 0.110 af

Subcatchment EX-9: Subcat EX-9 Runoff Area=0.738 ac 12.02% Impervious Runoff Depth=2.63"
Flow Length=394' Tc=8.8 min CN=62 Runoff=2.01 cfs 0.161 af

Link DP-1: Existing Catch Basin Inflow=20.51 cfs 1.947 af
Primary=20.51 cfs 1.947 af

Link DP-2: Network Outfall (FES) Inflow=38.06 cfs 4.251 af
Primary=38.06 cfs 4.251 af

Total Runoff Area = 21.090 ac Runoff Volume = 6.198 af Average Runoff Depth = 3.53"
88.55% Pervious = 18.676 ac 11.45% Impervious = 2.414 ac

Summary for Subcatchment EX-1: Subcat EX-1

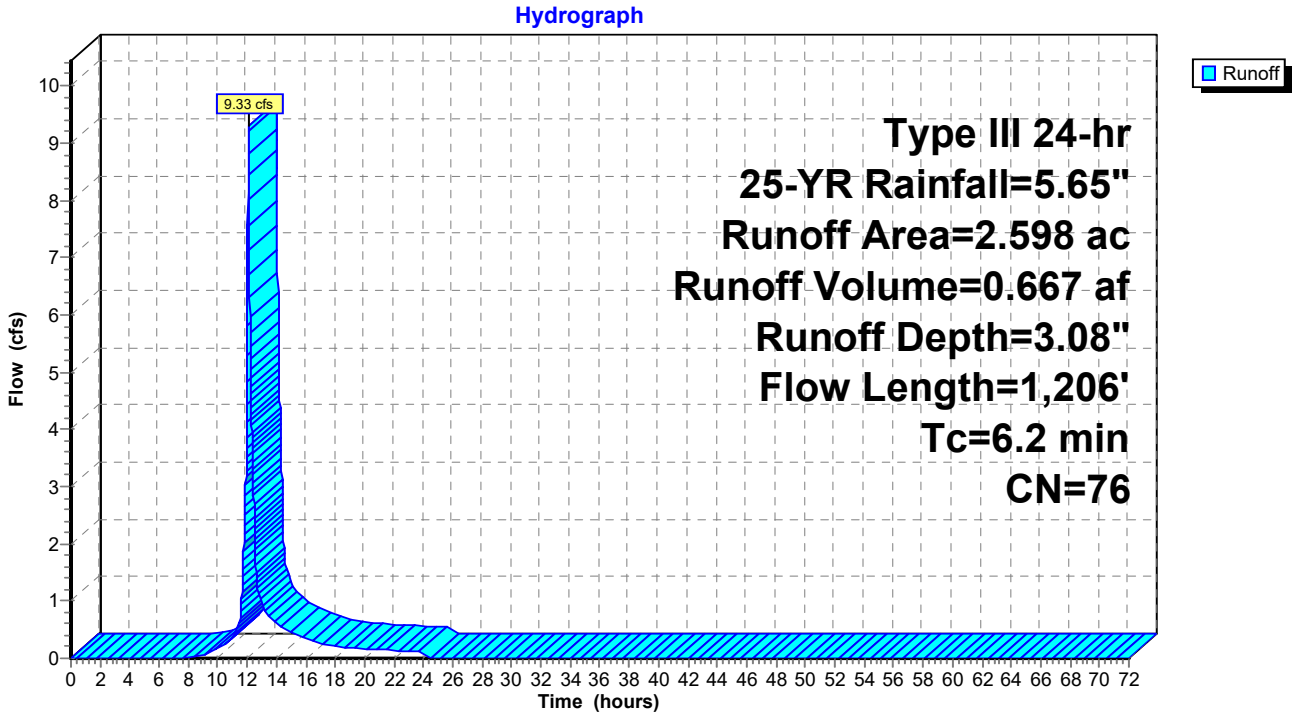
Runoff = 9.33 cfs @ 12.09 hrs, Volume= 0.667 af, Depth= 3.08"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.639	74	>75% Grass cover, Good, HSG C
0.319	98	Paved roads w/curbs & sewers, HSG C
0.000	77	2 acre lots, 12% imp, HSG C
1.501	72	Woods/grass comb., Good, HSG C
0.073	72	Woods/grass comb., Good, HSG C
0.057	72	Woods/grass comb., Good, HSG C
0.009	70	Woods, Good, HSG C
2.598	76	Weighted Average
2.280		87.74% Pervious Area
0.319		12.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.0700	1.88		**Sheet Flow, Sheet Paved** Smooth surfaces n= 0.011 P2= 2.90"
3.4	820	0.0700	3.97		**Shallow Concentrated Flow, Shallow Concentrated Grass Gutter** Grassed Waterway Kv= 15.0 fps
1.7	258	0.0272	2.47		**Shallow Concentrated Flow, Shallow Concentrated Grass Gutter** Grassed Waterway Kv= 15.0 fps
0.7	78	0.0150	1.84		**Shallow Concentrated Flow, Shallow Concentrated Grass Gutter** Grassed Waterway Kv= 15.0 fps
6.2	1,206	Total			

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-10: Subcat EX-10

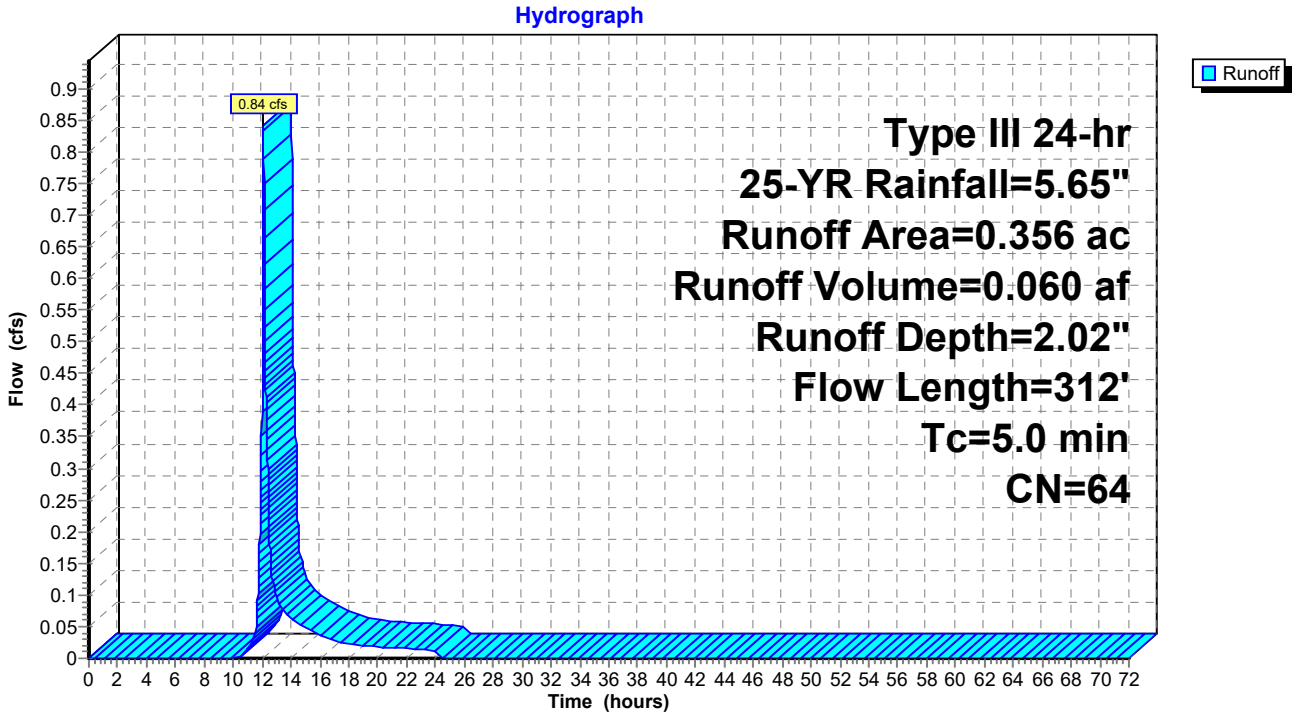
Runoff = 0.84 cfs @ 12.08 hrs, Volume= 0.060 af, Depth= 2.02"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.034	61	>75% Grass cover, Good, HSG B
0.065	98	Paved roads w/curbs & sewers, HSG B
0.024	65	2 acre lots, 12% imp, HSG B
0.001	65	2 acre lots, 12% imp, HSG B
0.233	55	Woods, Good, HSG B
0.356	64	Weighted Average
0.288		80.97% Pervious Area
0.068		19.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0827	0.25		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.90"
0.2	24	0.0827	2.01		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	147	0.1824	2.14		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.3	91	0.1093	4.96		**Shallow Concentrated Flow, Gutter** Grassed Waterway Kv= 15.0 fps
5.0	312	Total			

Subcatchment EX-10: Subcat EX-10



Summary for Subcatchment EX-11: Subcat EX-11

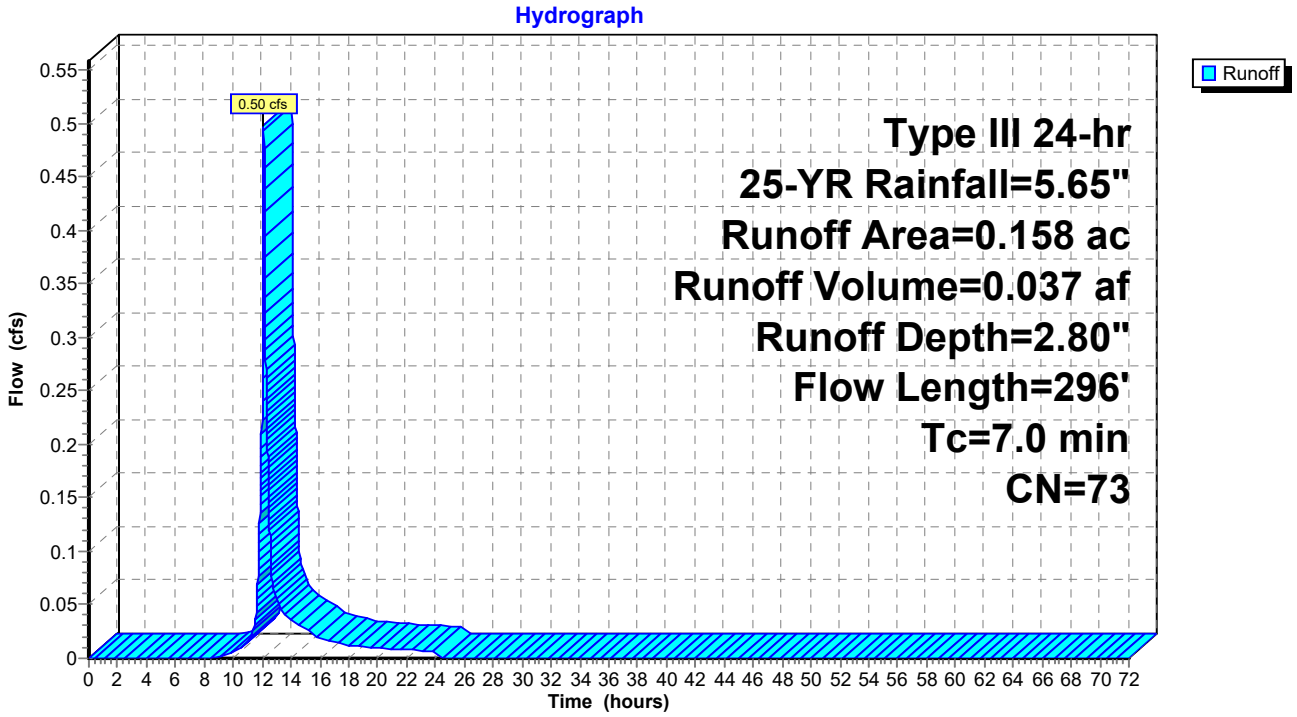
Runoff = 0.50 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 2.80"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.000	30	Woods, Good, HSG A
0.006	98	Paved roads w/curbs & sewers, HSG A
0.000	55	Woods, Good, HSG B
0.005	55	Woods, Good, HSG B
0.035	98	Paved roads w/curbs & sewers, HSG B
0.001	61	>75% Grass cover, Good, HSG B
0.000	65	2 acre lots, 12% imp, HSG B
0.001	65	2 acre lots, 12% imp, HSG B
0.023	55	Woods, Good, HSG B
0.039	55	Woods, Good, HSG B
0.020	98	Paved roads w/curbs & sewers, HSG B
0.027	65	2 acre lots, 12% imp, HSG B
0.000	61	>75% Grass cover, Good, HSG B
0.000	61	>75% Grass cover, Good, HSG B
0.158	73	Weighted Average
0.094		59.36% Pervious Area
0.064		40.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	50	0.1821	0.16		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
0.3	39	0.1821	2.13		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.3	24	0.0447	1.48		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.2	40	0.1958	3.10		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	57	0.1211	1.74		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.3	86	0.0779	4.19		**Shallow Concentrated Flow, Gutter** Grassed Waterway Kv= 15.0 fps
7.0	296	Total			

Subcatchment EX-11: Subcat EX-11



Summary for Subcatchment EX-12: Subcat EX-12

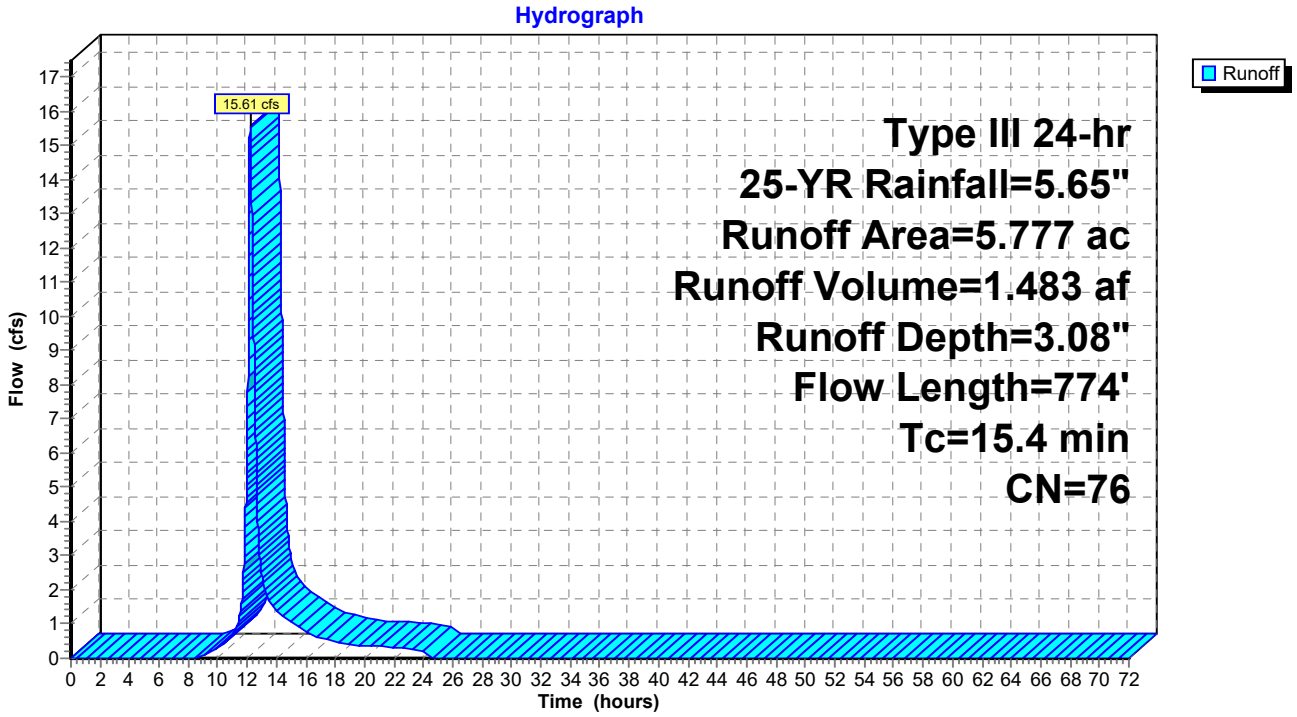
Runoff = 15.61 cfs @ 12.21 hrs, Volume= 1.483 af, Depth= 3.08"
Routed to Link DP-1 : Existing Catch Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.506	98	Paved roads w/curbs & sewers, HSG C
1.196	72	Woods/grass comb., Good, HSG C
0.085	72	Woods/grass comb., Good, HSG C
0.029	72	Woods/grass comb., Good, HSG C
1.118	74	>75% Grass cover, Good, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.000	74	>75% Grass cover, Good, HSG C
0.350	98	Paved roads w/curbs & sewers, HSG B
0.023	61	>75% Grass cover, Good, HSG B
0.139	61	>75% Grass cover, Good, HSG B
0.005	61	>75% Grass cover, Good, HSG B
0.093	61	>75% Grass cover, Good, HSG B
1.381	72	Woods/grass comb., Good, HSG C
0.852	74	>75% Grass cover, Good, HSG C
5.777	76	Weighted Average
4.921		85.18% Pervious Area
0.856		14.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0206	0.14		**Sheet Flow, Grass Sheet** Grass: Short n= 0.150 P2= 2.90"
1.0	65	0.0232	1.07		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.7	67	0.0473	1.52		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
7.9	592	0.0070	1.25		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.4	774	Total			

Subcatchment EX-12: Subcat EX-12



Summary for Subcatchment EX-2: Subcat EX-2

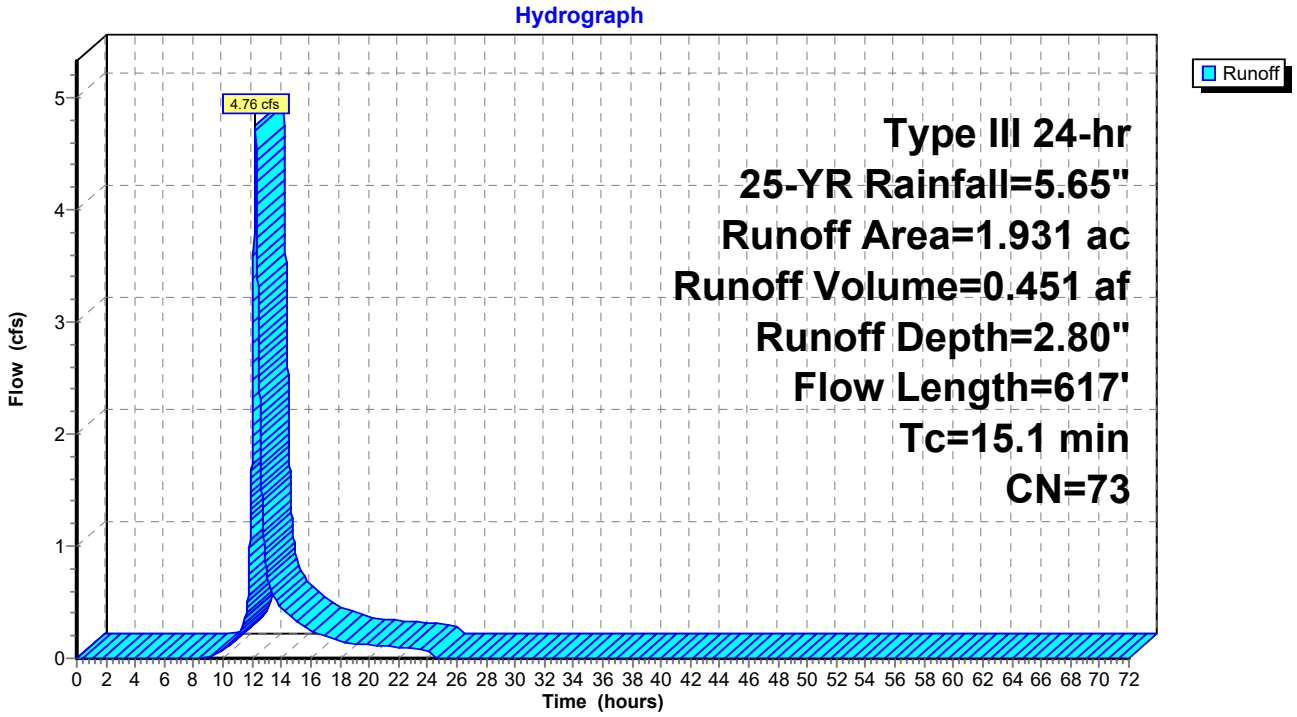
Runoff = 4.76 cfs @ 12.21 hrs, Volume= 0.451 af, Depth= 2.80"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.087	98	Paved roads w/curbs & sewers, HSG C
0.053	89	Gravel roads, HSG C
0.106	77	2 acre lots, 12% imp, HSG C
0.830	72	Woods/grass comb., Good, HSG C
0.081	70	Woods, Good, HSG C
0.082	70	Woods, Good, HSG C
0.015	70	Woods, Good, HSG C
0.352	74	>75% Grass cover, Good, HSG C
0.098	74	>75% Grass cover, Good, HSG C
0.031	74	>75% Grass cover, Good, HSG C
0.007	74	>75% Grass cover, Good, HSG C
0.026	74	>75% Grass cover, Good, HSG C
0.004	85	Gravel roads, HSG B
0.001	58	Woods/grass comb., Good, HSG B
0.147	61	>75% Grass cover, Good, HSG B
0.010	61	>75% Grass cover, Good, HSG B
1.931	73	Weighted Average
1.832		94.85% Pervious Area
0.099		5.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0160	0.13		**Sheet Flow, Grass Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
4.6	248	0.0167	0.90		**Shallow Concentrated Flow, Grass Conc Flow** Short Grass Pasture Kv= 7.0 fps
3.4	248	0.0300	1.21		**Shallow Concentrated Flow, Grass Conc Flow** Short Grass Pasture Kv= 7.0 fps
0.6	71	0.0162	1.91		**Shallow Concentrated Flow, Road Gutter Flow** Grassed Waterway Kv= 15.0 fps
15.1	617	Total			

Subcatchment EX-2: Subcat EX-2



Summary for Subcatchment EX-3: Subcat EX-3

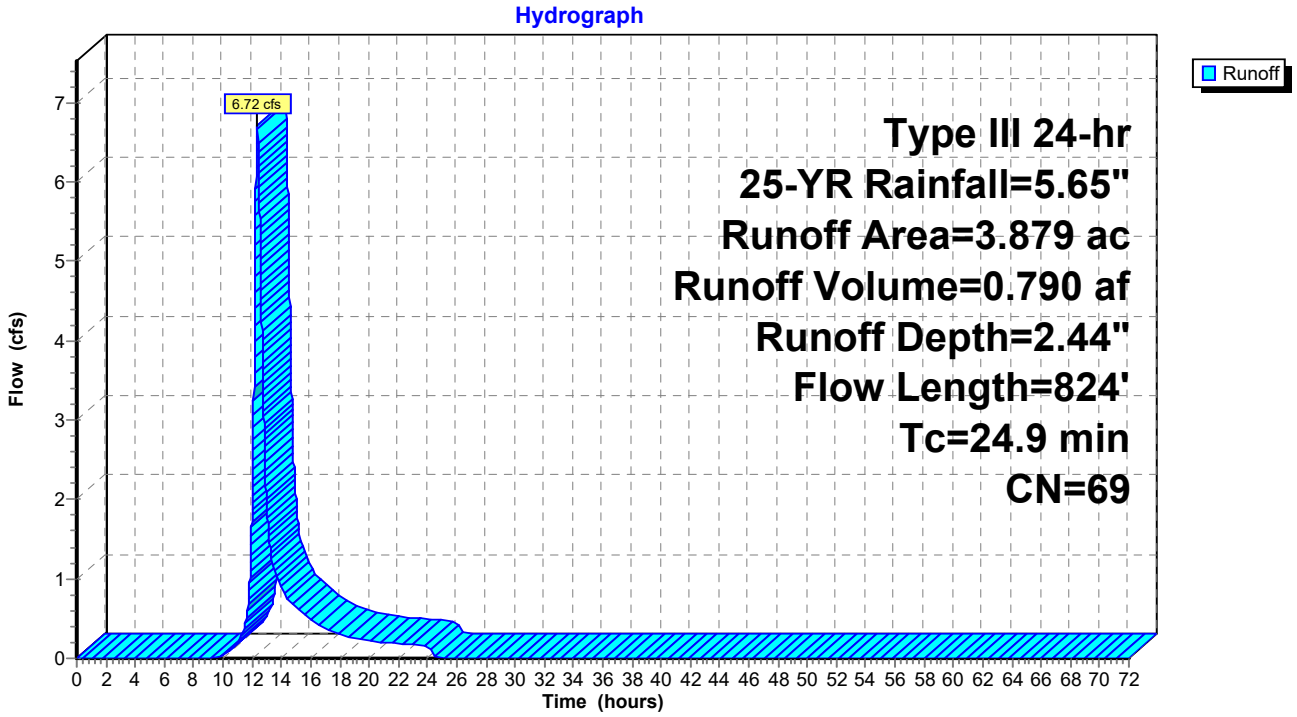
Runoff = 6.72 cfs @ 12.36 hrs, Volume= 0.790 af, Depth= 2.44"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.128	98	Paved roads w/curbs & sewers, HSG C
0.009	89	Gravel roads, HSG C
0.191	77	2 acre lots, 12% imp, HSG C
0.032	70	Woods, Good, HSG C
1.029	74	>75% Grass cover, Good, HSG C
0.093	74	>75% Grass cover, Good, HSG C
0.866	70	Woods, Good, HSG C
0.092	70	Woods, Good, HSG C
0.368	55	Woods, Good, HSG B
1.072	61	>75% Grass cover, Good, HSG B
3.879	69	Weighted Average
3.728		96.10% Pervious Area
0.151		3.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0100	0.11		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.90"
8.3	347	0.0100	0.70		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
2.3	69	0.0100	0.50		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
0.3	31	0.0890	1.49		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
3.5	106	0.0100	0.50		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
1.7	70	0.0100	0.70		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
1.0	151	0.0300	2.60		**Shallow Concentrated Flow, Road Gutter Flow** Grassed Waterway Kv= 15.0 fps
24.9	824	Total			

Subcatchment EX-3: Subcat EX-3



Summary for Subcatchment EX-4: Subcat EX-4

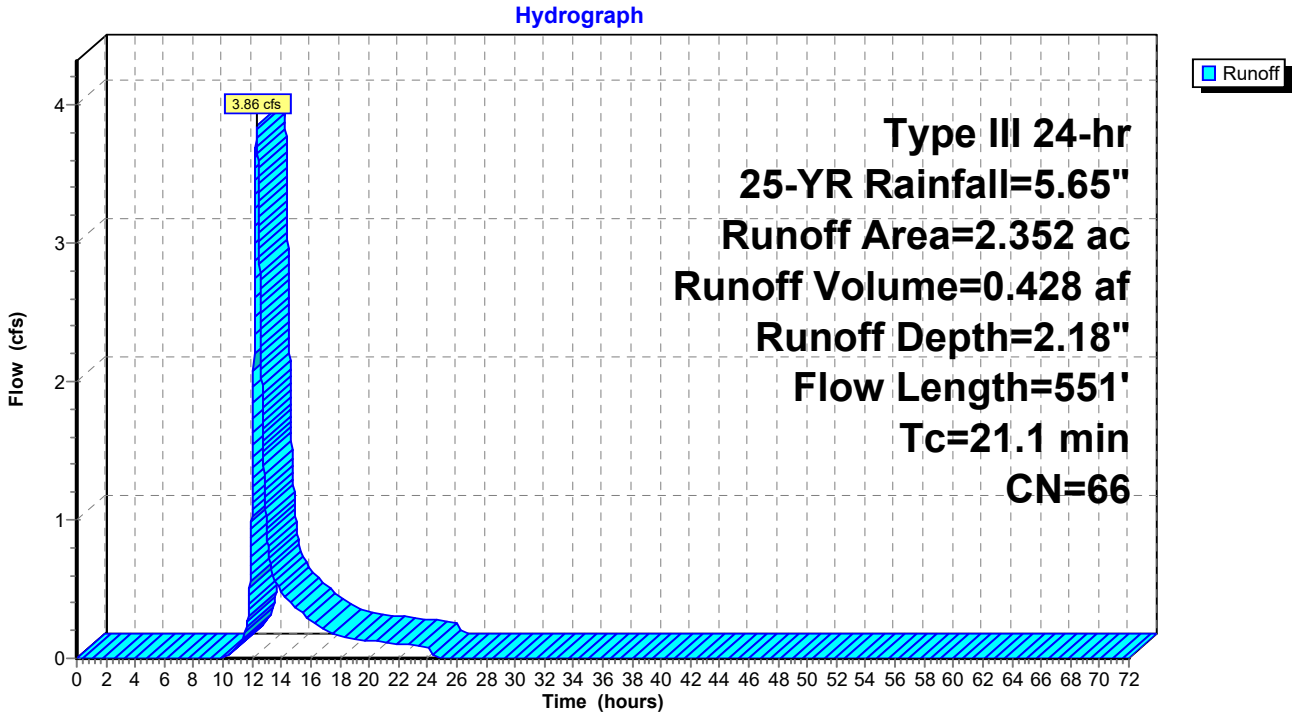
Runoff = 3.86 cfs @ 12.31 hrs, Volume= 0.428 af, Depth= 2.18"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.048	74	>75% Grass cover, Good, HSG C
0.087	98	Paved roads w/curbs & sewers, HSG C
0.288	77	2 acre lots, 12% imp, HSG C
0.819	70	Woods, Good, HSG C
0.022	70	Woods, Good, HSG C
0.066	61	>75% Grass cover, Good, HSG B
0.054	98	Paved roads w/curbs & sewers, HSG B
0.969	55	Woods, Good, HSG B
2.352	66	Weighted Average
2.177		92.56% Pervious Area
0.175		7.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0214	0.07		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
2.1	129	0.0407	1.01		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
6.1	287	0.0250	0.79		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.3	85	0.0500	4.54		**Shallow Concentrated Flow, Shallow Conc Paved** Paved Kv= 20.3 fps
21.1	551	Total			

Subcatchment EX-4: Subcat EX-4



Summary for Subcatchment EX-5: Subcat EX-5

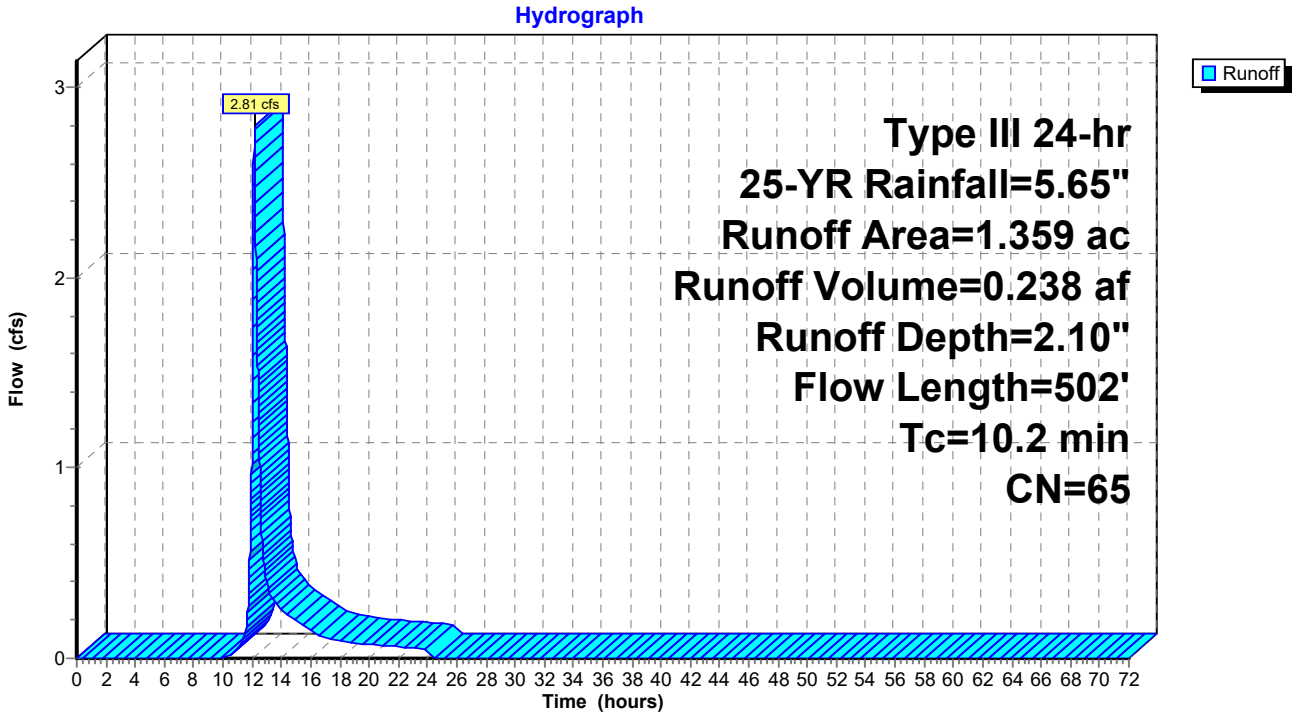
Runoff = 2.81 cfs @ 12.15 hrs, Volume= 0.238 af, Depth= 2.10"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.060	77	2 acre lots, 12% imp, HSG C
0.055	70	Woods, Good, HSG C
0.037	77	2 acre lots, 12% imp, HSG C
0.022	70	Woods, Good, HSG C
0.001	98	Paved roads w/curbs & sewers, HSG C
0.048	98	Paved roads w/curbs & sewers, HSG C
0.000	65	2 acre lots, 12% imp, HSG B
0.000	55	Woods, Good, HSG B
0.006	98	Paved roads w/curbs & sewers, HSG B
0.014	65	2 acre lots, 12% imp, HSG B
0.065	98	Paved roads w/curbs & sewers, HSG B
0.407	55	Woods, Good, HSG B
0.006	65	2 acre lots, 12% imp, HSG B
0.528	65	2 acre lots, 12% imp, HSG B
0.109	55	Woods, Good, HSG B
1.359	65	Weighted Average
1.161		85.47% Pervious Area
0.197		14.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0224	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.90"
0.3	21	0.0224	1.05		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
3.1	205	0.0476	1.09		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.2	48	0.0423	4.18		**Shallow Concentrated Flow, Shallow Conc Paved** Paved Kv= 20.3 fps
1.0	178	0.0416	3.06		**Shallow Concentrated Flow, Road Gutter Flow** Grassed Waterway Kv= 15.0 fps
10.2	502	Total			

Subcatchment EX-5: Subcat EX-5



Summary for Subcatchment EX-6: Subcat EX-6

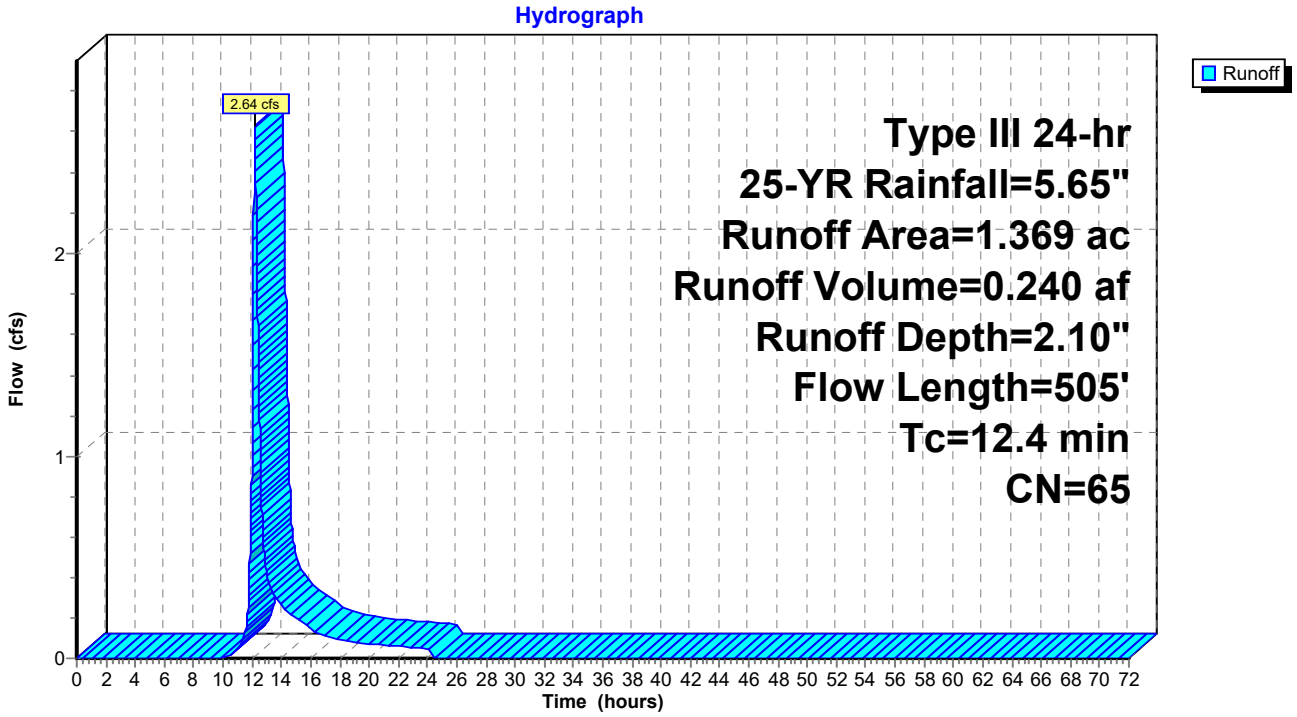
Runoff = 2.64 cfs @ 12.18 hrs, Volume= 0.240 af, Depth= 2.10"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.130	55	Woods, Good, HSG B
0.167	98	Paved roads w/curbs & sewers, HSG B
0.000	98	Paved roads w/curbs & sewers, HSG B
0.209	65	2 acre lots, 12% imp, HSG B
0.231	65	2 acre lots, 12% imp, HSG B
0.030	65	2 acre lots, 12% imp, HSG B
0.074	55	Woods, Good, HSG B
0.262	55	Woods, Good, HSG B
0.083	55	Woods, Good, HSG B
0.183	65	2 acre lots, 12% imp, HSG B
1.369	65	Weighted Average
1.124		82.08% Pervious Area
0.245		17.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	50	0.0447	0.09		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
1.4	110	0.0375	1.36		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	82	0.1365	2.59		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.1	37	0.1365	7.50		**Shallow Concentrated Flow, Shallow Conc Paved** Paved Kv= 20.3 fps
1.0	226	0.0672	3.89		**Shallow Concentrated Flow, Road Gutter** Grassed Waterway Kv= 15.0 fps
12.4	505	Total			

Subcatchment EX-6: Subcat EX-6



Summary for Subcatchment EX-7: Subcat EX-7

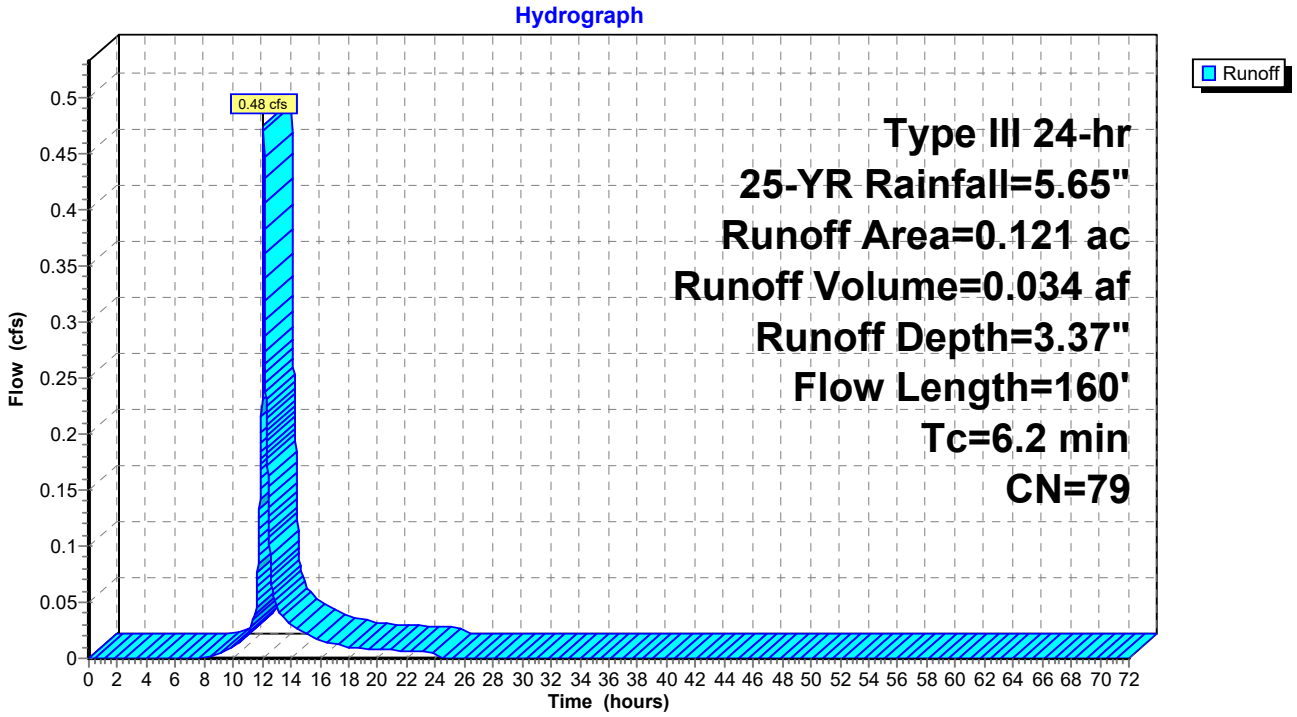
Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 3.37"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.064	98	Paved roads w/curbs & sewers, HSG B
0.018	55	Woods, Good, HSG B
0.021	55	Woods, Good, HSG B
0.019	65	2 acre lots, 12% imp, HSG B
0.121	79	Weighted Average
0.055		45.64% Pervious Area
0.066		54.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1588	0.15		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
0.2	26	0.1588	1.99		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.1	23	0.0837	4.66		**Shallow Concentrated Flow, Shallow Conc Gravel Drive** Unpaved Kv= 16.1 fps
0.2	61	0.1009	4.76		**Shallow Concentrated Flow, Road Gutter Flow** Grassed Waterway Kv= 15.0 fps
6.2	160	Total			

Subcatchment EX-7: Subcat EX-7



Summary for Subcatchment EX-8: Subcat EX-8

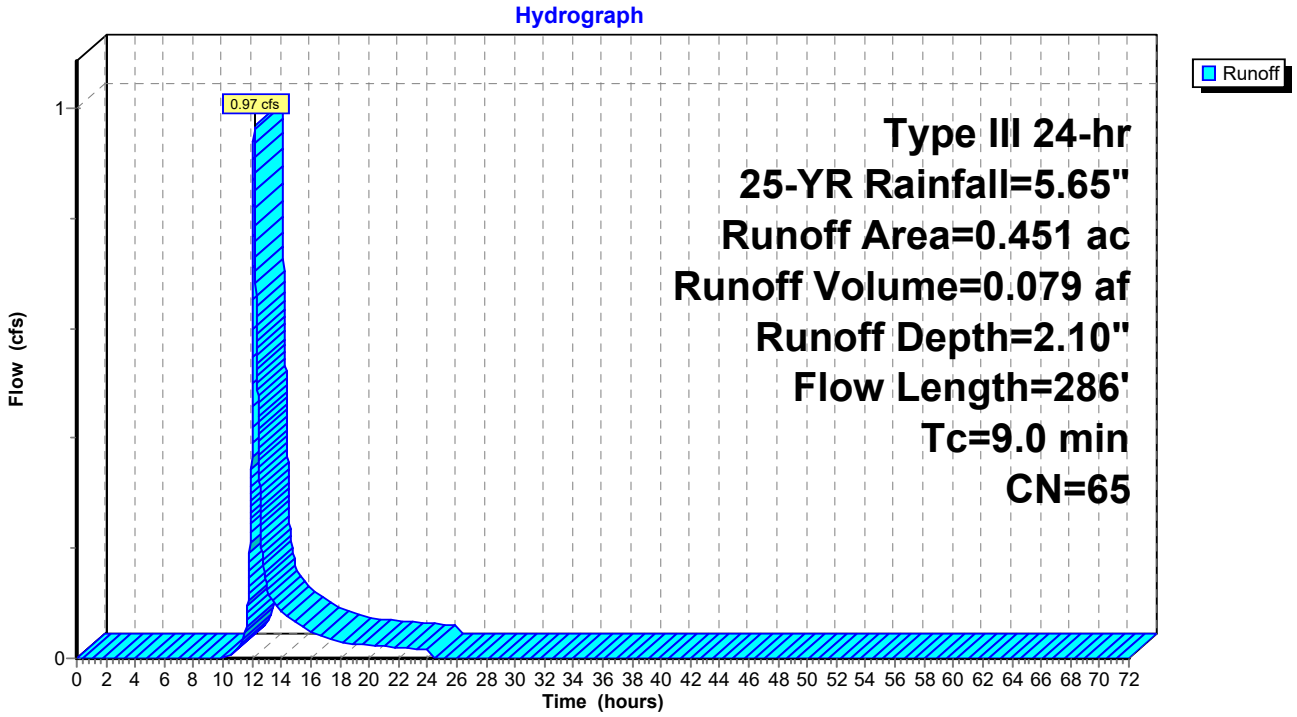
Runoff = 0.97 cfs @ 12.13 hrs, Volume= 0.079 af, Depth= 2.10"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.066	98	Paved roads w/curbs & sewers, HSG B
0.034	65	2 acre lots, 12% imp, HSG B
0.044	55	Woods, Good, HSG B
0.188	55	Woods, Good, HSG B
0.001	65	2 acre lots, 12% imp, HSG B
0.119	65	2 acre lots, 12% imp, HSG B
0.451	65	Weighted Average
0.367		81.27% Pervious Area
0.084		18.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	30	0.1020	0.11		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
2.5	20	0.1905	0.13		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
0.3	40	0.1905	2.18		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.0	15	0.1905	7.03		**Shallow Concentrated Flow, Shallow Conc Driveway** Unpaved Kv= 16.1 fps
0.9	31	0.0146	0.60		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.5	60	0.1831	2.14		**Shallow Concentrated Flow, Shallow Conc Woods** Woodland Kv= 5.0 fps
0.3	90	0.1238	5.28		**Shallow Concentrated Flow, Road Gutter** Grassed Waterway Kv= 15.0 fps
9.0	286	Total			

Subcatchment EX-8: Subcat EX-8



Summary for Subcatchment EX-9: Subcat EX-9

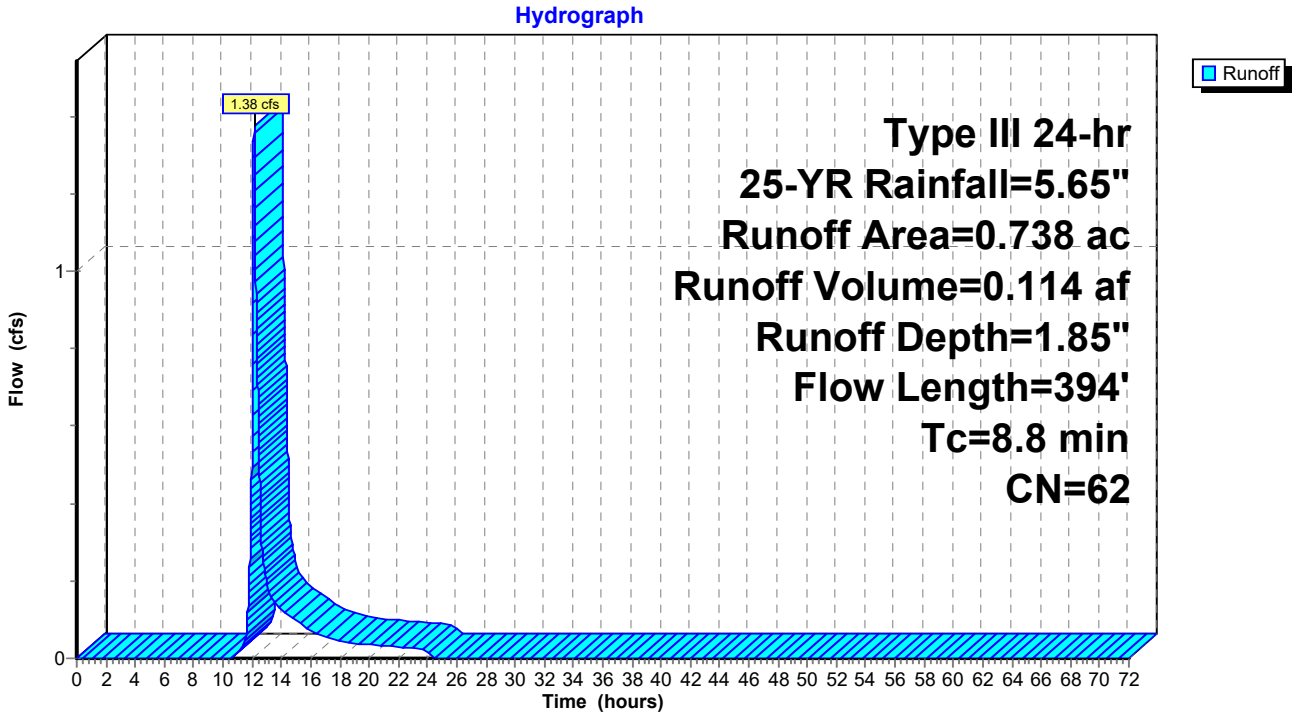
Runoff = 1.38 cfs @ 12.13 hrs, Volume= 0.114 af, Depth= 1.85"
Routed to Link DP-2 : Network Outfall (FES)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.026	61	>75% Grass cover, Good, HSG B
0.131	55	Woods, Good, HSG B
0.254	55	Woods, Good, HSG B
0.056	98	Paved roads w/curbs & sewers, HSG B
0.179	65	2 acre lots, 12% imp, HSG B
0.091	65	2 acre lots, 12% imp, HSG B
0.000	65	2 acre lots, 12% imp, HSG B
0.738	62	Weighted Average
0.649		87.98% Pervious Area
0.089		12.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	38	0.1710	0.14		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
1.9	12	0.1343	0.10		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 2.90"
0.4	46	0.1343	1.83		**Shallow Concentrated Flow, Shallwow Conc Woods** Woodland Kv= 5.0 fps
0.4	91	0.0632	4.05		**Shallow Concentrated Flow, Shallow Conc Driveway** Unpaved Kv= 16.1 fps
1.6	177	0.1402	1.87		**Shallow Concentrated Flow, Shallow Conc Driveway** Woodland Kv= 5.0 fps
0.1	30	0.1234	5.27		**Shallow Concentrated Flow, Road Gutter** Grassed Waterway Kv= 15.0 fps
8.8	394	Total			

Subcatchment EX-9: Subcat EX-9

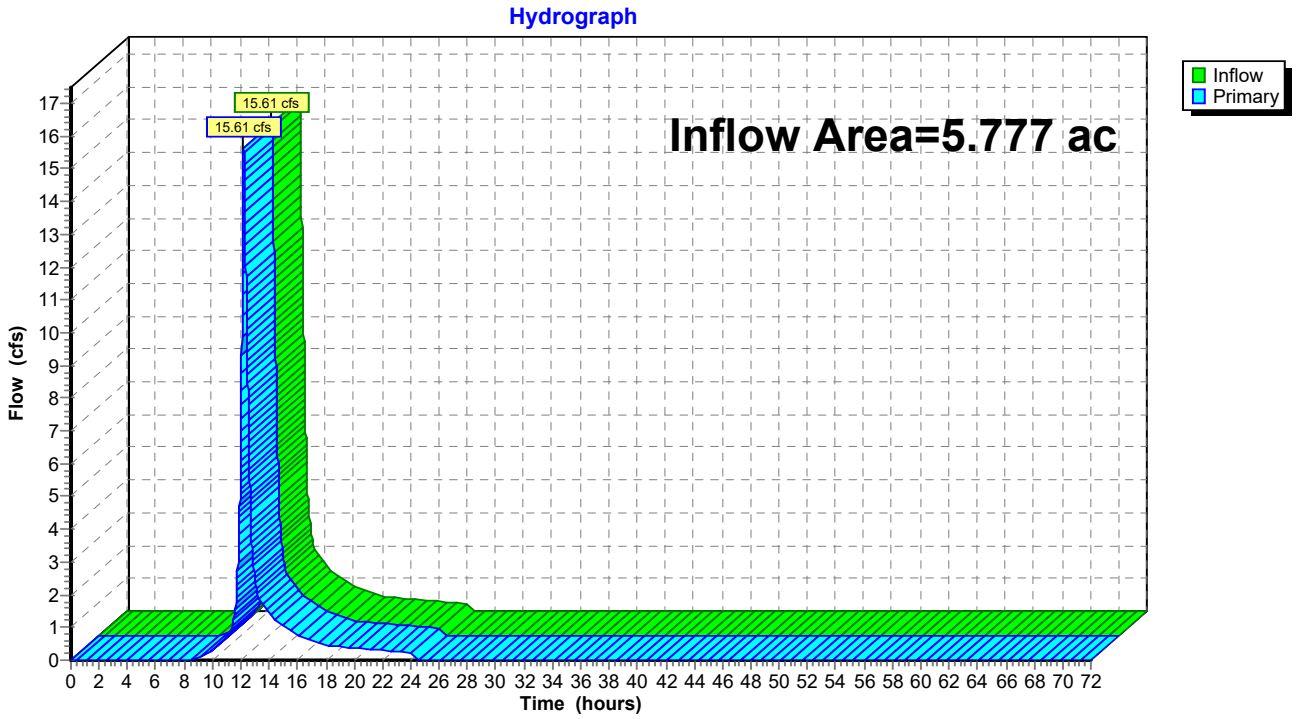


Summary for Link DP-1: Existing Catch Basin

Inflow Area = 5.777 ac, 14.82% Impervious, Inflow Depth = 3.08" for 25-YR event
Inflow = 15.61 cfs @ 12.21 hrs, Volume= 1.483 af
Primary = 15.61 cfs @ 12.21 hrs, Volume= 1.483 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Existing Catch Basin

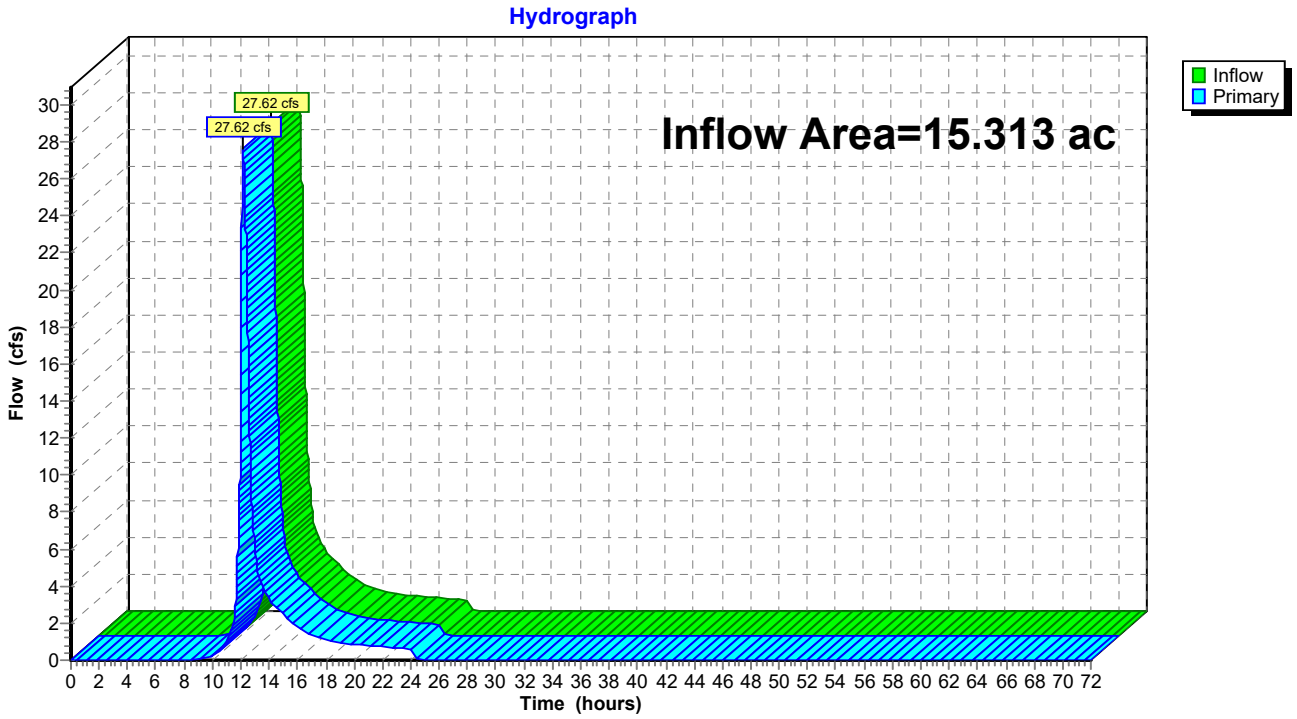


Summary for Link DP-2: Network Outfall (FES)

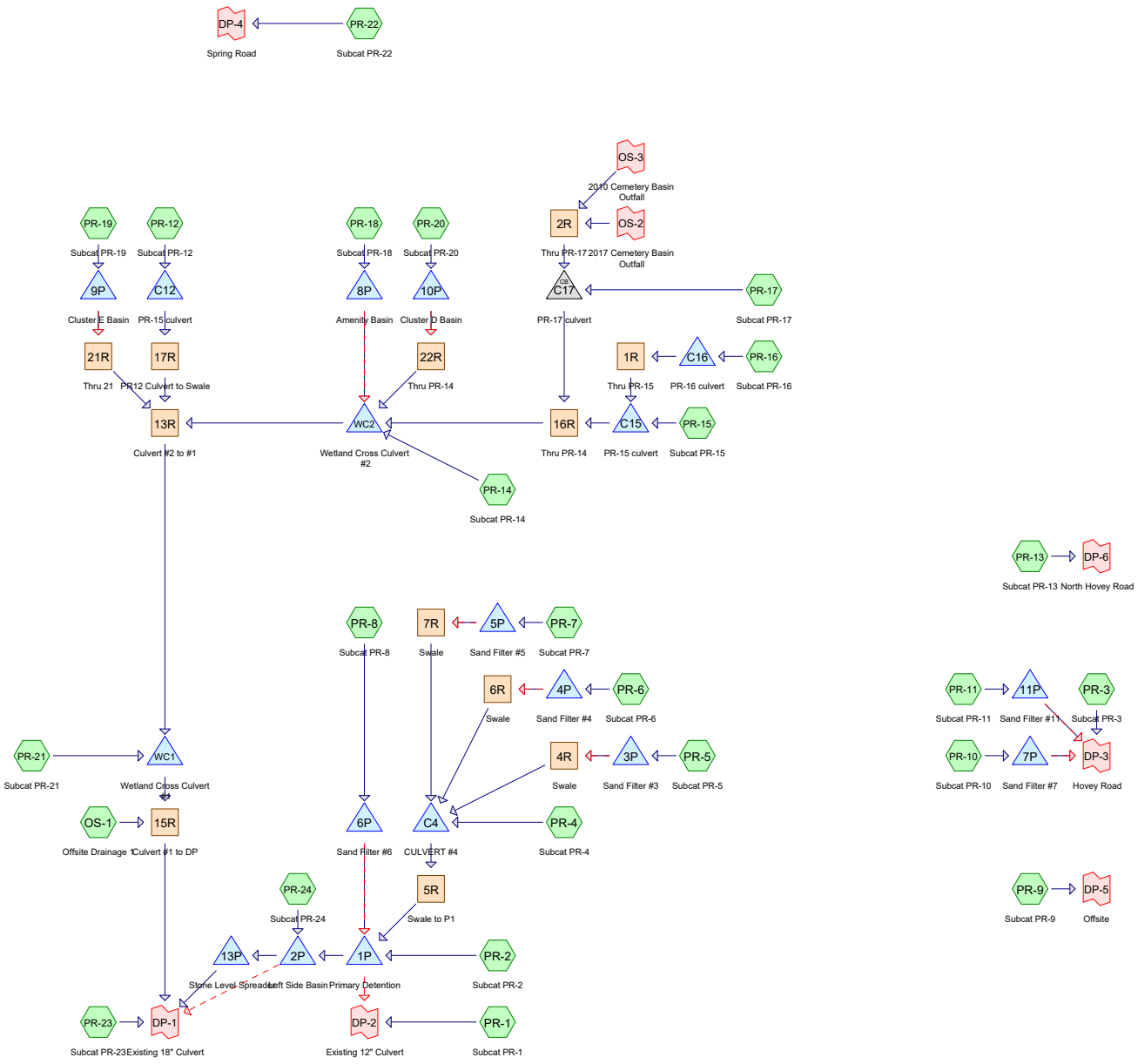
Inflow Area = 15.313 ac, 10.17% Impervious, Inflow Depth = 2.46" for 25-YR event
Inflow = 27.62 cfs @ 12.15 hrs, Volume= 3.136 af
Primary = 27.62 cfs @ 12.15 hrs, Volume= 3.136 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Network Outfall (FES)



Proposed Conditions: Project Site



Routing Diagram for 53140.00-PR
Prepared by VHB, Inc, Printed 11/7/2025
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type III 24-hr		Default	24.00	1	2.47	2
2	2-YR	Type III 24-hr		Default	24.00	1	2.95	2
3	10-YR	Type III 24-hr		Default	24.00	1	4.46	2
4	25-YR	Type III 24-hr		Default	24.00	1	5.65	2
5	50-YR	Type III 24-hr		Default	24.00	1	6.76	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
18.19	61	>75% Grass cover, Good, HSG B (OS-1, PR-1, PR-10, PR-14, PR-2, PR-21, PR-23, PR-24, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9)
15.06	74	>75% Grass cover, Good, HSG C (OS-1, PR-10, PR-11, PR-12, PR-13, PR-14, PR-15, PR-16, PR-17, PR-18, PR-19, PR-2, PR-20, PR-21, PR-22, PR-23, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9)
0.01	80	>75% Grass cover, Good, HSG D (PR-14, PR-15, PR-19, PR-21)
0.34	96	Gravel surface, HSG B (PR-1, PR-14, PR-2, PR-3, PR-4, PR-6, PR-8)
0.54	96	Gravel surface, HSG C (PR-11, PR-14, PR-18, PR-22, PR-3, PR-4, PR-6, PR-7, PR-8)
0.00	96	Gravel surface, HSG D (PR-14)
10.64	58	Meadow, non-grazed, HSG B (OS-1, PR-1, PR-10, PR-11, PR-13, PR-14, PR-16, PR-17, PR-2, PR-21, PR-22, PR-23, PR-3, PR-5, PR-6, PR-7, PR-8, PR-9)
18.58	71	Meadow, non-grazed, HSG C (PR-1, PR-10, PR-11, PR-12, PR-13, PR-14, PR-15, PR-16, PR-17, PR-18, PR-19, PR-2, PR-21, PR-22, PR-23, PR-3, PR-6, PR-7, PR-8, PR-9)
2.26	72	Meadow, non-grazed, HSG C (PR-20)
0.29	78	Meadow, non-grazed, HSG D (PR-1, PR-14, PR-15, PR-21, PR-23)
4.57	98	Paved parking, HSG B (PR-1, PR-10, PR-2, PR-21, PR-23, PR-4, PR-5, PR-6, PR-7, PR-8)
5.85	98	Paved parking, HSG C (PR-10, PR-11, PR-12, PR-14, PR-15, PR-18, PR-19, PR-20, PR-21, PR-22, PR-23, PR-5, PR-6, PR-7, PR-8, PR-9)
0.01	98	Paved parking, HSG D (PR-19, PR-23, PR-8)
0.46	98	Unconnected pavement, HSG C (PR-14, PR-18, PR-8)
1.99	98	Unconnected roofs, HSG B (PR-10, PR-23, PR-5, PR-6, PR-7, PR-8)
3.00	98	Unconnected roofs, HSG C (PR-10, PR-11, PR-13, PR-14, PR-18, PR-19, PR-20, PR-21, PR-22, PR-5, PR-6, PR-7, PR-8)
4.08	55	Woods, Good, HSG B (OS-1, PR-1, PR-10, PR-2, PR-21, PR-22, PR-23, PR-3, PR-9)
2.93	70	Woods, Good, HSG C (OS-1, PR-10, PR-16, PR-17, PR-20, PR-21, PR-22, PR-23, PR-9)
0.10	77	Woods, Good, HSG D (PR-21)
2.09	58	Woods/grass comb., Good, HSG B (OS-1, PR-14, PR-15, PR-21, PR-23)
9.19	72	Woods/grass comb., Good, HSG C (PR-12, PR-14, PR-15, PR-16, PR-17, PR-19, PR-21, PR-22, PR-23)
0.32	79	Woods/grass comb., Good, HSG D (PR-14, PR-15, PR-21)
100.51	**72**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
41.91	HSG B	OS-1, PR-1, PR-10, PR-11, PR-13, PR-14, PR-15, PR-16, PR-17, PR-2, PR-21, PR-22, PR-23, PR-24, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
57.86	HSG C	OS-1, PR-1, PR-10, PR-11, PR-12, PR-13, PR-14, PR-15, PR-16, PR-17, PR-18, PR-19, PR-2, PR-20, PR-21, PR-22, PR-23, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
0.74	HSG D	PR-1, PR-14, PR-15, PR-19, PR-21, PR-23, PR-8
0.00	Other	
100.51		**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 OS-1: Offsite Drainage 1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=0.13"
Flow Length=904' Tc=19.2 min CN=58 Runoff=0.2 cfs 0.07 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=5.91 ac 2.69% Impervious Runoff Depth=0.17"
Flow Length=835' Tc=9.4 min CN=60 Runoff=0.3 cfs 0.08 af

Subcatchment PR-10: Subcat PR-10 Runoff Area=4.35 ac 30.94% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=73 Runoff=2.4 cfs 0.20 af

Subcatchment PR-11: Subcat PR-11 Runoff Area=2.10 ac 27.07% Impervious Runoff Depth=0.82"
Flow Length=507' Tc=8.8 min UI Adjusted CN=79 Runoff=1.7 cfs 0.14 af

Subcatchment PR-12: Subcat PR-12 Runoff Area=0.67 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=231' Tc=6.1 min CN=72 Runoff=0.3 cfs 0.03 af

Subcatchment PR-13: Subcat PR-13 Runoff Area=2.69 ac 0.01% Impervious Runoff Depth=0.48"
Flow Length=359' Tc=7.4 min CN=71 Runoff=1.1 cfs 0.11 af

Subcatchment PR-14: Subcat PR-14 Runoff Area=10.64 ac 0.00% Impervious Runoff Depth=0.55"
Flow Length=1,659' Tc=21.2 min CN=73 Runoff=3.8 cfs 0.49 af

Subcatchment PR-15: Subcat PR-15 Runoff Area=3.14 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=493' Tc=12.4 min CN=72 Runoff=1.2 cfs 0.13 af

Subcatchment PR-16: Subcat PR-16 Runoff Area=0.68 ac 0.00% Impervious Runoff Depth=0.48"
Flow Length=250' Tc=7.1 min CN=71 Runoff=0.3 cfs 0.03 af

Subcatchment PR-17: Subcat PR-17 Runoff Area=1.75 ac 0.00% Impervious Runoff Depth=0.48"
Flow Length=523' Tc=11.4 min CN=71 Runoff=0.6 cfs 0.07 af

Subcatchment PR-18: Subcat PR-18 Runoff Area=2.25 ac 44.53% Impervious Runoff Depth=1.15"
Tc=6.0 min CN=85 Runoff=3.0 cfs 0.22 af

Subcatchment PR-19: Subcat PR-19 Runoff Area=5.06 ac 42.09% Impervious Runoff Depth=1.09"
Flow Length=1,393' Tc=6.0 min CN=84 Runoff=6.4 cfs 0.46 af

Subcatchment PR-2: Subcat PR-2 Runoff Area=4.31 ac 3.27% Impervious Runoff Depth=0.19"
Flow Length=782' Tc=7.8 min CN=61 Runoff=0.3 cfs 0.07 af

Subcatchment PR-20: Subcat PR-20 Runoff Area=5.20 ac 29.62% Impervious Runoff Depth=0.82"
Flow Length=1,180' Tc=9.1 min UI Adjusted CN=79 Runoff=4.2 cfs 0.35 af

Subcatchment PR-21: Subcat PR-21 Runoff Area=6.46 ac 0.01% Impervious Runoff Depth=0.41"
Flow Length=2,124' Tc=30.1 min CN=69 Runoff=1.3 cfs 0.22 af

Subcatchment PR-22: Subcat PR-22 Runoff Area=4.76 ac 0.05% Impervious Runoff Depth=0.51"
Flow Length=321' Tc=10.1 min CN=72 Runoff=2.0 cfs 0.20 af

Subcatchment PR-23: Subcat PR-23 Runoff Area=2.76 ac 12.60% Impervious Runoff Depth=0.29"
Flow Length=348' Tc=7.3 min CN=65 Runoff=0.5 cfs 0.07 af

Subcatchment PR-24: Subcat PR-24 Runoff Area=0.41 ac 0.00% Impervious Runoff Depth=0.19"
Tc=6.0 min CN=61 Runoff=0.0 cfs 0.01 af

Subcatchment PR-3: Subcat PR-3 Runoff Area=1.14 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=150' Tc=6.0 min CN=72 Runoff=0.6 cfs 0.05 af

Subcatchment PR-4: Subcat PR-4 Runoff Area=3.76 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=766' Tc=6.0 min CN=63 Runoff=0.4 cfs 0.07 af

Subcatchment PR-5: Subcat PR-5 Runoff Area=4.77 ac 28.74% Impervious Runoff Depth=0.44"
Tc=6.0 min UI Adjusted CN=70 Runoff=1.9 cfs 0.18 af

Subcatchment PR-6: Subcat PR-6 Runoff Area=4.22 ac 35.70% Impervious Runoff Depth=0.63"
Tc=6.0 min CN=75 Runoff=2.8 cfs 0.22 af

Subcatchment PR-7: Subcat PR-7 Runoff Area=9.26 ac 32.30% Impervious Runoff Depth=0.92"
Flow Length=1,294' Tc=6.0 min CN=81 Runoff=9.7 cfs 0.71 af

Subcatchment PR-8: Subcat PR-8 Runoff Area=6.49 ac 42.77% Impervious Runoff Depth=0.72"
Flow Length=1,020' Tc=10.1 min CN=77 Runoff=4.4 cfs 0.39 af

Subcatchment PR-9: Subcat PR-9 Runoff Area=1.41 ac 0.00% Impervious Runoff Depth=0.41"
Flow Length=88' Tc=6.0 min CN=69 Runoff=0.5 cfs 0.05 af

Reach 1R: Thru PR-15 Avg. Flow Depth=0.09' Max Vel=0.51 fps Inflow=0.2 cfs 0.03 af
n=0.080 L=492.7' S=0.0218 '/' Capacity=75.3 cfs Outflow=0.1 cfs 0.03 af

Reach 2R: Thru PR-17 Avg. Flow Depth=0.10' Max Vel=1.20 fps Inflow=0.8 cfs 0.27 af
n=0.035 L=365.0' S=0.0218 '/' Capacity=66.7 cfs Outflow=0.7 cfs 0.27 af

Reach 4R: Swale Avg. Flow Depth=0.07' Max Vel=2.67 fps Inflow=0.6 cfs 0.18 af
n=0.025 L=253.0' S=0.0751 '/' Capacity=948.3 cfs Outflow=0.6 cfs 0.18 af

Reach 5R: Swale to P1 Avg. Flow Depth=0.16' Max Vel=5.08 fps Inflow=2.9 cfs 1.18 af
n=0.022 L=139.0' S=0.0770 '/' Capacity=937.6 cfs Outflow=2.9 cfs 1.18 af

Reach 6R: Swale Avg. Flow Depth=0.09' Max Vel=2.87 fps Inflow=0.8 cfs 0.22 af
n=0.025 L=413.0' S=0.0642 '/' Capacity=876.6 cfs Outflow=0.8 cfs 0.22 af

Reach 7R: Swale Avg. Flow Depth=0.11' Max Vel=2.75 fps Inflow=1.0 cfs 0.71 af
n=0.025 L=766.0' S=0.0444 '/' Capacity=729.1 cfs Outflow=1.0 cfs 0.71 af

Reach 13R: Culvert #2 to #1 Avg. Flow Depth=0.69' Max Vel=1.97 fps Inflow=6.4 cfs 2.05 af
n=0.080 L=739.9' S=0.0289 '/' Capacity=186.3 cfs Outflow=6.2 cfs 2.05 af

Reach 15R: Culvert #1 to DP Avg. Flow Depth=0.54' Max Vel=2.45 fps Inflow=7.7 cfs 2.34 af
n=0.080 L=601.3' S=0.0576 '/' Capacity=363.8 cfs Outflow=7.6 cfs 2.34 af

Reach 16R: Thru PR-14 Avg. Flow Depth=0.33' Max Vel=0.96 fps Inflow=1.9 cfs 0.50 af
n=0.080 L=1,536.2' S=0.0155 '/' Capacity=136.1 cfs Outflow=1.2 cfs 0.50 af

Reach 17R: PR12 Culvert to Swale Avg. Flow Depth=0.03' Max Vel=0.48 fps Inflow=0.3 cfs 0.03 af
n=0.050 L=741.0' S=0.0219 '/' Capacity=1,023.2 cfs Outflow=0.1 cfs 0.03 af

Reach 21R: Thru 21 Avg. Flow Depth=0.03' Max Vel=0.51 fps Inflow=0.2 cfs 0.46 af
n=0.050 L=398.0' S=0.0251 '/' Capacity=1,094.4 cfs Outflow=0.2 cfs 0.46 af

Reach 22R: Thru PR-14 Avg. Flow Depth=0.27' Max Vel=0.94 fps Inflow=0.9 cfs 0.35 af
n=0.080 L=1,077.9' S=0.0190 '/' Capacity=151.0 cfs Outflow=0.9 cfs 0.35 af

Pond 1P: Primary Detention Peak Elev=391.28' Storage=24,814 cf Inflow=3.9 cfs 1.64 af
Primary=2.0 cfs 1.63 af Secondary=0.0 cfs 0.00 af Outflow=2.0 cfs 1.63 af

Pond 2P: Left Side Basin Peak Elev=383.56' Storage=3,279 cf Inflow=2.0 cfs 1.64 af
Primary=2.0 cfs 1.63 af Secondary=0.0 cfs 0.00 af Outflow=2.0 cfs 1.63 af

Pond 3P: Sand Filter #3 Peak Elev=443.60' Storage=1,165 cf Inflow=1.9 cfs 0.18 af
Primary=0.6 cfs 0.18 af Secondary=0.0 cfs 0.00 af Outflow=0.6 cfs 0.18 af

Pond 4P: Sand Filter #4 Peak Elev=449.24' Storage=1,778 cf Inflow=2.8 cfs 0.22 af
Primary=0.8 cfs 0.22 af Secondary=0.0 cfs 0.00 af Outflow=0.8 cfs 0.22 af

Pond 5P: Sand Filter #5 Peak Elev=451.05' Storage=11,437 cf Inflow=9.7 cfs 0.71 af
Primary=1.0 cfs 0.71 af Secondary=0.0 cfs 0.00 af Outflow=1.0 cfs 0.71 af

Pond 6P: Sand Filter #6 Peak Elev=404.14' Storage=5,389 cf Inflow=4.4 cfs 0.39 af
Primary=0.7 cfs 0.39 af Secondary=0.0 cfs 0.00 af Outflow=0.7 cfs 0.39 af

Pond 7P: Sand Filter #7 Peak Elev=446.75' Storage=2,918 cf Inflow=2.4 cfs 0.20 af
Primary=0.3 cfs 0.20 af Secondary=0.0 cfs 0.00 af Outflow=0.3 cfs 0.20 af

Pond 8P: Amenity Basin Peak Elev=437.35' Storage=2,465 cf Inflow=3.0 cfs 0.22 af
Primary=0.7 cfs 0.22 af Secondary=0.0 cfs 0.00 af Outflow=0.7 cfs 0.22 af

Pond 9P: Cluster E Basin Peak Elev=445.97' Storage=13,189 cf Inflow=6.4 cfs 0.46 af
Primary=0.2 cfs 0.46 af Secondary=0.0 cfs 0.00 af Outflow=0.2 cfs 0.46 af

Pond 10P: Cluster D Basin Peak Elev=455.77' Storage=4,071 cf Inflow=4.2 cfs 0.35 af
Primary=0.9 cfs 0.35 af Secondary=0.0 cfs 0.00 af Outflow=0.9 cfs 0.35 af

Pond 11P: Sand Filter #11 Peak Elev=453.85' Storage=2,053 cf Inflow=1.7 cfs 0.14 af
Primary=0.3 cfs 0.14 af Secondary=0.0 cfs 0.00 af Outflow=0.3 cfs 0.14 af

Pond 13P: Stone Level Spreader Peak Elev=383.10' Storage=59 cf Inflow=2.0 cfs 1.63 af
Outflow=2.0 cfs 1.63 af

Pond C12: PR-15 culvert Peak Elev=448.90' Storage=0 cf Inflow=0.3 cfs 0.03 af
36.0" x 36.0" Box Culvert w/ 0.5" inside fill n=0.013 L=53.0' S=0.0498 '/' Outflow=0.3 cfs 0.03 af

Pond C15: PR-15 culvert Peak Elev=456.64' Storage=27 cf Inflow=1.3 cfs 0.16 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0211 '/' Outflow=1.3 cfs 0.16 af

Pond C16: PR-16 culvert Peak Elev=467.91' Storage=143 cf Inflow=0.3 cfs 0.03 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0135 '/' Outflow=0.2 cfs 0.03 af

Pond C17: PR-17 culvert Peak Elev=458.38' Inflow=0.9 cfs 0.34 af
24.0" Round Culvert n=0.013 L=138.0' S=0.0217 '/' Outflow=0.9 cfs 0.34 af

Pond C4: CULVERT #4 Peak Elev=410.32' Storage=22 cf Inflow=2.9 cfs 1.18 af
60.0" x 42.0" Box Culvert n=0.013 L=50.0' S=0.0600 '/' Outflow=2.9 cfs 1.18 af

Pond WC1: Wetland Cross Culvert #1 Peak Elev=410.30' Storage=5 cf Inflow=7.5 cfs 2.27 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=46.0' S=0.0600 '/' Outflow=7.5 cfs 2.27 af

Pond WC2: Wetland Cross Culvert #2 Peak Elev=432.22' Storage=204 cf Inflow=6.2 cfs 1.56 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=50.0' S=0.0076 '/' Outflow=6.1 cfs 1.56 af

Link DP-1: Existing 18" Culvert Inflow=7.8 cfs 4.03 af
Primary=7.8 cfs 4.03 af

Link DP-2: Existing 12" Culvert Inflow=0.3 cfs 0.08 af
Primary=0.3 cfs 0.08 af

Link DP-3: Hovey Road Inflow=1.0 cfs 0.39 af
Primary=1.0 cfs 0.39 af

Link DP-4: Spring Road Inflow=2.0 cfs 0.20 af
Primary=2.0 cfs 0.20 af

Link DP-5: Offsite Inflow=0.5 cfs 0.05 af
Primary=0.5 cfs 0.05 af

Link DP-6: North Hovey Road Inflow=1.1 cfs 0.11 af
Primary=1.1 cfs 0.11 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=0.2 cfs 0.12 af
Area= 2.53 ac 31.91% Imperv. Primary=0.2 cfs 0.12 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=0.6 cfs 0.15 af
Area= 1.67 ac 29.54% Imperv. Primary=0.6 cfs 0.15 af

Total Runoff Area = 100.51 ac Runoff Volume = 4.61 af Average Runoff Depth = 0.55"
84.20% Pervious = 84.63 ac 15.80% Impervious = 15.88 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 OS-1: Offsite Drainage 1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=0.26"
Flow Length=904' Tc=19.2 min CN=58 Runoff=0.6 cfs 0.14 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=5.91 ac 2.69% Impervious Runoff Depth=0.32"
Flow Length=835' Tc=9.4 min CN=60 Runoff=0.9 cfs 0.16 af

Subcatchment PR-10: Subcat PR-10 Runoff Area=4.35 ac 30.94% Impervious Runoff Depth=0.83"
Tc=6.0 min CN=73 Runoff=3.9 cfs 0.30 af

Subcatchment PR-11: Subcat PR-11 Runoff Area=2.10 ac 27.07% Impervious Runoff Depth=1.15"
Flow Length=507' Tc=8.8 min UI Adjusted CN=79 Runoff=2.5 cfs 0.20 af

Subcatchment PR-12: Subcat PR-12 Runoff Area=0.67 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=231' Tc=6.1 min CN=72 Runoff=0.5 cfs 0.04 af

Subcatchment PR-13: Subcat PR-13 Runoff Area=2.69 ac 0.01% Impervious Runoff Depth=0.73"
Flow Length=359' Tc=7.4 min CN=71 Runoff=1.9 cfs 0.16 af

Subcatchment PR-14: Subcat PR-14 Runoff Area=10.64 ac 0.00% Impervious Runoff Depth=0.83"
Flow Length=1,659' Tc=21.2 min CN=73 Runoff=6.2 cfs 0.73 af

Subcatchment PR-15: Subcat PR-15 Runoff Area=3.14 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=493' Tc=12.4 min CN=72 Runoff=2.1 cfs 0.20 af

Subcatchment PR-16: Subcat PR-16 Runoff Area=0.68 ac 0.00% Impervious Runoff Depth=0.73"
Flow Length=250' Tc=7.1 min CN=71 Runoff=0.5 cfs 0.04 af

Subcatchment PR-17: Subcat PR-17 Runoff Area=1.75 ac 0.00% Impervious Runoff Depth=0.73"
Flow Length=523' Tc=11.4 min CN=71 Runoff=1.1 cfs 0.11 af

Subcatchment PR-18: Subcat PR-18 Runoff Area=2.25 ac 44.53% Impervious Runoff Depth=1.55"
Tc=6.0 min CN=85 Runoff=4.1 cfs 0.29 af

Subcatchment PR-19: Subcat PR-19 Runoff Area=5.06 ac 42.09% Impervious Runoff Depth=1.48"
Flow Length=1,393' Tc=6.0 min CN=84 Runoff=8.7 cfs 0.62 af

Subcatchment PR-2: Subcat PR-2 Runoff Area=4.31 ac 3.27% Impervious Runoff Depth=0.35"
Flow Length=782' Tc=7.8 min CN=61 Runoff=0.8 cfs 0.12 af

Subcatchment PR-20: Subcat PR-20 Runoff Area=5.20 ac 29.62% Impervious Runoff Depth=1.15"
Flow Length=1,180' Tc=9.1 min UI Adjusted CN=79 Runoff=6.2 cfs 0.50 af

Subcatchment PR-21: Subcat PR-21 Runoff Area=6.46 ac 0.01% Impervious Runoff Depth=0.64"
Flow Length=2,124' Tc=30.1 min CN=69 Runoff=2.3 cfs 0.35 af

Subcatchment PR-22: Subcat PR-22 Runoff Area=4.76 ac 0.05% Impervious Runoff Depth=0.78"
Flow Length=321' Tc=10.1 min CN=72 Runoff=3.4 cfs 0.31 af

Subcatchment PR-23: Subcat PR-23 Runoff Area=2.76 ac 12.60% Impervious Runoff Depth=0.48"
Flow Length=348' Tc=7.3 min CN=65 Runoff=1.1 cfs 0.11 af

Subcatchment PR-24: Subcat PR-24 Runoff Area=0.41 ac 0.00% Impervious Runoff Depth=0.35"
Tc=6.0 min CN=61 Runoff=0.1 cfs 0.01 af

Subcatchment PR-3: Subcat PR-3 Runoff Area=1.14 ac 0.00% Impervious Runoff Depth=0.78"
Flow Length=150' Tc=6.0 min CN=72 Runoff=0.9 cfs 0.07 af

Subcatchment PR-4: Subcat PR-4 Runoff Area=3.76 ac 0.00% Impervious Runoff Depth=0.41"
Flow Length=766' Tc=6.0 min CN=63 Runoff=1.1 cfs 0.13 af

Subcatchment PR-5: Subcat PR-5 Runoff Area=4.77 ac 28.74% Impervious Runoff Depth=0.69"
Tc=6.0 min UI Adjusted CN=70 Runoff=3.3 cfs 0.27 af

Subcatchment PR-6: Subcat PR-6 Runoff Area=4.22 ac 35.70% Impervious Runoff Depth=0.93"
Tc=6.0 min CN=75 Runoff=4.3 cfs 0.33 af

Subcatchment PR-7: Subcat PR-7 Runoff Area=9.26 ac 32.30% Impervious Runoff Depth=1.28"
Flow Length=1,294' Tc=6.0 min CN=81 Runoff=13.7 cfs 0.98 af

Subcatchment PR-8: Subcat PR-8 Runoff Area=6.49 ac 42.77% Impervious Runoff Depth=1.04"
Flow Length=1,020' Tc=10.1 min CN=77 Runoff=6.6 cfs 0.56 af

Subcatchment PR-9: Subcat PR-9 Runoff Area=1.41 ac 0.00% Impervious Runoff Depth=0.64"
Flow Length=88' Tc=6.0 min CN=69 Runoff=0.9 cfs 0.08 af

Reach 1R: Thru PR-15 Avg. Flow Depth=0.13' Max Vel=0.65 fps Inflow=0.3 cfs 0.04 af
n=0.080 L=492.7' S=0.0218 '/' Capacity=75.3 cfs Outflow=0.3 cfs 0.04 af

Reach 2R: Thru PR-17 Avg. Flow Depth=0.10' Max Vel=1.23 fps Inflow=0.8 cfs 0.30 af
n=0.035 L=365.0' S=0.0218 '/' Capacity=66.7 cfs Outflow=0.7 cfs 0.30 af

Reach 4R: Swale Avg. Flow Depth=0.07' Max Vel=2.67 fps Inflow=0.6 cfs 0.27 af
n=0.025 L=253.0' S=0.0751 '/' Capacity=948.3 cfs Outflow=0.6 cfs 0.27 af

Reach 5R: Swale to P1 Avg. Flow Depth=0.28' Max Vel=6.89 fps Inflow=7.3 cfs 1.71 af
n=0.022 L=139.0' S=0.0770 '/' Capacity=937.6 cfs Outflow=7.3 cfs 1.71 af

Reach 6R: Swale Avg. Flow Depth=0.09' Max Vel=2.87 fps Inflow=0.8 cfs 0.33 af
n=0.025 L=413.0' S=0.0642 '/' Capacity=876.6 cfs Outflow=0.8 cfs 0.33 af

Reach 7R: Swale Avg. Flow Depth=0.29' Max Vel=4.69 fps Inflow=5.3 cfs 0.98 af
n=0.025 L=766.0' S=0.0444 '/' Capacity=729.1 cfs Outflow=5.2 cfs 0.98 af

Reach 13R: Culvert #2 to #1 Avg. Flow Depth=0.86' Max Vel=2.21 fps Inflow=9.8 cfs 2.84 af
n=0.080 L=739.9' S=0.0289 '/' Capacity=186.3 cfs Outflow=9.5 cfs 2.84 af

Reach 15R: Culvert #1 to DP Avg. Flow Depth=0.70' Max Vel=2.82 fps Inflow=12.4 cfs 3.32 af
n=0.080 L=601.3' S=0.0576 '/' Capacity=363.8 cfs Outflow=12.3 cfs 3.32 af

Reach 16R: Thru PR-14 Avg. Flow Depth=0.45' Max Vel=1.13 fps Inflow=3.3 cfs 0.65 af
n=0.080 L=1,536.2' S=0.0155 '/' Capacity=136.1 cfs Outflow=2.0 cfs 0.65 af

Reach 17R: PR12 Culvert to Swale Avg. Flow Depth=0.04' Max Vel=0.57 fps Inflow=0.5 cfs 0.04 af
n=0.050 L=741.0' S=0.0219 '/' Capacity=1,023.2 cfs Outflow=0.3 cfs 0.04 af

Reach 21R: Thru 21 Avg. Flow Depth=0.04' Max Vel=0.51 fps Inflow=0.2 cfs 0.62 af
n=0.050 L=398.0' S=0.0251 '/' Capacity=1,094.4 cfs Outflow=0.2 cfs 0.62 af

Reach 22R: Thru PR-14 Avg. Flow Depth=0.35' Max Vel=1.09 fps Inflow=1.8 cfs 0.50 af
n=0.080 L=1,077.9' S=0.0190 '/' Capacity=151.0 cfs Outflow=1.4 cfs 0.50 af

Pond 1P: Primary Detention Peak Elev=391.61' Storage=31,742 cf Inflow=8.7 cfs 2.40 af
Primary=2.9 cfs 2.39 af Secondary=0.0 cfs 0.00 af Outflow=2.9 cfs 2.39 af

Pond 2P: Left Side Basin Peak Elev=383.67' Storage=3,944 cf Inflow=2.9 cfs 2.40 af
Primary=2.9 cfs 2.40 af Secondary=0.0 cfs 0.00 af Outflow=2.9 cfs 2.40 af

Pond 3P: Sand Filter #3 Peak Elev=444.24' Storage=2,921 cf Inflow=3.3 cfs 0.27 af
Primary=0.6 cfs 0.27 af Secondary=0.0 cfs 0.00 af Outflow=0.6 cfs 0.27 af

Pond 4P: Sand Filter #4 Peak Elev=449.74' Storage=3,679 cf Inflow=4.3 cfs 0.33 af
Primary=0.8 cfs 0.33 af Secondary=0.0 cfs 0.00 af Outflow=0.8 cfs 0.33 af

Pond 5P: Sand Filter #5 Peak Elev=451.32' Storage=13,101 cf Inflow=13.7 cfs 0.98 af
Primary=5.3 cfs 0.98 af Secondary=0.0 cfs 0.00 af Outflow=5.3 cfs 0.98 af

Pond 6P: Sand Filter #6 Peak Elev=405.04' Storage=9,526 cf Inflow=6.6 cfs 0.56 af
Primary=0.7 cfs 0.56 af Secondary=0.0 cfs 0.00 af Outflow=0.7 cfs 0.56 af

Pond 7P: Sand Filter #7 Peak Elev=447.29' Storage=5,552 cf Inflow=3.9 cfs 0.30 af
Primary=0.3 cfs 0.30 af Secondary=0.0 cfs 0.00 af Outflow=0.3 cfs 0.30 af

Pond 8P: Amenity Basin Peak Elev=437.76' Storage=3,870 cf Inflow=4.1 cfs 0.29 af
Primary=0.7 cfs 0.29 af Secondary=0.0 cfs 0.00 af Outflow=0.7 cfs 0.29 af

Pond 9P: Cluster E Basin Peak Elev=446.50' Storage=18,957 cf Inflow=8.7 cfs 0.62 af
Primary=0.2 cfs 0.62 af Secondary=0.0 cfs 0.00 af Outflow=0.2 cfs 0.62 af

Pond 10P: Cluster D Basin Peak Elev=456.30' Storage=6,459 cf Inflow=6.2 cfs 0.50 af
Primary=1.8 cfs 0.50 af Secondary=0.0 cfs 0.00 af Outflow=1.8 cfs 0.50 af

Pond 11P: Sand Filter #11 Peak Elev=454.21' Storage=3,370 cf Inflow=2.5 cfs 0.20 af
Primary=0.3 cfs 0.20 af Secondary=0.0 cfs 0.00 af Outflow=0.3 cfs 0.20 af

Pond 13P: Stone Level Spreader Peak Elev=383.13' Storage=61 cf Inflow=2.9 cfs 2.40 af
Outflow=2.9 cfs 2.39 af

Pond C12: PR-15 culvert Peak Elev=448.90' Storage=0 cf Inflow=0.5 cfs 0.04 af
36.0" x 36.0" Box Culvert w/ 0.5" inside fill n=0.013 L=53.0' S=0.0498 '/' Outflow=0.5 cfs 0.04 af

Pond C15: PR-15 culvert Peak Elev=456.75' Storage=42 cf Inflow=2.2 cfs 0.25 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0211 '/' Outflow=2.2 cfs 0.25 af

Pond C16: PR-16 culvert Peak Elev=467.95' Storage=219 cf Inflow=0.5 cfs 0.04 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0135 '/' Outflow=0.3 cfs 0.04 af

Pond C17: PR-17 culvert Peak Elev=458.43' Inflow=1.1 cfs 0.40 af
24.0" Round Culvert n=0.013 L=138.0' S=0.0217 '/' Outflow=1.1 cfs 0.40 af

Pond C4: CULVERT #4 Peak Elev=410.59' Storage=50 cf Inflow=7.3 cfs 1.71 af
60.0" x 42.0" Box Culvert n=0.013 L=50.0' S=0.0600 '/' Outflow=7.3 cfs 1.71 af

Pond WC1: Wetland Cross Culvert #1 Peak Elev=410.52' Storage=9 cf Inflow=11.8 cfs 3.18 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=46.0' S=0.0600 '/' Outflow=11.8 cfs 3.18 af

Pond WC2: Wetland Cross Culvert #2 Peak Elev=432.45' Storage=330 cf Inflow=9.5 cfs 2.17 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=50.0' S=0.0076 '/' Outflow=9.4 cfs 2.17 af

Link DP-1: Existing 18" Culvert Inflow=12.9 cfs 5.82 af
Primary=12.9 cfs 5.82 af

Link DP-2: Existing 12" Culvert Inflow=0.9 cfs 0.16 af
Primary=0.9 cfs 0.16 af

Link DP-3: Hovey Road Inflow=1.4 cfs 0.58 af
Primary=1.4 cfs 0.58 af

Link DP-4: Spring Road Inflow=3.4 cfs 0.31 af
Primary=3.4 cfs 0.31 af

Link DP-5: Offsite Inflow=0.9 cfs 0.08 af
Primary=0.9 cfs 0.08 af

Link DP-6: North Hovey Road Inflow=1.9 cfs 0.16 af
Primary=1.9 cfs 0.16 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=0.3 cfs 0.14 af
Area= 2.53 ac 31.91% Imperv. Primary=0.3 cfs 0.14 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=0.6 cfs 0.15 af
Area= 1.67 ac 29.54% Imperv. Primary=0.6 cfs 0.15 af

Total Runoff Area = 100.51 ac Runoff Volume = 6.82 af Average Runoff Depth = 0.81"
84.20% Pervious = 84.63 ac 15.80% Impervious = 15.88 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 OS-1: Offsite Drainage 1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=0.88"
Flow Length=904' Tc=19.2 min CN=58 Runoff=3.6 cfs 0.47 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=5.91 ac 2.69% Impervious Runoff Depth=1.00"
Flow Length=835' Tc=9.4 min CN=60 Runoff=5.2 cfs 0.49 af

Subcatchment PR-10: Subcat PR-10 Runoff Area=4.35 ac 30.94% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=73 Runoff=9.4 cfs 0.68 af

Subcatchment PR-11: Subcat PR-11 Runoff Area=2.10 ac 27.07% Impervious Runoff Depth=2.34"
Flow Length=507' Tc=8.8 min UI Adjusted CN=79 Runoff=5.2 cfs 0.41 af

Subcatchment PR-12: Subcat PR-12 Runoff Area=0.67 ac 0.00% Impervious Runoff Depth=1.79"
Flow Length=231' Tc=6.1 min CN=72 Runoff=1.4 cfs 0.10 af

Subcatchment PR-13: Subcat PR-13 Runoff Area=2.69 ac 0.01% Impervious Runoff Depth=1.72"
Flow Length=359' Tc=7.4 min CN=71 Runoff=5.0 cfs 0.38 af

Subcatchment PR-14: Subcat PR-14 Runoff Area=10.64 ac 0.00% Impervious Runoff Depth=1.87"
Flow Length=1,659' Tc=21.2 min CN=73 Runoff=15.0 cfs 1.65 af

Subcatchment PR-15: Subcat PR-15 Runoff Area=3.14 ac 0.00% Impervious Runoff Depth=1.79"
Flow Length=493' Tc=12.4 min CN=72 Runoff=5.2 cfs 0.47 af

Subcatchment PR-16: Subcat PR-16 Runoff Area=0.68 ac 0.00% Impervious Runoff Depth=1.72"
Flow Length=250' Tc=7.1 min CN=71 Runoff=1.3 cfs 0.10 af

Subcatchment PR-17: Subcat PR-17 Runoff Area=1.75 ac 0.00% Impervious Runoff Depth=1.72"
Flow Length=523' Tc=11.4 min CN=71 Runoff=2.9 cfs 0.25 af

Subcatchment PR-18: Subcat PR-18 Runoff Area=2.25 ac 44.53% Impervious Runoff Depth=2.87"
Tc=6.0 min CN=85 Runoff=7.5 cfs 0.54 af

Subcatchment PR-19: Subcat PR-19 Runoff Area=5.06 ac 42.09% Impervious Runoff Depth=2.78"
Flow Length=1,393' Tc=6.0 min CN=84 Runoff=16.4 cfs 1.17 af

Subcatchment PR-2: Subcat PR-2 Runoff Area=4.31 ac 3.27% Impervious Runoff Depth=1.06"
Flow Length=782' Tc=7.8 min CN=61 Runoff=4.3 cfs 0.38 af

Subcatchment PR-20: Subcat PR-20 Runoff Area=5.20 ac 29.62% Impervious Runoff Depth=2.34"
Flow Length=1,180' Tc=9.1 min UI Adjusted CN=79 Runoff=12.8 cfs 1.02 af

Subcatchment PR-21: Subcat PR-21 Runoff Area=6.46 ac 0.01% Impervious Runoff Depth=1.57"
Flow Length=2,124' Tc=30.1 min CN=69 Runoff=6.5 cfs 0.85 af

Subcatchment PR-22: Subcat PR-22 Runoff Area=4.76 ac 0.05% Impervious Runoff Depth=1.79"
Flow Length=321' Tc=10.1 min CN=72 Runoff=8.5 cfs 0.71 af

Subcatchment PR-23: Subcat PR-23 Runoff Area=2.76 ac 12.60% Impervious Runoff Depth=1.31"
Flow Length=348' Tc=7.3 min CN=65 Runoff=3.7 cfs 0.30 af

Subcatchment PR-24: Subcat PR-24 Runoff Area=0.41 ac 0.00% Impervious Runoff Depth=1.06"
Tc=6.0 min CN=61 Runoff=0.4 cfs 0.04 af

Subcatchment PR-3: Subcat PR-3 Runoff Area=1.14 ac 0.00% Impervious Runoff Depth=1.79"
Flow Length=150' Tc=6.0 min CN=72 Runoff=2.3 cfs 0.17 af

Subcatchment PR-4: Subcat PR-4 Runoff Area=3.76 ac 0.00% Impervious Runoff Depth=1.18"
Flow Length=766' Tc=6.0 min CN=63 Runoff=4.7 cfs 0.37 af

Subcatchment PR-5: Subcat PR-5 Runoff Area=4.77 ac 28.74% Impervious Runoff Depth=1.65"
Tc=6.0 min UI Adjusted CN=70 Runoff=8.9 cfs 0.65 af

Subcatchment PR-6: Subcat PR-6 Runoff Area=4.22 ac 35.70% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=75 Runoff=9.9 cfs 0.71 af

Subcatchment PR-7: Subcat PR-7 Runoff Area=9.26 ac 32.30% Impervious Runoff Depth=2.51"
Flow Length=1,294' Tc=6.0 min CN=81 Runoff=27.3 cfs 1.94 af

Subcatchment PR-8: Subcat PR-8 Runoff Area=6.49 ac 42.77% Impervious Runoff Depth=2.18"
Flow Length=1,020' Tc=10.1 min CN=77 Runoff=14.4 cfs 1.18 af

Subcatchment PR-9: Subcat PR-9 Runoff Area=1.41 ac 0.00% Impervious Runoff Depth=1.57"
Flow Length=88' Tc=6.0 min CN=69 Runoff=2.5 cfs 0.19 af

Reach 1R: Thru PR-15 Avg. Flow Depth=0.24' Max Vel=0.96 fps Inflow=1.0 cfs 0.10 af
n=0.080 L=492.7' S=0.0218 '/' Capacity=75.3 cfs Outflow=0.8 cfs 0.10 af

Reach 2R: Thru PR-17 Avg. Flow Depth=0.20' Max Vel=1.82 fps Inflow=2.6 cfs 0.68 af
n=0.035 L=365.0' S=0.0218 '/' Capacity=66.7 cfs Outflow=2.6 cfs 0.68 af

Reach 4R: Swale Avg. Flow Depth=0.18' Max Vel=4.70 fps Inflow=3.0 cfs 0.65 af
n=0.025 L=253.0' S=0.0751 '/' Capacity=948.3 cfs Outflow=3.0 cfs 0.65 af

Reach 5R: Swale to P1 Avg. Flow Depth=0.58' Max Vel=10.42 fps Inflow=28.9 cfs 3.67 af
n=0.022 L=139.0' S=0.0770 '/' Capacity=937.6 cfs Outflow=28.9 cfs 3.67 af

Reach 6R: Swale Avg. Flow Depth=0.24' Max Vel=5.15 fps Inflow=4.7 cfs 0.71 af
n=0.025 L=413.0' S=0.0642 '/' Capacity=876.6 cfs Outflow=4.7 cfs 0.71 af

Reach 7R: Swale Avg. Flow Depth=0.64' Max Vel=7.34 fps Inflow=24.2 cfs 1.94 af
n=0.025 L=766.0' S=0.0444 '/' Capacity=729.1 cfs Outflow=23.3 cfs 1.94 af

Reach 13R: Culvert #2 to #1 Avg. Flow Depth=1.66' Max Vel=3.16 fps Inflow=36.3 cfs 5.97 af
n=0.080 L=739.9' S=0.0289 '/' Capacity=186.3 cfs Outflow=35.6 cfs 5.97 af

Reach 15R: Culvert #1 to DP Avg. Flow Depth=1.35' Max Vel=4.03 fps Inflow=45.3 cfs 7.29 af
n=0.080 L=601.3' S=0.0576 '/' Capacity=363.8 cfs Outflow=45.0 cfs 7.29 af

Reach 16R: Thru PR-14 Avg. Flow Depth=0.88' Max Vel=1.64 fps Inflow=9.6 cfs 1.49 af
n=0.080 L=1,536.2' S=0.0155 '/' Capacity=136.1 cfs Outflow=7.2 cfs 1.49 af

Reach 17R: PR12 Culvert to Swale Avg. Flow Depth=0.09' Max Vel=0.86 fps Inflow=1.4 cfs 0.10 af
n=0.050 L=741.0' S=0.0219 '/' Capacity=1,023.2 cfs Outflow=0.8 cfs 0.10 af

Reach 21R: Thru 21 Avg. Flow Depth=0.24' Max Vel=1.63 fps Inflow=5.2 cfs 1.17 af
n=0.050 L=398.0' S=0.0251 '/' Capacity=1,094.4 cfs Outflow=5.0 cfs 1.17 af

Reach 22R: Thru PR-14 Avg. Flow Depth=0.83' Max Vel=1.76 fps Inflow=10.3 cfs 1.02 af
n=0.080 L=1,077.9' S=0.0190 '/' Capacity=151.0 cfs Outflow=7.3 cfs 1.02 af

Pond 1P: Primary Detention Peak Elev=393.01' Storage=63,098 cf Inflow=39.2 cfs 5.23 af
Primary=12.3 cfs 5.22 af Secondary=0.0 cfs 0.00 af Outflow=12.3 cfs 5.22 af

Pond 2P: Left Side Basin Peak Elev=384.35' Storage=8,327 cf Inflow=12.3 cfs 5.26 af
Primary=12.1 cfs 5.25 af Secondary=0.0 cfs 0.00 af Outflow=12.1 cfs 5.25 af

Pond 3P: Sand Filter #3 Peak Elev=445.71' Storage=7,945 cf Inflow=8.9 cfs 0.65 af
Primary=3.0 cfs 0.65 af Secondary=0.0 cfs 0.00 af Outflow=3.0 cfs 0.65 af

Pond 4P: Sand Filter #4 Peak Elev=450.63' Storage=7,531 cf Inflow=9.9 cfs 0.71 af
Primary=4.7 cfs 0.71 af Secondary=0.0 cfs 0.00 af Outflow=4.7 cfs 0.71 af

Pond 5P: Sand Filter #5 Peak Elev=451.78' Storage=16,072 cf Inflow=27.3 cfs 1.94 af
Primary=24.2 cfs 1.94 af Secondary=0.0 cfs 0.00 af Outflow=24.2 cfs 1.94 af

Pond 6P: Sand Filter #6 Peak Elev=405.66' Storage=12,974 cf Inflow=14.4 cfs 1.18 af
Primary=9.6 cfs 1.18 af Secondary=0.0 cfs 0.00 af Outflow=9.6 cfs 1.18 af

Pond 7P: Sand Filter #7 Peak Elev=447.77' Storage=8,059 cf Inflow=9.4 cfs 0.68 af
Primary=4.4 cfs 0.68 af Secondary=0.0 cfs 0.00 af Outflow=4.4 cfs 0.68 af

Pond 8P: Amenity Basin Peak Elev=438.14' Storage=5,270 cf Inflow=7.5 cfs 0.54 af
Primary=4.7 cfs 0.54 af Secondary=0.0 cfs 0.00 af Outflow=4.7 cfs 0.54 af

Pond 9P: Cluster E Basin Peak Elev=446.85' Storage=22,921 cf Inflow=16.4 cfs 1.17 af
Primary=5.2 cfs 1.17 af Secondary=0.0 cfs 0.00 af Outflow=5.2 cfs 1.17 af

Pond 10P: Cluster D Basin Peak Elev=456.65' Storage=8,197 cf Inflow=12.8 cfs 1.02 af
Primary=10.3 cfs 1.02 af Secondary=0.0 cfs 0.00 af Outflow=10.3 cfs 1.02 af

Pond 11P: Sand Filter #11 Peak Elev=454.69' Storage=6,036 cf Inflow=5.2 cfs 0.41 af
Primary=2.0 cfs 0.41 af Secondary=0.0 cfs 0.00 af Outflow=2.0 cfs 0.41 af

Pond 13P: Stone Level Spreader Peak Elev=383.32' Storage=71 cf Inflow=12.1 cfs 5.25 af
Outflow=12.1 cfs 5.25 af

Pond C12: PR-15 culvert Peak Elev=448.90' Storage=0 cf Inflow=1.4 cfs 0.10 af
36.0" x 36.0" Box Culvert w/ 0.5" inside fill n=0.013 L=53.0' S=0.0498 '/' Outflow=1.4 cfs 0.10 af

Pond C15: PR-15 culvert Peak Elev=457.10' Storage=96 cf Inflow=5.9 cfs 0.57 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0211 '/' Outflow=5.9 cfs 0.57 af

Pond C16: PR-16 culvert Peak Elev=468.06' Storage=472 cf Inflow=1.3 cfs 0.10 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0135 '/' Outflow=1.0 cfs 0.10 af

Pond C17: PR-17 culvert Peak Elev=458.83' Inflow=3.8 cfs 0.93 af
24.0" Round Culvert n=0.013 L=138.0' S=0.0217 '/' Outflow=3.8 cfs 0.93 af

Pond C4: CULVERT #4 Peak Elev=411.48' Storage=220 cf Inflow=28.9 cfs 3.67 af
60.0" x 42.0" Box Culvert n=0.013 L=50.0' S=0.0600 '/' Outflow=28.9 cfs 3.67 af

Pond WC1: Wetland Cross Culvert #1 Peak Elev=411.60' Storage=84 cf Inflow=42.0 cfs 6.82 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=46.0' S=0.0600 '/' Outflow=42.0 cfs 6.82 af

Pond WC2: Wetland Cross Culvert #2 Peak Elev=433.52' Storage=1,924 cf Inflow=32.4 cfs 4.70 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=50.0' S=0.0076 '/' Outflow=31.6 cfs 4.70 af

Link DP-1: Existing 18" Culvert Inflow=53.0 cfs 12.84 af
Primary=53.0 cfs 12.84 af

Link DP-2: Existing 12" Culvert Inflow=5.2 cfs 0.49 af
Primary=5.2 cfs 0.49 af

Link DP-3: Hovey Road Inflow=7.1 cfs 1.26 af
Primary=7.1 cfs 1.26 af

Link DP-4: Spring Road Inflow=8.5 cfs 0.71 af
Primary=8.5 cfs 0.71 af

Link DP-5: Offsite Inflow=2.5 cfs 0.19 af
Primary=2.5 cfs 0.19 af

Link DP-6: North Hovey Road Inflow=5.0 cfs 0.38 af
Primary=5.0 cfs 0.38 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=1.9 cfs 0.48 af
Area= 2.53 ac 31.91% Imperv. Primary=1.9 cfs 0.48 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=0.9 cfs 0.20 af
Area= 1.67 ac 29.54% Imperv. Primary=0.9 cfs 0.20 af

Total Runoff Area = 100.51 ac Runoff Volume = 15.20 af Average Runoff Depth = 1.82"
84.20% Pervious = 84.63 ac 15.80% Impervious = 15.88 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 OS-1: Offsite Drainage 1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=1.54"
Flow Length=904' Tc=19.2 min CN=58 Runoff=7.1 cfs 0.82 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=5.91 ac 2.69% Impervious Runoff Depth=1.70"
Flow Length=835' Tc=9.4 min CN=60 Runoff=9.7 cfs 0.84 af

Subcatchment PR-10: Subcat PR-10 Runoff Area=4.35 ac 30.94% Impervious Runoff Depth=2.80"
Tc=6.0 min CN=73 Runoff=14.3 cfs 1.02 af

Subcatchment PR-11: Subcat PR-11 Runoff Area=2.10 ac 27.07% Impervious Runoff Depth=3.37"
Flow Length=507' Tc=8.8 min UI Adjusted CN=79 Runoff=7.5 cfs 0.59 af

Subcatchment PR-12: Subcat PR-12 Runoff Area=0.67 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=231' Tc=6.1 min CN=72 Runoff=2.1 cfs 0.15 af

Subcatchment PR-13: Subcat PR-13 Runoff Area=2.69 ac 0.01% Impervious Runoff Depth=2.62"
Flow Length=359' Tc=7.4 min CN=71 Runoff=7.8 cfs 0.59 af

Subcatchment PR-14: Subcat PR-14 Runoff Area=10.64 ac 0.00% Impervious Runoff Depth=2.80"
Flow Length=1,659' Tc=21.2 min CN=73 Runoff=22.9 cfs 2.48 af

Subcatchment PR-15: Subcat PR-15 Runoff Area=3.14 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=493' Tc=12.4 min CN=72 Runoff=8.1 cfs 0.71 af

Subcatchment PR-16: Subcat PR-16 Runoff Area=0.68 ac 0.00% Impervious Runoff Depth=2.62"
Flow Length=250' Tc=7.1 min CN=71 Runoff=2.0 cfs 0.15 af

Subcatchment PR-17: Subcat PR-17 Runoff Area=1.75 ac 0.00% Impervious Runoff Depth=2.62"
Flow Length=523' Tc=11.4 min CN=71 Runoff=4.4 cfs 0.38 af

Subcatchment PR-18: Subcat PR-18 Runoff Area=2.25 ac 44.53% Impervious Runoff Depth=3.97"
Tc=6.0 min CN=85 Runoff=10.3 cfs 0.74 af

Subcatchment PR-19: Subcat PR-19 Runoff Area=5.06 ac 42.09% Impervious Runoff Depth=3.87"
Flow Length=1,393' Tc=6.0 min CN=84 Runoff=22.7 cfs 1.63 af

Subcatchment PR-2: Subcat PR-2 Runoff Area=4.31 ac 3.27% Impervious Runoff Depth=1.78"
Flow Length=782' Tc=7.8 min CN=61 Runoff=7.9 cfs 0.64 af

Subcatchment PR-20: Subcat PR-20 Runoff Area=5.20 ac 29.62% Impervious Runoff Depth=3.37"
Flow Length=1,180' Tc=9.1 min UI Adjusted CN=79 Runoff=18.5 cfs 1.46 af

Subcatchment PR-21: Subcat PR-21 Runoff Area=6.46 ac 0.01% Impervious Runoff Depth=2.44"
Flow Length=2,124' Tc=30.1 min CN=69 Runoff=10.3 cfs 1.31 af

Subcatchment PR-22: Subcat PR-22 Runoff Area=4.76 ac 0.05% Impervious Runoff Depth=2.71"
Flow Length=321' Tc=10.1 min CN=72 Runoff=13.1 cfs 1.07 af

Subcatchment PR-23: Subcat PR-23 Runoff Area=2.76 ac 12.60% Impervious Runoff Depth=2.10"
Flow Length=348' Tc=7.3 min CN=65 Runoff=6.3 cfs 0.48 af

Subcatchment PR-24: Subcat PR-24 Runoff Area=0.41 ac 0.00% Impervious Runoff Depth=1.78"
Tc=6.0 min CN=61 Runoff=0.8 cfs 0.06 af

Subcatchment PR-3: Subcat PR-3 Runoff Area=1.14 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=150' Tc=6.0 min CN=72 Runoff=3.6 cfs 0.26 af

Subcatchment PR-4: Subcat PR-4 Runoff Area=3.76 ac 0.00% Impervious Runoff Depth=1.94"
Flow Length=766' Tc=6.0 min CN=63 Runoff=8.2 cfs 0.61 af

Subcatchment PR-5: Subcat PR-5 Runoff Area=4.77 ac 28.74% Impervious Runoff Depth=2.53"
Tc=6.0 min UI Adjusted CN=70 Runoff=14.0 cfs 1.01 af

Subcatchment PR-6: Subcat PR-6 Runoff Area=4.22 ac 35.70% Impervious Runoff Depth=2.99"
Tc=6.0 min CN=75 Runoff=14.8 cfs 1.05 af

Subcatchment PR-7: Subcat PR-7 Runoff Area=9.26 ac 32.30% Impervious Runoff Depth=3.57"
Flow Length=1,294' Tc=6.0 min CN=81 Runoff=38.6 cfs 2.75 af

Subcatchment PR-8: Subcat PR-8 Runoff Area=6.49 ac 42.77% Impervious Runoff Depth=3.18"
Flow Length=1,020' Tc=10.1 min CN=77 Runoff=21.0 cfs 1.72 af

Subcatchment PR-9: Subcat PR-9 Runoff Area=1.41 ac 0.00% Impervious Runoff Depth=2.44"
Flow Length=88' Tc=6.0 min CN=69 Runoff=4.0 cfs 0.29 af

Reach 1R: Thru PR-15 Avg. Flow Depth=0.32' Max Vel=1.12 fps Inflow=1.6 cfs 0.15 af
n=0.080 L=492.7' S=0.0218 '/' Capacity=75.3 cfs Outflow=1.4 cfs 0.15 af

Reach 2R: Thru PR-17 Avg. Flow Depth=0.28' Max Vel=2.19 fps Inflow=5.0 cfs 0.89 af
n=0.035 L=365.0' S=0.0218 '/' Capacity=66.7 cfs Outflow=4.9 cfs 0.89 af

Reach 4R: Swale Avg. Flow Depth=0.24' Max Vel=5.54 fps Inflow=4.9 cfs 1.01 af
n=0.025 L=253.0' S=0.0751 '/' Capacity=948.3 cfs Outflow=4.9 cfs 1.01 af

Reach 5R: Swale to P1 Avg. Flow Depth=0.82' Max Vel=12.52 fps Inflow=55.9 cfs 5.41 af
n=0.022 L=139.0' S=0.0770 '/' Capacity=937.6 cfs Outflow=55.9 cfs 5.41 af

Reach 6R: Swale Avg. Flow Depth=0.39' Max Vel=6.69 fps Inflow=10.9 cfs 1.05 af
n=0.025 L=413.0' S=0.0642 '/' Capacity=876.6 cfs Outflow=10.8 cfs 1.05 af

Reach 7R: Swale Avg. Flow Depth=0.80' Max Vel=8.24 fps Inflow=36.1 cfs 2.75 af
n=0.025 L=766.0' S=0.0444 '/' Capacity=729.1 cfs Outflow=35.3 cfs 2.75 af

Reach 13R: Culvert #2 to #1 Avg. Flow Depth=2.17' Max Vel=3.67 fps Inflow=64.8 cfs 8.59 af
n=0.080 L=739.9' S=0.0289 '/' Capacity=186.3 cfs Outflow=63.7 cfs 8.59 af

Reach 15R: Culvert #1 to DP Avg. Flow Depth=1.77' Max Vel=4.69 fps Inflow=80.3 cfs 10.72 af
n=0.080 L=601.3' S=0.0576 '/' Capacity=363.8 cfs Outflow=79.9 cfs 10.72 af

Reach 16R: Thru PR-14 Avg. Flow Depth=1.21' Max Vel=1.94 fps Inflow=17.3 cfs 2.12 af
n=0.080 L=1,536.2' S=0.0155 '/' Capacity=136.1 cfs Outflow=13.6 cfs 2.12 af

Reach 17R: PR12 Culvert to Swale Avg. Flow Depth=0.12' Max Vel=1.03 fps Inflow=2.1 cfs 0.15 af
n=0.050 L=741.0' S=0.0219 '/' Capacity=1,023.2 cfs Outflow=1.4 cfs 0.15 af

Reach 21R: Thru 21 Avg. Flow Depth=0.41' Max Vel=2.19 fps Inflow=13.5 cfs 1.63 af
n=0.050 L=398.0' S=0.0251 '/' Capacity=1,094.4 cfs Outflow=12.7 cfs 1.63 af

Reach 22R: Thru PR-14 Avg. Flow Depth=1.12' Max Vel=2.07 fps Inflow=16.2 cfs 1.46 af
n=0.080 L=1,077.9' S=0.0190 '/' Capacity=151.0 cfs Outflow=12.9 cfs 1.46 af

Pond 1P: Primary Detention Peak Elev=394.26' Storage=94,010 cf Inflow=81.0 cfs 7.77 af
Primary=32.3 cfs 7.76 af Secondary=0.0 cfs 0.00 af Outflow=32.3 cfs 7.76 af

Pond 2P: Left Side Basin Peak Elev=385.29' Storage=15,274 cf Inflow=32.5 cfs 7.82 af
Primary=29.8 cfs 7.81 af Secondary=0.0 cfs 0.00 af Outflow=29.8 cfs 7.81 af

Pond 3P: Sand Filter #3 Peak Elev=446.62' Storage=11,825 cf Inflow=14.0 cfs 1.01 af
Primary=4.9 cfs 1.01 af Secondary=0.0 cfs 0.00 af Outflow=4.9 cfs 1.01 af

Pond 4P: Sand Filter #4 Peak Elev=450.92' Storage=8,944 cf Inflow=14.8 cfs 1.05 af
Primary=10.9 cfs 1.05 af Secondary=0.0 cfs 0.00 af Outflow=10.9 cfs 1.05 af

Pond 5P: Sand Filter #5 Peak Elev=452.00' Storage=17,539 cf Inflow=38.6 cfs 2.75 af
Primary=36.1 cfs 2.75 af Secondary=0.0 cfs 0.00 af Outflow=36.1 cfs 2.75 af

Pond 6P: Sand Filter #6 Peak Elev=405.89' Storage=14,342 cf Inflow=21.0 cfs 1.72 af
Primary=19.1 cfs 1.72 af Secondary=0.0 cfs 0.00 af Outflow=19.1 cfs 1.72 af

Pond 7P: Sand Filter #7 Peak Elev=448.38' Storage=11,624 cf Inflow=14.3 cfs 1.02 af
Primary=6.5 cfs 1.02 af Secondary=0.0 cfs 0.00 af Outflow=6.5 cfs 1.02 af

Pond 8P: Amenity Basin Peak Elev=438.33' Storage=6,015 cf Inflow=10.3 cfs 0.74 af
Primary=8.6 cfs 0.74 af Secondary=0.0 cfs 0.00 af Outflow=8.6 cfs 0.74 af

Pond 9P: Cluster E Basin Peak Elev=447.07' Storage=25,651 cf Inflow=22.7 cfs 1.63 af
Primary=13.5 cfs 1.63 af Secondary=0.0 cfs 0.00 af Outflow=13.5 cfs 1.63 af

Pond 10P: Cluster D Basin Peak Elev=456.87' Storage=9,309 cf Inflow=18.5 cfs 1.46 af
Primary=16.2 cfs 1.46 af Secondary=0.0 cfs 0.00 af Outflow=16.2 cfs 1.46 af

Pond 11P: Sand Filter #11 Peak Elev=454.86' Storage=6,995 cf Inflow=7.5 cfs 0.59 af
Primary=4.7 cfs 0.59 af Secondary=0.0 cfs 0.00 af Outflow=4.7 cfs 0.59 af

Pond 13P: Stone Level Spreader Peak Elev=383.56' Storage=84 cf Inflow=29.8 cfs 7.81 af
Outflow=29.8 cfs 7.81 af

Pond C12: PR-15 culvert Peak Elev=448.90' Storage=0 cf Inflow=2.1 cfs 0.15 af
36.0" x 36.0" Box Culvert w/ 0.5" inside fill n=0.013 L=53.0' S=0.0498 '/' Outflow=2.1 cfs 0.15 af

Pond C15: PR-15 culvert Peak Elev=457.35' Storage=162 cf Inflow=9.2 cfs 0.86 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0211 '/' Outflow=9.2 cfs 0.86 af

Pond C16: PR-16 culvert Peak Elev=468.14' Storage=677 cf Inflow=2.0 cfs 0.15 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0135 '/' Outflow=1.6 cfs 0.15 af

Pond C17: PR-17 culvert Peak Elev=459.28' Inflow=8.2 cfs 1.27 af
24.0" Round Culvert n=0.013 L=138.0' S=0.0217 '/' Outflow=8.2 cfs 1.27 af

Pond C4: CULVERT #4 Peak Elev=412.30' Storage=503 cf Inflow=55.9 cfs 5.41 af
60.0" x 42.0" Box Culvert n=0.013 L=50.0' S=0.0600 '/' Outflow=55.9 cfs 5.41 af

Pond WC1: Wetland Cross Culvert #1 Peak Elev=412.46' Storage=301 cf Inflow=73.7 cfs 9.91 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=46.0' S=0.0600 '/' Outflow=73.7 cfs 9.91 af

Pond WC2: Wetland Cross Culvert #2 Peak Elev=434.29' Storage=5,163 cf Inflow=54.0 cfs 6.81 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=50.0' S=0.0076 '/' Outflow=52.1 cfs 6.81 af

Link DP-1: Existing 18" Culvert Inflow=103.4 cfs 19.02 af
Primary=103.4 cfs 19.02 af

Link DP-2: Existing 12" Culvert Inflow=9.7 cfs 0.84 af
Primary=9.7 cfs 0.84 af

Link DP-3: Hovey Road Inflow=13.0 cfs 1.86 af
Primary=13.0 cfs 1.86 af

Link DP-4: Spring Road Inflow=13.1 cfs 1.07 af
Primary=13.1 cfs 1.07 af

Link DP-5: Offsite Inflow=4.0 cfs 0.29 af
Primary=4.0 cfs 0.29 af

Link DP-6: North Hovey Road Inflow=7.8 cfs 0.59 af
Primary=7.8 cfs 0.59 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=3.2 cfs 0.64 af
Area= 2.53 ac 31.91% Imperv. Primary=3.2 cfs 0.64 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=1.9 cfs 0.24 af
Area= 1.67 ac 29.54% Imperv. Primary=1.9 cfs 0.24 af

Total Runoff Area = 100.51 ac Runoff Volume = 22.80 af Average Runoff Depth = 2.72"
84.20% Pervious = 84.63 ac 15.80% Impervious = 15.88 ac

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 OS-1: Offsite Drainage 1 Runoff Area=6.35 ac 0.00% Impervious Runoff Depth=2.25"
Flow Length=904' Tc=19.2 min CN=58 Runoff=10.8 cfs 1.19 af

Subcatchment PR-1: Subcat PR-1 Runoff Area=5.91 ac 2.69% Impervious Runoff Depth=2.44"
Flow Length=835' Tc=9.4 min CN=60 Runoff=14.5 cfs 1.20 af

Subcatchment PR-10: Subcat PR-10 Runoff Area=4.35 ac 30.94% Impervious Runoff Depth=3.73"
Tc=6.0 min CN=73 Runoff=19.0 cfs 1.35 af

Subcatchment PR-11: Subcat PR-11 Runoff Area=2.10 ac 27.07% Impervious Runoff Depth=4.37"
Flow Length=507' Tc=8.8 min UI Adjusted CN=79 Runoff=9.7 cfs 0.77 af

Subcatchment PR-12: Subcat PR-12 Runoff Area=0.67 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=231' Tc=6.1 min CN=72 Runoff=2.8 cfs 0.20 af

Subcatchment PR-13: Subcat PR-13 Runoff Area=2.69 ac 0.01% Impervious Runoff Depth=3.52"
Flow Length=359' Tc=7.4 min CN=71 Runoff=10.6 cfs 0.79 af

Subcatchment PR-14: Subcat PR-14 Runoff Area=10.64 ac 0.00% Impervious Runoff Depth=3.73"
Flow Length=1,659' Tc=21.2 min CN=73 Runoff=30.6 cfs 3.31 af

Subcatchment PR-15: Subcat PR-15 Runoff Area=3.14 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=493' Tc=12.4 min CN=72 Runoff=10.9 cfs 0.95 af

Subcatchment PR-16: Subcat PR-16 Runoff Area=0.68 ac 0.00% Impervious Runoff Depth=3.52"
Flow Length=250' Tc=7.1 min CN=71 Runoff=2.7 cfs 0.20 af

Subcatchment PR-17: Subcat PR-17 Runoff Area=1.75 ac 0.00% Impervious Runoff Depth=3.52"
Flow Length=523' Tc=11.4 min CN=71 Runoff=6.0 cfs 0.51 af

Subcatchment PR-18: Subcat PR-18 Runoff Area=2.25 ac 44.53% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=85 Runoff=12.9 cfs 0.94 af

Subcatchment PR-19: Subcat PR-19 Runoff Area=5.06 ac 42.09% Impervious Runoff Depth=4.91"
Flow Length=1,393' Tc=6.0 min CN=84 Runoff=28.5 cfs 2.07 af

Subcatchment PR-2: Subcat PR-2 Runoff Area=4.31 ac 3.27% Impervious Runoff Depth=2.53"
Flow Length=782' Tc=7.8 min CN=61 Runoff=11.7 cfs 0.91 af

Subcatchment PR-20: Subcat PR-20 Runoff Area=5.20 ac 29.62% Impervious Runoff Depth=4.37"
Flow Length=1,180' Tc=9.1 min UI Adjusted CN=79 Runoff=23.8 cfs 1.89 af

Subcatchment PR-21: Subcat PR-21 Runoff Area=6.46 ac 0.01% Impervious Runoff Depth=3.32"
Flow Length=2,124' Tc=30.1 min CN=69 Runoff=14.1 cfs 1.79 af

Subcatchment PR-22: Subcat PR-22 Runoff Area=4.76 ac 0.05% Impervious Runoff Depth=3.63"
Flow Length=321' Tc=10.1 min CN=72 Runoff=17.6 cfs 1.44 af

Subcatchment PR-23: Subcat PR-23 Runoff Area=2.76 ac 12.60% Impervious Runoff Depth=2.92"
Flow Length=348' Tc=7.3 min CN=65 Runoff=8.9 cfs 0.67 af

Subcatchment PR-24: Subcat PR-24 Runoff Area=0.41 ac 0.00% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=61 Runoff=1.2 cfs 0.09 af

Subcatchment PR-3: Subcat PR-3 Runoff Area=1.14 ac 0.00% Impervious Runoff Depth=3.63"
Flow Length=150' Tc=6.0 min CN=72 Runoff=4.8 cfs 0.34 af

Subcatchment PR-4: Subcat PR-4 Runoff Area=3.76 ac 0.00% Impervious Runoff Depth=2.72"
Flow Length=766' Tc=6.0 min CN=63 Runoff=11.8 cfs 0.85 af

Subcatchment PR-5: Subcat PR-5 Runoff Area=4.77 ac 28.74% Impervious Runoff Depth=3.42"
Tc=6.0 min UI Adjusted CN=70 Runoff=19.1 cfs 1.36 af

Subcatchment PR-6: Subcat PR-6 Runoff Area=4.22 ac 35.70% Impervious Runoff Depth=3.94"
Tc=6.0 min CN=75 Runoff=19.5 cfs 1.39 af

Subcatchment PR-7: Subcat PR-7 Runoff Area=9.26 ac 32.30% Impervious Runoff Depth=4.58"
Flow Length=1,294' Tc=6.0 min CN=81 Runoff=49.2 cfs 3.54 af

Subcatchment PR-8: Subcat PR-8 Runoff Area=6.49 ac 42.77% Impervious Runoff Depth=4.15"
Flow Length=1,020' Tc=10.1 min CN=77 Runoff=27.4 cfs 2.24 af

Subcatchment PR-9: Subcat PR-9 Runoff Area=1.41 ac 0.00% Impervious Runoff Depth=3.32"
Flow Length=88' Tc=6.0 min CN=69 Runoff=5.5 cfs 0.39 af

Reach 1R: Thru PR-15 Avg. Flow Depth=0.39' Max Vel=1.25 fps Inflow=2.1 cfs 0.20 af
n=0.080 L=492.7' S=0.0218 '/' Capacity=75.3 cfs Outflow=1.9 cfs 0.20 af

Reach 2R: Thru PR-17 Avg. Flow Depth=0.36' Max Vel=2.50 fps Inflow=8.0 cfs 1.09 af
n=0.035 L=365.0' S=0.0218 '/' Capacity=66.7 cfs Outflow=7.7 cfs 1.09 af

Reach 4R: Swale Avg. Flow Depth=0.28' Max Vel=6.00 fps Inflow=6.3 cfs 1.36 af
n=0.025 L=253.0' S=0.0751 '/' Capacity=948.3 cfs Outflow=6.3 cfs 1.36 af

Reach 5R: Swale to P1 Avg. Flow Depth=0.95' Max Vel=13.60 fps Inflow=76.0 cfs 7.13 af
n=0.022 L=139.0' S=0.0770 '/' Capacity=937.6 cfs Outflow=76.0 cfs 7.13 af

Reach 6R: Swale Avg. Flow Depth=0.46' Max Vel=7.39 fps Inflow=15.1 cfs 1.39 af
n=0.025 L=413.0' S=0.0642 '/' Capacity=876.6 cfs Outflow=15.1 cfs 1.39 af

Reach 7R: Swale Avg. Flow Depth=0.90' Max Vel=8.82 fps Inflow=46.4 cfs 3.54 af
n=0.025 L=766.0' S=0.0444 '/' Capacity=729.1 cfs Outflow=45.5 cfs 3.54 af

Reach 13R: Culvert #2 to #1 Avg. Flow Depth=2.51' Max Vel=3.98 fps Inflow=88.8 cfs 11.16 af
n=0.080 L=739.9' S=0.0289 '/' Capacity=186.3 cfs Outflow=87.6 cfs 11.16 af

Reach 15R: Culvert #1 to DP Avg. Flow Depth=2.06' Max Vel=5.11 fps Inflow=111.3 cfs 14.14 af
n=0.080 L=601.3' S=0.0576 '/' Capacity=363.8 cfs Outflow=110.8 cfs 14.14 af

Reach 16R: Thru PR-14 Avg. Flow Depth=1.46' Max Vel=2.15 fps Inflow=24.6 cfs 2.75 af
n=0.080 L=1,536.2' S=0.0155 '/' Capacity=136.1 cfs Outflow=19.9 cfs 2.75 af

Reach 17R: PR12 Culvert to Swale Avg. Flow Depth=0.15' Max Vel=1.15 fps Inflow=2.8 cfs 0.20 af
n=0.050 L=741.0' S=0.0219 '/' Capacity=1,023.2 cfs Outflow=2.0 cfs 0.20 af

Reach 21R: Thru 21 Avg. Flow Depth=0.49' Max Vel=2.41 fps Inflow=17.6 cfs 2.07 af
n=0.050 L=398.0' S=0.0251 '/' Capacity=1,094.4 cfs Outflow=17.5 cfs 2.07 af

Reach 22R: Thru PR-14 Avg. Flow Depth=1.26' Max Vel=2.20 fps Inflow=17.2 cfs 1.89 af
n=0.080 L=1,077.9' S=0.0190 '/' Capacity=151.0 cfs Outflow=16.3 cfs 1.89 af

Pond 1P: Primary Detention Peak Elev=394.84' Storage=109,259 cf Inflow=112.2 cfs 10.28 af
Primary=63.1 cfs 10.28 af Secondary=0.0 cfs 0.00 af Outflow=63.1 cfs 10.28 af

Pond 2P: Left Side Basin Peak Elev=386.85' Storage=28,961 cf Inflow=63.6 cfs 10.36 af
Primary=52.2 cfs 10.36 af Secondary=0.0 cfs 0.00 af Outflow=52.2 cfs 10.36 af

Pond 3P: Sand Filter #3 Peak Elev=447.60' Storage=16,710 cf Inflow=19.1 cfs 1.36 af
Primary=6.3 cfs 1.36 af Secondary=0.0 cfs 0.00 af Outflow=6.3 cfs 1.36 af

Pond 4P: Sand Filter #4 Peak Elev=451.19' Storage=10,317 cf Inflow=19.5 cfs 1.39 af
Primary=15.1 cfs 1.39 af Secondary=0.0 cfs 0.00 af Outflow=15.1 cfs 1.39 af

Pond 5P: Sand Filter #5 Peak Elev=452.17' Storage=18,711 cf Inflow=49.2 cfs 3.54 af
Primary=46.4 cfs 3.54 af Secondary=0.0 cfs 0.00 af Outflow=46.4 cfs 3.54 af

Pond 6P: Sand Filter #6 Peak Elev=406.03' Storage=15,230 cf Inflow=27.4 cfs 2.24 af
Primary=26.2 cfs 2.24 af Secondary=0.0 cfs 0.00 af Outflow=26.2 cfs 2.24 af

Pond 7P: Sand Filter #7 Peak Elev=449.00' Storage=15,583 cf Inflow=19.0 cfs 1.35 af
Primary=8.1 cfs 1.35 af Secondary=0.0 cfs 0.00 af Outflow=8.1 cfs 1.35 af

Pond 8P: Amenity Basin Peak Elev=438.45' Storage=6,508 cf Inflow=12.9 cfs 0.94 af
Primary=11.5 cfs 0.94 af Secondary=0.0 cfs 0.00 af Outflow=11.5 cfs 0.94 af

Pond 9P: Cluster E Basin Peak Elev=447.34' Storage=29,094 cf Inflow=28.5 cfs 2.07 af
Primary=17.6 cfs 2.07 af Secondary=0.0 cfs 0.00 af Outflow=17.6 cfs 2.07 af

Pond 10P: Cluster D Basin Peak Elev=457.32' Storage=11,693 cf Inflow=23.8 cfs 1.89 af
Primary=17.2 cfs 1.89 af Secondary=0.0 cfs 0.00 af Outflow=17.2 cfs 1.89 af

Pond 11P: Sand Filter #11 Peak Elev=455.00' Storage=7,845 cf Inflow=9.7 cfs 0.77 af
Primary=7.6 cfs 0.77 af Secondary=0.0 cfs 0.00 af Outflow=7.6 cfs 0.77 af

Pond 13P: Stone Level Spreader Peak Elev=383.80' Storage=97 cf Inflow=52.2 cfs 10.36 af
Outflow=52.2 cfs 10.35 af

Pond C12: PR-15 culvert Peak Elev=448.90' Storage=0 cf Inflow=2.8 cfs 0.20 af
36.0" x 36.0" Box Culvert w/ 0.5" inside fill n=0.013 L=53.0' S=0.0498 '/' Outflow=2.8 cfs 0.20 af

Pond C15: PR-15 culvert Peak Elev=457.57' Storage=251 cf Inflow=12.5 cfs 1.15 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0211 '/' Outflow=12.5 cfs 1.15 af

Pond C16: PR-16 culvert Peak Elev=468.21' Storage=875 cf Inflow=2.7 cfs 0.20 af
36.0" x 36.0" Box Culvert w/ 6.0" inside fill n=0.013 L=54.0' S=0.0135 '/' Outflow=2.1 cfs 0.20 af

Pond C17: PR-17 culvert Peak Elev=459.66' Inflow=12.3 cfs 1.60 af
24.0" Round Culvert n=0.013 L=138.0' S=0.0217 '/' Outflow=12.3 cfs 1.60 af

Pond C4: CULVERT #4 Peak Elev=412.82' Storage=765 cf Inflow=76.0 cfs 7.13 af
60.0" x 42.0" Box Culvert n=0.013 L=50.0' S=0.0600 '/' Outflow=76.0 cfs 7.13 af

Pond WC1: Wetland Cross Culvert #1 Peak Elev=413.12' Storage=631 cf Inflow=101.5 cfs 12.95 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=46.0' S=0.0600 '/' Outflow=101.5 cfs 12.95 af

Pond WC2: Wetland Cross Culvert #2 Peak Elev=434.83' Storage=8,814 cf Inflow=72.3 cfs 8.89 af
60.0" x 48.0" Box Culvert w/ 6.0" inside fill n=0.030 L=50.0' S=0.0076 '/' Outflow=70.0 cfs 8.89 af

Link DP-1: Existing 18" Culvert Inflow=163.1 cfs 25.16 af
Primary=163.1 cfs 25.16 af

Link DP-2: Existing 12" Culvert Inflow=14.5 cfs 1.20 af
Primary=14.5 cfs 1.20 af

Link DP-3: Hovey Road Inflow=18.4 cfs 2.46 af
Primary=18.4 cfs 2.46 af

Link DP-4: Spring Road Inflow=17.6 cfs 1.44 af
Primary=17.6 cfs 1.44 af

Link DP-5: Offsite Inflow=5.5 cfs 0.39 af
Primary=5.5 cfs 0.39 af

Link DP-6: North Hovey Road Inflow=10.6 cfs 0.79 af
Primary=10.6 cfs 0.79 af

Link OS-2: 2017 Cemetery Basin Outfall Manual Hydrograph Inflow=5.1 cfs 0.80 af
Area= 2.53 ac 31.91% Imperv. Primary=5.1 cfs 0.80 af

Link OS-3: 2010 Cemetery Basin Outfall Manual Hydrograph Inflow=2.8 cfs 0.29 af
Area= 1.67 ac 29.54% Imperv. Primary=2.8 cfs 0.29 af

Total Runoff Area = 100.51 ac Runoff Volume = 30.37 af Average Runoff Depth = 3.63"
84.20% Pervious = 84.63 ac 15.80% Impervious = 15.88 ac

Summary for Subcatchment OS-1: Offsite Drainage 1

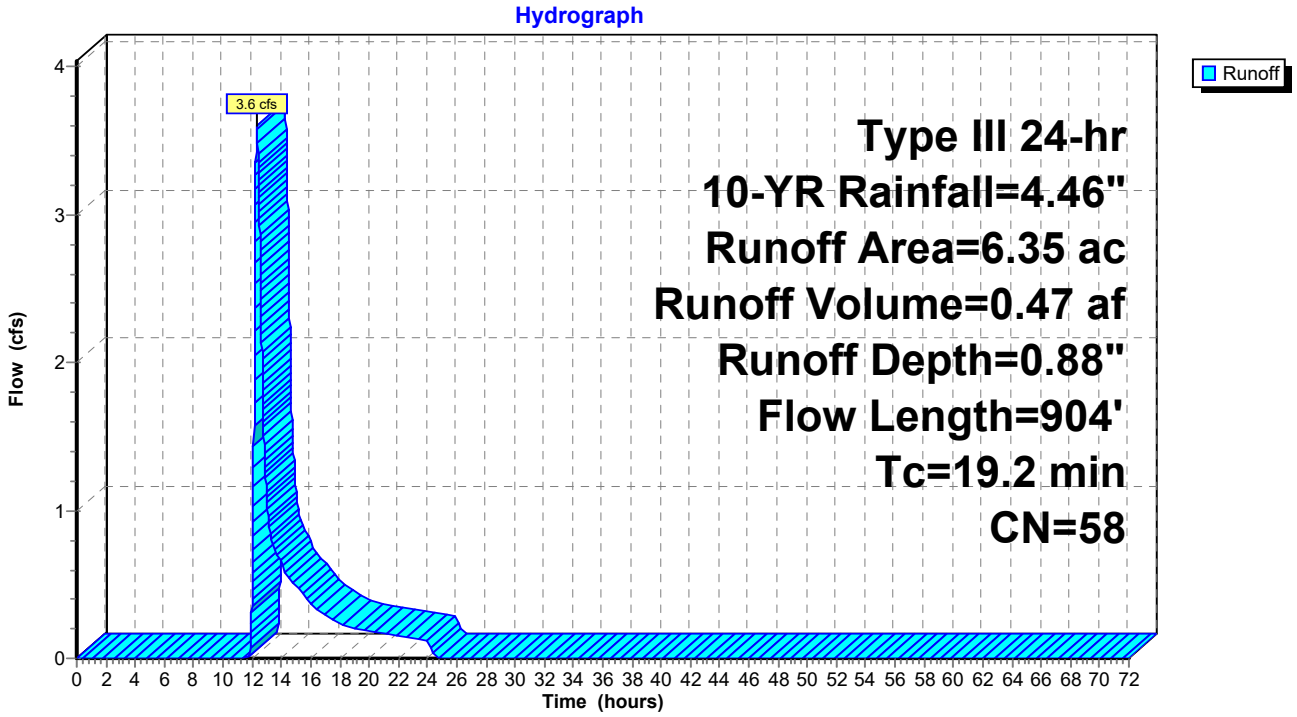
Runoff = 3.6 cfs @ 12.32 hrs, Volume= 0.47 af, Depth= 0.88"
Routed to Reach 15R : Culvert #1 to DP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.98	61	>75% Grass cover, Good, HSG B
0.00	74	>75% Grass cover, Good, HSG C
0.00	58	Meadow, non-grazed, HSG B
2.34	55	Woods, Good, HSG B
0.01	70	Woods, Good, HSG C
2.01	58	Woods/grass comb., Good, HSG B
6.35	58	Weighted Average
6.35		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0511	0.21		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
6.3	357	0.0183	0.95		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
1.4	162	0.0719	1.88		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
7.4	335	0.0229	0.76		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
19.2	904	Total			

Subcatchment OS-1: Offsite Drainage 1



Summary for Subcatchment PR-1: Subcat PR-1

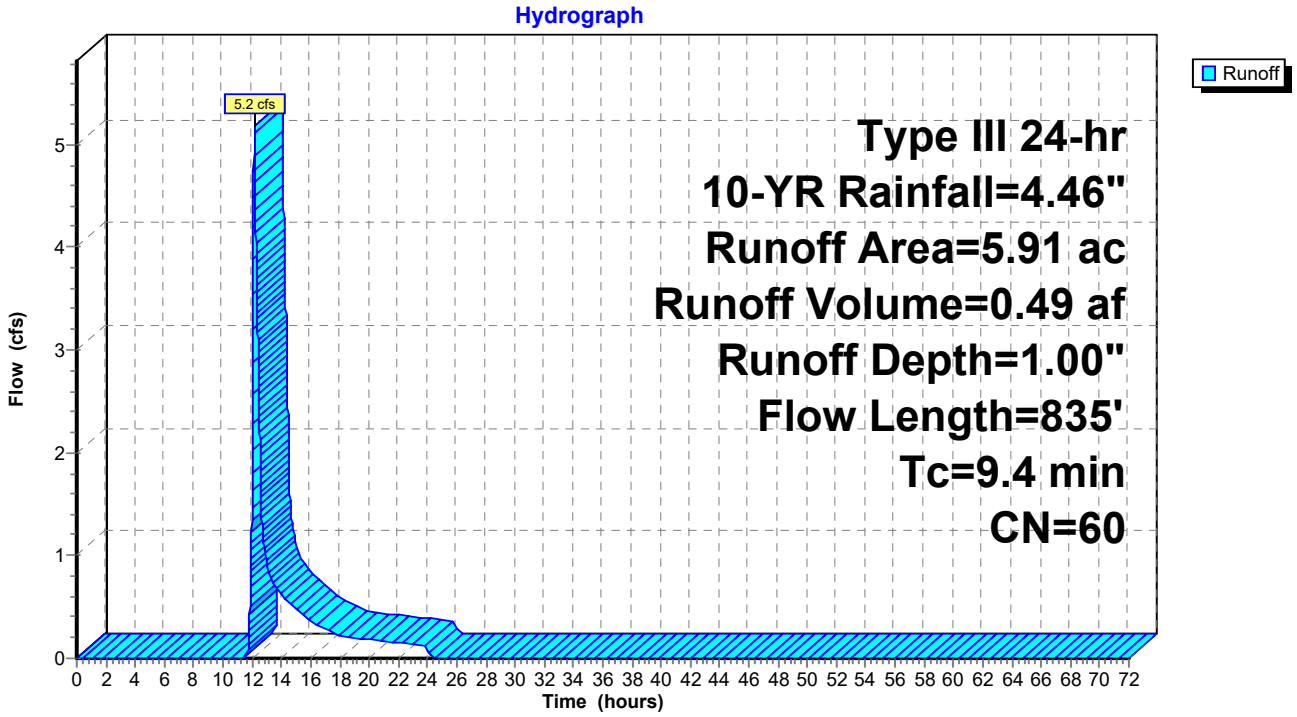
Runoff = 5.2 cfs @ 12.15 hrs, Volume= 0.49 af, Depth= 1.00"
Routed to Link DP-2 : Existing 12" Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.22	61	>75% Grass cover, Good, HSG B
0.11	96	Gravel surface, HSG B
4.86	58	Meadow, non-grazed, HSG B
0.15	71	Meadow, non-grazed, HSG C
0.12	78	Meadow, non-grazed, HSG D
0.16	98	Paved parking, HSG B
0.29	55	Woods, Good, HSG B
5.91	60	Weighted Average
5.75		97.31% Pervious Area
0.16		2.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0446	0.22		**Sheet Flow, Sheet Meadow** Range n= 0.130 P2= 2.90"
3.1	352	0.0736	1.90		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
0.9	220	0.0670	4.17		**Shallow Concentrated Flow, Shallow Concentrated Gravel** Unpaved Kv= 16.1 fps
1.6	213	0.1070	2.29		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
9.4	835	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

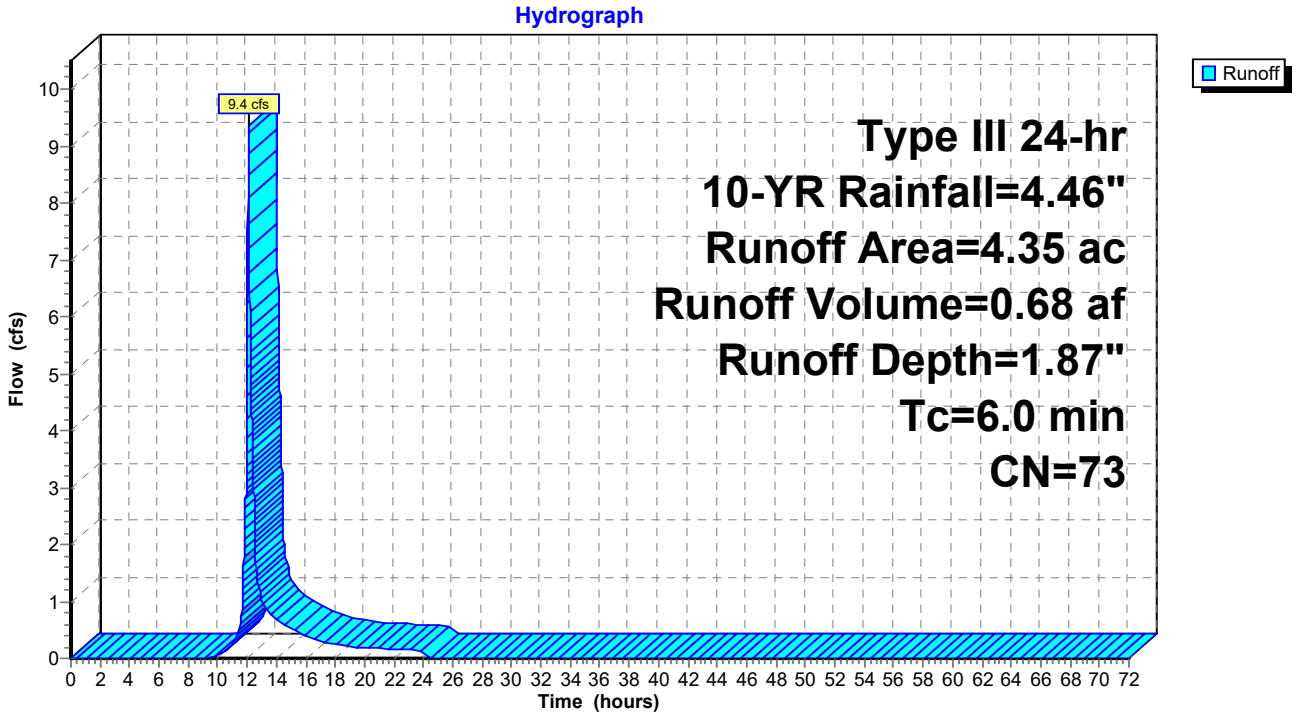
Runoff = 9.4 cfs @ 12.09 hrs, Volume= 0.68 af, Depth= 1.87"
Routed to Pond 7P : Sand Filter #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.54	61	>75% Grass cover, Good, HSG B
0.32	74	>75% Grass cover, Good, HSG C
0.03	58	Meadow, non-grazed, HSG B
0.09	71	Meadow, non-grazed, HSG C
0.60	98	Paved parking, HSG B
0.21	98	Paved parking, HSG C
0.41	98	Unconnected roofs, HSG B
0.13	98	Unconnected roofs, HSG C
0.92	55	Woods, Good, HSG B
0.10	70	Woods, Good, HSG C
4.35	73	Weighted Average
3.00		69.06% Pervious Area
1.35		30.94% Impervious Area
0.54		40.15% Unconnected

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

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

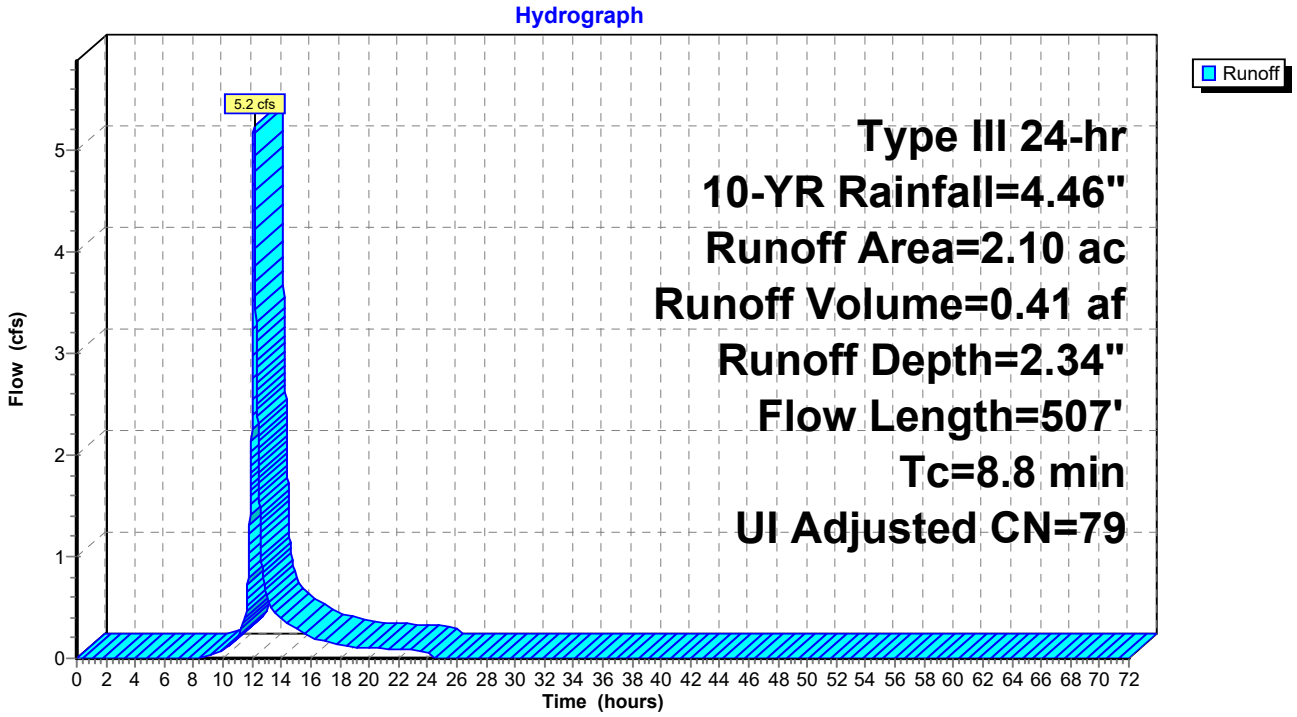
Runoff = 5.2 cfs @ 12.13 hrs, Volume= 0.41 af, Depth= 2.34"
Routed to Pond 11P : Sand Filter #11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Adj	Description
1.07	74		>75% Grass cover, Good, HSG C
0.01	96		Gravel surface, HSG C
0.01	58		Meadow, non-grazed, HSG B
0.44	71		Meadow, non-grazed, HSG C
0.37	98		Paved parking, HSG C
0.20	98		Unconnected roofs, HSG C
2.10	80	79	Weighted Average, UI Adjusted
1.53			72.93% Pervious Area
0.57			27.07% Impervious Area
0.20			34.80% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0194	0.14		**Sheet Flow, Grass Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
2.5	279	0.0084	1.86		**Shallow Concentrated Flow, Shallow Concentrated Pavement** Paved Kv= 20.3 fps
0.3	178	0.0263	8.54	10.48	**Pipe Channel, Pipe Flow** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
8.8	507	Total			

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-12: Subcat PR-12

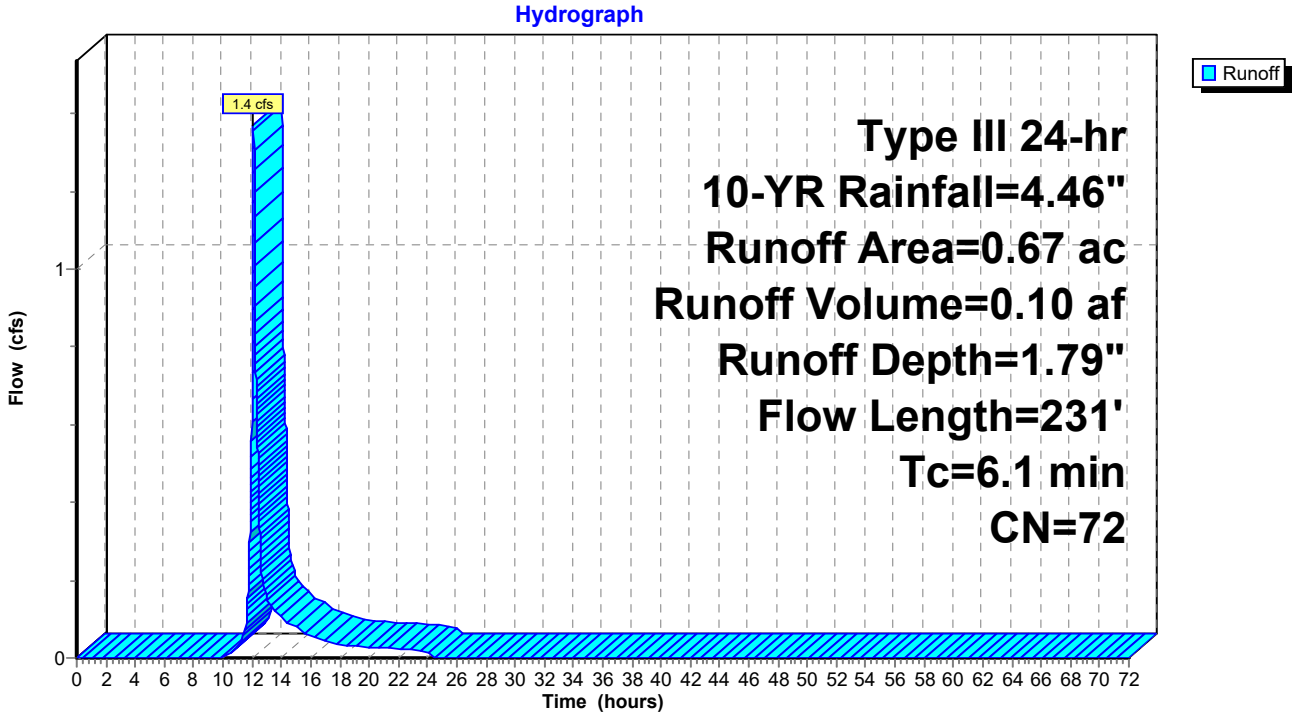
Runoff = 1.4 cfs @ 12.09 hrs, Volume= 0.10 af, Depth= 1.79"
Routed to Pond C12 : PR-15 culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.13	74	>75% Grass cover, Good, HSG C
0.45	71	Meadow, non-grazed, HSG C
0.00	98	Paved parking, HSG C
0.09	72	Woods/grass comb., Good, HSG C
0.67	72	Weighted Average
0.67		100.00% Pervious Area
0.00		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0578	0.24		**Sheet Flow,** Range n= 0.130 P2= 2.90"
2.7	181	0.0254	1.12		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.1	231	Total			

Subcatchment PR-12: Subcat PR-12



Summary for Subcatchment PR-13: Subcat PR-13

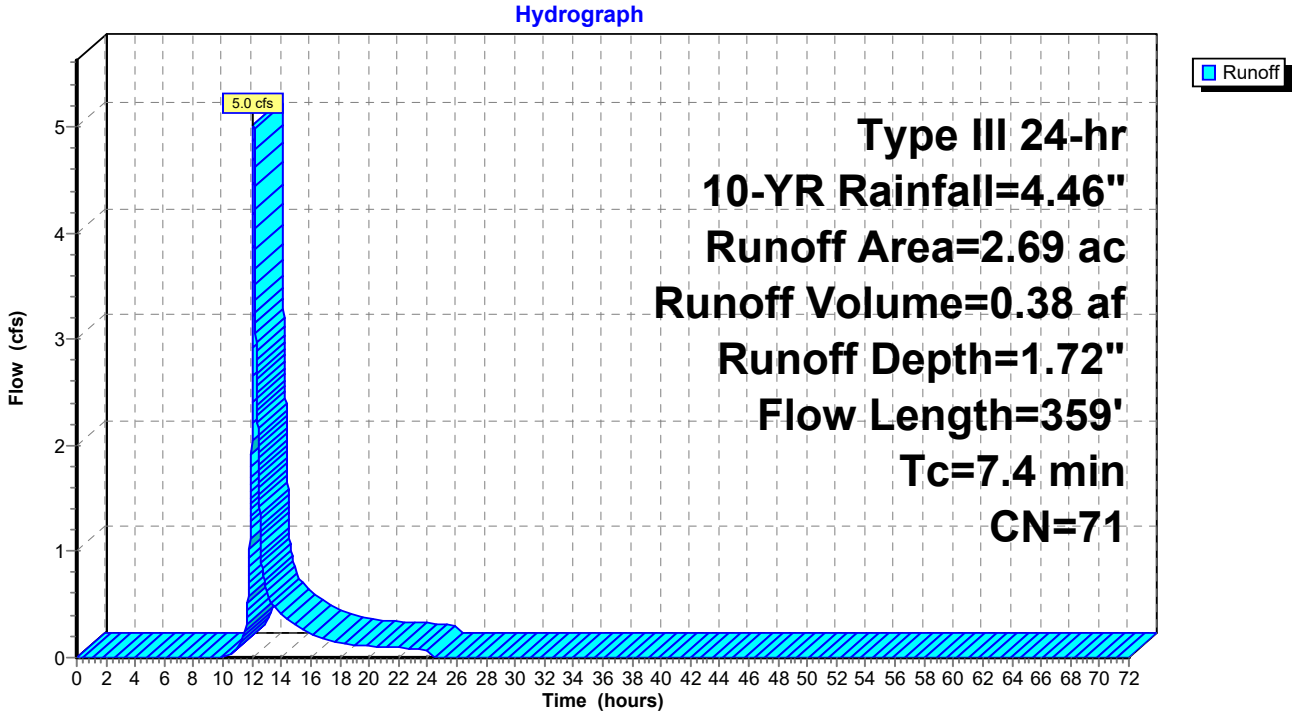
Runoff = 5.0 cfs @ 12.11 hrs, Volume= 0.38 af, Depth= 1.72"
Routed to Link DP-6 : North Hovey Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.24	74	>75% Grass cover, Good, HSG C
0.00	58	Meadow, non-grazed, HSG B
2.44	71	Meadow, non-grazed, HSG C
0.00	98	Unconnected roofs, HSG C
2.69	71	Weighted Average
2.69		99.99% Pervious Area
0.00		0.01% Impervious Area
0.00		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0346	0.20		**Sheet Flow, Meadow Sheet Flow** Range n= 0.130 P2= 2.90"
3.2	309	0.0544	1.63		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
7.4	359	Total			

Subcatchment PR-13: Subcat PR-13



Summary for Subcatchment PR-14: Subcat PR-14

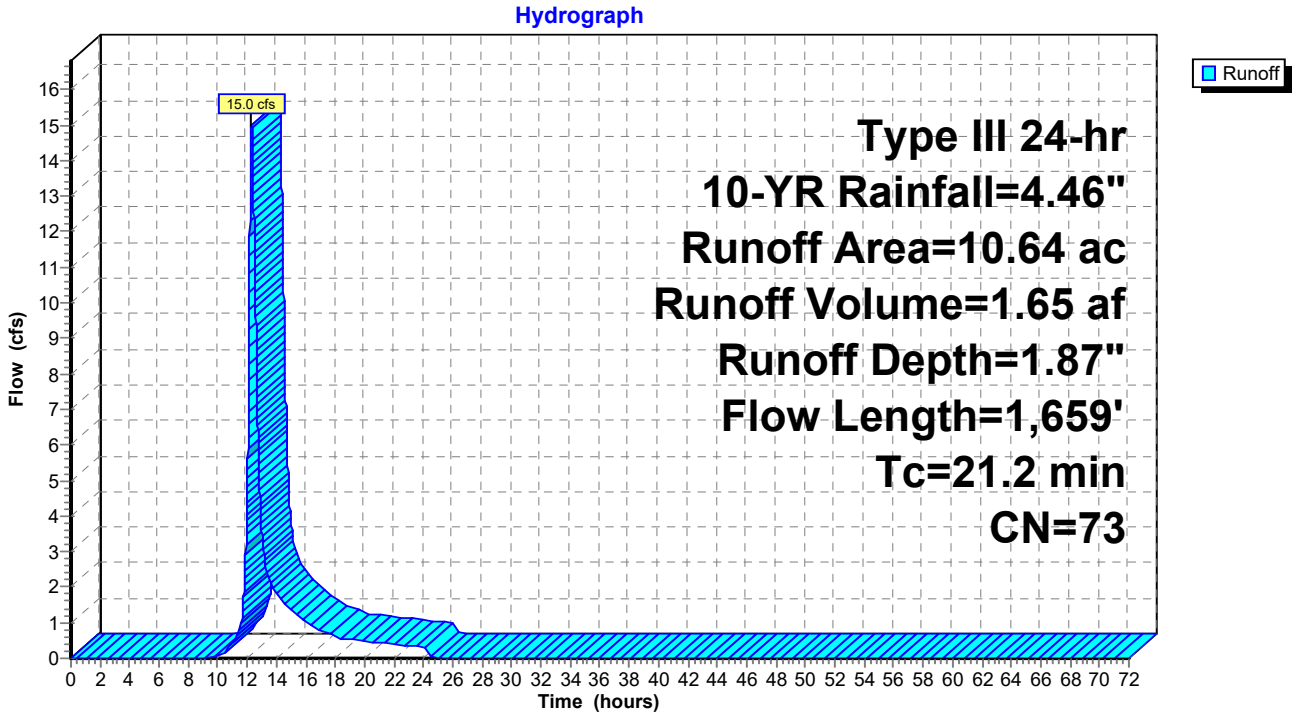
Runoff = 15.0 cfs @ 12.31 hrs, Volume= 1.65 af, Depth= 1.87"
Routed to Pond WC2 : Wetland Cross Culvert #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.22	61	>75% Grass cover, Good, HSG B
1.58	74	>75% Grass cover, Good, HSG C
0.01	80	>75% Grass cover, Good, HSG D
0.03	96	Gravel surface, HSG B
0.36	96	Gravel surface, HSG C
0.00	96	Gravel surface, HSG D
0.08	58	Meadow, non-grazed, HSG B
3.58	71	Meadow, non-grazed, HSG C
0.15	78	Meadow, non-grazed, HSG D
0.00	98	Paved parking, HSG C
0.00	98	Unconnected pavement, HSG C
0.00	98	Unconnected roofs, HSG C
0.00	58	Woods/grass comb., Good, HSG B
4.37	72	Woods/grass comb., Good, HSG C
0.25	79	Woods/grass comb., Good, HSG D
10.64	73	Weighted Average
10.64		100.00% Pervious Area
0.00		0.00% Impervious Area
0.00		97.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0276	0.16		**Sheet Flow, Meadow Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
9.8	637	0.0241	1.09		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
6.2	972	0.0125	2.61	57.06	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.50' Z= 2.3 '/' Top.W=14.50' n= 0.080 Earth, long dense weeds
21.2	1,659	Total			

Subcatchment PR-14: Subcat PR-14



Summary for Subcatchment PR-15: Subcat PR-15

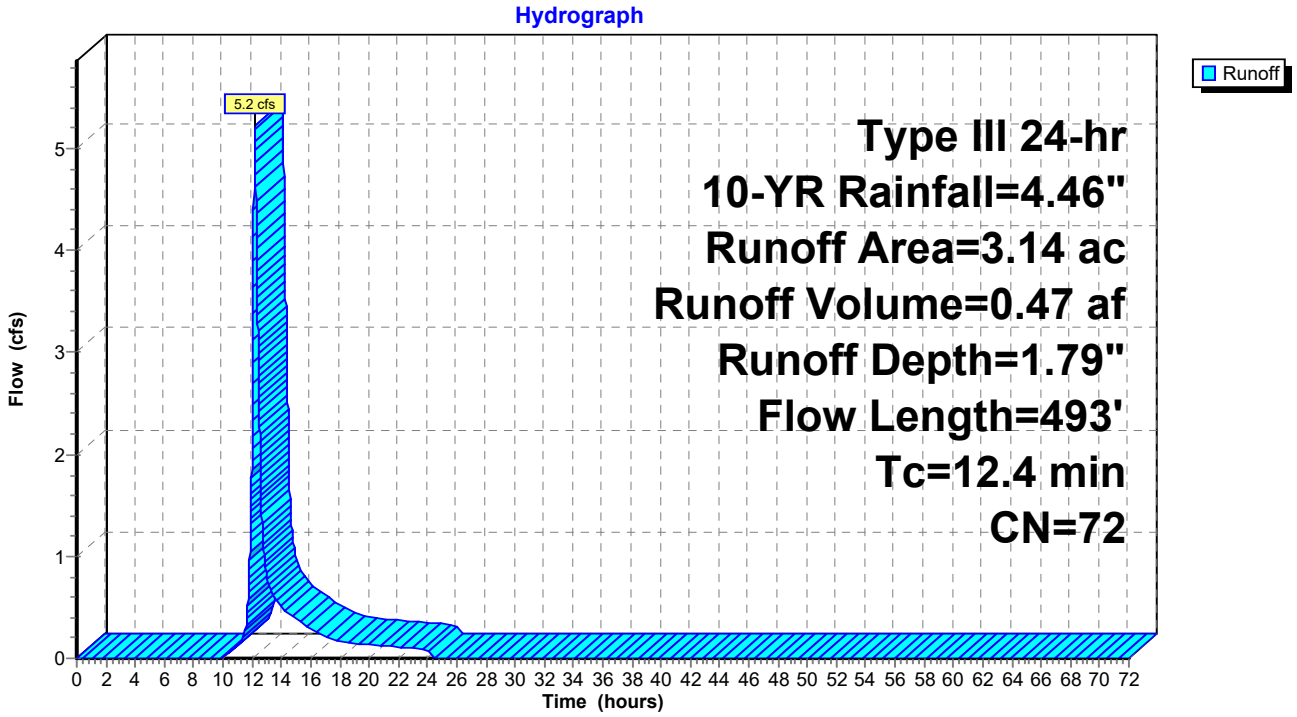
Runoff = 5.2 cfs @ 12.18 hrs, Volume= 0.47 af, Depth= 1.79"
Routed to Pond C15 : PR-15 culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.38	74	>75% Grass cover, Good, HSG C
0.00	80	>75% Grass cover, Good, HSG D
0.88	71	Meadow, non-grazed, HSG C
0.00	78	Meadow, non-grazed, HSG D
0.00	98	Paved parking, HSG C
0.00	58	Woods/grass comb., Good, HSG B
1.83	72	Woods/grass comb., Good, HSG C
0.05	79	Woods/grass comb., Good, HSG D
3.14	72	Weighted Average
3.14		100.00% Pervious Area
0.00		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0078	0.11		**Sheet Flow, Meadow Sheet Flow** Range n= 0.130 P2= 2.90"
3.8	246	0.0240	1.08		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
0.9	197	0.0224	3.49	76.38	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.50' Z= 2.3 '/' Top.W=14.50' n= 0.080
12.4	493	Total			

Subcatchment PR-15: Subcat PR-15



Summary for Subcatchment PR-16: Subcat PR-16

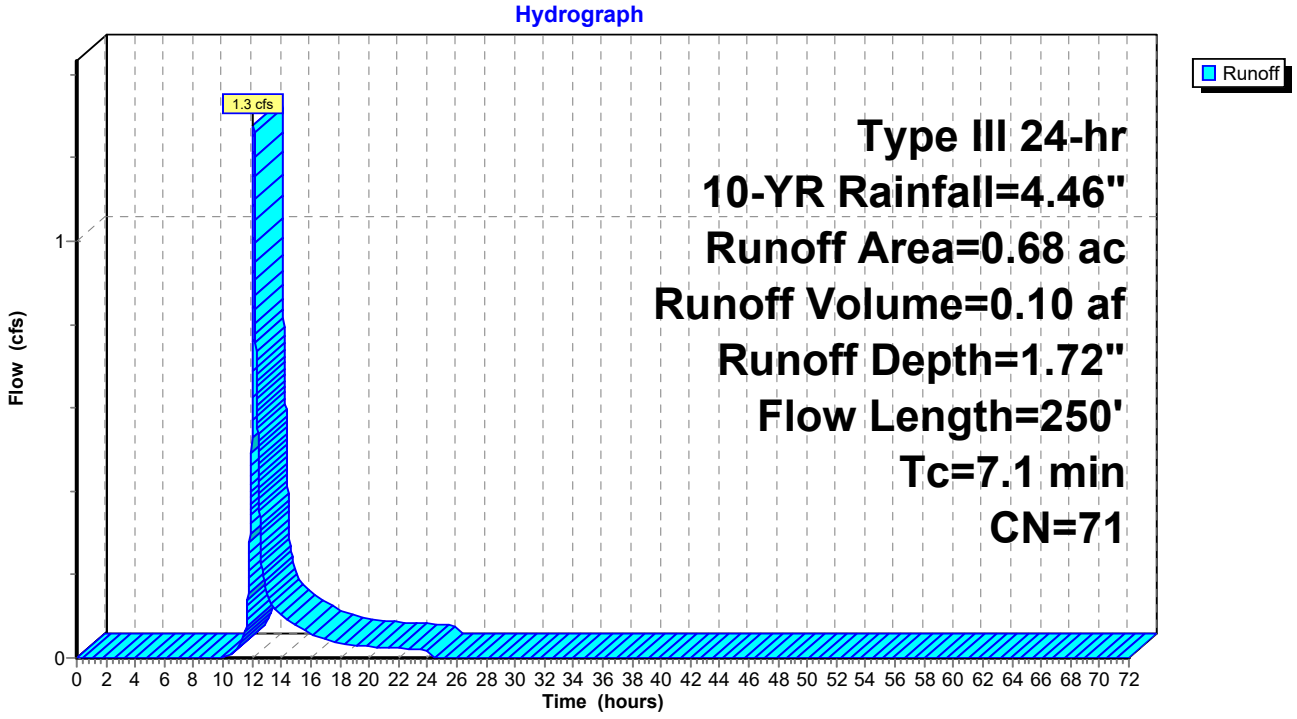
Runoff = 1.3 cfs @ 12.11 hrs, Volume= 0.10 af, Depth= 1.72"
Routed to Pond C16 : PR-16 culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.11	74	>75% Grass cover, Good, HSG C
0.00	58	Meadow, non-grazed, HSG B
0.33	71	Meadow, non-grazed, HSG C
0.16	70	Woods, Good, HSG C
0.08	72	Woods/grass comb., Good, HSG C
0.68	71	Weighted Average
0.68		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0354	0.20		**Sheet Flow, Meadow Sheet Flow** Range n= 0.130 P2= 2.90"
2.9	200	0.0274	1.16		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
7.1	250	Total			

Subcatchment PR-16: Subcat PR-16



Summary for Subcatchment PR-17: Subcat PR-17

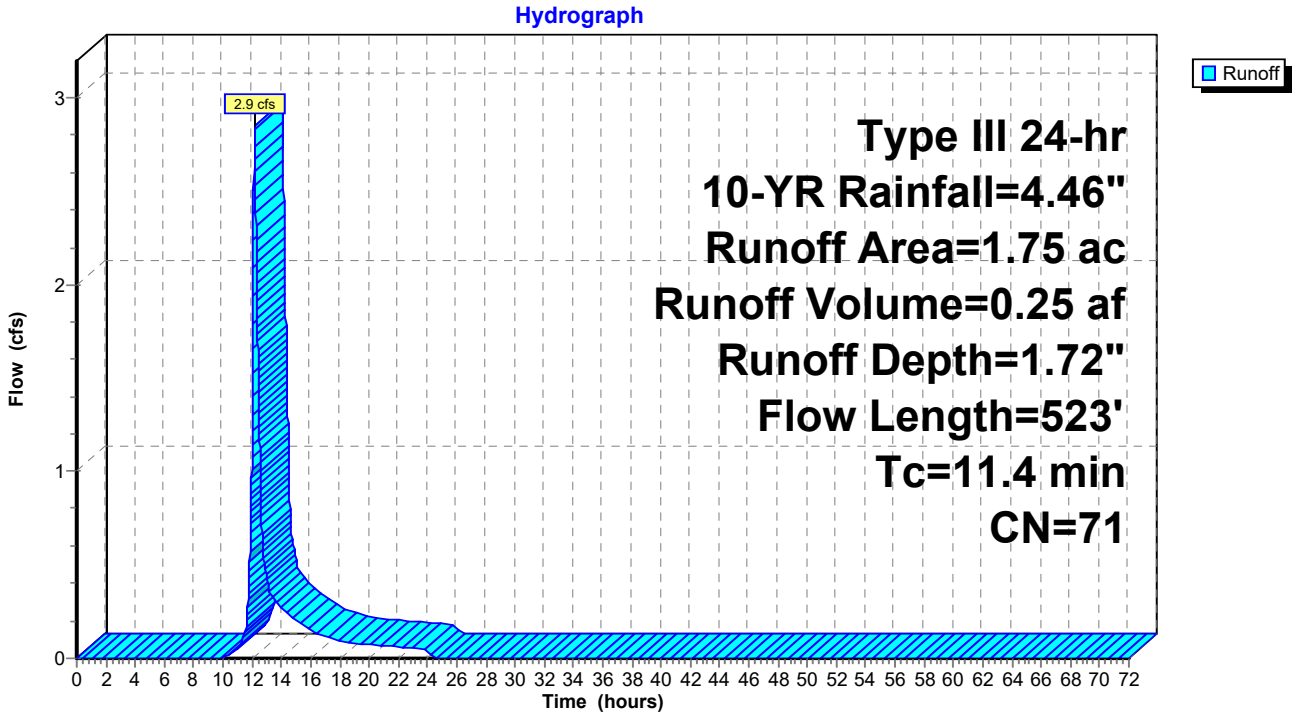
Runoff = 2.9 cfs @ 12.17 hrs, Volume= 0.25 af, Depth= 1.72"
Routed to Pond C17 : PR-17 culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.07	74	>75% Grass cover, Good, HSG C
0.01	58	Meadow, non-grazed, HSG B
1.38	71	Meadow, non-grazed, HSG C
0.00	70	Woods, Good, HSG C
0.29	72	Woods/grass comb., Good, HSG C
1.75	71	Weighted Average
1.75		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0280	0.18		**Sheet Flow, Meadow Sheet Flow** Range n= 0.130 P2= 2.90"
1.3	121	0.0525	1.60		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
0.8	44	0.0159	0.88		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
1.2	62	0.0162	0.89		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
2.8	190	0.0267	1.14		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
0.7	56	0.0339	1.29		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
11.4	523	Total			

Subcatchment PR-17: Subcat PR-17



Summary for Subcatchment PR-18: Subcat PR-18

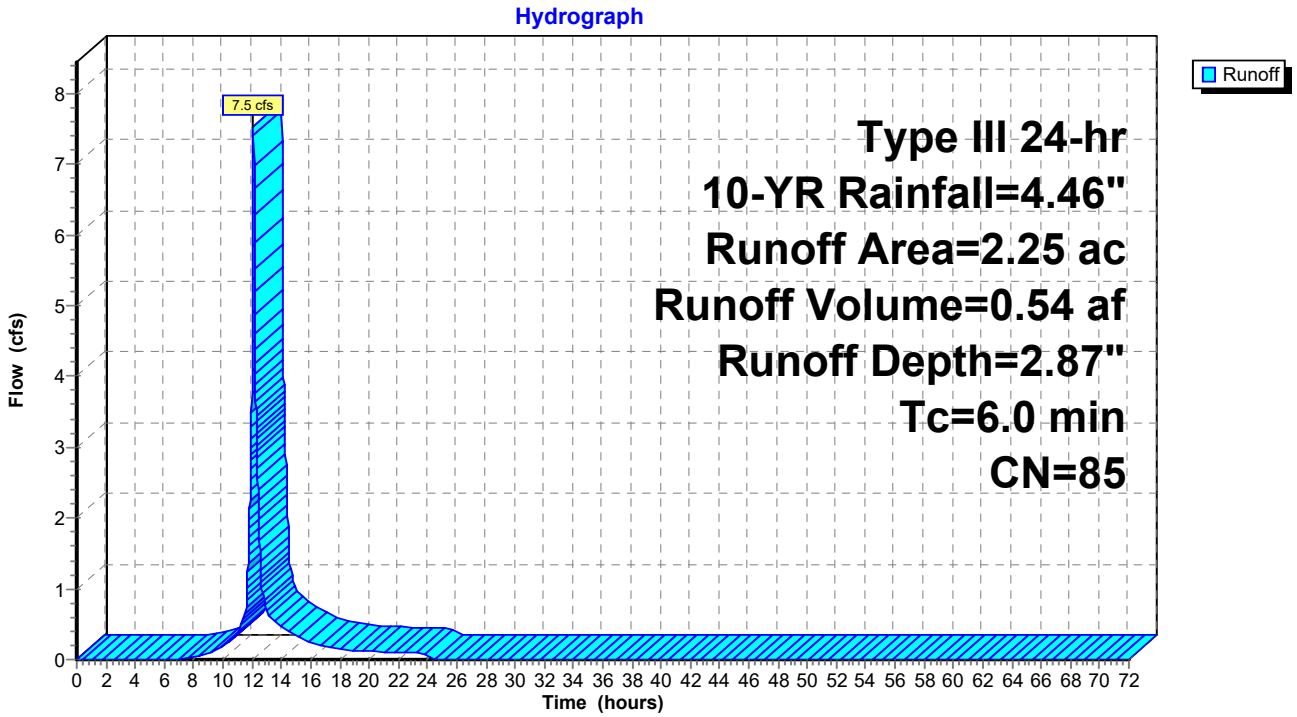
Runoff = 7.5 cfs @ 12.09 hrs, Volume= 0.54 af, Depth= 2.87"
Routed to Pond 8P : Amenity Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.03	74	>75% Grass cover, Good, HSG C
0.05	96	Gravel surface, HSG C
0.17	71	Meadow, non-grazed, HSG C
0.54	98	Paved parking, HSG C
0.29	98	Unconnected pavement, HSG C
0.17	98	Unconnected roofs, HSG C
2.25	85	Weighted Average
1.25		55.47% Pervious Area
1.00		44.53% Impervious Area
0.46		46.20% Unconnected

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

Subcatchment PR-18: Subcat PR-18



Summary for Subcatchment PR-19: Subcat PR-19

[47] Hint: Peak is 113% of capacity of segment #3

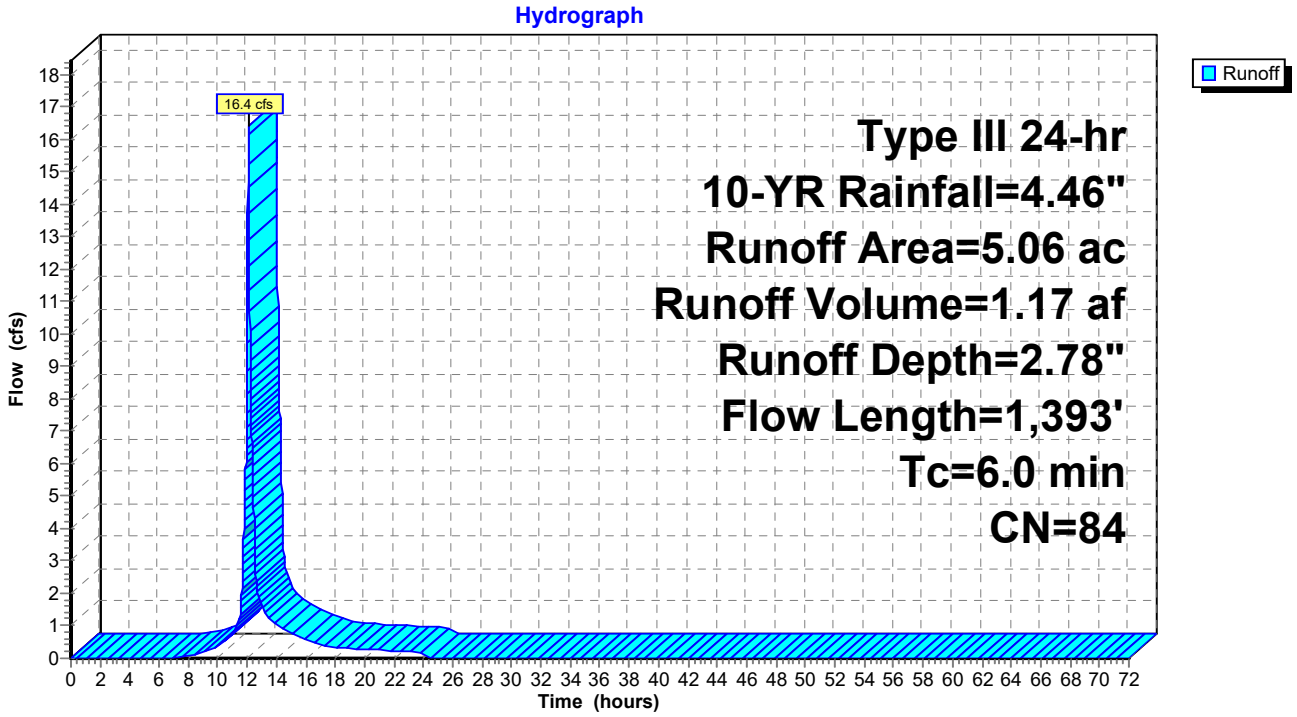
Runoff = 16.4 cfs @ 12.09 hrs, Volume= 1.17 af, Depth= 2.78"
Routed to Pond 9P : Cluster E Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.97	74	>75% Grass cover, Good, HSG C
0.00	80	>75% Grass cover, Good, HSG D
0.96	71	Meadow, non-grazed, HSG C
1.30	98	Paved parking, HSG C
0.01	98	Paved parking, HSG D
0.82	98	Unconnected roofs, HSG C
0.00	72	Woods/grass comb., Good, HSG C
5.06	84	Weighted Average
2.93		57.91% Pervious Area
2.13		42.09% Impervious Area
0.82		38.60% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.14		**Sheet Flow, Pavement Sheet Flow** Smooth surfaces n= 0.011 P2= 2.90"
1.3	198	0.0168	2.63		**Shallow Concentrated Flow, Shallow Concentrated Pavement** Paved Kv= 20.3 fps
2.3	1,145	0.0190	8.19	14.48	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
1.7					**Direct Entry,**
6.0	1,393	Total			

Subcatchment PR-19: Subcat PR-19



Summary for Subcatchment PR-2: Subcat PR-2

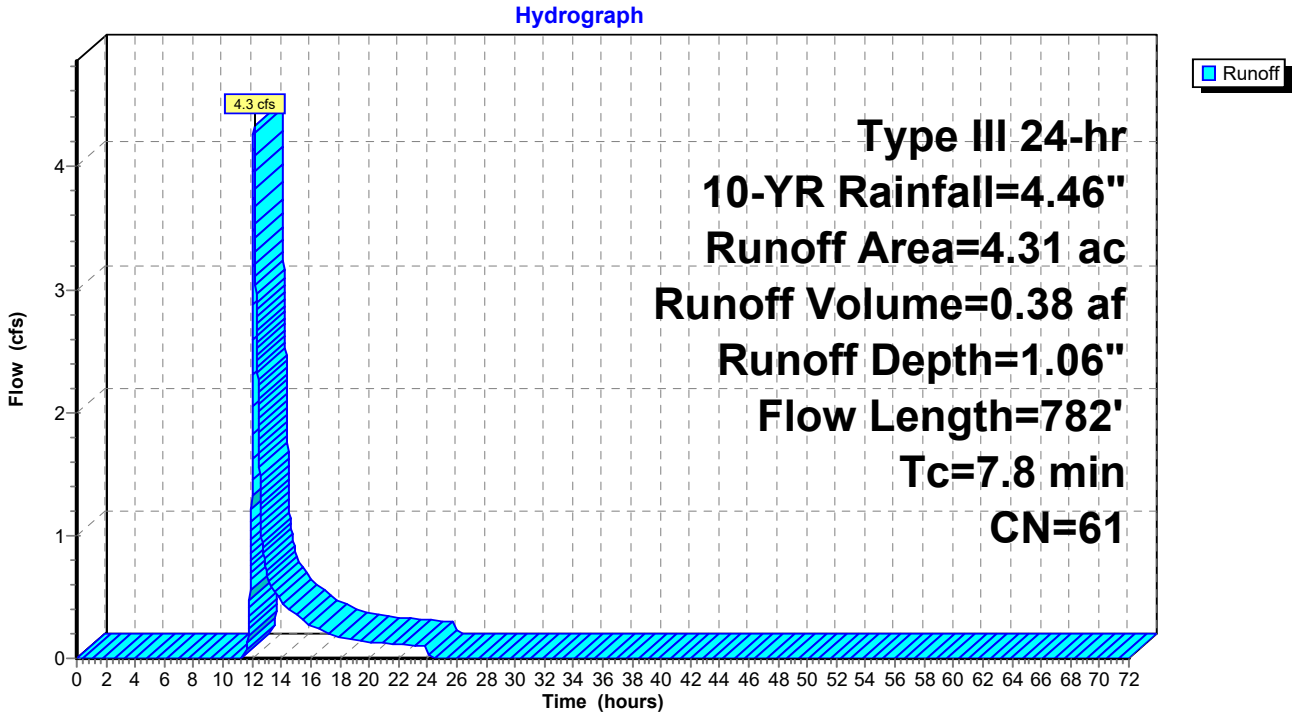
Runoff = 4.3 cfs @ 12.13 hrs, Volume= 0.38 af, Depth= 1.06"
Routed to Pond 1P : Primary Detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.96	61	>75% Grass cover, Good, HSG B
0.03	74	>75% Grass cover, Good, HSG C
0.04	96	Gravel surface, HSG B
2.04	58	Meadow, non-grazed, HSG B
0.09	71	Meadow, non-grazed, HSG C
0.14	98	Paved parking, HSG B
0.00	55	Woods, Good, HSG B
4.31	61	Weighted Average
4.17		96.73% Pervious Area
0.14		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	41	0.3400	0.29		**Sheet Flow, Sheet Meadow Flow** Grass: Dense n= 0.240 P2= 2.90"
2.6	253	0.0530	1.61		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
0.1	22	0.0759	4.44		**Shallow Concentrated Flow, Gravel Walk** Unpaved Kv= 16.1 fps
2.6	355	0.1040	2.26		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Short Grass Pasture Kv= 7.0 fps
0.1	111	0.1370	17.04	190.85	**Channel Flow, Channel Flow** Area= 11.2 sf Perim= 12.5' r= 0.90' n= 0.030 Earth, grassed & winding
7.8	782	Total			

Subcatchment PR-2: Subcat PR-2



Summary for Subcatchment PR-20: Subcat PR-20

[47] Hint: Peak is 127% of capacity of segment #4

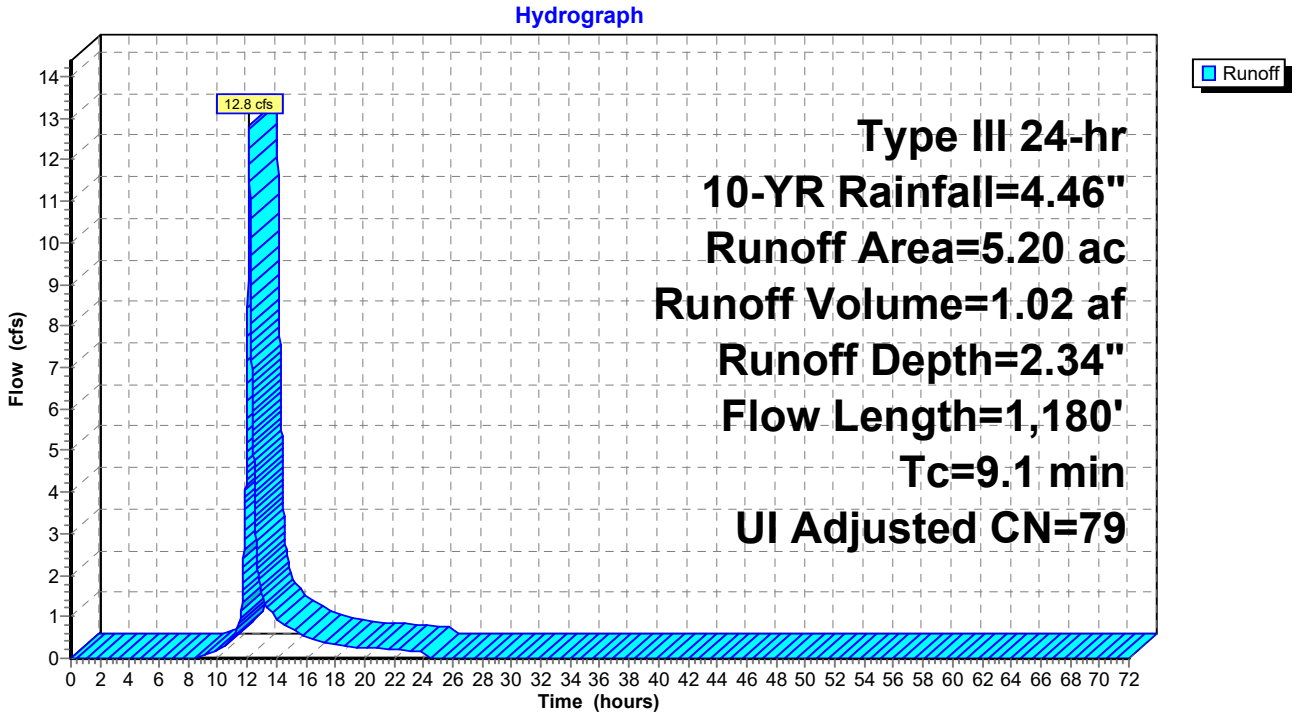
Runoff = 12.8 cfs @ 12.13 hrs, Volume= 1.02 af, Depth= 2.34"
Routed to Pond 10P : Cluster D Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

	Area (ac)	CN	Adj	Description
	1.22	74		>75% Grass cover, Good, HSG C
	0.00	96		Gravel surface, HSG C
	0.00	58		Meadow, non-grazed, HSG B
*	2.26	72		Meadow, non-grazed, HSG C
	1.12	98		Paved parking, HSG C
	0.00	98		Paved parking, HSG D
	0.42	98		Unconnected roofs, HSG C
	0.18	70		Woods, Good, HSG C
	0.00	72		Woods/grass comb., Good, HSG C
	5.20	80	79	Weighted Average, UI Adjusted
	3.66			70.38% Pervious Area
	1.54			29.62% Impervious Area
	0.42			27.27% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0650	0.25		**Sheet Flow, Pavement Sheet Flow** Range n= 0.130 P2= 2.90"
2.0	178	0.0457	1.50		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
1.3	103	0.0378	1.36		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
2.5	849	0.0093	5.73	10.13	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Concrete pipe, bends & connections
9.1	1,180	Total			

Subcatchment PR-20: Subcat PR-20



Summary for Subcatchment PR-21: Subcat PR-21

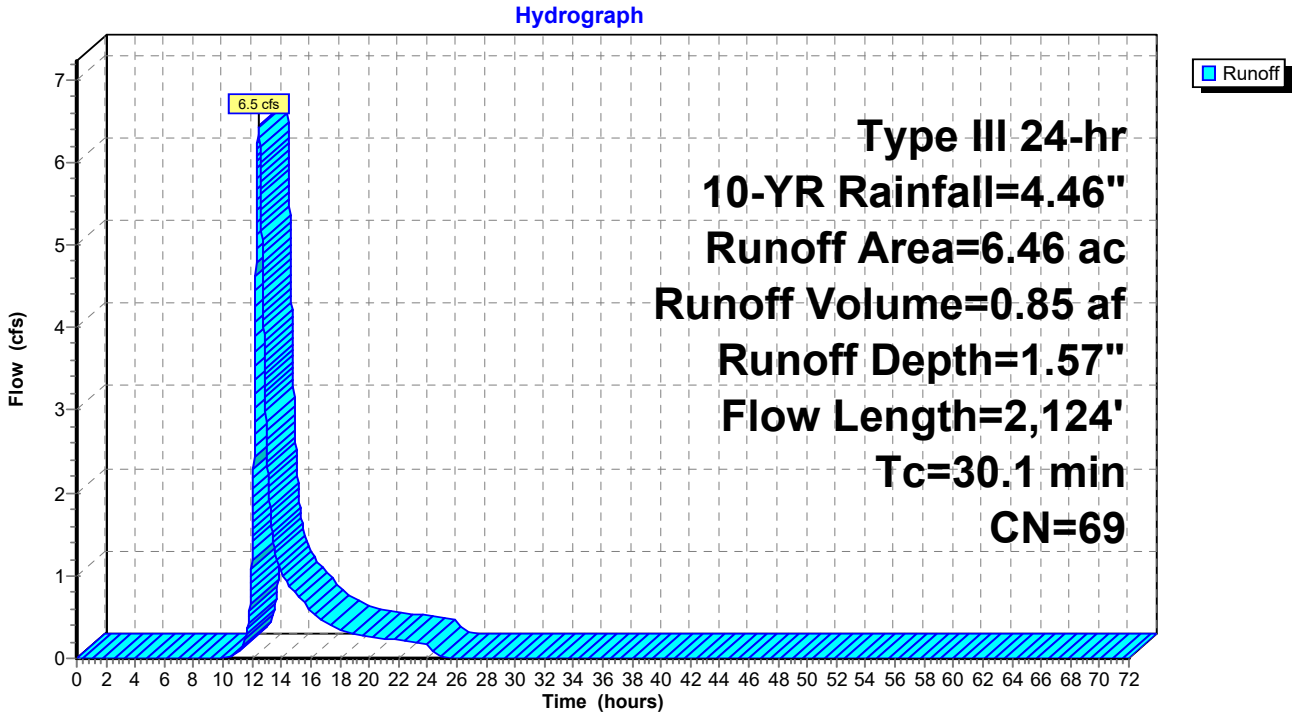
Runoff = 6.5 cfs @ 12.45 hrs, Volume= 0.85 af, Depth= 1.57"
Routed to Pond WC1 : Wetland Cross Culvert #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.18	61	>75% Grass cover, Good, HSG B
0.51	74	>75% Grass cover, Good, HSG C
0.00	80	>75% Grass cover, Good, HSG D
0.79	58	Meadow, non-grazed, HSG B
2.43	71	Meadow, non-grazed, HSG C
0.01	78	Meadow, non-grazed, HSG D
0.00	98	Paved parking, HSG B
0.00	98	Paved parking, HSG C
0.00	98	Unconnected roofs, HSG C
0.26	55	Woods, Good, HSG B
0.86	70	Woods, Good, HSG C
0.10	77	Woods, Good, HSG D
0.00	58	Woods/grass comb., Good, HSG B
1.30	72	Woods/grass comb., Good, HSG C
0.02	79	Woods/grass comb., Good, HSG D
6.46	69	Weighted Average
6.46		99.99% Pervious Area
0.00		0.01% Impervious Area
0.00		85.18% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0264	0.18		**Sheet Flow, Meadow Sheet Flow** Range n= 0.130 P2= 2.90"
23.2	1,461	0.0224	1.05		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
2.2	613	0.0331	4.71	139.90	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=3.00' Z= 2.3 '/' Top.W=16.80' n= 0.080
30.1	2,124	Total			

Subcatchment PR-21: Subcat PR-21



Summary for Subcatchment PR-22: Subcat PR-22

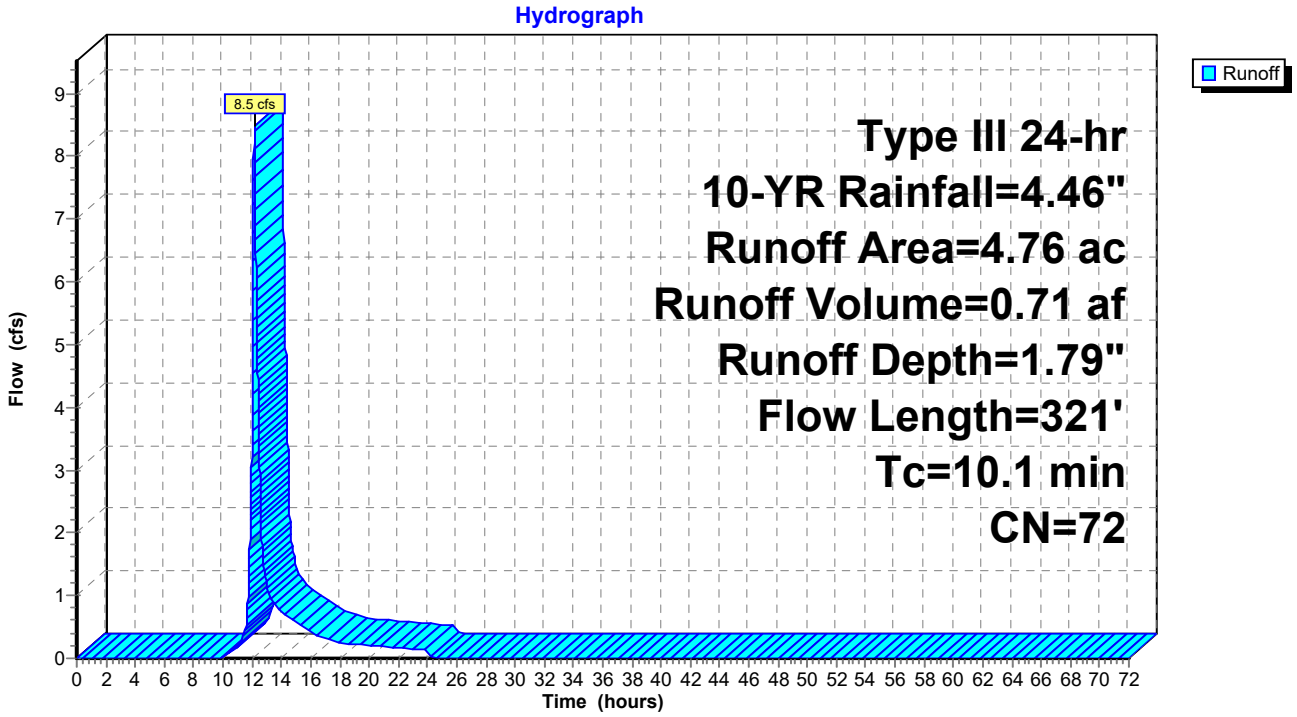
Runoff = 8.5 cfs @ 12.15 hrs, Volume= 0.71 af, Depth= 1.79"
Routed to Link DP-4 : Spring Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.25	74	>75% Grass cover, Good, HSG C
0.06	96	Gravel surface, HSG C
0.00	58	Meadow, non-grazed, HSG B
2.67	71	Meadow, non-grazed, HSG C
0.00	98	Paved parking, HSG C
0.00	98	Unconnected roofs, HSG C
0.00	55	Woods, Good, HSG B
0.81	70	Woods, Good, HSG C
0.96	72	Woods/grass comb., Good, HSG C
4.76	72	Weighted Average
4.75		99.95% Pervious Area
0.00		0.05% Impervious Area
0.00		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0134	0.13		**Sheet Flow, Meadow Sheet** Range n= 0.130 P2= 2.90"
3.0	205	0.0267	1.14		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
0.7	54	0.0350	1.31		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
0.2	12	0.0200	0.99		**Shallow Concentrated Flow, Shallow Concentrated** Short Grass Pasture Kv= 7.0 fps
10.1	321	Total			

Subcatchment PR-22: Subcat PR-22



Summary for Subcatchment PR-23: Subcat PR-23

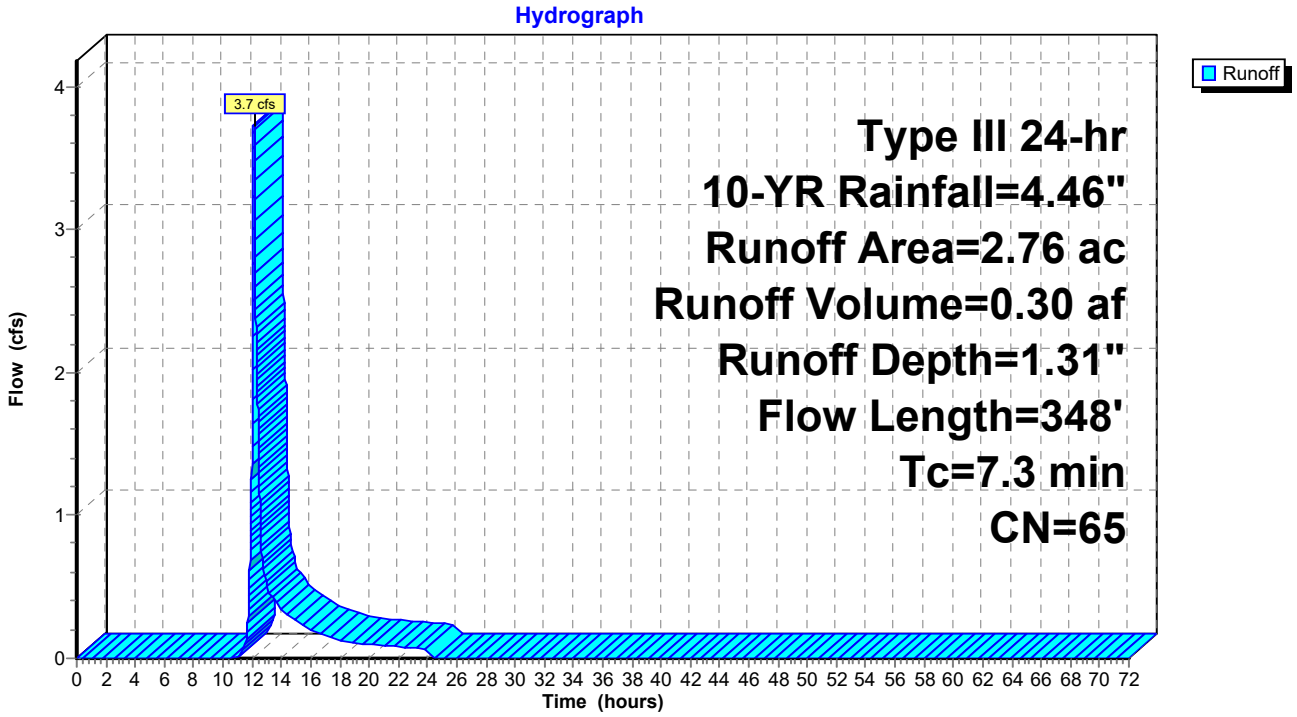
Runoff = 3.7 cfs @ 12.11 hrs, Volume= 0.30 af, Depth= 1.31"
Routed to Link DP-1 : Existing 18" Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.19	61	>75% Grass cover, Good, HSG B
0.00	74	>75% Grass cover, Good, HSG C
1.56	58	Meadow, non-grazed, HSG B
0.00	71	Meadow, non-grazed, HSG C
0.00	78	Meadow, non-grazed, HSG D
0.34	98	Paved parking, HSG B
0.00	98	Paved parking, HSG C
0.00	98	Paved parking, HSG D
0.01	98	Unconnected roofs, HSG B
0.18	55	Woods, Good, HSG B
0.13	70	Woods, Good, HSG C
0.08	58	Woods/grass comb., Good, HSG B
0.27	72	Woods/grass comb., Good, HSG C
2.76	65	Weighted Average
2.41		87.40% Pervious Area
0.35		12.60% Impervious Area
0.01		3.33% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0470	0.22		**Sheet Flow,** Range n= 0.130 P2= 2.90"
3.6	298	0.0397	1.39		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	348	Total			

Subcatchment PR-23: Subcat PR-23



Summary for Subcatchment PR-24: Subcat PR-24

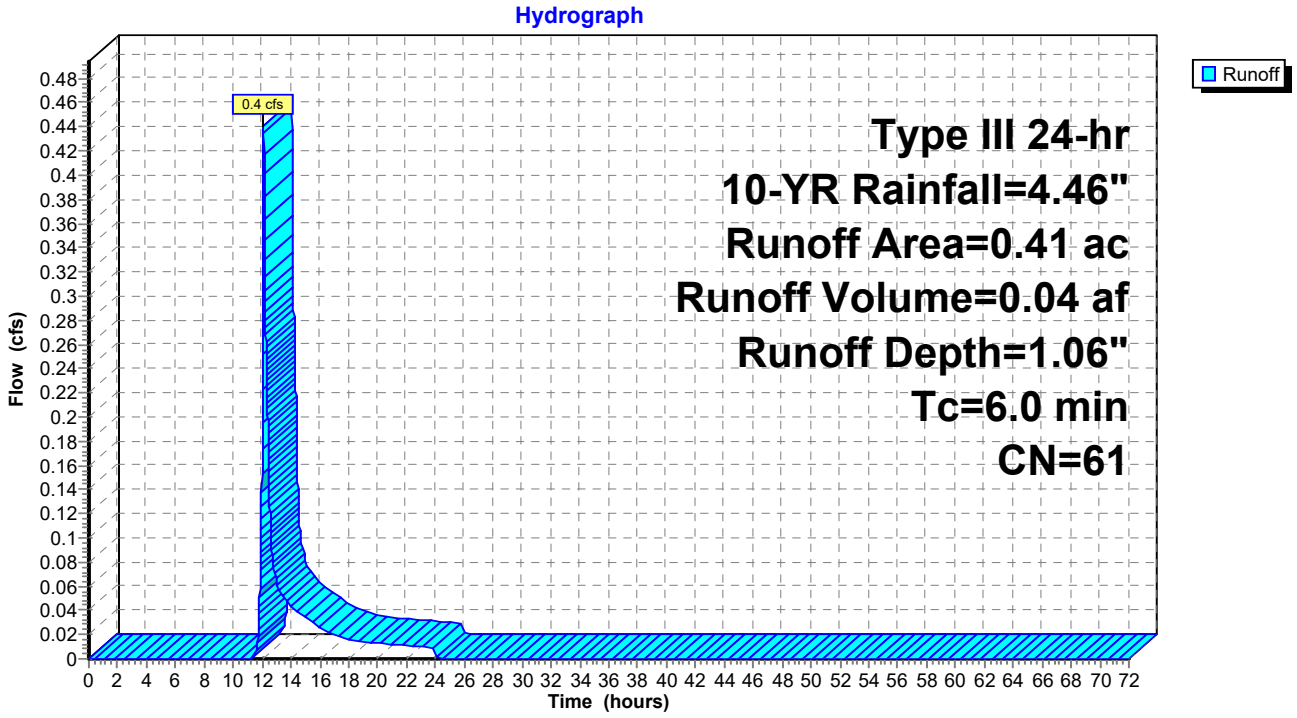
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.04 af, Depth= 1.06"
Routed to Pond 2P : Left Side Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.41	61	>75% Grass cover, Good, HSG B
0.41		100.00% Pervious Area

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

Subcatchment PR-24: Subcat PR-24



Summary for Subcatchment PR-3: Subcat PR-3

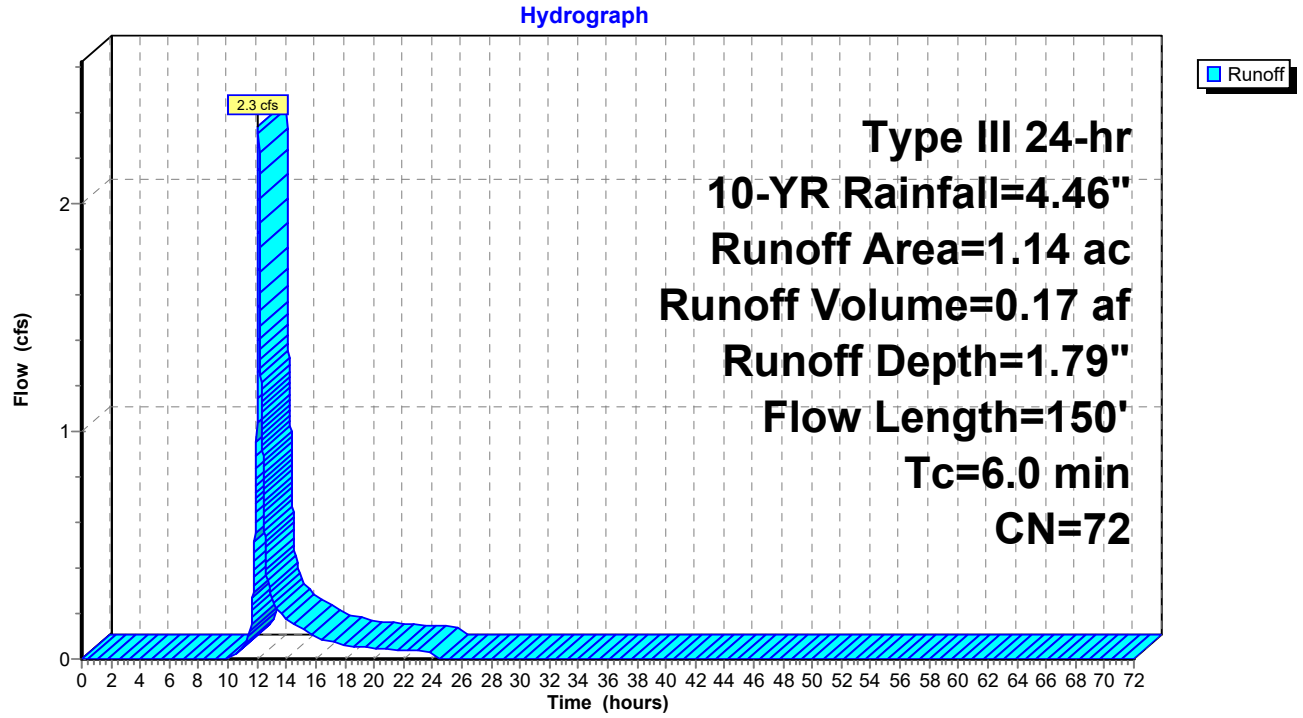
Runoff = 2.3 cfs @ 12.09 hrs, Volume= 0.17 af, Depth= 1.79"
Routed to Link DP-3 : Hovey Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.21	74	>75% Grass cover, Good, HSG C
0.00	96	Gravel surface, HSG B
0.03	96	Gravel surface, HSG C
0.01	58	Meadow, non-grazed, HSG B
0.88	71	Meadow, non-grazed, HSG C
0.00	55	Woods, Good, HSG B
1.14	72	Weighted Average
1.14		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0334	0.19		**Sheet Flow,** Range n= 0.130 P2= 2.90"
1.3	100	0.0332	1.28		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4					**Direct Entry,**
6.0	150	Total			

Subcatchment PR-3: Subcat PR-3



Summary for Subcatchment PR-4: Subcat PR-4

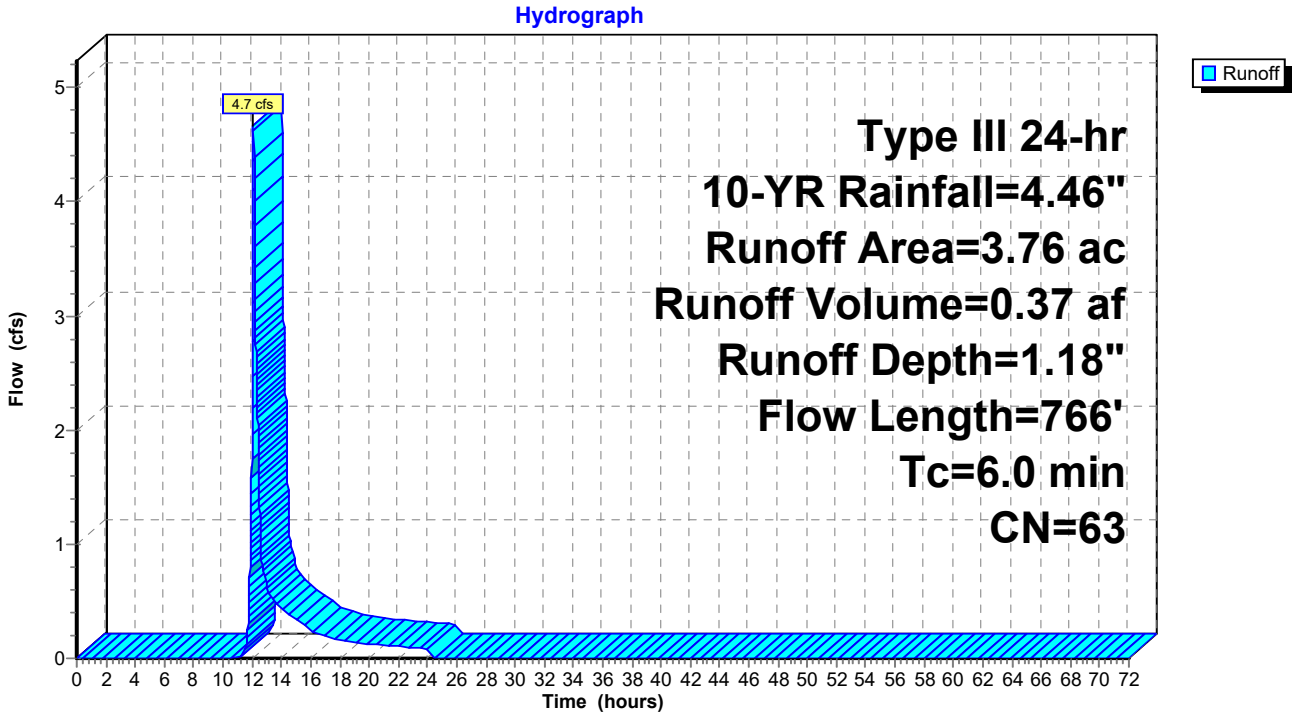
Runoff = 4.7 cfs @ 12.10 hrs, Volume= 0.37 af, Depth= 1.18"
Routed to Pond C4 : CULVERT #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
3.39	61	>75% Grass cover, Good, HSG B
0.28	74	>75% Grass cover, Good, HSG C
0.08	96	Gravel surface, HSG B
0.00	96	Gravel surface, HSG C
0.00	98	Paved parking, HSG B
3.76	63	Weighted Average
3.76		100.00% Pervious Area
0.00		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	50	0.0440	9.66	108.16	**Channel Flow, Swale Flow** Area= 11.2 sf Perim= 12.5' r= 0.90' n= 0.030 Earth, grassed & winding
3.8	716	0.0443	3.16		**Shallow Concentrated Flow, Channel** Grassed Waterway Kv= 15.0 fps
2.1					**Direct Entry, Entry to attain minimum TC**
6.0	766	Total			

Subcatchment PR-4: Subcat PR-4



Summary for Subcatchment PR-5: Subcat PR-5

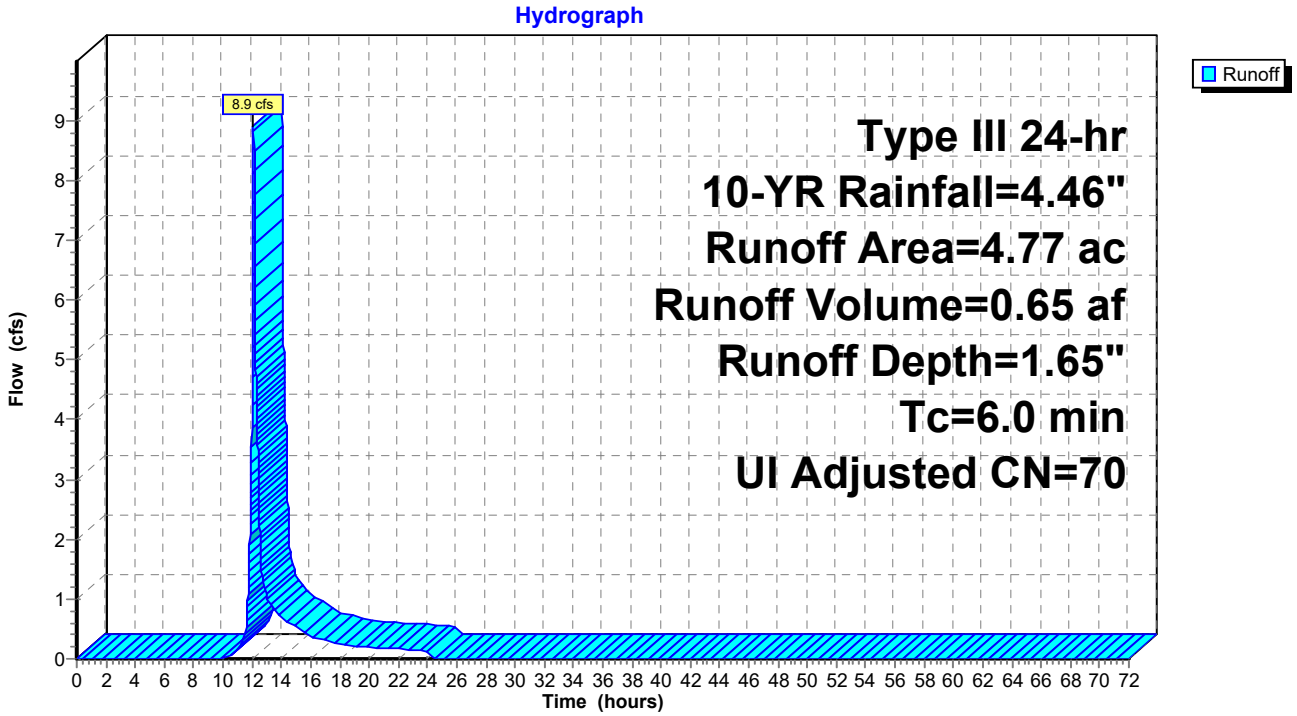
Runoff = 8.9 cfs @ 12.09 hrs, Volume= 0.65 af, Depth= 1.65"
Routed to Pond 3P : Sand Filter #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Adj	Description
3.25	61		>75% Grass cover, Good, HSG B
0.15	74		>75% Grass cover, Good, HSG C
0.00	58		Meadow, non-grazed, HSG B
0.77	98		Paved parking, HSG B
0.08	98		Paved parking, HSG C
0.45	98		Unconnected roofs, HSG B
0.07	98		Unconnected roofs, HSG C
4.77	72	70	Weighted Average, UI Adjusted
3.40			71.26% Pervious Area
1.37			28.74% Impervious Area
0.52			37.75% Unconnected

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

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

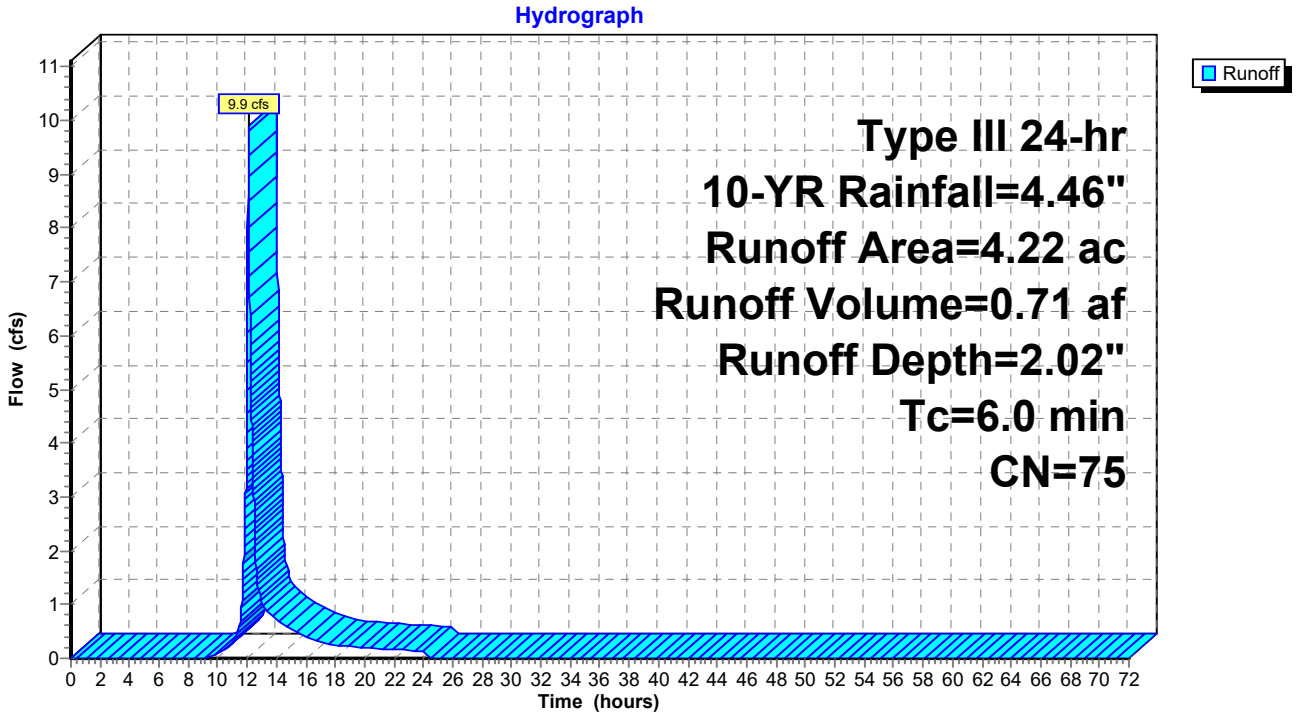
Runoff = 9.9 cfs @ 12.09 hrs, Volume= 0.71 af, Depth= 2.02"
Routed to Pond 4P : Sand Filter #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.17	61	>75% Grass cover, Good, HSG B
0.23	74	>75% Grass cover, Good, HSG C
0.00	96	Gravel surface, HSG B
0.01	96	Gravel surface, HSG C
1.07	58	Meadow, non-grazed, HSG B
0.24	71	Meadow, non-grazed, HSG C
0.89	98	Paved parking, HSG B
0.15	98	Paved parking, HSG C
0.40	98	Unconnected roofs, HSG B
0.08	98	Unconnected roofs, HSG C
4.22	75	Weighted Average
2.71		64.30% Pervious Area
1.51		35.70% Impervious Area
0.47		31.49% Unconnected

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

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

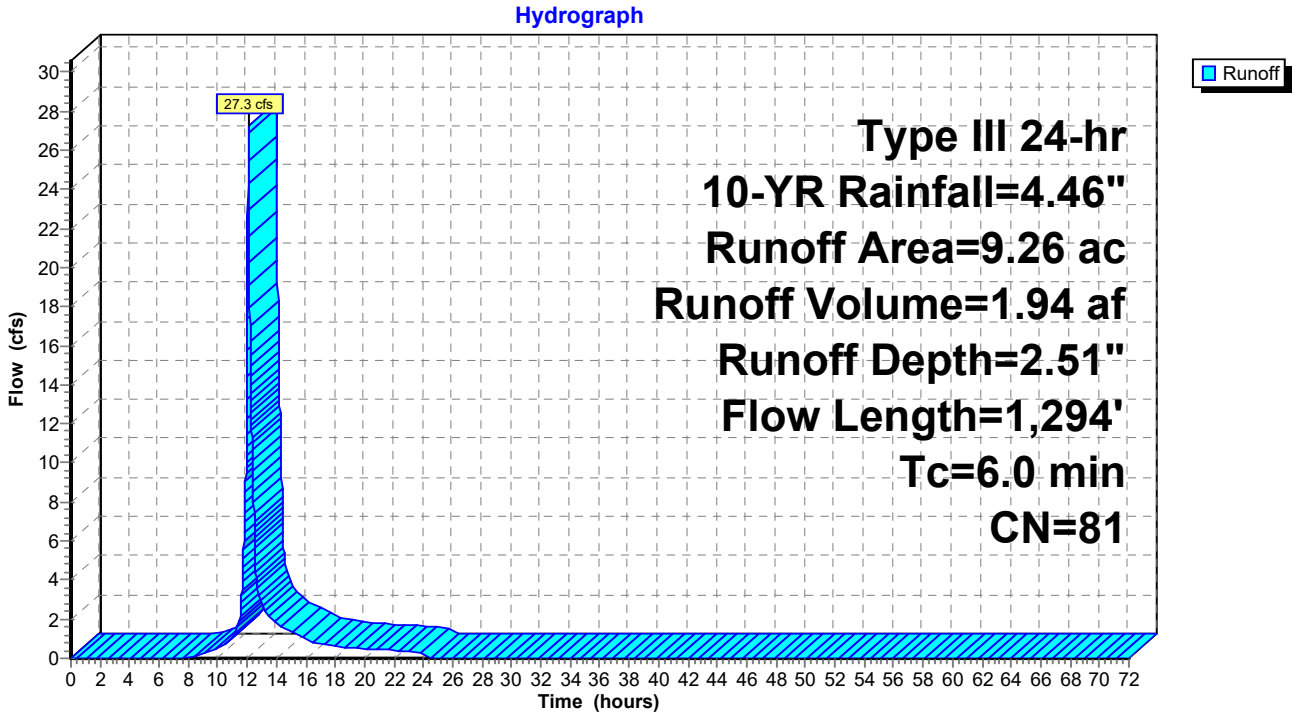
Runoff = 27.3 cfs @ 12.09 hrs, Volume= 1.94 af, Depth= 2.51"
Routed to Pond 5P : Sand Filter #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.28	61	>75% Grass cover, Good, HSG B
5.04	74	>75% Grass cover, Good, HSG C
0.01	96	Gravel surface, HSG C
0.00	58	Meadow, non-grazed, HSG B
0.94	71	Meadow, non-grazed, HSG C
0.01	98	Paved parking, HSG B
1.84	98	Paved parking, HSG C
0.03	98	Unconnected roofs, HSG B
1.10	98	Unconnected roofs, HSG C
9.26	81	Weighted Average
6.27		67.70% Pervious Area
2.99		32.30% Impervious Area
1.14		38.04% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	50	0.0100	0.86		**Sheet Flow, Meadow Sheet Flow** Smooth surfaces n= 0.011 P2= 2.90"
3.3	402	0.0100	2.03		**Shallow Concentrated Flow, Shallow Concentrated Meadow** Paved Kv= 20.3 fps
1.3	842	0.0135	10.96	77.50	**Pipe Channel, Pipe Flow** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Corrugated PE, smooth interior
0.4					**Direct Entry,**
6.0	1,294	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-8: Subcat PR-8

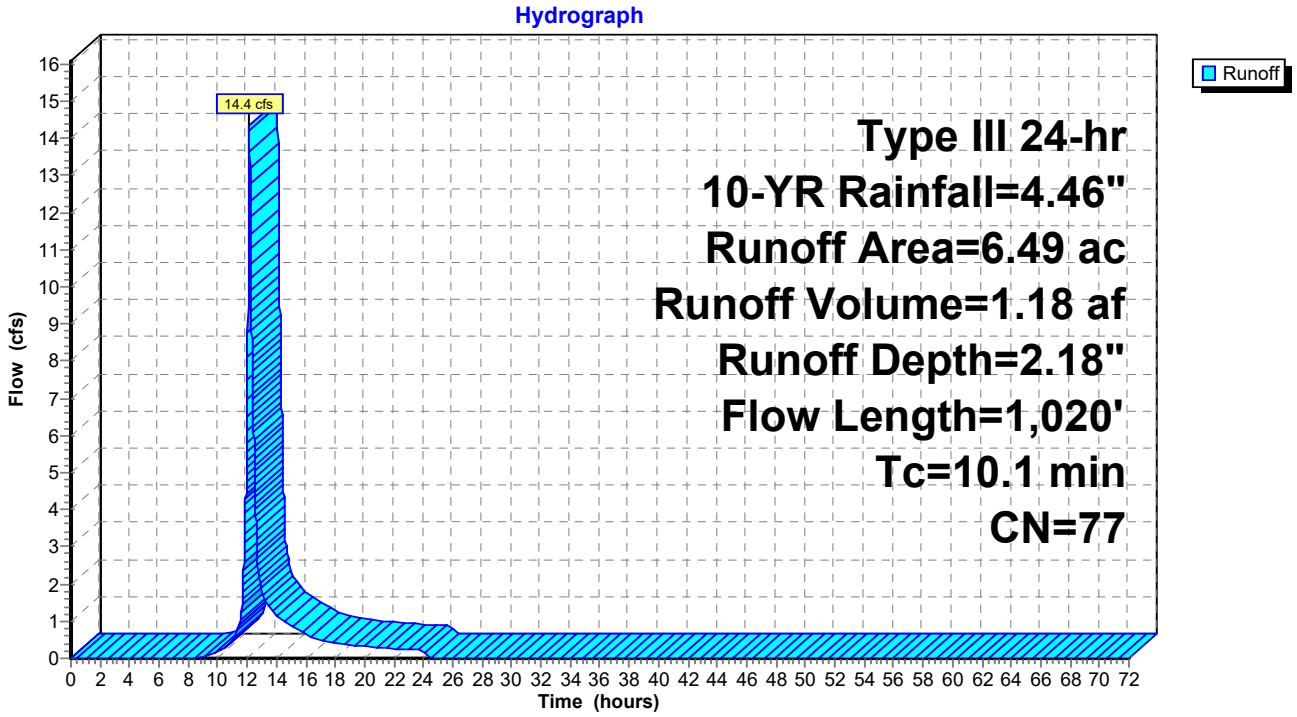
Runoff = 14.4 cfs @ 12.14 hrs, Volume= 1.18 af, Depth= 2.18"
Routed to Pond 6P : Sand Filter #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
3.42	61	>75% Grass cover, Good, HSG B
0.12	74	>75% Grass cover, Good, HSG C
0.08	96	Gravel surface, HSG B
0.00	96	Gravel surface, HSG C
0.09	58	Meadow, non-grazed, HSG B
0.00	71	Meadow, non-grazed, HSG C
1.67	98	Paved parking, HSG B
0.24	98	Paved parking, HSG C
0.00	98	Paved parking, HSG D
0.16	98	Unconnected pavement, HSG C
0.70	98	Unconnected roofs, HSG B
0.00	98	Unconnected roofs, HSG C
6.49	77	Weighted Average
3.71		57.23% Pervious Area
2.78		42.77% Impervious Area
0.86		31.16% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0100	0.11		**Sheet Flow, Grass Sheet Flow** Grass: Short n= 0.150 P2= 2.90"
1.1	211	0.0267	3.32		**Shallow Concentrated Flow, Shallow Concentrated Pavement** Paved Kv= 20.3 fps
1.2	759	0.0316	10.57	18.67	**Pipe Channel, Pipe Flow** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
10.1	1,020	Total			

Subcatchment PR-8: Subcat PR-8



Summary for Subcatchment PR-9: Subcat PR-9

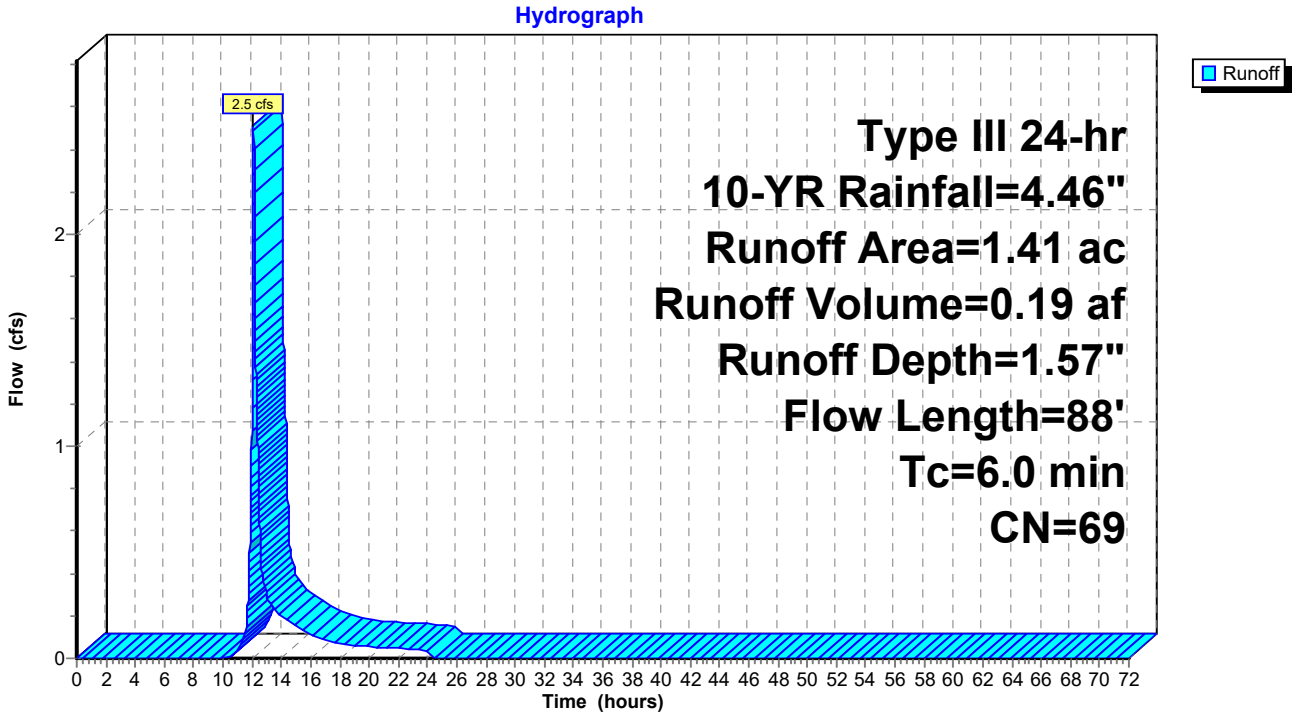
Runoff = 2.5 cfs @ 12.09 hrs, Volume= 0.19 af, Depth= 1.57"
Routed to Link DP-5 : Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.00	61	>75% Grass cover, Good, HSG B
0.12	74	>75% Grass cover, Good, HSG C
0.09	58	Meadow, non-grazed, HSG B
0.44	71	Meadow, non-grazed, HSG C
0.00	98	Paved parking, HSG C
0.08	55	Woods, Good, HSG B
0.68	70	Woods, Good, HSG C
1.41	69	Weighted Average
1.41		100.00% Pervious Area
0.00		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.0222	0.16		**Sheet Flow, Sheet Meadow Flow** Range n= 0.130 P2= 2.90"
0.6	38	0.0526	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3					**Direct Entry,**
6.0	88	Total			

Subcatchment PR-9: Subcat PR-9



Summary for Reach 1R: Thru PR-15

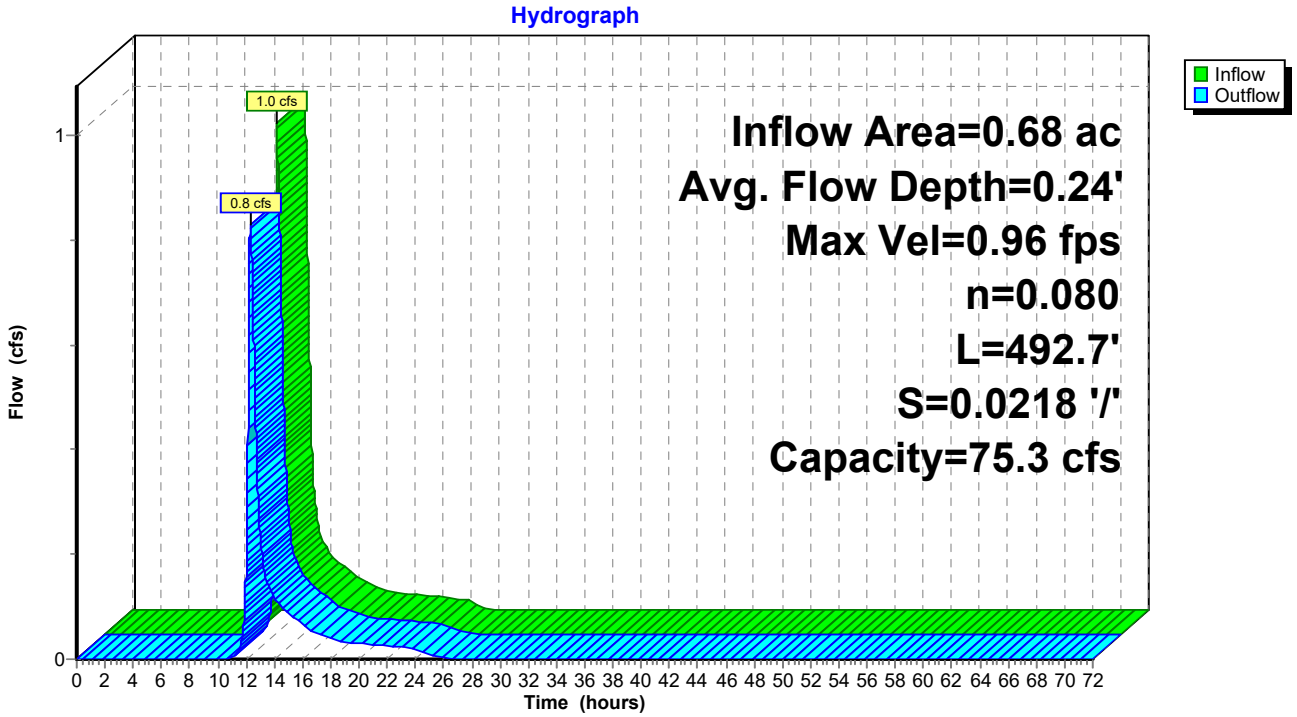
Inflow Area = 0.68 ac, 0.00% Impervious, Inflow Depth = 1.72" for 10-YR event
Inflow = 1.0 cfs @ 12.18 hrs, Volume= 0.10 af
Outflow = 0.8 cfs @ 12.30 hrs, Volume= 0.10 af, Atten= 15%, Lag= 7.0 min
Routed to Pond C15 : PR-15 culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.96 fps, Min. Travel Time= 8.6 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 26.2 min

Peak Storage= 427 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 4.12'
Bank-Full Depth= 2.50' Flow Area= 21.9 sf, Capacity= 75.3 cfs

3.00' x 2.50' deep channel, n= 0.080
Side Slope Z-value= 2.3 '/' Top Width= 14.50'
Length= 492.7' Slope= 0.0218 '/'
Inlet Invert= 467.11', Outlet Invert= 456.38'





Summary for Reach 2R: Thru PR-17

Inflow Area = 4.20 ac, 30.97% Impervious, Inflow Depth = 1.94" for 10-YR event
Inflow = 2.6 cfs @ 12.50 hrs, Volume= 0.68 af
Outflow = 2.6 cfs @ 12.55 hrs, Volume= 0.68 af, Atten= 2%, Lag= 3.1 min
Routed to Pond C17 : PR-17 culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.82 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 7.6 min

Peak Storage= 514 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 9.02'
Bank-Full Depth= 1.00' Flow Area= 15.0 sf, Capacity= 66.7 cfs

Custom cross-section, Length= 365.0' Slope= 0.0218 '/'
Constant n= 0.035 High grass
Inlet Invert= 470.44', Outlet Invert= 462.49'

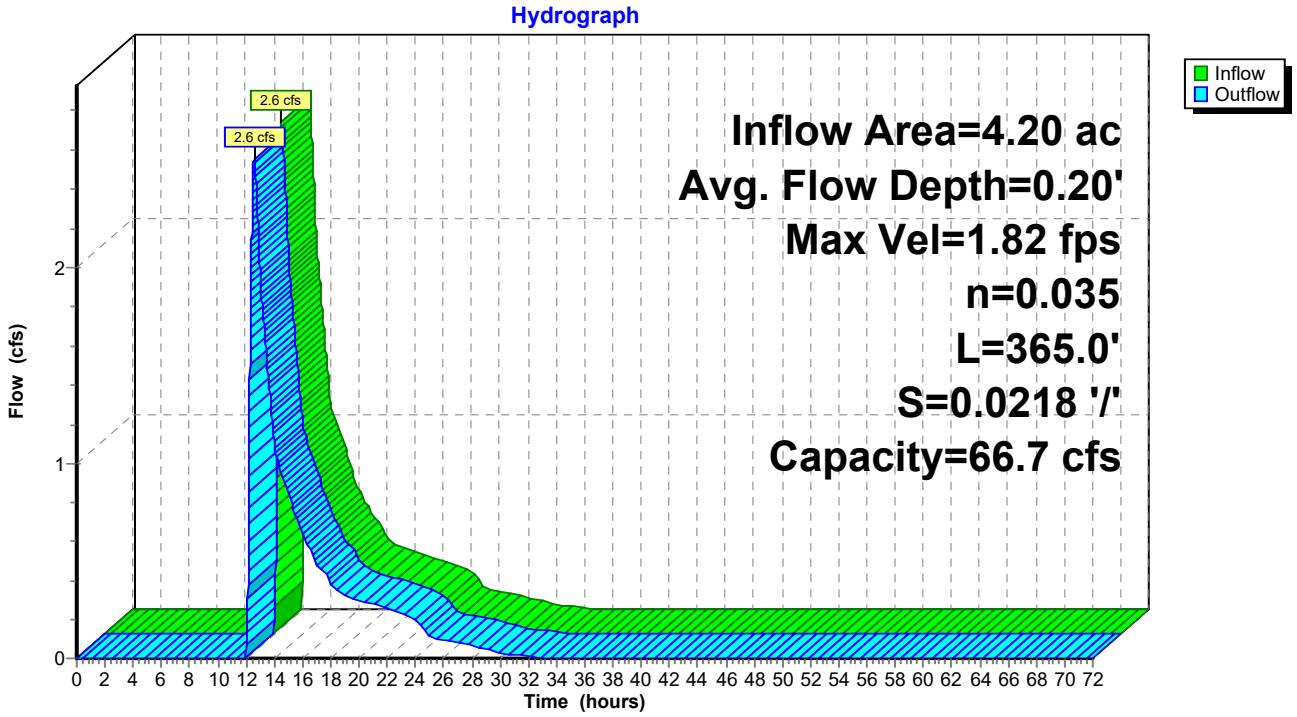


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	1.00	0.00
10.00	0.00	1.00
15.00	0.00	1.00
25.00	1.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.0	0.0	0	0.0
1.00	15.0	25.1	25.0	5,475	66.7

Reach 2R: Thru PR-17



Summary for Reach 4R: Swale

Inflow Area = 4.77 ac, 28.74% Impervious, Inflow Depth = 1.65" for 10-YR event
Inflow = 3.0 cfs @ 12.44 hrs, Volume= 0.65 af
Outflow = 3.0 cfs @ 12.45 hrs, Volume= 0.65 af, Atten= 0%, Lag= 0.6 min
Routed to Pond C4 : CULVERT #4

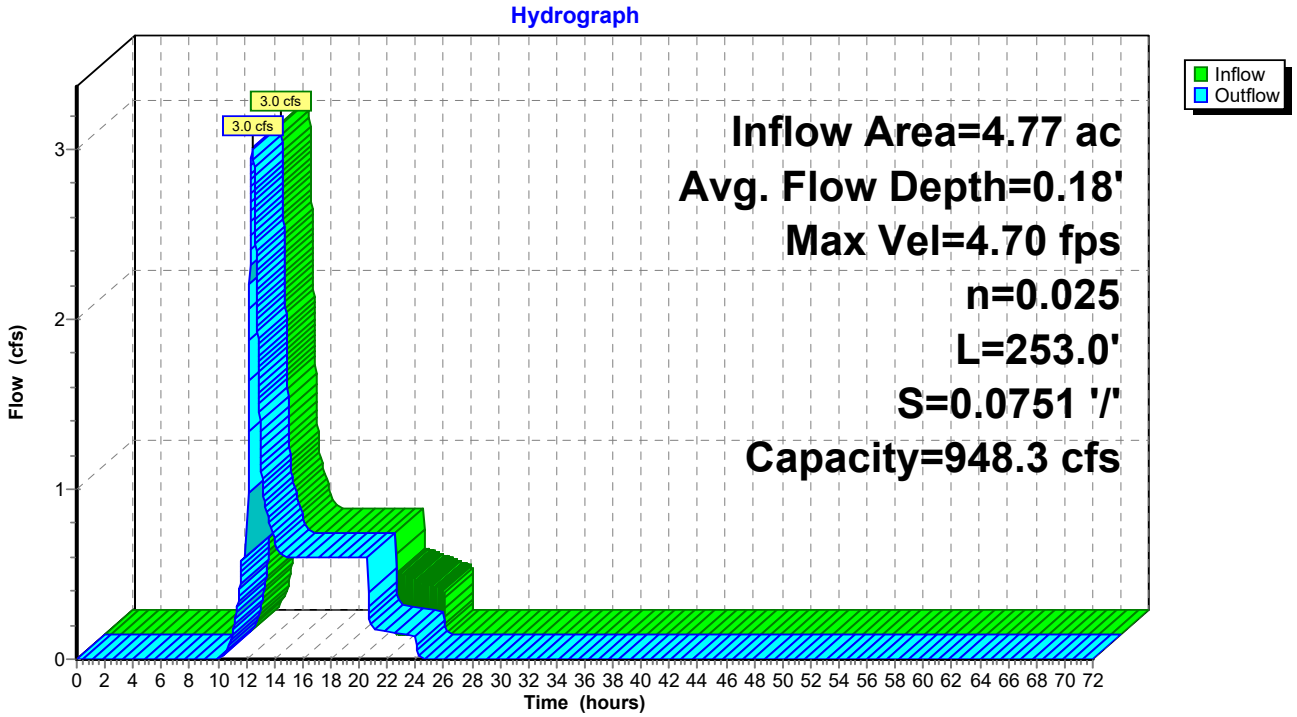
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.70 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.43 fps, Avg. Travel Time= 1.7 min

Peak Storage= 162 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 4.08'
Bank-Full Depth= 3.20' Flow Area= 40.3 sf, Capacity= 948.3 cfs

3.00' x 3.20' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 22.20'
Length= 253.0' Slope= 0.0751 '/'
Inlet Invert= 429.00', Outlet Invert= 410.00'



Reach 4R: Swale



Summary for Reach 5R: Swale to P1

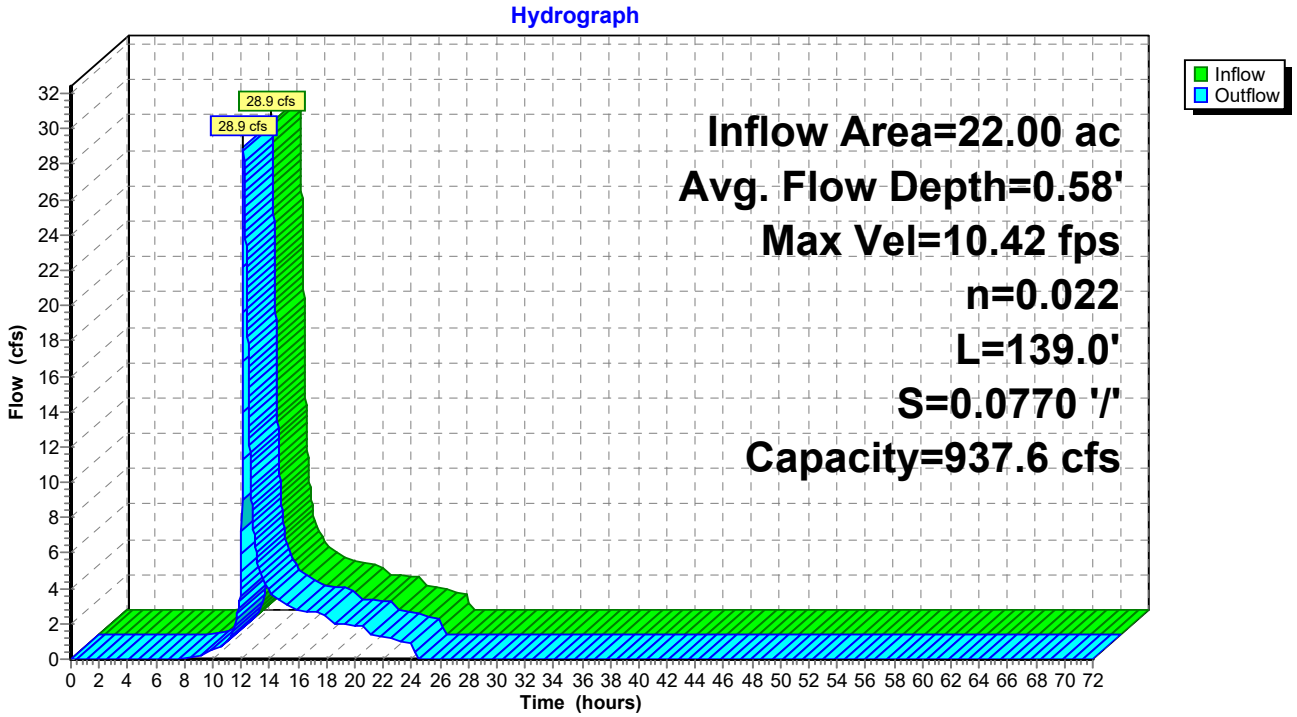
Inflow Area = 22.00 ac, 26.67% Impervious, Inflow Depth = 2.00" for 10-YR event
Inflow = 28.9 cfs @ 12.16 hrs, Volume= 3.67 af
Outflow = 28.9 cfs @ 12.16 hrs, Volume= 3.67 af, Atten= 0%, Lag= 0.2 min
Routed to Pond 1P : Primary Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.42 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.20 fps, Avg. Travel Time= 0.6 min

Peak Storage= 386 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.58' , Surface Width= 6.50'
Bank-Full Depth= 3.00' Flow Area= 36.0 sf, Capacity= 937.6 cfs

3.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 21.00'
Length= 139.0' Slope= 0.0770 '/'
Inlet Invert= 407.00', Outlet Invert= 396.30'





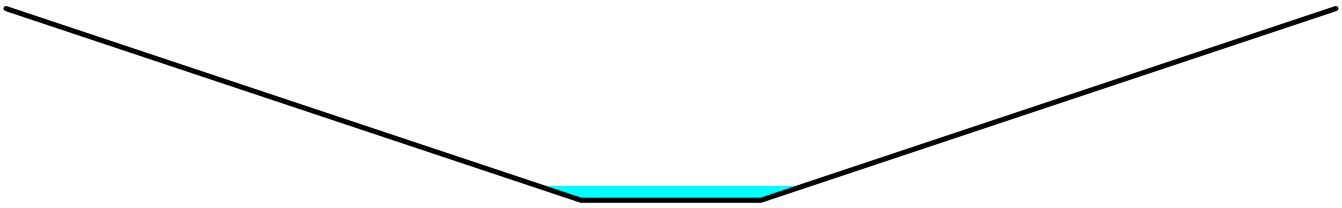
Summary for Reach 6R: Swale

Inflow Area = 4.22 ac, 35.70% Impervious, Inflow Depth = 2.02" for 10-YR event
Inflow = 4.7 cfs @ 12.29 hrs, Volume= 0.71 af
Outflow = 4.7 cfs @ 12.31 hrs, Volume= 0.71 af, Atten= 0%, Lag= 1.1 min
Routed to Pond C4 : CULVERT #4

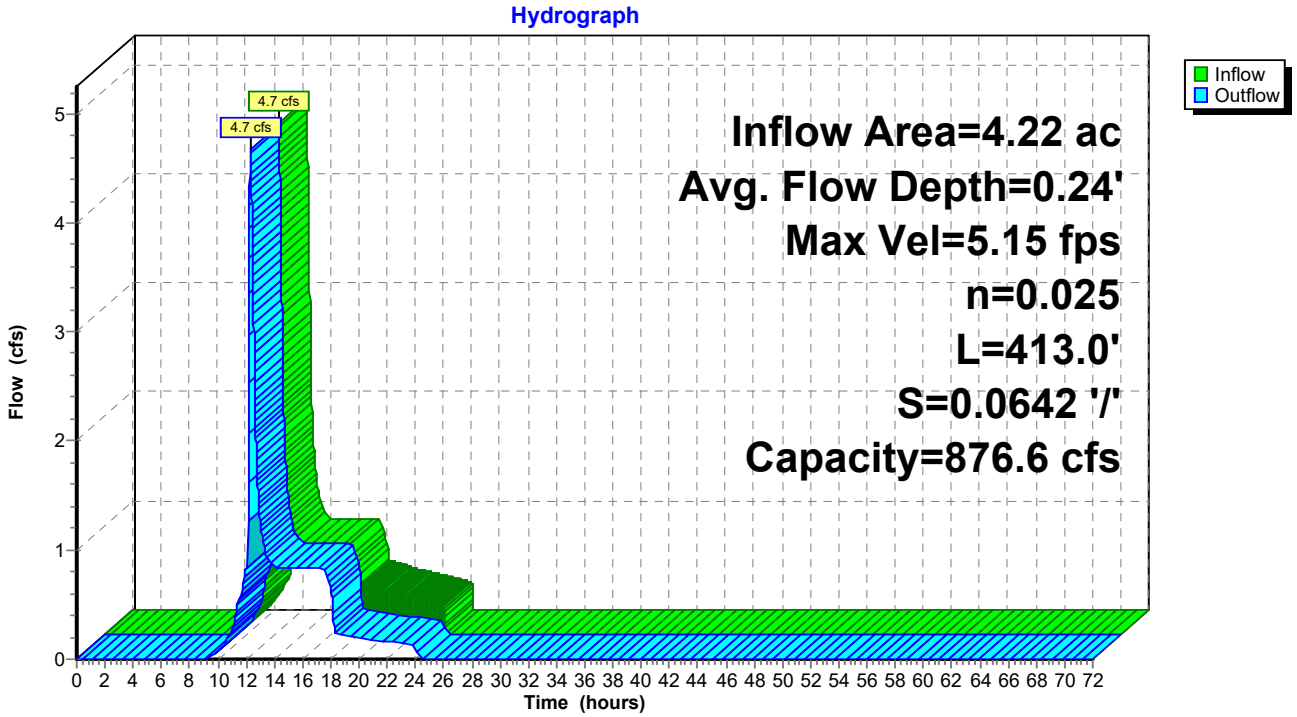
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.15 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.24 fps, Avg. Travel Time= 3.1 min

Peak Storage= 374 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 4.46'
Bank-Full Depth= 3.20' Flow Area= 40.3 sf, Capacity= 876.6 cfs

3.00' x 3.20' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 22.20'
Length= 413.0' Slope= 0.0642 '/'
Inlet Invert= 436.50', Outlet Invert= 410.00'



Reach 6R: Swale



Summary for Reach 7R: Swale

Inflow Area = 9.26 ac, 32.30% Impervious, Inflow Depth = 2.51" for 10-YR event
Inflow = 24.2 cfs @ 12.13 hrs, Volume= 1.94 af
Outflow = 23.3 cfs @ 12.16 hrs, Volume= 1.94 af, Atten= 4%, Lag= 1.5 min
Routed to Pond C4 : CULVERT #4

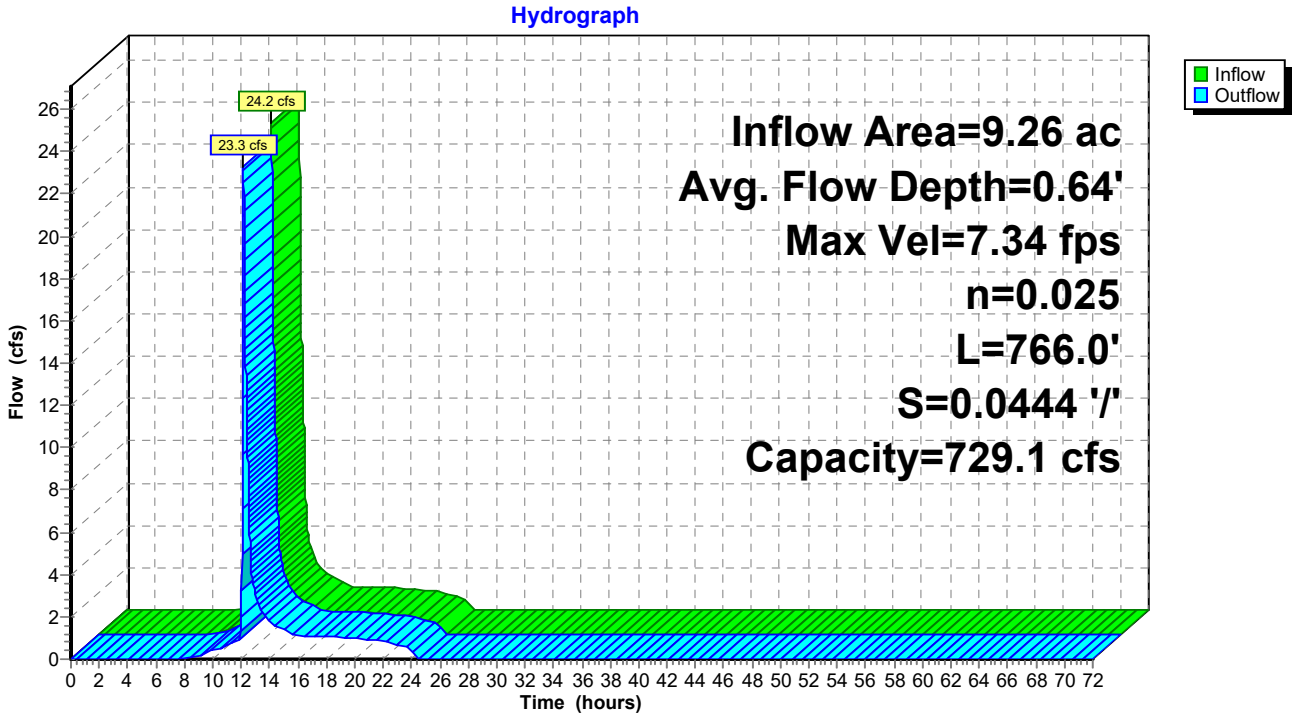
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.34 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.60 fps, Avg. Travel Time= 4.9 min

Peak Storage= 2,432 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.64' , Surface Width= 6.86'
Bank-Full Depth= 3.20' Flow Area= 40.3 sf, Capacity= 729.1 cfs

3.00' x 3.20' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 22.20'
Length= 766.0' Slope= 0.0444 '/'
Inlet Invert= 444.00', Outlet Invert= 410.00'



Reach 7R: Swale



Summary for Reach 13R: Culvert #2 to #1

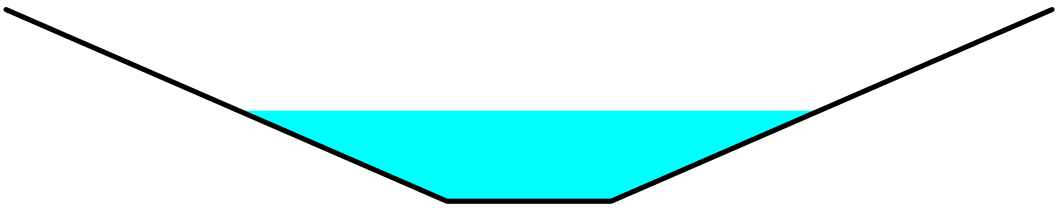
[62] Hint: Exceeded Reach 17R OUTLET depth by 2.68' @ 12.45 hrs
[62] Hint: Exceeded Reach 21R OUTLET depth by 2.51' @ 12.42 hrs

Inflow Area = 33.58 ac, 17.78% Impervious, Inflow Depth = 2.13" for 10-YR event
Inflow = 36.3 cfs @ 12.39 hrs, Volume= 5.97 af
Outflow = 35.6 cfs @ 12.44 hrs, Volume= 5.97 af, Atten= 2%, Lag= 3.2 min
Routed to Pond WC1 : Wetland Cross Culvert #1

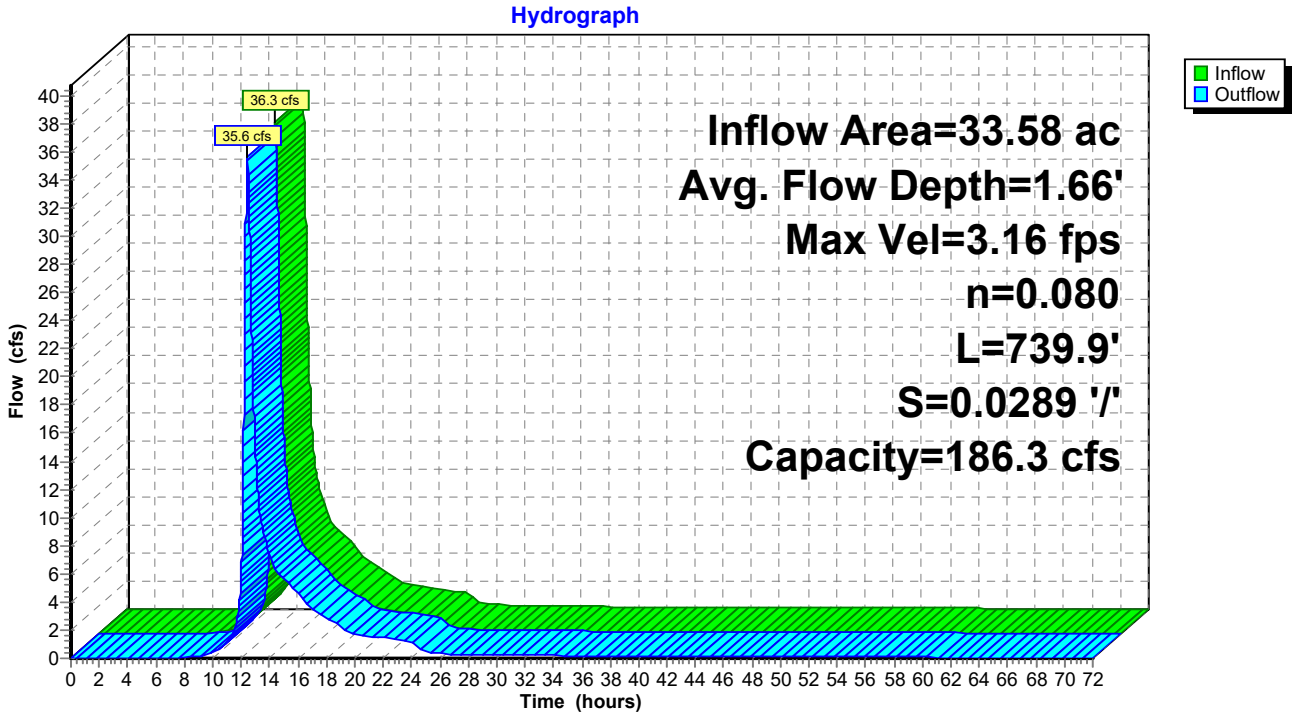
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.16 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 15.1 min

Peak Storage= 8,345 cf @ 12.44 hrs
Average Depth at Peak Storage= 1.66' , Surface Width= 10.62'
Bank-Full Depth= 3.50' Flow Area= 38.7 sf, Capacity= 186.3 cfs

3.00' x 3.50' deep channel, n= 0.080
Side Slope Z-value= 2.3 '/' Top Width= 19.10'
Length= 739.9' Slope= 0.0289 '/'
Inlet Invert= 431.12', Outlet Invert= 409.70'



Reach 13R: Culvert #2 to #1



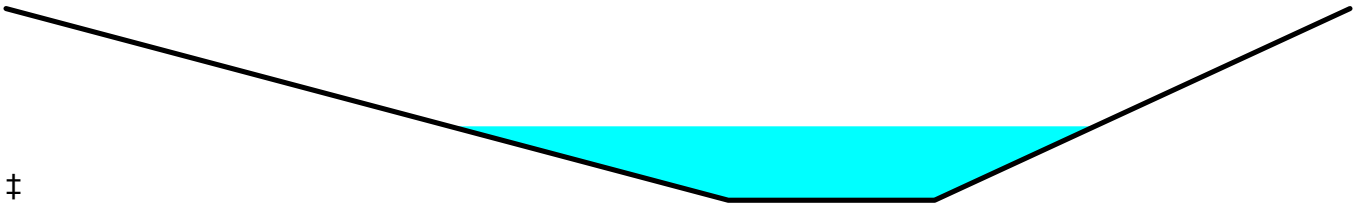
Summary for Reach 15R: Culvert #1 to DP

Inflow Area = 46.38 ac, 12.87% Impervious, Inflow Depth = 1.89" for 10-YR event
Inflow = 45.3 cfs @ 12.44 hrs, Volume= 7.29 af
Outflow = 45.0 cfs @ 12.47 hrs, Volume= 7.29 af, Atten= 1%, Lag= 2.0 min
Routed to Link DP-1 : Existing 18" Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 10.3 min

Peak Storage= 6,705 cf @ 12.47 hrs
Average Depth at Peak Storage= 1.35' , Surface Width= 12.51'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 363.8 cfs

4.00' x 3.50' deep channel, n= 0.080 Earth, long dense weeds
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 601.3' Slope= 0.0576 '/'
Inlet Invert= 406.94', Outlet Invert= 372.30'



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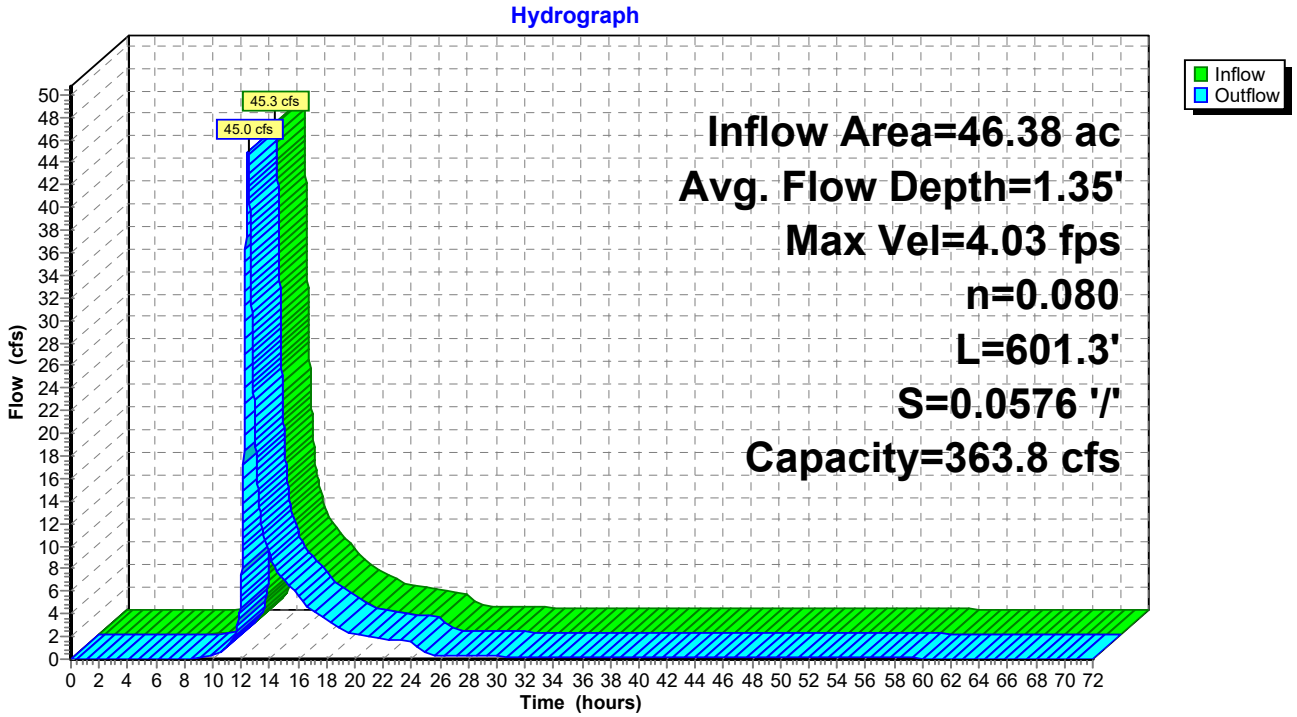


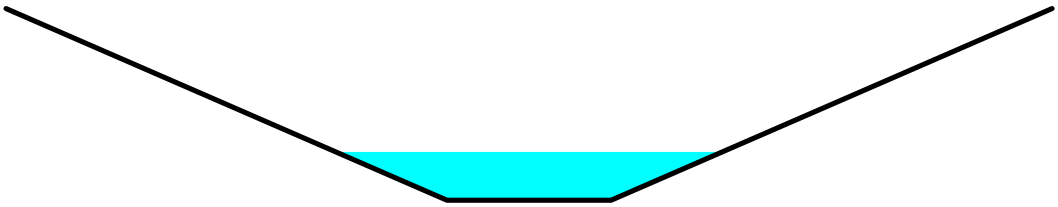
Summary for Reach 16R: Thru PR-14

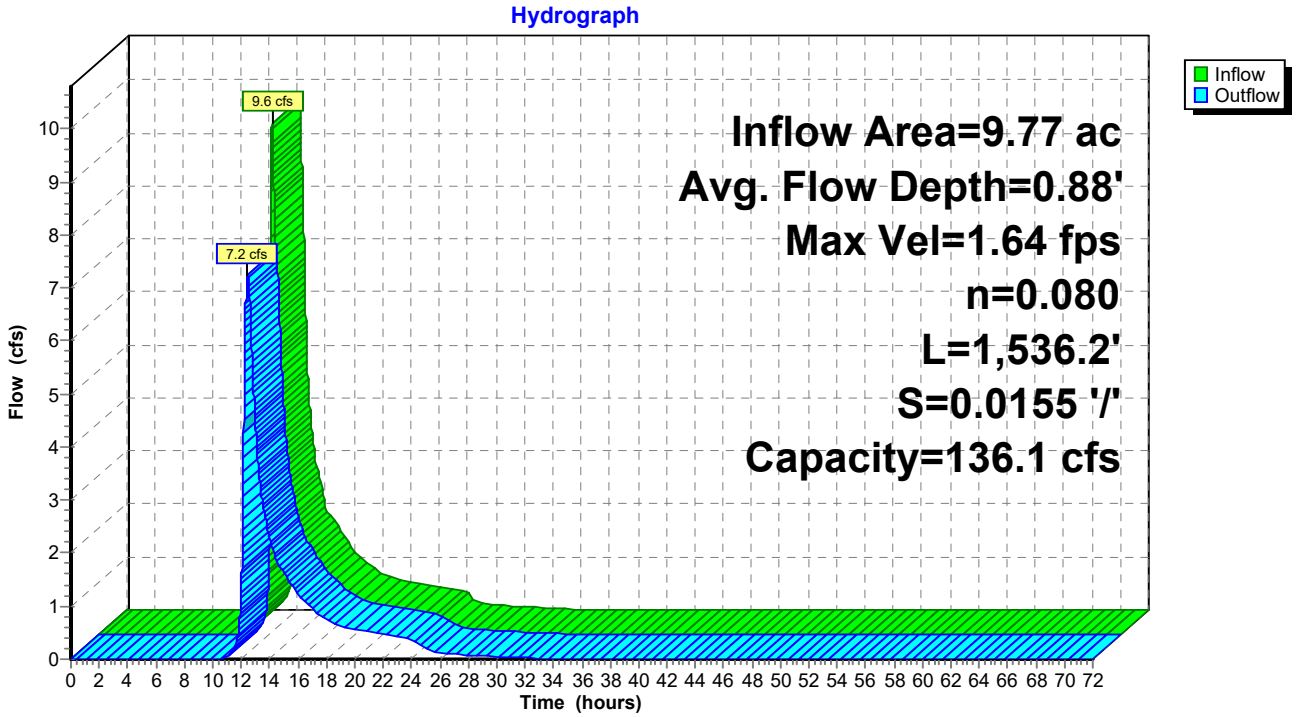
Inflow Area = 9.77 ac, 13.32% Impervious, Inflow Depth = 1.84" for 10-YR event
Inflow = 9.6 cfs @ 12.20 hrs, Volume= 1.49 af
Outflow = 7.2 cfs @ 12.45 hrs, Volume= 1.49 af, Atten= 25%, Lag= 15.2 min
Routed to Pond WC2 : Wetland Cross Culvert #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.64 fps, Min. Travel Time= 15.6 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 49.3 min

Peak Storage= 6,796 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.88' , Surface Width= 7.05'
Bank-Full Depth= 3.50' Flow Area= 38.7 sf, Capacity= 136.1 cfs

3.00' x 3.50' deep channel, n= 0.080 Earth, long dense weeds
Side Slope Z-value= 2.3 '/' Top Width= 19.10'
Length= 1,536.2' Slope= 0.0155 '/'
Inlet Invert= 455.24', Outlet Invert= 431.50'





Summary for Reach 17R: PR12 Culvert to Swale

Inflow Area = 0.67 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 1.4 cfs @ 12.09 hrs, Volume= 0.10 af
Outflow = 0.8 cfs @ 12.21 hrs, Volume= 0.10 af, Atten= 38%, Lag= 6.7 min
Routed to Reach 13R : Culvert #2 to #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.86 fps, Min. Travel Time= 14.4 min
Avg. Velocity = 0.49 fps, Avg. Travel Time= 25.2 min

Peak Storage= 731 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 11.80'
Bank-Full Depth= 3.70' Flow Area= 121.2 sf, Capacity= 1,023.2 cfs

Custom cross-section, Length= 741.0' Slope= 0.0219 '/' (101 Elevation Intervals)
Constant n= 0.050 Scattered brush, heavy weeds
Inlet Invert= 446.26', Outlet Invert= 430.02'

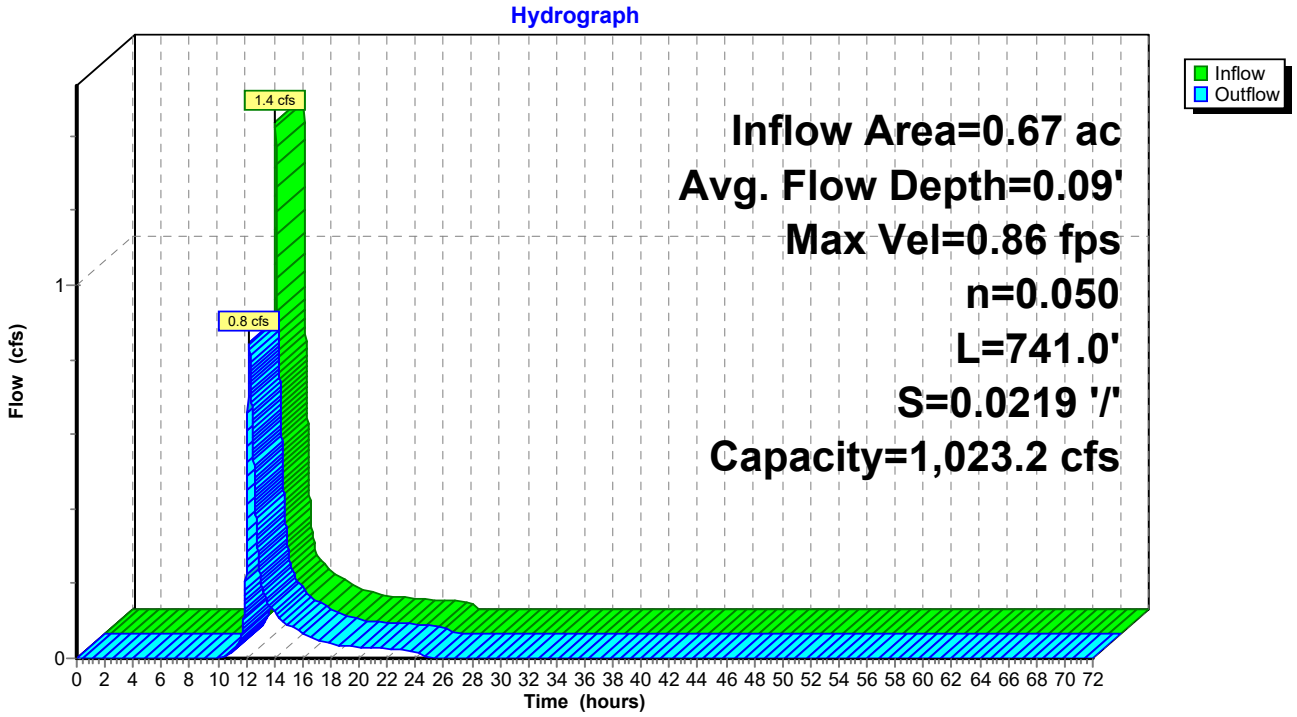


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	3.70	0.00
3.00	2.50	1.20
7.50	1.00	2.70
17.50	0.00	3.70
27.50	0.00	3.70
37.50	1.00	2.70
41.50	2.50	1.20
44.50	3.70	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0.0	0	0.0
1.00	20.0	30.1	30.0	14,820	67.0
2.50	71.4	39.1	38.5	52,889	468.9
3.70	121.2	45.6	44.5	89,791	1,023.2

Reach 17R: PR12 Culvert to Swale



Summary for Reach 21R: Thru 21

Inflow Area = 5.06 ac, 42.09% Impervious, Inflow Depth = 2.78" for 10-YR event
Inflow = 5.2 cfs @ 12.41 hrs, Volume= 1.17 af
Outflow = 5.0 cfs @ 12.47 hrs, Volume= 1.17 af, Atten= 4%, Lag= 3.6 min
Routed to Reach 13R : Culvert #2 to #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.63 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 11.8 min

Peak Storage= 1,211 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 14.89'
Bank-Full Depth= 3.70' Flow Area= 121.2 sf, Capacity= 1,094.4 cfs

Custom cross-section, Length= 398.0' Slope= 0.0251 '/' (101 Elevation Intervals)
Constant n= 0.050 Scattered brush, heavy weeds
Inlet Invert= 440.00', Outlet Invert= 430.02'

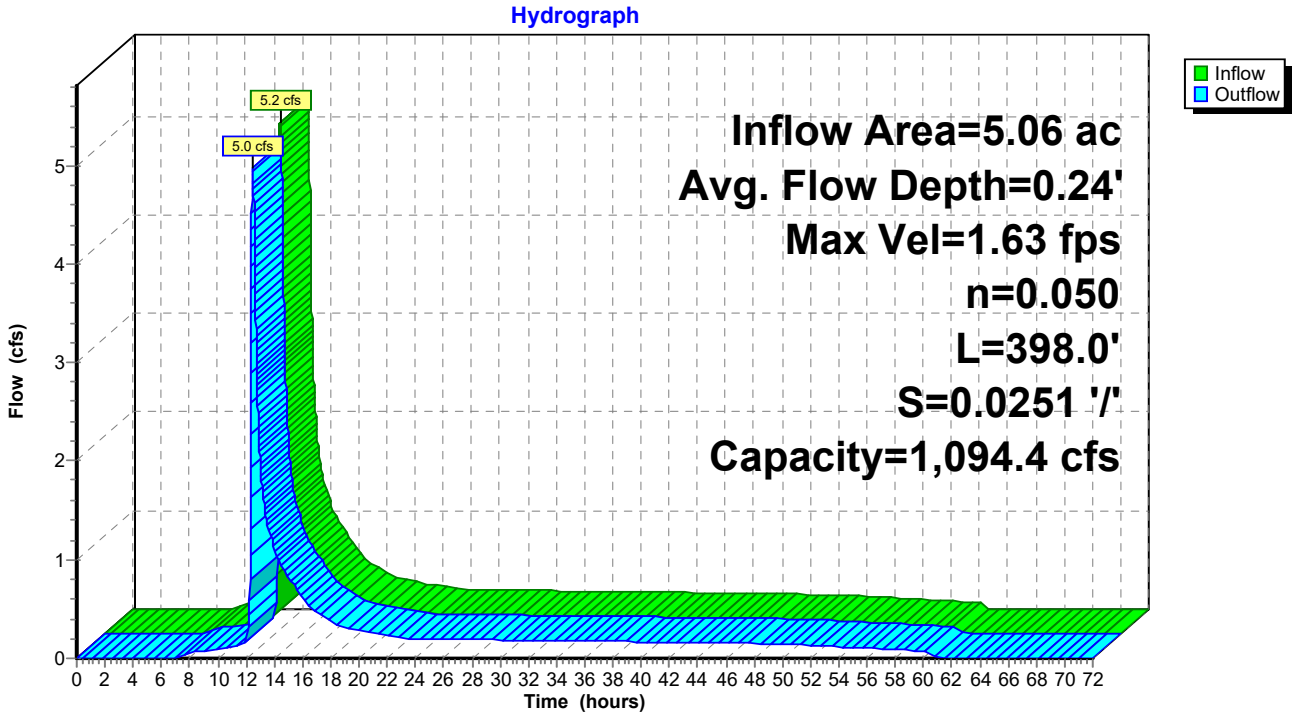


‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	3.70	0.00
3.00	2.50	1.20
7.50	1.00	2.70
17.50	0.00	3.70
27.50	0.00	3.70
37.50	1.00	2.70
41.50	2.50	1.20
44.50	3.70	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0.0	0	0.0
1.00	20.0	30.1	30.0	7,960	71.7
2.50	71.4	39.1	38.5	28,407	501.6
3.70	121.2	45.6	44.5	48,228	1,094.4

Reach 21R: Thru 21



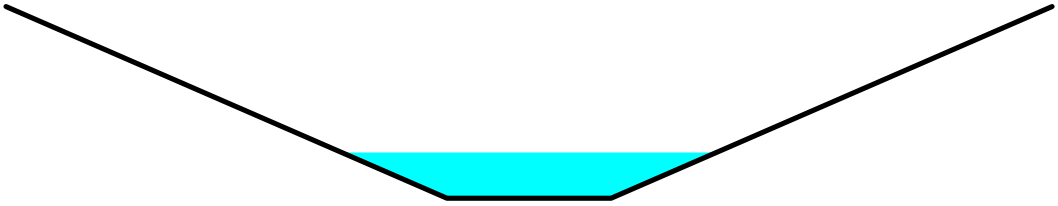
Summary for Reach 22R: Thru PR-14

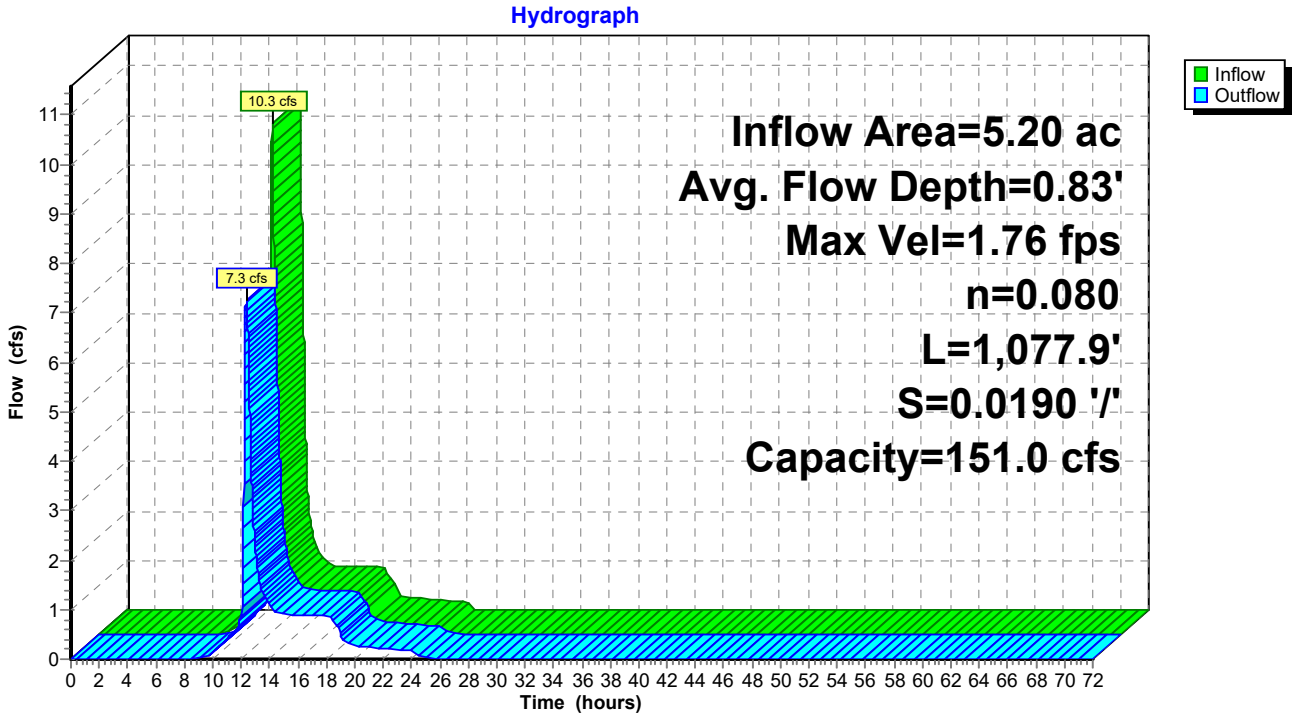
Inflow Area = 5.20 ac, 29.62% Impervious, Inflow Depth = 2.34" for 10-YR event
Inflow = 10.3 cfs @ 12.21 hrs, Volume= 1.02 af
Outflow = 7.3 cfs @ 12.36 hrs, Volume= 1.02 af, Atten= 30%, Lag= 9.2 min
Routed to Pond WC2 : Wetland Cross Culvert #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.76 fps, Min. Travel Time= 10.2 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 30.1 min

Peak Storage= 4,429 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.83' , Surface Width= 6.84'
Bank-Full Depth= 3.50' Flow Area= 38.7 sf, Capacity= 151.0 cfs

3.00' x 3.50' deep channel, n= 0.080 Earth, long dense weeds
Side Slope Z-value= 2.3 '/' Top Width= 19.10'
Length= 1,077.9' Slope= 0.0190 '/'
Inlet Invert= 452.00', Outlet Invert= 431.50'





Summary for Pond 1P: Primary Detention

Inflow Area = 32.80 ac, 26.78% Impervious, Inflow Depth = 1.91" for 10-YR event
Inflow = 39.2 cfs @ 12.24 hrs, Volume= 5.23 af
Outflow = 12.3 cfs @ 12.76 hrs, Volume= 5.22 af, Atten= 69%, Lag= 31.1 min
Primary = 12.3 cfs @ 12.76 hrs, Volume= 5.22 af
Routed to Pond 2P : Left Side Basin
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Link DP-2 : Existing 12" Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 393.01' @ 12.76 hrs Surf.Area= 23,611 sf Storage= 63,098 cf
Flood Elev= 395.00' Surf.Area= 27,420 sf Storage= 113,741 cf

Plug-Flow detention time= 158.3 min calculated for 5.22 af (100% of inflow)
Center-of-Mass det. time= 157.8 min (1,072.3 - 914.5)

Volume	Invert	Avail.Storage	Storage Description
#1	390.00'	142,168 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

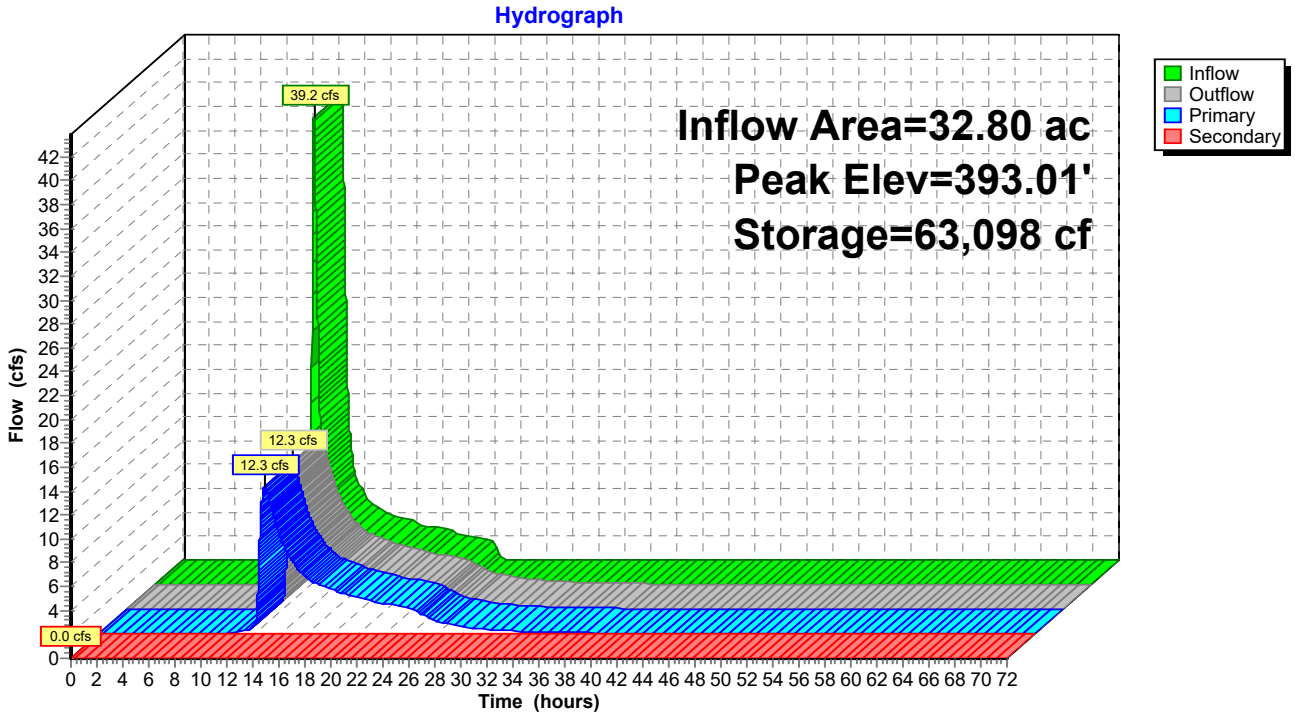
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
390.00	18,377	558.0	0	0	18,377
396.00	29,445	671.0	142,168	142,168	30,027

Device	Routing	Invert	Outlet Devices
#1	Primary	387.00'	**24.0" Round Culvert X 2.00** L= 131.0' Ke= 0.500 Inlet / Outlet Invert= 387.00' / 383.00' S= 0.0305 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	390.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.00 1.50 1.50 3.92 3.92 6.00 Width (feet) 0.00 0.42 0.42 1.25 1.25 0.00 0.00
#3	Device 1	393.90'	**36.0" x 36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	395.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=12.3 cfs @ 12.76 hrs HW=393.01' TW=384.32' (Dynamic Tailwater)
└**1=Culvert** (Passes 12.3 cfs of 67.7 cfs potential flow)
├**2=Custom Weir/Orifice** (Weir Controls 12.3 cfs @ 4.86 fps)
└**3=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=390.00' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Primary Detention



Summary for Pond 2P: Left Side Basin

Inflow Area = 33.21 ac, 26.45% Impervious, Inflow Depth > 1.90" for 10-YR event
Inflow = 12.3 cfs @ 12.76 hrs, Volume= 5.26 af
Outflow = 12.1 cfs @ 12.93 hrs, Volume= 5.25 af, Atten= 2%, Lag= 10.1 min
Primary = 12.1 cfs @ 12.93 hrs, Volume= 5.25 af
Routed to Pond 13P : Stone Level Spreader
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Link DP-1 : Existing 18" Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 384.35' @ 12.93 hrs Surf.Area= 6,859 sf Storage= 8,327 cf
Flood Elev= 387.00' Surf.Area= 9,878 sf Storage= 30,417 cf

Plug-Flow detention time= 24.9 min calculated for 5.25 af (100% of inflow)
Center-of-Mass det. time= 21.6 min (1,092.6 - 1,071.0)

Volume	Invert	Avail.Storage	Storage Description
#1	383.00'	40,928 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

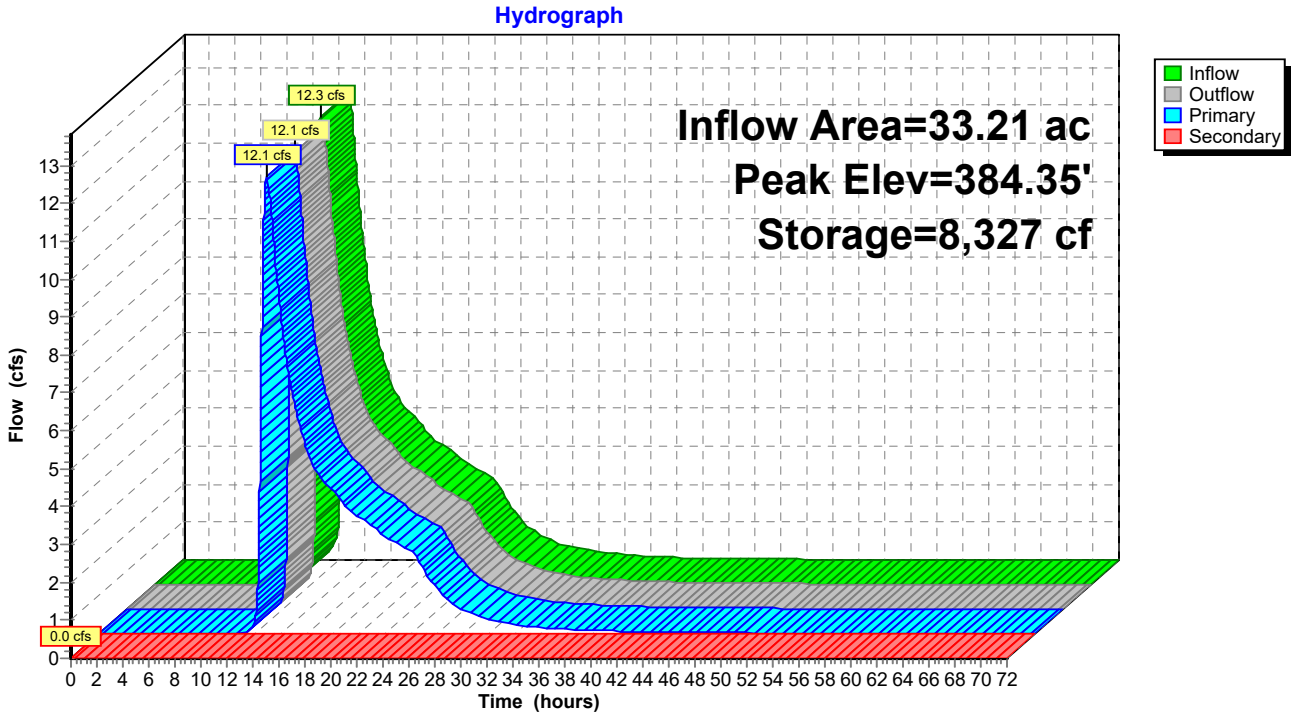
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
383.00	5,538	328.0	0	0	5,538
388.00	11,158	421.7	40,928	40,928	11,434

Device	Routing	Invert	Outlet Devices
#1	Primary	383.00'	**36.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 383.00' / 382.00' S= 0.0222 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf
#2	Secondary	387.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=12.1 cfs @ 12.93 hrs HW=384.35' TW=383.32' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 12.1 cfs @ 5.77 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=383.00' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Left Side Basin



Summary for Pond 3P: Sand Filter #3

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=170)

Inflow Area = 4.77 ac, 28.74% Impervious, Inflow Depth = 1.65" for 10-YR event
Inflow = 8.9 cfs @ 12.09 hrs, Volume= 0.65 af
Outflow = 3.0 cfs @ 12.44 hrs, Volume= 0.65 af, Atten= 66%, Lag= 20.8 min
Primary = 3.0 cfs @ 12.44 hrs, Volume= 0.65 af
Routed to Reach 4R : Swale
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach 4R : Swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 445.71' @ 12.44 hrs Surf.Area= 2,579 sf Storage= 7,945 cf
Flood Elev= 447.60' Surf.Area= 2,579 sf Storage= 16,684 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 86.5 min (940.5 - 854.0)

Volume	Invert	Avail.Storage	Storage Description
#1	442.10'	1,161 cf	**Sand Filter (Irregular)**Listed below (Recalc) 3,869 cf Overall x 30.0% Voids
#2	443.60'	21,293 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		22,454 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
442.10	2,579	194.0	0	0	2,579
443.60	2,579	194.0	3,869	3,869	2,870

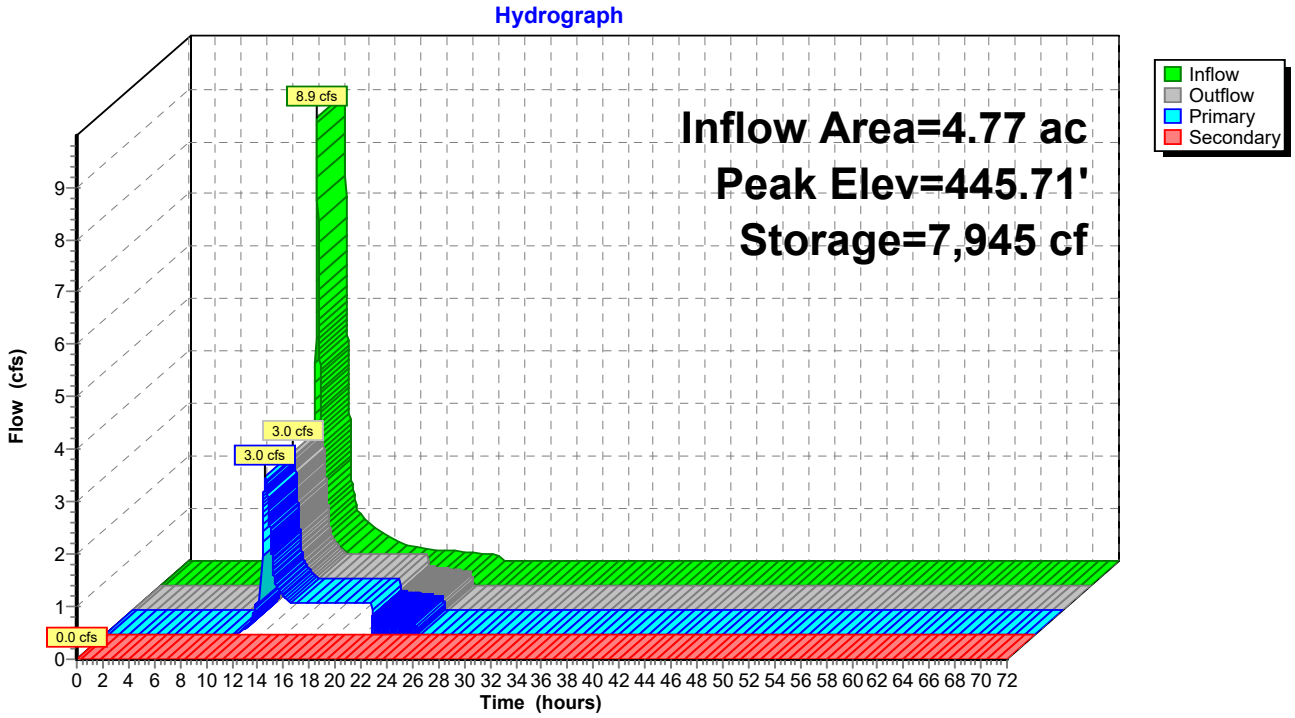
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
443.60	2,578	194.3	0	0	2,578
448.60	6,200	288.5	21,293	21,293	6,393

Device	Routing	Invert	Outlet Devices
#1	Primary	439.30'	**15.0" Round Culvert** L= 168.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 439.30' / 429.00' S= 0.0613 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	440.93'	**6.0" Vert. Undrdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	440.93'	**6.0" Round Underdrain** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 440.93' / 440.93' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	442.10'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	445.30'	**12.0" Horiz. Grate** C= 0.600
#6	Secondary	447.60'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.0 cfs @ 12.44 hrs HW=445.71' TW=429.18' (Dynamic Tailwater)
- **1=Culvert** (Passes 3.0 cfs of 14.2 cfs potential flow)
  - **2=Undrdrain Cap/Orifice** (Passes 0.6 cfs of 2.0 cfs potential flow)
    - **3=Underdrain** (Passes 0.6 cfs of 1.4 cfs potential flow)
      - **4=Exfiltration** (Exfiltration Controls 0.6 cfs)
  - **5=Grate** (Orifice Controls 2.4 cfs @ 3.07 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=442.10' TW=429.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3P: Sand Filter #3



Summary for Pond 4P: Sand Filter #4

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=297)

Inflow Area = 4.22 ac, 35.70% Impervious, Inflow Depth = 2.02" for 10-YR event
Inflow = 9.9 cfs @ 12.09 hrs, Volume= 0.71 af
Outflow = 4.7 cfs @ 12.29 hrs, Volume= 0.71 af, Atten= 53%, Lag= 11.8 min
Primary = 4.7 cfs @ 12.29 hrs, Volume= 0.71 af
Routed to Reach 6R : Swale
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach 6R : Swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 450.63' @ 12.29 hrs Surf.Area= 3,604 sf Storage= 7,531 cf
Flood Elev= 451.20' Surf.Area= 3,604 sf Storage= 10,356 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 53.0 min (893.5 - 840.5)

Volume	Invert	Avail.Storage	Storage Description
#1	447.70'	1,622 cf	**Sand Filter (Irregular)**Listed below (Recalc) 5,406 cf Overall x 30.0% Voids
#2	449.20'	13,750 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		15,371 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.70	3,604	233.6	0	0	3,604
449.20	3,604	233.6	5,406	5,406	3,954

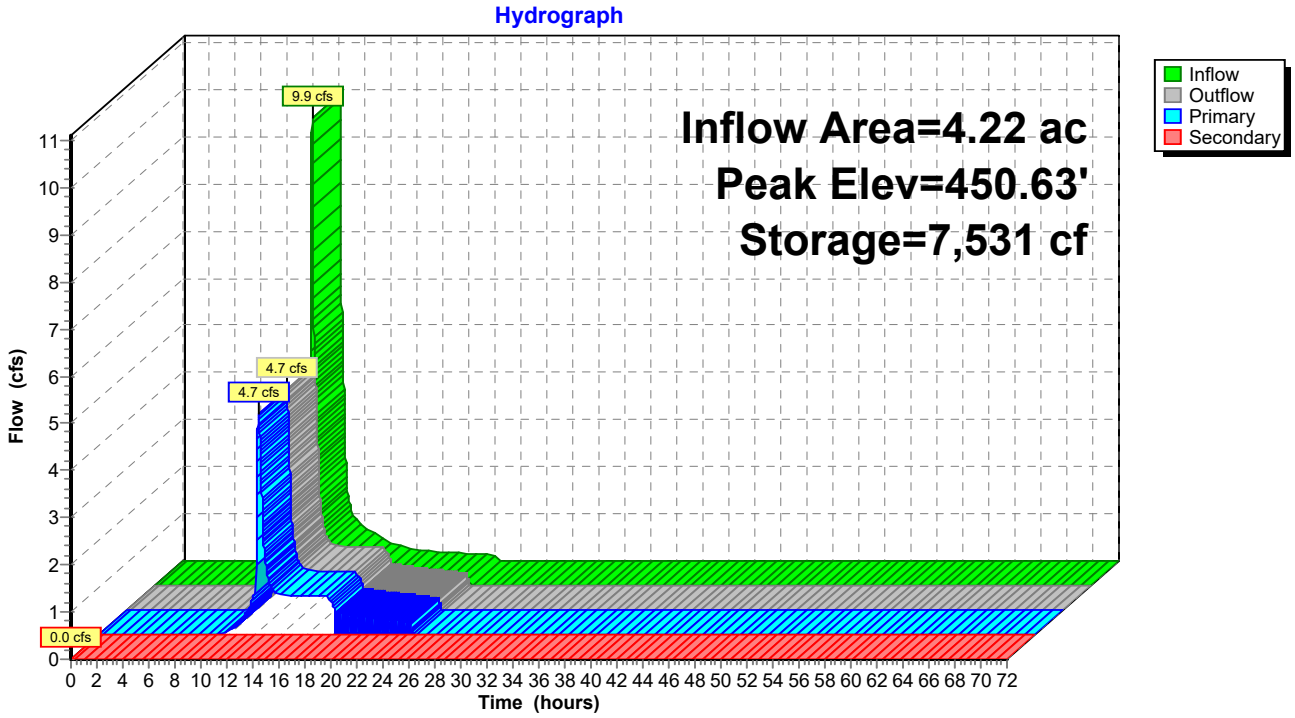
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
449.20	3,604	233.6	0	0	3,604
452.10	5,978	293.0	13,750	13,750	6,208

Device	Routing	Invert	Outlet Devices
#1	Primary	443.00'	**15.0" Round Culvert** L= 88.7' Ke= 0.500 Inlet / Outlet Invert= 443.00' / 436.50' S= 0.0733 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	446.53'	**6.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	446.53'	**6.0" Round Underdrain** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 446.53' / 446.53' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	447.70'	**10.000 in/hr Exfiltration - Sand Filter over Surface area**
#5	Device 1	450.30'	**24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	451.20'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.7 cfs @ 12.29 hrs HW=450.63' TW=436.74' (Dynamic Tailwater)
- **1=Culvert** (Passes 4.7 cfs of 15.6 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Passes 0.8 cfs of 1.9 cfs potential flow)
    - **3=Underdrain** (Passes 0.8 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration - Sand Filter** (Exfiltration Controls 0.8 cfs)
  - **5=Grate** (Weir Controls 3.9 cfs @ 1.87 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=447.70' TW=436.50' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Sand Filter #4



Summary for Pond 5P: Sand Filter #5

Inflow Area = 9.26 ac, 32.30% Impervious, Inflow Depth = 2.51" for 10-YR event
Inflow = 27.3 cfs @ 12.09 hrs, Volume= 1.94 af
Outflow = 24.2 cfs @ 12.13 hrs, Volume= 1.94 af, Atten= 11%, Lag= 2.6 min
Primary = 24.2 cfs @ 12.13 hrs, Volume= 1.94 af
Routed to Reach 7R : Swale
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach 7R : Swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 451.78' @ 12.13 hrs Surf.Area= 4,500 sf Storage= 16,072 cf
Flood Elev= 452.20' Surf.Area= 4,500 sf Storage= 18,941 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 72.3 min (896.3 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	447.75'	2,025 cf	**Sand (Irregular)** Listed below (Recalc) 6,750 cf Overall x 30.0% Voids
#2	449.25'	24,474 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) -Impervious
		26,499 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
447.75	4,500	260.0	0	0	4,500
449.25	4,500	260.0	6,750	6,750	4,890

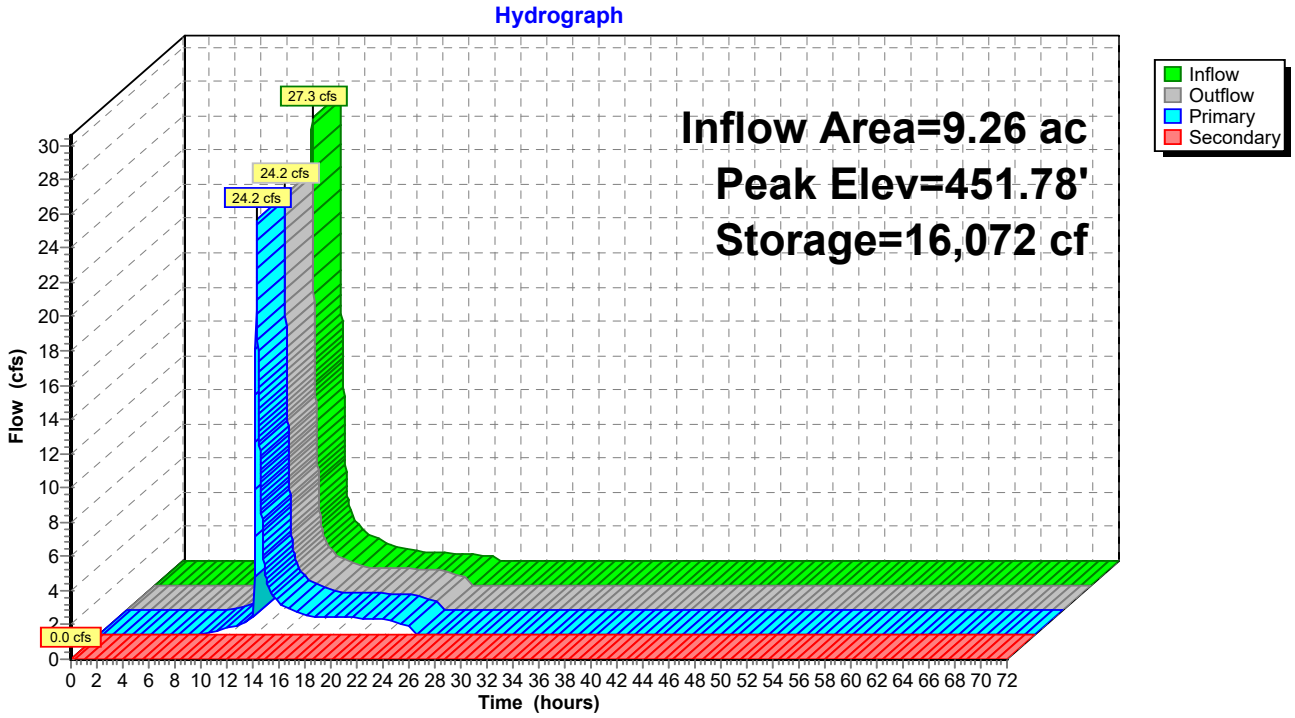
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
449.25	4,500	260.0	0	0	4,500
453.20	8,064	334.8	24,474	24,474	8,230

Device	Routing	Invert	Outlet Devices
#1	Primary	446.50'	**30.0" Round Culvert** L= 146.9' Ke= 0.500 Inlet / Outlet Invert= 446.50' / 445.50' S= 0.0068 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Device 1	446.58'	**6.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	446.58'	**6.0" Round Underdrain** L= 78.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 446.58' / 446.58' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	447.75'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	451.10'	**48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	452.20'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=24.2 cfs @ 12.13 hrs HW=451.78' TW=444.63' (Dynamic Tailwater)
- **1=Culvert** (Passes 24.2 cfs of 45.3 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Passes 1.0 cfs of 2.1 cfs potential flow)
    - **3=Underdrain** (Passes 1.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Exfiltration Controls 1.0 cfs)
  - **5=Grate** (Weir Controls 23.1 cfs @ 2.70 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=447.75' TW=444.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 5P: Sand Filter #5



Summary for Pond 6P: Sand Filter #6

Inflow Area = 6.49 ac, 42.77% Impervious, Inflow Depth = 2.18" for 10-YR event
Inflow = 14.4 cfs @ 12.14 hrs, Volume= 1.18 af
Outflow = 9.6 cfs @ 12.28 hrs, Volume= 1.18 af, Atten= 33%, Lag= 8.3 min
Primary = 9.6 cfs @ 12.28 hrs, Volume= 1.18 af
Routed to Pond 1P : Primary Detention
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Pond 1P : Primary Detention

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 405.66' @ 12.28 hrs Surf.Area= 2,990 sf Storage= 12,974 cf
Flood Elev= 406.10' Surf.Area= 2,990 sf Storage= 15,702 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 116.6 min (955.5 - 838.9)

Volume	Invert	Avail.Storage	Storage Description
#1	401.50'	1,346 cf	**Sand Filter (Irregular)**Listed below (Recalc) 4,485 cf Overall x 30.0% Voids
#2	403.00'	21,545 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		22,891 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
401.50	2,990	360.5	0	0	2,990
403.00	2,990	360.5	4,485	4,485	3,531

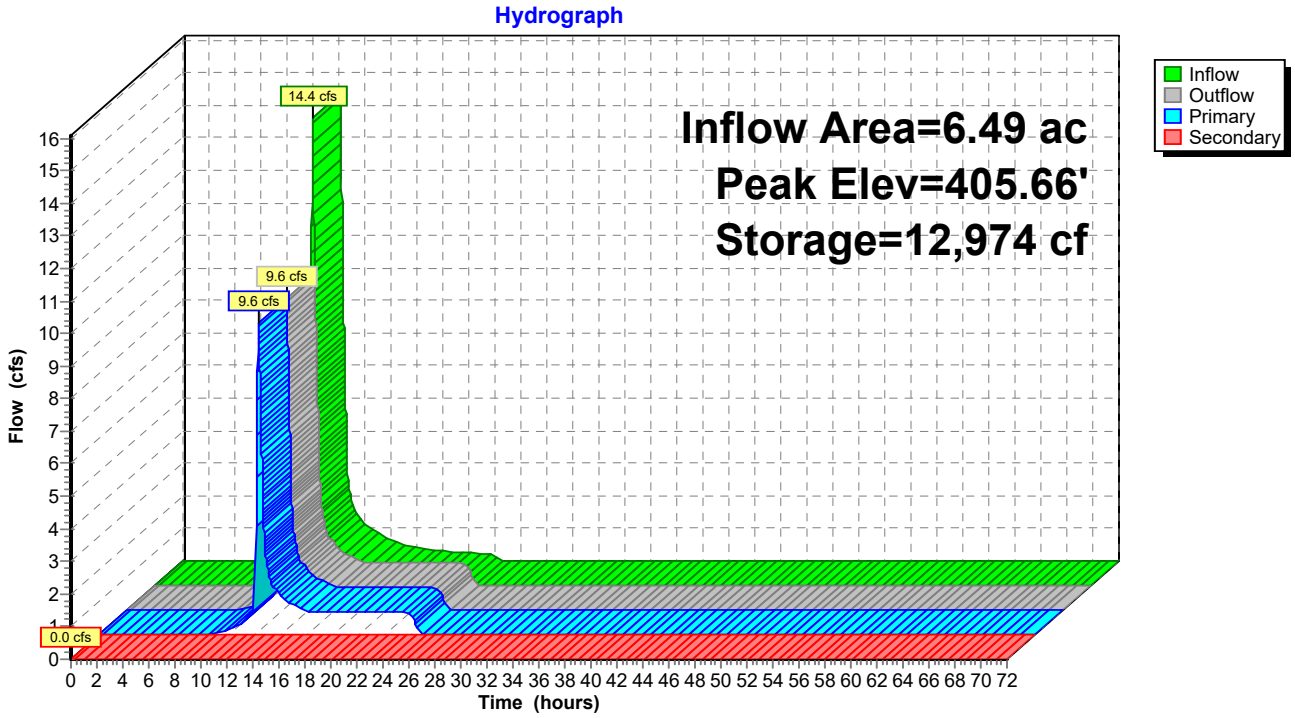
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
403.00	2,993	360.5	0	0	2,993
407.10	7,907	438.0	21,545	21,545	8,182

Device	Routing	Invert	Outlet Devices
#1	Primary	399.30'	**24.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 399.30' / 393.00' S= 0.0733 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	401.00'	**6.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	401.00'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 401.00' / 401.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	401.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	405.30'	**48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	406.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.6 cfs @ 12.28 hrs HW=405.66' TW=391.99' (Dynamic Tailwater)
- **1=Culvert** (Passes 9.6 cfs of 35.0 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Passes 0.7 cfs of 2.0 cfs potential flow)
    - **3=Culvert** (Passes 0.7 cfs of 1.4 cfs potential flow)
      - **4=Exfiltration** (Exfiltration Controls 0.7 cfs)
  - **5=Grate** (Weir Controls 8.9 cfs @ 1.96 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=401.50' TW=390.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 6P: Sand Filter #6



Summary for Pond 7P: Sand Filter #7

Inflow Area = 4.35 ac, 30.94% Impervious, Inflow Depth = 1.87" for 10-YR event
Inflow = 9.4 cfs @ 12.09 hrs, Volume= 0.68 af
Outflow = 4.4 cfs @ 12.30 hrs, Volume= 0.68 af, Atten= 54%, Lag= 12.6 min
Primary = 4.4 cfs @ 12.30 hrs, Volume= 0.68 af
Routed to Link DP-3 : Hovey Road
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Link DP-3 : Hovey Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 447.77' @ 12.30 hrs Surf.Area= 9,494 sf Storage= 8,059 cf
Flood Elev= 449.00' Surf.Area= 10,676 sf Storage= 15,564 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 140.6 min (986.5 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	445.00'	1,796 cf	**Sand Filter (Irregular)**Listed below (Recalc) 5,988 cf Overall x 30.0% Voids
#2	446.50'	20,967 cf	**Storage (Irregular)**Listed below (Recalc)
		22,763 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	3,992	273.5	0	0	3,992
446.50	3,992	273.5	5,988	5,988	4,402

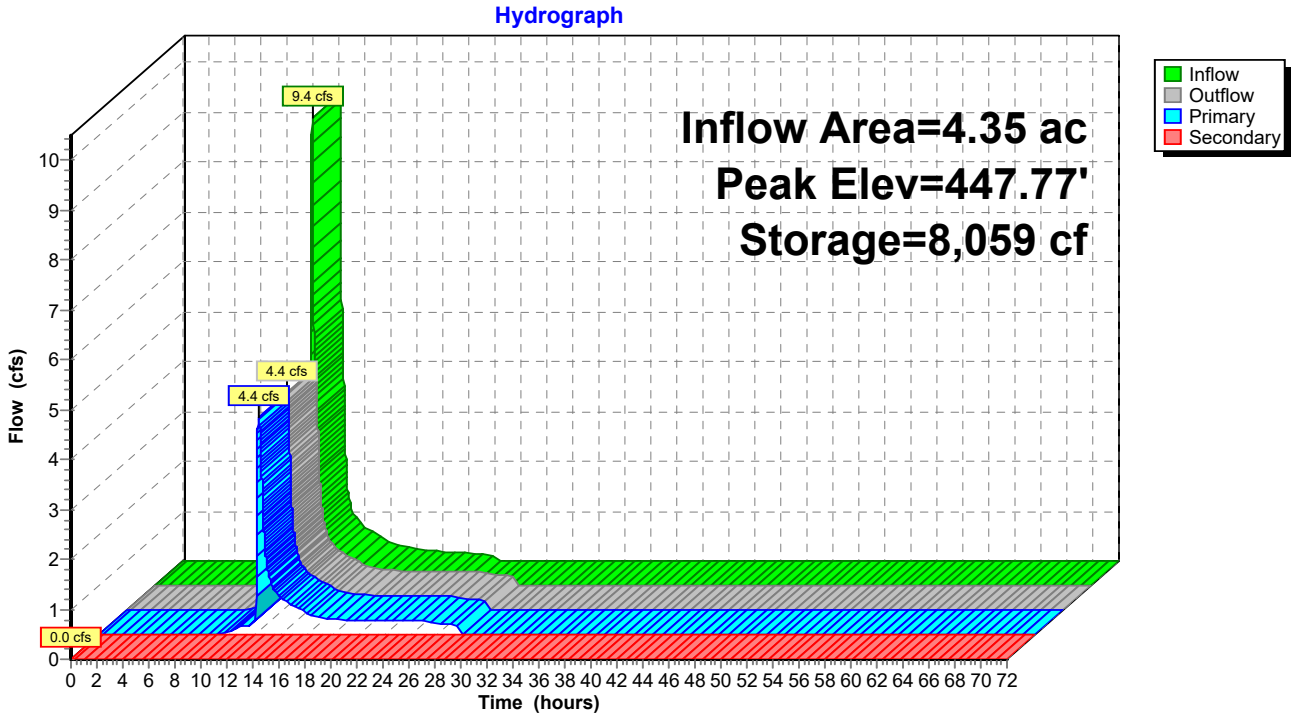
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
446.50	4,409	282.9	0	0	4,409
450.00	7,726	348.9	20,967	20,967	7,907

Device	Routing	Invert	Outlet Devices
#1	Primary	443.80'	**12.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 443.80' / 443.00' S= 0.0320 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Device 1	443.83'	**2.5" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	443.83'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 443.83' / 443.83' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	445.00'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	447.30'	**15.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	449.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.4 cfs @ 12.30 hrs HW=447.77' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 4.4 cfs of 7.0 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.3 cfs @ 9.43 fps)
    - **3=Culvert** (Passes 0.3 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes 0.3 cfs of 2.2 cfs potential flow)
  - **5=Grate** (Orifice Controls 4.0 cfs @ 3.29 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=445.00' TW=0.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 7P: Sand Filter #7



Summary for Pond 8P: Amenity Basin

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=321)

Inflow Area = 2.25 ac, 44.53% Impervious, Inflow Depth = 2.87" for 10-YR event
Inflow = 7.5 cfs @ 12.09 hrs, Volume= 0.54 af
Outflow = 4.7 cfs @ 12.19 hrs, Volume= 0.54 af, Atten= 37%, Lag= 6.0 min
Primary = 4.7 cfs @ 12.19 hrs, Volume= 0.54 af
Routed to Pond WC2 : Wetland Cross Culvert #2
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Pond WC2 : Wetland Cross Culvert #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 438.14' @ 12.19 hrs Surf.Area= 3,048 sf Storage= 5,270 cf
Flood Elev= 438.50' Surf.Area= 3,048 sf Storage= 6,711 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.6 min (848.7 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	435.50'	1,372 cf	**Sand Filter (Irregular)**Listed below (Recalc) 4,572 cf Overall x 30.0% Voids
#2	437.00'	9,823 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		11,195 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
435.50	3,048	221.0	0	0	3,048
437.00	3,048	221.0	4,572	4,572	3,380

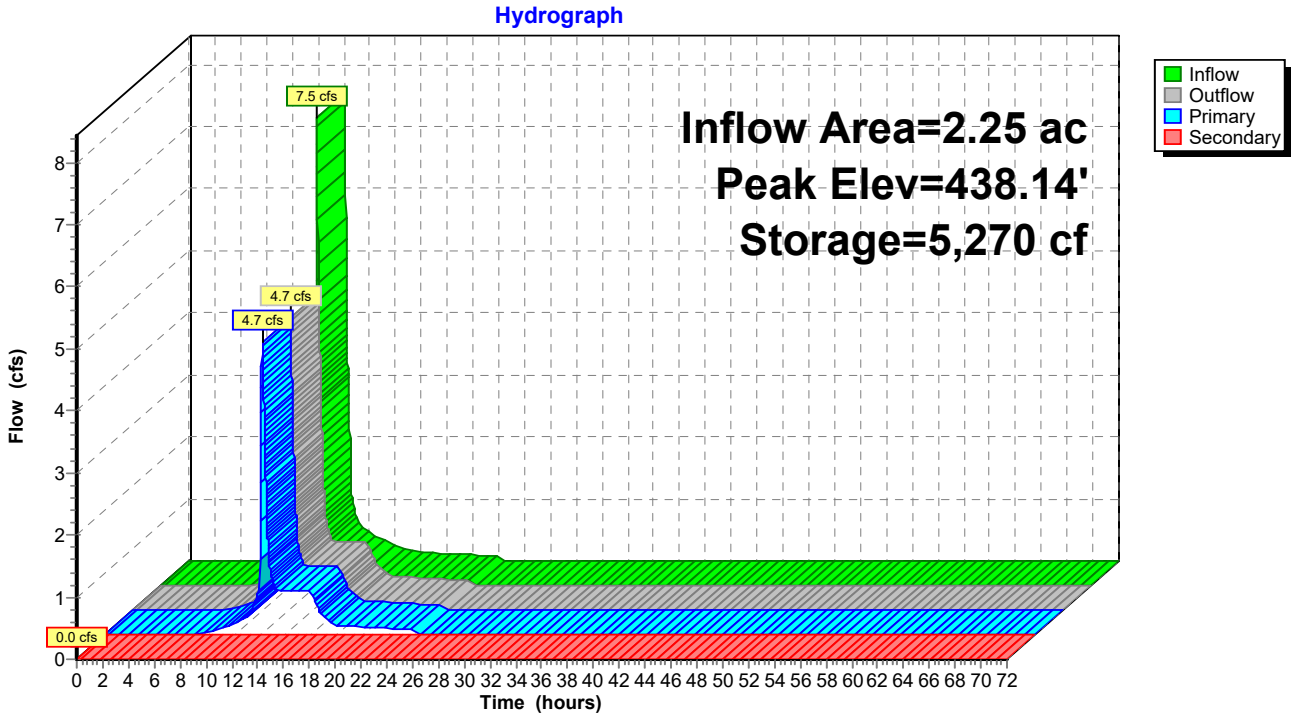
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
437.00	3,048	221.0	0	0	3,048
439.50	4,882	268.0	9,823	9,823	4,976

Device	Routing	Invert	Outlet Devices
#1	Primary	434.30'	**18.0" Round Culvert** L= 38.3' Ke= 0.500 Inlet / Outlet Invert= 434.30' / 434.00' S= 0.0078 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	435.00'	**6.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	435.00'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 435.00' / 435.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	435.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	437.80'	**24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	438.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.7 cfs @ 12.19 hrs HW=438.14' TW=433.05' (Dynamic Tailwater)
- **1=Culvert** (Passes 4.7 cfs of 14.9 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Passes 0.7 cfs of 1.6 cfs potential flow)
    - **3=Culvert** (Passes 0.7 cfs of 1.1 cfs potential flow)
      - **4=Exfiltration** (Exfiltration Controls 0.7 cfs)
  - **5=Grate** (Weir Controls 4.0 cfs @ 1.90 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=435.50' TW=431.50' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 8P: Amenity Basin



Summary for Pond 9P: Cluster E Basin

Inflow Area = 5.06 ac, 42.09% Impervious, Inflow Depth = 2.78" for 10-YR event
Inflow = 16.4 cfs @ 12.09 hrs, Volume= 1.17 af
Outflow = 5.2 cfs @ 12.41 hrs, Volume= 1.17 af, Atten= 68%, Lag= 19.4 min
Primary = 5.2 cfs @ 12.41 hrs, Volume= 1.17 af
Routed to Reach 21R : Thru 21
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach 21R : Thru 21

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 446.85' @ 12.41 hrs Surf.Area= 20,651 sf Storage= 22,921 cf
Flood Elev= 447.40' Surf.Area= 21,684 sf Storage= 29,803 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 673.8 min (1,489.0 - 815.1)

Volume	Invert	Avail.Storage	Storage Description
#1	443.50'	3,943 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 13,143 cf Overall x 30.0% Voids
#2	445.00'	39,755 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		43,698 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
443.50	8,762	569.1	0	0	8,762
445.00	8,762	569.1	13,143	13,143	9,616

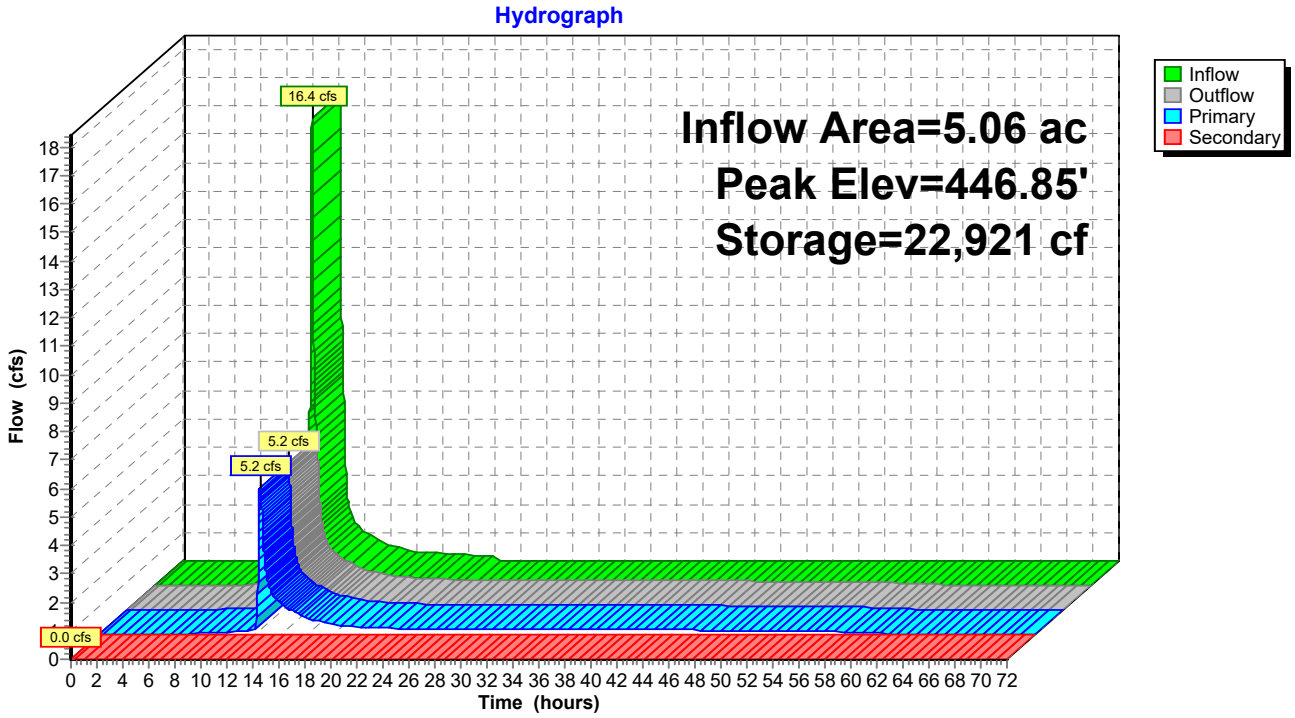
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
445.00	8,762	569.1	0	0	8,762
448.40	14,893	633.2	39,755	39,755	15,226

Device	Routing	Invert	Outlet Devices
#1	Primary	442.30'	**18.0" Round Culvert** L= 32.3' Ke= 0.500 Inlet / Outlet Invert= 442.30' / 440.00' S= 0.0712 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	443.00'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	443.00'	**6.0" Round Culvert** L= 224.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 443.00' / 443.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	443.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	446.60'	**48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	447.40'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.2 cfs @ 12.41 hrs HW=446.85' TW=440.24' (Dynamic Tailwater)
- **1=Culvert** (Passes 5.2 cfs of 16.6 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.2 cfs @ 9.34 fps)
    - **3=Culvert** (Passes 0.2 cfs of 0.7 cfs potential flow)
      - **4=Exfiltration** (Passes 0.2 cfs of 4.8 cfs potential flow)
  - **5=Grate** (Weir Controls 5.0 cfs @ 1.62 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=443.50' TW=440.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 9P: Cluster E Basin



Summary for Pond 10P: Cluster D Basin

Inflow Area = 5.20 ac, 29.62% Impervious, Inflow Depth = 2.34" for 10-YR event
Inflow = 12.8 cfs @ 12.13 hrs, Volume= 1.02 af
Outflow = 10.3 cfs @ 12.21 hrs, Volume= 1.02 af, Atten= 19%, Lag= 4.6 min
Primary = 10.3 cfs @ 12.21 hrs, Volume= 1.02 af
Routed to Reach 22R : Thru PR-14
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Reach 22R : Thru PR-14

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 456.65' @ 12.21 hrs Surf.Area= 3,889 sf Storage= 8,197 cf
Flood Elev= 457.40' Surf.Area= 3,889 sf Storage= 12,153 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 43.3 min (875.8 - 832.5)

Volume	Invert	Avail.Storage	Storage Description
#1	453.70'	1,750 cf	**Sand Filter (Irregular)**Listed below (Recalc) 5,834 cf Overall x 30.0% Voids
#2	455.20'	16,465 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		18,215 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
453.70	3,889	243.0	0	0	3,889
455.20	3,889	243.0	5,834	5,834	4,254

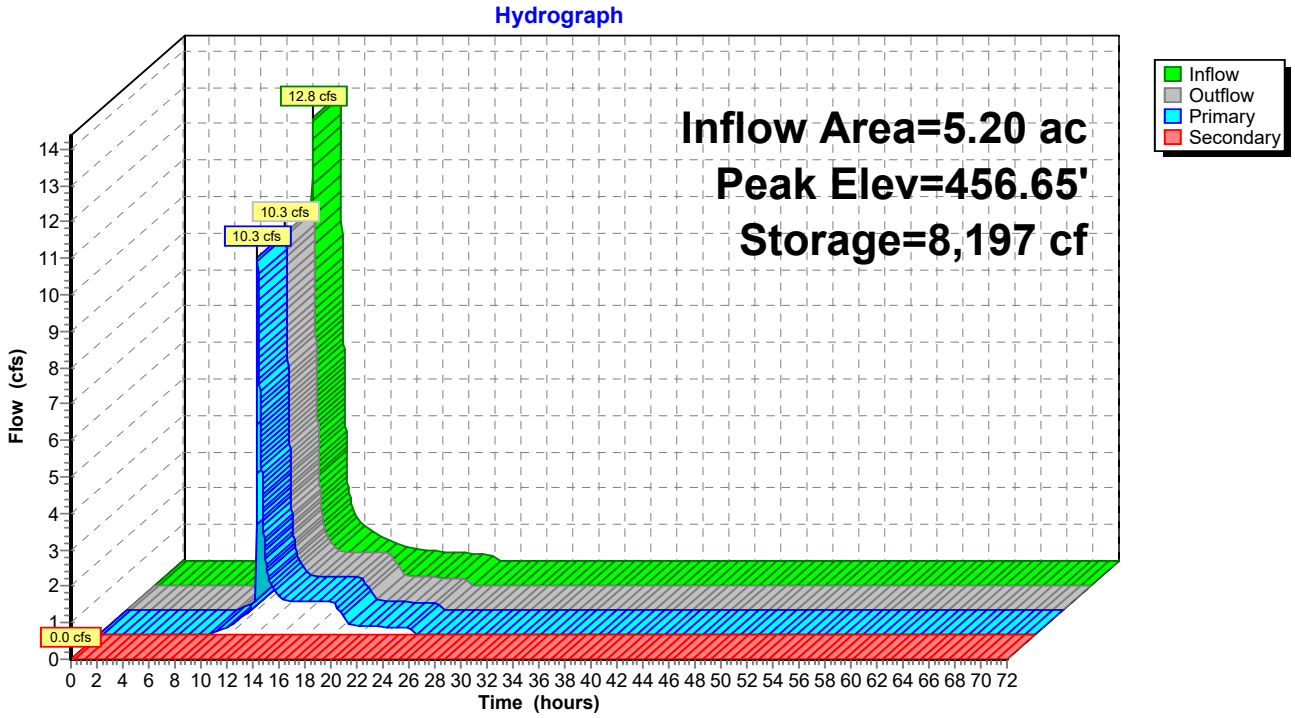
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
455.20	3,889	243.0	0	0	3,889
458.40	6,514	303.6	16,465	16,465	6,666

Device	Routing	Invert	Outlet Devices
#1	Primary	452.50'	**18.0" Round Culvert** L= 27.2' Ke= 0.500 Inlet / Outlet Invert= 452.50' / 452.00' S= 0.0184 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	452.53'	**6.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	452.53'	**6.0" Round Underdrain** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 452.53' / 452.53' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	453.70'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	456.20'	**36.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	457.40'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=10.3 cfs @ 12.21 hrs HW=456.65' TW=452.63' (Dynamic Tailwater)
- **1=Culvert** (Passes 10.3 cfs of 15.7 cfs potential flow)
- **2=Underdrain Cap/Orifice** (Passes 0.9 cfs of 1.9 cfs potential flow)
- **3=Underdrain** (Passes 0.9 cfs of 1.3 cfs potential flow)
- **4=Exfiltration** (Exfiltration Controls 0.9 cfs)
- **5=Grate** (Weir Controls 9.4 cfs @ 2.20 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=453.70' TW=452.00' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 10P: Cluster D Basin



Summary for Pond 11P: Sand Filter #11

Inflow Area = 2.10 ac, 27.07% Impervious, Inflow Depth = 2.34" for 10-YR event
Inflow = 5.2 cfs @ 12.13 hrs, Volume= 0.41 af
Outflow = 2.0 cfs @ 12.44 hrs, Volume= 0.41 af, Atten= 61%, Lag= 18.7 min
Primary = 2.0 cfs @ 12.44 hrs, Volume= 0.41 af
Routed to Link DP-3 : Hovey Road
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Routed to Link DP-3 : Hovey Road

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 454.69' @ 12.44 hrs Surf.Area= 10,827 sf Storage= 6,036 cf
Flood Elev= 455.00' Surf.Area= 11,130 sf Storage= 7,847 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 147.6 min (979.8 - 832.2)

Volume	Invert	Avail.Storage	Storage Description
#1	452.50'	2,289 cf	**Sand Filter (Irregular)**Listed below (Recalc) 7,631 cf Overall x 30.0% Voids
#2	454.00'	12,113 cf	**Storage Basin (Irregular)**Listed below (Recalc)
		14,402 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
452.50	5,087	313.0	0	0	5,087
454.00	5,087	313.0	7,631	7,631	5,557

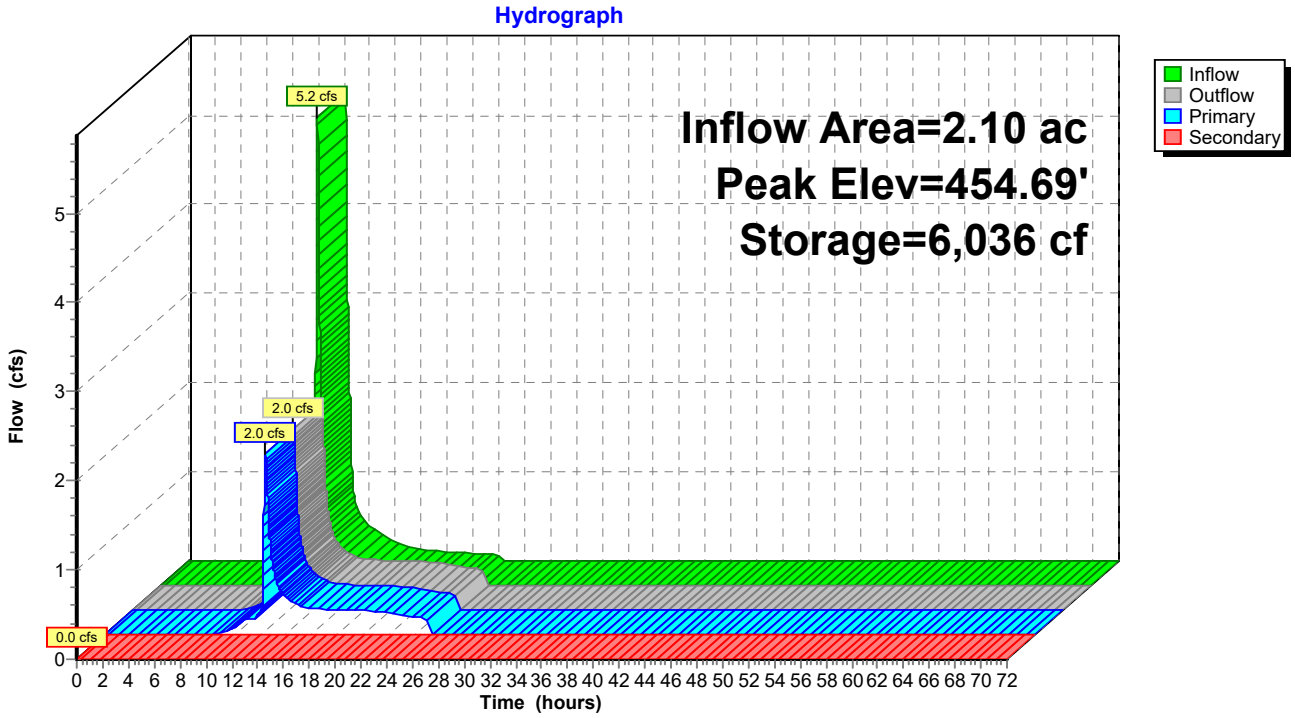
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
454.00	5,087	313.4	0	0	5,087
456.00	7,081	351.0	12,113	12,113	7,183

Device	Routing	Invert	Outlet Devices
#1	Primary	451.30'	**15.0" Round Culvert** L= 64.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 451.30' / 449.30' S= 0.0313 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	451.33'	**2.5" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	451.33'	**6.0" Round Underdrain** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 451.33' / 451.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	452.50'	**10.000 in/hr Exfiltration - Sand Filter over Surface area**
#5	Device 1	454.50'	**24.0" Horiz. Overflow Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	455.00'	**10.0' long x 10.0' breadth Emergency Spillway** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.0 cfs @ 12.44 hrs HW=454.69' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.0 cfs of 9.8 cfs potential flow)
  └─**2=Underdrain Cap/Orifice** (Orifice Controls 0.3 cfs @ 8.69 fps)
    └─**3=Underdrain** (Passes 0.3 cfs of 1.1 cfs potential flow)
      └─**4=Exfiltration - Sand Filter** (Passes 0.3 cfs of 2.5 cfs potential flow)
  └─**5=Overflow Grate** (Weir Controls 1.7 cfs @ 1.43 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=452.50' TW=0.00' (Dynamic Tailwater)
└─**6=Emergency Spillway** (Controls 0.0 cfs)

Pond 11P: Sand Filter #11



Summary for Pond 13P: Stone Level Spreader

Inflow Area = 33.21 ac, 26.45% Impervious, Inflow Depth > 1.90" for 10-YR event
Inflow = 12.1 cfs @ 12.93 hrs, Volume= 5.25 af
Outflow = 12.1 cfs @ 12.93 hrs, Volume= 5.25 af, Atten= 0%, Lag= 0.0 min
Primary = 12.1 cfs @ 12.93 hrs, Volume= 5.25 af
Routed to Link DP-1 : Existing 18" Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 383.32' @ 12.93 hrs Surf.Area= 135 sf Storage= 71 cf

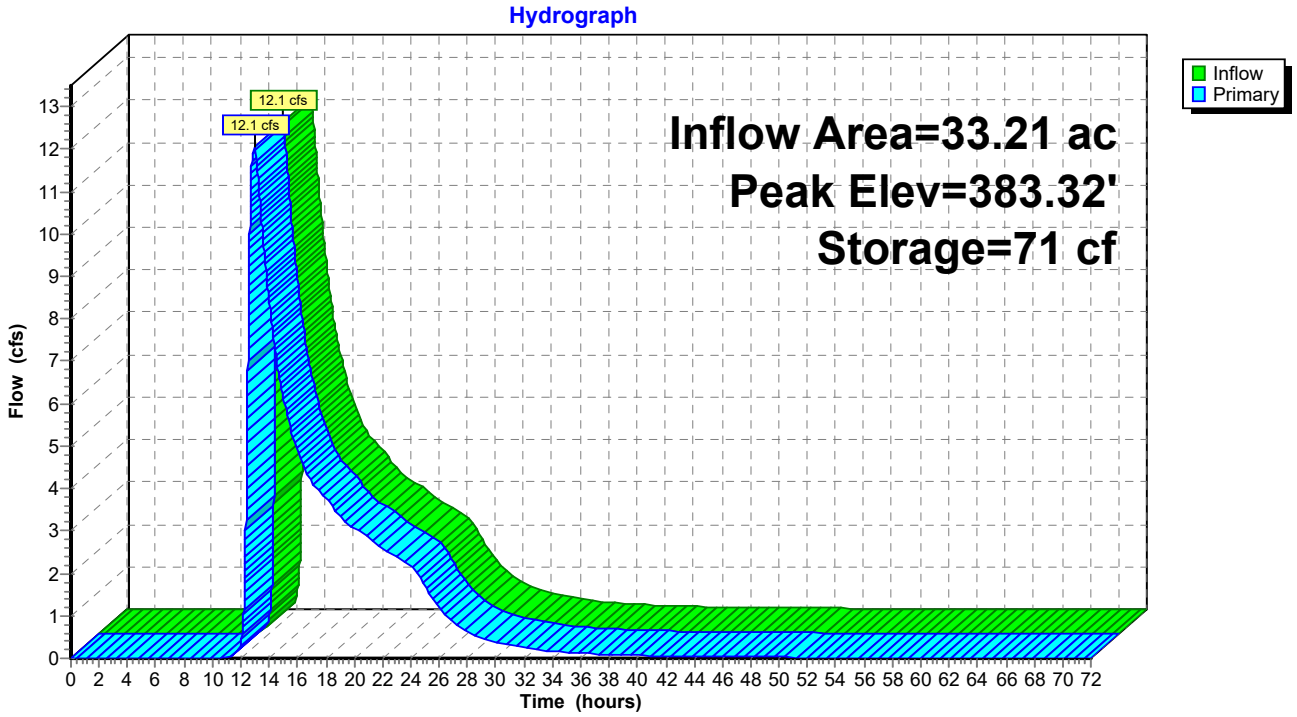
Plug-Flow detention time= 0.9 min calculated for 5.25 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (1,092.8 - 1,092.6)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	108 cf	**5.00'W x 27.00'L x 2.00'H Prismatoid** 270 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	383.00'	**27.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=12.1 cfs @ 12.93 hrs HW=383.32' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 12.1 cfs @ 1.38 fps)

Pond 13P: Stone Level Spreader



Summary for Pond C12: PR-15 culvert

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 0.67 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 1.4 cfs @ 12.09 hrs, Volume= 0.10 af
Outflow = 1.4 cfs @ 12.09 hrs, Volume= 0.10 af, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.09 hrs, Volume= 0.10 af
Routed to Reach 17R : PR12 Culvert to Swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 448.90' @ 12.10 hrs Surf.Area= 2 sf Storage= 0 cf
Flood Elev= 450.40' Surf.Area= 1,522 sf Storage= 590 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (848.7 - 848.7)

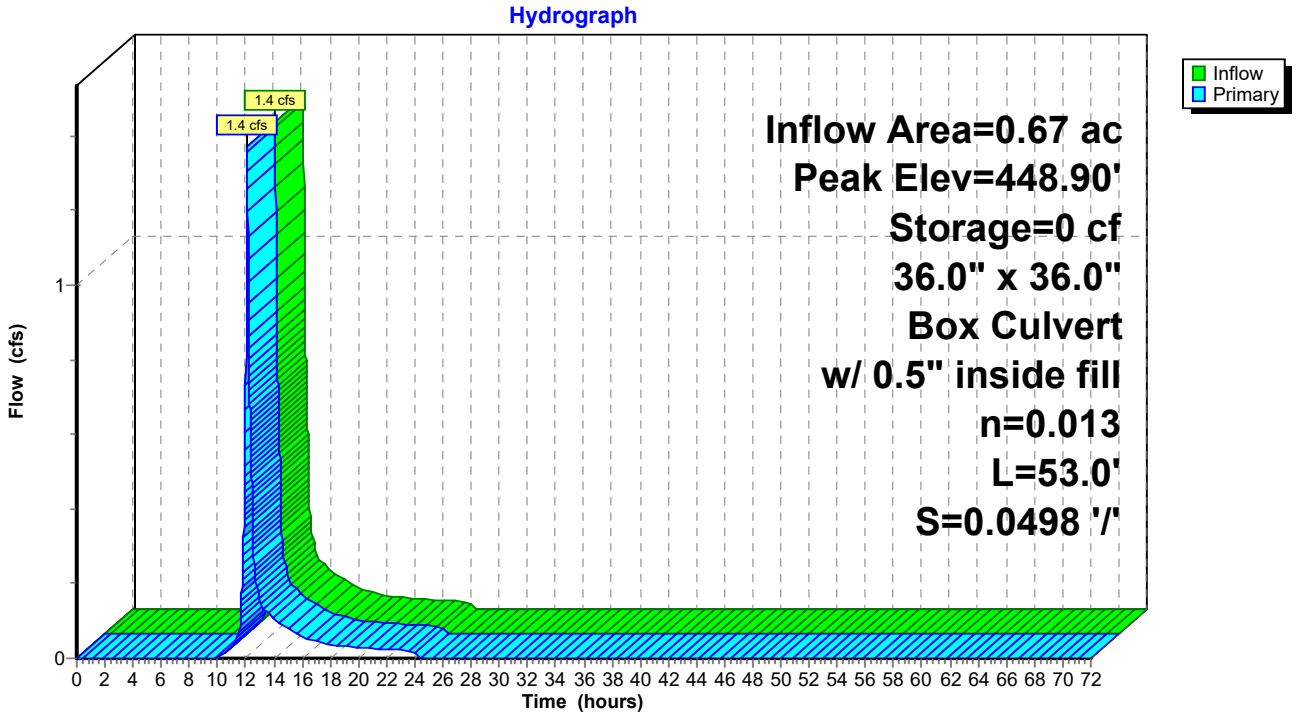
Volume	Invert	Avail.Storage	Storage Description
#1	448.90'	2,191 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
448.90	2	2.0	0	0	2
449.00	9	15.0	1	1	20
450.00	519	123.0	199	199	1,208
451.00	4,013	325.0	1,992	2,191	8,413

Device	Routing	Invert	Outlet Devices
#1	Primary	448.44'	**36.0" W x 36.0" H Box Culvert w/ 0.5" inside fill** L= 53.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 448.40' / 445.76' S= 0.0498 '/' Cc= 0.900 n= 0.013, Flow Area= 8.88 sf

Primary OutFlow Max=3.0 cfs @ 12.09 hrs HW=448.90' TW=446.33' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.0 cfs @ 2.17 fps)

Pond C12: PR-15 culvert



Summary for Pond C15: PR-15 culvert

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.51' @ 12.17 hrs

Inflow Area = 3.82 ac, 0.00% Impervious, Inflow Depth = 1.78" for 10-YR event
Inflow = 5.9 cfs @ 12.19 hrs, Volume= 0.57 af
Outflow = 5.9 cfs @ 12.19 hrs, Volume= 0.57 af, Atten= 0%, Lag= 0.2 min
Primary = 5.9 cfs @ 12.19 hrs, Volume= 0.57 af
Routed to Reach 16R : Thru PR-14

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 457.10' @ 12.19 hrs Surf.Area= 203 sf Storage= 96 cf

Plug-Flow detention time= 0.4 min calculated for 0.57 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (860.0 - 859.6)

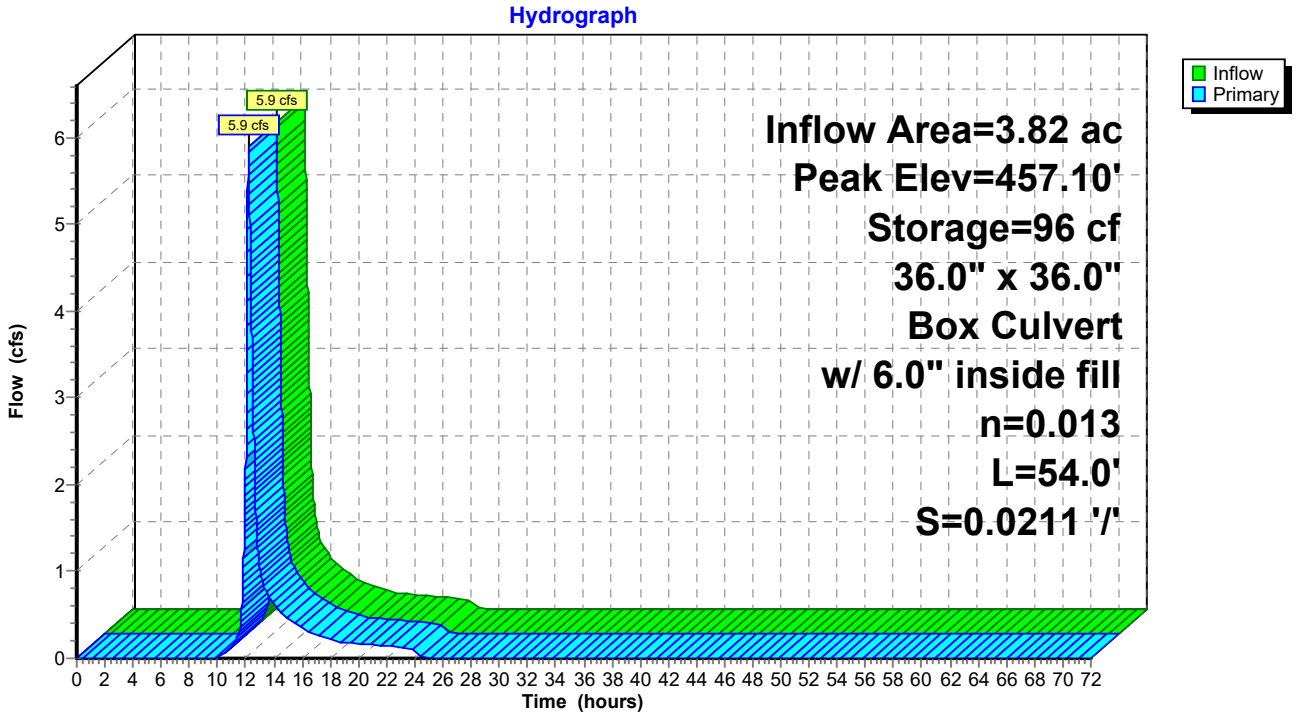
Volume	Invert	Avail.Storage	Storage Description
#1	456.38'	1,345 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
456.38	93	60.2	0	0	93
457.00	160	74.0	77	77	246
458.00	823	216.8	449	526	3,554
458.88	1,042	221.9	819	1,345	3,816

Device	Routing	Invert	Outlet Devices
#1	Primary	456.38'	**36.0" W x 36.0" H Box Culvert w/ 6.0" inside fill** L= 54.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 455.88' / 454.74' S= 0.0211 '/' Cc= 0.900 n= 0.013, Flow Area= 7.50 sf

Primary OutFlow Max=5.9 cfs @ 12.19 hrs HW=457.10' TW=455.93' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.9 cfs @ 2.72 fps)

Pond C15: PR-15 culvert



Summary for Pond C16: PR-16 culvert

Inflow Area = 0.68 ac, 0.00% Impervious, Inflow Depth = 1.72" for 10-YR event
Inflow = 1.3 cfs @ 12.11 hrs, Volume= 0.10 af
Outflow = 1.0 cfs @ 12.18 hrs, Volume= 0.10 af, Atten= 24%, Lag= 4.6 min
Primary = 1.0 cfs @ 12.18 hrs, Volume= 0.10 af
Routed to Reach 1R : Thru PR-15

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 468.06' @ 12.18 hrs Surf.Area= 2,442 sf Storage= 472 cf
Flood Elev= 470.84' Surf.Area= 7,154 sf Storage= 4,800 cf

Plug-Flow detention time= 14.9 min calculated for 0.10 af (100% of inflow)
Center-of-Mass det. time= 15.0 min (867.3 - 852.3)

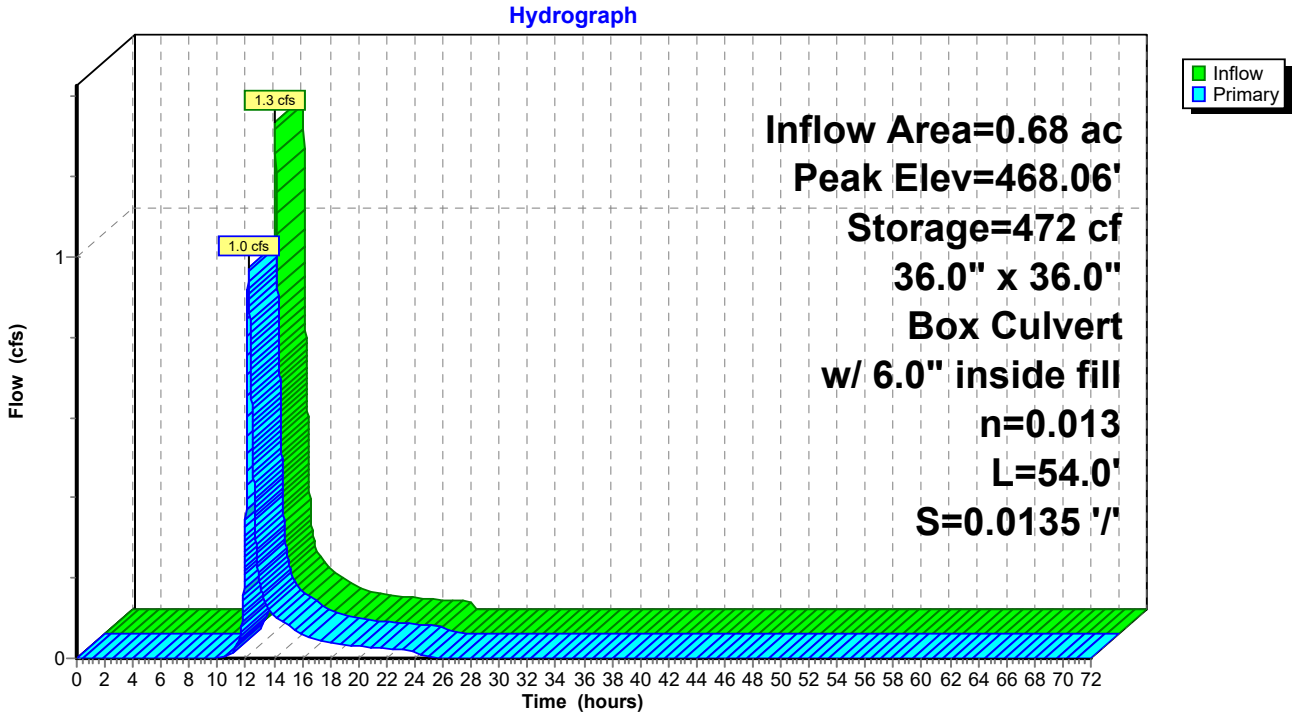
Volume	Invert	Avail.Storage	Storage Description
#1	467.84'	4,800 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.84	1,987	177.3	0	0	1,987
468.00	2,235	233.0	338	338	3,806
469.00	7,154	349.9	4,463	4,800	9,236

Device	Routing	Invert	Outlet Devices
#1	Primary	467.84'	**36.0" W x 36.0" H Box Culvert w/ 6.0" inside fill** L= 54.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 467.34' / 466.61' S= 0.0135 '/' Cc= 0.900 n= 0.013, Flow Area= 7.50 sf

Primary OutFlow Max=1.0 cfs @ 12.18 hrs HW=468.06' TW=467.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.0 cfs @ 1.50 fps)

Pond C16: PR-16 culvert



Summary for Pond C17: PR-17 culvert

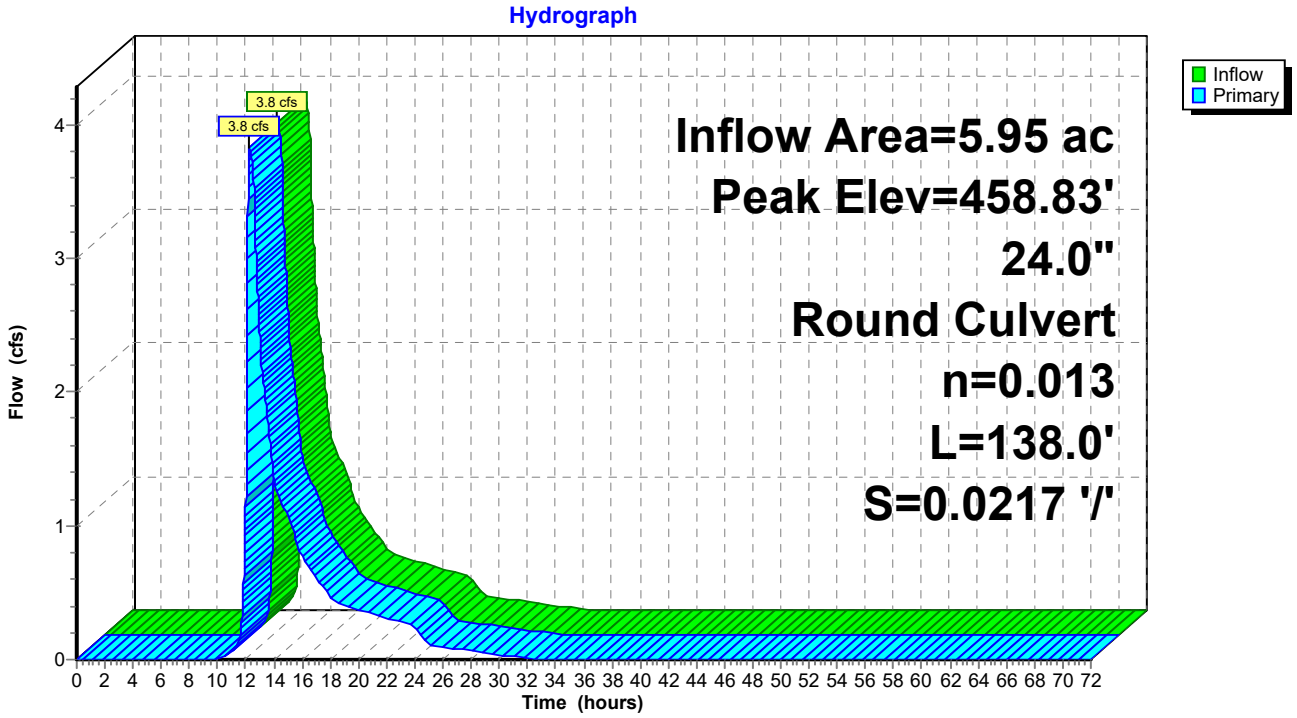
Inflow Area = 5.95 ac, 21.87% Impervious, Inflow Depth = 1.87" for 10-YR event
Inflow = 3.8 cfs @ 12.27 hrs, Volume= 0.93 af
Outflow = 3.8 cfs @ 12.27 hrs, Volume= 0.93 af, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.27 hrs, Volume= 0.93 af
Routed to Reach 16R : Thru PR-14

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 458.83' @ 12.27 hrs
Flood Elev= 462.49'

Device	Routing	Invert	Outlet Devices
#1	Primary	458.00'	**24.0" Round Culvert** L= 138.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 458.00' / 455.00' S= 0.0217 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=3.8 cfs @ 12.27 hrs HW=458.83' TW=456.04' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.8 cfs @ 3.10 fps)

Pond C17: PR-17 culvert



Summary for Pond C4: CULVERT #4

[62] Hint: Exceeded Reach 4R OUTLET depth by 1.41' @ 12.16 hrs
[62] Hint: Exceeded Reach 6R OUTLET depth by 1.38' @ 12.15 hrs
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.86' @ 12.23 hrs

Inflow Area = 22.00 ac, 26.67% Impervious, Inflow Depth = 2.00" for 10-YR event
Inflow = 28.9 cfs @ 12.16 hrs, Volume= 3.67 af
Outflow = 28.9 cfs @ 12.16 hrs, Volume= 3.67 af, Atten= 0%, Lag= 0.2 min
Primary = 28.9 cfs @ 12.16 hrs, Volume= 3.67 af
Routed to Reach 5R : Swale to P1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 411.48' @ 12.16 hrs Surf.Area= 265 sf Storage= 220 cf

Plug-Flow detention time= 0.3 min calculated for 3.67 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (904.2 - 904.1)

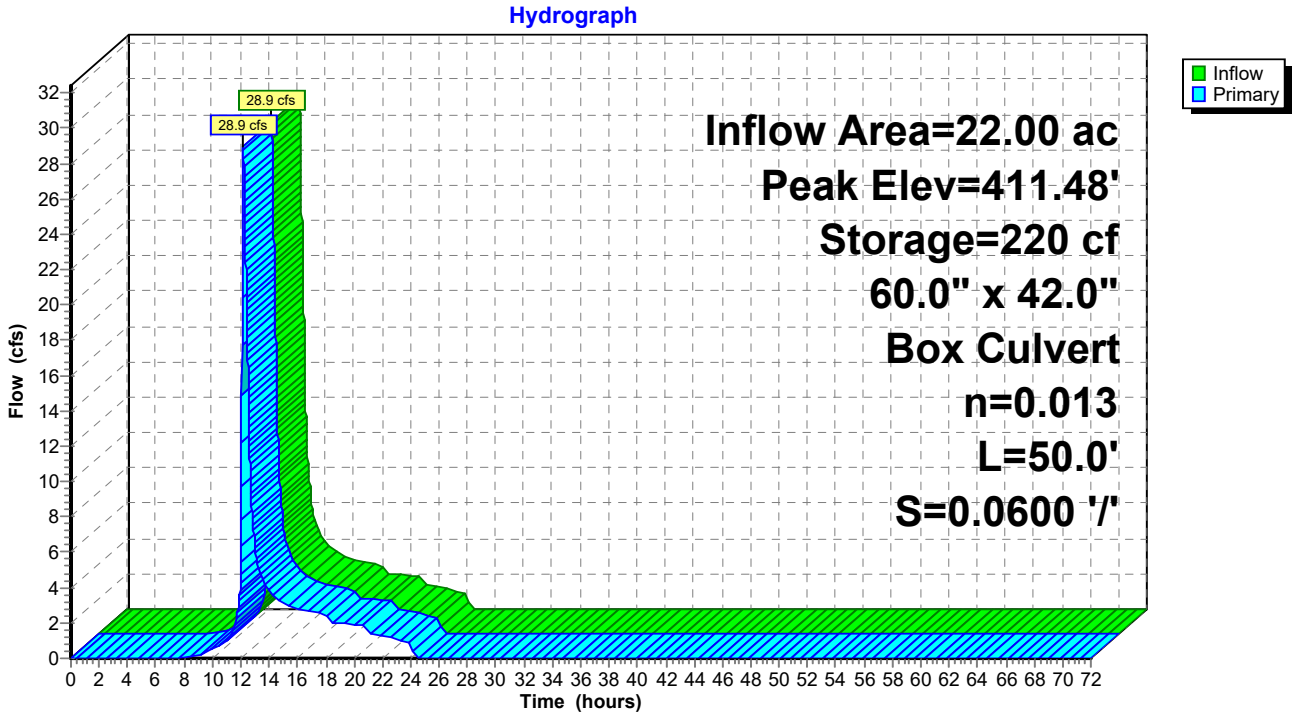
Volume	Invert	Avail.Storage	Storage Description
#1	410.00'	1,000 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
410.00	53	29.0	0	0	53
411.00	185	58.0	112	112	258
412.00	368	88.0	271	384	615
413.00	620	117.0	489	872	1,099
413.20	655	119.0	127	1,000	1,143

Device	Routing	Invert	Outlet Devices
#1	Primary	410.00'	**60.0" W x 42.0" H Box Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.00' / 407.00' S= 0.0600 '/' Cc= 0.900 n= 0.013, Flow Area= 17.50 sf

Primary OutFlow Max=28.9 cfs @ 12.16 hrs HW=411.48' TW=407.58' (Dynamic Tailwater)
1=Culvert (Inlet Controls 28.9 cfs @ 3.91 fps)

Pond C4: CULVERT #4



Summary for Pond WC1: Wetland Cross Culvert #1

[62] Hint: Exceeded Reach 13R OUTLET depth by 0.24' @ 12.45 hrs

Inflow Area = 40.04 ac, 14.91% Impervious, Inflow Depth = 2.04" for 10-YR event
Inflow = 42.0 cfs @ 12.44 hrs, Volume= 6.82 af
Outflow = 42.0 cfs @ 12.44 hrs, Volume= 6.82 af, Atten= 0%, Lag= 0.1 min
Primary = 42.0 cfs @ 12.44 hrs, Volume= 6.82 af
Routed to Reach 15R : Culvert #1 to DP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 411.60' @ 12.44 hrs Surf.Area= 145 sf Storage= 84 cf

Plug-Flow detention time= 0.0 min calculated for 6.82 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (1,000.9 - 1,000.9)

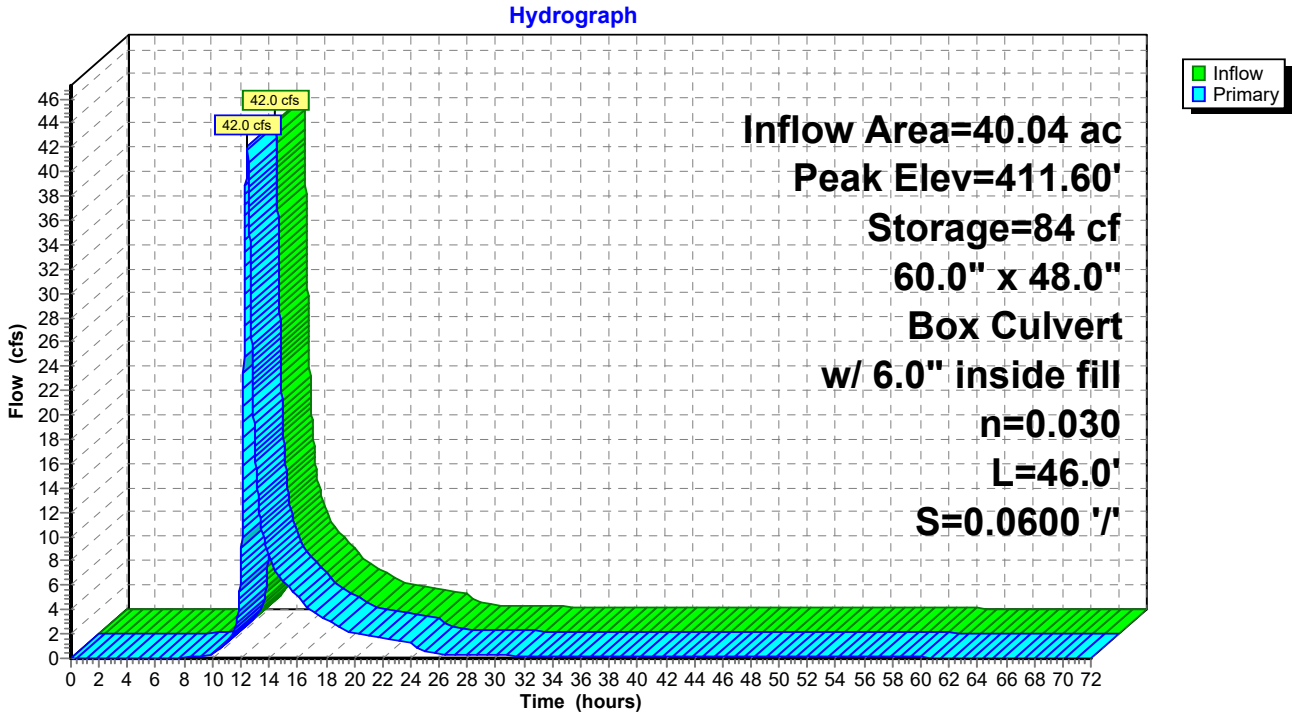
Volume	Invert	Avail.Storage	Storage Description
#1	409.70'	681 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
409.70	4	8.0	0	0	4
410.00	6	10.6	1	1	9
411.00	53	37.1	26	27	112
412.00	232	108.7	132	159	946
412.30	332	113.6	84	243	1,039
413.00	583	125.4	316	559	1,278
413.20	632	132.2	121	681	1,420

Device	Routing	Invert	Outlet Devices
#1	Primary	409.70'	**60.0" W x 48.0" H Box Culvert w/ 6.0" inside fill** L= 46.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 409.20' / 406.44' S= 0.0600 '/' Cc= 0.900 n= 0.030, Flow Area= 17.50 sf

Primary OutFlow Max=42.0 cfs @ 12.44 hrs HW=411.60' TW=408.29' (Dynamic Tailwater)
1=Culvert (Inlet Controls 42.0 cfs @ 4.42 fps)

Pond WC1: Wetland Cross Culvert #1



Summary for Pond WC2: Wetland Cross Culvert #2

[62] Hint: Exceeded Reach 16R OUTLET depth by 1.15' @ 12.38 hrs
[62] Hint: Exceeded Reach 22R OUTLET depth by 1.20' @ 12.42 hrs

Inflow Area = 27.85 ac, 13.80% Impervious, Inflow Depth = 2.03" for 10-YR event
Inflow = 32.4 cfs @ 12.32 hrs, Volume= 4.70 af
Outflow = 31.6 cfs @ 12.35 hrs, Volume= 4.70 af, Atten= 3%, Lag= 1.8 min
Primary = 31.6 cfs @ 12.35 hrs, Volume= 4.70 af
Routed to Reach 13R : Culvert #2 to #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 433.52' @ 12.39 hrs Surf.Area= 2,792 sf Storage= 1,924 cf
Flood Elev= 435.00' Surf.Area= 8,635 sf Storage= 10,195 cf

Plug-Flow detention time= 0.8 min calculated for 4.70 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (892.0 - 891.2)

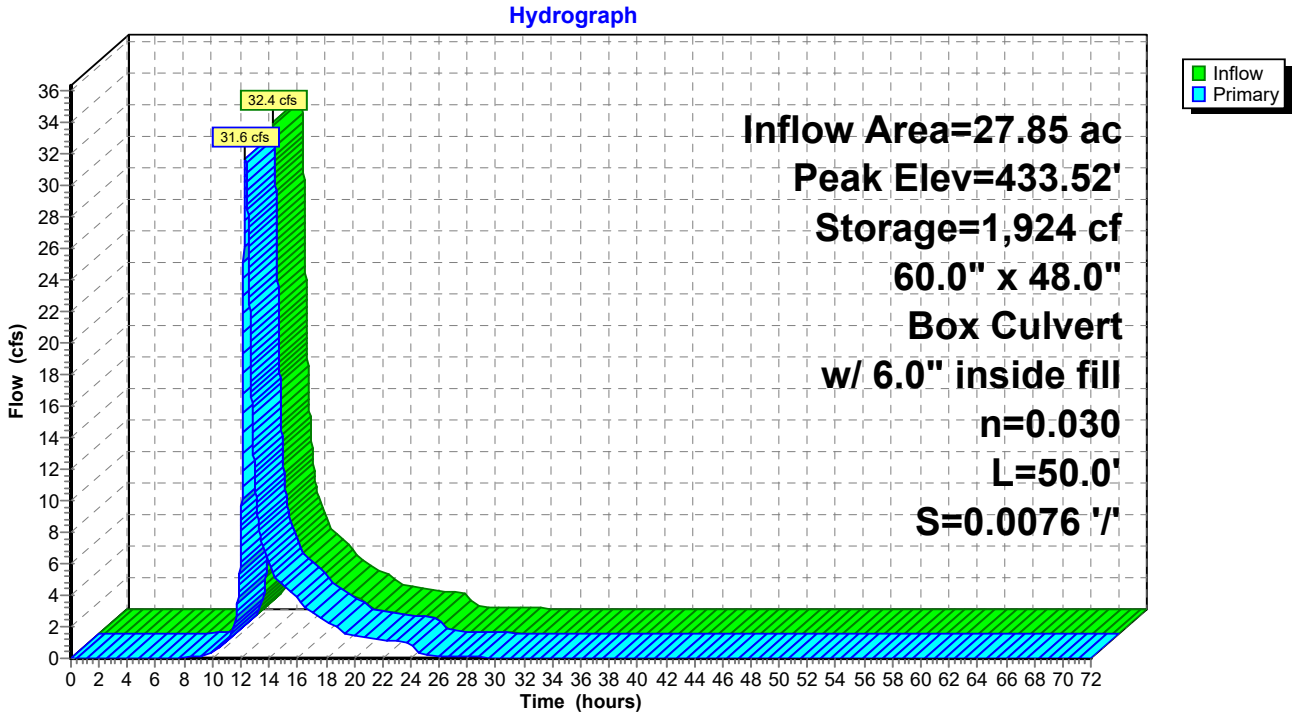
Volume	Invert	Avail.Storage	Storage Description
#1	431.50'	10,195 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
431.50	173	132.7	0	0	173
432.00	305	137.9	118	118	304
433.00	1,325	454.5	755	873	15,232
434.00	4,612	772.9	2,803	3,676	46,337
435.00	8,635	1,082.3	6,519	10,195	92,024

Device	Routing	Invert	Outlet Devices
#1	Primary	431.50'	**60.0" W x 48.0" H Box Culvert w/ 6.0" inside fill** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 431.00' / 430.62' S= 0.0076 '/' Cc= 0.900 n= 0.030, Flow Area= 17.50 sf

Primary OutFlow Max=31.3 cfs @ 12.35 hrs HW=433.51' TW=432.72' (Dynamic Tailwater)
1=Culvert (Outlet Controls 31.3 cfs @ 4.16 fps)

Pond WC2: Wetland Cross Culvert #2

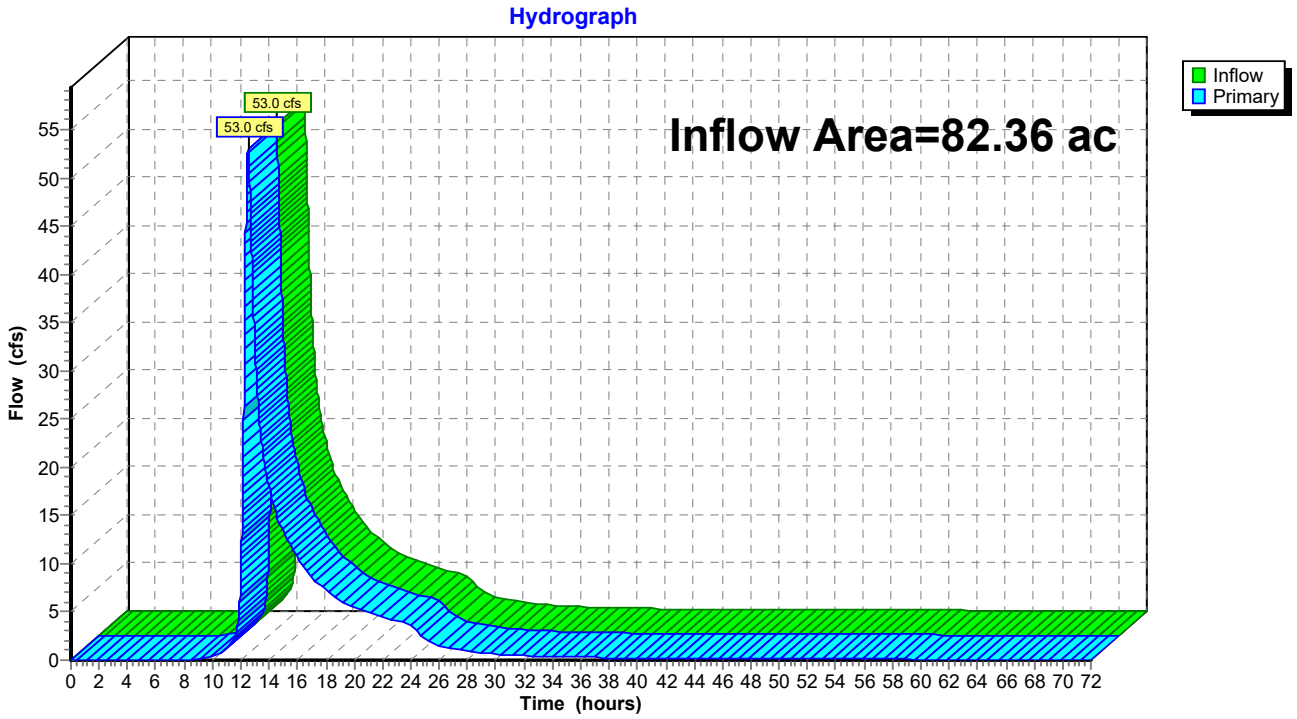


Summary for Link DP-1: Existing 18" Culvert

Inflow Area = 82.36 ac, 18.34% Impervious, Inflow Depth = 1.87" for 10-YR event
Inflow = 53.0 cfs @ 12.51 hrs, Volume= 12.84 af
Primary = 53.0 cfs @ 12.51 hrs, Volume= 12.84 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Existing 18" Culvert

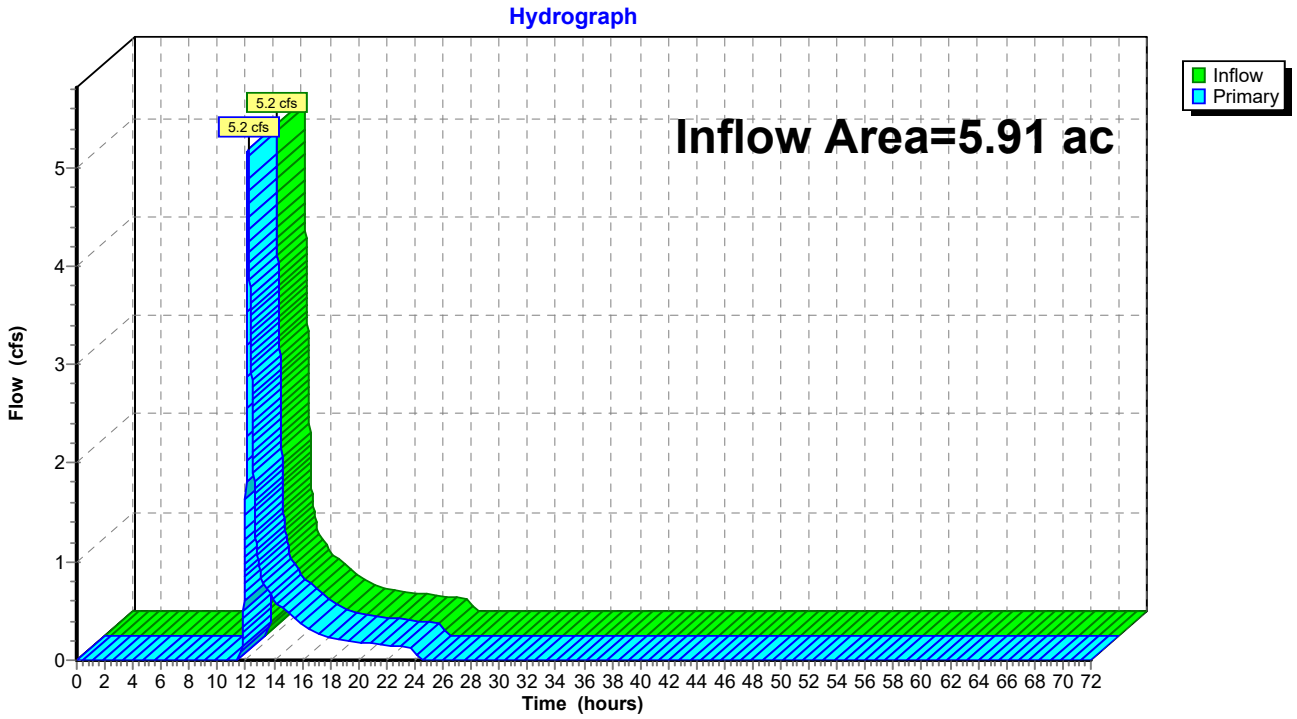


Summary for Link DP-2: Existing 12" Culvert

Inflow Area = 5.91 ac, 2.69% Impervious, Inflow Depth = 1.00" for 10-YR event
Inflow = 5.2 cfs @ 12.15 hrs, Volume= 0.49 af
Primary = 5.2 cfs @ 12.15 hrs, Volume= 0.49 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Existing 12" Culvert

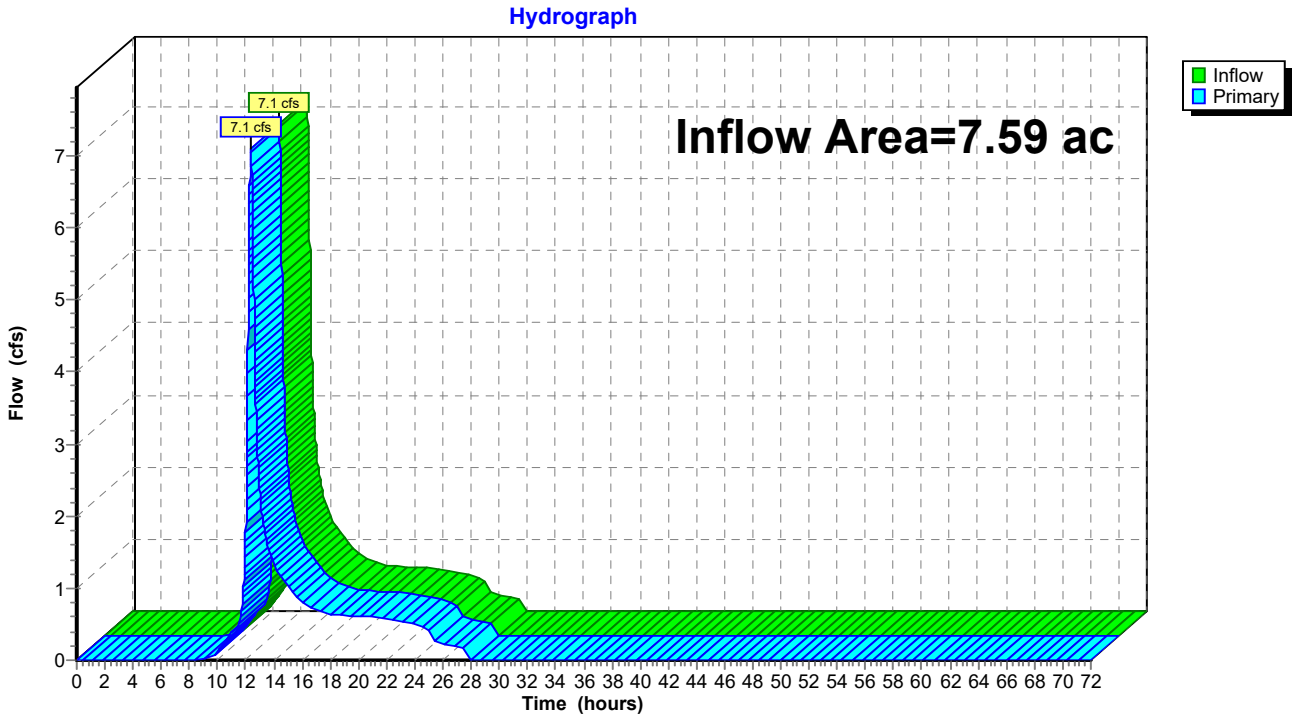


Summary for Link DP-3: Hovey Road

Inflow Area = 7.59 ac, 25.23% Impervious, Inflow Depth = 1.99" for 10-YR event
Inflow = 7.1 cfs @ 12.35 hrs, Volume= 1.26 af
Primary = 7.1 cfs @ 12.35 hrs, Volume= 1.26 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-3: Hovey Road

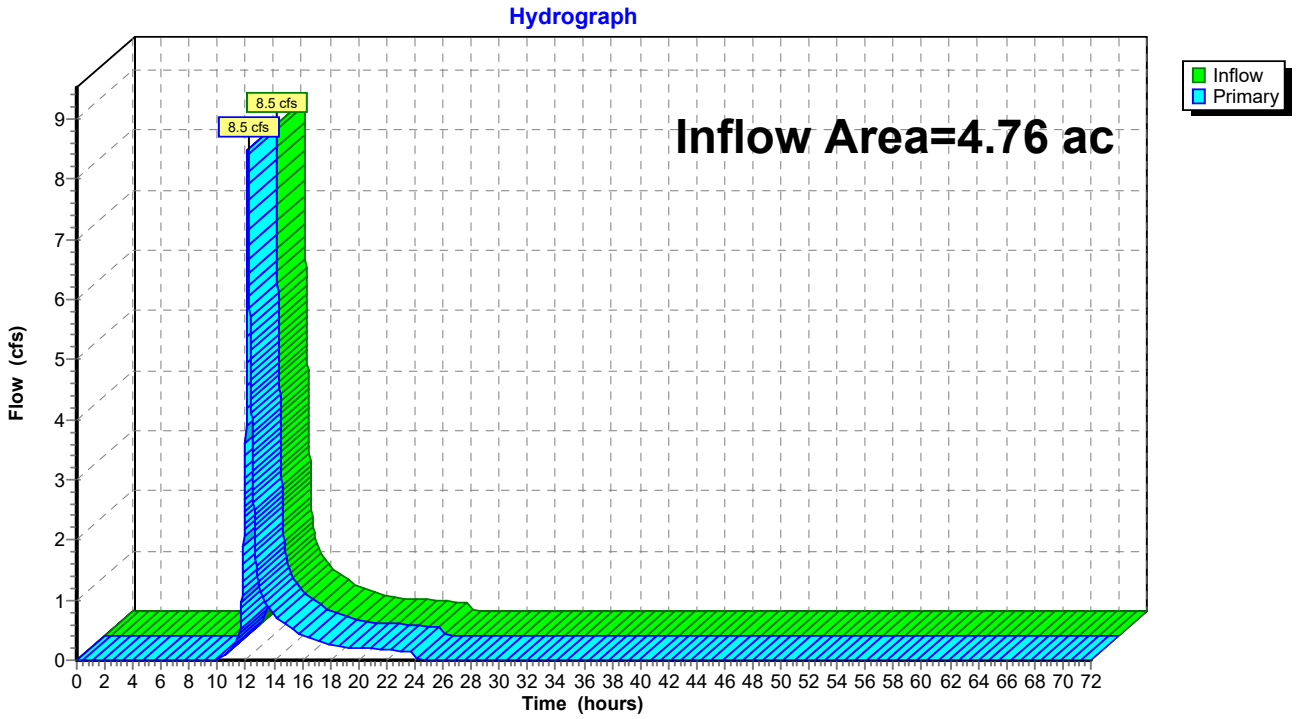


Summary for Link DP-4: Spring Road

Inflow Area = 4.76 ac, 0.05% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 8.5 cfs @ 12.15 hrs, Volume= 0.71 af
Primary = 8.5 cfs @ 12.15 hrs, Volume= 0.71 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-4: Spring Road

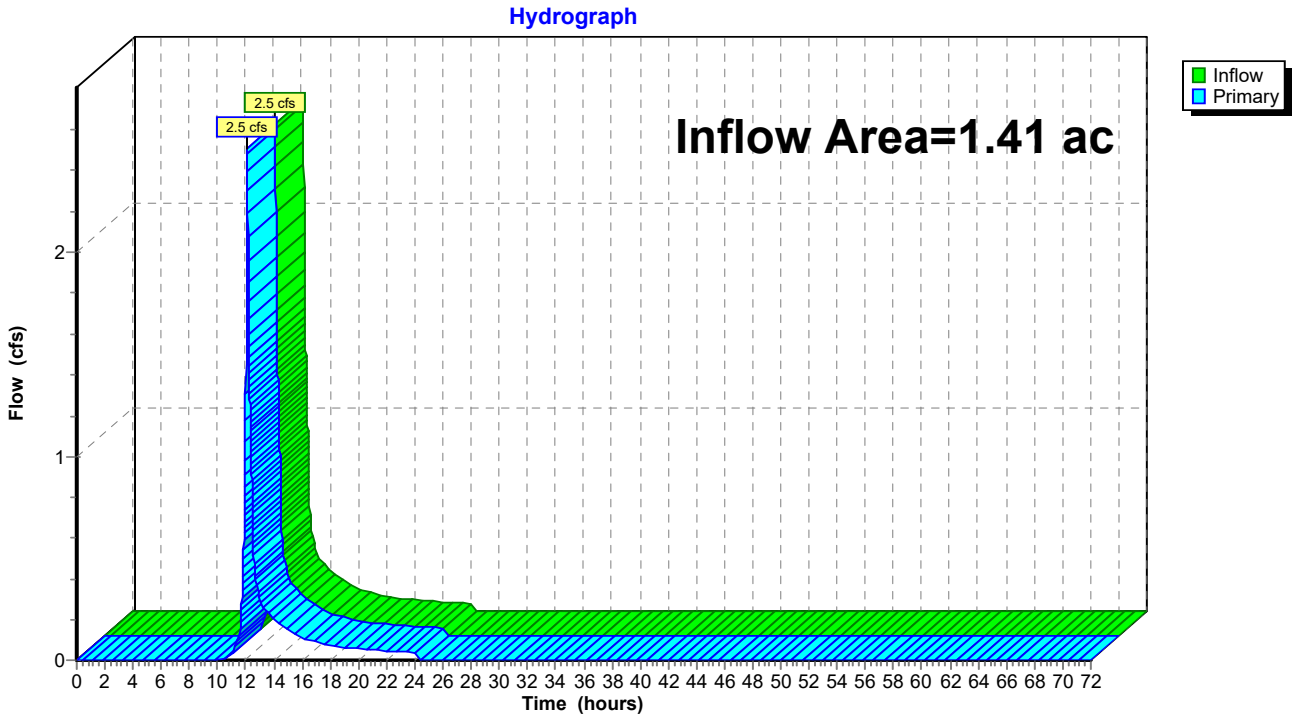


Summary for Link DP-5: Offsite

Inflow Area = 1.41 ac, 0.00% Impervious, Inflow Depth = 1.57" for 10-YR event
Inflow = 2.5 cfs @ 12.09 hrs, Volume= 0.19 af
Primary = 2.5 cfs @ 12.09 hrs, Volume= 0.19 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-5: Offsite

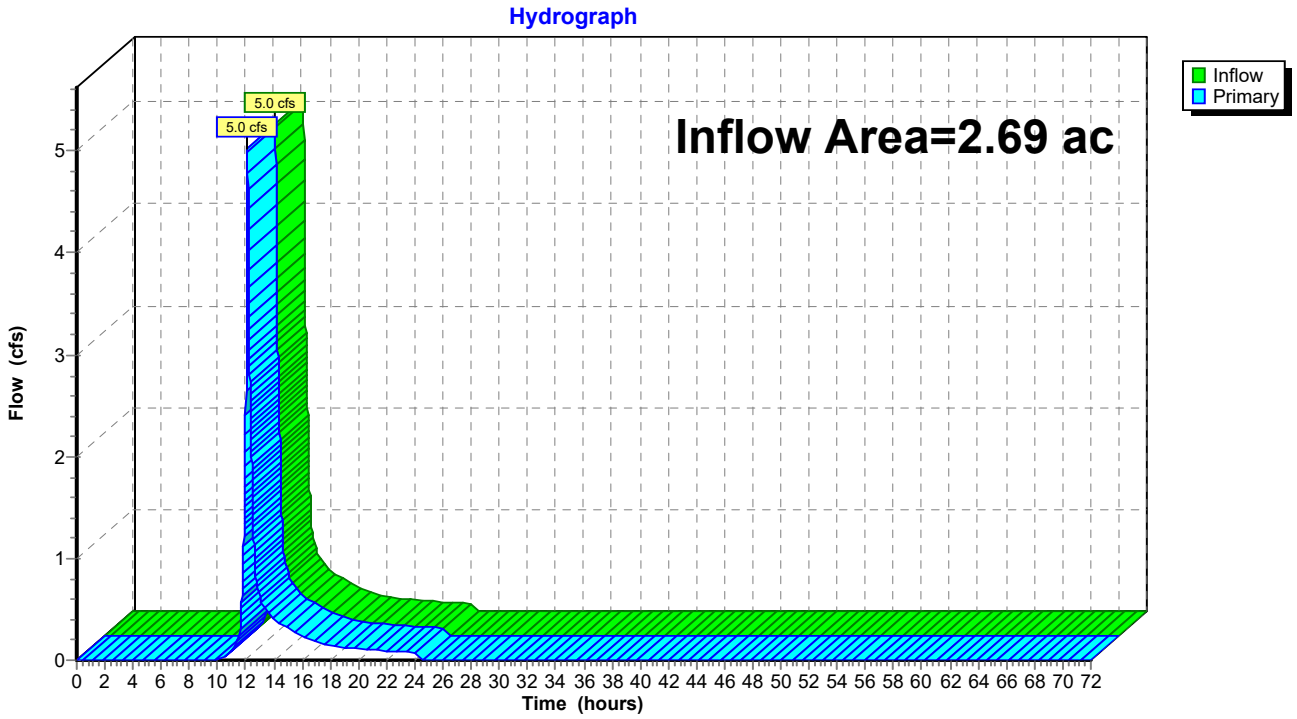


Summary for Link DP-6: North Hovey Road

Inflow Area = 2.69 ac, 0.01% Impervious, Inflow Depth = 1.72" for 10-YR event
Inflow = 5.0 cfs @ 12.11 hrs, Volume= 0.38 af
Primary = 5.0 cfs @ 12.11 hrs, Volume= 0.38 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-6: North Hovey Road



Summary for Link OS-2: 2017 Cemetery Basin Outfall

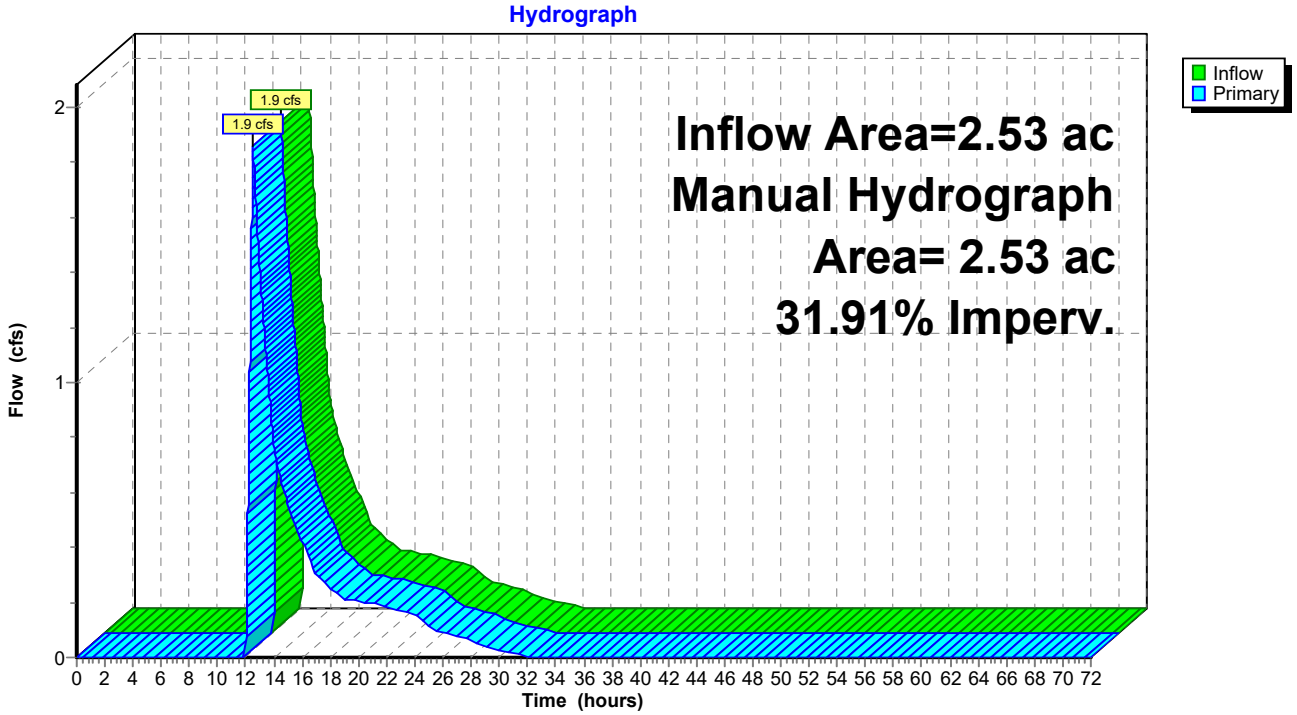
Inflow Area = 2.53 ac, 31.91% Impervious, Inflow Depth = 2.27" for 10-YR event
Inflow = 1.9 cfs @ 12.50 hrs, Volume= 0.48 af
Primary = 1.9 cfs @ 12.50 hrs, Volume= 0.48 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2R : Thru PR-17

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

10-YR 129 Point manual hydrograph, To= 0.00 hrs, dt= 0.25 hrs, Area= 2.53 ac, 31.91% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93
1.86	1.63	1.40	1.23	1.07	0.91	0.75	0.70	0.65	0.60
0.55	0.51	0.47	0.44	0.42	0.40	0.37	0.34	0.30	0.29
0.28	0.27	0.25	0.24	0.23	0.22	0.21	0.21	0.21	0.21
0.21	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.18	0.18
0.18	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.14	0.12
0.11	0.10	0.10	0.09	0.09	0.09	0.08	0.08	0.08	0.07
0.07	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03
0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	

Link OS-2: 2017 Cemetery Basin Outfall



Summary for Link OS-3: 2010 Cemetery Basin Outfall

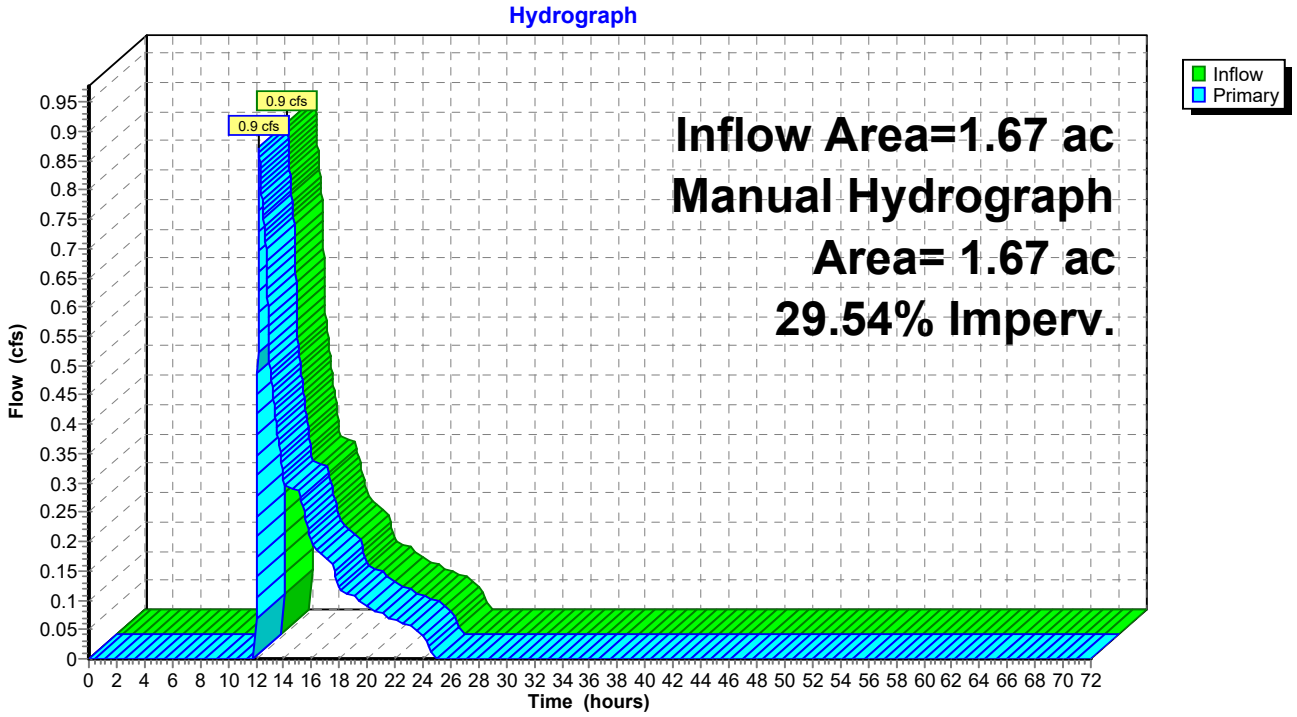
Inflow Area = 1.67 ac, 29.54% Impervious, Inflow Depth = 1.43" for 10-YR event
Inflow = 0.9 cfs @ 12.25 hrs, Volume= 0.20 af
Primary = 0.9 cfs @ 12.25 hrs, Volume= 0.20 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 2R : Thru PR-17

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

10-YR 102 Point manual hydrograph, To= 0.00 hrs, dt= 0.25 hrs, Area= 1.67 ac, 29.54% Imp., cfs =

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87
0.76	0.70	0.50	0.45	0.40	0.35	0.30	0.29	0.29	0.29
0.29	0.27	0.25	0.22	0.20	0.19	0.18	0.18	0.17	0.17
0.16	0.14	0.12	0.11	0.11	0.11	0.11	0.10	0.10	0.09
0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.06
0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.00
0.00	0.00								

Link OS-3: 2010 Cemetery Basin Outfall



Appendix C: Hydraulic Calculations

- Storm Drain Piping Calculations: Project Site
- Storm Drain Piping Calculations: Hovey Road Existing Network
- Riprap Apron/Energy Dissipation Calculations

Storm Drain Piping Calculations: Project Site

FlexTable: Conduit Table

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Diameter (in)	Manning's n	Slope (Calculated) (ft/ft)	Length (Scaled) (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Elevation Ground (Start) (ft)	Hydraulic Grade Line (In) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (Out) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)
CB-618	CB-617	0.004	0.670	0.003	7.270	15.0	0.010	0.010	30.0	0.02	8.40	0.2	431.48	426.65	431.42	426.65	426.60	426.30
CB-615	CB-614	0.006	0.854	0.005	7.270	12.0	0.010	0.010	30.0	0.04	4.63	0.8	422.30	417.87	422.30	417.87	417.50	417.20
CB-1206	CB-1205	0.030	0.847	0.025	7.270	15.0	0.010	0.009	22.0	0.19	8.01	2.3	451.03	446.34	451.03	446.34	446.00	445.80
CB-910	CB-911	0.072	0.844	0.061	7.270	15.0	0.010	0.010	30.3	0.45	8.35	5.3	462.62	458.54	462.70	458.55	457.90	457.60
CB-303	CB-302	0.088	0.846	0.074	7.270	15.0	0.010	0.014	22.0	0.55	9.81	5.6	448.74	444.69	448.74	444.68	444.40	444.10
CB-612	CB-610	0.016	0.515	0.105	7.216	15.0	0.010	0.024	215.3	0.77	13.05	5.9	425.61	421.04	420.26	416.27	420.70	415.50
CB-1203	CB-1202	0.089	0.877	0.078	7.270	15.0	0.010	0.010	20.5	0.57	8.29	6.9	443.24	439.03	443.32	439.04	438.50	438.30
CB-508	CB-507	0.185	0.786	0.145	7.270	15.0	0.010	0.033	24.0	1.07	15.32	7.0	457.84	453.81	457.80	453.82	453.10	452.30
CB-903	CB-902	0.247	0.633	0.156	7.270	18.0	0.010	0.014	22.0	1.15	15.94	7.2	453.28	449.26	453.28	449.26	448.30	448.00
CB-503	CB-502	0.089	0.846	0.075	7.270	15.0	0.010	0.008	26.0	0.55	7.37	7.5	455.02	450.15	454.99	450.15	448.80	448.60
CB-619	CB-616	0.105	0.844	0.193	7.230	15.0	0.010	0.046	174.2	1.40	18.10	7.8	436.98	432.77	429.03	424.75	432.30	424.20
CB-1101	1102 (36 Pillsbury - STORM DRAINAGE)	1.677	0.200	0.335	7.270	24.0	0.010	0.010	153.5	2.46	30.02	8.2	462.60	457.15	458.09	455.39	456.60	455.00
CB-613	CB-612	0.181	0.537	0.097	7.270	15.0	0.010	0.010	30.1	0.71	8.39	8.5	425.40	421.43	425.61	421.05	421.10	420.80
CB-620	CB-619	0.123	0.846	0.104	7.270	15.0	0.010	0.009	22.0	0.76	8.01	9.5	437.42	432.94	436.98	432.77	432.60	432.40
CB-403	CB-402	0.132	0.846	0.112	7.270	15.0	0.010	0.009	22.0	0.82	8.01	10.2	453.61	450.78	453.57	450.78	450.00	449.80
1204 (36 Pillsbury - STORM DRAINAGE)	CB-1202	(N/A)	(N/A)	0.351	7.085	18.0	0.010	0.025	167.1	2.51	21.39	11.7	447.56	443.00	443.32	439.04	442.40	438.30
CB-605	CB-604	0.130	0.718	0.093	7.270	12.0	0.010	0.015	26.0	0.68	5.74	11.9	427.53	415.85	427.53	415.56	415.50	415.10
CB-915	CB-914	0.271	0.575	0.156	7.270	15.0	0.010	0.012	34.4	1.14	9.06	12.6	471.06	466.82	470.77	466.31	466.40	466.00
CB-306	CB-305	0.401	0.578	0.232	7.270	18.0	0.010	0.009	22.0	1.70	13.02	13.0	448.17	443.78	448.17	443.80	443.10	442.90
CB-914	CB-912	0.074	0.828	0.217	7.219	15.0	0.010	0.019	239.8	1.58	11.50	13.7	470.77	466.40	466.35	462.25	465.90	461.40
CB-800	CB-801	0.424	0.405	0.172	7.270	15.0	0.010	0.012	26.0	1.26	9.02	14.0	462.71	458.34	462.66	458.36	457.90	457.60
CB-617	CB-616	0.287	0.614	0.179	7.110	15.0	0.010	0.011	177.7	1.28	8.91	14.4	431.42	426.65	429.03	424.75	426.20	424.20
CB-616	CB-614	0.006	0.859	0.377	6.852	15.0	0.010	0.046	138.6	2.60	18.04	14.4	429.03	424.75	422.30	418.02	424.10	417.70
CB-604	CB-603	0.195	0.731	0.236	7.230	12.0	0.010	0.045	252.0	1.72	9.85	17.5	427.53	415.56	409.78	404.78	415.00	403.60
CB-1205	1204 (36 Pillsbury - STORM DRAINAGE)	0.371	0.877	0.351	7.209	15.0	0.010	0.024	135.3	2.55	12.91	19.7	451.03	446.34	447.56	442.88	445.70	442.50
CB-302	301 (36 Pillsbury - STORM DRAINAGE)	0.748	0.480	0.433	7.232	18.0	0.010	0.014	29.2	3.16	15.98	19.8	448.74	444.68	445.19	444.09	444.00	443.60
CB-614	609 (36 Pillsbury - STORM DRAINAGE)	0.271	0.556	0.533	6.752	15.0	0.010	0.041	63.0	3.62	17.06	21.2	422.30	417.87	419.25	415.53	417.10	414.50
CB-506	CB-505	0.437	0.569	0.249	7.270	15.0	0.010	0.010	30.0	1.82	8.40	21.7	459.77	455.44	459.75	455.22	454.90	454.60
CB-702	701 (36 Pillsbury - STORM DRAINAGE)	0.649	0.594	1.487	7.092	24.0	0.010	0.027	152.7	10.63	48.76	21.8	459.00	452.37	449.09	447.64	451.20	447.00
CB-1012	CB-1011	0.612	0.442	0.271	7.270	15.0	0.010	0.012	26.0	1.98	9.02	22.0	469.04	465.45	468.98	465.26	464.70	464.40
CB-1008	CB-1007	0.435	0.388	0.169	7.270	12.0	0.010	0.014	22.0	1.24	5.41	22.9	464.85	460.87	464.86	460.98	460.40	460.10
CB-607	CB-606	0.385	0.416	1.679	6.603	24.0	0.010	0.027	81.3	11.18	48.35	23.1	411.35	407.40	409.44	404.70	406.20	404.00
CB-1012	CB-1010	0.083	0.849	0.341	7.149	15.0	0.010	0.016	135.4	2.46	10.46	23.5	469.04	464.93	466.86	463.01	464.30	462.20
CB-505	CB-504	0.303	0.620	0.437	7.229	15.0	0.010	0.025	218.4	3.18	13.20	24.1	459.75	455.22	456.48	451.67	454.50	449.10
CB-411	CB-410	0.460	0.625	0.287	7.270	15.0	0.010	0.010	30.0	2.11	8.40	25.1	458.41	454.68	458.41	454.53	454.10	453.80
CB-1002	1001 (36 Pillsbury - STORM DRAINAGE)	0.276	0.709	1.709	6.329	24.0	0.010	0.021	117.5	10.90	42.89	25.4	462.32	458.88	457.29	455.91	457.70	455.20
CB-611	CB-610	1.226	0.337	0.413	7.270	15.0	0.010	0.019	26.0	3.03	11.64	26.0	420.26	416.70	420.26	416.27	416.00	415.50
CB-1010	CB-1009	1.036	0.325	0.337	7.270	15.0	0.010	0.012	26.0	2.47	9.02	27.4	466.86	463.34	466.80	463.13	462.50	462.20
1005 (36 Pillsbury - STORM DRAINAGE)	CB-1002	(N/A)	(N/A)	0.933	6.484	24.0	0.010	0.006	124.3	6.10	22.07	27.6	464.00	459.37	462.32	458.88	458.50	457.80
CB-913	CB-912	0.569	0.561	0.319	7.270	15.0	0.010	0.010	30.0	2.34	8.40	27.9	466.37	462.31	466.35	462.25	461.70	461.40
CB-906	905 (36 Pillsbury - STORM DRAINAGE)	0.391	0.628	0.246	7.270	12.0	0.010	0.019	26.0	1.80	6.42	28.0	457.75	453.87	457.83	453.98	453.30	452.80
1006 (36 Pillsbury - STORM DRAINAGE)	1005 (36 Pillsbury - STORM DRAINAGE)	(N/A)	(N/A)	0.933	6.687	24.0	0.010	0.006	162.9	6.29	21.86	28.8	465.09	460.39	464.00	459.34	459.50	458.60
609 (36 Pillsbury - STORM DRAINAGE)	CB-608	(N/A)	(N/A)	1.267	6.709	18.0	0.010	0.047	163.1	8.57	29.66	28.9	419.25	415.53	411.35	407.25	414.40	406.70
CB-305	304 (36 Pillsbury - STORM DRAINAGE)	0.256	0.575	0.948	7.036	18.0	0.010	0.028	29.0	6.72	22.68	29.7	448.17	443.80	443.59	442.66	442.80	442.00
802 (36 Pillsbury - STORM DRAINAGE)	803 (36 Pillsbury - STORM DRAINAGE)	(N/A)	(N/A)	0.622	7.149	15.0	0.010	0.032	81.5	4.48	15.00	29.9	460.50	456.46	1.42	453.48	455.60	453.00
CB-407	CB-406	0.332	0.583	0.194	7.270	12.0	0.010	0.010	30.0	1.42	4.63	30.6	459.37	455.41	459.37	455.23	454.90	454.60
CB-902	901 (36 Pillsbury - STORM DRAINAGE)	0.211	0.619	2.219	6.377	24.0	0.010	0.022	131.8	14.26	43.61	32.7	453.28	449.26	447.09	445.81	447.90	445.00
CB-610	609 (36 Pillsbury - STORM DRAINAGE)	0.352	0.614	0.735	6.938	18.0	0.010	0.011	79.0	5.14	14.57	35.3	420.26	416.27	419.25	415.53	415.40	414.50
CB-606	CB-603	0.011	0.796	1.688	6.555	24.0	0.010	0.012	26.0	11.15	31.59	35.3	409.44	405.10	409.78	404.54	403.90	403.60
CB-406	CB-405	0.359	0.563	0.396	7.227	12.0	0.010	0.026	169.1	2.88	7.49	38.5	459.37	455.23	455.54	451.64	454.50	450.08
CB-410	CB-409	0.458	0.628	0.575	7.230	15.0	0.010	0.016	241.7	4.19	10.67	39.3	458.41	454.53	454.37	450.65	453.70	449.80
CB-801	802 (36 Pillsbury - STORM DRAINAGE)	0.822	0.548	0.622	7.232	15.0	0.010	0.019	97.0	4.54	11.44	39.6	462.66	458.36	460.50	456.25	457.50	455.70
CB-912	CB-911	0.412	0.618	0.791	6.945	15.0	0.010	0.024	152.2	5.54	13.09	42.3	466.35	462.25	462.70	458.17	461.30	457.60
CB-308	CB-307	0.447	0.601	0.269	7.270	12.0	0.010	0.010	30.0	1.97	4.63	42.5	454.95	451.00	454.95	450.86	450.40	450.10

FlexTable: Conduit Table

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Diameter (in)	Manning's n	Slope (Calculated) (ft/ft)	Length (Scaled) (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Elevation Ground (Start) (ft)	Hydraulic Grade Line (In) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (Out) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)
CB-603	602 (36 Pillsbury - STORM DRAINAGE)	0.012	0.773	1.933	6.533	24.0	0.010	0.010	51.3	12.73	29.03	43.9	409.78	404.78	405.09	404.00	403.50	403.00
CB-1202	1201 (36 Pillsbury - STORM DRAINAGE)	0.344	0.740	0.683	6.930	18.0	0.010	0.006	197.5	4.77	10.64	44.9	443.32	439.04	438.59	437.70	438.20	437.00
CB-502	501 (36 Pillsbury - STORM DRAINAGE)	1.748	0.329	3.865	6.655	36.0	0.010	0.004	45.0	25.93	57.77	44.9	454.99	450.15	452.34	449.77	448.50	448.30
CB-908	CB-907	0.141	0.856	1.305	6.670	18.0	0.010	0.019	96.3	8.77	18.67	47.0	460.91	456.95	459.06	454.75	455.80	454.00
CB-507	CB-504	2.191	0.404	2.584	6.855	24.0	0.010	0.015	145.4	17.86	36.17	49.4	457.80	453.82	456.48	451.67	452.30	450.10
CB-307	CB-305	0.480	0.626	0.569	7.230	12.0	0.010	0.028	258.0	4.15	7.68	54.0	454.95	450.86	448.17	443.80	450.00	442.90
CB-907	905 (36 Pillsbury - STORM DRAINAGE)	0.219	0.600	1.436	6.601	18.0	0.010	0.017	66.3	9.55	17.58	54.3	459.06	455.09	457.83	453.64	453.90	452.80
905 (36 Pillsbury - STORM DRAINAGE)	CB-904	(N/A)	(N/A)	1.682	6.552	18.0	0.010	0.019	131.0	11.10	18.86	58.9	457.83	453.98	455.22	451.04	452.70	450.20
CB-1010	CB-1007	0.042	0.848	0.713	7.003	15.0	0.010	0.010	199.2	5.04	8.41	59.8	466.86	463.01	464.86	460.80	462.10	460.10
CB-514	CB-513	1.206	0.571	0.689	7.270	15.0	0.010	0.010	30.1	5.05	8.38	60.2	465.94	462.39	465.92	462.11	461.20	460.90
CB-405	CB-404	0.286	0.569	0.558	7.084	15.0	0.010	0.006	50.4	3.99	6.48	61.5	455.54	451.64	454.95	451.52	412.40	412.10
CB-402	401 (36 Pillsbury - STORM DRAINAGE)	0.497	0.451	1.071	6.781	15.0	0.010	0.019	26.0	7.32	11.64	62.9	453.57	450.78	450.54	450.02	449.70	449.20
CB-909	CB-908	0.339	0.592	1.184	6.792	18.0	0.010	0.009	125.0	8.11	12.81	63.3	462.43	458.10	460.91	456.77	457.00	455.90
CB-515	CB-507	0.404	0.604	1.554	6.961	18.0	0.010	0.015	143.0	10.90	16.94	64.4	459.53	455.77	457.80	453.82	454.50	452.30
CB-514	CB-516	0.811	0.433	1.040	7.215	15.0	0.010	0.019	303.2	7.56	11.61	65.1	465.94	461.89	459.70	455.74	460.80	455.00
CB-1004	CB-1003	1.332	0.312	0.416	7.270	12.0	0.010	0.010	30.0	3.05	4.63	65.8	464.07	460.35	464.09	460.07	459.60	459.30
CB-1007	1006 (36 Pillsbury - STORM DRAINAGE)	0.060	0.846	0.933	6.795	18.0	0.010	0.005	82.6	6.39	9.50	67.3	464.86	460.98	465.09	460.50	460.00	459.60
CB-705	CB-704	0.688	0.618	0.425	7.270	12.0	0.010	0.010	30.0	3.12	4.63	67.3	457.84	454.06	457.82	453.88	453.30	453.00
CB-704	CB-703	0.991	0.378	0.800	7.234	15.0	0.010	0.010	114.4	5.83	8.60	67.8	457.82	453.88	459.01	452.71	452.90	451.70
CB-409	408 (36 Pillsbury - STORM DRAINAGE)	0.331	0.609	0.777	7.008	15.0	0.010	0.009	22.0	5.49	8.01	68.5	454.37	450.65	450.84	450.31	449.70	449.50
CB-516	CB-515	0.622	0.434	1.310	6.989	18.0	0.010	0.010	31.1	9.23	13.40	68.8	459.70	456.08	459.53	455.58	454.90	454.60
CB-608	CB-607	0.426	0.591	1.519	6.625	18.0	0.010	0.012	26.0	10.14	14.68	69.1	411.35	407.83	411.35	407.32	406.60	406.30
CB-904	CB-902	0.424	0.590	1.932	6.463	18.0	0.010	0.017	125.3	12.58	17.68	71.2	455.22	451.44	453.28	448.96	450.10	448.00
CB-504	CB-502	0.327	0.594	3.215	6.760	24.0	0.010	0.010	143.0	21.91	29.09	75.3	456.48	451.67	454.99	449.92	450.00	448.60
CB-1003	CB-1002	0.248	0.665	0.581	7.234	12.0	0.010	0.015	95.2	4.23	5.62	75.4	464.09	460.07	462.32	458.88	459.20	457.80
CB-911	CB-909	0.234	0.562	0.983	6.833	15.0	0.010	0.010	41.3	6.77	8.26	81.9	462.70	458.55	462.43	457.99	457.50	457.10
CB-404	CB-402	0.300	0.588	0.735	6.968	15.0	0.010	0.006	142.5	5.16	6.29	82.0	454.95	451.52	453.57	450.78	450.60	449.80
CB-703	CB-702	0.484	0.624	1.102	7.120	15.0	0.010	0.010	30.0	7.91	8.40	94.2	459.01	452.71	459.00	452.30	451.60	451.30

Storm Drain Piping Calculations: Hovey Road Existing Network

FlexTable: Conduit Table

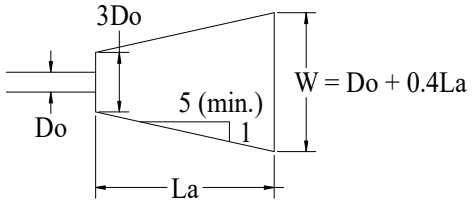
Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Diameter (in)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
CB-11	O-1	0.158	0.480	4.175	3.164	18.0	62.0	0.030	0.010	13.32	23.84	55.8	13.87	351.47	349.58	352.83	350.47
CB-1	CB-2	2.598	0.290	0.753	6.049	15.0	153.2	0.011	0.010	4.59	8.66	53.0	7.16	449.16	447.53	450.03	448.18
CB-2	CB-3	1.931	0.240	1.217	4.050	15.0	244.2	0.022	0.010	4.97	12.53	39.6	9.62	447.43	441.99	448.33	442.54
CB-3	CB-4	3.879	0.230	2.109	3.261	18.0	107.2	0.043	0.010	6.93	28.39	24.4	13.27	441.69	437.05	442.71	437.56
CB-4	CB-5	2.352	0.250	2.697	3.251	18.0	209.5	0.028	0.010	8.84	22.83	38.7	12.09	436.05	430.19	437.20	430.84
CB-5	CB-6	1.358	0.300	3.104	3.228	18.0	318.6	0.062	0.010	10.10	34.03	29.7	16.79	429.89	410.06	431.12	410.62
CB-6	CB-7	1.369	0.330	3.556	3.204	18.0	119.2	0.057	0.010	11.48	32.73	35.1	16.89	406.36	399.50	407.65	400.13
CB-7	CB-8	0.121	0.580	3.626	3.195	18.0	118.5	0.078	0.010	11.68	38.08	30.7	18.96	394.55	385.31	395.85	385.89
CB-8	CB-9	0.451	0.330	3.775	3.187	18.0	109.7	0.084	0.010	12.13	39.67	30.6	19.73	381.21	371.92	382.53	372.50
CB-9	CB-10	0.738	0.280	3.982	3.180	18.0	106.9	0.073	0.010	12.76	37.00	34.5	19.01	368.31	360.44	369.65	361.07
CB-10	CB-11	0.356	0.330	4.099	3.172	18.0	108.6	0.050	0.010	13.11	30.62	42.8	16.65	357.34	351.87	358.70	352.59
CB-12	DP-2	5.777	0.300	1.733	4.018	15.0	38.5	0.052	0.010	7.02	19.14	36.7	14.40	454.00	452.00	455.06	452.60

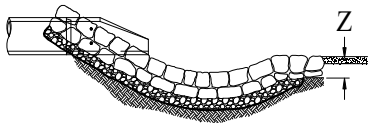
Riprap Apron/Energy Dissipation Calculations

Outfall Riprap Sizing and Velocity Calculations

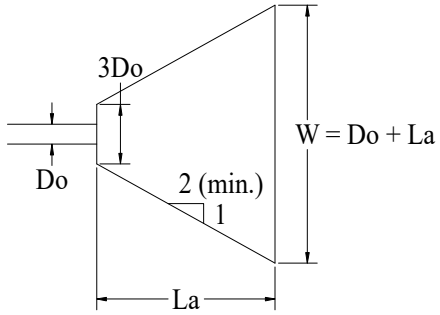
Project	Thornton Hill	Project #	53140.00
Calculated by	JRH	Date	11/10/2025
Checked by	EKG	Date	11/10/2025

Tw ≥ 0.5Do





Tw < 0.5Do



OUTLET STRUCTURE NUMBER:		300	301	305	400	401	408	500	501	600	601	602	701	803	900	901	1000	1001	1102	1200	1201
Design Storm	(yr)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Flow / Discharge (Q)	(cfs)	4.9	7.0	7.0	10.9	7.4	7.4	36.1	38.6	32.3	19.1	21.0	14.3	4.7	13.5	22.7	16.2	18.5	8.2	8.6	10.3
Defined Channel ?	-	YES	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Defined Channel Width	(ft)	21	0	0	21	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0
Outlet Pipe Diameter (D_O)	(in)	15	18	18	15	15	15	30	36	24	24	24	24	15	24	24	18	24	24	18	18
Tailwater Condition (T_W)	(ft)	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D	TW < 0.5D
Apron Length (L_A)	(ft)	9	11	11	13	11	11	17	18	16	15	13	11	9	11	14	12	13	12	10	12
Apron Width at Outlet ($3D_O$)	(ft)	21	4.5	4.5	21	3.75	3.75	21	9	6	6	6	6	3.75	6	6	4.5	6	6	4.5	4.5
Apron Width at End (W)	(ft)	21	12.5	12.5	21	12.25	12.25	21	21	18	17	15	13	10.25	13	16	13.5	15	14	11.5	13.5
Median Stone Diameter (d_{50})	(in)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Largest Stone Diameter	(in)	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Apron Depth (Z)	(in)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5

Apron Length (L_A): *Length = From Virginia DCR Handbook - Plate 3.18-3* *if T_W < 0.5D*

Length = From Virginia DCR Handbook - Plate 3.18-4 *if T_W ≥ 0.5D*

Apron Width at Outlet ($3D_O$): *Width = 3 x pipe dia. (or width of channel)*

Apron Width at End (W): *Width = dia. + apron length* *if T_W < 0.5D*

Width = dia. + 0.4 x apron length *if T_W ≥ 0.5D*

or apron width = channel width if a well defined channel exists

Rock Riprap: *Median Diameter (d_{50}) = From Virginia DCR Handbook - Plate 3.18-3 or 4*

Largest stone dia = 1.5 x d_{50}

Apron Depth (Z): *6" or 1.5 x largest stone dia*

Appendix D: Soil Investigations

- 36 Pillsbury Road Site Specific Soil Survey
- Hovey Road NRCS Web Soil Survey

36 Pillsbury Road Site Specific Soil Survey

Memorandum

To: Dave Fenstermacher, PE
Date: October 28, 2024
Project #: 53140.00

From: Sherrie Trefry, CSS
Trent Delehanty

Re: Site-Specific Soil Mapping Report

Vanasse Hangen Brustlin, Inc. (VHB) has prepared this Site-Specific Soil Mapping Report to accompany the soils map that was prepared for Procopio Companies for the site located at 36 Pilsbury Road in Londonderry, NH (the site). Certified Soil Scientist, Sherrie Trefry, CSS #93, developed a soils map on October 17th and 18th of 2024 to classify the soils within the 94±–acre parcel of land (Map 10 Lot 42) located at 36 Pillsbury Road in Londonderry, NH. The property is being evaluated for a proposed residential development that would include approximately 200 units. This Site-Site Specific Soil Map (SSSM) and Report were developed in accordance with Site-Specific Soil Mapping Standards For New Hampshire and Vermont, Special Publication No. 3, Version 7.0 (July 2021). The soils map was prepared on an existing condition plan at a scale of 1" = 80' Attachment 1.

The site is bordered by Pillsbury Road to the southwest and Hovey Road to the northeast. There is a cemetery operated by the Town that forms part of the northeastern border. The site was historically an apple orchard, and cultivated rows of the apple trees remain in the northwest, northeast, and southern corners. In the center of the site, that are open fields that are likely converted portions of the orchard. Several organic piles and exposed bedrock were observed in various locations on the site. There are several gravel access roads that cross the site. Two access roads extend from Pillsbury Road that extend to another gravel access road that bisects the site almost in half that extends west from Hovey Road to the western property line. There is a small patch of forest on the eastern section of the site adjacent to Hovey Road and the eastern most field.

Recent disturbance on the site includes the installation of an underground waterline that runs parallel to the western property boundary to a water tank that is being constructed on an adjacent town property to the northeast. Trees have been cleared and an access easement has been constructed in the location of the waterline extending from the existing access road to the water tank. Portions of the site at the intersection of the existing access road and the waterline were recently disturbed during the construction.

There is a large wetland feature that includes a large portion of the northwestern orchard. The site has been artificially drained through the excavation of a ditch that runs parallel to the western property boundary and a ditch that runs from the western property boundary towards Hovey Road before it extends northwest in the middle of the site towards the northern boundary. The ditches pass through upland and wetland portions of the site but are considered jurisdictional because they are hydrologically connected to natural wetland systems upstream.

The area evaluated, as depicted on the SSSM, contains soils formed from glacial till (active ice). The southern portion of the site contains bedrock controlled soils while most of the northern portion of the site contains soils with a mineral restrictive layer. The dominant soil texture on the site is sandy loam. Where present, the hardpan consists of fine sandy loam and fine sand. The site topography ranges from fairly level to steeply sloping. Overburden soils have moderate to moderately high hydrologic saturated conductivity but have Hydrologic Soil Group C designations due to shallow restrictive layers. In soils that are deeper to bedrock, the Hydrologic Soil Group is B.

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Soil classifications based on bedrock depth relied on the results of geotechnical test pit descriptions, direct observations made with hand tools, and topographic data. The bedrock is variable across the site and it likely that bedrock may be shallower or deeper than predicted by the classification. The Chatfield map unit may include up to 20% Charlton soils and 5% Hollis soils.

The Montauk soil unit may include up to 20% Newfields soils that do not contain a mineral restrictive layer (hard pan). These soil inclusion areas have a Hydrologic Soil Group B designation.

Test Pit Observations:

Hollis	Located just in a clearing on the eastern sub area on a 0-3% slope. Well drained and somewhat excessively drained soil formed in a thin mantle of till. These soils are shallow to bedrock. Soil classification: Hollis Ledge observed at 18" in the test and auger samples in adjacent areas ranged from to the surface to 20" Many stones were observed in the test and while using other excavation efforts throughout the mapping units. 

Depth	Horizon	Color	Texture	Structure	Consistence	Redox	Other observations
0-6"	Ap	10YR 3/2	Fine Sandy Loam	Granular	Friable	None	Many fine to medium roots
6-9"	Bw_1	5 YR 3/3	Fine Sandy Loam	Subangular Blocky	Friable	None	5-10% Stone inclusions
9-18"	Bw_2	10 YR 6/6 wet 7.5YR 4/6 dry	Very fine loamy sand	Subangular blocky	friable	None	5-10% Stone inclusions
18"	R						Ledge at 18"

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Charlton	Located in the southern portion of the site within a mowed field. The pit was located on a 3-8% slope. These are very deep, well drained soils formed in till loamy melt out till. Soil classification: Charlton No observed seasonal high-water table, bedrock at 24” Stones and boulders within the profile	

Depth	Horizon	Color	Texture	Structure	Consistence	Redox	Other observations
0-7”	A	10YR 3/2	Loam	Granular	Very friable	None	Many fine roots
7-11”	Bw	2.5Y 4/4	Very fine sandy loam	Subangular blocky	Friable	None	Few fine roots, 5-10% gravel and stone
11-24”	1C	2.5Y 5/3	Very fine sandy loam	subangular blocky	friable	no redox	5-10% gravel and stone
24”	2R						Ledge at 24”

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Montauk	Located in the northeastern portion of the site within the previously planted apple tree grove. The pit was located on a 0-3% slope. Pit was representative of the higher elevation well drained soils that have a densic contact. These soils formed in lodgment or flow till derived primarily from granitic materials with lesser amounts of gneiss and schist. Soil classification: Montauk No observed seasonal high-water table or bedrock Stones and gravel within the profile	

Depth	Horizon	Color	Texture	Structure	Consistence	Redox	Other observations
0-9″	Ap	10 YR 3/2	Loam	Granular	Friable	no redox	many fine roots down to 5″ and some fine roots down to 9″ 5% gravel and <5% cobble/channers
9-13″	Bw	2.5Y 5/6	Fine sandy loam	Subangular blocky	Friable	no redox	5% gravel and <5% cobble/channers
13-29″	Cd_1	2.5Y 6/4	Fine sandy loam	Platy	Very firm	no redox	Bands of lighter brown concentrations 10YR 5/8
29-40″	Cd_2	2.5Y 6/2	Loamy fine sand	Platy	Very firm	no redox	

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Ridgebury	Located in the far northwestern corner of the site. Pit was located on a 3-8% slope. Poorly drained soils formed in lodgement till. These soils are commonly shallow to a densic contact. Soil classification: Ridgebury Seasonal high-water table at ~7 inches No observed bedrock	

Depth	Horizon	Color	Texture	Structure	Consistence	Redox	Other observations
0-2"	A	10 YR 3/2	Loam	Subangular blocky	Friable	No redox	
2-8"	Bw	2.5Y 5/3	Sandy loam	Granular	Friable	Concentrations: 10YR 5/6	Redox starts at 7
8-10"	C_1	2.5Y 6/2	Sandy loam	Massive	Firm	Reductions: 2.5Y 7/1	
10-16"	C_d	2.5Y 6/2	Sandy loam	Massive	Very firm		

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Soil symbol	Soil series; Taxonomic class	Soil Unit Map Description
89A	Chatfield; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Well drained soils formed in loamy melt-out till that are moderately deep to bedrock (20-40 inches). Saturated hydraulic conductivity is moderately high or high in the mineral soil. This soil is on a 0-3% slope. Hydrologic Soil Group B.
89B	Chatfield; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Well drained soils formed in loamy melt-out till that are moderately deep to bedrock (20-40 inches). Saturated hydraulic conductivity is moderately high or high in the mineral soil. This soil is on a 3-8% slope. Hydrologic Soil Group B.
89C	Chatfield; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Well drained soils formed in loamy melt-out till that are moderately deep to bedrock (20-40 inches). Saturated hydraulic conductivity is moderately high or high in the mineral soil. This soil is on a 8-15% slope. Hydrologic Soil Group B.
89D	Chatfield; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Well drained soils formed in loamy melt-out till that are moderately deep to bedrock (20-40 inches). Saturated hydraulic conductivity is moderately high or high in the mineral soil. This soil is on a 15-25% slope. Hydrologic Soil Group B.
62A	Charlton; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils formed on bedrock controlled landscapes with bedrock deeper than 40 inches. Saturated hydraulic conductivity is moderately high or high. This soil is on a 0-3% slope. Hydrologic Soil Group B.

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62B	Charlton; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils formed on bedrock controlled landscapes with bedrock deeper than 40 inches. Saturated hydraulic conductivity is moderately high or high. This soil is on a 3-8% slope. Hydrologic Soil Group B.
62C	Charlton; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils formed on bedrock controlled landscapes with bedrock deeper than 40 inches. Saturated hydraulic conductivity is moderately high or high. This soil is on a 8-15% slope. Hydrologic Soil Group B.
62D	Charlton; Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils formed on bedrock controlled landscapes with bedrock deeper than 40 inches. Saturated hydraulic conductivity is moderately high or high. This soil is on a 15-25% slope. Hydrologic Soil Group B.
199C/ccabb	Dump of organic material	This unit represents an area of natural material fill located in the southeast corner of the site. Augering indicated loamy soil material and likely stumps had been stockpiled. The soil is well drained glacial till that has no restrictive features within 40 inches. The soil has moderate hydraulic saturated conductivity. Hydrologic Soil Group B. This soil is on a 8-15% slope.
199D/ccabb	Dump of organic material	This unit represents an area of natural material fill located in the southeast corner of the site. Augering indicated loamy soil material and likely stumps stockpiled. The soil is well drained glacial till that has no restrictive features within 40 inches. The soil has moderate hydraulic saturated conductivity. Hydrologic Soil Group B. This soil is on a 15-25% slope.
86A	Hollis; Loamy, mixed, superactive, mesic Lithic Dystrudepts	Well drained soils formed in a thin mantle of till. They are shallow to bedrock (<20 inches). They are nearly level located on the highest point of the site in a maintained field and adjacent forested area. Series has inclusion of up to 5% rock outcrops and 10% Charlton

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		series. Saturated hydraulic conductivity is moderately high or high. This soil is on 0-3% slope. Hydrologic Soil Group C.
86B	Hollis; Loamy, mixed, superactive, mesic Lithic Dystrudepts	Well drained soils formed in a thin mantle of till. They are shallow to bedrock (<20 inches). They are nearly level located on the highest point of the site in a maintained field and adjacent forested area. Series has inclusion of up to 5% rock outcrops and 10% Charlton series. Saturated hydraulic conductivity is moderately high or high. This soil is on 3-8% slope. Hydrologic Soil Group C.
86C	Hollis; Loamy, mixed, superactive, mesic Lithic Dystrudepts	Well drained soils formed in a thin mantle of till. They are shallow to bedrock (<20 inches). They are nearly level located on the highest point of the site in forested area in the southeast corner of the site. Series has inclusion of up to 5% rock outcrops and 10% Charlton series. Saturated hydraulic conductivity is moderately high or high. This soil is on 8-15% slope. Hydrologic Soil Group C.
200A/hahde	Udorthents; refuse substratum (Leach field)	These soils are associated with an observed leach field on the site. The drainage class, parent material, hydrologic soil group and Ksat value are undetermined for this manmade structure. It is likely that sand and leaching chambers were installed during the construction of the leach field. Direct observation was not attempted. This soil is on a 0-3% slope and represents the top of the leach field.
200D/hahde	Udorthents; refuse substratum (Leach field)	These soils are associated with an observed leach field on the site. The drainage class, parent material, hydrologic soil group and Ksat value are undetermined for this manmade structure. It is likely that sand and leaching chambers were installed during the construction of the leach field. Direct observation was not attempted. This soil is on a 15-25% slope and represents the side slope of the leach field.
514B/P	Leicester; Coarse-loamy, mixed, superactive, acid mesic Aeric Endoaquepts	These soils are poorly drained soils formed in coarse-loamy till. They are found in the drainage way in the southern corner of the site. The slope range for these soils is 3-8% slope. Permeability is moderate or

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		moderately rapid in the surface layer and subsoil and moderate to rapid in the substratum. Hydrologic Soil Group C.
656A/P	Ridgebury; Loamy, mixed, superactive, acid, mesic Aeric Endoaquepts	Very deep, poorly drained soils formed in lodgment till. Soils are nearly level and found within the drainage way of the uplands and low lying depressional areas on the site. Seasonal high water was observed at 7". This soil is on a 0-3% slopes. Hydrologic Soil Group C.
656B/P	Ridgebury; Loamy, mixed, superactive, acid, mesic Aeric Endoaquepts	Very deep, poorly drained soils formed in lodgment till. Soils are nearly level and found within the drainage way of the uplands and low lying depressional areas on the site. Seasonal high water was observed at 7". This soil is on a 3-8% slopes. Hydrologic Soil Group C.
500A/ccacc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with bedrock below 40 inches. These glacial till soils are located along the graded gravel access road that bisects the site horizontally from Hovey Road to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. This soil is on a 0-3% slopes. Hydrologic Soil Group C.
500B/ccacc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with bedrock below 40 inches. These glacial till soils are located along the graded gravel access road that bisects the site horizontally from Hovey Road to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. This soil is on a 3-8% slopes. Hydrologic Soil Group C.
500B/ccecc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with bedrock between 20-40 inches. These glacial till soils are located along the graded gravel access road that bisects the site horizontally from Hovey Road to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. This soil is on a 3-8% slopes. Hydrologic Soil Group C.

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500C/ccecc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with bedrock between 20-40 inches. These glacial till soils are located along the graded gravel access road that bisects the site horizontally from Hovey Road to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. This soil is on a 8-15% slopes. Hydrologic Soil Group C.
500B/ccccc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with a mineral restrictive layer. These glacial till soils are located along the graded gravel access road that bisects the site horizontally from Hovey Road to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. This soil is on a 3-8% slopes. Hydrologic Soil Group C.
500D/ccebb	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with bedrock within 40 inches of the soil surface. These glacial till soils are located along the excavated banks of the ditch that runs parallel to the gravel access road that bisects the site horizontally from Hovey Road to the southern property boundary. Saturated hydraulic conductivity (Ksat) is moderately high or high. This soil is on a 15-25% slopes. Hydrologic Soil Group B.
550E/ccebb	Udorthents; Bedrock substratum	This map unit is characterized by well drained sandy loam soil textures with a depth to bedrock that ranges between 10 to 24 inches. These glacial till soils are located along the excavated banks of the ditch that runs parallel to the southern property boundary. Saturated hydraulic conductivity (Ksat) is moderate. This soil is on a 25-50% slopes. Hydrologic Soil Group B.
500D/cccbc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with a mineral restrictive layer. These glacial till soils are located along the excavated banks of the ditch that that bisects the property. Saturated hydraulic conductivity (Ksat) is moderate. This soil is on a 15-25% slopes. Hydrologic Soil Group C.

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500E/cccbc	Udorthents; loamy	This map unit is characterized by well drained sandy loam soil textures with a mineral restrictive layer. These glacial till soils are located along the excavated banks of the ditch that that bisects the property. Saturated hydraulic conductivity (Ksat) is moderate. This soil is on a 25-50% slopes. Hydrologic Soil Group C.
600A/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that runs parallel to the southern property boundary. A mineral restrictive layer is present. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 0-3% slope.
600D/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that runs parallel to the southern property boundary. A mineral restrictive layer is present. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 15-25% slope.
600E/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that runs parallel to the southern property boundary. A mineral restrictive layer is present. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 25-50% slope.
600A/fcecd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. Bedrock is present within 40 inches. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch

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		that runs parallel to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 0-3% slope.
600B/fcecd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. Bedrock is present within 40 inches. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that runs parallel to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 3-8% slope.
600C/fcecd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. Bedrock is present within 40 inches. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that runs parallel to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 8-15% slope.
600D/fcecd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. Bedrock is present within 40 inches. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that runs parallel to the southern property boundary. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 15-25% slope.
600A/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. A mineral restrictive layer is present. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that bisects the property. Saturated hydraulic conductivity (Ksat) is

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		low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 0-3% slope.
600B/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. A mineral restrictive layer is present. This map unit represents areas where soil material was excavated down to, or near the water table in the ditch that bisects the property. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 3-8% slope.
600D/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. A mineral restrictive layer is present. This map unit represents areas where soil material was excavated down to the ditch that bisects the property. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 15-25% slope.
600E/fcccd	Endoaquents; loamy	This map unit is characterized by excavated poorly drained sandy loam soil textures derived from glacial till parent material. A mineral restrictive layer is present. This map unit represents areas where soil material was excavated down to the ditch that bisects the property. Saturated hydraulic conductivity (Ksat) is low. The Hydrologic Soil Group (HSG) is D. The soil is located on a 25-50% slope.
44A	Montauk; Coarse-loamy, mixed, active, mesic Oxyauic Dystrudepts	Very deep to bedrock and moderately deep to a densic contact and well drained soils formed in lodgment or flow till. These soils are found in the higher elevation throughout the northern portion of the site. The soil is on a 0-3% slope. Saturated hydraulic conductivity (Ksat) is moderately high or high. Hydrologic Soil Group C.
44B	Montauk; Coarse-loamy, mixed, active, mesic Oxyauic Dystrudepts	Very deep to bedrock and moderately deep to a densic contact and well drained soils formed in lodgment or flow till. These soils are found in the higher elevation throughout the northeast portion of

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		the site. The soil is on a 3-8% slope. Saturated hydraulic conductivity (Ksat) is moderately high or high. Hydrologic Soil Group C.
44C	Montauk; Coarse-loamy, mixed, active, mesic Oxyauic Dystrudepts	Very deep to bedrock and moderately deep to a densic contact and well drained soils formed in lodgment or flow till. These soils are found in the higher elevation throughout the northeast portion of the site. The soil is on a 8-15% slope. Saturated hydraulic conductivity (Ksat) is moderately high or high. Hydrologic Soil Group C.
199A/haade	Dumps, bark chips, and organic material	This map unit represents the stump dump in the center of the property near the wetland with the excavated ditch in the middle of the site. There is no natural soil within 60 inches of the surface. The drainage class, hydrologic soil group and Ksat value are undetermined for this stump dump. However, it is likely underlain with Montauk soils. The dump is located on 0-3% slope.

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LOCATION CHARLTON CT+MA NH NY RI

Established Series
Rev. SJM-DCP-SMF
05/2016

CHARLTON SERIES

The Charlton series consists of very deep, well drained soils formed in loamy melt-out till. They are nearly level to very steep soils on moraines, hills, and ridges. Slope ranges from 0 to 60 percent. Saturated hydraulic conductivity is moderately high or high. Mean annual temperature is about 9 degrees C and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Charlton fine sandy loam - forested, very stony, at an elevation of about 170 meters. (Colors are for moist soil unless otherwise noted.)

Oe -- 0 to 4 cm; black (10YR 2/1) moderately decomposed forest plant material. (0 to 5 cm thick.)

A -- 4 to 10 cm; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; 5 percent gravel; very strongly acid; abrupt smooth boundary. (2 to 15 cm thick.)

Bw1 -- 10 to 18 cm; brown (7.5YR 4/4) fine sandy loam; weak coarse granular structure; very friable; many fine and medium roots; 5 percent gravel; very strongly acid; clear wavy boundary.

Bw2 -- 18 to 48 cm; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 10 percent gravel and cobbles; very strongly acid; clear wavy boundary.

Bw3 -- 48 to 69 cm; light olive brown (2.5Y 5/4) gravelly fine sandy loam; massive; very friable; few medium roots; 15 percent gravel and cobbles; very strongly acid; abrupt wavy boundary. (Combined thickness of the Bw horizons is 35 to 91 cm.)

C -- 69 to 165 cm; grayish brown (2.5Y 5/2) gravelly fine sandy loam with thin lenses of loamy sand; massive; friable, some lenses firm; few medium roots; 25 percent gravel and cobbles; strongly acid.

TYPE LOCATION: New Haven County, Connecticut; town of Middlebury, 3800 feet along Long Meadow Road from the intersection with South Street, 450 feet southeast along a gravel road and 50 feet west of the gravel road, 400 feet northeast of Long Meadow Pond, in a wooded area. USGS Naugatuck topographic quadrangle, Latitude 41 degrees 29 minutes 48.40 seconds N., Longitude 73 degrees 7 minutes 04.59 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 31 to 109 cm. Depth to bedrock is commonly more than 180 cm. Rock fragments range from 5 to 35 percent by volume to a depth of 100 cm and up to 50 percent below 100 cm. Except where the surface layer is stony, the fragments are mostly subrounded gravel and typically make up 60 percent or more of the total rock fragments. Unless limed, reaction ranges from extremely acid to moderately acid.

The O horizon, where present, ranges from slightly decomposed to highly decomposed plant material.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. Disturbed pedons have an Ap horizon with value of 3 or 4 and chroma of 2 to 4. The A or Ap horizon is sandy loam, fine sandy loam, or loam in the fine-earth fraction. It has weak or moderate granular structure and is friable or very friable.

Some pedons have a thin AE or E horizon below the O horizon or a thin E horizon below the A horizon. It has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. Texture, structure, and consistence are like the A horizon.

The upper part of the Bw horizon has commonly hue of 7.5YR or 10YR, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, and value and chroma of 4 to 6. The lower part of the Bw horizon has hue of 10YR or 2.5Y and value and chroma of 4 to 6. Texture of the Bw horizon is loam, fine sandy loam, or sandy loam with less than 65 percent silt plus very fine sand in the fine earth fraction. It has weak granular or subangular blocky structure. Consistence is friable or very friable.

Some pedons have a BC horizon with value and chroma like the lower part of the Bw horizon, but includes hue of 5Y. The BC horizon commonly has texture, structure, and consistence like the Bw horizon but the range includes geologically derived structure appearing in the form of thin plates.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. Texture is loam, fine sandy loam, or sandy loam in the fine-earth fraction, with pockets or thin lenses of loamy sand. The horizon is massive or has plates of geogenic origin. Consistence commonly is very friable or friable but in some pedons includes firm.

COMPETING SERIES: These are Chadakoin, Chatfield, Maplecrest, Riverhead, Stinger and Valois. Chadakoin and Valois soils formed in till derived primary from sedimentary rock parent materials. Chatfield soils have a lithic contact at 50 to 100 cm below the mineral soil surface. Maplecrest soils formed in till derived from red sedimentary rock parent materials. Riverhead soils formed in glacial outwash deposits and have sandy textures in the substratum. Stinger soils are moderately deep to a paralithic contact and formed in colluvium on mountain side slopes in Oregon.

GEOGRAPHIC SETTING: Charlton soils are nearly level to very steep soils on moraines and glaciated upland hills and ridges. Slope ranges from 0 to 60 percent. The soils formed in acid melt-out till derived mainly from schist, gneiss, or granite. Mean annual temperature ranges from 7 to 11 degrees C and mean annual precipitation commonly ranges from 940 to 1245 cm, but the range includes as low as 660 cm in some places east of the Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 to 185 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Acton, Brookfield, Chatfield, Essex, Hollis, Leicester, Rainbow, Ridgebury, Sutton, Wapping, Whitman, and Woodbridge soils on nearby landscapes. The moderately well drained Sutton and the poorly drained Leicester soils are associated in a drainage sequence. Acton and Wapping soils are moderately well drained. Brookfield soils formed in iron sulfide bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Chatfield soils have bedrock within a depth of 50 to 100 cm. Essex soils have a sandy particle-size control section and a dense substratum. Hollis soils have bedrock within a depth of 25 to 50 cm. Rainbow and Woodbridge soils are moderately well drained with a dense substratum. Ridgebury soils are poorly drained and have a dense substratum. Whitman soils are very poorly drained with a dense substratum.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Areas cleared of stones are used for cultivated crops, specialty crops, hay, and pasture. Many scattered areas are used for community development. Stony areas are mostly wooded. Common

trees are northern red, white, and black oak, hickory, sugar maple, red maple, black and gray birch, white ash, beech, white pine, and hemlock.

DISTRIBUTION AND EXTENT: Glaciated uplands in Connecticut, Massachusetts, New Hampshire, New York, and Rhode Island. MLRAs 142,144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Worcester County, Massachusetts, 1922.

REMARKS: Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 10 cm (Oe and A horizons).
2. Cambic horizon - the zone from 10 to 69 cm (Bw1, Bw2, and Bw3 horizons).
3. Particle-size class - coarse-loamy in the control section from 29 to 109 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for sample numbers S1999NY005001 and S1999CT013003. Pedons analyzed by the KSSL, Lincoln, NE.

National Cooperative Soil Survey
U.S.A.

LOCATION CHATFIELD NH+CT MA NJ NY

Established Series
Rev. LWK-ERS-JTI
04/2017

CHATFIELD SERIES

The Chatfield series consists of well drained soils formed in loamy melt-out till. They are moderately deep to bedrock. They are nearly level to very steep soils on bedrock-controlled hills and ridges. Slope ranges from 0 to 70 percent. Crystalline bedrock is at depths of 50 to 100 cm. Saturated hydraulic conductivity is moderately high or high in the mineral soil. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Chatfield fine sandy loam, on a 13 percent slope in a wooded area. (Colors are for moist soil unless otherwise noted).

Oi -- 0 to 3 cm, slightly decomposed leaf, needle, and twig litter; extremely acid, pH 4.2. (0 to 15 cm thick.)

A -- 3 to 5 cm, very dark gray (10YR 3/1) fine sandy loam, gray (10YR 5/1), dry; weak fine subangular blocky structure; friable; many fine and medium roots throughout; 5 percent mixed gravel and cobbles; very strongly acid, pH 4.5; abrupt smooth boundary. (1 to 25 cm thick.)

Bw1-- 5 to 33 cm, strong brown (7.5YR 5/6) gravelly fine sandy loam; weak fine subangular blocky structure; friable; common fine roots throughout and common medium roots throughout; 15 percent mixed gravel and cobbles; very strongly acid, pH 4.5; abrupt wavy boundary.

Bw2 -- 33 to 76 cm, strong brown (7.5YR 5/6) gravelly fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots throughout; 20 percent mixed rock fragments; very strongly acid, pH 4.5; abrupt irregular boundary. (Combined thickness of the Bw horizons is 10 to 80 cm.)

2R -- 76 cm; fractured slightly-weathered schist bedrock.

TYPE LOCATION: Merrimack County, New Hampshire; Town of Epsom, 450 feet north-northwest from point 3,550 feet southwest along Old Mountain Road from intersection of Mountain Road and Tarlton Road. USGS Gossville, NH topographic quadrangle; Latitude 43 degrees, 11 minutes, 55.79 seconds N. and Longitude 71 degrees, 19 minutes, 22.31 seconds W., WGS 1984.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 40 to 97 cm. Depth to bedrock ranges from 50 to 100 cm from the mineral soil surface. Rock fragments range from 5 to 50 percent by volume in the A horizon and from 5 to 35 percent in the B and C horizons. Rock fragments are typically gravel or channers, but include cobbles, stones, boulders and flagstones, particularly just above the bedrock.

The O horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 2. It is slightly, intermediately, and/or highly decomposed plant material. Reaction ranges from extremely acid to moderately acid.

The A, or Ap horizon where present, has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 4. Dry value is 6 or higher. Texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth

fraction. Structure is granular. Consistence is friable or very friable. Reaction ranges from extremely acid to moderately acid, unless limed.

The AB or BA horizon, where present, has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. Texture is similar to the A horizon.

The Bw horizon commonly has hue of 10YR or 2.5Y, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, value of 3 to 6, and chroma of 4 to 6. Texture is similar to the A horizon. The Bw horizon has subangular blocky or granular structure and is friable or very friable. Reaction ranges from very strongly acid to moderately acid.

Some pedons have a BC horizon with color and texture similar to the C horizon.

The C horizon, where present, has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4, and the 7.5YR hue is limited to horizons having a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (> 0.15). Texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction and may have lenses or pockets of loamy sand. It is massive and may have plate-like divisions. It is friable or firm. Reaction ranges from very strongly through moderately acid.

The 2R horizon is dominantly schist, granite, or gneiss bedrock. In places it is massive, but it dominantly has vertical and horizontal fractures in the upper 30 to 76 cm.

COMPETING SERIES: These are the Chadakoin, Charlton, Maplecrest, Riverhead, Stinger, and Valois series. Chadakoin, Maplecrest, and Valois soils formed in till derived primary from sedimentary rock parent materials and are greater than 100 cm to bedrock. Charlton soils formed in similar parent material to that of Chatfield but are greater than 150 cm to bedrock. Riverhead soils formed in glacial outwash deposits and are greater than 100 cm to bedrock. Stinger soils are not from Region R and have a paralithic contact.

GEOGRAPHIC SETTING: Chatfield soils are nearly level through very steep, and are on bedrock-controlled glaciated upland landscapes. The soils formed in a moderately thick mantle of melt-out till overlying granite, gneiss, or schist bedrock. Slope ranges from 0 to 70 percent. Mean annual precipitation ranges from 660 to 1270 mm, mean annual temperature ranges from 7 to 13 degrees C, and the frost free season ranges from 130 to 180 days. Elevation ranges from 0 to 305 meters above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brimfield, Brookfield, Cardigan, Charlton, Hollis, Narragansett, Nipmuck, and Paxton soils and their wetter associates on nearby landscapes where the soil mantle is deeper than 100 cm. Brimfield, Brookfield and Nipmuck soils formed in sulfur bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Brookfield, Charlton, Narragansett, and Paxton soils are very deep soils. Cardigan soils are moderately deep soils that formed in till derived from phyllite, slate, shale, and schist. Hollis soils are shallow to bedrock and are on nearby ridge crests and areas adjacent to rock outcrops.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Potential for surface runoff ranges from low to high. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Most areas of Chatfield soils are in woodland. Major tree species include white and northern red oaks, sugar maple, beech, eastern hemlock, eastern white pine, eastern red cedar, and shagbark hickory. Some small cleared areas are used for pasture, are idle, or are sites for residential and recreational development.

DISTRIBUTION AND EXTENT: Connecticut, eastern New York, Massachusetts, New Jersey, and New Hampshire. MLRAs 142, 143, 144A and 145. The soils are of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Orange County, New York, 1940.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon - the zone from 0 to 5 cm (Oi and A horizons).
Cambic horizon - the zone from 5 to 76 cm (Bw1 and Bw2 horizons).
Lithic contact - bedrock at 76 cm (2R horizon).
Particle-size control section - the zone from 28 to 76 cm (part of the Bw1 horizon and all of the Bw2 horizon).
Lithologic discontinuity - at a depth of 76 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for pedons with User Pedon IDs of S1955NH015003, S1982CT007005, S1982CT007005, S1982NY061001, S1995NH013003, S1995NJ037003, S1998NY005001, S1999NY005004, S2000NY005002, S2000NY005004, S2000NY005008, S2000NY119002, S2000NY119003, S2002CT005007, and S2002CT005008. Pedons analyzed by the NSSL, Lincoln, NE. The laboratory characterization data for these pedons and similar soils is available through the National Cooperative Soil Survey Soil Characterization Database: http://ncsslabdatamart.sc.egov.usda.gov/

National Cooperative Soil Survey
U.S.A.

LOCATION HOLLIS CT+MA NH NJ NY

Established Series
Rev. MFF-SMF-SJM-DCP
05/2016

HOLLIS SERIES

The Hollis series consists of well drained and somewhat excessively drained soils formed in a thin mantle of till. They are shallow to bedrock. They are nearly level to very steep upland soils on bedrock-controlled hills and ridges. Slope ranges from 0 through 60 percent. Saturated hydraulic conductivity is moderately high or high. Depth to hard bedrock ranges from 25 to 50 cm. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Loamy, mixed, superactive, mesic Lithic Dystrudepts

TYPICAL PEDON: Hollis gravelly fine sandy loam, 3 to 15 percent slopes, forested. (Colors are for moist soil.)

Oi--0 to 3 cm; slightly decomposed plant material.

Oa--3 to 5 cm; black (10YR 2/1) highly decomposed plant material; moderate fine granular structure; very friable; many fine and very fine roots; abrupt smooth boundary. (Combined thickness of the O horizons is 0 to 10 cm.)

A--5 to 18 cm; very dark grayish brown (10YR 3/2) gravelly fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common fine, very fine, medium, and coarse roots; 10 percent gravel, 5 percent channers; very strongly acid; clear smooth boundary. (3 to 15 cm thick)

Bw1--18 to 25 cm; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots, common medium roots; 10 percent gravel, 10 percent channers; strongly acid; clear wavy boundary.

Bw2--25 to 41 cm; yellowish brown (10YR 5/6) gravelly fine sandy loam; moderate medium and coarse subangular blocky structure; friable; few fine and very fine roots, common medium roots; 10 percent gravel, 5 percent channers; strongly acid; abrupt smooth boundary. (Combined thickness of the Bw horizons is 18 to 48 cm.)

2R--41 cm; schist bedrock.

TYPE LOCATION: Middlesex County, Connecticut, town of East Hampton, 1000 feet due west of Connecticut Route 196 and 3200 feet due north of Connecticut Route 151; USGS Moodus, CT topographic quadrangle, Latitude 41 degrees 31, minutes 28, seconds N., Longitude 72 degrees, 29 minutes, 48 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the solum and depth to bedrock range from 25 to 50 cm. Rock fragments commonly range from 5 through 35 percent by volume, but some pedons have less than 5 percent rock fragments. The fragments are mostly subrounded gravel, except where the surface is stony. The soil has 20 percent or more silt in the particle-size control section. Unless limed, reaction ranges from extremely acid through moderately acid in the organic horizons and very strongly acid through moderately acid in the mineral horizons.

The O horizon, where present, ranges from slightly decomposed to highly decomposed plant material.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction. Consistence is friable or very friable.

Some pedons have a BA horizon with colors similar to the A horizon and other properties similar to the Bw horizon.

The Bw horizon commonly has hue of 10YR or 2.5Y, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, value of 4 or 5, and chroma of 4 through 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction. The Bw horizon has granular or subangular blocky structure. Consistence is friable or very friable.

Some pedons have a thin BC or C horizon with color like the Bw horizon, except it includes hue of 5Y. Texture, structure, and consistence are similar to the Bw horizon.

Some pedons have a thin 2Cr horizon that is typically weathered schist and moderately cemented.

COMPETING SERIES: This is the Holyoke series. Holyoke soils formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale, and typically overly basalt, red sandstone, conglomerate, or shale bedrock.

The Cleveland, Kearsarge, and Brimfield series are in closely related families. Cleveland soils have less than 20 percent silt in the particle-size control section and lack a 2R horizon. Kearsarge soils lack a 2R horizon and have rock fragments of phyllite, slate, or schist. Brimfield soils formed in parent materials derived from sulfur bearing schist and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron of less than 0.15. They have pedogenic iron contents of greater than 1 percent throughout the pedon.

GEOGRAPHIC SETTING: Hollis soils are nearly level to very steep soils on bedrock controlled hills, modified by glacial processes. Slope ranges from 0 to 60 percent. The soils formed in a thin mantle of till derived from local bedrock of schist, granite, and gneiss. Mean annual temperature ranges from 7 to 13 degrees C and mean annual precipitation ranges from 910 to 1295 mm, but the range includes as low as 660 mm in some places east of Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 through 185 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brimfield, Acton, Broadbrook, Brookfield, Canton, Charlton, Chatfield, Essex, Gloucester, Hibernia, Leicester, Montauk, Narragansett, Paxton, Rainbow, Ridgebury, Rockaway, Scituate, Sutton, Wapping, Whitman, and Woodbridge soils on nearby landscapes. All are very deep upland soils formed in till except for the Brimfield and Chatfield soils. Acton, Rainbow, Rockaway, Scituate, Sutton, Wapping, and Woodbridge soils are moderately well drained. The Broadbrook, Brookfield, Canton, Charlton, Essex, Montauk, Narragansett, and Paxton soils are well drained. Chatfield soils have bedrock within a depth of 50 to 100 cm. Gloucester soils are somewhat excessively drained. Hibernia, Leicester, and Ridgebury soils are somewhat poorly drained or poorly drained soils in drainageways or low lying areas.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained and somewhat excessively drained. Surface runoff is negligible to very high. Saturated hydraulic conductivity is moderately high or high.

USE AND VEGETATION: Mostly forested. Small areas with few rock outcrops are cleared of stones and used for cultivated crops, but most cleared areas are in hay or pasture. Scattered areas are used for community development. Common trees are northern red, white, black, and chestnut oak, hickory, eastern white pine, eastern hemlock, and gray and black birch.

DISTRIBUTION AND EXTENT: Glaciated uplands in Connecticut, Massachusetts, New Jersey, New

Hampshire, and eastern New York. MLRAs 101, 142, 144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Nashua Area, New Hampshire, 1909.

REMARKS: Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 18 cm (O and A horizons).
2. Cambic horizon - the zone from 18 to 41 cm (Bw1 and Bw2 horizons).
3. Lithic contact - hard bedrock at 41 cm (2R horizon).
4. Particle-size control section - the zone from 30 to 41 cm.
5. Loamy (coarse-loamy) particle-size class - the control section from 30 to 41 cm averages less than 35 percent clay in fine-earth fraction and the soil is in a Lithic subgroup.
6. Lithologic discontinuity - till with rock fragments from mixed sources overlying single kind of hard bedrock at 41 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for sample no.1999CT005001, 2000CT007004, S2002CT005001, S2002CT005004, S2002CT005005, S2002CT005006, S1998NY061001, S2000NY119001. Partial characterization data for sample no. S99NY061003 and S99NY061003A-3D. Analyzed by the NSSL, Lincoln, NE.

National Cooperative Soil Survey
U.S.A.

LOCATION LEICESTER CT+MA ME NH NY RI

Established Series
Rev. MFF-SMF-JTI
05/2016

LEICESTER SERIES

The Leicester series consists of very deep, poorly drained soils formed in coarse-loamy till. They are nearly level or gently sloping soils in drainageways and low-lying positions on hills. Slope ranges from 0 to 8 percent. Permeability is moderate or moderately rapid in the surface layer and subsoil and moderate to rapid in the substratum. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, acid, mesic Aeric Endoaquepts

TYPICAL PEDON: Leicester fine sandy loam - forested, extremely stony. (Colors are for moist soil.)

Oe--0 to 3 cm; black (10YR 2/1) moderately decomposed plant material. (0 to 10 cm thick)

A--3 to 18 cm; black (10YR 2/1) fine sandy loam; moderate medium granular structure; friable; common fine and medium roots; 10 percent gravel and cobbles; strongly acid; clear wavy boundary. (10 to 15 cm thick)

Bg1--18 to 25 cm; grayish brown (2.5Y 5/2) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent gravel and cobbles; common medium prominent yellowish red (5YR 5/6) masses of iron accumulation; strongly acid; gradual wavy boundary.

Bg2--25 to 46 cm; light brownish gray (2.5Y 6/2) fine sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; 10 percent gravel and cobbles; common fine prominent yellowish brown (10YR 5/6) masses of iron accumulation; strongly acid; gradual wavy boundary. (Combined thickness of the Bg horizons is 16 to 68 cm.)

BC--46 to 61 cm; pale brown (10YR 6/3) fine sandy loam; massive; friable; few fine roots; 10 percent gravel and cobbles; many medium distinct yellowish brown (10YR 5/6) and yellowish red (5YR 4/6) masses of iron accumulation; strongly acid; clear wavy boundary. (0 to 20 cm thick)

C1--61 to 84 cm; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; massive; friable; 15 percent gravel and cobbles; many medium distinct yellowish brown (10YR 5/6) masses of iron accumulation and prominent pinkish gray (7.5YR 6/2) iron depletions; strongly acid; gradual wavy boundary.

C2--84 to 155 cm; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; massive; friable; 15 percent gravel and cobbles; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; strongly acid.

TYPE LOCATION: New Haven County, Connecticut; town of Prospect, 5,200 feet north of the Prospect-Bethany town line and 130 feet west of Route 69; USGS Mount Carmel topographic quadrangle; latitude 41 degrees 28 minutes 48.88 seconds N. and longitude 72 degrees 58 minutes 14.81 seconds W., WGS 84.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 46 to 100 cm. Depth to bedrock is commonly more than 183 cm. Rock fragments range from 5 to 35 percent by volume to a depth of 100 cm and up to 50 percent below 100 cm. Except where the surface is stony, the fragments are mostly subrounded gravel and typically comprise 60 percent or more of the total rock fragments. Unless limed, reaction is very strongly

acid or strongly acid in the upper 100 cm and ranges from very strongly acid to moderately acid below.

The O horizon, where present, consists of slightly, intermediately, and/or highly decomposed organic material.

The A horizon has hue of 10YR, value of 2 or 3 and chroma of 1 or 2. Disturbed pedons have an Ap horizon that includes chroma of 3. The A or Ap horizon is fine sandy loam, very fine sandy loam, or loam in the fine-earth fraction. It has weak or moderate granular structure and is very friable or friable.

Some pedons have a thin Eg horizon below the A horizon. It has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. Texture, structure, and consistence are like the underlying B horizon.

The B horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. Chroma of 3 and 4 are limited to subhorizons. Chroma of 1 or 2 is in some subhorizons within a 50 cm depth. The horizon has distinct or prominent redoximorphic features. Texture is fine sandy loam, loam, or sandy loam in the fine-earth fraction. Structure is weak granular or subangular blocky, or the horizon is massive.

The BC horizon, where present, has hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 or 4. The horizon has distinct or prominent redoximorphic features. Texture is fine sandy loam, loam, or sandy loam in the fine earth fraction. Structure is weak subangular blocky or massive.

The C horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It has redoximorphic features that typically decrease in abundance with depth. Texture is fine sandy loam or sandy loam in the fine-earth fraction, but may range to loamy sand at depth. Some pedons have pockets or thin lenses of silt loam, loamy sand, or sand. The horizon is massive or it has weak plates. Consistence commonly is very friable or friable but some pedons have lenses or layers that are firm.

COMPETING SERIES: There are no other series currently in the same family.

The Fredon, Lamson, Lyme, Mansfield, Massena, Menlo, Neversink, Newstead, Raynham, Raypol, Red Hook, Ridgebury, Stissing, Sun, and Whitman series are similar soils in related families. Fredon, Lamson, Red Hook, and Raynham soils formed in water sorted materials and are nonacid. Lyme soils are in a frigid family. Mansfield, Menlo, and Whitman soils have a dense substratum and are very poorly drained. The Massena, Newstead, and Sun soils are nonacid. Raypol soils are coarse-loamy over sandy or sandy-skeletal. Ridgebury and Stissing soils are nonacid and have a dense substratum. Neversink soils have rock fragments dominated by sandstone, siltstone, and shale.

GEOGRAPHIC SETTING: Leicester soils are nearly level to gently sloping and are in low-lying depressional areas and drainageways of glaciated hills. Slope commonly is less than 3 percent but the range includes 0 to 8 percent. The soils formed in acid coarse-loamy till derived from granite, gneiss, and/or schist. Mean annual temperature ranges from 4 to 13 degrees C, and the mean annual precipitation ranges from 910 to 1800 mm. The frost-free period ranges from 140 to 240 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Ridgebury and Whitman soils and the Acton, Broadbrook, Brookfield, Canton, Charlton, Chatfield, Essex, Georgia, Gloucester, Hollis, Montauk, Narragansett, Paxton, Rainbow, Scituate, Stockbridge, Sutton, Wapping, and Woodbridge soils. The well drained Charlton and the moderately well drained Sutton soils are associated in a drainage sequence. Acton soils are sandy and moderately well drained. Broadbrook, Essex, Montauk, and Paxton soils are well drained with a dense substratum. Brookfield, Canton, Narragansett, and Stockbridge soils are well drained. Chatfield and Hollis soils have bedrock at 50 to 100 cm and 25 to 50 cm depths, respectively. Georgia and Wapping soils are moderately well drained. Gloucester soils are sandy and excessively drained. Rainbow, Scituate, and Woodbridge soils are moderately well drained and have a dense substratum.

DRAINAGE AND PERMEABILITY: Poorly drained. Surface runoff is slow. Saturated hydraulic conductivity is moderately high or high. Leicester soils have a water table at or near the surface much of the year.

USE AND VEGETATION: Most areas are wooded. Some areas are in brushy unimproved pasture. Cleared areas are used for hay or pasture. Tree species include alder, gray birch, red maple, eastern hemlock, American elm, and spruce. Shrub species include northern spicebush, winterberry, and silky dogwood. Herb species include skunk cabbage, green false hellebore, sensitive fern, cinnamon fern, jewelweed, and water-tolerant sedges and rushes.

DISTRIBUTION AND EXTENT: Low-lying areas on glaciated uplands in Connecticut, Massachusetts, Maine, New Hampshire, eastern New York, and Rhode Island; MLRAs 144A and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Windham County, Connecticut, 1947.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
1. Ochric epipedon - the zone from 0 to 18 cm (Oe and A horizons)
2. Cambic horizon - the zone from 18 to 46 cm (Bg horizons).
3. Aquic moisture regime as indicated by 2 chroma matrix color with redox concentrations at 18 cm (Bg horizons).
4. Endosaturation - based on saturation to a depth of 200 cm from the mineral soil surface.
5. Aeric great group based on matrix color and chroma of 3 or more in one subhorizon between the Ap and 75 cm. (BC horizon).
6. Particle-size class in control section from 25 to 100 cm - coarse-loamy.
7. Acid reaction class and mesic temperature regime.

National Cooperative Soil Survey
U.S.A.

LOCATION MONTAUK NY+CT MA NH

Established Series
Rev. RLM-JWW-MCT
05/2015

MONTAUK SERIES

The Montauk series consists of well drained soils formed in lodgment or flow till derived primarily from granitic materials with lesser amounts of gneiss and schist. The soils are very deep to bedrock and moderately deep to a densic contact. These soils are on upland hills and moraines. Slope ranges from 0 to 35 percent. Saturated hydraulic conductivity is moderately high or high in the mineral solum and low to moderately high in the substratum. Mean annual temperature is about 9 degrees C., and mean annual precipitation is about 1143 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Oxyaquic Dystrudepts

TYPICAL PEDON: Montauk loam on a 14 percent slope in a wooded area with a discontinuous layer of undecomposed and slightly decomposed plant material less than 1 cm thick on the surface. (Colors are for moist soil unless otherwise noted.)

Ap-- 0 to 10 cm; very dark gray (10YR 3/1) loam; moderate fine granular structure; very friable; many very fine, fine, medium, and coarse roots; 2 percent gravel, 1 percent cobbles, and 1 percent stones; extremely acid (pH 4.1); clear smooth boundary. (5 to 25 cm thick)

BA-- 10 to 34 cm; brown (10YR 4/3) loam; moderate medium and coarse subangular blocky structure; friable; many fine, medium, and coarse roots; many fine and medium pores; 4 percent gravel, 1 percent cobbles, and 1 percent stones; extremely acid (pH 4.3); clear wavy boundary. (0 to 25 cm thick)

Bw1-- 34 to 65 cm; dark yellowish brown (10YR 4/6) loam; moderate coarse subangular blocky structure; friable; many fine, medium, and coarse roots; many fine and medium pores; 6 percent gravel, 1 percent cobbles, and 1 percent stones; extremely acid (pH 4.3); clear wavy boundary.

Bw2-- 65 to 87 cm; yellowish brown (10YR 5/6) sandy loam; moderate medium and coarse subangular blocky structure; friable; many very fine, fine, and coarse roots; many fine and medium pores; 5 percent gravel and 1 percent cobbles; extremely acid (pH 4.3); clear smooth boundary. (Combined thickness of the Bw horizons is 31 to 86 cm.)

2Cd1-- 87 to 101 cm; strong brown (7.5YR 5/6) gravelly loamy sand; moderate medium plates; firm; few fine roots; many fine pores; 10 percent gravel, 5 percent cobbles, and 1 percent stones; very strongly acid (pH 4.7); clear wavy boundary. (18 to 76 cm thick.)

2Cd2-- 101 to 184 cm; dark yellowish brown (10YR 4/6) gravelly loamy sand; moderate medium plates; firm; many fine pores; 10 percent gravel, 5 percent cobbles, and 1 percent stones; strongly acid (pH 5.1).

TYPE LOCATION: Queens County, New York; in Alley Pond Park near the Cross Island Parkway. USGS Flushing, NY topographic quadrangle; latitude 40 degrees, 45 minutes, 35 seconds N. and Longitude 73 degrees, 45 minutes, 20 seconds W. WGS 84.

RANGE IN CHARACTERISTICS: The thickness of the mineral solum and depth to the dense substratum from the mineral soil surface ranges from 50 to 100 cm. Rock fragments range from 3 to 35 percent in the solum

and 5 to 50 percent in the substratum. Reaction ranges from extremely acid to moderately acid.

Some pedons have Oi, Oe, and/or Oa horizons overlying the A horizon. Combined thickness of the O horizons is 0 to 10 cm thick.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 4. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam. Structure is granular. Consistence is friable or very friable. Undisturbed pedons have an A horizon that has properties similar to the Ap horizon.

The BA horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam. Structure is subangular blocky or granular. Consistence is friable or very friable.

Some pedons have an E horizon up to 8 cm thick.

The upper part of the Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. Texture of the fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam. Structure is subangular blocky and may part to granular. Consistence is friable or very friable. Some pedons have an E, C, or BC horizon immediately above the Cd.

The Cd layer has hue of 5YR to 5Y, value of 4 to 6, and chroma of 1 to 6. Texture of the fine-earth fraction ranges from coarse sand to fine sandy loam, and at least one sublayer of the Cd is loamy fine sand or coarser. The horizon has plates of geogenic origin or is massive. Consistence is firm or very firm and is brittle. Some pedons have firm dark reddish brown bands up to 1 cm thick that are spaced 12 to 20 cm apart. Silt coatings on the upper side of stones and gravel are common.

COMPETING SERIES: These are the Amostown, Bernardston, Broadbrook, Horseneck, Nantucket, Paxton, Scituate, and Wethersfield series. Amostown and Scituate soils are moderately well drained and have redoximorphic features in the B horizon. The Bearnardston, Nantucket, Paxton, and Wethersfield soils do not have sandy substratums. Broadbrook soils have a silty mantle with more than 65 percent silt plus very fine sand. Horseneck soils formed in friable glacialfluvial deposits and do not have a dense substratum.

GEOGRAPHIC SETTING: Montauk soils are on undulating to hilly slopes of terminal and recessional moraines in MLRA 149B and on glaciated uplands, hills, and ground moraines in MLRAs 144A and 145. Slope ranges from 0 to 35 percent. The soils formed in loamy friable till underlain by firm sandy lodgment or flow till derived from granite with lesser amounts of gneiss and schist. The climate is humid and cool temperate. The mean annual precipitation is 889 to 1422 mm, and the mean annual temperature is 8 to 11 degrees C. The frost-free period ranges from 120 to 200 days. Elevation ranges from 3 to 122 m above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the well drained Charlton, Chatfield, Riverhead, Canton, and Haven soils that do not have dense substratums, the excessively drained and sandy Carver and Plymouth soils, the moderately well drained Scituate, Sutton, and Woodbridge soils, the somewhat poorly and poorly drained Ridgebury soils, the poorly drained Leicester soils, the very poorly drained Whitman soils, and the shallow Hollis soils.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is low to high. Saturated hydraulic conductivity is moderately high or high in the solum and low to moderately high in the substratum.

USE AND VEGETATION: Many of the nearly level and gently sloping areas are cleared and used for production of potatoes and vegetable crops, hay, silage corn, and pasture. Steeper and uneven areas are largely forested and contain northern red oak, white oak, and occasionally yellow poplar, eastern white pine, red pine, sugar maple, beech, and birch.

DISTRIBUTION AND EXTENT: New York, Connecticut, Massachusetts, New Hampshire and possibly New Jersey and Rhode Island, MLRAs 149B, 144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Suffolk County, New York, 1970.

REMARKS: The typical pedon was updated from 1975NY103005 to the lab-sampled pedon S1998NY081002 that better represents the typical textures, horizonation, and location.

Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 10 cm (Ap horizon).
2. Cambic horizon - the zone from 34 to 87 cm (Bw1 & Bw2 horizons).
3. Densic material - the zone from 87 to 184 cm (2Cd1 and 2Cd2 layers).
4. Oxyaquic subgroup - based on saturation in one or more layers within 100 cm of the mineral soil surface, for either or both 20 or more consecutive days or 30 or more cumulative days.
5. Lithologic discontinuity - at a depth of 87 cm.

ADDITIONAL DATA: Full characterization data for pedons with User Pedon IDs of S1973MA009003, S1987NY103002, S1993MA011001, S1998NY081002, and S02MA-011-002. Pedons analyzed by the KSSL, Lincoln, NE. Laboratory characterization data for these pedons and similar soils is available through the National Cooperative Soil Survey Soil Characterization Database: http://ncsslabdatamart.sc.egov.usda.gov/

National Cooperative Soil Survey
U.S.A.

LOCATION NEWFIELDS NH+MA

Established Series
HRM-RJK-DAS
01/2013

NEWFIELDS SERIES

The Newfields series consists of very deep, moderately well drained soils formed in a loamy mantle underlain by sandy till on upland hills, moraines, till plains, and mountain side slopes. Saturated hydraulic conductivity is moderately high to very high. Slope ranges from 0 through 25 percent. Mean annual precipitation is about 40 inches (1016 millimeters), and mean annual temperature is about 48 degrees F. (9 degrees C.).

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Oxyaquic Dystrudepts

TYPICAL PEDON: Newfields fine sandy loam, on a nearly level slope in a wooded area. The surface is covered by a 1 inch (3 centimeter) layer of leaves and twigs. (Colors are for moist soil.)

Ap -- 0 to 9 inches (0 to 23 centimeters); very dark grayish brown (10YR 3/2) fine sandy loam; light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine and medium, and common coarse roots; 5 percent gravel; moderately acid; abrupt smooth boundary. (4 to 10 inches (10 to 25 centimeters) thick.)

Bw1 -- 9 to 20 inches (23 to 51 centimeters); yellowish brown (10YR 5/6) fine sandy loam; weak medium granular structure; very friable; common medium and few coarse roots; 10 percent gravel; moderately acid; clear wavy boundary.

Bw2 -- 20 to 28 inches (51 to 71 centimeters); olive yellow (2.5Y 6/6) fine sandy loam; weak medium granular structure; very friable; common fine and few medium roots; 10 percent gravel; moderately acid; clear wavy boundary. (Combined thickness of the Bw horizon is 5 to 30 inches (13 to 76 centimeters).)

BC -- 28 to 35 inches (71 to 89 centimeters); light yellowish brown (2.5Y 6/4) fine sandy loam; massive; friable; few fine and medium roots; 5 percent gravel; few fine distinct yellowish brown (10YR 5/6) masses of iron accumulation and many medium distinct light gray (5Y 7/2) iron depletions; moderately acid; clear wavy boundary. (0 to 20 (0 to 51 centimeters) inches thick.)

2C1 -- 35 to 43 inches (89 to 109 centimeters); light yellowish brown (2.5Y 6/4) gravelly loamy sand; massive; friable; 25 percent gravel; many medium prominent strong brown (7.5YR 5/8) and common fine prominent yellowish red (5YR 5/8) masses of iron accumulation, and many medium distinct light gray (5Y 7/2) iron depletions; moderately acid; clear wavy boundary. (0 to 30 inches (0 to 76 centimeters) thick.)

2C2 -- 43 to 64 inches (109 to 163 centimeters); pale olive (5Y 6/3) gravelly loamy sand; massive; friable; 25 percent gravel; common fine prominent strong brown (7.5YR 5/8) masses of iron accumulation and many medium faint light gray (5Y 7/2) iron depletions; moderately acid.

TYPE LOCATION: Rockingham County, New Hampshire; Town of Atkinson, 300 feet south of Province Hill Road from a point on Province Hill Road .35 mile northeast of the intersection of Salem Road and Province Hill Road; USGS Haverhill, NH topographic quadrangle; Latitude 42 degrees, 49 minutes, 20 seconds North, longitude 71 degrees, 8 minutes, 50 seconds West, NAD 83.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 15 through 36 inches (38 through 91 centimeters). Depth to bedrock is typically greater than 60 inches (1.5 meters). Rock fragments range from 0 through 30 percent in the solum and 5 through 60 percent in the substratum. Rock fragments are dominantly granite, gneiss, schist, and quartzite gravel, but can often include cobbles, stones and boulders. Reaction ranges from extremely acid through slightly acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 2 through 4. Some pedons have an A horizon that has value of 2 through 3 and chroma of 1 through 3. Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. Texture of the Ap, A and E horizons is fine sandy loam, loam, sandy loam, or very fine sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 8. Texture is dominantly fine sandy loam in the fine-earth fraction, but includes thin subhorizons of sandy loam and very fine sandy loam in the upper part, with the weighted average of coarse-loamy material containing less than 50 percent fine or coarser sand. Some pedons have a Bs horizon.

The BC horizon has color and texture similar to the Bw horizon.

The 2C horizon has hue of 10YR through 5Y, value of 4 through 7, and chroma of 2 through 4. Texture is loamy sand, loamy fine sand, loamy coarse sand, fine sand, or sand in the fine-earth fraction. Some pedons have lenses of sand and gravel. Structure is weak thin platy or the horizon is massive. Consistence is very friable or friable, but may contain thin subhorizons with firm consistence.

COMPETING SERIES: There are currently no other series in the same family.

The Agawam, Branford, Canton, Deerfield, Haven, Narragansett, Scituate, and Sutton series are in related families. Agawam, Branford, and Haven soils have either stratified sand or sand and gravel in the series control section. The Canton and Narragansett soils do not have redoximorphic features. Deerfield soils have sandy textures in the solum. Scituate and Sutton soils have coarse-loamy particle-size control sections.

GEOGRAPHIC SETTING: Newfields soils are nearly level through moderately steep soils of glaciated uplands and morianes. Slope ranges from 0 through 25 percent. The soils formed in a loamy mantle over acid sandy melt out till of Wisconsin age derived mainly from granite, gneiss, or quartzite. The till generally contains cobbles and stones with some boulders. Mean annual precipitation ranges from 30 through 50 inches (889 through 1270 millimeters), and mean annual temperature ranges from 47 through 52 degrees F. (8 through 11 degrees C.).

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Canton, Leicester, Montauk and Scituate soils. Newfields soils are in a drainage sequence with the well drained Canton soils and the poorly drained Leicester soils. Montauk soils have a dense substratum and are in higher positions on the landscape. Scituate soils have a dense substratum and are in similar positions on the landscape.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained. Runoff ranges from slow to rapid. Saturated hydraulic conductivity is moderately high to very high.

USE AND VEGETATION: Most of these soils are presently forested although some areas were tilled at one time. Common species are northern red oak, eastern white pine, and red maple.

DISTRIBUTION AND EXTENT: Southeastern New Hampshire and southeastern Massachusetts. MLRA's 144A and 149B. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Rockingham County, New Hampshire, 1986.

REMARKS: The 2010 revision reflected changes to the range in characteristics as well as general updating to metric units. This series was classified to the 10th edition of Keys to Soil Taxonomy with that revision. The former classification was coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts. Historical notes are maintained in the maintenance file, OSD Historical Notes.

There is some debate over the source of the loamy mantle, one theory places it as aeolian.

The diagnostic horizons and features recognized in this pedon are:
1. Ochric epipedon - the zone from 0 to 9 inches (0 to 23 centimeters) (Ap horizon).
2. Cambic horizon - the zone from 9 to 35 inches (23 to 89 centimeters) (Bw1, Bw2, BC horizons).
3. Contrasting particle-size class - both the coarse-loamy part and the sandy part of the particle-size control section are greater than 5 inches (12.5 cm) thick and the transition zone between the two parts is less than 5 inches (12.5 cm) thick.
4) Particle-size control section - the zone from 10 through 40 inches (25 through 100 centimeters) (part of the Bw1, Bw2, BC, 2C1 horizons).
5) Lithologic discontinuity - at a depth of 35 inches (89 centimeters).

National Cooperative Soil Survey
U.S.A.

LOCATION RIDGEBURY MA+CT NH NJ NY RI

Established Series
Rev. SMF-JTI-DHZ
03/2015

RIDGEBURY SERIES

The Ridgebury series consists of very deep, somewhat poorly and poorly drained soils formed in lodgment till derived mainly from granite, gneiss and/or schist. They are commonly shallow to a densic contact. They are nearly level to gently sloping soils in depressions in uplands. They also occur in drainageways in uplands, in toeslope positions of hills, drumlins, and ground moraines, and in till plains. Slope ranges from 0 to 15 percent. Saturated hydraulic conductivity is moderately high or high in the solum and very low to moderately low in the substratum. Mean annual temperature is about 9 degrees C. and the mean annual precipitation is about 1143 mm.

TAXONOMIC CLASS: Loamy, mixed, superactive, acid, mesic, shallow Aeric Endoaquepts

TYPICAL PEDON: Ridgebury sandy loam - on a 3 to 8 percent slope in an extremely stony wooded area at an elevation of about 334 m. (Colors are for moist soil.)

A--0 to 13 cm; black (N 2/0) fine sandy loam; weak medium and coarse granular structure; friable; many very fine, fine and medium tree roots; 5 percent gravel and 5 percent cobbles; very strongly acid; abrupt smooth boundary. (5 to 25 cm thick)

Bw--13 to 23 cm; brown (10YR 4/3) sandy loam; weak medium subangular blocky structure; friable; few fine tree roots; 5 percent gravel and 5 percent cobbles; very strongly acid; abrupt wavy boundary. (8 to 22 cm thick)

Bg--23 to 46 cm; dark gray (10YR 4/1) gravelly sandy loam; massive; friable; 10 percent gravel and 5 percent cobbles; common fine prominent yellowish brown (10YR 5/6) and common medium distinct reddish brown (5YR 4/4) masses of iron accumulation; very strongly acid; gradual wavy boundary. (10 to 43 cm thick)

Cd--46 to 165 cm; gray (5Y 5/1) gravelly sandy loam; massive; firm; 10 percent gravel and 5 percent cobbles; common fine prominent reddish yellow (7.5YR 6/8) masses of iron accumulation; very strongly acid.

TYPE LOCATION: Hampshire County, Massachusetts; Town of Pelham; 1,600 feet east of Route 202 at a point 3,950 feet south of its junction with Amherst Road; USGS Shutesbury quadrangle; latitude 42 degrees 22 minutes 53 seconds N. and longitude 72 degrees 23 minutes 45 second W., NAD 27.

RANGE IN CHARACTERISTICS: Depth to the dense till commonly is 36 to 49 cm. The A horizon has 5 to 25 percent gravel, 0 to 10 percent cobbles, and 0 to 25 percent stones by volume. The B and C horizons have 5 to 25 percent gravel, 0 to 5 percent cobbles and 0 to 5 percent stones. Rock fragments within the soil range from 5 to 35 percent by volume and are subangular fragments. The unlimed soil ranges from very strongly acid to slightly acid.

The O horizon, where present, has hue of 7.5YR to 2.5Y, value of 2, 2.5, or 3 and chroma of 0 to 2.

The A or Ap horizon is neutral or has hue of 10YR to 5Y, value of 2, 2.5, or 3 and chroma of 0 to 2. Texture is sandy loam, fine sandy loam or loam in the fine-earth fraction.

Some pedons have a thin E horizon with hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. Texture is the

same as the A horizon.

The B horizon is neutral or has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 0 to 3. The chroma is 4 in some places. Chroma of 3 or 4 is restricted to subhorizons. Redoximorphic features are few to many and are distinct or prominent. Texture is sandy loam, fine sandy loam, very fine sandy or loam in the fine earth fraction with fifteen percent or more fine sand or coarser and clay content less than 18 percent. The B horizon has subangular blocky structure, weak to moderate very thin to medium platy structure or is massive. It is very friable or friable.

The Cd horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. It commonly has distinct or prominent redoximorphic features which generally become less abundant with depth but the range includes faint. Texture is coarse sandy loam, sandy loam, fine sandy loam, very fine sandy or loam in the fine-earth fraction. Consistence is firm or very firm and brittle. It is massive or has plates. Any physical aggregation is considered to not be pedogenic.

Some pedons have a C horizon below the Cd that is firm but not brittle.

COMPETING SERIES: There are no series currently in the same family.

The Painesville, Punsit, and Sun series are in a closely related family. Painesville soils lack a densic contact. Punsit soils have more than 60 percent silt plus very fine sand in the particle size control section. Sun soils formed in till derived from limestone and sandstone.

GEOGRAPHIC SETTING: The nearly level to gently sloping Ridgebury soils are in depressions and drainageways of till uplands. They also occur in toeslope positions and concave microfeatures of hills, drumlins, and ground moraines, and in till plains. Slope ranges from 0 to 15 percent. The soils formed in loamy lodgment till derived mainly from granite, gneiss and schist. Mean annual air temperature ranges from 7 to 11 degrees C and mean annual precipitation ranges from 1016 to 1270 mm. Mean growing season ranges from 100 to 195 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These include the Charlton, Chatfield, Hollis, Leicester, Paxton and Sutton, Whitman and Woodbridge soils. Ridgebury is a member of a drainage sequence that includes the well drained Paxton, moderately well drained Woodbridge, and very poorly drained Whitman soils. Charlton and Sutton soils are better drained and have friable substrata. Chatfield and Hollis soils have bedrock within depths of 100 and 50 cm respectively. Leicester soils do not have a densic contact.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Commonly poorly drained but the range includes the wetter part of somewhat poorly drained. Runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the solum and very low to moderately low in the substratum. A perched, fluctuating water table above the dense till saturates the solum to or near the surface for 7 to 9 months of the year.

USE AND VEGETATION: Largely forested to gray birch, yellow birch, red maple, hemlock, elm, spruce and balsam fir. Cleared areas are used mainly for hay and pasture.

DISTRIBUTION AND EXTENT: Glaciated landforms in Connecticut, Massachusetts, New Hampshire, New Jersey, New York, and Rhode Island. (MLRAs 142, 144A, 145, and 149B) The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Franklin County, Vermont, 1948.

REMARKS: An analysis of Ridgebury soils in 2002 for 38 surveys showed that this series most commonly has a densic contact at 40 to 60 cm including 8 surveys with the depth to a densic contact at 50 cm. The average

depth to a densic contact was 50 cm - the data showed an almost even split between depth class occurrences. A review of characterization data for Ridgebury soils shows a very slight dominance in the acid reaction class. Any physical aggregation in the Cd is considered to not be pedogenic. The type location is currently within the officially designated mesic zone in Massachusetts. Previous revision of this series was 12/2005.

Diagnostic horizons and features in this pedon include:

1. Ochric epipedon - the zone from 0 to 13 cm (A horizon).
2. Aeric feature 100 percent of the zone from 13 to 23 cm has hue of 10YR and both color value moist of 4 and chroma moist of 3 (Bw1 horizon).
3. Cambic horizon - the zone from 13 to 46 cm (Bw and Bg horizons).
3. Densic contact root limiting material begins at 46 cm (Cd horizon).
4. Endosaturation the zone from 23 to 46 cm is saturated above the densic contact (Bw2 horizon). A seasonal high water table is perched above the densic materials.
5. Reaction - the pH in the zone from 25 to 46 cm (control section for reaction) is presumed less than 5.0 in 0.01 M CaCl2 (1:2) (see remarks).
6. Series control section - the zone from 0 to 71 cm.

ADDITIONAL DATA: Reference samples from pedons with User Pedon IDs of S2000CT013002, S1995NH013005, and S1996NH013002
from Connecticut and New Hampshire, samples by NSSL, Lincoln, NE, various years. The laboratory data for these pedons and similar soils is available through the National Cooperative Soil Survey Soil Characterization Database: http://ncsslabdatamart.sc.egov.usda.gov/

National Cooperative Soil Survey
U.S.A.

Disturbed Map Units

This edition of the New Hampshire State-Wide Numerical Soil Legend contains eleven distinct map units used for identifying areas of soils altered or disturbed by human influence and the addition of one naturally formed map unit. These map units were designed for the Order 2 and Order 3 levels of mapping intensity, but can be used in Order 1 mapping if appropriate.

The definition of disturbed map units is intentionally brief and vague. Classification at the Great Group level allows for a wide range in soil properties and behavioral characteristics. The variability in soil properties typically requires on-site investigations before any interpretation can be developed. The map unit descriptions are intended to provide guidance in differentiating map units. The author of the soil map is expected to provide additional information to reflect the nature of the disturbed areas within the survey area.

I. Excavated land

300 Udipsamments

This map unit is characterized by soil textures of loamy fine sand to sand and gravel throughout the entire particle-size class control section (25 - 100 cm or 10 - 40 inches). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from excessively drained to well drained. The Hydrologic Soil Group (HSG) is A. Typical sand pit.

350 Udipsamments, wet substratum

This map unit is characterized by soil textures of loamy fine sand to sand and gravel throughout the entire particle-size class control section (25 - 100 cm or 10 - 40 inches). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from moderately well drained to somewhat poorly drained.

400 Udorthents, sandy or gravelly

This map unit typically includes the following concepts: 1) very gravelly (> 35%) sand or very gravelly loamy sand; Or 2) sand or loamy sand textures that may have lenses of loamy very fine sand or finer somewhere in the particle-size class control section (25 - 100 cm or 10 - 40"). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from excessively drained to somewhat poorly drained. Typical gravel pit.

Disturbed Map Units (continued)

500 Udorthents, loamy

This map unit is characterized typically by soil textures that are sandy loam, loam, or silt loam within the particle size control section (25 – 100cm or 10 – 40”). Saturated hydraulic conductivity (K_{sat}) is low through high. Drainage class ranges from well drained to somewhat poorly drained. These areas typically represent excavated glacial till or perhaps areas where sand and gravel was excavated down to the loamy underlying material.

550 Udorthents, Bedrock substratum

This map unit is characterized by soil textures of sandy loam, loam, or silt loam within the particle-size class control section (25 - 100 cm or 10 - 40 inches). These areas typically represent excavated soil materials where the range in depth to bedrock is 10 - 60 inches (25 - 152 cm). Saturated hydraulic conductivity (K_{sat}) is low through high. Drainage class ranges from somewhat excessively drained to somewhat poorly drained.

600 Endoaquents, loamy

This map unit represents areas where soil material was excavated down to, or near the water table. Soil material is typically sandy loam, loam or silt loam within the particle-size class control section (25 - 100 cm or 10 - 40 inches). Saturated hydraulic conductivity (K_{sat}) is low through high. Drainage class is poorly or very poorly drained. The Hydrologic Soil Group (HSG) is D.

900 Endoaquents, sandy or gravelly

This map unit represents areas where soil material was excavated down to / near the water table. This map unit is characterized typically by soil textures of: 1) very gravelly (> 35% gravel) sand or very gravelly loamy sand or; 2) sand or loamy sand textures that may have lenses of loamy very fine sand or finer somewhere in the particle-size class control section (25 - 100 cm or 10 - 40"). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class is poorly or very poorly drained. The Hydrologic Soil Group (HSG) is D. Typical gravel pit dug down to or close to the water table.

Disturbed Map Units (continued)

II. Filled land

100 Udorthents, wet substratum

This map unit represents areas that have been filled and leveled over what were originally hydric soils.

199 Dumps, bark chips, and organic material

This map unit consists of man-made deposits of bark, wood chips, sawdust, paper mill sludge, cinders, waste paper, ashes, and other similar refuse from the operation of paper mills and sawmills.

200 Udorthents, refuse substratum

This map unit represents alternating layers of soil and refuse such as in sanitary landfills. Closed landfills typically have 2 feet of loamy material capping the area.

299 Udorthents, smoothed

This map unit represents areas that have been cut and filled to create a large level or nearly level area. Soil material making up the map units typically came from the immediate area. School athletic fields are an example (unless they were created on hydric soils – see Map Unit 100).

III. Bottom Land

7 Fluvaquents

This map unit represents areas of various kinds of soil materials on the bottom lands of streams and rivers. The soil material ranges in texture from silt loam to sand and gravel within the particle-size class control section (25 - 100 cm or 10 - 40 inches). Drainage class is poorly or very poorly drained. The Hydrologic Soil Group (HSG) is D.

Disturbed Map Units (continued)

Catena Key for Excavated & Bottom Land

Disturbed Map Units	Map Unit						
	Drainage Class						
Parent Material	Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Somewhat Poorly Drained	Poorly Drained	Very Poorly Drained
I. Excavated Land							
Typically sands	**300** Udipsamments nearly level	**300** Udipsamments nearly level	**300** Udipsamment nearly level	**350** Udipsamments wet substratum	**350** Udipsamments wet substratum	**900** Endoaquents sandy or gravelly	**900** Endoaquents, sandy or gravelly
Typically gravels	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**900** Endoaquents sandy or gravelly	**900** Endoaquent, sandy or gravelly
Typically loams			**500** Udorthents, loamy	**500** Udorthents, loamy	**500** Udorthents, loamy	**600** Endoaquents loamy	**600** Endoaquent, loamy
Bedrock controlled loams		**550** Udorthents, Bedrock substratum	**550** Udorthents, Bedrock substratum	**550** Udorthents, Bedrock substratum	**550** Udorthents, Bedrock substratum	**600** Endoaquents loamy	**600** Endoaquent, loamy
III. Bottom Land							
Typically silt loam to sands and gravels						**7** Fluvaquents	**7** Fluvaquents

NOTE: Filled soils in Section II page 21 are too variable to place into the above key.

Disturbed Map Unit (Anthropogenic Soils) Supplement for New Hampshire DES AoT Site-Specific Soil Maps

Introduction

The NRCS NH State-Wide Legend, as amended, contains a number of distinct map units used for identifying areas of soils altered or disturbed by human influence. However, in preparing the required Site-Specific Soil Maps for compliance with NH Department of Environmental Services Alteration of Terrain (AoT) rules, additional information is often needed and desired. This supplement provides a means to supply the user a more detailed soil mapping unit description to meet this need.

Purpose

The purpose of the following map units is to provide Soil Scientists with additional soil mapping tools for disturbed sites (Anthropogenic soils). These map units are intended to enhance Site-Specific Soil Maps and interpretations, reflecting requirements under NHDES, Alteration of Terrain (AoT) regulations (Env-Wq 1500). This supplement allows for the creation of soil maps with mapping units that can be expanded beyond those listed in the USDA, NRCS NH State-Wide Numerical Legend and the standards of the National Cooperative Soil Survey.

Note that the disturbed soil supplement has been created by SSSNNE and is not a product of the NRCS or the National Cooperative Soil Survey. This supplemental legend can only be used in conjunction with the Site-Specific Soil Mapping standards and cannot be used to create a stand-alone soils map.

For the purposes of this supplement, the definition of disturbed soil, includes: areas where the natural soils have been partially removed and areas where human-transported soil material (HTM) has been placed on top of a native soil, other disturbed soil or bedrock, as defined by RSA 485-A: 6, VIII; RSA 485-A: 17, and NHDES Env-Wq 1500, etc.

Map Notation

Notation on the Site-Specific Soil Map completed to comply with the NH AoT rules should include the following disclaimer:

1. ***This detailed Site-Specific Soil Map conforms to the standards of SSSNNE Publication No. 3, as amended, "Site-Specific Soil Mapping Standards for NH and VT".***

2. ***This map has been prepared to comply with soil mapping requirements of RSA 485 A: 17and NHDES Env-Wq 1500, Alteration of Terrain.***

3. ***See accompanying narrative report for methodology, map symbol legend, and interpretations.***

4. ***Use of the map symbol denominators for disturbed or altered soils, is at the discretion of the Certified Soil Scientist.***

Map Symbol Denominators for Disturbed or Altered Soil Map Units

The map symbols for Site-Specific Soil Mapping of disturbed or altered soils in New Hampshire is a two-part symbol with parts separated by a forward slash (***/***).

The first part consists of the USDA-NRCS Disturbed Map Unit symbol from the NH State-Wide Numerical Soil Legend. The map symbol is composed of 1 to 3 digits followed by a capital letter designating slope.

The second part consists of symbols of the SSSNNE NH Disturbed or Altered Soil Supplement to the Site-Specific Soil Survey Standards, as detailed below. The disturbed map symbol is composed of 5 lower case letters.

A Site-Specific Map symbol for a map prepared for an AoT application would be formatted as follows: ***400A/aaaaa***

These New Hampshire Disturbed Soil Supplemental symbols can only be used in conjunction with the USDA-NRCS Disturbed Map Unit symbols for the NH Statewide Numerical Soil Legend.

Supplemental Symbols

Supplemental symbols may be used at the discretion of the Certified Soil Scientist who creates the Site-Specific Soil Survey. The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

Symbol 1: Drainage Class
a -Excessively 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 wetlands
i- Organic Materials-Tidal wetlands

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 hard pan, 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 layers, see “Soil Manual for Site evaluations in NH” 2 Ed., (page 3-17, figure 3-14)
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 limiting 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

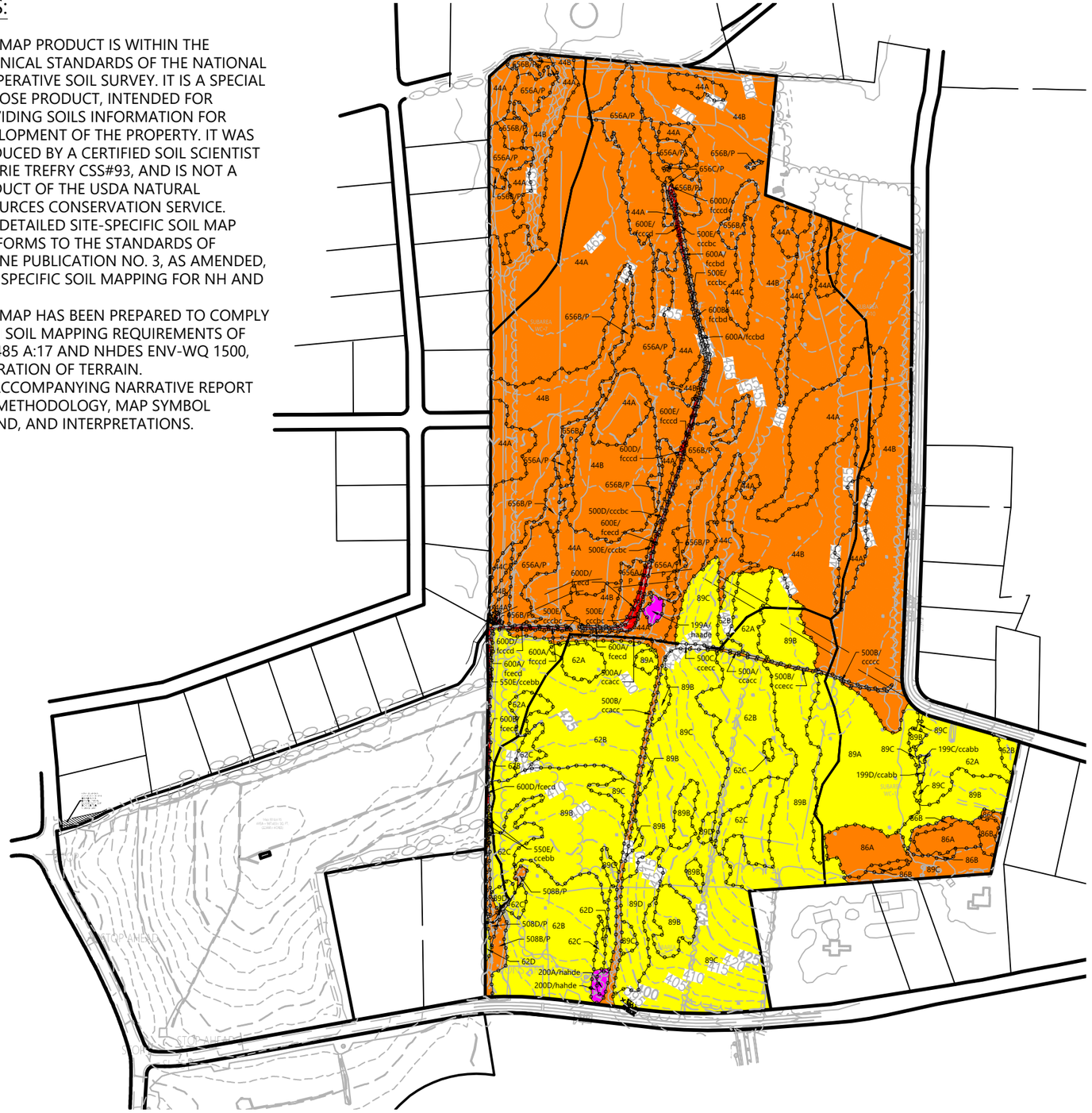
Symbol 5: Hydrologic Soil Group*

a-Group A
b-Group B
c-Group C
d-Group D
e-Not determined

*Excluding man-made surface impervious/restrictive layers

NOTES:

1. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
2. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
3. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
4. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.



Legend

LINETYPES

- SUBCATCHMENT BOUNDARIES
- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- HYDROLOGIC SOIL GROUP E
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

SITE SPECIFIC SOIL MAP UNIT LEGEND

89A - CHAFIELD; 0-3% SLOPE
89B - CHAFIELD; 3-8% SLOPE
89C - CHAFIELD; 8-15% SLOPE
89D - CHAFIELD; 15-25% SLOPE
62A - CHARLTON; 0-3% SLOPE
62B - CHARLTON; 3-8% SLOPE
62C - CHARLTON; 8-15% SLOPE
62D - CHARLTON; 15-25% SLOPE
199C/ccabb - DUMP OF ORGANIC MATERIAL; 8-15% SLOPE
199D/ccabb - DUMP OF ORGANIC MATERIAL; 15-25% SLOPE
86A - HOLLIS; 0-3% SLOPE
86B - HOLLIS; 3-15% SLOPE
86C - HOLLIS; 8-15% SLOPE
200A/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD); 0-3% SLOPE
200D/hahde - UDORTHENTS; REFUSE SUBSTRATUM (LEACH FIELD; 15-25% SLOPE
514B/P - LEICESTER; POORLY DRAINED SOILS; 3-8% SLOPE
656A/P - RIDGEBURY; POORLY DRAINED SOILS; 0-3% SLOPE
656B/P - RIDGEBURY; POORLY DRAINED SOILS; 3-8% SLOPE
500A/ccacc - UDORTHENTS; LOAMY; 0-3% SLOPE
500B/ccacc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500C/ccecc - UDORTHENTS; LOAMY; 3-8% SLOPE
500B/ccccc - UDORTHENTS; LOAMY; 3-8% SLOPE
500D/ccebb - UDORTHENTS; LOAMY; 15-25% SLOPE
550E/ccebb - UDORTHENTS; BEDROCK SUBSTRATUM; 25-50% SLOPE
500D/cccbc - UDORTHENTS; LOAMY; 15-25% SLOPE
500E/cccbc - UDORTHENTS; LOAMY; 25-50% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY; 25-50% SLOPE
600A/fcecd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcecd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600C/fcecd - ENDOAQUENTS; LOAMY; 8-15% SLOPE
600D/fcecd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600A/fcccd - ENDOAQUENTS; LOAMY; 0-3% SLOPE
600B/fcccd - ENDOAQUENTS; LOAMY; 3-8% SLOPE
600D/fcccd - ENDOAQUENTS; LOAMY; 15-25% SLOPE
600E/fcccd - ENDOAQUENTS; LOAMY 25-50% SLOPE
44A - MONTAUK - 0-3% SLOPE
44B - MONTAUK; 3-8% SLOPE
44C - MONTAUK; 8-15% SLOPE
199A/haade - DUMPS, BARK CHIPS, AND ORGANIC MATERIAL; 0-3% SLOPE

NOTE:

THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 17-18, 2024.

Existing Color Coded Soil Map
36 Pillsbury Road
Londonderry, New Hampshire

Figure 2

February 2025

Hovey Road NRCS Web Soil Survey

United States Department of Agriculture

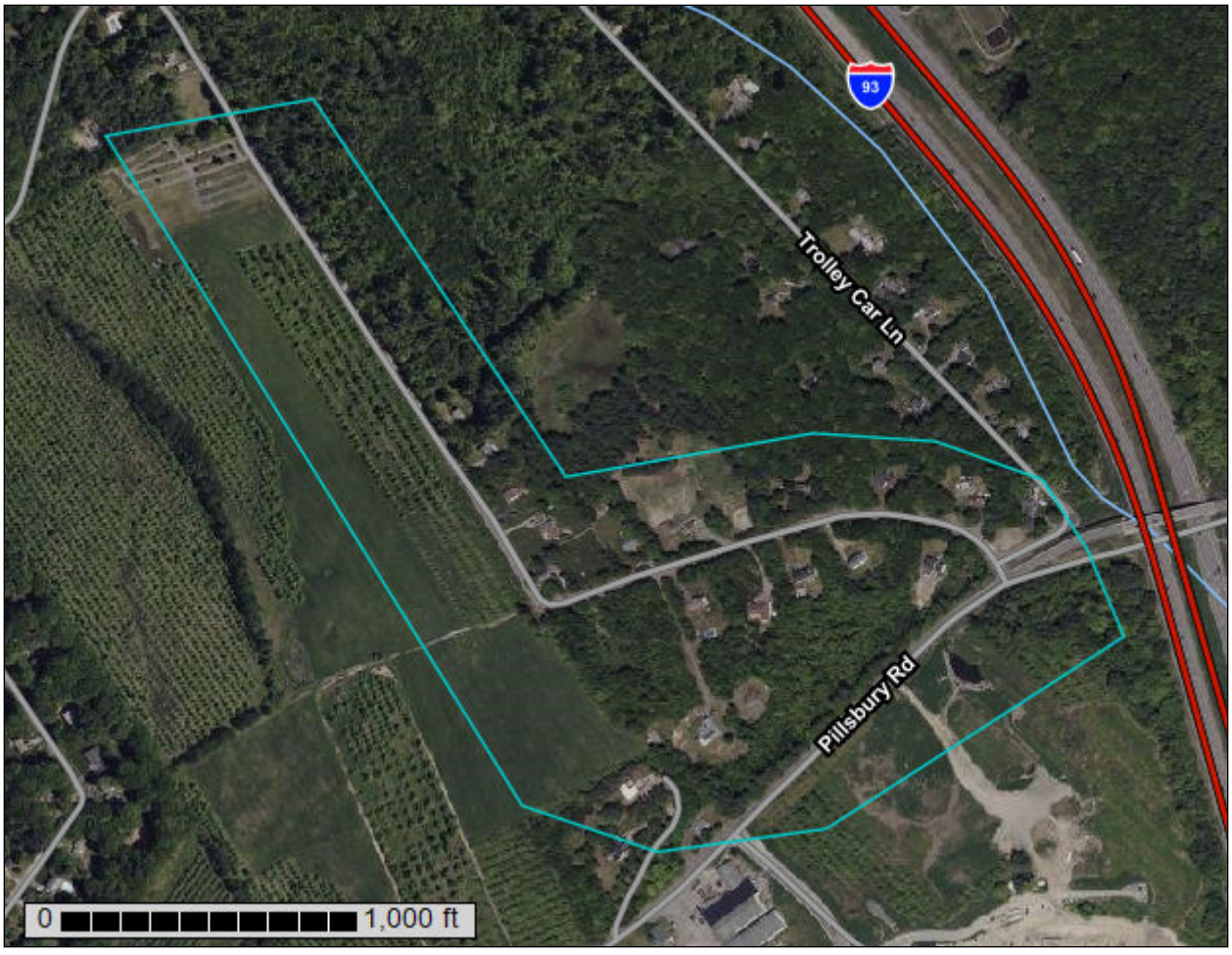
NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Rockingham County, New Hampshire

Hovey Road Analysis



November 3, 2025

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Soil Map

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

71° 21' 43" W
71° 20' 29" W
42° 53' 6" N
42° 52' 36" N



Map Scale: 1:4,530 if printed on B landscape (17" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: Rockingham County, New Hampshire
Survey Area Data: Version 28, Sep 9, 2025

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
29B	Woodbridge fine sandy loam, 3 to 8 percent slopes	25.5	31.1%
43D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	11.9	14.6%
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	15.8	19.3%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	12.6	15.4%
446A	Scituate-Newfields complex, 0 to 3 percent slopes	4.8	5.8%
446B	Scituate-Newfields complex, 3 to 8 percent slopes	8.2	10.0%
547A	Walpole very fine sandy loam, 0 to 3 percent slopes, very stony	3.1	3.8%
Totals for Area of Interest		**81.8**	**100.0%**

Map Unit Descriptions

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

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

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

are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Rockingham County, New Hampshire

29B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2ql
Elevation: 0 to 1,470 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Woodbridge, fine sandy loam, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent
Landform: Depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

43D—Canton fine sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81h
Elevation: 70 to 1,120 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam

Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Chatfield, very stony

Percent of map unit: 6 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Montauk, very stony

Percent of map unit: 5 percent
Landform: Hills, drumlins, recessionial moraines, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Newfields, very stony

Percent of map unit: 4 percent
Landform: Ground moraines, hills, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

140B—Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky

Map Unit Setting

National map unit symbol: 2w82m
Elevation: 380 to 1,070 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield, very stony, and similar soils: 35 percent
Hollis, very stony, and similar soils: 25 percent
Canton, very stony, and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam

Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Newfields, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Freetown

Percent of map unit: 5 percent
Landform: Marshes, depressions, bogs, kettles, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Walpole, very stony

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

Rock outcrop

Percent of map unit: 2 percent
Landform: Ridges, hills
Hydric soil rating: Unranked

140C—Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky

Map Unit Setting

National map unit symbol: 2w82s
Elevation: 0 to 980 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield, very stony, and similar soils: 35 percent
Hollis, very stony, and similar soils: 25 percent
Canton, very stony, and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Newfields, very stony

Percent of map unit: 5 percent
Landform: Moraines, ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Freetown

Percent of map unit: 5 percent
Landform: Marshes, depressions, bogs, kettles, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro, very stony

Percent of map unit: 3 percent
Landform: Depressions, outwash terraces, drainageways, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Rock outcrop

Percent of map unit: 2 percent

Landform: Ridges, hills
Hydric soil rating: Unranked

446A—Scituate-Newfields complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9cnn
Elevation: 20 to 1,000 feet
Mean annual precipitation: 35 to 49 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Scituate and similar soils: 50 percent
Newfields and similar soils: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scituate

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 32 inches: cobbly fine sandy loam
H3 - 32 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Description of Newfields

Setting

Parent material: Till

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 35 inches: fine sandy loam
H3 - 35 to 64 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Montauk

Percent of map unit: 5 percent
Hydric soil rating: No

Walpole

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Ridgebury

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Paxton

Percent of map unit: 5 percent
Hydric soil rating: No

Canton

Percent of map unit: 5 percent
Hydric soil rating: No

446B—Scituate-Newfields complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9cnp
Elevation: 0 to 1,000 feet
Mean annual precipitation: 35 to 48 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Scituate and similar soils: 50 percent
Newfields and similar soils: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scituate

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 32 inches: cobbly fine sandy loam
H3 - 32 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Description of Newfields

Setting

Parent material: Till

Typical profile

H1 - 0 to 9 inches: fine sandy loam

H2 - 9 to 35 inches: fine sandy loam
H3 - 35 to 64 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Canton

Percent of map unit: 5 percent
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Hydric soil rating: No

Walpole

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Ridgebury

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Montauk

Percent of map unit: 5 percent
Hydric soil rating: No

547A—Walpole very fine sandy loam, 0 to 3 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9cpc
Elevation: 0 to 2,100 feet

Mean annual precipitation: 28 to 49 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Walpole and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Walpole

Setting

Landform: Depressions

Typical profile

H1 - 0 to 7 inches: very fine sandy loam
H2 - 7 to 16 inches: sandy loam
H3 - 16 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A/D
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

Minor Components

Scarboro

Percent of map unit: 10 percent
Landform: Depressions
Hydric soil rating: Yes

Newfields

Percent of map unit: 5 percent
Hydric soil rating: No

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Appendix E: Snow Storage Plan and Calculations

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KITT LANE
PILLSBURY ROAD
(AR-1)
(PUD)
THORNTON HILL AVE
MARSH VIEW
SNOW STORAGE
SNOW STORAGE
SNOW STORAGE

Snow Storage Calculations

Project	Thornton Hill 36 Pillsbury Road	**Project #**	53140.00
Calculated by	SD	**Date**	2/5/2025
Checked by	BJZ	**Date**	2/18/2025

SNOW STORAGE VOLUME SUMMARY

Area to be Plowed:	1,805,375	s.f.	** Assumes 8" snowfall with 40% compaction factor*
Storage Volume Required:	722,150	c.f.	
Storage Volume Provided:	727,825	c.f.	

SNOW STORAGE VOLUME PROVIDED

ROAD SHOULDER:

Storage Height:	3	ft.	
Storage Width:	5	ft.	
Cross Sectional Area:	6	s.f.	** Assumes 1:1 side slope*
Storage Length:	11,998	ft.	
Storage Volume 1 Provided:	74,988	c.f.	

CLUSTER A #1:

Storage Height:	23	ft.	
Storage Width:	45	ft.	
Cross Sectional Area:	506	s.f.	** Assumes 1:1 side slope*
Storage Length:	330	ft.	
Storage Volume 2 Provided:	167,063	c.f.	

CLUSTER A #2:

Storage Height:	25	ft.	
Storage Width:	50	ft.	
Cross Sectional Area:	625	s.f.	** Assumes 1:1 side slope*
Storage Length:	115	ft.	

Snow Storage Calculations

Project	Thornton Hill 36 Pillsbury Road	**Project #**	53140.00
Calculated by	SD	**Date**	2/5/2025
Checked by	BJZ	**Date**	2/18/2025

Storage Volume 3 Provided:	**71,875**	c.f.	

CLUSTER A #3:

Storage Height:	10	ft.	
Storage Width:	20	ft.	
Cross Sectional Area:	**100**	s.f.	** Assumes 1:1 side slope*
Storage Length:	187	ft.	
Storage Volume 3 Provided:	**18,700**	c.f.	

CLUSTER B #1:

Storage Height:	15	ft.	
Storage Width:	30	ft.	
Cross Sectional Area:	**225**	s.f.	** Assumes 1:1 side slope*
Storage Length:	283	ft.	
Storage Volume 3 Provided:	**63,675**	c.f.	

CLUSTER C #1:

Storage Height:	13	ft.	
Storage Width:	25	ft.	
Cross Sectional Area:	**156**	s.f.	** Assumes 1:1 side slope*
Storage Length:	292	ft.	
Storage Volume 3 Provided:	**45,625**	c.f.	

CLUSTER F #1:

Snow Storage Calculations

Project	Thornton Hill 36 Pillsbury Road	**Project #**	53140.00
Calculated by	SD	**Date**	2/5/2025
Checked by	BJZ	**Date**	2/18/2025

Storage Height:	15	ft.	
Storage Width:	30	ft.	
Cross Sectional Area:	225	s.f.	** Assumes 1:1 side slope*
Storage Length:	104	ft.	
Storage Volume 3 Provided:	23,400	c.f.	

CLUSTER F #2:

Storage Height:	25	ft.	
Storage Width:	50	ft.	
Cross Sectional Area:	625	s.f.	** Assumes 1:1 side slope*
Storage Length:	420	ft.	
Storage Volume 3 Provided:	262,500	c.f.	

Appendix F: Inspection and Maintenance Manual

Thornton Hill

36 Pillsbury Road, Londonderry, NH

PREPARED FOR

The Procopio Companies
35 Village Road, 7th, Floor (702)
Middleton, MA 01949

PREPARED BY

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

February 20, 2025

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Inspection & Maintenance Log .....
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Introduction

VHB has prepared the following Stormwater Management System Inspection & Maintenance Manual for the residential project located at 36 Pillsbury Road, Londonderry, New Hampshire. The intent of this plan is to provide the applicant/owner with a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this development.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. By following the enclosed procedures, the applicant will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Responsible Party

The oversight of the inspection and maintenance program will be provided by:

Davide Roache
Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA 01949
(617) 594-5945
droache@procopiocompanies.com

Stormwater Management System Components

The Stormwater Management System is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

Non-Structural BMP's

Non-structural best management practices (BMP's) are designed to minimize and/or remove contaminants before they enter the stormwater collection system. Several of these BMP's have been incorporated into the Stormwater Management System

including reduced used of road deicing agents, and litter/trash removal. These types of BMP's are a highly effective initial treatment measure for reducing stormwater pollutant loading.

Structural BMP's

Structural BMP's have been incorporated into the overall stormwater management plan. Structural BMP's include deep sump catch basins, subsurface sand filter and subsurface detention basins.

Inspection & Maintenance Plan

By implementing the following procedures, the applicant will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

Source Control

- Routinely empty all outside waste receptacles provided for public use.
- Clearing litter from the parking area, islands, and perimeter landscape areas.

Vegetated Areas Maintenance

Although not a specific component of the drainage system, the maintenance of vegetated areas may affect the functioning of stormwater management practices. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

- Inspect planted areas on a semi-annual basis and remove any litter.
- Maintain planted areas adjacent to pavement to prevent soil washout.
- Immediately clean any soil deposited on pavement.
- Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative mixture of grass species in the event of unsuccessful establishment.
- The grass vegetation should be cut to a height between three and four inches.

- Pesticide/Herbicide Usage – No pesticides are to be used unless a single spot treatment is required for a specific control application.
- Fertilizer usage should be avoided. If deemed necessary, slow-release fertilizer should be used. Fertilizer may be used to begin the establishment of vegetation in bare or damaged areas but should not be applied on a regular basis unless necessary.

Deicing Agents

Deicing agents should be used in accordance with the following:

- Use sand as the primary agent for parking lot safety during ice and snow conditions.
- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Maintain a Deicing Log to track the amount and type of deicing materials applied to the site.
- Deicing operations should be conducted in accordance with the Salt Minimization Plan for the Project.

Snow Management

Snow storage areas shall be maintained as follows:

- Snow storage areas will be managed to prevent blockage of storm drain catch basins. Snow combined with sand and debris may block a storm drainage system, diminishing the infiltration capacity of the system and causing localized flooding.
- Sand and debris deposited on vegetated or paved areas shall be cleared from the site and properly disposed of at the end of the snow season, no later than May 15.
- Snow shall not be dumped into any water body, pond, wetland resource area or stormwater detention basin.
- Snow Management operations should be conducted in accordance with the Salt Minimization Plan for the Project.

Catch Basins

The proposed catch basins are constructed with sumps (minimum 3 feet) to trap debris, sediments, and floating contaminants. Disposal of all sediments must be in accordance with applicable local, state, and federal guidelines.

- Inspect catch basins at least two times per year and clean a minimum of once per year.
- Sediment greater than half the sump depth and/or floatable pollutants shall be pumped from the basin and disposed of at an approved offsite facility in accordance with all applicable regulations.
- Any structural damage or other indication of malfunction will be reported to the site manager and repaired as necessary.
- During colder periods, the catch basin grates must be kept free from snow and ice.
- During warmer periods, the catch basin grates must be kept free of leaves, litter, sand and debris.

Stormwater Outfalls

- Inspect outfall locations monthly for the first three months after construction to ensure proper functioning and correct any areas that have settled or experienced washouts.
- Inspect outfalls annually after initial three-month period.
- Annual inspections should be supplemented after large storms when washouts may occur.
- Maintain/cut vegetation around outfalls to prevent blockages at the outfall.
- Maintain rip-rap pad below each outfall and repair any washouts or other damage immediately.
- Remove and dispose of any trash or debris at the outfall.

Structural Water Quality Devices (Sand Filter)

- Refer to Manufacturers recommendations for specific O&M requirements.
- Inspect devices monthly for the first three months after construction.
- After initial three-month period, all water quality units are to be inspected at least twice a year and cleaned a minimum of at least once per year or when sediment reaches 8" in depth.

- Follow manufacturer instructions for inspection and cleaning and contact manufacturer if system is malfunctioning.
- Refer to the New Hampshire Stormwater Manual Volume 2 Chapter 4 Designing Best Management Practices, 4-3 Treatment Practice, 4 Filtering Practices, Section 4b Underground Sand Filter for additional Maintenance requirements.
    - Systems should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
    - Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
    - Trash and debris should be removed at each inspection.
    - Manufactured filter media should be replaced periodically per manufacturer's specifications.
    - At least once annually, system should be inspected for drawdown time. If a filtration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function, including but not limited to removal of accumulated sediments or reconstruction of the filter.

Storm Drain Manholes

- Inspect at least once annually for clogging or sediment accumulation and clean as needed to ensure proper stormwater conveyance.

Subsurface Detention System

- The subsurface detention systems will be inspected at least twice each year by removing the manhole/access port covers and determining the thickness, if any, of sediment that has accumulated.
- If sediment is more than six inches deep, it must be suspended via flushing with clean water and removed using a vactor truck.
- Refer to manufacturer's specifications and instructions for cleaning the system.
- Outlet control manholes will be examined at each inspection to verify that no blockage has occurred.
- System will be observed after rainfalls to see if it is properly draining.

Aboveground Stormwater Basins (Modified Existing Basin)

- Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- Trash and debris should be removed at each inspection.
- At least once annually, system should be inspected for drawdown time. If a filtration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function, including but not limited to removal of accumulated sediments or reconstruction of the filter.
- Remove debris from any inlet and outlet structures.
- Remove accumulated sediment.
- Inspected and repair (if needed) outlet structures and appurtenances.
- Remove woody vegetation from embankments. Inspect and repair embankments as needed.

Grass Conveyance Swale

- Grassed channels should be inspected periodically (at least annually) for sediment accumulation, erosion and condition of surface lining (vegetation or riprap). Repairs, including stone or vegetation replacement, should be made based on this inspection.
- Remove sediment and debris annually, or more frequently as warranted by inspection.
- Mow vegetated channels as needed to maintain grass establishment and remove woody vegetation. Grass to be cut no shorter than 4 inches.

Invasive Plant Species Control

- Invasive plant species are alien or non-native plants which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control or food crops; or arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some of these exotic plants become invasive and cause harm by:
  - becoming weedy and overgrown;

- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

- As part of the routine inspections of the drainage system and stormwater outfalls, the site should be checked for the presence of invasive plant species as defined by the New Hampshire Department of Agriculture, Markets & Food (a list is provide at the end of this manual).
- If invasive plant species are found to be present they should be controlled as described in the "Control of Invasive Plants" document prepared by the NH Department of Agriculture, Markets & Food. A copy is provided at the end of this manual.

Record Keeping

- Inspections of the stormwater management system shall be conducted in accordance with the Inspection & Maintenance Checklist provided in this Manual.
- An Inspection & Maintenance Log shall be completed for each inspection and maintenance activity.
- All record keeping required by the I&M manual shall be maintained by the Responsible Party.
- A deicing log shall be maintained that tracks the amount and type of deicing materials applied to the site.
- Any transfer of responsibility for the I&M activities or transfer of ownership shall be documented to the NHDES Water Division in writing.
- Inspection Reports shall be filed with the Town of Londonderry Department of Engineering and Environmental Services on an annual basis.

Inspection & Maintenance Checklist/Log

The following pages contain an Inspection & Maintenance Checklist, a blank copy of the Stormwater Management System's Inspection & Maintenance Log, and a reduced copy of the Grading and Utility Plans. These forms/plans are provided to assist the

applicant with the inspection and maintenance of the Stormwater Management System.

Invasive Species Information

A copy of the New Hampshire Department of Agriculture, Markets & Food's document "Control of Invasive Plants" is provided at the end of this manual.

Stormwater Management System

Inspection & Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Source Control	Routinely	Inspect outdoor waste receptacles areas for spillage. Inspect and clear litter from parking area, islands and perimeter landscape areas.	Clean as required.
Deicing Agents	N/A	N/A	Use sand as primary agent for site roadway and parking safety during winter.

Stormwater Management System

Inspection & Maintenance Checklist

Closed Drainage System			
Catch Basins	2 times per year	Check for sediment accumulation. Check for floatable contaminants.	≥ 2 ft. sediment depth. ≥ 3 in. floatable depth.
Storm Drain Manholes	1 time per 2 years	Check for sediment accumulation.	≥ 3 in. sediment depth.
Drainage Pipes	1 time per 2 years	Check for sediment accumulation/clogging.	≥ 2 in. sediment depth.
Aboveground Stormwater Basin	2 times per year	Check for sediment accumulation, trash and debris.	Clean/repair as needed.
Subsurface Detention Basin	2 times per year	Check for sediment accumulation.	Refer to Manufacturers Requirements
Subsurface Sand Filter	2 times per year	Check for sediment accumulation/clogging	Refer to Manufacturers Requirements
Outlet Control Structure	2 times per year	Check for sediment accumulation/clogging	Clean/repair as needed.
Outfalls	Monthly for first 3 months and 1 time per year thereafter	-Check for sediment, trash and debris accumulation. -Check for vegetation blocking outfall. Inspect rip rap for washout.	Clean/repair as needed.
Grass Conveyance Swale	1 time per year	Check for sediment, trash and debris accumulation	Clean/repair as needed

Stormwater Management System

Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed *(List Items/Comments)*	Date of Cleaning/Repair	Performed By
OCS 101					
FES 102					
CB 201					
CB 202					
FES 203					
OCS 204					
FES 205					
CB 301					
FES 302					
CB 303					
CB 304					
OCS 305					
FES 306					

CB 401					
FES 402					
OCS 403					
FES 404					
CB 501					
CB 502					
CB 503					
CB 504					
FES 505					
OCS 506					
FES 507					
CB 601					
CB 602					
CB 603					

CB 604					
DMH 605					
FES 606					
OCS 607					
FES 608					
CB 701					
CB 702					
FES 703					
OCS 704					
CB 801					
CB 802					
FES 803					
OCS 804					
FES 805					

CB 901					
CB 902					
DMH 903					
FES 904					
CB 905					
CB 906					
FES 907					
CB 1001					
CB 1002					
DMH 1003					
DMH 1005					
FES 1006					
CB 1007					
FES 1008					

OCS 1009					
FES 1010					
CB 1101					
FES 1102					
Swale Near Welcome Building					
Swale Near Building					
Swale Near Pillsbury					
Notes:					

Stormwater Management System

Deicing Log

Date	Type	Location/Amount	Name(s) of Maintenance Personnel

Appendix G: Salt Minimization Plan

TECHNICAL MANUAL

Salt Minimization Plan

36 Pillsbury Road
Londonderry, NH

PREPARED FOR

PROCOPIO

The Procopio Companies
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PREPARED BY

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February 20th, 2025

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Project Area Description **2**

Responsibility **3**

Operational Guidelines **4**

4.1 Winter Operator Certification Requirements 4
4.2 Weather Monitoring 4
4.3 Equipment Calibration Requirements 4
4.4 Plowing 5
4.5 Deicer Storage and Application 5

Salt Usage Evaluation and Monitoring **6**

Analysis of Alternative De-icing Materials and Site Design Considerations **7**

Appendices

Snow Storage Plan

New Hampshire Salt Reduction Best Management Practices

Hydraulic-Run Spreader Calibration

Pony Motor-Run Spreader Calibration

How Salt Works

Anti-Icing

Pre-wetting

Brine Making

Material Storage and Housekeeping

Smart Salting Practices

1

Introduction and Background

The proposed development is within the surface watershed of the Merrimack River. This watershed has been identified by the New Hampshire Department of Environmental Services (NHDES) as being impaired by chlorides. The NHDES has identified the primary source of chlorides as salt used for winter snow and ice management. Nevertheless, snow and ice on roadways, parking lots, and sidewalks create a public safety hazard for users. Thus, the goal of this Salt Minimization Plan is to reduce the amount of chloride entering sensitive environmental areas while maintaining site safety. The best management practices (BMPs) described in this document can generate long-term cost savings via salt purchase decreases, vegetation health improvements, and infrastructure and vehicle corrosion reductions.

2

Project Area Description

The 94.15-acre Site is located along Pillsbury Road in Londonderry, New Hampshire. The Site is presently vacant and was previously occupied by an apple orchard. The proposed development of the site includes the construction of 250 freestanding residential dwelling units, arranged 'clusters' around communal open spaces. In total, approximately 20 acres of new pavement and other impervious surfaces will be added to the site.

3

Responsibility

All property managers of the site should implement and comply with the Salt Minimization Plan, review the success of the Plan, and update the Plan as new requirements, products, and practices are developed. A copy of this plan shall be provided to all personnel who handle snow and ice maintenance within the site.

4

Operational Guidelines

4.1 Winter Operator Certification Requirements

All employed or contracted winter maintenance operators shall be New Hampshire Certified Green SnowPro or equivalent. Green SnowPro training is provided by the University of New Hampshire. It is preferred that operators also have NHDES Salt Applicator Certification. Information on these certifications can be found at the links below:

https://www.des.nh.gov/land/roads/road-salt-reduction

https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification

4.2 Weather Monitoring

Operators providing winter maintenance to the site shall monitor winter storm events using the National Weather Service (www.weather.gov) or other sources that rely on National Weather Service data, like local TV and radio stations and other weather websites and apps. All vehicles that apply de-icing agents shall be equipped with air and ground surface temperature monitors. These temperature monitors shall be calibrated annually. Operators shall monitor air and ground temperatures before, during, and immediately after expected storm events to ensure that this information is taken into consideration when making decisions about deicing material placement and timing. Dry salt is ineffective below 15°F and most deicers are ineffective once the temperature drops below -10°F. Monitoring air and ground temperatures and acting accordingly will aid the effective use of these materials.

4.3 Equipment Calibration Requirements

Salt spreaders shall have ground speed control applications to regulate the amount of salt that is deposited. Winter maintenance operators shall calibrate equipment

each fall using an application rate chart. After each storm, equipment should be checked and recalibrated, if necessary. For more information, refer to the attached "Hydraulic-Run Spreader Calibration" and "Pony Motor-Run Spreader Calibration" NH Best Management Practices sheets from the Technology Transfer Center at University of New Hampshire.

4.4 Plowing

Snow shall be mechanically removed from roadways, driveways, parking lots, and sidewalks to the maximum extent practicable before deicers are applied to pavement. Snow shall be piled in designated snow storage areas on the attached Snow Storage Plan or other zones that do not interfere with occupant parking or navigation of the site and do not drain directly into wetlands. Snow storage areas shall not be situated on top of catch basins or within detention areas. It is preferred that snow storage zones do not drain back across cleared areas, where the meltwater can refreeze.

4.5 Deicer Storage and Application

Winter maintenance operators should be proactive and apply small amounts of pre-wetted de-icer, salt brine, or liquid de-icers to pavement prior to frost or snow accumulation to prevent ice from bonding with the pavement surface. This anti-icing method is most effective when applied 1-2 hours before precipitation. It can be applied up to 24 hours in advance if necessary. Salt shall be pre-wet or pre-treated with a brine solution to reduce salt loss from bounce and scatter and improve melting times. Pretreating paved areas has been shown to reduce the amount of salt needed in most winter storms. For more information, refer to the "How Salt Works", "Anti-Icing", "Pre-wetting" and "Brine Making" NH Best Management Practices sheets from the Technology Transfer Center at University of New Hampshire.

On roadways, deicers should be applied to the crown of the road or the high side of a curve. On sidewalks, salt should be deposited by drop spreaders. If using a rotary spreader, shields must be installed to restrict the spread to the sidewalk. Salt brine or liquid de-icers shall not be applied before a rainstorm, but can be applied before a light freezing drizzle. Salt shall not be used to "burn off" snow. If the pavement temperature is below 15°F, contractor shall wait until the temperature rises before applying salt, if possible. Otherwise, contractor shall use pre-wetted deicing materials. If the pavement temperature is below -10°F, operator shall use mechanical methods to clear snow and ice and wait until the temperature rises before applying deicers.

Salt and sand shall be applied separately since their purposes—melting and traction, respectively—are different. Salt shall be stored in a building or under secure cover, away from water flow or water bodies. For more information, refer to the "Material Storage and Housekeeping" NH Best Management Practices sheet from the Technology Transfer Center at University of New Hampshire.

5

Salt Usage Evaluation and Monitoring

Monitoring salt usage and winter maintenance activities are the keys to identifying what methods are successful in deicing the site, how much salt or other material was used, how much is needed for the next winter season, and the effectiveness of the salt minimization plan at reducing salt loads in the watershed. For each application, operators shall record the following:

- What activity is being performed and/or what equipment is being used
- Where the maintenance is occurring
- When activity is being performed (date, start and end time)
- Weather conditions
  - Event timing (Start and end time)
  - Snow fall or ice totals
  - Air and ground temperatures
- Application rates
- Results

Operators shall periodically compare salt usage between vehicles to confirm spreader calibrations. Operators are also encouraged to provide feedback on effectiveness of BMPs in practice and suggest others that should be considered for implementation. Shortly following the winter season, a report should be developed summarizing this data and analyzing the results. The report should also be provided to the local jurisdiction for the purposes of tracking chloride applications throughout the watershed. The Salt Minimization Plan should also be reviewed and updated each year, preferably when the report is complete. The attached checklist for snow and ice maintenance can be used as a guide for best management practices.

6

Analysis of Alternative De-icing Materials and Site Design Considerations

Alternative de-icing materials, such as potassium acetate and calcium magnesium acetate (CMA), and limited use of abrasives, like sand, sawdust, or cat litter, should also be considered to reduce chloride application in the watershed. Pavement should be kept free of potholes to minimize the ability of water to pond and freeze. Cracks should also be filled before the winter season since cracks can allow chlorides to leach into the ground and migrate into the groundwater. Pavement that is in good condition also aids the mechanical removal of snow and ice.

Snow Storage Plan

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KITT LANE
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(PUD)
THORNTON HILL AVE
MARSH VIEW
SNOW STORAGE
SNOW STORAGE
SNOW STORAGE

New Hampshire Salt Reduction Best Management Practices

Calibration Chart (Hydraulic Type)

Material: _____ Truck/Spreader ID: _____

Date: _____ Performed by: _____

Tarp/Canvas/Bucket Weight: _____

Conveyor or Auger Setting	W	A	Discharge Rate (lb/min.)			B	D					
	Spread Width (ft.)	5.28 × W	Run 1	Run 2	Run 3	Average Discharge Rate *((Run1 + Run2 + Run3)/3)*	Pounds of Material Discharged per 1000 square ft. *(D = B × C ÷ A)*					
							5 mph (C = 12)	10 mph (C = 6)	15 mph (C = 4)	20 mph (C = 3)	25 mph (C = 2.4)	30 mph (C = 2)
1												
2												
3												
4												
5												
EX	14	5.28 × 14= **73.92**	87	92	93	(87+92+93)÷3= **90.67**	12 × 90.67 ÷ 73.92= **14.72**	6 × 90.67 ÷ 73.92= **7.36**	4 × 90.67 ÷ 73.92= **4.91**	3 × 90.67 ÷ 73.92= **3.68**	2.4 × 90.67 ÷ 73.92= **2.94**	2 × 90.67 ÷ 73.92= **2.45**

Calculation Instructions: Multiply the spread width from column **W** by **5.28** and record the answer in column **A**. For each conveyor/auger setting, add **Run 1**, **Run 2**, and **Run 3** together. Divide the result by **3** and record in column **B** to get the average discharge rate. To find the pounds of material discharge per 1000 square feet, you must know the number of minutes it takes to travel one mile at every truck speed you intend to calibrate for. These numbers are designated as variable "**C**". The "**C**" value for each travel speed is shown in red under that given speed. Multiply column **B** by the "**C**" value for that speed and divide by the **A** column to find the number of pounds of material discharged per 1000 square feet for the given speed. Record these numbers in the **D** columns. The full equation is shown here:

$$D = \frac{B \times C}{A}$$

Pony Motor-Run Spreader Calibration

NH Best Management Practices

WHY CALIBRATE?

You can't reduce your salt use if you don't know how much salt you actually use! The goal of calibrating is to know how much material you are putting down on a roadway or parking lot for every setting on your truck that you use. This is why calibrating your equipment is the first step to reducing salt use and saving money!

REMEMBER:

Each truck must be independently calibrated for each material it will be used to spread (the salt calibration card *will* be different than the sand calibration card).

Calibrations should be preformed annually, or after a spreader is serviced.

CALCULATIONS:

There are a few simple calculations you must perform in order to complete the calibration. Once all of the necessary data is recorded, head back inside and warm up! Refer to the reverse side of this fact sheet for calculation instructions.



Step 1: Load the Truck

Partially load the truck. Half of a full load should be more than adequate for calibration purposes.



Step 2: Set Your Controls

Gate Height: Set the gate height to its lowest practical setting to start (approximately 1" to 1.5"). After the truck is calibrated for the lowest gate setting, calibrate for each 1/2" increment greater than the lowest setting. Continue until all gate settings you use are calibrated.

Engine Speed: Set the pony motor speed to the maximum setting, or to the setting you would normally use.



Step 3: Measure Spread Width

Measure the width that the material covers during spreading. Do this for each gate setting you are calibrating. Round your numbers to the nearest half foot and record them in column "**W**" of the calibration chart (see reverse side).



Step 4: Collect & Weigh Material

You will need either a sheet of canvas, a tarp, or a bucket to collect the material that is dispensed from the spreader, as well as a scale. Weight the object you are using to collect the material in, and record that value in the purple box above the discharge rate column. Collect material for 1 minute. Weigh the collected material and subtract the weight of the tarp/canvas/bucket. Record this value in the first purple column of the calibration chart. Do this 3 times for each gate opening that is typically used. Average these three values together and record in the orange column in the calibration chart.

Step 5: Perform Calculations

Go inside and calculate your discharge rate using the calibration chart for each truck speed and gate setting you normally use. Refer to the reverse side of this fact sheet for calculation instructions. The formula you will be using is shown below:

$$D = \frac{B \times C}{A}$$

Step 6: Distribute Completed Calibration Cards!

Put a copy of the calibration card in the truck you just calibrated. Also, leave a copy of the calibration card in the office so you have a copy incase the original is damaged.

Produced in partnership with:

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Calibration Chart (Pony Motor Type)

Material: _____ Truck/Spreader ID: _____

Date: _____ Performed by: _____

Tarp/Canvas/Bucket Weight: _____

Gate Opening	W	A	Discharge Rate (lb/min.)			B	D					
	Spread Width (ft.)	5.28 × W	Run 1	Run 2	Run 3	Average Discharge Rate *((Run1 + Run2 + Run3)/3)*	Pounds of Material Discharged per 1000 square ft. *(D = B × C ÷ A)*					
							5 mph (C = 12)	10 mph (C = 6)	15 mph (C = 4)	20 mph (C = 3)	25 mph (C = 2.4)	30 mph (C = 2)
1”												
1.5”												
2”												
2.5”												
3”												
EX	14	5.28 × 14= **73.92**	87	92	93	(87+92+93)÷3= **90.67**	12 × 90.67 ÷ 73.92= **14.72**	6 × 90.67 ÷ 73.92= **7.36**	4 × 90.67 ÷ 73.92= **4.91**	3 × 90.67 ÷ 73.92= **3.68**	2.4 × 90.67 ÷ 73.92= **2.94**	2 × 90.67 ÷ 73.92= **2.45**

Calculation Instructions: Multiply the spread width from column **W** by **5.28** and record the answer in column **A**. For each gate setting, add **Run 1**, **Run 2**, and **Run 3** together. Divide the result by **3** and record in column **B** to get the average discharge rate. To find the pounds of material discharge per 1000 square feet, you must know the number of minutes it takes to travel one mile at every truck speed you intend to calibrate for. These numbers are designated as variable “**C**”. The “**C**” value for each travel speed is shown in red under that given speed. Multiply column **B** by the “**C**” value for that speed and divide by the **A** column to find the number of pounds of material discharged per 1000 square feet for the given speed. Record these numbers in the **D** columns. The full equation is shown here:

$$D = \frac{B \times C}{A}$$

How Salt Works

NH Best Management Practices

BE PROACTIVE - ANTI-ICE

Anti-icing is the proactive method of preventing snow and ice from bonding to pavement. It can be more than 50% more efficient than deicing. See the NH Anti-Icing Factsheet for more information.

PRE-WETTING FOR FASTER ACTING SALT

Adding brine to salt before you apply it to pavement jump starts the melting process which means your pavement will be clear sooner. See the Pre-wetting Fact Sheet for more information.

KNOW YOUR LIMITS

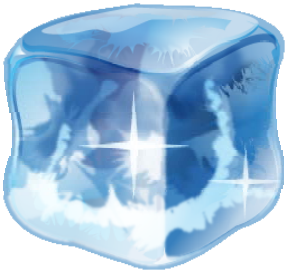
Dry salt becomes ineffective below 15°F if possible wait until the temperature rises before applying salt. At 30°F 1 lb of salt can melt 46.3 lb of ice in 5 minutes. At 15°F 1 lb of salt can melt 6.3 lb of ice in 1 hour.

PLOW FIRST

Always plow before applying any kind of chemical deicer to avoid pushing it away!

How Do We Melt Ice?

Ice can be melted by increasing the temperature, or lowering the freezing point of the water. It's not cost effective to use heat to melt ice on our roads so we use chemicals to reduce the freezing point—anything that will dissolve in water will work, including: salt, sugar, even alcohol!



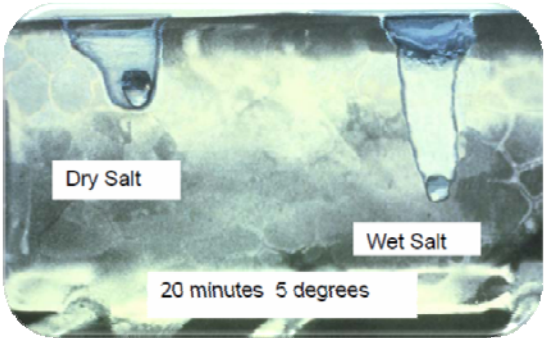


Why Use Salt?

Salt (Sodium Chloride) is the cheapest and most readily available chemical that efficiently melts ice and can be easily applied to our roadways and parking lots. However salt does corrode our cars and bridges, contaminates drinking water and pollutes our streams. Alternatives include potassium acetate, and calcium magnesium acetate (CMA), — all of which are considerably more expensive than calcium chloride, and have their own environmental concerns.

Brine Makes It Happen

The first step in melting ice is the formation of a brine. Salt crystals pull water molecules out of ice formation which creates a brine with a lower freeze point. Once the brine is formed melting is greatly accelerated. Save time and money by pre-wetting your salt with a brine before it hits the pavement to jump start melting! See the Pre-Wetting fact sheet for more information.



Source: Wisconsin DOT Transportation Bulletin #22



Save $$ and the Environment

In New Hampshire there are over 40 watersheds currently contaminated from road salt. As the pavement temperature drops more salt is required. As the pavement temperature rises less salt is required. Save money and the environment by using only what is needed to do the job. See NH application rate charts for recommended rates.

Produced in partnership with:

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Anti-Icing

NH Best Management Practices

GET OUT EARLY

Typically anti-icing is most effective if applied 1-2 hours before the precipitation begins however it can be applied up to 24 hours in advance.

TRY IT FIRST

Trying anti-icing for the first time? Make a 23.3% brine solution and before a storm spray pavement on your own property using a masonry/ plant sprayer. Use this experiment to determine how best to use it with your clients.

LEAVE SOME PAVEMENT BARE

It's always best to use stream nozzles instead of fan tip to avoid creating a slippery condition. If the anti-icing liquid freezes the bare pavement will still provide a traction surface.

USE A FILTER

Having a filter in your liquid dispensing system will reduce clogs in your nozzle. Automotive in line fuel filters work quiet well. If your liquid dispenser is not functioning properly be sure to check the filter first.

A Proactive Treatment

Anti-Icing before a storm is very similar to using a non-stick spray on a pan before cooking. Just like a non-stick spray prevents food from bonding to the pan, anti-icing prevents snow and ice from bonding to the pavement so that it can be plowed away. Anti-icing can save you money as it costs 50% less than reactive deicing.





Make Your Own Salt Brine

When making brine it is important to add enough salt to produce a 23.3% solution which freezes around 0°F. Roughly 2.5lb per gallon of water will produce a 23.3% solution. You can verify using a salometer (~$20) a 23.3% solution will have a specific gravity of 1.176, or 85% salinity. Consult the Brine Making BMP sheet for more info.

How Much Should I Use and When?

You can apply brine up to 24 hours in advance of the storm. Typical application rates range from 0.5 to 0.75 gallon per 1000 sq.ft. (10' x 100' area). Other chemicals such as magnesium are also available—consult your supplier for application rates. Anti-icing is not advised prior to freezing rain events.





Getting Started

Try making your own salt brine by putting 13 lb of salt in 5 gallons of water to get a 23.3% salt brine solution. Mix the brine until all of the salt is dissolved. Using a masonry sprayer apply the liquid several hours before a storm. Start by applying about 0.25—0.5 gallons to a 10' x 50' area. Adjust the application rates based on your experience. Being careful not to over apply and cause a slippery condition.

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New Hampshire LTAP at UNH

Pre-wetting

NH Best Management Practices

PRE-WETTING?

Pre-wetting is the process of coating a solid de-icer with a liquid before it is spread on a roadway.

WHY PRE-WET?

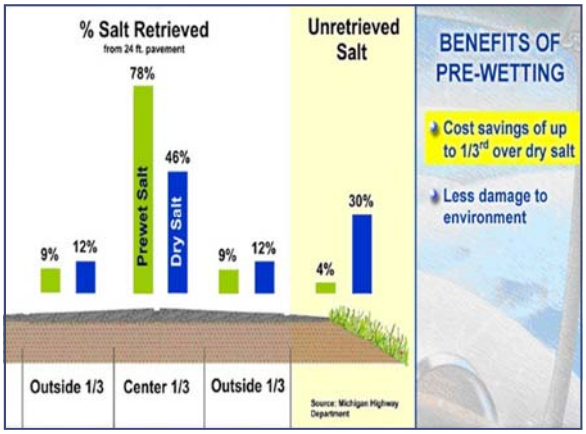
De-icing chemicals must form a brine before they can begin melting ice. Pre-wetting your chemicals accelerates the brine making process, which improves the melting action of the material. Pre-wetting also reduces bounce and scatter of material during spreading, and reduces the total amount of de-icer needed to obtain the desired results.

REDUCED RATES

If you are pre-wetting, don't forget to reduce your application rates accordingly. Reductions in the range of 15-20% are typical.

HOW MUCH LIQUID?

A good rule of thumb is to use 8-10 gallons of pre-wetting liquid for every ton of de-icer. For other chemicals, such as magnesium chloride, consult your supplier for application rates

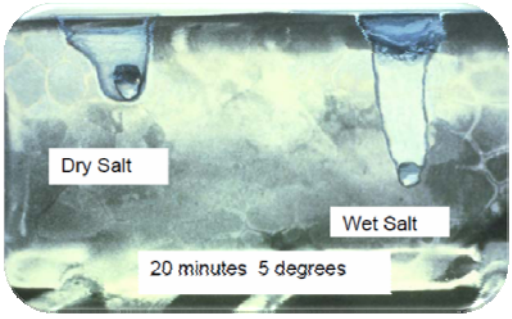


Pre-wetting Liquids

You have a few options for pre-wetting liquids. The most commonly used is a 23% sodium chloride brine solution. Calcium chloride at 32% solution is also used, as well as Magic Minus Zero™ and other patented products.

Getting Started

Wet the pile! There are two ways to pre-wet your de-icing chemicals. The easiest way to get started with pre-wetting is to spread your salt pile, spray it with pre-wetting liquid, mix it around, and re-pile it. More advanced truck mounted pre-wet systems can be installed on your trucks if you decide to make the investment.



Source: Wisconsin DOT Transportation Bulletin

Spraying the Pile

This is the easiest and most cost effective way to get started in pre-wetting. The first step is to spread your salt pile on a flat, impermeable surface. Next, spray the salt while it is spread out, and mix it around to ensure adequate and consistent liquid coverage. After the salt is sufficiently covered, re-stack the salt in your storage shed for later use.



Truck Mounted Systems

These systems are mounted in the truck bed and coat the de-icer with liquid as it comes off the conveyor/auger onto the spinner. These systems have the benefit of applying liquid only to the material you use as you use it. However, these systems must be installed on every truck that will be used to spread pre-wetted material.



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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Brine Making

NH Best Management Practices

GET THE LOWEST FREEZE POINT

When salt brine is 23% salt (measured with a hydrometer: 1.176, or with a salimeter: 85%) it has the lowest freeze point possible (about 0°F).

BRINE STORAGE

23% brine solution may be stored outside, however if temperatures get below 0°F the brine may freeze. A circulator pump will reduce the risk of freezing. If possible store brine indoors to eliminate risk of freezing.

COST OF BRINE

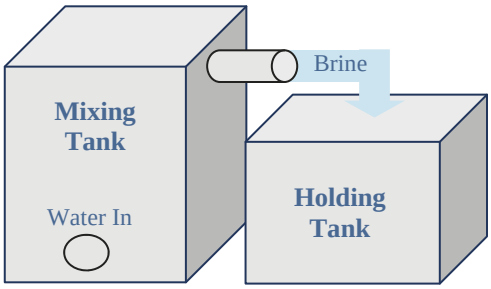
Calcium chloride brine costs about 7¢ / gallon (assuming $58/ton for salt) after you have your equipment setup.

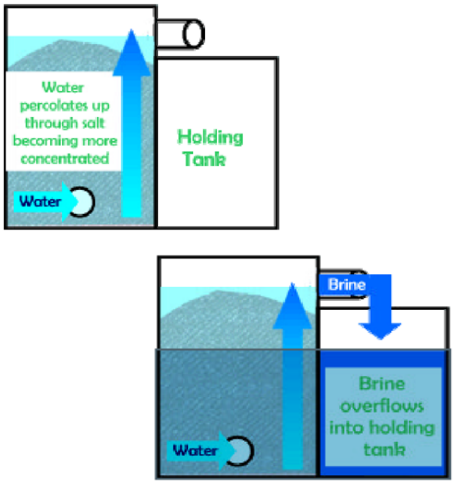
MULTIPLE USES

Brine can be used directly for anti-icing, for prewetting salt as it is dispensed from your truck, or to pretreat salt before it is loaded into your truck. Brine can be safely stored for up to a year, however, the concentration should be tested before use.

What Do You Need?

Brine making is a fairly simple process—the only ingredients are salt and water, and the only equipment you'll need is an open top mixing tank, a holding tank, a small pump, and a salimeter.





Images courtesy of Iowa DOT

Step 1: Fill Mixing Tank

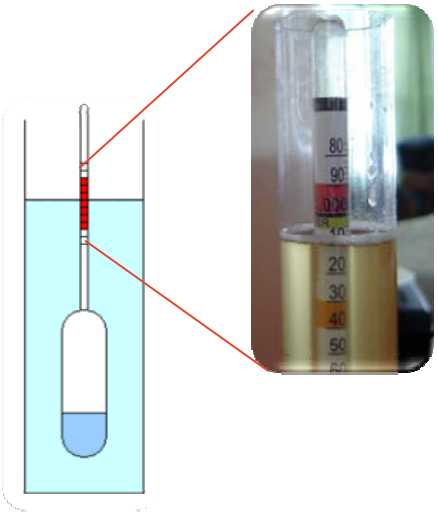
Add Salt: Add about 2.5 lb of salt per gallon of water you plan to add. Make sure your mixing tank has a large opening to make adding salt easy.

Add Water: Slowly add water from the bottom of your brine mixing tank. This will allow it to percolate up through the salt and overflow into the holding tank.

Step 2: Check Concentration

Float a hydrometer or salimeter directly in your holding tank and read the value at the surface of the water. The number should be either 85% or 1.176 depending on the units of your device.

If the values are too low, pump some brine from your holding tank back into the mixing tank and allow it to overflow. If values are too high simply add some fresh water





Quality Control & Documentation

Make sure that you record the date when you create each batch of brine and document who mixed it and checked the concentration. It is also a good idea to note the final concentration. These records should be kept for at least two years to protect your group in the event of litigation.

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New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Material Storage and Housekeeping

NH Best Management Practices

IMPERMEABLE SURFACE STORAGE

Store salt and liquids on an impermeable surface to prevent groundwater contamination.

COVERED STORAGE AREAS

If possible, store your salt in a covered shed to prevent runoff. If there is not a shed available, cover your salt pile well with an impermeable membrane or tarp.

SECONDARY CONTAINMENT

Keep your liquids in an appropriate storage container. Secondary containment should be used incase a leak develops in the primary container.

PROPER DRAINAGE & COLLECTION

Protect your ground water supply! A drainage system should be in place to collect runoff from your salt pile, as well as to collect any liquids that may escape containment. Remember, the collected liquid can be used as a base for salt brine.

Proper Material Storage

Proper storage of materials (especially chemicals) is essential. If impermeable surfaces are NOT used in your storage facilities and brine infiltrates the ground or groundwater, you need to register with the DES under the Groundwater Discharge Permit and Registration Rules, Env-Wq 402. It is a free registration used for tracking potential contaminant sources.





Secondary Containment

Secondary containment for your liquid storage is a HIGHLY recommended technique to help reduce soil and groundwater contamination. If a tank Begins leak, the secondary containment prevents liquid from seeping into sensitive environments.

Liquid Storage

Brine stored using holding tanks must be managed so that there are no releases to drains, groundwater or surface water.




ENVIRONMENTAL
Fact Sheet
Environmental Services

Storage and Management of Deicing Materials

Need for Proper Management

NHDES Fact Sheet DWGB-22-30

This fact sheet outlines the basic required specifications for salt and chemical storage facilities. For additional information, please contact the Drinking Water and Groundwater Bureau at (603)271-2513 or dwgbinfo@des.nh.gov, or visit their website at: http://des.nh.gov/organization/divisions/water/dwgb/index.html. *The Salt Storage Handbook* contains more information and guidelines that should be referenced.

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Smart Salting Practices

SMART SALTING PRACTICES

A checklist for snow and ice maintenance contractors.

Recommended practice	Check which response applies to current practices and anticipated site maintenance activities for job site.				
	Already do	Will do	Might do	Will not do	If "will not do"….why not?
Use an application rate chart.					
Calibrate equipment each year.					
Learn about the deicer ingredients and use the appropriate one for the condition.					
Look for reasons if and why materials are leaking or spilling from vehicles and fix them (e.g. gaps, overfilling, etc).					
Develop a comprehensive winter maintenance policy. Follow your policy.					
Measure and use pavement temperatures.					
Use anti-icing appropriately prior to the storm.					
Plow before applying deicers.					
Use wet materials (pre-wet or pre-treated).					
Don't apply sodium chloride (road salt) for pavement temperatures below 15ºF.					
Don't apply deicers for pavement temps under -10º F. It's too cold.					
Separate salt and sand. Use salt for melting. Use sand for traction.					
Apply deicers in the center of the road or on the high side of the curve.					
Store the salt in a building or under secure cover.					
Store salt away from water flow and direct the water away from storage area.					
Store snow away from lakes, ponds and wetlands.					
Sweep up sand, dispose of properly.					
For each event, document what you did and how well it worked. Use this information to make improvements.					

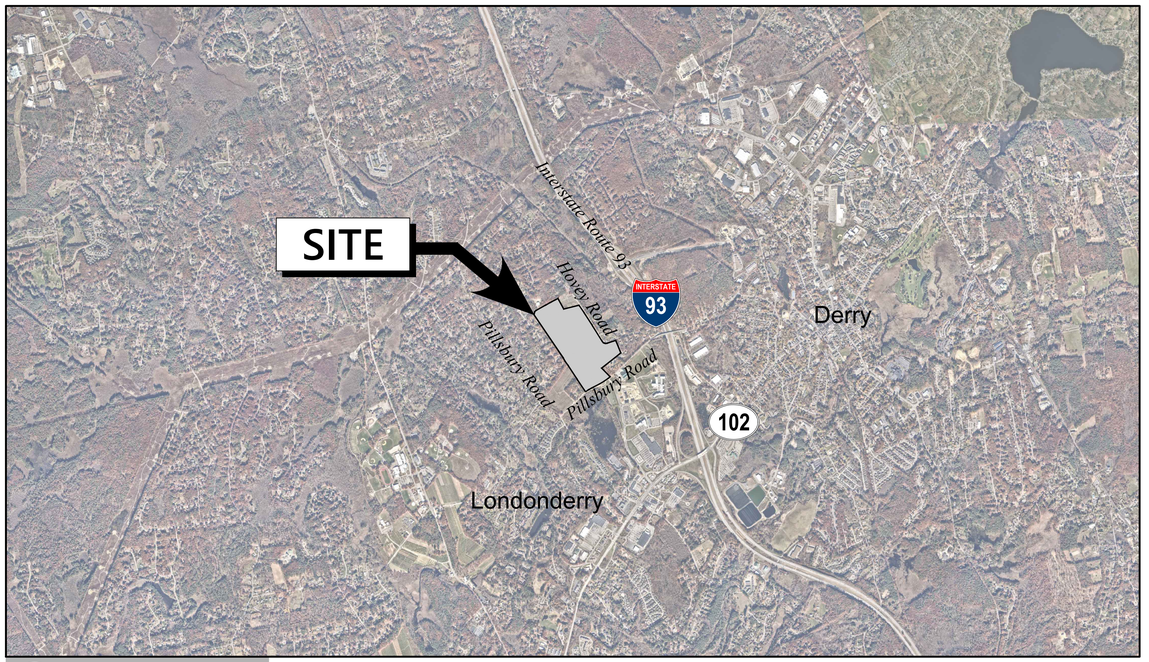
Checklist is adapted from worksheet created by Fortin Consulting as a part of the Minnesota Pollution Control Agency Smart Salting Voluntary Certification Program.

Site Plans

Issued for	**Permitting**
Date Issued	**February 20, 2025**
Latest Issue	**November 13, 2025**

Thornton Hill

36 Pillsbury Road
Londonderry, NH 03053



Sheet Index

No.	Drawing Title	Latest Issue
C1.00	Legend and General Notes	November 13, 2025
C2.00	Overall Site Plan	November 13, 2025
C2.01-C2.08	Layout and Materials Plans	November 13, 2025
C2.09-C2.15	Sight Distance Plans	November 13, 2025
C2.16	Overall Vehicle Access Plan	November 13, 2025
C2.17-C2.24	Vehicle Access Plans	November 13, 2025
C3.00	Overall Grading and Drainage Plan	November 13, 2025
C3.01-C3.08	Grading and Drainage Plans	November 13, 2025
C4.00	Overall Utility Plan	November 13, 2025
C4.01-C4.08	Utility Plans	November 13, 2025
C4.09-C4.15	Sanitary Plan and Profile Plans	November 13, 2025
C5.00	Overall Profile View Plan	November 13, 2025
C5.01-C5.08	Profile View Plans	November 13, 2025
C5.09-C5.14	Thornton Hill Avenue Profiles	November 13, 2025
C5.15-C5.16	Oxford Court Profiles	November 13, 2025
C5.17-C5.18	Redfield Court Profiles	November 13, 2025
C5.19-C5.20	Bramley Court Profiles	November 13, 2025
C5.21-C5.22	Kingston Court Profiles	November 13, 2025
C5.23-C5.24	Porters Court Profiles	November 13, 2025
C6.00	Overall Erosion and Sediment Control Plan	November 13, 2025
C6.01-C6.08	Erosion and Sediment Control Plans	November 13, 2025
C7.01-C7.09	Site Details	November 13, 2025
C8.00	Overall Sequencing Plan	November 13, 2025
C9.01	Inspection & Maintenance Notes	November 13, 2025
C9.02	Inspection & Maintenance Logs	November 13, 2025
L1.00	Overall Landscape Plan	November 13, 2025
L1.01-L1.10	Landscape Plans	November 13, 2025
L2.01-L2.03	Landscape Details	November 13, 2025

Reference Drawings

No.	Drawing Title	Latest Issue
Sv1.0	Existing Conditions Master Plan	November 13, 2025
Sv1.1-Sv1.8	Existing Conditions Plan of Land	November 13, 2025
A3.01-A3.10	Exterior Elevations & Axonometric Plans	November 10, 2025
L-1	Photometric Calculation Plan	November 12, 2025

Northern Black Racer

(New Hampshire state-threatened species)

NHFG Wildlife Biologist Contacts:
Melissa Winters 603-479-1129 and Brendan Clifford 603-944-0885

- **Emerge from hibernacula in April, Basking April - August**
- **Hatchlings emerge August - September, Return to hibernacula mid-September - mid-October**
- **Found in a variety of habitats but prefer early successional and sandy (sand pit) sites.**





- Solid black with a white thrat and chin
- Slender with glossy scales, 3-6 ft. long
- Hatchlings are very small and patterned





Northern black racers are protected by state laws. It is illegal to capture, harass or harm these species, including their nests. Handle ONLY if necessary to move out of harms way. Move to the nearest location in the direction they were moving and contact NHFG. Do not disturb nests. Fis 1401.03 (a) No person shall take or possess a black racer (Coluber constrictor)...or any egg or part thereof.

Report sightings in accordance with NHFG permit conditions. Contact NHFG Wildlife Biologist Melissa Winters 603-479-1129 (cell) and Brendan Clifford 603-944-0885 (group text preferred) if a turtle is observed nesting or a nest site is suspected within the project area. Please report promptly, noting specific location, project site and date – Photographs strongly encouraged to be included with report.

NEW HAMPSHIRE SPECIES OF CONCERN

WOOD TURTLE

Report Sightings: Contact Wildlife Biologist Josh Megyesy at (603) 271 – 1125 or the Wildlife Division at (603) 271 – 2461. Observation reports can be sent to RAARP@wildlife.nh.gov. Photographs and exact locations are strongly encouraged.



Specific Information:

- Adults are 5 – 8 inches long.
- Neck and front limbs are orange.
- Associated with streams and rivers where they hibernate. Use surrounding fields, forests, and floodplains extensively during active period.
- Turtles are frequently concealed by leaves and undergrowth and may not be easily visible.
- Turtles are most active from April 15 – October 15.
- During nesting season (May 15 – July 15) turtles are attracted to disturbed ground.





This species is protected under Fis 1400. Thank you for reporting any observations.

PLEASE DO NOT DISTURB OR HANDLE WILDLIFE

vhb.com

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Architect
Utile
115 Kingston Street
Boston, MA 02111
617.423.7200

Civil Engineer/Landscape Architect
VHB
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Surveyor
VHB
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Applicant

Procopio Enterprises, Inc.
35 Village Road
7th Floor (702)
Middleton, MA 01949

Owner

Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Assessor's Map: 10
Lot: 42

OWNER'S SIGNATURE
Signed by: Kevin Smith
E746E121B2B6...
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date: _____
Certified By: _____
_____

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

\\VHB\GBL\PRO\BEDFORD\53140.00 36 PILLSBURY RD. LONDONDY\CAD\LD\PLANSET\53140000-COV 12 November 2025

VHB Project : 53140.00 36 Pillsbury Road
Issued for : Permitting 11/13/2025

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\ld\Planset\5314000-LG.dwg

Legend

Exist.	Prop.	
		PROPERTY LINE
		PROJECT LIMIT LINE
		RIGHT-OF-WAY/PROPERTY LINE
		EASEMENT
		BUILDING SETBACK
		PARKING SETBACK
10+00	10+00	BASELINE
		CONSTRUCTION LAYOUT
		ZONING LINE
		TOWN LINE
		LIMIT OF DISTURBANCE
		WETLAND LINE WITH FLAG
		FLOODPLAIN
	BLSF	BORDERING LAND SUBJECT TO FLOODING
	BZ	WETLAND BUFFER ZONE
	NDZ	NO DISTURB ZONE
	200'RA	200' RIVERFRONT AREA
		SWALE
		GRAVEL ROAD
EOP	EOP	EDGE OF PAVEMENT
BB	BB	BITUMINOUS BERM
BC	BC	BITUMINOUS CURB
CC	CC	CONCRETE CURB
CG	CG	CURB AND GUTTER
ECC	ECC	EXTRUDED CONCRETE CURB
MCC	MCC	MONOLITHIC CONCRETE CURB
PCC	PCC	PRECAST CONC. CURB
SGE	SGE	SLOPED GRAN. EDGING
VGC	VGC	VERT. GRAN. CURB
		LIMIT OF CURB TYPE
		SAWCUT
		BUILDING
	EN	BUILDING ENTRANCE
	LD	LOADING DOCK
		BOLLARD
D	D	DUMPSTER PAD
		SIGN
		DOUBLE SIGN
		STEEL GUARDRAIL
		WOOD GUARDRAIL
		PATH
		TREE LINE
		WIRE FENCE
		FENCE
		STOCKADE FENCE
		STONE WALL
		RETAINING WALL
		STREAM / POND / WATER COURSE
		DETENTION BASIN
		HAY BALES
		SILT FENCE
		SILT SOCK / STRAW WATTLE
4	4	MINOR CONTOUR
20	20	MAJOR CONTOUR
10	10	PARKING COUNT
	C10	COMPACT PARKING STALLS
DYL	DYL	DOUBLE YELLOW LINE
SL	SL	STOP LINE
		CROSSWALK
		ACCESSIBLE CURB RAMP
		ACCESSIBLE PARKING
VAN	VAN	VAN-ACCESSIBLE PARKING

Exist.	Prop.	
		CONCRETE
		HEAVY DUTY PAVEMENT
		BUILDINGS
		RIPRAP
		CONSTRUCTION EXIT
27.35 TC×	27.35 TC×	TOP OF CURB ELEVATION
26.85 BC×	26.85 BC×	BOTTOM OF CURB ELEVATION
132.75 ×	132.75 ×	SPOT ELEVATION
45.0 TW 38.5 BW×	45.0 TW× 38.5 BW	TOP & BOTTOM OF WALL ELEVATION
		BORING LOCATION
		TEST PIT LOCATION
MW	MW	MONITORING WELL
UD	UD	UNDERDRAIN
12"D	12"D	DRAIN
6"RD	6"RD	ROOF DRAIN
12"S	12"S	SEWER
FM	FM	FORCE MAIN
OHW	OHW	OVERHEAD WIRE
6"W	6"W	WATER
4"FP	4"FP	FIRE PROTECTION
	2"DW	DOMESTIC WATER
S"G	G	GAS
E	E	ELECTRIC
STM	STM	STEAM
T	T	TELEPHONE
FA	FA	FIRE ALARM
CATV	CATV	CABLE TV
		CATCH BASIN CONCENTRIC
		CATCH BASIN ECCENTRIC
		DOUBLE CATCH BASIN CONCENTRIC
		DOUBLE CATCH BASIN ECCENTRIC
		GUTTER INLET
		DRAIN MANHOLE CONCENTRIC
		DRAIN MANHOLE ECCENTRIC
TD		TRENCH DRAIN
		PLUG OR CAP
CO	CO	CLEANOUT
		FLARED END SECTION
		HEADWALL
S	S	SEWER MANHOLE CONCENTRIC
S	S	SEWER MANHOLE ECCENTRIC
GS	GS	CURB STOP & BOX
WV	WV	WATER VALVE & BOX
TSV	TSV	TAPPING SLEEVE, VALVE & BOX
		FIRE DEPARTMENT CONNECTION
HYD	HYD	FIRE HYDRANT
WM	WM	WATER METER
PIV	PIV	POST INDICATOR VALVE
W	W	WATER WELL
GS	GS	GAS GATE
GM	GM	GAS METER
E	EMH	ELECTRIC MANHOLE
EM	EM	ELECTRIC METER
		LIGHT POLE
T	TMH	TELEPHONE MANHOLE
T	T	TRANSFORMER PAD
		UTILITY POLE
		GUY POLE
HH		GUY WIRE & ANCHOR
HH	HH	HAND HOLE
PB	PB	PULL BOX
		MATCHLINE

Abbreviations

General

ABAN	ABANDON
ACR	ACCESSIBLE CURB RAMP
ADJ	ADJUST
APPROX	APPROXIMATE
BIT	BITUMINOUS
BS	BOTTOM OF SLOPE
BWLL	BROKEN WHITE LANE LINE
CONC	CONCRETE
DYCL	DOUBLE YELLOW CENTER LINE
EL	ELEVATION
ELEV	ELEVATION
EV	ELECTRIC VEHICLE CHARGING SPACE
EX	EXISTING
FDN	FOUNDATION
FFE	FIRST FLOOR ELEVATION
GRAN	GRANITE
GTD	GRADE TO DRAIN
LA	LANDSCAPE AREA
LOD	LIMIT OF DISTURBANCE
MAX	MAXIMUM
MIN	MINIMUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PERF	PERFORATED
PROP	PROPOSED
REM	REMOVE
RET	RETAIN
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
SWEL	SOLID WHITE EDGE LINE
SWLL	SOLID WHITE LANE LINE
TS	TOP OF SLOPE
TYP	TYPICAL

Utility

CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
DCB	DOUBLE CATCH BASIN
DMH	DRAIN MANHOLE
CIP	CAST IRON PIPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
FM	FORCE MAIN
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
GI	GUTTER INLET
GT	GREASE TRAP
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HH	HANDHOLE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT ELEVATION
I=	INVERT ELEVATION
LP	LIGHT POLE
MES	METAL END SECTION
PIV	POST INDICATOR VALVE
PWW	PAVED WATER WAY
PVC	POLYVINYLCHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
R=	RIM ELEVATION
RIM=	RIM ELEVATION
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UG	UNDERGROUND
UP	UTILITY POLE

Notes

General

1. THE PURPOSE OF THESE PLANS IS TO DEPICT THE PROPOSED SITE DEVELOPMENT OF 250 COTTAGE COURT STYLE DWELLINGS (2-3 BEDROOMS) WITH ASSOCIATED AMENITIES, INCLUDING THE FULL SUBJECT PARCEL AND ABUTTING PARCEL INFORMATION. FOR GREATER DESIGN DETAIL RELATIVE TO THE PROPOSED DEVELOPMENT, REFER TO THE OTHER SHEETS PROVIDED HEREIN.
2. CONTRACTOR SHALL NOTIFY "DIG-SAFE" (811 OR 1-888-344-7233) AT LEAST 72 HOURS BEFORE EXCAVATING.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
4. ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS AND WALKWAYS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).
5. AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE 6 INCHES LOAM AND SEED.
6. WITHIN THE LIMITS OF THE BUILDING FOOTPRINT, THE SITE CONTRACTOR SHALL PERFORM EARTHWORK OPERATIONS REQUIRED UP TO SUBGRADE ELEVATIONS.
7. WORK WITHIN THE LOCAL RIGHTS-OF-WAY SHALL CONFORM TO LOCAL MUNICIPAL STANDARDS. WORK WITHIN STATE RIGHTS-OF-WAY SHALL CONFORM TO THE LATEST EDITION OF THE STATE HIGHWAY DEPARTMENTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
8. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, AND FIRE HYDRANTS, WITHOUT APPROPRIATE PERMITS.
9. TRAFFIC SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
10. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
11. IN THE EVENT THAT SUSPECTED CONTAMINATED SOIL, GROUNDWATER, AND OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND SHALL NOTIFY THE OWNER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.
12. CONTRACTOR SHALL PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE AND SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS.
13. DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
14. CONTRACTOR SHALL CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND SHALL BE RESPONSIBLE TO REPAIR RESULTING DAMAGES, IF ANY, AT NO COST TO OWNER.
15. THIS PROJECT DISTURBS MORE THAN ONE ACRE OF LAND AND FALLS WITHIN THE NPDES CONSTRUCTION GENERAL PERMIT (CGP) PROGRAM AND EPA JURISDICTION. PRIOR TO THE START OF CONSTRUCTION CONTRACTOR IS TO FILE A CGP NOTICE OF INTENT WITH THE EPA AND PREPARE A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE NPDES REGULATIONS. CONTRACTOR SHALL CONFIRM THE OWNER HAS ALSO FILED A NOTICE OF INTENT WITH THE EPA.
16. ALL FUTURE TENANTS OF THIS SITE SHALL BE REQUIRED TO COMPLY WITH THE TOWN OF LONDONDERRY ZONING ORDINANCE SECTION 5.16.

Utilities

1. THE UTILITY COMPANIES SERVICING THE PROJECT AREA ARE:
   A. WATER: MANCHESTER WATER WORKS
   B. SEWER: LONDONDERRY DEPARTMENT OF PUBLIC WORKS
   C. ELECTRIC: EVERSOURCE
   D. TELEPHONE: CONSOLIDATED COMMUNICATIONS
   E. CABLE TV: COMCAST
   F. GAS: LIBERTY UTILITIES
2. THE LOCATIONS, SIZES, AND TYPES OF EXISTING UTILITIES ARE SHOWN AS AN APPROXIMATE REPRESENTATION ONLY. THE OWNER OR IT'S REPRESENTATIVE(S) HAVE NOT INDEPENDENTLY VERIFIED THIS INFORMATION AS SHOWN ON THE PLANS. THE UTILITY INFORMATION SHOWN DOES NOT GUARANTEE THE ACTUAL EXISTENCE, SERVICEABILITY, OR OTHER DATA CONCERNING THE UTILITIES, NOR DOES IT GUARANTEE AGAINST THE POSSIBILITY THAT ADDITIONAL UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE PLANS. PRIOR TO ORDERING MATERIALS AND BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND DETERMINE THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF THE POINTS OF CONNECTIONS TO EXISTING UTILITIES AND, SHALL CONFIRM THAT THERE ARE NO INTERFERENCES WITH EXISTING UTILITIES AND THE PROPOSED UTILITY ROUTES, INCLUDING ROUTES WITHIN THE PUBLIC RIGHTS OF WAY.
3. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, OR EXISTING CONDITIONS DIFFER FROM THOSE SHOWN SUCH THAT THE WORK CANNOT BE COMPLETED AS INTENDED, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT AND CONTRACTOR'S FAILURE TO NOTIFY PRIOR TO PERFORMING ADDITIONAL WORK RELEASES OWNER FROM OBLIGATIONS FOR ADDITIONAL PAYMENTS WHICH OTHERWISE MAY BE WARRANTED TO RESOLVE THE CONFLICT.
4. SET CATCH BASIN RIMS, AND INVERTS OF SEWERS, DRAINS, AND DITCHES IN ACCORDANCE WITH ELEVATIONS ON THE GRADING AND UTILITY PLANS.
5. RIM ELEVATIONS FOR DRAIN AND SEWER MANHOLES, WATER VALVE COVERS, GAS GATES, ELECTRIC AND TELEPHONE PULL BOXES, AND MANHOLES, AND OTHER SUCH ITEMS, ARE APPROXIMATE AND SHALL BE SET/RESET AS FOLLOWS:
   A. PAVEMENTS AND CONCRETE SURFACES: FLUSH
   B. ALL SURFACES ALONG ACCESSIBLE ROUTES: FLUSH
   C. LANDSCAPE, LOAM AND SEED, AND OTHER EARTH SURFACE AREAS: ONE INCH ABOVE SURROUNDING AREA AND TAPER EARTH TO THE RIM ELEVATION.
6. THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY, THE RESPECTIVE UTILITY COMPANY (GAS, TELEPHONE, ELECTRIC, FIRE ALARM, ETC.). FINAL DESIGN LOADS AND LOCATIONS TO BE COORDINATED WITH OWNER AND ARCHITECT.
7. CONTRACTOR SHALL MAKE ARRANGEMENTS FOR AND SHALL BE RESPONSIBLE FOR PAYING FEES FOR POLE RELOCATION AND FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, FIRE ALARM, AND ANY OTHER PRIVATE UTILITIES, WHETHER WORK IS PERFORMED BY CONTRACTOR OR BY THE UTILITIES COMPANY.
8. UTILITY PIPE MATERIALS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED ON THE PLAN:
   A. WATER PIPES SHALL BE CEMENT LINED DUCTILE IRON CLASS 52
   B. SANITARY SEWER PIPES SHALL BE POLYVINYL CHLORIDE SDR 35 MINIMUM (PVC) SEWER PIPE
   C. STORM DRAINAGE PIPES SHALL BE REINFORCED CONCRETE PIPE OR ADS N12 PIPE
9. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR AND SHALL FURNISH EXCAVATION, INSTALLATION, AND BACKFILL OF ELECTRICAL FURNISHED SITEWORK RELATED ITEMS SUCH AS PULL BOXES, CONDUITS, DUCT BANKS, LIGHT POLE BASES, AND CONCRETE PADS. SITE CONTRACTOR SHALL FURNISH CONCRETE ENCASEMENT OF DUCT BANKS IF REQUIRED BY THE UTILITY COMPANY AND AS INDICATED ON THE DRAWINGS.
10. CONTRACTOR SHALL EXCAVATE AND BACKFILL TRENCHES FOR GAS IN ACCORDANCE WITH GAS COMPANY'S REQUIREMENTS.
11. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN.) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS AND LOCAL MUNICIPAL STANDARDS. FOR MANHOLES THAT ARE 15 FEET IN DEPTH AND GREATER, THE MINIMUM DIAMETER SHALL BE 5 FEET.
12. CONTRACTOR SHALL CONSTRUCT SANITARY SEWER WITH FORCE MAIN CONSTRUCTION MATERIALS THAT MEET THE REQUIREMENTS IN ENV-WQ 704.08 WHERE MINIMUM SEPARATION OF 18" FROM WATER IS NOT ACHIEVABLE.

Layout and Materials

5. DIMENSIONS ARE FROM THE FACE OF CURB, FACE OF BUILDING, FACE OF WALL, AND CENTER LINE OF PAVEMENT MARKINGS, UNLESS OTHERWISE NOTED.
6. CURB RADII ARE 3 FEET UNLESS OTHERWISE NOTED.
7. CURBING SHALL BE CAPE COD BERM (CCB) WITHIN THE SITE UNLESS OTHERWISE INDICATED ON THE PLANS.
8. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND DETAILS CONTIGUOUS TO THE BUILDING, INCLUDING SIDEWALKS, RAMPS, BUILDING ENTRANCES, STAIRWAYS, UTILITY PENETRATIONS, CONCRETE DOOR PADS, COMPACTOR PAD, LOADING DOCKS, BOLLARDS, ETC.
9. PROPOSED BOUNDS AND ANY EXISTING PROPERTY LINE MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A LICENSED LAND SURVEYOR (LLS).
10. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING PAVEMENT ELEVATIONS AT INTERFACE WITH PROPOSED PAVEMENTS, AND EXISTING GROUND ELEVATIONS ADJACENT TO DRAINAGE OUTLETS TO ASSURE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED FACILITIES.

Document Use

1. THESE PLANS AND CORRESPONDING CADD DOCUMENTS ARE INSTRUMENTS OF PROFESSIONAL SERVICE, AND SHALL NOT BE USED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN FOR WHICH IT WAS CREATED WITHOUT THE EXPRESSED, WRITTEN CONSENT OF VHB. ANY UNAUTHORIZED USE, REUSE, MODIFICATION OR ALTERATION, INCLUDING AUTOMATED CONVERSION OF THIS DOCUMENT SHALL BE AT THE USER'S SOLE RISK WITHOUT LIABILITY OR LEGAL EXPOSURE TO VHB.
2. CONTRACTOR SHALL NOT RELY SOLELY ON ELECTRONIC VERSIONS OF PLANS, SPECIFICATIONS, AND DATA FILES THAT ARE OBTAINED FROM THE DESIGNERS, BUT SHALL VERIFY LOCATION OF PROJECT FEATURES IN ACCORDANCE WITH THE PAPER COPIES OF THE PLANS AND SPECIFICATIONS THAT ARE SUPPLIED AS PART OF THE CONTRACT DOCUMENTS.
3. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SCALED TO THEIR ACTUAL DIMENSIONS OR LOCATIONS ON THE DRAWINGS. THE CONTRACTOR SHALL REFER TO THE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
4. ALL APPROVED PROJECT PLANS WILL BE ON FILE AT THE TOWN OF LONDONDERRY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT.

Construction Sequence

1. SURVEY AND STAKE LIMITS OF CLEARING AND GRUBBING.
2. INSTALL SILT FENCING, STRAW BALES, CONSTRUCTION EXITS, ETC. PRIOR TO START OF CONSTRUCTION, TO BE MAINTAINED UNTIL COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
3. CLEAR AND GRUB ALL AREAS TO BE DISTURBED BY CONSTRUCTION AND PERFORM DEMOLITION OPERATIONS.
4. REPAIR, CLEAN, AND REPLACE ANY SEDIMENT CONTROLS DAMAGED DURING AND/OR AFTER RAINFALL EVENTS.
5. STRIP LOAM AND PAVEMENT, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK AND STOCKPILE EXCESS MATERIAL.
6. CONSTRUCT TEMPORARY SEDIMENTATION BASINS AS REQUIRED.
7. PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE.
8. PERFORM PRELIMINARY SITE GRADING AND CONSTRUCT TEMPORARY DIVERSION SWALES AS REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT THE PRELIMINARY GRADING ALLOWS SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS TO FLOW TOWARDS THE TEMPORARY SEDIMENTATION BASINS.
9. PREPARE BUILDING PAD TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
10. INSTALL SEWER SYSTEM, DRAINAGE SYSTEM, AND OTHER UTILITIES IN ACCORDANCE WITH THE PLANS AND DETAILS.
11. INSTALL STRAW BALES AND INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED, IN ACCORDANCE WITH THE DETAILS.
12. PERFORM FINAL/FINE GRADING INCLUDING SLOPE STABILIZATION BLANKETS.
13. PERFORM ALL REMAINING SITE CONSTRUCTION. (I.E. BUILDING AND PAVEMENT AREAS).
14. LOAM AND SEED ALL DISTURBED AREAS.
15. REMOVE TEMPORARY EROSION CONTROL MEASURES, SILT FENCE, ETC. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
16. CLEAN ALL DRAINAGE BASINS, STRUCTURES, PIPES, AND SUMPS WITHIN THE PROJECT LIMITS OF ALL SILT AND DEBRIS.

Demolition

1. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING MANMADE SURFACE FEATURES WITHIN THE LIMIT OF WORK INCLUDING BUILDINGS, STRUCTURES, PAVEMENTS, SLABS, CURBING, FENCES, UTILITY POLES, SIGNS, ETC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS. REMOVE AND DISPOSE OF EXISTING UTILITIES, FOUNDATIONS AND UNSUITABLE MATERIAL BENEATH AND FOR A DISTANCE OF 10 FEET BEYOND THE PROPOSED BUILDING FOOTPRINT INCLUDING EXTERIOR COLUMNS.
2. EXISTING UTILITIES SHALL BE TERMINATED, UNLESS OTHERWISE NOTED, IN CONFORMANCE WITH LOCAL, STATE AND INDIVIDUAL UTILITY COMPANY STANDARD SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES.
3. CONTRACTOR SHALL DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.
4. THE DEMOLITION LIMITS DEPICTED IN THE PLANS IS INTENDED TO AID THE CONTRACTOR DURING THE BIDDING AND CONSTRUCTION PROCESS AND IS NOT INTENDED TO DEPICT EACH AND EVERY ELEMENT OF DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING THE DETAILED SCOPE OF DEMOLITION BEFORE SUBMITTING ITS BID/PROPOSAL TO PERFORM THE WORK AND SHALL MAKE NO CLAIMS AND SEEK NO ADDITIONAL COMPENSATION FOR CHANGED CONDITIONS OR UNFORESEEN OR LATENT SITE CONDITIONS RELATED TO ANY CONDITIONS DISCOVERED DURING EXECUTION OF THE WORK.
5. UNLESS OTHERWISE SPECIFICALLY PROVIDED ON THE PLANS OR IN THE SPECIFICATIONS, THE ENGINEER HAS NOT PREPARED DESIGNS FOR AND SHALL HAVE NO RESPONSIBILITY FOR THE PRESENCE, DISCOVERY, REMOVAL, ABATEMENT OR DISPOSAL OF HAZARDOUS MATERIALS, TOXIC WASTES OR POLLUTANTS AT THE PROJECT SITE. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY CLAIMS OF LOSS, DAMAGE, EXPENSE, DELAY, INJURY OR DEATH ARISING FROM THE PRESENCE OF HAZARDOUS MATERIAL AND CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE ENGINEER FROM ANY CLAIMS MADE IN CONNECTION THEREWITH. MOREOVER, THE ENGINEER SHALL HAVE NO ADMINISTRATIVE OBLIGATIONS OF ANY TYPE WITH REGARD TO ANY CONTRACTOR AMENDMENT INVOLVING THE ISSUES OF PRESENCE, DISCOVERY, REMOVAL, ABATEMENT OR DISPOSAL OF ASBESTOS OR OTHER HAZARDOUS MATERIALS.

Erosion Control

1. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT.
2. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF THE OCCURRENCE OF A STORM EVENT THAT PRODUCES 0.25 INCHES OR MORE OF RAIN WITHIN A 24-HOUR PERIOD, OR WITHIN 24 HOURS OF A SNOWMELT DISCHARGE FROM A STORM EVENT THAT PRODUCES 3.25 INCHES OR MORE OF SNOW IN A 24-HOUR PERIOD. THE CONTRACTOR SHALL ADDRESS DEFICIENCIES AND MAINTENANCE ITEMS WITHIN TWENTY-FOUR HOURS OF INSPECTION. CONTRACTOR SHALL PROPERLY DISPOSE OF SEDIMENT SUCH THAT IT DOES NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
3. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
4. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
5. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS FROM ENTIRE DRAINAGE AND SEWER SYSTEMS.

Existing Conditions Information

1. BASE PLAN: THE PROPERTY LINES SHOWN WITHIN THE "EXISTING CONDITIONS PLAN OF LAND" PLAN WERE DETERMINED BY AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, INC., IN SEPTEMBER 2024. THE TOPOGRAPHY AND PHYSICAL FEATURES ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED ON THE GROUND BY VHB, INC., DURING SEPTEMBER 2024.

   A. DELINEATION OF THE WETLANDS AND PLACEMENT OF THE FLAGS WAS PERFORMED BY: VHB, INC. IN SEPTEMBER AND OCTOBER 2024.
   B. FLAGS MARKING THE WETLANDS WERE LOCATED BY: VHB, INC. IN SEPTEMBER AND OCTOBER 2024.

2. TOPOGRAPHY: ELEVATIONS ARE BASED ON NAVD OF 1988.
3. PARCEL USES: USES SHOWN BELOW ARE BASED ON AVAILABLE PROPERTY CARD INFORMATION.
   EXISTING USE: VACANT LAND
   PROPOSED USE: RESIDENTIAL DEVELOPMENT

Waivers/Variances

1. WAIVER REQUESTED FROM SECTION 3.09.R OF SUBDIVISION REGULATIONS - REQUESTING 8% ROAD SLOPES FOR 500 FT OR LESS
2. WAIVER REQUESTED FROM SECTION 3.04 OF SITE PLAN REGULATIONS - GOVERNING UTILITY SPACING FROM ROAD CENTERLINE

Required Permits

1. NHDES ALTERATION OF TERRAIN PERMIT: SUBMITTED & UNDER REVIEW - APPLICATION 250716-129
2. NHDES STANDARD DREDGE AND FILL PERMIT: SUBMITTED & UNDER REVIEW - FILE No. 2025-01554
3. NHDES SEWER DISCHARGE PERMIT: TO BE SUBMITTED
4. EPA CONSTRUCTION GENERAL PERMIT: TO BE SUBMITTED
5. LONDONDERRY SEWER DISCHARGE PERMIT: TO BE SUBMITTED
6. LONDONDERRY STORMWATER PERMIT: TO BE SUBMITTED

Rock Blasting

BEST MANAGEMENT PRACTICES FOR BLASTING: ALL ACTIVITIES RELATED TO BLASTING ADHERE TO THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPS) TO PREVENT CONTAMINATION OF GROUNDWATER INCLUDING PREPARING, REVIEWING AND FOLLOWING AN APPROVED BLASTING PLAN; PROPER DRILLING, EXPLOSIVE HANDING AND LOADING PROCEDURES; OBSERVING THE ENTIRE BLASTING PROCEDURES; EVALUATING BLASTING PERFORMANCE; AND HANDLING AND STORAGE OF BLASTED ROCK.

1. LOADING PRACTICES: THE FOLLOWING BLASTHOLE LOADING PRACTICES TO MINIMIZE ENVIRONMENTAL EFFECTS SHALL BE FOLLOWED:

   A. DRILLING LOGS SHALL BE MAINTAINED BY THE DRILLER AND COMMUNICATED DIRECTLY TO THE BLASTER. THE LOGS SHALL INDICATE DEPTHS AND LENGTHS OF VOIDS, CAVITIES, AND FAULT ZONES OR OTHER WEAK ZONES ENCOUNTERED AS WELL AS GROUNDWATER CONDITIONS.
   B. EXPLOSIVE PRODUCTS SHALL BE MANAGED ON-SITE SO THAT THEY ARE EITHER USED IN THE BOREHOLE, RETURNED TO THE THE DELIVERY VEHICLE, OR PLACED IN SECURE CONTAINERS FOR OFF-SITE DISPOSAL.
   C. SPILLAGE AROUND THE BOREHOLE SHALL EITHER BE PLACED IN THE BOREHOLE OR CLEANED UP AND RETURNED TO AN APPROPRIATE VEHICLE FOR HANDLING OR PLACEMENT IN SECURED CONTAINERS FOR OFF-SITE DISPOSAL.
   D. LOADED EXPLOSIVES SHALL BE DETONATED AS SOON AS POSSIBLE AND SHALL NOT BE LEFT IN THE BLASTHOLES OVERNIGHT, UNLESS WEATHER OR OTHER SAFETY CONCERNS REASONABLY DICTATE THAT DETONATION SHOULD BE POSTPONED.
   E. LOADING EQUIPMENT SHALL BE CLEANED IN AN AREA WHERE WASTEWATER CAN BE PROPERLY CONTAINED AND HANDLED IN A MANNER THAT PREVENTS RELEASE OF CONTAMINANTS TO THE ENVIRONMENT.
   F. EXPLOSIVES SHALL BE LOADED TO MAINTAIN GOOD CONTINUITY IN THE COLUMN LOAD TO PROMOTE COMPLETE DETONATION. INDUSTRY ACCEPTED LOADING PRACTICES FOR PRIMING, STEMMING, DECKING AND COLUMN RISE NEED TO BE ATTENDED TO.

2. EXPLOSIVE SELECTION: THE FOLLOWING BMPS SHALL BE FOLLOWED TO REDUCE THE POTENTIAL FOR GROUNDWATER CONTAMINATION WHEN EXPLOSIVES ARE USED:

   A. EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT ARE APPROPRIATE FOR SITE CONDITIONS AND SAFE BLAST EXECUTION.
   B. EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT HAVE THE APPROPRIATE WATER RESISTANCE FOR THE SITE CONDITIONS PRESENT TO MINIMIZE THE POTENTIAL FOR HAZARDOUS EFFECT OF THE PRODUCT UPON GROUNDWATER.

3. PREVENTION OF MISFIRES:

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Wetland & Stream Impacts

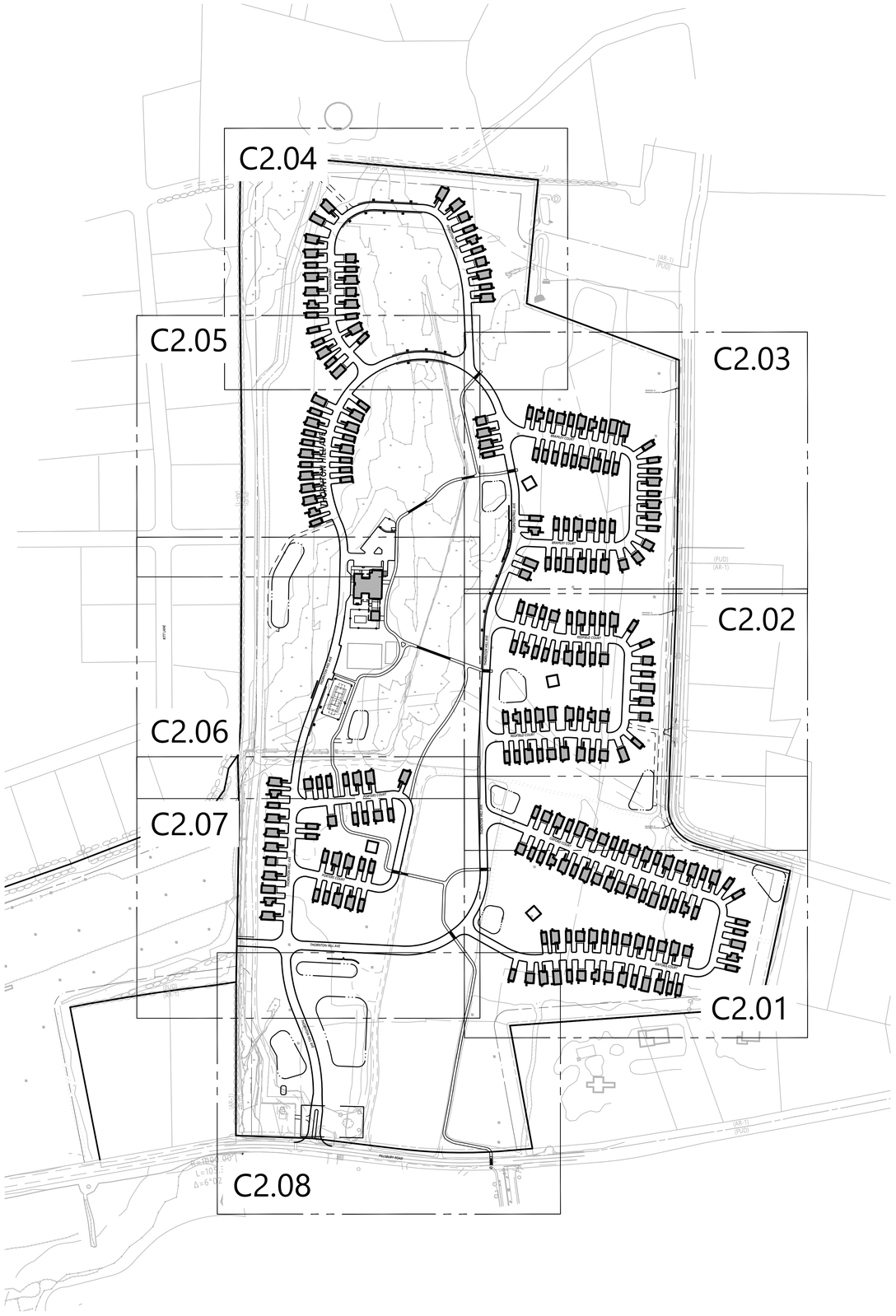
Impact Type	Area (SF)	
	Permanent Impacts	Temporary Impacts
STREAM CROSSINGS (3)	1286	294
WETLAND IMPACTS	14583	1865
TOTAL IMPACTS *	18028	

* TOTAL IMPACTS, AS DENOTED ABOVE, ARE THE SUMMATION OF BOTH THE TEMPORARY AND PERMANENT IMPACTS FROM STREAM CROSSINGS AND WETLAND IMPACTS SITE-WIDE.

NHB25-0249 New Hampshire Fish And Game Conservation Measures

1. NORTHERN BLACK RACER (STATE THREATENED) OCCURS WITHIN THE VICINITY OF THE PROJECT AREA. ALL OPERATORS AND PERSONNEL WORKING ON OR ENTERING THE SITE SHALL BE MADE AWARE OF THE POTENTIAL PRESENCE OF THESE SPECIES AND SHALL BE PROVIDED FLYERS THAT HELP TO IDENTIFY THESE SPECIES, ALONG WITH NHFG CONTACT INFORMATION. SEE COVER SHEET.
2. RARE SPECIES INFORMATION (E.G. IDENTIFICATION, OBSERVATION AND REPORTING OF OBSERVATIONS, WHEN TO CONTACT NHFG IMMEDIATELY AND NHFG CONTACT INFORMATION) SHALL BE COMMUNICATED DURING MORNING MEETINGS PRIOR TO WORK COMMENCEMENT DURING THE CONSTRUCTION PHASE OF THE PROJECT. SEE COVER SHEET.
3. OBSERVATIONS OF NORTHERN BLACK RACER IN THE MONTHS OF APRIL-MAY AND SEPTEMBER-OCTOBER MAY INDICATE THE POTENTIAL FOR A DEN SITE ON OR NEAR THE PROJECT SITE. ALL OBSERVATIONS OF THIS SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM. PLEASE CONTACT MELISSA WINTERS AND BRENDAN CLIFFORD - VIA GROUP TEXT PREFERRED. A PHOTOGRAPH WITH TEXT IS PREFERRED IF FEASIBLE. SEE SPECIES FLYERS, SEE COVER SHEET FOR NHFG CONTACT INFORMATION.
4. THE PROJECT SITE IN IT'S CURRENT CONDITION PROVIDES SUITABLE HABITAT FOR VARIOUS SNAKE SPECIES. NHFG ENCOURAGES REPORTS OF ALL OTHER SNAKE OBSERVATIONS FOUND ON THE PROJECT SITE TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM. PLEASE CONTACT MELISSA WINTERS AND BRENDAN CLIFFORD - VIA GROUP TEXT PREFERRED. A PHOTOGRAPH WITH TEXT IS PREFERRED IF FEASIBLE. SEE NORTHERN BLACK RACER SPECIES FLYERS, SEE COVER SHEET FOR NHFG CONTACT INFORMATION.
5. TURTLES AND SNAKES MAY BE ATTRACTED TO DISTURBED GROUND DURING THE NESTING SEASON (MAY 15TH - JULY 15TH). TURTLE AND SNAKE NESTS ARE PROTECTED BY NH LAWS. IF A NEST IS OBSERVED OR SUSPECTED, OPERATORS SHALL CONTACT MELISSA WINTERS AND BRENDAN CLIFFORD FOR SNAKES AND JOSH MEGYESY FOR TURTLES AT NHFG IMMEDIATELY FOR FURTHER CONSULTATION. SEE SPECIES FLYERS, SEE COVER SHEET FOR NHFG CONTACT INFORMATION.
   - 5.1. THE NEST OR SUSPECTED NEST SHALL BE MARKED (SURROUNDING ROPED OFF OR CONE BUFFER DEPLOYED) AND AVOIDED; THIS SHALL BE COMMUNICATED TO ALL PERSONNEL ONSITE.
   - 5.2. SITE ACTIVITIES SHALL NOT OCCUR IN THE AREA SURROUNDING THE NEST OR SUSPECTED NEST UNTIL FURTHER GUIDANCE IS PROVIDED BY NHFG.
6. NHFG WOULD PREFER THAT CATCH BASINS NOT CONTAIN SUMPS. CATCH BASINS AND OUTLET CONTROL STRUCTURES SHALL HAVE DOUBLE-TYPE 'A' GRATES WITH GRATE OPENINGS NO LARGER THAN 1-13/64" X 21".
7. OUTLET CONTROL STRUCTURES SHALL NOT CONTAIN SUMPS AND SHALL NOT BE PLACED ADJACENT TO THE SIDE SLOPES BUT RATHER AS FAR AWAY AS POSSIBLE TO DETER WILDLIFE FROM CRAWLING ONTO THEM AND FALLING THROUGH THE GRATE OPENINGS. THESE STRUCTURES SHALL BE A MINIMUM OF 12"-18" ABOVE GRADE.
8. RIP-RAP SHALL BE FILLED WITH FINER MATERIAL (I.E., NATIVE WETLAND MATERIAL, NATIVE WETLAND SEED MIX, 3/4" SMALLER SIZED STONE, OR CLEAN GRAVEL IN BETWEEN RIP-RAP) TO CREATE A RELATIVELY SMOOTH SURFACE FOR WILDLIFE TO TRAVERSE.
9. A NATIVE SEED MIXTURE SHALL BE APPLIED TO ALL AREAS AFFECTED BY CONSTRUCTION. THE SEED MIXTURE SHALL NOT CONTAIN INVASIVE SPECIES SUCH AS CROWN VETCH, BIRD'S-FOOT TREFOIL, ALSIKE CLOVER, OR FLAT PEA.
10. ALL MANUFACTURED EROSION AND SEDIMENT CONTROL PRODUCTS, WITH THE EXCEPTION OF TURF REINFORCEMENT MATS, UTILIZED FOR, BUT NOT LIMITED TO, SLOPE PROTECTION, RUNOFF DIVERSION, SLOPE INTERRUPTION, PERIMETER CONTROL, INLET PROTECTION, CHECK DAMS, AND SEDIMENT TRAPS SHALL NOT CONTAIN PLASTIC, OR MULTIFILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN 1/8 INCHES.
11. ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES ON THE PROJECT SITE SHALL BE REPORTED IMMEDIATELY TO THE NHFG NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603-271-2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV, WITH THE EMAIL SUBJECT LINE CONTAINING THE NHB DATACHECK TOOL RESULTS LETTER ASSIGNED NUMBER, THE PROJECT NAME, AND THE TERM WILDLIFE SPECIES OBSERVATION.
   - 11.1. PHOTOGRAPHS OF THE OBSERVED SPECIES AND NEARBY ELEMENTS OF HABITAT OR AREAS OF LAND DISTURBANCE SHALL BE PROVIDED TO NHFG IN DIGITAL FORMAT AT THE ABOVE EMAIL ADDRESS FOR VERIFICATION, AS FEASIBLE.
12. IN THE EVENT A THREATENED OR ENDANGERED SPECIES IS OBSERVED ON THE PROJECT SITE DURING THE TERM OF THE PERMIT, THE SPECIES SHALL NOT BE DISTURBED, HANDLED, OR HARMED IN ANY WAY PRIOR TO CONSULTATION WITH NHFG AND IMPLEMENTATION OF CORRECTIVE ACTIONS RECOMMENDED BY NHFG.
   - 12.1. SITE OPERATORS SHALL BE ALLOWED TO RELOCATE WILDLIFE ENCOUNTERED IF DISCOVERED WITHIN THE ACTIVE WORK ZONE IF IN DIRECT HARM FROM PROJECT ACTIVITIES.
   - 12.2. WILDLIFE SHALL BE RELOCATED IN CLOSE PROXIMITY TO THE CAPTURE LOCATION BUT OUTSIDE OF THE WORK ZONE AND IN THE DIRECTION THE INDIVIDUAL WAS HEADING.
   - 12.3. NHFG SHALL BE CONTACTED IMMEDIATELY IF THIS ACTION OCCURS.
13. NHFG, INCLUDING ITS EMPLOYEES AND AUTHORIZED AGENTS, SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.
14. WOOD TURTLE (SPECIAL CONCERN, PROTECTED UNDER FIS 1400 RULES) OCCUR WITHIN THE VICINITY OF THE PROJECT AREA. ALL OPERATORS AND PERSONNEL WORKING ON OR ENTERING THE SITE SHOULD BE MADE AWARE OF THE POTENTIAL PRESENCE OF THIS SPECIES AND SHOULD BE PROVIDED NHFG CONTACT INFORMATION. SEE COVER SHEET.

Saved Friday, November 7, 2025 1:41:13 PM JHOWE Plotted Tuesday, November 11, 2025 3:24:34 PM Jason Howe



Zoning Summary Chart

Zoning District(S): (PUD-1)	Woodmont Commons PUD
Overlay District(S):	Conservation Overlay (CO)

Zoning Regulation Requirements	Required*	Provided
MINIMUM LOT AREA	-	94.2 Acres **
FRONTAGE	150 Feet	2,160 Feet
FRONT YARD SETBACK	40 Feet	56.4 Feet
SIDE YARD SETBACK	30 Feet	57.6 Feet
REAR YARD SETBACK	35 Feet	55.9 Feet
MAXIMUM BUILDING HEIGHT	50 Feet	<50 Feet
PERCENT BUILDING COVERAGE	-	5.3 %
PERCENT GREEN AREA	-	82.1%

* Zoning regulation requirements as specified in the Town of Londonderry, NH Zoning Ordinance as Amended Through June 6, 2022.
** Project specific lot area, sub area to Woodmont Commons PUD

Parking Summary Chart

Description	Size		Spaces	
	Required	Provided	Required	Provided
RESIDENTIAL DWELLING SPACES	9 x 20	9 x 20	500	500
OUTDOOR RECREATION	9 x 20	9 x 20	3	4
AMENITY SPACES **	9 x 20	9 x 20	27	27
STANDARD ACCESSIBLE SPACES *	8 x 20	9 x 20	1	1
VAN ACCESSIBLE SPACES	8 x 20	9 x 20	1	2
TOTAL SPACES			530	534

* ADA/STATE/LOCAL REQUIREMENTS
** INCLUDES 1 VAN ACCESSIBLE AND 1 STANDARD ACCESSIBLE SPACE

Parking Requirements:

RESIDENTIAL DWELLING	250 UNITS	x	2 SPACES	/ 1 UNIT	=	500 SPACES
OUTDOOR RECREATION FACILITIES - SPORTS COURT	1 COURT	x	3 SPACES	/ 1 COURT	=	3 SPACES
COMMUNITY CENTER	6,710 SF	x	4 SPACES	/ 1,000 SF	=	27 SPACES
			TOTAL PARKING REQUIRED		=	530 SPACES

Notes

1. THE SITE PLAN IS GOVERNED BY THE 2013 WOODMONT COMMONS MASTER PLAN AND THE TOWN OF LONDONDERRY'S LAND USE REGULATIONS IN EFFECT AT THAT TIME. ON DECEMBER 11TH, 2024, THE LONDONDERRY PLANNING BOARD APPROVED A COMPLIANCE ALTERNATIVE REQUEST ALLOWING FOR A VARIATION TO THE LOT TYPE, EXISTING DIMENSIONAL SETBACK AND FRONTAGE REQUIREMENTS.
2. THE PURPOSE OF THIS PLAN IS TO DEPICT THE OVERALL PROPOSED SITE DEVELOPMENT, INCLUDING THE FULL SUBJECT PARCEL AND ABUTTING PARCEL INFORMATION. FOR GREATER DESIGN DETAIL RELATIVE TO THE PROPOSED DEVELOPMENT, REFER TO THE OTHER SHEETS PROVIDED HEREIN.
3. MAP 10, LOT 42 LIES ENTIRELY WITHIN ZONE X (UNSHADED) (AREAS TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR ROCKINGHAM COUNTRY, NEW HAMPSHIRE, MAP NUMBER 33015C0338E, EFFECTIVE DATE MAY 17, 2005.
4. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXIST IN THE APPROVED DESIGN DRAWINGS, THE OWNER SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET THE REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE TOWN.
5. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP ANY EROSION ON THE CONSTRUCTION SITE DUE TO ACTUAL SITE CONDITIONS, THE OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION AT NO EXPENSE TO THE TOWN.
6. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO TOWN OF LONDONDERRY SITE PLAN REGULATIONS AND THE LATEST EDITION OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
7. IN ACCORDANCE WITH SECTION 6.01 OF THE LONDONDERRY SITE PLAN REGULATIONS AND RSA § 676:13, ALL IMPROVEMENTS SPECIFIED ON THESE SITE PLANS SHALL BE CONSTRUCTED, COMPLETED, AND INSPECTED AND APPROVED BY THE TOWN OF LONDONDERRY PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
8. IN ACCORDANCE WITH SECTION 6.01 OF THE LONDONDERRY SITE PLAN REGULATIONS AND RSA § 676:12, ALL OFF-SITE IMPROVEMENTS SPECIFIED ON THESE PLANS SHALL BE CONSTRUCTED, COMPLETED, AND INSPECTED AND APPROVED BY THE TOWN OF LONDONDERRY (AND/OR NHDOT, IF APPLICABLE) PRIOR TO THE ISSUANCE OF OCCUPANCY.
9. PARCEL USES: USES SHOWN BELOW ARE BASED ON AVAILABLE PROPERTY CARD INFORMATION.
   EXISTING USE: VACANT LAND
   PROPOSED USE: RESIDENTIAL DEVELOPMENT
10. CONTRACTOR TO COORDINATE WITH THE TOWN OF LONDONDERRY FIRE DEPARTMENT FOR THEIR REQUIREMENTS FOR FIRE ACCESS AND MAINTENANCE THROUGHOUT THE CONSTRUCTION PHASE. FIRE DEPARTMENT ACCESS ROADS SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS AND BE PROVIDED WITH AN ALL WEATHER DRIVING SURFACE.

OWNER'S SIGNATURE
Signed by: Kevin Smith
E746E121820D...
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date: _____
Certified By: _____

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2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Sign Summary

M.U.T.C.D. Number	Specification Width	Specification Height	Desc.
D3-1	VAIRES	8"	STREET NAME
R1-1	30"	30"	STOP
R2-1-15	24"	30"	SPEED LIMIT 15
R2-1-25	24"	30"	SPEED LIMIT 25
R7-8	12"	18"	RESERVED PARKING
R7-8aP	12"	6"	VAN ACCESSIBLE
R8-31	12"	18"	NO PARKING FIRE LANE
W11-2	30"	30"	
W16-7P	24"	12"	

0 100 200 400Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ | Checked by: DHF
Issued for: Permitting | Date: February 20, 2025

Not Approved for Construction

Drawing Title: Overall Site Plan

Drawing Number: C2.00

Sheet 2 of 111

STATE OF NEW HAMPSHIRE - DAVID N. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number: 53140.00

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Match Line
See Sheet C2.06

THORNTON HILL AVE

36'R

STOP

R1-1
D3-1

EOP

R2-1-15

R8-31
SPACING 100'
(TYP)

OXFORD COURT

A75 -2A/B
A73-3B
A71-3A
A69 -2A/B
A67-2C
A65-3B
A63-3B
A61 -2A/B
A59 -2A/B
A57-3B
A55-3A
A53 -2A/B
A51-3A
A49-3B
A47-3A
A45 -2A/B
A43-3A
A41 -2A/B
A39-2A/B
A37-2A/B
A35-2A/B
A33-2C
A31-1
A29-2A/B
A60-3B
A58 -2A/B
A56 -2A/B
A54-1
A52-3A
A50 -2A/B
A48-3A
A46-3B
A44-3A
A42-3B
A40-3B
A38 -2A/B
A36-2C
A34 2A/B
A32 -2A/B
A30-1
A28 -2A/B

12' ACCESS PATH
(SEE DETAIL)(TYP)

PROPOSED 10'
DRAINAGE EASEMENT

10'

S 71°46'20" W
312.18'

N/F
EDWARD J.
TROMBLEY
24 HOVEY ROAD
LONDONDERRY,
NH 03053
MAP 10, LOT 39
BK. 4774, PG. 1178
ZONE: AR-1
USE: RESIDENTIAL

N/F
CHRISTEN ANN GOODWIN
20 HOVEY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 39-1
BK. 6513, PG. 140
ZONE: AR-1
USE: RESIDENTIAL

Match Line
See Sheet C2.02

24' PRIVATE ROAD
TO BE MAINTAINED
BY OWNER (TYP)

STONE DUST
PATH (TYP)

W11-2
W16-7P

8' X 8' STONE
DUST PAD

CROSSWALK (TYP)

R2-1-25

23.6'R

24'

CLUSTER A
68 Dwelling Units

AMENITY PERGOLA
(DESIGN BY OTHERS)

STORMWATER DETENTION
BASIN RIM, SEE GRADING AND
DRAINAGE PLANS (TYP)

CCB

A2 -2A/B
A4-3A
A6 -2A/B
A8-3B
A10-3A
A12 -2A/B
A14 -2A/B
A16-3B
A18-3A
A20 2A/B
A22-3B
A24-3A
A26-3B

REFER TO DETAILS FOR UNIT
DRIVEWAY DIMENSIONS

A1 -2A/B
A3-3B
A5-3A
A7-2C
A9 -2A/B
A11-3B
A13-1
A15-3B
A17-3A
A19 -2A/B
A21-2C
A23-3A
A25 -2A/B
A27 -2A/B

50' PERIMETER BUFFER

805.73'
S 51°54'05" W

56.41'

N/F
RICHARD J. & LORI E.
HILLARD
9 HOVEY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 42-5
BK. 6386, PG. 2149
ZONE: AR-1
USE: RESIDENTIAL

N/F
MARC CHARTIER
11 HOVEY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 42-6
BK. 5511, PG. 908
ZONE: AR-1
USE: RESIDENTIAL

N/F
DANIEL R. PACHECO JR. &
KATHERINE M. PACHECO
22 PILLSBURY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 40
BK. 6059, PG. 338
ZONE: AR-1
USE: RESIDENTIAL

N/F
MEGHAN MASURY
18 PILLSBURY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 40-1
BK. 6282, PG. 340
ZONE: AR-1

Match Line
See Sheet C2.07

Match Line
See Sheet C2.08

OWNER'S SIGNATURE

Signed by: Kevin Smith
E746E1218206...
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

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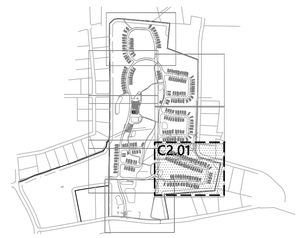
Suite 200
Bedford, NH 03110
603.391.3900



0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Layout and Materials Plan

Drawing Number
C2.01

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Sheet 3 of 111

Project Number
53140.00

Saved Tuesday, November 11, 2025 2:47:46 PM JHOWE Plotted Tuesday, November 11, 2025 3:26:22 PM Jason Howe

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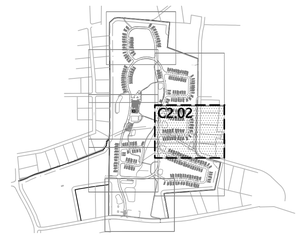

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Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Layout and Materials Plan

OWNER'S SIGNATURE
Signed by: Kevin Smith
E746E121820E0E
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date:
Certified By:

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Drawing Number
C2.02

Sheet 4 of 111

Project Number
53140.00

Saved Tuesday, November 11, 2025 2:47:46 PM JHOWE Plotted Tuesday, November 11, 2025 3:26:39 PM Jason Howe

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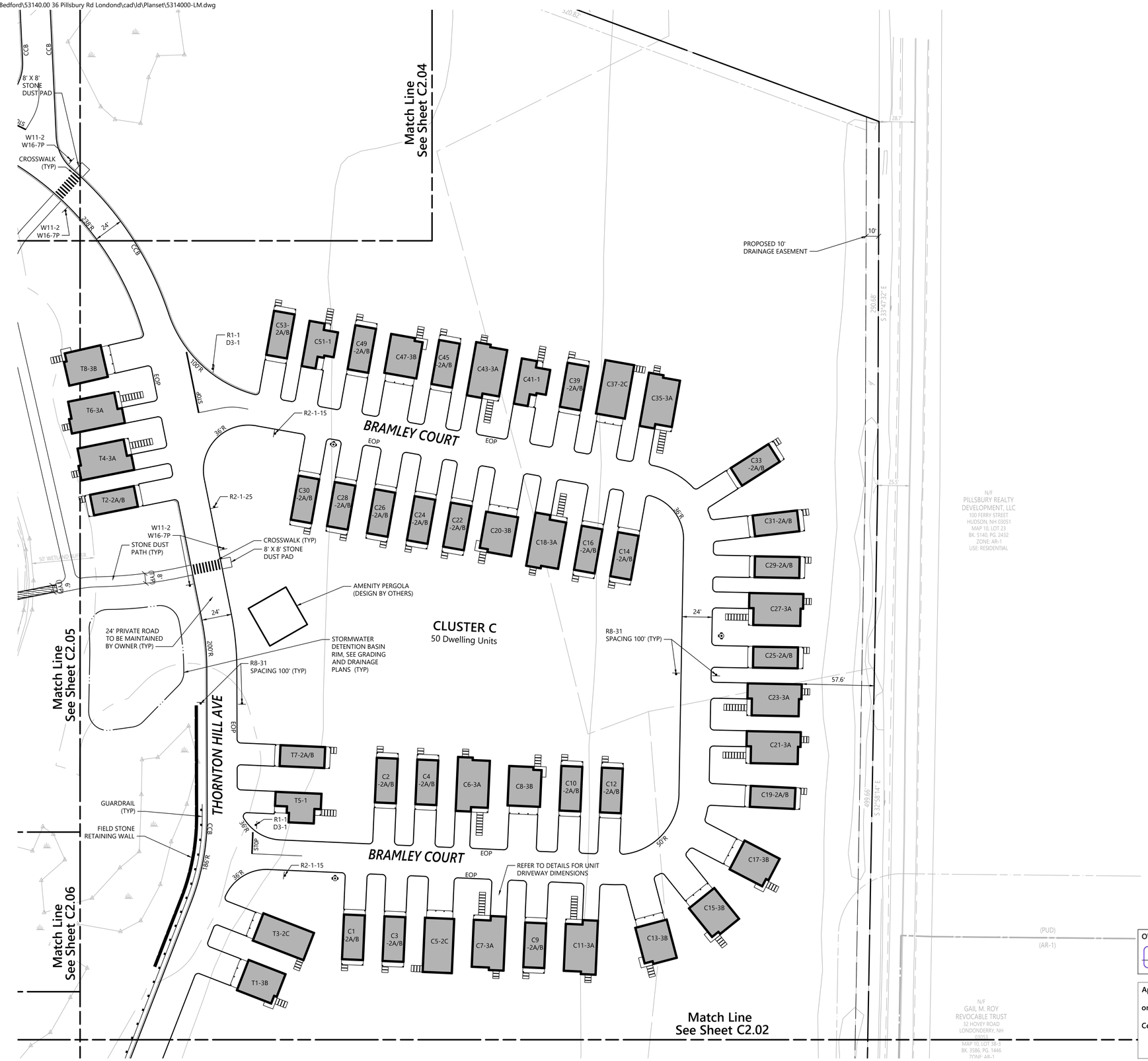

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Bedford, NH 03110
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0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Layout and Materials Plan

OWNER'S SIGNATURE
Signed by: Kevin Smith
E746E121820E
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date:
Certified By:

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Drawing Number
C2.03

Sheet 5 of 111

Project Number
53140.00

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Bedford, NH 03110
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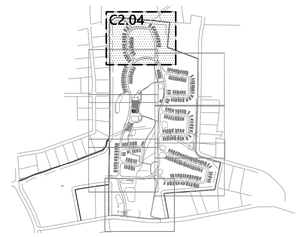

N/F
PENNICHUCK
EAST UTILITY, INC.
25 WALNUT ST.
P.O. BOX 428
NASHUA, NH 03060
MAP 10, LOT 142
BK. 5214, PG. 246
ZONE: AR-1
USE: COMMERCIAL

N/F
IWG II, LLC.
1199 N. FAIRFAX ST. SUITE 700
ALEXANDRIA, VA 22314
MAP 10, LOT 18
BK. 5869, PG. 2469
ZONE: AR-1
USE: COMMERCIAL

N/F
TOWN OF
LONDONDERRY
268B MAMMOTH ROAD
LONDONDERRY, NH 0305
MAP 10, LOT 154
BK. 4294, PG. 2802
ZONE: AR-1 / PUD-1
USE: CEMETERY

N/F
VID COSCIA
4 KITT LANE
NDERRY, NH 03053
10, LOT 16-25
5160, PG. 1344
ZONE: AR-1
: RESIDENTIAL

N/F
A J. BALDWIN
ABLE TRUST
KITT LANE
ERRY, NH 03053
0, LOT 16-24
37, PG. 1734
NE: AR-1
RESIDENTIAL

N/F
R F. GALLO
KITT LANE
ERRY, NH 03053
0, LOT 16-23
369, PG. 181
NE: AR-1
RESIDENTIAL

N/F
E ANTHONY
PELLETIER
8 KITT LANE
NDERRY, NH 03053
P 10, LOT 16-22
6186, PG. 2584
ZONE: AR-1
E RESIDENTIAL

N 46°01'58" E 62.14'
N 46°00'28" E 91.17'
N 60°57'55" E 386.50'
(AR-1)
(PUD)
N 60°35'59" E 148.78'
N 61°53'45" E 288.53'
N 23°20'29" W 216.00'
N 34°43'28" W 257.72'
N 24°14'38" E 398.10'

TIE INTO EXISTING GRAVEL ACCESS

12' WIDE GRAVEL UTILITY ACCESS ROAD - FOR UTILITY SERVICE USE ONLY

20 FT. WIDE UTILITY EASEMENT BK. 6539, PG. 2559

50' PERIMETER BUFFER

WETLAND BUFFER

55.85'

D19-3A
D17-3A
D15-3B
D13-2A/B
D11-1
D9-2A/B
D7-3B
D5-3A
D3-2A/B
D1-3A
D21-3A
D23-2C
D25-3A
D27-3A
D29-2A/B
D31-3A
D33-3A
D35-1
D37-2A/B
D39-2A/B
D41-2A/B
D43-3A
D45-2A/B
D47-2C
D28-3B
D30-2A/B
D32-3A
D34-3B
D36-3A
D38-2A/B
D40-3A
D42-2A/B

R8-31
SPACING 100' (TYP)

GUARDRAIL (TYP)

726'R

26'R

KINGSTON COURT

REFER TO DETAILS FOR UNIT DRIVEWAY DIMENSIONS

488'R

CLUSTER D
32 Dwelling Units

Match Line
See Sheet C2.05

Match Line
See Sheet C2.03

EOP

160'R

24'

R2-1-15

36'R

CCB

238'R

R8-31
SPACING 100' (TYP)

R1-1
D3-1

24' PRIVATE ROAD
TO BE MAINTAINED
BY OWNER (TYP)

GUARDRAIL (TYP)

8' X 8'
STONE
DUST PAD

W11-2
W16-7P

CROSSWALK (TYP)

10' BUILDING SETBACK

EDGE OF BRUSH

EDGE OF WOODS

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Layout and Materials Plan

Drawing Number
C2.04

Sheet 6 of 111

Project Number
53140.00

OWNER'S SIGNATURE
Signed by: Erwin Smith
E746E121820...
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date: _____
Certified By: _____

DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE
11/13/2025

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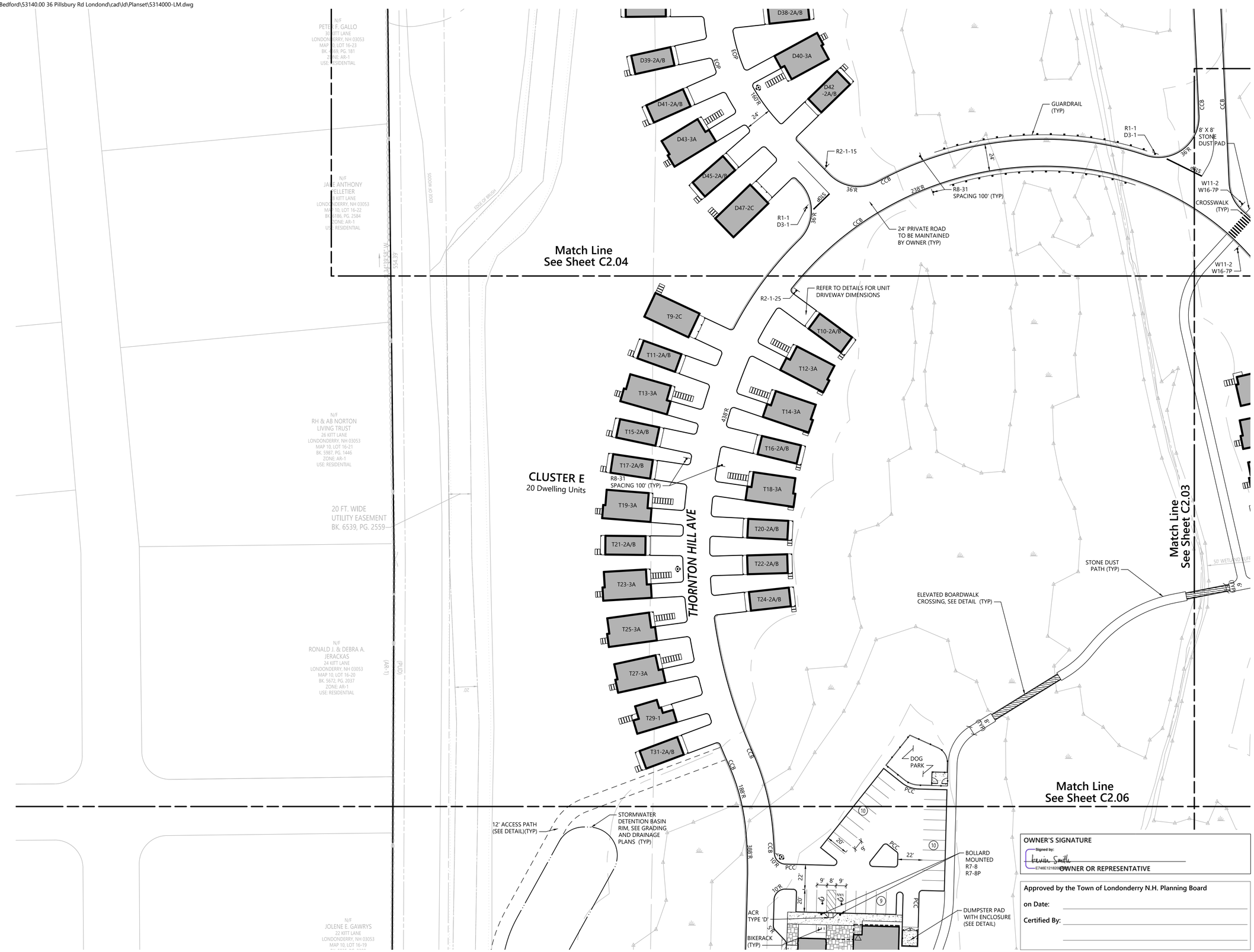

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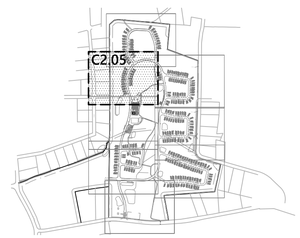

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ
Checked by DHF

Issued for Permitting
Date February 20, 2025

Not Approved for Construction

Drawing Title
Layout and Materials Plan

OWNER'S SIGNATURE
Signed by:
Kevin Smith
E746E121820E
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date:
Certified By:

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Drawing Number
C2.05

Sheet 7 of 111

Project Number
53140.00

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OWNER'S SIGNATURE

Signed by: Kevin Smith

E746E1218208 OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

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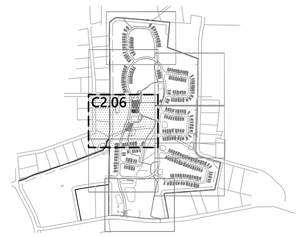

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

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Drawing Title

Layout and Materials Plan

Drawing Number

C2.06

STATE OF NEW HAMPSHIRE DAVID H. FENSTERMACHER No. 13332 LICENSED PROFESSIONAL ENGINEER

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Sheet 8 of 111

Project Number 53140.00

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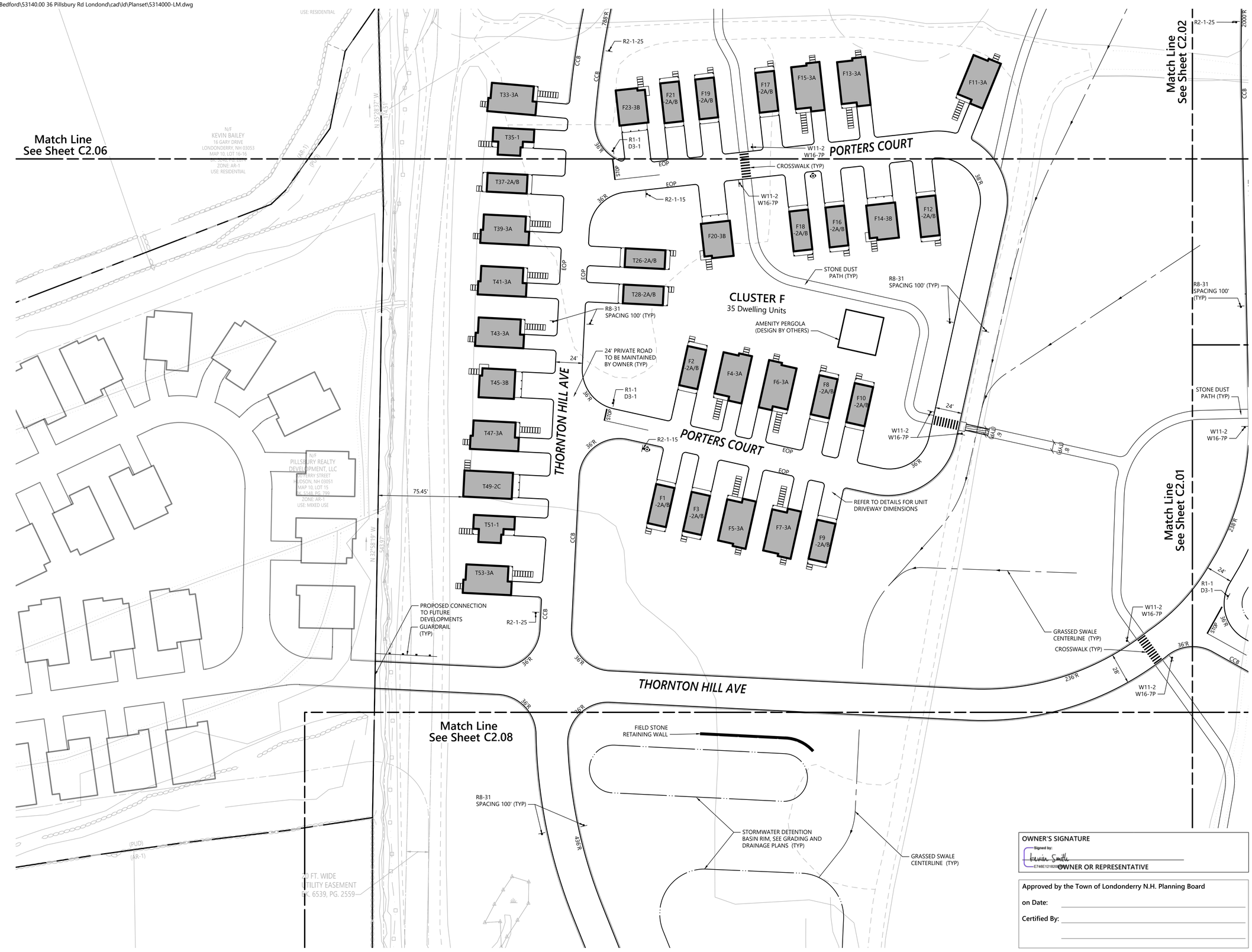

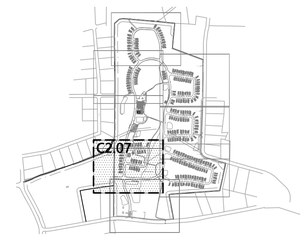

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0 20 40 80 Feet

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Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ
Checked by DHF

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Drawing Title
Layout and Materials Plan

OWNER'S SIGNATURE
Signed by:
Kevin Smith
E746E1218209
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Drawing Number
C2.07

Sheet 9 of 111

Project Number
53140.00

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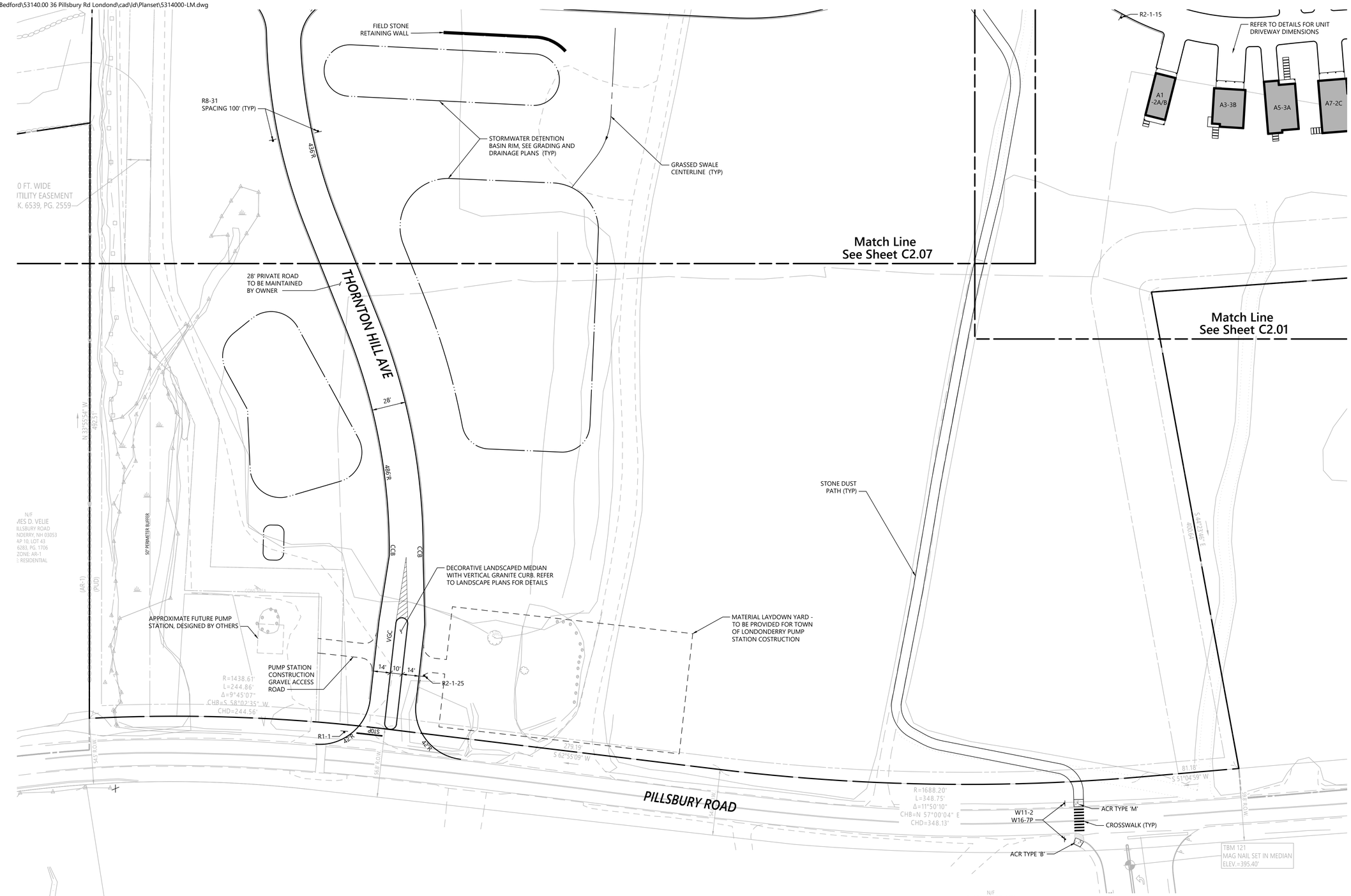

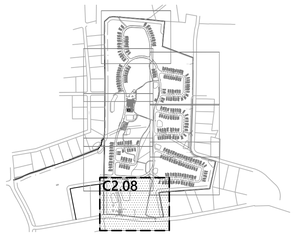

0 20 40 80 Feet

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF
Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Layout and Materials Plan

OWNER'S SIGNATURE
Signed by:
Kevin Smith
E746E121820E
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date:
Certified By:

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13332
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Drawing Number
C2.08

Sheet 10 of 111

Project Number
53140.00

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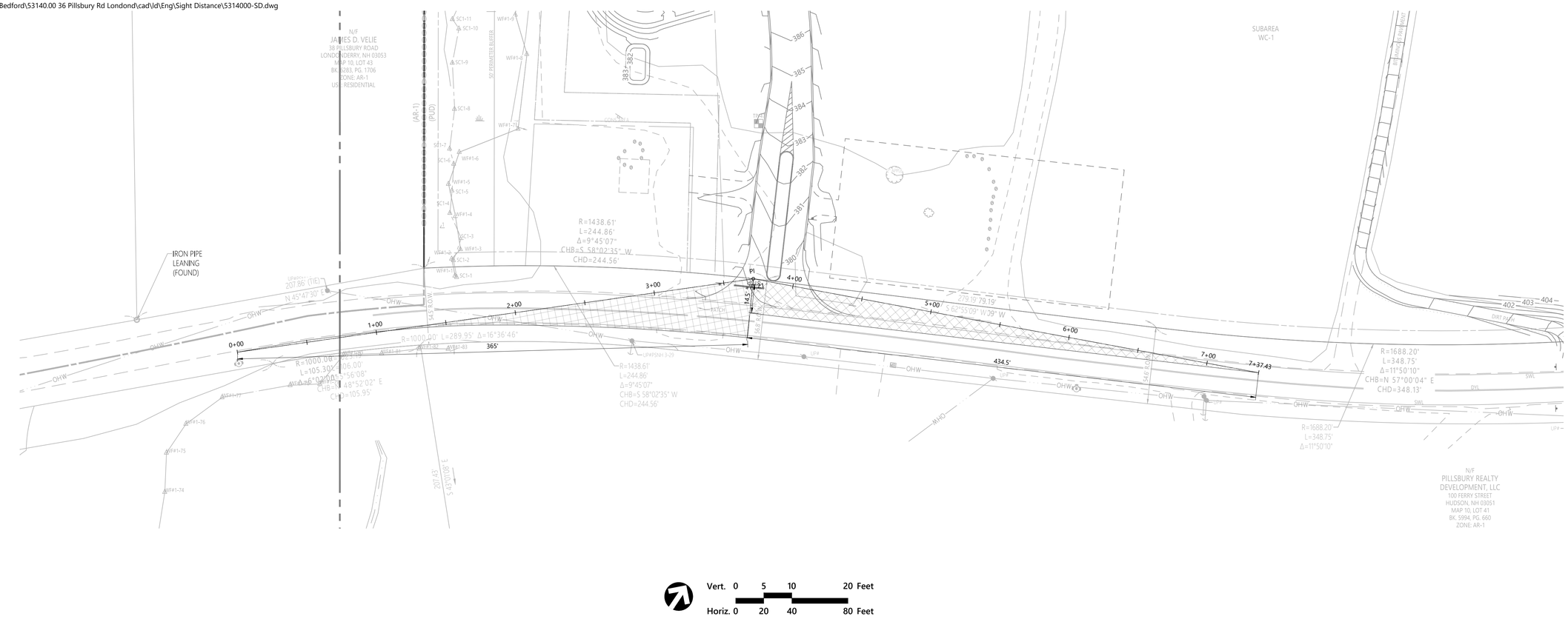

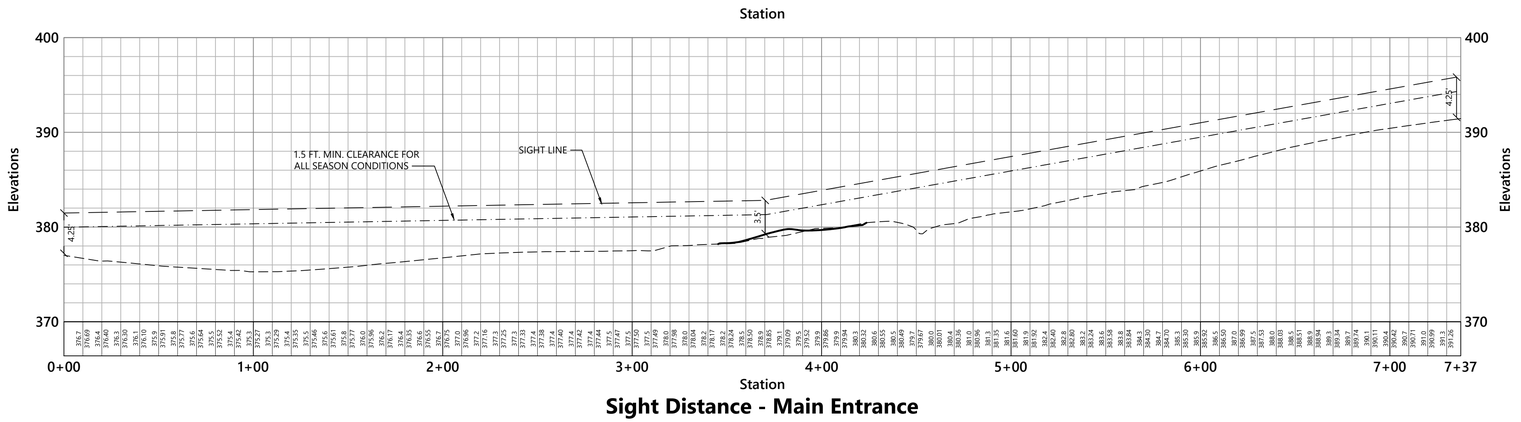

Sight Distance - Main Entrance

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Sight Distance Plan
Pillsbury Road

Drawing Number
C2.09

Sheet 11 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13935
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

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0 20 40 80 Feet

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Prepared For: Procopio Enterprises, LLC
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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Sight Distance Plan
Oxford Court

Drawing Number
C2.10

Sheet 12 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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0 20 40 80 Feet

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Prepared For: Procopio Enterprises, LLC
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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Sight Distance Plan
Redfield Court

Drawing Number
C2.11

Sheet 13 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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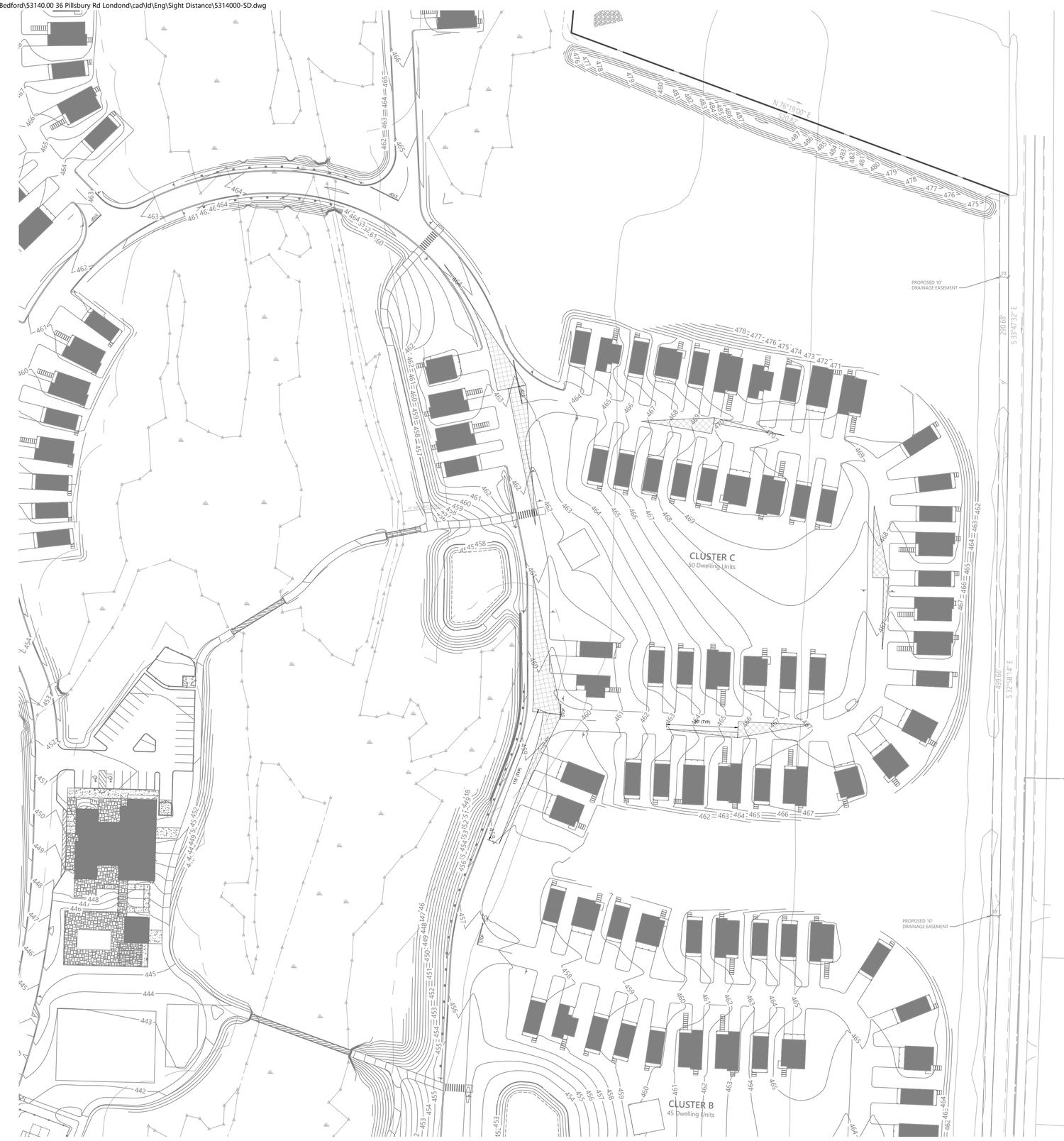

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title

Sight Distance Plan
Bramley Court

Drawing Number

C2.12

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 14 of 111

Project Number 53140.00

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Checked by: DHF

Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Sight Distance Plan
Kingston Court

Drawing Number
C2.13

Sheet 15 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025



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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
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Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Sight Distance Plan
Thornton Hill Avenue

Drawing Number
C2.14

Sheet 16 of 111

STATE OF NEW HAMPSHIRE – DAVID H. FENSTERMACHER No. 13302 – LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number
53140.00

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Prepared For: Procopio Enterprises, LLC
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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Sight Distance Plan
Porters Court

Drawing Number
C2.15

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 17 of 111

Project Number
53140.00

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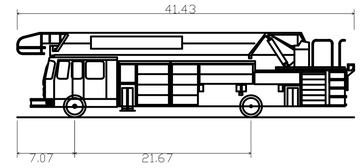

Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

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0 100 200 400 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, Inc.
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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title
Overall Vehicle Access Plan

Drawing Number
C2.16

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 18 of 111

Project Number 53140.00

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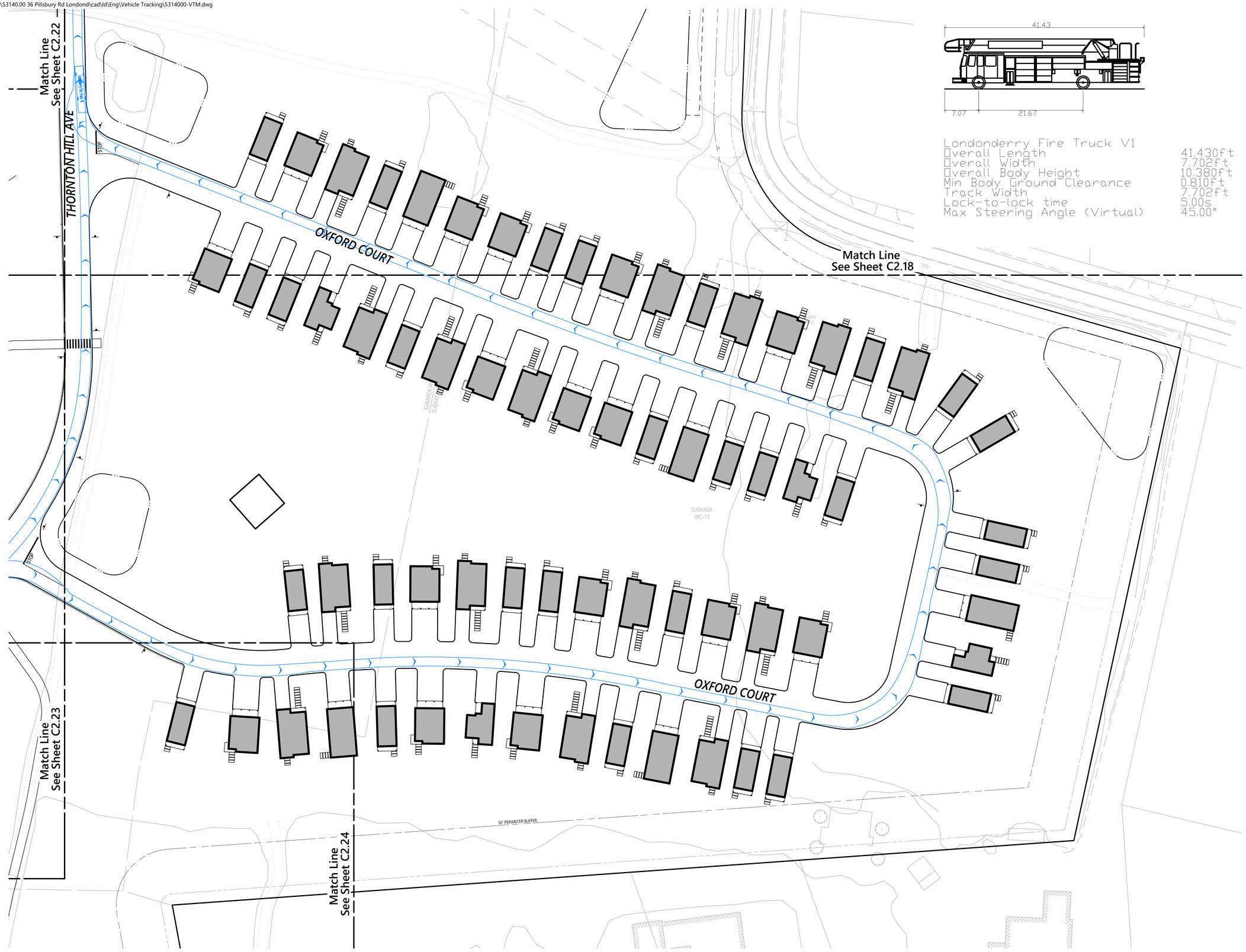

Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

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0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, Inc.
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **February 20, 2025**

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Drawing Title
Vehicle Access Plan

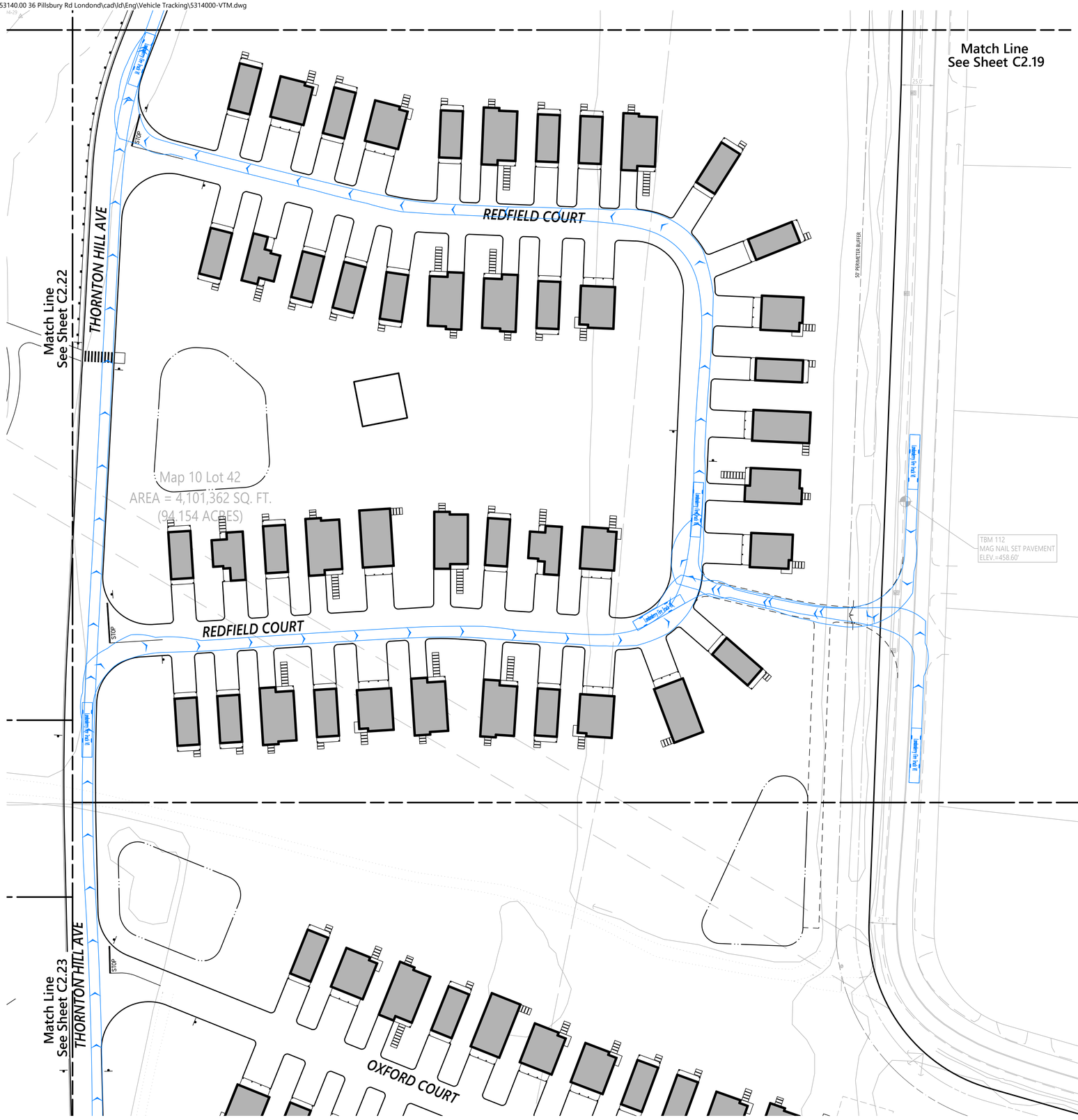
Drawing Number
C2.17

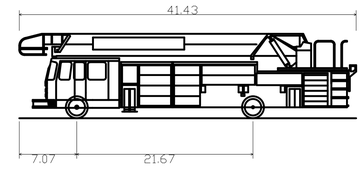
Sheet 19 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number
53140.00

Saved Tuesday, November 11, 2025 7:15:29 PM JHOWE Plotted Wednesday, November 12, 2025 1:18:45 AM Ben Zoller





Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

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2 Bedford Farms Drive
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Bedford, NH 03110
603.391.3900

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Vehicle Access Plan

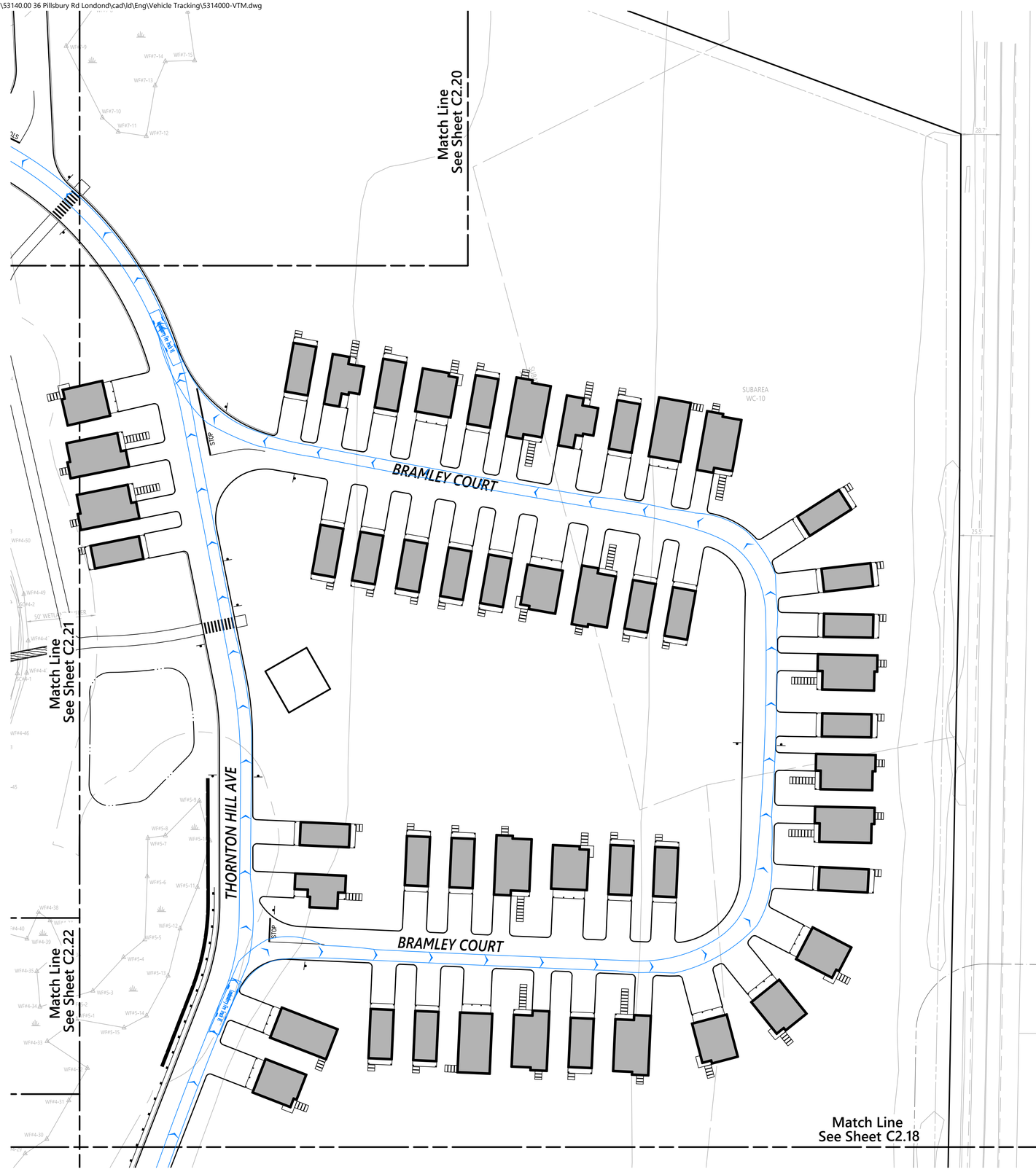
Drawing Number
C2.18

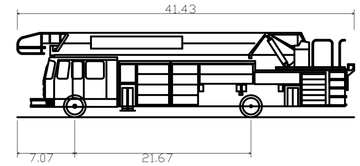
Sheet 20 of 111

Project Number 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Saved Friday, November 7, 2025 1:39:47 PM JHOWE Plotted Tuesday, November 11, 2025 3:34:01 PM Jason Howe





Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

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0 20 40 80 Feet

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
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Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Vehicle Access Plan

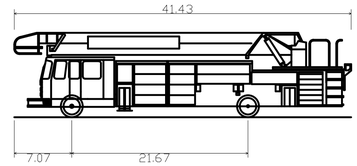
Drawing Number
C2.19

Sheet 21 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Saved Friday, November 7, 2025 1:39:47 PM JHOWE Plotted Tuesday, November 11, 2025 3:34:13 PM Jason Howe



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Min Body Ground Clearance	0.810ft
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Max Steering Angle (Virtual)	45.00°

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50' PERIMETER BUFFER

WETLAND BUFFER

KINGSTON COURT

KINGSTON COURT

AREA WC-7

AREA WC-8

EDGE OF WOODS

EDGE OF BRUSH

Match Line
See Sheet C2.21

Match Line
See Sheet C2.18

10' BUILDING SETBACK

0 20 40 80 Feet

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title:
Vehicle Access Plan

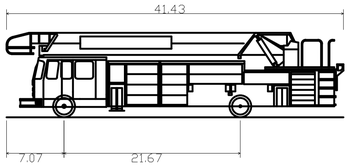
Drawing Number:
C2.20

Sheet 22 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number: 53140.00

Saved Friday, November 7, 2025 1:39:47 PM JHOWE Plotted Tuesday, November 11, 2025 3:34:28 PM Jason Howe



Londonderry Fire Truck V1	
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Overall Width	7.702ft
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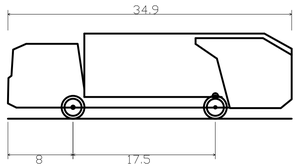
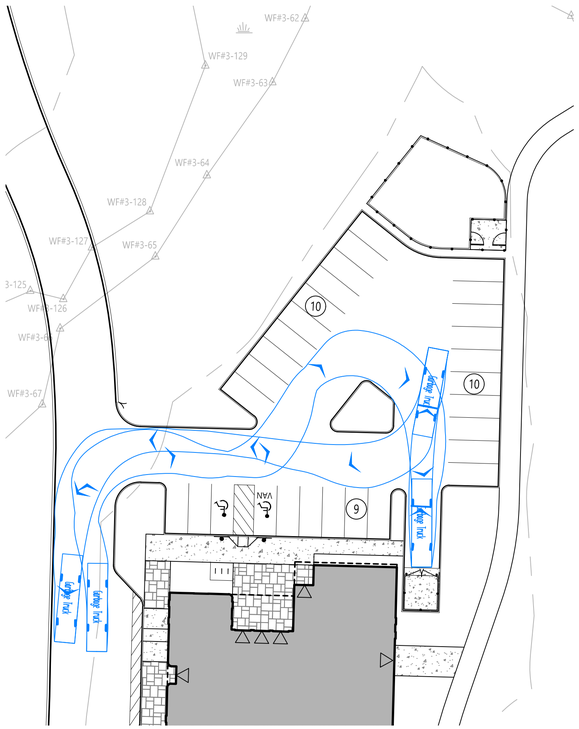
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°



Garbage Truck	
Overall Length	34.900ft
Overall Width	8.000ft
Overall Body Height	10.481ft
Min Body Ground Clearance	1.311ft
Track Width	8.000ft
Lock-to-lock time	4.00s
Max Steering Angle (Virtual)	37.00°



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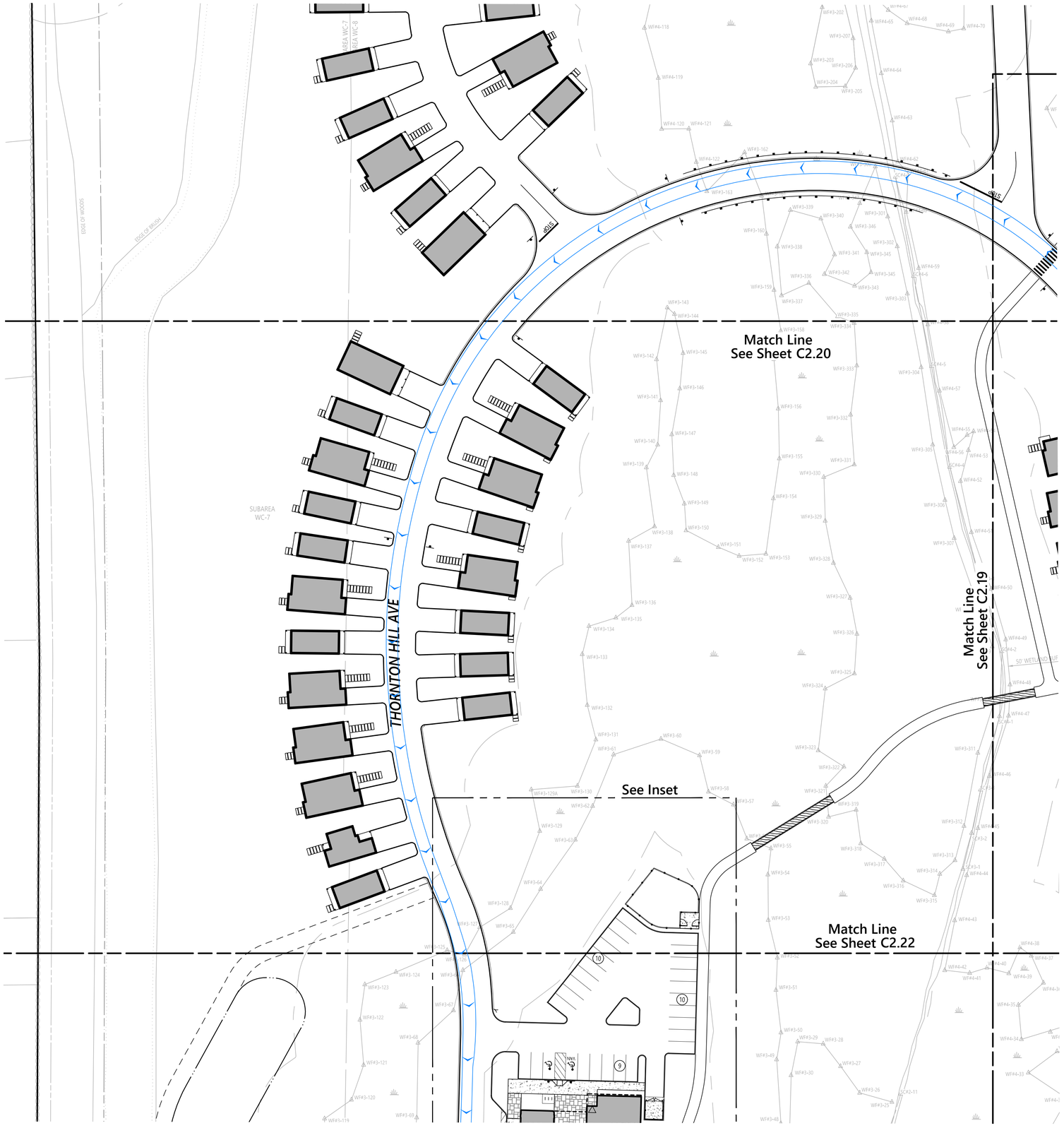
1" = 30'



0 20 40 80 Feet

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35 Village Road, 7th Floor (702)
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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Vehicle Access Plan

Drawing Number
C2.21

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 23 of 111

Project Number 53140.00

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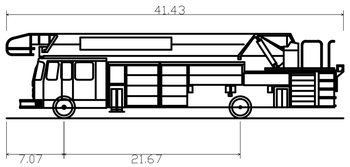
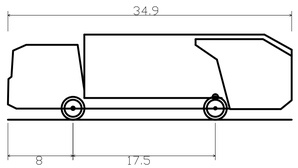


Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°



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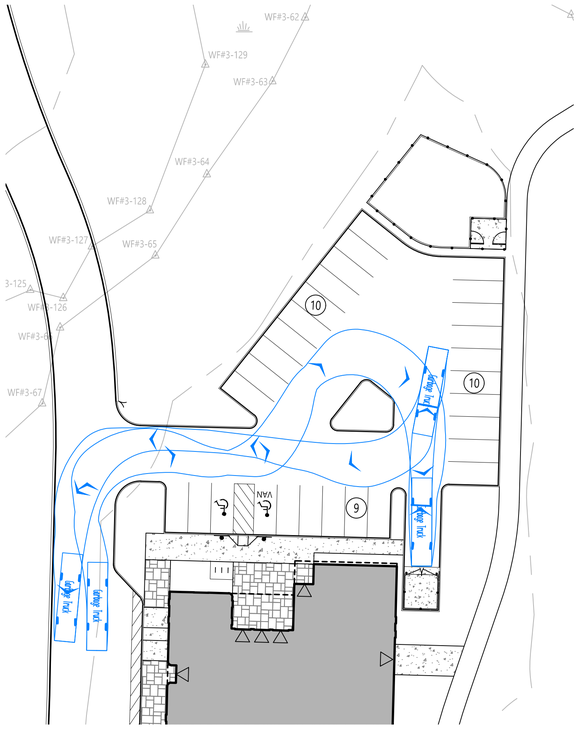
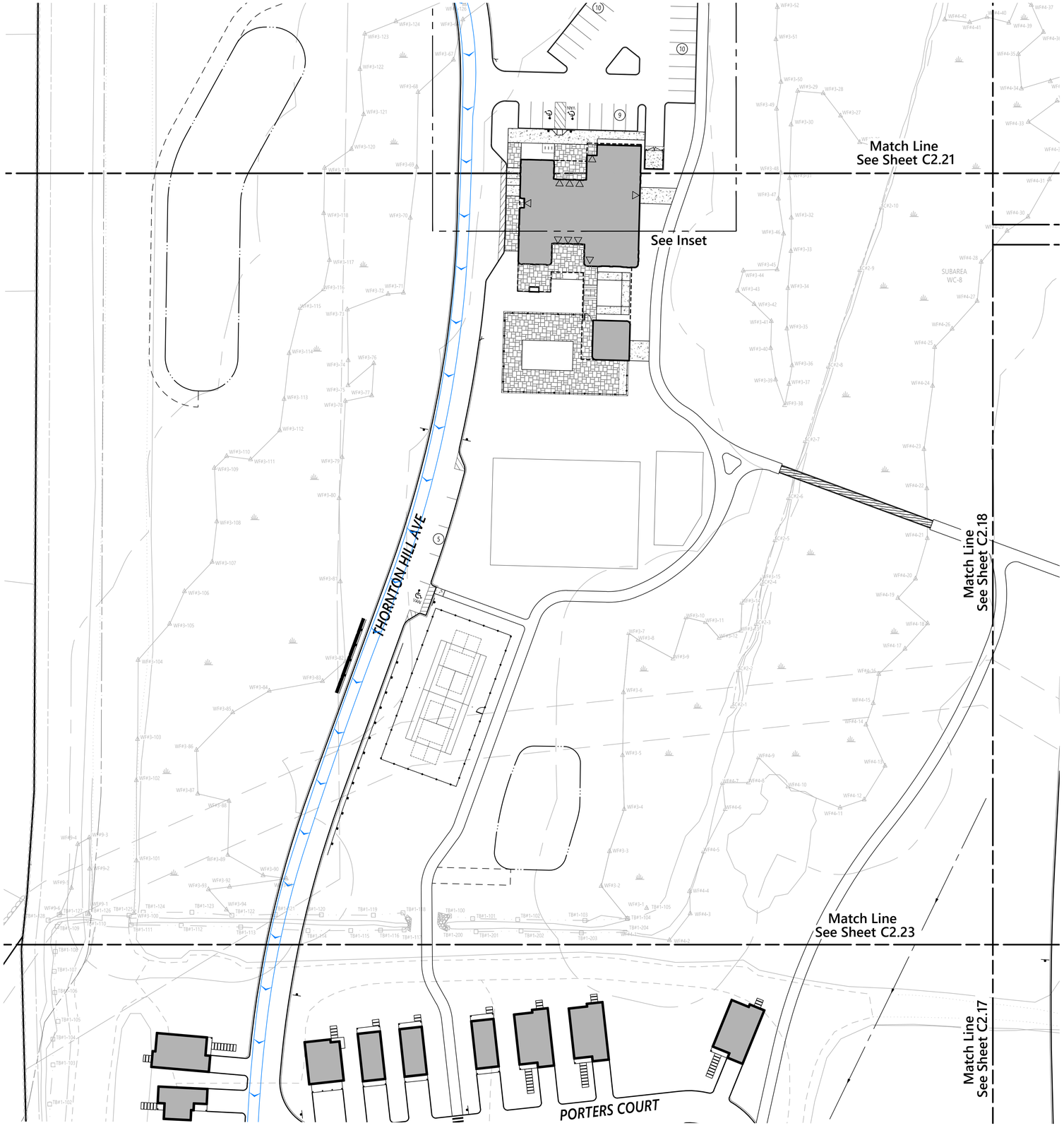


Inset
1" = 30'



0 20 40 80 Feet

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100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, Inc.
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title: Vehicle Access Plan

Drawing Number: C2.22

Sheet 24 of 111

Project Number: 53140.00

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STATE OF NEW HAMPSHIRE - DAVID H. FENSTERMACHER No. 13302 - LICENSED PROFESSIONAL ENGINEER
11/13/2025

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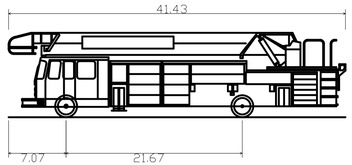
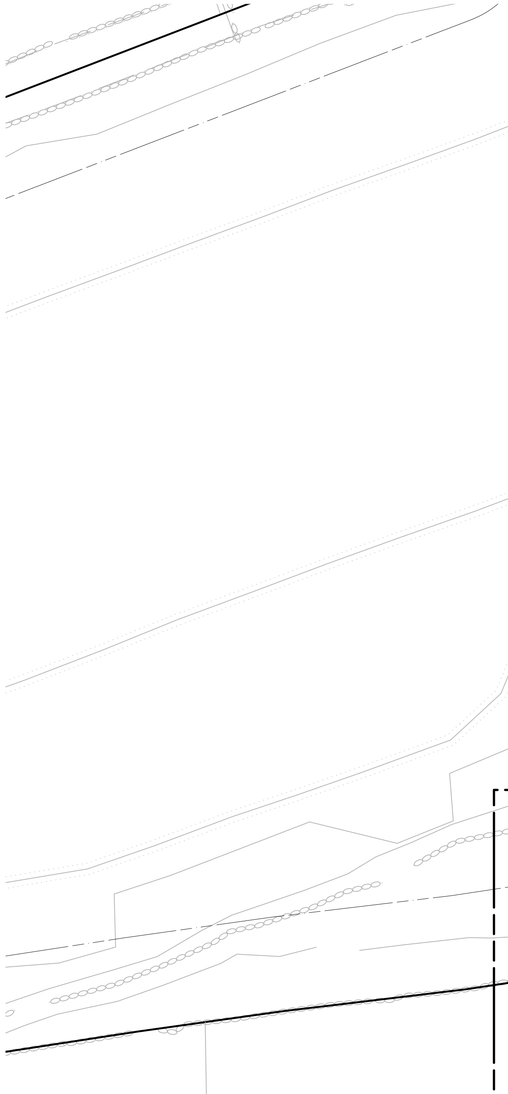
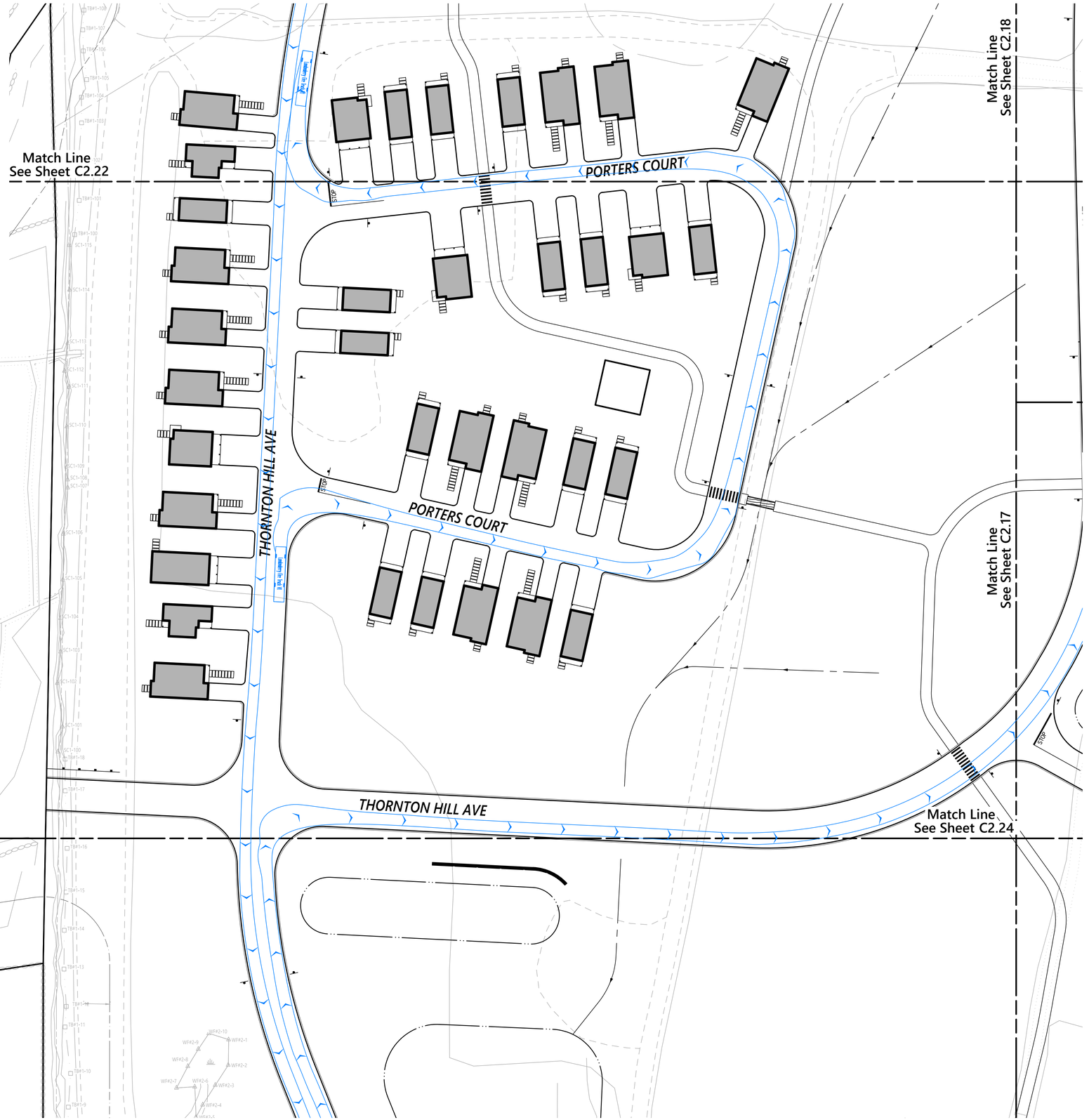


Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°





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Prepared For: Procopio Enterprises, LLC
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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
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2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title: **Vehicle Access Plan**

Drawing Number: **C2.23**

Sheet 25 of 111

Project Number: 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13938
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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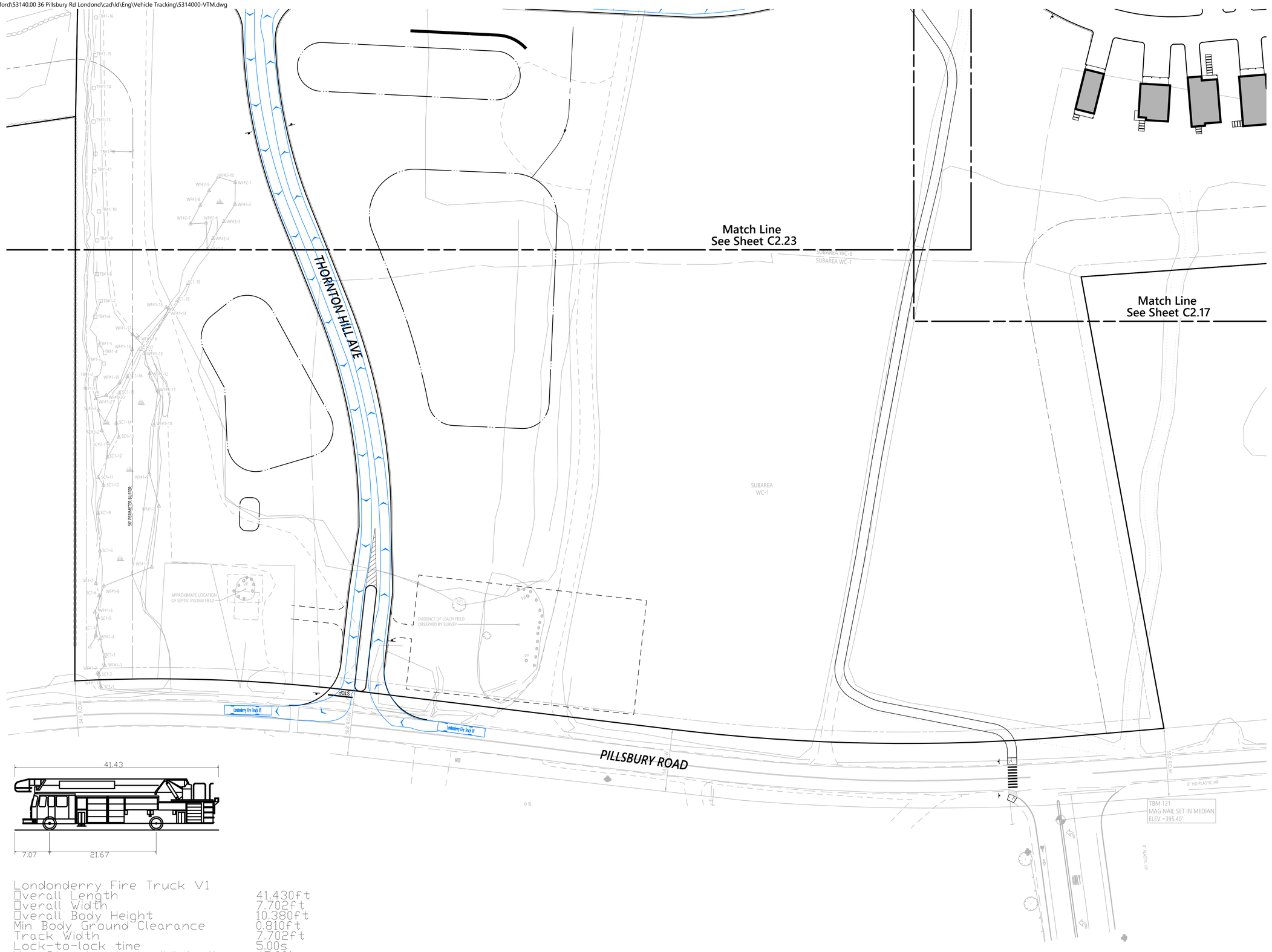

Londonderry Fire Truck V1

Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

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0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
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Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
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Designed by BJZ | Checked by DHF

Issued for: Permitting | Date: February 20, 2025

Not Approved for Construction

Drawing Title: Vehicle Access Plan 8

Drawing Number: C2.24

Sheet 26 of 111

Project Number: 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

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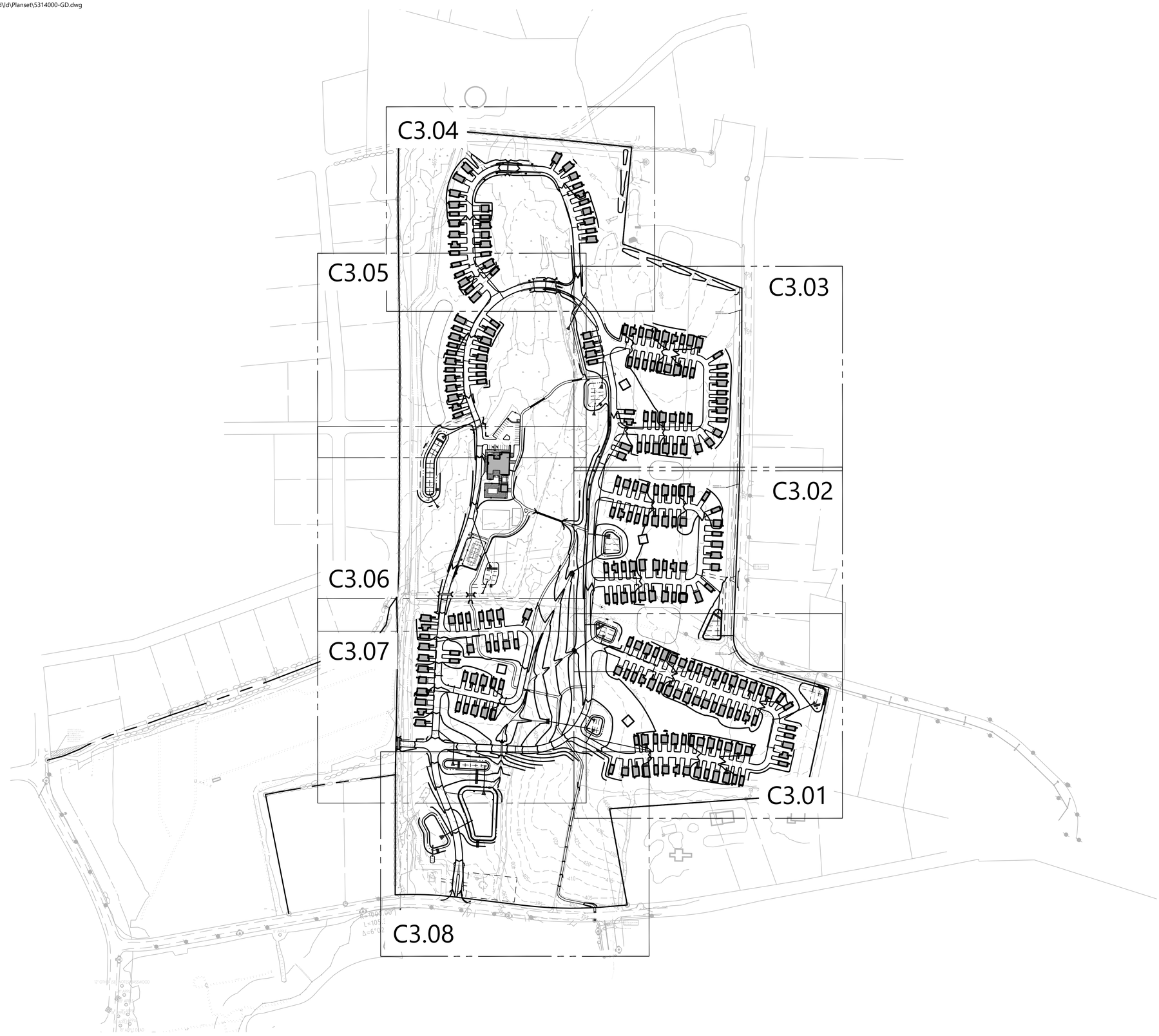

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd
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Designed by BJZ | Checked by DHF

Issued for: Permitting | Date: February 20, 2025

Not Approved for Construction

Drawing Title
Overall Grading and Drainage Plan 1

Drawing Number
C3.00

STATE OF NEW HAMPSHIRE - DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 27 of 111

Project Number 53140.00

Saved Sunday, November 9, 2025 1:17:03 PM JHOWE Plotted Tuesday, November 11, 2025 3:40:23 PM Jason Howe

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Match Line
See Sheet C3.06

Match Line
See Sheet C3.07

Match Line
See Sheet C3.02

Match Line
See Sheet C3.08

CLUSTER A

SEDIMENT FOREBAY
WITH PLACED STONE
SURFACE SAND FILTER 11
TOP OF BERM = 456.0'
OVERFLOW BERM = 455.0'
BOTTOM ELEV = 454.0'

POTENTIAL SOIL STORAGE AREA.
SIZING TO BE DETERMINED BY
CONSTRUCTION NEEDS

PROPOSED 10'
DRAINAGE EASEMENT

SURFACE SAND FILTER #7
TOP OF BERM = 450.0'
OVERFLOW BERM = 449.0'
BOTTOM ELEV = 446.5'

10' WIDE
EMERGENCY
OVERFLOW
STONE SWALE

SEDIMENT FOREBAY
WITH PLACED STONE

SURFACE SAND FILTER #4
TOP OF BERM = 452.2'
OVERFLOW BERM = 451.2'
BOTTOM ELEV = 449.2'

SURFACE SAND FILTER #3
TOP OF BERM = 448.6'
OVERFLOW BERM = 447.6'
BOTTOM ELEV = 443.6'
UNDERDRAIN (TYP)

50' PERIMETER BUFFER

GARDEN AREA
(APPARENT
ENCROACHMENT)

RAISED GARDEN
(APPARENT
ENCROACHMENT)

PILE OF ROCKS

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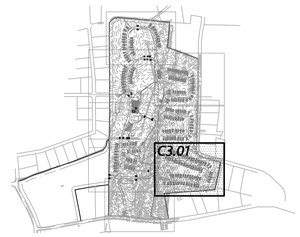

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
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Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

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Drawing Title
Grading and Drainage Plan

Drawing Number
C3.01

Sheet 28 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

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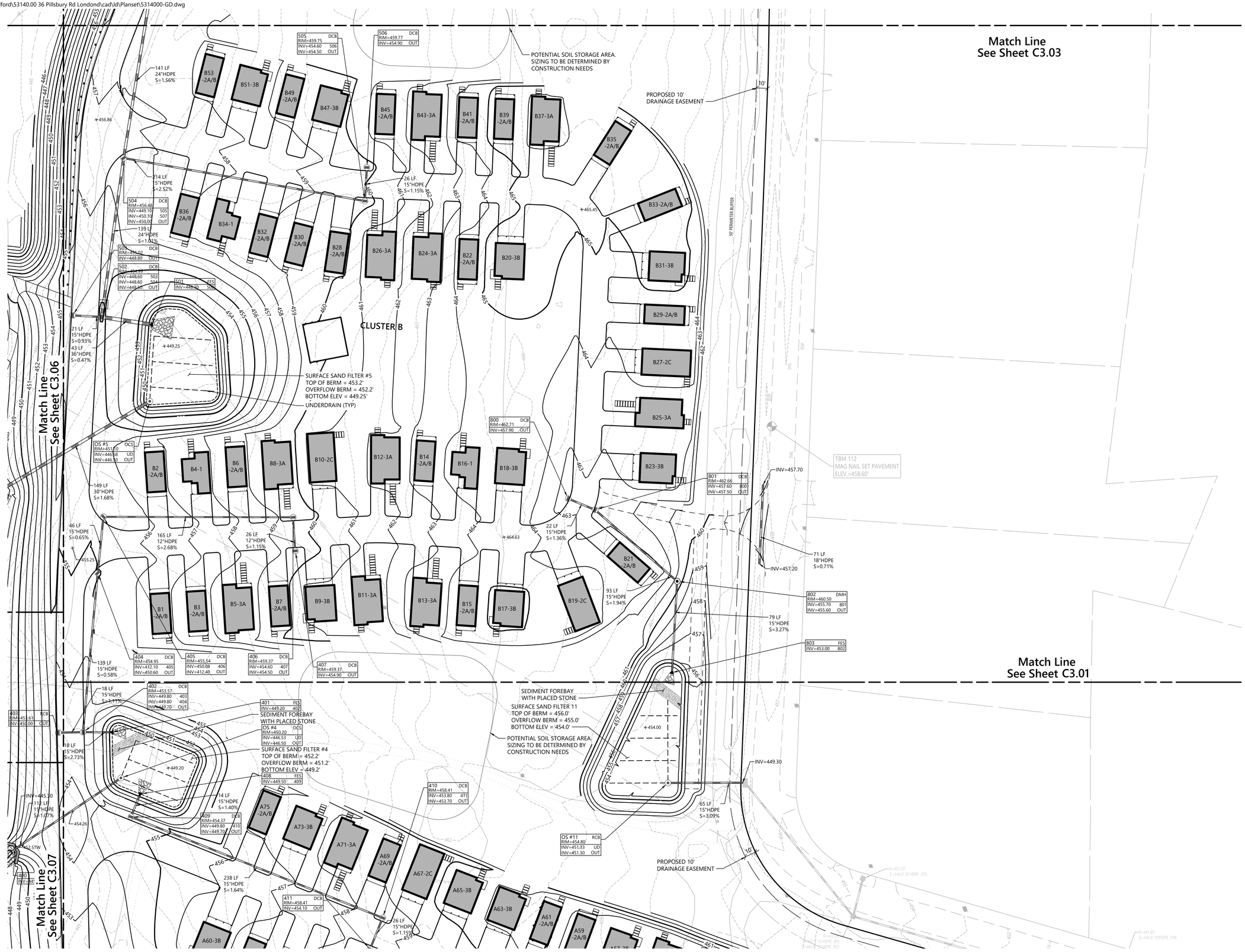

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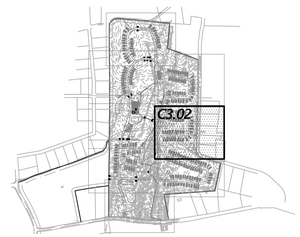

0 20 40 80 Feet

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

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Drawing Title
Grading and Drainage Plan

Drawing Number
C3.02

STATE OF NEW HAMPSHIRE
DAVID N. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 29 of 111

Project Number 53140.00

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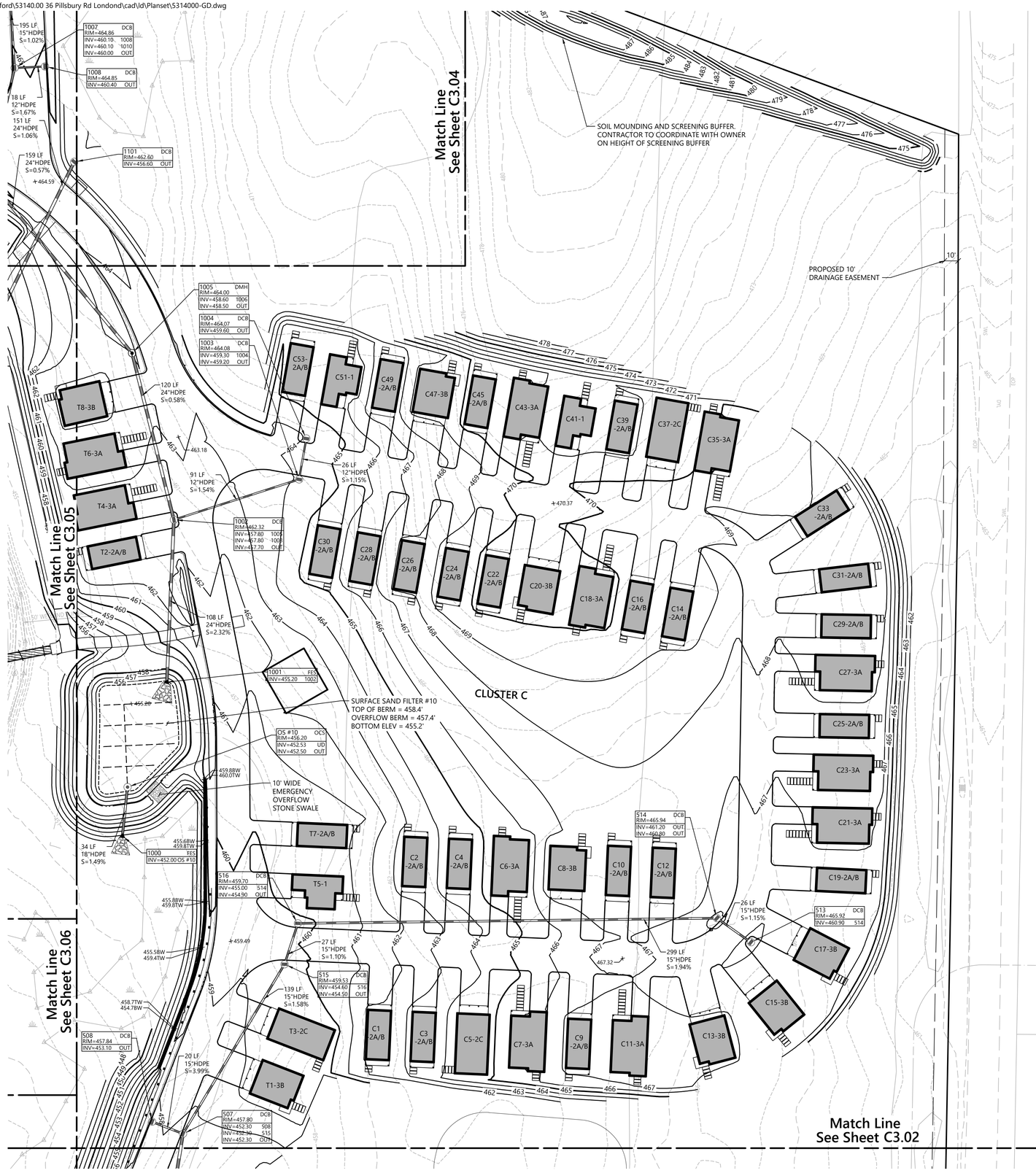

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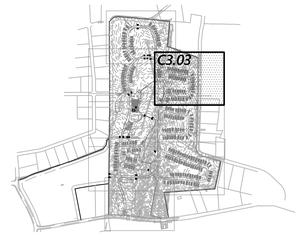

0 20 40 80 Feet

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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

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Drawing Title
Grading and Drainage Plan

Drawing Number
C3.03

Sheet 30 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEERS - DAVID H. FENSTERMACHER No. 13302 LICENSED
11/13/2025

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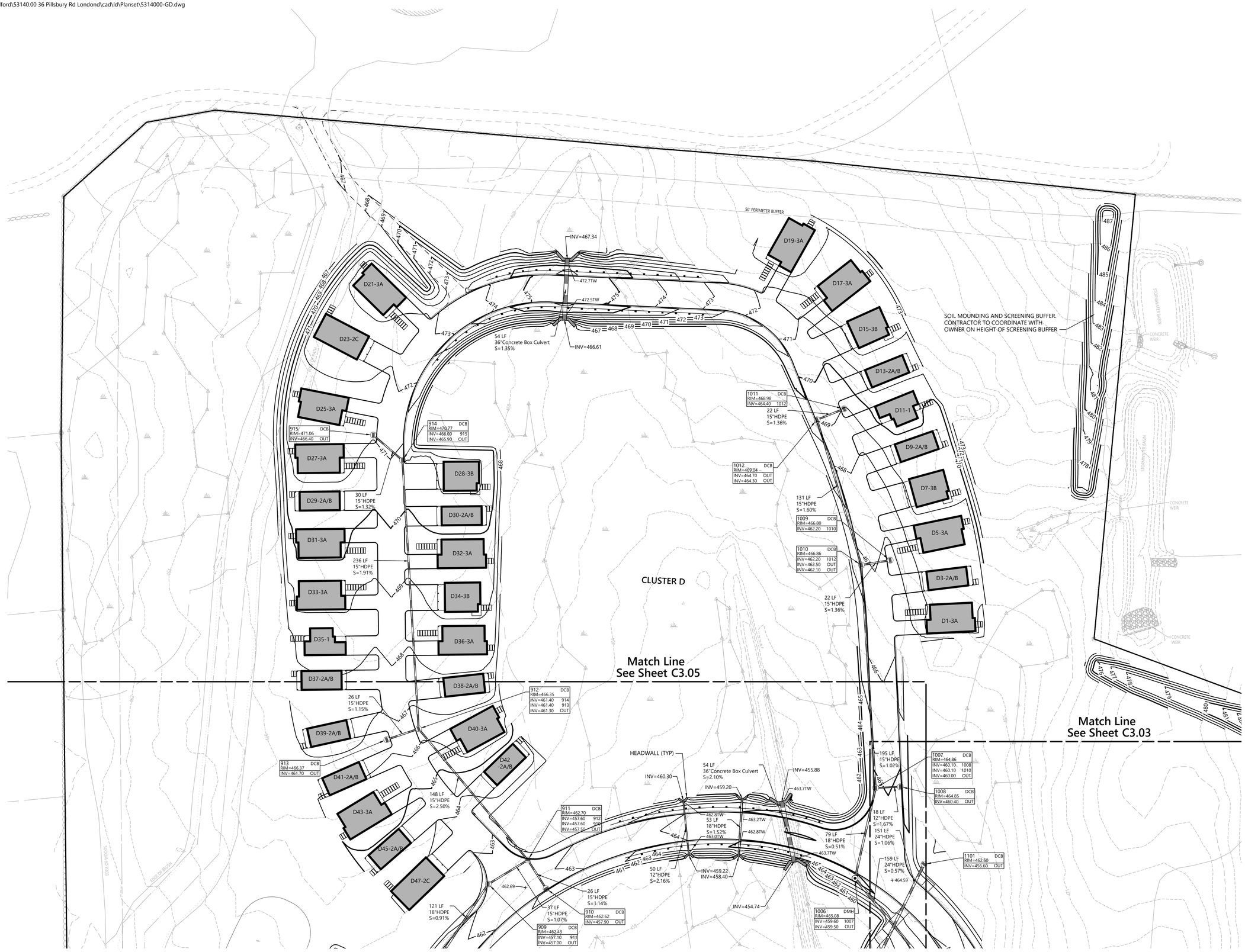

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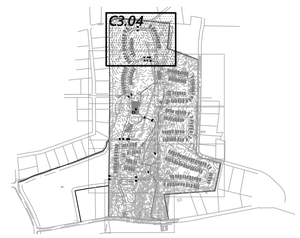

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Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
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Drawing Title: Grading and Drainage Plan

Drawing Number: C3.04

Sheet 31 of 111

STATE OF NEW HAMPSHIRE - DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number: 53140.00

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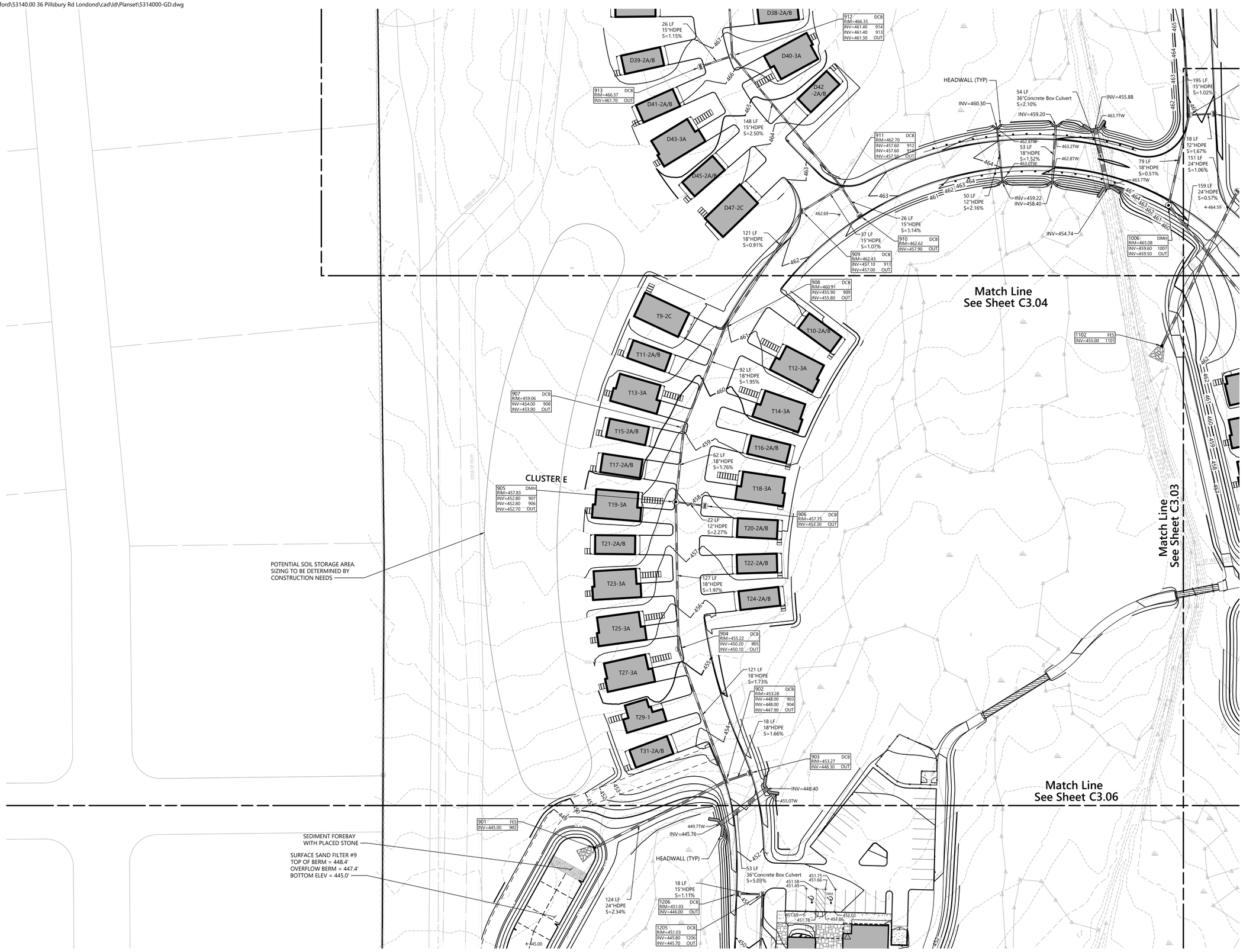

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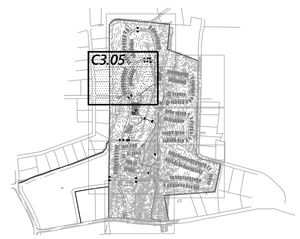

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Map 10, Lot 42 - 36 Pillsbury Road
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No.	Revision	Date	Appvd.
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Drawing Title: **Grading and Drainage Plan**

Drawing Number: **C3.05**

Sheet 32 of 111

Project Number: **53140.00**

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

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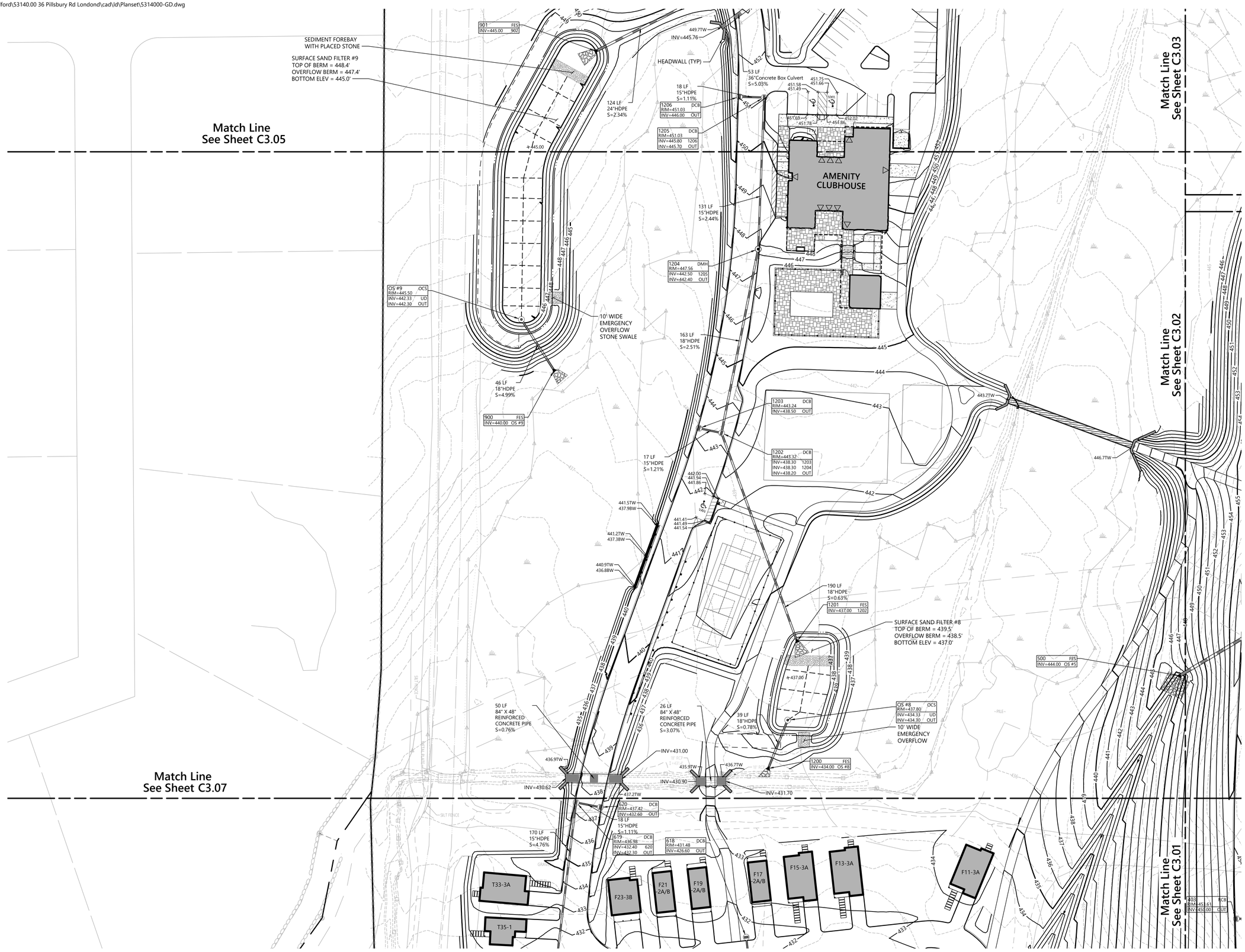

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Map 10, Lot 42 - 36 Pillsbury Road
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Drawing Title

Grading and Drainage Plan

Drawing Number

C3.06

Sheet 33 of 111

Project Number 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
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Grading and Drainage Plan

Drawing Number

C3.07

Sheet 34 of 111



Project Number 53140.00

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602 DCB
RIM=409.78
INV=403.60 606
INV=403.60 604
INV=403.50 OUT

602 FES
INV=403.00 603

44 LF
24"HDPE
S=1.15%

MTD-1
4' x 8' FILTERRA BOX
W/ 6" PVC OUTLET PIPE

SEDIMENT FOREBAY
WITH PLACED STONE

MTD-2
4' x 8' FILTERRA BOX
W/ 6" PVC OUTLET PIPE

10' WIDE
EMERGENCY
OVERFLOW
STONE SWALE

INV=413.90

604 DCB
RIM=427.53
INV=415.10 605
INV=415.00 OUT

22 LF
12"HDPE
S=1.82%

50 LF
60"W x 48"H Concrete Box Culvert
S=1.20%

OS #6 OCS
RIM=403.31
INV=400.30 UD
INV=396.00 OUT

SURFACE SAND FILTER #6
TOP OF BERM = 407.1'
OVERFLOW BERM = 406.1'
BOTTOM ELEV = 403.0'
UNDERDRAIN (TYP)

INV=390.00

6"PVC

INV=395.00

95 LF
24"HDPE
S=6.32%

601 FES
INV=390.00 OS #6

Match Line
See Sheet C3.07

DETENTION BASIN #2
TOP OF BERM = 388.0'
OVERFLOW BERM = 387.0'
BOTTOM ELEV = 383.0'

OS #1
RIM=393.90
INV=390.00 WEIR
INV=387.00 OUT

DETENTION BASIN #1
TOP OF BERM = 396.0'
OVERFLOW BERM = 395.0'
BOTTOM ELEV = 390.0'

123 LF
24"HDPE
S=3.24%

10' WIDE
EMERGENCY
OVERFLOW
STONE SWALE

600 FES
INV=383.00 OS #1

OS#2 CB
INV=383.00 OUT

43 LF
36"HDPE
S=2.31%

LEVEL
SPREADER

10' WIDE
EMERGENCY
OVERFLOW

MTD-3
4' x 8' FILTERRA BOX
W/ 6" PVC OUTLET PIPE

MTD-4
4' x 8' FILTERRA BOX
W/ 6" PVC OUTLET PIPE

50' PERIMETER BUFFER

Match Line
See Sheet C3.01

A1
2A/B

A3-3B

A5-3A

A7-2C

TBM #21
MAG NAIL SET IN MEDIAN
ELEV.=395.40'

(2) RAISED CONDUIT

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C3.08

0 20 40 80 Feet

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No.	Revision	Date	Appvd.
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Drawing Title
Grading and Drainage Plan

Drawing Number
C3.08

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 35 of 111

Project Number
53140.00

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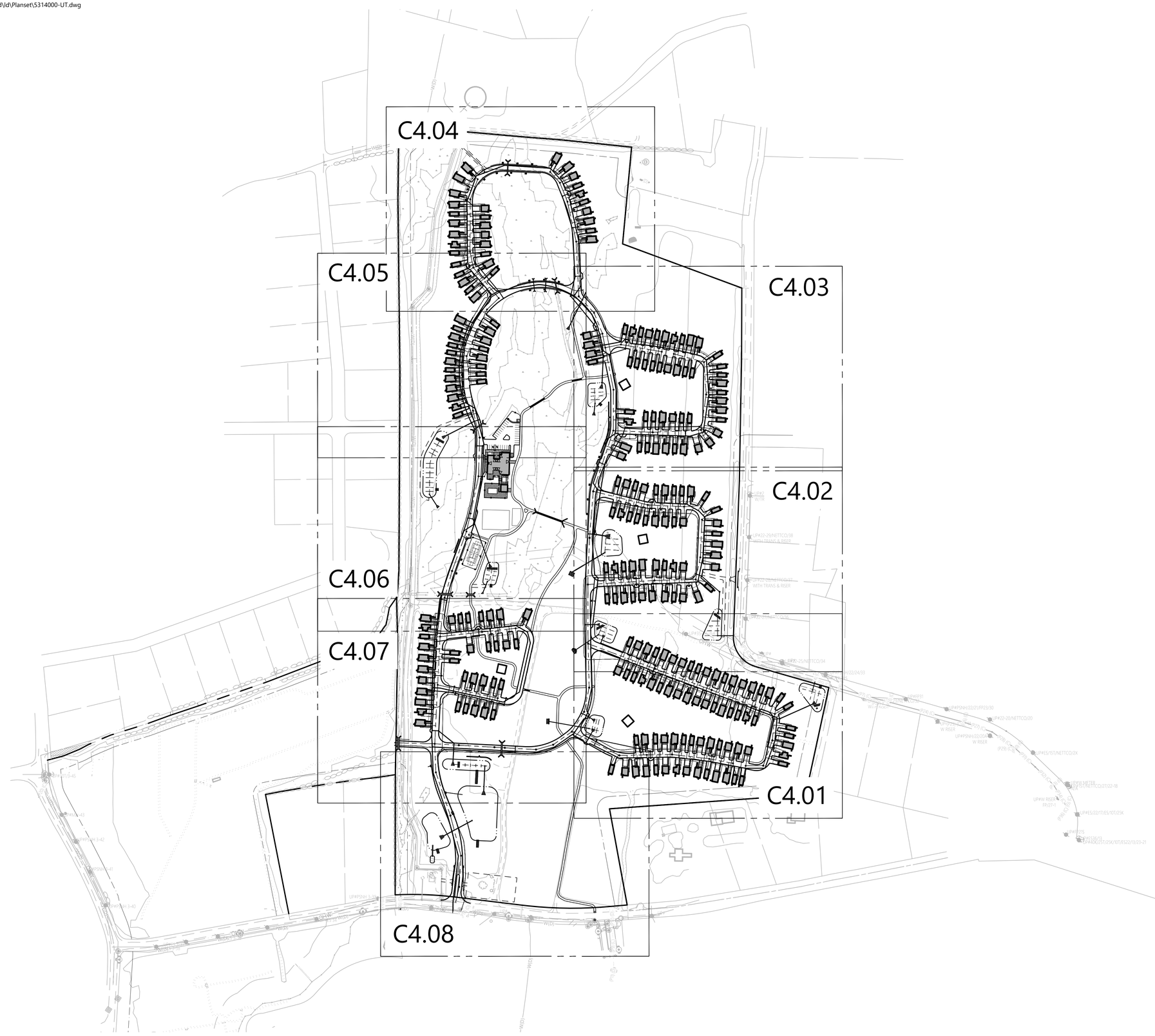

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

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Drawing Title
Overall Utility Plan

Drawing Number
C4.00

Sheet 36 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number
53140.00

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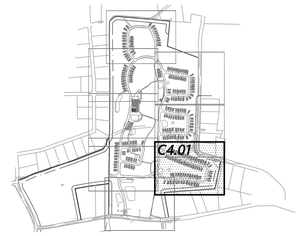

Match Line
See Sheet C4.06

Match Line
See Sheet C4.07

Match Line
See Sheet C4.02

Match Line
See Sheet C4.08

CLUSTER A

- 2" WATER CONNECTION (TYP)
- 4" SEWER CONNECTION (TYP)
- ELECTRIC CONNECTION (TYP)

100-250 kVA PAD (TYP)

FIRE HYDRANT (TYP)

109 SMH (DROP)
RIM=454.27
INV=439.60 108
INV=444.40 100A
INV=439.50 OUT
5' Diameter

100A SMH
RIM=458.78
INV=446.10 101A
INV=446.00 OUT
4' Diameter

101A SMH
RIM=462.30
INV=447.50 102A
INV=447.40 OUT
5' Diameter

102A SMH
RIM=459.50
INV=449.00 103A
INV=448.90 OUT
4' Diameter

103A SMH (DROP)
RIM=458.37
INV=450.10 104A
INV=449.60 OUT
5' Diameter

104A SMH (DROP)
RIM=458.42
INV=451.70 105A
INV=450.70 OUT
5' Diameter

105A SMH
RIM=459.16
INV=452.40 OUT
4' Diameter

106A SMH
RIM=459.69
INV=453.00 OUT
4' Diameter

107A SMH
RIM=460.67
INV=452.50 106A
INV=452.40 OUT
4' Diameter

108A SMH (DROP)
RIM=457.42
INV=450.70 107A
INV=448.30 OUT
5' Diameter

109A SMH
RIM=454.84
INV=447.80 108A
INV=447.60 OUT
4' Diameter

110 SMH
RIM=451.21
INV=438.60 109
INV=438.50 OUT
5' Diameter

110A SMH (DROP)
RIM=452.02
INV=445.30 109A
INV=441.30 OUT
5' Diameter

111 SMH (DROP)
RIM=449.11
INV=438.00 110
INV=434.40 OUT
5' Diameter

50' PERIMETER BUFFER

GARDEN AREA (APPARENT ENCROACHMENT)

RAISED GARDEN (APPARENT ENCROACHMENT)

PILE OF ROCKS

0 20 40 80 Feet

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No.	Revision	Date	Appvd.
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Drawing Title
Utility Plan

Drawing Number
C4.01

Sheet 37 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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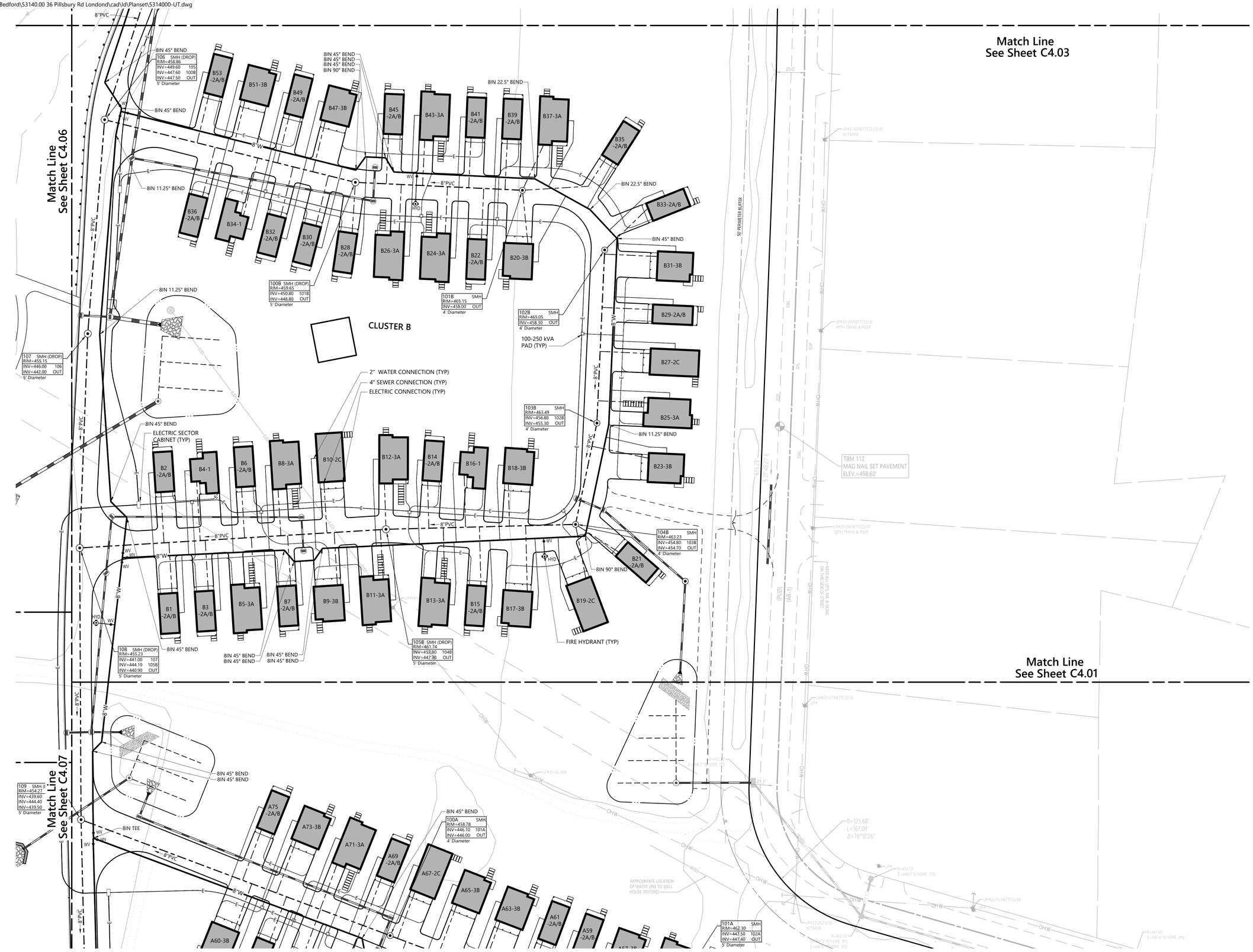

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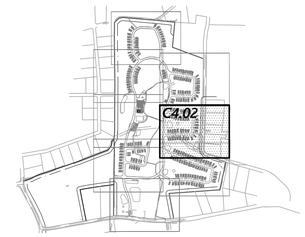

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

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Drawing Title
Utility Plan

Drawing Number
C4.02

Sheet 38 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
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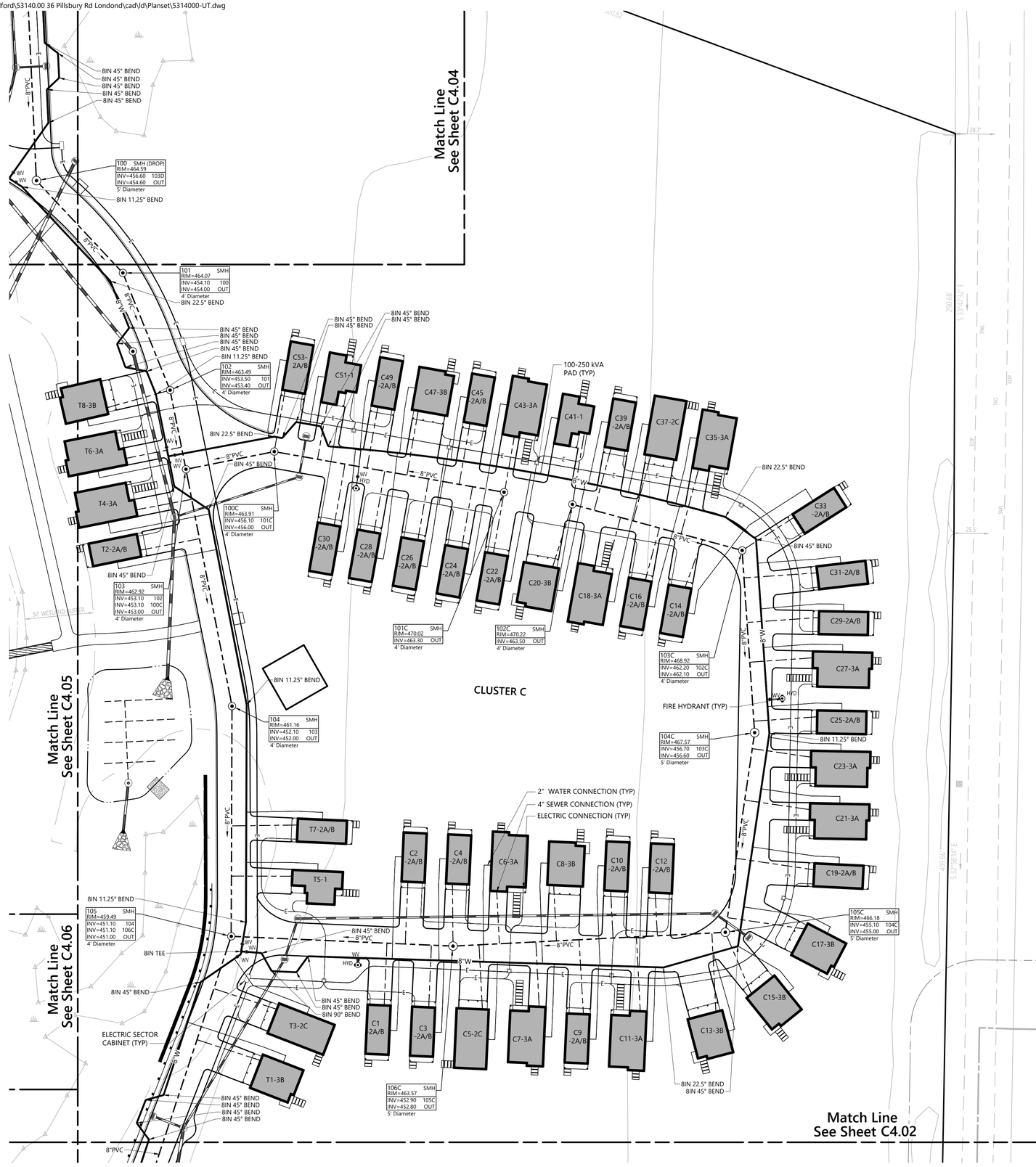

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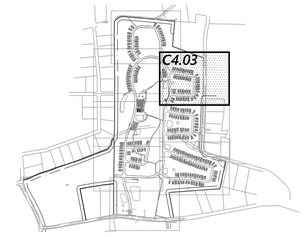

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Map 10, Lot 42 - 36 Pillsbury Road
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Drawing Title
Utility Plan

Drawing Number
C4.03

Sheet 39 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
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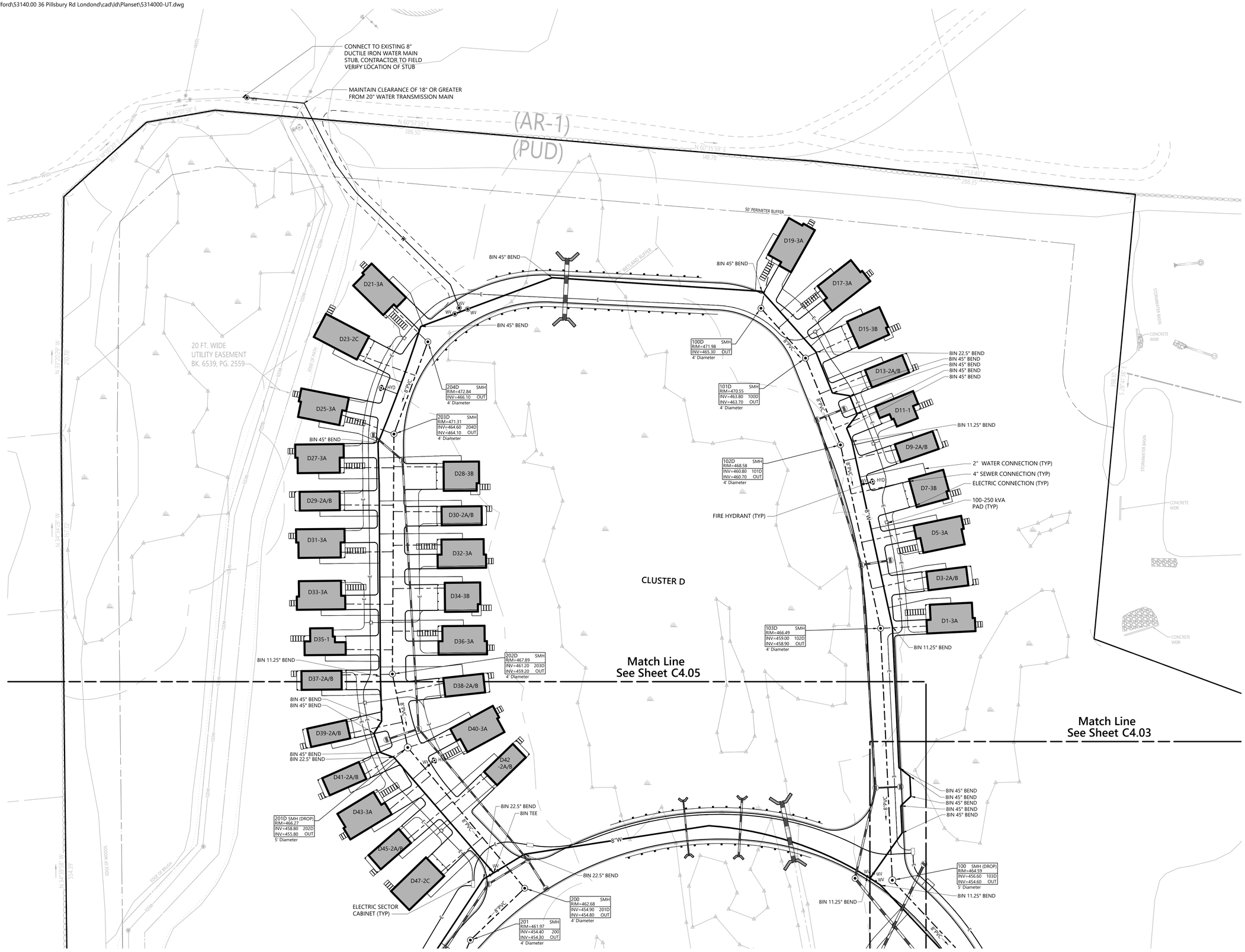

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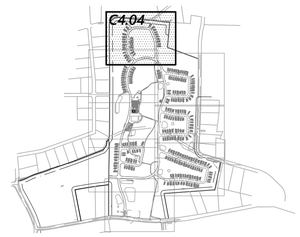

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Drawing Title: Utility Plan

Drawing Number: C4.04

STATE OF NEW HAMPSHIRE DAVID N. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 40 of 111

Project Number 53140.00

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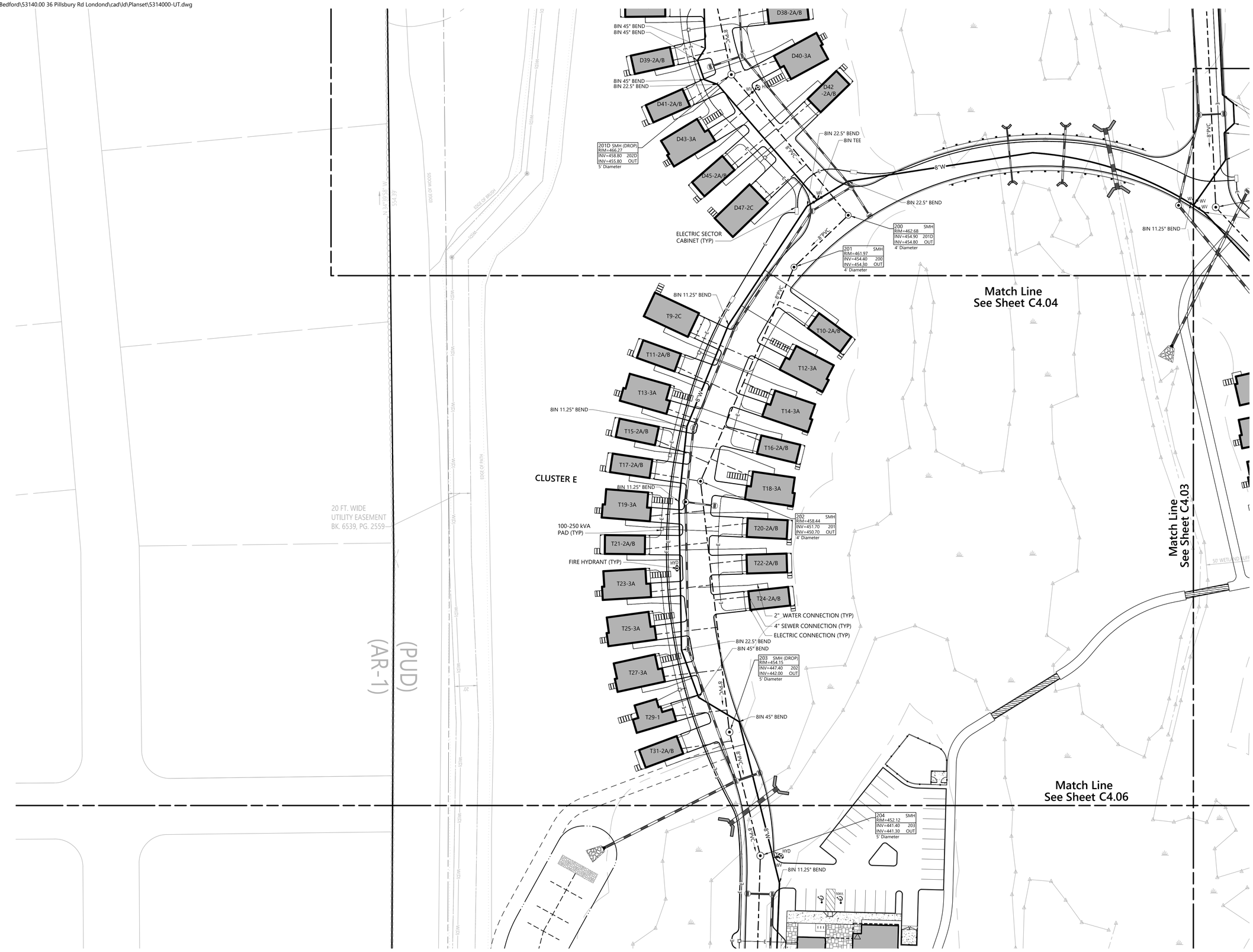

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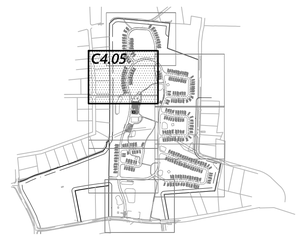

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Record Owner: Pillsbury Realty Development, LLC
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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

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Drawing Title
Utility Plan

Drawing Number
C4.05



Sheet 41 of 111

Project Number 53140.00



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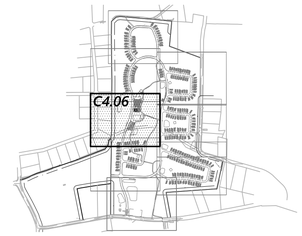

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

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Drawing Title: Utility Plan

Drawing Number: C4.06

Sheet 42 of 111

Project Number: 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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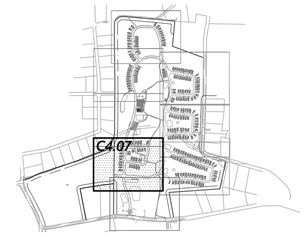

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Record Owner: Pillsbury Realty Development, LLC
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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
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Drawing Title
Utility Plan

Drawing Number
C4.07

Sheet 43 of 111

Project Number 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

THREE-WAY ELECTRIC MANHOLE (TYP)

213 SMH
RIM=403.14
INV=396.40 212
INV=394.90 OUT
4' Diameter

8IN 11.25° BEND

8"PVC

214 SMH (DROP)
RIM=393.77
INV=387.10 213
INV=380.10 OUT
5' Diameter

ELECTRIC VAULT (TYP)

215 SMH
RIM=385.75
INV=379.00 214
INV=378.90 OUT
4' Diameter

8IN 22.5° BEND

Match Line
See Sheet C4.07

0 FT. WIDE
ITILITY EASEMENT
K. 6539, PG. 2559

(AR-1)

(PUD)

50' PERIMETER BUFFER

APPROXIMATE FUTURE PUMP STATION, DESIGNED BY OTHERS

CONNECTION INTO FUTURE MUNICIPAL PUMP STATION, DESIGNED BY OTHERS

APPROXIMATE LOCATION OF SEPTIC SYSTEM FIELD

SMH P6 TO BE CONSTRUCTED BY OTHERS

EX-P6 SMH
RIM=379.03
INV=373.00 216
INV=368.63 OUT
4' Diameter

EVIDENCE OF LEACH FIELD OBSERVED BY SURVEY

216 SMH
RIM=380.86
INV=374.10 215
INV=374.00 OUT
4' Diameter

8IN 11.25° BEND

CONTRACTOR TO CONFIRM LOCATION AND INVERT OF FUTURE SEWER MANHOLE AND SUBMIT TO ENGINEER PRIOR TO INSTALLATION OF SEWER NETWORK

TIE INTO EXISTING 12" DUCTILE IRON WATER MAIN

CONTRACTOR TO COORDINATE WITH EVERSOURCE ON SITE ELECTRIC CONNECTION POINT

CONTRACTOR TO CONFIRM CLEARANCE OF 20" HDPE TRANSMISSION WATER MAIN. CROSSING TO BE IN ACCORDANCE WITH PENNICHUCK STANDARDS

110A SMH (DROP)
RIM=452.02
INV=445.30 109A
INV=441.30 OUT
5' Diameter

8"PVC

8"W

A1 -2A/B

A3-3B

A5-3A

A7-2C

8IN 11.25° BEND

109A SMH
RIM=454.84
INV=447.80 108A
INV=447.60 OUT
4' Diameter

8IN 45° BEND

Match Line
See Sheet C4.01

TBM 121
MAG NAIL SET IN MEDIAN
ELEV.=395.40'

(2) RAISED CONDUIT

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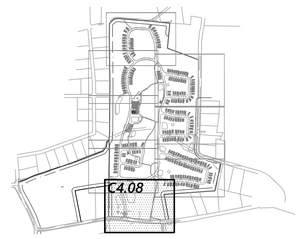

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ
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Date
February 20, 2025

Not Approved for Construction

Drawing Title
Utility Plan

Drawing Number
C4.08

Sheet 44 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEERS - LICENSED - DAVID H. FENSTERMACHER No. 13382
11/13/2025

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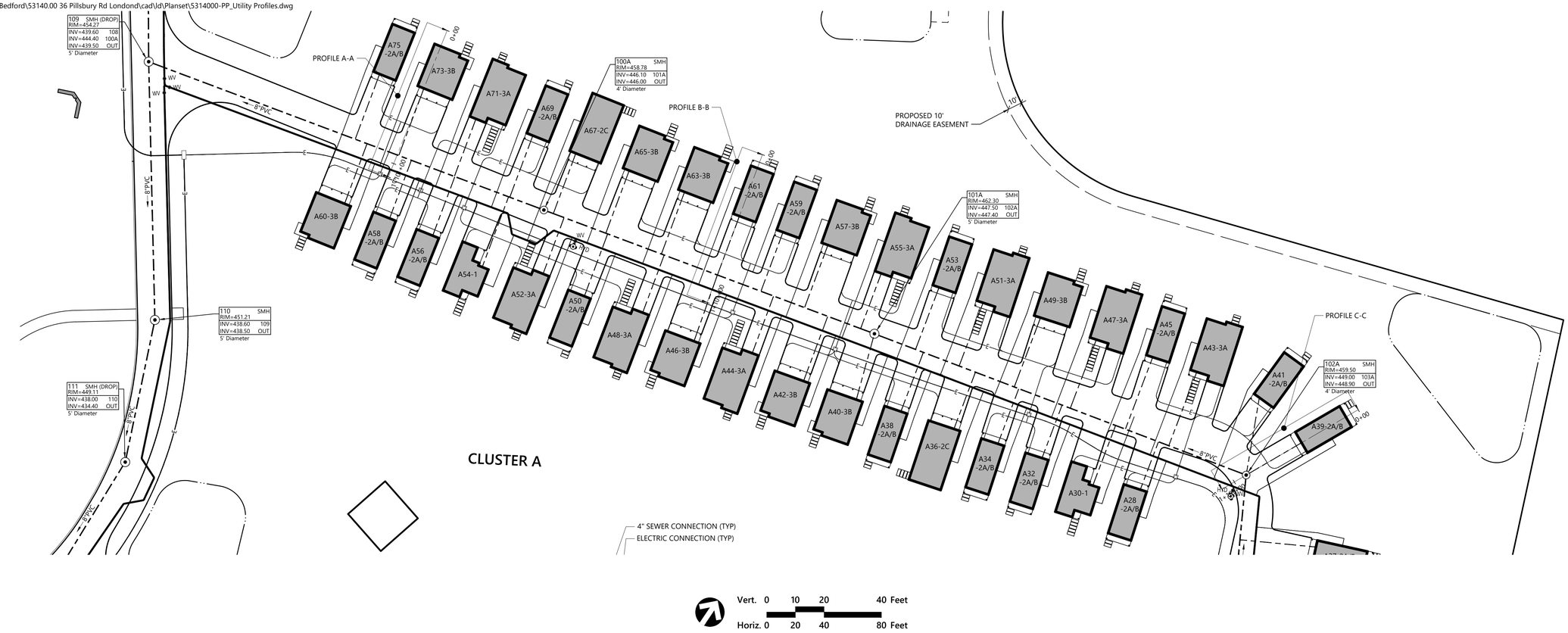
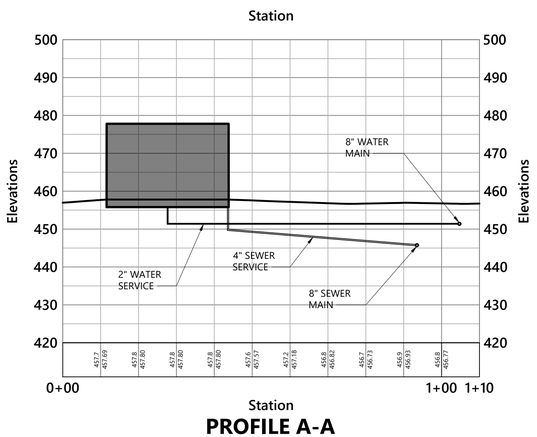
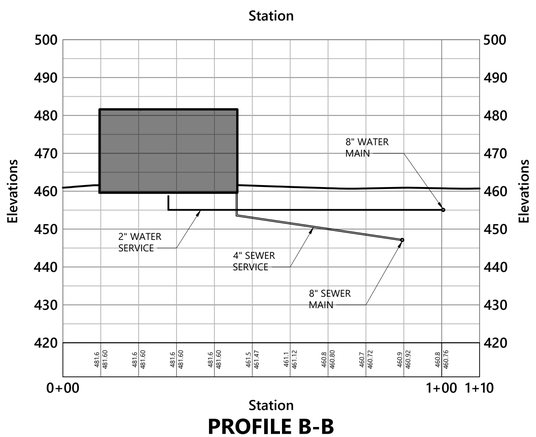
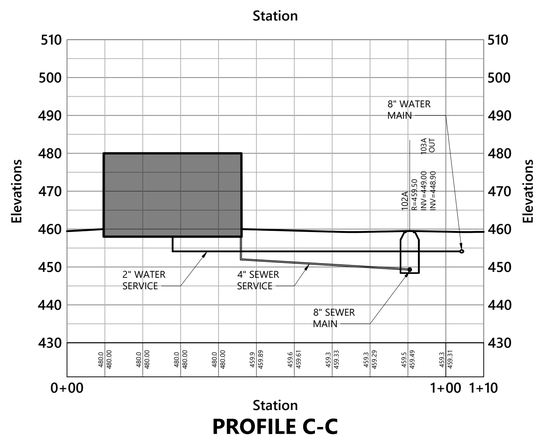




PROFILE A-A



PROFILE B-B



PROFILE C-C

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Issued for: **Permitting** | Date: **February 20, 2025**

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Drawing Title
Sanitary Plan and Profile
Oxford Court

Drawing Number
C4.09

Sheet 45 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13332
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

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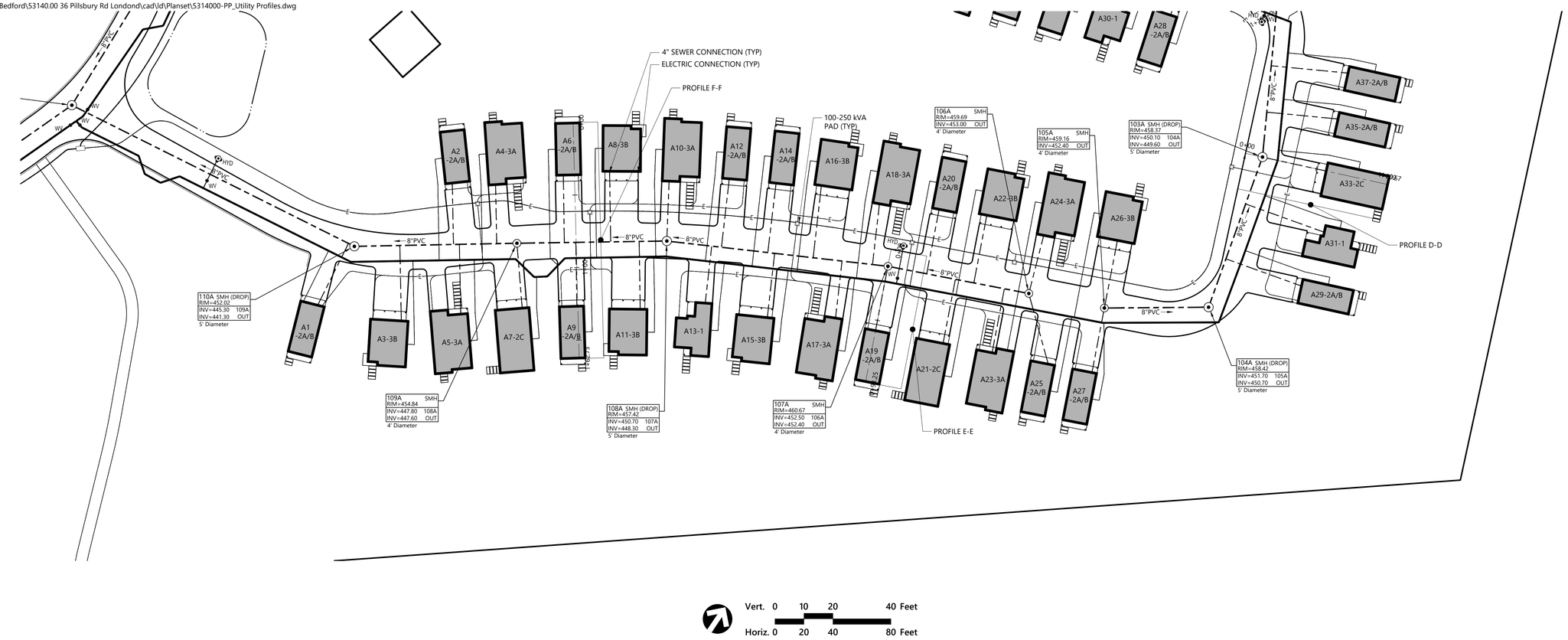

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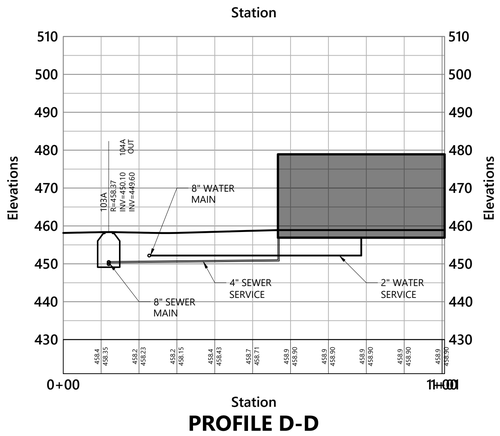
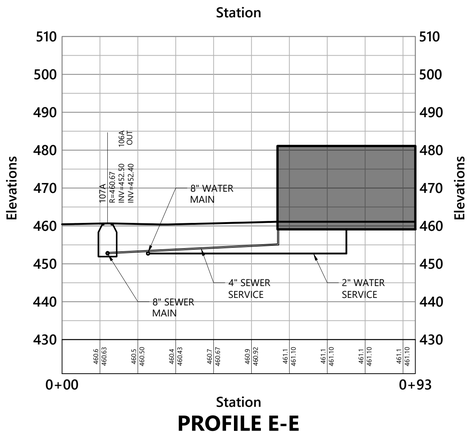
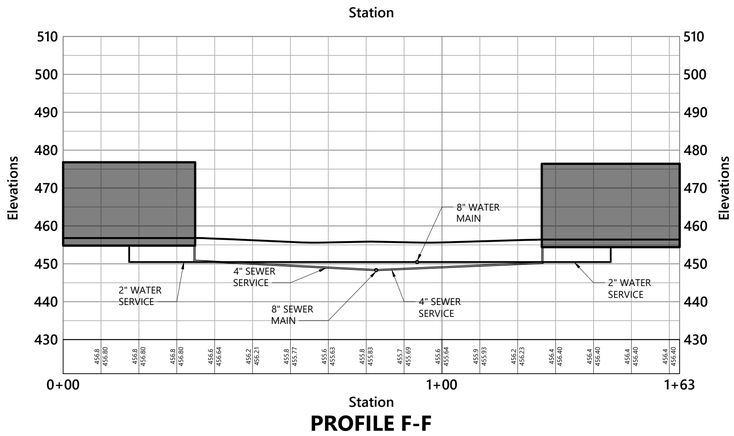


PROFILE D-D



PROFILE E-E



PROFILE F-F

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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title

Sanitary Plan and Profile Oxford Court

Drawing Number

C4.10

Sheet 46 of 111

Project Number 53140.00

STATE OF NEW HAMPSHIRE DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER 11/13/2025

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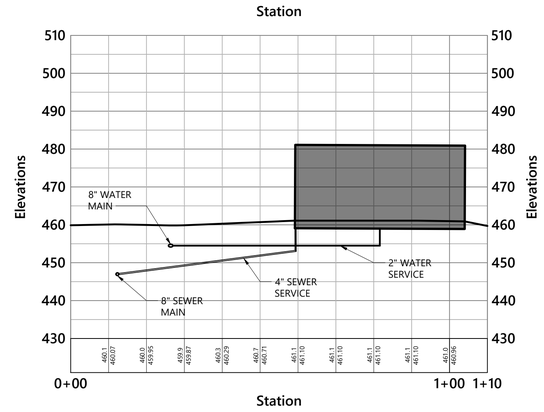

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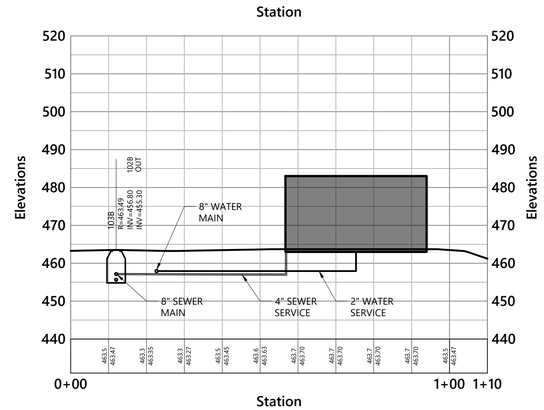

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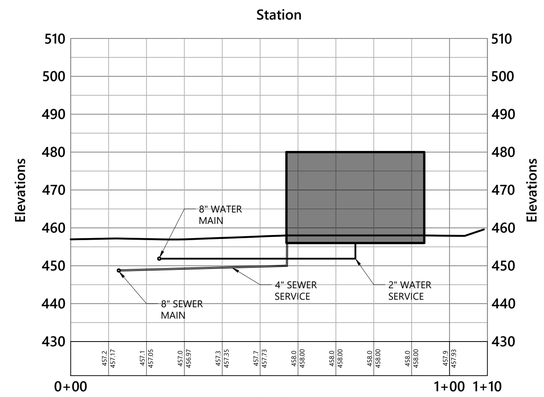

PROFILE C-C

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
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Drawing Title
Sanitary Plan and Profile Redfield Court

Drawing Number
C4.11

Sheet 47 of 111

Project Number 53140.00

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11/13/2025

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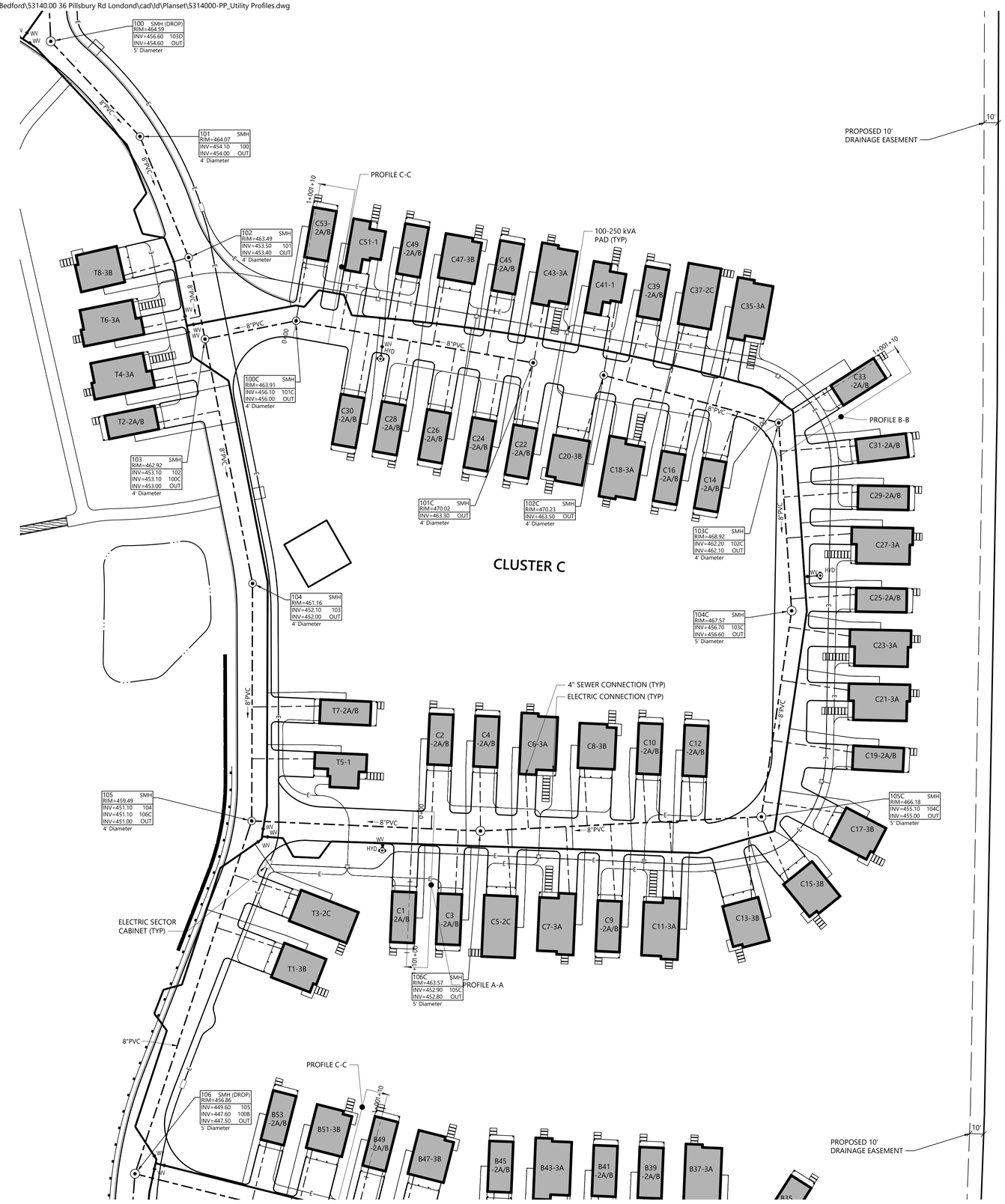
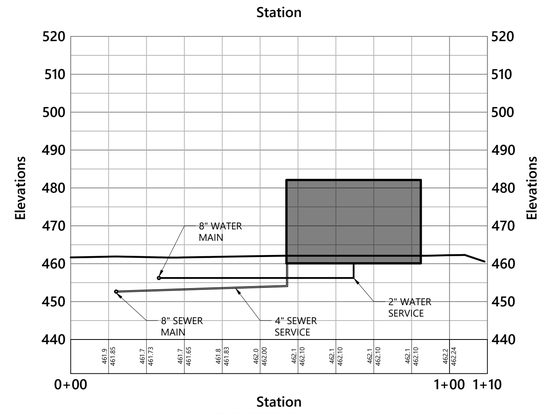
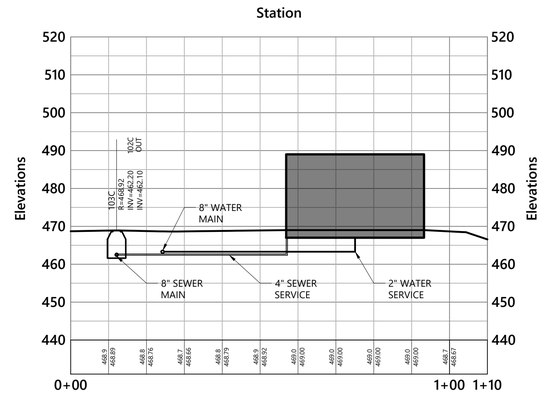




PROFILE A-A



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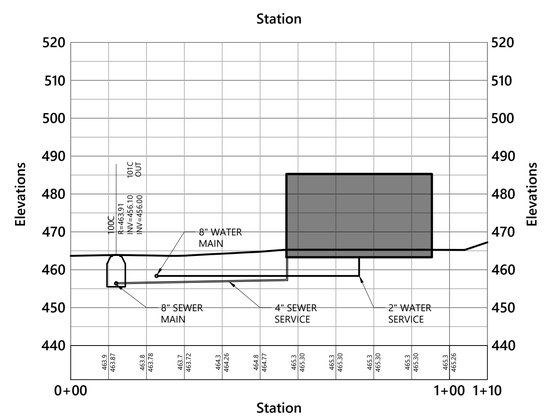

PROFILE C-C

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Drawing Title
Sanitary Plan and Profile Bramley Court

Drawing Number
C4.12

Sheet 48 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
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11/13/2025

Project Number 53140.00

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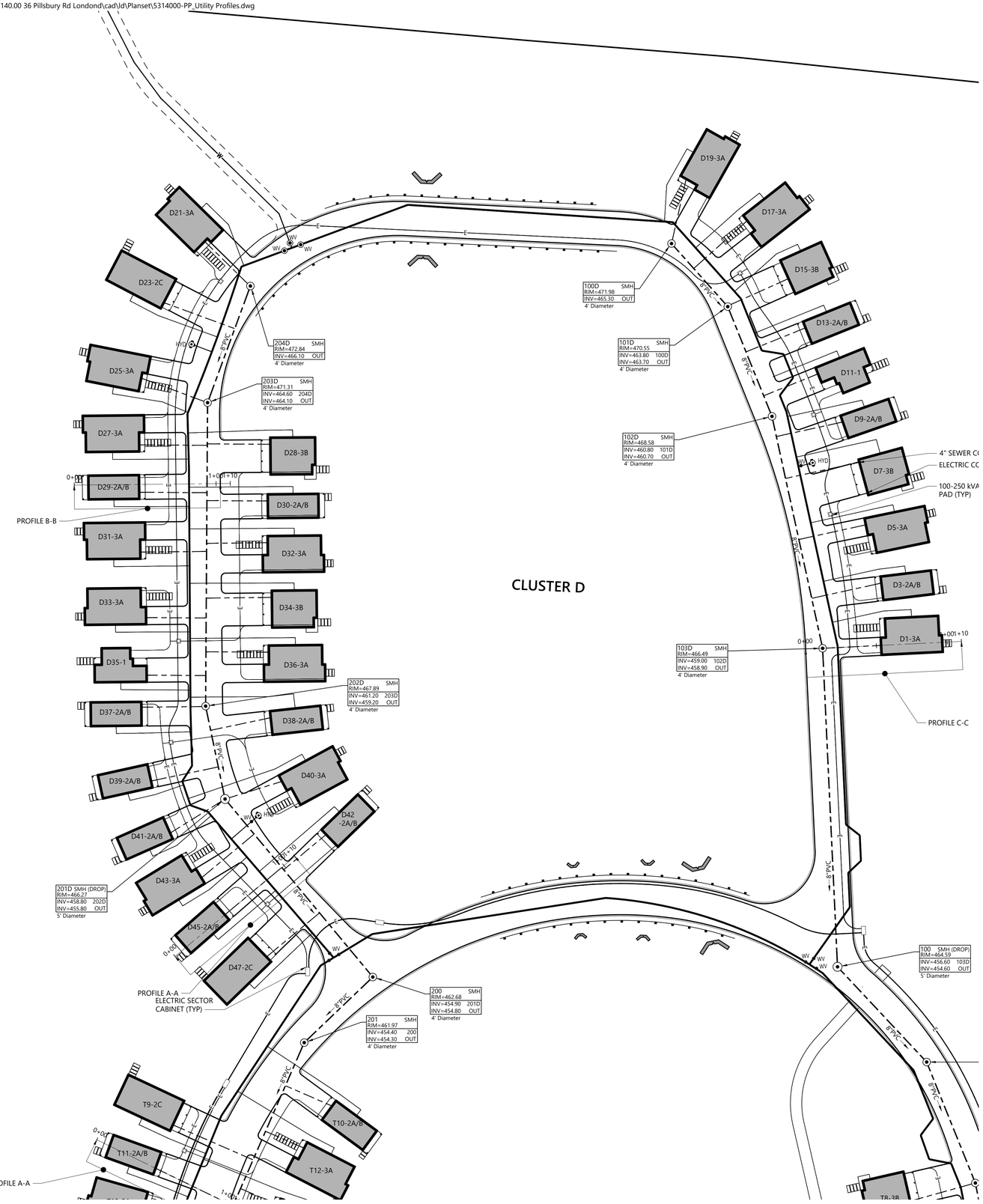
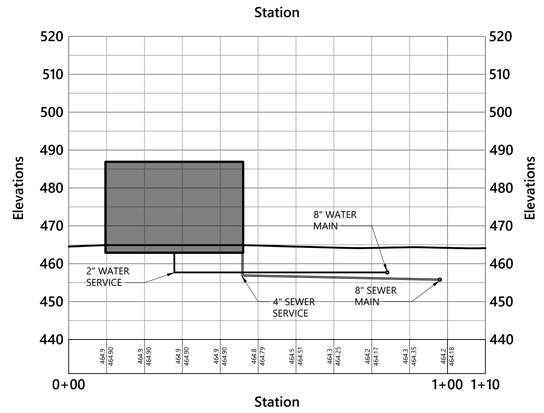
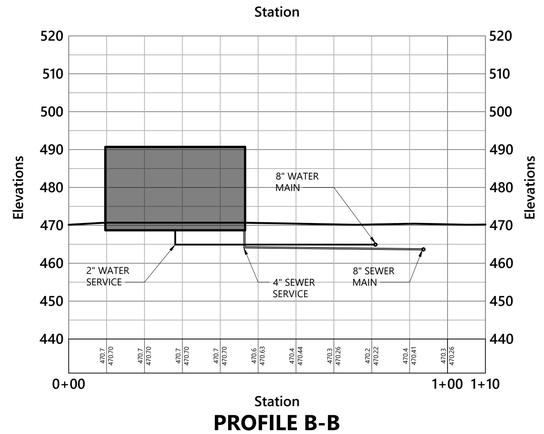
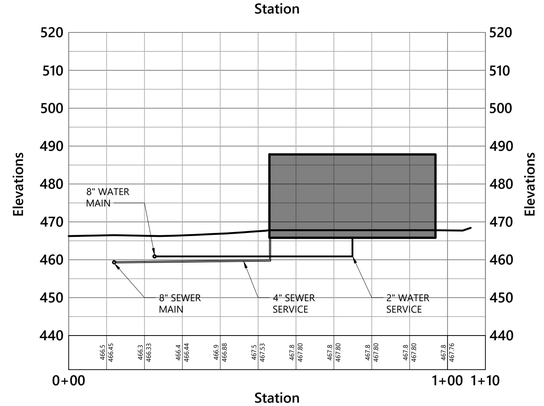




PROFILE A-A



PROFILE B-B



PROFILE C-C

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Drawing Title
Sanitary Plan and Profile Kingston Court

Drawing Number
C4.13

Sheet 49 of 111

STATE OF NEW HAMPSHIRE DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number 53140.00

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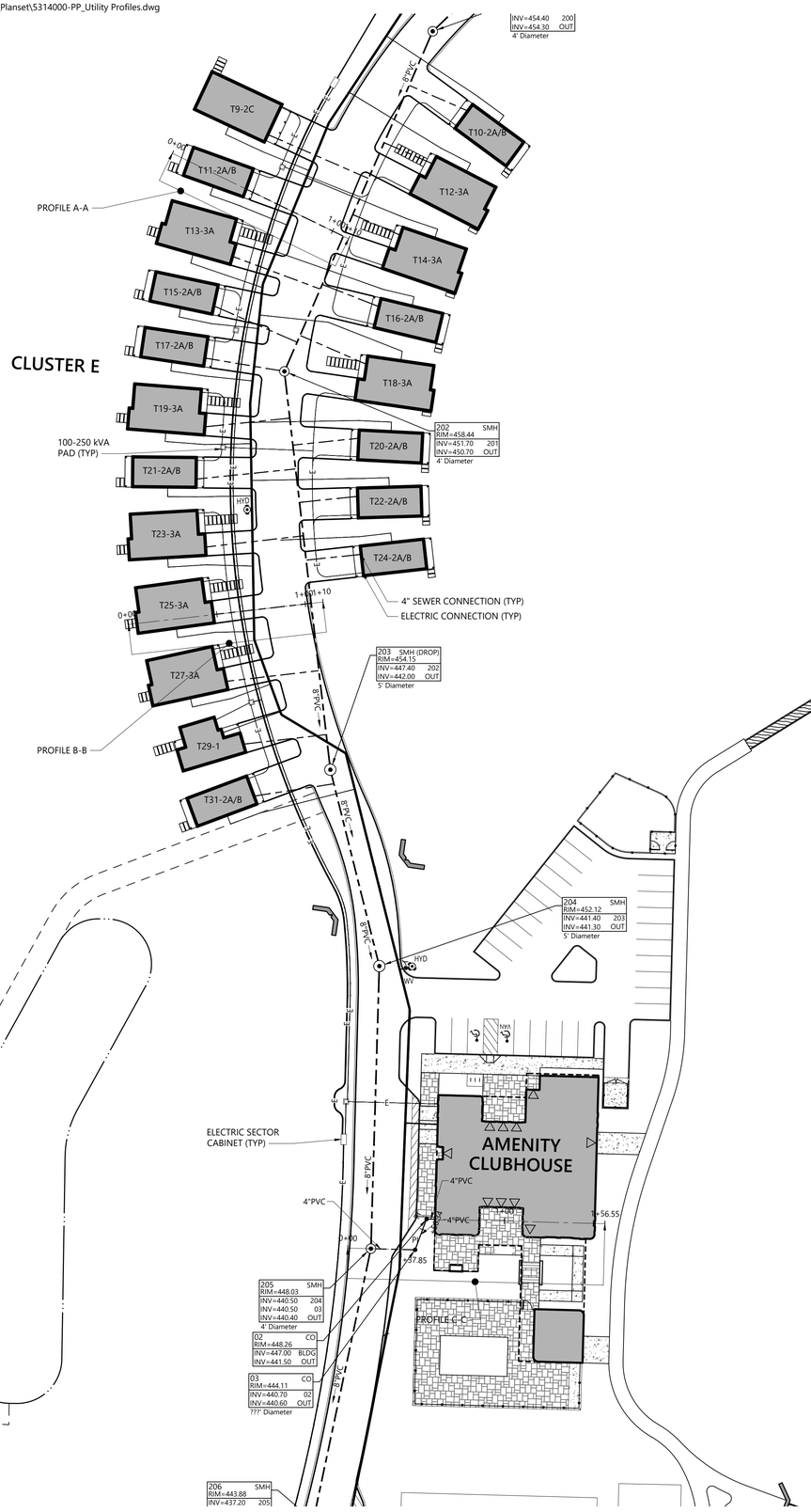
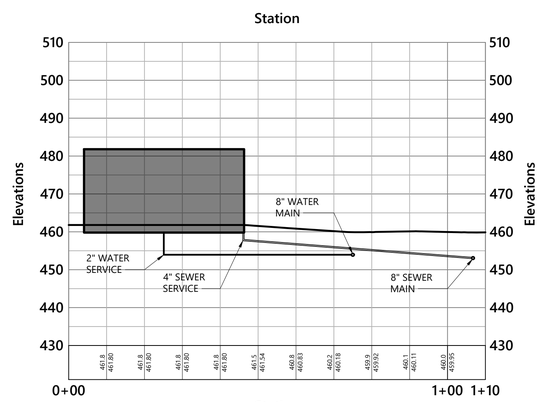
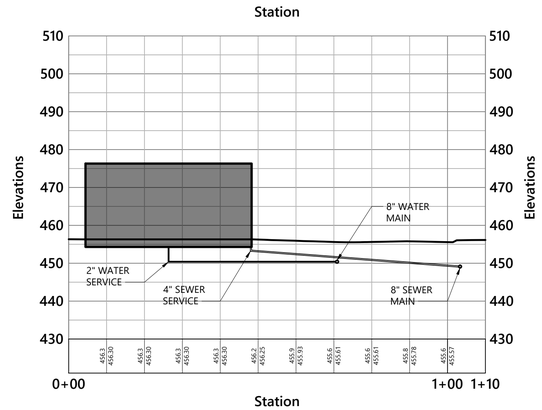
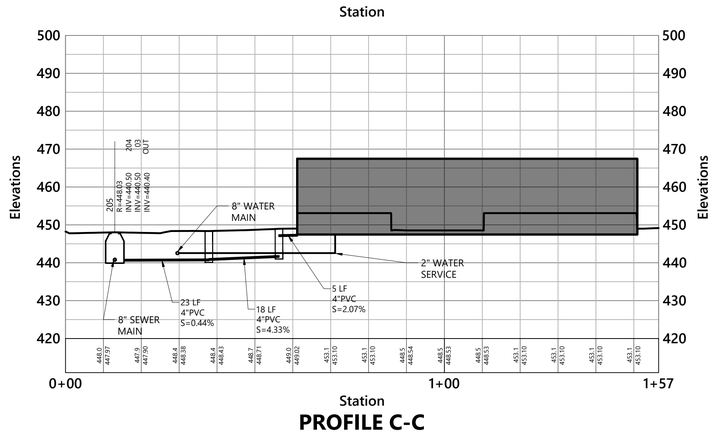




PROFILE A-A



PROFILE B-B



PROFILE C-C

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Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Drawing Title
Sanitary Plan and Profile Thornton Hill Avenue

Drawing Number
C4.14

Sheet 50 of 111

Project Number 53140.00

STATE OF NEW HAMPSHIRE - DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

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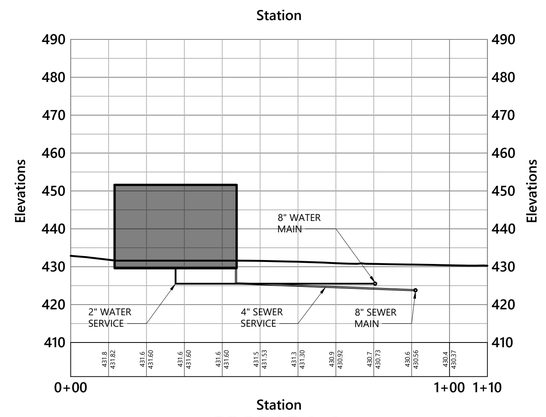

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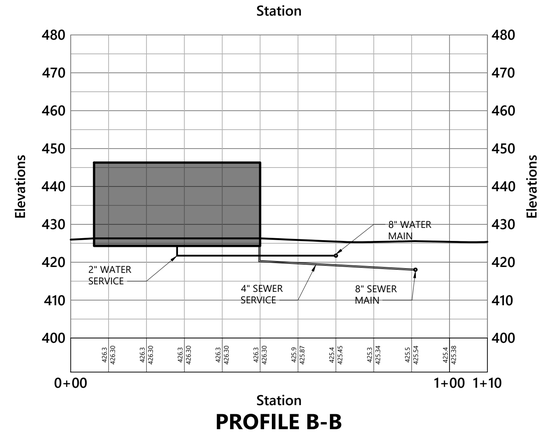

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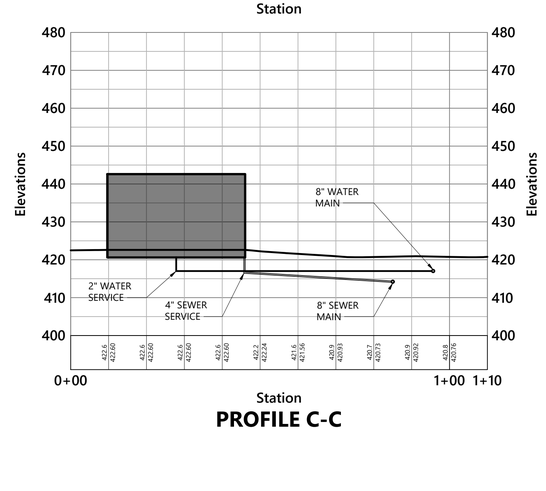

PROFILE C-C

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Date February 20, 2025

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Drawing Title
Sanitary Plan and Profile Porters Court

Drawing Number
C4.15

Sheet 51 of 111

Project Number 53140.00

STATE OF NEW HAMPSHIRE DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

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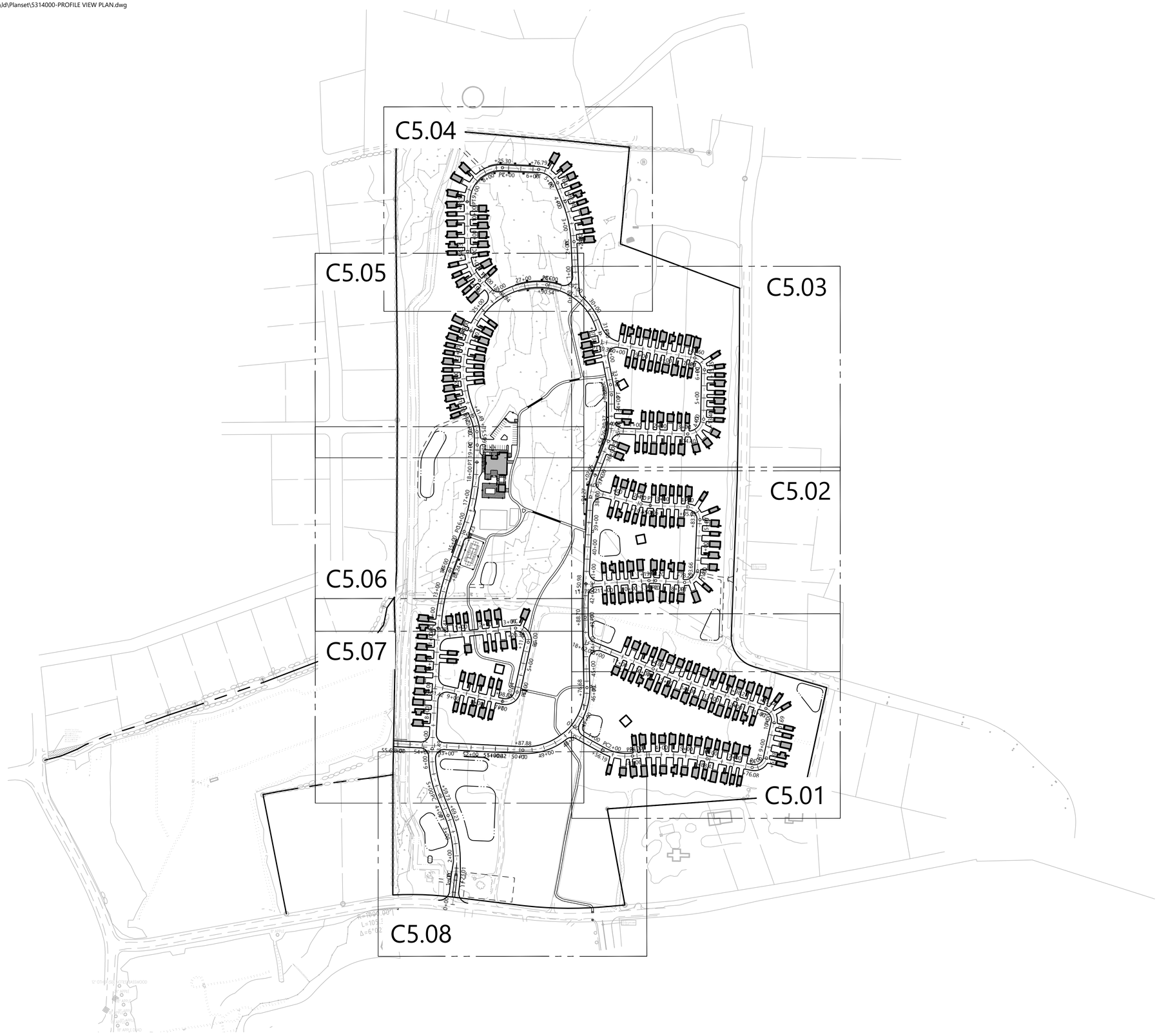

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No.	Revision	Date	Appvd.
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Drawing Title
Overall Profile View Plan

Drawing Number
C5.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 52 of 111

Project Number
53140.00

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title
Profile View Plan

Drawing Number
C5.01

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Map 10, Lot 42 - 36 Pillsbury Road
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Drawing Title
Profile View Plan

Drawing Number
C5.02

STATE OF NEW HAMPSHIRE
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11/13/2025

Sheet 54 of 111

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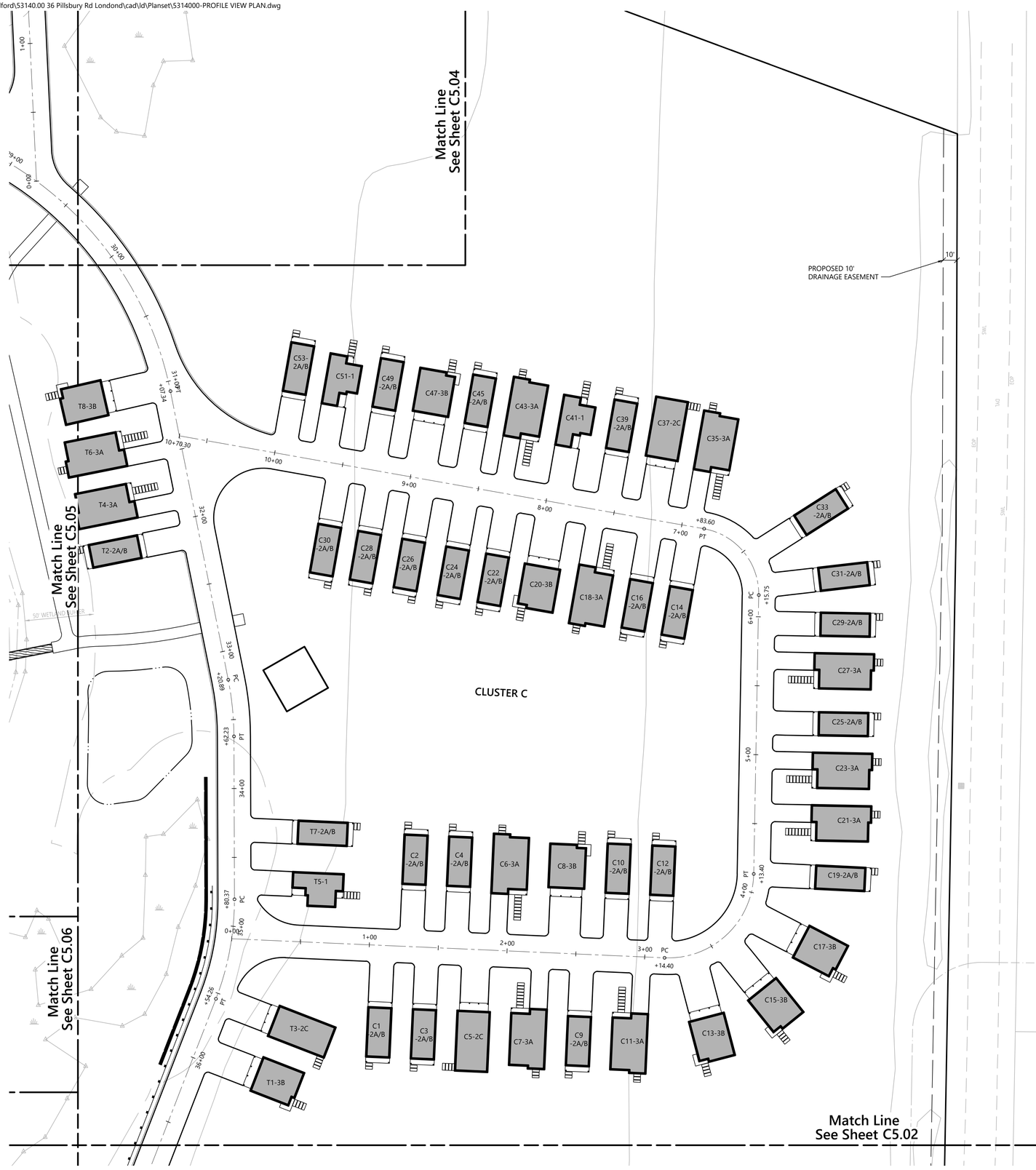

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Londonderry, New Hampshire 03053

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Drawing Title
Profile View Plan

Drawing Number
C5.03

Sheet 55 of 111

Project Number
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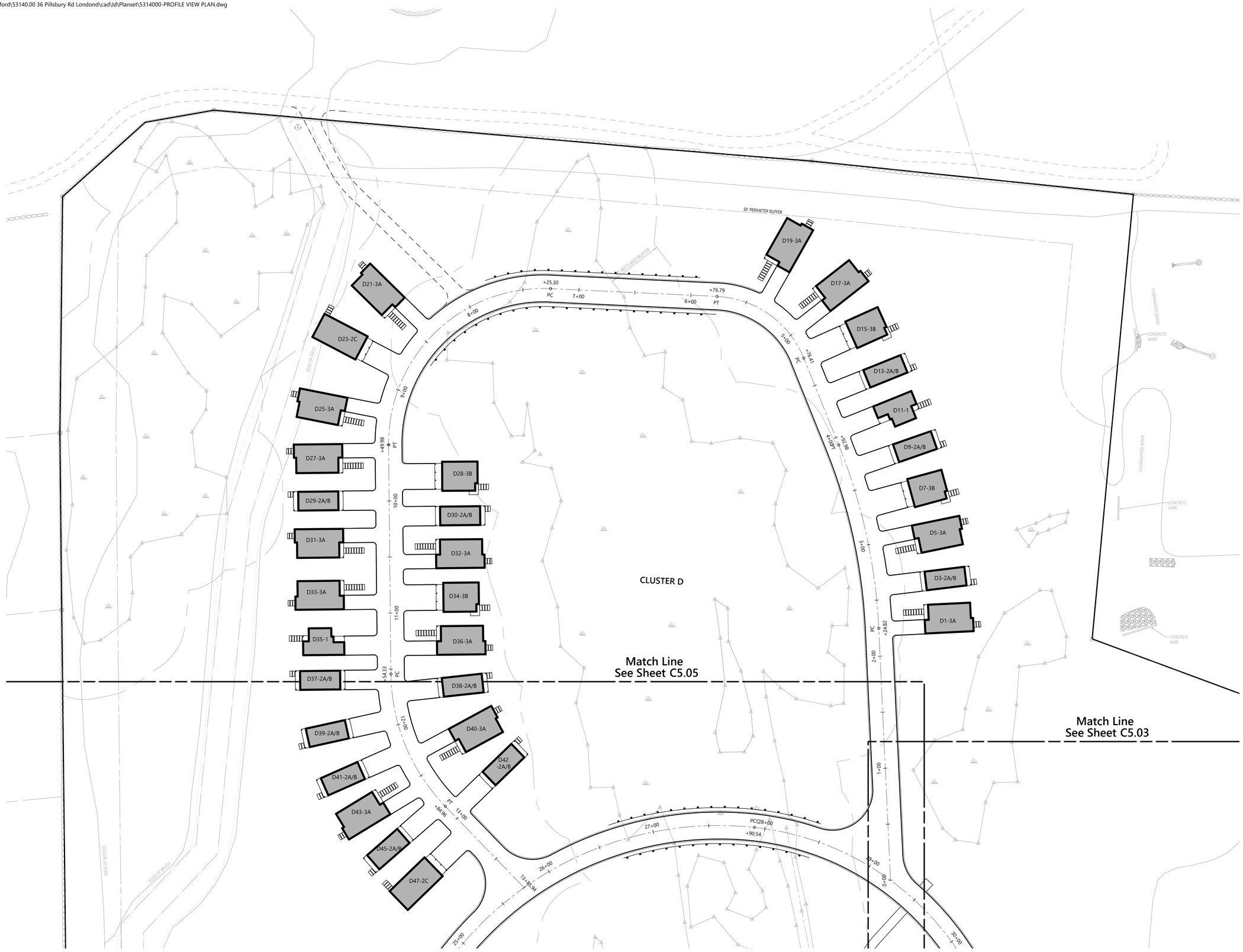

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Map 10, Lot 42 - 36 Pillsbury Road
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Drawing Title: Profile View Plan

Drawing Number: C5.04

Sheet 56 of 111

Project Number: 53140.00

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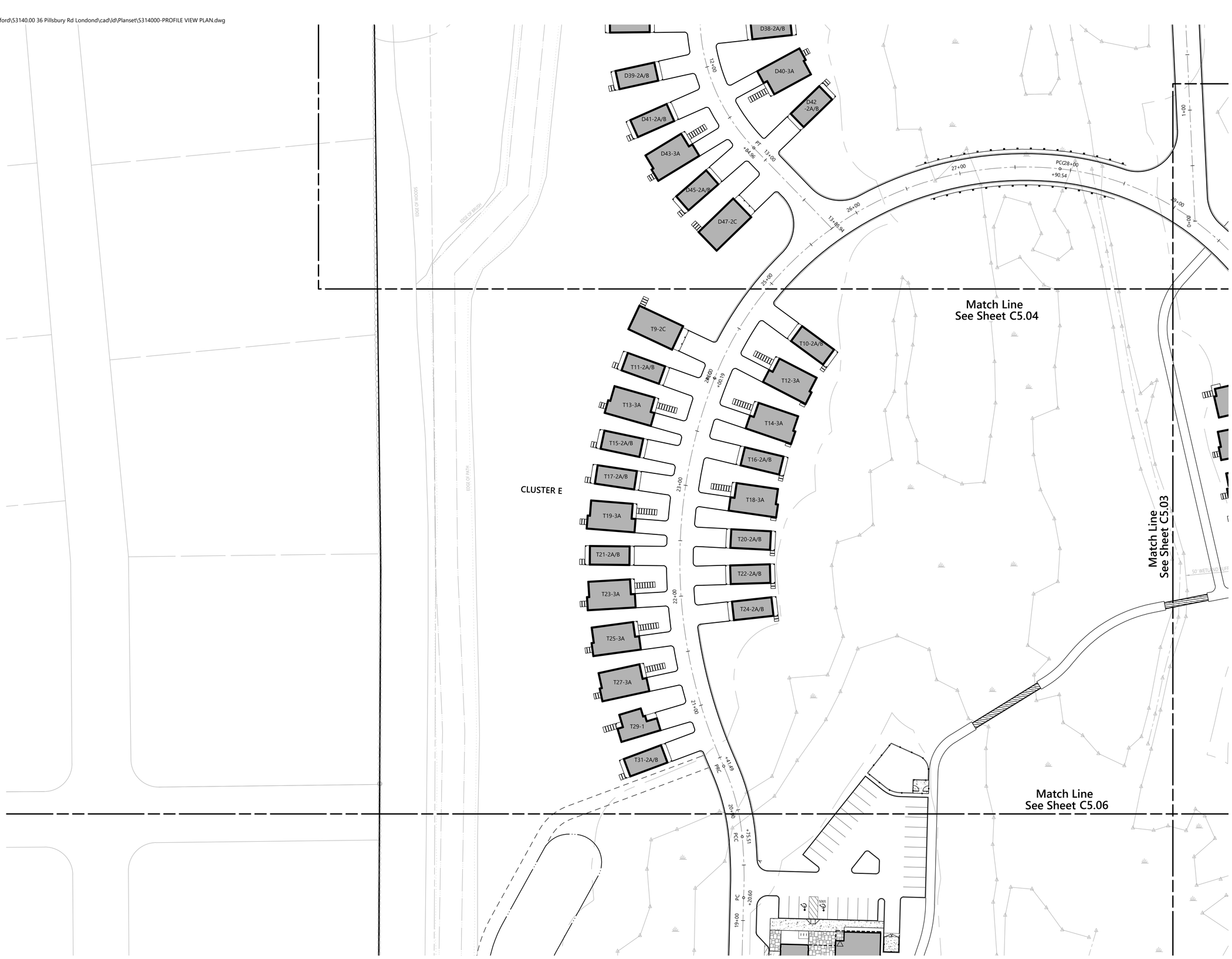

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Drawing Title
Profile View Plan

Drawing Number
C5.05

Sheet 57 of 111

Project Number
53140.00

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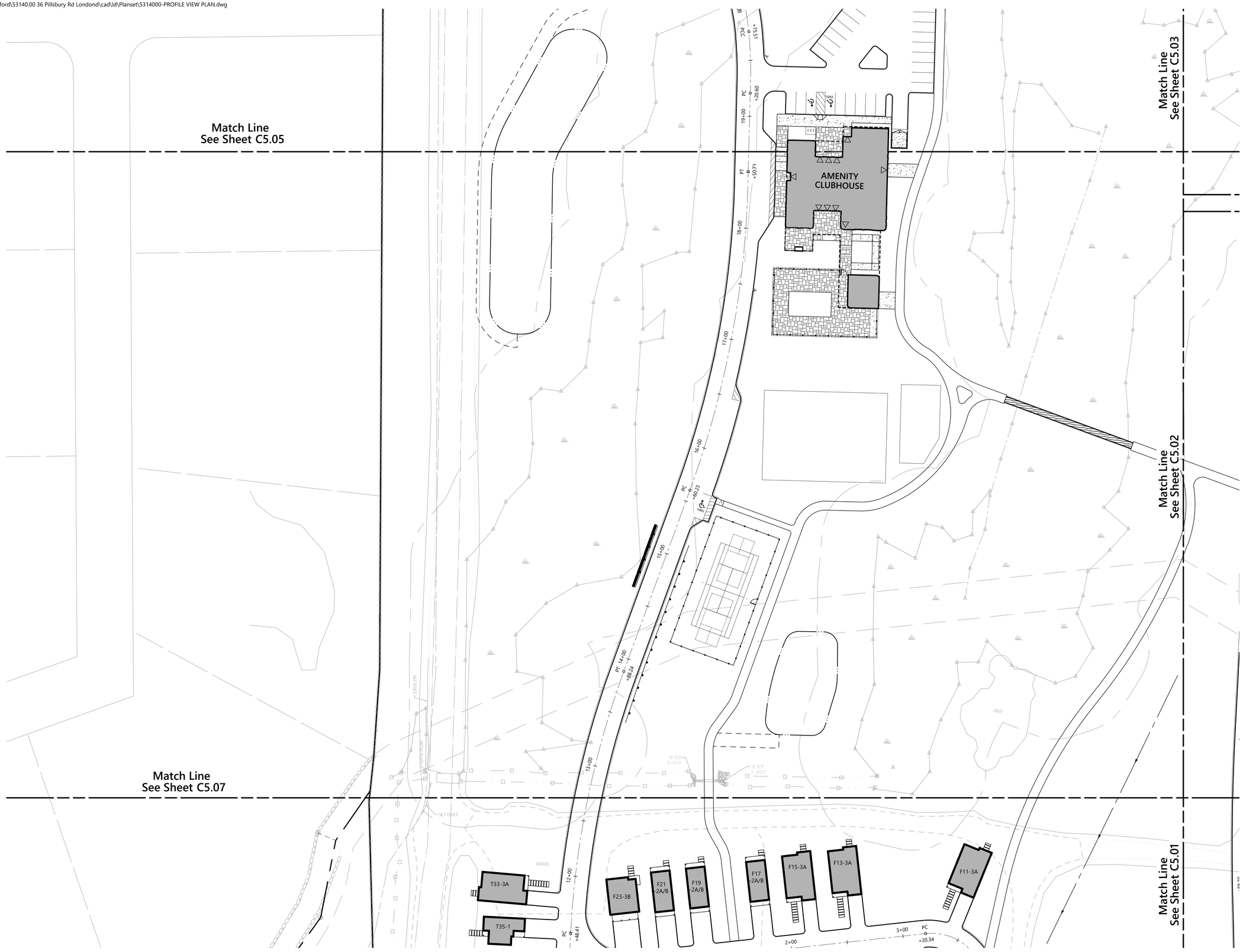

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Drawing Title
Profile View Plan

Drawing Number
C5.06

Sheet 58 of 111

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Map 10, Lot 42 - 36 Pillsbury Road
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Drawing Title
Profile View Plan

Drawing Number
C5.07

Sheet 59 of 111

Project Number
53140.00

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
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Drawing Title: Profile View Plan

Drawing Number: C5.08

Sheet 60 of 111

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DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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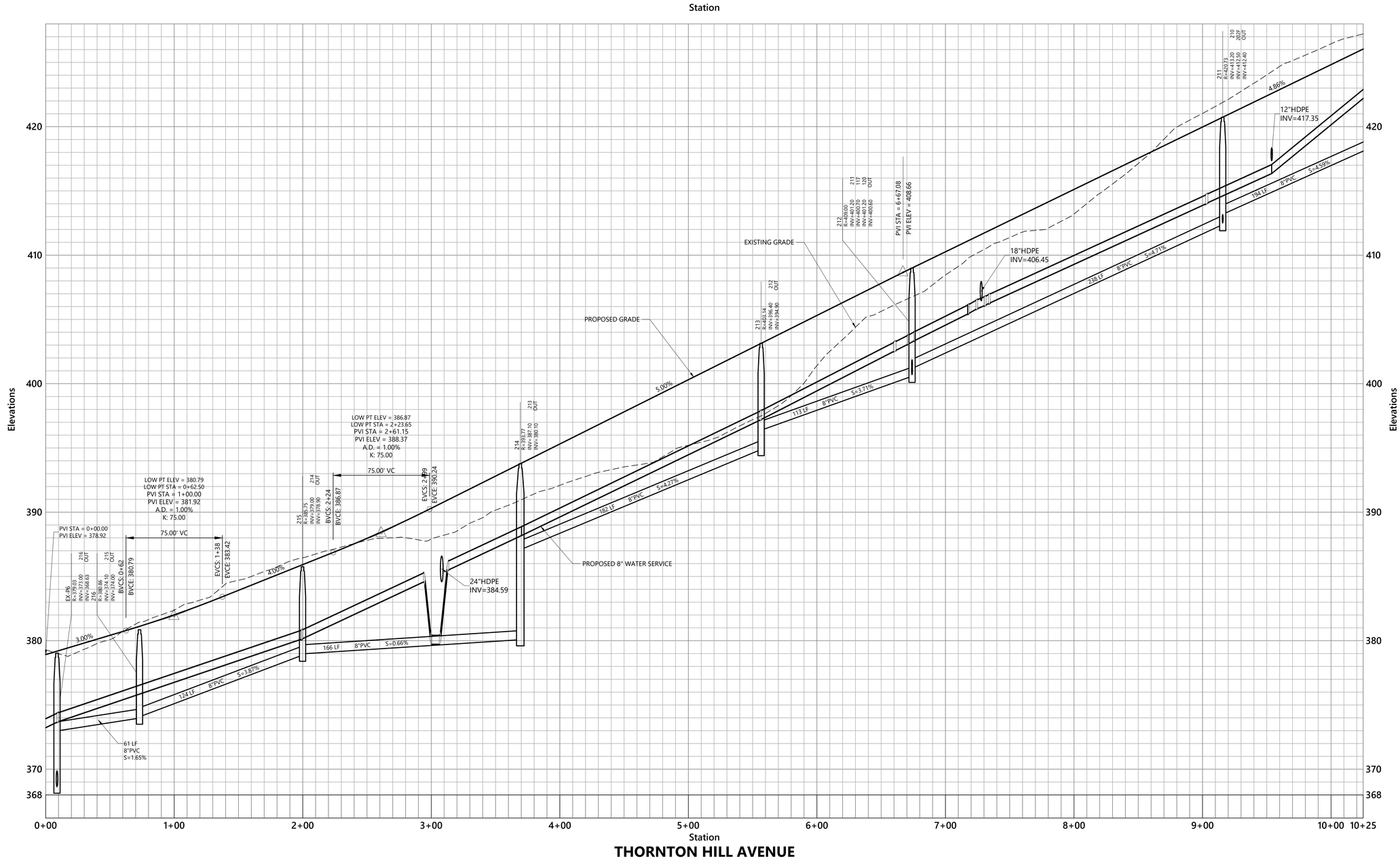

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Map 10, Lot 42 - 36 Pillsbury Road
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No.	Revision	Date	Appvd.
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Drawing Title
Thornton Hill Avenue Profile

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C5.09

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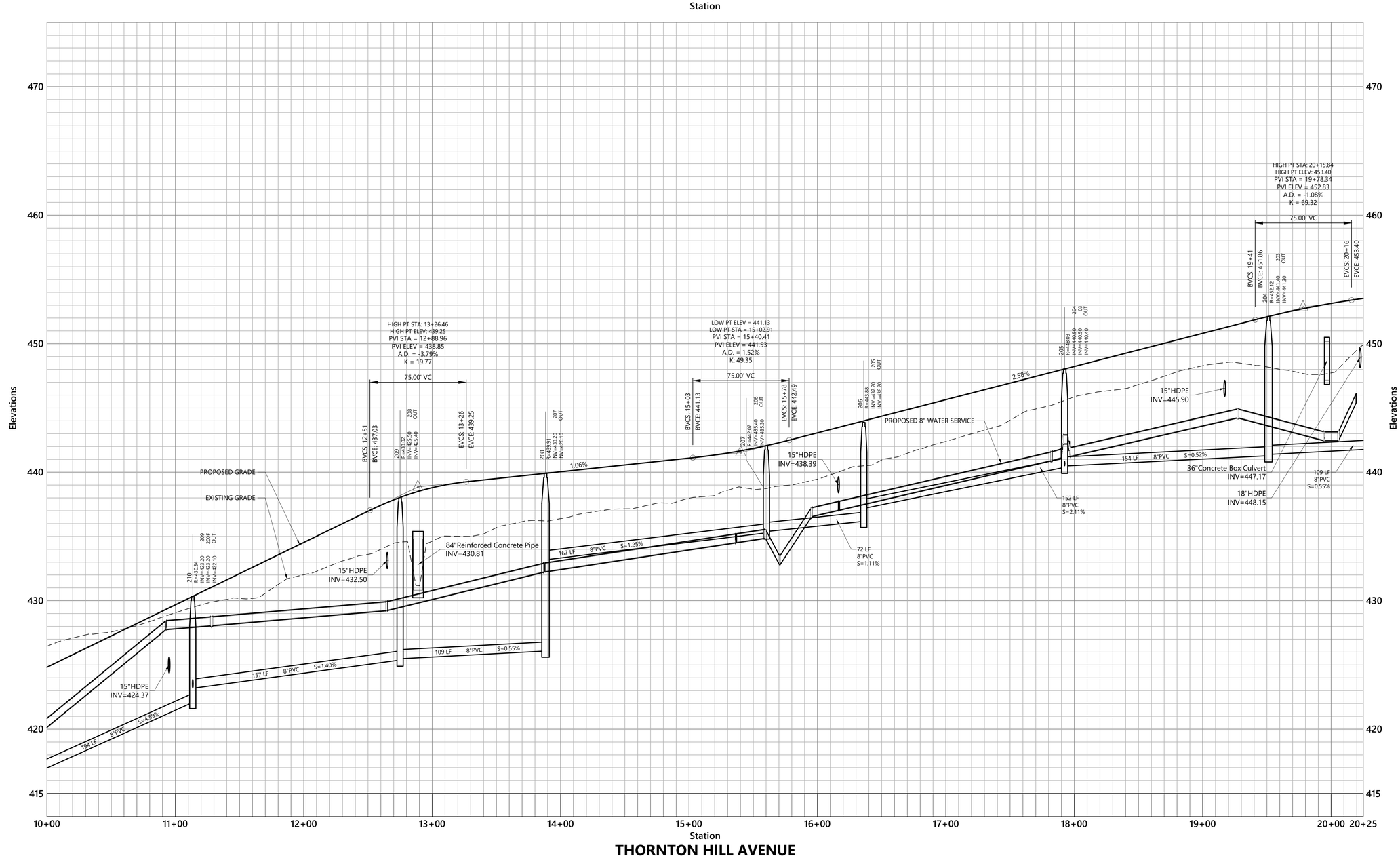

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Map 10, Lot 42 - 36 Pillsbury Road
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Drawing Title
Thornton Hill Avenue Profile

Drawing Number
C5.10

Sheet ## of 111

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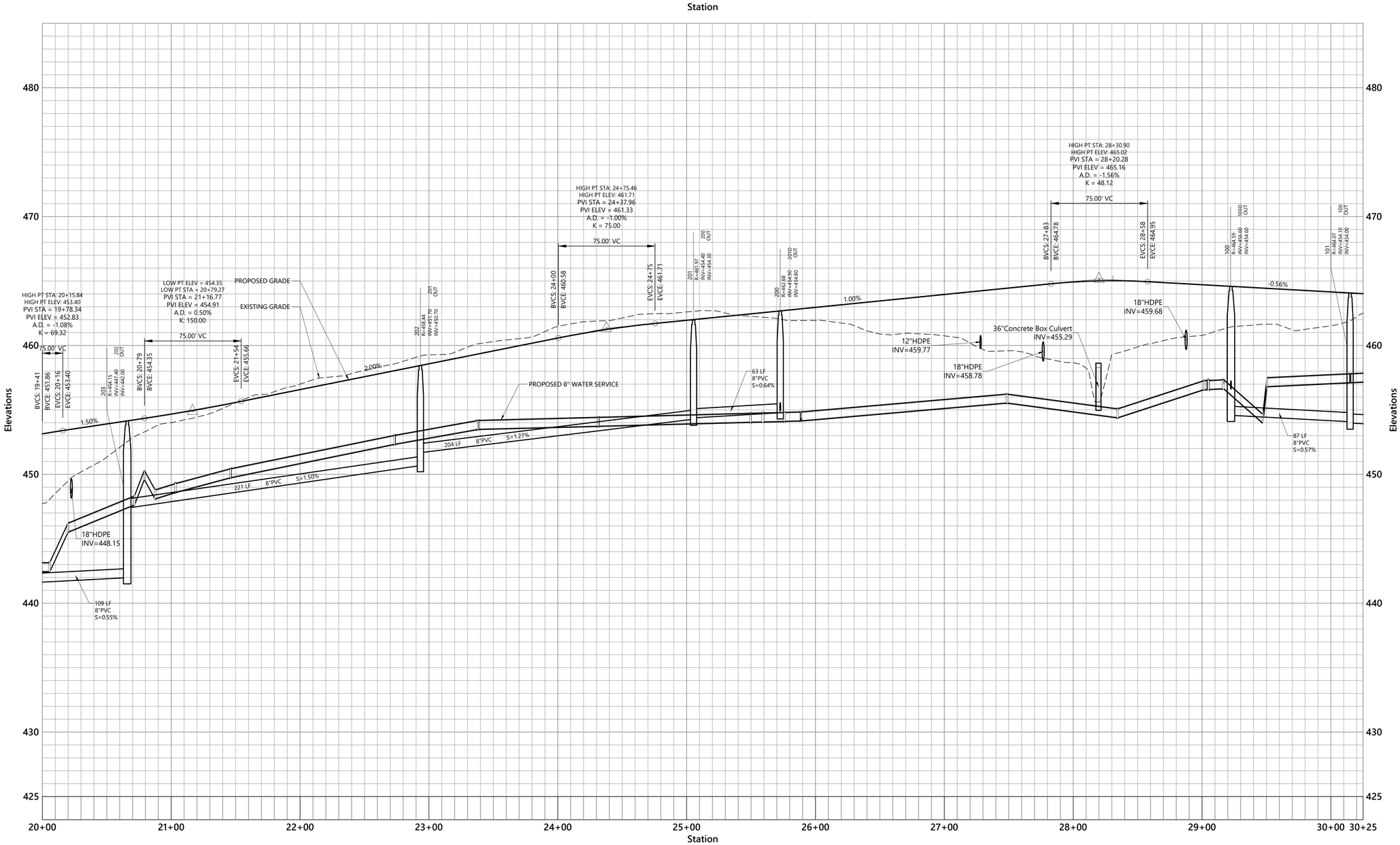

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Drawing Title
Thornton Hill Avenue Profile

Drawing Number
C5.11

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53140.00

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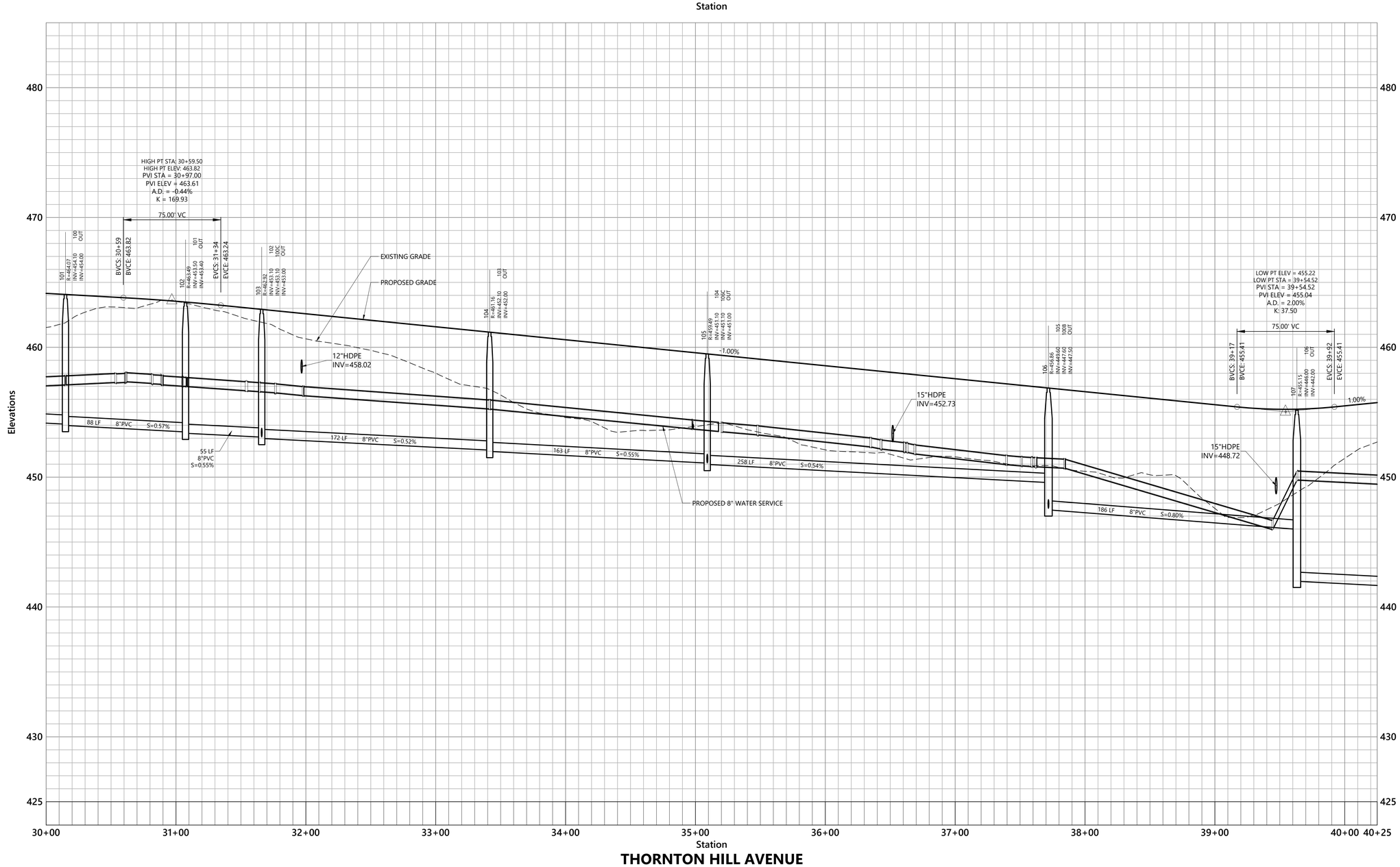

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No.	Revision	Date	Apprvd.
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Drawing Title
Thornton Hill Avenue Profile

Drawing Number
C5.12

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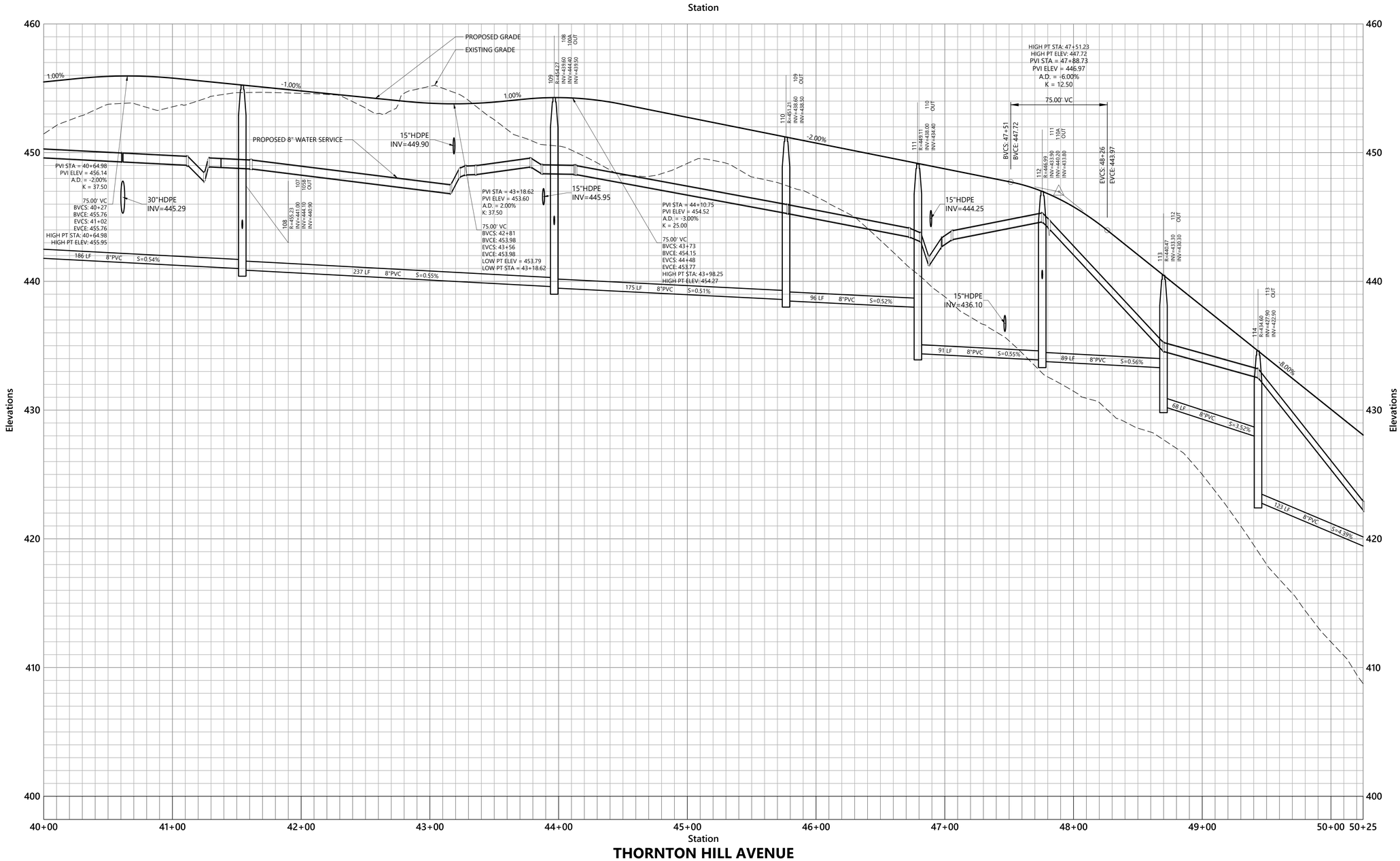

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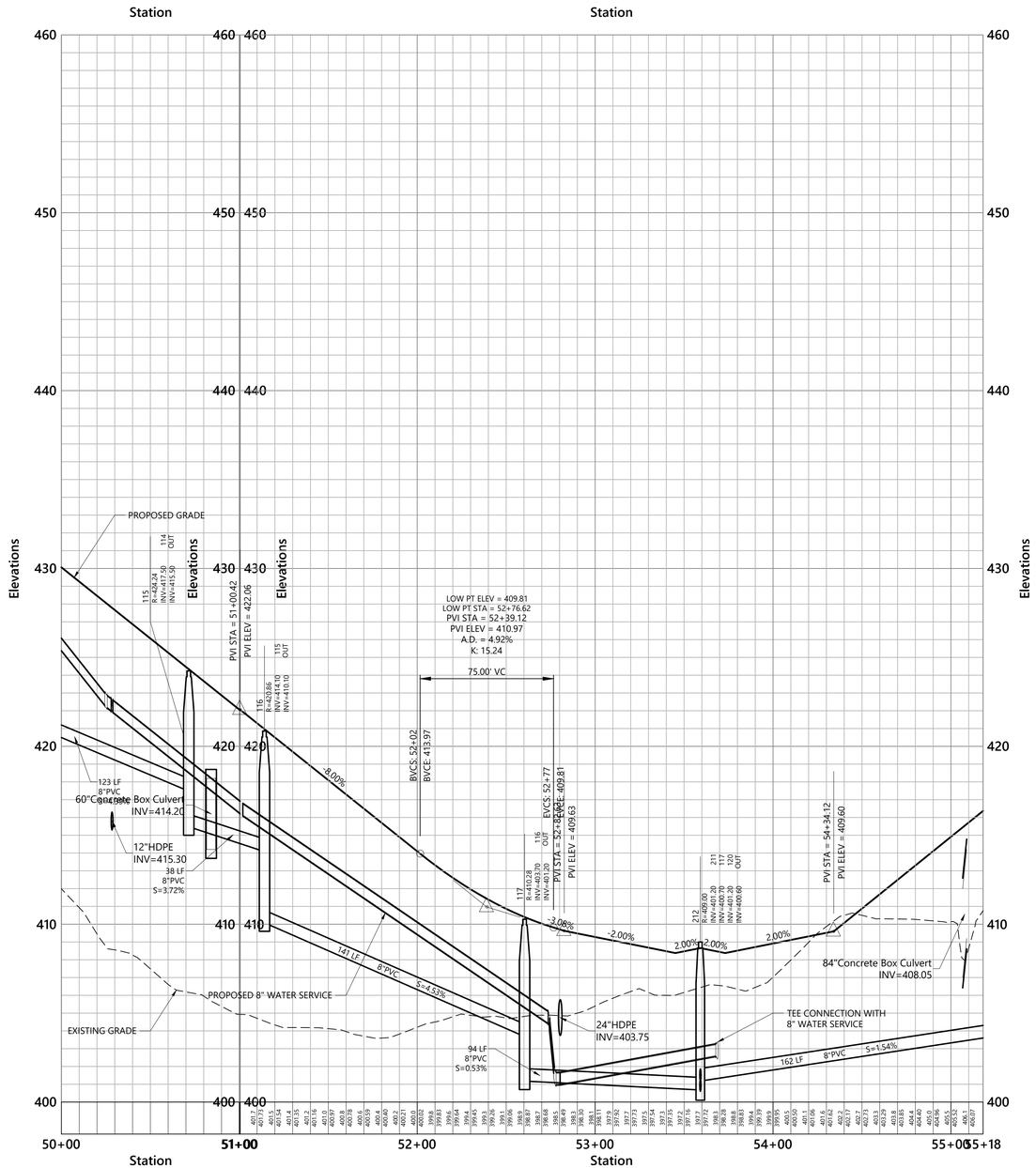

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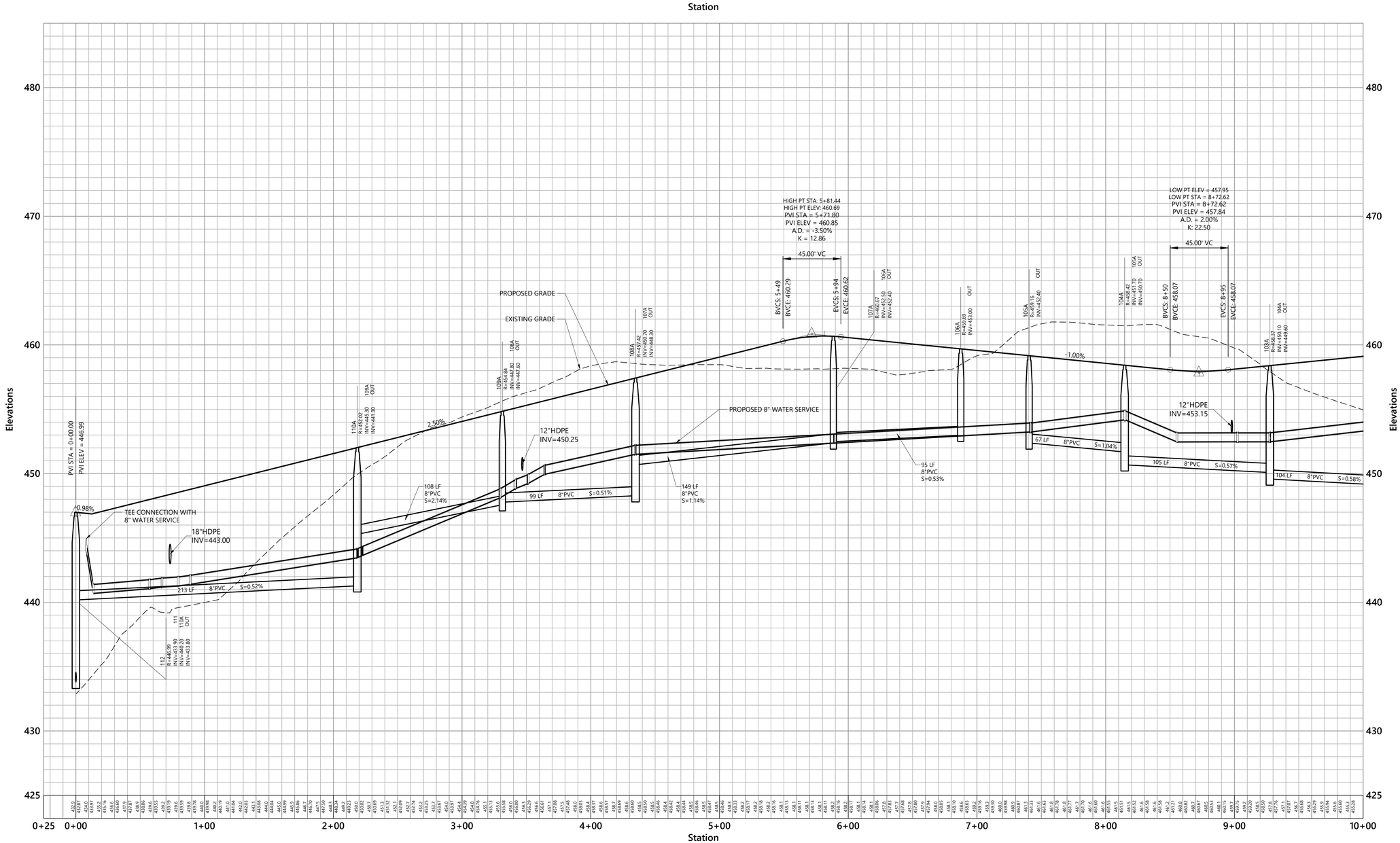

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title
Oxford Court Profile

Drawing Number
C5.15

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11/13/2025

Sheet 67 of 111

Project Number
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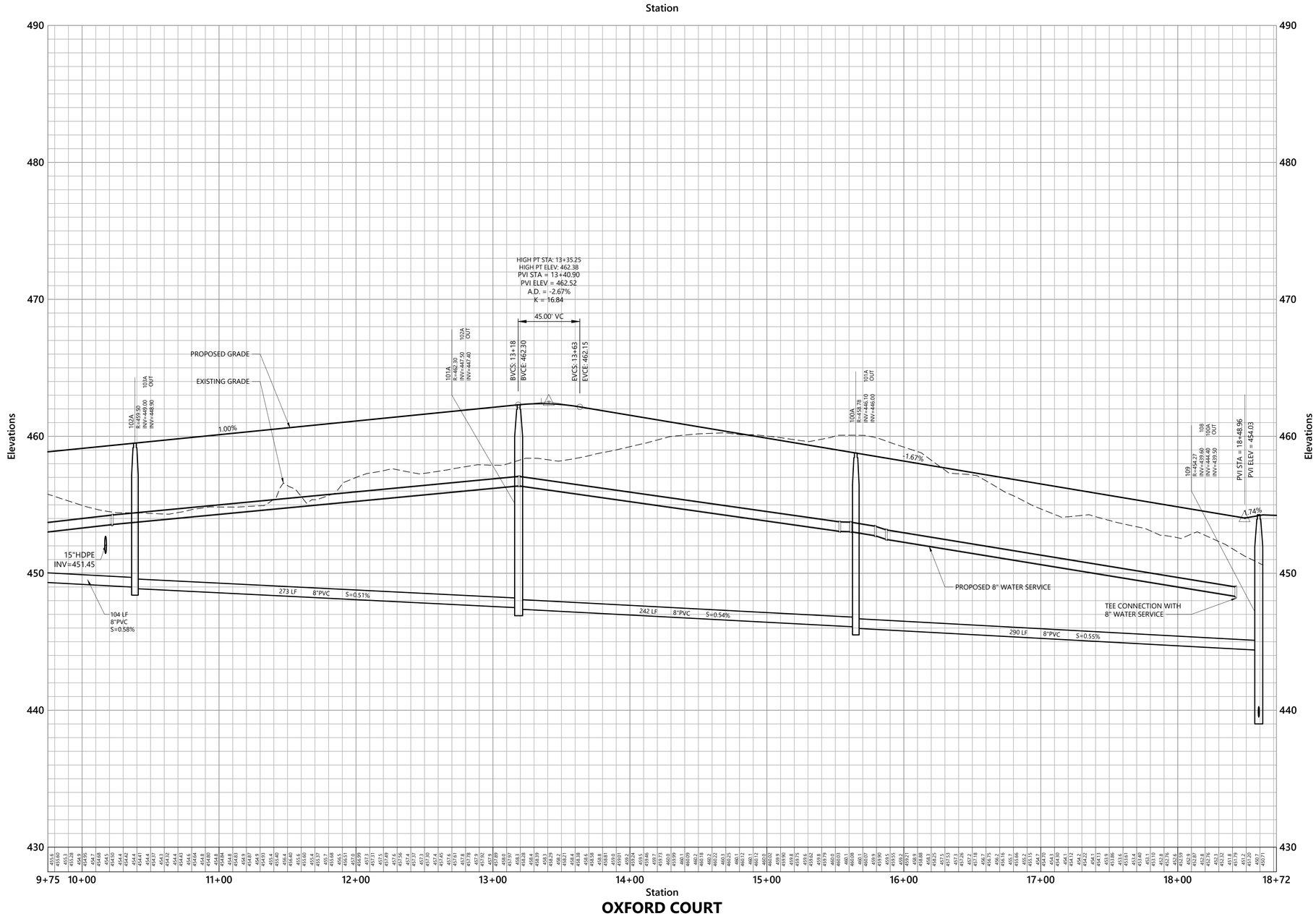

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Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

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Drawing Title
Oxford Court Profile

Drawing Number
C5.16

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
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11/13/2025

Sheet 68 of 111

Project Number 53140.00

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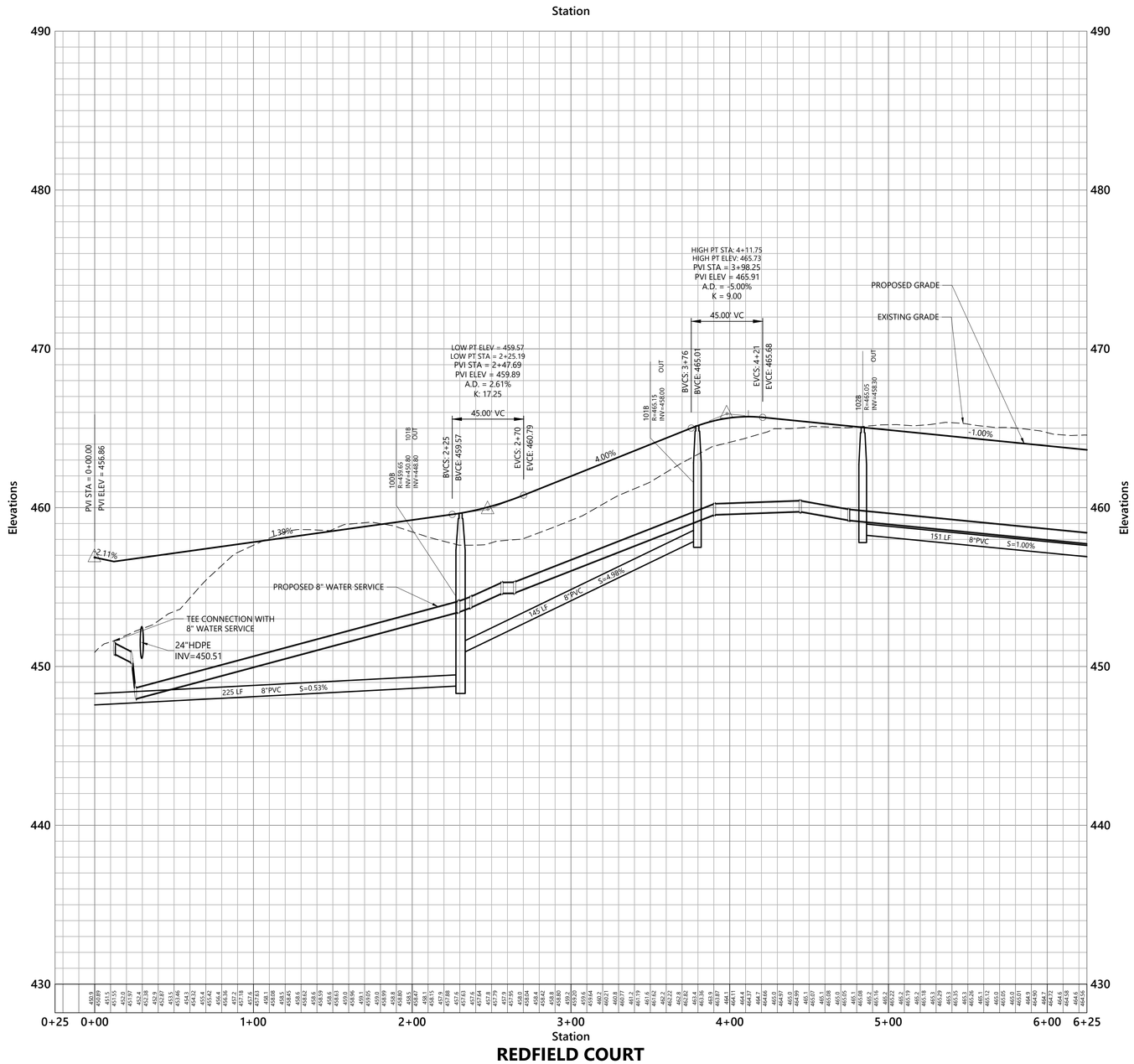

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Drawing Title
Redfield Court Profile

Drawing Number
C5.17

Sheet 69 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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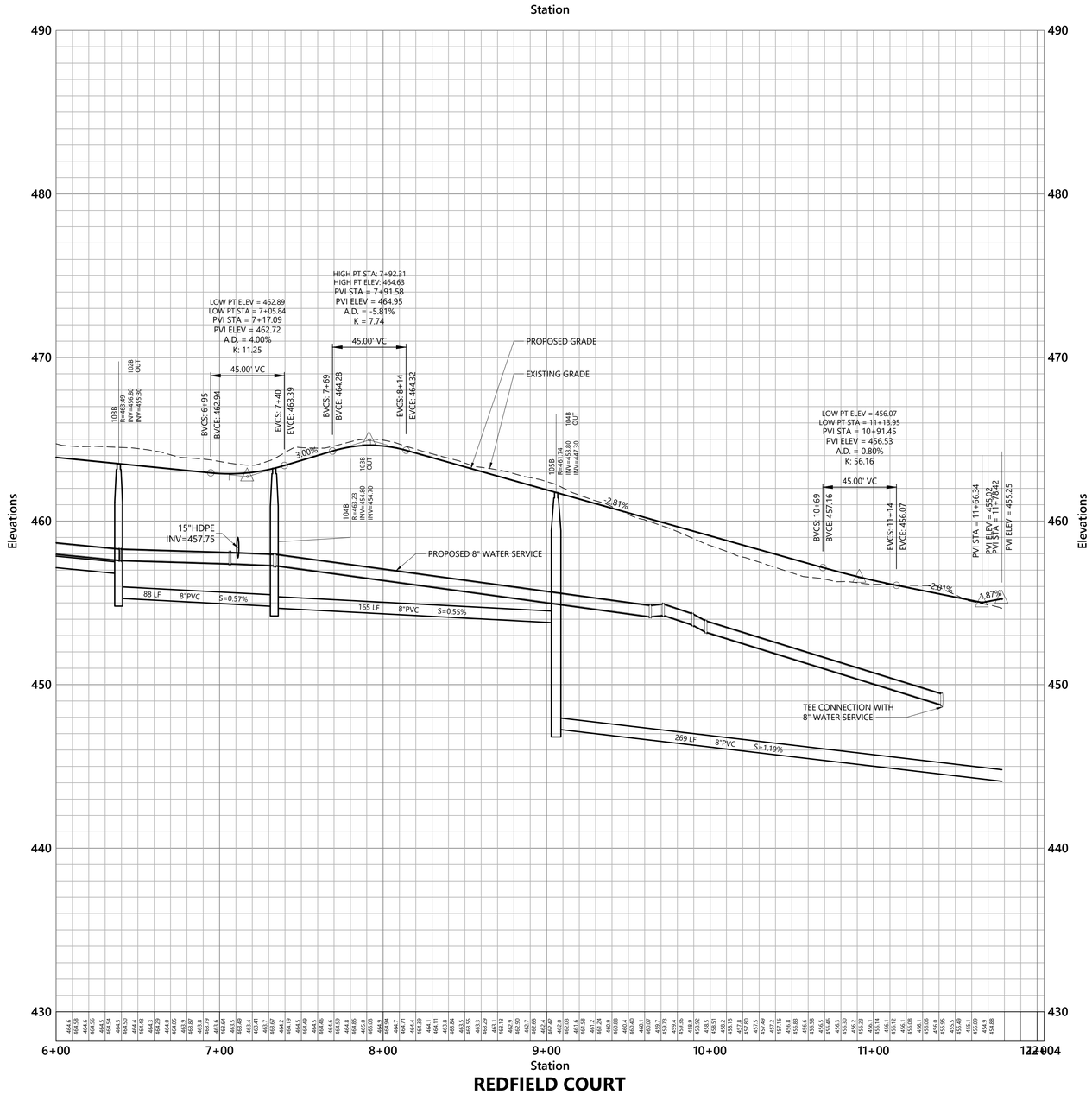

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Drawing Title
Redfield Court Profile

Drawing Number
C5.18

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LICENSED
PROFESSIONAL ENGINEER
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Sheet 70 of 111

Project Number 53140.00

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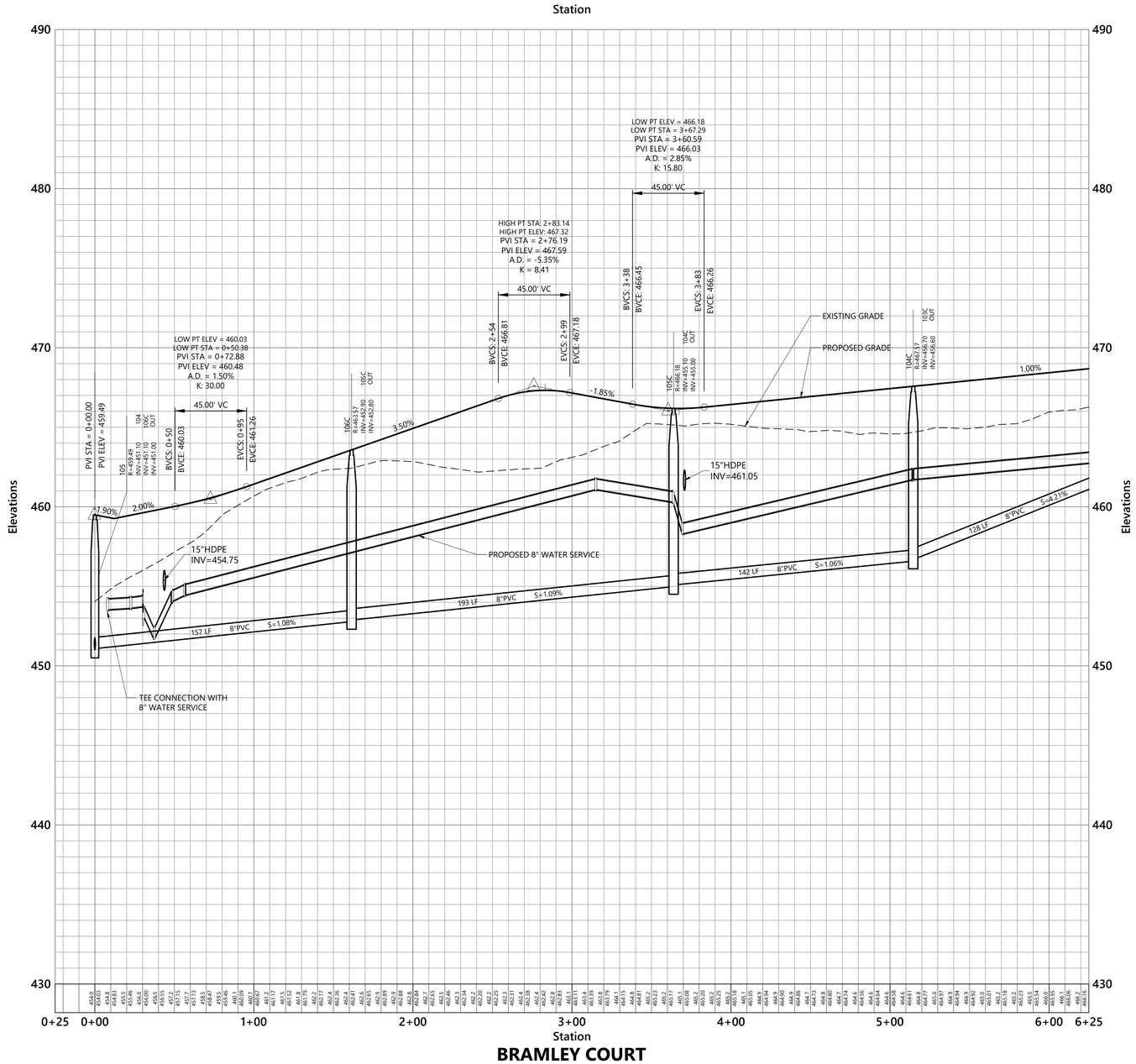

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Drawing Title
Bramley Court Profile

Drawing Number
C5.19

Sheet 71 of 111

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53140.00

STATE OF NEW HAMPSHIRE
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No. 13382
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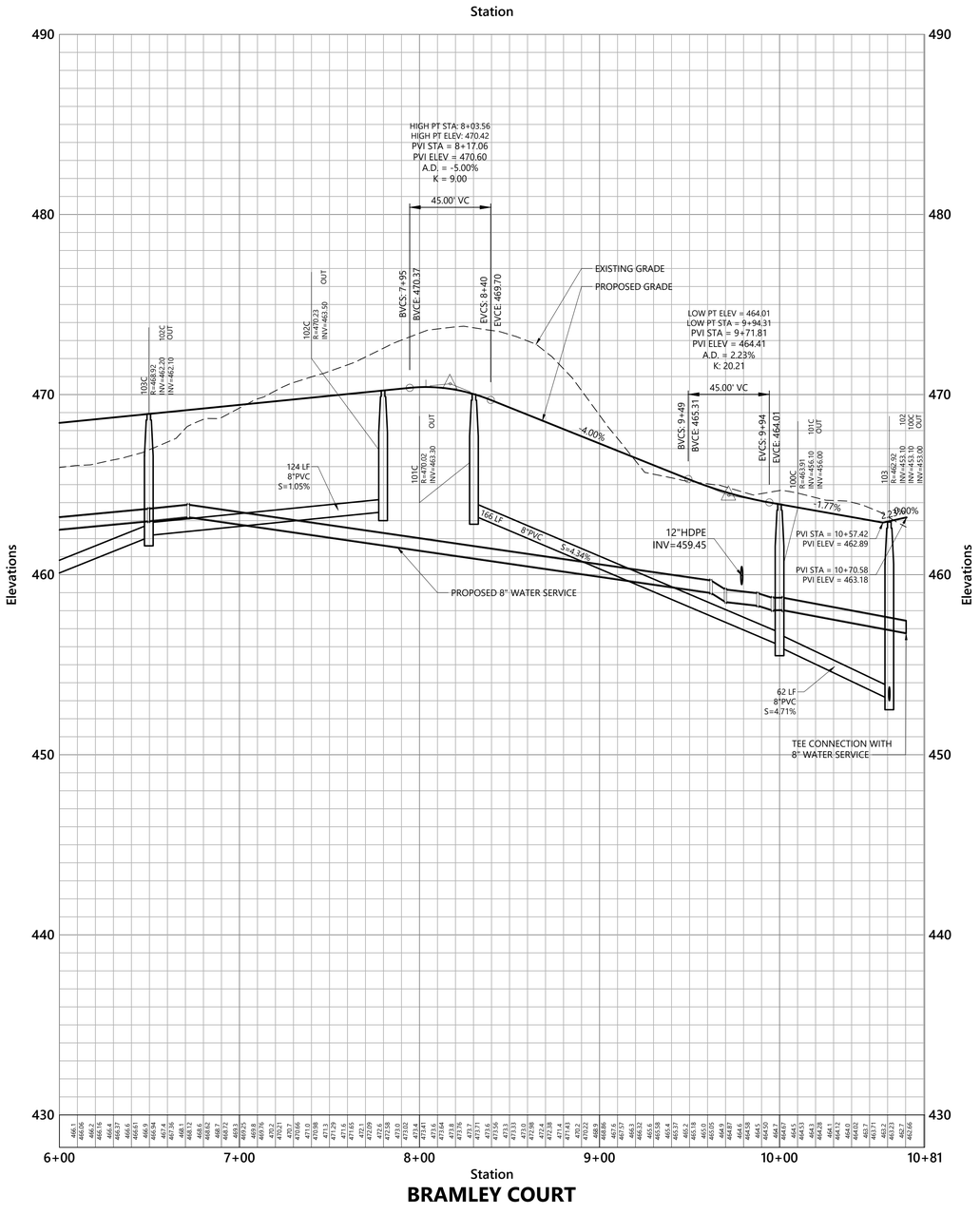

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Drawing Title
Bramley Court Profile

Drawing Number
C5.20

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Project Number
53140.00

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DAVID H. FENSTERMACHER No. 13382
11/13/2025

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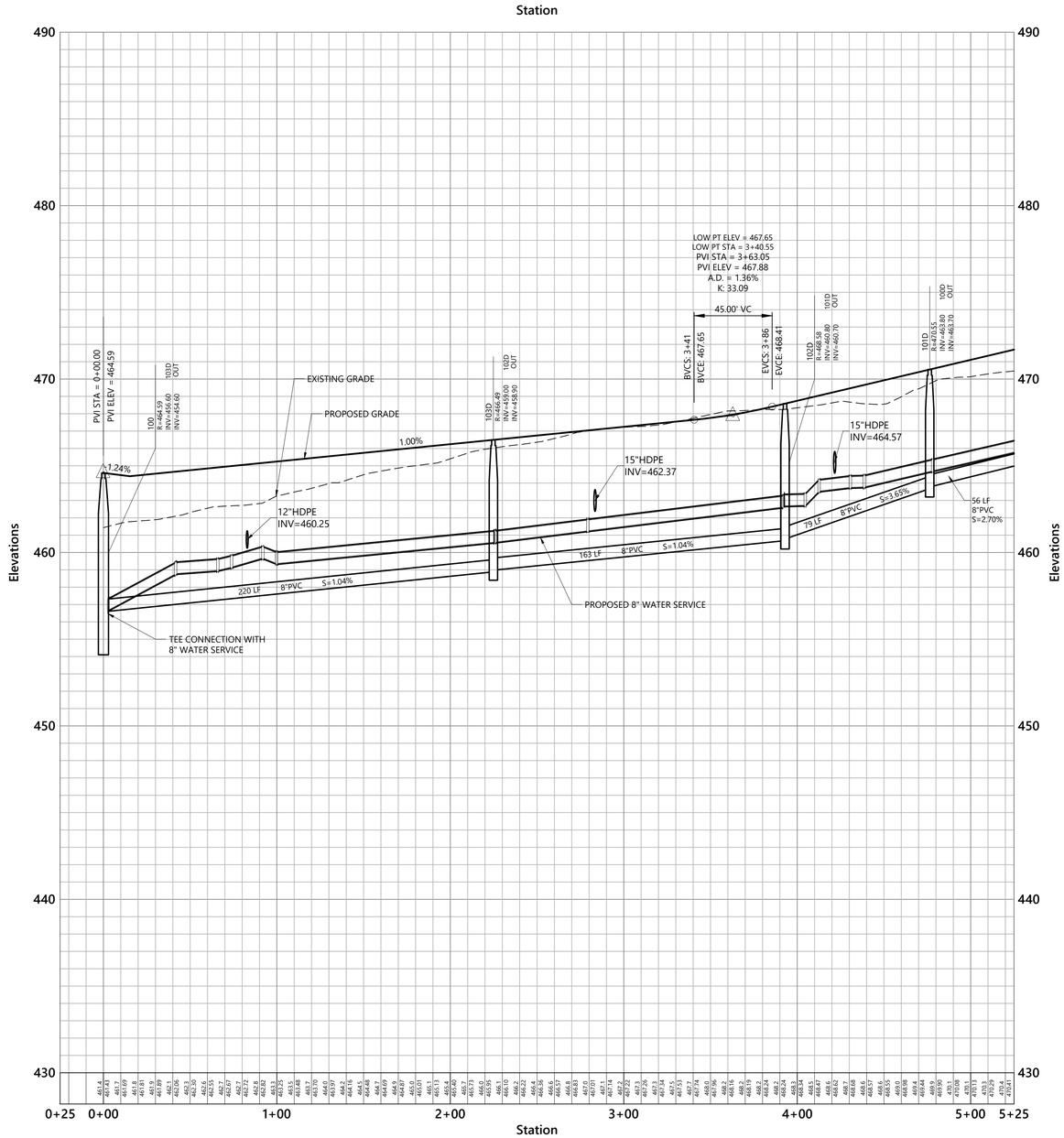

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Drawing Title
Kingston Court Profile

Drawing Number
C5.21

Sheet 73 of 111

Project Number
53140.00

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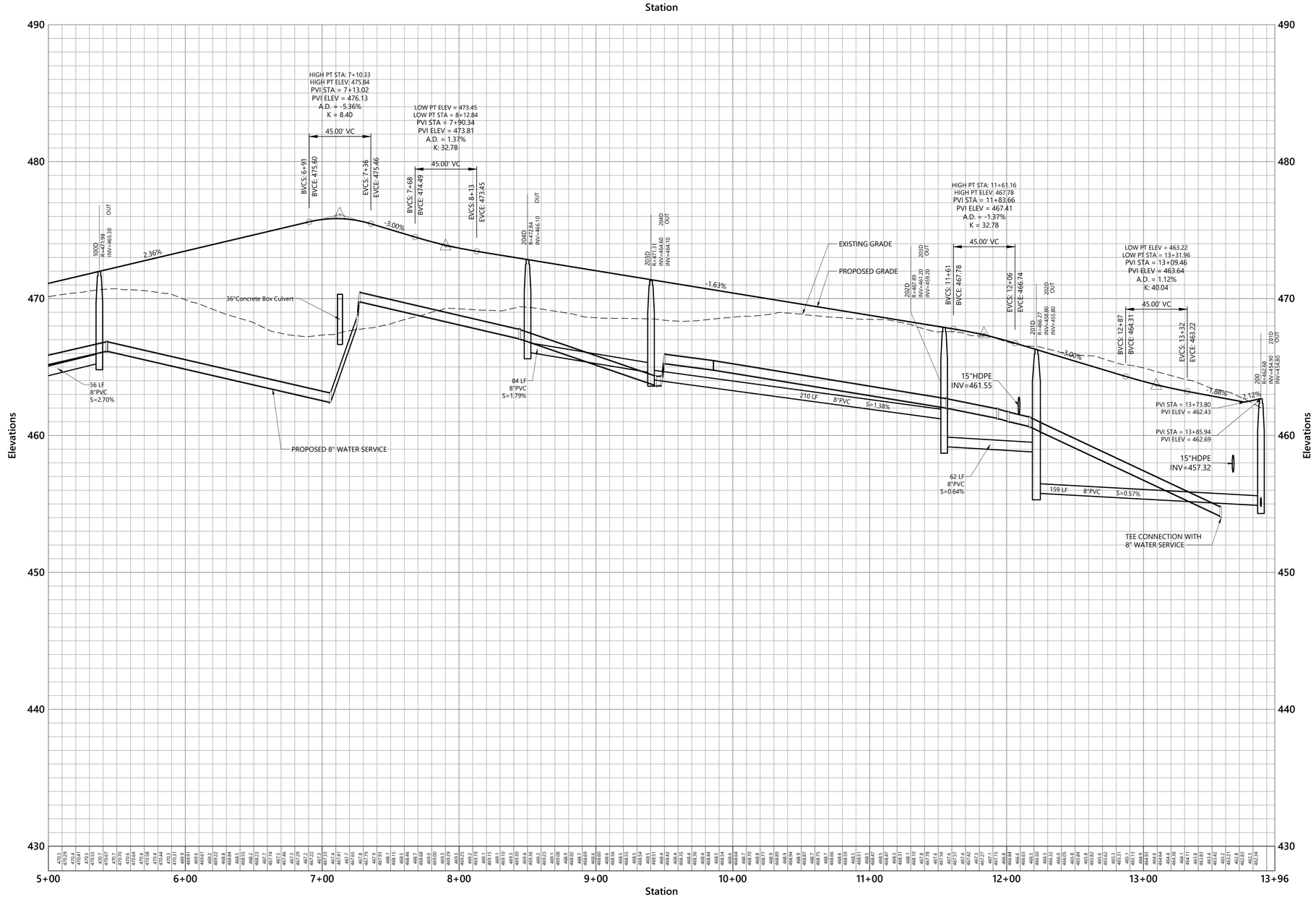

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Drawing Title
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Drawing Number
C5.22

Sheet 74 of 111

Project Number
53140.00

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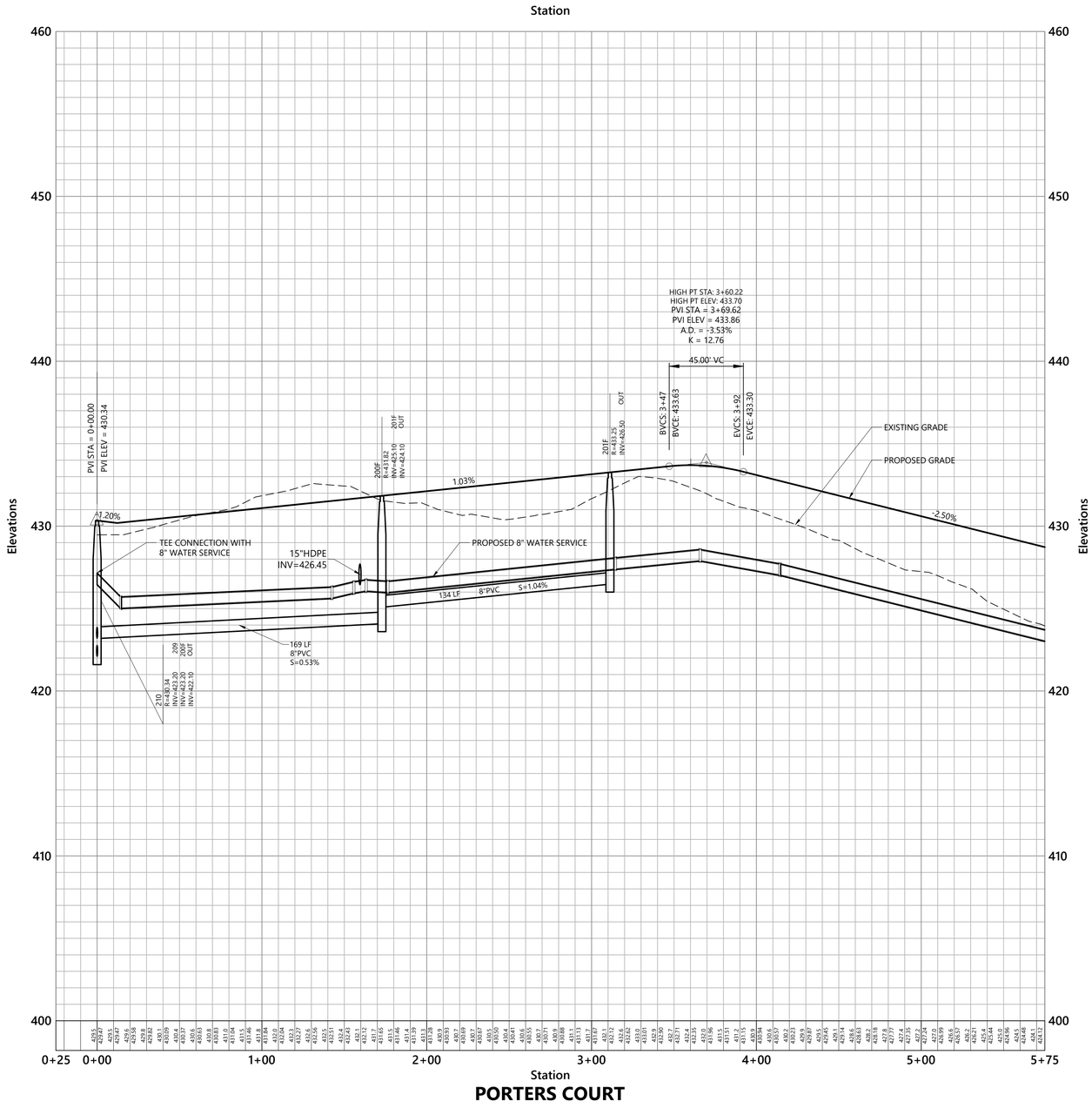

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Drawing Number
C5.23

Sheet 75 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
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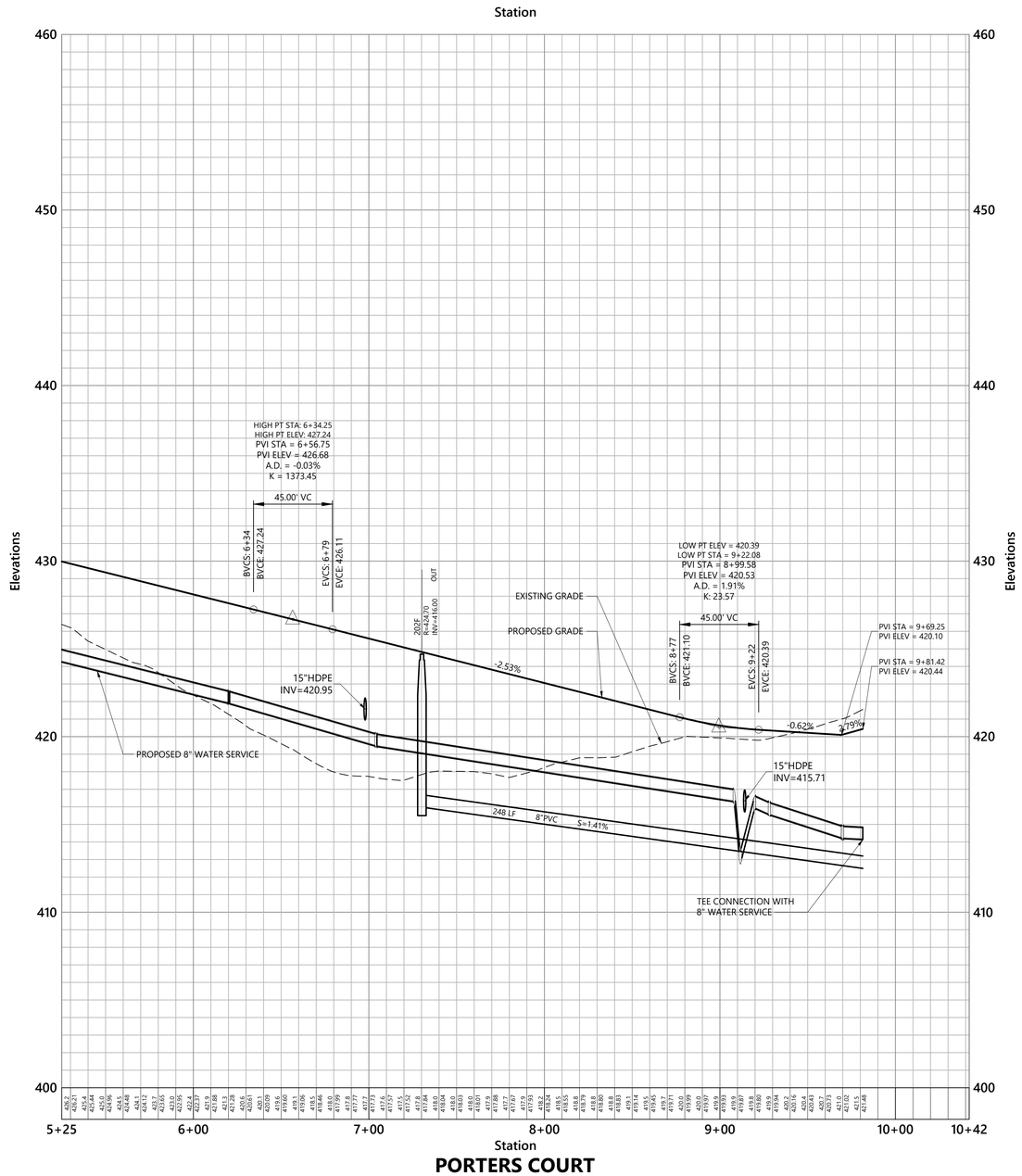

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Project Number 53140.00

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Erosion Control

1. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT.
2. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES, AND REMOVE SEDIMENT THEREFROM ON A WEEKLY BASIS AND WITHIN TWELVE HOURS AFTER EACH STORM EVENT (0.5" OF RAINFALL OR GREATER) AND DISPOSE OF SEDIMENTS IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
3. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
4. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
5. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS FROM ENTIRE DRAINAGE AND SEWER SYSTEMS.
6. AREAS REMAINING UNSTABILIZED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. STRAW MULCH SHALL BE APPLIED AT A MINIMUM RATE OF 1-1/2 TONS/ACRE.
7. PERMANENT SEEDING SHALL OCCUR BETWEEN APRIL 1 AND JUNE 1, AND/OR BETWEEN AUGUST 15 AND OCTOBER 15. ALL SEEDING FROM SEPTEMBER 15 SHALL BE STRAW MULCHED.
8. DUST SHALL BE CONTROLLED THROUGH THE USE OF WATER.
9. SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. CONTRACTOR SHALL INSTALL SILT FENCING ALONG DOWNHILL SIDE OF STOCKPILES.
10. CONTRACTOR SHALL PROVIDE TEMPORARY SEDIMENTATION BASINS TO CONTROL SEDIMENTATION AND STORMWATER RUNOFF DURING THE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL SUBMIT PROPOSED BASIN LOCATIONS, DESIGNS, ETC. TO THE ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION. TEMPORARY SEDIMENTATION BASINS SHALL MEET NHDES REQUIREMENTS.
11. CONTRACTOR SHALL PROVIDE NECESSARY EROSION CONTROL MEASURES TO INSURE THAT SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS DOES NOT CARRY SILT, SEDIMENT, AND OTHER DEBRIS OUTSIDE OF THE LIMITS OF WORK.
12. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
    B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    C. A MINIMUM OF 3-IN OF NON-EROSIVE MATERIAL, SUCH AS STONE OR RIPRAP, HAS BEEN INSTALLED;
    D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
13. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT AT NO TIME SHALL THE TOTAL UNSTABILIZED DISTURBED AREA ON-SITE BE GREATER THAN (5) FIVE ACRES. [NHDES ALLOWS FOR MORE THAN 5 AC ON CERTAIN SITES IF CERTAIN PROVISIONS ARE PROVIDED]
14. ALL DITCHES, SWALES, AND DRAINAGE BASINS SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
15. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
16. ALL CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
17. ALL PERMANENT AND TEMPORARY SEEDING SHALL BE AS FOLLOWS (UNLESS OTHERWISE NOTED):

PERMANENT SEEDING	PROPORTION	GERMINATION MINIMUM	PURITY MINIMUM
LAWNS:			
CREEPING RED FESCUE	50%	85%	95%
KENTUCKY BLUEGRASS	40%	85%	90%
MANHATTAN PERENNIAL RYE	10%	90%	95%

TEMPORARY SEEDING*	% WEIGHT	GERMINATION MINIMUM
WINTER RYE	80% MIN.	85%
RED FESCUE (CREEPING)	4% MIN.	80%
PERENNIAL RYE GRASS	3% MIN.	90%
RED CLOVER	3% MIN.	90%
OTHER CROP GRASS	0.5% MAX.	
NOXIOUS WEED SEED	0.5% MAX.	
INERT MATTER	1.0% MAX.	

* TEMPORARY SEED FOR LAWNS SHALL ONLY BE PLANTED WHEN PERMANENT GRASSES CANNOT BE PLANTED DUE TO THE GROWING SEASON.

18. NO-MOW PLANTING MIX (FOR AREAS INDICATED ON LANDSCAPE PLAN)

    THE NO-MOW PLANTING MIX" SHALL BE THE "NEW ENGLAND CONSERVATION WILDLIFE MIX' AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC.

19. DETENTION BASIN PLANTING MIX (FOR BOTTOM OF DETENTION BASIN)

    THE DETENTION BASIN PLANTING MIX SHALL BE THE "NEW ENGLAND EROSION-CONTROL / RESTORATION MIX (FOR DETENTION BASINS AND MOIST SITES) AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC., AMHERST, MA. (413) 256-1752

20. EROSION CONTROL BLANKETS SHALL BE INSTALLED ON ALL SLOPES THAT ARE STEEPER THAN 3-FT HORIZONTAL AND 1-FT VERTICAL (3:1). EROSION CONTROL BLANKETS SHALL BE NORTH AMERICAN GREEN SC150BN, OR APPROVED EQUAL.
21. THE PROJECT SHALL BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

Winter Construction

1. ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED. STABILIZATION METHODS SHALL INCLUDE 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 FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE TEMPORARILY STABILIZED WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
3. AFTER OCTOBER 15TH, 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 (NHDOT 304.3).

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Thornton Hill

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Drawing Title
Overall Erosion and Sediment Control Plan

Drawing Number
C6.00

Sheet 77 of 111

Project Number **53140.00**

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

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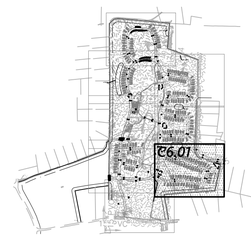

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Drawing Title

Erosion and Sediment Control Plan

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STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
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11/13/2025

Project Number 53140.00

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\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\d\Planset\5314000-ER.dwg

SILT FENCE AND HAYBALE BARRIER (TYP)

POTENTIAL SOIL STORAGE AREA. SIZING TO BE DETERMINED BY CONSTRUCTION NEEDS

Match Line
See Sheet C6.03

Match Line
See Sheet C6.06

Match Line
See Sheet C6.01

Match Line
See Sheet C6.07

50' PERIMETER BUFFER

CLUSTER B

B53 -2A/B
B51-3B
B49 -2A/B
B47-3B
B45 -2A/B
B43-3A
B41 -2A/B
B39 -2A/B
B37-3A
B35 -2A/B
B33-2A/B
B31-3B
B29-2A/B
B27-2C
B25-3A
B23-3B
B21 -2A/B
B19-2C
B17-3B
B15 -2A/B
B13-3A
B11-3A
B9-3B
B7 -2A/B
B5-3A
B3 -2A/B
B1 -2A/B
B36 -2A/B
B34-1
B32 -2A/B
B30 -2A/B
B28 -2A/B
B26-3A
B24-3A
B22 -2A/B
B20-3B
B18-3B
B16-1
B14 -2A/B
B12-3A
B10-2C
B8-3A
B6 -2A/B
B4-1
B2 -2A/B

POTENTIAL SOIL STORAGE AREA. SIZING TO BE DETERMINED BY CONSTRUCTION NEEDS

SILT FENCE BARRIER (TYP)
R=123.68'
L=167.09'
Δ=76°10'26"

HAYBALE SEDIMENT TRAP WITH INLET FILTER BASKET (TYP)

A75 -2A/B
A73-3B
A71-3A
A69 -2A/B
A67-2C
A65-3B
A63-3B
A61 -2A/B
A59 -2A/B
A60-3B

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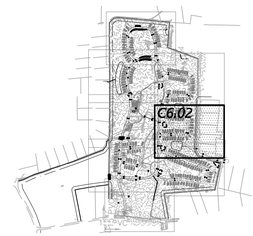

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, Inc.
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Erosion and Sediment Control Plan

Drawing Number
C6.02

Sheet 79 of 111

STATE OF NEW HAMPSHIRE - DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number
53140.00

Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 1:35:13 AM Ben Zoller

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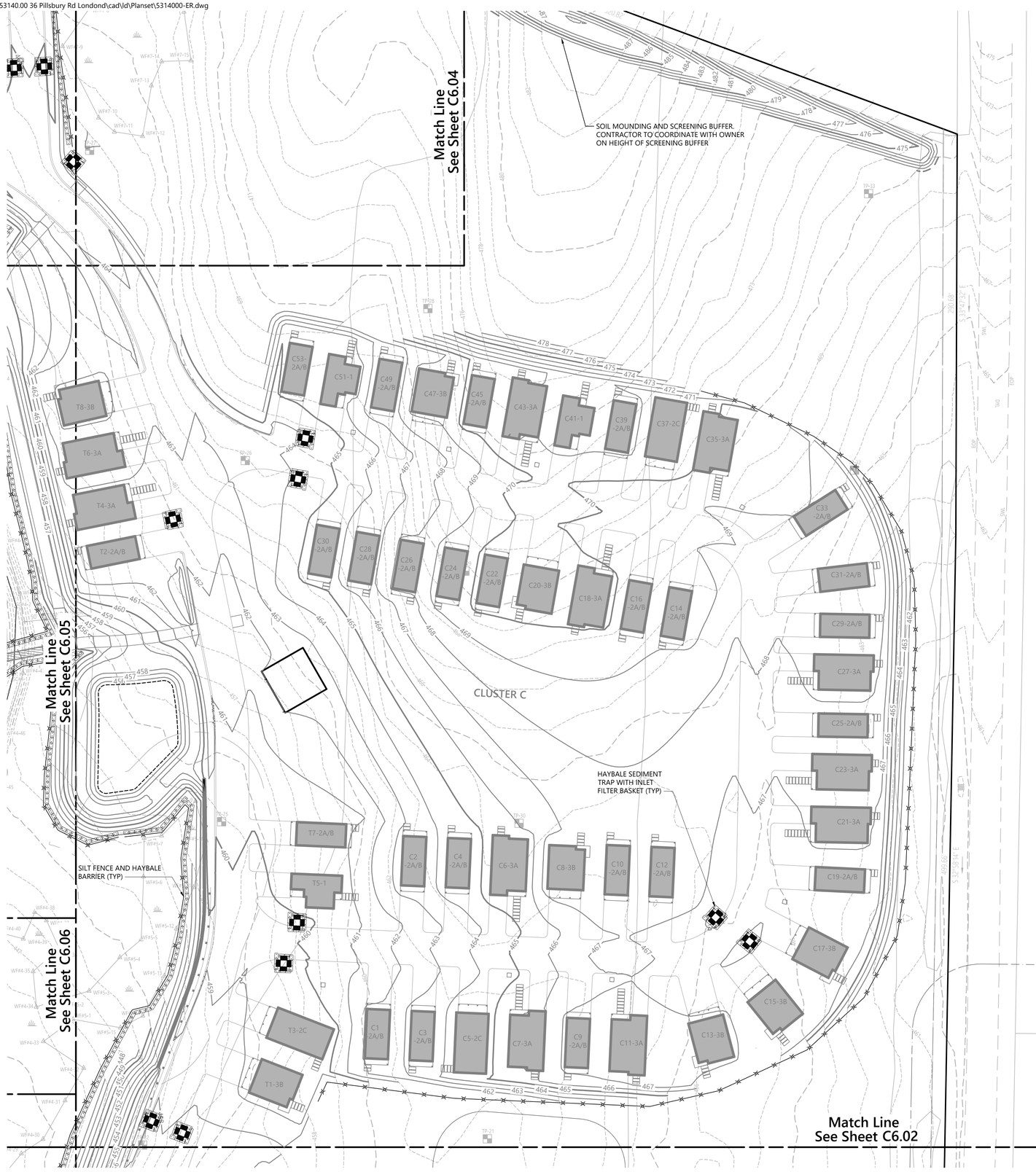

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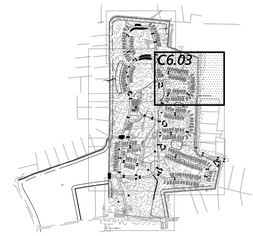

0 20 40 80 Feet

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Prepared For: Procopio Enterprises, Inc.
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: February 20, 2025

Not Approved for Construction

Drawing Title
Erosion and Sediment Control Plan

Drawing Number
C6.03

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 80 of 111

Project Number 53140.00

Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 1:35:31 AM Ben Zoller

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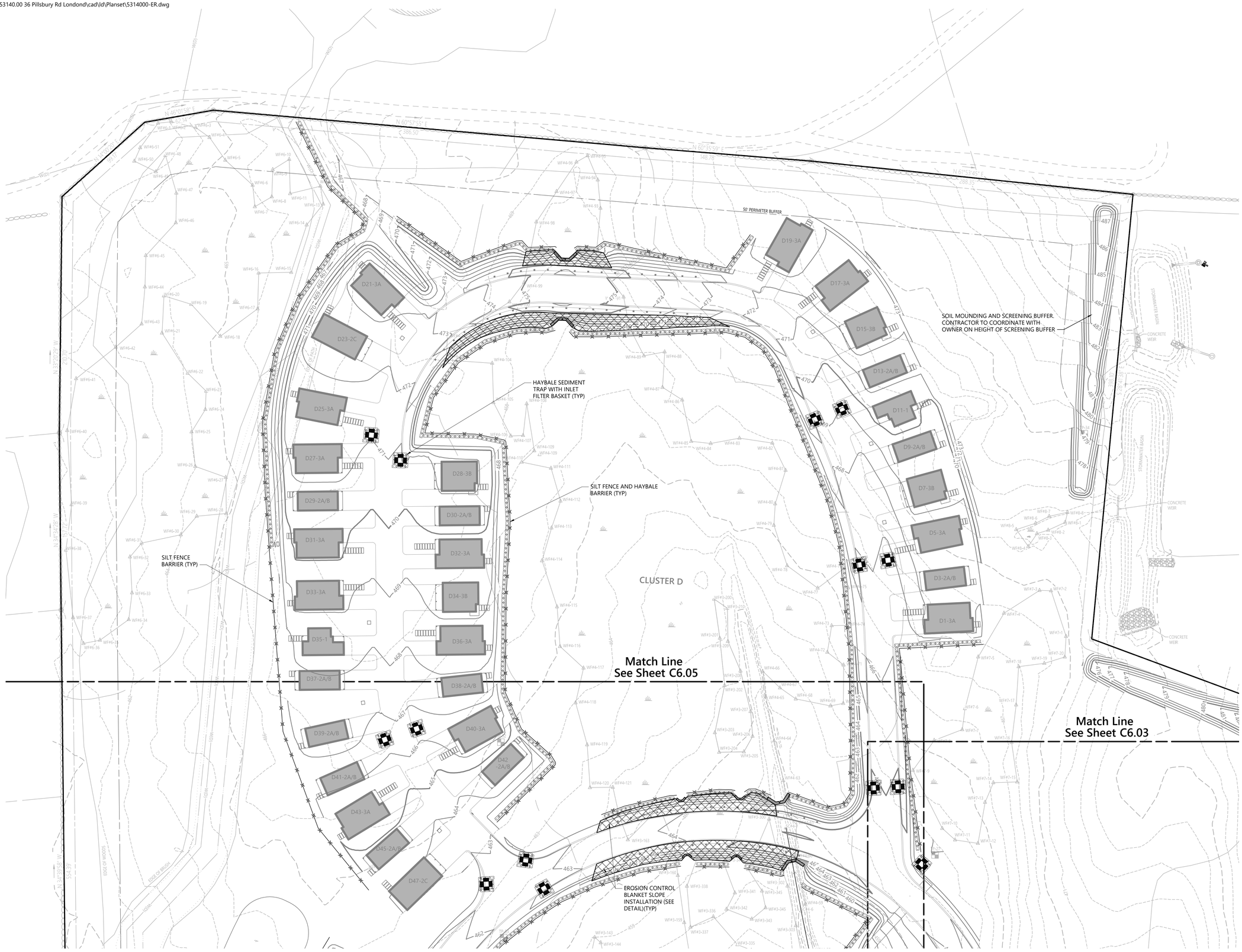

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Checked by: DHF

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Date: February 20, 2025

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Drawing Title
Erosion and Sediment Control Plan

Drawing Number
C6.04

Sheet 81 of 111

Project Number
53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 1:35:49 AM Ben Zoller

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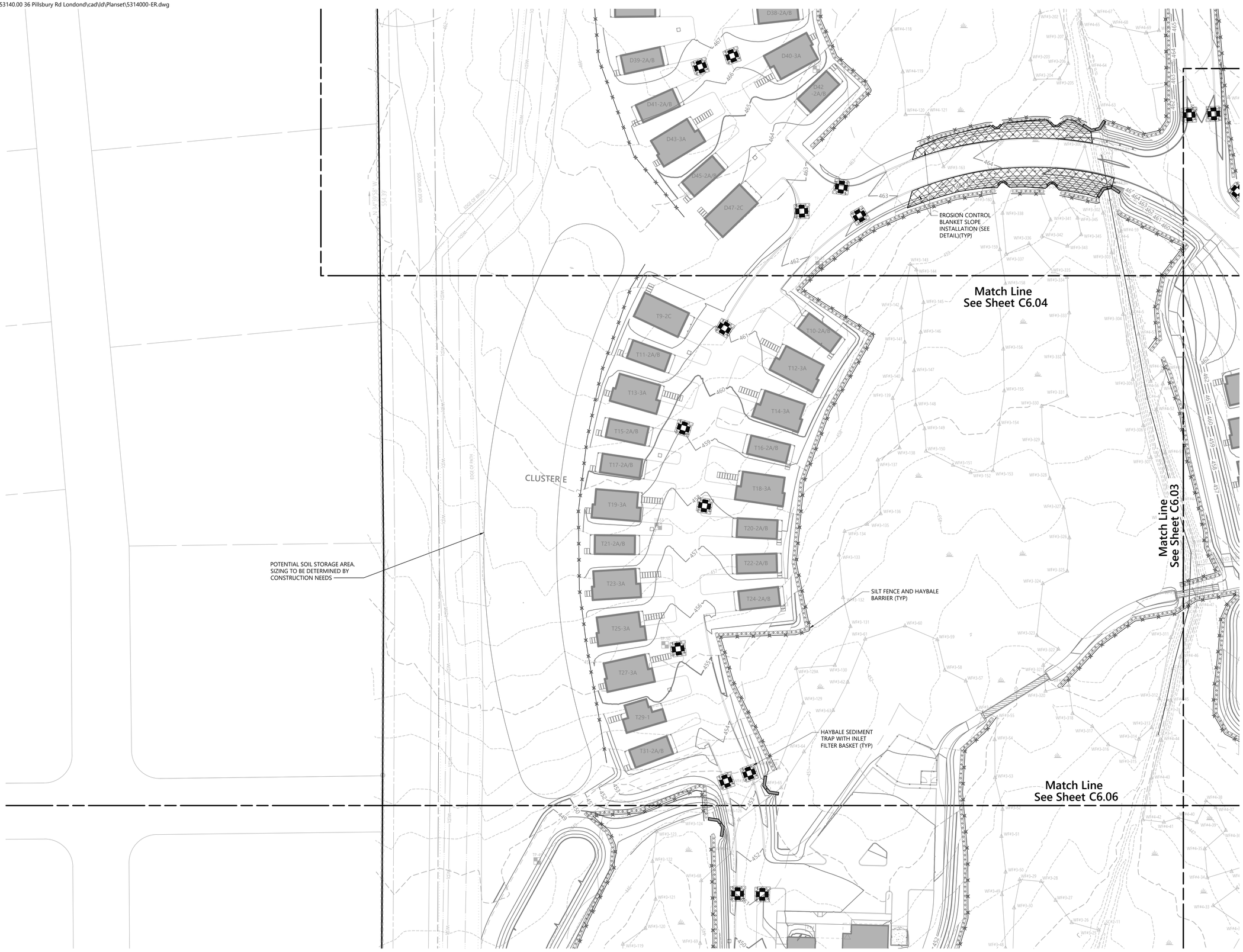

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title

Erosion and Sediment Control Plan

Drawing Number

C6.05

Sheet 82 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Project Number 53140.00

Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 1:36:08 AM Ben Zoller

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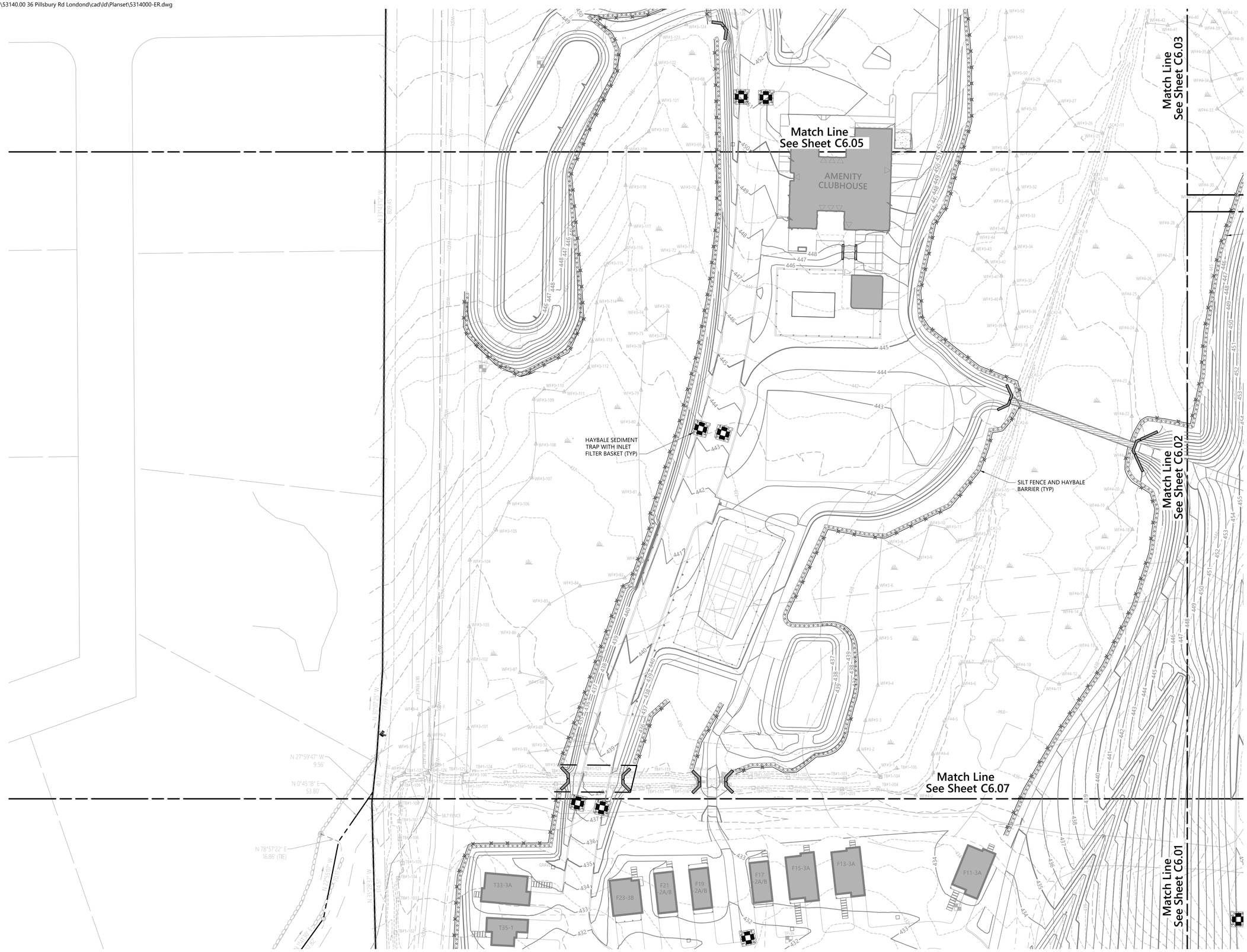

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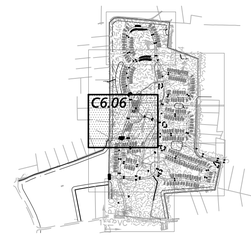

0 20 40 80 Feet

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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Drawing Title

Erosion and Sediment Control Plan

Drawing Number

C6.06

Sheet 83 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED
PROFESSIONAL ENGINEER
11/13/2025

Project Number 53140.00

Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 1:36:27 AM Ben Zoller

Match Line
See Sheet C6.06

Match Line
See Sheet C6.02

Match Line
See Sheet C6.01

Match Line
See Sheet C6.08

SILT FENCE AND HAYBALE BARRIER (TYP)

SILT FENCE BARRIER (TYP)

HAYBALE SEDIMENT TRAP WITH INLET FILTER BASKET (TYP)

CLUSTER 5

T33-3A
T35-1
T37-2A/B
T39-3A
T41-3A
T43-3A
T45-3B
T47-3A
T49-2C
T51-1
T53-3A
F23-3B
F21 -2A/B
F19 -2A/B
F17 -2A/B
F15-3A
F13-3A
F11-3A
F20-3B
F18 -2A/B
F16 -2A/B
F14-3B
F12 -2A/B
F2 -2A/B
F4-3A
F6-3A
F8 -2A/B
F10 -2A/B
F1 -2A/B
F3 -2A/B
F5-3A
F7-3A
F9 -2A/B

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C6.07

0 20 40 80 Feet

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Prepared For: Procopio Enterprises, Inc.
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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Not Approved for Construction

Drawing Title

Erosion and Sediment Control Plan

Drawing Number

C6.07

Sheet 84 of 111

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – DAVID H. FENSTERMACHER No. 13383 LICENSED
11/13/2025

Project Number 53140.00

Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 13:6:45 AM Ben Zoller

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0 20 40 80 Feet

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
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Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title

Erosion and Sediment Control Plan

Drawing Number

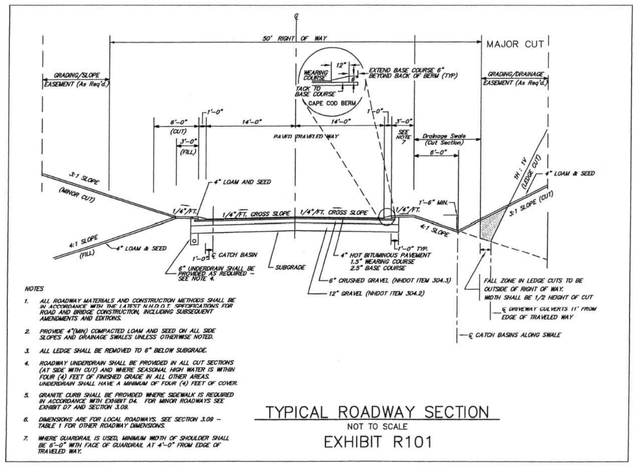
C6.08

Sheet 85 of 111

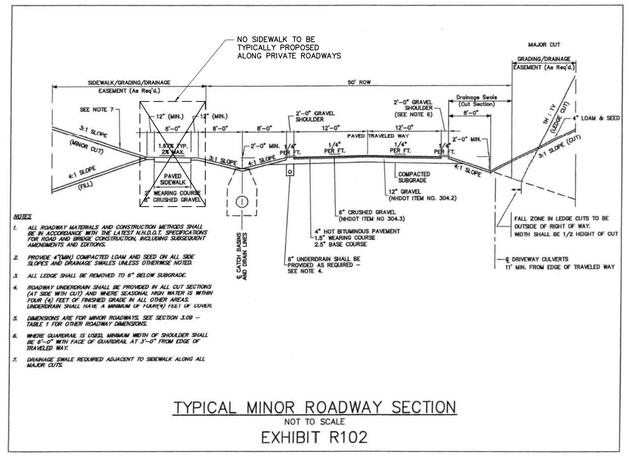
STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number 53140.00

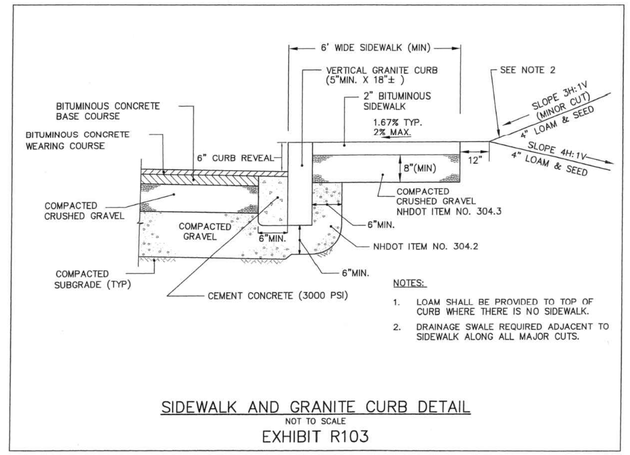
Saved Tuesday, November 11, 2025 7:54:12 PM JHOWE Plotted Wednesday, November 12, 2025 1:37:04 AM Ben Zoller



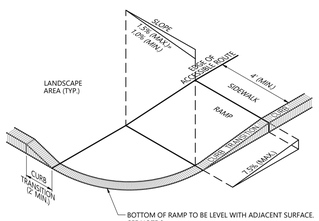
TYPICAL ROADWAY SECTION
NOT TO SCALE
EXHIBIT R101



TYPICAL MINOR ROADWAY SECTION
NOT TO SCALE
EXHIBIT R102



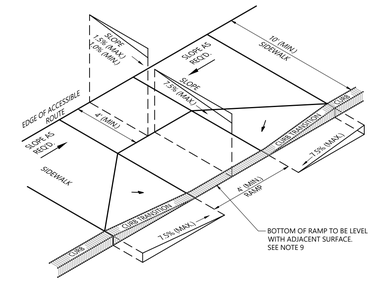
SIDEWALK AND GRANITE CURB DETAIL
NOT TO SCALE
EXHIBIT R103



NOTES

1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5 (1% MIN.).
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE AT CURB RAMPS SHALL BE 7.5%.
4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. RAMP, CURB AND ADJACENT PAVEMENTS SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SIDEWALK SECTION FOR RAMP CONSTRUCTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5' x 5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ELIMINATE CURBING AT RAMP WHERE IT ABUTS ROADWAY, EXCEPT WHERE VERTICAL CURBING IS INDICATED ON THE DRAWINGS TO BE INSTALLED AND SET FLUSH.

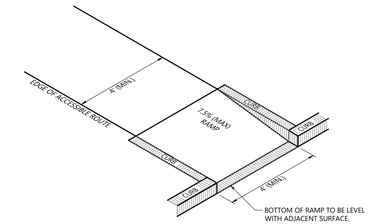
Accessible Curb Ramp (ACR) - Type 'B'
12/20
N.T.S. Source: VHB LD_501



NOTES

1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5 (1% MIN.).
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE AT CURB RAMPS SHALL BE 7.5%.
4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. RAMP, CURB AND ADJACENT PAVEMENTS SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SIDEWALK SECTION FOR RAMP CONSTRUCTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5' x 5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ELIMINATE CURBING AT RAMP WHERE IT ABUTS ROADWAY, EXCEPT WHERE VERTICAL CURBING IS INDICATED ON THE DRAWINGS TO BE INSTALLED AND SET FLUSH.

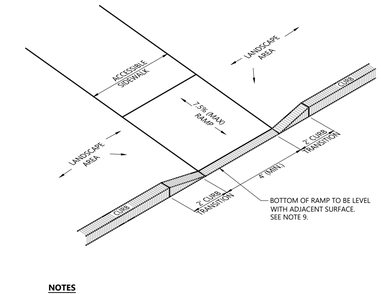
Accessible Curb Ramp (ACR) Type 'D'
12/20
N.T.S. Source: VHB LD_503



NOTES

1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5 (1% MIN.).
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE AT CURB RAMPS SHALL BE 7.5%.
4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. RAMP, CURB AND ADJACENT PAVEMENTS SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SIDEWALK SECTION FOR RAMP CONSTRUCTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5' x 5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ELIMINATE CURBING AT RAMP WHERE IT ABUTS ROADWAY, EXCEPT WHERE VERTICAL CURBING IS INDICATED ON THE DRAWINGS TO BE INSTALLED AND SET FLUSH.

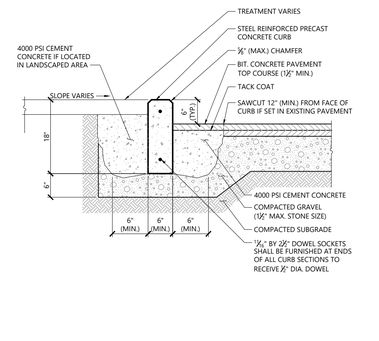
Accessible Curb Ramp (ACR) Type 'J'
12/20
N.T.S. Source: VHB LD_509



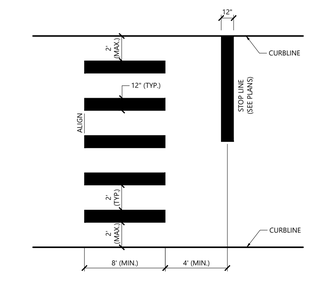
NOTES

1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5 (1% MIN.).
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE AT CURB RAMPS SHALL BE 7.5%.
4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. RAMP, CURB AND ADJACENT PAVEMENTS SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SIDEWALK SECTION FOR RAMP CONSTRUCTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5' x 5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ELIMINATE CURBING (OTHER THAN VERTICAL CURBING, WHICH SHALL BE SET FLUSH) WHERE IT ABUTS ROADWAYS.

Accessible Curb Ramp (ACR) Type 'M'
12/20
N.T.S. Source: VHB LD_512



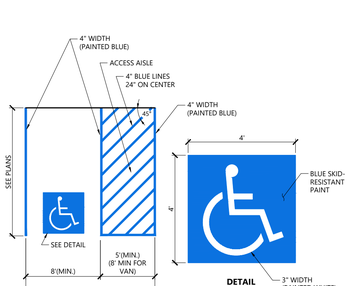
Precast Concrete Curb (PCC)
3/20
N.T.S. Source: VHB LD_404



NOTES

1. TWELVE INCH (12") LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6 INCH LINES) WILL BE ACCEPTED.
2. LONGITUDINAL CROSSWALK LINES TO BE PARALLEL TO CURBLINE.
3. ALL LONGITUDINAL CROSSWALK LINES SHALL BE THE SAME LENGTH AND PROPERLY ALIGNED.
4. CROSS WALK SIDESLOPE SHALL NOT EXCEED 1.5%.

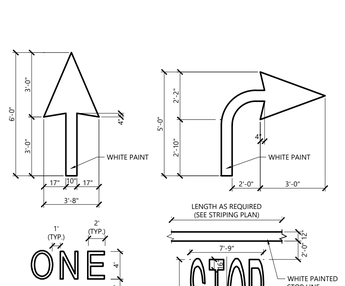
Crosswalk
12/19
N.T.S. Source: VHB LD_553A



NOTES

1. ALL DIMENSIONS TO EDGES OF 4" PAVEMENT STRIPING.
2. 8' STALL WIDTH REFERS TO 8' CLEAR BETWEEN INSIDE EDGES OF PAVEMENT MARKINGS.
3. ALL SLOPES THROUGHOUT THE ACCESSIBLE PARKING AND AISLE AREAS SHALL NOT EXCEED 1.5%.
4. ACCESS AISLE MEASURED BETWEEN OUTSIDE EDGES OF PAVEMENT MARKINGS.

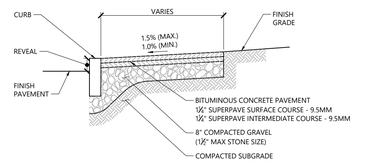
Accessible Parking Space
1/16
N.T.S. Source: VHB LD_552-NH



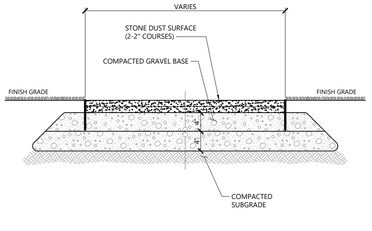
NOTES

1. PAVEMENT MARKINGS TO BE INSTALLED FOR ON SITE WORK IN LOCATIONS SHOWN.

Painted Pavement Markings - On Site
1/16
N.T.S. Source: VHB LD_554



Bituminous Concrete Sidewalk
3/20
N.T.S. Source: VHB REV LD_422



Stonedust Path
02/25
N.T.S. Source: VHB REV

vhb.com
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2 Bedford Farms Drive
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100 Ferry Street
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Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill
Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF
Issued for: Permitting | Date: February 20, 2025

Not Approved for Construction

Drawing Title: Site Details

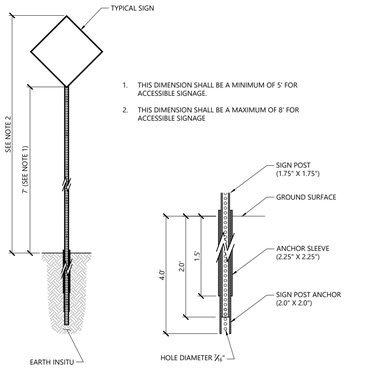
Drawing Number: C7.01

Sheet 86 of 111

STATE OF NEW HAMPSHIRE – DAVID H. FENSTERMACHER No. 13382 – LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number: 53140.00

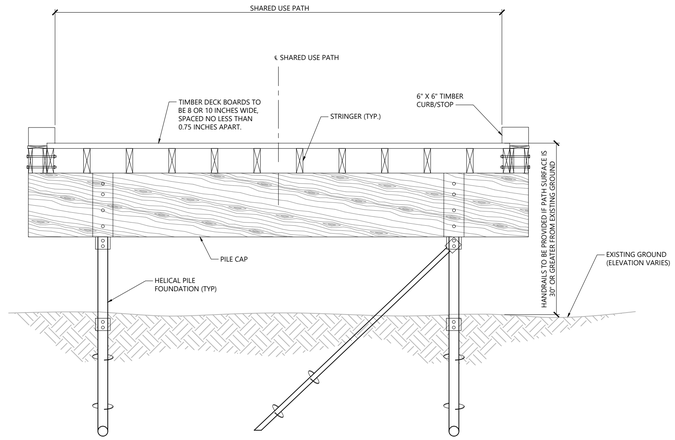
Saved Monday, November 10, 2025 5:30:23 PM SFLEUROCK Plotted Tuesday, November 11, 2025 4:21:52 PM Jason Howe



Sign Post - Type 'B'

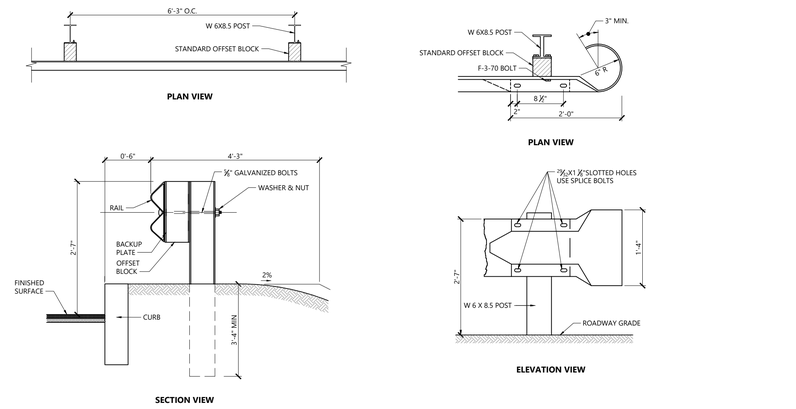
3/19

N.T.S. Source: VHB LD_702



Wetland Boardwalk Crossing (Designed by Others)

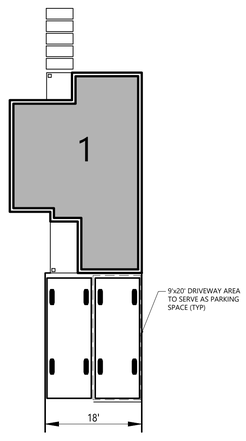
N.T.S.



Steel Beam Guardrail with Steel Post

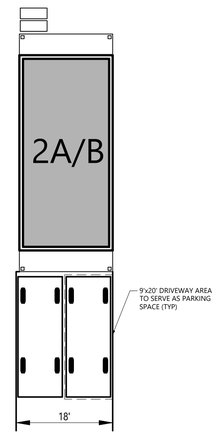
10/20

N.T.S. Source: VHB LD_456



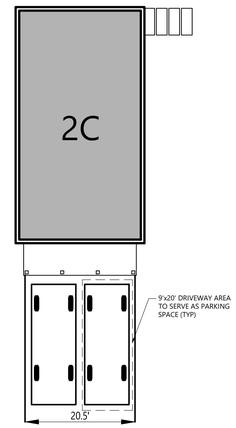
Dwelling Unit Type 1 Parking Arrangement

N.T.S. Source: VHB



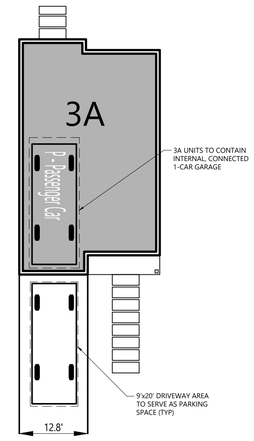
Dwelling Unit Type 2A/B Parking Arrangement

N.T.S. Source: VHB



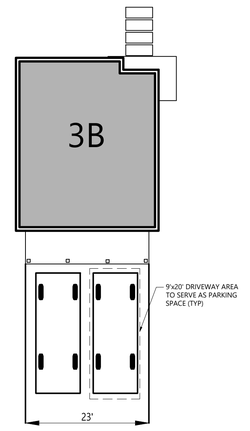
Dwelling Unit Type 2C Parking Arrangement

N.T.S. Source: VHB



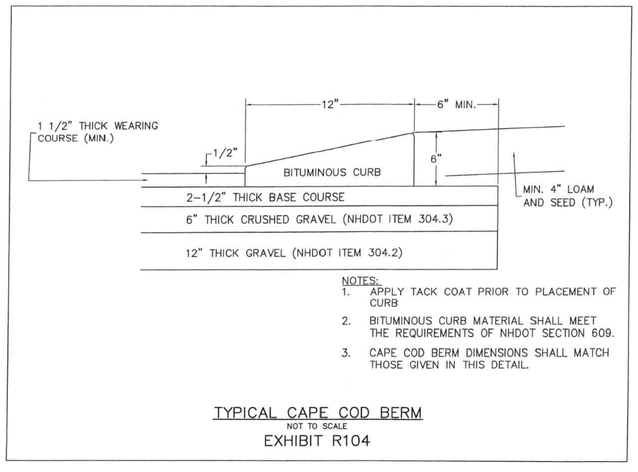
Dwelling Unit Type 3A Parking Arrangement

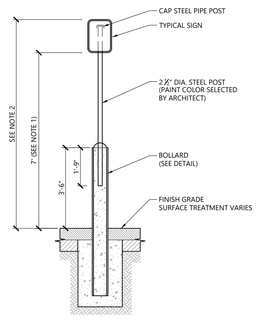
N.T.S. Source: VHB



Dwelling Unit Type 3B Parking Arrangement

N.T.S. Source: VHB



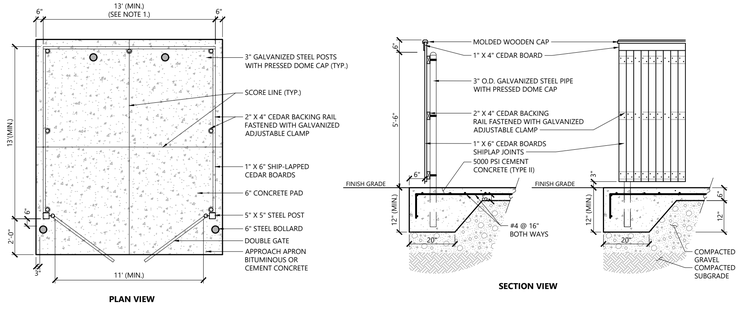


1. THIS DIMENSION SHALL BE A MINIMUM OF 5' FOR ACCESSIBLE SIGNAGE.
2. THIS DIMENSION SHALL BE A MAXIMUM OF 8' FOR ACCESSIBLE SIGNAGE

Bollard Mounted Sign

2/20

N.T.S. Source: VHB LD_703



NOTES

1. DUMPSTER PAD DIMENSIONS SHOWN AS MINIMUM. REFER TO PLAN FOR ACTUAL DIMENSION.
2. PAD DESIGNED FOR 6 YARD DUMPSTER.

Dumpster Pad w/ Enclosure

1/20

N.T.S. Source: VHB LD_713

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35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ Checked by DHF

Issued for Permitting

Date February 20, 2025

Not Approved for Construction

Drawing Title
Site Details

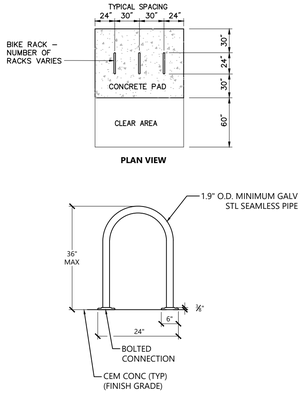
Drawing Number
C7.02

Sheet 87 of 111

Project Number 53140.00

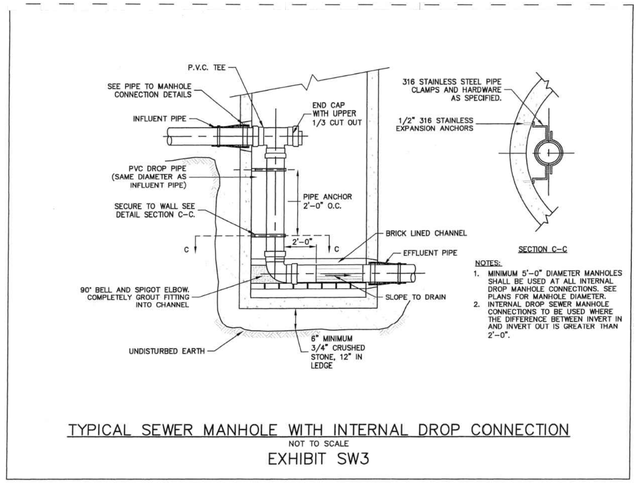
STATE OF NEW HAMPSHIRE DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Saved Monday, November 10, 2025 5:30:23 PM SFLEUROCK Plotted Tuesday, November 11, 2025 4:22:02 PM Jason Howe



Bike Rack

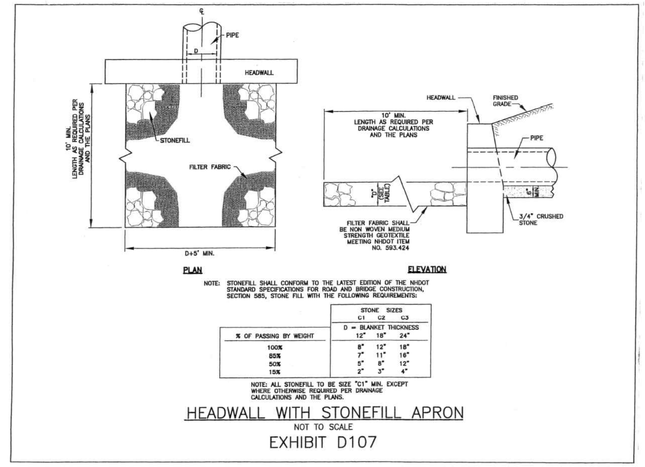
N.T.S.



TYPICAL SEWER MANHOLE WITH INTERNAL DROP CONNECTION

NOT TO SCALE

EXHIBIT SW3



NOTE: STONEFILL SHALL CONFORM TO THE LATEST EDITION OF THE NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 585, STONE FILL WITH THE FOLLOWING REQUIREMENTS:

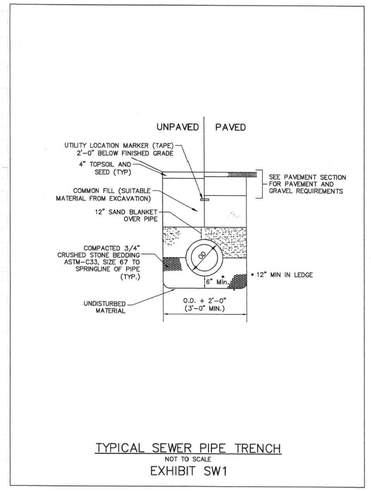
% OF PASSING BY WEIGHT	STONE SIZES C1 D = BLANKET THICKNESS 12"	C2 18"	C3 24"
100%	9"	12"	18"
85%	7"	11"	16"
50%	5"	8"	12"
15%	2"	3"	4"

NOTE: ALL STONEFILL TO BE SIZE "C1" MIN. EXCEPT WHERE OTHERWISE REQUIRED PER DRAINAGE CALCULATIONS AND THE PLANS.

HEADWALL WITH STONEFILL APRON

NOT TO SCALE

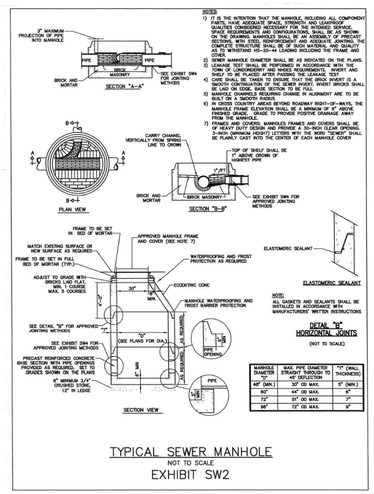
EXHIBIT D107



TYPICAL SEWER PIPE TRENCH

NOT TO SCALE

EXHIBIT SW1



MANHOLE DIAMETER	MAX. PIPE DIAMETER, STRAIGHT THROUGH	"T" (MIN.), WALL THICKNESS
	42" OUTSIDE DIA.	
48" (MIN.)	33" OD MAX.	5" (MIN.)
60"	44" OD MAX.	6"
72"	57" OD MAX.	7"
96"	72" OD MAX.	9"

TYPICAL SEWER MANHOLE

NOT TO SCALE

EXHIBIT SW2

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100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd
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Designed by: BJZ | Checked by: DHF

Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title: **Site Details**

Drawing Number: **C7.03**

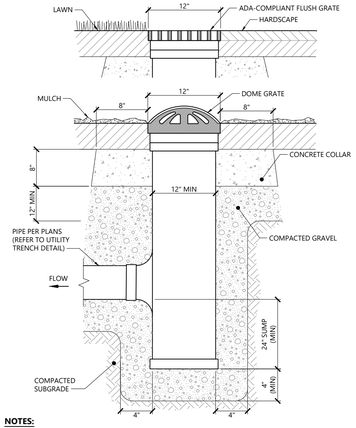
Sheet 88 of 111

Project Number: **53140.00**

STATE OF NEW HAMPSHIRE – DAVID H. FENSTERMACHER No. 13382 – LICENSED PROFESSIONAL ENGINEER

11/13/2025

Saved Monday, November 10, 2025 5:30:23 PM SFLEUROCK Plotted Tuesday, November 11, 2025 4:22:13 PM Jason Howe



NOTES:

1. AREA DRAINS SHALL BE NYLOPLAST 12" DIAMETER DRAIN BASIN, OR APPROVED EQUAL.
2. GRATES SHALL BE NYLOPLAST 12" PEDESTRIAN MODEL 1299CGP OR 12" DOME GRATE MODEL 1299CGD (OR APPROVED EQUAL).

Area Drain (AD) Type 1

12/19

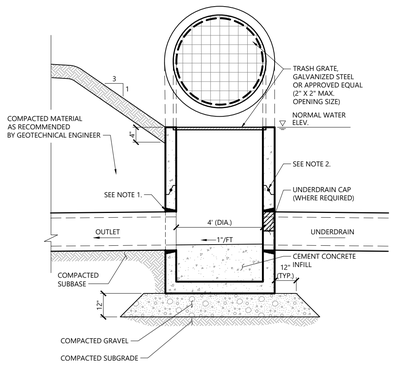
N.T.S. Source: VHB LD_193

OUTLET STRUCTURE CHART

DETENTION BASIN	STRUCTURE DIAMETER	RIM ELEVATION	UNDERDRAIN DIAMETER	UNDERDRAIN CAP DIAMETER
#3	12"	SEE GD PLAN	6.0"	6.0"
#4	24"	SEE GD PLAN	6.0"	6.0"
#5	48"	SEE GD PLAN	6.0"	6.0"
#6	48"	SEE GD PLAN	6.0"	6.0"
#7	15"	SEE GD PLAN	6.0"	2.5"
#8	24"	SEE GD PLAN	6.0"	6.0"
#9	48"	SEE GD PLAN	6.0"	2.0"
#10	36"	SEE GD PLAN	6.0"	6.0"
#11	24"	SEE GD PLAN	6.0"	2.5"

NOTES

1. WHERE STRUCTURE DIAMETER IS 24" OR SMALLER, A NYLOPLAST DRAIN WITH A DOMED GRATE CAN BE USED IN LIEU OF CONCRETE STRUCTURE. NYLOPLAST DRAIN SHALL BE BLACK IN COLOR



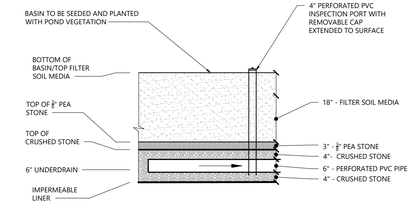
NOTES

1. PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
2. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.

Pond Outlet Control Detail (OCS)

3/20

N.T.S. Source: VHB REV LD_162A



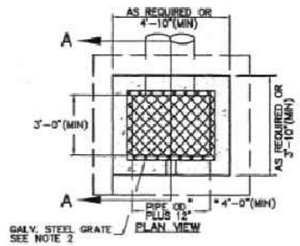
NOTES

1. FILTER SOIL MEDIA SHALL CONSIST (BY VOLUME) OF:
   - 60% TO 85% SAND (0.5 TO 2.0 MM) (SEE SPECS BELOW)
   - 15% TO 25% LOAM OR TOPSOIL
   - 3% TO 8% ORGANIC MATTER

   * ALTERNATIVELY, USE MEDIA SPECIFIED IN THE ALTERATION OF TERRAIN RULES, Env-Wq 1508.07(k)
2. ¾" PEASTONE SHALL CONFORM TO ASTM-33 #8 GRADATION, OR APPROVED EQUAL.

Basin Sand Filter

N.T.S. Source: VHB

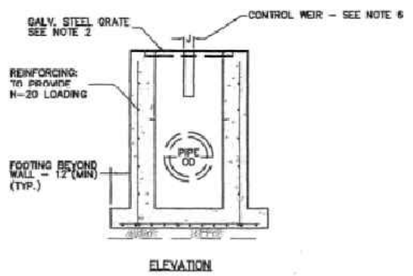


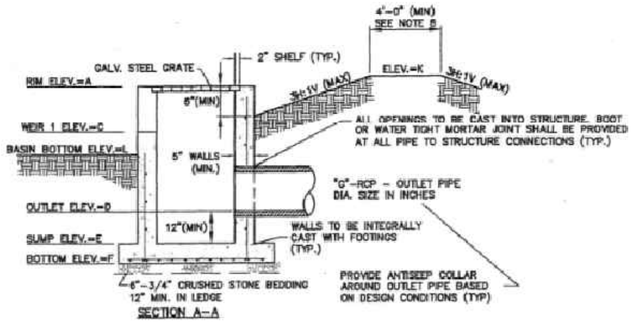
OUTLET STRUCTURE CHART

DETENTION BASIN	STRUCTURE NUMBER	A	B	C	D	E	F
1P	OS#1	SEE GD PLAN	388.5'	15"W x 29"H	387.0'	5"W x 18"H	387.0'	386.0'	-

Notes

1. THE SEWER CONNECTIONS SHALL BE INSPECTED BY AUTHORIZED TOWN OF LONDONDERRY PUBLIC WORKS AND ENGINEERING DEPARTMENT PERSONNEL BEFORE ANY BACKFILLING. INSPECTION HOURS ARE BETWEEN 9:00AM AND 4:30 PM, MONDAY - FRIDAY, WITH ATLEAST DAYS OF ADVANCE NOTICE
2. THE SEWER SERVICE MANHOLES SHALL BE VACUUM TESTED AND THE PVC PIPING PRESSURE TESTED WITH AUTHORIZED TOWN OF LONDONDERRY PUBLIC WORKS AND ENGINEERING DEPARTMENT PERSONNEL PRESENT ON SITE AS A WITNESS. SEWER MANHOLES SHALL BE VACUUM TESTED IN ACCORDANCE WITH ENV-WQ 704.17 AND GRAVITY SEWER PIPE SHALL BE TESTED IN ACCORDANCE WITH ENV-WQ 704.06 AND THE PROJECT SPECIFICATIONS.
3. ALL SEWER CONSTRUCTION AND USE SHALL CONFORM TO THE STATE OF NEW HAMPSHIRE STANDARD SEWER CONSTRUCTION SPECIFICATIONS AND THE TOWN OF LONDONDERRY SEWER USE ORDINANCE.
4. PRIOR TO CONSTRUCTION, CONTRACTOR TO FIELD VERIFY AS-BUILT CONDITIONS AT SMH 102 (BY OTHERS) AND THE STUB (BY OTHERS) BETWEEN SMH 101 AND 102 AND REPORT BACK DISCREPANCIES TO THE DESIGN ENGINEER.

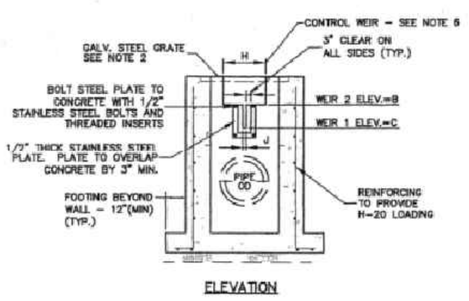


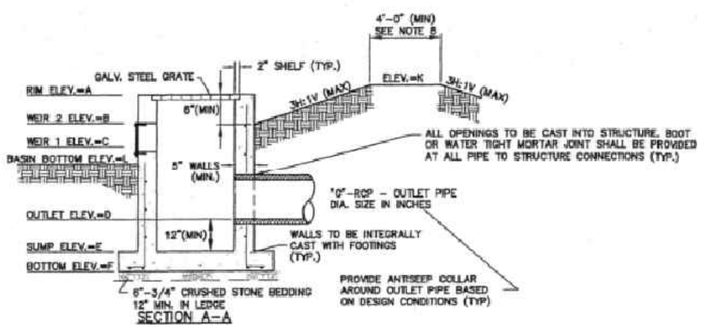


SINGLE WEIR OUTLET STRUCTURE

NOTES:

1. ALL CEMENT CONCRETE TO BE 4000 PSI(MIN).
2. GALVANIZED STEEL GRATE SHALL BE BOLTED TO TOP OF STRUCTURE WITH 1/2" STAINLESS STEEL BOLTS AND THREADED INSERTS.
3. OUTLET PIPE SHALL NOT BE LESS THAN 15" DIAMETER AND SHALL BE SIZED FOR A 50-YEAR STORM.
4. ALL OPENINGS SHALL BE CAST IN AS REQUIRED. MINIMUM CONCRETE WEIR WIDTH SHALL BE 2 INCHES.
5. PRECAST REINFORCED CONCRETE STRUCTURE TO MEET ASTM C-478 DESIGNATION AND H-20 LOADING.
6. CONTROL WEIR SHALL BE SIZED TO MITIGATE DESIGN STORM AS REQUIRED BY THE REGULATIONS AND IN ACCORDANCE WITH THE APPROVED DRAINAGE CALCULATIONS. STAINLESS STEEL PLATE SHALL BE USED FOR CONTROL WEIRS LESS THAN 2 INCHES WIDE.
7. ALL STAINLESS STEEL SHALL BE GRADE 316.
8. MINIMUM EMBANKMENT ELEVATION TO BE 12" ABOVE 50-YEAR STORM ELEVATION.





DOUBLE WEIR OUTLET STRUCTURE

TYPICAL OUTLET STRUCTURE AT DETENTION BASINS
(PRECAST CONCRETE CONTROL STRUCTURE)
NOT TO SCALE
EXHIBIT D108

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Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

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Designed by BJZ Checked by DHF

Issued for Permitting Date February 20, 2025

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Drawing Title
Site Details

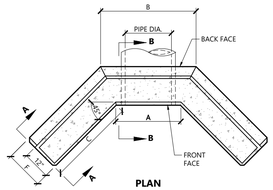
Drawing Number
C7.04

Sheet 89 of 111



Project Number 53140.00

Saved Monday, November 10, 2025 5:30:23 PM SFLEUROCK Plotted Tuesday, November 11, 2025 4:22:20 PM Jason Howe

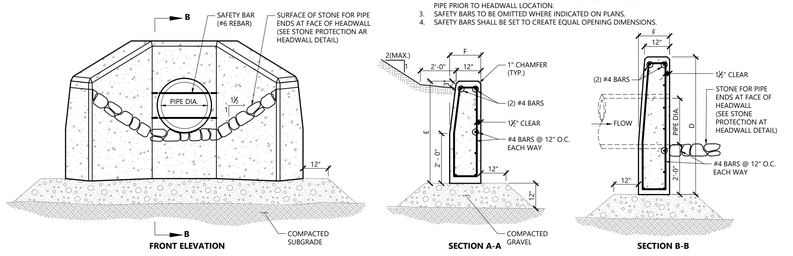


DIMENSIONAL TABLE

PIPE DIA.	A	B	C	D	E	F	#OF SAFETY BARS
12"	2'-6"	3'-8"	2'-11"	4'-0"	3'-3"	1'-6"	-
15"	2'-6"	3'-8"	2'-11"	4'-0"	3'-6"	1'-6"	1
18"	3'-0"	4'-2"	3'-3"	4'-6"	3'-6"	1'-6"	1
24"	3'-6"	4'-8"	3'-6"	5'-0"	3'-9"	1'-6"	1
30"	4'-0"	5'-3"	4'-3"	5'-10"	4'-0"	1'-6"	2
36"	4'-6"	5'-11"	5'-0"	6'-4"	4'-3"	1'-8"	2
42"	5'-0"	6'-6"	5'-9"	6'-11"	4'-6"	1'-10"	3
48"	5'-6"	7'-2"	6'-6"	7'-5"	4'-9"	2'-0"	3
60"	6'-6"	8'-5"	8'-0"	8'-6"	5'-3"	2'-4"	4
72"	7'-6"	9'-9"	9'-6"	9'-7"	5'-9"	2'-8"	5

NOTES

1. CONCRETE SHALL BE 6% ±1.5% AIR ENTRAINED TYPE II CEMENT WITH MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
2. INSTALL IMPERMEABLE TRENCH DAM ANTI-SEEP COLLAR AROUND DRAIN PIPE PRIOR TO HEADWALL LOCATION.
3. SAFETY BARS TO BE OMITTED WHERE INDICATED ON PLANS.
4. SAFETY BARS SHALL BE SET TO CREATE EQUAL OPENING DIMENSIONS.



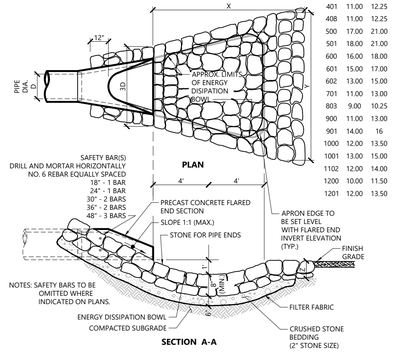
Concrete Headwall (HW) with Wing Walls

10/20

N.T.S. Source: VHB REV LD_132

RIPRAP STONE

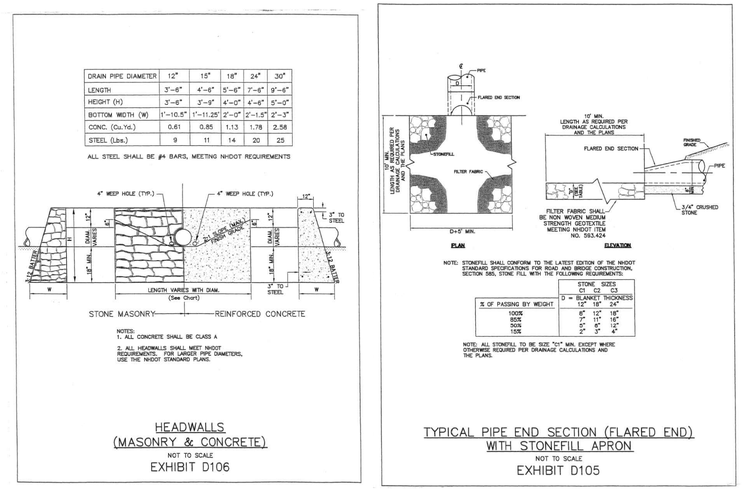
FES. NO.	X (FT)	Y (FT)	Z (IN)	STONE DIA. (Da)(IN)
300	9.00	21.00	13.50	6.00
301	11.00	12.50	13.50	6.00
305	11.00	12.50	13.50	6.00
400	13.00	21.00	13.50	6.00
401	11.00	12.25	13.50	6.00
408	11.00	12.25	13.50	6.00
500	17.00	21.00	13.50	6.00
501	18.00	21.00	13.50	6.00
600	16.00	18.00	13.50	6.00
601	15.00	17.00	13.50	6.00
602	13.00	15.00	13.50	6.00
701	11.00	13.00	13.50	6.00
803	9.00	10.25	13.50	6.00
900	11.00	13.00	13.50	6.00
901	14.00	16	13.50	6.00
1000	12.00	13.50	13.50	6.00
1001	13.00	15.00	13.50	6.00
1102	12.00	14.00	13.50	6.00
1200	10.00	11.50	13.50	6.00
1201	12.00	13.50	13.50	6.00



Flared End Section (FES) with Stone Protection

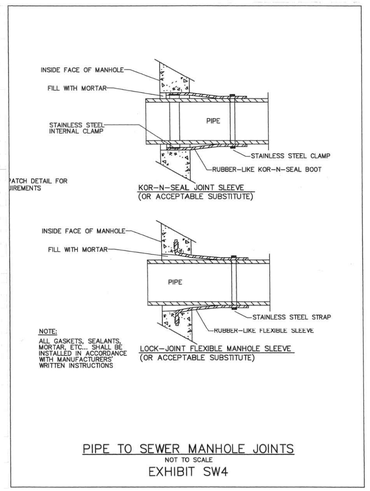
3/19

N.T.S. Source: VHB LD_134

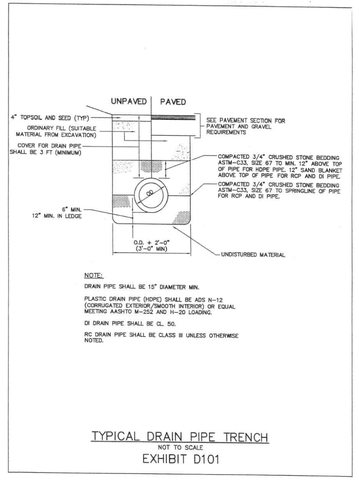


HEADWALLS
(MASONRY & CONCRETE)
NOT TO SCALE
EXHIBIT D106

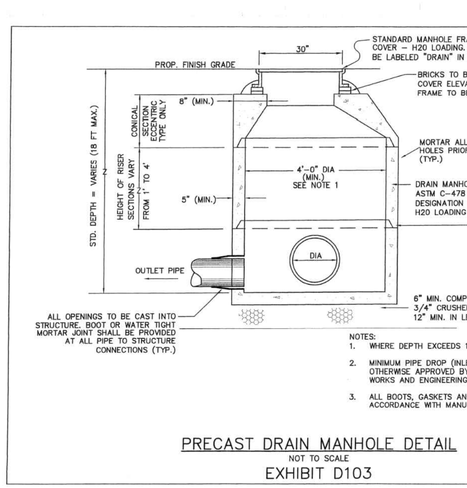
TYPICAL PIPE END SECTION (FLARED END) WITH STONEFILL APRON
NOT TO SCALE
EXHIBIT D105



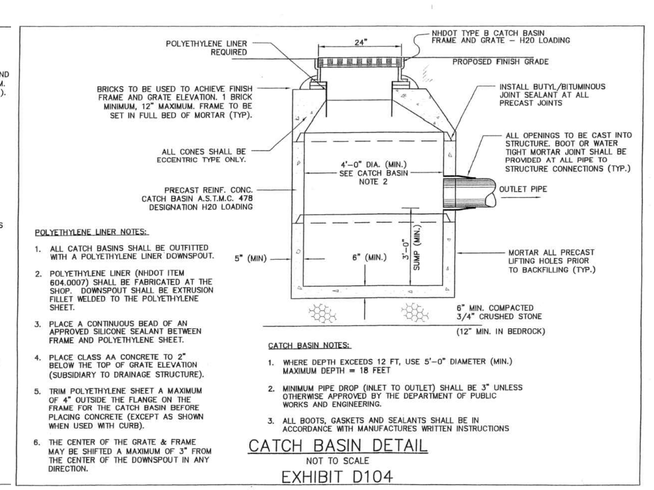
PIPE TO SEWER MANHOLE JOINTS
NOT TO SCALE
EXHIBIT SW4



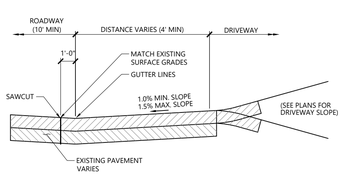
TYPICAL DRAIN PIPE TRENCH
NOT TO SCALE
EXHIBIT D101



PRECAST DRAIN MANHOLE DETAIL
NOT TO SCALE
EXHIBIT D103



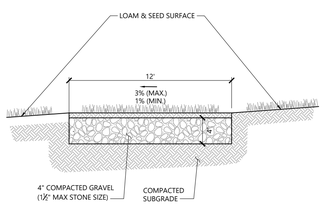
CATCH BASIN DETAIL
NOT TO SCALE
EXHIBIT D104



Driveway Entrance Section Detail

1/16

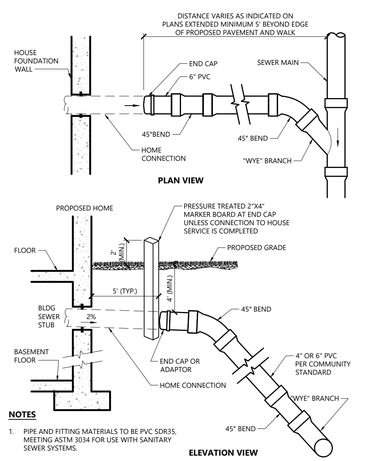
N.T.S. Source: VHB LD_423



12' Access Path

11/25

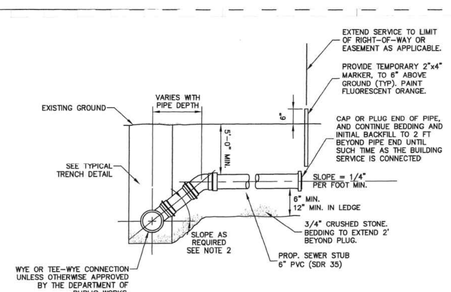
N.T.S. Source: VHB REV



Typical Wye and Chimney Detail (Residential)

1/16

N.T.S. Source: VHB LD_222



DETAIL FOR SEWER SERVICE CONNECTION
NOT TO SCALE
EXHIBIT SW5

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Suite 200
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603.391.3900

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ Checked by DHF

Issued for **Permitting** Date **February 20, 2025**

Not Approved for Construction

Drawing Title
Site Details

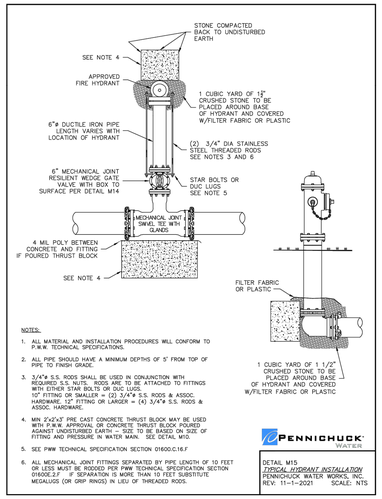
Drawing Number
C7.05

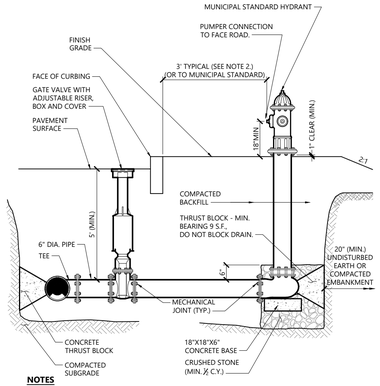
Sheet 90 of 111

Project Number
53140.00



Saved Monday, November 10, 2025 5:30:23 PM SFLEUROCK Plotted Tuesday, November 11, 2025 4:22:34 PM Jason Howe





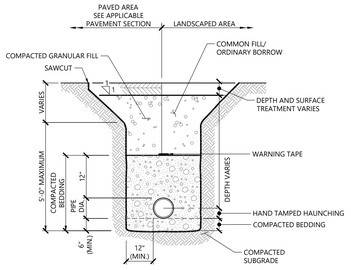
NOTES

1. CONCRETE THRUST BLOCKS TO BE USED ONLY WHERE THEY CAN BEAR ON UNDISTURBED EARTH AS SHOWN. USE CLAMPS AND TIE RODS OR OTHER ACCEPTABLE METHOD OF JOINT RESTRAINT WHERE SOIL CONDITIONS PROHIBIT THE USE OF THRUST BLOCKS.
2. HYDRANT IN SIDEWALK AREAS TO BE LOCATED TO PROVIDE MINIMUM CLEAR SIDEWALK PASSAGE WIDTH OF 3 FEET AT HYDRANT.
3. A 36-INCH CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE HYDRANT UNLESS OTHERWISE APPROVED BY AUTHORITY HAVING JURISDICTION.

Hydrant Construction

12/19

N.T.S. Source: VHB LD_250



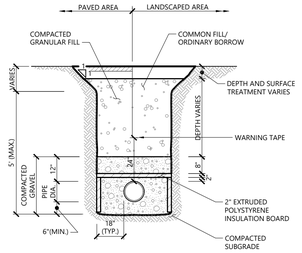
NOTES

1. WHERE UTILITY TRENCHES ARE CONSTRUCTED THROUGH DETENTION BASIN BERMS OR OTHER SUCH SPECIAL SECTIONS, PLACE TRENCH BACKFILL WITH MATERIALS SIMILAR TO THE SPECIAL SECTION REQUIREMENTS.
2. USE METALLIC TRACING/WARNING TAPE OVER ALL PIPES.
3. COMPACTED GRANULAR FILL MAY CONSIST OF GRAVEL, CRUSHED STONE, SAND, OR OTHER MATERIAL AS APPROVED BY ENGINEER.

Utility Trench

11/19

N.T.S. Source: VHB LD_300



NOTES

1. SEWER LINE SHALL BE INSULATED WHEN COVER IS LESS THAN FOUR (4) FEET AND WHERE SHOWN ON PLANS.
2. WATER LINE SHALL BE INSULATED WHEN COVER IS LESS THAN FIVE (5) FEET AND WHERE SHOWN ON PLANS.
3. BACKFILL PLACED IN UTILITY TRENCHES INCLUDING DISTURBED AREAS SURROUNDING UTILITY TRENCHES SHALL BE PLACED AND COMPACTED IN 12" (MAX.) VERTICAL LIFTS.

Utility - Pipe Insulation

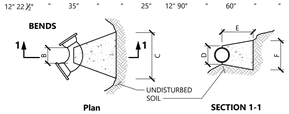
12/19

N.T.S. Source: VHB LD_305

TABLE OF DIMENSIONS

BENDS	B	C	D	E	F	BENDS	B	C	D	E	F
6" 11 ¼"	8"	15"	12"	24"	12"	6" 45°	8"	30"	12"	24"	14"
6" 22 ½"	"	19"	"	"	13"	6" 90°	"	30"	"	"	27"
8" 11 ¼"	"	20"	"	"	12"	8" 45°	"	30"	"	"	24"
8" 22 ½"	"	22"	"	"	17"	8" 90°	"	38"	"	"	36"
12" 11 ¼"	"	30"	"	"	15"	12" 45°	"	40"	"	"	40"
12" 22 ½"	"	35"	"	"	25"	12" 90°	"	60"	"	"	52"

BENDS

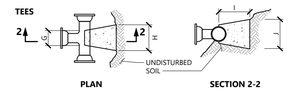


Plan SECTION 1-1

TABLE OF DIMENSIONS

TEES	G	H	I	J	TEES	G	H	I	J
6"X6"X6"	12"	24"	24"	18"	12"X12"X6"	12"	24"	24"	18"
8"X8"X6"	"	"	"	"	12"X12"X8"	"	"	"	24"
8"X8"X8"	"	"	"	24"	12"X12"X12"	"	36"	"	36"

TEES



PLAN SECTION 2-2

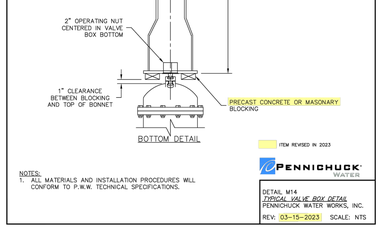
NOTES

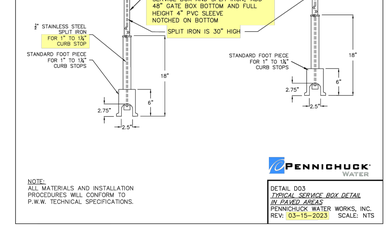
1. PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE VALVES, AND VERTICAL BENDS (SAME SIZE AS REQUIRED FOR TEES). PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE VALVES.
2. CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND FITTING.
3. CONCRETE SHALL BE 3,000 PSI-TYPE I.

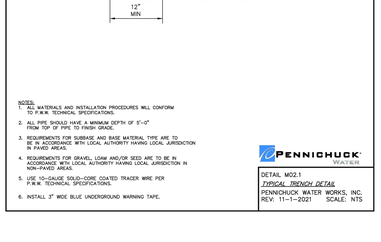
Concrete Thrust Block

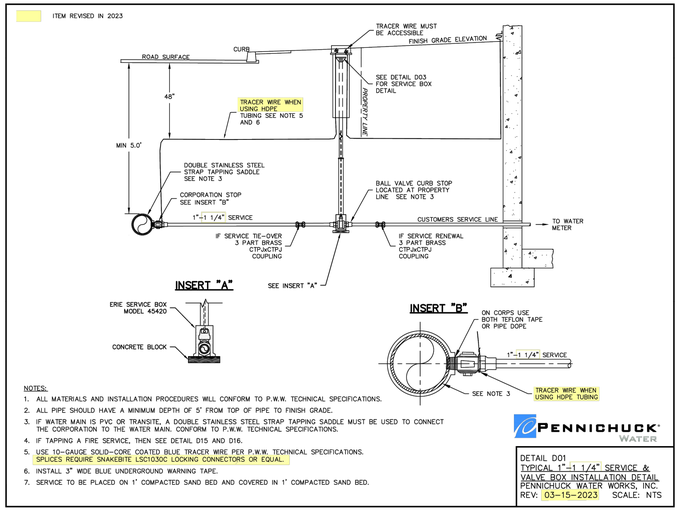
1/16

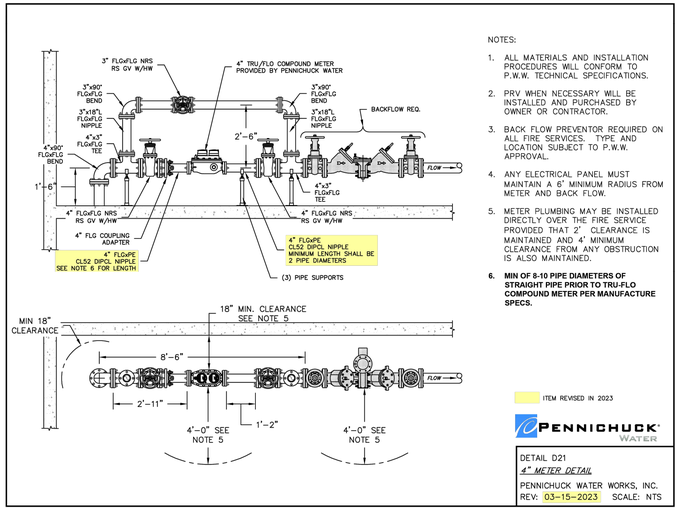
N.T.S. Source: VHB LD_260











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100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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2	Planning Board Submission	11-13-2025	EKG

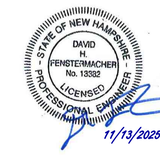
Designed by BJZ Checked by DHF

Issued for Permitting Date February 20, 2025

Not Approved for Construction

Drawing Title
Site Details

Drawing Number
C7.06



Sheet 91 of 111

Project Number 53140.00

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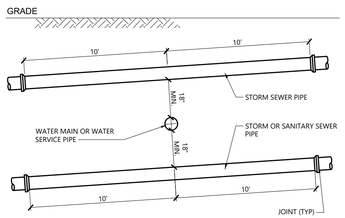


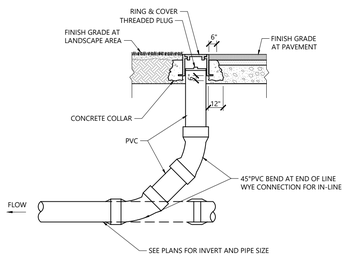
NOTES

1. WHERE SEWER LINE CROSSES OVER WATER LINE, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER AND WATER LINE. SEWER LINE JOINTS SHALL BE 10 FEET FROM THE POINT OF CROSSING WHERE SEWER LINES CROSS OVER WATER LINES.
2. WHERE WATER LINE CROSSES OVER SEWER LINE AND 18 INCH SEPARATION CANNOT BE MAINTAINED, BOTH WATER AND SEWER LINES SHALL BE CONSTRUCTED OF PRESSURE PIPE AND A MINIMUM SEPARATION BETWEEN THE BOTTOM OF THE WATER LINE AND THE TOP OF THE SEWER LINE OF 12 INCHES SHALL BE MAINTAINED.
3. IN THE EVENT THAT A STORM SEWER CROSSES OVER A SANITARY SEWER, THE SANITARY SEWER MUST BE CONSTRUCTED OF DIP UNLESS 18 INCH SEPARATION IS MAINTAINED.

Water/Sanitary/Drainage Pipe Crossing

11/25

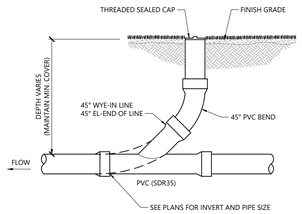
N.T.S. Source: VHB REV



Cleanout (CO)

12/19

N.T.S. Source: VHB LD_303

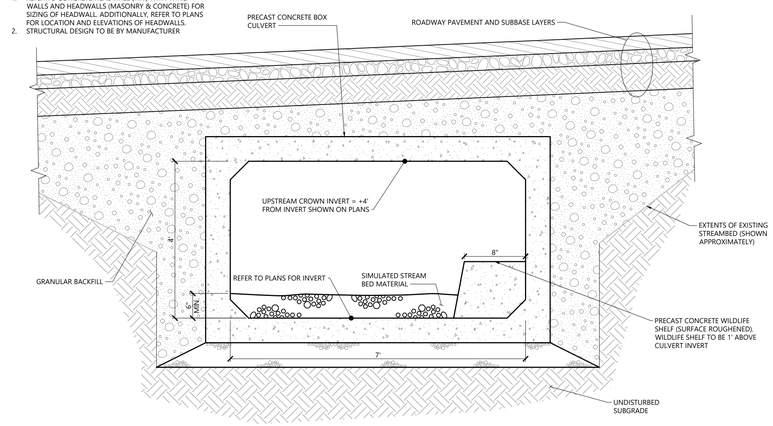


Cleanout (CO) - Landscape Area

11/19

N.T.S. Source: VHB LD_302

NOTES:
1. REFER TO CONCRETE HEADWALL (HW) WITH WING WALLS AND HEADWALLS (MASONRY & CONCRETE) FOR SIZING OF HEADWALL. ADDITIONALLY, REFER TO PLANS FOR LOCATION AND ELEVATIONS OF HEADWALLS.
2. STRUCTURAL DESIGN TO BE BY MANUFACTURER



4' by 7' - Box Culvert Section

11/25

N.T.S. Source: VHB

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Bedford, NH 03110
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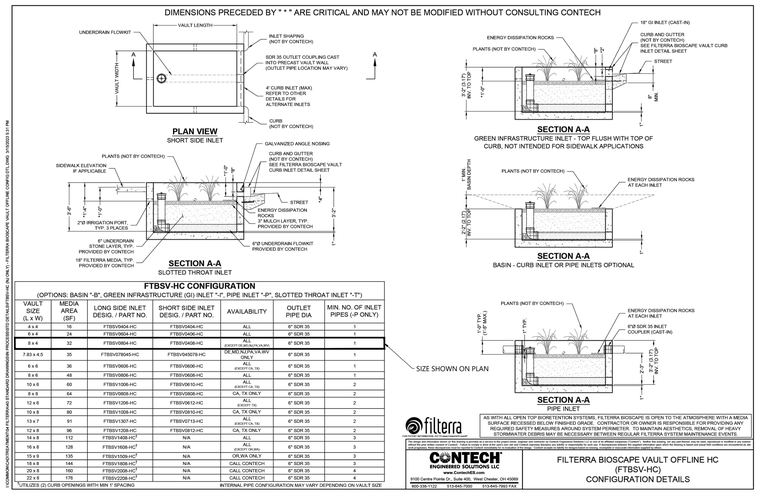

FTBSV-HC CONFIGURATION

(OPTIONS: BASIN "-B", GREEN INFRASTRUCTURE (GI) INLET "-I", PIPE INLET "-P", SLOTTED THROAT INLET "-T")

VAULT SIZE (L x W)	MEDIA AREA (SF)	LONG SIDE INLET DESIG. / PART NO.	SHORT SIDE INLET DESIG. / PART NO.	AVAILABILITY	OUTLET PIPE DIA	MIN. NO. OF INLET PIPES (-P ONLY)
4 x 4	16	FTBSV0404-HC	FTBSV0404-HC	ALL	6" SDR 35	1
6 x 4	24	FTBSV0604-HC	FTBSV0406-HC	ALL	6" SDR 35	1
8 x 4	32	FTBSV0804-HC	FTBSV0468-HC	ALL (DEPTH RESTRICTION APPLIES)	6" SDR 35	1
7.83 x 4.5	35	FTBSV0784S-HC	FTBSV0478S-HC	OR MD-NJ PA VA WV ONLY	6" SDR 35	1
6 x 6	36	FTBSV0606-HC	FTBSV0606-HC	ALL (EXCEPT FL TX)	6" SDR 35	1
8 x 6	48	FTBSV0806-HC	FTBSV0668-HC	ALL	6" SDR 35	1
10 x 6	60	FTBSV1006-HC	FTBSV0610-HC	ALL (EXCEPT FL TX)	6" SDR 35	2
8 x 8	64	FTBSV0808-HC	FTBSV0808-HC	CA, TX ONLY	6" SDR 35	2
12 x 6	72	FTBSV1206-HC	FTBSV0612-HC	ALL (EXCEPT TX)	6" SDR 35	2
10 x 8	80	FTBSV1008-HC	FTBSV0810-HC	CA, TX ONLY	6" SDR 35	2
13 x 7	91	FTBSV1307-HC	FTBSV0713-HC	ALL (EXCEPT TX)	6" SDR 35	2
12 x 8	96	FTBSV1208-HC	FTBSV0812-HC	CA, TX ONLY	6" SDR 35	2
14 x 8	112	FTBSV1408-HC*	N/A	ALL (EXCEPT CA, MA)	6" SDR 35	3
16 x 8	128	FTBSV1608-HC*	N/A	(EXCEPT CA, MA)	6" SDR 35	3
13 x 9	135	FTBSV1309-HC*	N/A	OR, WA ONLY	6" SDR 35	3
14 x 8	144	FTBSV1808-HC*	N/A	CALL CONTECH*	6" SDR 35	3
20 x 8	160	FTBSV2008-HC*	N/A	CALL CONTECH*	6" SDR 35	4
22 x 8	176	FTBSV2208-HC*	N/A	CALL CONTECH*	6" SDR 35	4

*UTILIZES (2) CURB OPENINGS WITH MIN 1' SPACING

INTERNAL PIPE CONFIGURATION MAY VARY DEPENDING ON VAULT SIZE

filterra

AS WITH ALL OPEN TOP BIORETENTION SYSTEMS, FILTERRA BIOSCAPE IS OPEN TO THE ATMOSPHERE WITH A MEDIA SURFACE RECESSED BELOW FINISHED GRADE. CONTRACTOR OR OWNER IS RESPONSIBLE FOR PROVIDING ANY REQUIRED SAFETY MEASURES AROUND SYSTEM PERIMETER. TO MAINTAIN AESTHETICS, REMOVAL OF HEAVY STORMWATER DEBRIS MAY BE NECESSARY BETWEEN REGULAR FILTERRA SYSTEM MAINTENANCE EVENTS.

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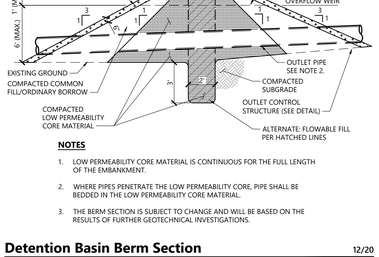
FILTERRA BIOSCAPE VAULT OFFLINE HC (FTBSV-HC) CONFIGURATION DETAILS

Detention Basin Berm Section

12/20

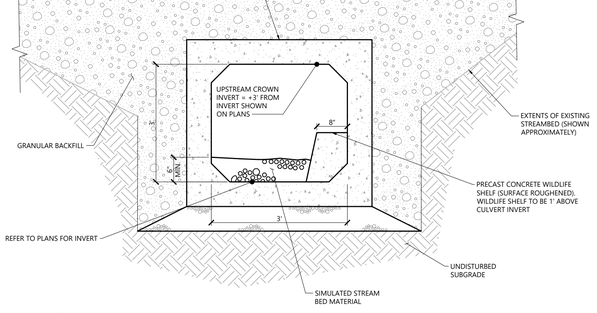
N.T.S. Source: VHB LD_160



NOTES

1. LOW PERMEABILITY CORE MATERIAL IS CONTINUOUS FOR THE FULL LENGTH OF THE EMBANKMENT.
2. WHERE PIPES PENETRATE THE LOW PERMEABILITY CORE, PIPE SHALL BE BEDDED IN THE LOW PERMEABILITY CORE MATERIAL.
3. THE BERM SECTION IS SUBJECT TO CHANGE AND WILL BE BASED ON THE RESULTS OF FURTHER GEOTECHNICAL INVESTIGATIONS.

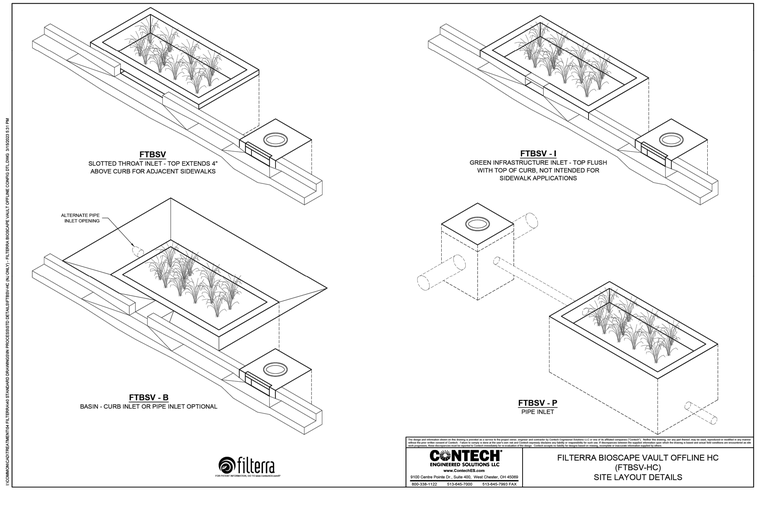
NOTES:
1. REFER TO CONCRETE HEADWALL (HW) WITH WING WALLS AND HEADWALLS (MASONRY & CONCRETE) FOR SIZING OF HEADWALL. ADDITIONALLY, REFER TO PLANS FOR LOCATION AND ELEVATIONS OF HEADWALLS.
2. STRUCTURAL DESIGN TO BE BY MANUFACTURER



3' by 3' - Box Culvert Section

11/25

N.T.S. Source: VHB



filterra

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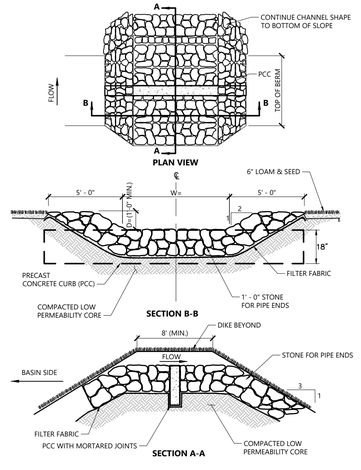
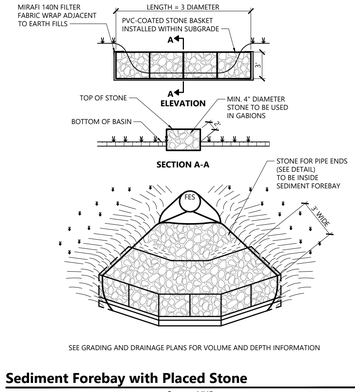
FILTERRA BIOSCAPE VAULT OFFLINE HC (FTBSV-HC) SITE LAYOUT DETAILS



Overflow Stone Swale

1/16

N.T.S. Source: VHB LD_161



Sediment Forebay with Placed Stone

11/25

N.T.S. Source: VHB REV

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
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Designed by BJZ | Checked by DHF

Issued for: Permitting | Date: February 20, 2025

Not Approved for Construction

Drawing Title: Site Details

Drawing Number: C7.07

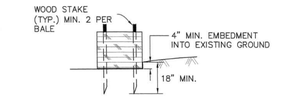
Sheet 92 of 111

STATE OF NEW HAMPSHIRE DAVID N. FENSTERMACHER No. 13332 LICENSED PROFESSIONAL ENGINEER 11/13/2025

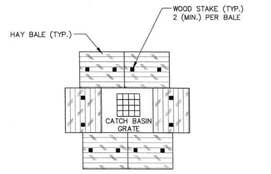
Project Number 53140.00

Saved Monday, November 10, 2025 5:30:23 PM SFLEUROCK Plotted Tuesday, November 11, 2025 4:23:04 PM Jason Howe

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\ld\Planset\5314000-DT.dwg



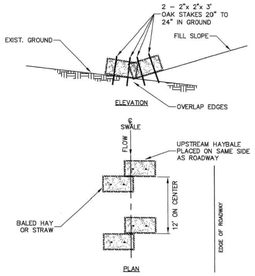
DETAILS FOR HAYBALE AND SILT FENCE INSTALLATION
NOT TO SCALE
EXHIBIT EC1



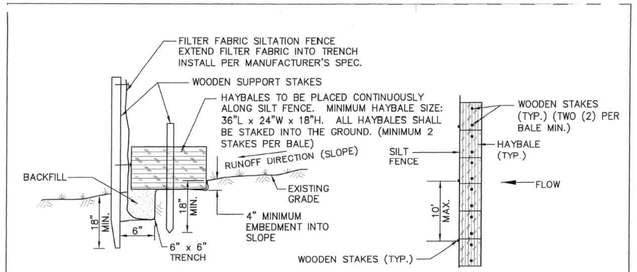
NOTES:

1. BALES TO REMAIN UNTIL SUBBASE PREPARATION IS COMPLETE AND ROADWAY PAVING IS TO BEGIN OR UNTIL ALL UPSTREAM AREAS ARE STABILIZED WITH VEGETATION.
2. HAYBALES AROUND CATCH BASINS TO BE USED IN NON-PAVED AREAS ONLY. FOR CATCH BASINS IN PAVED AREAS USE INLET FILTER BASKETS. SEE EXHIBIT EC6.
3. EACH CATCH BASIN LOCATION SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM ENTERING THE DRAINAGE PIPING SYSTEM AND/OR CAUSING SURFACE FLOODING.

DETAILS FOR SEDIMENT CONTROL AT CATCH BASINS
NOT TO SCALE
EXHIBIT EC2



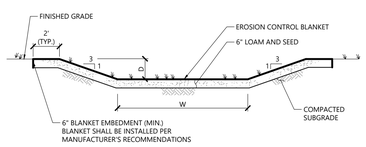
DETAILS FOR HAY BALE CHECK DAM
NOT TO SCALE
EXHIBIT EC3



DETAIL FOR SILT FENCE WITH HAY BALES
NOT TO SCALE
EXHIBIT EC4

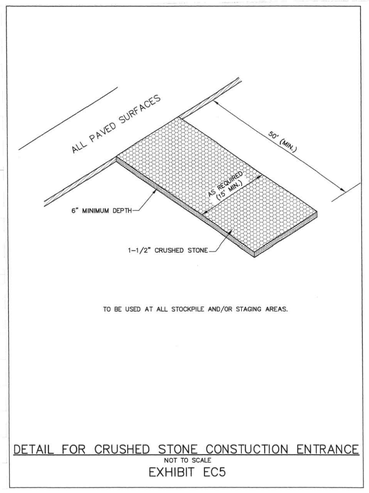
SWALE TABLE

SWALE DESIGNATION	W	D
TYP	3	3



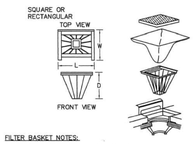
Grassed Swale 11/5

N.T.S. Source: VHB LD_171 REV



TO BE USED AT ALL STOCKPILE AND/OR STAGING AREAS.

DETAIL FOR CRUSHED STONE CONSTUCTION ENTRANCE
NOT TO SCALE
EXHIBIT EC5



FILTER BASKET NOTES:

1. INLET BASKETS SHALL BE USED ON ALL CATCH BASINS WITHIN THE PROJECT LIMITS WITHIN PAVED AREAS. INLET FILTER BASKETS SHALL BE "SILT SACK®" OR APPROVED EQUAL.
2. FILTER FABRIC SHALL BE PUSHED DOWN AND FORMED TO THE SHAPE OF THE BASKET. THE SHEET OF FABRIC SHALL BE LARGE ENOUGH TO BE SUPPORTED BY THE BASKET FRAME WHEN HOLDING SEDIMENT AND EXTEND AT LEAST 6 INCHES PAST THE FRAME. THE INLET GRATE SHALL BE PLACED OVER THE BASKET/FRAME AND WILL SERVE AS THE FABRIC ANCHOR.
3. THE FILTER FABRIC SHALL BE A GEO-TEXTILE FABRIC: POLYESTER, POLYPROPYLENE, STABILIZED NYLON, POLYETHYLENE OR POLYVINYLIDENE CHLORIDE MEETING THE FOLLOWING SPECIFICATIONS:
   GRAB STRENGTH: 300 lb. MINIMUM IN ANY PRINCIPAL DIRECTION (ASTM D-4632).
   MULLEN BURST STRENGTH: MINIMUM 800 psi (ASTM D-3786).

   THE FABRIC SHALL HAVE AN OPENING NO GREATER THAN A NUMBER 40 U.S.
4. STANDARD SIEVE AND MINIMUM PERMEABILITY OF 40 gpm/sq. ft.

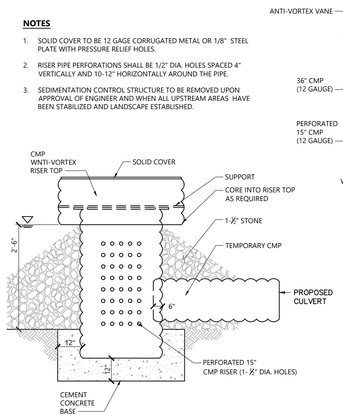
   THE INLET BASKET SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL
5. OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM ENTERING THE DRAINAGE PIPING SYSTEM AND/OR CAUSING SURFACE FLOODING.

   INLET BASKETS SHALL BE MAINTAINED IN PLACE UNTIL ALL PAVING IS COMPLETED
6. AND ALL UNPAVED AREAS HAVE BEEN STABILIZED WITH VEGETATION.

DETAIL FOR INLET FILTER BASKET
NOT TO SCALE
EXHIBIT EC6

NOTES

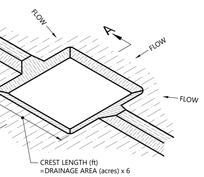
1. SOLID COVER TO BE 12 GAGE CORRUGATED METAL OR 1/8" STEEL PLATE WITH PRESSURE RELIEF HOLES.
2. RISER PIPE PERFORATIONS SHALL BE 1/2" DIA. HOLES SPACED 4" VERTICALLY AND 10-12" HORIZONTALLY AROUND THE PIPE.
3. SEDIMENTATION CONTROL STRUCTURE TO BE REMOVED UPON APPROVAL OF ENGINEER AND WHEN ALL UPSTREAM AREAS HAVE BEEN STABILIZED AND LANDSCAPE ESTABLISHED.



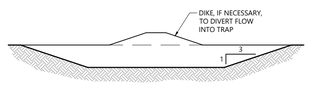
SECTION A-A

Temporary Sedimentation Control Structure 1/16

N.T.S. Source: VHB LD_692



ISOMETRIC VIEW



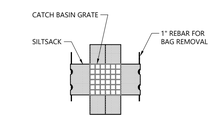
SECTION A-A

NOTES

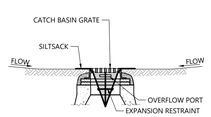
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA OR SOURCE OF SEDIMENT AS POSSIBLE .
2. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. THE SIDE SLOPES OF THE TRAP SHALL BE 3:1 OR FLATTER, AND SHALL BE STABILIZED IMMEDIATELY AFTER THEIR CONSTRUCTION.
5. THE OUTLET OF THE TRAP SHALL BE A MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP AND SHALL DISCHARGE TO A STABILIZED AREA.
6. THE TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. THE MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

Temporary Sediment Trap

N.T.S. Source: NH Stormwater Manual



PLAN VIEW



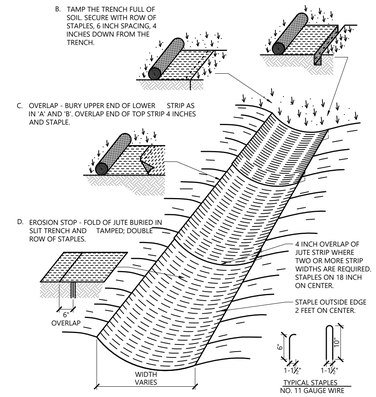
SECTION VIEW

NOTES

1. INSTALL SILTSACK IN ALL CATCH BASINS WHERE INDICATED ON THE PLAN BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND STRAW BALES HAVE BEEN REMOVED.
2. GRATE TO BE PLACED OVER SILTSACK.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED

Siltsack Sediment Trap 1/20

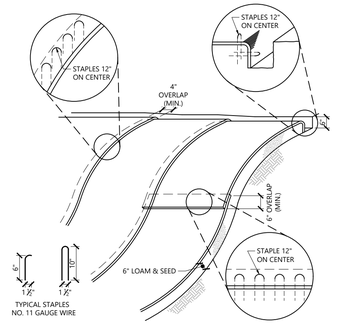
N.T.S. Source: VHB REV LD_674



* INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS

Erosion Control Blanket Swale Installation 1/16

N.T.S. Source: VHB LD_681

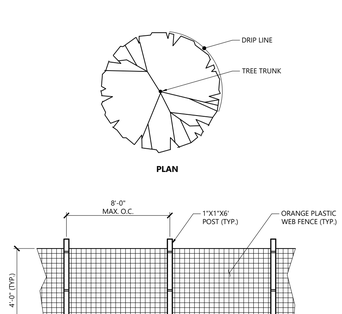


NOTES

1. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH BACKFILL AND COMPACT TRENCH AFTER STAPLING.
2. ROLL THE BLANKET DOWN THE SWALE IN THE DIRECTION OF THE WATER FLOW.
3. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
4. WHEN BLANKETS MUST BE SPLICED DOWN THE SWALE, PLACE UPPER BLANKET END OVER LOWER END WITH 6 INCH (MIN.) OVERLAP AND STAPLE BOTH TOGETHER.
5. METHOD OF INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS.
6. EROSION CONTROL BLANKETS SHALL BE USED IN ALL AREAS WHERE SLOPES EXCEED 3:1.
7. THERE SHALL BE NO PLASTIC OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN ⅛ INCHES MATERIAL UTILIZED.

Erosion Control Blanket Slope Installation 10/20

N.T.S. Source: VHB LD_680



NOTES

1. INSTALL TREE PROTECTION FENCE AT THE DRIP LINE OF EXISTING TREES TO REMAIN.

Tree Protection Fence 1/16

N.T.S. Source: VHB LD_610

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Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ Checked by DHF

Issued for **Permitting** Date **February 20, 2025**

Not Approved for Construction

Drawing Title
Site Details

Drawing Number
C7.08

Sheet 93 of 111

STATE OF NEW HAMPSHIRE DAVID H. FENSTERMACHER No. 13382 LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number 53140.00

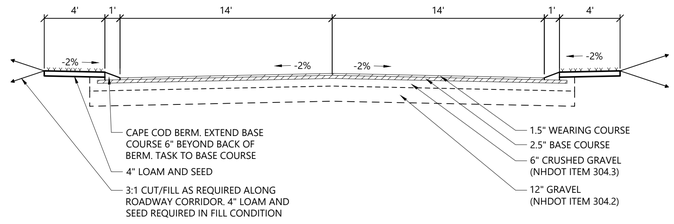
Saved Monday, November 10, 2025 5:30:23 PM STLEUROCK Plotted Tuesday, November 11, 2025 4:23:18 PM Jason Howe

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Planset\5314000-DT-XSECTION.dwg

TYPICAL 28' ROADWAY CROSS SECTION

APPLICABLE STATIONS:

THORNTON HILL AVENUE:
FROM STATION 0+00.00' TO STATION 8+02.01'
FROM STATION 47+11.95 ' TO STATION 55+05.87'



TYPICAL 24' ROADWAY CROSS SECTION

APPLICABLE STATIONS:

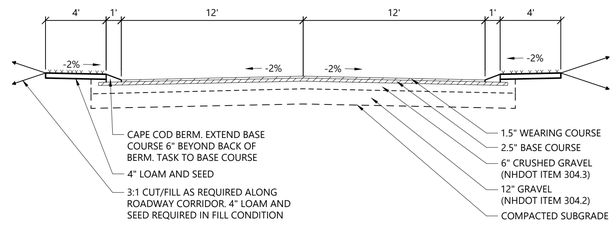
THORNTON HILL AVENUE:
FROM STATION 8+02.01' TO STATION 47+11.95'

OXFORD COURT:
FROM STATION 0+00.00' TO STATION 2+81.06'
FROM STATION 17+18.29' TO STATION 18+62.02'

BRAMLEY COURT:
FROM STATION 10+05.55' TO STATION 10+70.30'

KINGSTON COURT:
FROM STATION 0+00.00' TO STATION 9+63.95'
FROM STATION 13+06.07' TO STATION 13+85.94'

PORTERS COURT:
FROM STATION 0+00.00' TO STATION 0+40.09'
FROM STATION 8+92.76' TO STATION 9+81.42'



TYPICAL 24' ROADWAY CROSS SECTION

APPLICABLE STATIONS:

THORNTON HILL AVENUE:
FROM STATION 8+02.01' TO STATION 47+11.95'

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FROM STATION 0+00.00' TO STATION 10+05.55'

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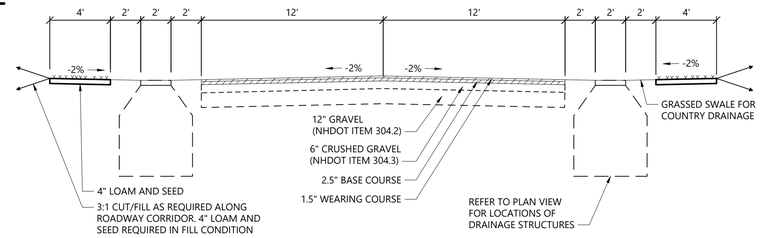
FROM STATION 0+00.00' TO STATION 9+63.95'
FROM STATION 13+06.07' TO STATION 13+85.94'

PORTERS COURT:
FROM STATION 0+00.00' TO STATION 0+40.09'
FROM STATION 8+92.76' TO STATION 9+81.42'



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Designed by: BJZ
Checked by: DHF
Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title: Site Details

Drawing Number: C7.09

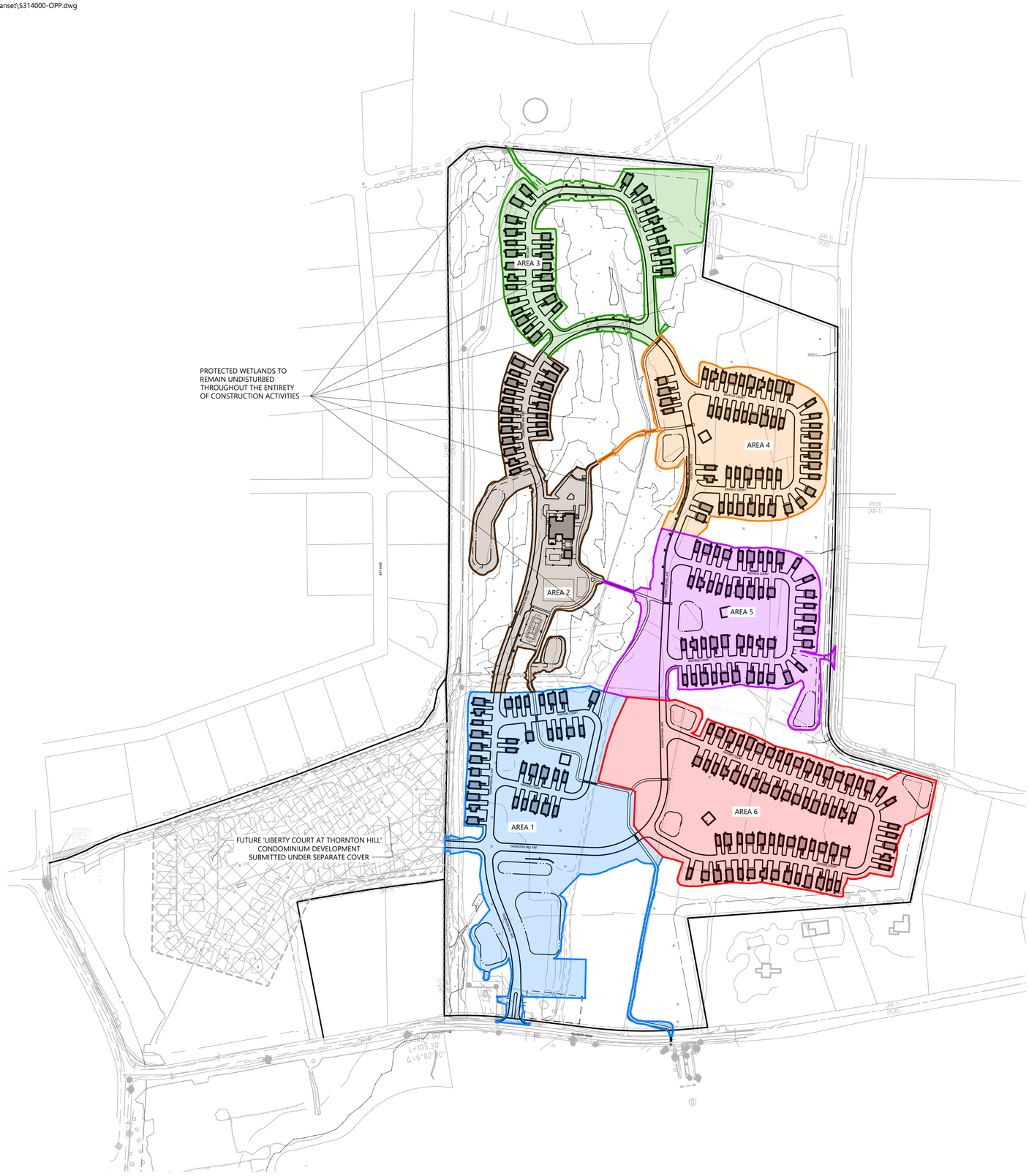
STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Sheet 94 of 111

Project Number: 53140.00

Saved Monday, November 10, 2025 3:57:04 PM JHOWE Plotted Tuesday, November 11, 2025 4:23:44 PM Jason Howe

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\d\Planset\5314000-OPP.dwg



Sequencing Notes

1. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO NHDES, AND THE ENGINEER, A DETAILED PHASING AND CONSTRUCTION SEQUENCING PLAN THAT SHOWS THE PHASED AREAS OF CONSTRUCTION AND TEMPORARY EROSION CONTROL MEASURES TO BE IMPLEMENTED.
2. TEMPORARY ROAD CLOSURE BARRICADES TO BE PLACED AT THE LIMITS OF EACH PHASE, AND WILL BE MOVED TO THE END OF THE SUCCESSIVE PHASE WHEN THAT PHASE IS COMPLETED.

NHDES Env-Wq 1500: AoT Notes

(a) ALL AREAS OF UNSTABILIZED SOIL SHALL BE:
(1) TEMPORARILY STABILIZED AS SOON AS PRACTICABLE BUT IN ALL CASES WITHIN 45 DAYS OF INITIAL DISTURBANCE, UNLESS A SHORTER TIME IS SPECIFIED BY LOCAL AUTHORITIES, THE CONSTRUCTION SEQUENCE APPROVED AS PART OF THE ISSUED PERMIT, OR AN INDEPENDENT MONITOR; AND
(2) PERMANENTLY STABILIZED AS SOON AS PRACTICABLE BUT IN ALL CASES WITHIN 3 DAYS OF FINAL GRADING.

(b) SUBJECT TO (C) AND (F), BELOW, THE AREA OF UNSTABILIZED SOIL SHALL NOT EXCEED 5 ACRES AT ANY TIME.

(c) THE DEPARTMENT SHALL AUTHORIZE AN APPLICANT TO DISTURB MORE THAN 5 ACRES AT ONE TIME IF THE APPLICANT:
(1) SUBMITS DOCUMENTATION THAT THE REQUIRED AREAS OF EARTH CUTS AND FILLS ARE SUCH THAT AN AREA OF DISTURBANCE OF 5 ACRES OR LESS WOULD UNREASONABLY LIMIT THE CONSTRUCTION SCHEDULE;
(2) SUBMITS A CONSTRUCTION SEQUENCE PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST; AND
(3) EMPLOYS AN ENVIRONMENTAL MONITOR DURING CONSTRUCTION.

(d) SUBJECT TO (E), BELOW, THE ENVIRONMENTAL MONITOR SHALL:
(1) INSPECT THE PROJECT SITE AT LEAST ONCE EACH WEEK FROM THE START OF TERRAIN ALTERATION ACTIVITIES UNTIL ALL TERRAIN ALTERATION ACTIVITIES ARE COMPLETED AND THE SITE IS STABILIZED;
(2) IN ADDITION TO REGULAR WEEKLY INSPECTIONS, INSPECT THE PROJECT SITE DURING ANY RAIN EVENT IN WHICH 0.5 INCH OF PRECIPITATION OR MORE FALLS WITHIN A 24 HOUR PERIOD, PROVIDED THAT IF THE ENVIRONMENTAL MONITOR IS UNABLE TO BE PRESENT DURING SUCH A STORM, THE MONITOR SHALL INSPECT THE SITE WITHIN 24 HOURS OF THE RAIN EVENT;
(3) SUBMIT A WRITTEN REPORT, STAMPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, TO THE DEPARTMENT WITHIN 24 HOURS OF EACH INSPECTION THAT:
a. DESCRIBES THE PROGRESS OF THE PROJECT, INCLUDING WHETHER ALL CONDITIONS OF THE PERMIT ARE BEING MET AND, IF NOT, WHICH REQUIREMENTS ARE NOT BEING MET;
b. IF ANY REQUIREMENTS ARE NOT BEING MET, AN EXPLANATION OF THE CORRECTIVE ACTION(S) THAT WILL BE OR ARE BEING TAKEN TO BRING THE PROJECT INTO COMPLIANCE WITH APPLICABLE REQUIREMENTS AND THE DEADLINE BY WHICH SUCH ACTIONS WILL BE COMPLETED; AND
c. INCLUDES PHOTOGRAPHS OF THE SITE THAT ARE REPRESENTATIVE OF THE PROJECT; AND
(1) RETAIN A COPY OF THE REPORT PREPARED PURSUANT TO (3), ABOVE, ON-SITE FOR REVIEW DURING SITE INSPECTIONS BY FEDERAL, STATE, AND LOCAL OFFICIALS.

(a) ROUTINE INSPECTION FREQUENCY MAY BE REDUCED FROM ONCE EACH WEEK TO AT LEAST ONCE EACH MONTH IF EITHER OF THE FOLLOWING CONDITIONS IS MET:
(1) WORK HAS BEEN SUSPENDED AND THE ENTIRE SITE IS STABILIZED IN ACCORDANCE WITH ENV-WQ 1505.04; OR
(2) RUNOFF IS UNLIKELY BECAUSE:
a. THE GROUND IS FROZEN OR THE SITE IS COVERED WITH SNOW OR ICE; AND
b. THE PROJECT IS IN AN AREA WHERE FROZEN CONDITIONS ARE ANTICIPATED TO CONTINUE FOR MORE THAN ONE MONTH.

(f) IF THE SITE IS WITHIN 50 FEET OF A SURFACE WATER OF THE STATE, OR WETLANDS AS DEFINED IN RSA 482-A, HAS A GRADE OF 25% OR GREATER, OR CONTAINS SOILS HAVING AN ERODIBILITY FACTOR OF 0.4 OR GREATER, OR ANY COMBINATION OF THESE, THE OWNER SHALL, REGARDLESS OF THE SIZE OF THE OPEN AREA:
(1) SUBMIT A CONSTRUCTION SEQUENCE PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST;
(2) EMPLOY AN ENVIRONMENTAL MONITOR; AND
(3) COMPLY WITH (D) AND (E), ABOVE.

SOURCE. (SEE REVISION NOTE #1 AT CHAPTER HEADING FOR ENV-WQ 1500) #9343, EFF 1-1-09; SS BY #12342, EFF 8-15-17
(FORMERLY ENV-WQ 1505.02) (SEE REVISION NOTE #3 AT CHAPTER HEADING FOR ENV-WQ 1500); SS BY #13758, EFF 9-28-23 (SEE REVISION NOTE #4 AT CHAPTER HEADING FOR ENV-WQ 1500)

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35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road Londonderry, New Hampshire 03053

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Designed by BJZ | Checked by DHF

Issued for: Permitting

Date: February 20, 2025

Not Approved for Construction

Drawing Title: Overall Sequencing Plan

Drawing Number: C8.00

Sheet 95 of 111

Project Number: 53140.00

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Saved Tuesday, November 11, 2025 9:35:32 AM JHOWE Plotted Wednesday, November 12, 2025 2:33:55 PM Ben Zoller

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Notes

INTRODUCTION

VHB HAS PREPARED THE FOLLOWING STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE MANUAL FOR THE REDISENTIAL PROJECT LOCATED AT 36 PILLSBURY ROAD, LONDONDERRY, NEW HAMPSHIRE. THE INTENT OF THIS PLAN IS TO PROVIDE THE APPLICANT/OWNER WITH A LIST OF PROCEDURES THAT DOCUMENT THE INSPECTION AND MAINTENANCE REQUIREMENTS OF THE STORMWATER MANAGEMENT SYSTEM FOR THIS DEVELOPMENT.

THE FOLLOWING INSPECTION AND MAINTENANCE PROGRAM IS NECESSARY IN ORDER TO KEEP THE STORMWATER MANAGEMENT SYSTEM FUNCTIONING PROPERLY. BY FOLLOWING THE ENCLOSED PROCEDURES, THE APPLICANT WILL BE ABLE TO MAINTAIN THE FUNCTIONAL DESIGN OF THE STORMWATER MANAGEMENT SYSTEM AND MAXIMIZE ITS ABILITY TO REMOVE SEDIMENT AND OTHER CONTAMINANTS FROM SITE GENERATED STORMWATER RUNOFF.

RESPONSIBLE PARTY

THE OVERSIGHT OF THE INSPECTION AND MAINTENANCE PROGRAM WILL BE PROVIDED BY:

PROCOPIO ENTERPRISE, LLC
35 VILLAGE ROAD,. 7TH FLOOR (702)
MIDDLETON, MA 01949

STORMWATER MANAGEMENT SYSTEM COMPONENTS

THE STORMWATER MANAGEMENT SYSTEM IS DESIGNED TO MITIGATE BOTH THE QUANTITY AND QUALITY OF SITE-GENERATED STORMWATER RUNOFF. AS A RESULT, ITS DESIGN INCLUDES THE FOLLOWING ELEMENTS:

A. NON-STRUCTURAL BMP'S

A.1. NON-STRUCTURAL BEST MANAGEMENT PRACTICES (BMP'S) ARE DESIGNED TO MINIMIZE AND/OR REMOVE CONTAMINANTS BEFORE THEY ENTER THE STORMWATER COLLECTION SYSTEM. SEVERAL OF THESE BMP'S HAVE BEEN INCORPORATED INTO THE STORMWATER MANAGEMENT SYSTEM INCLUDING REDUCED USED OF ROAD DEICING AGENTS, AND LITTER/TRASH REMOVAL. THESE TYPES OF BMP'S ARE A HIGHLY EFFECTIVE INITIAL TREATMENT MEASURE FOR REDUCING STORMWATER POLLUTANT LOADING.

B. STRUCTURAL BMP'S

B.1. STRUCTURAL BMP'S HAVE BEEN INCORPORATED INTO THE OVERALL STORMWATER MANAGEMENT PLAN. STRUCTURAL BMP'S INCLUDE DEEP SUMP CATCH BASINS, SUBSURFACE SAND FILTERS, AND SUBSURFACE DETENTION BASINS.

INSPECTION & MAINTENANCE PLAN

BY IMPLEMENTING THE FOLLOWING PROCEDURES, THE APPLICANT WILL BE ABLE TO MAINTAIN THE FUNCTIONAL DESIGN OF THE STORMWATER MANAGEMENT SYSTEM AND MAXIMIZE THE SYSTEM'S ABILITY TO REMOVE SEDIMENT AND OTHER CONTAMINANTS FROM SITE GENERATED STORMWATER RUNOFF.

A. SOURCE CONTROL

A.1. ROUTINELY EMPTY ALL OUTSIDE WASTE RECEPTACLES PROVIDED FOR PUBLIC USE.

A.2. CLEARING LITTER FROM THE PARKING AREA, ISLANDS AND PERIMETER LANDSCAPE AREAS.

B. VEGETATED AREAS MAINTENANCE

ALTHOUGH NOT A SPECIFIC COMPONENT OF THE DRAINAGE SYSTEM, THE MAINTENANCE OF VEGETATED AREAS MAY AFFECT THE FUNCTIONING OF STORMWATER MANAGEMENT PRACTICES. THIS INCLUDES THE HEALTH/DENSITY OF VEGETATIVE COVER AND ACTIVITIES SUCH AS THE APPLICATION AND DISPOSAL OF LAWN AND GARDEN CARE PRODUCTS, DISPOSAL OF LEAVES AND YARD TRIMMINGS.

B.1. INSPECT PLANTED AREAS ON A SEMI-ANNUAL BASIS AND REMOVE ANY LITTER.

B.2. MAINTAIN PLANTED AREAS ADJACENT TO PAVEMENT TO PREVENT SOIL WASHOUT.

B.3. IMMEDIATELY CLEAN ANY SOIL DEPOSITED ON PAVEMENT.

B.4. RE-SEED BARE AREAS; INSTALL APPROPRIATE EROSION CONTROL MEASURES WHEN NATIVE SOIL IS EXPOSED OR EROSION CHANNELS ARE FORMING.

B.5. PLANT ALTERNATIVE MIXTURE OF GRASS SPECIES IN THE EVENT OF UNSUCCESSFUL ESTABLISHMENT.

B.6. THE GRASS VEGETATION SHOULD BE CUT TO A HEIGHT BETWEEN THREE AND FOUR INCHES.

B.7. PESTICIDE/HERBICIDE USAGE - NO PESTICIDES ARE TO BE USED UNLESS A SINGLE SPOT TREATMENT IS REQUIRED FOR A SPECIFIC CONTROL APPLICATION.

B.8. FERTILIZER USAGE SHOULD BE AVOIDED. IF DEEMED NECESSARY, SLOW-RELEASE FERTILIZER SHOULD BE USED. FERTILIZER MAY BE USED TO BEGIN THE ESTABLISHMENT OF VEGETATION IN BARE OR DAMAGED AREAS BUT SHOULD NOT BE APPLIED ON A REGULAR BASIS UNLESS NECESSARY.

C. DEICING AGENTS

DEICING AGENTS SHOULD BE USED IN ACCORDANCE WITH THE FOLLOWING:

C.1. USE SAND AS THE PRIMARY AGENT FOR PARKING LOT SAFETY DURING ICE AND SNOW CONDITIONS.

C.2. USE DE-ICING OR ANTI-CAKING AGENTS, ADDED TO ENHANCE PERFORMANCE AND APPLICATION CHARACTERISTICS OF SAND MIXTURES, ONLY AS NECESSARY AND AT MINIMUM APPLICATION RATES.

C.3. MAINTAIN A DEICING LOG TO TRACK THE AMOUNT AND TYPE OF DEICING MATERIALS APPLIED TO THE SITE.

D. SNOW MANAGEMENT

SNOW STORAGE AREAS SHALL BE MAINTAINED AS FOLLOWS:

D.1. SNOW STORAGE AREAS WILL BE MANAGED TO PREVENT BLOCKAGE OF STORM DRAIN CATCH BASINS. SNOW COMBINED WITH SAND AND DEBRIS MAY BLOCK A STORM DRAINAGE SYSTEM, DIMINISHING THE INFILTRATION CAPACITY OF THE SYSTEM AND CAUSING LOCALIZED FLOODING.

D.2. SAND AND DEBRIS DEPOSITED ON VEGETATED OR PAVED AREAS SHALL BE CLEARED FROM THE SITE AND PROPERLY DISPOSED OF AT THE END OF THE SNOW SEASON, NO LATER THAN MAY 15.

D.3. SNOW SHALL NOT BE DUMPED INTO ANY WATER BODY, POND, WETLAND RESOURCE AREA OR STORMWATER DETENTION BASIN.

E. WINTER OPERATOR CERTIFICATION REQUIREMENTS

PER THE LONDONDERRY STORMWATER REGULATIONS, ALL EMPLOYED OR CONTRACTED WINTER MAINTENANCE OPERATORS SHALL BE NEW HAMPSHIRE CERTIFIED GREEN SNOWPRO OR EQUIVALENT. GREEN SNOWPRO TRAINING IS PROVIDED BY THE UNIVERSITY OF NEW HAMPSHIRE. IT IS PREFERRED THAT OPERATORS ALSO HAVE NHDES SALT APPLICATOR CERTIFICATION. INFORMATION ON THESE CERTIFICATIONS CAN BE FOUND AT THE LINKS BELOW:

https://www.des.nh.gov/land/roads/road-salt-reduction
https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification

F. CATCH BASINS

THE PROPOSED CATCH BASINS ARE CONSTRUCTED WITH SUMPS (MINIMUM 3 FEET) TO TRAP DEBRIS, SEDIMENTS, AND FLOATING CONTAMINANTS. DISPOSAL OF ALL SEDIMENTS MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL GUIDELINES.

F.1. INSPECT CATCH BASINS AT LEAST TWO TIMES PER YEAR AND CLEAN A MINIMUM OF ONCE PER YEAR.

F.2. SEDIMENT GREATER THAN HALF THE SUMP DEPTH AND/OR FLOATABLE POLLUTANTS SHALL BE PUMPED FROM THE BASIN AND DISPOSED OF AT AN APPROVED OFFSITE FACILITY IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.

F.3. ANY STRUCTURAL DAMAGE OR OTHER INDICATION OF MALFUNCTION WILL BE REPORTED TO THE SITE MANAGER AND REPAIRED AS NECESSARY.

F.4. DURING COLDER PERIODS, THE CATCH BASIN GRATES MUST BE KEPT FREE FROM SNOW AND ICE.

F.5. DURING WARMER PERIODS, THE CATCH BASIN GRATES MUST BE KEPT FREE OF LEAVES, LITTER, SAND AND DEBRIS.

G. STORMWATER OUTFALLS

INSPECT OUTFALL LOCATIONS MONTHLY FOR THE FIRST THREE MONTHS AFTER CONSTRUCTION TO ENSURE PROPER FUNCTIONING AND CORRECT ANY AREAS THAT HAVE SETTLED OR EXPERIENCED WASHOUTS.

G.1. INSPECT OUTFALLS ANNUALLY AFTER INITIAL THREE-MONTH PERIOD.

G.2. ANNUAL INSPECTIONS SHOULD BE SUPPLEMENTED AFTER LARGE STORMS, WHEN WASHOUTS MAY OCCUR.

G.3. MAINTAIN/CUT VEGETATION AROUND OUTFALLS TO PREVENT BLOCKAGES AT THE OUTFALL.

G.4. MAINTAIN RIP-RAP PAD BELOW EACH OUTFALL AND REPAIR ANY WASHOUTS OR OTHER DAMAGE IMMEDIATELY.

G.5. REMOVE AND DISPOSE OF ANY TRASH OR DEBRIS AT THE OUTFALL.

H. STRUCTURAL WATER QUALITY DEVICES (SAND FILTER)

H.1. REFER TO MANUFACTURERS RECOMMENDATIONS FOR SPECIFIC O&M REQUIREMENTS.

H.2. INSPECT DEVICES MONTHLY FOR THE FIRST THREE MONTHS AFTER CONSTRUCTION.

H.3. AFTER INITIAL THREE-MONTH PERIOD, ALL WATER QUALITY UNITS ARE TO BE INSPECTED AT LEAST TWICE A YEAR AND CLEANED A MINIMUM OF AT LEAST ONCE PER YEAR OR WHEN SEDIMENT REACHES 8" IN DEPTH.

H.4. FOLLOW MANUFACTURER INSTRUCTIONS FOR INSPECTION AND CLEANING AND CONTACT MANUFACTURER IF SYSTEM IS MALFUNCTIONING.

H.5. REFER TO THE NEW HAMPSHIRE STORMWATER MANUAL VOLUME 2 CHAPTER 4 DESIGNING BEST MANAGEMENT PRACTICES, 4-3 TREATMENT PRACTICE, 4 FILTERING PRACTICES, SECTION 4B UNDERGROUND SAND FILTER FOR ADDITIONAL MAINTENANCE REQUIREMENTS.

H.5.1. SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.

H.5.2. PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

H.5.3. TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.

H.5.4. MANUFACTURED FILTER MEDIA SHOULD BE REPLACED PERIODICALLY PER MANUFACTURER'S SPECIFICATIONS.

H.5.5. AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF A FILTRATION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER

I. STORM DRAIN MANHOLES

I.1. INSPECT AT LEAST ONCE ANNUALLY FOR CLOGGING OR SEDIMENT ACCUMULATION AND CLEAN AS NEEDED TO ENSURE PROPER STORMWATER CONVEYANCE.

J. SUBSURFACE DETENTION SYSTEM

J.1. THE SUBSURFACE DETENTION SYSTEMS WILL BE INSPECTED AT LEAST TWICE EACH YEAR BY REMOVING THE MANHOLE/ACCESS PORT COVERS AND DETERMINING THE THICKNESS, IF ANY, OF SEDIMENT THAT HAS ACCUMULATED.

J.2. IF SEDIMENT IS MORE THAN SIX INCHES DEEP, IT MUST BE SUSPENDED VIA FLUSHING WITH CLEAN WATER AND REMOVED USING A VACTOR TRUCK.

J.3. REFER TO MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS FOR CLEANING THE SYSTEM.

J.4. OUTLET CONTROL MANHOLES WILL BE EXAMINED AT EACH INSPECTION TO VERIFY THAT NO BLOCKAGE HAS OCCURRED.

J.5. SYSTEM WILL BE OBSERVED AFTER RAINFALLS TO SEE IF IT IS PROPERLY DRAINING.

L. ABOVEGROUND STORMWATER BASINS (MODIFIED EXISTING BASINS)

L.1. SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.

L.2. PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

L.3. TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.

L.4. AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF A FILTRATION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER.

L.5. REMOVE DEBRIS FROM ANY INLET AND OUTLET STRUCTURES.

L.6. REMOVE ACCUMULATED SEDIMENT

L.7. INSPECTED AND REPAIR (IF NEEDED) OUTLET STRUCTURES AND APPURTENANCES.

L.8. REMOVE WOODY VEGETATION FROM EMBANKMENTS. INSPECT AND REPAIR EMBANKMENTS AS NEEDED.

M. GRASS CONVEYANCE SWALE

M.1. GRASSED CHANNELS SHOULD BE INSPECTED PERIODICALLY (AT LEAST ANNUALLY) FOR SEDIMENT ACCUMULATION, EROSION AND CONDITION OF SURFACE LINING (VEGETATION OR RIPRAP). REPAIRS, INCLUDING STONE OR VEGETATION REPLACEMENT, SHOULD BE MADE BASED ON THIS INSPECTION.

M.2. REMOVE SEDIMENT AND DEBRIS ANNUALLY, OR MORE FREQUENTLY AS WARRANTED BY INSPECTION.

M.3. MOW VEGETATED CHANNELS AS NEEDED TO MAINTAIN GRASS ESTABLISHMENT AND REMOVE WOODY VEGETATION. GRASS TO BE CUT NO SHORTER THAN 4 INCHES.

N. INVASIVE PLANT SPECIES CONTROL

INVASIVE PLANT SPECIES ARE ALIEN OR NON-NATIVE PLANTS WHICH HAVE BEEN MOVED BY PEOPLE FROM THEIR NATIVE HABITAT TO A NEW AREA. SOME EXOTIC PLANTS ARE IMPORTED FOR HUMAN USE SUCH AS LANDSCAPING, EROSION CONTROL OR FOOD CROPS; OR ARRIVE AS "HITCHHIKERS" AMONG SHIPMENTS OF OTHER PLANTS, SEEDS, PACKING MATERIALS, OR FRESH PRODUCE. SOME OF THESE EXOTIC PLANTS BECOME INVASIVE AND CAUSE HARM BY:

N.1. BECOMING WEEDY AND OVERGROWN;

N.2. KILLING ESTABLISHED SHADE TREES;

N.3. OBSTRUCTING PIPES AND DRAINAGE SYSTEMS;
N.4. FORMING DENSE BEDS IN WATER;

N.5. LOWERING WATER LEVELS IN LAKES, STREAMS AND WETLANDS;

N.6. DESTROYING NATURAL COMMUNITIES;

N.7. PROMOTING EROSION ON STREAM BANKS AND HILLSIDES; AND

N.8. RESISTING CONTROL EXCEPT BY HAZARDOUS CHEMICAL.

AS PART OF THE ROUTINE INSPECTIONS OF THE DRAINAGE SYSTEM AND STORMWATER OUTFALLS, THE SITE SHOULD BE CHECKED FOR THE PRESENCE OF INVASIVE PLANT SPECIES AS DEFINED BY THE NEW HAMPSHIRE DEPARTMENT OF AGRICULTURE, MARKETS & FOOD (A LIST IS PROVIDED AT THE END OF THIS MANUAL).

IF INVASIVE PLANT SPECIES ARE FOUND TO BE PRESENT, THEY SHOULD BE CONTROLLED AS DESCRIBED IN THE "CONTROL OF INVASIVE PLANTS" DOCUMENT PREPARED BY THE NH DEPARTMENT OF AGRICULTURE, MARKETS

O. RECORD KEEPING

O.1. INSPECTIONS OF THE STORMWATER MANAGEMENT SYSTEM SHALL BE CONDUCTED IN ACCORDANCE WITH THE INSPECTION & MAINTENANCE CHECKLIST PROVIDED IN THIS MANUAL.

O.2. AN INSPECTION & MAINTENANCE LOG SHALL BE COMPLETED FOR EACH INSPECTION AND MAINTENANCE ACTIVITY.

O.3. ALL RECORD KEEPING REQUIRED BY THE I&M MANUAL SHALL BE MAINTAINED BY THE RESPONSIBLE PARTY.

O.4. A DEICING LOG SHALL BE MAINTAINED THAT TRACKS THE AMOUNT AND TYPE OF DEICING MATERIALS APPLIED TO THE SITE.

O.5. ANY TRANSFER OF RESPONSIBILITY FOR THE I&M ACTIVITIES OR TRANSFER OF OWNERSHIP SHALL BE DOCUMENTED TO THE NHDES WATER DIVISION IN WRITING.

O.6. INSPECTION REPORTS SHALL BE FILED WITH THE TOWN OF LONDONDERRY DEPARTMENT OF ENGINEERING AND ENVIRONMENTAL SERVICES ON AN ANNUAL BASIS.

P. INSPECTION & MAINTENANCE CHECKLIST/LOG

P.1. THE FOLLOWING PAGES CONTAIN AN INSPECTION & MAINTENANCE CHECKLIST, A BLANK COPY OF THE STORMWATER MANAGEMENT SYSTEM'S INSPECTION & MAINTENANCE LOG, AND A REDUCED COPY OF THE GRADING AND UTILITY PLANS. THESE FORMS/PLANS ARE PROVIDED TO ASSIST THE APPLICANT WITH THE INSPECTION AND MAINTENANCE OF THE STORMWATER MANAGEMENT SYSTEM.

Q. INVASIVE SPECIES INFORMATION

Q.1. A COPY OF THE NEW HAMPSHIRE DEPARTMENT OF AGRICULTURE, MARKETS & FOOD'S DOCUMENT "CONTROL OF INVASIVE PLANTS" IS PROVIDED AT THE END OF THIS MANUAL.

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Drawing Title
Inspection and Maintenance Notes

Drawing Number
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Sheet 96 of 111

STATE OF NEW HAMPSHIRE
DAVID H. FENSTERMACHER
No. 13382
LICENSED PROFESSIONAL ENGINEER
11/13/2025

Project Number
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Saved Tuesday, November 11, 2025 3:17:03 PM JHOWE Plotted Tuesday, November 11, 2025 4:25:27 PM Jason Howe

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Stormwater Management System
Deicing Log

Date	Type	Location/Amount	Name(s) of Maintenance Personnel

Stormwater Management System
Inspection & Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Source Control	Routinely	Inspect outdoor waste receptacles areas for spillage. Inspect and clear litter from parking area, islands and perimeter landscape areas.	Clean as required.
Deicing Agents	N/A	N/A	Use sand as primary agent for site roadway and parking safety during winter.

Stormwater Management System
Inspection & Maintenance Checklist

Stormwater Management System
Inspection & Maintenance Checklist

Closed Drainage System			
Catch Basins	2 times per year	Check for sediment accumulation. Check for floatable contaminants.	≥ 2 ft. sediment depth. ≥ 3 in. floatable depth.
Storm Drain Manholes	1 time per 2 years	Check for sediment accumulation.	≥ 3 in. sediment depth.
Drainage Pipes	1 time per 2 years	Check for sediment accumulation/clogging.	≥ 2 in. sediment depth.
Aboveground Stormwater Basin	2 times per year	Check for sediment accumulation, trash and debris.	Clean/repair as needed.
Subsurface Detention Basin	2 times per year	Check for sediment accumulation.	Refer to Manufacturers Requirements
Subsurface Sand Filter	2 times per year	Check for sediment accumulation/clogging	Refer to Manufacturers Requirements
Outlet Control Structure	2 times per year	Check for sediment accumulation/clogging	Clean/repair as needed.
Outfalls	Monthly for first 3 months and 1 time per year thereafter	-Check for sediment, trash and debris accumulation. -Check for vegetation blocking outfall. Inspect rip rap for washout.	Clean/repair as needed.
Grass Conveyance Swale	1 time per year	Check for sediment, trash and debris accumulation	Clean/repair as needed

Stormwater Management System Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed (List Items/Comments)	Date Of Cleaning/Repair	Performed By
HW 300					
FES 301					
CB 302					
CB 303					
FES 304					
CB 305					
CB 306					
CB 307					
CB 308					
HW 400					
FES 401					
CB 402					
CB 403					
CB 404					
CB 405					
CB 406					
CB 407					
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MH 609					
CB 610					
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CB 614					
CB 615					
CB 616					
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CB 618					
CB 619					
CB 620					
FES 701					
CB 702					
CB 703					
CB 704					
CB 705					
CB 800					
CB 801					
MH 802					
FES 803					

Stormwater Management System Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed (List Items/Comments)	Date Of Cleaning/Repair	Performed By
FES 900					
FES 901					
CB 902					
CB 903					
CB 904					
MH 905					
CB 906					
CB 907					
CB 908					
CB 909					
CB 910					
CB 911					
CB 912					
CB 913					
CB 914					
CB 915					
FES 1000					
FES 1001					
CB 1002					
CB 1003					
CB 1004					
MH 1005					
MH 1006					
CB 1007					
CB 1008					
CB 1009					
CB 1010					
CB 1011					
CB 1012					
CB 1101					
FES 1102					
FES 1200					
FES 1201					
CB 1202					
CB 1203					
MH 1204					
CB 1205					
CB 1206					
OS #1					
OS #2					
OS #3					
OS #4					
OS #5					
OS #6					
OS #7					
OS #8					
OS #9					
OS #10					
OS #11					

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C9.02

Sheet 97 of 111

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PLANT SCHEDULE

SYMBOL	QTY	COMMON NAME	SIZE
DECIDUOUS TREES			
	198	REPRESENTATIVE SPECIES INCLUDE: SUGAR MAPLE RED MAPLE TUPELO RED OAK BASSWOOD RIVER BIRCH YELLOW BIRCH SHAGBARK HICKORY	2 1/2 - 3" CAL.
EVERGREEN TREES			
	28	REPRESENTATIVE SPECIES INCLUDE: AMERICAN LARCH DARK AMERICAN ARBORVITAE PITCH PINE WHITE SPRUCE WHITE PINE	6 - 7` HT.
FLOWERING TREES			
	58	REPRESENTATIVE SPECIES INCLUDE: SERVICEBERRY-ROBIN HILL SERVICEBERRY-SPRING FLURRY PAGODA DOGWOOD REDBUD THORNLESS HAWTHORNE	2 - 2 1/2" CAL / B&B

SHRUBS

SHRUBS SHALL BE A SELECTION OF:

- ARROWOOD VIBURNUM
- BAYBERRY
- HIGHBUSH BLUEBERRY
- ELDERBERRY
- WINTERBERRY
- WITCH HAZEL
- MISS KIM LILAC
- GEM BOX INKBERRY
- LEMON CANDY NINEBARK
- CLETHERA HUMMINGBIRD
- HYDRANGEA ARB - SMOOTH BAIFUL

PERENNIALS AND GRASSES SHALL BE A SELECTION OF:

- ROSES - DRIFT APRICOT
- KNOCK OUT ROSES - MAGENTA
- KNOCK OUT ROSES - PINK
- NEPETA - WALKERS LOW CATMINT
- NEW ENGLAND ASTER
- ECHINACEA - POW WOW
- ECHINACEA - POW WOW WHITE
- SEDUM AUTUMN JOY
- FEATHER REED GRASS - KARL FOERSTER
- SWITCH GRASS - CHEYENNE SKY
- SWITCH GRASS - SHENANDOAH

SOD/SEED

- Conservation Seed Mix
- Detention Basin Seed Mix
- Loam and Seed

Planting Notes

1. AS SHOWN, APPROX. 1050 EXISTING TREES WILL REMAIN.
2. ALL PROPOSED PLANTING LOCATIONS SHALL BE STAKED AS SHOWN ON THE PLANS FOR FIELD REVIEW AND APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
3. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL BELOW GRADE AND ABOVE GROUND UTILITIES AND NOTIFY OWNERS REPRESENTATIVE OF CONFLICTS.
4. NO PLANT MATERIALS SHALL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA. CONTRACTOR SHALL NOTIFY OWNER'S REPRESENTATIVE OF ANY CONFLICT.
5. ALL TREES SHALL BE BALLED AND BURLAPPED, UNLESS OTHERWISE NOTED IN THE DRAWINGS OR SPECIFICATION, OR APPROVED BY THE OWNER'S REPRESENTATIVE.
6. FINAL QUANTITY FOR EACH PLANT TYPE SHALL BE AS GRAPHICALLY SHOWN ON THE PLAN. THIS NUMBER SHALL TAKE PRECEDENCE IN CASE OF ANY DISCREPANCY BETWEEN QUANTITIES SHOWN ON THE PLANT LIST AND ON THE PLAN. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES BETWEEN THE NUMBER OF PLANTS SHOWN ON THE PLANT LIST AND PLANT LABELS PRIOR TO BIDDING.
7. ANY PROPOSED PLANT SUBSTITUTIONS MUST BE REVIEWED BY LANDSCAPE ARCHITECT AND APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
8. ALL PLANT MATERIALS INSTALLED SHALL MEET THE SPECIFICATIONS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN AND CONTRACT DOCUMENTS.
9. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.
10. AREAS DESIGNATED "LOAM & SEED" SHALL RECEIVE MINIMUM 6" OF LOAM AND SPECIFIED SEED MIX. LAWNS OVER 2:1 SLOPE SHALL BE PROTECTED WITH EROSION CONTROL FABRIC.
11. ALL DISTURBED AREAS NOT OTHERWISE NOTED ON CONTRACT DOCUMENTS SHALL BE LOAM AND SEEDED WITH CONSERVATION SEED MAX.
12. THIS PLAN IS INTENDED FOR PLANTING PURPOSES. REFER TO SITE / CIVIL DRAWINGS FOR ALL OTHER SITE CONSTRUCTION INFORMATION.



Seed Mixtures:

1. AREAS INDICATED AS "DETENTION BASIN" ARE TO BE SEEDED WITH NEW ENGLAND EROSION CONTROL / RESTORATION MIX FOR DETENTION PONDS AND MOIST AREAS, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com,OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. AREAS INDICATED AS "EROSION CONTROL SEED MIX" ARE TO BE SEEDED WITH NEW ENGLAND CONSERVATION EROSION CONTROL/RESTORATION MIX FOR DRY SITES, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com,OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. AREAS INDICATED AS "MEADOW MIX" ARE TO BE SEEDED WITH NEW ENGLAND CONSERVATION / WILDLIFE SEED MIX, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com,OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
4. AREAS INDICATED AS "WET MEADOW MIX" ARE TO BE SEEDED WITH NEW ENGLAND ROADSIDE MATRIX WET MEADOW SEED MIX, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com, OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
5. AREAS INDICATED AS "WILDFLOWER MIX" ARE TO BE SEEDED WITH NEW ENGLAND WILDFLOWER MIX, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com, OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
6. AREAS INDICATED AS "UPLAND SEED MIX" ARE TO BE SEEDED WITH NEW ENGLAND ROADSIDE MATRIX UPLAND SEED MIX, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com, OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
7. AREAS INDICATED AS "NO MOW SEED MIX" SHALL BE SEEDED WITH A PROPORTIONAL MIX OF: JAMESTOWN CHEWING FESCUE (20%), QUATTRO SHEEP CREEPING FESCUE (20%) SEA LINK SLENDER CREEPING FESCUE (20%), SWORD CREEPING FESCUE (10%), AURORA CREEPING FESCUE (10%), KENT CREEPING FESCUE (10%) AND CHARLOT OR HERON HARD FESCUE (10%).

Tree Protection

1. CERTIFIED ARBORIST SHALL ASSESS EXISTING APPLE ORCHARD IDENTIFIED TO BE PRESERVED. WHERE POSSIBLE, ORCHARD SHALL BE PRESERVED AND REJUVENATED PER ARBORIST RECOMMENDATIONS. WHERE TREES ARE DEAD OR IN POOR CONDITION, ARBORIST SHALL NOTIFY THE OWNER/LANDSCAPE ARCHITECT FOR LANDSCAPE.
2. EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH TEMPORARY CONSTRUCTION FENCE. ERECT FENCE AT EDGE OF THE TREE DRIPLINE PRIOR TO START OF CONSTRUCTION.
3. CONTRACTOR SHALL NOT OPERATE VEHICLES WITHIN THE TREE PROTECTION AREA. CONTRACTOR SHALL NOT STORE VEHICLES OR MATERIALS, OR DISPOSE OF ANY WASTE MATERIALS, WITHIN THE TREE PROTECTION AREA.
4. DAMAGE TO EXISTING TREES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED BY A CERTIFIED ARBORIST AT THE CONTRACTOR'S EXPENSE.

OWNER'S SIGNATURE

Signed by: Kevin Smith
E746E121820...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

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2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

LICENSED LANDSCAPE ARCHITECT · ERIK N. BEDNAREK · 00175 · STATE OF NEW HAMPSHIRE
11/12/2025

0 100 200 400Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **February 20, 2025**

Not Approved for Construction

Drawing Title: **Overall Landscape Plan**

Drawing Number: **L1.00**

Sheet 98 of 111

Project Number: 53140.00

Saved Tuesday, November 11, 2025 3:56:21 PM JHOWE Plotted Tuesday, November 11, 2025 4:11:39 PM Jason Howe

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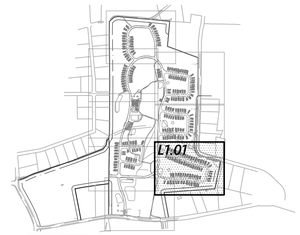

LICENSED LANDSCAPE ARCHITECT
ERIK J. BEDNAREK
00175
STATE OF NEW HAMPSHIRE
11/12/2025

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by BJZ
Checked by DHF

Issued for Permitting
Date February 20, 2025

Not Approved for Construction

Drawing Title
Landscape Plan 1

OWNER'S SIGNATURE
Signed by:
Kevin Smith
E746E121820E
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date:
Certified By:

Drawing Number
L1.01

Sheet 99 of 111

Project Number
53140.00

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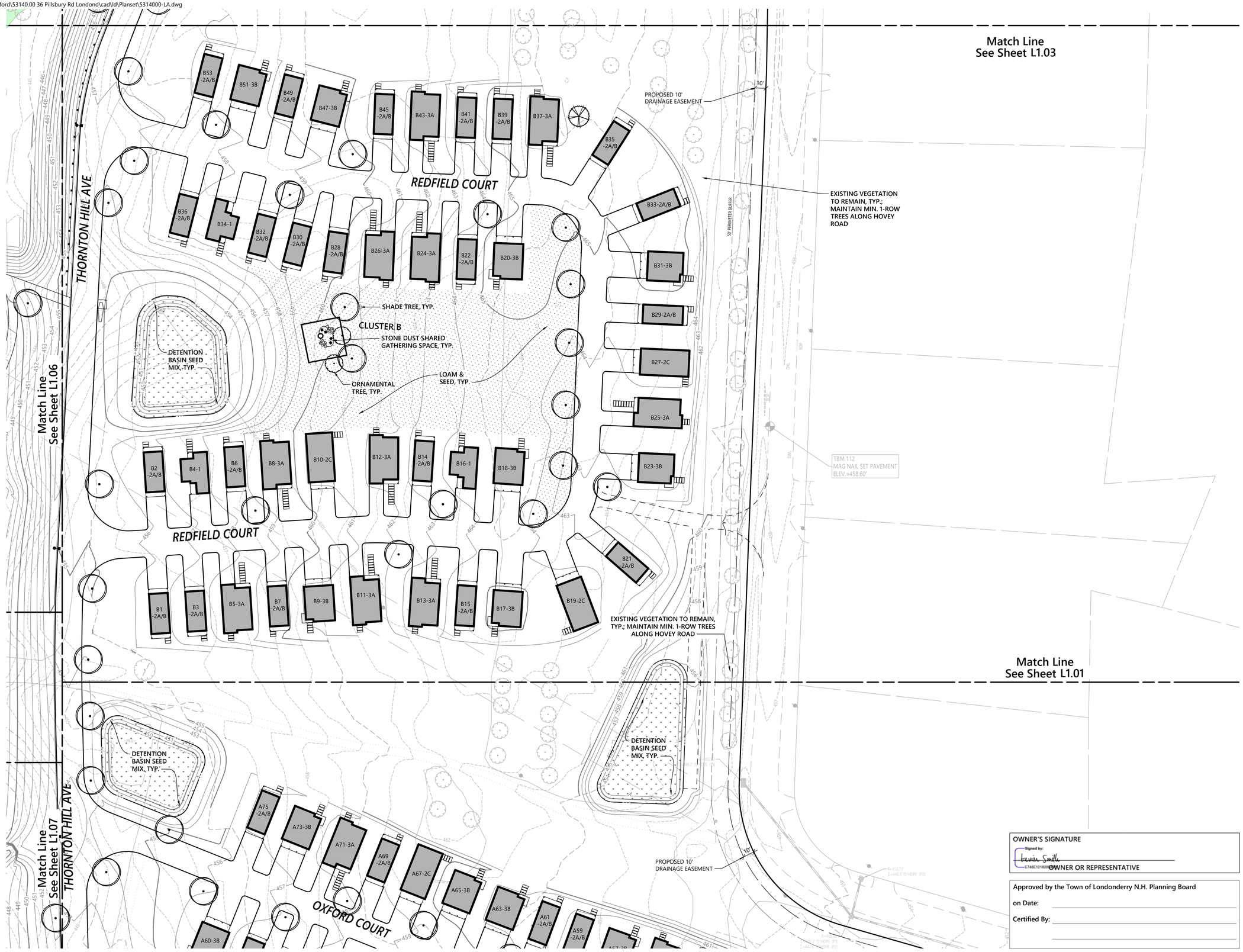

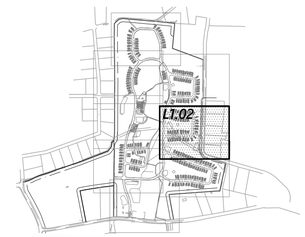



11/12/2025

0 20 40 80 Feet

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603.391.3900

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100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Landscape Plan 2

OWNER'S SIGNATURE
Signed by:
Kevin Smith
E746E121820E
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

Drawing Number
L1.02

Sheet 100 of 111

Project Number
53140.00

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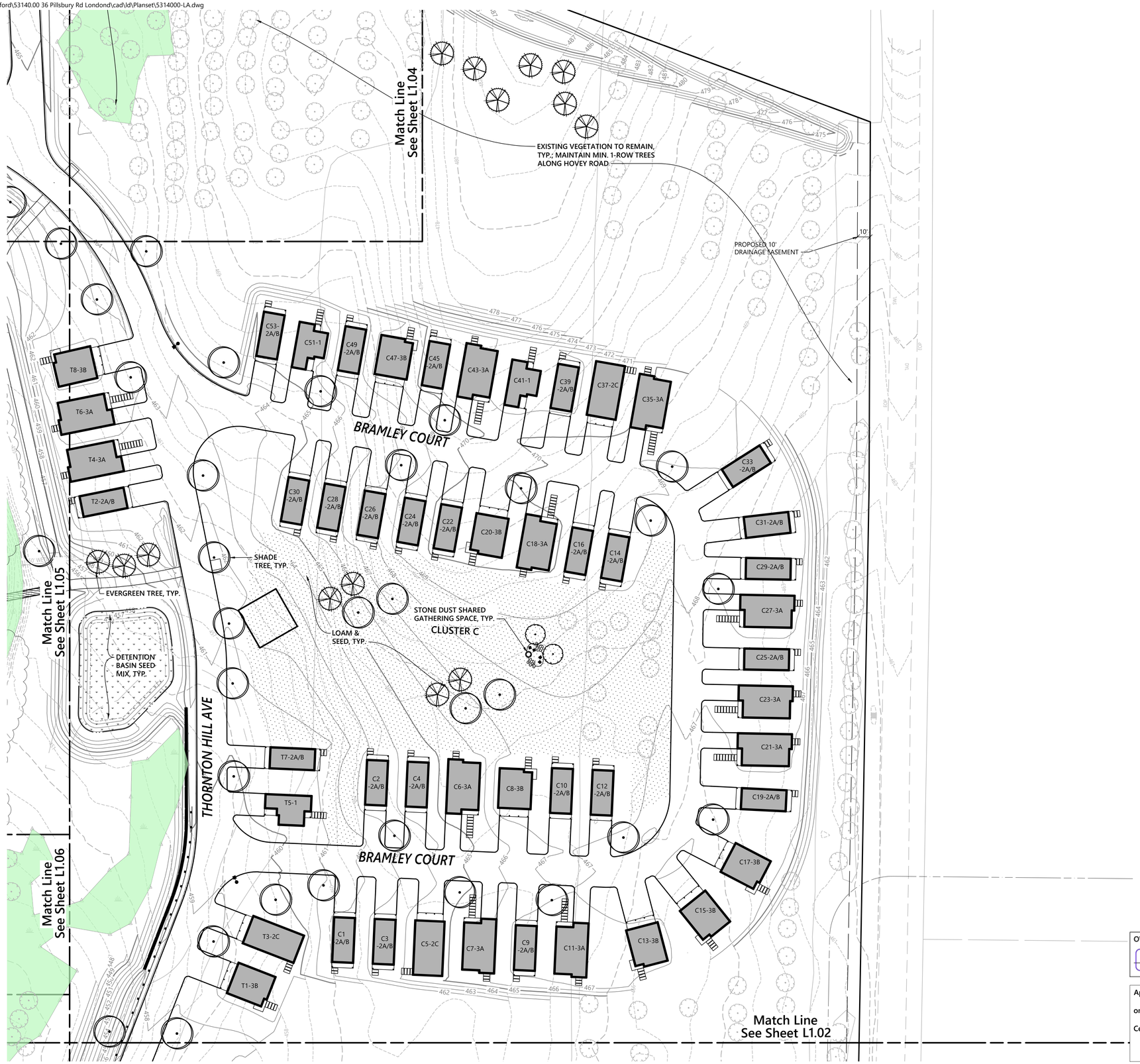

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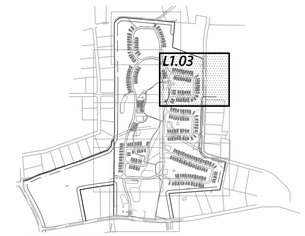

LICENSED LANDSCAPE ARCHITECT
ERIK J. BEDNAREK
00175
STATE OF NEW HAMPSHIRE
11/12/2025

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Landscape Plan 3

OWNER'S SIGNATURE
Signed by:
Kevin Smith
E746E121820
OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board
on Date:
Certified By:

Drawing Number
L1.03

Sheet 101 of 111

Project Number
53140.00

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OWNER'S SIGNATURE

Signed by: Erwin Smith
E746E121820...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

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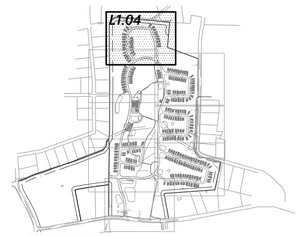
603.391.3900





0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title: Landscape Plan 4

Drawing Number: L1.04

Sheet 102 of 111

Project Number: 53140.00

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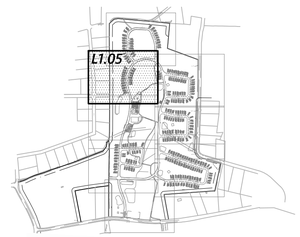



0 20 40 80 Feet

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Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Issued for: **Permitting** | Date: **February 20, 2025**

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Drawing Title
Landscape Plan 5

Drawing Number
L1.05

Sheet 103 of 111

Project Number
53140.00

OWNER'S SIGNATURE
Signed by: Kevin Smith
E746E121820...
OWNER OR REPRESENTATIVE

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on Date: _____
Certified By: _____
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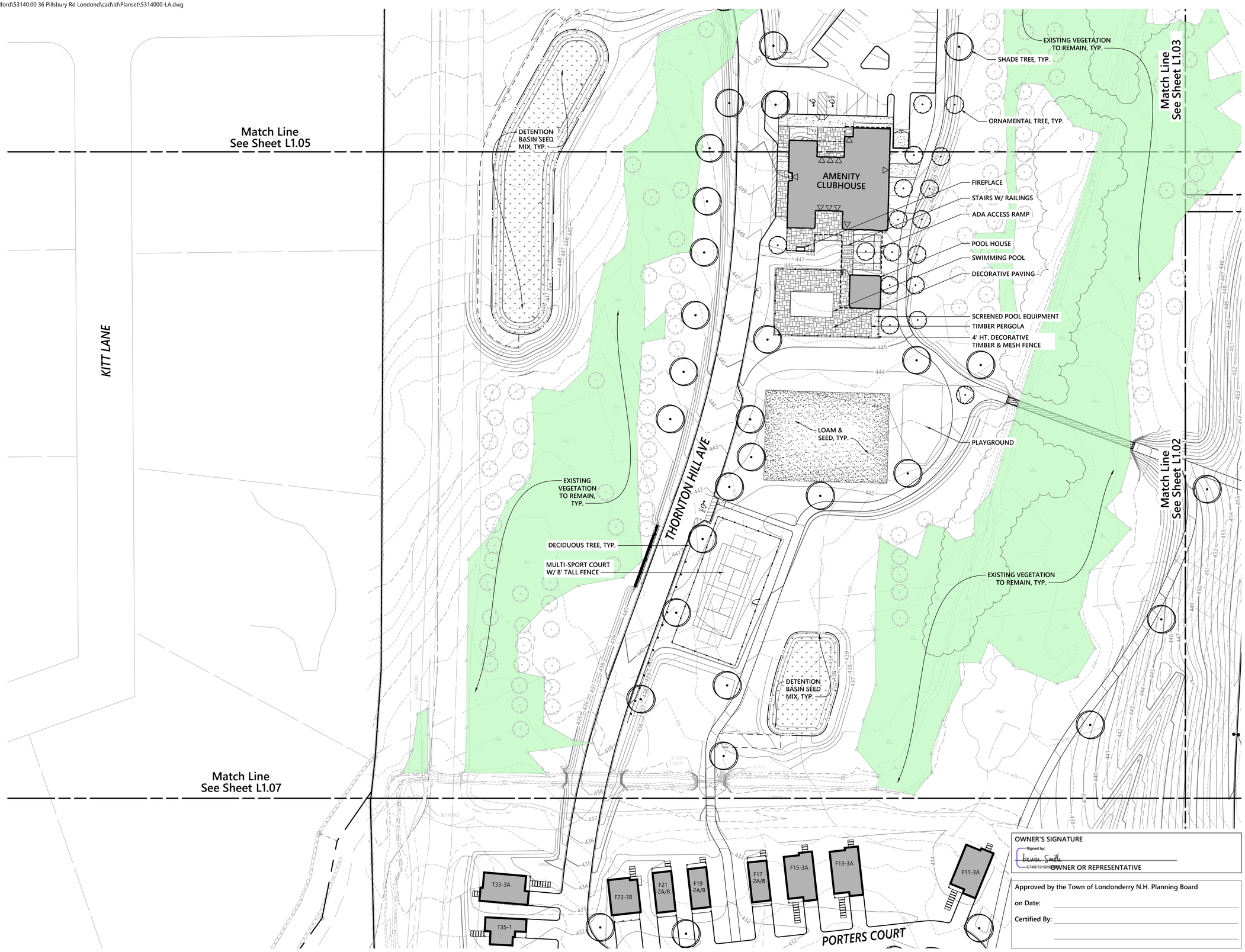

OWNER'S SIGNATURE

Signed by: Kevin Smith
E746E1218204...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

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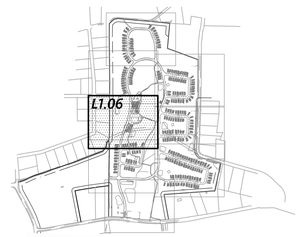

LICENSED LANDSCAPE ARCHITECT
ERIK
V.
BEDNAREK
00175
STATE OF NEW HAMPSHIRE
11/12/2025

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Issued for: Permitting

Date: February 20, 2025

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Drawing Title
Landscape Plan 6

Drawing Number
L1.06

Sheet 104 of 111

Project Number
53140.00

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OWNER'S SIGNATURE

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E746E1218206...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

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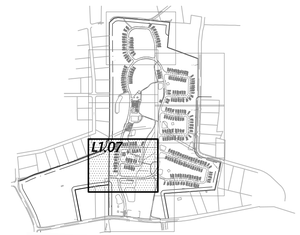

LICENSED LANDSCAPE ARCHITECT
ERIK
BEDNAREK
00175
STATE OF NEW HAMPSHIRE
11/12/2025

0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Landscape Plan 7

Drawing Number
L1.07

Sheet 105 of 111

Project Number
53140.00

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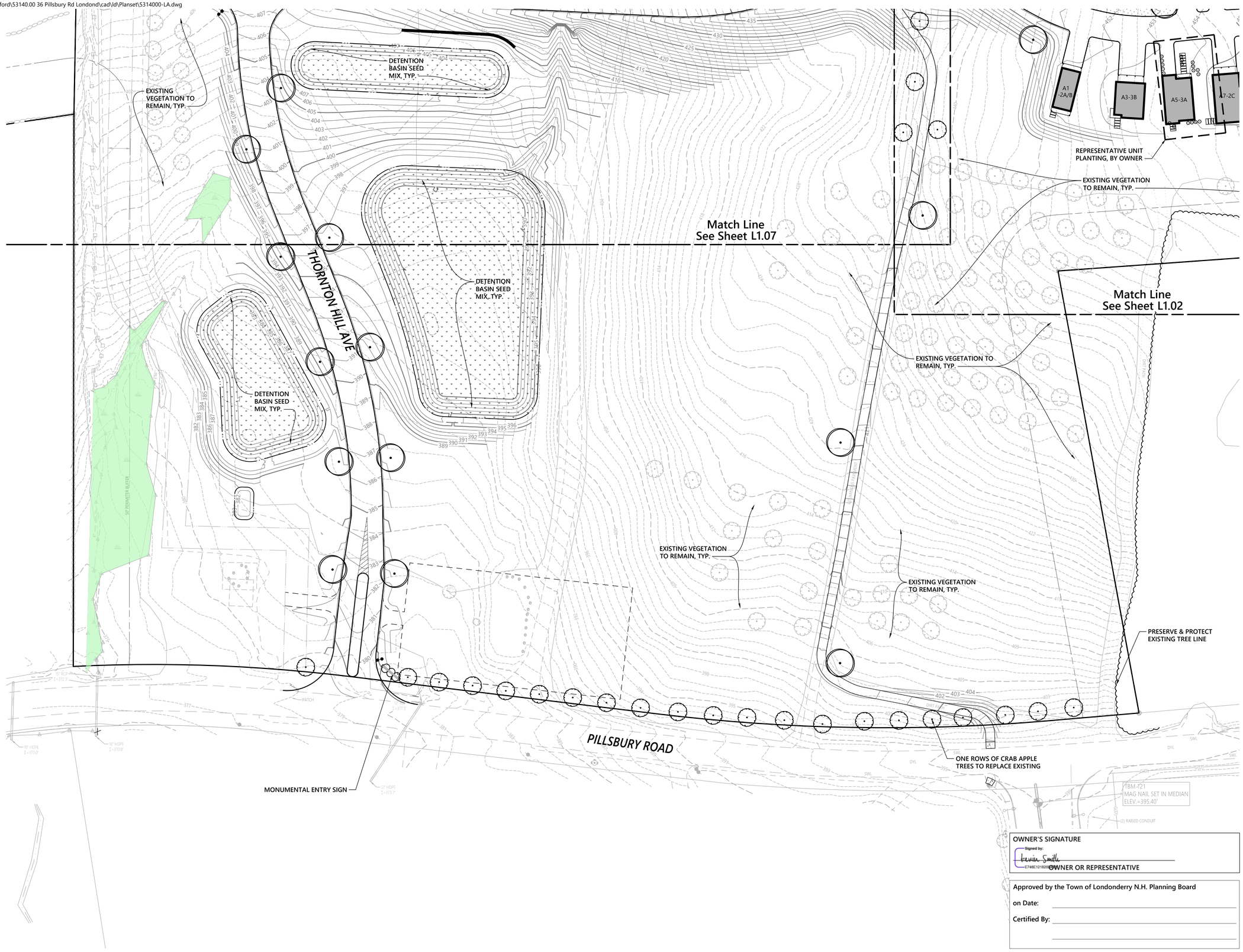

OWNER'S SIGNATURE

Signed by: Kevin Smith
E746E1218204...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

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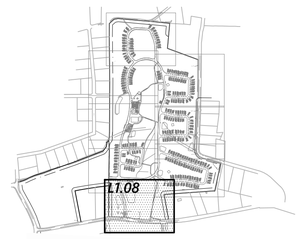
603.391.3900





0 20 40 80 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: **Permitting**
Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Landscape Plan 8

Drawing Number
L1.08

Sheet 106 of 111

Project Number
53140.00

Saved Tuesday, November 11, 2025 11:23:18 AM ALOUW Plotted Tuesday, November 11, 2025 3:02:27 PM Jason Howe

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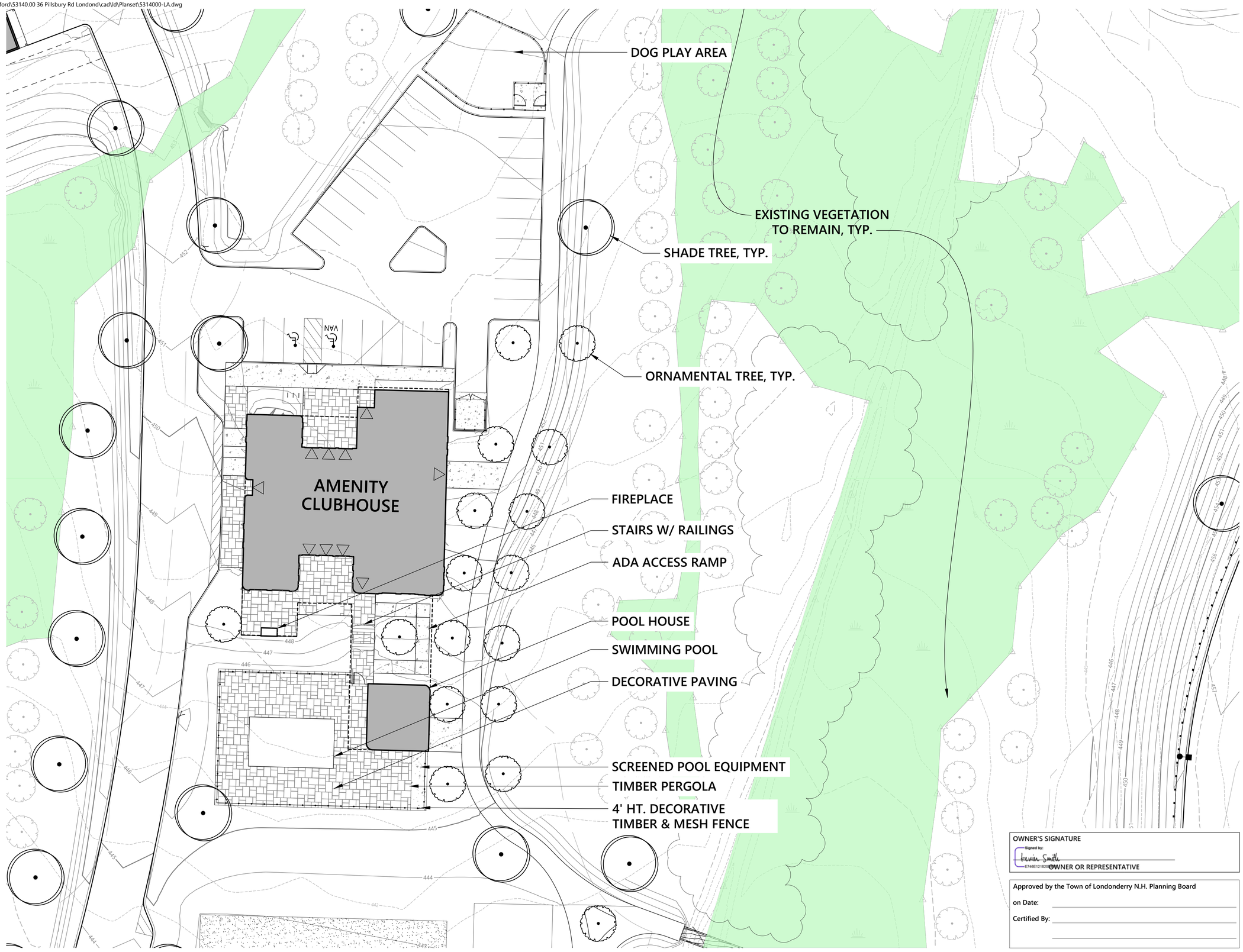

OWNER'S SIGNATURE

Signed by: Kevin Smith

E746E1218208 OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

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2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900



LICENSED LANDSCAPE ARCHITECT
ERIK J. BEDNAREK
00175
STATE OF NEW HAMPSHIRE
11/12/2025

0 10 20 40 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: February 20, 2025

Not Approved for Construction

Drawing Title
Landscape Plan 9

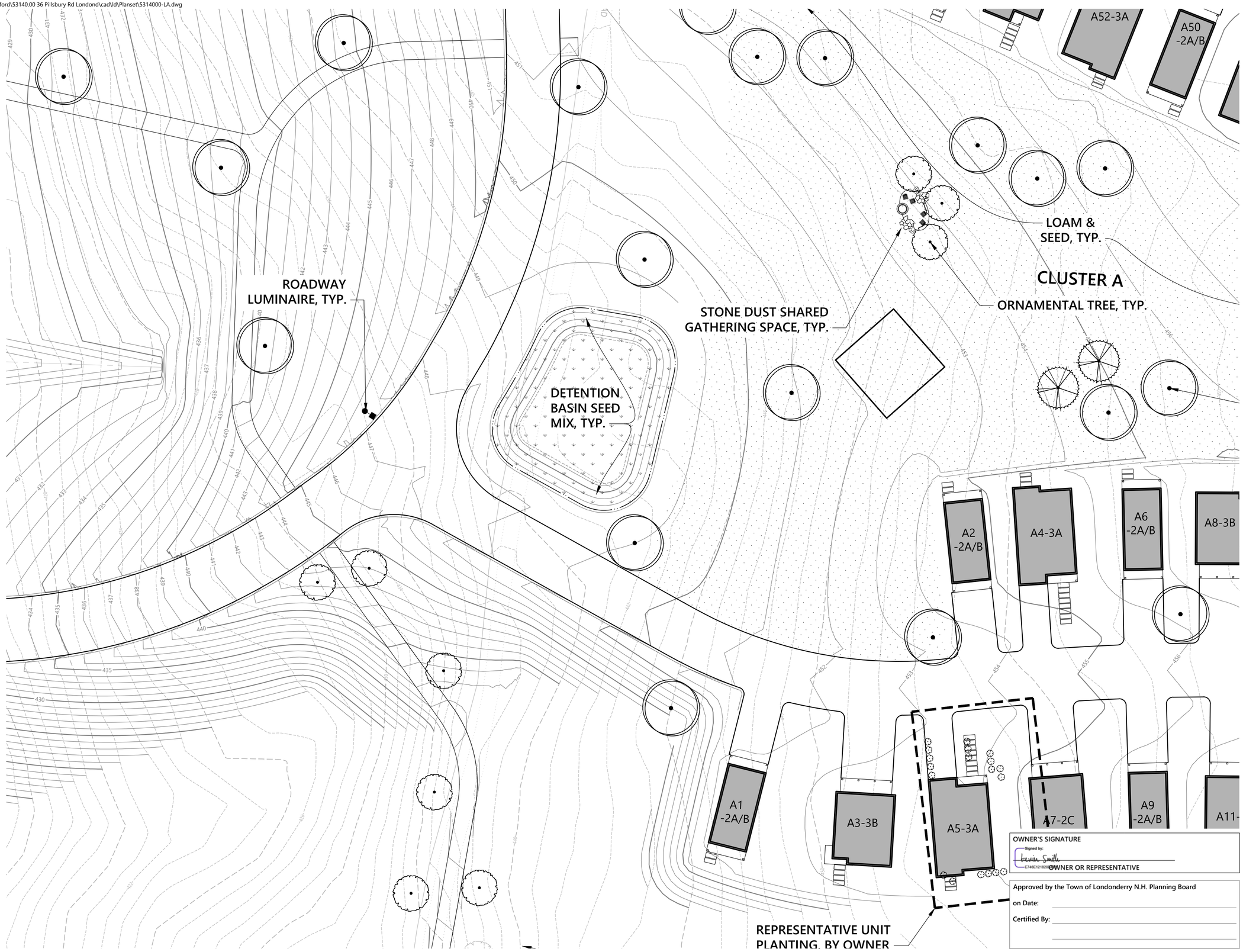
Drawing Number
L1.09

Sheet 107 of 111

Project Number
53140.00

Saved Tuesday, November 11, 2025 11:23:18 AM ALOUW Plotted Tuesday, November 11, 2025 3:02:53 PM Jason Howe

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Planset\5314000-LA.dwg



vhb.com

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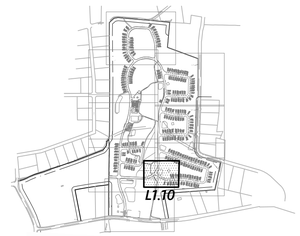
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900





11/12/2025

0 10 20 40 Feet

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Designed by BJZ | Checked by DHF

Issued for: Permitting

Date: February 20, 2025

Not Approved for Construction

Drawing Title
Landscape
Plan 10

Drawing Number
L1.10

Sheet 108 of 111

Project Number
53140.00

OWNER'S SIGNATURE

Signed by: Kevin Smith
E746E1218206...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

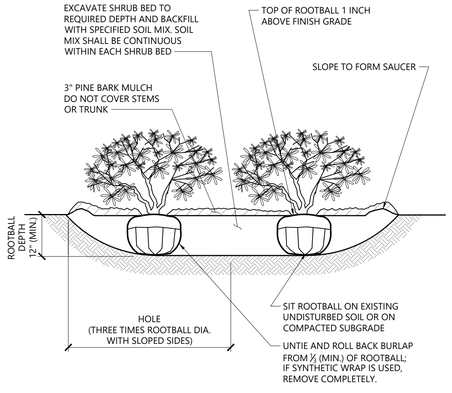
on Date: _____

Certified By: _____

_____

Saved Tuesday, November 11, 2025 3:56:21 PM JHOWE Plotted Tuesday, November 11, 2025 4:14:34 PM Jason Howe

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\ld\Planset\5314000-LA-DT.dwg



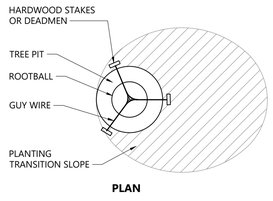
NOTES

1. LOOSEN ROOTS AT THE OUTER EDGE OF ROOTBALL OF CONTAINER GROWN SHRUBS.

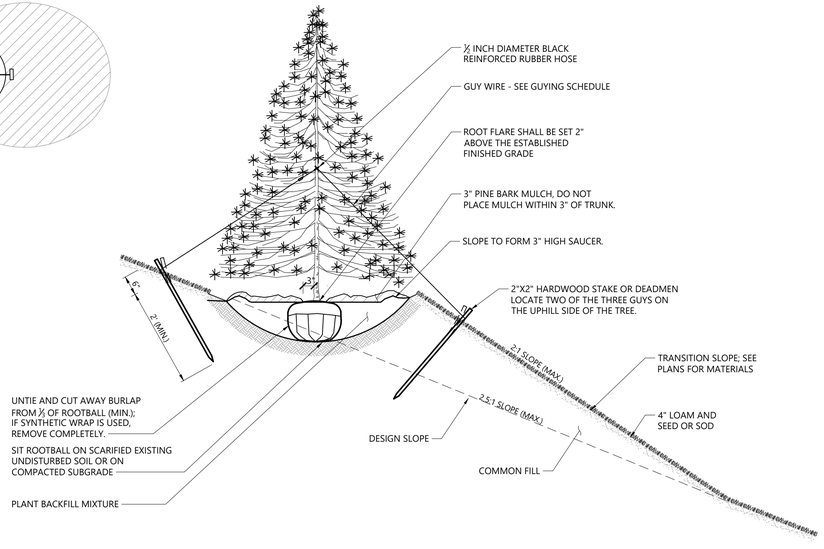
Shrub Bed Planting

1/16

N.T.S. Source: VHB LD_601



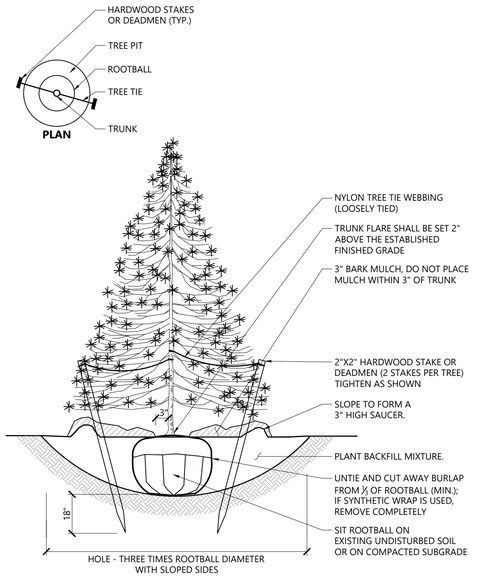
PLAN



Tree Planting on Slope

1/16

N.T.S. Source: VHB LD_605



PLAN

Evergreen Tree Planting

9/21

N.T.S. Source: VHB LD_604

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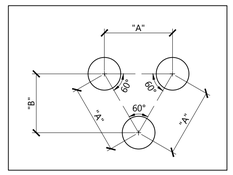
vhb

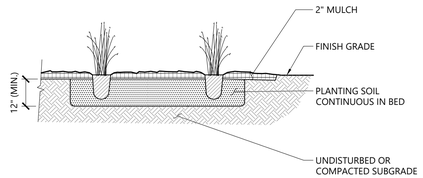
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

LICENSED LANDSCAPE ARCHITECT · ERIK N. BEDNAREK · 00175 · STATE OF NEW HAMPSHIRE

11/12/2025

PLANT SPACING	
PLANT SPACING("A")	ROW SPACING ("B")
6 IN. O.C.	5 IN. O.C.
8 IN. O.C.	7 IN. O.C.
10 IN. O.C.	8 ⅔ IN. O.C.
12 IN. O.C.	10 ⅓ IN. O.C.
15 IN. O.C.	13 IN. O.C.
18 IN. O.C.	16 IN. O.C.
24 IN. O.C.	21 IN. O.C.
30 IN. O.C.	26 IN. O.C.
36 IN. O.C.	30 IN. O.C.
48 IN. O.C.	42 IN. O.C.
54 IN. O.C.	48 IN. O.C.
60 IN. O.C.	54 IN. O.C.

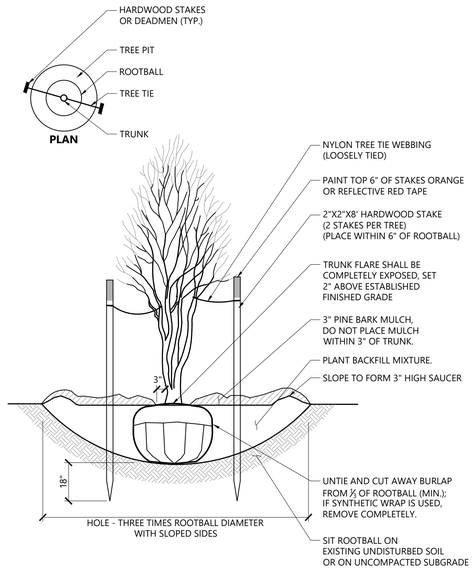




Perennial and Ornamental Grass Planting

1/16

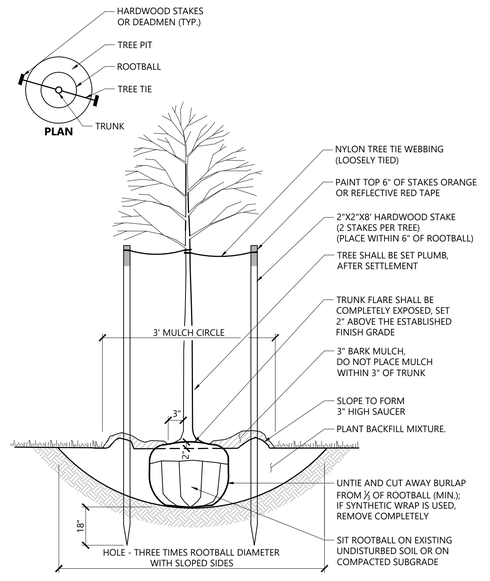
N.T.S. Source: VHB LD_618



Multistem Tree Planting

9/21

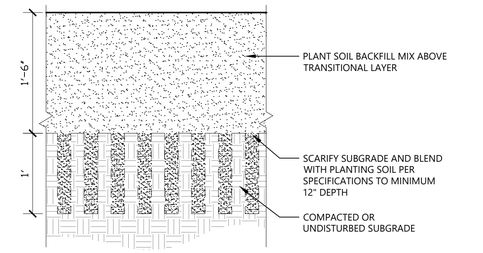
N.T.S. Source: VHB LD_606



Tree Planting (For Trees Under 4" Caliper)

9/21

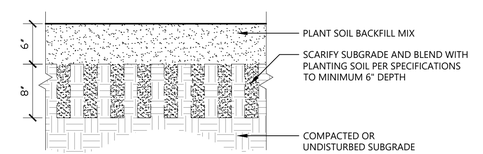
N.T.S. Source: VHB LD_602



Soil Preparation Groundcover and Shrubs

11/15

N.T.S. Source: VHB LD_



Soil Preparation at Lawn

11/15

N.T.S. Source: VHB LD_

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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Designed by | Checked by

Issued for | Date

Permitting February 20, 2025

Not Approved for Construction

Drawing Title

Landscape Details

Drawing Number

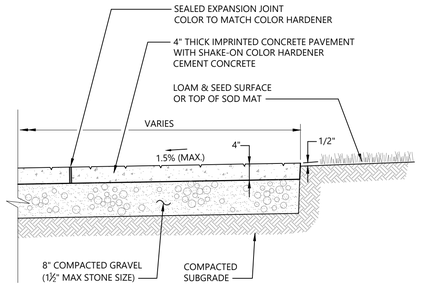
L2.01

Sheet 109 of 111

Project Number

53140.00

Saved Tuesday, June 17, 2025 9:27:19 AM ALOUW Plotted Tuesday, November 11, 2025 3:05:14 PM Jason Howe



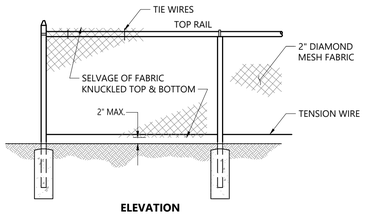
SECTION

NOTES

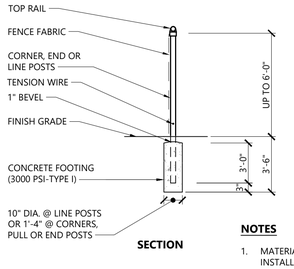
1. PROVIDE SEALED EXPANSION JOINTS WITH PREFORMED JOINT FILLER AT 30 FEET OR CLOSER O.C. WHERE NOT OTHERWISE INDICATED ON THE PLANS.

Stamped Concrete

N.T.S. Source: VHB



ELEVATION



SECTION

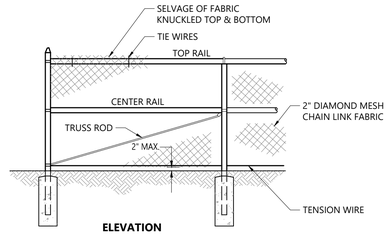
NOTES

1. MATERIALS TO BE SUPPLIED AND INSTALLED IN CONFORMANCE WITH "CHAIN LINK MANUFACTURER'S INSTITUTE" PRODUCT MANUAL.

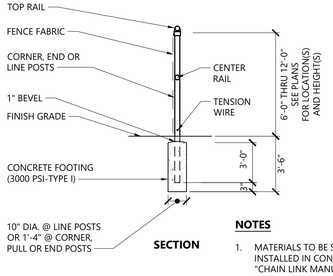
Chain Link Fence up to 6'

10/20

N.T.S. Source: VHB LD_481



ELEVATION



SECTION

NOTES

1. MATERIALS TO BE SUPPLIED AND INSTALLED IN CONFORMANCE WITH "CHAIN LINK MANUFACTURER'S INSTITUTE" PRODUCT MANUAL.

6' to 12' Chain Link Fence

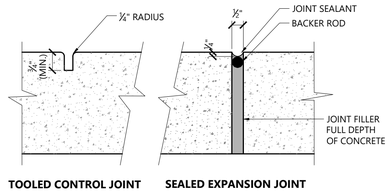
10/20

N.T.S. Source: VHB LD_480

..\Planmisc\LA Details\Fencing\Cedar wood with corten mesh.jpg

Ornamental Timber Fence with Mesh Panels

N.T.S. Source: VHB

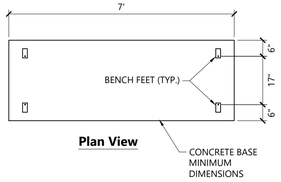


TOOLED CONTROL JOINT **SEALED EXPANSION JOINT**

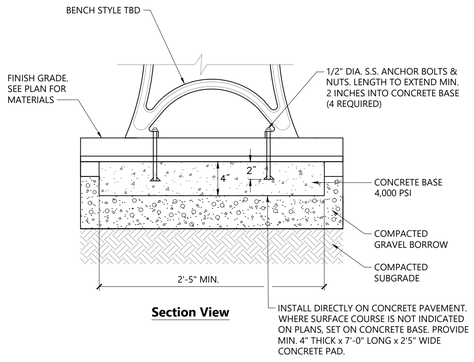
Concrete Joints

1/16

N.T.S. Source: VHB LD_840



Plan View

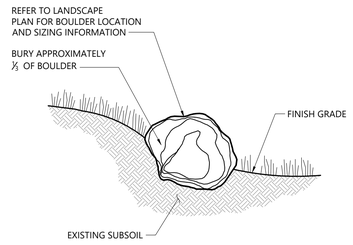


Section View

Bench Installation on Concrete

11/15

N.T.S. Source: VHB LD_



NOTES

1. GRANITE BOULDERS TO BE PLACED BY STRAPS OR CABLES WITH CARPET TO PREVENT SCARRING.
2. BOULDERS WITH EXCESSIVE SCARRING WILL BE REJECTED.
3. BOULDERS SHALL BE WEATHERED FIELD STONE.

Boulder Installation

1/16

N.T.S. Source: VHB LD_607

vhb.com

vhb

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

ERIK N. BEDNARek
LICENSED LANDSCAPE ARCHITECT
00175
STATE OF NEW HAMPSHIRE
11/12/2025

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Response to Town Comments	06-13-2025	DHF
2	Planning Board Submission	11-13-2025	EKG

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Permitting February 20, 2025

Not Approved for Construction

Drawing Title

Landscape Details

Drawing Number

L2.02

Sheet 110 of 111

Project Number
53140.00

Saved Tuesday, June 17, 2025 9:27:19 AM ALOUW Plotted Tuesday, November 11, 2025 3:05:28 PM Jason Howe



Amenity and Sales Building "Fin" Sign



Street Name Signs



Walking Path Sign



Amenity Building Sign

Representative Wayfinding Signage Concepts

11/15

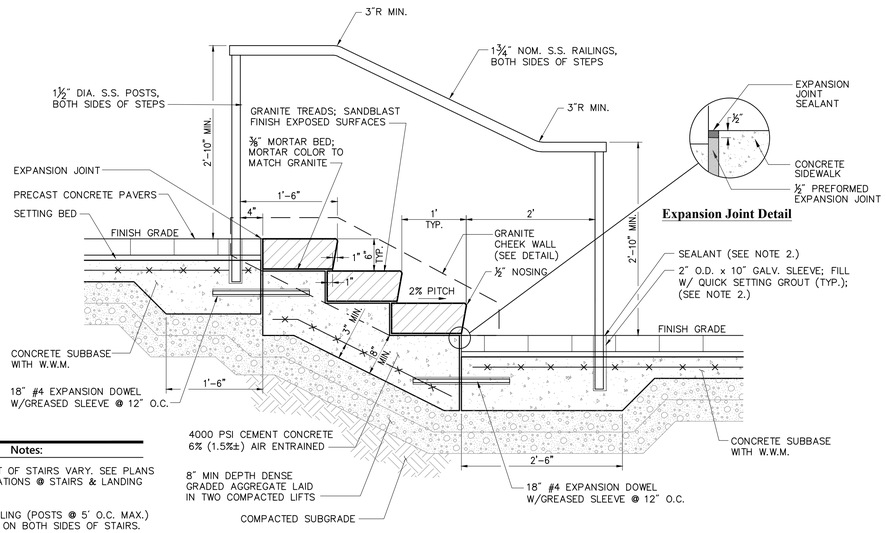
N.T.S. Source: VHB LD_



Representative Monumental Entry Sign

11/15

N.T.S. Source: VHB LD_



Expansion Joint Detail

Notes:

1. SPACE & HEIGHT OF STAIRS VARY. SEE PLANS FOR SPOT ELEVATIONS @ STAIRS & LANDING LENGTHS.
2. CONTINUOUS RAILING (POSTS @ 5' O.C. MAX.) SHALL BE USED ON BOTH SIDES OF STAIRS.
3. WIDTH OF STEPS SHALL BE AS INDICATED ON THE PLANS AS MEASURED BETWEEN INSIDE FACE OF CHEEK WALLS.

Granite Steps - 3 Risers

3/17

1" = 1'-0" Source: VHB

vhb.com

vhb

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

LICENSED LANDSCAPE ARCHITECT
ERIK N. BEDNAREK
00175
STATE OF NEW HAMPSHIRE
11/12/2025

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street
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Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
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2	Planning Board Submission	11-13-2025	EKG

Designed by | Checked by

Issued for: **Permitting** Date: **February 20, 2025**

Not Approved for Construction

Drawing Title
Landscape Details

Drawing Number
L2.03

Sheet 111 of 111

Project Number
53140.00

Saved Tuesday, June 17, 2025 9:27:19 AM ALOUW Plotted Tuesday, November 11, 2025 3:05:39 PM Jason Howe

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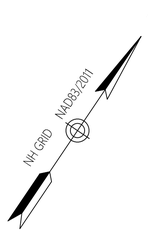


Wetland Notes

1) THE WETLANDS DEPICTED WERE DELINEATED BY JAKE TINUS CERTIFIED WETLAND SCIENTIST (NH CWS #228) ON OCTOBER 9 THRU 11, 2024, AND REFERENCE JURISDICTIONAL WETLANDS AND SURFACE WATERS WITHIN THE PROJECT SITE. THE WETLAND DELINEATION WAS PERFORMED IN ACCORDANCE WITH THE PROCEDURES AND STANDARDS OUTLINED IN THE *1987 CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE U.S. ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0 (JANUARY 2012),* SUPPLIMENTED WITH *FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2,* PUBLISHED BY THE NATURAL RESOURCE CONSERVATION SERVICE AND THE *FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4.0,* PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION. DOMINANT WETLAND VEGETATION WAS ASSESSED USING THE *NORTHCENTRAL AND NORTHEAST REGIONAL WETLAND PLANT LIST* PUBLISHED BY THE U.S. ARMY CORPS OF ENGINEERS. WETLANDS AND SURFACE WATERS WERE CLASSIFIED USING THE USFWS METHODOLOGY *CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES (COWARDIN ET AL. 1979, REVISED 1985).*

Plan References

1) PLAN ENTITLED "TAX MAP 10 LOTS 42 & 154 OVERALL LOT LINE ADJUSTMENT PLAN PILLSBURY CEMETERY 36 PILLSBURY & 49 HOVEY ROADS, LONDONDERRY, NH" DATED: SEPTEMBER 24, 2014, REVISED THRU 6/19/15. RECORDED AT RCRD AS PLAN D-39205.

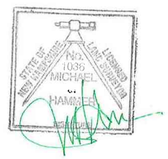
2) PLAN ENTITLED "PROPOSED EASEMENT PLAN PREPARED FOR: PENNICHUCK EAST UTILITY, INC. AND TOWN OF LONDONDERRY, NH LANDS OF: PILLSBURY REALTY DEVELOPMENT, LLC TAX MAP 10 LOTS 41 & 42 LONDONDERRY, NH" DATED: JULY 6, 2023. RECORDED AT RCRD AS PLAN D-44426.

3) PLAN ENTITLED "ANNEXATION AND SUBDIVISION PLAN ROBERT & STEPHEN LIEVENS TAX MAP 10 LOT 42 AND THE PINKERTON CEMETERY TAX MAP 10 LOT 154 HOVEY AND PILLSBURY ROADS LONDONDERRY, NH" DATED: JULY 17, 2002. RECORDED AT RCRD AS PLAN D-30457.

4) PLAN ENTITLED "SUBDIVISION PLAN OF LAND HOVEY VIEW ESTATES TAX MAP 10 LOT 42-1 PILLSBURY & HOVEY ROADS LONDONDERRY, NH" DATED: NOVEMBER 8, 2006 REVISED THRU 9/10/07. RECORDED AT RCRD AS PLAN D-35065.

Certification

I HEREBY REPORT THAT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION, AND BELIEF: THIS PLAN WAS PREPARED FROM A FIELD SURVEY SUPERVISED BY ME AND MADE IN CONFORMANCE WITH THE STANDARDS PROMULGATED IN NH LAN 500 FOR A STANDARD PROPERTY SURVEY AND MEETS THE ACCURACY STANDARD FOR AN URBAN CLASS REAL PROPERTY SURVEY.



Benchmarks

1. TBM 112 - MAG NAIL SET IN PAVEMENT ON HOVEY ROAD, ELEV.=458.60'
2. TBM 121 - MAG NAIL SET IN MEDIAN ON MICHELS WAY, ELEV.=395.40'

200 0 200 400
SCALE IN FEET

No.	Revision	Date	Appvd.
1	RESPONSE TO TOWN COMMENTS	6/13/2025	MJH
2	PLANNING BOARD SUBMISSION	11/13/2025	MJH

General Notes

1) THE PURPOSE OF THE PLAN IS TO DEPICT THE PARCEL BOUNDARIES AND EXISTING SURFACE SITE CONDITIONS AND TOPOGRAPHY OBSERVED IN SEPTEMBER AND OCTOBER 2024.

2) THE PROPERTY LINES SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, INC. IN JULY AND SEPTEMBER 2024, AND FROM DEEDS AND PLANS OF RECORD.

3) THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON A COMBINATION OF AN ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY VHB, INC. IN JULY AND SEPTEMBER 2024, AND DERIVED FROM DIGITAL ORTHOGRAPHIC IMAGERY AND LIDAR CAPTURED BY VHB, INC. WITH LEAF ON CONDITIONS DURING SEPTEMBER 2024 USING UAV TECHNOLOGIES. VERTICAL INFORMATION DEPICTED AS AN 1-FOOT CONTOUR INTERVAL OR SPOT ELEVATION SHOWN HEREON WERE DERIVED FROM THE SAME AND CONFORM WITH THE CURRENT NATIONAL MAP ACCURACY STANDARDS.

4) THIS SURVEY MEETS THE MINIMUM ACCURACY REQUIREMENTS OF AN URBAN CLASS SURVEY PROMULGATED UNDER LAN 503.04.

5) THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN WERE MAPPED PER AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD 38-22, QUALITY LEVEL(S) 'X' AS SPECIFIED IN THE CONTRACT BETWEEN "THE CLIENT" AND VHB. PLEASE NOTE THAT WHILE BEST PRACTICES WERE FOLLOWED, NOT ALL UTILITIES MAY BE SHOWN AND THE ACCURACY OF UTILITY LOCATIONS CANNOT BE GUARANTEED.

6) HORIZONTAL DATUM IS BASED ON NH. GRID SYSTEM, NAD 1983/2011. ELEVATIONS SHOWN ON THIS PLAN REFER TO NAVD OF 1988/2018 ESTABLISHED FROM STATIC GPS OBSERVATIONS MADE ON JULY 31, 2024, POSTPROCESSED USLING TRIMBLE RTX-PP.

7) THE LOT LIES ENTIRELY WITHIN ZONE X (UNSHADED) (AREAS TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0338E, EFFECTIVE DATE MAY 17, 2005.

8) THE LOT LIES ENTIRELY WITHIN THE WOODMONT COMMONS PUD DISTRICT (PUD-1) AS SHOWN ON THE "TOWN OF LONDONDERRY, NEW HAMPSHIRE ZONING MAP", DATED APRIL 24, 2023. DIMENSIONAL REQUIREMENTS FOR A (PUD-1) AT THE TIME OF THIS SURVEY ARE:

REQUIRED	
MINIMUM LOT AREA	N/A
MINIMUM FRONTAGE	50 FEET
MINIMUM FRONT YARD SETBACK	10 FEET
MINIMUM SIDE YARD SETBACK	10 FEET
MINIMUM REAR YARD SETBACK	5 FEET
MAXIMUM BUILDING HEIGHT	50 FEET
MINIMUM FRONT YARD PARKING SETBACK	6 FEET
MINIMUM SIDE/REAR PARKING SETBACK	0 FT

9) THE TREE SYMBOL OUTLINE SHOWN ON THIS PLAN DOES NOT REPRESENT THE ACTUAL TREE CANOPY.

10) MONUMENTS TO BE SET NOTED WILL BE INSTALLED IN ACCORDANCE WITH SECTION 3.02 OF THE LONDONDERRY SITE PLAN REGULATIONS

NRCS Soils Legend

29B WOODBRIDGE FINE SANDY LOAM
3 TO 8 PERCENT SLOPES

43D CANTON FINE SANDY LOAM
15 TO 25 PERCENT SLOPES, VERY STONY

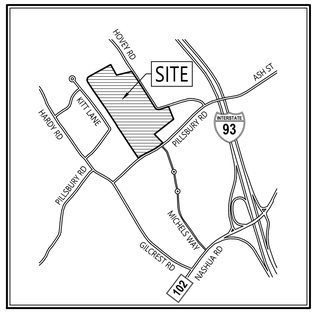
140B CHATFIELD-HOLLIS-CANTON COMPLEX
0 TO 8 PERCENT SLOPES, ROCKY

140C CHATFIELD-HOLLIS-CANTON COMPLEX
8 TO 15 PERCENT SLOPES, ROCKY

447A SCITUATE-NEWFIELDS COMPLEX
0 TO 3 PERCENT SLOPES, VERY STONY

447B SCITUATE-NEWFIELDS COMPLEX
3 TO 8 PERCENT SLOPES, VERY STONY

657A RIDGEBURY FINE SANDY LOAM
0 TO 3 PERCENT SLOPES, VERY STONY



Locus Map
(SCALE: 1"=2,500')

Legend

- DRAIN MANHOLE
- CATCH BASIN
- SEWER MANHOLE
- ELECTRIC MANHOLE
- TELEPHONE MANHOLE
- MANHOLE
- HH HAND HOLE
- WATER GATE
- FIRE HYDRANT
- GAS GATE
- BOLLARD w/LIGHT
- STREET SIGN
- LIGHT POLE
- UTILITY POLE
- GUY POLE
- GUY WIRE
- MONITORING WELL
- FLOOD LIGHT
- W WELL
- MARSH
- F.F.E.=45.27' FINISHED FLOOR ELEVATION
- CNO COULD NOT OPEN
- NPV NO PIPES VISIBLE
- DYL DOUBLE YELLOW LINE
- DWL DASHED WHITE LINE
- SYL SINGLE YELLOW LINE
- 8"TREE DECIDUOUS TREE WITH SIZE
- 6"TREE CONIFEROUS TREE WITH SIZE
- EOP EDGE OF PAVEMENT
- VGC VERTICAL GRANITE CURB
- GUARDRAIL
- CHAIN LINK FENCE
- (PS1) (C) DRAINAGE LINE w/PIPE NUMBER & ASCE SUE LEVEL CLASSIFICATION
- (P41) (C) SEWER LINE w/PIPE NUMBER & ASCE SUE LEVEL CLASSIFICATION
- OHW OVERHEAD WIRE
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- G GAS LINE
- W WATER LINE
- STONE WALL
- TREE LINE
- BF1-100 LIMIT OF BANK
- WF1-100 VEGETATED WETLAND BOUNDARY
- SOILS LINE

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by	Checked by

Issued for	Date
Permitting	**February 20, 2025**

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street Hudson, NH 03051

Prepared For: Procopio Companies
35 Village Road, Suite 702
Middleton, MA 01949

Scale: 1"=150'

Drawing Title
Existing Conditions Master Plan

Drawing Number
Sv-1.0

Sheet 1 of 9

Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
603.391.3900 • FAX 603.518.7495

Project Number
53140.00

Saved Monday, November 10, 2025 6:13:46 PM PGUERTIN Plotted Wednesday, November 12, 2025 1:30:47 PM Mike Hammer

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SEE SHEET 1.2

SEE SHEET 1.7



Certification

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STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — NO. 1036 — MICHAEL L. HAMMER

Benchmarks

1. TBM 112 - MAG NAIL SET IN PAVEMENT ON HOVEY ROAD, ELEV.=458.60'
2. TBM 121 - MAG NAIL SET IN MEDIAN ON MICHELS WAY, ELEV.=395.40'

No.	Revision	Date	Appvd.
1	RESPONSE TO TOWN COMMENTS	6/13/2025	MJH
2	PLANNING BOARD SUBMISSION	11/13/2025	MJH

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

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Issued for | Date

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Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street Hudson, NH 03051

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Middleton, MA 01949

Scale: 1"=40'

Drawing Title

Existing Conditions Plan of Land

Drawing Number

Sv-1.1

Sheet 2 of 9

Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
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Project Number **53140.00**

Saved Monday, November 10, 2025 10:57:08 AM PQUERTIN Plotted Monday, November 10, 2025 11:09:15 AM Paul Guertin



40 0 40 80
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STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — NO. 1036 — MICHAEL J. HAMMER — SEAL

Benchmarks

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Thornton Hill

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Scale: 1"=40'

Drawing Title

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Drawing Number

Sv-1.2

Sheet 3 of 9

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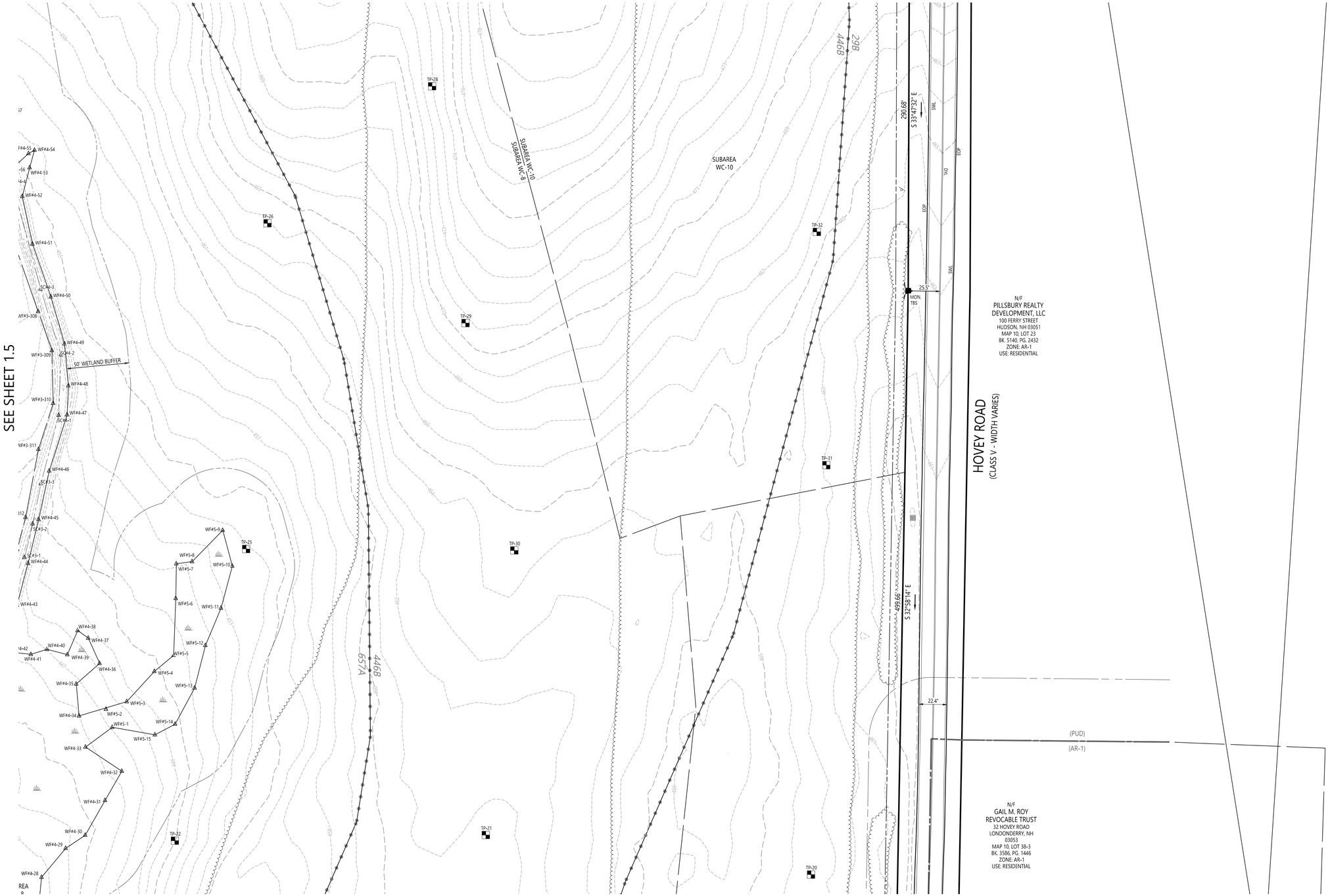
SEE SHEET 1.4

SEE SHEET 1.5



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STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 1036 MICHAEL J. HAMMER SIGNATURE

Benchmarks

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Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by | Checked by

Issued for | Date

Permitting **February 20, 2025**

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100 Ferry Street Hudson, NH 03051

Prepared For: Procopio Companies
35 Village Road, Suite 702
Middleton, MA 01949

Scale: **1"=40'**

Drawing Title
Existing Conditions Plan of Land

Drawing Number
Sv-1.3

Sheet 4 of 9

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2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
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Project Number **53140.00**

Saved Monday, November 10, 2025 10:57:08 AM PGUERTIN Plotted Monday, November 10, 2025 11:09:43 AM Paul Guertin

SPRING ROAD
(CLASS VI)

MONUMENT TO BE SET (TYP.)

N 46°01'58" E 62.14'

N 60°57'55" E 386.50'

N 60°35'59" E 148.78'

N 61°53'45" E 288.35'

DRILL HOLE (FOUND)

N/F
PENNICHUCK EAST UTILITY, INC.
25 WALNUT ST.,
P.O. BOX 428
NASHUA, NH 03060
MAP 10, LOT 142
BK. 5214, PG. 246
ZONE: AR-1
USE: COMMERCIAL

N/F
IWG II, LLC
1199 N. FAIRFAX ST. SUITE 700
ALEXANDRIA, VA 22314
MAP 10, LOT 18
BK. 5869, PG. 2469
ZONE: AR-1
USE: COMMERCIAL

(AR-1)
(PUD)

50' PERIMETER BUFFER

50' WETLAND BUFFER

IRON ROD UP NO CAP (FOUND)

N/F
DAVID COSCIA
34 KITT LANE
LONDONDERRY, NH 03053
MAP 10, LOT 16-25
BK. 6160, PG. 1344
ZONE: AR-1
USE: RESIDENTIAL

N 18°00'20" E 99.17'

N 33°20'20" W 210.70'

20 FT. WIDE UTILITY EASEMENT BK. 6539, PG. 2559

IRON PIPE LEANING (FOUND)

N/F
ANDREA J. BALDWIN REVOCABLE TRUST
32 KITT LANE
LONDONDERRY, NH 03053
MAP 10, LOT 16-24
BK. 6237, PG. 1734
ZONE: AR-1
USE: RESIDENTIAL

N 34°34'28" W 157.72'

IRON PIPE LEANING (FOUND)

N/F
PETER F. GALLO
30 KITT LANE
LONDONDERRY, NH 03053
MAP 10, LOT 16-23
BK. 4369, PG. 181
ZONE: AR-1
USE: RESIDENTIAL

N/F
JAKE ANTHONY PELLETIER
28 KITT LANE
LONDONDERRY, NH 03053
MAP 10, LOT 16-22
BK. 6186, PG. 2584
ZONE: AR-1
USE: RESIDENTIAL

EDGE OF WOODS

EDGE OF BRUSH

446B 447A

446B 657A

657A 447A

SUBAREA WC-7

SUBAREA WC-8

TP-52

TP-27

TP-34

STORMWATER BASIN

CONCRETE WEIR

N/F
TOWN OF LONDONDERRY
2688 MAMMOTH ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 154
BK. 4294, PG. 2802
ZONE: AR-1 / PUD-1
USE: CEMETERY

S 28°41'38" E 398.10'

GRAN. BOUND W/D.H. FIRM (FOUND)

10' BUILDING SETBACK

NH GRID NAD83/2011

N

SEE SHEET 1.2

SCALE IN FEET
40 0 40 80

Certification

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STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR NO. 1036 MICHAEL HAMMER

Benchmarks

1. TBM 112 - MAG NAIL SET IN PAVEMENT ON HOVEY ROAD, ELEV.=458.60'
2. TBM 121 - MAG NAIL SET IN MEDIAN ON MICHELS WAY, ELEV.=395.40'

No.	Revision	Date	Appvd.
1	RESPONSE TO TOWN COMMENTS	6/13/2025	MJH
2	PLANNING BOARD SUBMISSION	11/13/2025	MJH

Thornton Hill

Map 10, Lot 42 - 36 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by | Checked by

Issued for | Date

Permitting **February 20, 2025**

Record Owner: Pillsbury Realty Development, LLC
100 Ferry Street Hudson, NH 03051

Prepared For: Procopio Companies
35 Village Road, Suite 702
Middleton, MA 01949

Scale: 1"=40'

Drawing Title
Existing Conditions Plan of Land

Drawing Number
Sv-1.4

Sheet 5 of 9

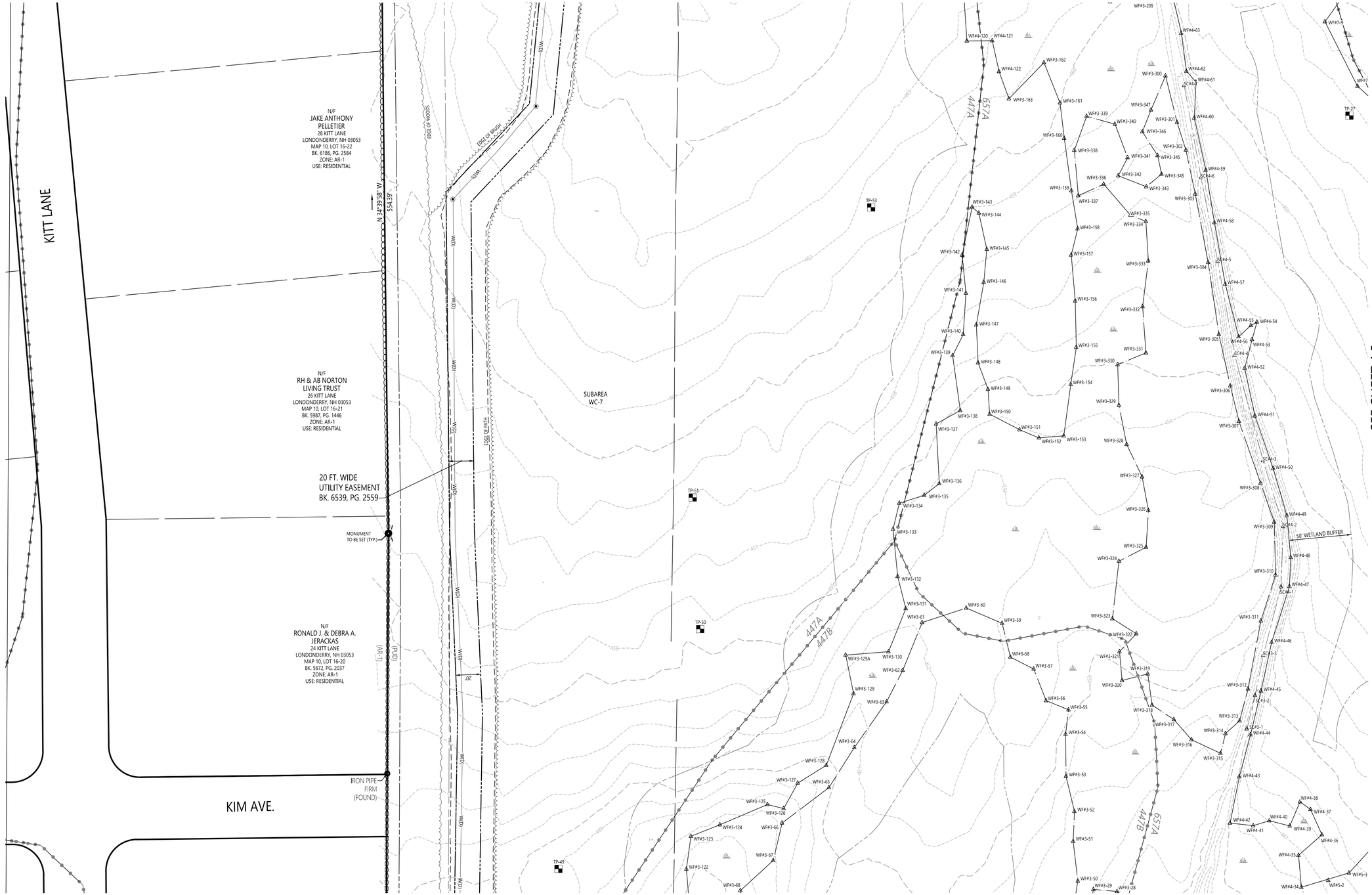
Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
603.391.3900 • FAX 603.518.7495

Project Number **53140.00**

Saved Monday, November 10, 2025 10:57:08 AM PQUERTIN Plotted Monday, November 10, 2025 11:09:59 AM Paul Guertin

SEE SHEET 1.4

SEE SHEET 1.3



40 0 40 80
SCALE IN FEET

SEE SHEET 1.6

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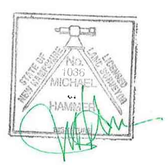

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Thornton Hill

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Drawing Title

Existing Conditions Plan of Land

Drawing Number

Sv-1.5

Sheet 6 of 9

Vanasse Hangen Brustlin, Inc.
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Bedford, New Hampshire 03110
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Project Number **53140.00**

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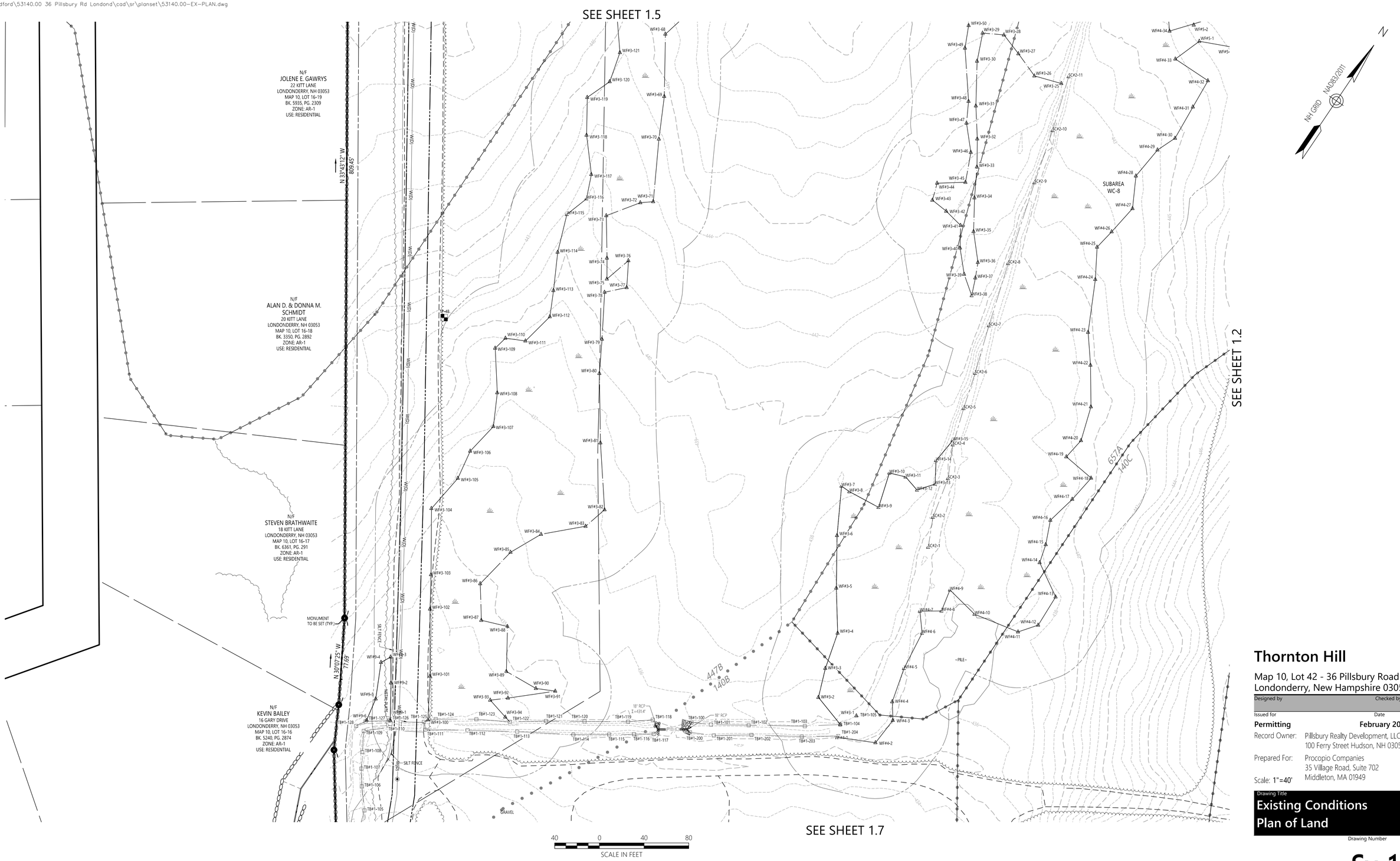

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STATE OF NEW HAMPSHIRE
No. 1036
MICHAEL J. HAMMER
LICENSED LAND SURVEYOR
SIGNATURE

Benchmarks

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Thornton Hill

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Londonderry, New Hampshire 03053

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Issued for | Date

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Scale: 1"=40'

Drawing Title

Existing Conditions Plan of Land

Drawing Number

Sv-1.6

Sheet 7 of 9

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SEE SHEET 1.6



SEE SHEET 1.1

SEE SHEET 1.8

40 0 40 80
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NH GRID NAD83/2011

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STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — NO. 1036 — MICHAEL W. HAMMER

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Sv-1.7

Sheet 8 of 9

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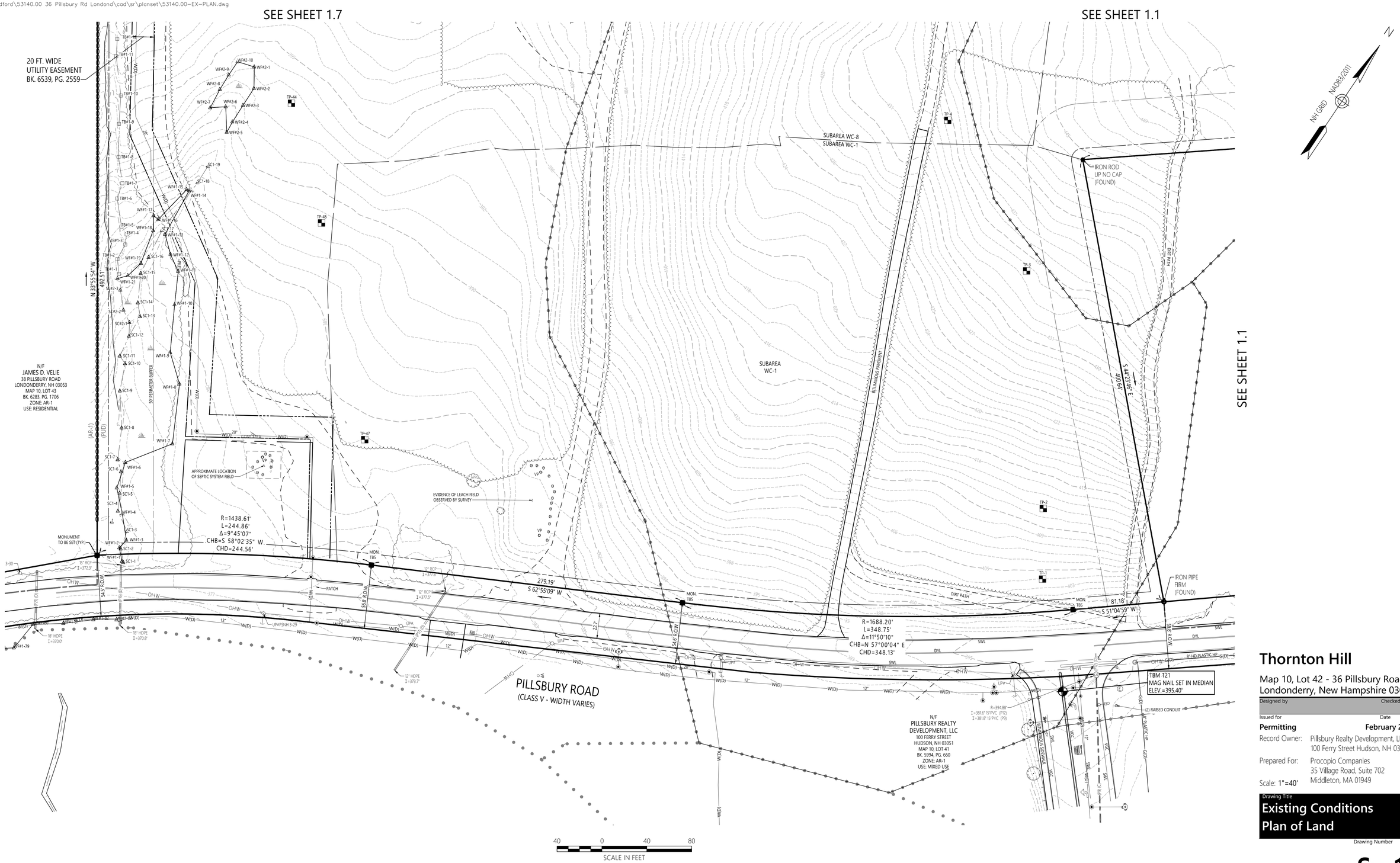

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Thornton Hill

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Drawing Title

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Drawing Number

Sv-1.8

Sheet 9 of 9

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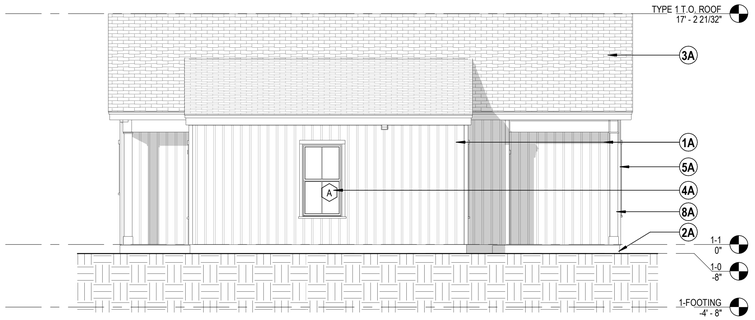
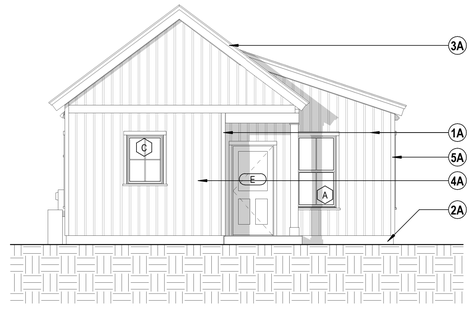
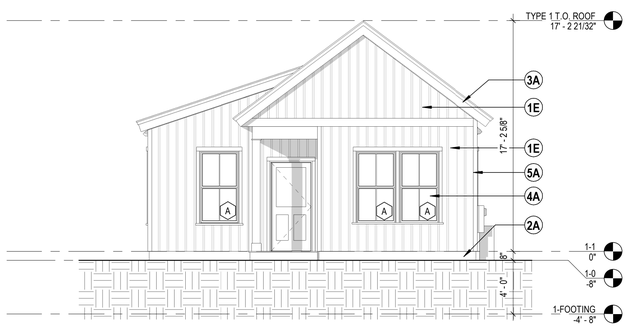


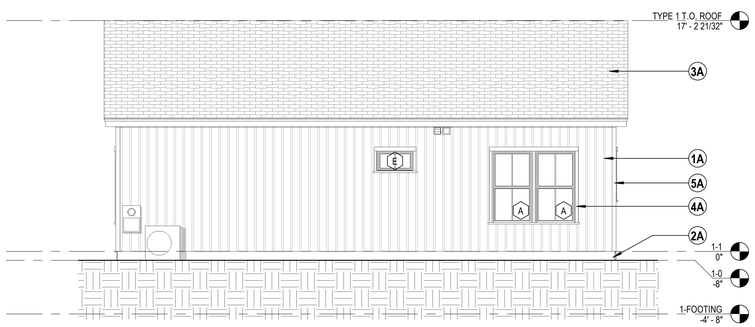
4 UNIT TYPE 1 EAST EXTERIOR ELEVATION
3/16" = 1'-0"



3 UNIT TYPE 1 NORTH EXTERIOR ELEVATION
3/16" = 1'-0"



2 UNIT TYPE 1 SOUTH EXTERIOR ELEVATION
3/16" = 1'-0"



1 UNIT TYPE 1 WEST EXTERIOR ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE	
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL TRANSITION TRIM
1C	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
1D	VINYL CORNER BOARD
1E	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
8A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
9A	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
10A	GABLE BRACKET; BOD FYPON ASHER
10B	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKT8X29X4
10C	GABLE BRACKET; BASIS OF DESIGN FYPON MEIER
10D	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKTS18X24X6S

THORNTON HILL

MAP 10, LOT 42 - 36
PILLSBURY ROAD,
LONDONDERRY NH 03053

PROJECT #2417

PROCOPIO ENTERPRISES, LLC
35 VILLAGE ROAD, 7TH FLOOR (702)
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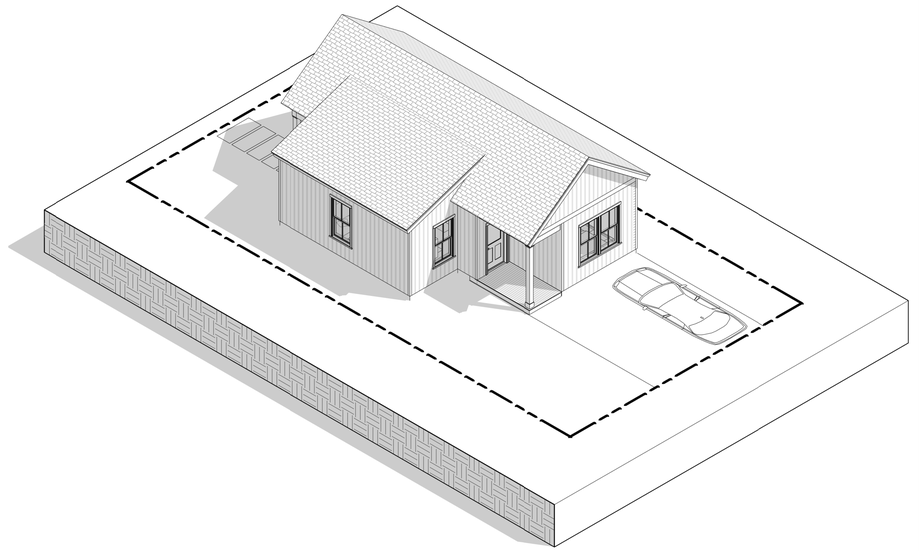
SCALE **3/16" = 1'-0"**
UTILE PROJECT NUMBER **2417**

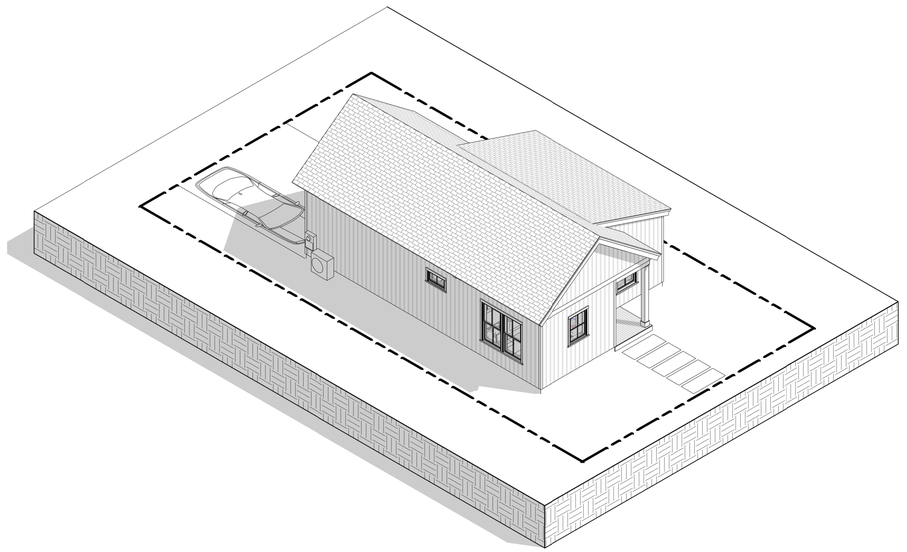
UNIT TYPE 1 - EXTERIOR ELEVATIONS

A-1-3.01

11/10/2023 3:02:21 PM



2 UNIT TYPE 1 - AXONOMETRIC 2



1 UNIT TYPE 1 - AXONOMETRIC 1

THORNTON HILL

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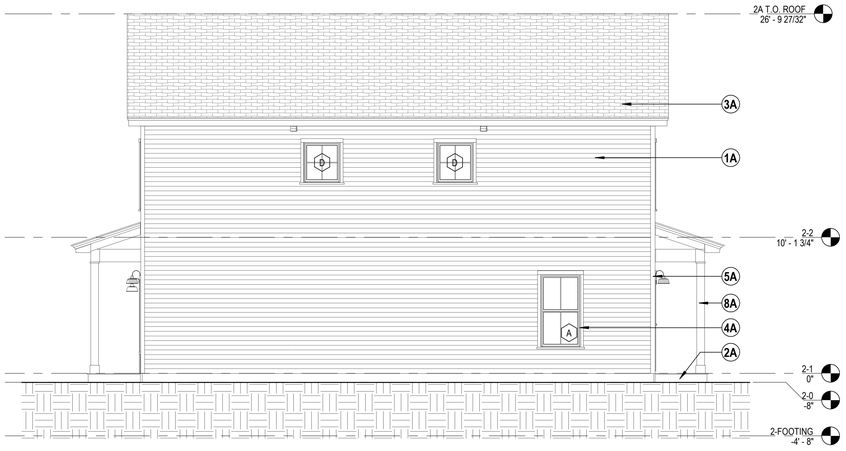
SCALE

UTILE PROJECT NUMBER
2417

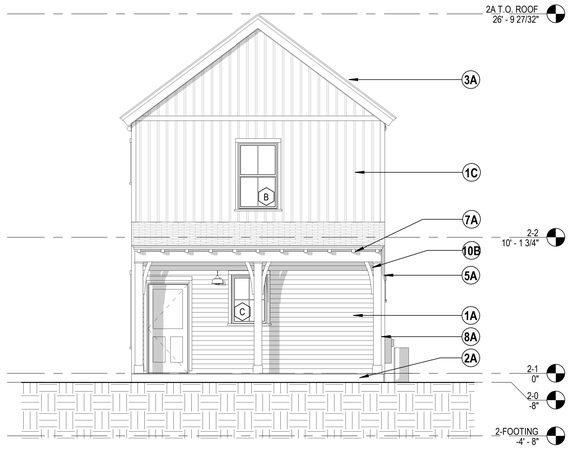
UNIT TYPE 1 - AXONOMETRICS

A-1-3.11

11/10/2025 2:56:47 PM

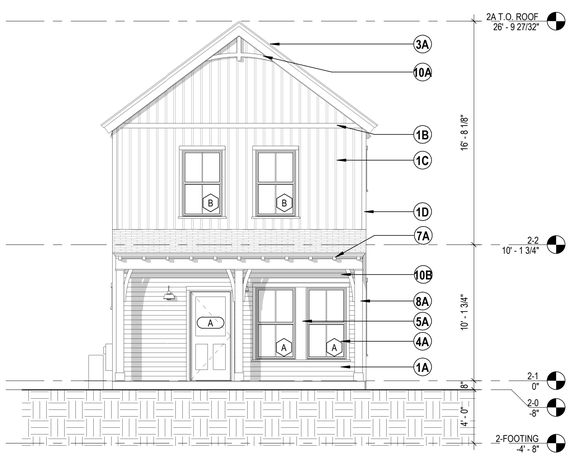


4 UNIT TYPE 2A EAST EXTERIOR ELEVATION
3/16" = 1'-0"

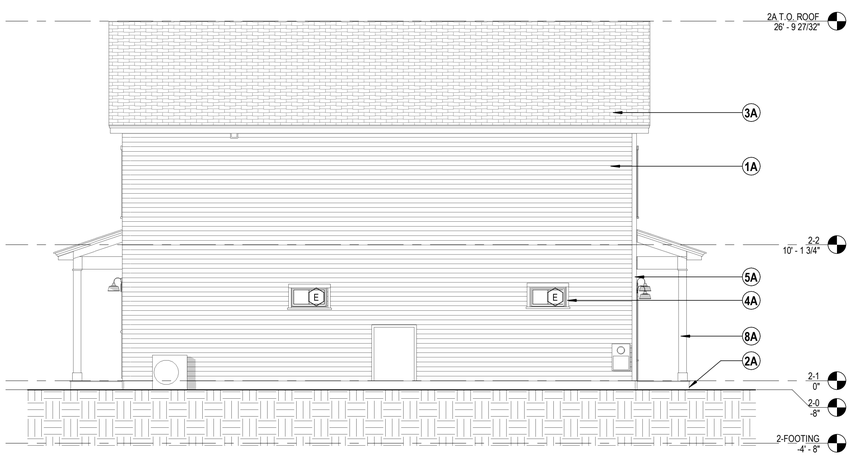


3 UNIT TYPE 2A NORTH EXTERIOR ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE	
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL TRANSITION TRIM
1C	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
1D	VINYL CORNER BOARD
1E	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
8A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
9A	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
10A	GABLE BRACKET; BOD FYPON ASHER
10B	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKT8X29X4
10C	GABLE BRACKET; BASIS OF DESIGN FYPON MEIER
10D	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKTS18X24X6S



2 UNIT TYPE 2A SOUTH EXTERIOR ELEVATION
3/16" = 1'-0"



1 UNIT TYPE 2A WEST EXTERIOR ELEVATION
3/16" = 1'-0"

THORNTON HILL
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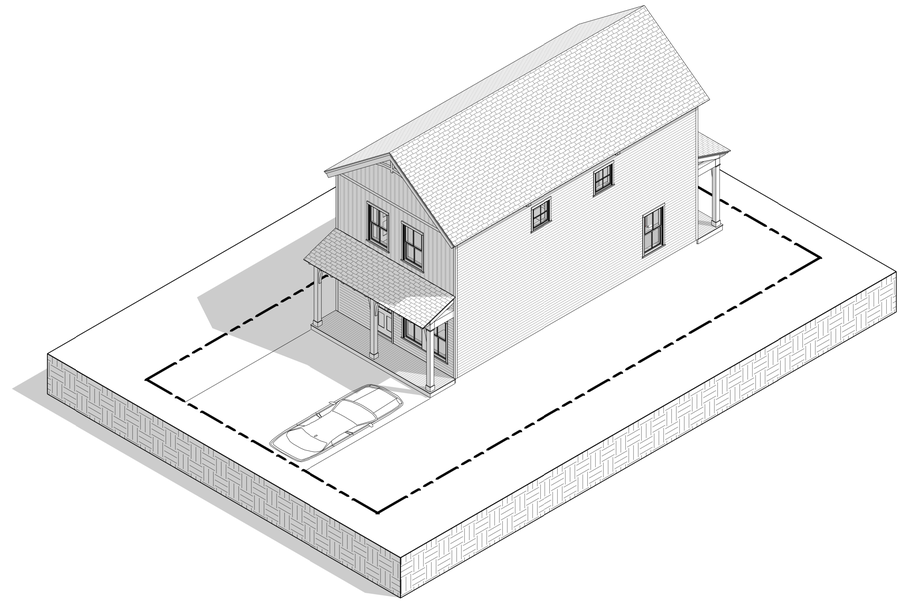
SCALE **3/16" = 1'-0"**
UTILE PROJECT NUMBER **2417**

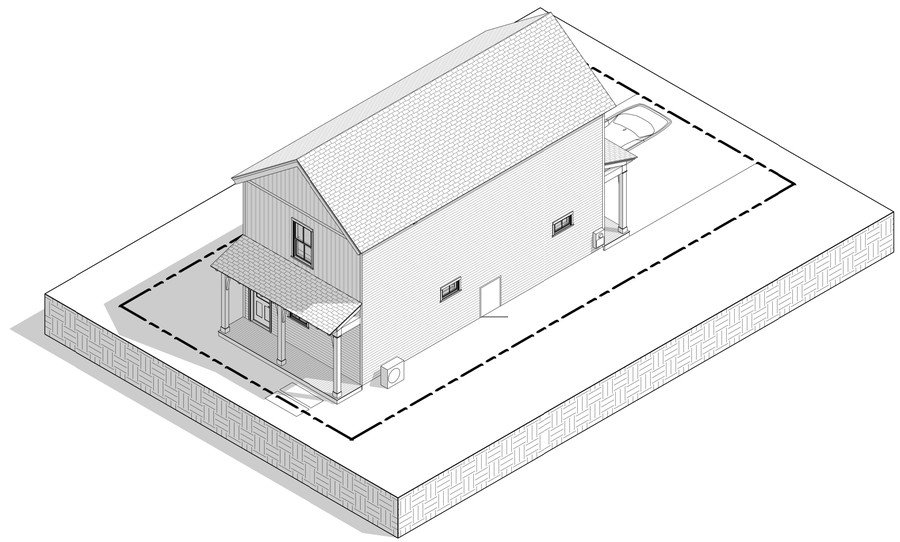
UNIT TYPE 2A - EXTERIOR ELEVATIONS

A-2A-3.01

11/10/2025 2:56:52 PM



2 UNIT TYPE 2A - AXONOMETRIC 1



1 UNIT TYPE 2A - AXONOMETRIC 2

THORNTON HILL

MAP 10, LOT 42 - 36
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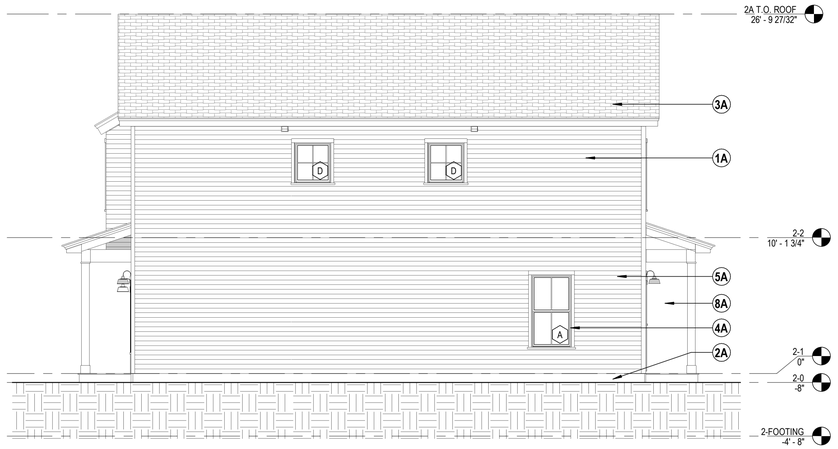
SCALE

UTILE PROJECT NUMBER
2417

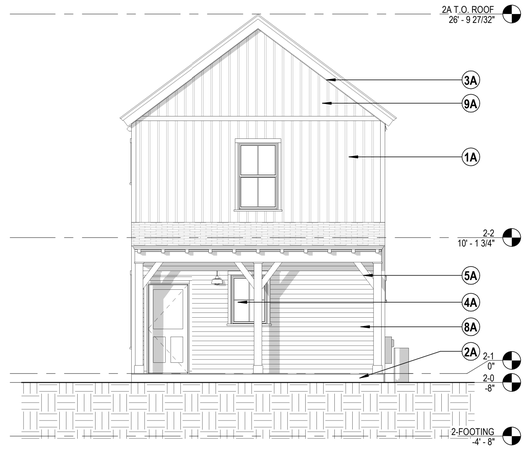
UNIT TYPE 2A - AXONOMETRICS

A-2A-3.11

11/10/2025 2:56:55 PM



4 UNIT TYPE 2B EAST EXTERIOR ELEVATION
3/16" = 1'-0"



3 UNIT TYPE 2B NORTH EXTERIOR ELEVATION
3/16" = 1'-0"

#A	ELEVATION KEY NOTE SCHEDULE
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL TRANSITION TRIM
1C	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
1D	VINYL CORNER BOARD
1E	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
8A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
9A	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
10A	GABLE BRACKET; BOD FYPON ASHER
10B	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKT8X29X4
10C	GABLE BRACKET; BASIS OF DESIGN FYPON MEIER
10D	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKTS18X24X6S

2 UNIT TYPE 2B SOUTH EXTERIOR ELEVATION
3/16" = 1'-0"

1 UNIT TYPE 2B WEST EXTERIOR ELEVATION
3/16" = 1'-0"

THORNTON HILL

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SCALE **3/16" = 1'-0"**
UTILE PROJECT NUMBER **2417**

UNIT TYPE 2B - EXTERIOR ELEVATIONS

A-2B-3.01

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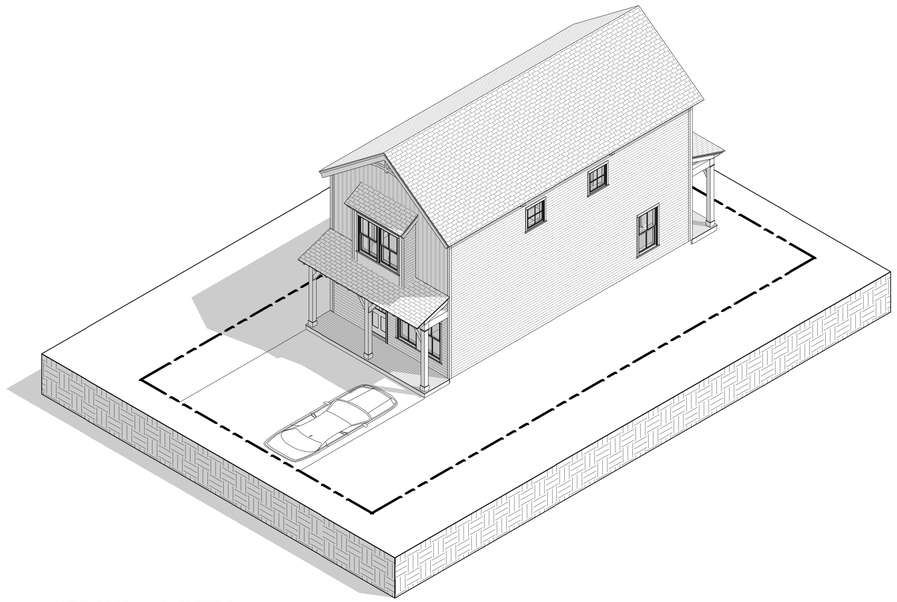
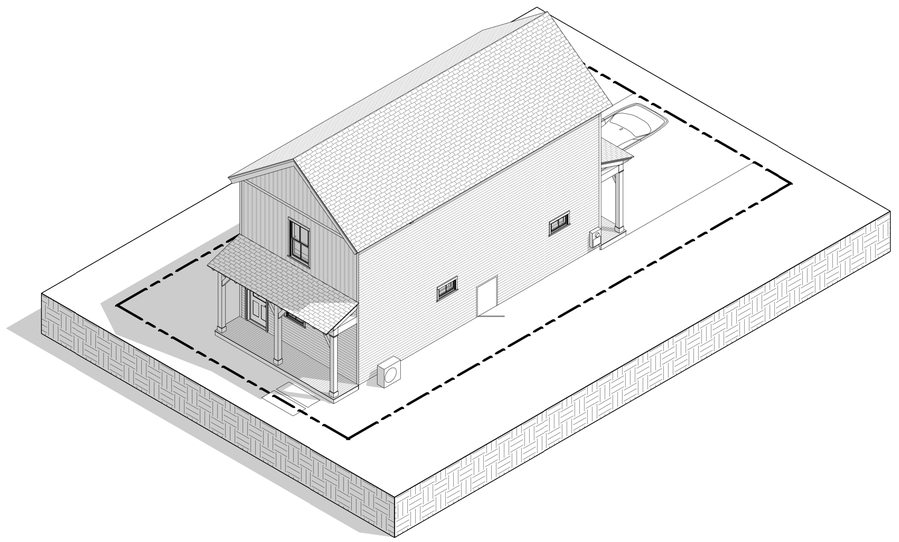


2 UNIT TYPE 2B - AXONOMETRIC 1



1 UNIT TYPE 2B - AXONOMETRIC 2

THORNTON HILL

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SCALE

UTILE PROJECT NUMBER
2417

UNIT TYPE 2B - AXONOMETRICS

A-2B-3.11

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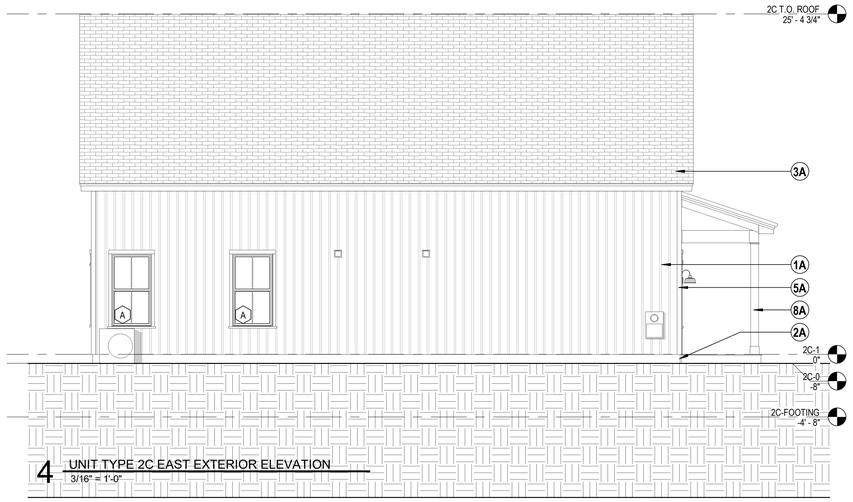
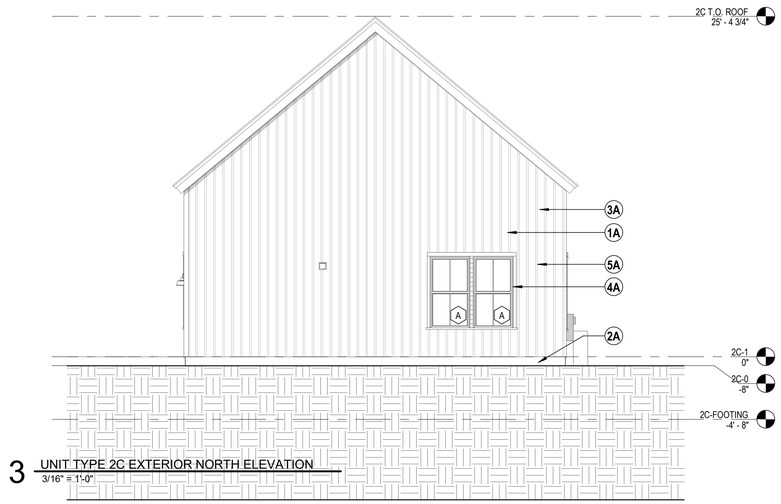
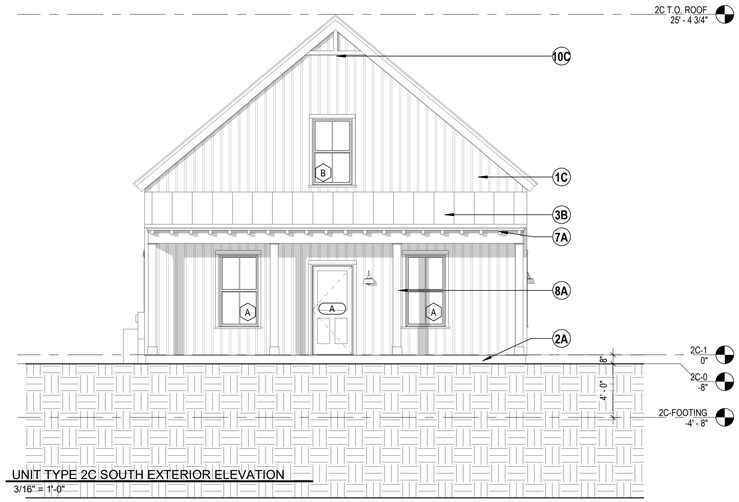


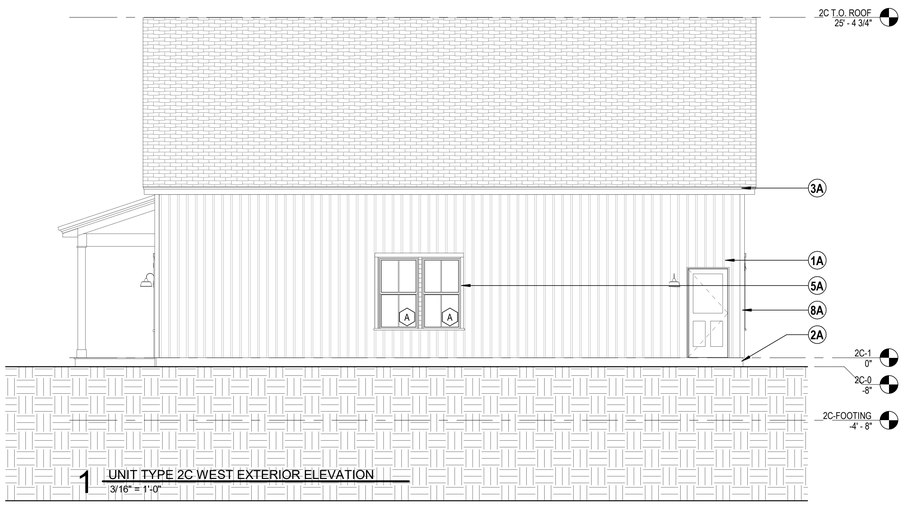
4 UNIT TYPE 2C EAST EXTERIOR ELEVATION
3/16" = 1'-0"



3 UNIT TYPE 2C EXTERIOR NORTH ELEVATION
3/16" = 1'-0"



2 UNIT TYPE 2C SOUTH EXTERIOR ELEVATION
3/16" = 1'-0"



1 UNIT TYPE 2C WEST EXTERIOR ELEVATION
3/16" = 1'-0"

#A	ELEVATION KEY NOTE SCHEDULE
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL TRANSITION TRIM
1C	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
1D	VINYL CORNER BOARD
1E	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
8A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
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10D	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKTS18X24X6S

THORNTON HILL

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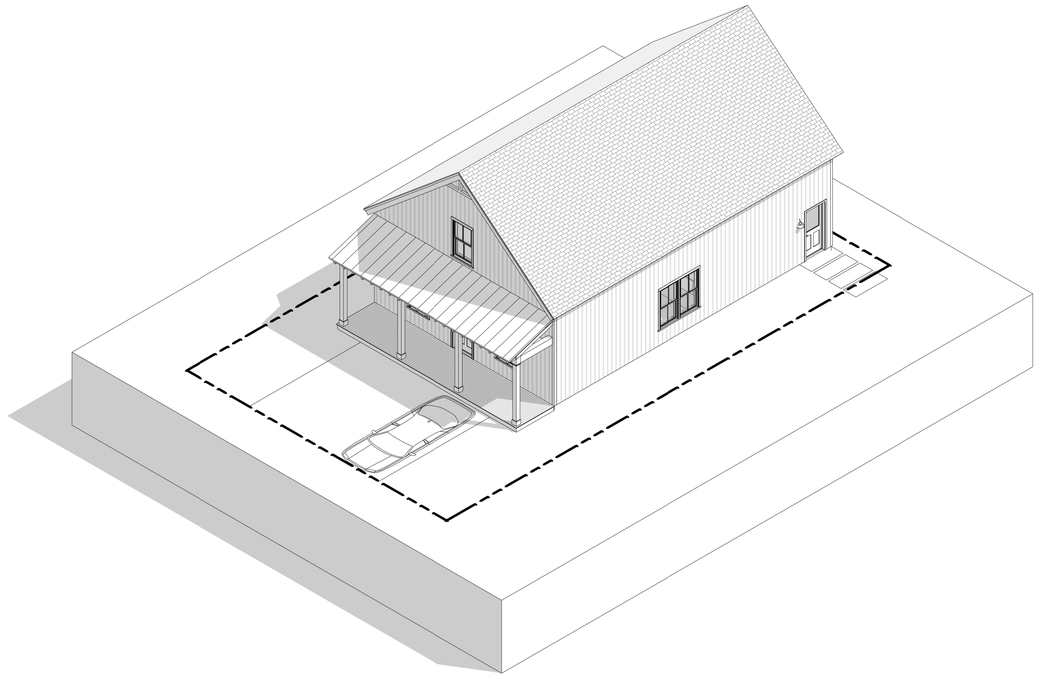
SCALE **3/16" = 1'-0"**
UTILE PROJECT NUMBER **2417**

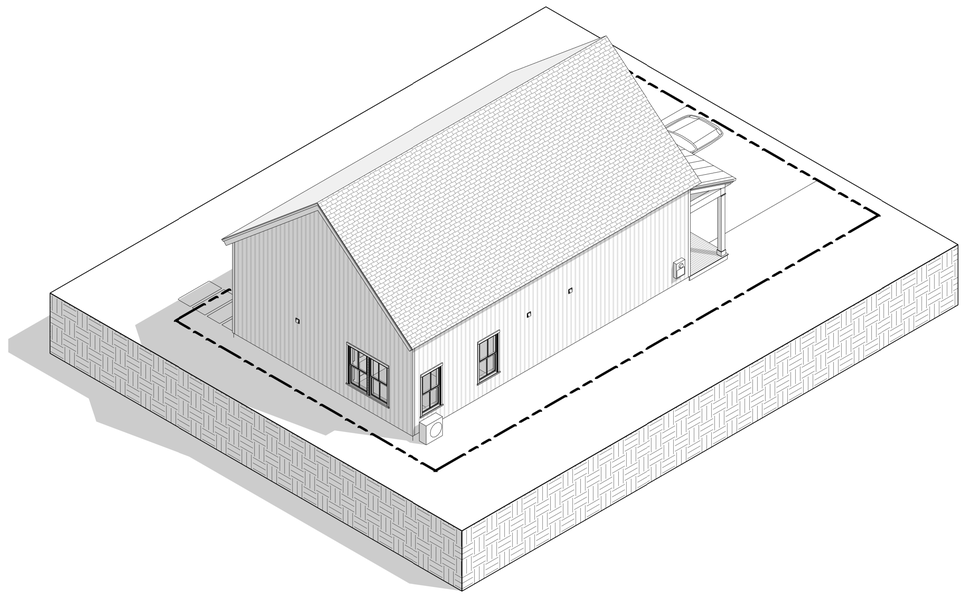
UNIT TYPE 2C - EXTERIOR ELEVATIONS

A-2C-3.01

11/10/2025 2:37:08 PM



2 UNIT TYPE 2C - AXONOMETRIC 1



1 UNIT TYPE 2C - AXONOMETRIC 2

THORNTON HILL

MAP 10, LOT 42 - 36
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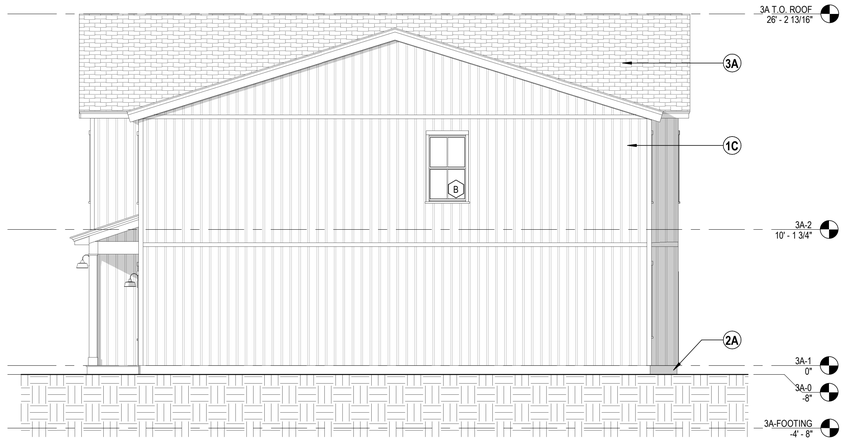
SCALE

UTILE PROJECT NUMBER
2417

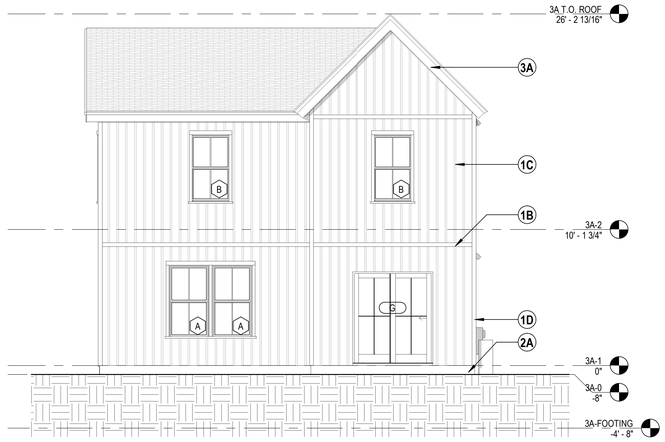
UNIT TYPE 2C - AXONOMETRICS

A-2C-3.11

11/10/2025 2:57:11 PM



4 UNIT TYPE 3A EAST EXTERIOR ELEVATION
3/16" = 1'-0"

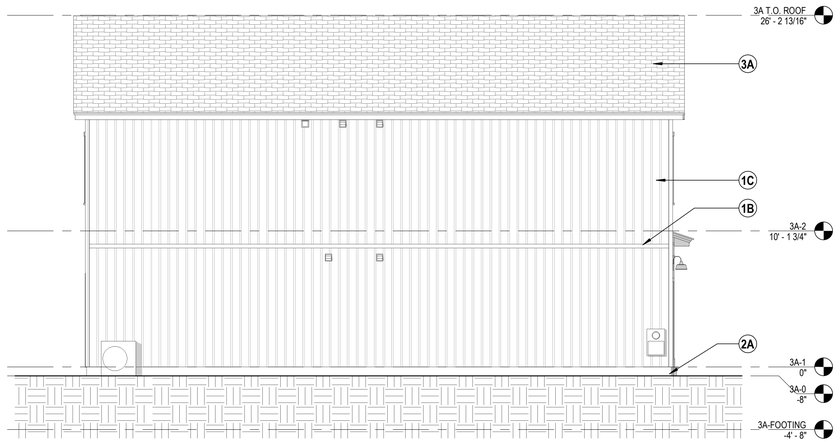


3 UNIT TYPE 3A NORTH EXTERIOR ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE	
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL TRANSITION TRIM
1C	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
1D	VINYL CORNER BOARD
1E	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
8A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
9A	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
10A	GABLE BRACKET; BOD FYPON ASHER
10B	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKT8X29X4
10C	GABLE BRACKET; BASIS OF DESIGN FYPON MEIER
10D	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKTS18X24X6S



2 UNIT TYPE 3A SOUTH EXTERIOR ELEVATION
3/16" = 1'-0"



1 UNIT TYPE 3A WEST EXTERIOR ELEVATION
3/16" = 1'-0"

THORNTON HILL
MAP 10, LOT 42 - 36
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SCALE **3/16" = 1'-0"**
UTILE PROJECT NUMBER **2417**

UNIT TYPE 3A - EXTERIOR ELEVATIONS

A-3A-3.01

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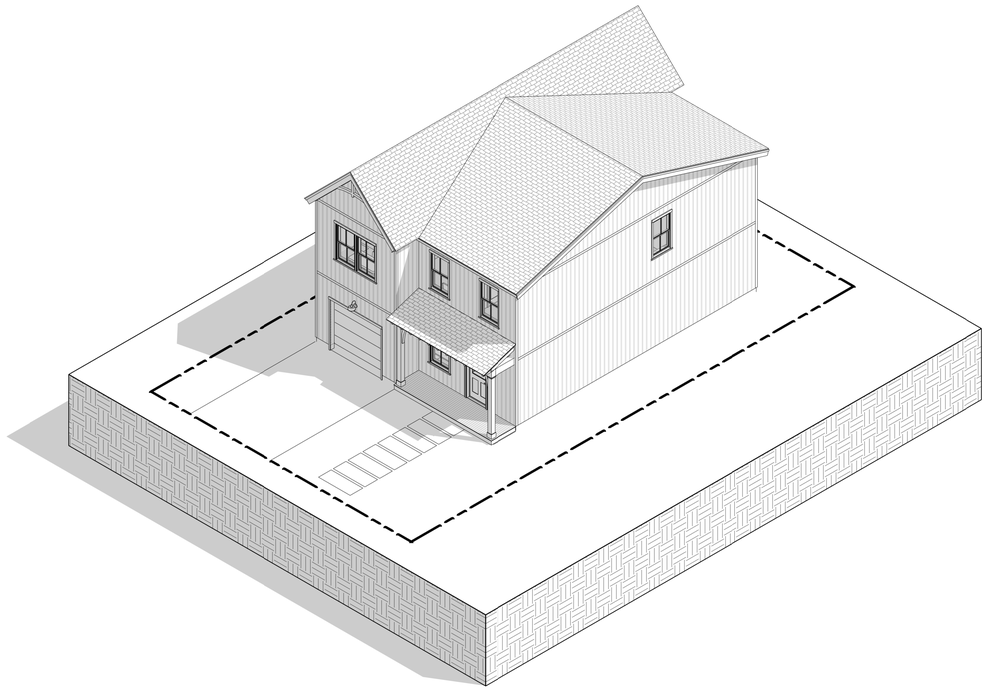
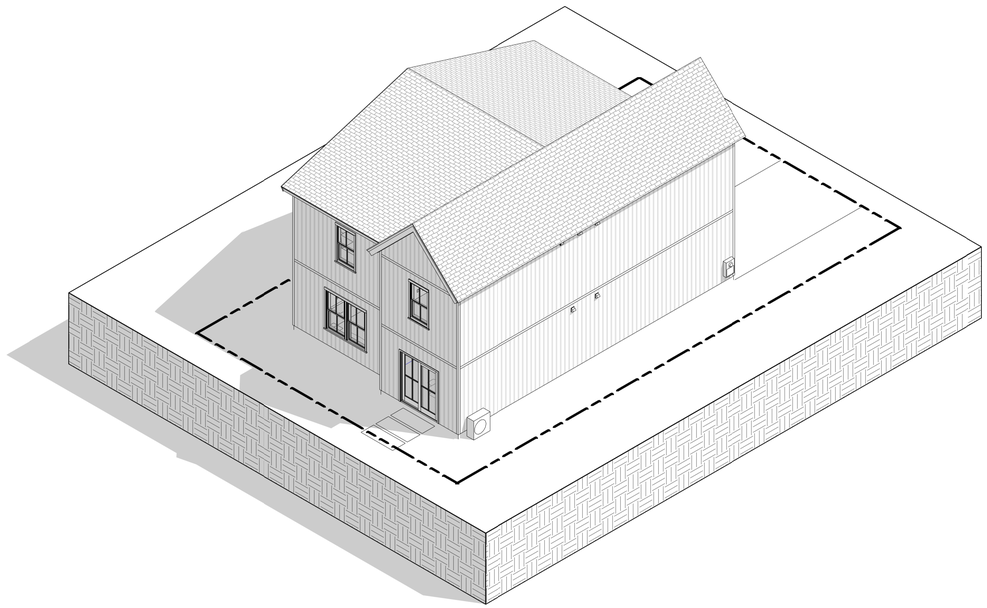


2 UNIT TYPE 3A - AXONOMETRIC 1



1 UNIT TYPE 3A - AXONOMETRIC 2

THORNTON HILL

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SCALE

UTILE PROJECT NUMBER
2417

UNIT TYPE 3A - AXONOMETRICS

A-3A-3.11

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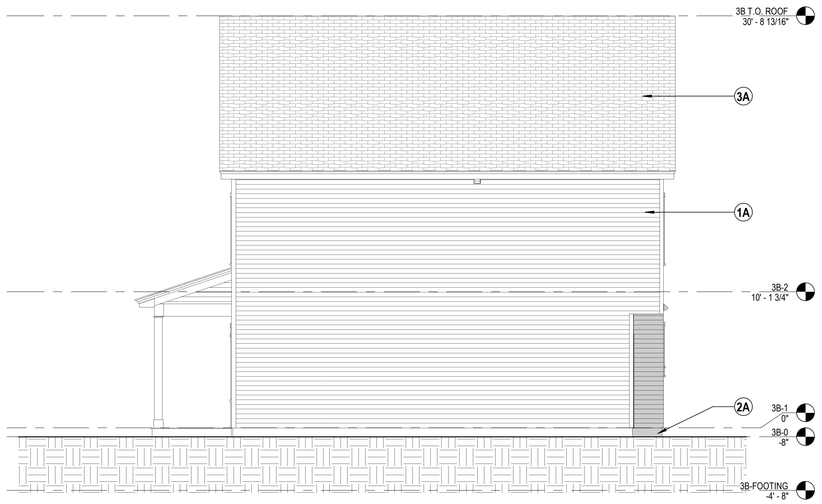
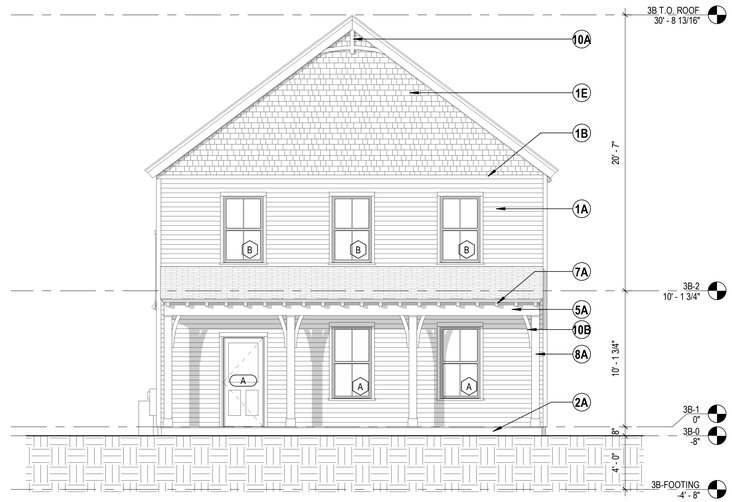
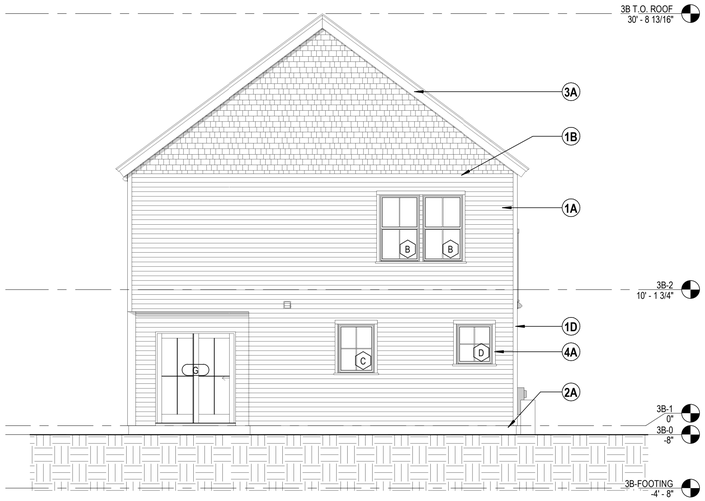


4 UNIT TYPE 3B EAST EXTERIOR ELEVATION
3/16" = 1'-0"

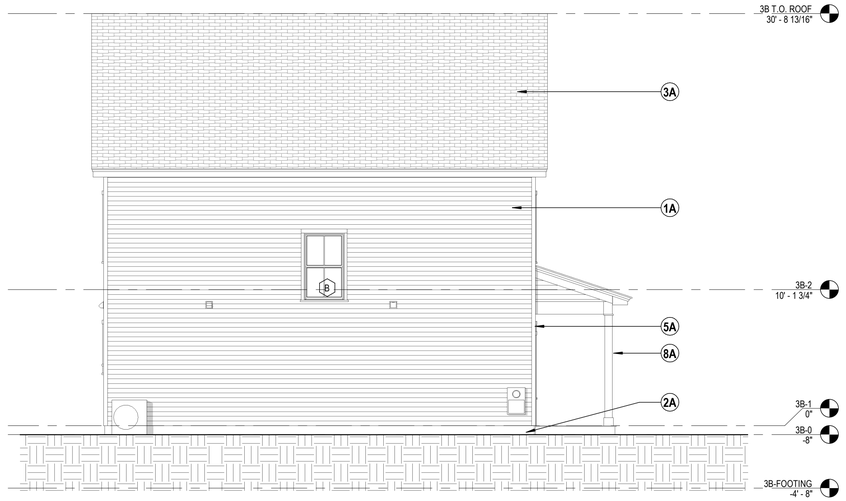


3 UNIT TYPE 3B NORTH EXTERIOR ELEVATION
3/16" = 1'-0"

#A	ELEVATION KEY NOTE SCHEDULE
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL TRANSITION TRIM
1C	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
1D	VINYL CORNER BOARD
1E	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	EXPOSED RAFTER TAILS; PAINTED WOOD OR PVC CLAD
8A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
9A	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
10A	GABLE BRACKET; BOD FYPON ASHER
10B	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKT8X29X4
10C	GABLE BRACKET; BASIS OF DESIGN FYPON MEIER
10D	PVC KNEE BRACE; BASIS OF DESIGN FYPON BKTS18X24X6S



2 UNIT TYPE 3B SOUTH EXTERIOR ELEVATION
3/16" = 1'-0"



1 UNIT TYPE 3B WEST EXTERIOR ELEVATION
3/16" = 1'-0"

THORNTON HILL
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SCALE **3/16" = 1'-0"**
UTILE PROJECT NUMBER **2417**

UNIT TYPE 3B - EXTERIOR ELEVATIONS

A-3B-3.01

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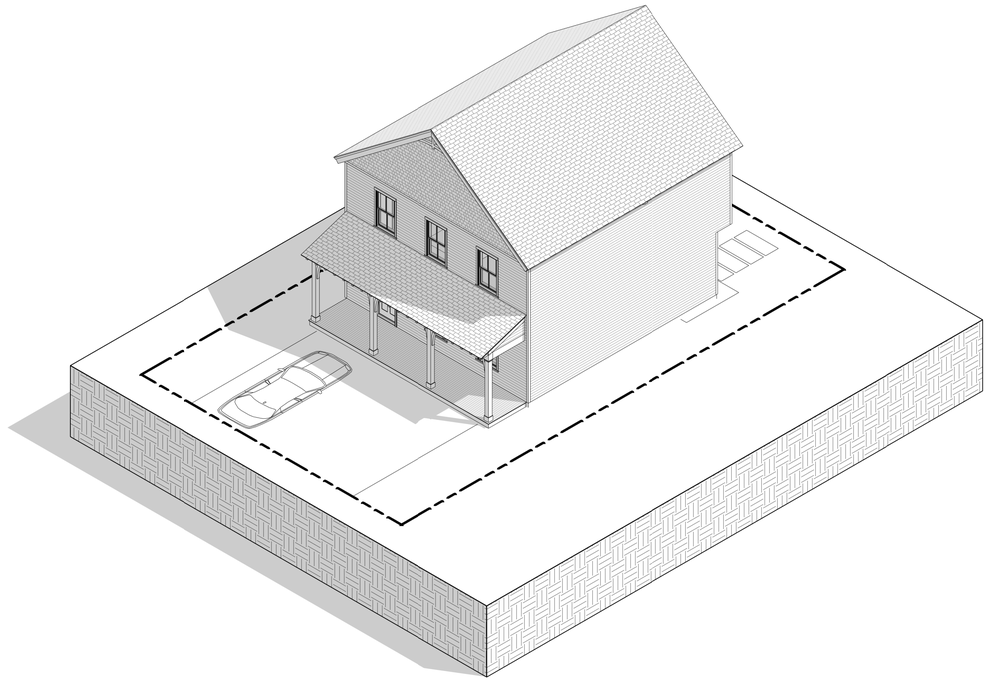
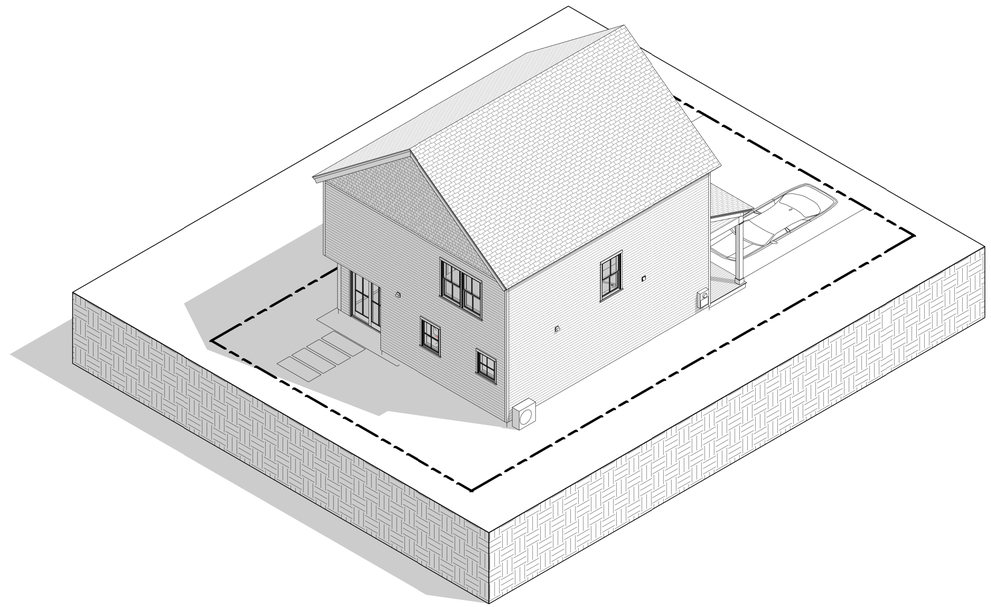


2 UNIT TYPE 3B - AXONOMETRIC 1



1 UNIT TYPE 3B - AXONOMETRIC 2

THORNTON HILL

MAP 10, LOT 42 - 36
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SCALE

UTILE PROJECT NUMBER
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UNIT TYPE 3B - AXONOMETRICS

A-3B-3.11

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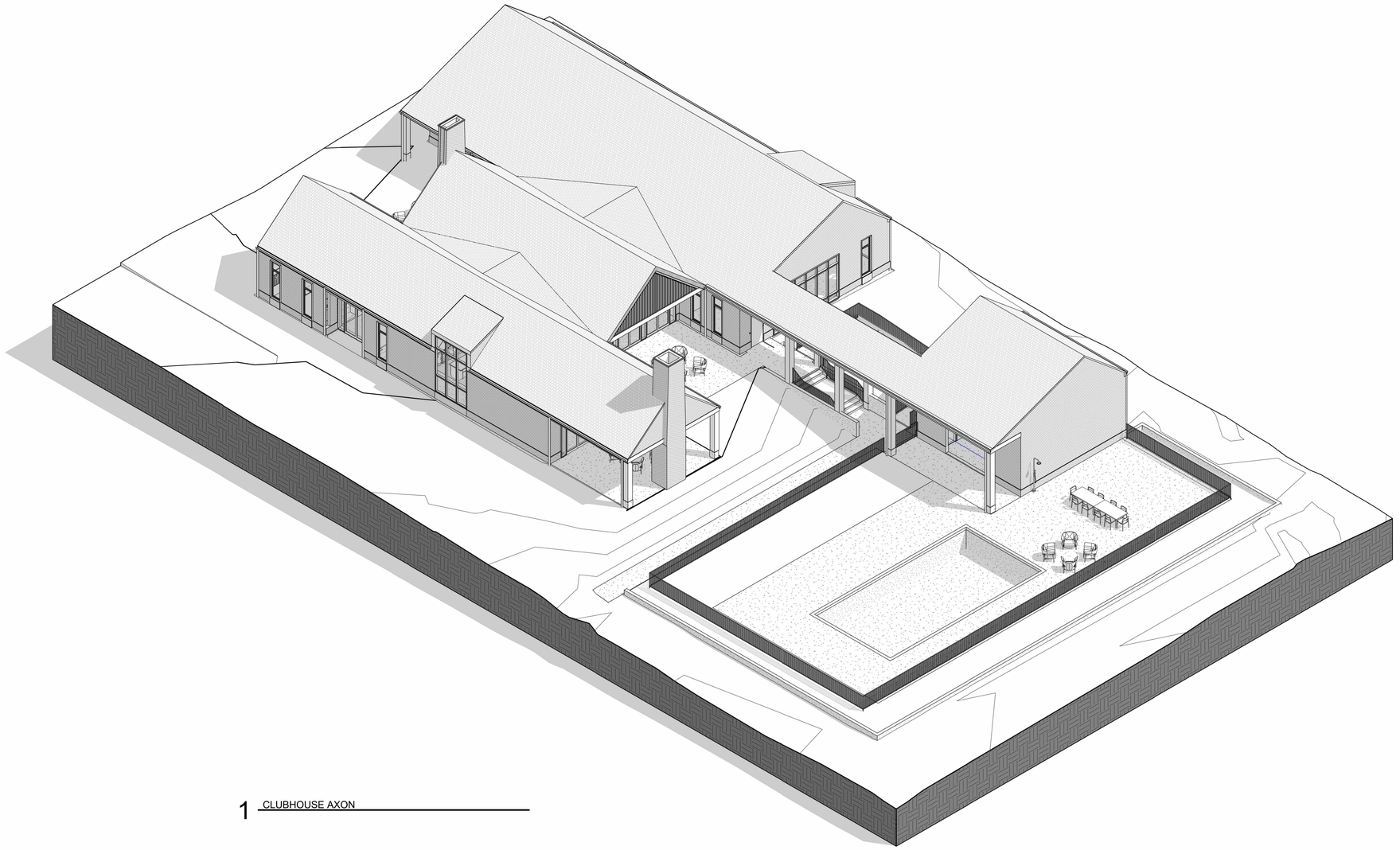

1 CLUBHOUSE AXON

THORNTON HILL

MAP 10, LOT 42 - 36
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SCALE

UTILE PROJECT NUMBER
2417

CLUBHOUSE AXON

A0.00

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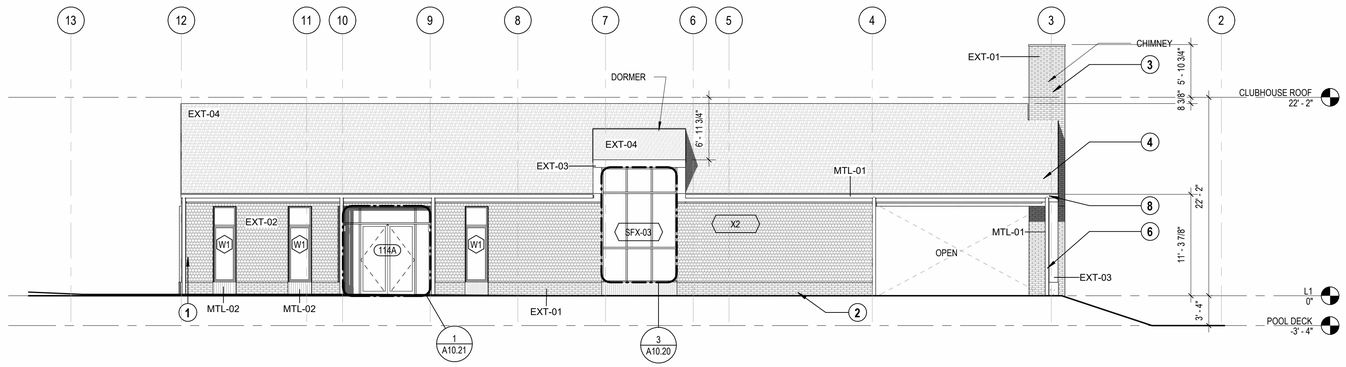
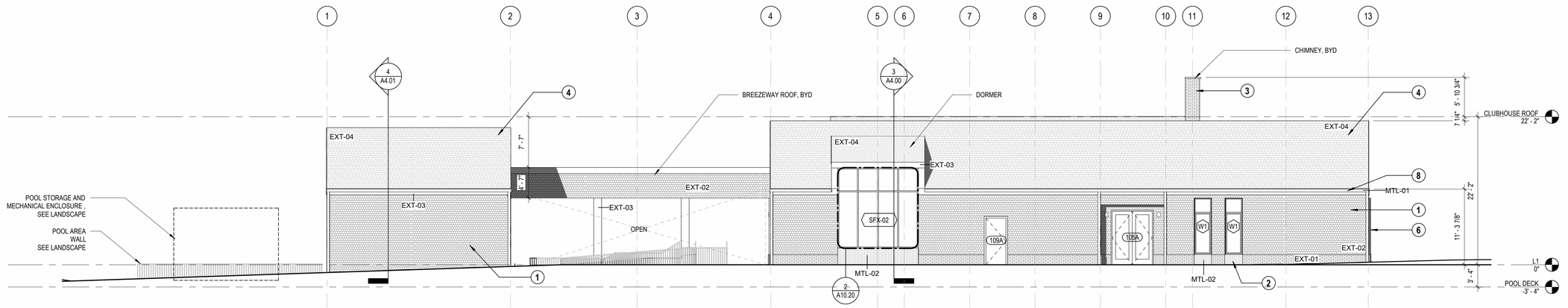
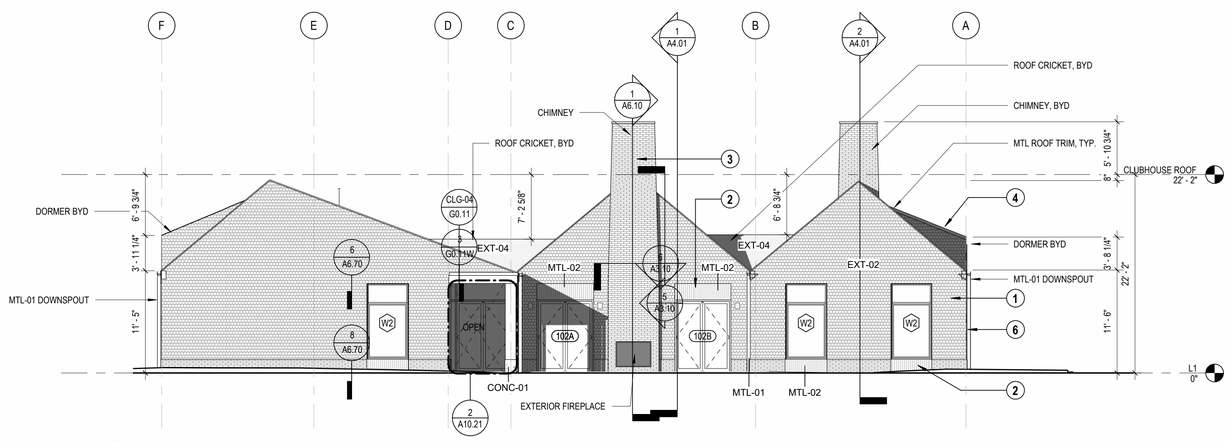
#A ELEVATION KEY NOTE SCHEDULE	
Number	Description
1	VINYL 5" SHINGLE, DRIFTWOOD BLEND MEDIUM, BASIS OF DESIGN CERTAINTEED SAWMILL INDIVIDUAL SHINGLE
2	PTD MTL PANEL
2A	BRICK WATER TABLE
3	BRICK A, RUNNING BOND
4	ASPHALT SHINGLES
6	DOWNSPOUT
7	GLAZED STOREFRONT W/ANODIZED ALUM FRAMES
8	GALVANIZED HALF-ROUND GUTTER



3 WEST ELEVATION - 01
1/8" = 1'-0"



2 EAST ELEVATION 01
1/8" = 1'-0"



1 NORTH ELEVATION 01
1/8" = 1'-0"

THORNTON HILL
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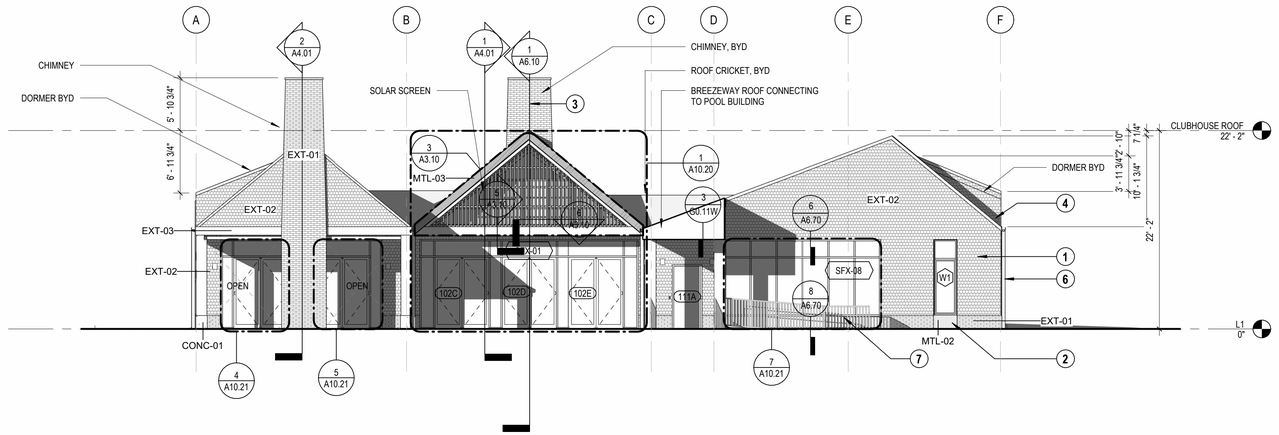
SCALE **1/8" = 1'-0"**
UTILE PROJECT NUMBER **2417**

EXTERIOR ELEVATIONS - CLUBHOUSE

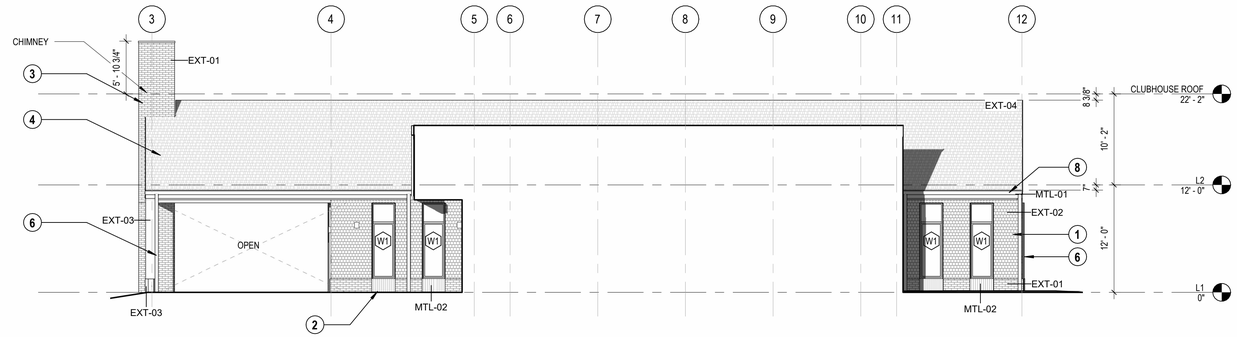
A3.08

11/10/2025 12:27:19 PM

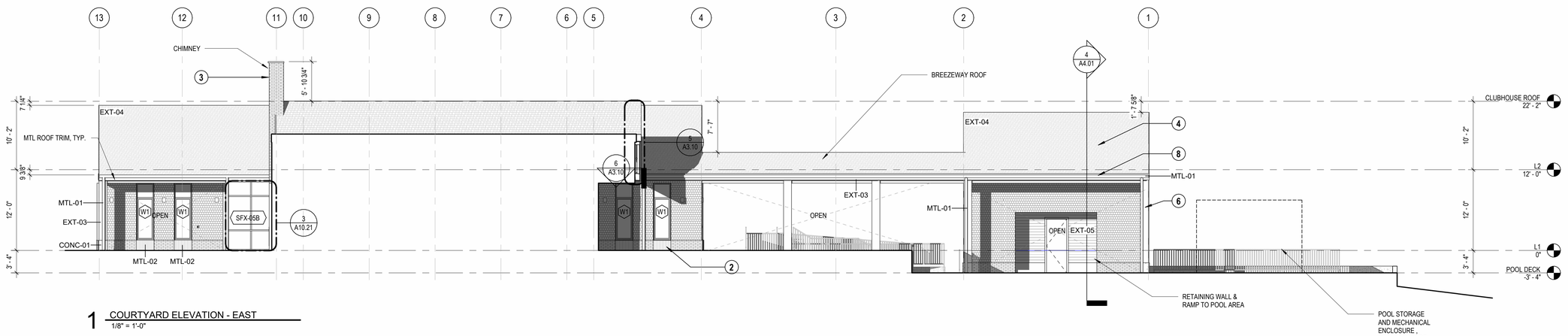
#A	ELEVATION KEY NOTE SCHEDULE
Number	Description
1	VINYL 5" SHINGLE, DRIFTWOOD BLEND MEDIUM, BASIS OF DESIGN CERTAINTEED SAWMILL INDIVIDUAL SHINGLE
2	PTD MTL PANEL
2A	BRICK WATER TABLE
3	BRICK A, RUNNING BOND
4	ASPHALT SHINGLES
6	DOWNSPOUT
7	GLAZED STOREFRONT W/ANODIZED ALUM FRAMES
8	GALVANIZED HALF-ROUND GUTTER



5 COURTYARD ELEVATION - NORTH
1/8" = 1'-0"



4 COURTYARD ELEVATION - WEST
1/8" = 1'-0"



1 COURTYARD ELEVATION - EAST
1/8" = 1'-0"

THORNTON HILL

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UTILE PROJECT NUMBER **2417**

EXTERIOR ELEVATIONS - CLUBHOUSE

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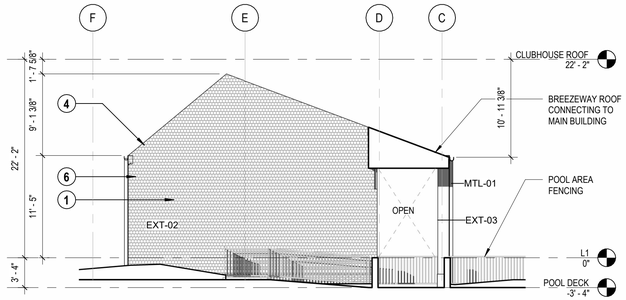
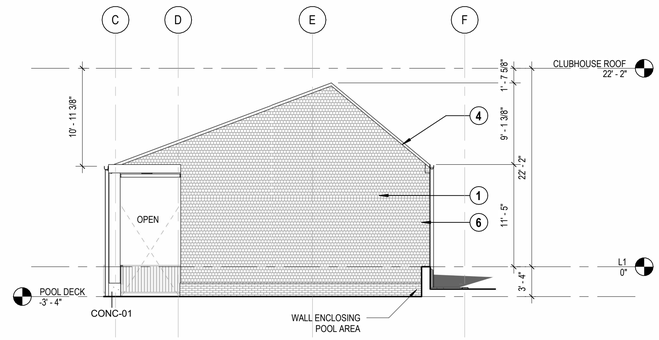


1 PATIO ELEVATION - SOUTH
1/8" = 1'-0"



2 POOL BUILDING SOUTH ELEVATION
1/8" = 1'-0"

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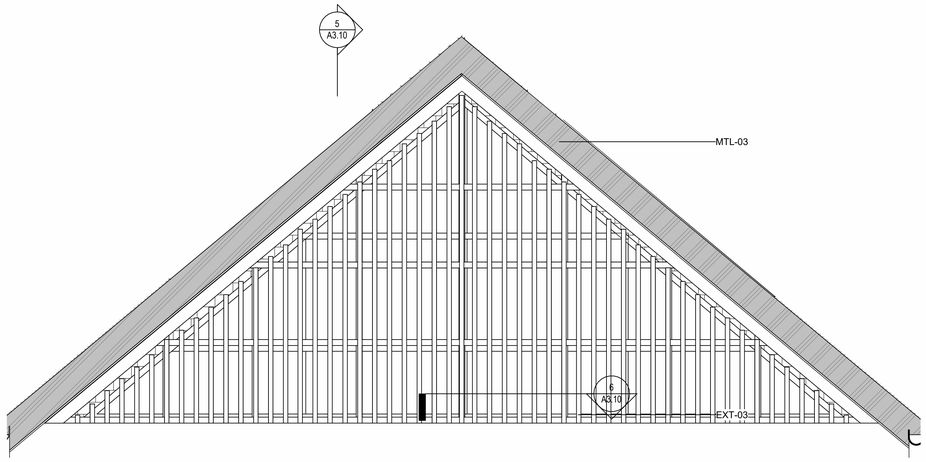
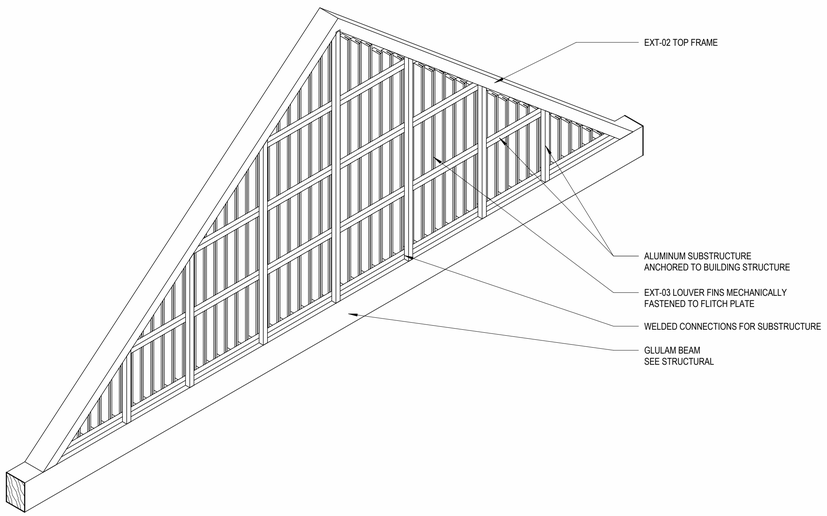
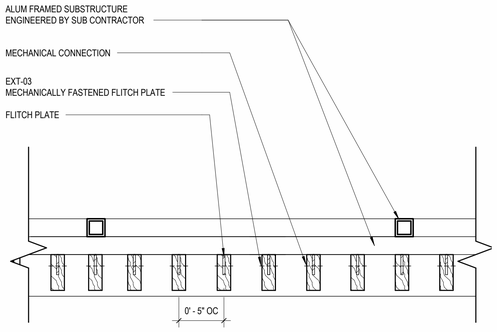
Number	Description
1	VINYL 5" SHINGLE, DRIFTWOOD BLEND MEDIUM, BASIS OF DESIGN CERTAINTEED SAWMILL INDIVIDUAL SHINGLE
2	PTD MTL PANEL
2A	BRICK WATER TABLE
3	BRICK A, RUNNING BOND
4	ASPHALT SHINGLES
6	DOWNSPOUT
7	GLAZED STOREFRONT W/ANODIZED ALUM FRAMES
8	GALVANIZED HALF-ROUND GUTTER



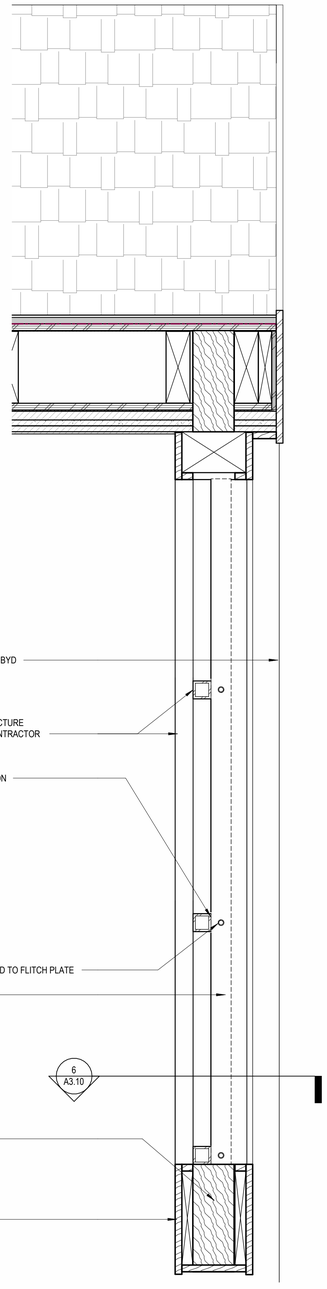
3 EXTERIOR ELEVATION SOUTH - SOLAR SCREEN
1/2" = 1'-0"



4 CLUBHOUSE SOLAR SCREEN - REAR AXONOMETRIC



6 CLUBHOUSE SOLAR SCREEN PLAN DETAIL
1 1/2" = 1'-0"



5 CLUBHOUSE SOLAR SCREEN SECTION DETAIL
1 1/2" = 1'-0"

THORNTON HILL
MAP 10, LOT 42 - 36
PILLSBURY ROAD,
LONDONDERRY NH 03053
PROJECT #2417

PROCOPIO ENTERPRISES, LLC
35 VILLAGE ROAD, 7TH FLOOR (702)
MIDDLETOWN, MA 01949
P (781) 233-3190

utile
ARCHITECTURE + URBAN DESIGN

115 KINGSTON ST
BOSTON, MA 02111
P 617 423.7200
utiledesign.com
ARCHITECT

H+O
100 SUMMER STREET
SUITE 1600
BOSTON, MA 02110
P 617 938 3349
STRUCTURAL

VHB
2 BEDFORD FARMS DR
SUITE 200
BEDFORD, NH 03110
P 603 391 3900
CIVIL

VHB
2 BEDFORD FARMS DR
SUITE 200
BEDFORD, NH 03110
P 603 391 3900
LANDSCAPE

STAMP

ISSUE DATE	DOCUMENT SUBMISSION

ISSUE DATE	REVISIONS ON SHEET

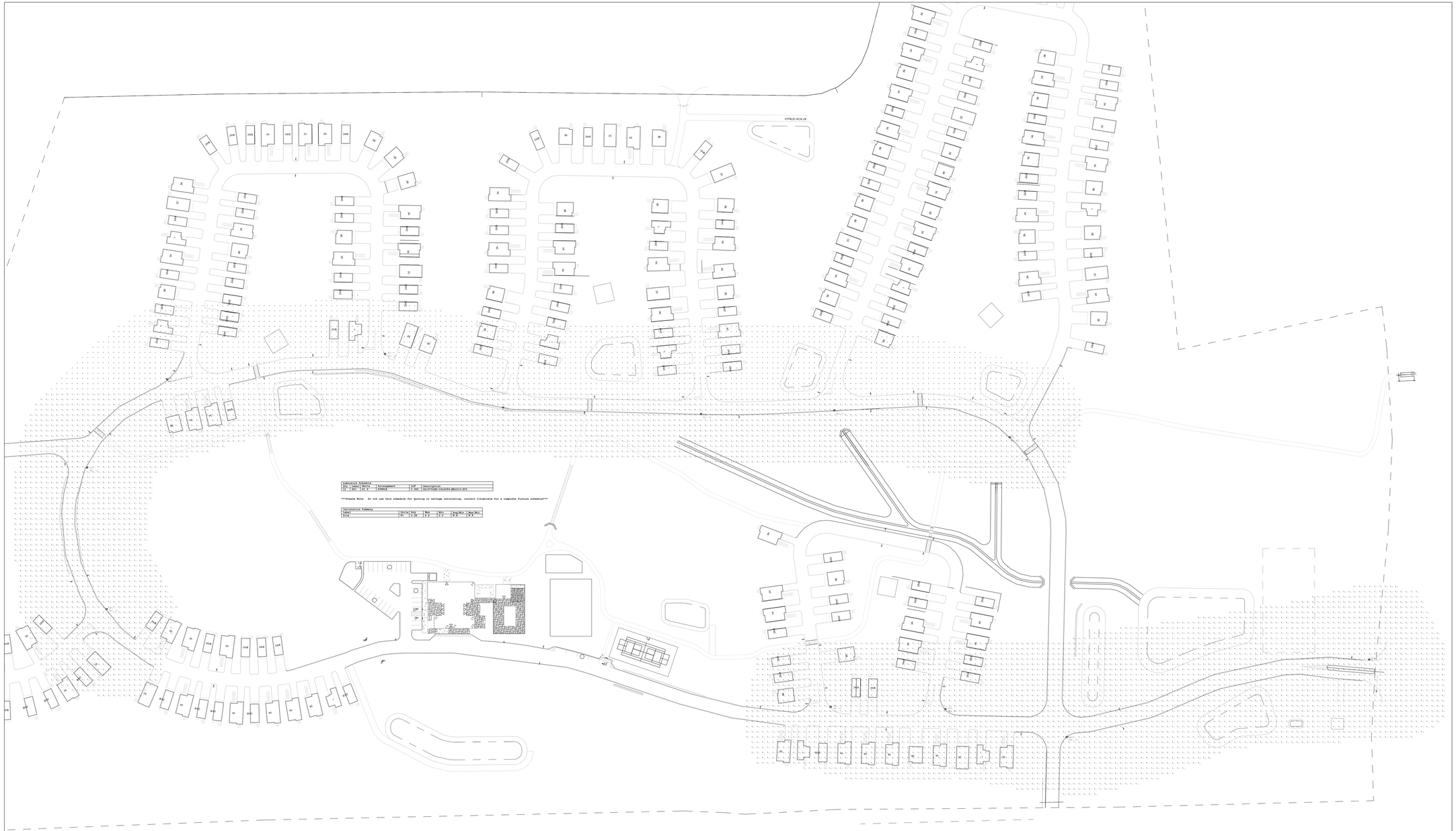
NOTE: LEGIBILITY OF PERFORMANCE CRITERIA AND DETAILING SCOPE REQUIRES THAT DRAWINGS BE VIEWED OR PRINTED IN COLOR - COORDINATE AS REQUIRED TO DETERMINE FULL PROJECT SCOPE

SCALE **As indicated**
UTILE PROJECT NUMBER **2417**

EXTERIOR ELEVATIONS - CLUBHOUSE

A3.10

11/10/2025 12:27:28 PM



Luminaire Schedule			
Qty	Label	Mounting	Arrangement	LLF	Description
1	2AB	4A	2AB0A	1.000	0LLF7(LBC-2414FE-WB2C1-2F)

Please Note: Do not use this schedule for quoting or voltage calculating, contact Illuminate for a complete fixture schedule

Calculation Summary						
Label	Qty	Avg	Max	Min	Avg/Min	Max/Min
Site	Pr	1.38	4.4	0.1	8.8	8.8

Project:
Pillsbury NH Housing Project - Site

Contact:
Sean Goulding
Specification Sales
(781) 272-2300 X211
sgoulding@omnilite.com

Detail: Photometric Calculation
Date: 11/12/2025
Revision: 1
Scale: 1" = 60'-0"
Drawn By: SHJ

Generated For:
VHB

illuminate
263 Winn Street
Burlington, MA 01803
(781) 272-2300

Drawing Number:

L-1

Sheet 1 of 1

Town of Londonderry, New Hampshire

Planning & Economic Development Department 603-432-1100
268B Mammoth Road 603-432-1128
Town Hall – 2nd Floor www.londonderrynh.org

Planning – Zoning – Economic Development – Conservation

MEMORANDUM

TO: Planning Board

FROM: Kellie Caron, Deputy Town Manager & Director of Economic Development

DATE: January 7, 2026

RE: Public hearing on an application for formal review of site plan and conditional use permit for 250 single family cottage court style dwellings along with associated site improvements. 36 Pillsbury Road (Map 10, Lot 42) zoned Agricultural Residential (AR-1) and Woodmont Commons Planned Unit Development (PUD). Procopio Companies (Applicant) & Pillsbury Realty Development, LLC (Owner).

The Applicant proposes to construct 250 single-family cottage court dwellings, internal private roadways, utilities, drainage systems, pedestrian paths, recreational amenities, and associated site improvements within the Woodmont Commons PUD boundary. The site is located along Pillsbury Road in close proximity to the intersection of Michel's Way and Pillsbury Road and Pillsbury Road and Gilcreast Road and is abutting residential uses.

As the Board will recall, on December 11, 2024, the Planning Board approved a compliance alternative allowing flexibility in lot type, block type, and alternative standards for street design and public frontage.

The Board must take action on completeness, one waiver request, and the site plan application.

Completeness: There are no outstanding checklist items, however, some required permits may remain under review or are otherwise addressed in the Engineering & Environmental Services Department and HTA Memorandum dated December 3, 2025(the "Engineering Memo"). Issuance of these permits should remain or become conditions of approval.

I believe the application includes sufficient information to allow the board to proceed with consideration and to make an informed decision, and therefore recommend the Board accept the application as complete.

Board Action Required: **Motion to accept the application for 36 Pillsbury Road – Thornton Hill site plan approval as complete.**

Waivers:
The Applicant is requesting the following waiver:

1. Waiver from LSPR 3.09.R – Maximum Roadway Grade. Request to allow an 8% roadway grade for approximately 500 feet where a maximum of 6% is required.

Staff supports the waiver request due to topographic constraints, consistent with prior PUD approvals and action by NHDES requiring roadway relocation for wetland crossings.

Staff recommends that that the Board vote with respect to any requested waivers utilizing the criteria from RSA 674:36 and Londonderry Subdivision and Site Plan Regulations Section 6.04 and 7.04 as noted below:

In a case when the strict application of these regulations would:

a. Result in peculiar and exceptional practical difficulties or exceptional and undue hardship upon the owner of the affected property; or
b. An alternative site planning and building design approach meets the design objectives as stated in the regulations, equally well or better than would compliance with the regulations; and
c. In either of the foregoing circumstances, the waiver may be granted without substantial detriment to the public good;

1. Staff Comments

The Engineering Memo dated December 3, 2025, is incorporated herein by reference. I recommend the Board condition any approval on the comments set forth therein, except as may be modified by decision of the Board.

A. *Planning Comments.* The Applicant has meaningfully and substantially addressed design review comments and recommendations supplied during the design review process, improving the submitted plans by:

- The development is consistent with the permitted uses within the PUD and incorporates the required clustering principles. The site's cluster configurations (e.g., Cluster B, Cluster C) and compact layout are characteristic of the PUD framework, supporting open space preservation, reduced impervious surface, and enhanced walkability.

- Enhancing pedestrian connectivity through the addition and clarification of internal walking paths, trail linkages, and circulation routes that improve walkability and access across the site.

- Refining the overall site layout to better align with the Woodmont Commons PUD Master Plan, including adjustments to block structure, internal circulation, and open-space distribution.

- Updating landscape plans to strengthen perimeter buffering, internal plantings, and coordination with pedestrian areas, consistent with PUD landscape guidelines.

- Addressing lighting plan comments by providing dark-sky compliant fixtures, photometric details, and adjustments to fixture placement to reduce glare and improve pedestrian safety.

B. Design Review Comments

All other design review comments have been addressed, with the exception of nonbinding recommendations made by the Heritage Commission and Conservation Commission, and which are attached for the Board's reference and noted below.

- **Conservation Commission Comment:** "Recommend removal of 5 driveways from overlay district buffer"
  Applicant Response: "Coordination has been made between the project's Land-Use Attorney and the Planning Department. Confirmation has been received that the project parcel is not subject to the Conservation Overlay, and other associated restrictions that are outlined in the Londonderry Zoning Ordinance."
- **Heritage Commission Comment:** "Recommended for approval as presented"
  Applicant Response: "Acknowledged, the Heritage Commission presentation's themes and feedback will be adhered to as the project's design progresses."

If the Board wishes to discuss these comments, I encourage it to inquire of the Applicant. The nonbinding Conservation Commission and Heritage Commission design review comments are attached to this memorandum. Additionally, an email response from the zoning administrator dated April 10, 2025, with determination regarding the conservation overlay is attached for reference.

2. Recommendation

At this time, we (Town and Propcopio) are still awaiting and working through additional information related to the off-site improvements, including the cost estimate, draft agreement language addressing off-site improvements and easements, and supporting diagrams and engineered materials as discussed in the meeting with Town Staff and Procopio on 12/22/25. The draft agreement will also require review by the Town's legal counsel.
Given the status of the outstanding items, staff is recommending a continuance to allow sufficient time for a complete and thorough review of the materials referenced above.

Staff recommend the Planning Board **CONTINUE** this application to February 4, 2026.

MEMORANDUM

To: Planning Board

Date: December 3, 2025

From: Planning and Economic Development
Engineering and Environmental Services
Hoyle Tanner & Associates, Inc

Re: 36 Pillsbury Road Site Plan
Londonderry, New Hampshire
Tax Map 10, Lot 42

Owner: Pillsbury Realty Development, LLC
Applicant: Procopio Enterprises, LLC

Procopio Enterprises, LLC submitted plans and supporting information for the above-referenced project. DRC and the Town's engineering consultant, Hoyle, Tanner and Associates, Inc. reviewed the submitted plans and information, and review comments were forwarded to the Applicant's engineer. The Applicant submitted revised plans and information, and supplemental comments were provided to the Applicant. The Applicant submitted revised plans and information, and we offer the following comments:

Checklist Items:

1. The Applicant should add the permit approval numbers to the plans and provide copies of secured permits in accordance with Checklist Item XII, Londonderry Site Plan Regulations (LSPR) 3.06.a., LSPR 4.13., and LSPR 4.18.e. The Applicant has noted the following permit status:
    a. NHDES Alteration of Terrain Permit – Submitted and under review
    b. NHDES Standard Dredge and Fill Permit – Submitted and under review
    c. NHDES Sewer Discharge Permit – To be submitted
    d. EPA Construction General Permit – To be submitted
    e. Londonderry Sewer Discharge Permit – To be submitted
    f. Londonderry Stormwater Permit – To be submitted

Design Review Items:

1. The Applicant has requested a **waiver** from LSR 3.09.R.3., which requires 6% maximum roadway grade. LSR 3.09.R.3 allows granting of a waiver provided: "no other such slope greater than six percent (6%) occurs within five-hundred (500) feet measured along the centerline of the road from PVIs". Though the profile is unlabeled, it appears the Applicant is proposing a slope of greater than 6% for the beginning of Liberty Court, which is approximately 194 feet from the proposed 8% slope on Thornton Hill Road (though the Liberty Court plans received for review did not have roadway profile slope labels). Therefore, this design does not appear to meet the waiver requirements.
2. The Applicant should add roadway centerline stationing to all plan sheets.

3. The Applicant has shown several retaining walls on the plan set. The Applicant should add a note to the plan set that acknowledges that a building permit is required for all retaining walls greater than 3 feet in height.

4. We recommend that the Applicant address the following items related to the ***Existing Conditions Plan*** **(Sheets Sv-1.0 – Sv1.8):**
   a. The Applicant shall provide an error of closure note that complies with LSR 4.12.A.
   b. The Applicant shall provide a wetland scientist certification (stamp) per LSPR 4.12.c.15.ii.
   c. The Applicant shall provide additional benchmarks to meet the requirements of LSPR 4.05 of one benchmark per 5 acres.

5. We recommend that the Applicant address the following items related to the ***Legend and General Notes Sheet*** **(Sheet C1.00):**
   a. The Applicant has noted that no gas is proposed for the project on the Application and Checklist. The Applicant should remove the gas utility provider listed in Utility Note 1.F. for clarity.
   b. The Applicant should revise Utility Note 12 to say "…WHERE MINIMIM 18" OF VERTICAL SEPARATION OR MINIMUM 10' OF HORIZONTAL SEPARATION FROM WATER IS NOT ACHIEVEABLE".

6. We recommend that the Applicant address the following items related to the ***Layout and Materials Plan(s)*** **(Sheet C2.01 – C2.08):**
   a. The Applicant should provide access drives to the outlet structures for all sand filters and detention ponds.
   b. The Applicant should discuss with the DPW the need for drainage easements and additional Right-of-Way. The Applicant has provided a 10-foot drainage easement along Hovey Road. The Town had also requested a drainage easement reaching 36-feet off the centerline of Pillsbury Road.

7. We recommend that the Applicant address the following items related to the ***Sight Distance Plans*** **(Sheets C2.09 – C2.15):**
   a. The Applicant has labelled the incorrect plan view scale on sight distance plans.
   b. The Applicant should add the grades to the profile sheets.
   c. The Applicant should confirm that the sight distances are designed to meet design speed requirements.
   d. The Applicant should add existing topography to sheet C2.09.
   e. The Applicant should correct the vertical scale on sheet C2.09.
   f. The Applicant should coordinate the grading with sheet C3.07.
   g. The Applicant should revise all sight distance plans to conform to the requirements of LSR Exhibit D3. The sight triangles should begin 15' back from the edge of traveled way for roadways and 10' back from driveways.
   h. It appears there are several sight distance conflicts with the landscaping design. Landscaping should be shown on these plans. Landscaping at intersection and between

driveways should begin 15' back from the edge of pavement unless it cannot interfere with sight distance.

8. We recommend that the Applicant address the following items related to the ***Grading and Drainage Plan(s)*** **(C3.00 – C3.08):**
   a. The Applicant should provide riprap calculations for the Detention Basin 2 outlet to the level spreader.
   b. The Applicant should supplement the berm design with means to address stormwater that is currently running onto the project site from the cemetery. It seems that the Applicant intends for stormwater from the basin outlets to run southerly along the berm onto the site. If this is the case, the Applicant should propose a swale in this location to prevent erosion.
   c. If the Applicant intends to have a 2:1 slope on the berms and around culvert headwalls, they should address the Town of Londonderry *Typical Details for Site and Roadway Infrastructure* standards requirement from Exhibit R106 to riprap all 2:1 slopes.
   d. The Applicant should provide additional information regarding the timeframe for use of the "Potential Soil Storage Area" and details for managing stormwater flow around the area" by 48" reinforced concrete pipes.
   e. The Applicant has several callouts referencing "48" Concrete Pipes". These are shown as concrete box culverts on the profile sheets. The Applicant should clarify if these structures are pipes or box culverts, and should provide a section detail for each size of box culvert.
   f. The Applicant should note on the plans that a field core and boot is required for the connection to existing drainage structures (Hovey Road).
   g. The Applicant should clarify the intent for the irregular contour lines, around most of the basin slopes.
   h. It appears the Applicant has removed the emergency overflows for several of the Sand Filters. The Applicant should explain the removal of emergency overflow locations for all basins.

9. We recommend that the Applicant address the following items related to the ***Utility Plans*** **(Sheets C4.01 – C4.08):**
   a. The Applicant should provide the inverts from the house connections into the sewer manholes.
   b. The Applicant should identify structures by location and offset.
   c. The Applicant should label the pressure pipe material to be used if sufficient separation cannot be achieved between water and sewer. The Town recommends C900 be used, not DICL as cement liming will corrode from gases. The Applicant should provide additional details including pipe and joint specifications and identify locations where this situation may occur.

10. We recommend that the Applicant address the following items related to the ***Sanitary Plan or Profile Plans*** **(Sheets C4.09 – C4.15) and Profile View Plans (Sheets C5.01 – C5.08):**
    a. The Applicant should label the material type, inverts, and slopes of the service pipes.

b. The Applicant should include roadway geometry including bearings and distances, radii, and tangent lengths such that the roadway can be constructed in the designed location.

11. We recommend that the Applicant address the following items related to the ***Profiles*** **(Sheets C5.09 – C5.24):**
    a. The Applicant should show the utilities in the Profile View Plans so that their location could be determined relative to the profiles and roadway alignments per Londonderry Subdivision Regulations (LSR) 4.16.C.1.i-ii.
    b. The Applicant should label each crossing location with less than 18" of vertical separation and each pipe with less than 10' of horizontal separation. Additionally, the Applicant should label the force main material to be used for these pipes.
    c. The Applicant should review all utilities for locations of conflict and insufficient cover.
    d. The Applicant shall identify all structures by station and offset.
    e. The Applicant shall provide existing and proposed centerline grades (C5.09 – C5.13).
    f. The Applicant should review the grades provided at the bottom of the profiles.
    g. The Applicant should note the proposed design speed so the proposed vertical geometry K values can be verified to meet safe stopping distance for the roadway design speed.
    h. Areas of insufficient separation or cover should be clearly labeled in per LSPR 4.14.b.2.d.-e. (Select locations of conflict and insufficient cover are noted below.)
        i. The water main is shown with only 0.8 feet of cover at STA 10+90 on C5.10, 1.6 feet of cover at 47+80 on C5.13, 1.3 feet of cover at STA 49+40 on C5.13.
        ii. There appears to be no separation between the sewer main and box culvert at STA 12+90 C5.10.
        iii. There appears to be no separation between the water main and box culvert at STA 28+30 C5.11.
        iv. The sewer main and water main are shown crossing directly through the box culvert at STA 50+70 on C5.14. If this is the design intent, the Applicant should provide details for the penetration of the box culvert, pipe insulation, pipe restraint, etc.
    i. The Applicant should show the section view of the box culvert crossing at STA 55+10 on C5.14.
    j. The Applicant should add a slope label for the Liberty Court roadway segment on Sheet C5.14. Additionally, the Applicant should better identify the proposed connection between Liberty Court and the Thornton Hill development. A station and elevation match equation should be provided to confirm the match points.
    k. The Applicant should provide all proposed profile and centerline labels, including slopes, in accordance with LSR 4.16.C.1.v and LSR 4.16.C.1.xii. Currently, the roadway slope for the Liberty Court segment is not labeled, and the centerline alignment is missing curve data, including radius.

12. We recommend that the Applicant address the following items related to the ***Details*** **(Sheets C7.01 – C7.09):**
    a. The Applicant should provide and clearly label typical sections for all roadways, paths, and maintenance access areas that meet Town of Londonderry Infrastructure standards.
    b. The Applicant should replace the curb sidewalk detail with the Town of Londonderry Infrastructure standard detail R103 (with the exception of the curbing material).
    c. The Applicant has provided a stone dust landing area for the path. The Applicant should consider revising the stone dust landing to include detectible warning elements.
    d. The Applicant should note whether the cross walk lines are intended to be thermoplastic or paint and clearly note the intended color that complies with MUTCD requirements.
    e. The Applicant should provide additional details related to proposed culverts and compatibility with wildlife.
    f. The Applicant should add details and notes to the Concrete Headwall (HW) with Wing Walls detail such as proposed slope, such that it can be confirmed that in accordance with Town of Londonderry Exhibit D106, the detail meets NHDOT headwall standard Plan requirements. [The detail provided uses a unique table of measurements that does not directly correlate to the NHDOT detail.] Additionally, a clarification shall be provided related to the use of proposed safety bars and the proposed configuration. The detail only shows horizontal safety bars, but the note indicates 12" O.C. "each way". Also, the detail references a "stone protection at headwall detail", however, the detail provided is for a Flared End Section.
    g. The Applicant should provide a detail for the proposed level spreader.
    h. The Applicant should include the wetland boardwalk crossing details (including the width) as part of the plan set.
    i. The Applicant has noted that the source of water details to be VHB. The construction details to be provided for water-related elements should be Pennichuck Water Works.
    j. Reference to Manchester Water Works details should be replaced with Pennichuck details.
    k. The Applicant should provide additional information about the Pond Outlet Control Detail. An underdrain cap is shown in the detail and caps of varying diameters are proposed for each structure. Please clarify how a 2" cap will be applied to a 6" underdrain and provide the intent.
    l. The following comments are related to the Outlet Structure Details:
        i. Per the Town of Londonderry *Typical Details for Site and Roadway Infrastructure,* the Typical Outlet Structure at Detention Basins should be used for all detention basins. The Application has written in the Drainage Report that the Sand Filters are intended to provide extended detention, so the Town's typical outlet structure should be used.
        ii. The Applicant should complete the Outlet Structure Chart and not reference "see plans."

iii. The Applicant should clarify if the Londonderry Typical Outlet Structures that are proposed will be single or double weir.

iv. The Applicant should reformat the dimension/elevation table of the Londonderry Typical Outlet Structure so that the column values are clear and ensure the dimensions listed match the elevations.

v. The Applicant should include Detention Basin 2 in the Londonderry Typical Outlet Structures Table.

vi. The Applicant has proposed to use the Londonderry Typical Outlet Structure for Detention Basin 1 but a different outlet structure without a control weir for the sand filters, which does not follow Town of Londonderry Infrastructure Standards. If the Applicant intends for the sand filters to be used only for treatment, then the drainage report and the plan set should clearly indicate that there is no intent for detention built into the sand filter design. The Applicant should demonstrate that the stormwater flowing to the sand filters meet Town of Londonderry stormwater design requirements.

vii. The Applicant should relocate the sewer notes off the outlet structure page to the sewer details sheet.

m. The Applicant has provided an area drain detail. The Applicant should note the location for the proposed use.

n. The Applicant has noted the option for 12" minimum separation between water and sewer at crossings. Since this is all new construction, the Applicant should identify any locations where this situation is proposed.

o. The Applicant should provide additional details regarding the Simulated Stream Bed Material shown on the Box Culvert Sections.

13. We recommend that the Applicant address the following items related to the ***Drainage Report*****:**

a. The Applicant should provide drainage pipes with velocities between 2 feet per second and a maximum velocity of 10 feet per second per LSPR 3.07.g.2.

b. The Applicant should provide a minimum of 12 inches of free board **to the minimum elevation of embankment** for all basins and ponds in the 50-year storm analysis per LSPR 3.07.b.10.

c. The Applicant has not taken into account the elevation of the emergency overflow berm in Table 6 for the maximum storage height of the basins. One foot minimum of freeboard should be provided from the lowest elevation of the basin wall. Sufficient storage has not been provided for almost all basins.

d. The Applicant should provide the BMP worksheets for the Filterras (MTD-1-4). The Applicant should provide detailed design criteria for these treatment devices including subcatchment areas. The Applicant should comment as to why collection of roadway stormwater was not integrated into the cross pipe at station 4+50. Additionally, the Applicant should clearly demonstrate that these structures will not overflow into Pillsbury Road.

e. The Applicant should include all pipes in the Pipe Summary Table per LSPR 3.07.b.4. For example, the pipe from OCS #9 to FES #900 and other pond inlet and outlet pipes are missing.

f. The Applicant should provide evidence that pipes will not be submerged in the design storm per LSPR 3.07.c.1. It appears likely that some pipes are operating under more than full flow conditions. For example, the grate of the outlet control structure at sand filter #9 is 445.50' but the peak elevation is 447.07' in the 25-year storm.

g. The Applicant should provide grate capacity calculations for the outlet control structure.

h. The Applicant should provide the hydrographs associated with design storm.

i. The Applicant has written in the Drainage Report that the sand filters are used for extended detention. The Applicant should clarify how the sand filters will meet LSPR requirements for detention. For example, sand filter #9 has a peak elevation of 447.07' in the 25-year storm but the grate of the outlet control structure is 445.50', so the flow is not being detained.

j. The Applicant should revise the Tc line of PR-17. It currently is running over the proposed mound.

k. The Applicant should coordinate the references to infiltration rate in the report. Section 4 lists the infiltration rate as 2.5 inches per hour through the sand filters, but the HydroCAD model uses 10 inches per hour. Additionally, the Applicant should provide data or justification for the selected design infiltration rate that aligns with Alteration of Terrain's rules found at Env-Wq 1500.

l. In the Review 2 letter dated July 9, 2025 and subsequent review meetings for 36 Pillsbury Road, the Town has asked the Applicant to provide evidence that the culverts on Pillsbury Road are in good condition to receive flow from the project site. The pipe condition evaluation information was not included in the package received for review.

Board Action Items:

The following waiver should be considered:

The Applicant has requested a **waiver** from LSR 3.09.R.3., which requires 6% maximum roadway grade, however, based upon the information provided, it appears as if the waiver does not meet the waiver criteria outlined in the Regulations.

HOYLE TANNER

Trusted Experts | Innovative Results

TRAFFIC REVIEW MEMORANDUM

To: Ms. Kellie Caron
Assistant Town Manager &
Director of Economic Development

CC: Mr. John Trottier, PE
Division of Engineering &
Environmental Services

From: Alyssa Smith, EI, RSP1
Stephen B. Haas, PE, PTOE

Date: December 2, 2025

Re: Traffic Impact Study
Response to Comments
Proposed Residential Development
36 Pillsbury Road
Londonderry, New Hampshire

Applicant: Procopio Enterprises, LLC

Hoyle, Tanner & Associates (Hoyle Tanner) has been retained by the Town of Londonderry, New Hampshire to review the Traffic Impact Analysis (TIA) prepared by Vanasse Hangen Brustlin, Inc. (VHB) for the proposed 250 unit Residential Development at 36 Pillsbury Road, which is within the Woodmont Commons Planned Unit Development (PUD). The following comments are based upon that Response to Comments Memo with bullet numbers corresponding to Hoyle Tanner's review letter dated August 19, 2025.

Comment 1: Comment has been addressed; no further action required.

Comment 2: The Applicant notes that the interior trails are recreational and will be made of compacted crushed gravel, and that no sidewalk will be provided along Pillsbury Road, as noted in the alternative standards in the Compliance Alternative (CA) approved by the Planning Board in December 2024.

Comment 3: Comment has been addressed; no further action required.

Comment 4: As discussed at the 12/2/25 Traffic Coordination meeting with Procopio and the Town, it is anticipated that a condition of Planning Board approval will be that a new Developers Agreement is created stipulating that the 36 Pillsbury Development shall place funds in an escrow account equal to the anticipated construction cost for a right turn slip lane improvement at the Gilcrest/Pillsbury intersection, to be used for future full intersection improvements to be determined at a later date. The Applicant should coordinate with the Town to implement this condition, as required.

Comment 5: The Applicant is not proposing mitigation at this time but will continue to monitor intersection volumes and operations as part of the Woodmont Commons PUD. However, it is recommended that the Applicant place additional funds in the escrow account, noted in Comment 4, to allow for future mitigation at this intersection such as additional

northbound left turn storage capacity or a traffic signal if/when warranted in the future.

Comment 6: Comment has been addressed; no further action required.

Design Review Committee

Conservation Commission Comment Sheet

Project: 36 Pillsbury Rd CUP + DRC
Location: Map 10 Lot 42
Date: 4-8-25

Please return comments by .

Please return comments to Michael Bazegian mbazegian@londonderrynh.org **Thank You.**

	Yes	No	N/A
Are there wetlands on the site?	☑	☐	☐
Are they high quality wetlands?	☐	☐	☐
Will they be impacted?	☐	☐	☐
Could the impacts be mitigated?	☐	☐	☐
Are there other important natural resources?	☐	☐	☐
Will they be impacted?	☐	☐	☐
Could the impacts be mitigated?	☐	☐	☐

Comments:

- Recommend removal of 5 driveway from overlay district buffer -

- Support granting CUP subject to comments above on DRC.

Submitted by: MBados Date: 4/8/25

Outlook

Fw: 36 Pillsbury Road - Procopio Site Plan

From Nick Codner <ncodner@londonderrynh.gov>
Date Thu 4/10/2025 11:17 AM
To Kellie Caron <kcaron@londonderrynh.gov>
Cc Alecia LaFlamme <alaflamme@londonderrynh.gov>

From: Nick Codner <ncodner@londonderrynh.gov>
Sent: Friday, April 4, 2025 5:01 PM
To: Laura J. Gandia <lgandia@devinemillimet.com>
Subject: Re: 36 Pillsbury Road - Procopio Site Plan

Hi Laura,

The Londonderry Conservation District Ordinance was adopted by the Town Council on 04/23/01.
If 36 Pillsbury Rd. existed as a buildable residential lot when the ordinance was adopted, then per LZO 2.6.3..6.2
it is exempt from LZO 2.6.3.

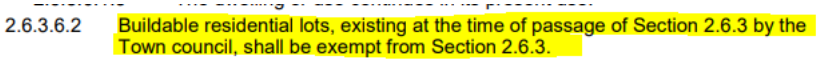
Thanks,

Nick

From: Laura J. Gandia <lgandia@devinemillimet.com>
Sent: Wednesday, April 2, 2025 3:01 PM
To: Nick Codner <ncodner@londonderrynh.gov>
Cc: John Trottier <jrtrottier@londonderrynh.gov>; Kellie Caron <kcaron@londonderrynh.gov>
Subject: RE: 36 Pillsbury Road - Procopio Site Plan

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.
Hi Nick –

I had a question about the applicability of the wetland conservation district (WCD) on 36 Pillsbury Road. As you are aware, the Londonderry Zoning Ordinance (2011 – which is the version that governs the PUD) provides:


2.6.3.6.2 Buildable residential lots, existing at the time of passage of Section 2.6.3 by the Town council, shall be exempt from Section 2.6.3.

Our lot 36 Pillsbury Road existed as a residential buildable lot prior to the enactment of the WCD. We believe that this property would exempt from the provisions of the WCD per the LZO. We did as a part of our site plan application submit a conditional use permit, but we are now questioning whether one is necessary based on section 2.6.3.6.2.

Coud you please opine?

Thanks,

Laura

Laura J. Gandia
Of Counsel
111 Amherst Street
Manchester, NH 03101
p. 603-695-8722

DEVINE MILLIMET
ATTORNEYS AT LAW

Proudly serving our clients, colleagues and communities throughout New England since 1947.

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The incidence of fraud involving wired funds is on the rise. Never rely solely on emailed wiring instructions from anyone. Devine Millimet will not ask you to wire funds to us or to a third party without separately confirming the relevant wiring instructions with you by telephone. Once that telephonic confirmation has occurred, we will not change the wiring instructions. If you receive an email which appears to be from our Firm and which requests that you wire funds but have not received final telephonic confirmation from us, or which otherwise seems suspicious, then please contact us by telephone at 603-669-1000 before transferring any funds.

Londonderry Heritage/Historic District Commission Meeting
March 27, 2025 - 7:00 P.M.
MOOSE HILL CONFERENCE ROOM
Draft Minutes

A. **Call to Order:** Krys Kenney called the meeting to order at 7:00 pm. The following were present: Commissioners Krys Kenney, David Colglazier, Art Rugg, John Mahon, Sue Joudrey, Ex-Officio Ted Combes, and Alternate Commissioner David Ellis. Absent: Commissioner Krysten Endyke, Alternate Commissioners Megan Thompson, Jim Butler, and Laura Schenkman. The Chair appointed D. Ellis in place of K. Endyke. Staff: Kristan Farr, Town Planner.

B. **Approval of minutes from the prior meeting:** A. Rugg made a motion to approve the minutes of the January 23, 2025, meeting; D. Colglazier seconded. The motion passed 5-0 with 2 abstentions (K. Kenney; T. Combes).

C. **Design/Formal Review Applications:**

A. **Application for design review of a site plan for a 20,000 square foot building and a 60,000 square foot manufacturing building along with associated site improvements. 5 Kitty Hawk Landing (Map 17 Lot 5-5) zoned Industrial I (IND-I) and The Village on Technology Hill Planned Unit Development (PUD). Londonderry Holdings, LLC (owner & applicant)**

Presented by Tony Nasaka, Stone River Associates, and Nick Golan, TF Moran. The 20,000 sq. Ft. building is for Onpoint Systems; the 60,000 sq. Ft. facility is for light manufacturing and may be subdivided for several tenants. Both buildings have a more contemporary design with accents that carry over from the previously presented residential buildings of The Village on Technology Hill. The buildings have a stone base like all of the other buildings in this development. The façades of the buildings are panelized reveal siding with an almond or similar coloring. The large glass entries have a wood-like material to achieve a warmer, natural feel. Large upper windows provide natural light and views of the surrounding area for employees. The parapet along the roof ties into the residential buildings and hides the solar panels and the mechanicals. The rears of these buildings are similarly designed to provide an attractive view to those approaching them from that direction. The landscape plan includes a wide variety of trees and scrubs both for aesthetic and screening purposes. The signage plan has yet to be finalized but will include monument signs for each building. The lighting plan is dark-sky compliant with a limited number of pole-mounted lights and wall packs.

Action: Recommended for approval as presented.

B. **Application for design review of a site plan and conditional use permit for 250 single family cottage court style dwellings along with associated site improvements. 36 Pillsbury Road (Map 10, Lot 42) zoned Agricultural Residential (AR-1) and Woodmont Commons Planned Unit Development (PUD). Procopio Companies (Applicant) & Pillsbury Realty Development, LLC (Owner).**

Presented by Will Nuccio, Procopio; Erik Bednarek, VHB; Kieth Case, Utile; Kevin Smith, Pillsbury Realty; and Laura Gandia, Attorney, Devine Millimet. This is a development of 250 cottage style homes with either 1, 2, or 3

bedrooms and in about 5 differing styles. These are intended to be for rent and the entire property will remain under the management of Procopio once construction is completed. The landscape plan includes preserving over 1000 apple trees and plantings of many other trees on the property. Architecture on the cottage exteriors vary depending on the size and style of each building but reflect back on traditional New England heritage. Clusters of buildings surround large central common areas. The building color palette includes 7 colors from colonial white to slate grey. The club house and welcome building will have slightly more contemporary looks with crisper design features and darker colors. Other amenities include playgrounds, a pool, and a multi-purpose (tennis/pickle ball court). Lighting is low-key and intentionally minimalistic so as to not disturb abutters. Signage will be primarily wayfinding in nature.

Action: Recommended for approval as presented.

D. **Other business:**

David Ellis detailed the commission on his trip with Nick Codner, Londonderry's Chief Building Inspector, to 2 Litchfield Road. They met with the owner, Richard Flier, and his attorney and were allowed to examine the exterior of the building. Required maintenance included needed painting of at least three sides of the building and repointing of the chimney. D. Ellis will send a letter to staff for review and forwarding to Mr. Flier. D. Ellis and the building inspector were not allowed access to the interior of 2 Litchfield Road. The general consensus of the commission was that this access should not be denied per its understanding of the historic preservation easement. This matter is under discussion between the town's attorney and that of Mr. Flier. The Chair will send a letter to staff requesting a resolution of this legal discussion to allow the designated commissioner and the building inspector access to the interior of 2 Litchfield Road.

E. **Public input:** None

F. **Adjournment:** At about 8:30, D. Colglazier motioned to adjourn; T. Combes seconded. The motion passed 7-0.

Site Plans

Issued for	**Permitting**
Date Issued	**October 14, 2025**
Latest Issue	**February 12, 2026**

Rosecrans Drive at Thornton Hill

44 Pillsbury Road
Londonderry, NH 03053



Sheet Index

No.	Drawing Title	Latest Issue
C1.00	Legend and General Notes	2/12/2026
C1.01	Condominium Plan	2/12/2026
C2.00	Overall Site Plan	2/12/2026
C2.01-C2.03	Layout and Materials Plans	2/12/2026
C2.04	Sight Distance Plan	2/12/2026
C2.05	Sight Distance Plan and Profile	2/12/2026
C2.06	Vehicle Access Plan	2/12/2026
C3.00-C3.03	Grading and Drainage Plans	2/12/2026
C4.00-C4.03	Utility Plans	2/12/2026
C5.01-C5.03	Roadway Plan and Profile Plans	2/12/2026
C6.00-C6.03	Erosion Control Plans	2/12/2026
C7.01-C7.08	Site Detail Plans	2/12/2026
C8.00	Overall Sequencing Plan	2/12/2026
C9.01	Inspection & Maintenance Notes	2/12/2026
C9.02	Inspection & Maintenance Logs	2/12/2026
L1.00	Overall Landscape Plan	2/12/2026
L1.01-L1.03	Landscape Plans	2/12/2026
L2.01	Landscape Details	2/12/2026

Reference Drawings

No.	Drawing Title	Latest Issue
Sv1.0	Existing Conditions Master Plan	February 12, 2026
Sv1.1-Sv1.3	Existing Conditions Plan of Land	February 12, 2026
A1.00-A3.00	Architectural Drawings	February 6, 2026
L-1	Site Photometric Plan	February 10, 2026

Owner

Pillsbury Realty Develop LLC
100 Ferry Street
Hudson, NH 03051

Applicant

Procopio Enterprises, LLC
35 Village Road
7th Floor (702)
Middleton, MA 01949

vhb.com

vhb

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Bedford, NH 03110
603.391.3900

Civil Engineer/Landscape Architect
VHB
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Architect
Utile
115 Kingston Street
Boston, MA 02111
617.423.7200

Surveyor
VHB
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Northern Black Racer

(New Hampshire state-threatened species)

NHFG Wildlife Biologist Contacts:
Melissa Winters 603-479-1129 and Brendan Clifford 603-944-0885

- **Emerge from hibernacula in April, Basking April - August**
- **Hatchlings emerge August - September, Return to hibernacula mid-September - mid-October**
- **Found in a variety of habitats but prefer early successional and sandy (sand pit) sites.**





- Solid black with a white thrat and chin
- Slender with glossy scales, 3-6 ft. long
- Hatchlings are very small and patterned





Northern black racers are protected by state laws. It is illegal to capture, harass or harm these species, including their nests. Handle ONLY if necessary to move out of harms way. Move to the nearest location in the direction they were moving and contact NHFG. Do not disturb nests. Fis 1401.03 (a) No person shall take or possess a black racer (Coluber constrictor)...or any egg or part thereof.

Report sightings in accordance with NHFG permit conditions. Contact NHFG Wildlife Biologist Melissa Winters 603-479-1129 (cell) and Brendan Clifford 603-944-0885 (group text preferred) if a turtle is observed nesting or a nest site is suspected within the project area. Please report promptly, noting specific location, project site and date – Photographs strongly encouraged to be included with report.

NEW HAMPSHIRE
SPECIES OF CONCERN

WOOD TURTLE

Report Sightings: Contact Wildlife Biologist Josh Megyesy at (603) 271 – 1125 or the Wildlife Division at (603) 271 – 2461. Observation reports can be sent to RAARP@wildlife.nh.gov. Photographs and exact locations are strongly encouraged.



Specific Information:
- Adults are 5 – 8 inches long.
- Neck and front limbs are orange.
- Associated with streams and rivers where they hibernate. Use surrounding fields, forests, and floodplains extensively during active period.
- Turtles are frequently concealed by leaves and undergrowth and may not be easily visible.
- Turtles are most active from April 15 – October 15.
- During nesting season (May 15 – July 15) turtles are attracted to disturbed ground.





This species is protected under Fis 1400. Thank you for reporting any observations.

PLEASE DO NOT DISTURB OR HANDLE WILDLIFE

Assessor's Map: 10
Lot: 15

OWNER'S SIGNATURE

Signed by: Kevin Smith
1B4EADDCA6B2434...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No.13672
LICENSED
PROFESSIONAL ENGINEER
2/12/2026

\\VHB.COM\GBLPRO\BEDFORD\53140.00 36 PILLSBURY RD LONDOND\CAD\LDV\CONCEPTS\44 PILLSBURY RD\CAD\LDV\PLANSETS\53140 44-COV
12 February 2026

VHB Project : 53140.00 44 Pillsbury Road
Issued for : Permitting 2/12/2026

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Concepts\44 Pillsbury Rd\cad\ld\Planset\5314044-LG.dwg

Legend

Exist.	Prop.	
		PROPERTY LINE
		PROJECT LIMIT LINE
		RIGHT-OF-WAY/PROPERTY LINE
		EASEMENT
		BUILDING SETBACK
		PARKING SETBACK
10+00	10+00	BASELINE
		CONSTRUCTION LAYOUT
		ZONING LINE
		TOWN LINE
		LIMIT OF DISTURBANCE
WL	WL	WETLAND LINE WITH FLAG
		FLOODPLAIN
BLS	BLS	BORDERING LAND SUBJECT TO FLOODING
BZ	BZ	WETLAND BUFFER ZONE
NDZ	NDZ	NO DISTURB ZONE
200'RA	200'RA	200' RIVERFRONT AREA
		SWALE
		GRAVEL ROAD
EOP	EOP	EDGE OF PAVEMENT
BB	BB	BITUMINOUS BERM
BC	BC	BITUMINOUS CURB
CC	CC	CONCRETE CURB
CG	CG	CURB AND GUTTER
CC	ECC	EXTRUDED CONCRETE CURB
CC	MCC	MONOLITHIC CONCRETE CURB
CC	PCC	PRECAST CONC. CURB
SGE	SGE	SLOPED GRAN. EDGING
VGC	VGC	VERT. GRAN. CURB
		LIMIT OF CURB TYPE
		SAWCUT
		BUILDING
EN	EN	BUILDING ENTRANCE
LD	LD	LOADING DOCK
		BOLLARD
D	D	DUMPSTER PAD
		SIGN
		DOUBLE SIGN
		STEEL GUARDRAIL
		WOOD GUARDRAIL
		PATH
		TREE LINE
		WIRE FENCE
		FENCE
		STOCKADE FENCE
		STONE WALL
		RETAINING WALL
		STREAM / POND / WATER COURSE
		DETENTION BASIN
		HAY BALES
		SILT FENCE
		SILT SOCK / STRAW WATTLE
4	4	MINOR CONTOUR
20	20	MAJOR CONTOUR
10	10	PARKING COUNT
	C10	COMPACT PARKING STALLS
DYL	DYL	DOUBLE YELLOW LINE
SL	SL	STOP LINE
		CROSSWALK
		ACCESSIBLE CURB RAMP
		ACCESSIBLE PARKING
VAN	VAN	VAN-ACCESSIBLE PARKING

Exist.	Prop.	
		CONCRETE
		HEAVY DUTY PAVEMENT
		BUILDINGS
		RIPRAP
		CONSTRUCTION EXIT
27.35 TC×	27.35 TC×	TOP OF CURB ELEVATION
26.85 BC×	26.85 BC×	BOTTOM OF CURB ELEVATION
132.75 ×	132.75 ×	SPOT ELEVATION
45.0 TW 38.5 BW	45.0 TW× 38.5 BW	TOP & BOTTOM OF WALL ELEVATION
		BORING LOCATION
		TEST PIT LOCATION
MW	MW	MONITORING WELL
UD	UD	UNDERDRAIN
12"D	12"D	DRAIN
6"RD	6"RD	ROOF DRAIN
12"S	12"S	SEWER
FM	FM	FORCE MAIN
OHW	OHW	OVERHEAD WIRE
6"W	6"W	WATER
4"FP	4"FP	FIRE PROTECTION
	2"DW	DOMESTIC WATER
G	G	GAS
E	E	ELECTRIC
STM	STM	STEAM
T	T	TELEPHONE
FA	FA	FIRE ALARM
CATV	CATV	CABLE TV
		CATCH BASIN CONCENTRIC
		CATCH BASIN ECCENTRIC
		DOUBLE CATCH BASIN CONCENTRIC
		DOUBLE CATCH BASIN ECCENTRIC
		GUTTER INLET
		DRAIN MANHOLE CONCENTRIC
		DRAIN MANHOLE ECCENTRIC
		TRENCH DRAIN
		PLUG OR CAP
CO	CO	CLEANOUT
		FLARED END SECTION
		HEADWALL
S	S	SEWER MANHOLE CONCENTRIC
S	S	SEWER MANHOLE ECCENTRIC
CS	CS	CURB STOP & BOX
WV	WV	WATER VALVE & BOX
TSV	TSV	TAPPING SLEEVE, VALVE & BOX
	HYD	FIRE DEPARTMENT CONNECTION
HYD	HYD	FIRE HYDRANT
WM	WM	WATER METER
PIV	PIV	POST INDICATOR VALVE
W	W	WATER WELL
GG	GG	GAS GATE
GM	GM	GAS METER
EMH	EMH	ELECTRIC MANHOLE
EM	EM	ELECTRIC METER
		LIGHT POLE
TMH	TMH	TELEPHONE MANHOLE
T	T	TRANSFORMER PAD
		UTILITY POLE
		GUY POLE
		GUY WIRE & ANCHOR
HH	HH	HAND HOLE
PB	PB	PULL BOX
		MATCHLINE

Abbreviations

General

ABAN	ABANDON
ACR	ACCESSIBLE CURB RAMP
ADJ	ADJUST
APPROX	APPROXIMATE
BIT	BITUMINOUS
BS	BOTTOM OF SLOPE
BWLL	BROKEN WHITE LANE LINE
CONC	CONCRETE
DYCL	DOUBLE YELLOW CENTER LINE
EL	ELEVATION
ELEV	ELEVATION
EV	ELECTRIC VEHICLE CHARGING SPACE
EX	EXISTING
FDN	FOUNDATION
FFE	FIRST FLOOR ELEVATION
GRAN	GRANITE
GTD	GRADE TO DRAIN
LA	LANDSCAPE AREA
LOD	LIMIT OF DISTURBANCE
MAX	MAXIMUM
MIN	MINIMUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PERF	PERFORATED
PROP	PROPOSED
REM	REMOVE
RET	RETAIN
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
SWEL	SOLID WHITE EDGE LINE
SWLL	SOLID WHITE LANE LINE
TS	TOP OF SLOPE
TYP	TYPICAL

Utility

CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
DCB	DOUBLE CATCH BASIN
DMH	DRAIN MANHOLE
CIP	CAST IRON PIPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
FM	FORCE MAIN
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
GI	GUTTER INLET
GT	GREASE TRAP
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HH	HANDHOLE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT ELEVATION
I=	INVERT ELEVATION
LP	LIGHT POLE
MES	METAL END SECTION
PIV	POST INDICATOR VALVE
PWW	PAVED WATER WAY
PVC	POLYVINYLCHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
R=	RIM ELEVATION
RIM=	RIM ELEVATION
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UG	UNDERGROUND
UP	UTILITY POLE

Notes

General

1. THE PURPOSE OF THESE PLANS IS TO DEPICT THE PROPOSED SITE DEVELOPMENT OF 60 SINGLE FAMILY CONDOMINIUM HOMES (3 BEDROOMS).
2. CONTRACTOR SHALL NOTIFY "DIG-SAFE" (811 OR 1-888-344-7233) AT LEAST 72 HOURS BEFORE EXCAVATING.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
4. ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS AND WALKWAYS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).
5. AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE 6 INCHES LOAM AND SEED.
6. WITHIN THE LIMITS OF THE BUILDING FOOTPRINT, THE SITE CONTRACTOR SHALL PERFORM EARTHWORK OPERATIONS REQUIRED UP TO SUBGRADE ELEVATIONS.
7. WORK WITHIN THE LOCAL RIGHTS-OF-WAY SHALL CONFORM TO LOCAL MUNICIPAL STANDARDS. WORK WITHIN STATE RIGHTS-OF-WAY SHALL CONFORM TO THE LATEST EDITION OF THE STATE HIGHWAY DEPARTMENTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
8. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, AND FIRE HYDRANTS, WITHOUT APPROPRIATE PERMITS.
9. TRAFFIC SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
10. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
11. IN THE EVENT THAT SUSPECTED CONTAMINATED SOIL, GROUNDWATER, AND OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND SHALL NOTIFY THE OWNER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.
12. CONTRACTOR SHALL PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE AND SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS.
13. DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
14. CONTRACTOR SHALL CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND SHALL BE RESPONSIBLE TO REPAIR RESULTING DAMAGES, IF ANY, AT NO COST TO OWNER.
15. THIS PROJECT DISTURBS MORE THAN ONE ACRE OF LAND AND FALLS WITHIN THE NPDES CONSTRUCTION GENERAL PERMIT (CGP) PROGRAM AND EPA JURISDICTION. PRIOR TO THE START OF CONSTRUCTION CONTRACTOR IS TO FILE A CGP NOTICE OF INTENT WITH THE EPA AND PREPARE A STORMWATER POLLUTION PREVENTION PLAN IN ACCORDANCE WITH THE NPDES REGULATIONS. CONTRACTOR SHALL CONFIRM THE OWNER HAS ALSO FILED A NOTICE OF INTENT WITH THE EPA.

Utilities

1. THE UTILITY COMPANIES SERVICING THE PROJECT AREA ARE:

   A. WATER: PENNICHUCK WATER WORKS
   B. SEWER: LONDONDERRY DEPARTMENT OF PUBLIC WORKS
   C. ELECTRIC: EVERSOURCE
   D. TELEPHONE: CONSOLIDATED COMMUNICATIONS
   E. CABLE TV: COMCAST

2. THE LOCATIONS, SIZES, AND TYPES OF EXISTING UTILITIES ARE SHOWN AS AN APPROXIMATE REPRESENTATION ONLY. THE OWNER OR IT'S REPRESENTATIVE(S) HAVE NOT INDEPENDENTLY VERIFIED THIS INFORMATION AS SHOWN ON THE PLANS. THE UTILITY INFORMATION SHOWN DOES NOT GUARANTEE THE ACTUAL EXISTENCE, SERVICEABILITY, OR OTHER DATA CONCERNING THE UTILITIES, NOR DOES IT GUARANTEE AGAINST THE POSSIBILITY THAT ADDITIONAL UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE PLANS. PRIOR TO ORDERING MATERIALS AND BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND DETERMINE THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF THE POINTS OF CONNECTIONS TO EXISTING UTILITIES AND, SHALL CONFIRM THAT THERE ARE NO INTERFERENCES WITH EXISTING UTILITIES AND THE PROPOSED UTILITY ROUTES, INCLUDING ROUTES WITHIN THE PUBLIC RIGHTS OF WAY.
3. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, OR EXISTING CONDITIONS DIFFER FROM THOSE SHOWN SUCH THAT THE WORK CANNOT BE COMPLETED AS INTENDED, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT AND CONTRACTOR'S FAILURE TO NOTIFY PRIOR TO PERFORMING ADDITIONAL WORK RELEASES OWNER FROM OBLIGATIONS FOR ADDITIONAL PAYMENTS WHICH OTHERWISE MAY BE WARRANTED TO RESOLVE THE CONFLICT.
4. SET CATCH BASIN RIMS, AND INVERTS OF SEWERS, DRAINS, AND DITCHES IN ACCORDANCE WITH ELEVATIONS ON THE GRADING AND UTILITY PLANS.
5. RIM ELEVATIONS FOR DRAIN AND SEWER MANHOLES, WATER VALVE COVERS, GAS GATES, ELECTRIC AND TELEPHONE PULL BOXES, AND MANHOLES, AND OTHER SUCH ITEMS, ARE APPROXIMATE AND SHALL BE SET/RESET AS FOLLOWS:

   A. PAVEMENTS AND CONCRETE SURFACES: FLUSH
   B. ALL SURFACES ALONG ACCESSIBLE ROUTES: FLUSH
   C. LANDSCAPE, LOAM AND SEED, AND OTHER EARTH SURFACE AREAS: ONE INCH ABOVE SURROUNDING AREA AND TAPER EARTH TO THE RIM ELEVATION.

5. THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY, THE RESPECTIVE UTILITY COMPANY (TELEPHONE, ELECTRIC, FIRE ALARM, ETC.). FINAL DESIGN LOADS AND LOCATIONS TO BE COORDINATED WITH OWNER AND ARCHITECT.
6. CONTRACTOR SHALL MAKE ARRANGEMENTS FOR AND SHALL BE RESPONSIBLE FOR PAYING FEES FOR POLE RELOCATION AND FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, FIRE ALARM, AND ANY OTHER PRIVATE UTILITIES, WHETHER WORK IS PERFORMED BY CONTRACTOR OR BY THE UTILITIES COMPANY.

7. UTILITY PIPE MATERIALS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED ON THE PLAN:

   A. WATER PIPES SHALL BE CEMENT LINED DUCTILE IRON CLASS 52
   B. SANITARY SEWER PIPES SHALL BE POLYVINYL CHLORIDE SDR 35 MINIMUM (PVC) SEWER PIPE
   C. STORM DRAINAGE PIPES SHALL BE REINFORCED CONCRETE PIPE OR ADS N12 PIPE

8. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR AND SHALL FURNISH EXCAVATION, INSTALLATION, AND BACKFILL OF ELECTRICAL FURNISHED SITEWORK RELATED ITEMS SUCH AS PULL BOXES, CONDUITS, DUCT BANKS, LIGHT POLE BASES, AND CONCRETE PADS. SITE CONTRACTOR SHALL FURNISH CONCRETE ENCASEMENT OF DUCT BANKS IF REQUIRED BY THE UTILITY COMPANY AND AS INDICATED ON THE DRAWINGS.
9. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN.) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS AND LOCAL MUNICIPAL STANDARDS. FOR MANHOLES THAT ARE 20 FEET IN DEPTH AND GREATER, THE MINIMUM DIAMETER SHALL BE 5 FEET.

Layout and Materials

1. DIMENSIONS ARE FROM THE FACE OF CURB, FACE OF BUILDING, FACE OF WALL, AND CENTER LINE OF PAVEMENT MARKINGS, UNLESS OTHERWISE NOTED.
2. CURB RADII ARE 3 FEET UNLESS OTHERWISE NOTED.
3. CURBING SHALL BE CAPE COD BERM (CCB) WITHIN THE SITE UNLESS OTHERWISE INDICATED ON THE PLANS.
4. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND DETAILS CONTIGUOUS TO THE BUILDING, INCLUDING SIDEWALKS, RAMPS, BUILDING ENTRANCES, STAIRWAYS, UTILITY PENETRATIONS, CONCRETE DOOR PADS, COMPACTOR PAD, LOADING DOCKS, BOLLARDS, ETC.
5. PROPOSED BOUNDS AND ANY EXISTING PROPERTY LINE MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A LICENSED LAND SURVEYOR (LLS).
6. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING PAVEMENT ELEVATIONS AT INTERFACE WITH PROPOSED PAVEMENTS, AND EXISTING GROUND ELEVATIONS ADJACENT TO DRAINAGE OUTLETS TO ASSURE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED FACILITIES.

Document Use

1. THESE PLANS AND CORRESPONDING CADD DOCUMENTS ARE INSTRUMENTS OF PROFESSIONAL SERVICE, AND SHALL NOT BE USED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN FOR WHICH IT WAS CREATED WITHOUT THE EXPRESSED, WRITTEN CONSENT OF VHB. ANY UNAUTHORIZED USE, REUSE, MODIFICATION OR ALTERATION, INCLUDING AUTOMATED CONVERSION OF THIS DOCUMENT SHALL BE AT THE USER'S SOLE RISK WITHOUT LIABILITY OR LEGAL EXPOSURE TO VHB.
2. CONTRACTOR SHALL NOT RELY SOLELY ON ELECTRONIC VERSIONS OF PLANS, SPECIFICATIONS, AND DATA FILES THAT ARE OBTAINED FROM THE DESIGNERS, BUT SHALL VERIFY LOCATION OF PROJECT FEATURES IN ACCORDANCE WITH THE PAPER COPIES OF THE PLANS AND SPECIFICATIONS THAT ARE SUPPLIED AS PART OF THE CONTRACT DOCUMENTS.
3. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SCALED TO THEIR ACTUAL DIMENSIONS OR LOCATIONS ON THE DRAWINGS. THE CONTRACTOR SHALL REFER TO THE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
4. ALL APPROVED PROJECT PLANS WILL BE ON FILE AT THE TOWN OF LONDONDERRY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT.

Construction Sequence

1. SURVEY AND STAKE LIMITS OF CLEARING AND GRUBBING.
2. INSTALL SILT FENCING, STRAW BALES, CONSTRUCTION EXITS, ETC. PRIOR TO START OF CONSTRUCTION, TO BE MAINTAINED UNTIL COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
3. CLEAR AND GRUB ALL AREAS TO BE DISTURBED BY CONSTRUCTION AND PERFORM DEMOLITION OPERATIONS.
4. REPAIR, CLEAN, AND REPLACE ANY SEDIMENT CONTROLS DAMAGED DURING AND/OR AFTER RAINFALL EVENTS.
5. STRIP LOAM AND PAVEMENT, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK AND STOCKPILE EXCESS MATERIAL.
6. CONSTRUCT TEMPORARY SEDIMENTATION BASINS AS REQUIRED.
7. PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE.
8. PERFORM PRELIMINARY SITE GRADING AND CONSTRUCT TEMPORARY DIVERSION SWALES AS REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT THE PRELIMINARY GRADING ALLOWS SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS TO FLOW TOWARDS THE TEMPORARY SEDIMENTATION BASINS.
9. PREPARE BUILDING PAD TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
10. INSTALL SEWER SYSTEM, DRAINAGE SYSTEM, AND OTHER UTILITIES IN ACCORDANCE WITH THE PLANS AND DETAILS.
11. INSTALL STRAW BALES AND INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED, IN ACCORDANCE WITH THE DETAILS.
12. PERFORM FINAL/FINE GRADING INCLUDING SLOPE STABILIZATION BLANKETS.
13. PERFORM ALL REMAINING SITE CONSTRUCTION. (I.E. BUILDING AND PAVEMENT AREAS).
14. LOAM AND SEED ALL DISTURBED AREAS.
15. REMOVE TEMPORARY EROSION CONTROL MEASURES, SILT FENCE, ETC. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
16. CLEAN ALL DRAINAGE BASINS, STRUCTURES, PIPES, AND SUMPS WITHIN THE PROJECT LIMITS OF ALL SILT AND DEBRIS.

Phasing

1. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO NHDES, AND THE ENGINEER, A DETAILED PHASING AND CONSTRUCTION SEQUENCING PLAN THAT SHOWS THE PHASED AREAS OF CONSTRUCTION AND TEMPORARY EROSION CONTROL MEASURES TO BE IMPLEMENTED.
2. TEMPORARY ROAD CLOSURE BARRICADES TO BE PLACED AT THE LIMITS OF EACH PHASE, AND WILL BE MOVED TO THE END OF THE SUCCESSIVE PHASE WHEN THAT PHASE IS COMPLETED.

Demolition

1. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING MANMADE SURFACE FEATURES WITHIN THE LIMIT OF WORK INCLUDING BUILDINGS, STRUCTURES, PAVEMENTS, SLABS, CURBING, FENCES, UTILITY POLES, SIGNS, ETC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS. REMOVE AND DISPOSE OF EXISTING UTILITIES, FOUNDATIONS AND UNSUITABLE MATERIAL BENEATH AND FOR A DISTANCE OF 10 FEET BEYOND THE PROPOSED BUILDING FOOTPRINT INCLUDING EXTERIOR COLUMNS.
2. EXISTING UTILITIES SHALL BE TERMINATED, UNLESS OTHERWISE NOTED, IN CONFORMANCE WITH LOCAL, STATE AND INDIVIDUAL UTILITY COMPANY STANDARD SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES.
3. CONTRACTOR SHALL DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.
4. THE DEMOLITION LIMITS DEPICTED IN THE PLANS IS INTENDED TO AID THE CONTRACTOR DURING THE BIDDING AND CONSTRUCTION PROCESS AND IS NOT INTENDED TO DEPICT EACH AND EVERY ELEMENT OF DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING THE DETAILED SCOPE OF DEMOLITION BEFORE SUBMITTING ITS BID/PROPOSAL TO PERFORM THE WORK AND SHALL MAKE NO CLAIMS AND SEEK NO ADDITIONAL COMPENSATION FOR CHANGED CONDITIONS OR UNFORESEEN OR LATENT SITE CONDITIONS RELATED TO ANY CONDITIONS DISCOVERED DURING EXECUTION OF THE WORK.
5. UNLESS OTHERWISE SPECIFICALLY PROVIDED ON THE PLANS OR IN THE SPECIFICATIONS, THE ENGINEER HAS NOT PREPARED DESIGNS FOR AND SHALL HAVE NO RESPONSIBILITY FOR THE PRESENCE, DISCOVERY, REMOVAL, ABATEMENT OR DISPOSAL OF HAZARDOUS MATERIALS, TOXIC WASTES OR POLLUTANTS AT THE PROJECT SITE. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY CLAIMS OF LOSS, DAMAGE, EXPENSE, DELAY, INJURY OR DEATH ARISING FROM THE PRESENCE OF HAZARDOUS MATERIAL AND CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE ENGINEER FROM ANY CLAIMS MADE IN CONNECTION THEREWITH. MOREOVER, THE ENGINEER SHALL HAVE NO ADMINISTRATIVE OBLIGATIONS OF ANY TYPE WITH REGARD TO ANY CONTRACTOR AMENDMENT INVOLVING THE ISSUES OF PRESENCE, DISCOVERY, REMOVAL, ABATEMENT OR DISPOSAL OF ASBESTOS OR OTHER HAZARDOUS MATERIALS.

Erosion Control

1. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT.
2. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF THE OCCURRENCE OF A STORM EVENT THAT PRODUCES 0.25 INCHES OR MORE OF RAIN WITHIN A 24-HOUR PERIOD, OR WITHIN 24 HOURS OF A SNOWMELT DISCHARGE FROM A STORM EVENT THAT PRODUCES 3.25 INCHES OR MORE OF SNOW IN A 24-HOUR PERIOD. THE CONTRACTOR SHALL ADDRESS DEFICIENCIES AND MAINTENANCE ITEMS WITHIN TWENTY-FOUR HOURS OF INSPECTION. CONTRACTOR SHALL PROPERLY DISPOSE OF SEDIMENT SUCH THAT IT DOES NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
3. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
4. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
5. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS FROM ENTIRE DRAINAGE AND SEWER SYSTEMS.

Existing Conditions Information

1. BASE PLAN: THE PROPERTY LINES SHOWN WITHIN THE "EXISTING CONDITIONS PLAN OF LAND" PLAN WERE DETERMINED BY AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, INC., IN SEPTEMBER 2024. THE TOPOGRAPHY AND PHYSICAL FEATURES ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED ON THE GROUND BY VHB, INC., DURING SEPTEMBER 2024.

   A. DELINEATION OF THE WETLANDS AND PLACEMENT OF THE FLAGS WAS PERFORMED BY: VHB, INC. IN SEPTEMBER AND OCTOBER 2024.
   B. FLAGS MARKING THE WETLANDS WERE LOCATED BY: VHB, INC. IN SEPTEMBER AND OCTOBER 2024.
   C. NO WETLANDS WERE IDENTIFIED ON THE 44 PILLSBURY ROAD PARCEL (SUBJECT PROPERTY) AND SHOWN ON THE ADJACENT 36 PILLSBURY ROAD PARCEL FOR REFERENCE.

2. TOPOGRAPHY: ELEVATIONS ARE BASED ON NAVD OF 1988.
3. PARCEL USES: USES SHOWN BELOW ARE BASED ON AVAILABLE PROPERTY CARD INFORMATION.
   EXISTING USE: VACANT LAND
   PROPOSED USE: RESIDENTIAL DEVELOPMENT

Waivers/Variances

1. WAIVER REQUESTED FROM SECTION 3.09.R OF SUBDIVISION REGULATIONS - REQUESTING 8% ROAD SLOPES FOR 500 FT OR LESS
2. WAIVER REQUESTED FROM SECTION 3.04 OF SITE PLAN REGULATIONS - GOVERNING UTILITY SPACING FROM ROAD CENTERLINE

Required Permits

1. NHDES ALTERATION OF TERRAIN PERMIT TO BE SUBMITTED
2. NHDES SEWER CONNECTION PERMIT TO BE SUBMITTED
3. NH SUBDIVISION APPROVAL TO BE SUBMITTED
4. EPA CONSTRUCTION GENERAL PERMIT TO BE SUBMITTED
5. LONDONDERRY SEWER CONNECTION PERMIT TO BE SUBMITTED
6. LONDONDERRY STORMWATER PERMIT TO BE SUBMITTED

Rock Blasting (IF REQUIRED)

BEST MANAGEMENT PRACTICES FOR BLASTING: ALL ACTIVITIES RELATED TO BLASTING ADHERE TO THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPS) TO PREVENT CONTAMINATION OF GROUNDWATER INCLUDING PREPARING, REVIEWING AND FOLLOWING AN APPROVED BLASTING PLAN; PROPER DRILLING, EXPLOSIVE HANDING AND LOADING PROCEDURES; OBSERVING THE ENTIRE BLASTING PROCEDURES; EVALUATING BLASTING PERFORMANCE; AND HANDLING AND STORAGE OF BLASTED ROCK.

1. LOADING PRACTICES: THE FOLLOWING BLASTHOLE LOADING PRACTICES TO MINIMIZE ENVIRONMENTAL EFFECTS SHALL BE FOLLOWED:

   A. DRILLING LOGS SHALL BE MAINTAINED BY THE DRILLER AND COMMUNICATED DIRECTLY TO THE BLASTER. THE LOGS SHALL INDICATE DEPTHS AND LENGTHS OF VOIDS, CAVITIES, AND FAULT ZONES OR OTHER WEAK ZONES ENCOUNTERED AS WELL AS GROUNDWATER CONDITIONS.
   B. EXPLOSIVE PRODUCTS SHALL BE MANAGED ON-SITE SO THAT THEY ARE EITHER USED IN THE BOREHOLE, RETURNED TO THE THE DELIVERY VEHICLE, OR PLACED IN SECURE CONTAINERS FOR OFF-SITE DISPOSAL.
   C. SPILLAGE AROUND THE BOREHOLE SHALL EITHER BE PLACED IN THE BOREHOLE OR CLEANED UP AND RETURNED TO AN APPROPRIATE VEHICLE FOR HANDLING OR PLACEMENT IN SECURED CONTAINERS FOR OFF-SITE DISPOSAL.
   D. LOADED EXPLOSIVES SHALL BE DETONATED AS SOON AS POSSIBLE AND SHALL NOT BE LEFT IN THE BLASTHOLES OVERNIGHT, UNLESS WEATHER OR OTHER SAFETY CONCERNS REASONABLY DICTATE THAT DETONATION SHOULD BE POSTPONED.
   E. LOADING EQUIPMENT SHALL BE CLEANED IN AN AREA WHERE WASTEWATER CAN BE PROPERLY CONTAINED AND HANDLED IN A MANNER THAT PREVENTS RELEASE OF CONTAMINANTS TO THE ENVIRONMENT.
   F. EXPLOSIVES SHALL BE LOADED TO MAINTAIN GOOD CONTINUITY IN THE COLUMN LOAD TO PROMOTE COMPLETE DETONATION. INDUSTRY ACCEPTED LOADING PRACTICES FOR PRIMING, STEMMING, DECKING AND COLUMN RISE NEED TO BE ATTENDED TO.

2. EXPLOSIVE SELECTION: THE FOLLOWING BMPS SHALL BE FOLLOWED TO REDUCE THE POTENTIAL FOR GROUNDWATER CONTAMINATION WHEN EXPLOSIVES ARE USED:

   A. EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT ARE APPROPRIATE FOR SITE CONDITIONS AND SAFE BLAST EXECUTION.
   B. EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT HAVE THE APPROPRIATE WATER RESISTANCE FOR THE SITE CONDITIONS PRESENT TO MINIMIZE THE POTENTIAL FOR HAZARDOUS EFFECT OF THE PRODUCT UPON GROUNDWATER.

3. PREVENTION OF MISFIRES: APPROPRIATE PRACTICES SHALL BE DEVELOPED AND IMPLEMENTED TO PREVENT MISFIRES.

4. MUCK PILE MANAG

Notes

A. THE PURPOSE OF THESE PLANS IS TO DEPICT THE PROPOSED SITE DEVELOPMENT OF 60 SINGLE FAMILY CONDOMINIUM HOMES (3 BEDROOMS).

B. THE PROJECT PARCEL IS TAX MAP 10 LOT 15.

C. THE PROJECT PARCEL IS A TOTAL 22.6 ACRES (EXISTING AND PROPOSED).

D. THE PROJECT PARCEL IS LOCATED IN THE AGRICULTURAL-RESIDENTIAL 1 (AR-1) ZONE. THE PROJECT PARCEL IS LOCATED IN THE WOODMONT COMMONS (WC-7, WC-8) OVERLAY DISTRICT.

E. THERE IS NO MINIMUM LOT AREA IN THE WOODMONT COMMONS OVERLAY DISTRICT. THE PROJECT PARCEL IS SUBJECT TO A 40 FOOT FRONT YARD SETBACK, 30 FOOT SIDE YARD SETBACKS, AND A 35 FOOT REAR YARD SETBACK.

F. THE EXISTING USE OF THE PROJECT PARCEL IS A FORMER APPLE ORCHARD. THE PROJECT PROPOSES SINGLE-FAMILY RESIDENTIAL USE.

G. THE PROJECT REQUIRES 120 PARKING SPACES AND PROVIDES 138 PARKING SPACES.

H. THERE IS NO MINIMUM GREEN AREA IN THE WOODMONT COMMONS OVERLAY DISTRICT. THE PROJECT PROVIDES 78.6% GREEN AREA.

I. THERE IS NO MAXIMUM BUILDING COVERAGE IN THE WOODMONT COMMONS DISTRICT. THE PROJECT PROVIDES 12.1% BUILDING COVERAGE.

J. THE SANITARY SEWER COMPANY SERVICING THE PROJECT AREA IS THE LONDONDERRY DEPARTMENT OF PUBLIC WORKS.

K. THE WATER SUPPLY SOURCE COMPANY SERVICING THE PROJECT AREA IS PENNICHUCK WATER WORKS.

L. A WAIVER HAS BEEN REQUESTED FROM SECTION 3.04 OF THE SITE PLAN REGULATIONS - GOVERNING UTILITY SPACING FROM ROAD CENTERLINE.

M. NO FEMA FLOOD ZONES ARE PRESENT ON THE SITE.

N. THE PROPOSED PROJECT REQUIRES THE FOLLOWING PERMITS:

- N.A. NHDES ALTERATION OF TERRAIN PERMIT
- N.B. NHDES SEWER CONNECTION PERMIT
- N.C. NH SUBDIVISION APPROVAL
- N.D. EPA CONSTRUCTION GENERAL PERMIT
- N.E. LONDONDERRY SEWER CONNECTION PERMIT
- N.F. LONDONDERRY STORMWATER PERMIT

O. NO PLANNING BOARD WAIVERS NOR CONDITIONAL USE PERMITS AT HAVE BEEN GRANTED AT THIS TIME.

P. THE CONSTRUCTION SEQUENCE IS TO OCCUR AS FOLLOWS:

- P.A. SURVEY AND STAKE LIMITS OF CLEARING AND GRUBBING.
- P.B. INSTALL SILT FENCING, STRAW BALES, CONSTRUCTION EXITS, ETC. PRIOR TO START OF CONSTRUCTION, TO BE MAINTAINED UNTIL COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
- P.C. CLEAR AND GRUB ALL AREAS TO BE DISTURBED BY CONSTRUCTION AND PERFORM DEMOLITION OPERATIONS.
- P.D. REPAIR, CLEAN, AND REPLACE ANY SEDIMENT CONTROLS DAMAGED DURING AND/OR AFTER RAINFALL EVENTS.
- P.E. STRIP LOAM AND PAVEMENT, OR RECLAIM EXISTING PAVEMENT WITHIN LIMITS OF WORK AND STOCKPILE EXCESS MATERIAL.
- P.F. CONSTRUCT TEMPORARY SEDIMENTATION BASINS AS REQUIRED.
- P.G. PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE.
- P.H. PERFORM PRELIMINARY SITE GRADING AND CONSTRUCT TEMPORARY DIVERSION SWALES AS REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT THE PRELIMINARY GRADING ALLOWS SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS TO FLOW TOWARDS THE TEMPORARY SEDIMENTATION BASINS.
- P.I. PREPARE BUILDING PAD TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
- P.J. INSTALL SEWER SYSTEM, DRAINAGE SYSTEM, AND OTHER UTILITIES IN ACCORDANCE WITH THE PLANS AND DETAILS.
- P.K. INSTALL STRAW BALES AND INLET PROTECTION AT ALL CATCH BASINS AS THEY ARE CONSTRUCTED, IN ACCORDANCE WITH THE DETAILS.
- P.L. PERFORM FINAL/FINE GRADING INCLUDING SLOPE STABILIZATION BLANKETS.
- P.M. PERFORM ALL REMAINING SITE CONSTRUCTION. (I.E. BUILDING AND PAVEMENT AREAS).
- P.N. LOAM AND SEED ALL DISTURBED AREAS.
- P.O. REMOVE TEMPORARY EROSION CONTROL MEASURES, SILT FENCE, ETC. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER.
- P.P. CLEAN ALL DRAINAGE BASINS, STRUCTURES, PIPES, AND SUMPS WITHIN THE PROJECT LIMITS OF ALL SILT AND DEBRIS.

Q. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXISTING IN THE APPROVED DESIGN DRAWINGS, THE OWNER SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE TOWN.

R. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP ANY EROSION ON THE CONSTRUCTION SITE DUE TO ACTUAL SITE CONDITIONS, THE OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION PROTECTION AT NO EXPENSE TO THE TOWN.

S. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE TOWN OF LONDONDERRY SUBDIVISION REGULATIONS AND THE LATEST EDITION OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

T. IN ACCORDANCE WITH SECTION 6.01 OF THE LONDONDERRY SITE PLAN REGULATIONS AND RSA § 676:13, ALL IMPROVEMENTS SPECIFIED ON THESE SITE PLANS SHALL BE CONSTRUCTED, COMPLETED, INSPECTED, AND APPROVED BY THE TOWN OF LONDONDERRY PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.

U. IN ACCORDANCE WITH SECTION 6.01 OF THE LONDONDERRY SITE PLAN REGULATIONS AND RSA § 676:12, ALL OFF-SITE IMPROVEMENTS SPECIFIED ON THESE SITE PLANS SHALL BE CONSTRUCTED, COMPLETED, INSPECTED AND APPROVED BY THE TOWN OF LONDONDERRY PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.



Condominium Lot Information

House Number	Limited Common Area (LCA)	
2	4728 SF	0.109 AC
3	6076 SF	0.139 AC
4	4799 SF	0.110 AC
6	5557 SF	0.128 AC
8	5936 SF	0.136 AC
10	5715 SF	0.131 AC
12	5902 SF	0.135 AC
14	6000 SF	0.138 AC
15	4886 SF	0.112 AC
16	6000 SF	0.138 AC
17	5500 SF	0.126 AC
18	6000 SF	0.138 AC
19	5500 SF	0.126 AC
20	5850 SF	0.134 AC
21	5500 SF	0.126 AC
22	6000 SF	0.138 AC
23	5350 SF	0.123 AC
24	6068 SF	0.139 AC
25	5519 SF	0.127 AC

Condominium Lot Information

House Number	Limited Common Area (LCA)	
26	6209 SF	0.143 AC
27	5550 SF	0.127 AC
28	7301 SF	0.168 AC
29	5446 SF	0.125 AC
30	7375 SF	0.169 AC
31	5272 SF	0.121 AC
32	5925 SF	0.136 AC
33	5500 SF	0.126 AC
34	6000 SF	0.138 AC
35	5350 SF	0.123 AC
36	5987 SF	0.137 AC
37	5654 SF	0.130 AC
38	5915 SF	0.136 AC
40	5908 SF	0.136 AC
41	5620 SF	0.129 AC
42	6000 SF	0.138 AC
43	6000 SF	0.138 AC
44	6000 SF	0.138 AC
45	4904 SF	0.113 AC

Condominium Lot Information

House Number	Limited Common Area (LCA)	
46	6000 SF	0.138 AC
48	5891 SF	0.135 AC
50	5844 SF	0.134 AC
52	5754 SF	0.132 AC
53	5765 SF	0.132 AC
54	5350 SF	0.123 AC
55	5917 SF	0.136 AC
56	5500 SF	0.126 AC
58	5682 SF	0.130 AC
60	5991 SF	0.138 AC
62	4839 SF	0.111 AC
63	4839 SF	0.111 AC
64	5662 SF	0.130 AC
65	6000 SF	0.138 AC
67	6005 SF	0.138 AC
69	5990 SF	0.138 AC
71	5140 SF	0.118 AC
73	5472 SF	0.126 AC
75	5350 SF	0.123 AC

Condominium Lot Information

House Number	Limited Common Area (LCA)	
77	5500 SF	0.126 AC
79	5500 SF	0.126 AC
81	5602 SF	0.129 AC

* Existing Lot Area = 22.6 Acres, Proposed Common Area = 14.6 Acres

vhb.com
vhb
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

0 40 80 160Feet

Record Owner: Pillsbury Realty Develop LLC
100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by SJF | Checked by DHF

Issued for: Permitting — Date: October 14, 2025

Not Approved for Construction

Drawing Title: Condominium Plan

Drawing Number: C1.01

Sheet 2 of 41

Project Number: 53140.44

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13872 LICENSED PROFESSIONAL ENGINEER - 2/12/2026

Saved Wednesday, February 11, 2026 10:46:13 PM JHOWE Plotted Thursday, February 12, 2026 9:20:57 AM Jason Howe

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Concepts\44 Pillsbury Rd\cad\ld\Planset\5314044-OSP.dwg



Zoning Summary Chart

Zoning District:	Agricultural-Residential (AR-1)
Overlay District:	Woodmont Commons PUD (WC-7, WC-8)

Zoning Regulation Requirements	Required*	Provided
MINIMUM LOT AREA	-	22.6 Acres **
FRONTAGE	150 Feet	1,490 Feet
FRONT YARD SETBACK	40 Feet	272.1 Feet
SIDE YARD SETBACK	30 Feet	23.3 Feet
REAR YARD SETBACK	35 Feet	19.3 Feet
MAXIMUM BUILDING HEIGHT	50 Feet	<50 Feet
PERCENT BUILDING COVERAGE	-	12.1 %
PERCENT GREEN AREA	-	78.6%

* Zoning regulation requirements as specified in the Town of Londonderry, NH Zoning Ordinance as Amended Through 2012.
** Project specific lot area, sub area to Woodmont Commons PUD

Parking Summary Chart

Description	Size Required	Size Provided	Spaces Required	Spaces Provided
RESIDENTIAL DWELLING SPACES	9 x 20	9 x 20	120	120
VISITOR SPACES	9 x 20	9 x 20	0	18
TOTAL SPACES			120	138

Parking Requirements:

RESIDENTIAL DWELLING	60 UNITS	x	2 SPACES	/	1 UNIT	= 120 SPACES
			TOTAL PARKING REQUIRED			= 120 SPACES

Sign Summary

M.U.T.C.D. Number	Specification Width	Specification Height	Desc.
R1-1	30"	30"	STOP
R2-1-15	24"	30"	SPEED LIMIT 15
R8-31	12"	18"	NO PARKING FIRE LANE
R5-11	30"	24"	AUTHORIZED VEHICLES ONLY

Notes

1. THE SITE PLAN IS GOVERNED BY THE 2013 WOODMONT COMMONS MASTER PLAN AND THE TOWN OF LONDONDERRY'S LAND USE REGULATIONS IN EFFECT AT THAT TIME. THE APPLICANT WILL APPLY FOR A COMPLIANCE ALTERNATIVE REQUEST ALLOWING FOR A VARIATION TO THE LOT TYPE, EXISTING DIMENSIONAL SETBACK AND FRONTAGE REQUIREMENTS.
2. THE PURPOSE OF THIS PLAN IS TO DEPICT THE OVERALL PROPOSED SITE DEVELOPMENT, INCLUDING THE FULL SUBJECT PARCEL AND ABUTTING PARCEL INFORMATION. FOR GREATER DESIGN DETAIL RELATIVE TO THE PROPOSED DEVELOPMENT, REFER TO THE OTHER SHEETS PROVIDED HEREIN.
3. MAP 10, LOT 15 LIES ENTIRELY WITHIN ZONE X (UNSHADED) (AREAS TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR ROCKINGHAM COUNTRY, NEW HAMPSHIRE, MAP NUMBER 33015C0338E, EFFECTIVE DATE MAY 17, 2005.
4. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXIST IN THE APPROVED DESIGN DRAWINGS, THE OWNER SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET THE REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE TOWN.
5. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP ANY EROSION ON THE CONSTRUCTION SITE DUE TO ACTUAL SITE CONDITIONS, THE OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION AT NO EXPENSE TO THE TOWN.
6. ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO TOWN OF LONDONDERRY SITE PLAN REGULATIONS AND THE LATEST EDITION OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
7. IN ACCORDANCE WITH SECTION 6.01 OF THE LONDONDERRY SITE PLAN REGULATIONS AND RSA § 676:13, ALL IMPROVEMENTS SPECIFIED ON THESE SITE PLANS SHALL BE CONSTRUCTED, COMPLETED, AND INSPECTED AND APPROVED BY THE TOWN OF LONDONDERRY PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
8. IN ACCORDANCE WITH SECTION 6.01 OF THE LONDONDERRY SITE PLAN REGULATIONS AND RSA § 676:12, ALL OFF-SITE IMPROVEMENTS SPECIFIED ON THESE PLANS SHALL BE CONSTRUCTED, COMPLETED, AND INSPECTED AND APPROVED BY THE TOWN OF LONDONDERRY (AND/OR NHDOT, IF APPLICABLE) PRIOR TO THE ISSUANCE OF OCCUPANCY.
9. PARCEL USES: USES SHOWN BELOW ARE BASED ON AVAILABLE PROPERTY CARD INFORMATION.
   EXISTING USE: VACANT LAND
   PROPOSED USE: RESIDENTIAL DEVELOPMENT
10. CONTRACTOR TO COORDINATE WITH THE TOWN OF LONDONDERRY FIRE DEPARTMENT FOR THEIR REQUIREMENTS FOR FIRE ACCESS AND MAINTENANCE THROUGHOUT THE CONSTRUCTION PHASE. FIRE DEPARTMENT ACCESS ROADS SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS AND BE PROVIDED WITH AN ALL WEATHER DRIVING SURFACE.
11. STONES FROM STONEWALLS TO BE DISTURBED SHALL BE SAVED AND STONEWALLS RECONSTRUCTED AS SHOWN.

NHB25-0249 New Hampshire Fish And Game Conservation Measures

1. NORTHERN BLACK RACER (STATE THREATENED) OCCURS WITHIN THE VICINITY OF THE PROJECT AREA. ALL OPERATORS AND PERSONNEL WORKING ON OR ENTERING THE SITE SHALL BE MADE AWARE OF THE POTENTIAL PRESENCE OF THESE SPECIES AND SHALL BE PROVIDED FLYERS THAT HELP TO IDENTIFY THESE SPECIES, ALONG WITH NHFG CONTACT INFORMATION. SEE COVER SHEET.
2. RARE SPECIES INFORMATION (E.G. IDENTIFICATION, OBSERVATION AND REPORTING OF OBSERVATIONS, WHEN TO CONTACT NHFG IMMEDIATELY AND NHFG CONTACT INFORMATION) SHALL BE COMMUNICATED DURING MORNING MEETINGS PRIOR TO WORK COMMENCEMENT DURING THE CONSTRUCTION PHASE OF THE PROJECT. SEE COVER SHEET.
3. OBSERVATIONS OF NORTHERN BLACK RACER IN THE MONTHS OF APRIL-MAY AND SEPTEMBER-OCTOBER MAY INDICATE THE POTENTIAL FOR A DEN SITE ON OR NEAR THE PROJECT SITE. ALL OBSERVATIONS OF THIS SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM. PLEASE CONTACT MELISSA WINTERS AND BRENDAN CLIFFORD - VIA GROUP TEXT PREFERRED. A PHOTOGRAPH WITH TEXT IS PREFERRED IF FEASIBLE. SEE SPECIES FLYERS, SEE COVER SHEET FOR NHFG CONTACT INFORMATION.
4. THE PROJECT SITE IN IT'S CURRENT CONDITION PROVIDES SUITABLE HABITAT FOR VARIOUS SNAKE SPECIES. NHFG ENCOURAGES REPORTS OF ALL OTHER SNAKE OBSERVATIONS FOUND ON THE PROJECT SITE TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM. PLEASE CONTACT MELISSA WINTERS AND BRENDAN CLIFFORD - VIA GROUP TEXT PREFERRED. A PHOTOGRAPH WITH TEXT IS PREFERRED IF FEASIBLE. SEE NORTHERN BLACK RACER SPECIES FLYERS, SEE COVER SHEET FOR NHFG CONTACT INFORMATION.
5. TURTLES AND SNAKES MAY BE ATTRACTED TO DISTURBED GROUND DURING THE NESTING SEASON (MAY 15TH - JULY 15TH). TURTLE AND SNAKE NESTS ARE PROTECTED BY NH LAWS. IF A NEST IS OBSERVED OR SUSPECTED, OPERATORS SHALL CONTACT MELISSA WINTERS AND BRENDAN CLIFFORD FOR SNAKES AND JOSH MEGYESY FOR TURTLES AT NHFG IMMEDIATELY FOR FURTHER CONSULTATION. SEE SPECIES FLYERS, SEE COVER SHEET FOR NHFG CONTACT INFORMATION.
   5.1. THE NEST OR SUSPECTED NEST SHALL BE MARKED (SURROUNDING ROPED OFF OR CONE BUFFER DEPLOYED) AND AVOIDED; THIS SHALL BE COMMUNICATED TO ALL PERSONNEL ONSITE.
   5.2. SITE ACTIVITIES SHALL NOT OCCUR IN THE AREA SURROUNDING THE NEST OR SUSPECTED NEST UNTIL FURTHER GUIDANCE IS PROVIDED BY NHFG.
6. NHFG WOULD PREFER THAT CATCH BASINS NOT CONTAIN SUMPS. CATCH BASINS AND OUTLET CONTROL STRUCTURES SHALL HAVE DOUBLE-TYPE 'A' GRATES WITH GRATE OPENINGS NO LARGER THAN 1-13/64" X 21".
7. OUTLET CONTROL STRUCTURES SHALL NOT CONTAIN SUMPS AND SHALL NOT BE PLACED ADJACENT TO THE SIDE SLOPES BUT RATHER AS FAR AWAY AS POSSIBLE TO DETER WILDLIFE FROM CRAWLING ONTO THEM AND FALLING THROUGH THE GRATE OPENINGS. THESE STRUCTURES SHALL BE A MINIMUM OF 12"-18" ABOVE GRADE.
8. RIP-RAP SHALL BE FILLED WITH FINER MATERIAL (I.E., NATIVE WETLAND MATERIAL, NATIVE WETLAND SEED MIX, 3/4" SMALLER SIZED STONE, OR CLEAN GRAVEL IN BETWEEN RIP-RAP) TO CREATE A RELATIVELY SMOOTH SURFACE FOR WILDLIFE TO TRAVERSE.
9. A NATIVE SEED MIXTURE SHALL BE APPLIED TO ALL AREAS AFFECTED BY CONSTRUCTION. THE SEED MIXTURE SHALL NOT CONTAIN INVASIVE SPECIES SUCH AS CROWN VETCH, BIRD'S-FOOT TREFOIL, ALSIKE CLOVER, OR FLAT PEA.
10. ALL MANUFACTURED EROSION AND SEDIMENT CONTROL PRODUCTS, WITH THE EXCEPTION OF TURF REINFORCEMENT MATS, UTILIZED FOR, BUT NOT LIMITED TO, SLOPE PROTECTION, RUNOFF DIVERSION, SLOPE INTERRUPTION, PERIMETER CONTROL, INLET PROTECTION, CHECK DAMS, AND SEDIMENT TRAPS SHALL NOT CONTAIN PLASTIC, OR MULTIFILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN 1/8 INCHES.
11. ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES ON THE PROJECT SITE SHALL BE REPORTED IMMEDIATELY TO THE NHFG NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603-271-2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV, WITH THE EMAIL SUBJECT LINE CONTAINING THE NHB DATACHECK TOOL RESULTS LETTER ASSIGNED NUMBER, THE PROJECT NAME, AND THE TERM WILDLIFE SPECIES OBSERVATION.
   11.1. PHOTOGRAPHS OF THE OBSERVED SPECIES AND NEARBY ELEMENTS OF HABITAT OR AREAS OF LAND DISTURBANCE SHALL BE PROVIDED TO NHFG IN DIGITAL FORMAT AT THE ABOVE EMAIL ADDRESS FOR VERIFICATION, AS FEASIBLE.
12. IN THE EVENT A THREATENED OR ENDANGERED SPECIES IS OBSERVED ON THE PROJECT SITE DURING THE TERM OF THE PERMIT, THE SPECIES SHALL NOT BE DISTURBED, HANDLED, OR HARMED IN ANY WAY PRIOR TO CONSULTATION WITH NHFG AND IMPLEMENTATION OF CORRECTIVE ACTIONS RECOMMENDED BY NHFG.
   12.1. SITE OPERATORS SHALL BE ALLOWED TO RELOCATE WILDLIFE ENCOUNTERED IF DISCOVERED WITHIN THE ACTIVE WORK ZONE IF IN DIRECT HARM FROM PROJECT ACTIVITIES.
   12.2. WILDLIFE SHALL BE RELOCATED IN CLOSE PROXIMITY TO THE CAPTURE LOCATION BUT OUTSIDE OF THE WORK ZONE AND IN THE DIRECTION THE INDIVIDUAL WAS HEADING.
   12.3. NHFG SHALL BE CONTACTED IMMEDIATELY IF THIS ACTION OCCURS.
13. NHFG, INCLUDING ITS EMPLOYEES AND AUTHORIZED AGENTS, SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.
14. WOOD TURTLE (SPECIAL CONCERN, PROTECTED UNDER FIS 1400 RULES) OCCUR WITHIN THE VICINITY OF THE PROJECT AREA. ALL OPERATORS AND PERSONNEL WORKING ON OR ENTERING THE SITE SHOULD BE MADE AWARE OF THE POTENTIAL PRESENCE OF THIS SPECIES AND SHOULD BE PROVIDED NHFG CONTACT INFORMATION. SEE COVER SHEET.

OWNER'S SIGNATURE

Signed by: Kevin Smith 08AE4DDC6445240...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: October 14, 2025

Not Approved for Construction

Drawing Title: Overall Site Plan

Drawing Number: C2.00

Sheet 3 of 41

Project Number: 53140.44

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13072 LICENSED PROFESSIONAL ENGINEER
2/12/2026

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No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: SJF
Checked by: DHF

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Drawing Title: Layout and Materials Plan 1

Drawing Number: C2.01

Sheet 4 of 41

Project Number: 53140.44

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13872 LICENSED PROFESSIONAL ENGINEER
2/12/2026

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1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title
Layout and Materials Plan 2

Drawing Number
C2.02

STATE OF NEW HAMPSHIRE
ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER
2/12/2026

Sheet 5 of 41

Project Number
53140.44

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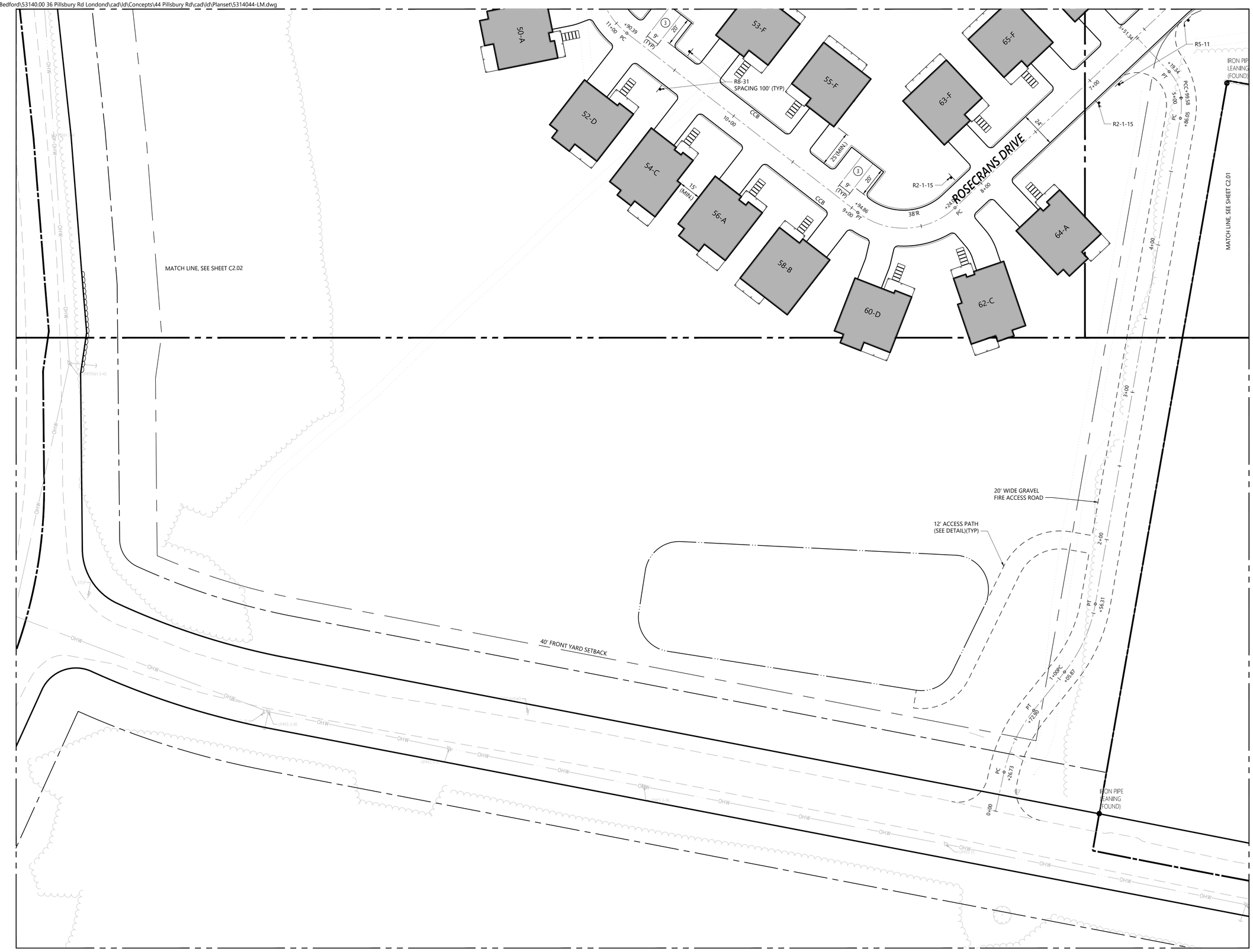

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

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1	Site Plan Application Submission	02/12/2026	EKG

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Date: October 14, 2025

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Drawing Title
Layout and Materials Plan 3

Drawing Number
C2.03

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No.13872
LICENSED PROFESSIONAL ENGINEER
2/11/2026

Sheet 6 of 41

Project Number
53140.44

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title
Sight Distance Plan

Drawing Number
C2.04

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No.13872
LICENSED PROFESSIONAL ENGINEER
2/11/2026

Sheet 7 of 41

Project Number
53140.44

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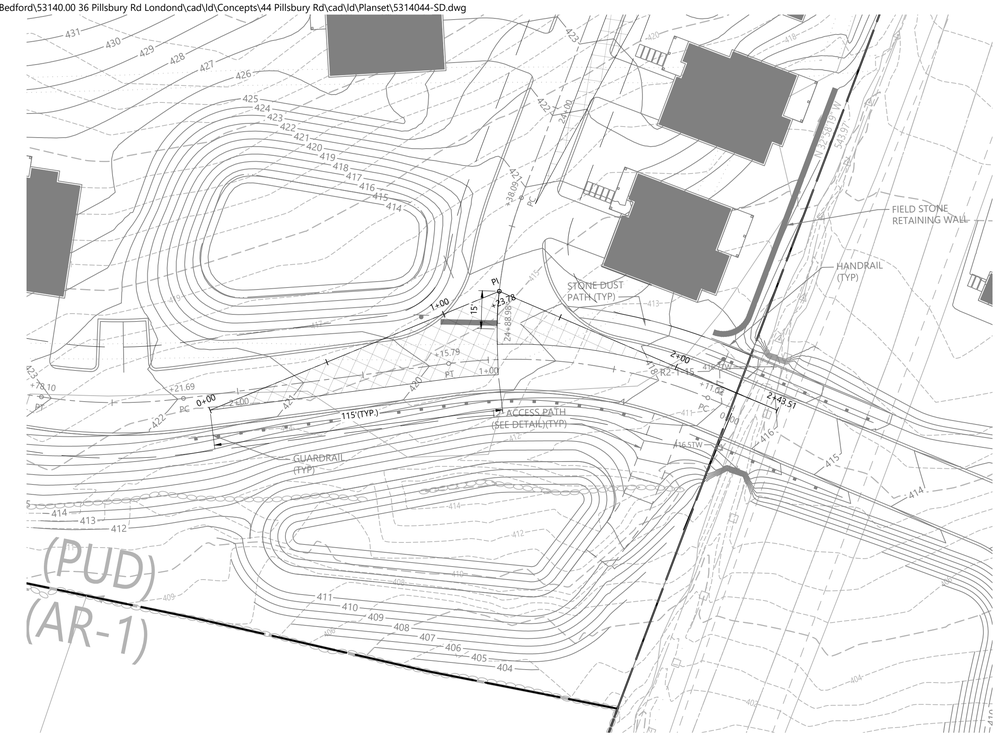
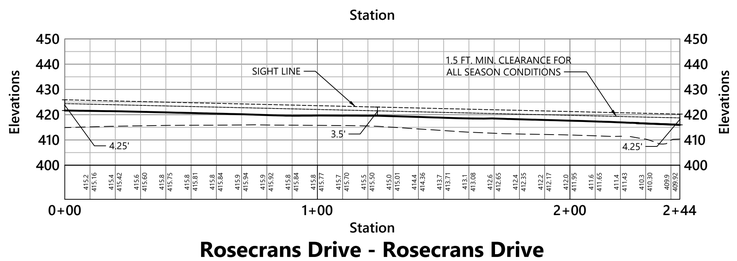
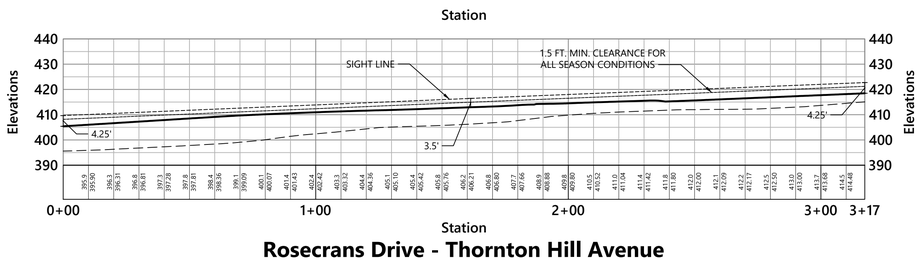






Rosecrans Drive - Rosecrans Drive



Rosecrans Drive - Thornton Hill Avenue

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
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No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title
Sight Distance Plan and Profile

Drawing Number
C2.05

Sheet 8 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE
ERIC K. GERADE No.13872
LICENSED PROFESSIONAL ENGINEER
2/12/2026

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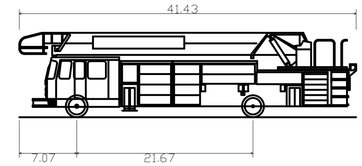

Londonderry Fire Truck V1	
Overall Length	41.430ft
Overall Width	7.702ft
Overall Body Height	10.380ft
Min Body Ground Clearance	0.810ft
Track Width	7.702ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°

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Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

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1	Site Plan Application Submission	02/12/2026	EKG

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Date October 14, 2025

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Drawing Title
Vehicle Access Plan

Drawing Number
C2.06

Sheet 9 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER - 2/12/2026

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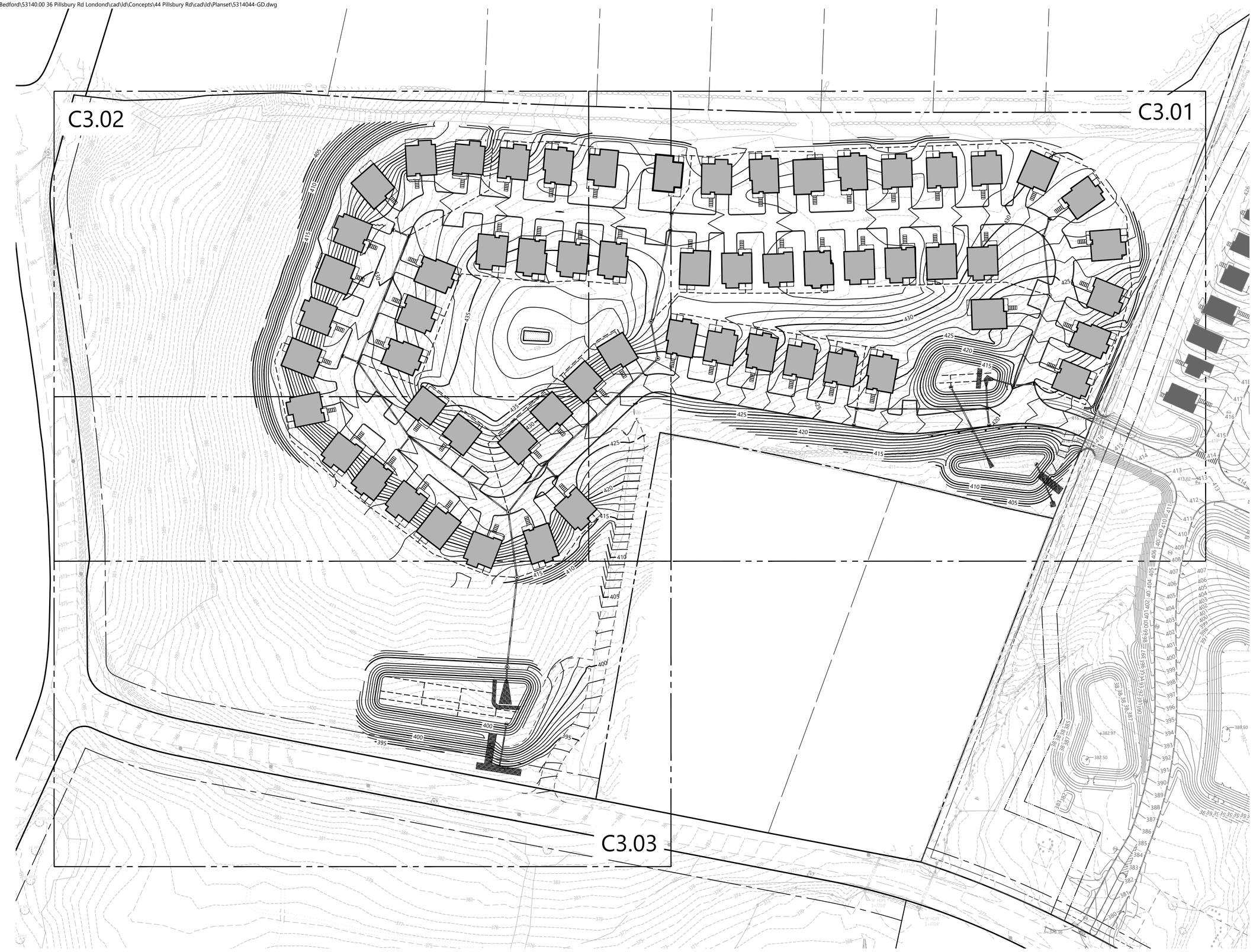

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Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: SJF
Checked by: DHF

Issued for: Permitting
Date: October 14, 2025

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Drawing Title
Overall Grading and Drainage Plan

Drawing Number
C3.00

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER - 2/12/2026

Sheet 10 of 41

Project Number
53140.44

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Map 10, Lot 15 - 44 Pillsbury Road
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No.	Revision	Date	Apprvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title
Grading and Drainage Plan 1

Drawing Number
C3.01

Sheet 11 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No.13972
LICENSED PROFESSIONAL ENGINEER
2/11/2026

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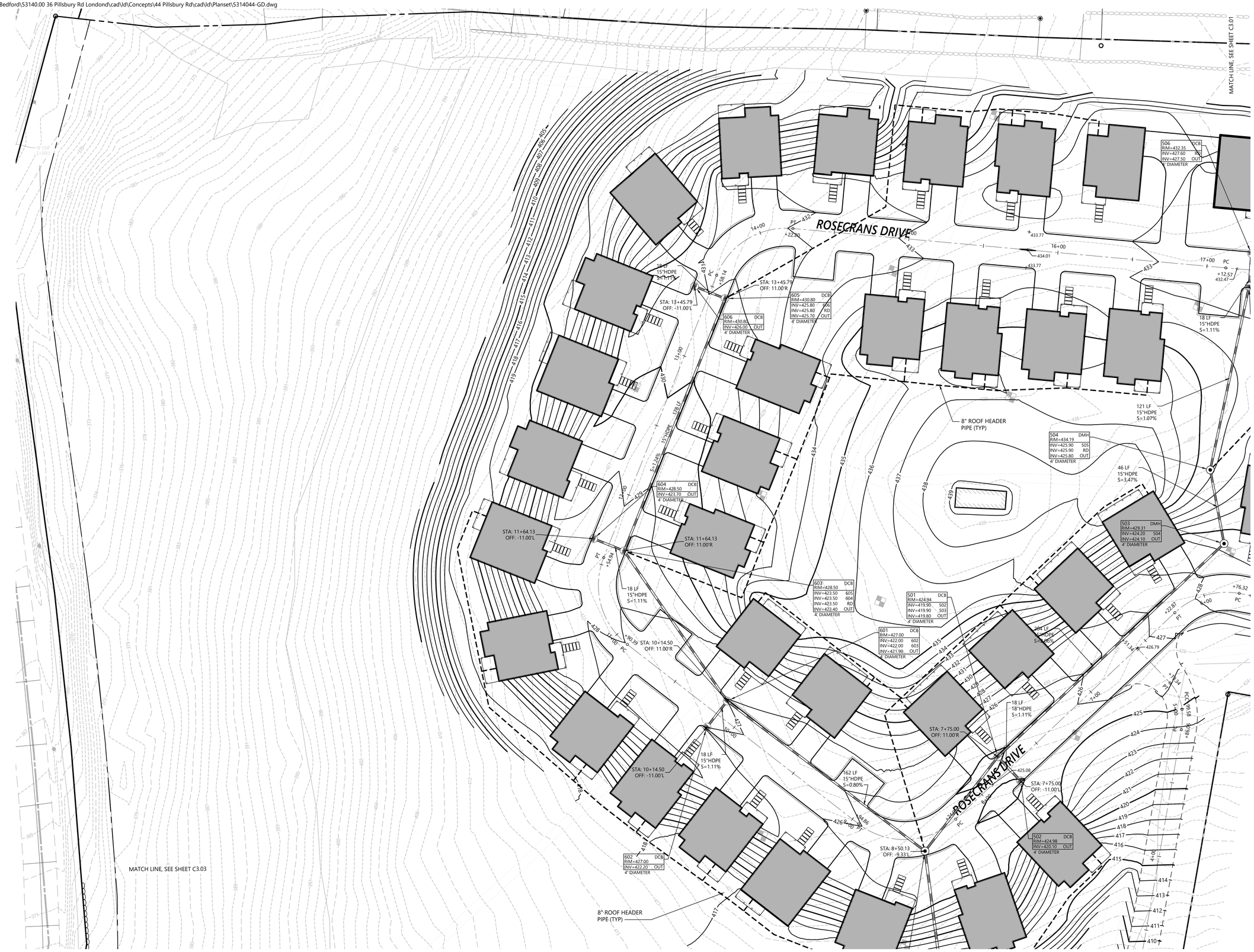

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Map 10, Lot 15 - 44 Pillsbury Road
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Drawing Title
Grading and Drainage Plan 2

Drawing Number
C3.02

Sheet 12 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No.13872
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2/12/2026

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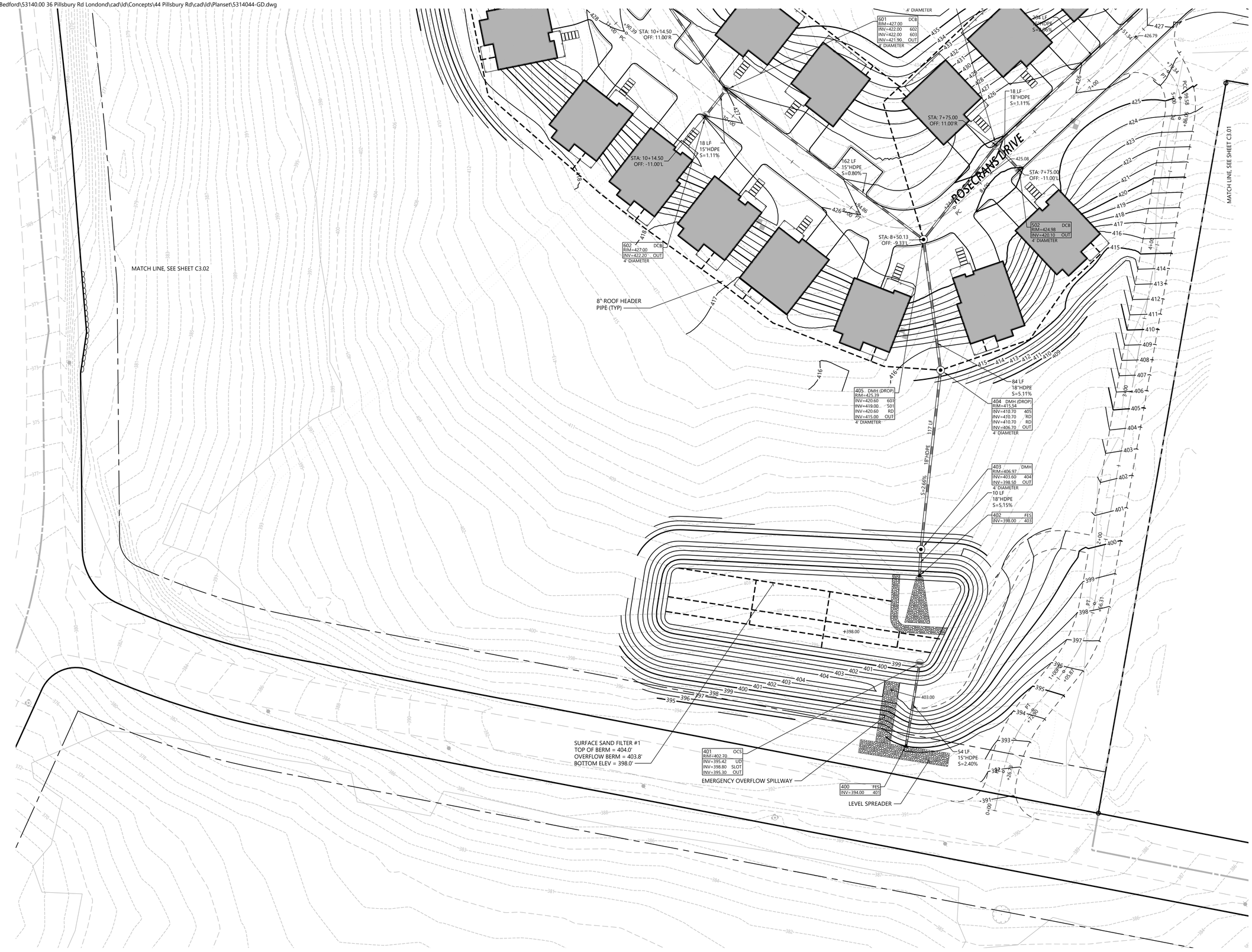

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Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title
Grading and Drainage Plan 3

Drawing Number
C3.03

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No. 13072
LICENSED PROFESSIONAL ENGINEER
2/12/2026

Sheet 13 of 41

Project Number
53140.44

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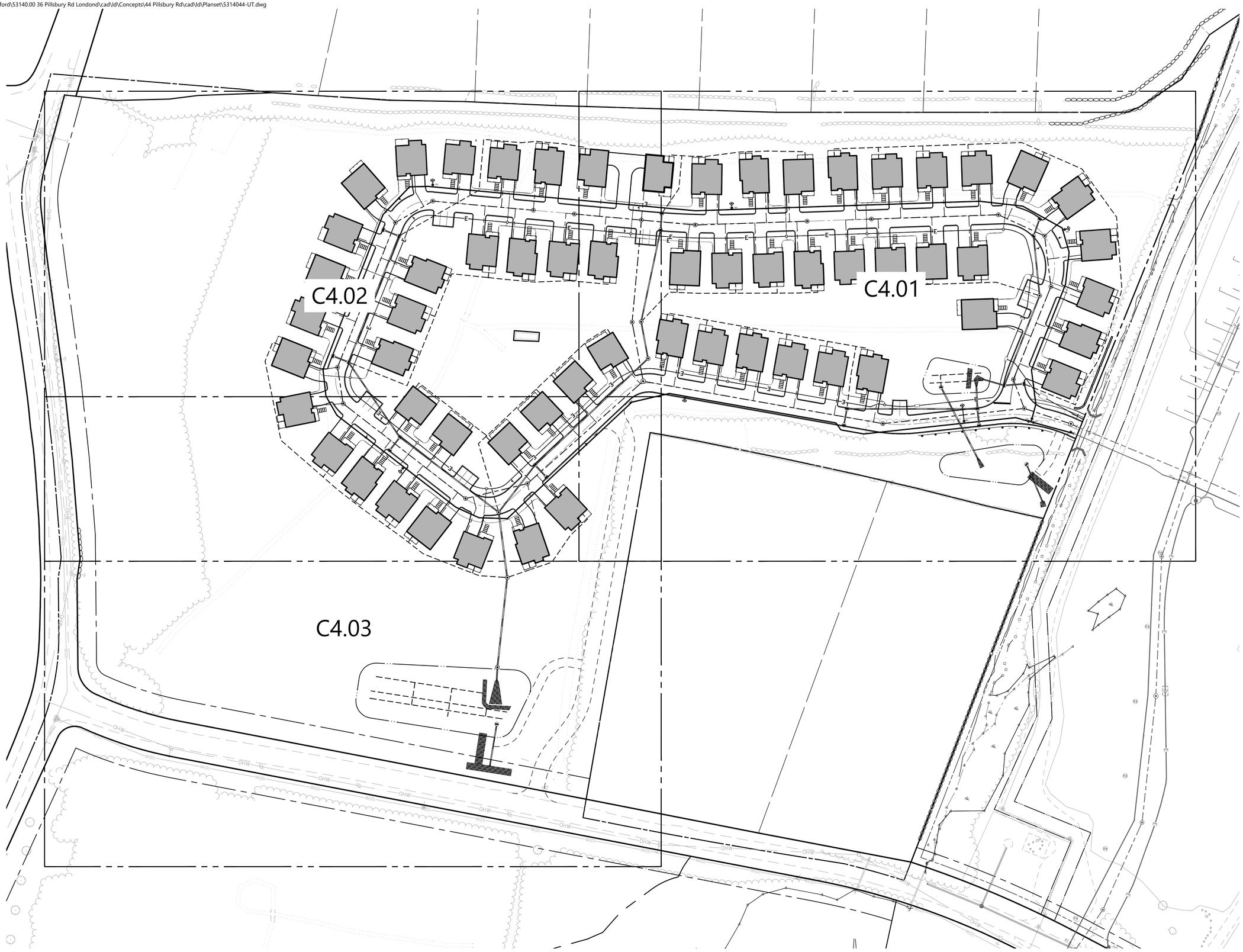

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Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by SJF
Checked by DHF

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Permitting

Date
October 14, 2025

Not Approved for Construction

Drawing Title
Overall Utility Plan

Drawing Number
C4.00

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER
2/12/2026

Sheet 14 of 41

Project Number
53140.44

Saved Thursday, February 12, 2026 3:19:41 AM BZOLLER Plotted Thursday, February 12, 2026 8:50:09 AM Jason Howe



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0 15 30 60 Feet

Record Owner: Pillsbury Realty Develop LLC
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Hudson, NH 03051

Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

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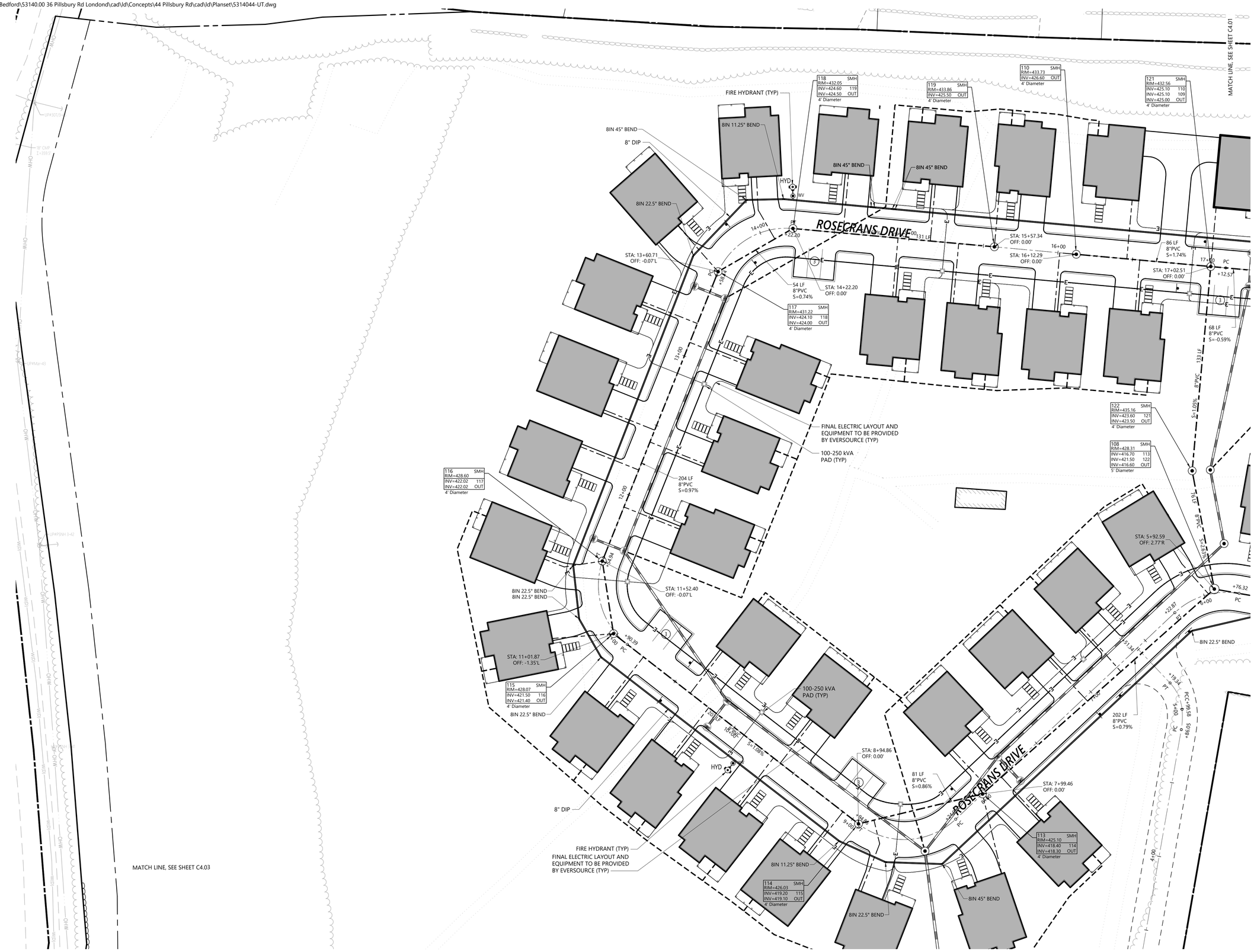
Drawing Title
Utility Plan 1

Drawing Number
C4.01

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No. 13672
LICENSED PROFESSIONAL ENGINEER
2/12/2026

Sheet 15 of 41

Project Number
53140.44



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Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
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Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by SJF
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Date October 14, 2025

Not Approved for Construction

Drawing Title
Utility Plan 2

Drawing Number
C4.02

Sheet 16 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13872 LICENSED PROFESSIONAL ENGINEER
2/12/2026

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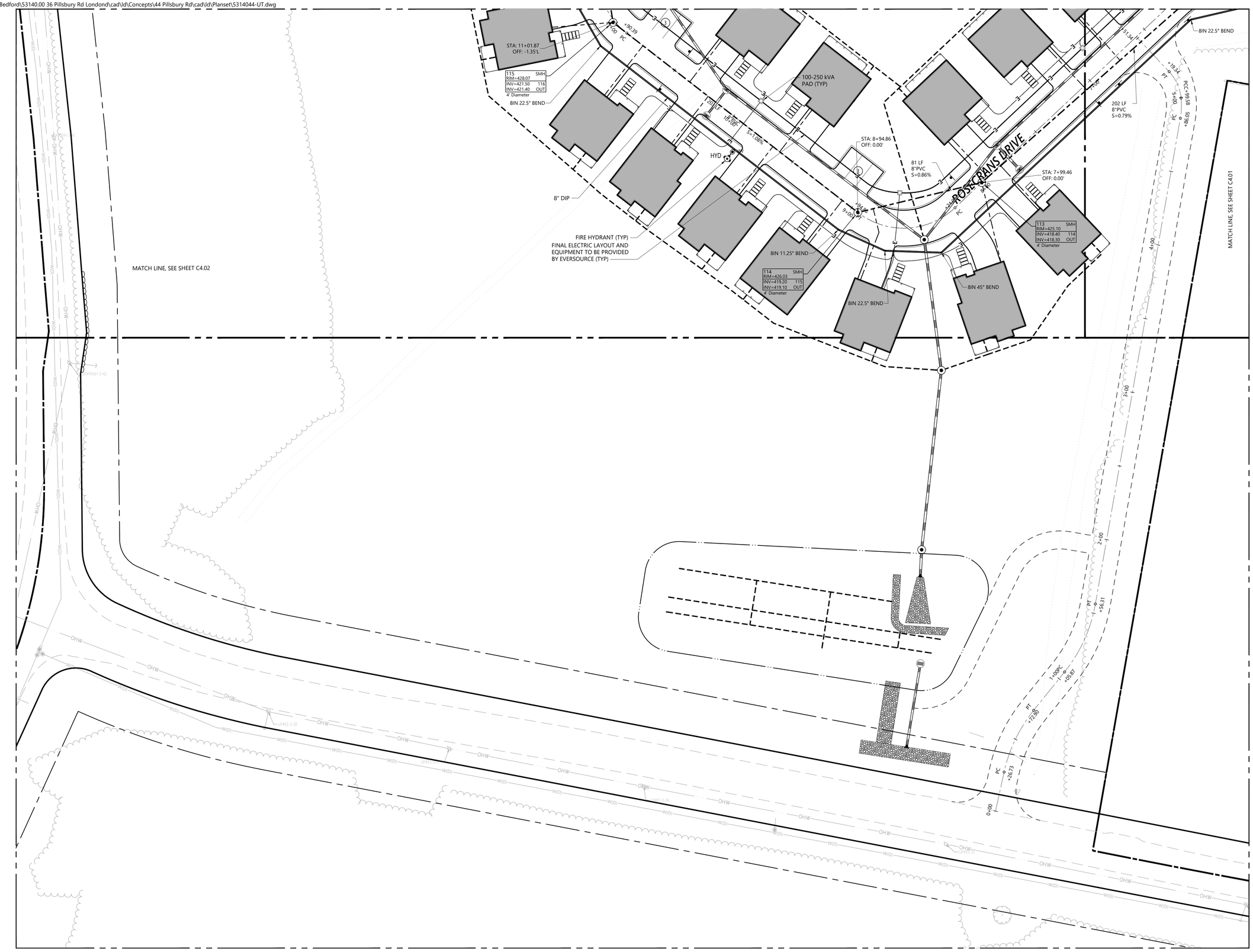
STA: 11+01.87
OFF: -1.35'L
115 SMH
RIM=428.07
INV=421.50 116
INV=421.40 OUT
4' Diameter
8IN 22.5° BEND
8" DIP
FIRE HYDRANT (TYP)
FINAL ELECTRIC LAYOUT AND EQUIPMENT TO BE PROVIDED BY EVERSOURCE (TYP)
MATCH LINE, SEE SHEET C4.02
100-250 kVA PAD (TYP)
HYD
202 LF 8"PVC S=1.00%
STA: 8+94.86
OFF: 0.00'
81 LF 8"PVC S=0.86%
ROSECRANS DRIVE
STA: 7+99.46
OFF: 0.00'
8IN 11.25" BEND
114 SMH
RIM=426.03
INV=419.20 115
INV=419.10 OUT
4' Diameter
8IN 22.5° BEND
8IN 45° BEND
113 SMH
RIM=425.10
INV=418.40 114
INV=418.30 OUT
4' Diameter
8IN 22.5° BEND
202 LF 8"PVC S=0.79%
MATCH LINE, SEE SHEET C4.01
OHW
W(D)
OHW
W(D)
OHW
W(D)

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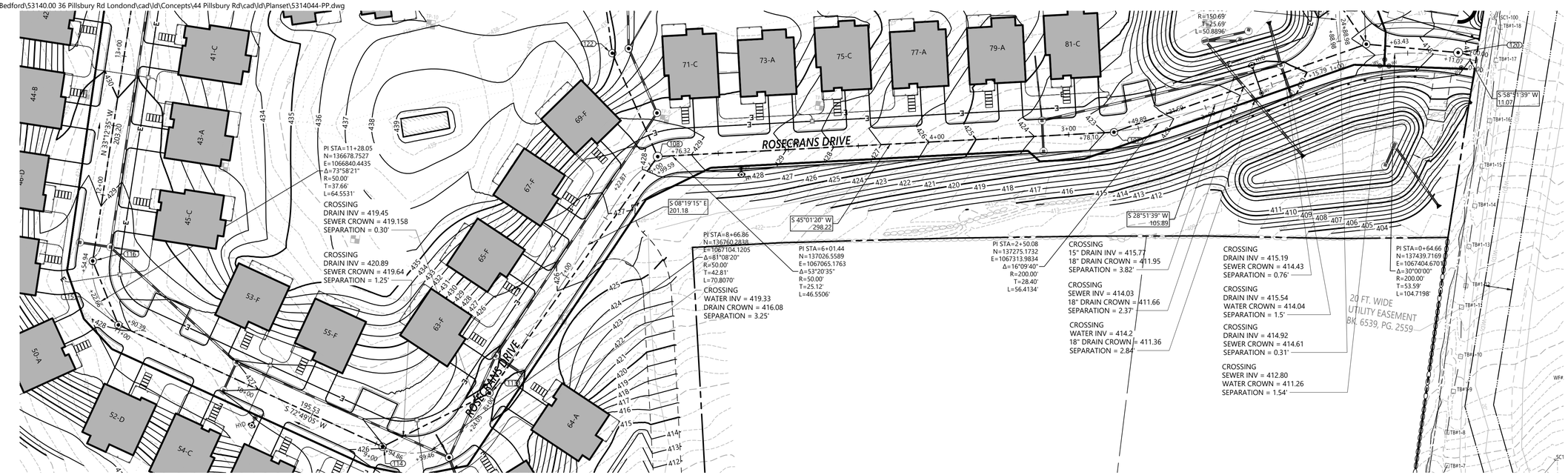
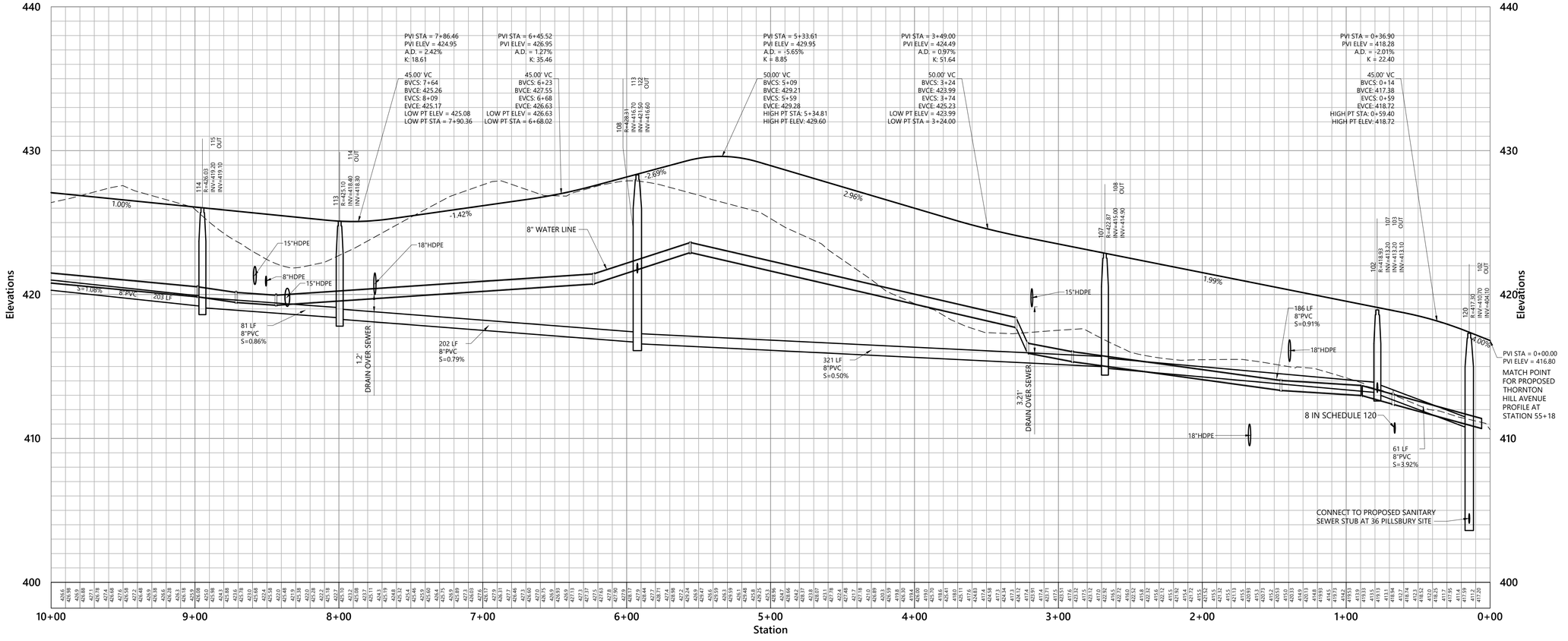


NOTE: ALL VERTICAL UTILITY CROSSINGS WHICH OCCUR AT THE ROADWAY CENTERLINE ARE DIMENSIONED IN THE ROADWAY PROFILES; CROSSINGS WHICH OCCUR OUTSIDE OF THE ROADWAY CENTERLINE ARE LABELED IN PLAN VIEW.

PLAN

Vert. 0 2 4 8 Feet
Horiz. 0 20 40 80 Feet

PROFILE



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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title: Roadway Plan and Profile 1

Drawing Number: C5.01

Sheet 18 of 41

Project Number: 53140.44

STATE OF NEW HAMPSHIRE – ERIC K. GERADE No.13072 – LICENSED PROFESSIONAL ENGINEER – 2/12/2026

Saved Wednesday, February 11, 2026 11:28:45 PM BZOLLER Plotted Thursday, February 12, 2026 12:59:09 AM Ben Zoller

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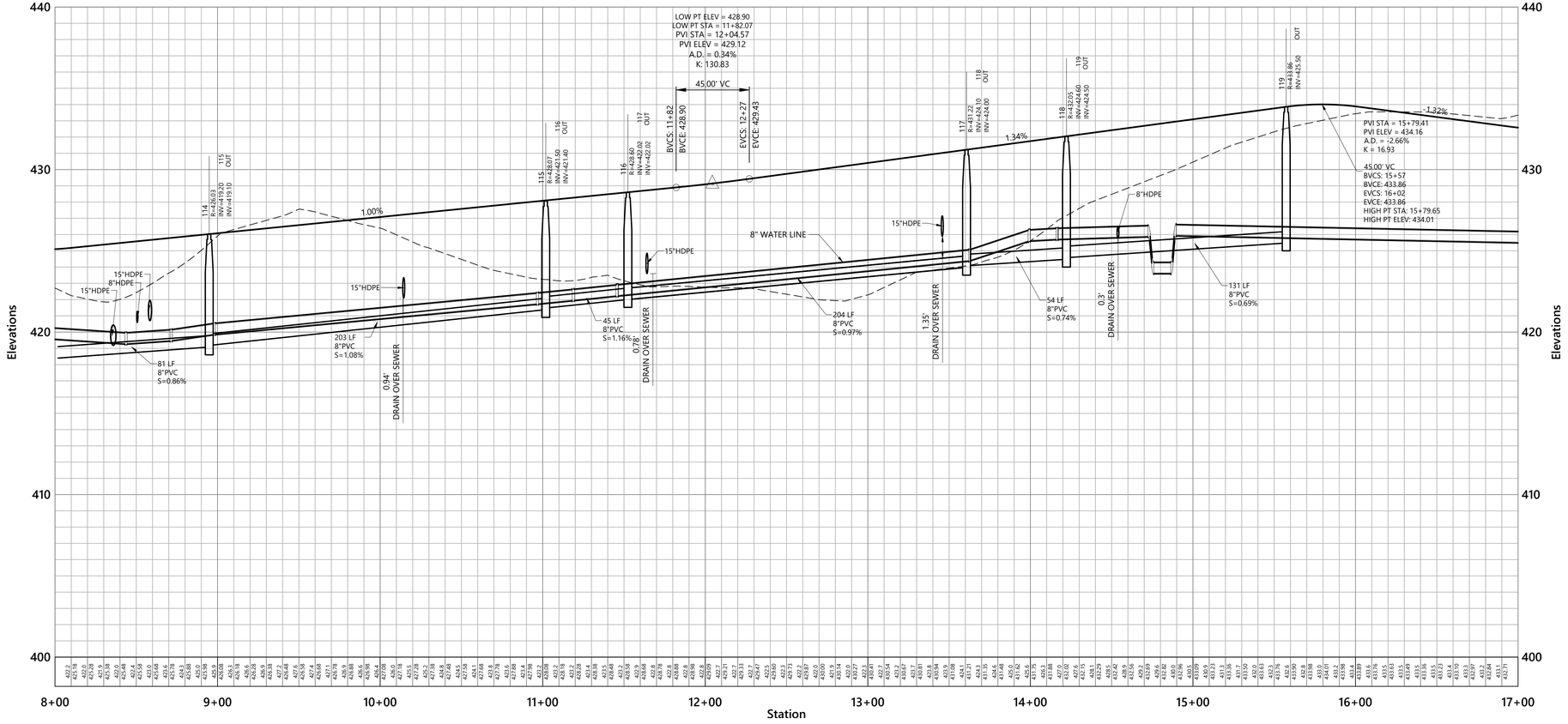
PLAN

Vert. 0 2 4 8 Feet
Horiz. 0 20 40 80 Feet

NOTE: ALL VERTICAL UTILITY CROSSINGS WHICH OCCUR AT THE ROADWAY CENTERLINE ARE DIMENSIONED IN THE ROADWAY PROFILES; CROSSINGS WHICH OCCUR OUTSIDE OF THE ROADWAY CENTERLINE ARE LABELED IN PLAN VIEW.

PROFILE



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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title: Roadway Plan and Profile 2

Drawing Number: C5.02

Sheet 19 of 41

Project Number: 53140.44

STATE OF NEW HAMPSHIRE – ERIC K. GERADE No.13072 LICENSED PROFESSIONAL ENGINEER – 2/12/2026

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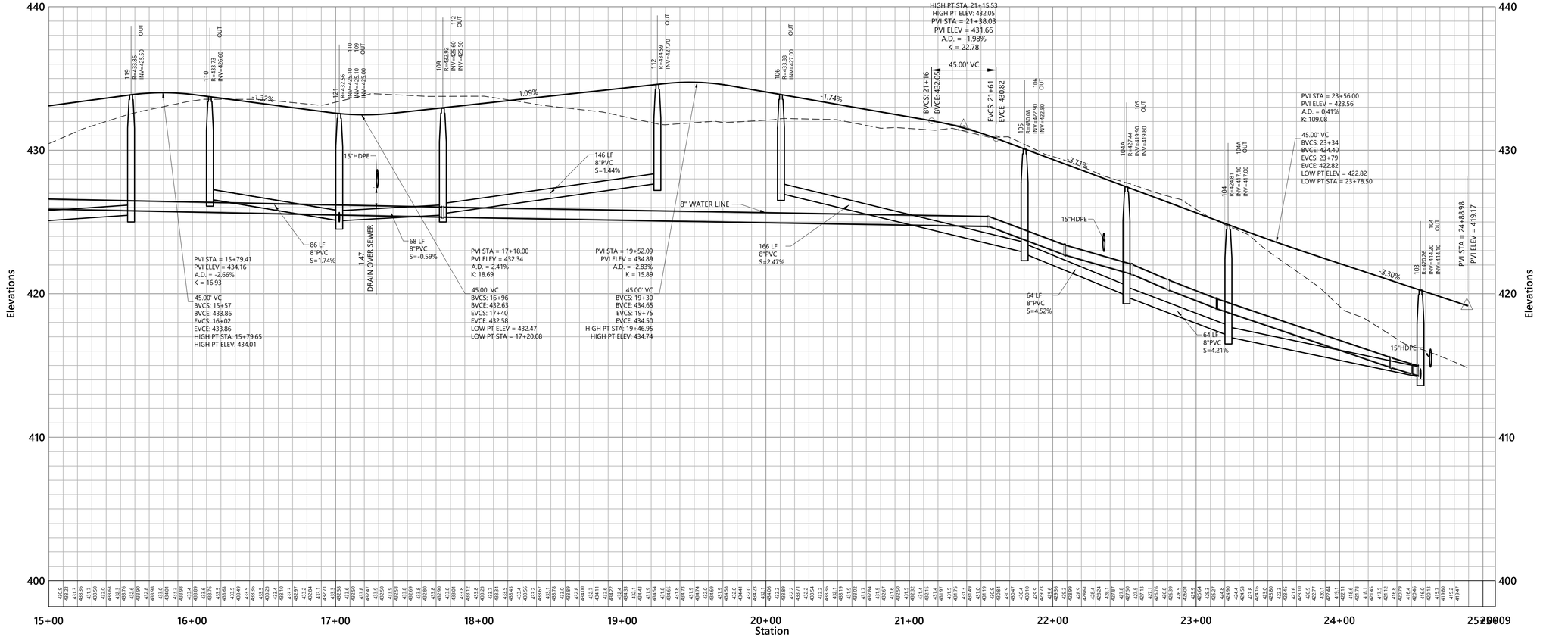
PLAN

Vert. 0 2 4 8 Feet
Horiz. 0 20 40 80 Feet

PROFILE



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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title
Roadway Plan And Profile 3

Drawing Number
C5.03

Sheet 20 of 41

Project Number
53140.44



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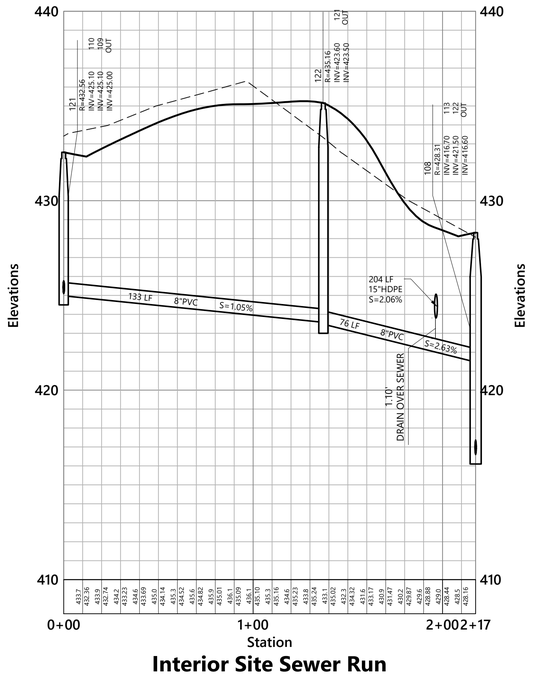
PLAN

Vert. 0 2 4 8 Feet
Horiz. 0 20 40 80 Feet

PROFILE



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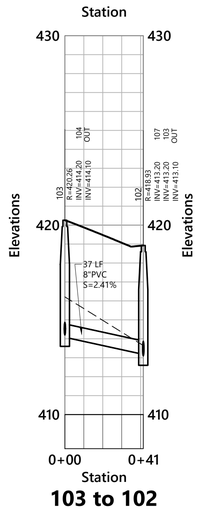
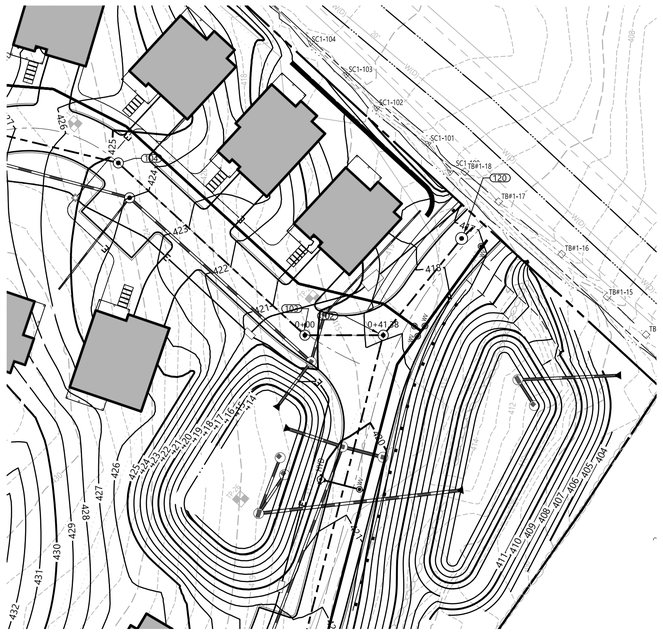


103 to 102



PLAN

Vert. 0 2 4 8 Feet
Horiz. 0 20 40 80 Feet

PROFILE

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title

Additional Sewer Plans And Profiles

Drawing Number

C5.04

Sheet 21 of 41

Project Number 53140.44

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER - 2/12/2026

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: SJF
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Issued for: Permitting
Date: October 14, 2025

Not Approved for Construction

Drawing Title
Overall Erosion Control Plan

Drawing Number
C6.00

Sheet 22 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE – ERIC K. GERADE No.13072 LICENSED PROFESSIONAL ENGINEER – 2/12/2026

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0 15 30 60 Feet

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: SJF
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Issued for: Permitting
Date: October 14, 2025

Not Approved for Construction

Drawing Title
Erosion Control Plan 1

Drawing Number
C6.01

Sheet 23 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE
ERIC K. GERADE No.13672
LICENSED PROFESSIONAL ENGINEER
2/12/2026

Saved Wednesday, February 11, 2026 11:28:04 AM JHOWE Plotted Thursday, February 12, 2026 1:03:36 AM Ben Zoller

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Map 10, Lot 15 - 44 Pillsbury Road
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No.	Revision	Date	Apprvd.
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Drawing Title
Erosion Control Plan 2

Drawing Number
C6.02

STATE OF NEW HAMPSHIRE - ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER
2/12/2026

Sheet 24 of 41

Project Number
53140.44

Saved Wednesday, February 11, 2026 11:28:04 AM JHOWE Plotted Thursday, February 12, 2026 1:06:07 AM Ben Zoller

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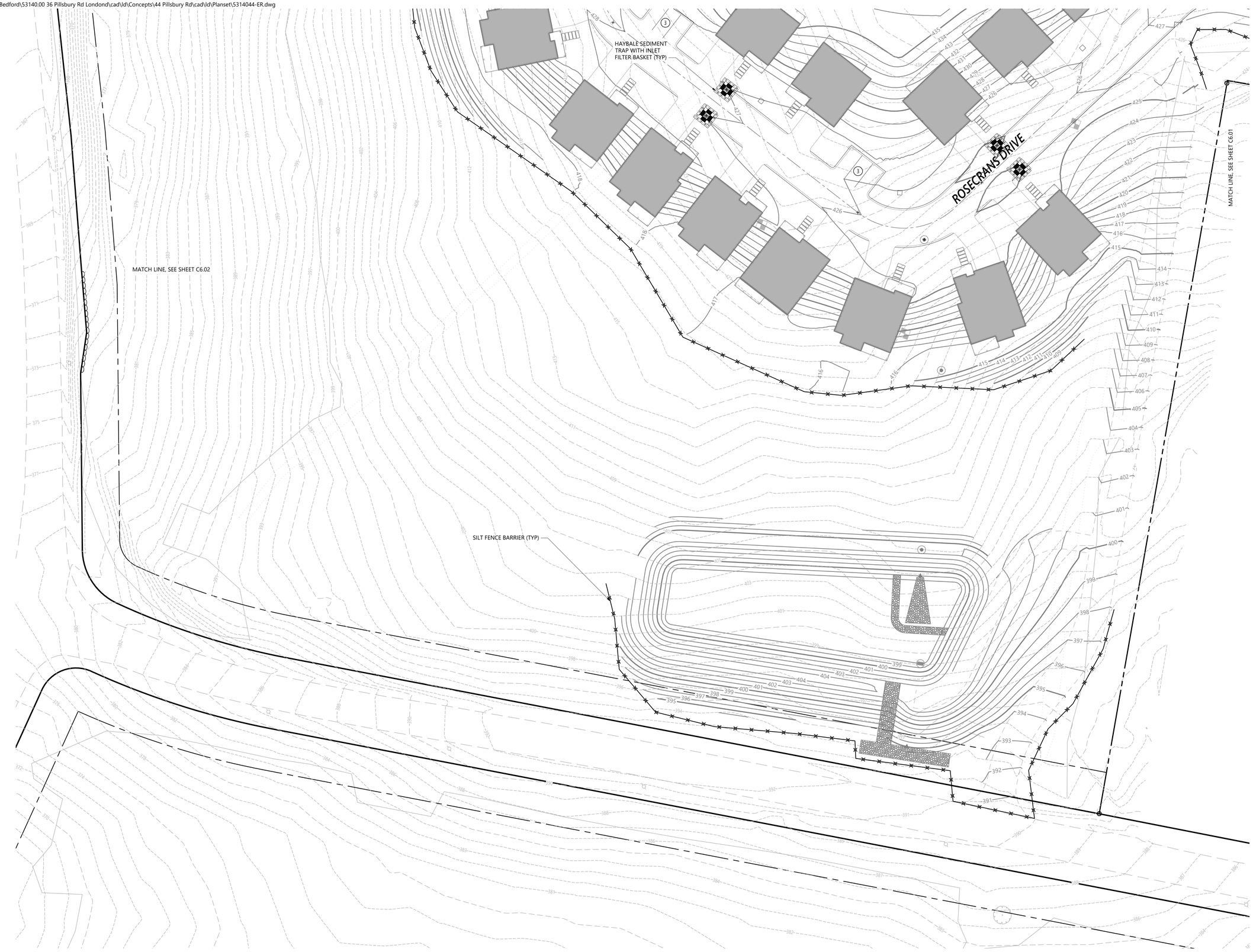

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Apprvd.
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Drawing Title
Erosion Control Plan 3

Drawing Number
C6.03

STATE OF NEW HAMPSHIRE – ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER – 2/12/2026

Sheet 25 of 41

Project Number
53140.44

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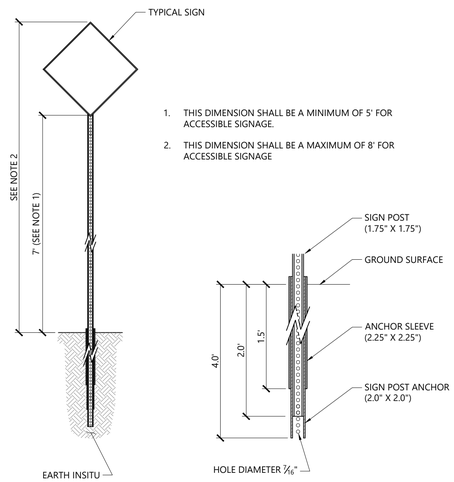
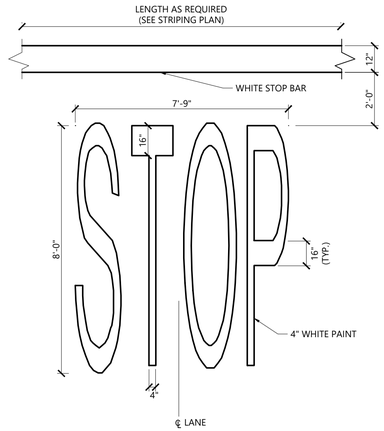


1. THIS DIMENSION SHALL BE A MINIMUM OF 5' FOR ACCESSIBLE SIGNAGE.
2. THIS DIMENSION SHALL BE A MAXIMUM OF 8' FOR ACCESSIBLE SIGNAGE

Sign Post - Type 'B'

3/19

N.T.S. | Source: VHB | LD_702



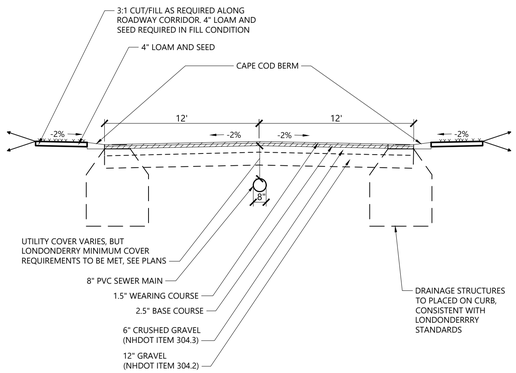
NOTES

1. PAVEMENT MARKINGS TO BE INSTALLED FOR ON SITE WORK IN LOCATIONS SHOWN.

Pavement Markings - Stop Marking & Bar

1/16

N.T.S. | Source: VHB | LD_554

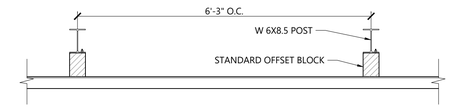


NOTES

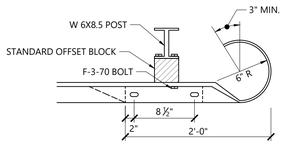
1. LOCATION OF WATER LINE VARIES. SEE PLAN FOR LOCATION.

24' Roadway Section Detail

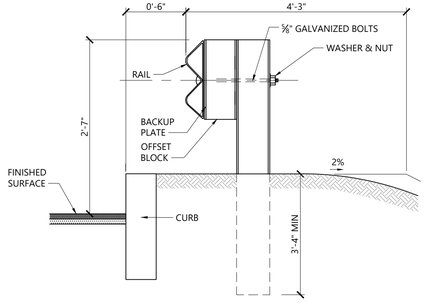
N.T.S. | Source: VHB



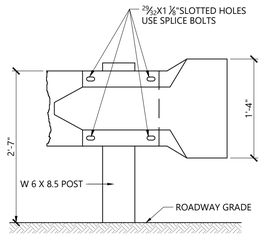
PLAN VIEW



PLAN VIEW



SECTION VIEW

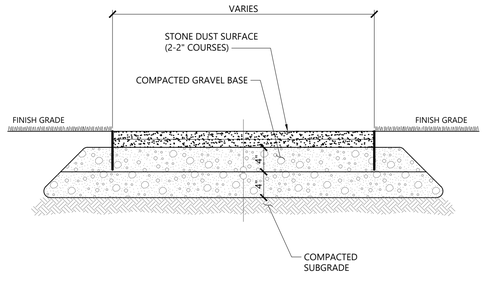


ELEVATION VIEW

Steel Beam Guardrail with Steel Post

10/20

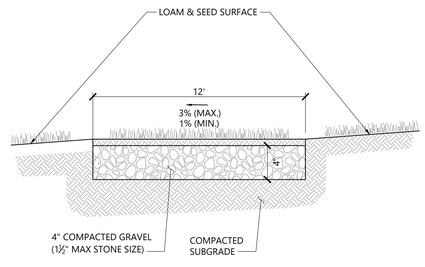
N.T.S. | Source: VHB | LD_456



Stonedust Path

02/25

N.T.S. | Source: VHB | REV



SECTION

12' Access Path

11/25

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
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No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

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Drawing Title: Site Details 1

Drawing Number: C7.01



Sheet 26 of 41

Project Number: 53140.44

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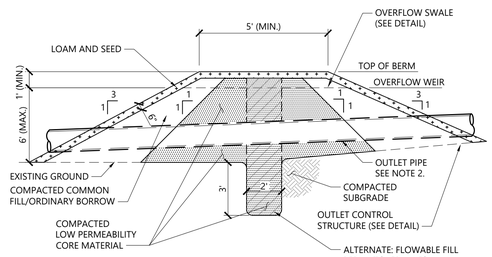


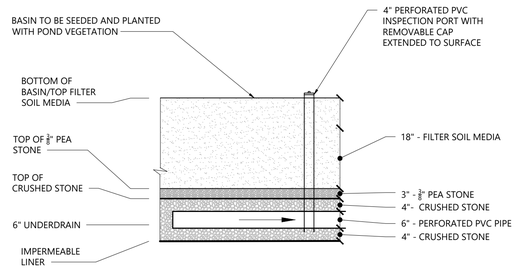
NOTES

1. LOW PERMEABILITY CORE MATERIAL IS CONTINUOUS FOR THE FULL LENGTH OF THE EMBANKMENT.
2. WHERE PIPES PENETRATE THE LOW PERMEABILITY CORE, PIPE SHALL BE BEDDED IN THE LOW PERMEABILITY CORE MATERIAL.
3. THE BERM SECTION IS SUBJECT TO CHANGE AND WILL BE BASED ON THE RESULTS OF FURTHER GEOTECHNICAL INVESTIGATIONS.

Detention Basin Berm Section

12/20

N.T.S. Source: VHB LD_160



NOTES

1. FILTER SOIL MEDIA SHALL CONSIST (BY VOLUME) OF:
   - 60% TO 85% SAND (0.5 TO 2.0 MM) (SEE SPECS BELOW)
   - 15% TO 25% LOAM OR TOPSOIL
   - 3% TO 8% ORGANIC MATTER

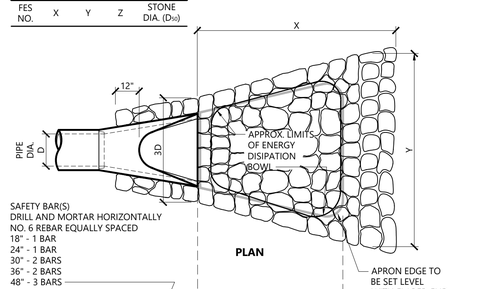
   * ALTERNATIVELY, USE MEDIA SPECIFIED IN THE ALTERATION OF TERRAIN RULES, Env-Wq 1508.07(k)
2. ⅜" PEASTONE SHALL CONFORM TO ASTM-33 #8 GRADATION, OR APPROVED EQUAL.

Basin Sand Filter

N.T.S. Source: VHB

RIPRAP STONE

FES NO.	X	Y	Z	STONE DIA. (D_{50})

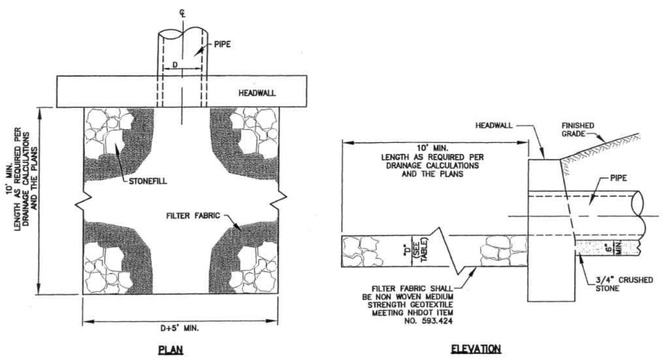


SECTION A-A

Flared End Section (FES) with Stone Protection

3/19

N.T.S. Source: VHB LD_134



PLAN ELEVATION

NOTE: STONEFILL SHALL CONFORM TO THE LATEST EDITION OF THE NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 585, STONE FILL WITH THE FOLLOWING REQUIREMENTS:

% OF PASSING BY WEIGHT	STONE SIZES C1	C2	C3
	D = BLANKET THICKNESS		
	12"	18"	24"
100%	8"	12"	18"
85%	7"	11"	16"
50%	5"	8"	12"
15%	2"	3"	4"

NOTE: ALL STONEFILL TO BE SIZE "C1" MIN. EXCEPT WHERE OTHERWISE REQUIRED PER DRAINAGE CALCULATIONS AND THE PLANS.

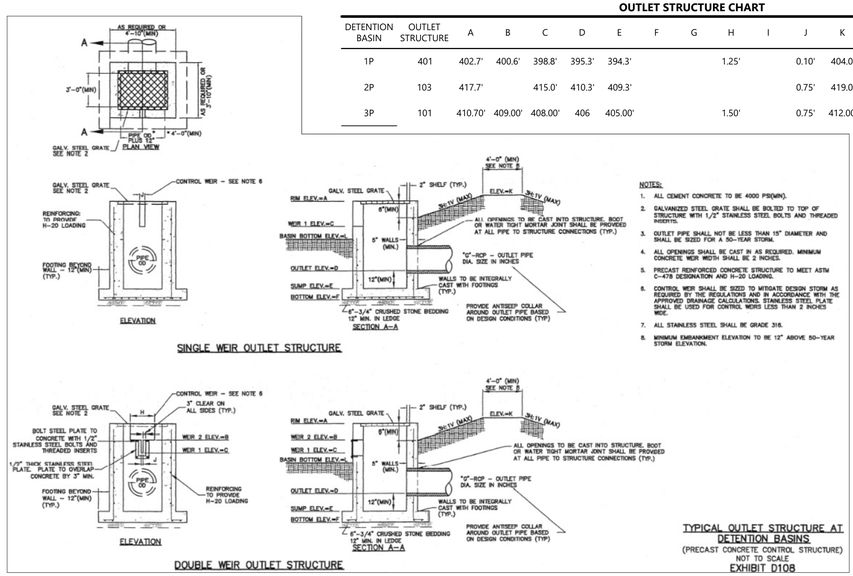
HEADWALL WITH STONEFILL APRON

NOT TO SCALE

EXHIBIT D107

OUTLET STRUCTURE CHART

DETENTION BASIN	OUTLET STRUCTURE	A	B	C	D	E	F	G	H	I	J	K	L	UNDERDRAIN DIAMETER	UNDERDRAIN CAP DIAMETER
1P	401	402.7'	400.6'	398.8'	395.3'	394.3'			1.25'		0.10'	404.0'	398.0'	6.0"	1.0"
2P	103	417.7'		415.0'	410.3'	409.3'					0.75'	419.0'	414.0'	6.0"	2.0"
3P	101	410.70'	409.00'	408.00'	406	405.00'			1.50'		0.75'	412.00'	408.00'	-	-



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Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by SJF Checked by DHF

Issued for **Permitting** Date **October 14, 2025**

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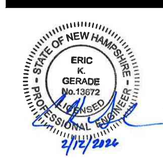
Drawing Title
Site Details 2

Drawing Number
C7.02

Sheet 27 of 41

Project Number
53140.44



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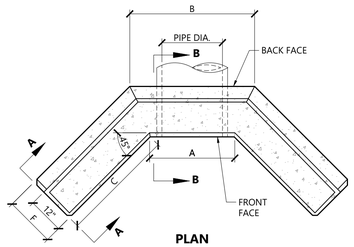
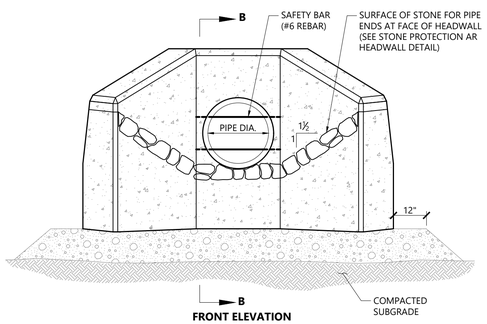
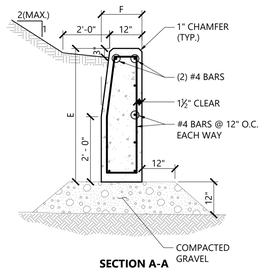
\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londonderry\cad\ld\Concepts\44 Pillsbury Rd\cad\ld\Planset\5314044-DT.dwg



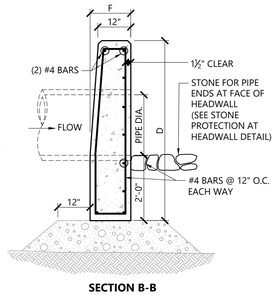
PLAN



FRONT ELEVATION



SECTION A-A



SECTION B-B

DIMENSIONAL TABLE

PIPE DIA.	A	B	C	D	E	F	#OF SAFETY BARS
12"	2'-6"	3'-8"	2'-11"	4'-0"	3'-3"	1'-6"	
15"	2'-6"	3'-8"	2'-11"	4'-0"	3'-6"	1'-6"	1
18"	3'-0"	4'-2"	3'-3"	4'-6"	3'-6"	1'-6"	1
24"	3'-6"	4'-8"	3'-6"	5'-0"	3'-9"	1'-6"	1
30"	4'-0"	5'-3"	4'-3"	5'-10"	4'-0"	1'-6"	2
36"	4'-6"	5'-11"	5'-0"	6'-4"	4'-3"	1'-8"	2
42"	5'-0"	6'-6"	5'-9"	6'-11"	4'-6"	1'-10"	3
48"	5'-6"	7'-2"	6'-6"	7'-5"	4'-9"	2'-0"	3
60"	6'-6"	8'-5"	8'-0"	8'-6"	5'-3"	2'-4"	4
72"	7'-6"	9'-9"	9'-6"	9'-7"	5'-9"	2'-8"	5

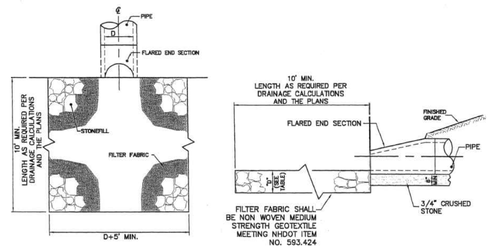
NOTES

1. CONCRETE SHALL BE 6% ±1.5% AIR ENTRAINED TYPE II CEMENT WITH MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
2. INSTALL IMPERMEABLE TRENCH DAM ANTI-SEEP COLLAR AROUND DRAIN PIPE PRIOR TO HEADWALL LOCATION.
3. SAFETY BARS TO BE OMITTED WHERE INDICATED ON PLANS.
4. SAFETY BARS SHALL BE SET TO CREATE EQUAL OPENING DIMENSIONS.

Concrete Headwall (HW) with Wing Walls

10/20

N.T.S. Source: VHB REV LD_132



PLAN ELEVATION

NOTE: STONEFILL SHALL CONFORM TO THE LATEST EDITION OF THE NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 585, STONE FILL WITH THE FOLLOWING REQUIREMENTS:

% OF PASSING BY WEIGHT	STONE SIZES C1 C2 C3 D = BLANKET THICKNESS 12" 18" 24"
100%	6" 12" 18"
85%	7" 11" 16"
50%	5" 8" 12"
15%	2" 3" 4"

NOTE: ALL STONEFILL TO BE SIZE "C1" MIN. EXCEPT WHERE OTHERWISE REQUIRED PER DRAINAGE CALCULATIONS AND THE PLANS.

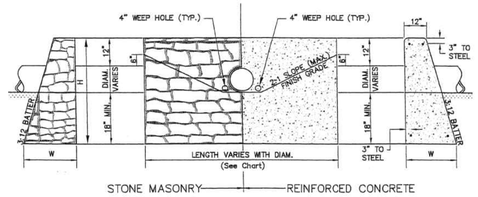
TYPICAL PIPE END SECTION (FLARED END) WITH STONEFILL APRON

NOT TO SCALE

EXHIBIT D105

DRAIN PIPE DIAMETER	12"	15"	18"	24"	30"
LENGTH	3'-6"	4'-6"	5'-6"	7'-6"	9'-6"
HEIGHT (H)	3'-6"	3'-9"	4'-0"	4'-6"	5'-0"
BOTTOM WIDTH (W)	1'-10.5"	1'-11.25"	2'-0"	2'-1.5"	2'-3"
CONC. (Cu.Yd.)	0.61	0.85	1.13	1.78	2.58
STEEL (Lbs.)	9	11	14	20	25

ALL STEEL SHALL BE #4 BARS, MEETING NHDOT REQUIREMENTS



NOTES:
1. ALL CONCRETE SHALL BE CLASS A
2. ALL HEADWALLS SHALL MEET NHDOT REQUIREMENTS. FOR LARGER PIPE DIAMETERS, USE THE NHDOT STANDARD PLANS.

HEADWALLS (MASONRY & CONCRETE)

NOT TO SCALE

EXHIBIT D106

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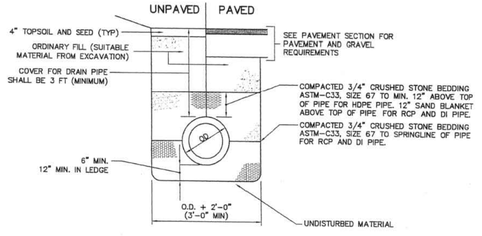


NOTE:

DRAIN PIPE SHALL BE 15" DIAMETER MIN.

PLASTIC DRAIN PIPE (HDPE) SHALL BE ADS N-12 (CORRUGATED EXTERIOR/SMOOTH INTERIOR) OR EQUAL MEETING AASHTO M-252 AND H-20 LOADING.

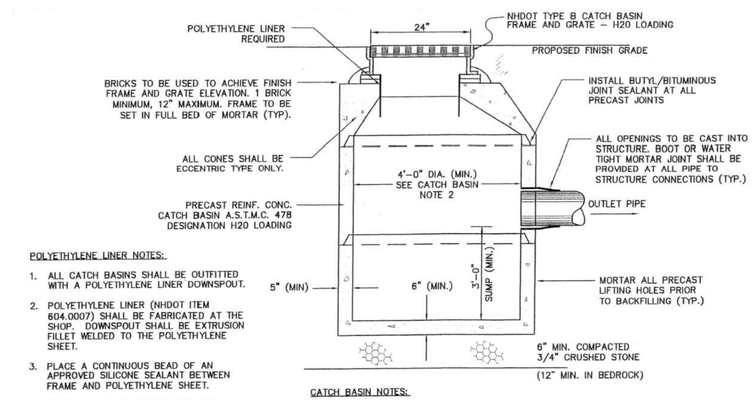
DI DRAIN PIPE SHALL BE CL. 50.

RC DRAIN PIPE SHALL BE CLASS III UNLESS OTHERWISE NOTED.

TYPICAL DRAIN PIPE TRENCH

NOT TO SCALE

EXHIBIT D101



POLYETHYLENE LINER NOTES:

1. ALL CATCH BASINS SHALL BE OUTFITTED WITH A POLYETHYLENE LINER DOWNSPOUT.
2. POLYETHYLENE LINER (NHDOT ITEM 604.0007) SHALL BE FABRICATED AT THE SHOP. DOWNSPOUT SHALL BE EXTRUSION FILLET WELDED TO THE POLYETHYLENE SHEET.
3. PLACE A CONTINUOUS BEAD OF AN APPROVED SILICONE SEALANT BETWEEN FRAME AND POLYETHYLENE SHEET.
4. PLACE CLASS AA CONCRETE TO 2" BELOW THE TOP OF GRATE ELEVATION (SUBSIDIARY TO DRAINAGE STRUCTURE).
5. TRIM POLYETHYLENE SHEET A MAXIMUM OF 4" OUTSIDE THE FLANGE ON THE FRAME FOR THE CATCH BASIN BEFORE PLACING CONCRETE (EXCEPT AS SHOWN WHEN USED WITH CURB).
6. THE CENTER OF THE GRATE & FRAME MAY BE SHIFTED A MAXIMUM OF 3" FROM THE CENTER OF THE DOWNSPOUT IN ANY DIRECTION.

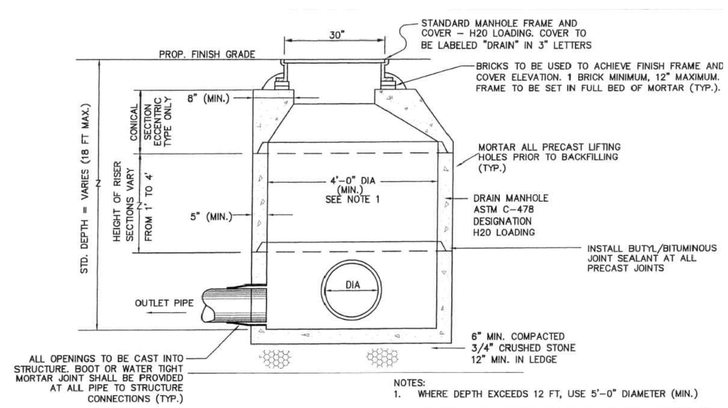
CATCH BASIN NOTES:

1. WHERE DEPTH EXCEEDS 12 FT, USE 5'-0" DIAMETER (MIN.) MAXIMUM DEPTH = 18 FEET
2. MINIMUM PIPE DROP (INLET TO OUTLET) SHALL BE 3" UNLESS OTHERWISE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS AND ENGINEERING.
3. ALL BOOTS, GASKETS AND SEALANTS SHALL BE IN ACCORDANCE WITH MANUFACTURES WRITTEN INSTRUCTIONS

CATCH BASIN DETAIL

NOT TO SCALE

EXHIBIT D104



NOTES:
1. WHERE DEPTH EXCEEDS 12 FT, USE 5'-0" DIAMETER (MIN.)
2. MINIMUM PIPE DROP (INLET TO OUTLET) SHALL BE 3" UNLESS OTHERWISE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS AND ENGINEERING.
3. ALL BOOTS, GASKETS AND SEALANTS SHALL BE IN ACCORDANCE WITH MANUFACTURES WRITTEN INSTRUCTIONS

PRECAST DRAIN MANHOLE DETAIL

NOT TO SCALE

EXHIBIT D103

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by SJF Checked by DHF

Issued for Permitting Date October 14, 2025

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Drawing Title: Site Details 3

Drawing Number: C7.03

Sheet 28 of 41

Project Number: 53140.44



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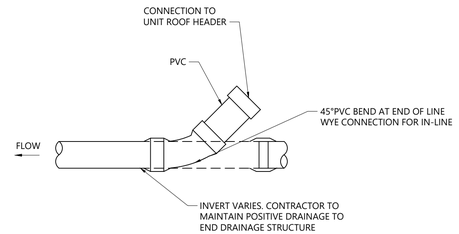
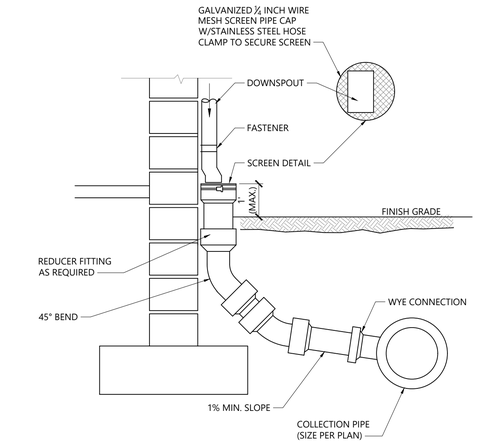


Roof Header Connection

2/26

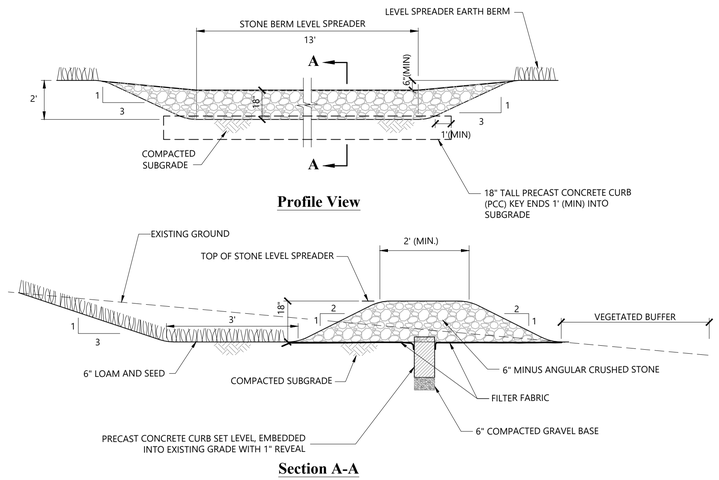
N.T.S. Source: VHB REV



Downspout Rain Leader

1/16

N.T.S. Source: VHB LD_195



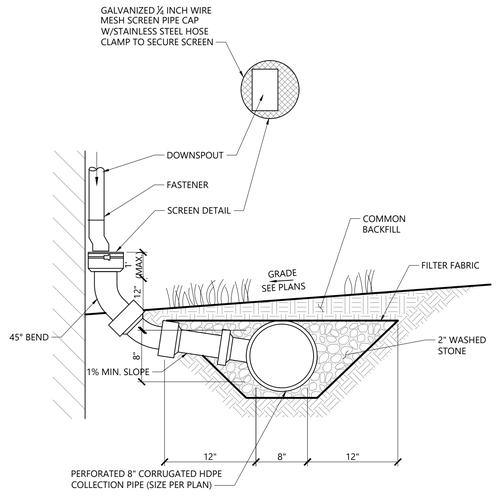
NOTES:

1. SEE GRADING AND DRAINAGE PLANS FOR ELEVATIONS.
2. ANY DISTURBED AREA DOWNSLOPE FROM THE LEVEL SPREADER SHALL BE STABILIZED WITH EROSION CONTROL BLANKETS AND REVEGETATED.

Stone Berm Level Spreader Detail

1/16

N.T.S. Source: VHB



NOTES

1. SEE PLAN VIEW FOR SLOPES OF HEADER DRAINAGE SYSTEM.
2. COMBINATION DOWNSPOUT AND FRENCH DRAIN TO BE UTILIZED WHERE FINISHED GRADE SLOPES ARE DIRECTED TOWARDS DWELLING UNITS. IN ALL OTHER INSTANCES WHERE FINISHED GRADE IS DIRECTED AWAY FROM DWELLING UNITS, THE DOWNSPOUT RAIN LEADER DETAIL SHALL BE REFERENCED, THIS SHEET.

Combination Downspout and French Drain

1/16

N.T.S. Source: VHB REV LD_184

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Rosecrans Drive at Thornton Hill

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Designed by SJF Checked by DHF

Issued for Date

Permitting October 14, 2025

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Drawing Title

Site Details 4

Drawing Number

C7.04

Sheet 29 of 41

Project Number

53140.44



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Notes

1. THE SEWER CONNECTIONS SHALL BE INSPECTED BY AUTHORIZED TOWN OF LONDONDERRY PUBLIC WORKS AND ENGINEERING DEPARTMENT PERSONNEL BEFORE ANY BACKFILLING. INSPECTION HOURS ARE BETWEEN 9:00AM AND 4:30 PM, MONDAY - FRIDAY, WITH AT LEAST 2 DAYS OF ADVANCE NOTICE

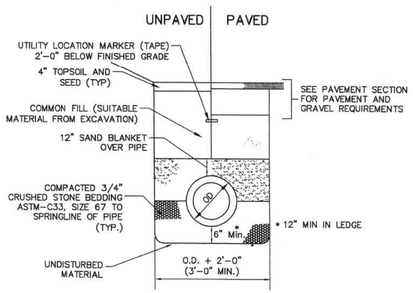
2. THE SEWER SERVICE MANHOLES SHALL BE VACUUM TESTED AND THE PVC PIPING PRESSURE TESTED WITH AUTHORIZED TOWN OF LONDONDERRY PUBLIC WORKS AND ENGINEERING DEPARTMENT PERSONNEL PRESENT ON SITE AS A WITNESS. SEWER MANHOLES SHALL BE VACUUM TESTED IN ACCORDANCE WITH ENV-WQ 704.17 AND GRAVITY SEWER PIPE SHALL BE TESTED IN ACCORDANCE WITH ENV-WQ 704.06 AND THE PROJECT SPECIFICATIONS.

3. ALL SEWER CONSTRUCTION AND USE SHALL CONFORM TO THE STATE OF NEW HAMPSHIRE STANDARD SEWER CONSTRUCTION SPECIFICATIONS AND THE TOWN OF LONDONDERRY SEWER USE ORDINANCE.

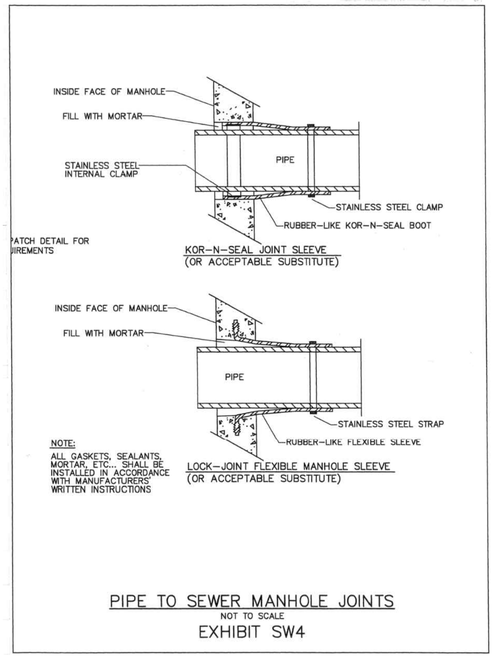
4. PRIOR TO CONSTRUCTION, CONTRACTOR TO FIELD VERIFY AS-BUILT CONDITIONS AT SMH 102 (BY OTHERS) AND THE STUB (BY OTHERS) BETWEEN SMH 101 AND 102 AND REPORT BACK DISCREPANCIES TO THE DESIGN ENGINEER.

Sewer Notes 6/10

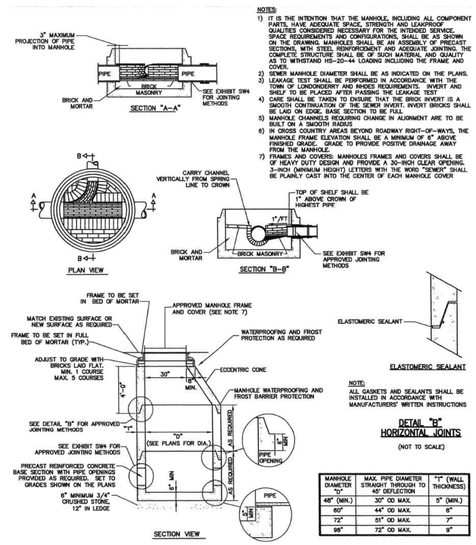
N.T.S. Source: VHB LD_



TYPICAL SEWER PIPE TRENCH
NOT TO SCALE
EXHIBIT SW1

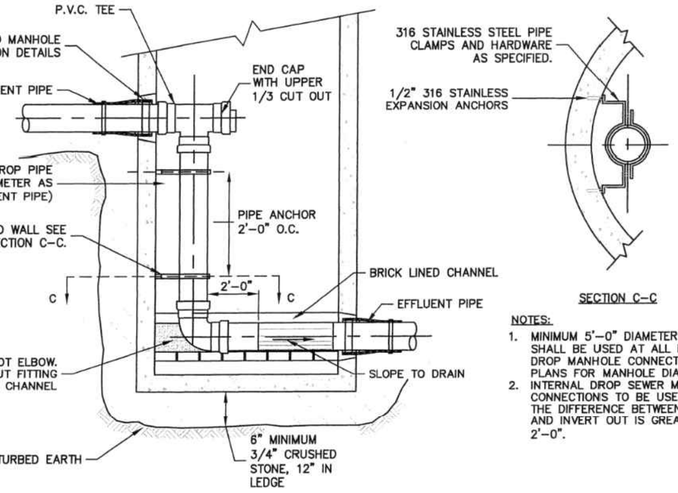


PIPE TO SEWER MANHOLE JOINTS
NOT TO SCALE
EXHIBIT SW4



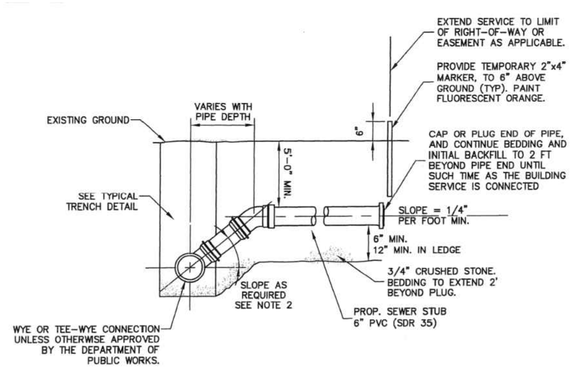
MANHOLE DIAMETER "D"	MAX. PIPE DIAMETER STRAIGHT THROUGH TO 45° DEFLECTION	"T" (WALL THICKNESS)
48" (MIN.)	30" OD MAX.	5" (MIN.)
60"	44" OD MAX.	6"
72"	51" OD MAX.	7"
96"	72" OD MAX.	9"

TYPICAL SEWER MANHOLE
NOT TO SCALE
EXHIBIT SW2



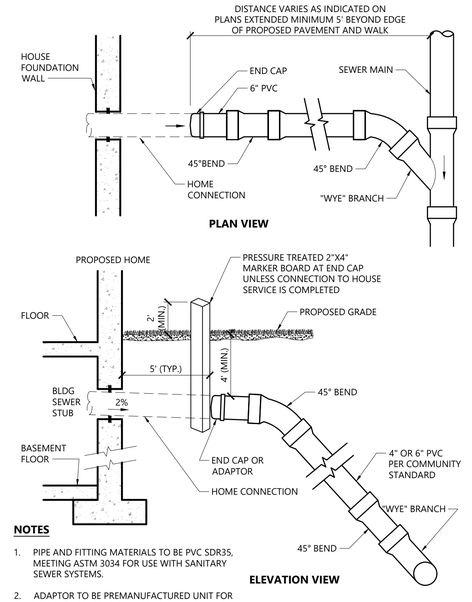
NOTES:
1. MINIMUM 5'-0" DIAMETER MANHOLES SHALL BE USED AT ALL INTERNAL DROP MANHOLE CONNECTIONS. SEE PLANS FOR MANHOLE DIAMETER.
2. INTERNAL DROP SEWER MANHOLE CONNECTIONS TO BE USED WHERE THE DIFFERENCE BETWEEN INVERT IN AND INVERT OUT IS GREATER THAN 2'-0".

TYPICAL SEWER MANHOLE WITH INTERNAL DROP CONNECTION
NOT TO SCALE
EXHIBIT SW3



NOTES:
1. ALL SERVICE CONNECTIONS TO BE 6" MINIMUM UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. USE CHIMNEY DETAIL WHERE SERVICE CONNECTION ENTERS SEWER AT GREATER THAN 60° TO THE HORIZONTAL.

DETAIL FOR SEWER SERVICE CONNECTION
NOT TO SCALE
EXHIBIT SW5



NOTES
1. PIPE AND FITTING MATERIALS TO BE PVC SDR35, MEETING ASTM 3034 FOR USE WITH SANITARY SEWER SYSTEMS.
2. ADAPTOR TO BE PREMANUFACTURED UNIT FOR CONNECTION OF PIPE TYPES

Typical Wye and Chimney Detail (Residential) 1/16

N.T.S. Source: VHB LD_222

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Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by SJF Checked by DHF

Issued for Permitting Date October 14, 2025

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Drawing Title
Site Details 5

Drawing Number
C7.05

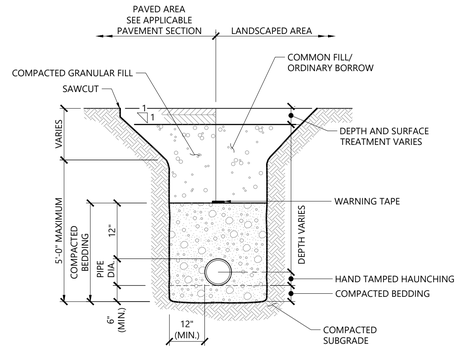
Sheet 30 of 41

Project Number
53140.44



Saved Thursday, February 12, 2026 12:09:03 AM BZOLLER Plotted Thursday, February 12, 2026 1:13:43 AM Ben Zoller

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Concepts\44 Pillsbury Rd\cad\ld\Planset\5314044-DT.dwg



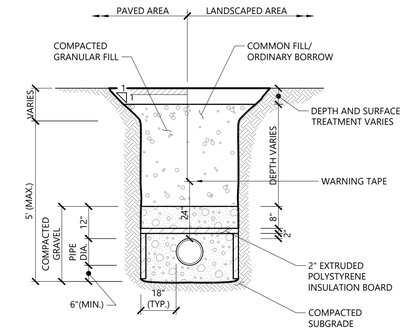
NOTES

1. WHERE UTILITY TRENCHES ARE CONSTRUCTED THROUGH DETENTION BASIN BERMS OR OTHER SUCH SPECIAL SECTIONS, PLACE TRENCH BACKFILL WITH MATERIALS SIMILAR TO THE SPECIAL SECTION REQUIREMENTS.
2. USE METALLIC TRACING/WARNING TAPE OVER ALL PIPES.
3. COMPACTED GRANULAR FILL MAY CONSIST OF GRAVEL, CRUSHED STONE, SAND, OR OTHER MATERIAL AS APPROVED BY ENGINEER.

Utility Trench

11/19

N.T.S. Source: VHB LD_300



NOTES

1. SEWER LINE SHALL BE INSULATED WHEN COVER IS LESS THAN FOUR (4) FEET AND WHERE SHOWN ON PLANS.
2. WATER LINE SHALL BE INSULATED WHEN COVER IS LESS THAN FIVE (5) FEET AND WHERE SHOWN ON PLANS.
3. BACKFILL PLACED IN UTILITY TRENCHES INCLUDING DISTURBED AREAS SURROUNDING UTILITY TRENCHES SHALL BE PLACED AND COMPACTED IN 12" (MAX.) VERTICAL LIFTS.

Utility - Pipe Insulation

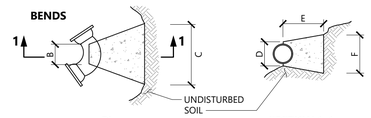
12/19

N.T.S. Source: VHB LD_305

TABLE OF DIMENSIONS

BENDS	B	C	D	E	F	BENDS	B	C	D	E	F
6" 11 ¼°	8"	15"	12"	24"	12"	6" 45°	8"	30"	12"	24"	14"
6" 22 ½°	"	19"	"	"	13"	6" 90°	"	30"	"	"	27"
8" 11 ¼°	"	20"	"	"	12"	8" 45°	"	30"	"	"	24"
8" 22 ½°	"	22"	"	"	17"	8" 90°	"	38"	"	"	36"
12" 11 ¼°	"	30"	"	"	15"	12" 45°	"	40"	"	"	40"
12" 22 ½°	"	35"	"	"	25"	12" 90°	"	60"	"	"	52"

BENDS

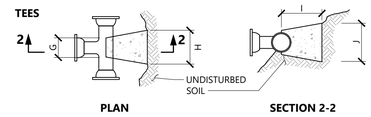


Plan **SECTION 1-1**

TABLE OF DIMENSIONS

TEES	G	H	I	J	TEES	G	H	I	J
6"X6"X6"	12"	24"	24"	18"	12"X12"X6"	12"	24"	24"	18"
8"X8"X6"	"	"	"	"	12"X12"X8"	"	"	"	24"
8"X8"X8"	"	"	"	24"	12"X12"X12"	"	36"	"	36"

TEES



PLAN **SECTION 2-2**

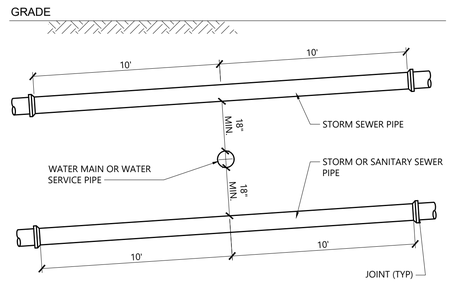
NOTES

1. PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE VALVES, AND VERTICAL BENDS (SAME SIZE AS REQUIRED FOR TEES). PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE VALVES.
2. CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND FITTING.
3. CONCRETE SHALL BE 3,000 PSI-TYPE I.

Concrete Thrust Block

1/16

N.T.S. Source: VHB LD_260



NOTES

1. WHERE SEWER LINE CROSSES OVER WATER LINE, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER AND WATER LINE. SEWER LINE JOINTS SHALL BE 10 FEET FROM THE POINT OF CROSSING WHERE SEWER LINES CROSS OVER WATER LINES.
2. WHERE WATER LINE CROSSES OVER SEWER LINE AND 18 INCH SEPARATION CANNOT BE MAINTAINED, BOTH WATER AND SEWER LINES SHALL BE CONSTRUCTED OF PRESSURE PIPE AND A MINIMUM SEPARATION BETWEEN THE BOTTOM OF THE WATER LINE AND THE TOP OF THE SEWER LINE OF 12 INCHES SHALL BE MAINTAINED.
3. IN THE EVENT THAT A STORM SEWER CROSSES OVER A SANITARY SEWER, THE SANITARY SEWER MUST BE CONSTRUCTED OF DIP UNLESS 18 INCH SEPARATION IS MAINTAINED.

Water/Sanitary/Drainage Pipe Crossing

11/25

N.T.S. Source: VHB REV

vhb.com

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100 Ferry Street
Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
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Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
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Drawing Title: Site Details 6

Drawing Number: C7.06

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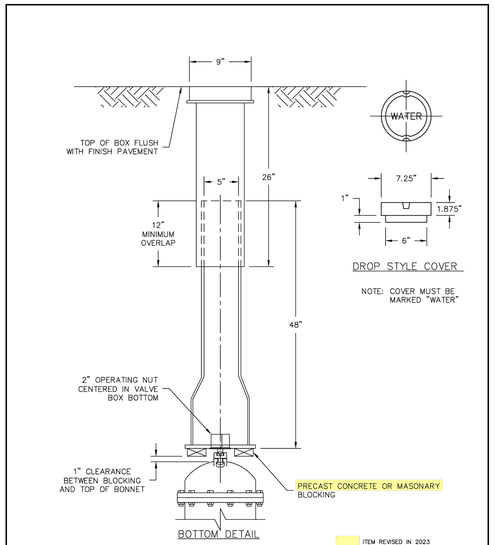
Project Number: 53140.44



Saved Thursday, February 12, 2026 12:09:03 AM BZOLLER Plotted Thursday, February 12, 2026 1:06:42 AM Ben Zoller

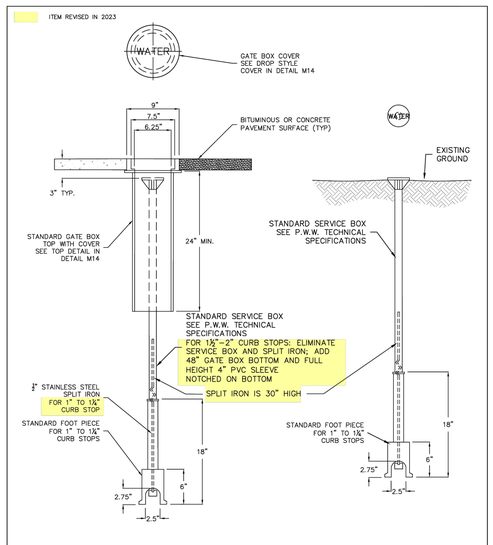


ITEM REVISED IN 2023

NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.

PENNICHUCK WATER

DETAIL M14
TYPICAL VALVE BOX DETAIL
PENNICHUCK WATER WORKS, INC.
REV: 03-15-2023 SCALE: NTS

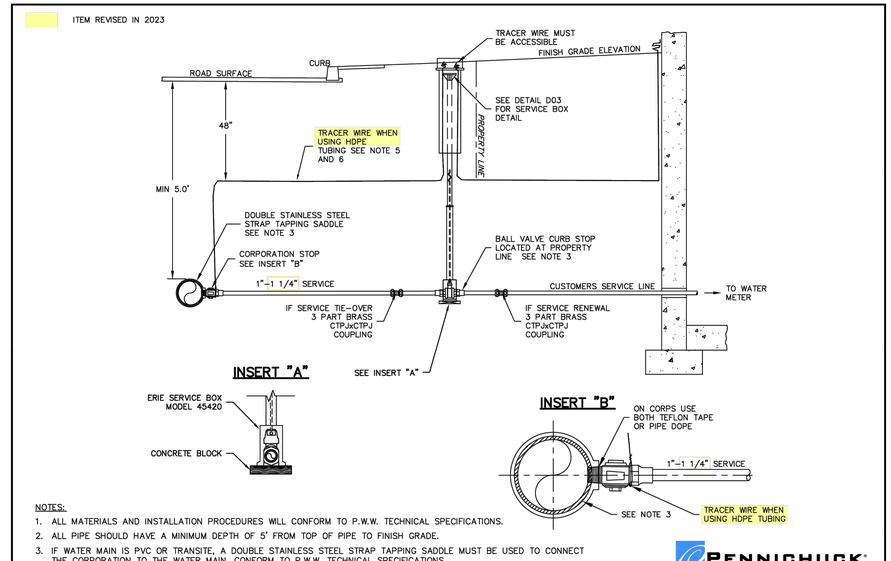


NOTE:
ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.

PENNICHUCK WATER

DETAIL D03
TYPICAL SERVICE BOX DETAIL IN PAVED AREAS
PENNICHUCK WATER WORKS, INC.
REV: 03-15-2023 SCALE: NTS

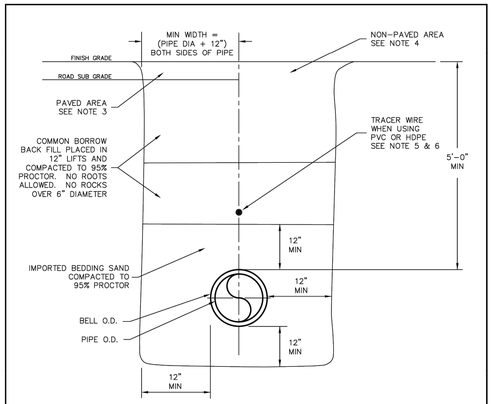
ITEM REVISED IN 2023



NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. IF WATER MAIN IS PVC OR TRANSITE, A DOUBLE STAINLESS STEEL STRAP TAPPING SADDLE MUST BE USED TO CONNECT THE CORPORATION TO THE WATER MAIN. CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.
4. IF TAPPING A FIRE SERVICE, THEN SEE DETAIL D15 AND D16.
5. USE 10-GAUGE SOLID-CORE COATED BLUE TRACER WIRE PER P.W.W. TECHNICAL SPECIFICATIONS. SPLICES REQUIRE SNAKEBITE LSC1030C LOCKING CONNECTORS OR EQUAL.
6. INSTALL 3" WIDE BLUE UNDERGROUND WARNING TAPE.
7. SERVICE TO BE PLACED ON 1' COMPACTED SAND BED AND COVERED IN 1' COMPACTED SAND BED.

PENNICHUCK WATER

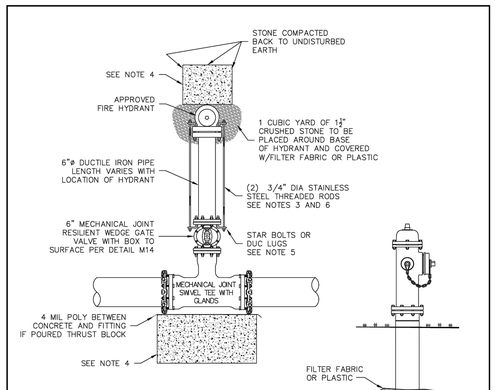
DETAIL D01
TYPICAL 1"-1 1/4" SERVICE & VALVE BOX INSTALLATION DETAIL
PENNICHUCK WATER WORKS, INC.
REV: 03-15-2023 SCALE: NTS



NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5'-0" FROM TOP OF PIPE TO FINISH GRADE.
3. REQUIREMENTS FOR SUBBASE AND BASE MATERIAL TYPE ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY HAVING LOCAL JURISDICTION IN PAVED AREAS.
4. REQUIREMENTS FOR GRAVEL, LOAM AND/OR SEED ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY HAVING LOCAL JURISDICTION IN NON-PAVED AREAS.
5. USE 10-GAUGE SOLID-CORE COATED TRACER WIRE PER P.W.W. TECHNICAL SPECIFICATIONS.
6. INSTALL 3" WIDE BLUE UNDERGROUND WARNING TAPE.

PENNICHUCK WATER

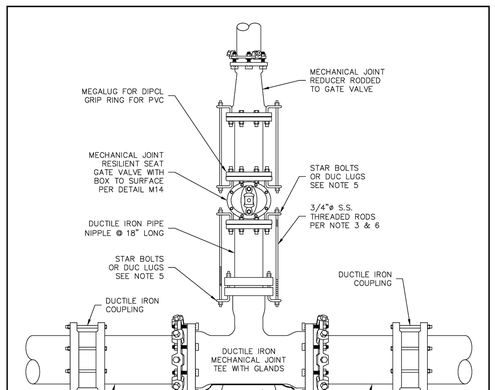
DETAIL M02.1
TYPICAL TRENCH DETAIL
PENNICHUCK WATER WORKS, INC.
REV: 11-1-2021 SCALE: NTS



NOTES:
1. ALL MATERIAL AND INSTALLATION PROCEDURES WILL CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTHS OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. 3/4"ø S.S. RODS SHALL BE USED IN CONJUNCTION WITH REQUIRED S.S. NUTS. RODS ARE TO BE ATTACHED TO FITTINGS WITH EITHER STAR BOLTS OR DUC LUGS. 10" FITTING OR SMALLER = (2) 3/4"ø S.S. RODS & ASSOC. HARDWARE. 12" FITTING OR LARGER = (4) 3/4"ø S.S. RODS & ASSOC. HARDWARE.
4. MIN 2'x2'x3' PRE CAST CONCRETE THRUST BLOCK MAY BE USED WITH P.W.W. APPROVAL OR CONCRETE THRUST BLOCK POURED AGAINST UNDISTURBED EARTH – SIZE TO BE BASED ON SIZE OF FITTING AND PRESSURE IN WATER MAIN. SEE DETAIL M10.
5. SEE PWW TECHNICAL SPECIFICATION SECTION 01600.C.16.F
6. ALL MECHANICAL JOINT FITTINGS SEPARATED BY PIPE LENGTH OF 10 FEET OR LESS MUST BE RODDED PER PWW TECHNICAL SPECIFICATION SECTION 01600E.2.F IF SEPARATION IS MORE THAN 10 FEET SUBSTITUTE MEGALUGS (OR GRIP RINGS) IN LIEU OF THREADED RODS.

PENNICHUCK WATER

DETAIL M15
TYPICAL HYDRANT INSTALLATION
PENNICHUCK WATER WORKS, INC.
REV: 11-1-2021 SCALE: NTS



NOTES:
1. ALL MATERIAL AND INSTALLATION PROCEDURES WILL CONFORM TO P.W.W. TECHNICAL SPECIFICATIONS.
2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5' FROM TOP OF PIPE TO FINISH GRADE.
3. 3/4"ø S.S. RODS SHALL BE USED IN CONJUNCTION WITH REQUIRED S.S. NUTS. RODS ARE TO BE ATTACHED TO FITTINGS WITH EITHER STAR BOLTS OR DUC LUGS. 10" FITTING OR SMALLER = (2) 3/4"ø S.S. RODS & ASSOC. HARDWARE. 12" FITTING OR LARGER = (4) 3/4"ø S.S. RODS & ASSOC. HARDWARE.
4. MIN 2'x2'x3' PRE CAST CONCRETE THRUST BLOCK MAY BE USED WITH P.W.W. APPROVAL OR CONCRETE THRUST BLOCK POURED AGAINST UNDISTURBED EARTH – SIZE TO BE BASED ON SIZE OF FITTING AND PRESSURE IN WATER MAIN. SEE DETAIL M10.
5. SEE PWW TECHNICAL SPECIFICATION SECTION 01600.C.16.F
6. ALL MECHANICAL JOINT FITTINGS SEPARATED BY PIPE LENGTH OF 10 FEET OR LESS MUST BE RODDED PER PWW TECHNICAL SPECIFICATION SECTION 01600E.2.F IF SEPARATION IS MORE THAN 10 FEET SUBSTITUTE MEGALUGS (OR GRIP RINGS) IN LIEU OF THREADED RODS.

PENNICHUCK WATER

DETAIL M09
TYPICAL TEE INSTALLATION ON EXISTING MAIN
PENNICHUCK WATER WORKS, INC.
REV: 11-1-2021 SCALE: NTS

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Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
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Drawing Title
Site Details 7

Drawing Number
C7.07



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Project Number
53140.44

Saved Thursday, February 12, 2026 12:09:03 AM BZOLLER Plotted Thursday, February 12, 2026 1:15:12 AM Ben Zoller

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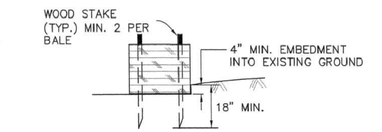
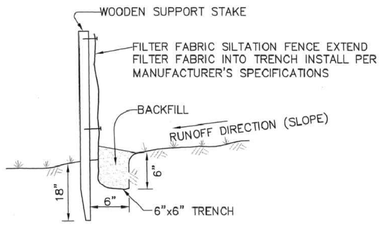


STAKED HAYBALE DETAIL

(NOT TO SCALE)



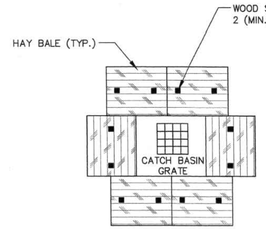
SILT FENCE DETAIL

(NOT TO SCALE)

DETAILS FOR HAYBALE AND SILT FENCE INSTALLATION

NOT TO SCALE

EXHIBIT EC1



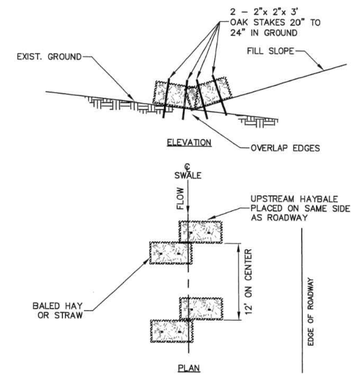
NOTES:

1. BALES TO REMAIN UNTIL SUBBASE PREPARATION IS COMPLETE AND ROADWAY PAVING IS TO BEGIN OR UNTIL ALL UPSTREAM AREAS ARE STABILIZED WITH VEGETATION.
2. HAYBALES AROUND CATCH BASINS TO BE USED IN NON-PAVED AREAS ONLY. FOR CATCH BASINS IN PAVED AREAS USE INLET FILTER BASKETS. SEE EXHIBIT EC6.
3. EACH CATCH BASIN LOCATION SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM ENTERING THE DRAINAGE PIPING SYSTEM AND/OR CAUSING SURFACE FLOODING.

DETAILS FOR SEDIMENT CONTROL AT CATCH BASINS

NOT TO SCALE

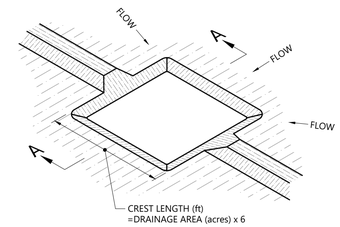
EXHIBIT EC2



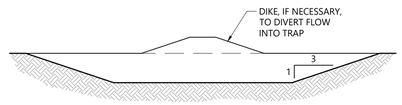
DETAILS FOR HAY BALE CHECK DAM

NOT TO SCALE

EXHIBIT EC3



ISOMETRIC VIEW



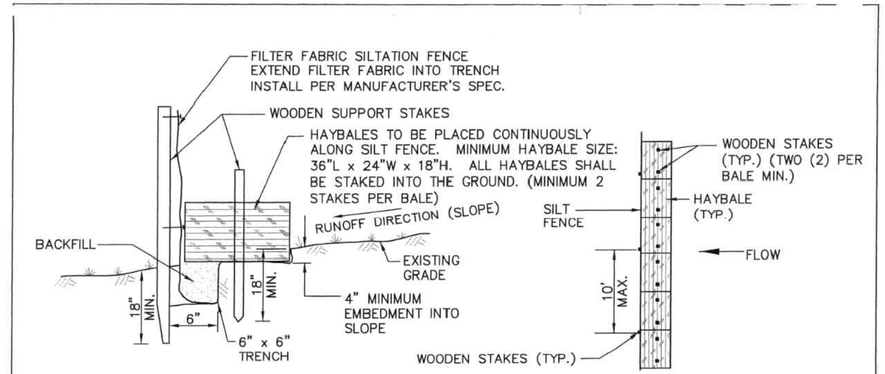
SECTION A-A

NOTES

1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA OR SOURCE OF SEDIMENT AS POSSIBLE .
2. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. THE SIDE SLOPES OF THE TRAP SHALL BE 3:1 OR FLATTER, AND SHALL BE STABILIZED IMMEDIATELY AFTER THEIR CONSTRUCTION.
5. THE OUTLET OF THE TRAP SHALL BE A MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP AND SHALL DISCHARGE TO A STABILIZED AREA.
6. THE TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. THE MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

Temporary Sediment Trap

N.T.S. Source: NH Stormwater Manual



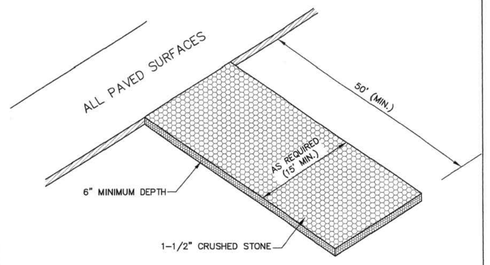
SECTION VIEW **PLAN VIEW**

NOTE: TO BE USED AT INLET END OF ALL CULVERTS AND DRAINAGE STRUCTURES.

DETAIL FOR SILT FENCE WITH HAY BALES

NOT TO SCALE

EXHIBIT EC4

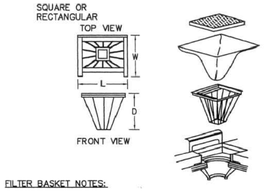


TO BE USED AT ALL STOCKPILE AND/OR STAGING AREAS.

DETAIL FOR CRUSHED STONE CONSTUCTION ENTRANCE

NOT TO SCALE

EXHIBIT EC5



FILTER BASKET NOTES:

1. INLET BASKETS SHALL BE USED ON ALL CATCH BASINS WITHIN THE PROJECT LIMITS WITHIN PAVED AREAS. INLET FILTER BASKETS SHALL BE "SILT SACK®" OR APPROVED EQUAL.
2. FILTER FABRIC SHALL BE PUSHED DOWN AND FORMED TO THE SHAPE OF THE BASKET. THE SHEET OF FABRIC SHALL BE LARGE ENOUGH TO BE SUPPORTED BY THE BASKET FRAME WHEN HOLDING SEDIMENT AND EXTEND AT LEAST 6 INCHES PAST THE FRAME. THE INLET GRATE SHALL BE PLACED OVER THE BASKET/FRAME AND WILL SERVE AS THE FABRIC ANCHOR.
3. THE FILTER FABRIC SHALL BE A GEO-TEXTILE FABRIC: POLYESTER, POLYPROPYLENE, STABILIZED NYLON, POLYETHYLENE OR POLYVINYLIDENE CHLORIDE MEETING THE FOLLOWING SPECIFICATIONS:
   GRAB STRENGTH: 300 lb. MINIMUM IN ANY PRINCIPAL DIRECTION (ASTM D-4632).
   MULLEN BURST STRENGTH: MINIMUM 800 psi (ASTM D-3786).
4. THE FABRIC SHALL HAVE AN OPENING NO GREATER THAN A NUMBER 40 U.S. STANDARD SIEVE AND MINIMUM PERMEABILITY OF 40 gpm/sq. ft.
5. THE INLET BASKET SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM ENTERING THE DRAINAGE PIPING SYSTEM AND/OR CAUSING SURFACE FLOODING.
6. INLET BASKETS SHALL BE MAINTAINED IN PLACE UNTIL ALL PAVING IS COMPLETED AND ALL UNPAVED AREAS HAVE BEEN STABILIZED WITH VEGETATION.

DETAIL FOR INLET FILTER BASKET

NOT TO SCALE

EXHIBIT EC6

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Prepared For: Procopio Enterprises, LLC
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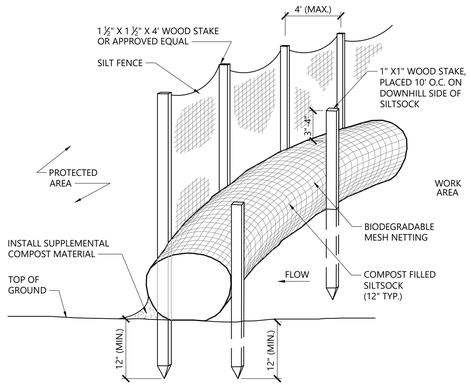
Sheet 33 of 41

Project Number: 53140.44

Saved Thursday, February 12, 2026 12:09:03 AM BZOLLER Plotted Thursday, February 12, 2026 1:01:54 AM Ben Zoller



NOTES

1. SILTSOCK SHALL BE FILTREXX SILTSOXX, OR APPROVED EQUAL.
2. SILTSOCKS SHALL OVERLAP A MINIMUM OF 12 INCHES.
3. SILTSOCK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
4. UPON SITE STABILIZATION, COMPOST MATERIAL SHALL BE DISPERSED ON SITE, AS DETERMINED BY THE ENGINEER.
5. IF NON BIODEGRADABLE NETTING IS USED THE NETTING SHALL BE COLLECTED AND DISPOSED OF OFFSITE.

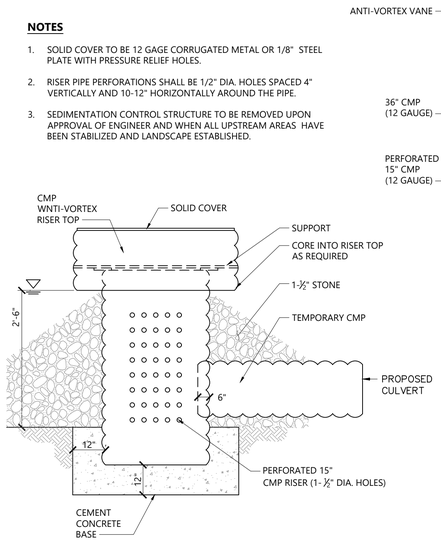
Siltsock / Silt Fence Barrier

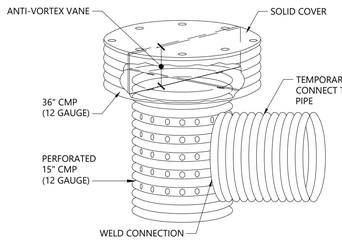
10/20

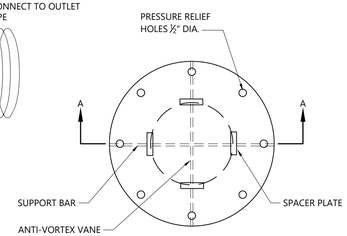
N.T.S. | Source: VHB | REV | LD_658-A

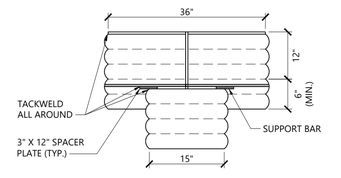
NOTES

1. SOLID COVER TO BE 12 GAGE CORRUGATED METAL OR 1/8" STEEL PLATE WITH PRESSURE RELIEF HOLES.
2. RISER PIPE PERFORATIONS SHALL BE 1/2" DIA. HOLES SPACED 4" VERTICALLY AND 10-12" HORIZONTALLY AROUND THE PIPE.
3. SEDIMENTATION CONTROL STRUCTURE TO BE REMOVED UPON APPROVAL OF ENGINEER AND WHEN ALL UPSTREAM AREAS HAVE BEEN STABILIZED AND LANDSCAPE ESTABLISHED.









SECTION A-A

Temporary Sedimentation Control Structure

1/

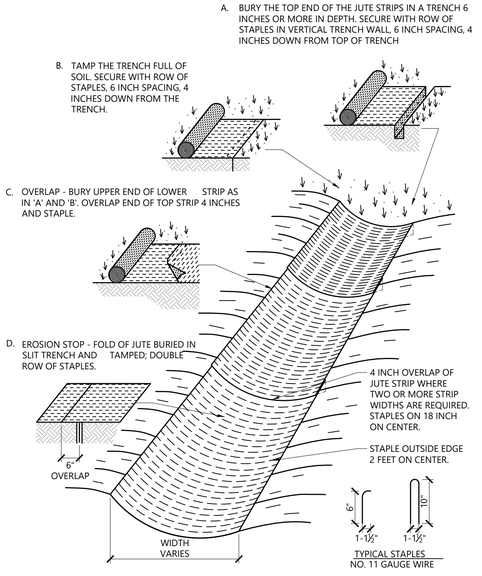
N.T.S. | Source: VHB | LD_6

A. BURY THE TOP END OF THE JUTE STRIPS IN A TRENCH 6 INCHES OR MORE IN DEPTH. SECURE WITH ROW OF STAPLES IN VERTICAL TRENCH WALL, 6 INCH SPACING, 4 INCHES DOWN FROM TOP OF TRENCH

B. TAMP THE TRENCH FULL OF SOIL. SECURE WITH ROW OF STAPLES, 6 INCH SPACING, 4 INCHES DOWN FROM THE TRENCH.

C. OVERLAP - BURY UPPER END OF LOWER STRIP AS IN 'A' AND 'B'. OVERLAP END OF TOP STRIP 4 INCHES AND STAPLE.

D. EROSION STOP - FOLD OF JUTE BURIED IN SLIT TRENCH AND TAMPED; DOUBLE ROW OF STAPLES.

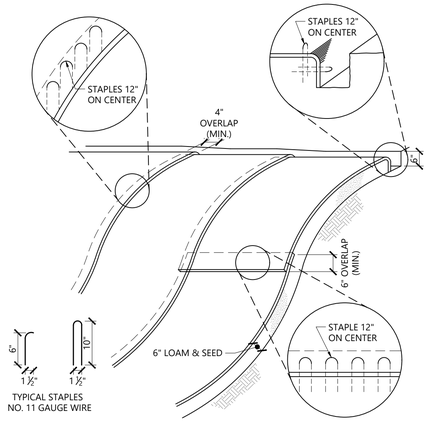


* INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS

Erosion Control Blanket Swale Installation

1/16

N.T.S. | Source: VHB | LD_681



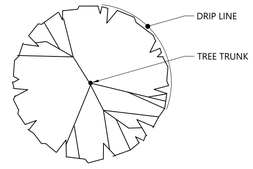
NOTES

1. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH BACKFILL AND COMPACT TRENCH AFTER STAPLING.
2. ROLL THE BLANKET DOWN THE SWALE IN THE DIRECTION OF THE WATER FLOW.
3. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
4. WHEN BLANKETS MUST BE SPLICED DOWN THE SWALE, PLACE UPPER BLANKET END OVER LOWER END WITH 6 INCH (MIN.) OVERLAP AND STAPLE BOTH TOGETHER.
5. METHOD OF INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS.
6. EROSION CONTROL BLANKETS SHALL BE USED IN ALL AREAS WHERE SLOPES EXCEED 3:1.
7. THERE SHALL BE NO PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN ½ INCHES MATERIAL UTILIZED.

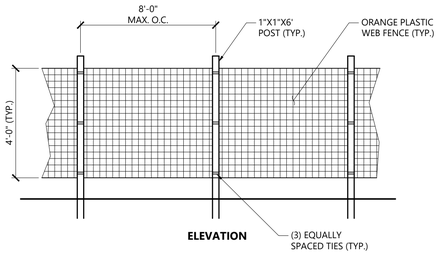
Erosion Control Blanket Slope Installation

10/20

N.T.S. | Source: VHB | LD_680



PLAN



ELEVATION

NOTES

1. INSTALL TREE PROTECTION FENCE AT THE DRIP LINE OF EXISTING TREES TO REMAIN.

Tree Protection Fence

1/16

N.T.S. | Source: VHB | LD_610

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Record Owner: Pillsbury Realty Develop LLC
100 Ferry Street
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35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: SJF | Checked by: DHF

Issued for: Permitting | Date: October 14, 2025

Not Approved for Construction

Drawing Title: Site Details 9

Drawing Number: C7.09

Sheet 34 of 41

Project Number: 53140.44



Saved Thursday, February 12, 2026 12:09:03 AM BZOLLER Plotted Thursday, February 12, 2026 1:06:05 AM Ben Zoller

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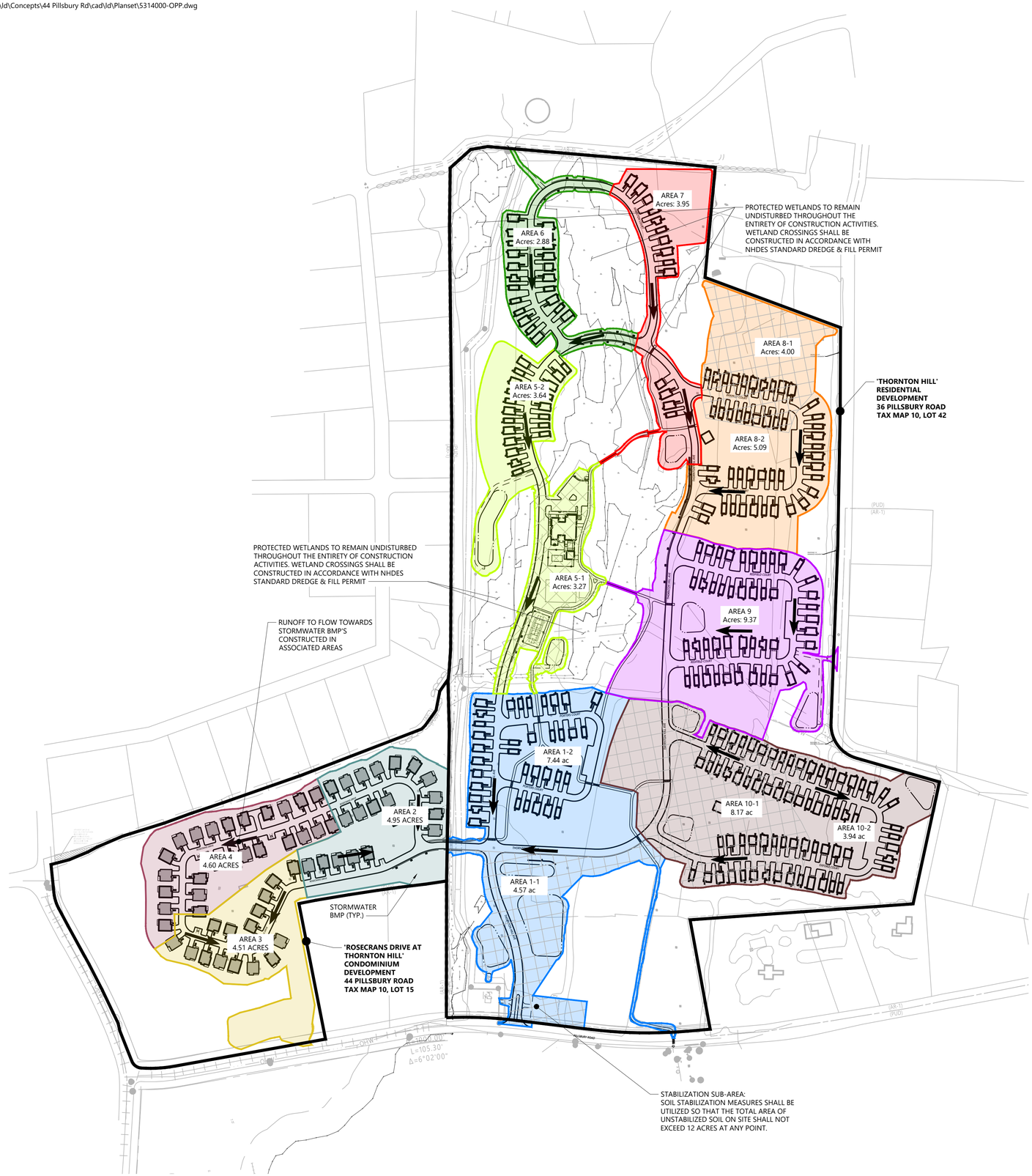

Sequencing Notes

1. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO NHDES, AND THE ENGINEER, A DETAILED PHASING AND CONSTRUCTION SEQUENCING PLAN THAT SHOWS THE PHASED AREAS OF CONSTRUCTION AND TEMPORARY EROSION CONTROL MEASURES TO BE IMPLEMENTED.
2. TEMPORARY ROAD CLOSURE BARRICADES TO BE PLACED AT THE LIMITS OF EACH PHASE, AND WILL BE MOVED TO THE END OF THE SUCCESSIVE PHASE WHEN THAT PHASE IS COMPLETED.

NHDES Env-Wq 1500: AoT Notes

(a) ALL AREAS OF UNSTABILIZED SOIL SHALL BE:
(1) TEMPORARILY STABILIZED AS SOON AS PRACTICABLE BUT IN ALL CASES WITHIN 45 DAYS OF INITIAL DISTURBANCE, UNLESS A SHORTER TIME IS SPECIFIED BY LOCAL AUTHORITIES, THE CONSTRUCTION SEQUENCE APPROVED AS PART OF THE ISSUED PERMIT, OR AN INDEPENDENT MONITOR; AND
(2) PERMANENTLY STABILIZED AS SOON AS PRACTICABLE BUT IN ALL CASES WITHIN 3 DAYS OF FINAL GRADING.

(b) SUBJECT TO (c) AND (f), BELOW, THE AREA OF UNSTABILIZED SOIL SHALL NOT EXCEED 5 ACRES AT ANY TIME.

(c) THE DEPARTMENT SHALL AUTHORIZE AN APPLICANT TO DISTURB MORE THAN 5 ACRES AT ONE TIME IF THE APPLICANT:
(1) SUBMITS DOCUMENTATION THAT THE REQUIRED AREAS OF EARTH CUTS AND FILLS ARE SUCH THAT AN AREA OF DISTURBANCE OF 5 ACRES OR LESS WOULD UNREASONABLY LIMIT THE CONSTRUCTION SCHEDULE;
(2) SUBMITS A CONSTRUCTION SEQUENCE PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST; AND
(3) EMPLOYS AN ENVIRONMENTAL MONITOR DURING CONSTRUCTION.

(d) SUBJECT TO (E), BELOW, THE ENVIRONMENTAL MONITOR SHALL:
(1) INSPECT THE PROJECT SITE AT LEAST ONCE EACH WEEK FROM THE START OF TERRAIN ALTERATION ACTIVITIES UNTIL ALL TERRAIN ALTERATION ACTIVITIES ARE COMPLETED AND THE SITE IS STABILIZED;
(2) IN ADDITION TO REGULAR WEEKLY INSPECTIONS, INSPECT THE PROJECT SITE DURING ANY RAIN EVENT IN WHICH 0.5 INCH OF PRECIPITATION OR MORE FALLS WITHIN A 24 HOUR PERIOD, PROVIDED THAT IF THE ENVIRONMENTAL MONITOR IS UNABLE TO BE PRESENT DURING SUCH A STORM, THE MONITOR SHALL INSPECT THE SITE WITHIN 24 HOURS OF THE RAIN EVENT;
(3) SUBMIT A WRITTEN REPORT, STAMPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, TO THE DEPARTMENT WITHIN 24 HOURS OF EACH INSPECTION THAT:
a. DESCRIBES THE PROGRESS OF THE PROJECT, INCLUDING WHETHER ALL CONDITIONS OF THE PERMIT ARE BEING MET AND, IF NOT, WHICH REQUIREMENTS ARE NOT BEING MET;
b. IF ANY REQUIREMENTS ARE NOT BEING MET, AN EXPLANATION OF THE CORRECTIVE ACTION(S) THAT WILL BE OR ARE BEING TAKEN TO BRING THE PROJECT INTO COMPLIANCE WITH APPLICABLE REQUIREMENTS AND THE DEADLINE BY WHICH SUCH ACTIONS WILL BE COMPLETED; AND
c. INCLUDES PHOTOGRAPHS OF THE SITE THAT ARE REPRESENTATIVE OF THE PROJECT; AND
(1) RETAIN A COPY OF THE REPORT PREPARED PURSUANT TO (3), ABOVE, ON-SITE FOR REVIEW DURING SITE INSPECTIONS BY FEDERAL, STATE, AND LOCAL OFFICIALS.

(e) ROUTINE INSPECTION FREQUENCY MAY BE REDUCED FROM ONCE EACH WEEK TO AT LEAST ONCE EACH MONTH IF EITHER OF THE FOLLOWING CONDITIONS IS MET:
(1) WORK HAS BEEN SUSPENDED AND THE ENTIRE SITE IS STABILIZED IN ACCORDANCE WITH ENV-WQ 1505.04; OR
(2) RUNOFF IS UNLIKELY BECAUSE:
a. THE GROUND IS FROZEN OR THE SITE IS COVERED WITH SNOW OR ICE; AND
b. THE PROJECT IS IN AN AREA WHERE FROZEN CONDITIONS ARE ANTICIPATED TO CONTINUE FOR MORE THAN ONE MONTH.

(f) IF THE SITE IS WITHIN 50 FEET OF A SURFACE WATER OF THE STATE, OR WETLANDS AS DEFINED IN RSA 482-A, HAS A GRADE OF 25% OR GREATER, OR CONTAINS SOILS HAVING AN ERODIBILITY FACTOR OF 0.4 OR GREATER, OR ANY COMBINATION OF THESE, THE OWNER SHALL, REGARDLESS OF THE SIZE OF THE OPEN AREA:
(1) SUBMIT A CONSTRUCTION SEQUENCE PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST;
(2) EMPLOY AN ENVIRONMENTAL MONITOR; AND
(3) COMPLY WITH (D) AND (E), ABOVE.

SOURCE. (SEE REVISION NOTE #1 AT CHAPTER HEADING FOR ENV-WQ 1500) #9343, EFF 1-1-09; SS BY #12342, EFF 8-15-17
(FORMERLY ENV-WQ 1505.02) (SEE REVISION NOTE #3 AT CHAPTER HEADING FOR ENV-WQ 1500); SS BY #13758, EFF 9-28-23 (SEE REVISION NOTE #4 AT CHAPTER HEADING FOR ENV-WQ 1500)

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Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by BJZ | Checked by DHF

Issued for: Permitting
Date: October 14, 2025

Not Approved for Construction

Drawing Title
Overall Sequencing Plan: Thornton Hill & Rosecrans Drive Developments

Drawing Number
C8.00

STATE OF NEW HAMPSHIRE · ERIC K. GERADE No.13672 LICENSED PROFESSIONAL ENGINEER · 2/12/2026

Sheet 35 of 41

Project Number
53140.44

Saved Wednesday, February 11, 2026 11:51:41 PM BZOLLER Plotted Thursday, February 12, 2026 12:57:00 AM Ben Zoller

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Notes

INTRODUCTION

VHB HAS PREPARED THE FOLLOWING STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE MANUAL FOR THE RESIDENTIAL PROJECT LOCATED AT 44 PILLSBURY ROAD, LONDONDERRY, NEW HAMPSHIRE. THE INTENT OF THIS PLAN IS TO PROVIDE THE APPLICANT/OWNER WITH A LIST OF PROCEDURES THAT DOCUMENT THE INSPECTION AND MAINTENANCE REQUIREMENTS OF THE STORMWATER MANAGEMENT SYSTEM FOR THIS DEVELOPMENT.

THE FOLLOWING INSPECTION AND MAINTENANCE PROGRAM IS NECESSARY IN ORDER TO KEEP THE STORMWATER MANAGEMENT SYSTEM FUNCTIONING PROPERLY. BY FOLLOWING THE ENCLOSED PROCEDURES, THE APPLICANT WILL BE ABLE TO MAINTAIN THE FUNCTIONAL DESIGN OF THE STORMWATER MANAGEMENT SYSTEM AND MAXIMIZE ITS ABILITY TO REMOVE SEDIMENT AND OTHER CONTAMINANTS FROM SITE GENERATED STORMWATER RUNOFF.

RESPONSIBLE PARTY

THE OVERSIGHT OF THE INSPECTION AND MAINTENANCE PROGRAM WILL BE PROVIDED BY:

PROCOPIO ENTERPRISE, LLC
35 VILLAGE ROAD,. 7TH FLOOR (702)
MIDDLETON, MA 01949

STORMWATER MANAGEMENT SYSTEM COMPONENTS

THE STORMWATER MANAGEMENT SYSTEM IS DESIGNED TO MITIGATE BOTH THE QUANTITY AND QUALITY OF SITE-GENERATED STORMWATER RUNOFF. AS A RESULT, ITS DESIGN INCLUDES THE FOLLOWING ELEMENTS:

A. NON-STRUCTURAL BMP'S

A.1. NON-STRUCTURAL BEST MANAGEMENT PRACTICES (BMP'S) ARE DESIGNED TO MINIMIZE AND/OR REMOVE CONTAMINANTS BEFORE THEY ENTER THE STORMWATER COLLECTION SYSTEM. SEVERAL OF THESE BMP'S HAVE BEEN INCORPORATED INTO THE STORMWATER MANAGEMENT SYSTEM INCLUDING REDUCED USED OF ROAD DEICING AGENTS, AND LITTER/TRASH REMOVAL. THESE TYPES OF BMP'S ARE A HIGHLY EFFECTIVE INITIAL TREATMENT MEASURE FOR REDUCING STORMWATER POLLUTANT LOADING.

B. STRUCTURAL BMP'S

B.1. STRUCTURAL BMP'S HAVE BEEN INCORPORATED INTO THE OVERALL STORMWATER MANAGEMENT PLAN. STRUCTURAL BMP'S INCLUDE DEEP SUMP CATCH BASINS, SUBSURFACE SAND FILTERS, AND SUBSURFACE DETENTION BASINS.

INSPECTION & MAINTENANCE PLAN

BY IMPLEMENTING THE FOLLOWING PROCEDURES, THE APPLICANT WILL BE ABLE TO MAINTAIN THE FUNCTIONAL DESIGN OF THE STORMWATER MANAGEMENT SYSTEM AND MAXIMIZE THE SYSTEM'S ABILITY TO REMOVE SEDIMENT AND OTHER CONTAMINANTS FROM SITE GENERATED STORMWATER RUNOFF.

A. SOURCE CONTROL

A.1. ROUTINELY EMPTY ALL OUTSIDE WASTE RECEPTACLES PROVIDED FOR PUBLIC USE.

A.2. CLEARING LITTER FROM THE PARKING AREA, ISLANDS AND PERIMETER LANDSCAPE AREAS.

B. VEGETATED AREAS MAINTENANCE

ALTHOUGH NOT A SPECIFIC COMPONENT OF THE DRAINAGE SYSTEM, THE MAINTENANCE OF VEGETATED AREAS MAY AFFECT THE FUNCTIONING OF STORMWATER MANAGEMENT PRACTICES. THIS INCLUDES THE HEALTH/DENSITY OF VEGETATIVE COVER AND ACTIVITIES SUCH AS THE APPLICATION AND DISPOSAL OF LAWN AND GARDEN CARE PRODUCTS, DISPOSAL OF LEAVES AND YARD TRIMMINGS.

B.1. INSPECT PLANTED AREAS ON A SEMI-ANNUAL BASIS AND REMOVE ANY LITTER.

B.2. MAINTAIN PLANTED AREAS ADJACENT TO PAVEMENT TO PREVENT SOIL WASHOUT.

B.3. IMMEDIATELY CLEAN ANY SOIL DEPOSITED ON PAVEMENT.

B.4. RE-SEED BARE AREAS; INSTALL APPROPRIATE EROSION CONTROL MEASURES WHEN NATIVE SOIL IS EXPOSED OR EROSION CHANNELS ARE FORMING.

B.5. PLANT ALTERNATIVE MIXTURE OF GRASS SPECIES IN THE EVENT OF UNSUCCESSFUL ESTABLISHMENT.

B.6. THE GRASS VEGETATION SHOULD BE CUT TO A HEIGHT BETWEEN THREE AND FOUR INCHES.

B.7. PESTICIDE/HERBICIDE USAGE - NO PESTICIDES ARE TO BE USED UNLESS A SINGLE SPOT TREATMENT IS REQUIRED FOR A SPECIFIC CONTROL APPLICATION.

B.8. FERTILIZER USAGE SHOULD BE AVOIDED. IF DEEMED NECESSARY, SLOW-RELEASE FERTILIZER SHOULD BE USED. FERTILIZER MAY BE USED TO BEGIN THE ESTABLISHMENT OF VEGETATION IN BARE OR DAMAGED AREAS BUT SHOULD NOT BE APPLIED ON A REGULAR BASIS UNLESS NECESSARY.

C. DEICING AGENTS

DEICING AGENTS SHOULD BE USED IN ACCORDANCE WITH THE FOLLOWING:

C.1. USE SAND AS THE PRIMARY AGENT FOR PARKING LOT SAFETY DURING ICE AND SNOW CONDITIONS.

C.2. USE DE-ICING OR ANTI-CAKING AGENTS, ADDED TO ENHANCE PERFORMANCE AND APPLICATION CHARACTERISTICS OF SAND MIXTURES, ONLY AS NECESSARY AND AT MINIMUM APPLICATION RATES.

C.3. MAINTAIN A DEICING LOG TO TRACK THE AMOUNT AND TYPE OF DEICING MATERIALS APPLIED TO THE SITE.

D. SNOW MANAGEMENT

SNOW STORAGE AREAS SHALL BE MAINTAINED AS FOLLOWS:

D.1. SNOW STORAGE AREAS WILL BE MANAGED TO PREVENT BLOCKAGE OF STORM DRAIN CATCH BASINS. SNOW COMBINED WITH SAND AND DEBRIS MAY BLOCK A STORM DRAINAGE SYSTEM, DIMINISHING THE INFILTRATION CAPACITY OF THE SYSTEM AND CAUSING LOCALIZED FLOODING.

D.2. SAND AND DEBRIS DEPOSITED ON VEGETATED OR PAVED AREAS SHALL BE CLEARED FROM THE SITE AND PROPERLY DISPOSED OF AT THE END OF THE SNOW SEASON, NO LATER THAN MAY 15.

D.3. SNOW SHALL NOT BE DUMPED INTO ANY WATER BODY, POND, WETLAND RESOURCE AREA OR STORMWATER DETENTION BASIN.

E. WINTER OPERATOR CERTIFICATION REQUIREMENTS

PER THE LONDONDERRY STORMWATER REGULATIONS, ALL EMPLOYED OR CONTRACTED WINTER MAINTENANCE OPERATORS SHALL BE NEW HAMPSHIRE CERTIFIED GREEN SNOWPRO OR EQUIVALENT. GREEN SNOWPRO TRAINING IS PROVIDED BY THE UNIVERSITY OF NEW HAMPSHIRE. IT IS PREFERRED THAT OPERATORS ALSO HAVE NHDES SALT APPLICATOR CERTIFICATION. INFORMATION ON THESE CERTIFICATIONS CAN BE FOUND AT THE LINKS BELOW:

https://www.des.nh.gov/land/roads/road-salt-reduction
https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification

F. CATCH BASINS

THE PROPOSED CATCH BASINS ARE CONSTRUCTED WITH SUMPS (MINIMUM 3 FEET) TO TRAP DEBRIS, SEDIMENTS, AND FLOATING CONTAMINANTS. DISPOSAL OF ALL SEDIMENTS MUST BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL GUIDELINES.

F.1. INSPECT CATCH BASINS AT LEAST TWO TIMES PER YEAR AND CLEAN A MINIMUM OF ONCE PER YEAR.

F.2. SEDIMENT GREATER THAN HALF THE SUMP DEPTH AND/OR FLOATABLE POLLUTANTS SHALL BE PUMPED FROM THE BASIN AND DISPOSED OF AT AN APPROVED OFFSITE FACILITY IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.

F.3. ANY STRUCTURAL DAMAGE OR OTHER INDICATION OF MALFUNCTION WILL BE REPORTED TO THE SITE MANAGER AND REPAIRED AS NECESSARY.

F.4. DURING COLDER PERIODS, THE CATCH BASIN GRATES MUST BE KEPT FREE FROM SNOW AND ICE.

F.5. DURING WARMER PERIODS, THE CATCH BASIN GRATES MUST BE KEPT FREE OF LEAVES, LITTER, SAND AND DEBRIS.

G. STORMWATER OUTFALLS

INSPECT OUTFALL LOCATIONS MONTHLY FOR THE FIRST THREE MONTHS AFTER CONSTRUCTION TO ENSURE PROPER FUNCTIONING AND CORRECT ANY AREAS THAT HAVE SETTLED OR EXPERIENCED WASHOUTS.

G.1. INSPECT OUTFALLS ANNUALLY AFTER INITIAL THREE-MONTH PERIOD.

G.2. ANNUAL INSPECTIONS SHOULD BE SUPPLEMENTED AFTER LARGE STORMS, WHEN WASHOUTS MAY OCCUR.

G.3. MAINTAIN/CUT VEGETATION AROUND OUTFALLS TO PREVENT BLOCKAGES AT THE OUTFALL.

G.4. MAINTAIN RIP-RAP PAD BELOW EACH OUTFALL AND REPAIR ANY WASHOUTS OR OTHER DAMAGE IMMEDIATELY.

G.5. REMOVE AND DISPOSE OF ANY TRASH OR DEBRIS AT THE OUTFALL.

H. STRUCTURAL WATER QUALITY DEVICES (SAND FILTER)

H.1. REFER TO MANUFACTURERS RECOMMENDATIONS FOR SPECIFIC O&M REQUIREMENTS.

H.2. INSPECT DEVICES MONTHLY FOR THE FIRST THREE MONTHS AFTER CONSTRUCTION.

H.3. AFTER INITIAL THREE-MONTH PERIOD, ALL WATER QUALITY UNITS ARE TO BE INSPECTED AT LEAST TWICE A YEAR AND CLEANED A MINIMUM OF AT LEAST ONCE PER YEAR OR WHEN SEDIMENT REACHES 8" IN DEPTH.

H.4. FOLLOW MANUFACTURER INSTRUCTIONS FOR INSPECTION AND CLEANING AND CONTACT MANUFACTURER IF SYSTEM IS MALFUNCTIONING.

H.5. REFER TO THE NEW HAMPSHIRE STORMWATER MANUAL VOLUME 2 CHAPTER 4 DESIGNING BEST MANAGEMENT PRACTICES, 4-3 TREATMENT PRACTICE, 4 FILTERING PRACTICES, SECTION 4B UNDERGROUND SAND FILTER FOR ADDITIONAL MAINTENANCE REQUIREMENTS.

H.5.1. SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.

H.5.2. PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

H.5.3. TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.

H.5.4. MANUFACTURED FILTER MEDIA SHOULD BE REPLACED PERIODICALLY PER MANUFACTURER'S SPECIFICATIONS.

H.5.5. AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF A FILTRATION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER

I. STORM DRAIN MANHOLES

I.1. INSPECT AT LEAST ONCE ANNUALLY FOR CLOGGING OR SEDIMENT ACCUMULATION AND CLEAN AS NEEDED TO ENSURE PROPER STORMWATER CONVEYANCE.

L. ABOVEGROUND STORMWATER BASINS (MODIFIED EXISTING BASINS)

L.1. SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.

L.2. PRETREATMENT MEASURES SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND CLEANED OF ACCUMULATED SEDIMENT AS WARRANTED BY INSPECTION, BUT NO LESS THAN ONCE ANNUALLY.

L.3. TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.

L.4. AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF A FILTRATION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER.

L.5. REMOVE DEBRIS FROM ANY INLET AND OUTLET STRUCTURES.

L.6. REMOVE ACCUMULATED SEDIMENT

L.7. INSPECTED AND REPAIR (IF NEEDED) OUTLET STRUCTURES AND APPURTENANCES.

L.8. REMOVE WOODY VEGETATION FROM EMBANKMENTS. INSPECT AND REPAIR EMBANKMENTS AS NEEDED.

M. GRASS CONVEYANCE SWALE

M.1. GRASSED CHANNELS SHOULD BE INSPECTED PERIODICALLY (AT LEAST ANNUALLY) FOR SEDIMENT ACCUMULATION, EROSION AND CONDITION OF SURFACE LINING (VEGETATION OR RIPRAP). REPAIRS, INCLUDING STONE OR VEGETATION REPLACEMENT, SHOULD BE MADE BASED ON THIS INSPECTION.

M.2. REMOVE SEDIMENT AND DEBRIS ANNUALLY, OR MORE FREQUENTLY AS WARRANTED BY INSPECTION.

M.3. MOW VEGETATED CHANNELS AS NEEDED TO MAINTAIN GRASS ESTABLISHMENT AND REMOVE WOODY VEGETATION. GRASS TO BE CUT NO SHORTER THAN 4 INCHES.

N. INVASIVE PLANT SPECIES CONTROL

INVASIVE PLANT SPECIES ARE ALIEN OR NON-NATIVE PLANTS WHICH HAVE BEEN MOVED BY PEOPLE FROM THEIR NATIVE HABITAT TO A NEW AREA. SOME EXOTIC PLANTS ARE IMPORTED FOR HUMAN USE SUCH AS LANDSCAPING, EROSION CONTROL OR FOOD CROPS; OR ARRIVE AS "HITCHHIKERS" AMONG SHIPMENTS OF OTHER PLANTS, SEEDS, PACKING MATERIALS, OR FRESH PRODUCE. SOME OF THESE EXOTIC PLANTS BECOME INVASIVE AND CAUSE HARM BY:

N.1. BECOMING WEEDY AND OVERGROWN;

N.2. KILLING ESTABLISHED SHADE TREES;

N.3. OBSTRUCTING PIPES AND DRAINAGE SYSTEMS;
N.4. FORMING DENSE BEDS IN WATER;

N.5. LOWERING WATER LEVELS IN LAKES, STREAMS AND WETLANDS;

N.6. DESTROYING NATURAL COMMUNITIES;

N.7. PROMOTING EROSION ON STREAM BANKS AND HILLSIDES; AND

N.8. RESISTING CONTROL EXCEPT BY HAZARDOUS CHEMICAL.

AS PART OF THE ROUTINE INSPECTIONS OF THE DRAINAGE SYSTEM AND STORMWATER OUTFALLS, THE SITE SHOULD BE CHECKED FOR THE PRESENCE OF INVASIVE PLANT SPECIES AS DEFINED BY THE NEW HAMPSHIRE DEPARTMENT OF AGRICULTURE, MARKETS & FOOD (A LIST IS PROVIDED AT THE END OF THIS MANUAL).

IF INVASIVE PLANT SPECIES ARE FOUND TO BE PRESENT, THEY SHOULD BE CONTROLLED AS DESCRIBED IN THE "CONTROL OF INVASIVE PLANTS" DOCUMENT PREPARED BY THE NH DEPARTMENT OF AGRICULTURE, MARKETS & FOOD. A COPY IS PROVIDED AT THE END OF THIS MANUAL.

O. RECORD KEEPING

O.1. INSPECTIONS OF THE STORMWATER MANAGEMENT SYSTEM SHALL BE CONDUCTED IN ACCORDANCE WITH THE INSPECTION & MAINTENANCE CHECKLIST PROVIDED IN THIS MANUAL.

O.2. AN INSPECTION & MAINTENANCE LOG SHALL BE COMPLETED FOR EACH INSPECTION AND MAINTENANCE ACTIVITY.

O.3. ALL RECORD KEEPING REQUIRED BY THE I&M MANUAL SHALL BE MAINTAINED BY THE RESPONSIBLE PARTY.

O.4. A DEICING LOG SHALL BE MAINTAINED THAT TRACKS THE AMOUNT AND TYPE OF DEICING MATERIALS APPLIED TO THE SITE.

O.5. ANY TRANSFER OF RESPONSIBILITY FOR THE I&M ACTIVITIES OR TRANSFER OF OWNERSHIP SHALL BE DOCUMENTED TO THE NHDES WATER DIVISION IN WRITING.

O.6. INSPECTION REPORTS SHALL BE FILED WITH THE TOWN OF LONDONDERRY DEPARTMENT OF ENGINEERING AND ENVIRONMENTAL SERVICES ON AN ANNUAL BASIS.

P. INSPECTION & MAINTENANCE CHECKLIST/LOG

P.1. THE FOLLOWING PAGES CONTAIN AN INSPECTION & MAINTENANCE CHECKLIST, A BLANK COPY OF THE STORMWATER MANAGEMENT SYSTEM'S INSPECTION & MAINTENANCE LOG, AND A REDUCED COPY OF THE GRADING AND UTILITY PLANS. THESE FORMS/PLANS ARE PROVIDED TO ASSIST THE APPLICANT WITH THE INSPECTION AND MAINTENANCE OF THE STORMWATER MANAGEMENT SYSTEM.

Q. INVASIVE SPECIES INFORMATION

Q.1. A COPY OF THE NEW HAMPSHIRE DEPARTMENT OF AGRICULTURE, MARKETS & FOOD'S DOCUMENT "CONTROL OF INVASIVE PLANTS" IS PROVIDED AT THE END OF THIS MANUAL.

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603.391.3900

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Hudson, NH 03051
Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA, 01949

Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: BJZ
Checked by: DHF

Issued for: Permitting
Date: October 14, 2025

Not Approved for Construction

Drawing Title: Inspection and Maintenance Notes

Drawing Number: C9.01

Sheet 36 of 41

Project Number: 53140.44



Saved Wednesday, February 11, 2026 11:52:07 PM BZOLLER Plotted Thursday, February 12, 2026 12:55:47 AM Ben Zoller

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Stormwater Management System
Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed (*List Items/Comments*)	Date of Cleaning/Repair	Performed By

Stormwater Management System
Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed (*List Items/Comments*)	Date of Cleaning/Repair	Performed By

Stormwater Management System
Inspection & Maintenance Log

Notes:

Stormwater Management System
Deicing Log

Date	Type	Location/Amount	Name(s) of Maintenance Personnel

Stormwater Management System
Inspection & Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Source Control	Routinely	Inspect outdoor waste receptacles areas for spillage. Inspect and clear litter from parking area, islands and perimeter landscape areas.	Clean as required.
Deicing Agents	N/A	N/A	Use sand as primary agent for site roadway and parking safety during winter.

Stormwater Management System
Inspection & Maintenance Checklist

Closed Drainage System			
Catch Basins	2 times per year	Check for sediment accumulation. Check for floatable contaminants.	≥ 2 ft. sediment depth. ≥ 3 in. floatable depth.
Storm Drain Manholes	1 time per 2 years	Check for sediment accumulation.	≥ 3 in. sediment depth.
Drainage Pipes	1 time per 2 years	Check for sediment accumulation/clogging.	≥ 2 in. sediment depth.
Detention Basin/Surface Sand Filter	2 times per year	Check for sediment accumulation, clogging, trash and debris.	Clean/repair as needed.
Outlet Control Structure	2 times per year	Check for sediment accumulation/clogging	Clean/repair as needed.
Outfalls	Monthly for first 3 months and 1 time per year thereafter	-Check for sediment, trash and debris accumulation. -Check for vegetation blocking outfall. Inspect rip rap for washout.	Clean/repair as needed.

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Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by BJZ | Checked by DHF

Issued for: **Permitting** | Date: **October 14, 2025**

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Drawing Title
Inspection and Maintenance Checklists and Logs

Drawing Number
C9.02

Sheet 37 of 41

Project Number
53140.44

STATE OF NEW HAMPSHIRE
ERIC K. GERADE
No. 13672
LICENSED
PROFESSIONAL ENGINEER
2/12/2026

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PLANT SCHEDULE

CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
DECIDUOUS TREES				
AR	7	Acer rubrum	Red Maple	2 1/2 - 3" CAL.
AS	4	Acer saccharum `Green Mountain`	Green Mountain Sugar Maple	2 1/2 - 3" CAL.
BN	3	Betula nigra `Heritage`	Heritage River Birch	10 - 12' HT./Multi-Stem
GB	3	Ginkgo biloba	Maidenhair Tree	2 1/2 - 3" CAL.
LSR	5	Liquidambar styraciflua `Rotundiloba`	Rotundiloba Seedless Sweetgum	2 1/2 - 3" CAL.
NS	4	Nyssa sylvatica	Black Tupelo	2 1/2 - 3" CAL.
PAB	3	Platanus acerifolia `Bloodgood`	London Planetree	2 1/2 - 3" CAL.
QA	4	Quercus alba	White Oak	2 1/2 - 3" CAL.
QC	6	Quercus coccinea	Scarlet Oak	2 1/2 - 3" CAL.
QP	7	Quercus palustris	Pin Oak	2 1/2 - 3" CAL.
UA	7	Ulmus americana `Valley Forge`	Valley Forge American Elm	2 1/2 - 3" CAL.
EVERGREEN TREES				
AC	22	Abies concolor	White Fir	6 - 7' HT.
PG	26	Picea glauca	White Spruce	6 - 7' HT.
PS	27	Pinus strobus	White Pine	6 - 7' HT.
FLOWERING TREES				
ACS	14	Amelanchier canadensis	Shadblow Serviceberry	8 - 10' HT./Multi-Stem
MS	18	Malus hybrid `Spring Snow`	Spring Snow Crab Apple	2 - 2 1/2" CAL.

CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
SOD/SEED				
DB	11,316 sf	Detention Basin Seed Mix	Detention Basin Seed Mix	seed

DETENTION BASIN SEED MIX

MEADOW MIX

OWNER'S SIGNATURE

Signed by:
Kevin Smith
0B4E4DCC4452434

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date:

Certified By:

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

No.	Revision	Date	Appvd.
1	Site Plan Application Submission	02/12/2026	EKG

Designed by: SJF
Checked by: DHF

Issued for: Permitting
Date: October 14, 2025

Not Approved for Construction

Drawing Title: Planting Plan

LICENSED LANDSCAPE ARCHITECT
ERIK J. BEDNAREK
00175
STATE OF NEW HAMPSHIRE
FEBRUARY 11, 2026

Drawing Number: L1.01

Sheet 38 of 41

Project Number: 53140.44

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OWNER'S SIGNATURE

Signed by: Kevin Smith
0B4E4DDC4452434...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date:

Certified By:

DETENTION BASIN SEED MIX

EROSION CONTROL SEED MIX

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

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Designed by SJF
Checked by DHF

Issued for Permitting
Date October 14, 2025

Not Approved for Construction

Drawing Title
Planting Plan

LICENSED LANDSCAPE ARCHITECT
ERIK J. BEDNAREK
00175
STATE OF NEW HAMPSHIRE
FEBRUARY 11, 2026

Drawing Number
L1.02

Sheet 39 of 41

Project Number
53140.44

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Planting Notes

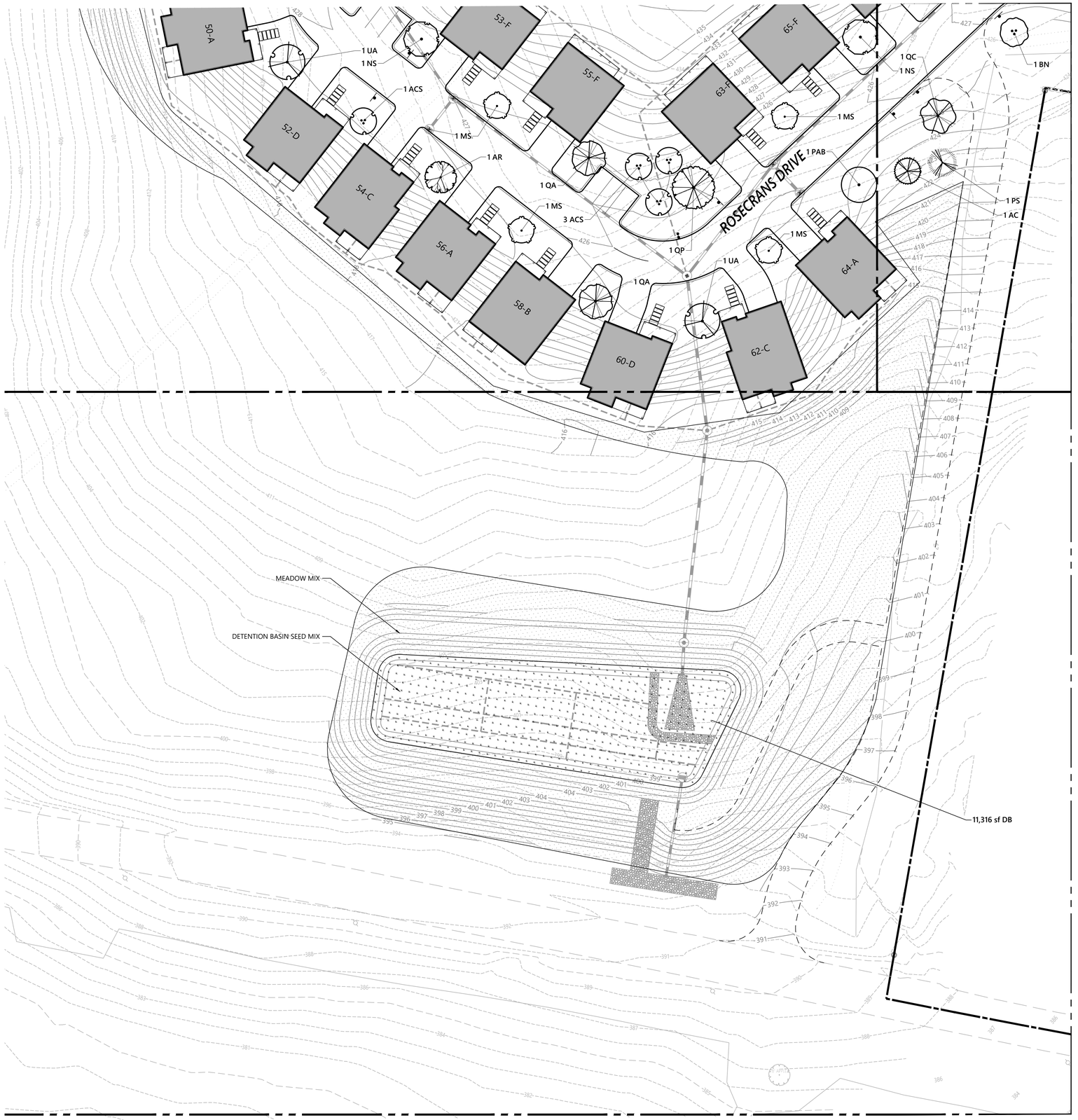
1. AS SHOWN, APPROX. 1050 EXISTING TREES WILL REMAIN.
2. ALL PROPOSED PLANTING LOCATIONS SHALL BE STAKED AS SHOWN ON THE PLANS FOR FIELD REVIEW AND APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
3. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL BELOW GRADE AND ABOVE GROUND UTILITIES AND NOTIFY OWNERS REPRESENTATIVE OF CONFLICTS.
4. NO PLANT MATERIALS SHALL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA. CONTRACTOR SHALL NOTIFY OWNER'S REPRESENTATIVE OF ANY CONFLICT.
5. ALL TREES SHALL BE BALLED AND BURLAPPED, UNLESS OTHERWISE NOTED IN THE DRAWINGS OR SPECIFICATION, OR APPROVED BY THE OWNER'S REPRESENTATIVE.
6. FINAL QUANTITY FOR EACH PLANT TYPE SHALL BE AS GRAPHICALLY SHOWN ON THE PLAN. THIS NUMBER SHALL TAKE PRECEDENCE IN CASE OF ANY DISCREPANCY BETWEEN QUANTITIES SHOWN ON THE PLANT LIST AND ON THE PLAN. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES BETWEEN THE NUMBER OF PLANTS SHOWN ON THE PLANT LIST AND PLANT LABELS PRIOR TO BIDDING.
7. ANY PROPOSED PLANT SUBSTITUTIONS MUST BE REVIEWED BY LANDSCAPE ARCHITECT AND APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
8. ALL PLANT MATERIALS INSTALLED SHALL MEET THE SPECIFICATIONS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN AND CONTRACT DOCUMENTS.
9. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF FINAL ACCEPTANCE.
10. AREAS DESIGNATED "LOAM & SEED" SHALL RECEIVE MINIMUM 6" OF LOAM AND SPECIFIED SEED MIX. LAWNS OVER 2:1 SLOPE SHALL BE PROTECTED WITH EROSION CONTROL FABRIC.
11. ALL DISTURBED AREAS NOT OTHERWISE NOTED ON CONTRACT DOCUMENTS SHALL BE LOAM AND SEEDED WITH CONSERVATION SEED MAX.
12. THIS PLAN IS INTENDED FOR PLANTING PURPOSES. REFER TO SITE / CIVIL DRAWINGS FOR ALL OTHER SITE CONSTRUCTION INFORMATION.

Seed Mixtures:

1. AREAS INDICATED AS "DETENTION BASIN" ARE TO BE SEEDED WITH NEW ENGLAND EROSION CONTROL / RESTORATION MIX FOR DETENTION PONDS AND MOIST AREAS, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com,OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. AREAS INDICATED AS "MEADOW MIX" ARE TO BE SEEDED WITH NEW ENGLAND CONSERVATION / WILDLIFE SEED MIX, AS MANUFACTURED BY NEW ENGLAND WETLAND PLANTS, INC. AMHERST, MA (413) 548-8000, www.NEWP.com,OR AN APPROVED EQUAL. APPLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

DETENTION BASIN SEED MIX

MEADOW MIX



OWNER'S SIGNATURE

Signed by: kevin Smith
0B4E4DCC4452416...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

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Rosecrans Drive at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road Londonderry, New Hampshire 03053

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Drawing Title: Planting Plan

Drawing Number: L1.03

Sheet 40 of 41

Project Number: 53140.44

LICENSED LANDSCAPE ARCHITECT ERIK J. BEDNAREK 00175 STATE OF NEW HAMPSHIRE

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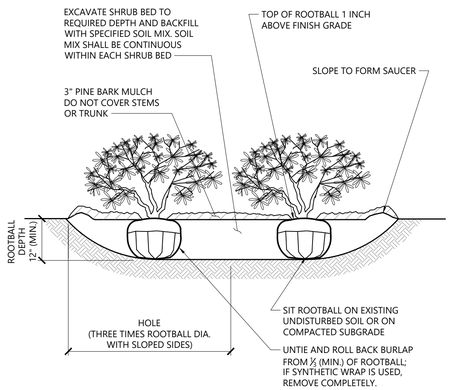


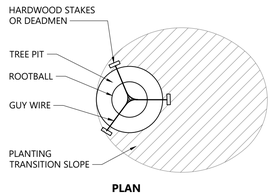
NOTES

1. LOOSEN ROOTS AT THE OUTER EDGE OF ROOTBALL OF CONTAINER GROWN SHRUBS.

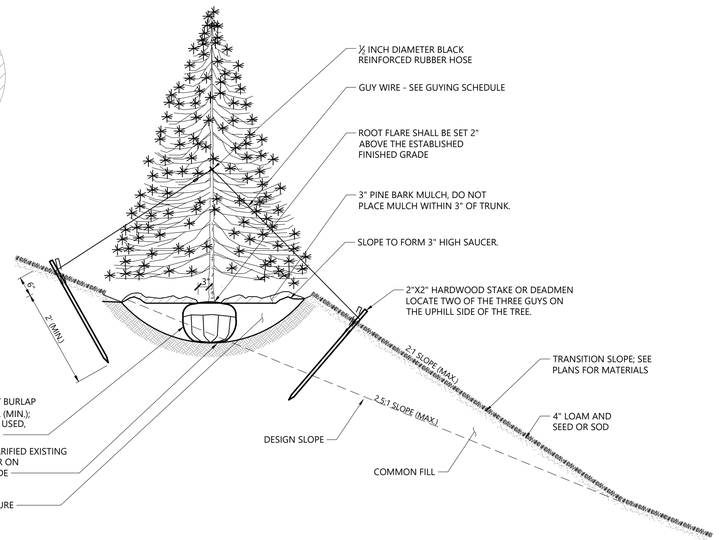
Shrub Bed Planting

1/16

N.T.S. Source: VHB LD_601



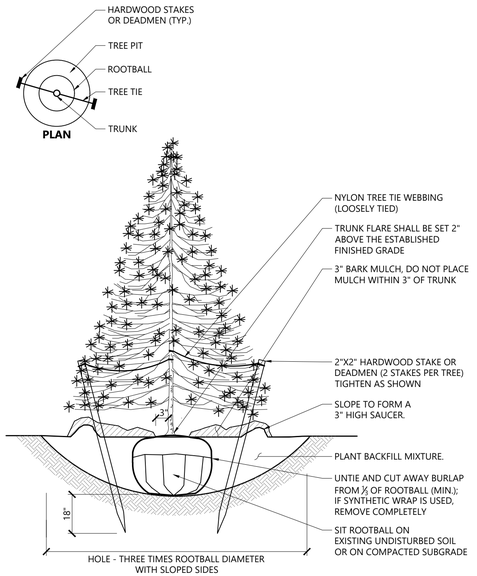
PLAN



Tree Planting on Slope

1/16

N.T.S. Source: VHB LD_605



PLAN

Evergreen Tree Planting

9/21

N.T.S. Source: VHB LD_604

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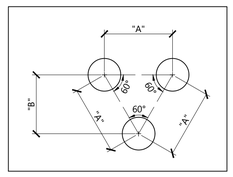
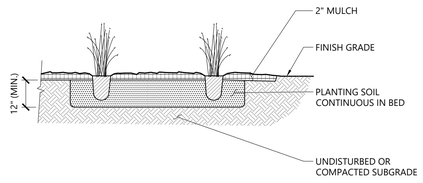
PLANT SPACING	
PLANT SPACING("A")	ROW SPACING ("B")
6 IN. O.C.	5 IN. O.C.
8 IN. O.C.	7 IN. O.C.
10 IN. O.C.	8 ⅔ IN. O.C.
12 IN. O.C.	10 ⅔ IN. O.C.
15 IN. O.C.	13 IN. O.C.
18 IN. O.C.	16 IN. O.C.
24 IN. O.C.	21 IN. O.C.
30 IN. O.C.	26 IN. O.C.
36 IN. O.C.	30 IN. O.C.
48 IN. O.C.	42 IN. O.C.
54 IN. O.C.	48 IN. O.C.
60 IN. O.C.	54 IN. O.C.

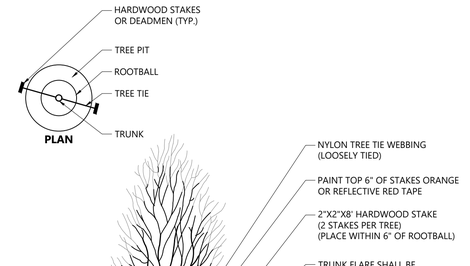




Perennial and Ornamental Grass Planting

1/16

N.T.S. Source: VHB LD_618

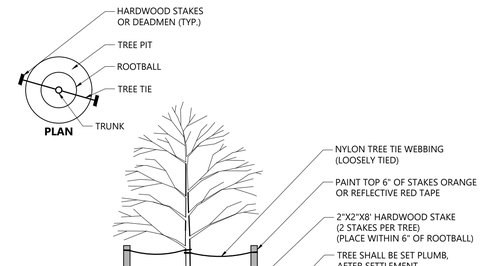


PLAN

Multistem Tree Planting

9/21

N.T.S. Source: VHB LD_606

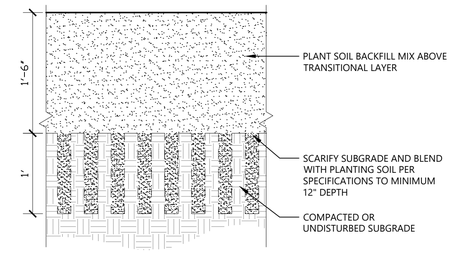


PLAN

Tree Planting (For Trees Under 4" Caliper)

9/21

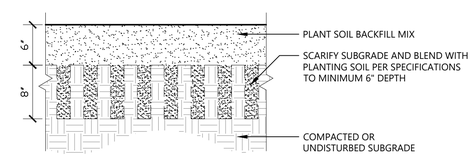
N.T.S. Source: VHB LD_602



Soil Preparation Groundcover and Shrubs

11/15

N.T.S. Source: VHB LD_



Soil Preparation at Lawn

11/15

N.T.S. Source: VHB LD_

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Drawing Title

Landscape Details 1

Drawing Number

L2.01

Sheet 41 of 41

Project Number 53140.44



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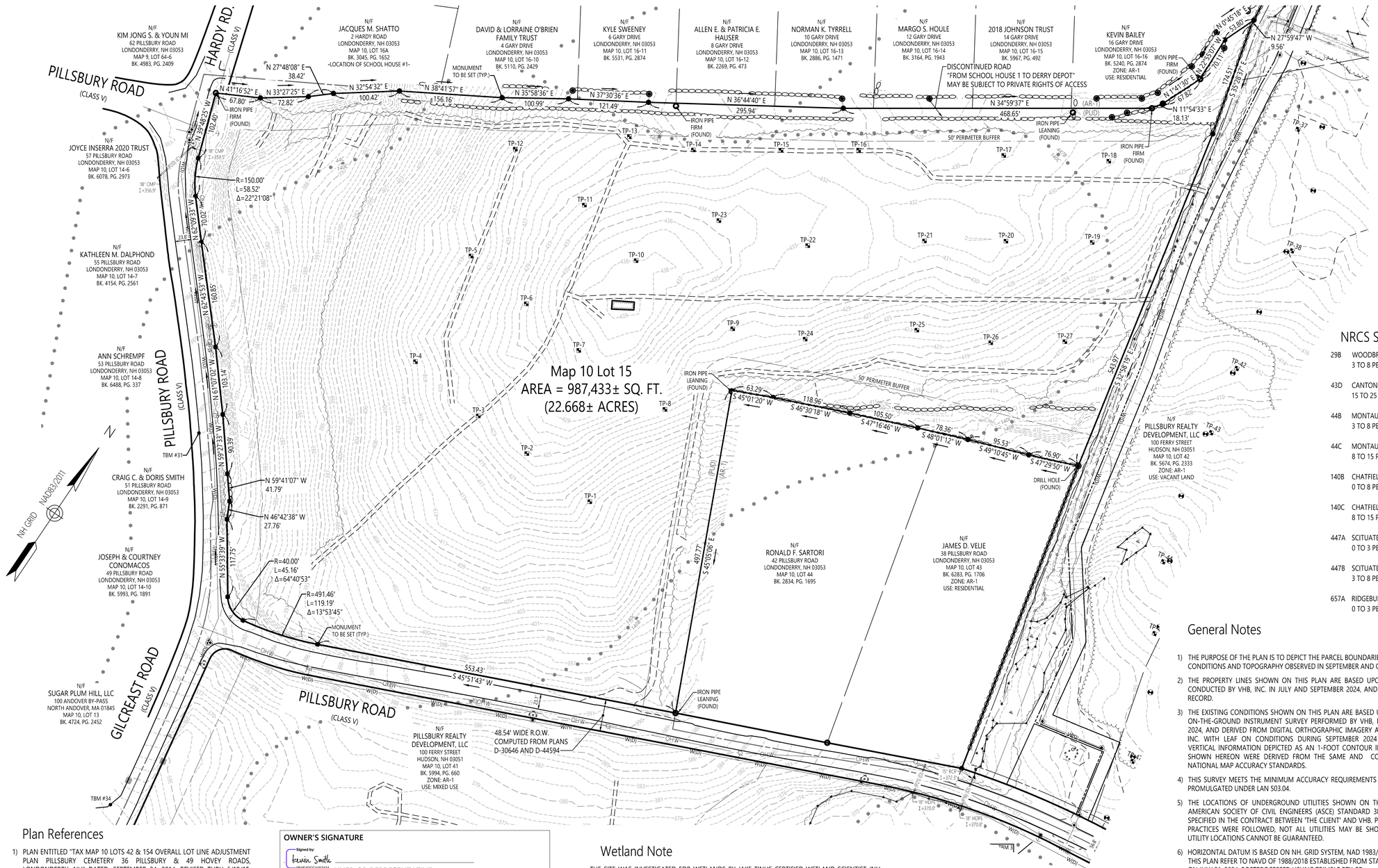
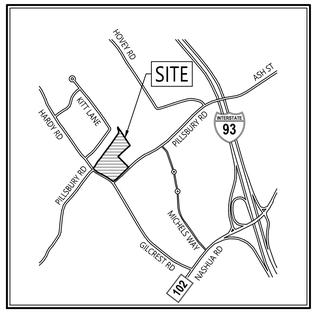




Locus Map
(SCALE: 1"=2,500')

Legend

- DRILL HOLE FOUND
- MONUMENT TO BE SET
- MONUMENT TO BE SET
- DRAIN MANHOLE
- CATCH BASIN
- WATER MANHOLE
- TESTPIT
- WATER GATE
- FIRE HYDRANT
- STREET SIGN
- UTILITY POLE
- GUY POLE
- GUY WIRE
- MARSH
- DECIDUOUS TREE WITH SIZE
- CONIFEROUS TREE WITH SIZE
- EDGE OF PAVEMENT
- DIRT/GRAVEL ROAD
- WOOD FENCE
- DRAINAGE LINE w/PIPE NUMBER & ASCE SUE LEVEL CLASSIFICATION
- OVERHEAD WIRE
- WATER LINE
- STONE WALL
- TREE LINE
- LIMIT OF BANK
- VEGETATED WETLAND BOUNDARY
- SOILS LINE

NRCS Soils Legend

29B	WOODBRIDGE FINE SANDY LOAM 3 TO 8 PERCENT SLOPES
43D	CANTON FINE SANDY LOAM 15 TO 25 PERCENT SLOPES, VERY STONY
44B	MONTAUK FINE SANDY LOAM 3 TO 8 PERCENT SLOPES
44C	MONTAUK FINE SANDY LOAM 8 TO 15 PERCENT SLOPES
140B	CHATFIELD-HOLLIS-CANTON COMPLEX 0 TO 8 PERCENT SLOPES, ROCKY
140C	CHATFIELD-HOLLIS-CANTON COMPLEX 8 TO 15 PERCENT SLOPES, ROCKY
447A	SCITUATE-NEWFIELDS COMPLEX 0 TO 3 PERCENT SLOPES, VERY STONY
447B	SCITUATE-NEWFIELDS COMPLEX 3 TO 8 PERCENT SLOPES, VERY STONY
657A	RIDGEBURY FINE SANDY LOAM 0 TO 3 PERCENT SLOPES, VERY STONY

General Notes

1) THE PURPOSE OF THE PLAN IS TO DEPICT THE PARCEL BOUNDARIES AND EXISTING SURFACE SITE CONDITIONS AND TOPOGRAPHY OBSERVED IN SEPTEMBER AND OCTOBER 2024.
2) THE PROPERTY LINES SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, INC. IN JULY AND SEPTEMBER 2024, AND FROM DEEDS AND PLANS OF RECORD.
3) THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON A COMBINATION OF AN ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY VHB, INC. IN JULY AND SEPTEMBER 2024, AND DERIVED FROM DIGITAL ORTHOGRAPHIC IMAGERY AND LIDAR CAPTURED BY VHB, INC. WITH LEAF ON CONDITIONS DURING SEPTEMBER 2024 USING UAV TECHNOLOGIES. VERTICAL INFORMATION DEPICTED AS AN 1-FOOT CONTOUR INTERVAL OR SPOT ELEVATION SHOWN HEREON WERE DERIVED FROM THE SAME AND CONFORM WITH THE CURRENT NATIONAL MAP ACCURACY STANDARDS.
4) THIS SURVEY MEETS THE MINIMUM ACCURACY REQUIREMENTS OF AN URBAN CLASS SURVEY PROMULGATED UNDER LAN 503.04.
5) THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN WERE MAPPED PER AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD 38-22, QUALITY LEVEL(S) 'X' AS SPECIFIED IN THE CONTRACT BETWEEN 'THE CLIENT' AND VHB. PLEASE NOTE THAT WHILE BEST PRACTICES WERE FOLLOWED, NOT ALL UTILITIES MAY BE SHOWN AND THE ACCURACY OF UTILITY LOCATIONS CANNOT BE GUARANTEED.
6) HORIZONTAL DATUM IS BASED ON NH. GRID SYSTEM, NAD 1983/2011. ELEVATIONS SHOWN ON THIS PLAN REFER TO NAVD OF 1988/2018 ESTABLISHED FROM STATIC GPS OBSERVATIONS MADE ON JULY 31, 2024, POSTPROCESSED USLING TRIMBLE RTX-PP.
7) THE LOT LIES ENTIRELY WITHIN ZONE X (UNSHADED) (AREAS TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR ROCKINGHAM COUNTY, NEW HAMPSHIRE, MAP NUMBER 33015C0338E, EFFECTIVE DATE MAY 17, 2005.
8) NO WELLS WERE OBSERVED ON THE PROPERTY IN THE COURSE OF THIS SURVEY.
9) THE LOT LIES ENTIRELY WITHIN THE WOODMONT COMMONS PUD DISTRICT (PUD-1) AS SHOWN ON THE "TOWN OF LONDONDERRY, NEW HAMPSHIRE ZONING MAP", DATED APRIL 24, 2023. DIMENSIONAL REQUIREMENTS FOR A (PUD-1) AT THE TIME OF THIS SURVEY ARE:

	REQUIRED
MINIMUM LOT AREA	N/A
MINIMUM FRONTAGE	50 FEET
MINIMUM FRONT YARD SETBACK	10 FEET
MINIMUM SIDE YARD SETBACK	10 FEET
MINIMUM REAR YARD SETBACK	5 FEET
MAXIMUM BUILDING HEIGHT	50 FEET
MINIMUM FRONT YARD PARKING SETBACK	6 FEET
MINIMUM SIDE/REAR PARKING SETBACK	0 FT

10) THE TREE SYMBOL OUTLINE SHOWN ON THIS PLAN DOES NOT REPRESENT THE ACTUAL TREE CANOPY.

Plan References

1) PLAN ENTITLED "TAX MAP 10 LOTS 42 & 154 OVERALL LOT LINE ADJUSTMENT PLAN PILLSBURY CEMETERY 36 PILLSBURY & 49 HOVEY ROADS, LONDONDERRY, NH" DATED: SEPTEMBER 24, 2014, REVISED THRU 6/19/15. RECORDED AT RCRD AS PLAN D-39205.
2) PLAN ENTITLED "ANNEXATION AND SUBDIVISION PLAN ROBERT & STEPHEN LIEVENS TAX MAP 10 LOT 42 AND THE PINKERTON CEMETERY TAX MAP 10 LOT 154 HOVEY AND PILLSBURY ROADS LONDONDERRY, NH" DATED: JULY 17, 2002. RECORDED AT RCRD AS PLAN D-30457.
3) PLAN ENTITLED "PLAN OF LAND OF CHARLES E. & ROGER D. ANDERSON LONDONDERRY, NH" DATED: SEPTEMBER 1963. RECORDED AT THE RCRD AS PLAN 284 IN DRAWER III, SECTION H.
3) PLAN ENTITLED "SKETCH PLAN OF PART OF CHARLES E. & ROGER D. ANDERSON LAND LONDONDERRY, NH" DATED: JUNE 1964. RECORDED AT THE RCRD AS PLAN 285 IN DRAWER I, SECTION C.
4) PLAN ENTITLED "SUBDIVISION PLAN IN LONDONDERRY, NH 2ND ADDITION TO SUNDY LEE TERRACE"NDATED: DEC. 1970. RECORDED AT THE RCRD AS PLAN C-2103.
5) PLAN ENTITLED "PLAN OF LAND IN LONDONDERRY, NH TAX MAP 10 LOT 40 & 40-1" DATED: APRIL 2003, RECORDED AT THE RCRD AS PLAN D-30646.
6) PLAN ENTITLED "SUBDIVISION PLAN (MAP 10, LOT 41) WOODMONT COMMONS PLANNED UNIT DEVELOPMENT PILLSBURY ROAD, MICHELS WAY AND WOODMONT AVE LONDONDERRY, NEW HAMPSHIRE" DATED: 2 MAY 2023. RECORDED AT THE RCRD AS PLAN D-44594.
7) PLAN ENTITLED "SURVEY WORKSHEET OF MAP 10 LOT 15-0" PREPARED BY TFM UNDATED, NOT RECORDED.

OWNER'S SIGNATURE

Signed by: Kevin Smith
0B4E4ADCC4452E42...

OWNER OR REPRESENTATIVE

Approved by the Town of Londonderry N.H. Planning Board

on Date: _____

Certified By: _____

_____

Survey Endorsement

I CERTIFY THAT THIS PLAN WAS PREPARED FROM THE BOUNDARY INFORMATION SHOWN ON THE PLAN REFERENCED AND A FIELD SURVEY MADE ON THE GROUND IN JULY AND SEPTEMBER 2024, HAVING A MAXIMUM ERROR OF CLOSURE BETTER THAN 1 IN 10,000.

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR NO. 1036 MICHAEL HAMMER

DATE

MICHAEL J. HAMMER, LLS #1036

Wetland Note

THE SITE WAS INVESTIGATED FOR WETLANDS BY JAKE TINUS CERTIFIED WETLAND SCIENTIST (NH CWS #228) ON NOVEMBER 25, 2024 AND NO EVIDENCE OF WETLANDS WAS FOUND ON THE SUBJECT PROPERTY. WETLANDS ON THE ADJACENT PARCEL WERE MAPPED BY JAKE TINUS ON OCTOBER 9 THRU 11, 2024.

Benchmarks

1. TBM 31 - MAG NAIL SET IN PAVEMENT ON PILLSBURY ROAD, ELEV.=368.09'
2. TBM 34 - MAG NAIL SET IN PAVEMENT ON PILLSBURY ROAD, ELEV.=361.87'
3. TBM 2 - NAIL SET IN U.POLE (PSNH 3/27), ELEV.=384.09'
4. TBM 3 - MAG NAIL FOUND IN U.POLE (PSNH 3/29), ELEV.=377.81'
5. TBM 4 - NAIL SET IN U.POLE (EVERSOURCE 35), ELEV.=390.57'

80 0 80 160
SCALE IN FEET

No.	Revision	Date	Appvd.
1	SITE PLAN APPLICATION SUBMISSION	2/12/2026	MJH

Liberty Court at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by | Checked by

Issued for | Date

Permitting | **October 14, 2025**

Record Owner/ Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA 01949

Scale: 1"=80'

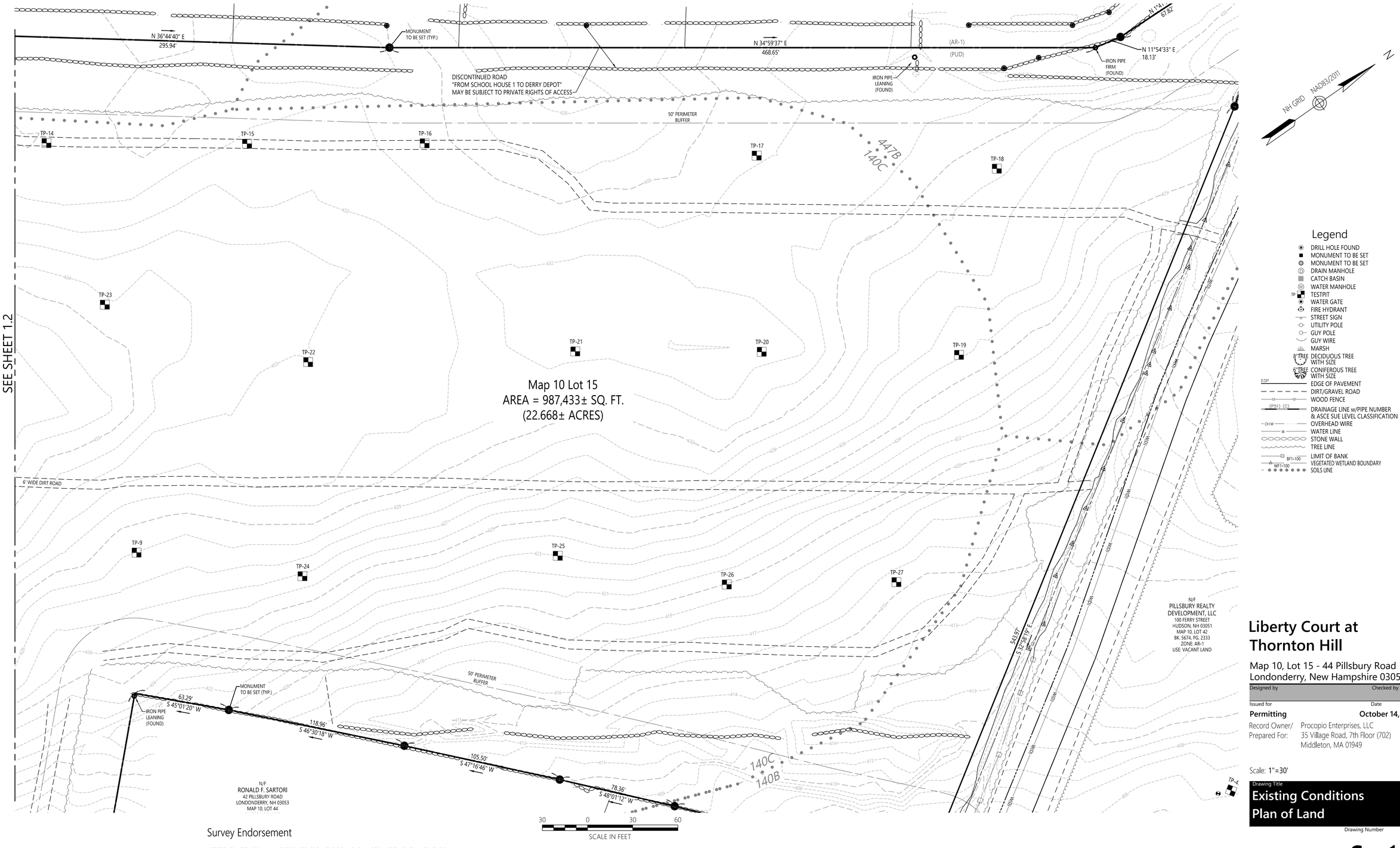
Drawing Title
Existing Conditions Master Plan

Drawing Number
Sv-1.0

Sheet 1 of 4

Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
603.391.3900 • FAX 603.518.7495

Project Number **53140.00**



Legend

- DRILL HOLE FOUND
- MONUMENT TO BE SET
- MONUMENT TO BE SET
- DRAIN MANHOLE
- CATCH BASIN
- WATER MANHOLE
- TESTPIT
- WATER GATE
- FIRE HYDRANT
- STREET SIGN
- UTILITY POLE
- GUY POLE
- GUY WIRE
- MARSH
- 8" TREE DECIDUOUS TREE WITH SIZE
- 6" TREE CONIFEROUS TREE WITH SIZE
- EDGE OF PAVEMENT
- DIRT/GRAVEL ROAD
- WOOD FENCE
- (PS1) (C) DRAINAGE LINE w/PIPE NUMBER & ASCE SUE LEVEL CLASSIFICATION
- OHW OVERHEAD WIRE
- W WATER LINE
- STONE WALL
- TREE LINE
- BF1-100 LIMIT OF BANK
- WF1-100 VEGETATED WETLAND BOUNDARY
- SOILS LINE

Survey Endorsement

I CERTIFY THAT THIS PLAN WAS PREPARED FROM THE BOUNDARY INFORMATION SHOWN ON THE PLAN REFERENCED AND A FIELD SURVEY MADE ON THE GROUND IN JULY AND SEPTEMBER 2024, HAVING A MAXIMUM ERROR OF CLOSURE BETTER THAN 1IN 10,000.



DATE MICHAEL J. HAMMER, LLS #1036

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1	SITE PLAN APPLICATION SUBMISSION	2/12/2026	MJH

Liberty Court at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by | Checked by

Issued for: **Permitting** | Date: **October 14, 2025**

Record Owner/ Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA 01949

Scale: 1"=30'

Drawing Title
Existing Conditions Plan of Land

Drawing Number
Sv-1.1

Sheet 2 of 4

Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
603.391.3900 • FAX 603.518.7495

Project Number **53140.00**

PILLSBURY ROAD
(CLASS V)

N/F
JOYCE INSERRA 2020 TRUST
57 PILLSBURY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 14-6
BK. 6078, PG. 2973

N/F
KATHLEEN M. DALPHOND
55 PILLSBURY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 14-7
BK. 4154, PG. 2561

N/F
ANN SCHREMPF
53 PILLSBURY ROAD
LONDONDERRY, NH 03053
MAP 10, LOT 14-8
BK. 6488, PG. 337

N 41°16'52" E 67.80'
N 33°27'25" E 72.82'
N 32°54'32" E 100.42'
N 38°41'57" E 156.16'
N 35°58'36" E 100.99'
N 37°30'36" E 121.49'
N 19°38'25" W 102.40'
N 62°43'53" W 160.85'
N 62°09'53" W 102.02'
N 61°07'02" W 103.14'
R=150.00'
L=58.52'
Δ=22°21'08"

IRON PIPE FIRM (FOUND)
MONUMENT TO BE SET (TYP.)
50' PERIMETER BUFFER
MOWED PATH
BUILDING
18" CMP I=359.5'
18" CMP I=356.9'
UP#30T3
UP#SNH 3-43
UP#Mar-43
UP#SNH 3-42
UP#SNH 3-41
LOP AHEAD
TBM #31

TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-10
TP-11
TP-12
TP-13

44C
140C
44B
140C

MATCH LINE SEE SHEET 1.3
MATCH LINE SEE SHEET 1.1

Map 10 Lot 15
AREA = 987,433± SQ. FT.
(22.668± ACRES)

NH GRID NAD83/2011

30 0 30 60
SCALE IN FEET

Legend

- DRILL HOLE FOUND
- MONUMENT TO BE SET
- MONUMENT TO BE SET
- DRAIN MANHOLE
- CATCH BASIN
- WATER MANHOLE
- TP TESTPIT
- WATER GATE
- FIRE HYDRANT
- STREET SIGN
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- GUY POLE
- GUY WIRE
- MARSH
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- DIRT/GRAVEL ROAD
- WOOD FENCE
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- TREE LINE
- BF1-100 LIMIT OF BANK
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Survey Endorsement

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DATE

MICHAEL J. HAMMER, LLS #1036

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No.	Revision	Date	Appvd.
1	SITE PLAN APPLICATION SUBMISSION	2/12/2026	MJH

Liberty Court at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by | Checked by

Issued for: **Permitting** | Date: **October 14, 2025**

Record Owner/ Prepared For: Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA 01949

Scale: 1"=30'

Drawing Title
Existing Conditions Plan of Land

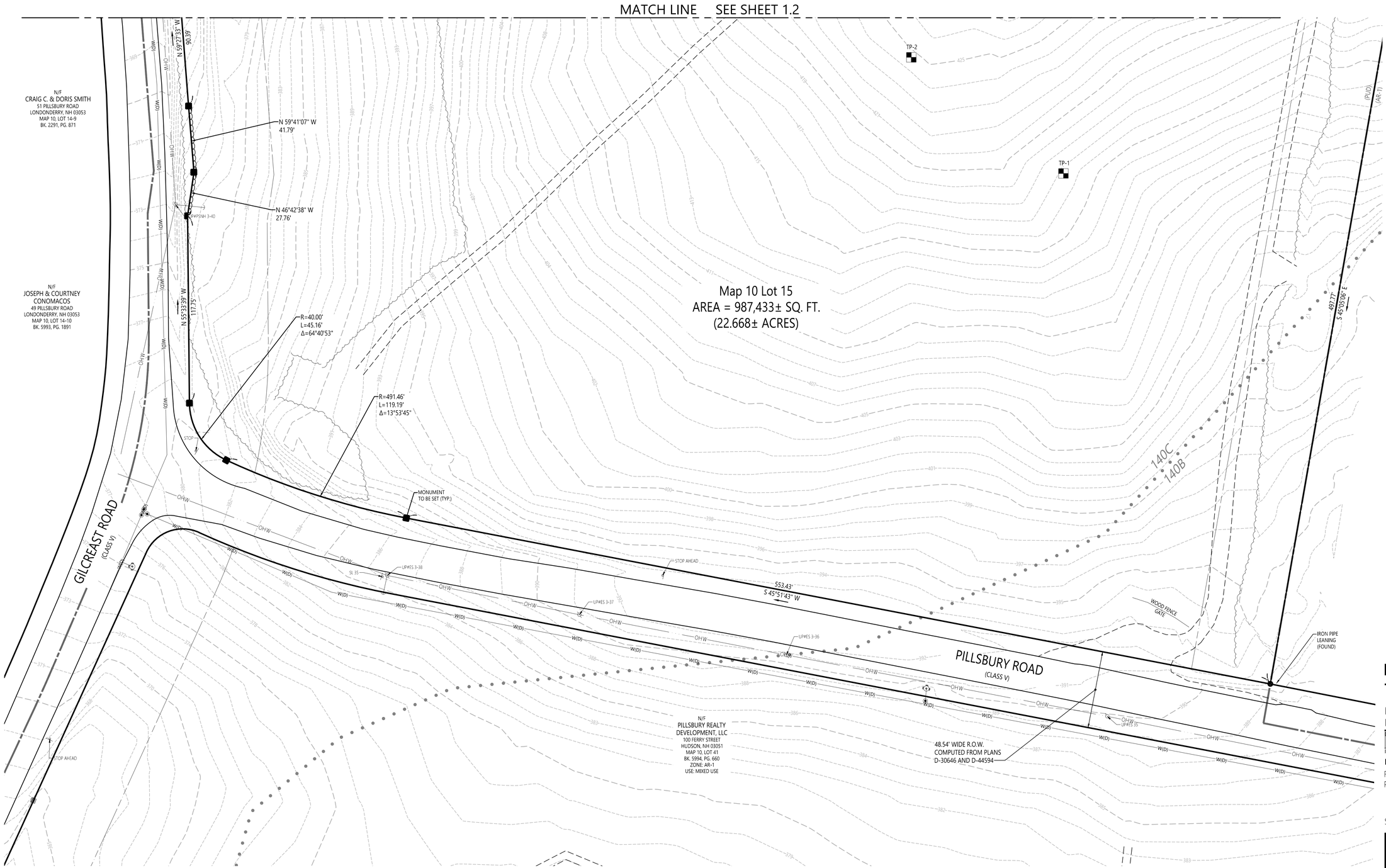
Drawing Number
Sv-1.2

Sheet 3 of 4

Vanasse Hangen Brustlin, Inc.
2 Bedford Farms Drive, Suite 200
Bedford, New Hampshire 03110
603.391.3900 • FAX 603.518.7495

Project Number **53140.00**

\\vhb\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\sr\planset\53140.00-EX-PLAN44.dwg



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- SOILS LINE

Liberty Court at Thornton Hill

Map 10, Lot 15 - 44 Pillsbury Road
Londonderry, New Hampshire 03053

Designed by | Checked by

Issued for: **Permitting** | Date: **October 14, 2025**

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Scale: 1"=30'

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Existing Conditions Plan of Land

Drawing Number
Sv-1.3

Sheet 4 of 4

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STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 1036 MICHAEL J. HAMMER

DATE | MICHAEL J. HAMMER, LLS #1036

30 0 30 60
SCALE IN FEET

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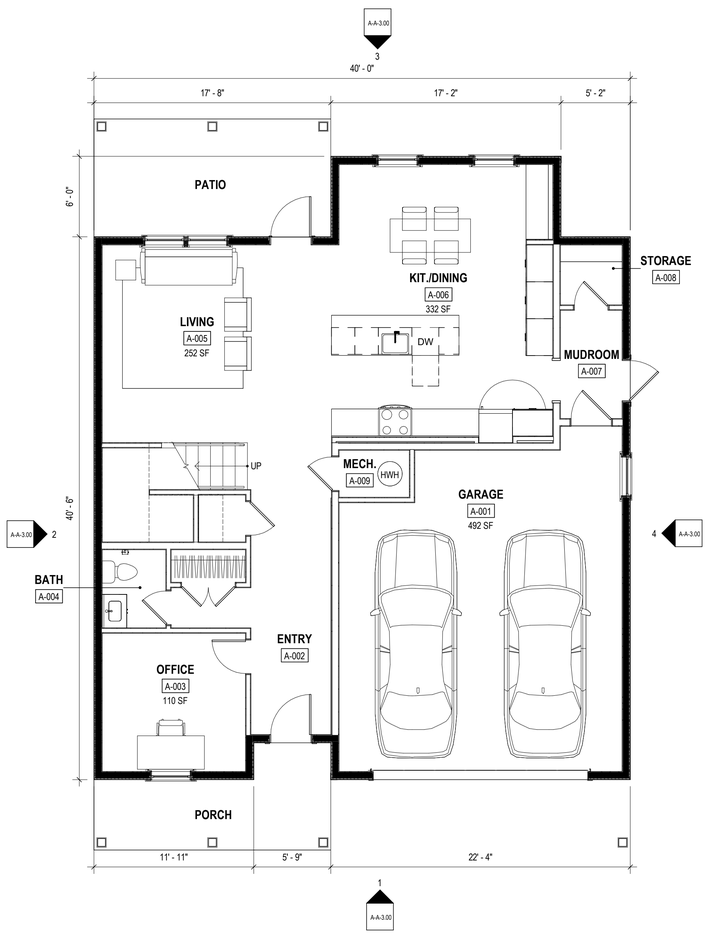
No.	Revision	Date	Appvd.
1	SITE PLAN APPLICATION SUBMISSION	2/12/2026	MJH

UNIT TYPE AREAS:

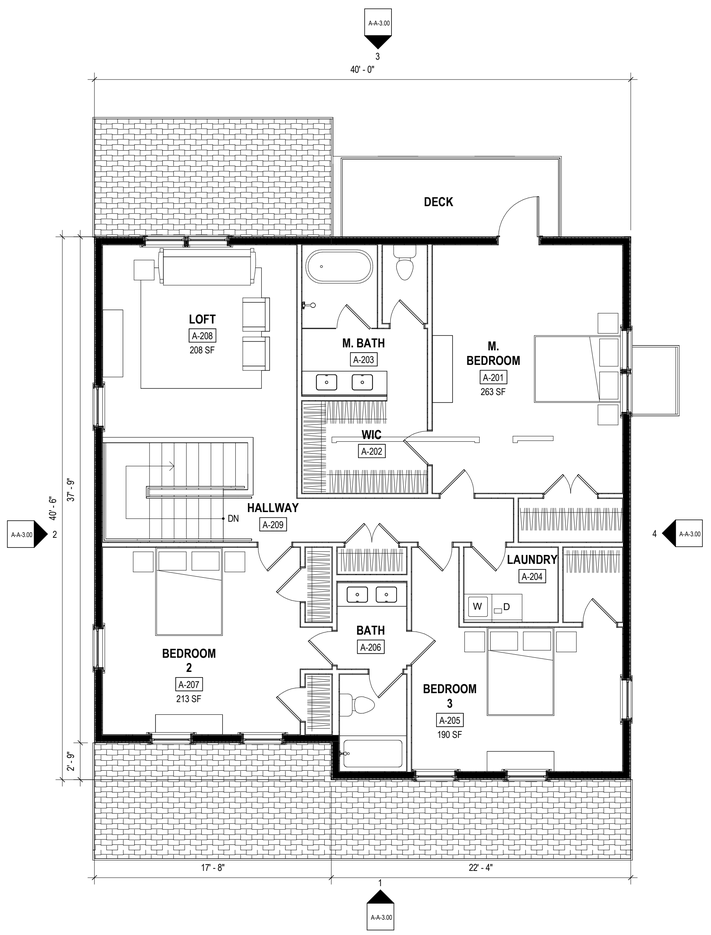
UNIT TYPE A:
GROUND FLOOR: 1,101 SF (GARAGE: 505 SF)
SECOND FLOOR: 1395 SF
TOTAL: 2,496 SF (WITH GARAGE: 3,001 SF)
UNIT TYPE B:
GROUND FLOOR: 1,177 SF (522 GARAGE)
SECOND FLOOR: 1,377 SF
TOTAL: 2,554 SF (WITH GARAGE: 3,076 SF)
UNIT TYPE C:
GROUND FLOOR: 1,033 SF (GARAGE: 595 SF)
SECOND FLOOR: 1,477 SF
TOTAL: 2,510 SF (WITH GARAGE: 3,105)
UNIT TYPE D:
GROUND FLOOR: 1,101 SF (GARAGE: 430 SF)
SECOND FLOOR: 1,176 SF
TOTAL: 2,277 SF (WITH GARAGE: 2,707 SF)
UNIT TYPE E:
GROUND FLOOR: 1,086 SF (GARAGE: 503 SF)
SECOND FLOOR: 1,492 SF
TOTAL: 2,578 SF (WITH GARAGE: 3,143)
UNIT TYPE F:
GROUND FLOOR: 246 SF (GARAGE: 479 SF)
SECOND FLOOR: 1,372 SF
THIRD FLOOR: 1,001 SF
TOTAL: 2,619 SF (WITH GARAGE: 3,098 SF)

GENERAL FLOOR PLAN NOTES:

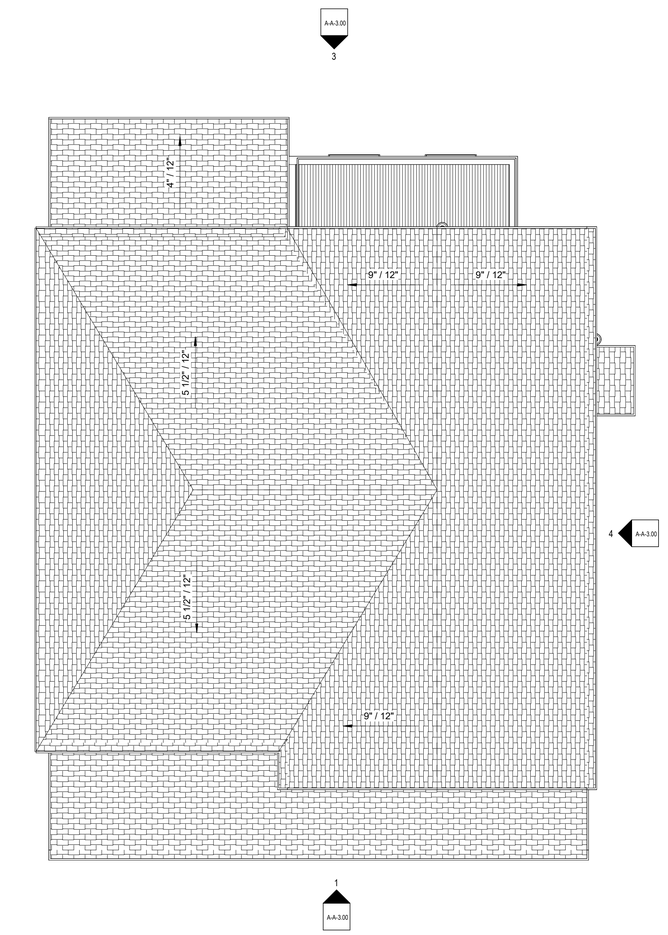
1. *OVERALL DIMENSIONS ARE TO GRIDLINES, F.O.STUD, U.N.O.*
2. *OPENING DIMENSIONS TO CENTER OF OPENING*
3. REFER TO LIFE SAFETY PLANS AND ASSEMBLY SHEETS TO DETERMINE ALL REQUIRED RATINGS.
4. COORDINATE ALL LOAD BEARING ELEMENTS WITH STRUCTURAL DWGS.
5. FIRE CAULK ALL PENETRATIONS AND JOINTS AT RATED ASSEMBLIES.
6. REFER TO ENLARGED PLANS FOR ADDITIONAL INFORMATION.
7. REFER TO FINISH SCHEDULE FOR ADDITIONAL INFORMATION.
8. *ALL DOORS LOCATED 6" FROM ADJACENT WALL, U.N.O.*
9. PROVIDE WATER AND MOLD RESISTANT GWB IN ALL AREAS HAVING WATER SOURCE INCLUDING BUT NOT LIMITED TO BATHROOMS, KITCHENS, UTILITY CLOSETS, LAUNDRY ROOMS/CLOSETS AND CHASE WALLS.
10. CONFIRM ALL APPLIANCE / PLUMBING FIXTURE DIMENSIONS WITH FINAL EQUIPMENT SELECTIONS.
11. PROVIDE SEMI-RECESSED FIRE EXTINGUISHER CABINETS, LOCATE PER CODE REQ'S AND MAINTAIN RATING AS REQUIRED AT RATED WALLS. COORDINATE FINAL LOCATION IN FIELD WITH ARCHITECT.
12. REFER TO AIR SEALING DETAILS FOR ADDITIONAL REQUIREMENTS.
13. REFER TO PARTITION TYPE SHEET FOR PARTITION INFORMATION AND TAG TYPES.
14. REFER TO DOOR SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.



3 UNIT TYPE A - GROUND FLOOR
3/16" = 1'-0"



2 UNIT TYPE A - SECOND FLOOR
3/16" = 1'-0"



1 UNIT TYPE A - ROOF PLAN
3/16" = 1'-0"

THORNTON HILL

MAP 10, LOT 15, 44
PILLSBURY ROAD,
LONDONDERRY NH 03053

PROJECT #2527

PROCOPIO ENTERPRISES, LLC
35 VILLAGE ROAD, 7TH FLOOR (702)
MIDDLETOWN, MA 01949
P (781) 233-3190

utile
ARCHITECTURE + URBAN DESIGN
115 KINGSTON ST
BOSTON, MA 02111
P 617 423.7200
utiledesign.com
ARCHITECT

H+O
100 SUMMER STREET
SUITE 1600
BOSTON, MA 02110
P 617 938 3349
STRUCTURAL

VHB
2 BEDFORD FARMS DR
SUITE 200
BEDFORD, NH 03110
P 603 391 3900
CIVIL

VHB
2 BEDFORD FARMS DR
SUITE 200
BEDFORD, NH 03110
P 603 391 3900
LANDSCAPE

NOT FOR CONSTRUCTION

STAMP

ISSUE DATE **DOCUMENT SUBMISSION**

ISSUE DATE **REVISIONS ON SHEET**

NOTE: LEGIBILITY OF PERFORMANCE CRITERIA AND DETAILING SCOPE REQUIRES THAT DRAWINGS BE VIEWED OR PRINTED IN COLOR - COORDINATE AS REQUIRED TO DETERMINE FULL PROJECT SCOPE

SCALE **As indicated**
UTILE PROJECT NUMBER **2417**

UNIT TYPE A - FLOOR PLANS

A-A-1.00

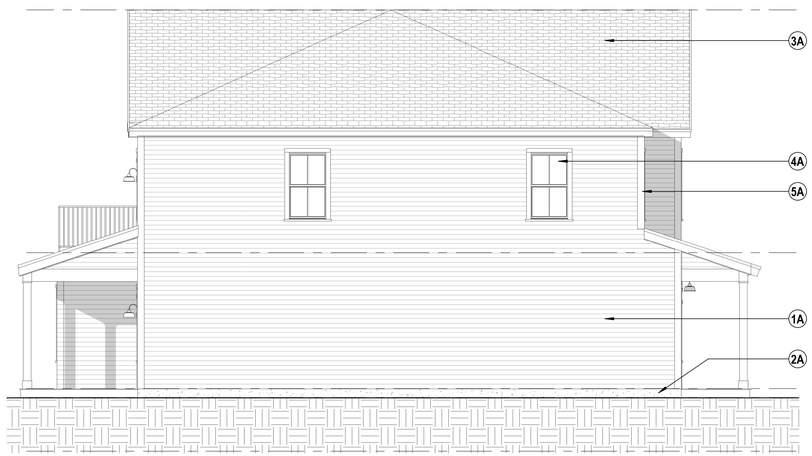
2/6/2026 3:39:08 PM



4 UNIT TYPE A - SIDE ELEVATION 2
3/16" = 1'-0"



3 UNIT TYPE A - REAR ELEVATON
3/16" = 1'-0"



2 UNIT TYPE A - SIDE ELEVATION 1
3/16" = 1'-0"



1 UNIT TYPE A - FRONT ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE

Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
1C	VINYL CLAPBOARD SIDING, BOARD AND BATTEN, BASIS OF DESIGN CERTAINTEED MONOGRAM
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
8A	BRICK; COLOR AND PATTERN TBD
8B	STONE; COLOR AND PATTERN TBD

FACADE ALTERNATES

1. SHUTTERS AT FRONT FACADE WINDOWS
2. SHAKE-STYLE SHINGLES IN LIEU OF BOARD AND BATTEN
3. TRELLIS IN LIEU OF GARAGE ROOF OVERHANG
4. STONE/BRICK CLADDING BELOW GARAGE ROOF OVERHANG
5. STANDING SEAM LOWER ROOF IN LIEU OF ASPHALT SHINGLE
6. GARAGE DOOR STYLE
7. NO CANOPY AT SIDE ENTRANCE

THORNTON HILL

MAP 10, LOT 15, 44
PILLSBURY ROAD,
LONDONDERRY NH 03053

PROJECT #2527

PROCOPIO ENTERPRISES, LLC
35 VILLAGE ROAD, 7TH FLOOR (702)
MIDDLETOWN, MA 01949
P (781) 233-3190

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H+O
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SUITE 1600
BOSTON, MA 02110
P 617 938 3349
STRUCTURAL

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SUITE 200
BEDFORD, NH 03110
P 603 391 3900
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NOTE: LEGIBILITY OF PERFORMANCE CRITERIA AND DETAILING SCOPE REQUIRES THAT DRAWINGS BE VIEWED OR PRINTED IN COLOR - COORDINATE AS REQUIRED TO DETERMINE FULL PROJECT SCOPE

SCALE **As indicated**
UTILE PROJECT NUMBER **2417**

UNIT TYPE A - EXTERIOR ELEVATIONS

A-A-3.00

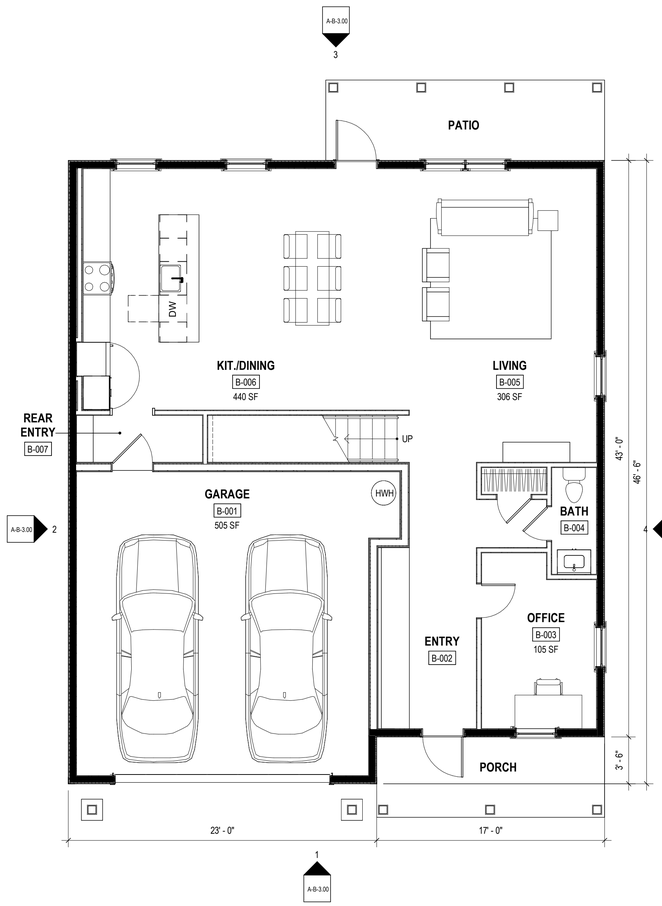
2/6/2026 3:39:11 PM

UNIT TYPE AREAS:

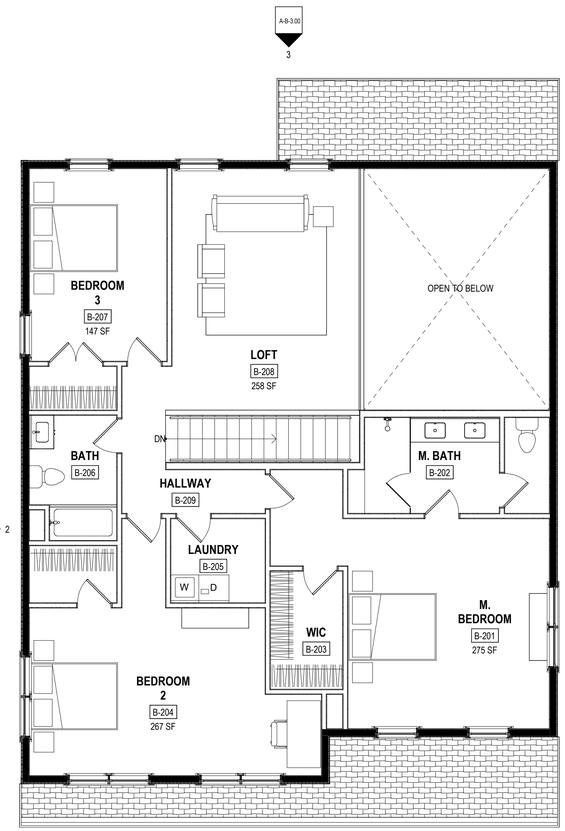
UNIT TYPE A:
GROUND FLOOR: 1,101 SF (GARAGE: 505 SF)
SECOND FLOOR: 1395 SF
TOTAL: 2,496 SF (WITH GARAGE: 3,001 SF)
UNIT TYPE B:
GROUND FLOOR: 1,177 SF (522 GARAGE)
SECOND FLOOR: 1,377 SF
TOTAL: 2,554 SF (WITH GARAGE: 3,076 SF)
UNIT TYPE C:
GROUND FLOOR: 1,033 SF (GARAGE: 595 SF)
SECOND FLOOR: 1,477 SF
TOTAL: 2,510 SF (WITH GARAGE: 3,105)
UNIT TYPE D:
GROUND FLOOR: 1,101 SF (GARAGE: 430 SF)
SECOND FLOOR: 1,176 SF
TOTAL: 2,277 SF (WITH GARAGE: 2,707 SF)
UNIT TYPE E:
GROUND FLOOR: 1,086 SF (GARAGE: 503 SF)
SECOND FLOOR: 1,492 SF
TOTAL: 2,578 SF (WITH GARAGE: 3,143)
UNIT TYPE F:
GROUND FLOOR: 246 SF (GARAGE: 479 SF)
SECOND FLOOR: 1,372 SF
THIRD FLOOR: 1,001 SF
TOTAL: 2,619 SF (WITH GARAGE: 3,098 SF)

GENERAL FLOOR PLAN NOTES:

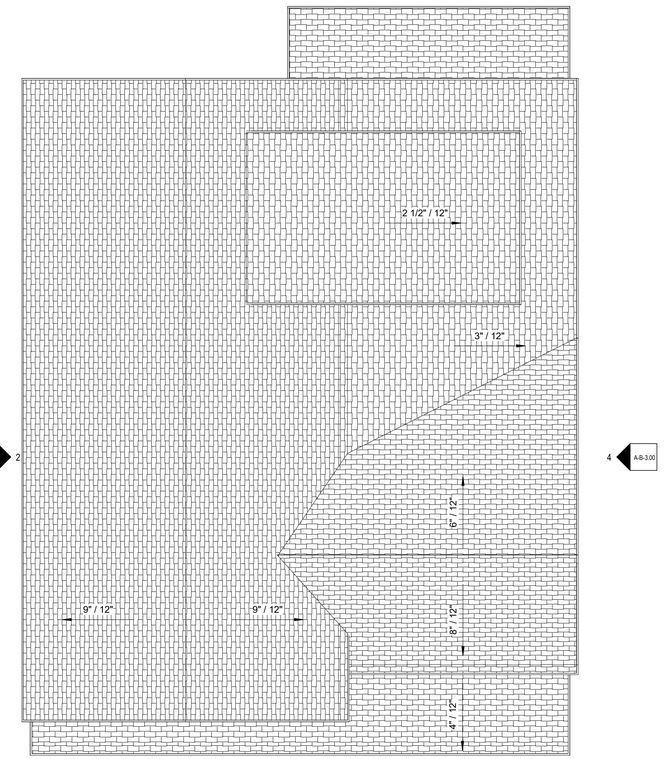
1. *OVERALL DIMENSIONS ARE TO GRIDLINES, F.O.STUD, U.N.O.*
2. *OPENING DIMENSIONS TO CENTER OF OPENING*
3. REFER TO LIFE SAFETY PLANS AND ASSEMBLY SHEETS TO DETERMINE ALL REQUIRED RATINGS.
4. COORDINATE ALL LOAD BEARING ELEMENTS WITH STRUCTURAL DWGS.
5. FIRE CAULK ALL PENETRATIONS AND JOINTS AT RATED ASSEMBLIES.
6. REFER TO ENLARGED PLANS FOR ADDITIONAL INFORMATION.
7. REFER TO FINISH SCHEDULE FOR ADDITIONAL INFORMATION.
8. *ALL DOORS LOCATED 6" FROM ADJACENT WALL, U.N.O.*
9. PROVIDE WATER AND MOLD RESISTANT GWB IN ALL AREAS HAVING WATER SOURCE INCLUDING BUT NOT LIMITED TO BATHROOMS, KITCHENS, UTILITY CLOSETS, LAUNDRY ROOMS/CLOSETS AND CHASE WALLS.
10. CONFIRM ALL APPLIANCE / PLUMBING FIXTURE DIMENSIONS WITH FINAL EQUIPMENT SELECTIONS.
11. PROVIDE SEMI-RECESSED FIRE EXTINGUISHER CABINETS, LOCATE PER CODE REQ'S AND MAINTAIN RATING AS REQUIRED AT RATED WALLS. COORDINATE FINAL LOCATION IN FIELD WITH ARCHITECT.
12. REFER TO AIR SEALING DETAILS FOR ADDITIONAL REQUIREMENTS.
13. REFER TO PARTITION TYPE SHEET FOR PARTITION INFORMATION AND TAG TYPES.
14. REFER TO DOOR SCHEDULE AND DETAILS FOR ADDITIONAL INFORMATION.



3 UNIT TYPE B - GROUND FLOOR
3/16" = 1'-0"



2 UNIT TYPE B - SECOND FLOOR
3/16" = 1'-0"



1 UNIT TYPE B - ROOF PLAN
3/16" = 1'-0"

THORNTON HILL

MAP 10, LOT 15, 44
PILLSBURY ROAD,
LONDONDERRY NH 03053

PROJECT #2527

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SCALE **As indicated**
UTILE PROJECT NUMBER **2417**

UNIT TYPE B - FLOOR PLANS

A-B-1.00

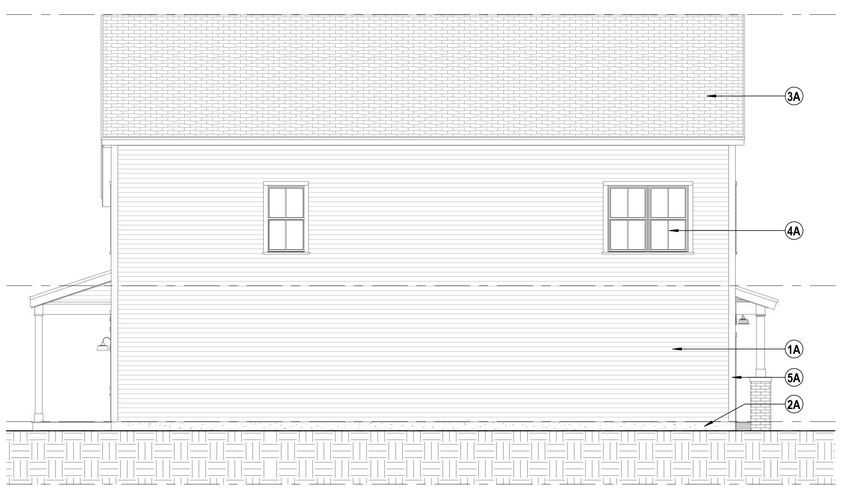
2/6/2026 3:39:13 PM



4 UNIT TYPE B - SIDE ELEVATION 2
3/16" = 1'-0"



3 UNIT TYPE B - REAR ELEVATION
3/16" = 1'-0"



2 UNIT TYPE B - SIDE ELEVATION 1
3/16" = 1'-0"



1 UNIT TYPE B - FRONT ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE	
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
1C	VINYL CLAPBOARD SIDING, BOARD AND BATTEN, BASIS OF DESIGN CERTAINTEED MONOGRAM
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
5A	PVC TRIM BOARD, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
8A	BRICK; COLOR AND PATTERN TBD
8B	STONE; COLOR AND PATTERN TBD

FACADE ALTERNATES

1. ROUND COLUMNS IN LIEU OF SQUARE COLUMNS
2. STONE PIERS IN LIEU OF BRICK PIERS
3. SHUTTERS AT FRONT FACADE WINDOWS
4. STONE UNDER PORCH
5. FYPON HEADERS AT WINDOWS
6. GARAGE DOOR STYLE

THORNTON HILL

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SCALE **As Indicated**
UTILE PROJECT NUMBER **2417**

UNIT TYPE B - EXTERIOR ELEVATIONS

A-B-3.00

2/6/2026 3:39:16 PM

UNIT TYPE AREAS:

UNIT TYPE A:
GROUND FLOOR: 1,101 SF (GARAGE: 505 SF)
SECOND FLOOR: 1395 SF
TOTAL: 2,496 SF (WITH GARAGE: 3,001 SF)
UNIT TYPE B:
GROUND FLOOR: 1,177 SF (522 GARAGE)
SECOND FLOOR: 1,377 SF
TOTAL: 2,554 SF (WITH GARAGE: 3,076 SF)
UNIT TYPE C:
GROUND FLOOR: 1,033 SF (GARAGE: 595 SF)
SECOND FLOOR: 1,477 SF
TOTAL: 2,510 SF (WITH GARAGE: 3,105)
UNIT TYPE D:
GROUND FLOOR: 1,101 SF (GARAGE: 430 SF)
SECOND FLOOR: 1,176 SF
TOTAL: 2,277 SF (WITH GARAGE: 2,707 SF)
UNIT TYPE E:
GROUND FLOOR: 1,086 SF (GARAGE: 503 SF)
SECOND FLOOR: 1,492 SF
TOTAL: 2,578 SF (WITH GARAGE: 3,143)
UNIT TYPE F:
GROUND FLOOR: 246 SF (GARAGE: 479 SF)
SECOND FLOOR: 1,372 SF
THIRD FLOOR: 1,001 SF
TOTAL: 2,619 SF (WITH GARAGE: 3,098 SF)

GENERAL FLOOR PLAN NOTES:

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2. *OPENING DIMENSIONS TO CENTER OF OPENING*
3. REFER TO LIFE SAFETY PLANS AND ASSEMBLY SHEETS TO DETERMINE ALL REQUIRED RATINGS.
4. COORDINATE ALL LOAD BEARING ELEMENTS WITH STRUCTURAL DWGS.
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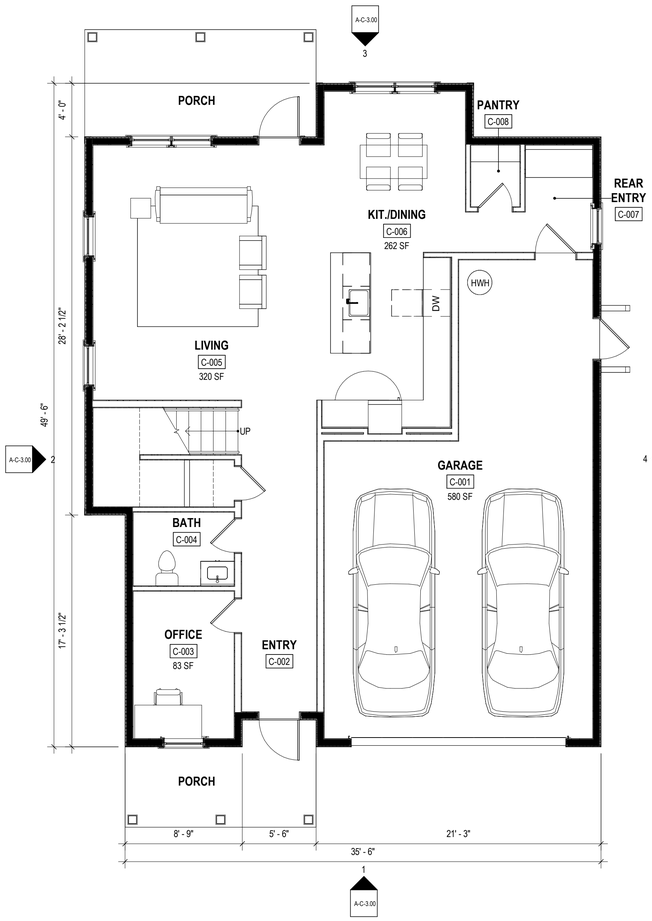
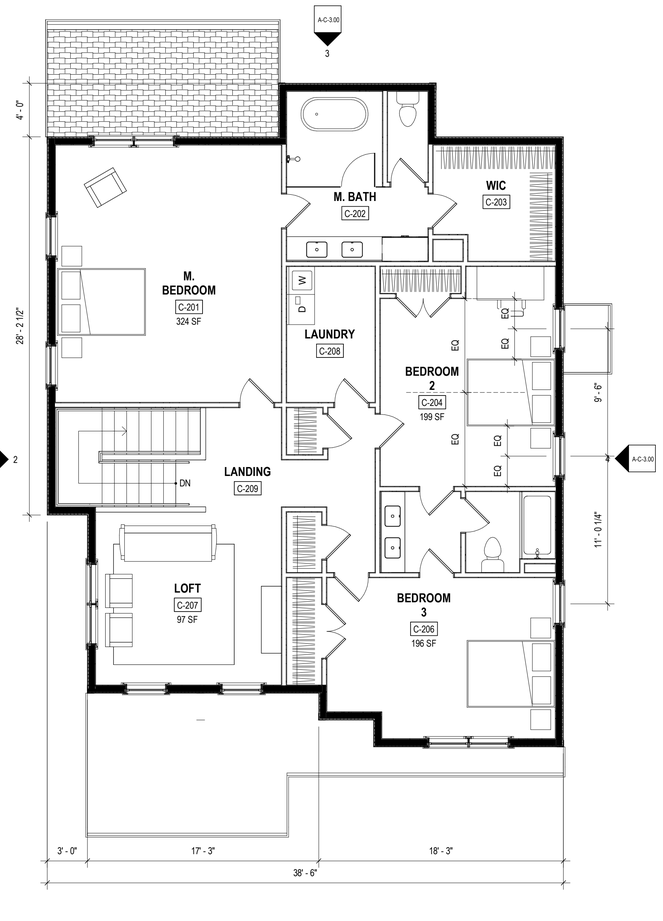
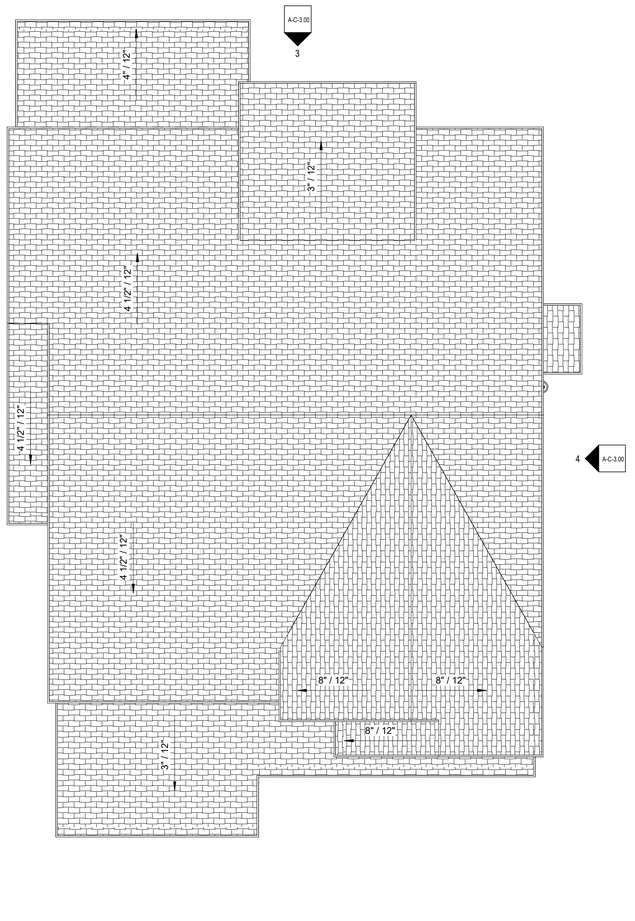


3 UNIT TYPE C - GROUND FLOOR
3/16" = 1'-0"



2 UNIT TYPE C - SECOND FLOOR
3/16" = 1'-0"



1 UNIT TYPE C - ROOF PLAN
3/16" = 1'-0"

THORNTON HILL

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SCALE: **As indicated**
UTILE PROJECT NUMBER: **2417**

UNIT TYPE C - FLOOR PLANS

A-C-1.00

2/6/2026 3:39:19 PM



4 UNIT TYPE C - SIDE ELEVATION 2
3/16" = 1'-0"



3 UNIT TYPE C - REAR ELEVATION
3/16" = 1'-0"



2 UNIT TYPE C - SIDE ELEVATION 1
3/16" = 1'-0"



1 UNIT TYPE C - FRONT ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE

Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
1B	VINYL SHAKE SHINGLE, BASIS OF DESIGN CERTAINTEED CEDAR IMPRESSIONS
1C	VINYL CLAPBOARD SIDING, BOARD AND BATTEN, BASIS OF DESIGN CERTAINTEED MONOGRAM
2A	EXPOSED CONCRETE FROST WALL
3A	ARCHITECTURAL GRADE ASPHALT SHINGLE, BASIS OF DESIGN CERTAINTEED LANDMARK
4A	VINYL DOUBLE HUNG WINDOWS WITH DIVIDED LIGHT, BASIS OF DESIGN ANDERSEN 100 SERIES
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6A	SECTIONAL OVERHEAD DOOR, BASIS OF DESIGN OVERHEAD DOOR CORP. THERMACORE
7A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
8A	BRICK; COLOR AND PATTERN TBD
8B	STONE; COLOR AND PATTERN TBD

FACADE ALTERNATES

1. SHUTTERS AT FRONT FACADE WINDOWS
2. ROUND COLUMNS IN LIEU OF SQUARE COLUMNS
3. GARAGE DOOR STYLE
4. NO CANOPY AT SIDE ENTRANCE

THORNTON HILL

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SCALE **As indicated**
UTILE PROJECT NUMBER **2417**

UNIT TYPE C - EXTERIOR ELEVATIONS

A-C-3.00

2/6/2026 3:39:22 PM

UNIT TYPE AREAS:

UNIT TYPE A:
GROUND FLOOR: 1,101 SF (GARAGE: 505 SF)
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UNIT TYPE B:
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TOTAL: 2,554 SF (WITH GARAGE: 3,076 SF)
UNIT TYPE C:
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TOTAL: 2,510 SF (WITH GARAGE: 3,105)
UNIT TYPE D:
GROUND FLOOR: 1,101 SF (GARAGE: 430 SF)
SECOND FLOOR: 1,176 SF
TOTAL: 2,277 SF (WITH GARAGE: 2,707 SF)
UNIT TYPE E:
GROUND FLOOR: 1,086 SF (GARAGE: 503 SF)
SECOND FLOOR: 1,492 SF
TOTAL: 2,578 SF (WITH GARAGE: 3,143)
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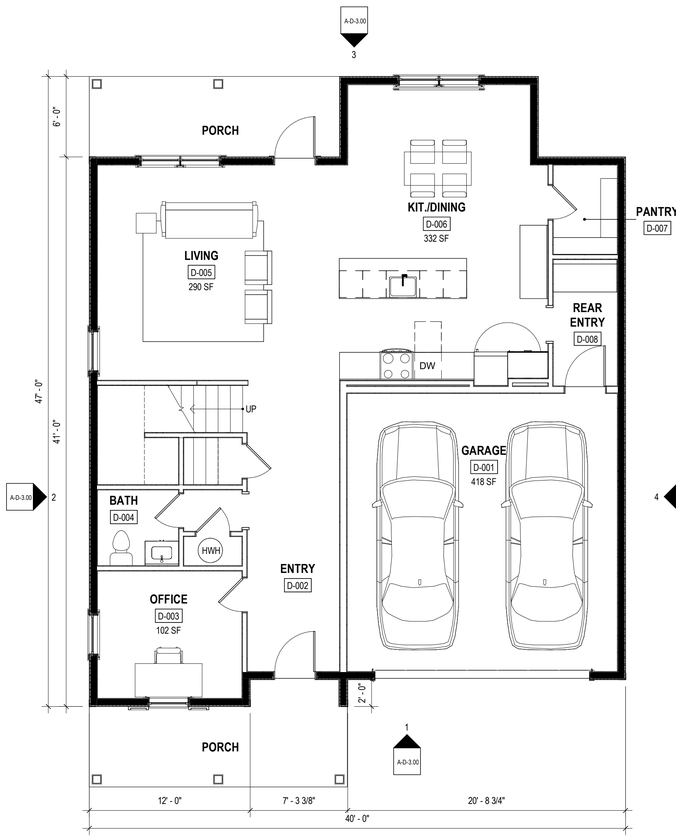
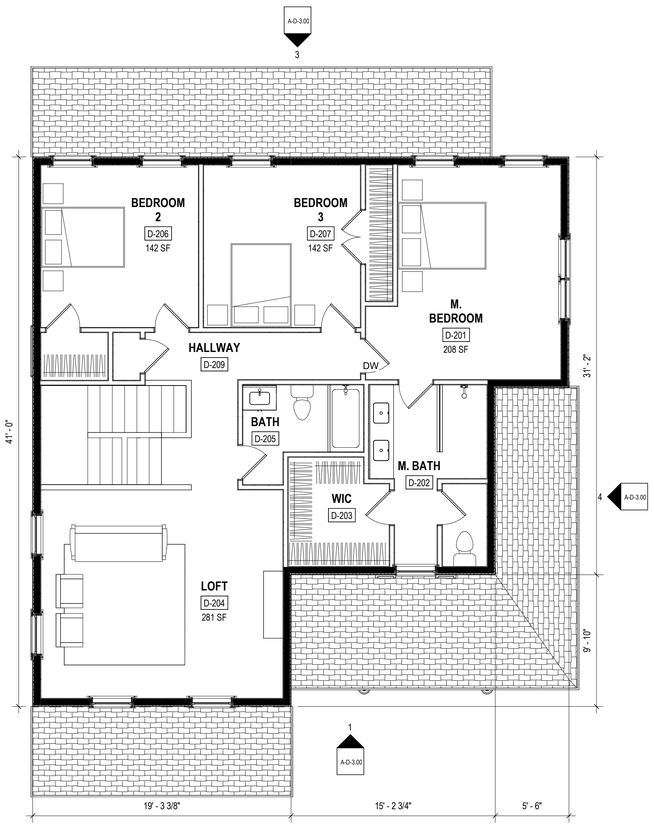
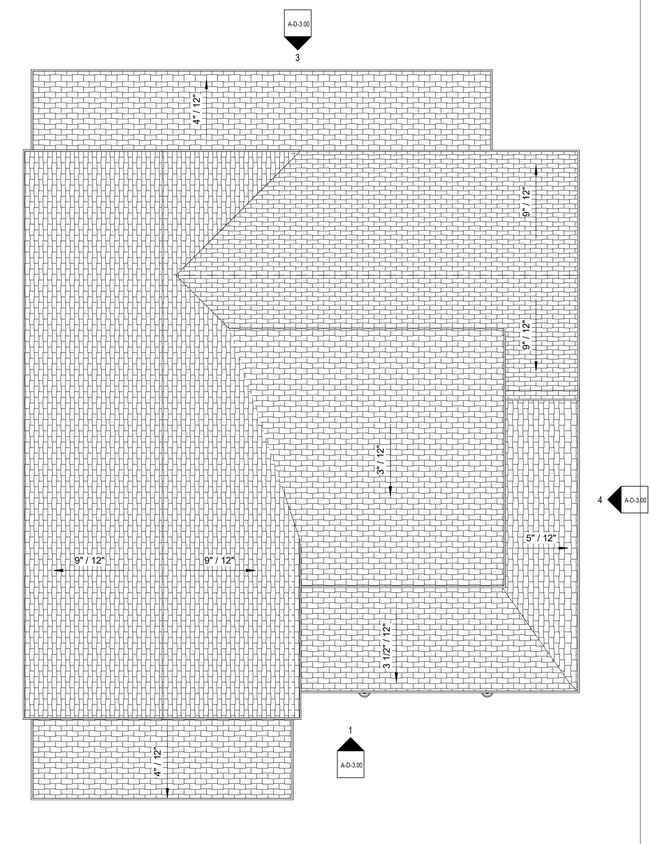


3 UNIT TYPE D - GROUND FLOOR
3/16" = 1'-0"



2 UNIT TYPE D - SECOND FLOOR
3/16" = 1'-0"



1 UNIT TYPE D - ROOF PLAN
3/16" = 1'-0"

THORNTON HILL

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SCALE **As indicated**
UTILE PROJECT NUMBER **2417**

UNIT TYPE D - FLOOR PLANS

A-D-1.00

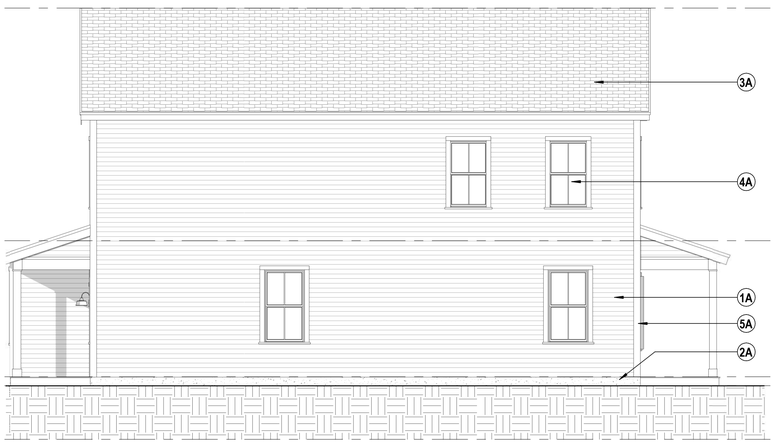
2/6/2026 3:39:24 PM



4 UNIT TYPE D - SIDE ELEVATION 2
3/16" = 1'-0"



3 UNIT TYPE D - REAR ELEVATION
3/16" = 1'-0"



2 UNIT TYPE D - SIDE ELEVATION 1
3/16" = 1'-0"



1 UNIT TYPE D - FRONT ELEVATION
3/16" = 1'-0"

#A ELEVATION KEY NOTE SCHEDULE

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1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
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8A	BRICK; COLOR AND PATTERN TBD
8B	STONE; COLOR AND PATTERN TBD

FACADE ALTERNATES

1. SHUTTER STYLE
2. SHUTTERS AT FRONT FACADE WINDOWS
3. GARAGE DOOR STYLE

THORNTON HILL

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LONDONDERRY NH 03053

PROJECT #2527

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UNIT TYPE D - EXTERIOR ELEVATIONS

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UNIT TYPE AREAS:

UNIT TYPE A:
GROUND FLOOR: 1,101 SF (GARAGE: 505 SF)
SECOND FLOOR: 1395 SF
TOTAL: 2,496 SF (WITH GARAGE: 3,001 SF)
UNIT TYPE B:
GROUND FLOOR: 1,177 SF (522 GARAGE)
SECOND FLOOR: 1,377 SF
TOTAL: 2,554 SF (WITH GARAGE: 3,076 SF)
UNIT TYPE C:
GROUND FLOOR: 1,033 SF (GARAGE: 595 SF)
SECOND FLOOR: 1,477 SF
TOTAL: 2,510 SF (WITH GARAGE: 3,105)
UNIT TYPE D:
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TOTAL: 2,277 SF (WITH GARAGE: 2,707 SF)
UNIT TYPE E:
GROUND FLOOR: 1,086 SF (GARAGE: 503 SF)
SECOND FLOOR: 1,492 SF
TOTAL: 2,578 SF (WITH GARAGE: 3,143)
UNIT TYPE F:
GROUND FLOOR: 246 SF (GARAGE: 479 SF)
SECOND FLOOR: 1,372 SF
THIRD FLOOR: 1,001 SF
TOTAL: 2,619 SF (WITH GARAGE: 3,098 SF)

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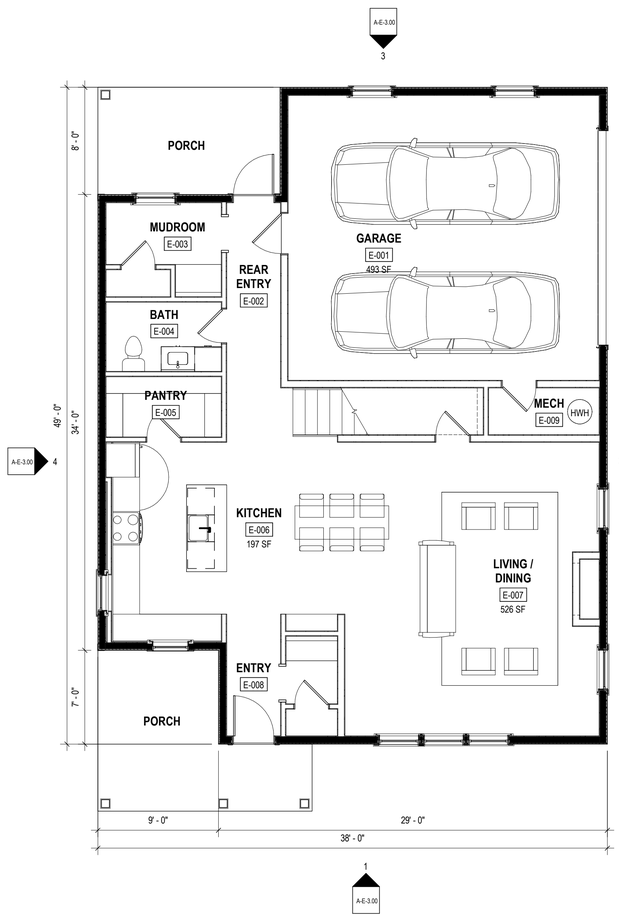

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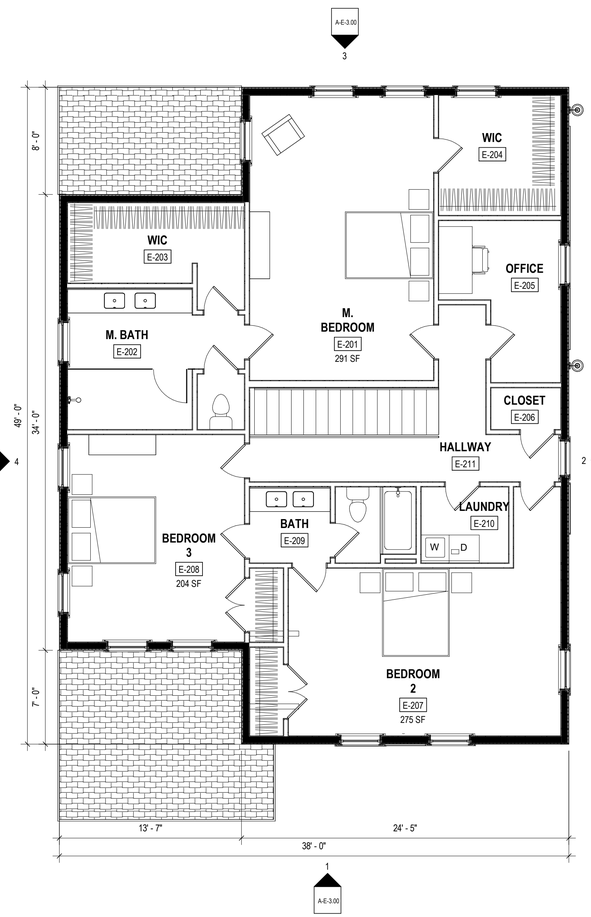

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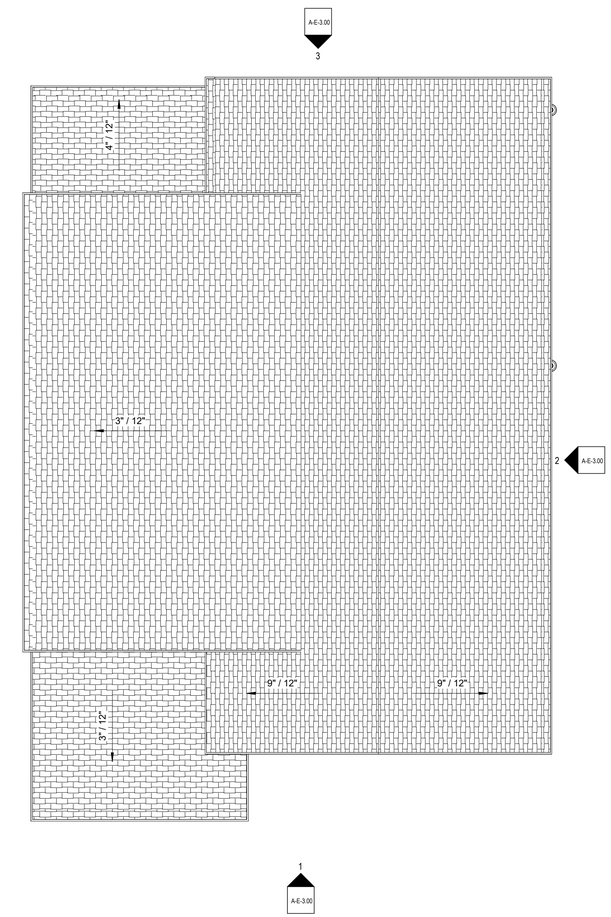
3/16" = 1'-0"



1 UNIT TYPE E - ROOF PLAN
3/16" = 1'-0"

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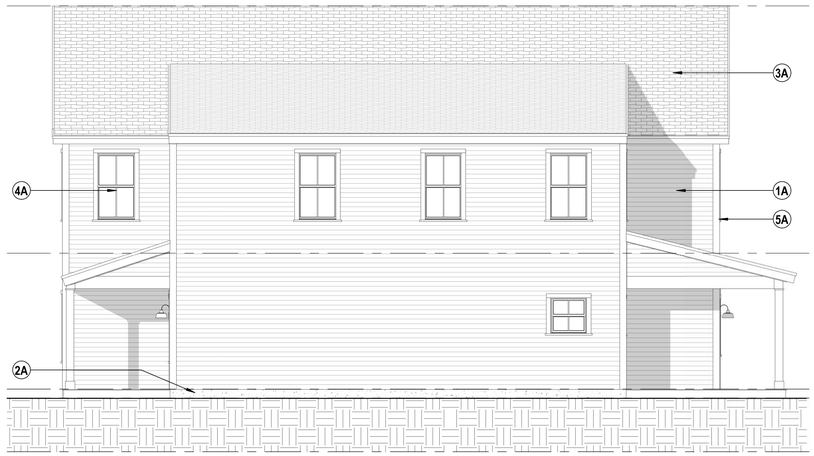

4 UNIT TYPE E - SIDE ELEVATION 2
3/16" = 1'-0"



3 UNIT TYPE E - REAR ELEVATION
3/16" = 1'-0"



2 UNIT TYPE E - SIDE ELEVATION 1
3/16" = 1'-0"



1 UNIT TYPE E - FRONT ELEVATION
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#A ELEVATION KEY NOTE SCHEDULE	
Number	Description
1A	VINYL CLAPBOARD SIDING, 4" EXPOSURE, BASIS OF DESIGN CERTAINTEED MONOGRAM
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7A	PREMADE COLUMN COVER WITH TRIM, BASIS OF DESIGN CERTAINTEED RESTORATION MILLWORK
8A	BRICK; COLOR AND PATTERN TBD
8B	STONE; COLOR AND PATTERN TBD

FACADE ALTERNATES

1. SHUTTERS AT FRONT FACADE WINDOWS
2. SHAKE-STYLE SHINGLES IN LIEU OF BOARD AND BATTEN
3. STONE UNDER PORCH
4. ROUND COLUMNS IN LIEU OF SQUARE COLUMNS

THORNTON HILL

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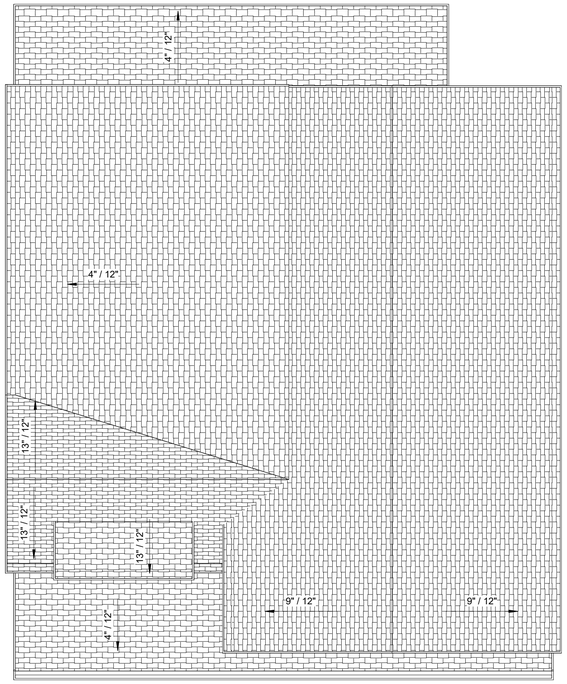

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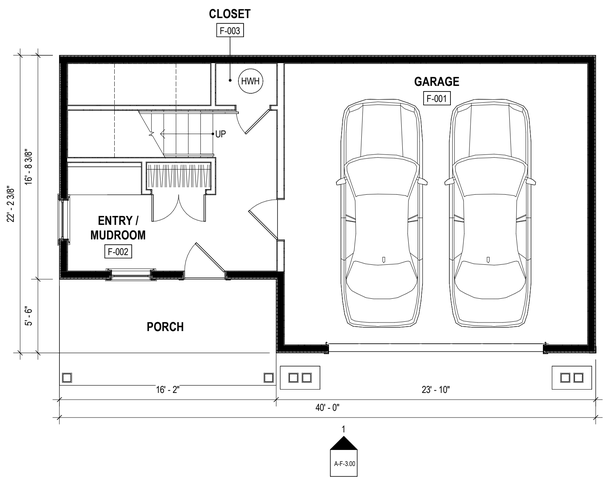

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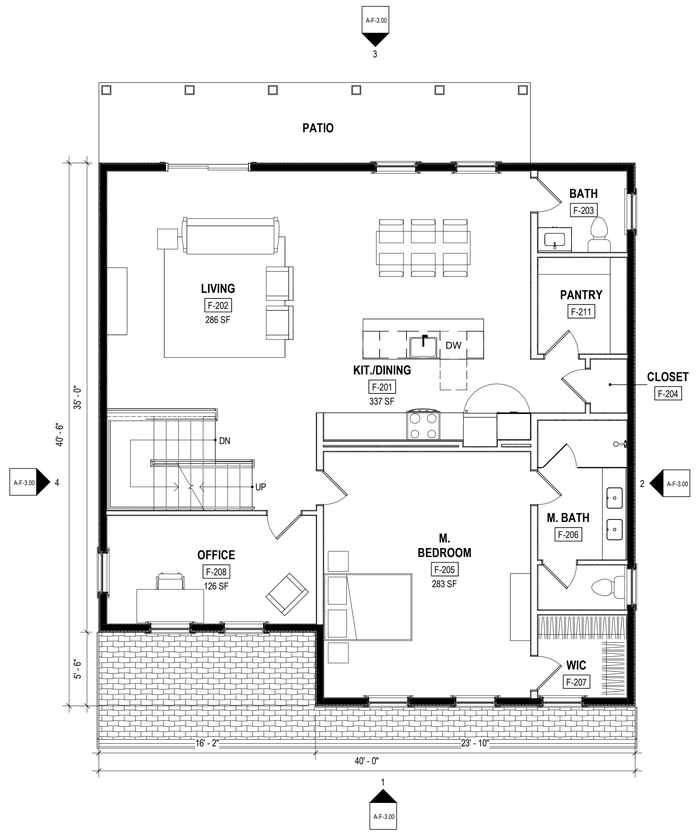

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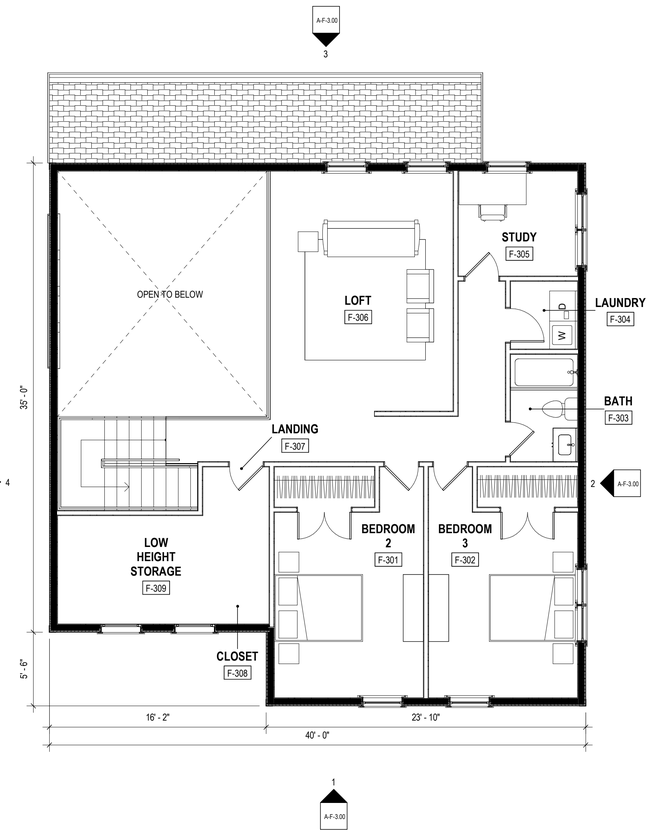

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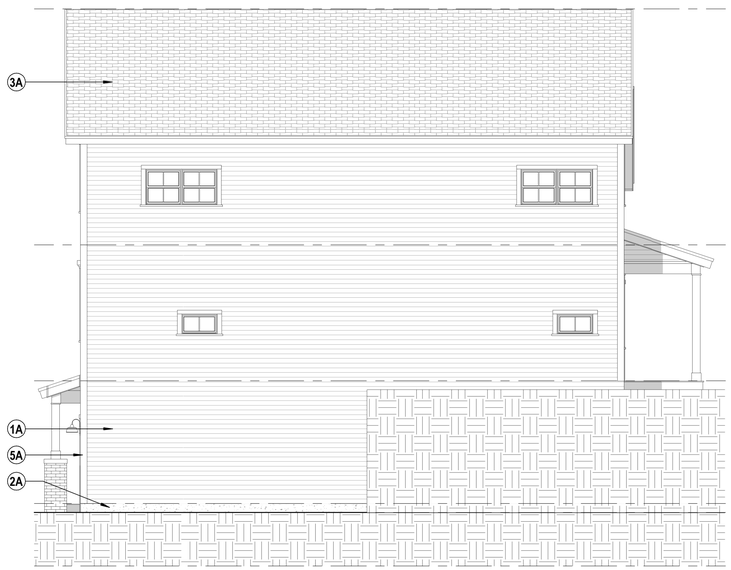

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FACADE ALTERNATES

1. DENTIL IN LIEU OF BRACKETS
2. BRICK IN LIEU OF STONE
3. HEADER STYLE
4. FLUTED IN LIEU OF SMOOTH CORNERS
5. GARAGE DOOR STYLE

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STREETSCAPE UNIT TYPE A



STREETSCAPE UNIT TYPE B



STREETSCAPE UNIT TYPE C



STREETSCAPE UNIT TYPE D



STREETSCAPE UNIT TYPE E



STREETSCAPE UNIT TYPE F

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ELEVATIONS

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38-A
Type A
36-D
Type D
34-A
Type A
32-C
Type C
30-E
Type E
28-E
Type E
26-A
Type A
24-C
Type C
22-B
Type B
20-C
Type C
18-D
Type D
16-A
Type A
14-D
Type D
12-B
Type B
10-C
Type C
8-A
Type A
6-D
Type D
4-C
Type C
2-A
Type A
40-B
Type B
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Type A
41-2
Type C
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Type B
43-A
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46-D
Type D
45-C
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Type D
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Type D
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17-B
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15-D
Type D
3-B
Type B
1-A
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41-1
CCB
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CCB

DRAINAGE REPORT

Rosecrans Drive at Thornton Hill

44 Pillsbury Road, Londonderry, NH

PREPARED FOR

PROCOPIO

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PREPARED BY

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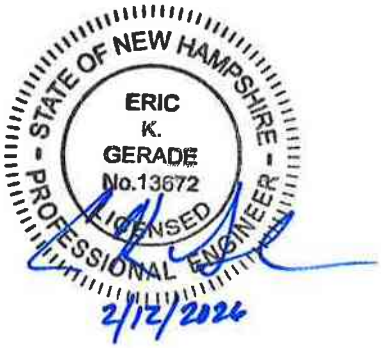
February 12th, 2026



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- Web GIS Printouts
- Aerial Photograph of the Site
- BMP Worksheets
- Rainfall Data
- Test Pit Locations

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- Proposed Conditions

Appendix C: Hydraulic Calculations
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1

Introduction

This report has been prepared by VHB to provide a brief description of existing and proposed drainage areas, design methodology, soil characteristics, and a summary of peak discharge rates for the project area.

The 22.6–acre Site is located along Pillsbury Road in Londonderry, New Hampshire (see Figure 1: Site Location Map). The Site is bounded by abutting properties to the north, Pillsbury Road and abutting properties to the south, Pillsbury Road to the west, and the separately proposed Thornton Hill residential development (36 Pillsbury Road) to the east. The Site is located within the surface watershed of the Merrimack River. There are no Wetland Resources on the Site. A manmade intermittent stream exists just east of the Site on the adjacent 36 Pillsbury Road property. It is approximately 3,200 feet in length and is not wet year-round, but periodically contains water after large storm events.

The Site is presently vacant and was previously occupied by an apple orchard. Under existing conditions, stormwater runoff flows across orchard tree rows and open grass pastures, in multiple directions, from a high point located near the center of the Site. Runoff from the easterly side of the site overland flows offsite and is collected and routed via the manmade ditch (which is now classified as an intermittent stream), that runs along the eastern edge of the Site towards Pillsbury Road. Stormwater runoff continues south under Pillsbury Road, mostly through an existing drainage culvert. This culvert eventually outfalls into a large pond, named the 'Duck Pond', which was identified to be a wetland over 10 acres by the Londonderry Wetlands Study Committee in 1991. Another significant portion of the Site drains west towards the N-S portion of Pillsbury Road, to a culvert under the roadway at the northwest corner of the Site.

The proposed development of the site includes the construction of 60 freestanding residential dwelling units, arranged around an internal site drive, Rosecrans Drive. Under proposed conditions, stormwater runoff will be conveyed to stormwater detention and treatment measures, via drainage structures and closed drainage infrastructure. Once stormwater runoff is appropriately treated and detained, it will be released through various outfall structures and routed towards existing culverts, ditches, and other design points to best match existing flow patterns. Wherever possible existing drainage and grading patterns were maintained in the proposed design. Additionally, water quality and quantity control measures such as surface sand filters and detention basins have been designed to protect the surrounding natural resources from potential stormwater runoff impacts.

A hydrologic model was developed to evaluate the existing and proposed drainage conditions on the Site. The results of the analyses indicate that there is no increase in peak discharge rates between the pre- and post-development conditions for the 2, 10, 25 and 50-year storm events. The pre- and post-development peak discharge rates are presented in the Stormwater Management Impacts Section of this report.

2

Existing Conditions

2.1 Description of Contributing Areas

The study area for the development is located within the Merrimack River watershed (see Figure 4, Existing Conditions: Drainage Area Plan). The existing drainage area is approximately 28.6-acres in size and slopes down in all directions from a high point located roughly in the center of the northern portion of the site. Elevations range from 363 at the northwest to 439 at the on-site high point. The area is currently undeveloped and ground cover consists of orchard, open grass and brush, dense woodland, gravel-to-dirt roads, and one small outpost building (±425 SF).

The study area has been divided into 8 drainage areas that discharge into one of 5 design points. Two of the drainage areas (EX-6 and EX-7) contain the residential properties abutting the Site to the southeast (38 and 40 Pillsbury Road). The design points include two existing culverts under Pillsbury Road (DP-1 in the southeast and DP-4 in the northwest), the property's edge adjacent to a high point where runoff crosses Pillsbury Road (DP-5), and woodland near an adjacent residential neighborhood, in the vicinity of Gary Drive (DP-2 and DP-3).

Table 1 on the following page summarizes the study area and its characteristics.

Table 1 Drainage Area Characteristics Summary (Existing Conditions)

Design Point		Sub-Area(s)		Area (Acres)	Tc (Min.)	CN
DP-1	Existing 18" Culvert	EX-1	Existing Subcatchment 1	4.47	19.1	72
		EX-6	Existing Subcatchment 6	4.21	12.7	73
		EX-7	Existing Subcatchment 7	0.78	10.3	71
DP-2	Woodlands near Gary Drive residences	EX-2	Existing Subcatchment 2	1.34	11.4	63
DP-3	Woodlands near Gary Drive residences	EX-3	Existing Subcatchment 3	0.49	8.0	61
DP-4	Existing 18" Culvert	EX-4	Existing Subcatchment 4	10.23	11.0	69
		EX-8	Existing Subcatchment 8	1.04	6.7	74
DP-5	Pillsbury Road High Point/Swale Break	EX-5	Existing Subcatchment 5	6.004	6.5	75
Total				28.56	n/a	71*

* Weighted CN Value

2.2 Soil Conditions

The study area is comprised of several different soil types as defined by the Natural Resources Conservation Service (NRCS). As part of the required site investigations before development on the project site can occur, a Site Specific Soil Investigation was performed onsite, on October 29, 2025. The findings of that report are listed in Table 2, below, and is included in this Report's Appendices. Table 2, Soil Types, lists the designations, names, and groups of the soils located within the study area. The Appendices contains a copy of the soil mapping and soil types found within the study area.

Table 2 Soil Types

Soil Designation	Soil Name	Hydrologic Soil Group
86A	Hollis	C
86B	Hollis	C
86C	Hollis	C
62A	Charlton	B
62B	Charlton	B
62C	Charlton	B
178B	Charlton-Chatfield	B
178C	Charlton-Chatfield	B
184A	Hollis-Chatfield	C
184B	Hollis-Chatfield	C
184C	Hollis-Chatfield	C
184D	Hollis-Chatfield	C
660B	Bernardston	C
660C	Bernardston	C
550B	Udorthents	D
550C	Udorthents	D

Source: Site Specific Soil Mapping

2.3 Existing Hydrologic Flow Patterns

Stormwater runoff from the existing study area flows in several directions from the on-site high point. An existing, man-made intermittent stream is located directly adjacent to the project site, on the 36 Pillsbury Road property, which helps to convey drainage south towards existing culverts underneath Pillsbury Road.

The following describes the existing stormwater flow patterns for each of the sub areas.

- Sub Area EX-1 flows in an easterly direction to the edge of the Site, into the intermittent stream. The stream conveys runoff to Design Point 1, which is an existing 18" culvert underneath Pillsbury Road.
- Sub Area EX-2 flows in a northerly direction, towards Design Point 2, woodlands behind residences at Gary Drive.
- Sub Area EX-3 flows in a northerly direction, towards Design Point 3, woodlands behind residences at Gary Drive.
- Sub Area EX-4 flows in a westerly direction towards Pillsbury Road. A drainage swale along Pillsbury Road conveys runoff north towards Design Point 4, an 18-inch culvert under Pillsbury Road.
- Sub Area EX-5 flows to the south, across Pillsbury Road towards Design Point 5, the property to the south.
- Sub Area EX-6 flows to the southeast, along Pillsbury Road and towards Design Point 1 (as previously described).

- Sub Area EX-7 flows to the southeast, into the intermittent stream which conveys runoff to Design Point 1 (as previously described).
- Sub Area EX-8 flows to the south, into the drainage swale along Pillsbury Road. The swale conveys runoff towards Design Point 4 (as previously described).

3

Proposed Conditions

3.1 Description of Contributing Areas

The proposed development for the study area includes the construction of 60 residential dwelling units. The residential units will be freestanding buildings arranged along the proposed internal drive, Rosecrans Drive. Landscaping, drainage improvements, and erosion control measures are also proposed (see Figure 5, Proposed Conditions: Drainage Area Plan).

The proposed conditions sub-areas are comprised of the same 28.6-acre study area represented in the existing conditions drainage analysis. The proposed development will add approximately 5.2 acres of impervious area to the site with the remaining areas of the development covered with landscaping, grass, and/or existing vegetation. Table 3 summarizes the proposed sub areas and their characteristics.

Table 3 Drainage Area Characteristics Summary (Proposed Conditions)

Design Point		Sub-Area(s)		Area (Acres)	Tc (Min.)	CN
DP-1	Existing 18" Culvert	PR-1	Proposed Subcatchment 1	1.09	10.8	75
		PR-6	Proposed Subcatchment 6	3.68	10.9	72
		PR-7	Proposed Subcatchment 7	0.75	10.3	72
		PR-10	Proposed Subcatchment 10	3.63	6.0	85
		PR-11	Proposed Subcatchment 11	0.21	6.0	62
DP-2	Woodlands near Gary Drive residences	PR-2	Proposed Subcatchment 2	0.56	11.5	75
DP-3	Woodlands near Gary Drive residences	PR-3	Proposed Subcatchment 3	0.29	11.5	59
DP-4	Existing 18" Culvert	PR-4	Proposed Subcatchment 4	6.93	7.8	70
		PR-8	Proposed Subcatchment 8	1.04	6.7	72
DP-5	Pillsbury Road High Point/Swale Break	PR-5	Proposed Subcatchment 5	3.60	6.8	75
		PR-9	Proposed Subcatchment 9	6.78	6.0	84
Total				28.56	n/a	74*

* Weighted CN Value

3.2 Proposed Hydrologic Flow Patterns

The proposed development has been designed to direct the stormwater runoff from the site's impervious areas into a network of detention basins with sand filters. Runoff from the remaining areas within the study area will generally maintain their existing flow patterns.

The following describes the proposed stormwater flow patterns for each of the sub areas.

- Sub Area PR-1 flows in an easterly direction to the edge of the Site, into the intermittent stream (reach 3R and 2R), and ultimately to Design Point 1.
- Sub Area PR-2 flows in a northerly direction, towards Design Point 2.
- Sub Area PR-3 flows in a northerly direction, towards Design Point 2.
- Sub Area PR-4 flows in a westerly direction towards Pillsbury Road, along the roadway drainage swale, and ultimately to Design Point 4.
- Sub-Area PR-5 flows to the south, across Pillsbury Road towards Design Point 5.
- Sub-Area PR-6 flows to the southeast, along Pillsbury Road and towards Design Point 1.
- Sub Area PR-7 flows to the southeast, into the intermittent stream (reach 2R) which conveys runoff to Design Point 1.
- Sub Area PR-8 flows to the south, into the drainage swale along Pillsbury Road (reach 1R). The swale conveys runoff towards Design Point 4.
- Sub-Area PR-9 flows in a southerly direction, and is routed to Basin P1. Basin P1 discharges to Design Point 5.
- Sub-Area PR-10 flows in an easterly direction, and is routed to Basin P2. Basin P2 discharges to Basin P3, which discharges to the intermittent stream (reach 2R), which ultimately discharges to Design Point 1.
- Sub-Area PR-11 flows into basin P3, which discharges to the intermittent stream (reach 2R), which ultimately discharges to Design Point 1.

The proposed development will add approximately 5.2 acres of impervious area to the project site. As a result, the peak stormwater runoff rates increase from pre- to post-development conditions. These increases in peak runoff rates will be mitigated by use of a network of catch basins, detention basins and sand filters. These basins will mitigate the increased runoff rates by restricting stormwater outflow from the storage areas through the use of outlet control structures. The purpose and functions of the outlet control structures will be discussed in more detail later in this report.

4

Methodology & Design Criteria

VHB used two separate methodologies to evaluate the hydrologic and hydraulic impacts for proposed development's stormwater runoff. VHB analyzed the proposed development's hydrologic impacts using the Soil Conservation Service (SCS) Technical Release 20 (TR-55) methodology and analyzed the development's hydraulic characteristics using the Rational Method to determine the flow rates used in the storm drain piping calculations. The following section summarizes the design parameters/constraints that were used during the drainage design for this development under the SCS and Rational Methodologies. Additionally, this section summarizes the methodology used for the development's proposed erosion control and stormwater treatment methods.

4.1 Hydrologic Model Description

VHB analyzed the proposed developments stormwater runoff impacts using the SCS TR-20 methodology. The hydrologic program HydroCAD, as developed by HydroCAD Software Solutions, LLC., was utilized to compute and develop the stormwater runoff model. HydroCAD's SCS TR-20 program is designed to model complex watersheds, such as the watershed analyzed in this report. The complexity of the watershed has been based on multiple land uses (surface conditions) with varying soil conditions and inter-connected sub-watersheds reflecting complex hydrologic flow patterns.

4.1.1 Design Storms

VHB analyzed the proposed stormwater impacts for the 2, 10, 25, and 50-year design storms. These rainfall events are based on a 24-hour storm duration using a Type III distribution curve. The appendices contain copies of the rainfall data charts used in the calculations.

4.1.2 Curve Number

VHB developed weighted curve numbers for each sub-area based on the different ground covers and hydrologic soil group types found within each area. The curve numbers were based on the SCS TR-55 methodology and are included in hydrologic calculations.

4.1.3 Travel Times & Time of Concentration

VHB calculated the Travel Times (Tt) and the Time of Concentrations (Tc) for each of the individual sub-areas using the hydraulically most distant point within each area. A minimum time of 6 minutes was used in the calculations. The Tt's and Tc's were based on SCS TR-55 methodology and are included in hydrologic calculations.

4.2 Hydraulic Calculations (Storm Drain Piping System)

VHB used the rational method to develop the flows used in the design the development's subsurface storm drain piping system. The drainage system was sized based on a 25 year design storm under pressurized flow conditions. VHB used the following design parameters and criteria to design the system:

- Minimum Pipe Size: 15 inches
- Pipe Flow Velocity Range: 2-10 feet per second (fps)
- HDPE Pipe Coefficient of Friction: 0.013
- Minimum Time of Concentration (Tc): 6 minutes
- Design Software: StormCAD (Bentley)

The storm drain piping calculations are included in the appendices.

4.3 Stormwater Detention

The proposed development increases the amount of impervious area from that of the existing conditions; as a result, the runoff curve numbers will increase for the proposed conditions. The higher curve numbers will increase the calculated stormwater runoff rate from that of the existing site, therefore, stormwater detention has been proposed for this project. The various detention areas will mitigate the increased stormwater runoff rates by using outlet control structures to reduce the proposed stormwater discharge rates from the site. Additionally, two the detention areas have been designed as sand filters that will provide stormwater treatment for the proposed development's stormwater runoff by detaining the water quality volume and passing it through a sand filter layer. These filters will be described in in further detail in Section 5.1.

VHB used the following design parameters and criteria to design the detention areas:

- Side Slopes: 3:1 (maximum)
- Design Storms: 1, 2, 10, 25, 50-year, 24-hour storm events
- Infiltration Rates: 10 inches per hour through sand filters. (Note, the Town of Londonderry does not allow infiltration to groundwater, and sand filters will be lined with geotextile fabric to prevent infiltration to groundwater.

Refer to the appendices for further information and design calculations. The Town of Londonderry requires that the stormwater model be analyzed without utilizing the water quality volume (ie, storage beneath the lowest outlet), assuming that the sand filter section has failed and/or in a frozen condition and that volume is not available to manage the larger rainfall events. In this scenario, no storage volume is accounted for beneath the bottom of the weir. The following results for the 25 and the 50-year storm events are shown below.

Table 4 Detention Basin Characteristics Summaries

Basin 1P Characteristics		Proposed
Storage Volume		83,189 cf
Maximum Storage Height		404.00
Peak Water Elevation	2 Year	399.96
	10 Year	401.06
	25 Year	401.79
	25 Year (Frozen)	402.14
	50 Year	402.38
	50 Year (Frozen)	402.65

Basin 2P Characteristics		Proposed
Storage Volume		26,801 cf
Maximum Storage Height		419.00
Peak Water Elevation	2 Year	415.54
	10 Year	416.56
	25 Year	417.22
	25 Year (Frozen)	417.40
	50 Year	417.73
	50 Year (Frozen)	417.80

Basin 3P Characteristics		Proposed
Storage Volume		14,810 cf
Maximum Storage Height		412.00
Peak Water Elevation	2 Year	408.57
	10 Year	409.38
	25 Year	409.82
	25 Year (Frozen)	409.91
	50 Year	410.15
	50 Year (Frozen)	410.19

4.3.1 Outlet Control Structures

The stormwater that discharges from the detention areas will be controlled through outlet control structures. The outlet control structures have been designed to reduce the peak outflow rates from the detention areas for the design storm events.

The detention areas have also been designed with overflow outlets to handle emergency overflow conditions (i.e., malfunctioning or clogging of inlets), consisting of an emergency riprap stone-protected overflow spillway set below the top of each proposed berm.

Details of the Outlet Structure and Overflow Spillway are shown on the Detail Sheets of the project's Site Plans. The Town of Londonderry specifies how outlet structures should be configured, and the design of the outlet control structures is compliant with these specifications to the maximum extent practical.

4.4 Riprap Outlet Protection

VHB sized the riprap outlet protection using Chapter 4, Section 4-6.6, Outlet Protection of the New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection& Design, December 2008, NHDES. The following design parameters represent the minimum acceptable riprap apron dimensions used for design (refer to the appendices for design computations):

- Apron Width: 17 feet
- Apron Length: 31 feet
- Median Stone Diameter: 0.5 feet
- Depth of Stone: 13.5 inches (minimum)

4.5 Base Calculations (WQV & WQF)

Water Quality Volume (WQV), and Water Quality Flow (WQF) calculations were performed in accordance with the New Hampshire DES Chapter Env-Wq 1500 – Alteration of Terrain. See Appendix A for specific BMP worksheets, as they pertain to surface sand filters.

5

Stormwater Management Impacts / Conclusion

5.1 Stormwater Quantity Mitigation

Under the proposed conditions, the peak flow rates were calculated for the 2, 10, 25 and 50 year storm events. The peak runoff rates for the proposed conditions, in the absence of mitigation, are anticipated to increase over the existing condition rates. These peak flow increases are to be reduced to near current or under current peak runoff rates at Design Points 1, 4, & 5 by routing the runoff through the proposed detention areas. Due to the proposed site grading, the areas contributing runoff to Design Points 2 and 3 will be smaller than the contributing areas in the existing condition, so peak runoff rates are anticipated to be less at those points. The proposed development will incorporate a stormwater collection system that will capture runoff from impervious areas by means of deep sump (3' deep) catch basins, as well as sheet flow across open spaces, and will then direct runoff to the proposed detention areas.

The detention areas are designed to attenuate site runoff by utilizing restrictive outlet control structures that will temporarily detain excess runoff. The outlet control structures for the detention areas include restrictive outlet control devices and an emergency overflow spillway. The outlet structures will meter outflow rates from the detention areas, such that the outflow will be equal to or below the existing flow rates for the design storm events. Table 5 provides a summary of the peak stormwater runoff rates from the proposed development.

In the event of a failed sand filter section and a frozen condition on site, the stormwater model was analyzed as if the basins were frozen up to the lowest elevation of the outlet control structure's weir. In this scenario, no storage volume is accounted for beneath the bottom of the weir. The following results for the 25 and the 50-year storm events are shown below.

Table 5 Peak Stormwater Runoff Rate Summary

Design Point		Condition	Peak Flow for Given Storm (cfs)				
			1-yr	2-yr	10-yr	25-yr	50-yr
1	Existing 18" Culvert	Existing	3.3	5.4	13.7	21.2	28.6
		Proposed	2.5	4.1	11.1	19.4	27.5
		Proposed (Frozen)	-	-	-	21.1	28.3
2	Woodlands near Gary Drive residences	Existing	0.1	0.3	1.4	2.4	3.5
		Proposed	0.0	0.1	0.5	0.9	1.4
		Proposed (Frozen)	-	-	-	0.9	1.4
3	Woodlands near Gary Drive residences	Existing	0.0	0.1	0.5	0.9	1.3
		Proposed	0.0	0.0	0.2	0.4	0.6
		Proposed (Frozen)	-	-	-	0.4	0.6
4	Existing 18" Culvert	Existing	3.4	6.3	17.4	27.6	37.7
		Proposed	2.9	5.1	13.8	21.8	29.6
		Proposed (Frozen)	-	-	-	21.8	29.6
5	Pillsbury Road High Point/Swale Break	Existing	3.9	6.0	13.9	20.7	27.2
		Proposed	2.3	3.6	8.5	13.5	21.2
		Proposed (Frozen)	-	-	-	16.9	24.7

5.2 Stormwater Quality Mitigation – Best Management Practices (BMPs)

The proposed Stormwater Management System contains several Best Management Practices (BMPs) that will provide treatment of site generated stormwater runoff.

The proposed BMPs are described below:

5.2.1 Catch Basins with Sumps

Stormwater from the paved surfaces on-site will be collected in deep sump (3-foot) catch basins. Catch basin sumps are effective pollution control devices for removal of large particulate and

adsorbed pollutants. Catch basins with sumps are designed to collect sediment particles that are the largest constituents of the pollutant load in urban runoff. Regular maintenance and cleaning of catch basins is required to assure adequate performance of these structures.

5.2.2 Sand Filters

The two proposed surface sand filters consist of a detention basin with a sand filter bed below. When runoff enters the sand filter, it saturates the filter bed, then fills the temporary storage volume provided above the bed. As the water filters down through the sand bed, pollutants are strained from the water or adsorbed to the filter media. The top surface of the sand filter is exposed to the elements but is kept free of vegetation. Each filter has a perforated underdrain system to collect treated water at the bottom of the sand filter and direct it to a suitable outlet. The sand filters will have liners to isolate them from adjacent soil material and prevent discharge of treated water to the groundwater table. Each sand filter basin has an outlet control structure and emergency riprap stone-protected overflow spillway set below the top of each proposed berm.

5.2.3 Energy Dissipators

Energy dissipators (i.e., riprap stone protection) will be constructed below outlets of all pipes in the stormwater management system. The energy dissipators will allow the concentrated runoff from the drainage system to be discharged at non-erosive velocities to protect the receiving water resources. The appendices contain design information and calculations for the energy dissipators.

5.3 Erosion Control Measures

5.3.1 Temporary Erosion Control

During construction of the proposed development, the contractor shall be responsible for installation and maintenance of temporary sedimentation and erosion control measures to prevent off-site tracking and waterborne loss of earth sediment and debris. The specific measures proposed as a part of the project plan are shown in the Site Plan Package on the Sedimentation and Erosion Control Plan and the Erosion Control Details.

Removal of temporary erosion control measures will be prohibited until paving has been installed and vegetation (grass) is well established.

5.3.2 Permanent Erosion Control

At the completion of construction, all soils will be permanently stabilized by one or more of the following measures:

- **Parking/Access:** Driveways, parking areas and access roads will be stabilized with bituminous concrete pavement.
- **Landscaped Areas:** All disturbed areas, not permanently stabilized by pavement or buildings, will be covered with bark mulch, stone, sod or a minimum of [six (6)] inches of topsoil and seeded.

- **Pipe Outlets:** Scour protection (riprap) shall be constructed at the headwall outlet to prevent scouring.

Additionally, all catch basins will be constructed with deep sumps to collect sediment from parking areas and access roads.

5.4 Conclusion

By implementing standard stormwater management techniques, the proposed development can successfully mitigate its impacts on peak stormwater runoff rates. Furthermore, stormwater quality issues can be addressed through the proposed implementation of standard practices (i.e., sand filters, deep sump catch basins, etc.) that are accepted by the NH Department of Environmental Services Alteration of Terrain Bureau.

6

Figures

Figure 1: Site Location Map

Figure 2: Existing Soil Plan

Figure 3: Proposed Soil Plan

Figure 4: Existing Conditions Drainage Area Plan

Figure 5: Proposed Conditions Drainage Area Plan

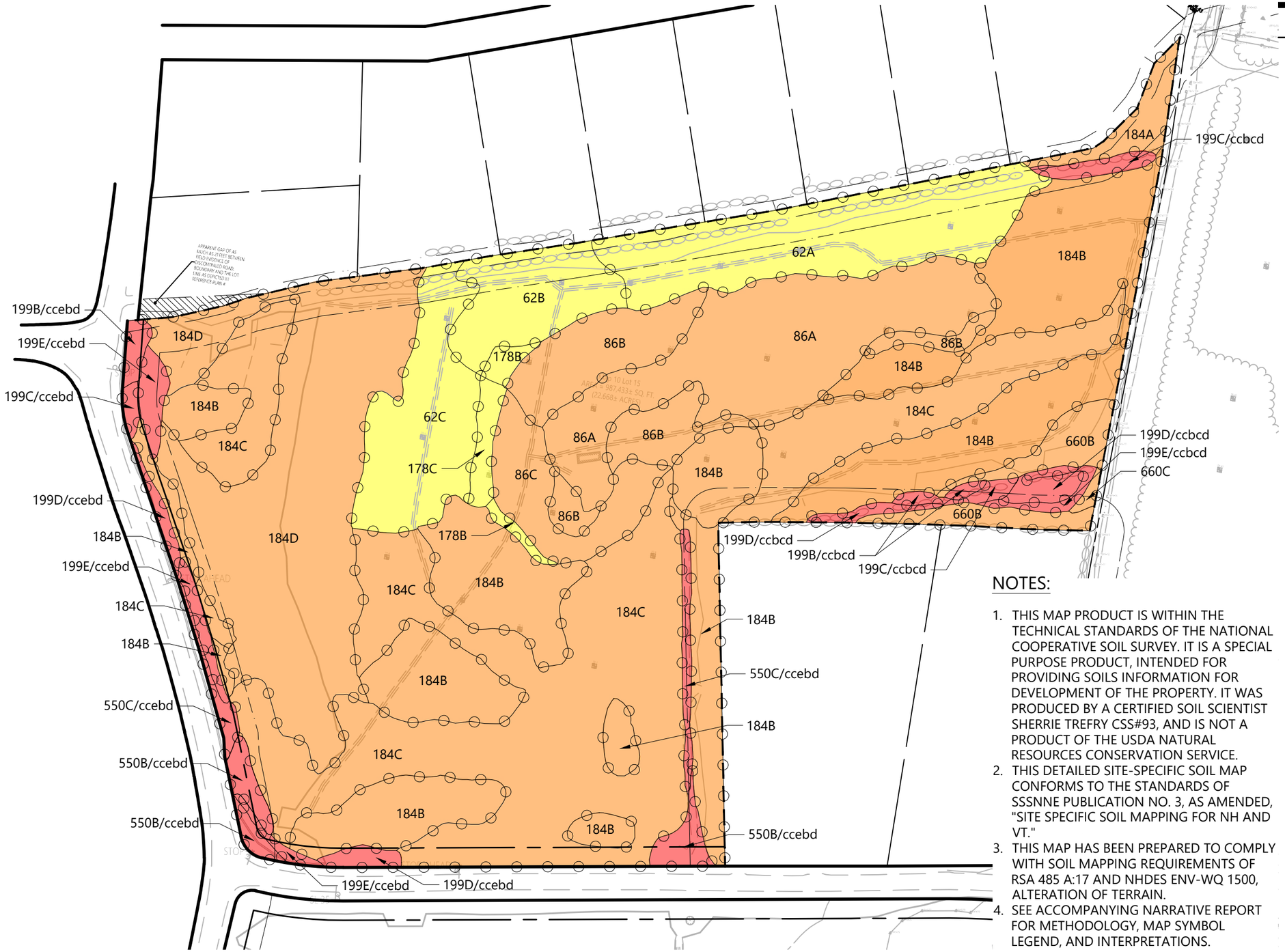


0 1000 2000 4000 Feet

Site Aerial Map
44 Pillsbury Road
Londonderry, NH

Figure 1

October 2025



Legend

LINETYPES

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

SITE SPECIFIC SOIL MAP UNIT LEGEND

199B/ccbcd - DUMP OF STONES, COBBLES, AND BOULDERS; 3-8% SLOPE

199C/ccbcd - DUMP OF STONES, COBBLES, AND BOULDERS; 8-15% SLOPE

199D/ccbcd - DUMP OF STONES, COBBLES, AND BOULDERS; 15-25% SLOPE

199B/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 3-8% SLOPE

199C/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 8-15% SLOPE

199D/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 15-25% SLOPE

199E/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 25-50% SLOPE

86A - HOLLIS; 0-3% SLOPE

86B - HOLLIS; 3-8% SLOPE

86C - HOLLIS; 8-15% SLOPE

62A - CHARLTON; 0-3% SLOPE

62B - CHARLTON; 3-8% SLOPE

62C - CHARLTON; 8-15% SLOPE

178B - CHARLTON-CHATFIELD; 3-8% SLOPE

178C - CHARLTON-CHATFIELD; 8-15% SLOPE

184A - HOLLIS-CHATFIELD; 0-3% SLOPE

184B - HOLLIS-CHATFIELD; 3-8% SLOPE

184C - HOLLIS-CHATFIELD; 8-15% SLOPE

184D - HOLLIS-CHATFIELD; 15-25% SLOPE

660B - BERNARDSTON; 3-8% SLOPE

660C - BERNARDSTON; 8-15% SLOPE

550B/ccebd - UDORTHENTS; BEDROCK SUBSTRATUM; 3-8% SLOPE

550C/ccebd - UDORTHENTS; BEDROCK SUBSTRATUM; 8-15% SLOPE

NOTES:

1. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
2. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
3. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
4. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

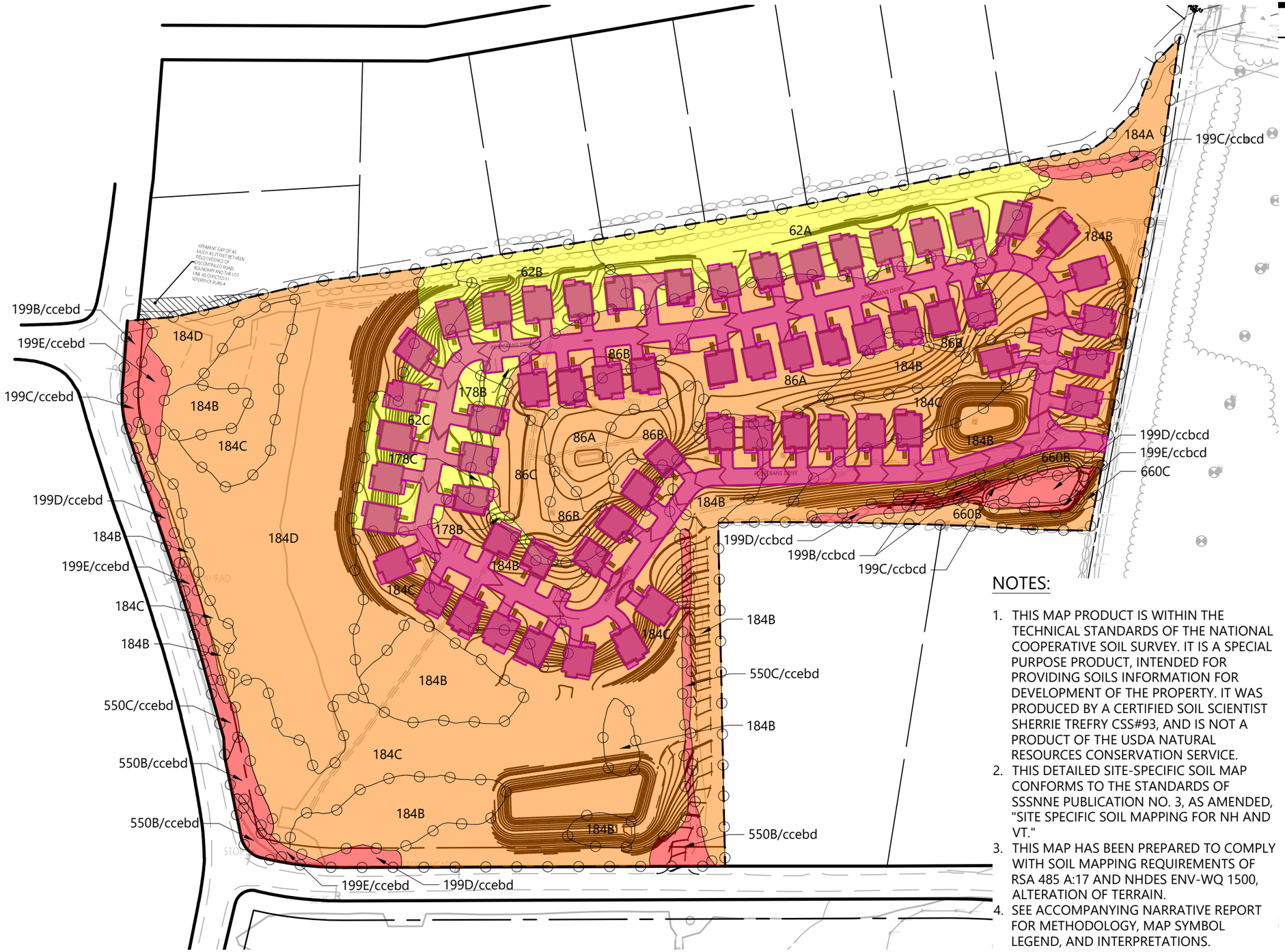
NOTE:

THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 25, 2025.

Existing Color Coded Soil Map
44 Pillsbury Road
Londonderry, New Hampshire

Figure 2

January 2026



Legend

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199B/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 3-8% SLOPE

199C/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 8-15% SLOPE

199D/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 15-25% SLOPE

199E/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 25-50% SLOPE

86A - HOLLIS; 0-3% SLOPE

86B - HOLLIS; 3-8% SLOPE

86C - HOLLIS; 8-15% SLOPE

62A - CHARLTON; 0-3% SLOPE

62B - CHARLTON; 3-8% SLOPE

62C - CHARLTON; 8-15% SLOPE

178B - CHARLTON-CHATFIELD; 3-8% SLOPE

178C - CHARLTON-CHATFIELD; 8-15% SLOPE

184A - HOLLIS-CHATFIELD; 0-3% SLOPE

184B - HOLLIS-CHATFIELD; 3-8% SLOPE

184C - HOLLIS-CHATFIELD; 8-15% SLOPE

184D - HOLLIS-CHATFIELD; 15-25% SLOPE

660B - BERNARDSTON; 3-8% SLOPE

660C - BERNARDSTON; 8-15% SLOPE

550B/ccebd - UDORTHENTS; BEDROCK SUBSTRATUM; 3-8% SLOPE

550C/ccebd - UDORTHENTS; BEDROCK SUBSTRATUM; 8-15% SLOPE

NOTES:

1. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
2. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
3. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
4. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

NOTE:

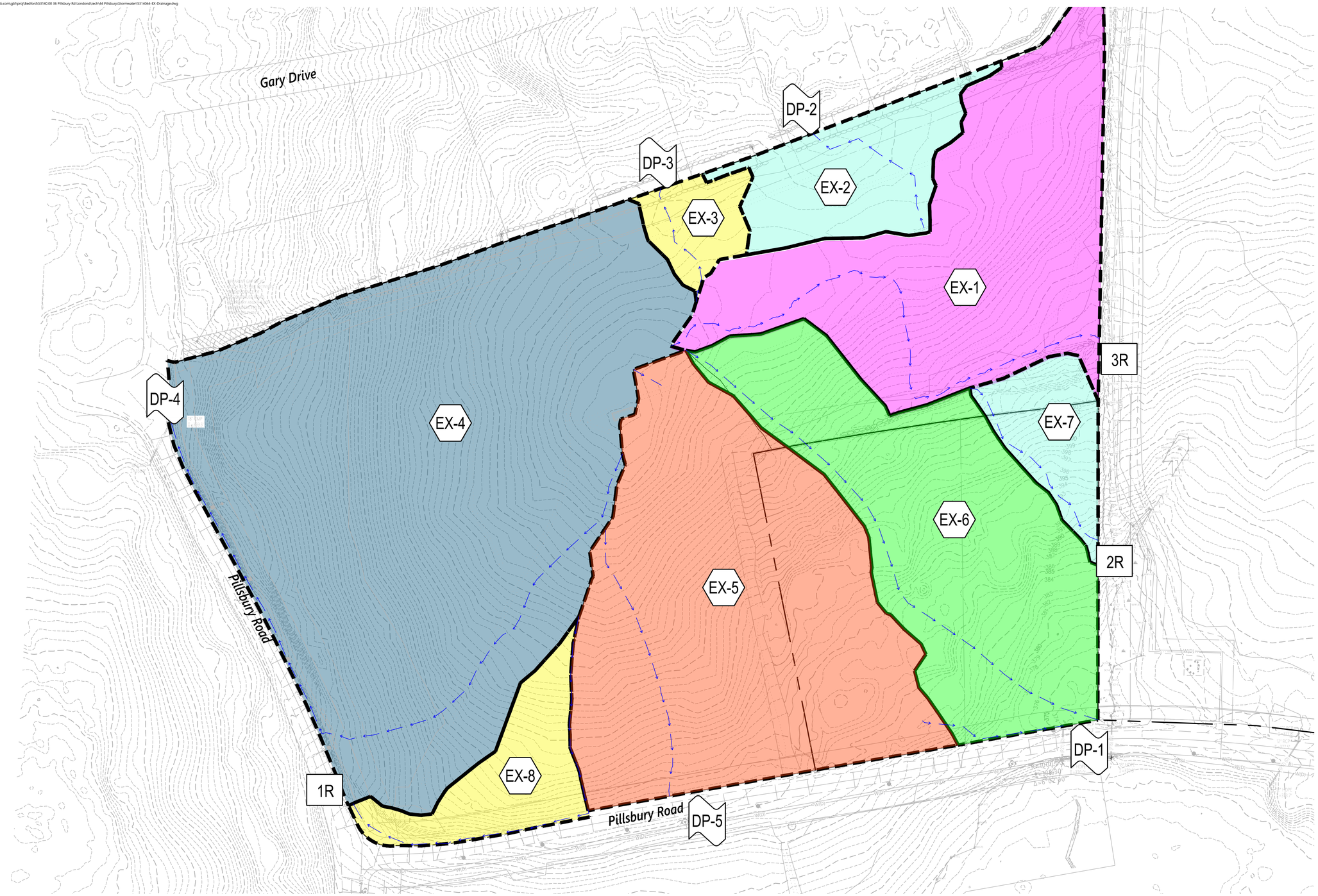
THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 25, 2025.

Proposed Color Coded Soil Map
44 Pillsbury Road
Londonderry, New Hampshire

Figure 3

February 2026

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd London\Tech\44 Pillsbury\Stormwater\5314044-EX-Drainage.dwg



Legend

SYMBOLS

- X — DESIGN POINT
- X — DRAINAGE AREA DESIGNATION
- X — POND
- X — REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Drainage Catchments Sizes

Drainage Subareas	Area (Acres)
EX-1	4.47
EX-2	1.34
EX-3	0.49
EX-4	10.23
EX-5	6.00
EX-6	4.21
EX-7	0.78
EX-8	1.04
TOTAL:	28.56

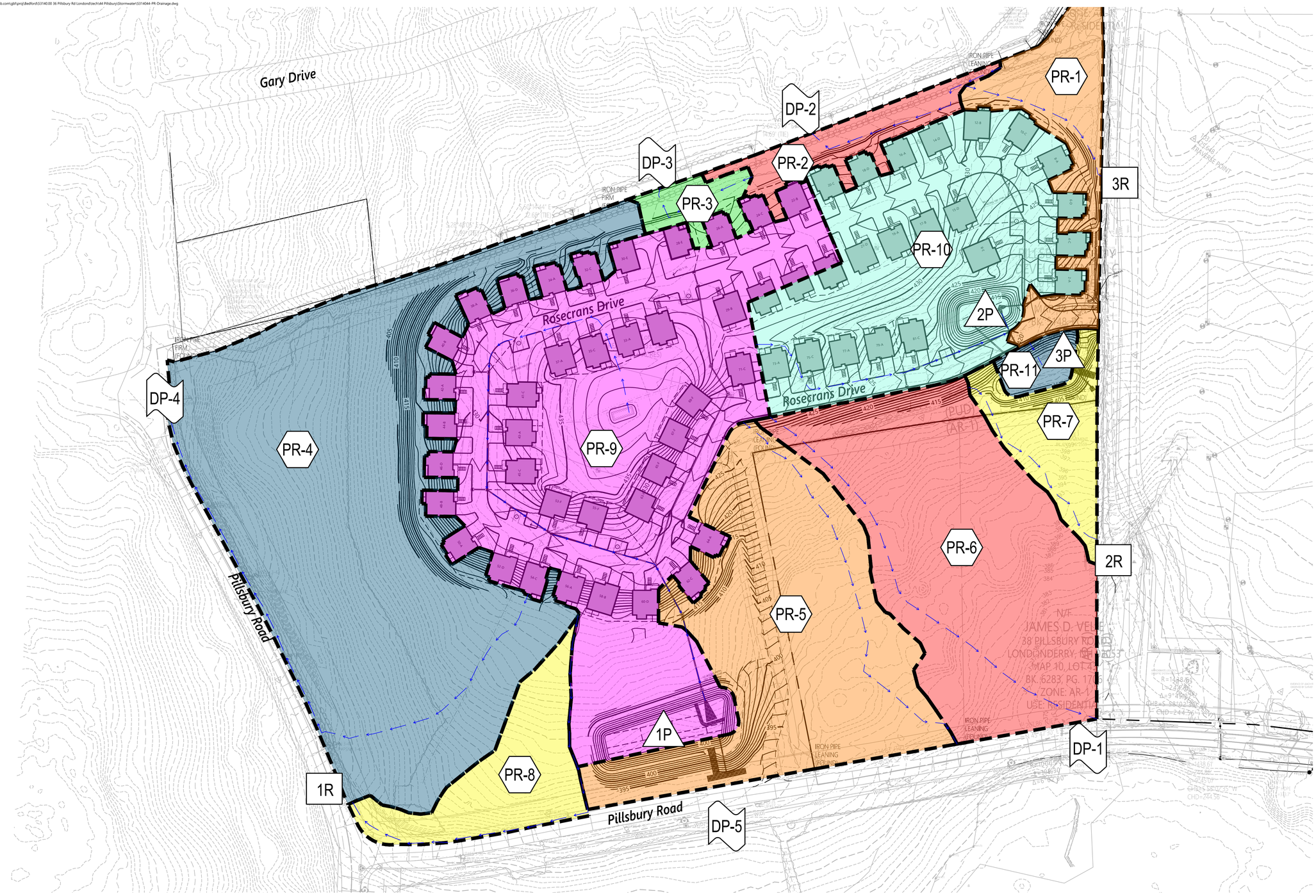
Figure 4-1: Overall Existing Conditions Drainage Plan

44 Pillsbury Road
Londonderry, NH

0 75 150 Feet

Source: **VHB**
Prepared for: **Town of Londonderry - Site Plan Application**
Date: **February 2026**

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd London\tech\44 Pillsbury\Stormwater\5314044-PR-Drainage.dwg



Legend

SYMBOLS

- DESIGN POINT
- DRAINAGE AREA DESIGNATION
- POND
- REACH

LINETYPES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW LINE
- SITE SPECIFIC SOIL BOUNDARY

Drainage Catchments Sizes

Drainage Subareas	Area (Acres)
PR-1	1.09
PR-2	0.56
PR-3	0.29
PR-4	6.93
PR-5	3.60
PR-6	3.68
PR-7	0.75
PR-8	1.04
PR-9	6.78
PR-10	3.63
PR-11	0.21
TOTAL:	28.56

Figure 5-1: Overall Proposed Conditions Drainage Plan

44 Pillsbury Road
Londonderry, NH

0 75 150 Feet

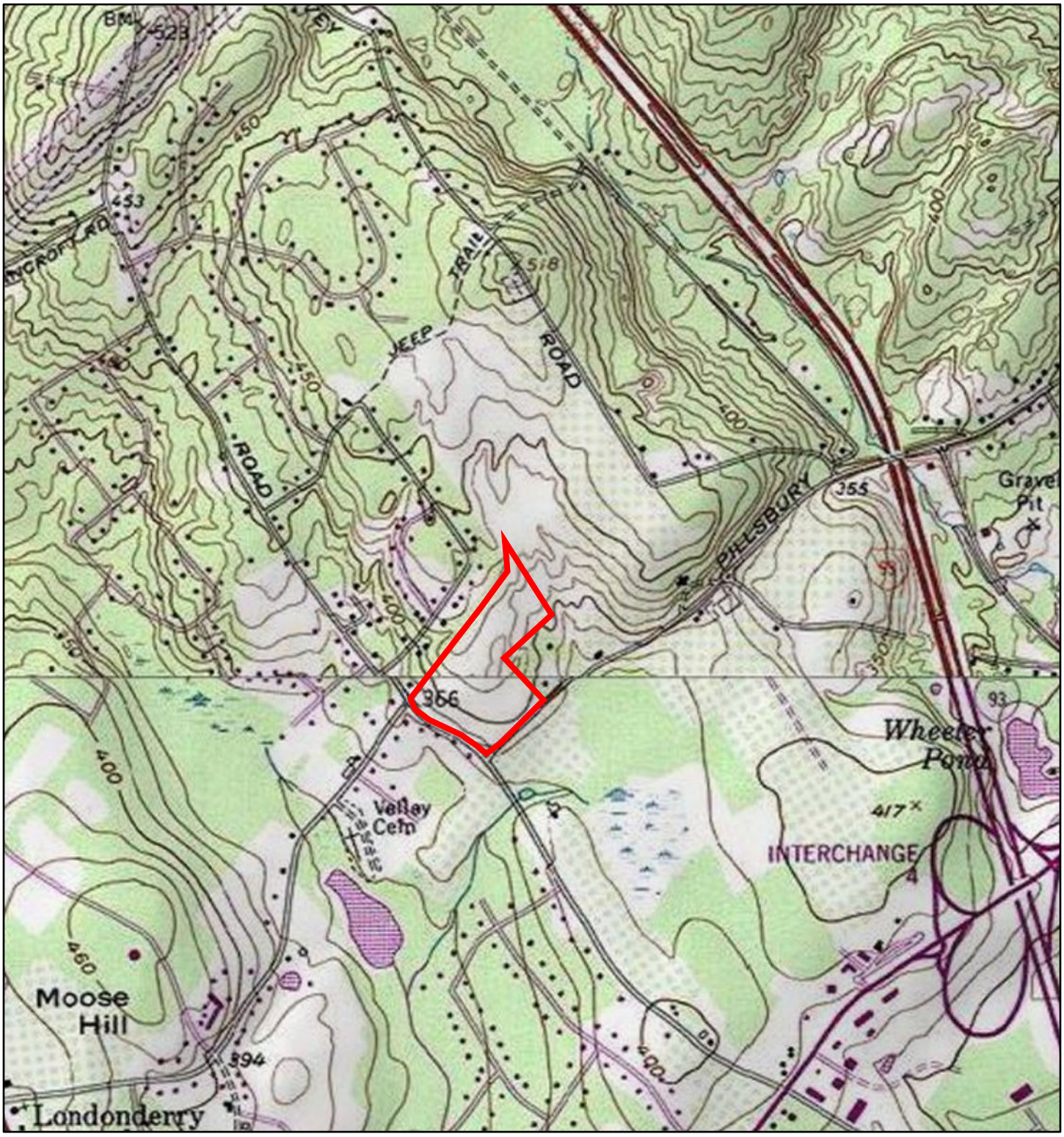
Source: **VHB**
Prepared for: **Town of Londonderry - Site Plan Application**
Date: **February 2026**

Appendix A: Support Data

- USGS Map
- Web GIS Printouts
- Aerial Photograph of the Site
- BMP Worksheets
- Rainfall Data
- Test Pit Locations

USGS Map

USGS Map



9/23/2025, 1:36:57 PM

USA_Topo_Maps

1:20,000

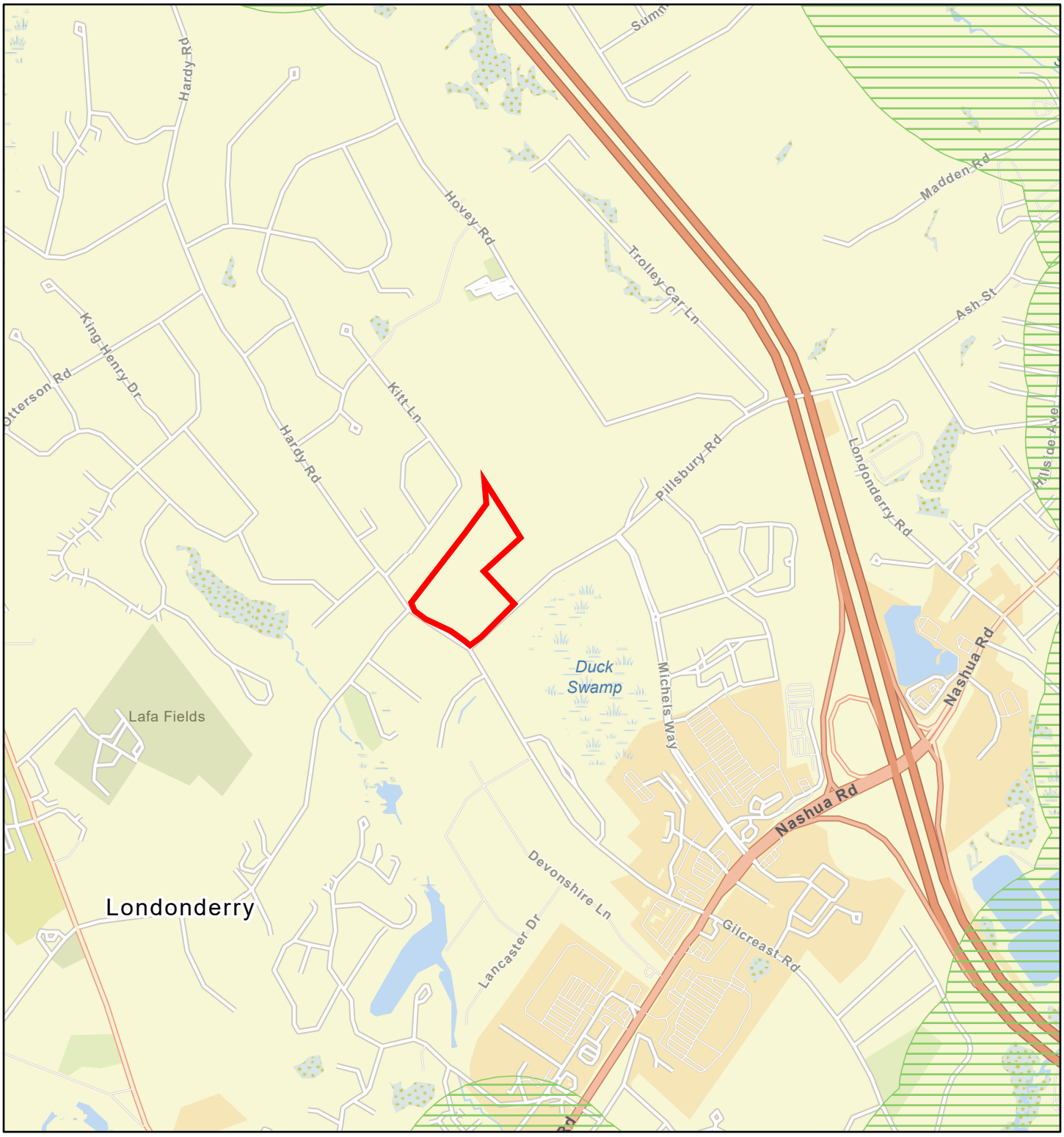
0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Copyright:© 2013 National Geographic Society, i-cubed, NHDRA, Axiomatic, Inc.

Web GIS Printouts

AoT Surfcae Water Impairments



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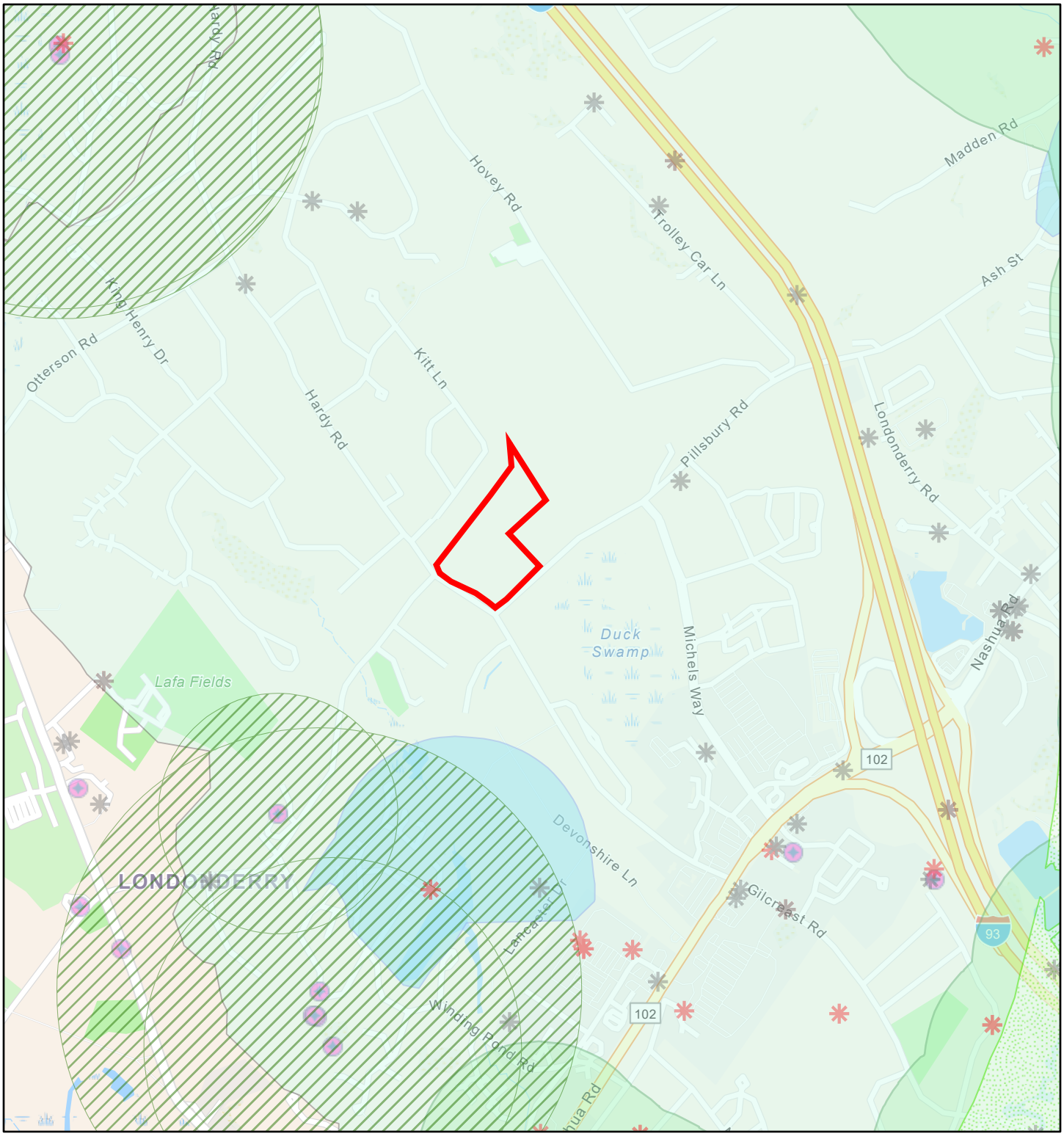
Surface Waters with Impairments with Quarter Mile Buffer

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

AoT Screening Layers



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0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Remediation Sites

- Closed
- Other

Groundwater Classification Areas GA2

Wellhead Protection Areas

Public Water Supply Wells

Watersheds with Chloride Impairments

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

All Lakes with a Quarter Mile Buffer

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community

Aerial Photograph of the Site



0 500 1000 2000 Feet

Site Aerial Map
44 Pillsbury Road
Londonderry, NH

Figure 2

September 2025

BMP Worksheets

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Pond 1P - PR-9**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
6.78	ac	A = Area draining to the practice	
2.98	ac	A_I = Impervious area draining to the practice	
0.44	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.45	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
3.02	ac-in	WQV= 1" x Rv x A	
10,960	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,740	cf	25% x WQV (check calc for sediment forebay volume)	
8,220	cf	75% x WQV (check calc for surface sand filter volume)	
Sediment Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
2,740	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
398.80	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.10	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
60.89	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
396.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
395.42	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
402.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
402.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.08	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
(5.50)	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
(5.50)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
402.38	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
404.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
83,189	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	Details	Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
NO	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**> 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **Pond 2P - PR-10**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
3.63	ac	A = Area draining to the practice	
1.71	ac	A_I = Impervious area draining to the practice	
0.47	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.72	ac-in	WQV= 1" x Rv x A	
6,255	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,564	cf	25% x WQV (check calc for sediment forebay volume)	
4,692	cf	75% x WQV (check calc for surface sand filter volume)	
Sediment Forebay		Method of Pretreatment? (not required for clean or roof runoff)	
1,564	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
415.00	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.20	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
17.38	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
411.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
410.33	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
414.50	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
414.50	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.17	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
(3.00)	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
(3.00)	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
417.73	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
419.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
18,835	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
Yes	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**> 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Rainfall Data

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	New Hampshire
Location	New Hampshire, United States
Latitude	42.880 degrees North
Longitude	71.356 degrees West
Elevation	130 feet
Date/Time	Wed Sep 17 2025 13:47:15 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	0.27	0.41	0.51	0.67	0.84	1.05	**1yr**	0.72	1.00	1.22	1.54	1.94	2.47	2.69	**1yr**	2.18	2.58	3.00	3.67	4.28	**1yr**
2yr	0.33	0.50	0.63	0.83	1.04	1.30	**2yr**	0.89	1.19	1.51	1.89	2.36	2.95	3.27	**2yr**	2.61	3.14	3.64	4.34	4.95	**2yr**
5yr	0.39	0.60	0.75	1.01	1.29	1.64	**5yr**	1.11	1.49	1.91	2.39	2.99	3.73	4.17	**5yr**	3.30	4.01	4.63	5.47	6.18	**5yr**
10yr	0.43	0.68	0.86	1.17	1.53	1.96	**10yr**	1.32	1.77	2.28	2.87	3.58	4.46	5.01	**10yr**	3.95	4.82	5.55	6.51	7.32	**10yr**
25yr	0.51	0.82	1.04	1.43	1.90	2.47	**25yr**	1.64	2.21	2.88	3.64	4.56	5.65	6.41	**25yr**	5.00	6.16	7.07	8.20	9.16	**25yr**
50yr	0.58	0.93	1.19	1.67	2.25	2.95	**50yr**	1.95	2.62	3.46	4.38	5.47	6.76	7.71	**50yr**	5.99	7.42	8.48	9.77	10.86	**50yr**
100yr	0.66	1.07	1.38	1.96	2.67	3.52	**100yr**	2.30	3.10	4.14	5.24	6.55	8.10	9.30	**100yr**	7.17	8.94	10.19	11.65	12.88	**100yr**
200yr	0.75	1.23	1.59	2.29	3.17	4.20	**200yr**	2.73	3.68	4.96	6.29	7.86	9.70	11.21	**200yr**	8.59	10.78	12.24	13.89	15.29	**200yr**
500yr	0.91	1.50	1.96	2.84	3.97	5.30	**500yr**	3.42	4.62	6.27	7.97	9.97	12.32	14.36	**500yr**	10.91	13.81	15.62	17.55	19.18	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.42	0.57	0.70	0.86	**1yr**	0.61	0.84	1.08	1.35	1.65	2.20	2.54	**1yr**	1.94	2.44	2.71	3.15	3.82	**1yr**
2yr	0.31	0.48	0.59	0.80	0.99	1.18	**2yr**	0.85	1.15	1.35	1.77	2.26	2.81	3.13	**2yr**	2.49	3.01	3.50	4.19	4.76	**2yr**
5yr	0.36	0.55	0.68	0.94	1.19	1.41	**5yr**	1.03	1.38	1.59	2.07	2.64	3.46	3.72	**5yr**	3.06	3.57	4.18	4.99	5.64	**5yr**
10yr	0.39	0.61	0.75	1.05	1.36	1.60	**10yr**	1.17	1.56	1.81	2.33	2.96	3.98	4.21	**10yr**	3.53	4.05	4.77	5.71	6.37	**10yr**
25yr	0.45	0.69	0.86	1.22	1.61	1.87	**25yr**	1.39	1.83	2.13	2.72	3.44	4.79	4.96	**25yr**	4.24	4.77	5.68	6.84	7.42	**25yr**
50yr	0.50	0.76	0.94	1.35	1.82	2.11	**50yr**	1.57	2.07	2.42	3.07	3.87	5.50	5.64	**50yr**	4.87	5.42	6.52	7.85	8.27	**50yr**
100yr	0.55	0.84	1.05	1.51	2.08	2.39	**100yr**	1.79	2.34	2.75	3.47	4.34	5.46	6.39	**100yr**	4.84	6.14	7.48	9.02	9.24	**100yr**
200yr	0.61	0.92	1.17	1.69	2.36	2.69	**200yr**	2.04	2.63	3.11	3.92	4.90	6.09	7.29	**200yr**	5.39	7.01	8.60	10.40	10.27	**200yr**
500yr	0.71	1.06	1.36	1.97	2.81	3.17	**500yr**	2.42	3.10	3.68	4.62	5.74	6.99	8.67	**500yr**	6.19	8.33	10.38	12.58	11.83	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.57	0.76	0.94	1.09	**1yr**	0.81	1.07	1.23	1.63	2.07	2.72	2.84	**1yr**	2.41	2.74	3.37	4.13	4.78	**1yr**
2yr	0.34	0.53	0.65	0.88	1.08	1.28	**2yr**	0.93	1.25	1.45	1.89	2.42	3.12	3.48	**2yr**	2.76	3.35	3.83	4.56	5.24	**2yr**
5yr	0.42	0.65	0.81	1.11	1.41	1.63	**5yr**	1.22	1.60	1.87	2.40	3.03	4.04	4.66	**5yr**	3.57	4.48	5.09	6.01	6.77	**5yr**
10yr	0.51	0.78	0.97	1.35	1.75	1.99	**10yr**	1.51	1.94	2.26	2.87	3.62	5.00	5.87	**10yr**	4.43	5.64	6.34	7.43	8.33	**10yr**
25yr	0.66	1.00	1.24	1.77	2.33	2.58	**25yr**	2.01	2.52	2.93	3.65	4.56	6.67	7.97	**25yr**	5.90	7.67	8.48	9.82	11.00	**25yr**
50yr	0.79	1.20	1.49	2.15	2.89	3.15	**50yr**	2.49	3.08	3.56	4.39	5.43	8.28	10.08	**50yr**	7.33	9.69	10.55	12.10	13.58	**50yr**
100yr	0.96	1.45	1.82	2.63	3.60	3.85	**100yr**	3.11	3.76	4.33	5.27	6.48	11.47	12.71	**100yr**	10.15	12.22	13.10	14.95	16.81	**100yr**
200yr	1.16	1.75	2.21	3.21	4.47	4.70	**200yr**	3.86	4.60	5.27	6.32	7.73	14.51	16.00	**200yr**	12.84	15.38	16.28	18.45	20.81	**200yr**
500yr	1.51	2.24	2.89	4.19	5.97	6.14	**500yr**	5.15	6.00	6.84	8.06	9.77	19.83	21.77	**500yr**	17.55	20.93	21.71	24.38	27.62	**500yr**

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Test Pit Locations

\\vhb.com\gbl\proj\Bedford\53140.00 36 Pillsbury Rd Londond\cad\ld\Concepts\44 Pillsbury Rd\cad\ld\Eng\Test Pits\5314044 - Test Pit Figure.dwg



Legend

TP - # : Test Pit #

[#'-#"] = Depth From Existing Grade to Observed Top of Rock

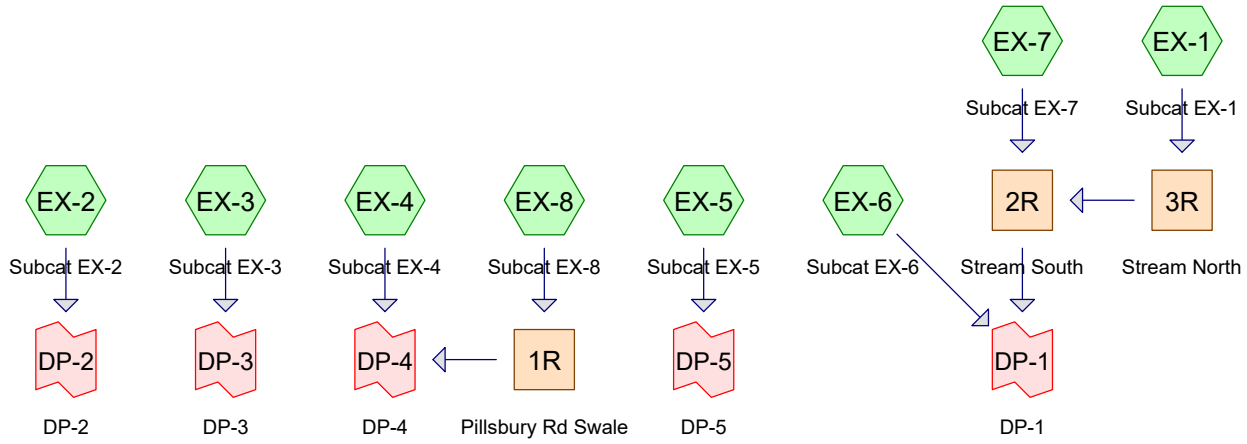
Test Pit Map
44 Pillsbury Road
Londonderry, New Hampshire

February 2026

Appendix B: Hydrologic Calculations

- Existing Conditions
- Proposed Conditions

Existing Conditions



Subcat Reach Pond Link

Routing Diagram for 5314044-EX
Prepared by VHB, Inc, Printed 2/11/2026
HydroCAD® 10.20-5c s/n 01038 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	2.95	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.46	2
3	25-YR	Type III 24-hr		Default	24.00	1	5.65	2
4	50-YR	Type III 24-hr		Default	24.00	1	6.76	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.376	61	>75% Grass cover, Good, HSG B (EX-1, EX-2, EX-3, EX-4)
8.000	74	>75% Grass cover, Good, HSG C (EX-1, EX-2, EX-4, EX-5, EX-6, EX-8)
0.146	80	>75% Grass cover, Good, HSG D (EX-1, EX-4, EX-5, EX-8)
0.192	89	Gravel roads, HSG C (EX-5)
0.186	91	Gravel roads, HSG D (EX-5)
0.203	98	Paved parking, HSG C (EX-5, EX-6)
0.224	98	Roofs, HSG C (EX-4, EX-5, EX-6)
0.729	55	Woods, Good, HSG B (EX-1, EX-2, EX-3, EX-4)
7.718	70	Woods, Good, HSG C (EX-1, EX-2, EX-4, EX-5, EX-6, EX-7, EX-8)
0.931	77	Woods, Good, HSG D (EX-1, EX-2, EX-4, EX-5, EX-6, EX-7, EX-8)
1.301	58	Woods/grass comb., Good, HSG B (EX-1, EX-2, EX-3, EX-4)
7.550	72	Woods/grass comb., Good, HSG C (EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-8)

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.406	HSG B	EX-1, EX-2, EX-3, EX-4
23.887	HSG C	EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8
1.264	HSG D	EX-1, EX-2, EX-4, EX-5, EX-6, EX-7, EX-8
0.000	Other	

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.376	8.000	0.146	0.000	9.522	>75% Grass cover, Good	EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-8
0.000	0.000	0.192	0.186	0.000	0.378	Gravel roads	EX-5
0.000	0.000	0.203	0.000	0.000	0.203	Paved parking	EX-5, EX-6
0.000	0.000	0.224	0.000	0.000	0.224	Roofs	EX-4, EX-5, EX-6
0.000	0.729	7.718	0.931	0.000	9.378	Woods, Good	EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8
0.000	1.301	7.550	0.000	0.000	8.851	Woods/grass comb., Good	EX-1, EX-2, EX-3, EX-4, EX-5, EX-6, EX-8

Summary for Subcatchment EX-1: Subcat EX-1

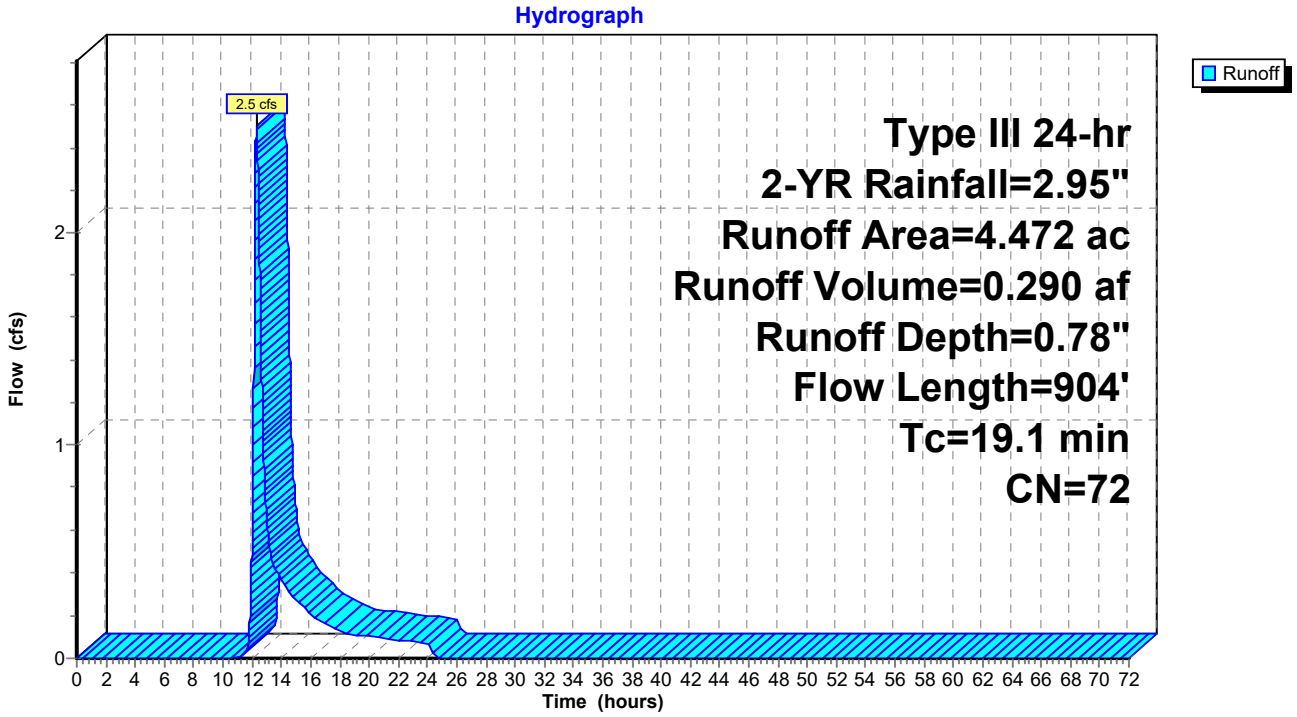
Runoff = 2.5 cfs @ 12.29 hrs, Volume= 0.290 af, Depth= 0.78"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.073	61	>75% Grass cover, Good, HSG B
1.670	74	>75% Grass cover, Good, HSG C
0.007	80	>75% Grass cover, Good, HSG D
0.024	55	Woods, Good, HSG B
0.513	70	Woods, Good, HSG C
0.172	77	Woods, Good, HSG D
0.026	58	Woods/grass comb., Good, HSG B
1.989	72	Woods/grass comb., Good, HSG C
4.472	72	Weighted Average
4.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0511	0.21		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
6.3	357	0.0183	0.95		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.4	162	0.0719	1.88		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
7.4	335	0.0229	0.76		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
19.1	904	Total			

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

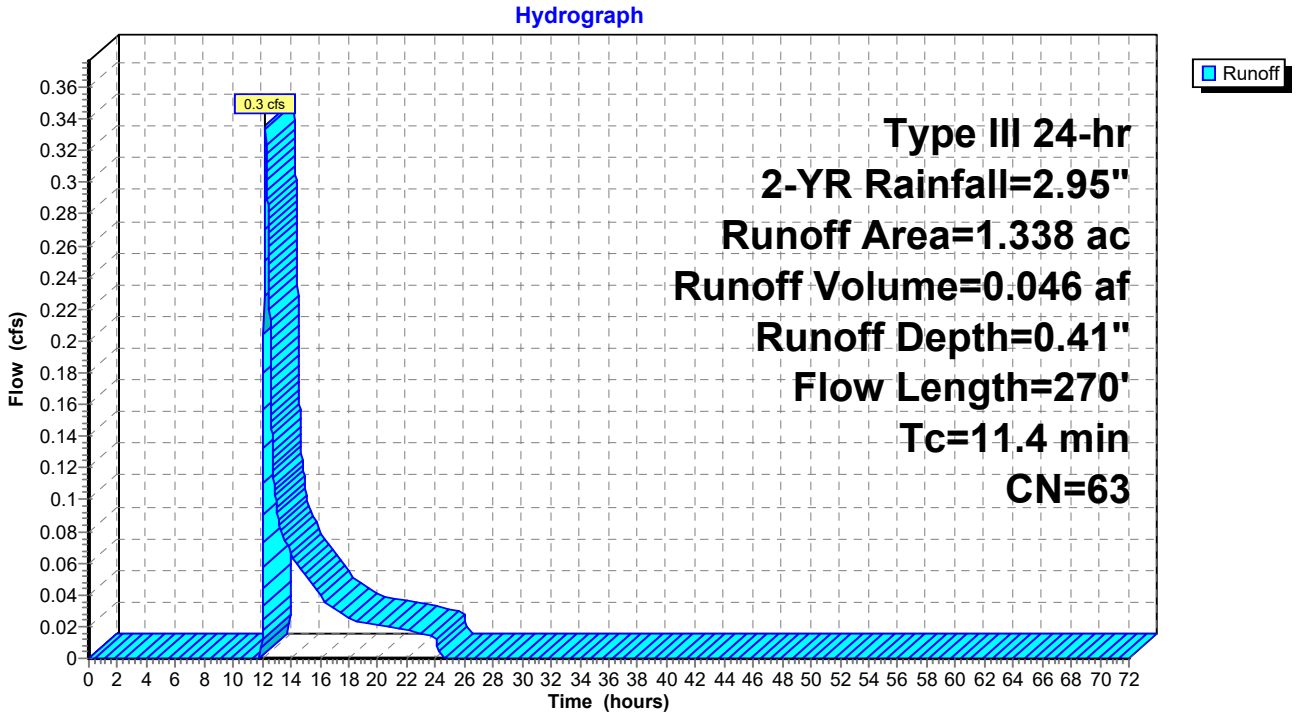
Runoff = 0.3 cfs @ 12.22 hrs, Volume= 0.046 af, Depth= 0.41"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.406	61	>75% Grass cover, Good, HSG B
0.012	74	>75% Grass cover, Good, HSG C
0.308	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.191	58	Woods/grass comb., Good, HSG B
0.410	72	Woods/grass comb., Good, HSG C
1.338	63	Weighted Average
1.338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0236	0.15		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.8	50	0.0236	1.08		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.2	87	0.0285	1.18		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
3.9	83	0.0050	0.35		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
11.4	270	Total			

Subcatchment EX-2: Subcat EX-2



Summary for Subcatchment EX-3: Subcat EX-3

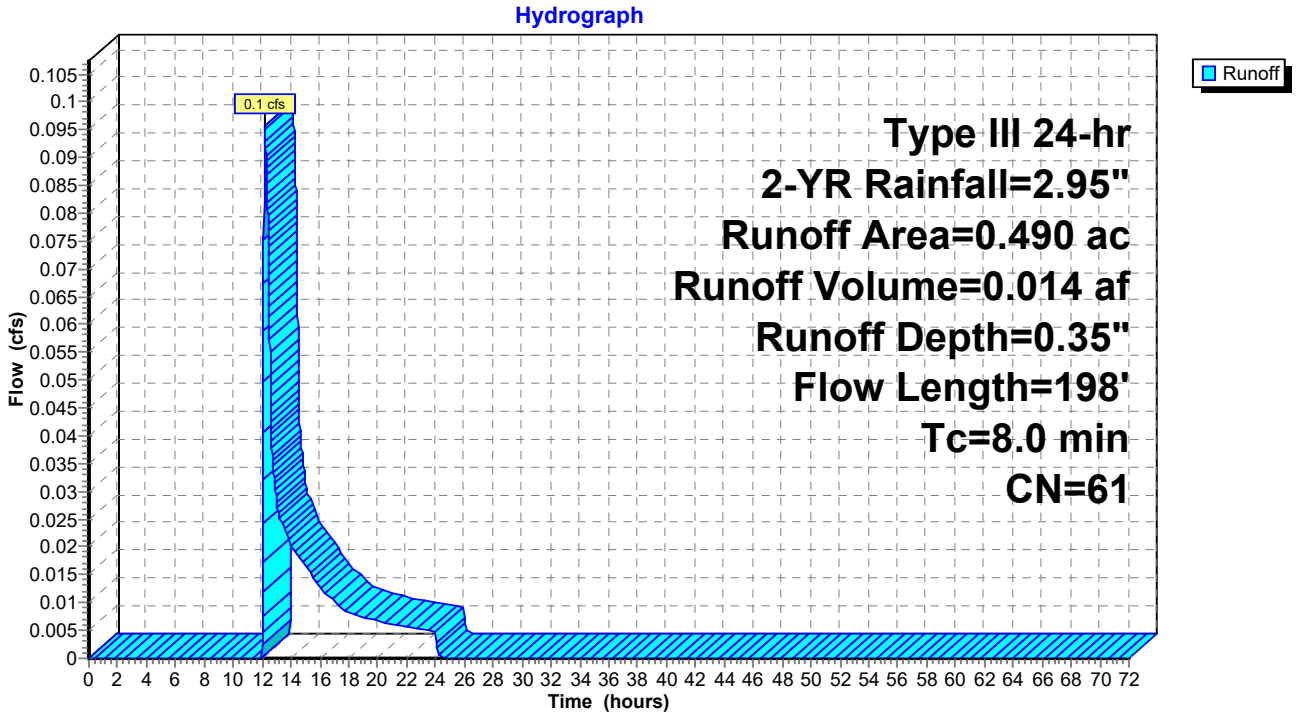
Runoff = 0.1 cfs @ 12.17 hrs, Volume= 0.014 af, Depth= 0.35"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.085	61	>75% Grass cover, Good, HSG B
0.142	55	Woods, Good, HSG B
0.129	58	Woods/grass comb., Good, HSG B
0.133	72	Woods/grass comb., Good, HSG C
0.490	61	Weighted Average
0.490		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0295	0.17		**Sheet Flow, Sheet Flow Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.9	84	0.0505	1.57		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.2	13	0.0180	0.94		**Shallow Concentrated Flow, Shallow Concentrated Gress** Short Grass Pasture Kv= 7.0 fps
1.9	51	0.0080	0.45		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
8.0	198	Total			

Subcatchment EX-3: Subcat EX-3



Summary for Subcatchment EX-4: Subcat EX-4

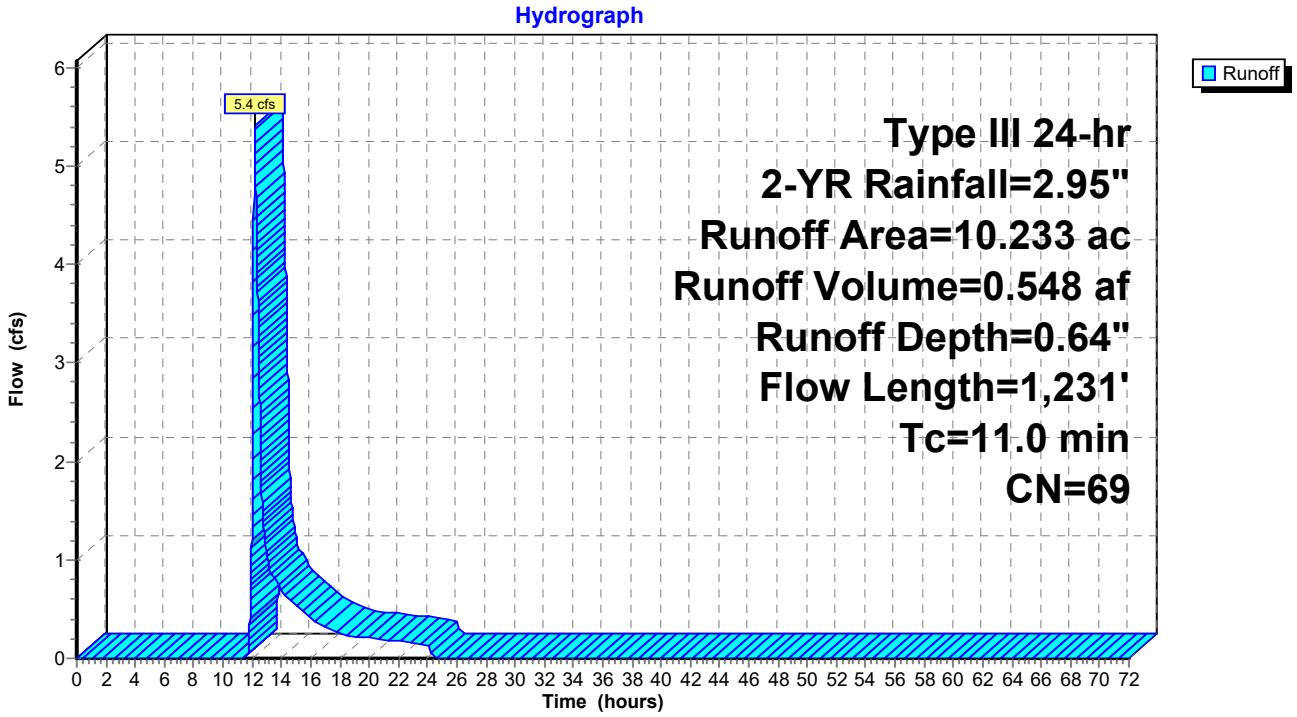
Runoff = 5.4 cfs @ 12.18 hrs, Volume= 0.548 af, Depth= 0.64"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.812	61	>75% Grass cover, Good, HSG B
1.755	74	>75% Grass cover, Good, HSG C
0.008	80	>75% Grass cover, Good, HSG D
0.010	98	Roofs, HSG C
0.255	55	Woods, Good, HSG B
2.954	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
0.956	58	Woods/grass comb., Good, HSG B
2.987	72	Woods/grass comb., Good, HSG C
10.233	69	Weighted Average
10.223		99.91% Pervious Area
0.010		0.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0502	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	202	0.0731	1.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	243	0.0862	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
11.0	1,231	Total			

Subcatchment EX-4: Subcat EX-4



Summary for Subcatchment EX-5: Subcat EX-5

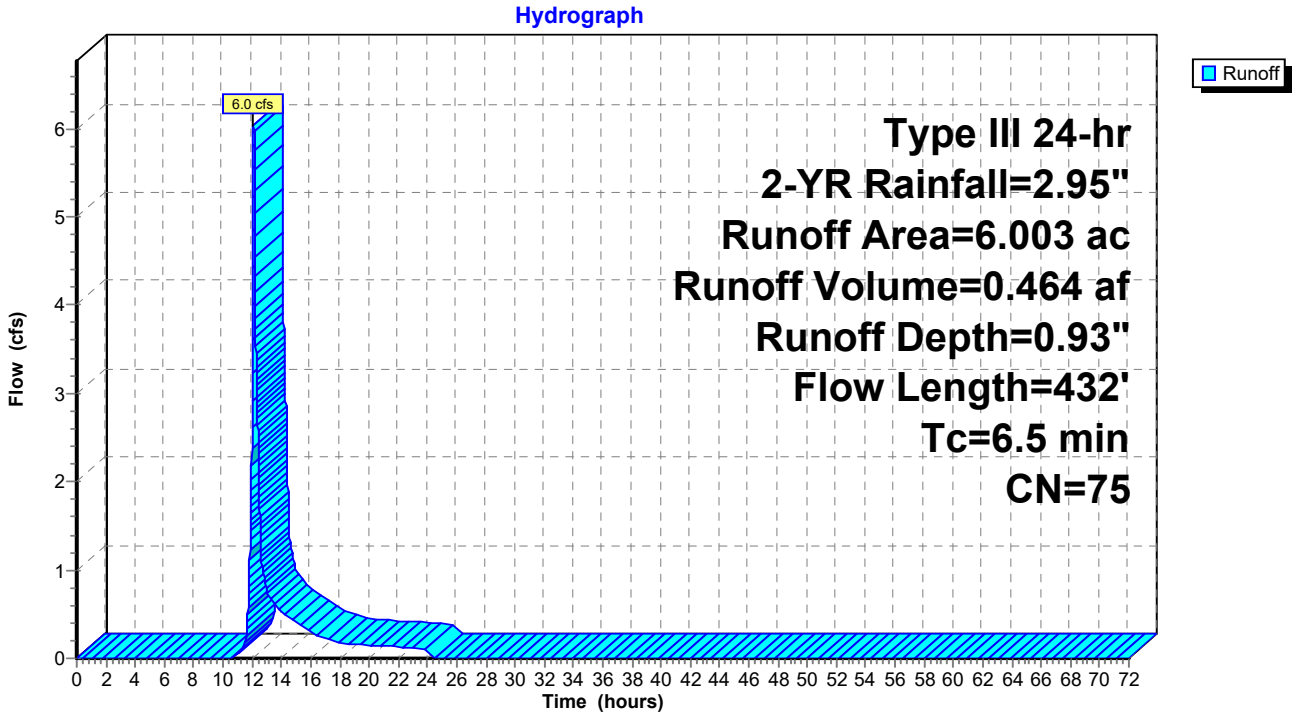
Runoff = 6.0 cfs @ 12.10 hrs, Volume= 0.464 af, Depth= 0.93"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
2.532	74	>75% Grass cover, Good, HSG C
0.029	80	>75% Grass cover, Good, HSG D
0.192	89	Gravel roads, HSG C
0.186	91	Gravel roads, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
1.160	70	Woods, Good, HSG C
0.001	77	Woods, Good, HSG D
1.630	72	Woods/grass comb., Good, HSG C
6.003	75	Weighted Average
5.730		95.44% Pervious Area
0.274		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0710	0.24		**Sheet Flow, Sheet Flow Grass/Woods** Grass: Short n= 0.150 P2= 2.95"
0.2	21	0.0571	1.67		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.8	97	0.0766	1.94		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.7	95	0.1039	2.26		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.3	45	0.0981	2.19		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.4	46	0.0956	2.16		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.6	78	0.0857	2.05		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
6.5	432	Total			

Subcatchment EX-5: Subcat EX-5



Summary for Subcatchment EX-6: Subcat EX-6

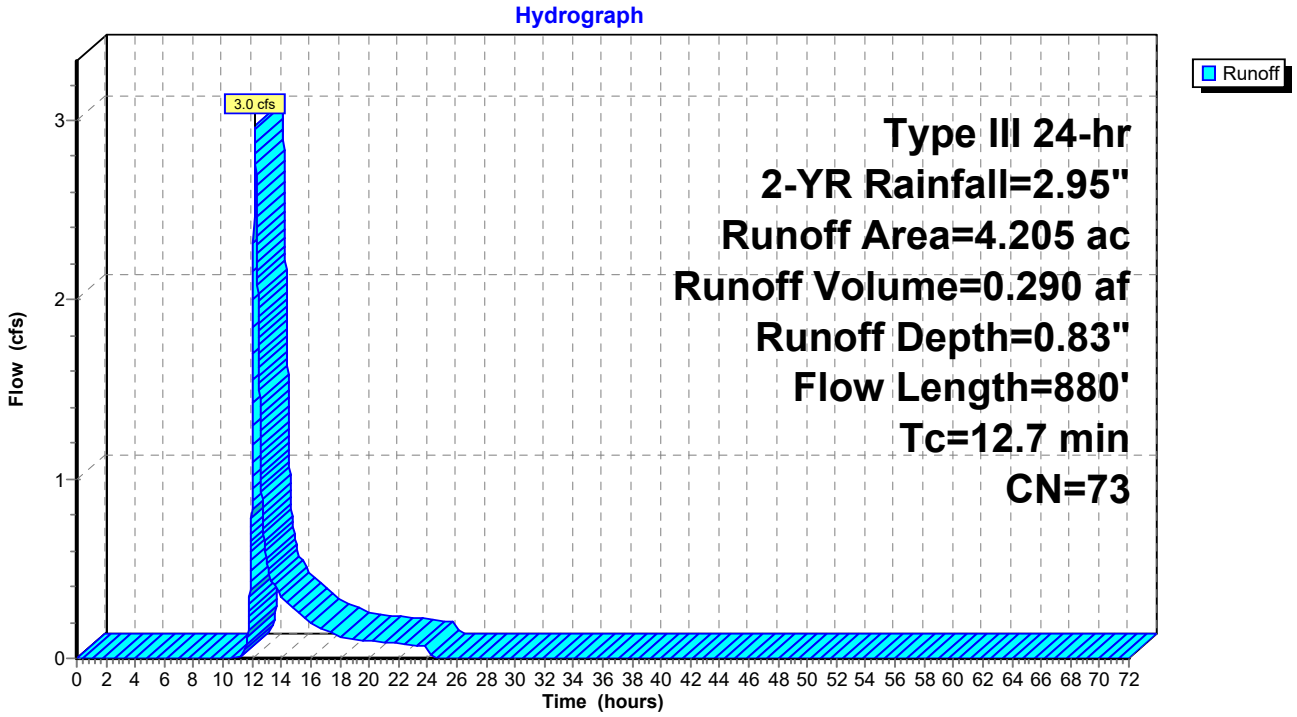
Runoff = 3.0 cfs @ 12.19 hrs, Volume= 0.290 af, Depth= 0.83"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
1.452	74	>75% Grass cover, Good, HSG C
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.419	70	Woods, Good, HSG C
0.065	77	Woods, Good, HSG D
0.125	72	Woods/grass comb., Good, HSG C
4.205	73	Weighted Average
4.061		96.57% Pervious Area
0.144		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0862	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.4	149	0.0627	1.75		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	212	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0449	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1063	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	55	0.0682	1.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.7	880	Total			

Subcatchment EX-6: Subcat EX-6



Summary for Subcatchment EX-7: Subcat EX-7

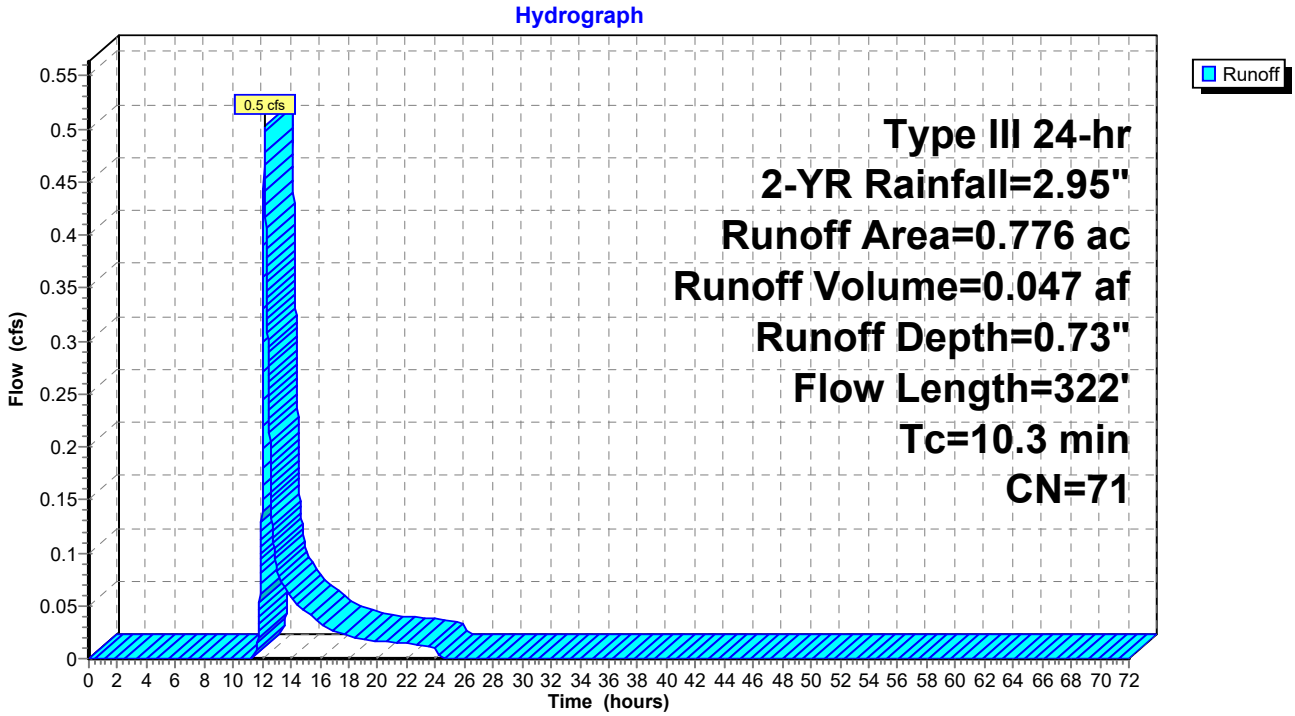
Runoff = 0.5 cfs @ 12.16 hrs, Volume= 0.047 af, Depth= 0.73"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.633	70	Woods, Good, HSG C
0.143	77	Woods, Good, HSG D
0.776	71	Weighted Average
0.776		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment EX-7: Subcat EX-7



Summary for Subcatchment EX-8: Subcat EX-8

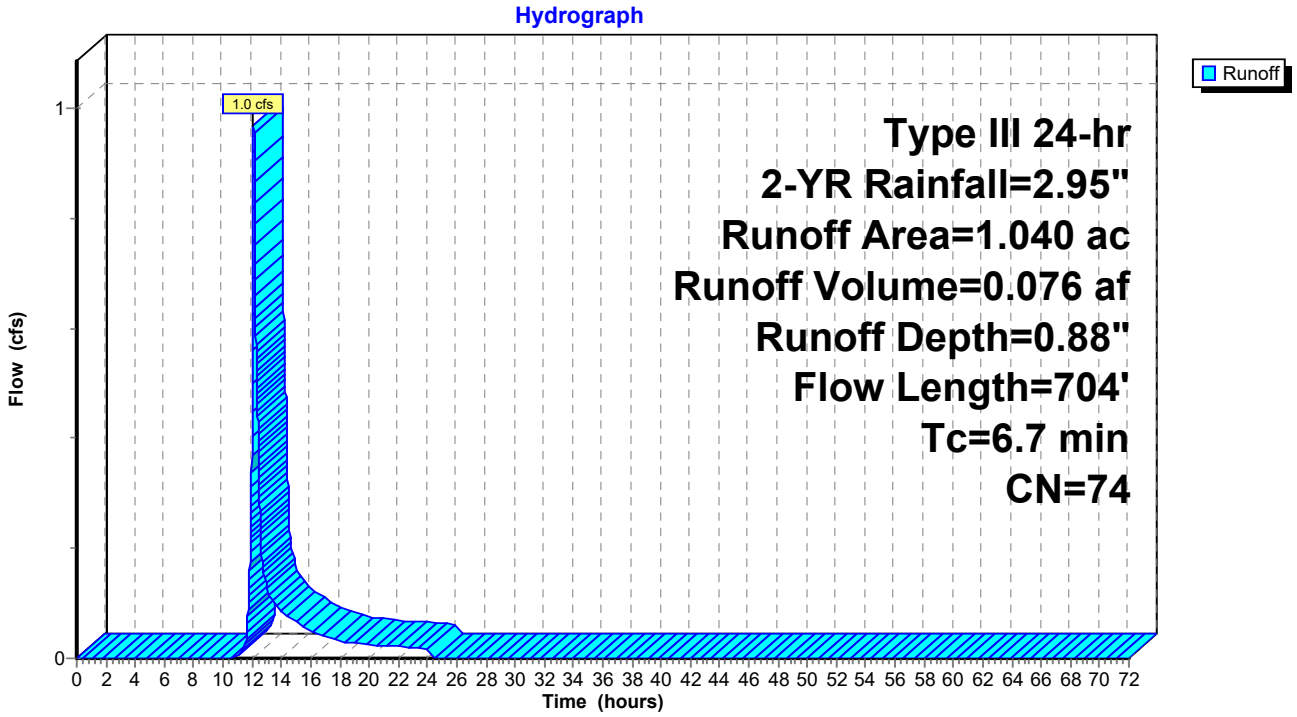
Runoff = 1.0 cfs @ 12.11 hrs, Volume= 0.076 af, Depth= 0.88"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.578	74	>75% Grass cover, Good, HSG C
0.103	80	>75% Grass cover, Good, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
0.277	72	Woods/grass comb., Good, HSG C
1.040	74	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0768	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0814	2.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	141	0.1014	2.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	704	Total			

Subcatchment EX-8: Subcat EX-8



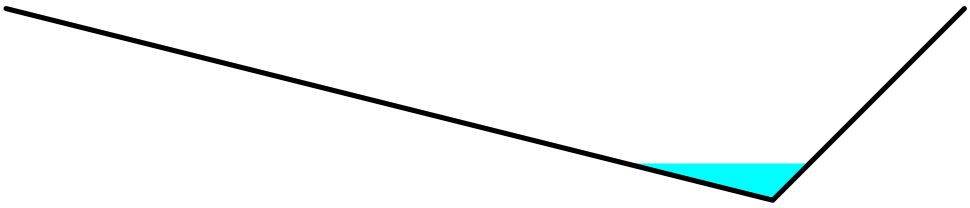
Summary for Reach 1R: Pillsbury Rd Swale

Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 0.88" for 2-YR event
Inflow = 1.0 cfs @ 12.11 hrs, Volume= 0.076 af
Outflow = 0.9 cfs @ 12.15 hrs, Volume= 0.076 af, Atten= 11%, Lag= 2.7 min
Routed to Link DP-4 : DP-4

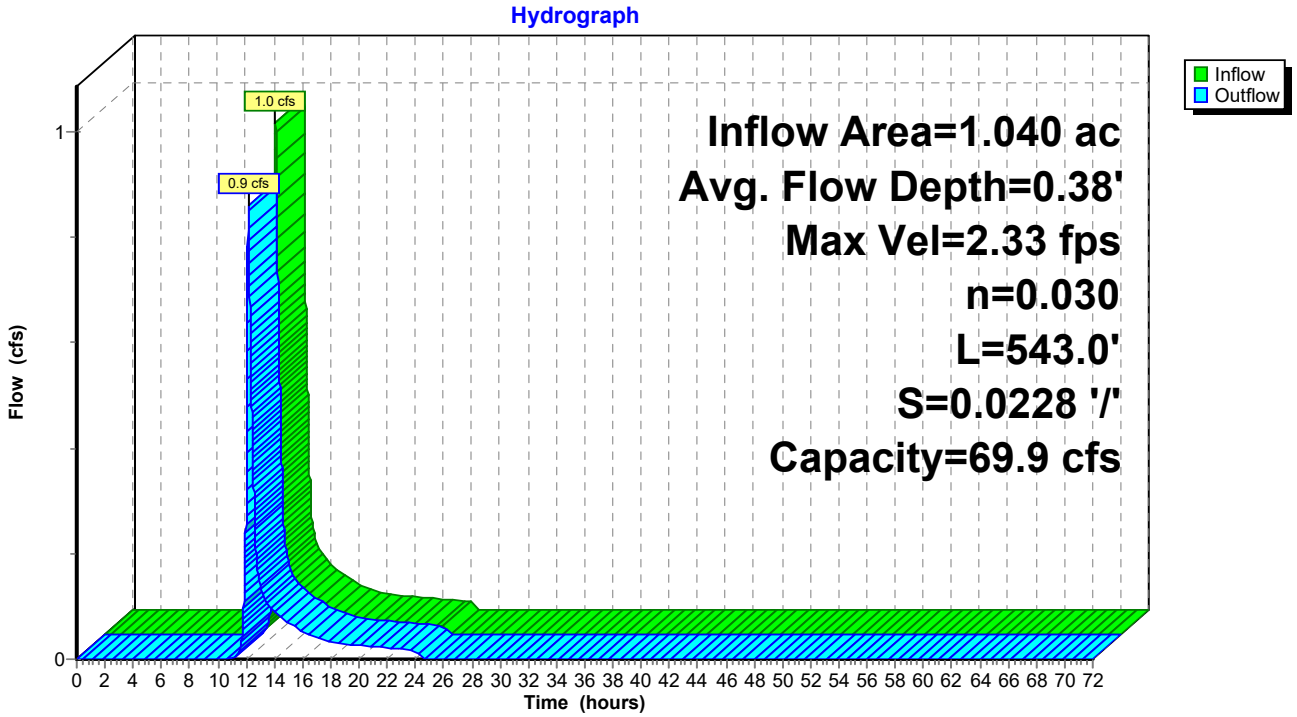
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.33 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 8.9 min

Peak Storage= 200 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 1.92'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'



Reach 1R: Pillsbury Rd Swale



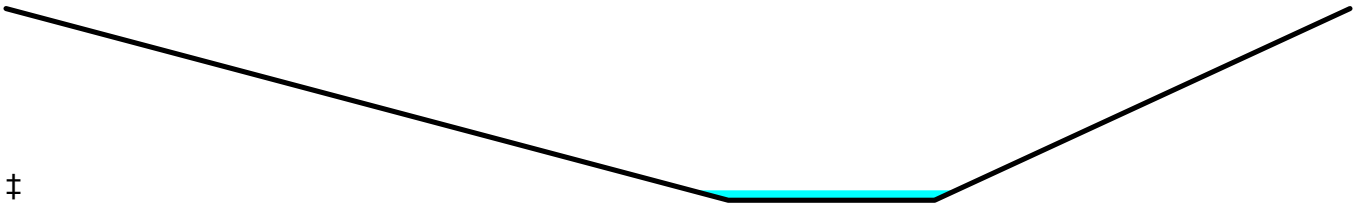
Summary for Reach 2R: Stream South

Inflow Area = 5.248 ac, 0.00% Impervious, Inflow Depth = 0.77" for 2-YR event
Inflow = 2.9 cfs @ 12.30 hrs, Volume= 0.337 af
Outflow = 2.8 cfs @ 12.32 hrs, Volume= 0.337 af, Atten= 0%, Lag= 0.9 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 3.2 min

Peak Storage= 235 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 5.12'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0588 '/'
Inlet Invert= 16.99', Outlet Invert= 0.00'



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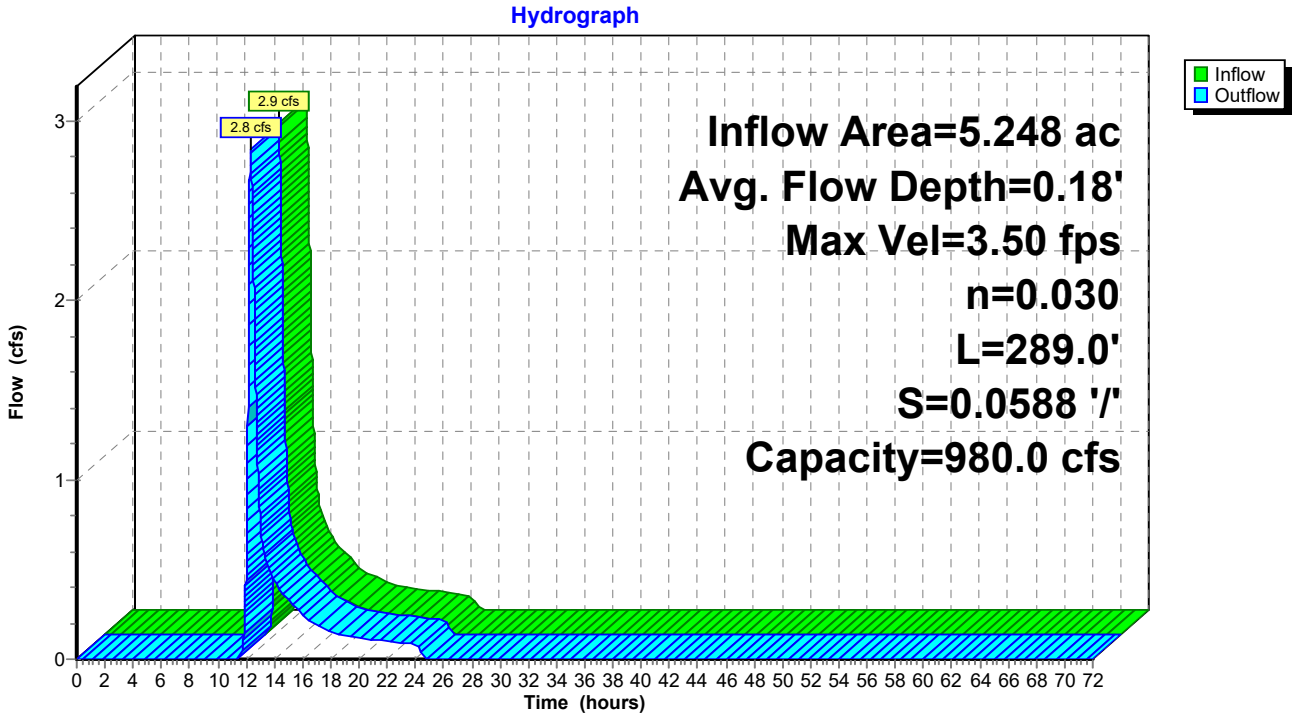


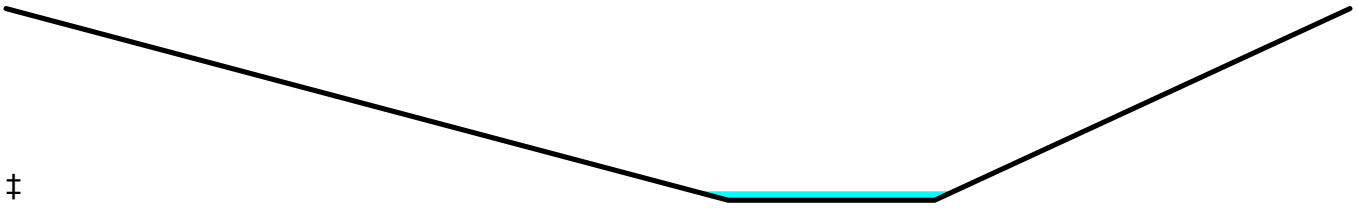
Summary for Reach 3R: Stream North

Inflow Area = 4.472 ac, 0.00% Impervious, Inflow Depth = 0.78" for 2-YR event
Inflow = 2.5 cfs @ 12.29 hrs, Volume= 0.290 af
Outflow = 2.5 cfs @ 12.31 hrs, Volume= 0.290 af, Atten= 1%, Lag= 1.3 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.35 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 3.6 min

Peak Storage= 235 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 5.04'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 316.0' Slope= 0.0588 '/'
Inlet Invert= 35.57', Outlet Invert= 16.99'



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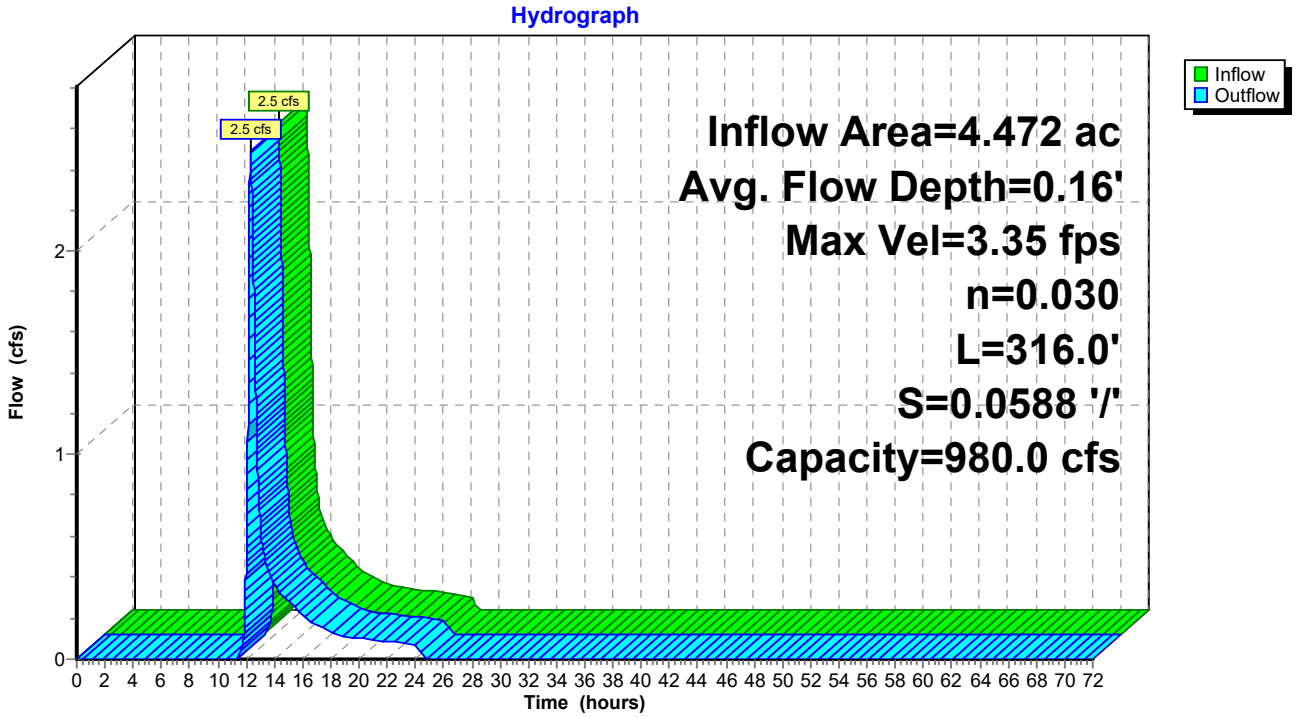
Reach 3R: Stream North

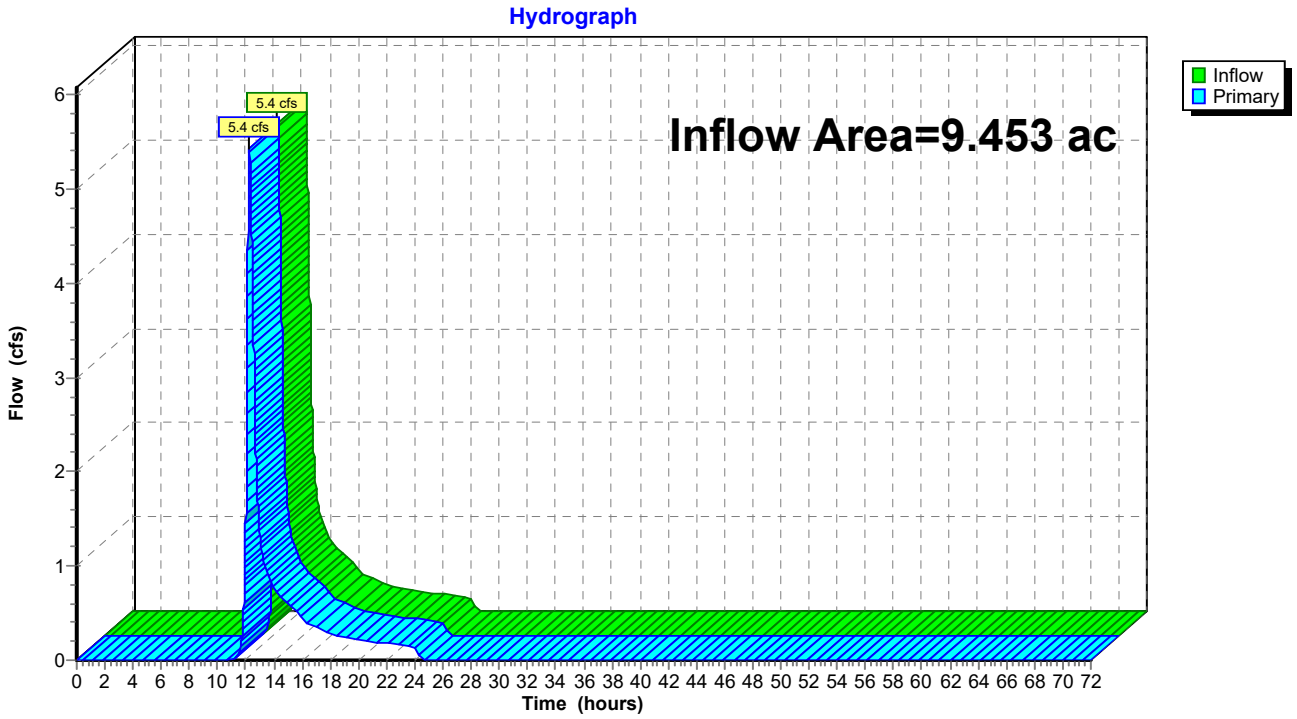


Summary for Link DP-1: DP-1

Inflow Area = 9.453 ac, 1.52% Impervious, Inflow Depth = 0.80" for 2-YR event
Inflow = 5.4 cfs @ 12.24 hrs, Volume= 0.627 af
Primary = 5.4 cfs @ 12.24 hrs, Volume= 0.627 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

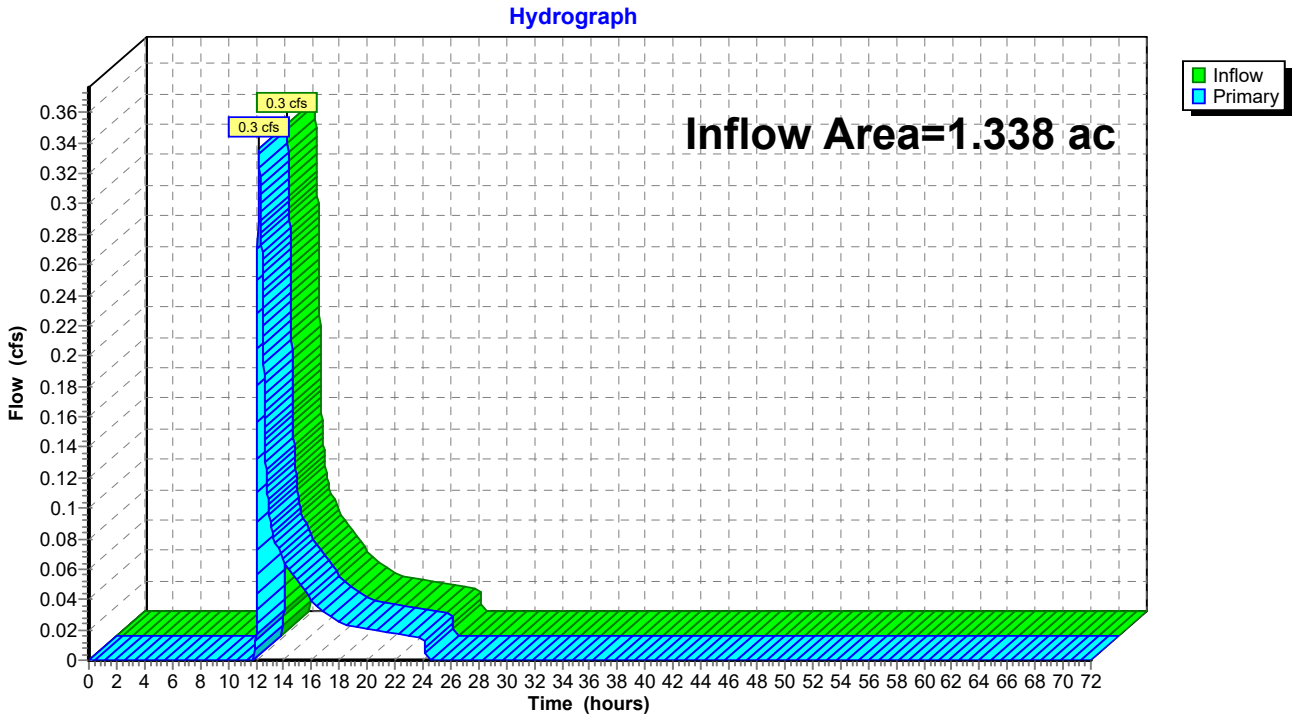


Summary for Link DP-2: DP-2

Inflow Area = 1.338 ac, 0.00% Impervious, Inflow Depth = 0.41" for 2-YR event
Inflow = 0.3 cfs @ 12.22 hrs, Volume= 0.046 af
Primary = 0.3 cfs @ 12.22 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

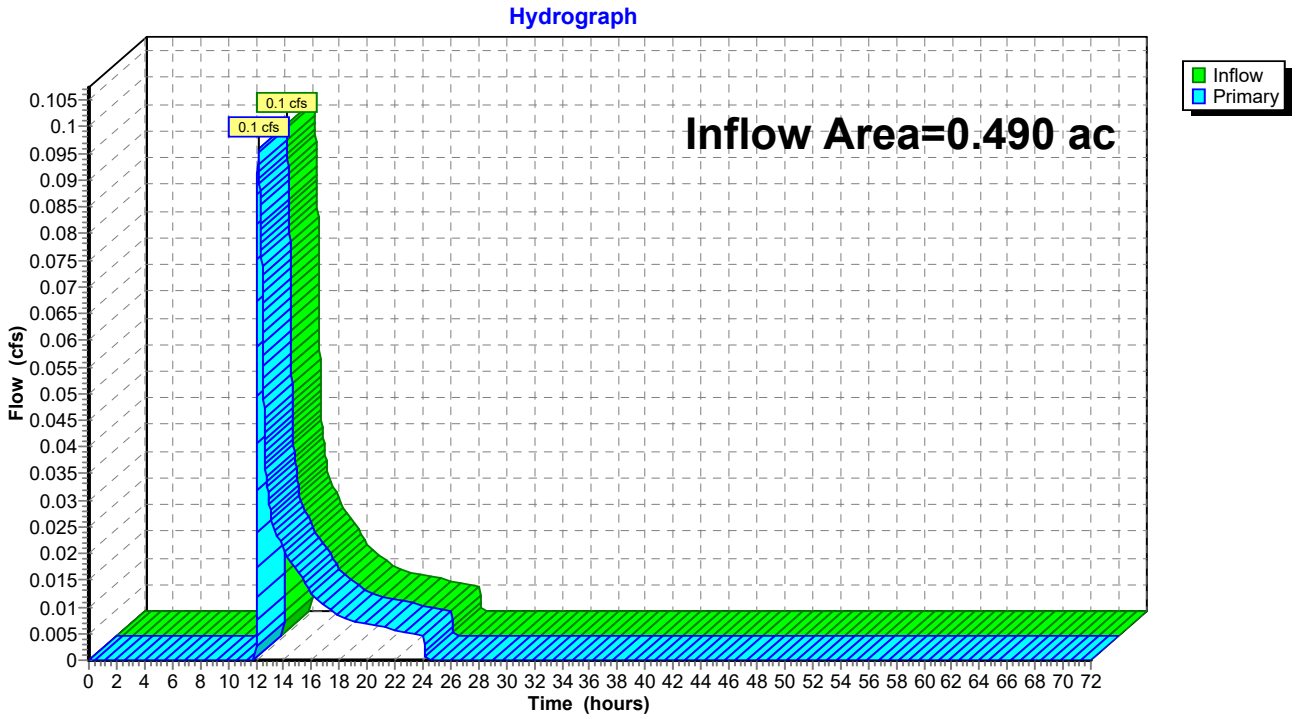


Summary for Link DP-3: DP-3

Inflow Area = 0.490 ac, 0.00% Impervious, Inflow Depth = 0.35" for 2-YR event
Inflow = 0.1 cfs @ 12.17 hrs, Volume= 0.014 af
Primary = 0.1 cfs @ 12.17 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3

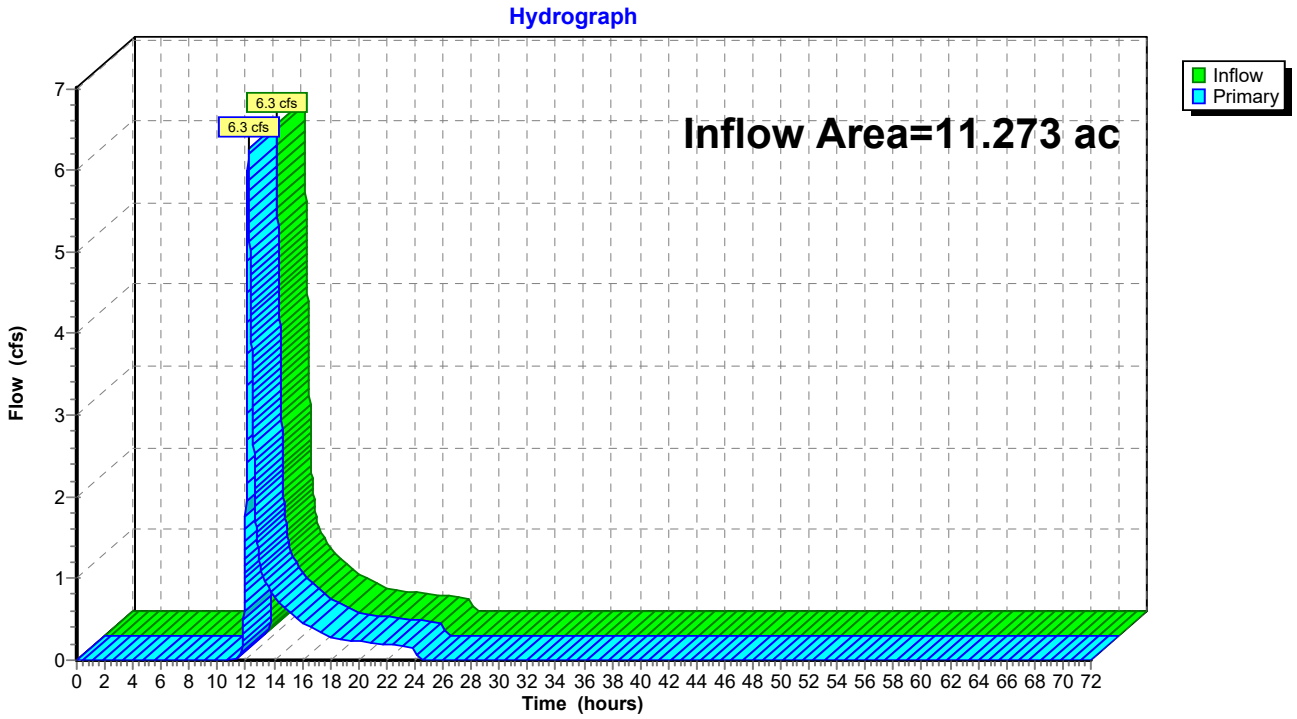


Summary for Link DP-4: DP-4

Inflow Area = 11.273 ac, 0.09% Impervious, Inflow Depth = 0.66" for 2-YR event
Inflow = 6.3 cfs @ 12.17 hrs, Volume= 0.624 af
Primary = 6.3 cfs @ 12.17 hrs, Volume= 0.624 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-4: DP-4

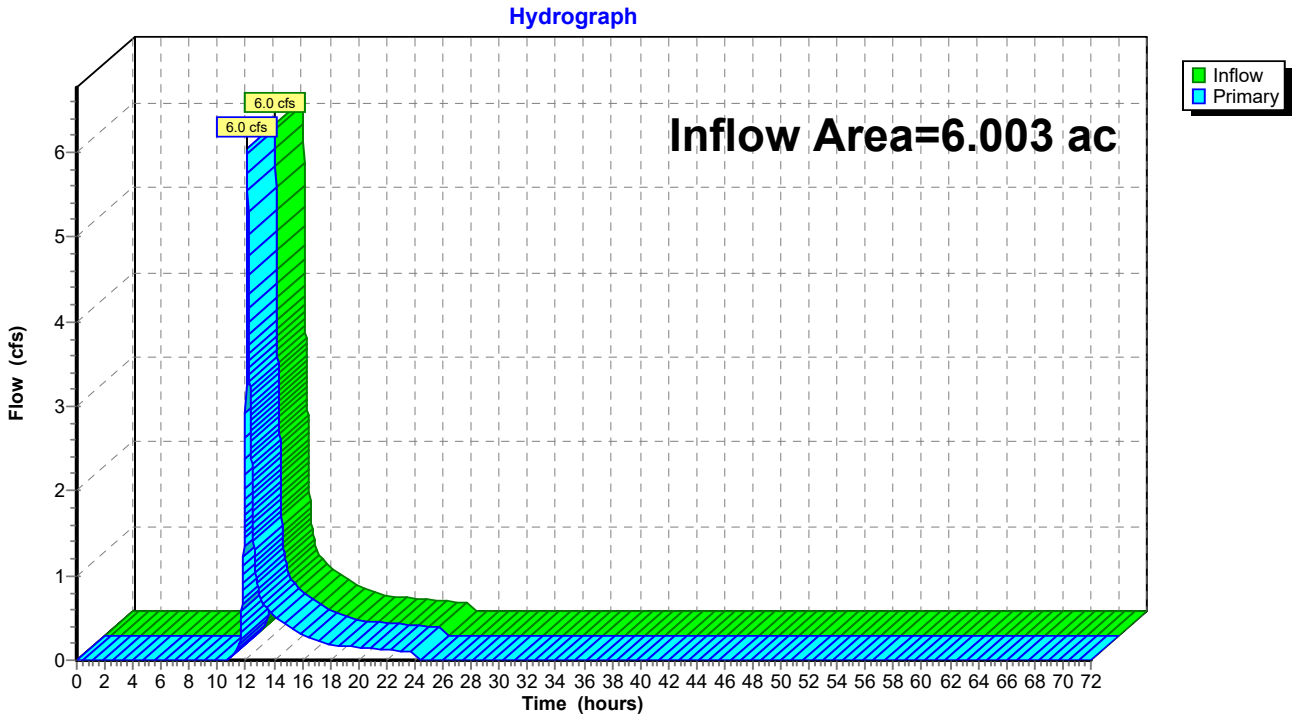


Summary for Link DP-5: DP-5

Inflow Area = 6.003 ac, 4.56% Impervious, Inflow Depth = 0.93" for 2-YR event
Inflow = 6.0 cfs @ 12.10 hrs, Volume= 0.464 af
Primary = 6.0 cfs @ 12.10 hrs, Volume= 0.464 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-5: DP-5



Summary for Subcatchment EX-1: Subcat EX-1

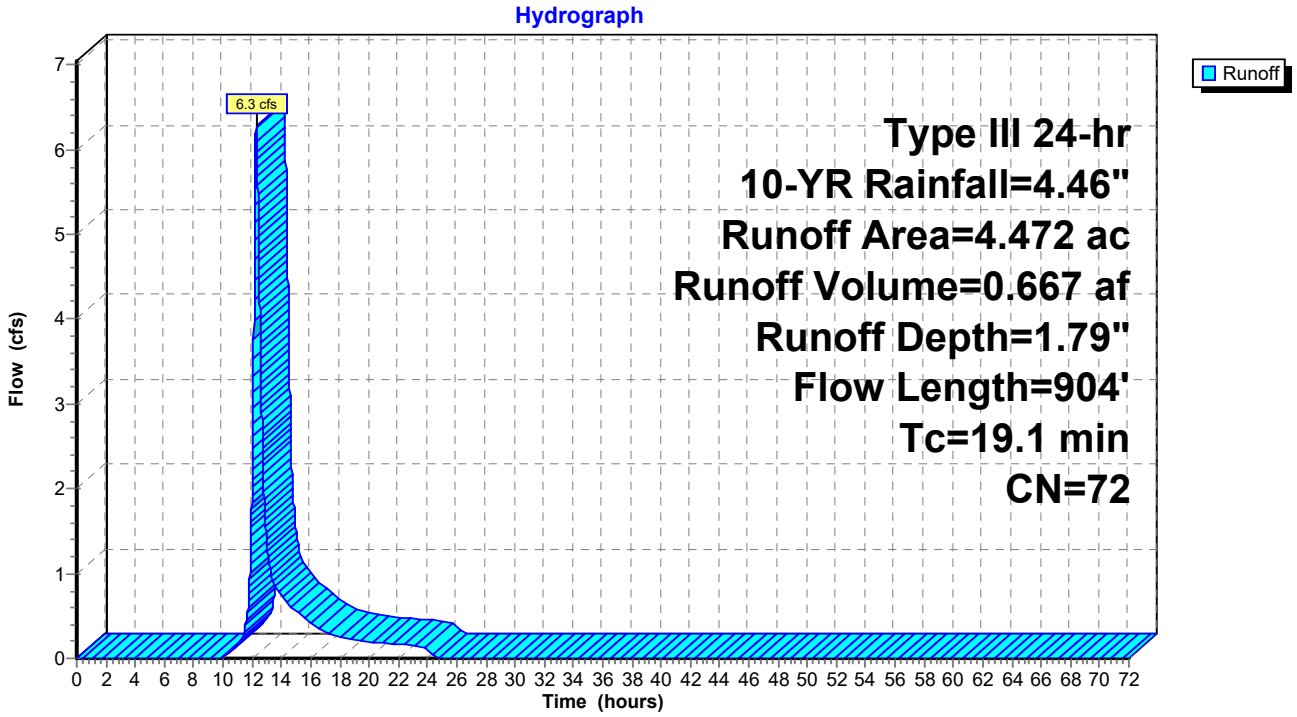
Runoff = 6.3 cfs @ 12.28 hrs, Volume= 0.667 af, Depth= 1.79"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.073	61	>75% Grass cover, Good, HSG B
1.670	74	>75% Grass cover, Good, HSG C
0.007	80	>75% Grass cover, Good, HSG D
0.024	55	Woods, Good, HSG B
0.513	70	Woods, Good, HSG C
0.172	77	Woods, Good, HSG D
0.026	58	Woods/grass comb., Good, HSG B
1.989	72	Woods/grass comb., Good, HSG C
4.472	72	Weighted Average
4.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0511	0.21		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
6.3	357	0.0183	0.95		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.4	162	0.0719	1.88		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
7.4	335	0.0229	0.76		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
19.1	904	Total			

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

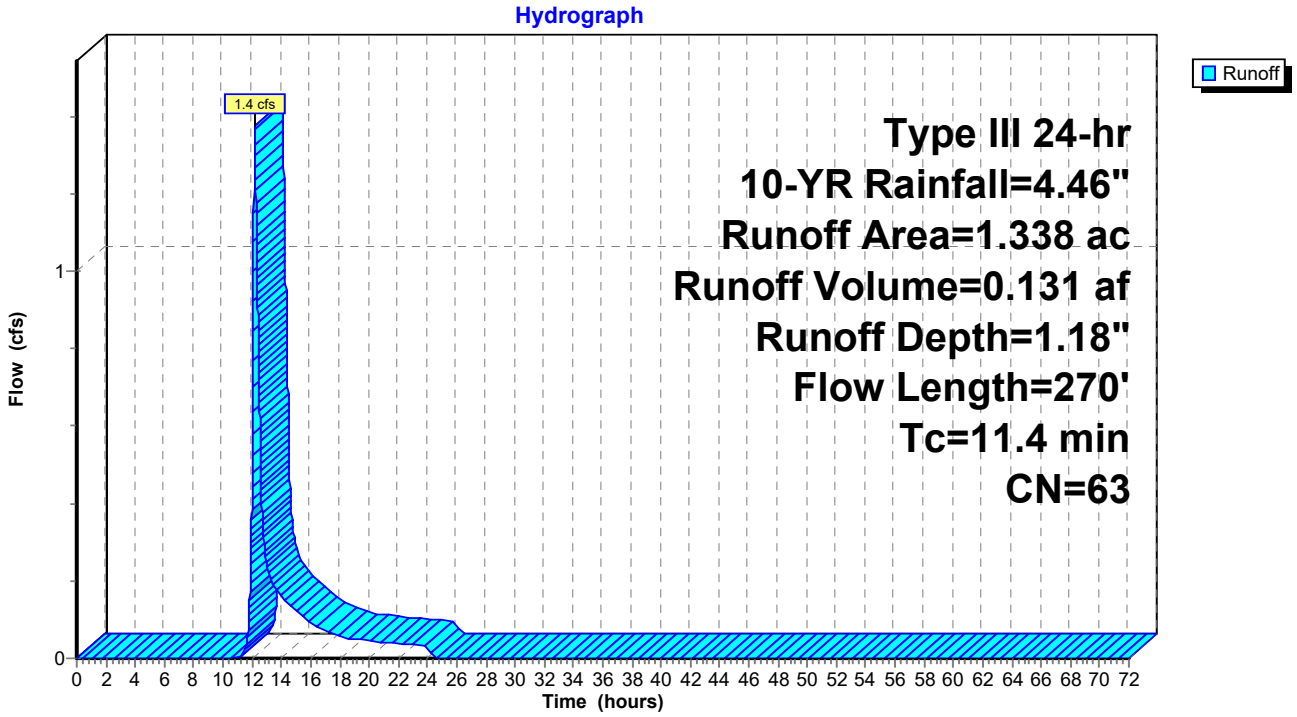
Runoff = 1.4 cfs @ 12.17 hrs, Volume= 0.131 af, Depth= 1.18"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.406	61	>75% Grass cover, Good, HSG B
0.012	74	>75% Grass cover, Good, HSG C
0.308	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.191	58	Woods/grass comb., Good, HSG B
0.410	72	Woods/grass comb., Good, HSG C
1.338	63	Weighted Average
1.338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0236	0.15		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.8	50	0.0236	1.08		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.2	87	0.0285	1.18		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
3.9	83	0.0050	0.35		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
11.4	270	Total			

Subcatchment EX-2: Subcat EX-2



Summary for Subcatchment EX-3: Subcat EX-3

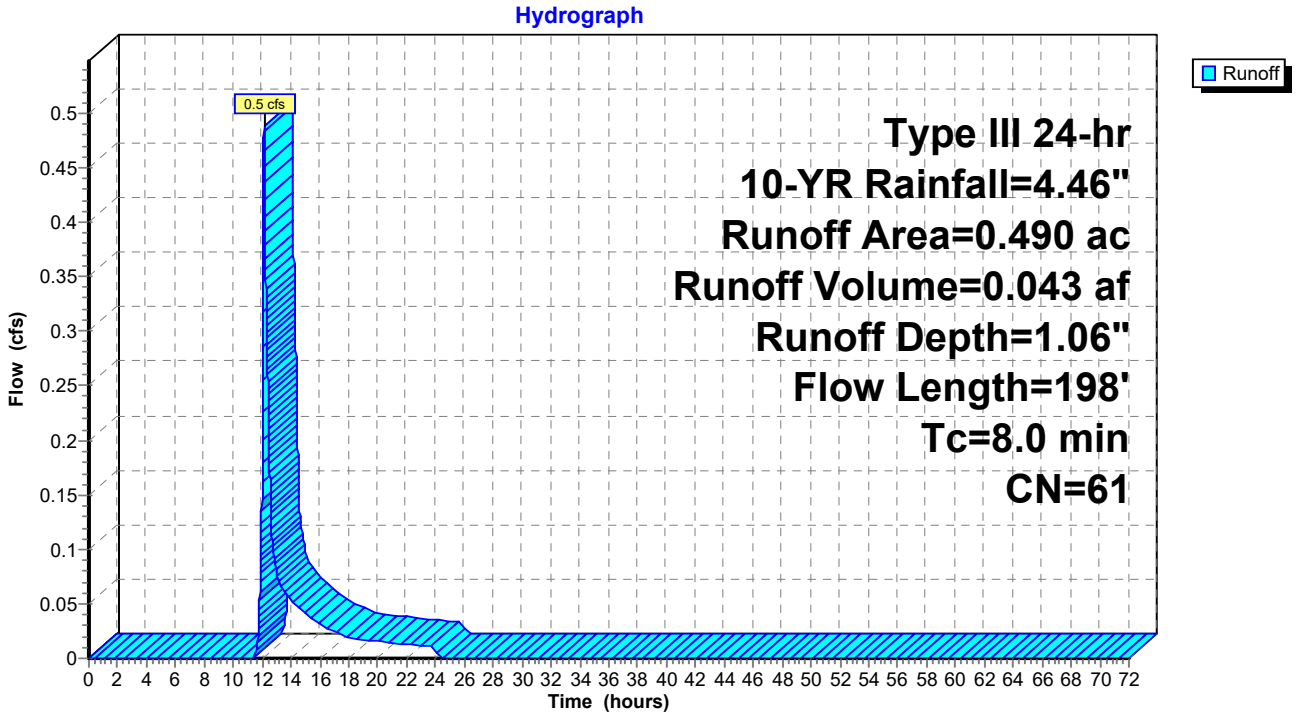
Runoff = 0.5 cfs @ 12.13 hrs, Volume= 0.043 af, Depth= 1.06"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.085	61	>75% Grass cover, Good, HSG B
0.142	55	Woods, Good, HSG B
0.129	58	Woods/grass comb., Good, HSG B
0.133	72	Woods/grass comb., Good, HSG C
0.490	61	Weighted Average
0.490		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0295	0.17		**Sheet Flow, Sheet Flow Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.9	84	0.0505	1.57		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.2	13	0.0180	0.94		**Shallow Concentrated Flow, Shallow Concentrated Gress** Short Grass Pasture Kv= 7.0 fps
1.9	51	0.0080	0.45		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
8.0	198	Total			

Subcatchment EX-3: Subcat EX-3



Summary for Subcatchment EX-4: Subcat EX-4

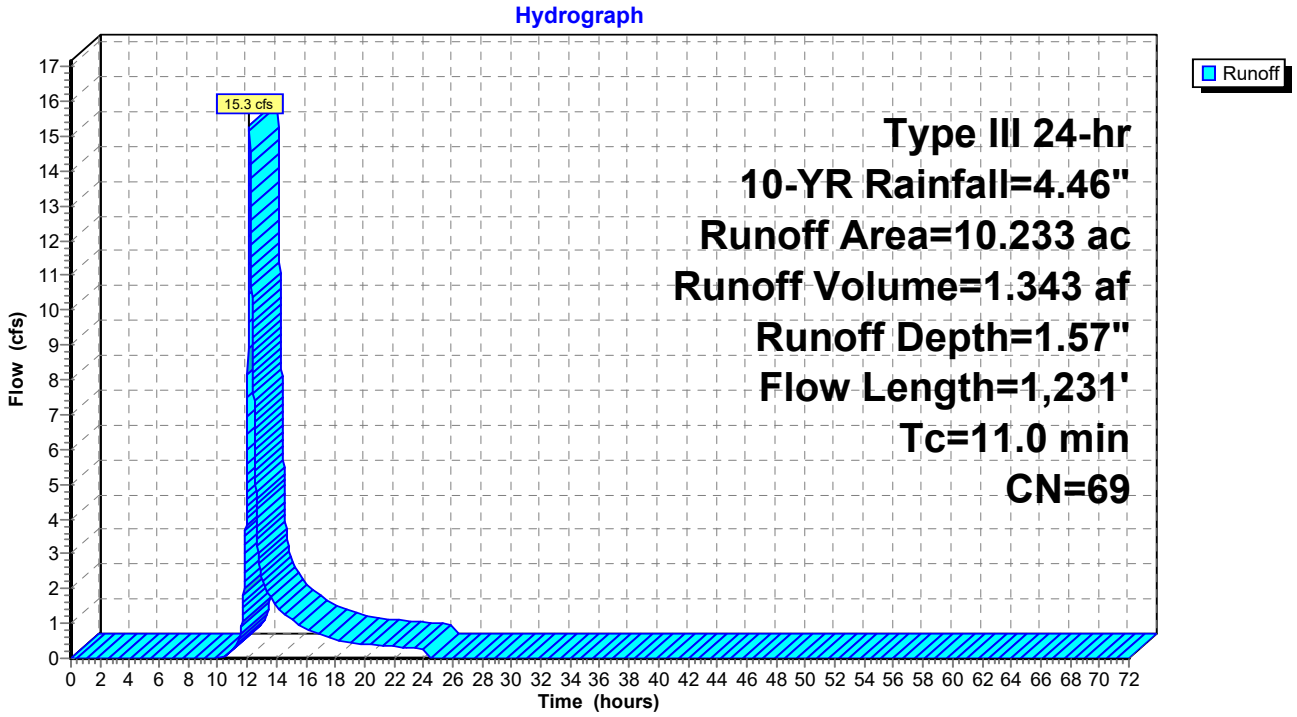
Runoff = 15.3 cfs @ 12.16 hrs, Volume= 1.343 af, Depth= 1.57"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.812	61	>75% Grass cover, Good, HSG B
1.755	74	>75% Grass cover, Good, HSG C
0.008	80	>75% Grass cover, Good, HSG D
0.010	98	Roofs, HSG C
0.255	55	Woods, Good, HSG B
2.954	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
0.956	58	Woods/grass comb., Good, HSG B
2.987	72	Woods/grass comb., Good, HSG C
10.233	69	Weighted Average
10.223		99.91% Pervious Area
0.010		0.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0502	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	202	0.0731	1.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	243	0.0862	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
11.0	1,231	Total			

Subcatchment EX-4: Subcat EX-4



Summary for Subcatchment EX-5: Subcat EX-5

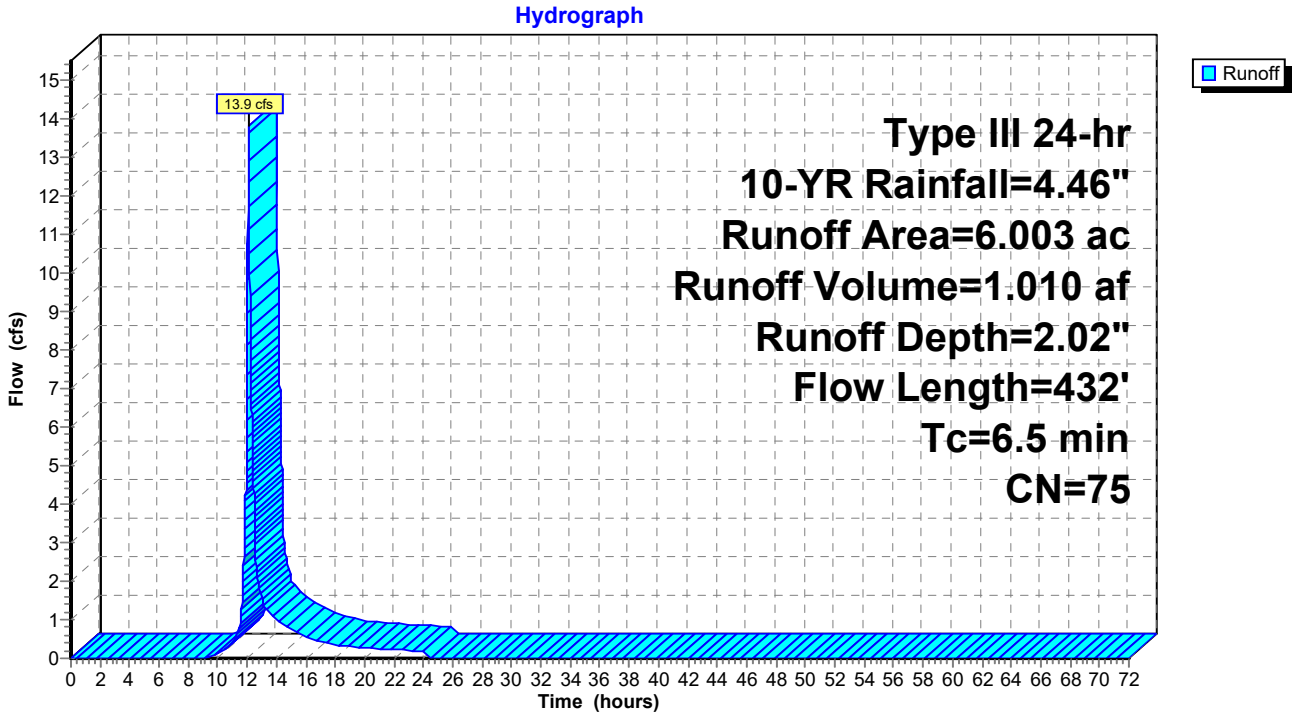
Runoff = 13.9 cfs @ 12.10 hrs, Volume= 1.010 af, Depth= 2.02"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
2.532	74	>75% Grass cover, Good, HSG C
0.029	80	>75% Grass cover, Good, HSG D
0.192	89	Gravel roads, HSG C
0.186	91	Gravel roads, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
1.160	70	Woods, Good, HSG C
0.001	77	Woods, Good, HSG D
1.630	72	Woods/grass comb., Good, HSG C
6.003	75	Weighted Average
5.730		95.44% Pervious Area
0.274		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0710	0.24		**Sheet Flow, Sheet Flow Grass/Woods** Grass: Short n= 0.150 P2= 2.95"
0.2	21	0.0571	1.67		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.8	97	0.0766	1.94		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.7	95	0.1039	2.26		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.3	45	0.0981	2.19		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.4	46	0.0956	2.16		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.6	78	0.0857	2.05		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
6.5	432	Total			

Subcatchment EX-5: Subcat EX-5



Summary for Subcatchment EX-6: Subcat EX-6

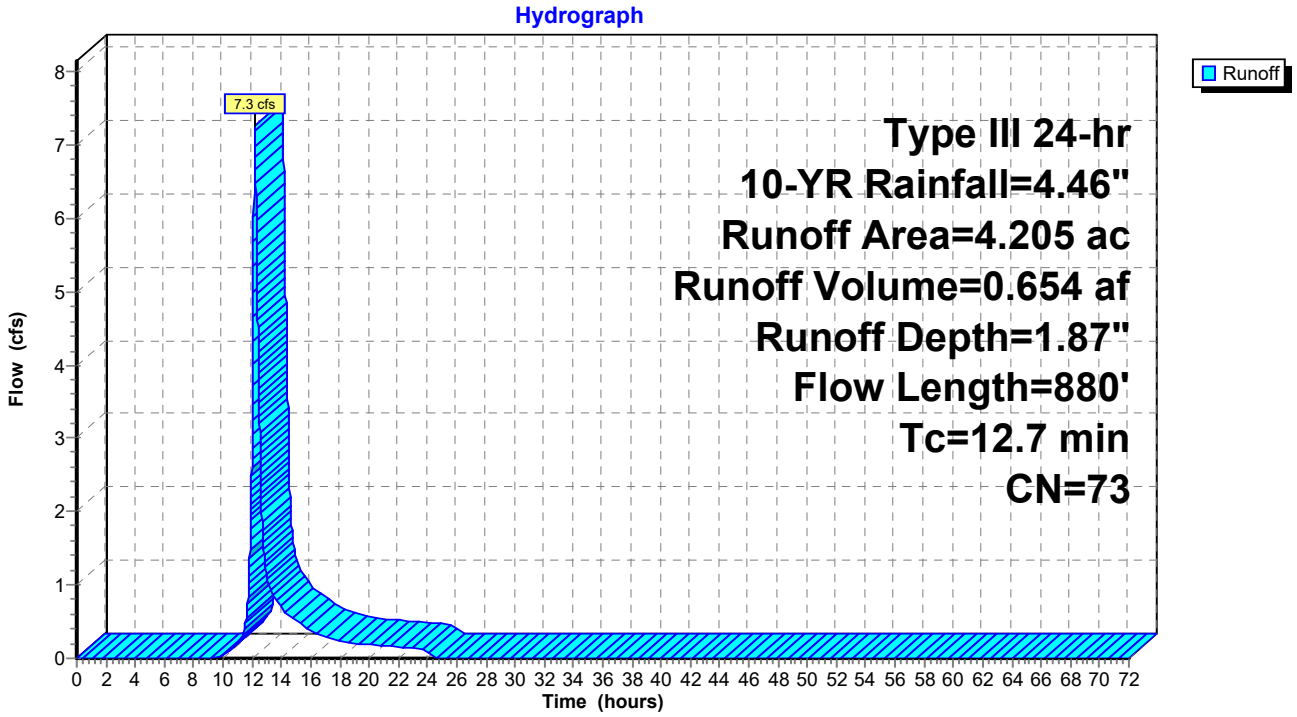
Runoff = 7.3 cfs @ 12.18 hrs, Volume= 0.654 af, Depth= 1.87"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.452	74	>75% Grass cover, Good, HSG C
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.419	70	Woods, Good, HSG C
0.065	77	Woods, Good, HSG D
0.125	72	Woods/grass comb., Good, HSG C
4.205	73	Weighted Average
4.061		96.57% Pervious Area
0.144		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0862	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.4	149	0.0627	1.75		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	212	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0449	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1063	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	55	0.0682	1.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.7	880	Total			

Subcatchment EX-6: Subcat EX-6



Summary for Subcatchment EX-7: Subcat EX-7

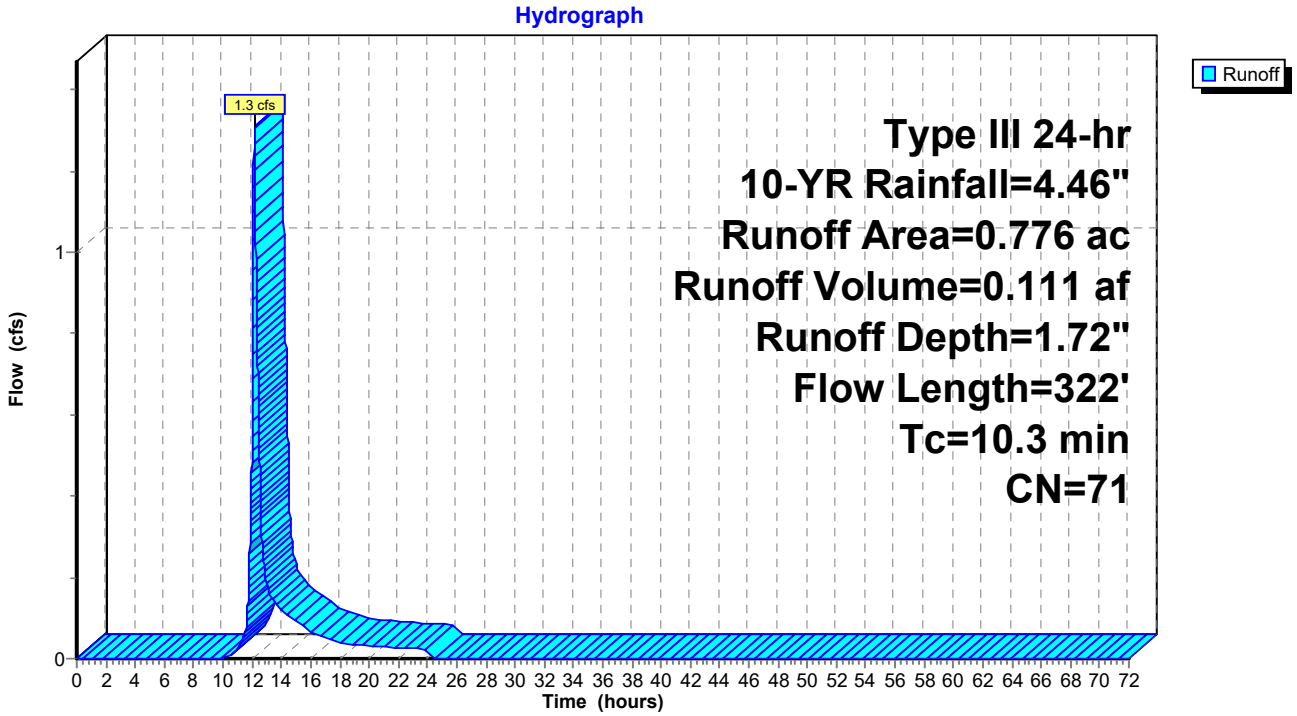
Runoff = 1.3 cfs @ 12.15 hrs, Volume= 0.111 af, Depth= 1.72"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.633	70	Woods, Good, HSG C
0.143	77	Woods, Good, HSG D
0.776	71	Weighted Average
0.776		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment EX-7: Subcat EX-7



Summary for Subcatchment EX-8: Subcat EX-8

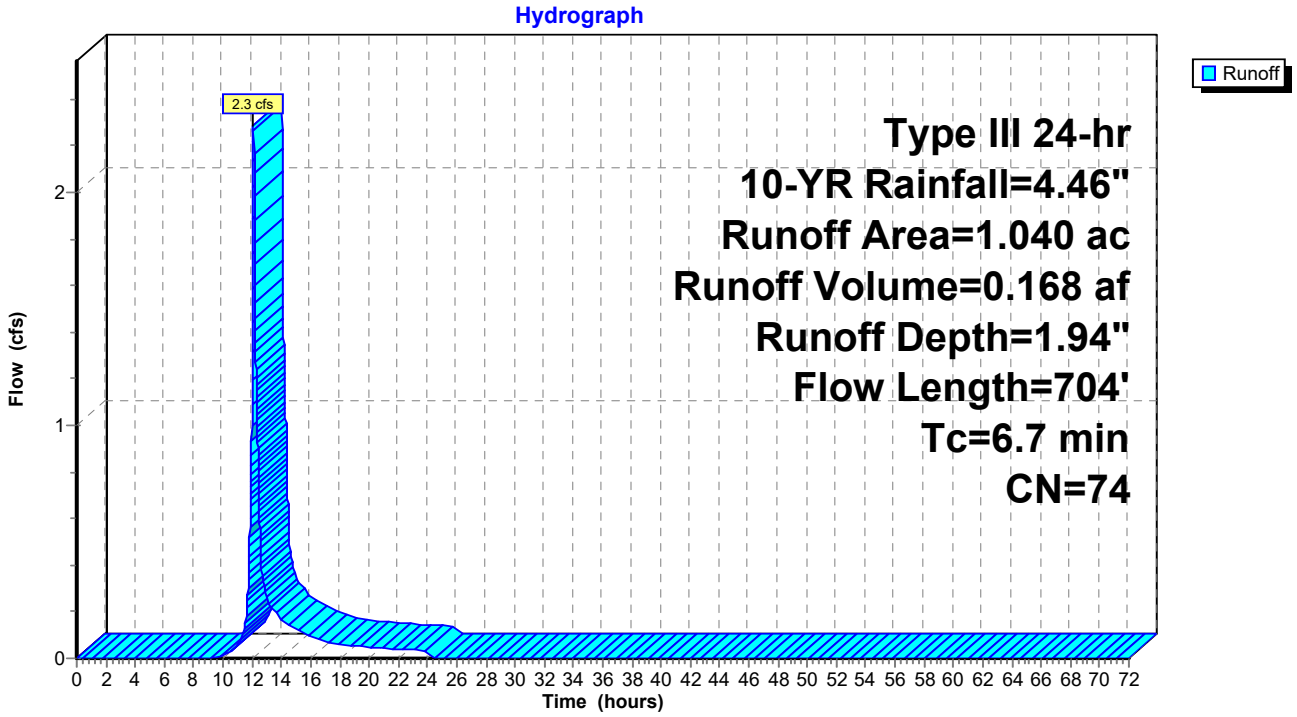
Runoff = 2.3 cfs @ 12.10 hrs, Volume= 0.168 af, Depth= 1.94"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.578	74	>75% Grass cover, Good, HSG C
0.103	80	>75% Grass cover, Good, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
0.277	72	Woods/grass comb., Good, HSG C
1.040	74	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0768	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0814	2.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	141	0.1014	2.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	704	Total			

Subcatchment EX-8: Subcat EX-8



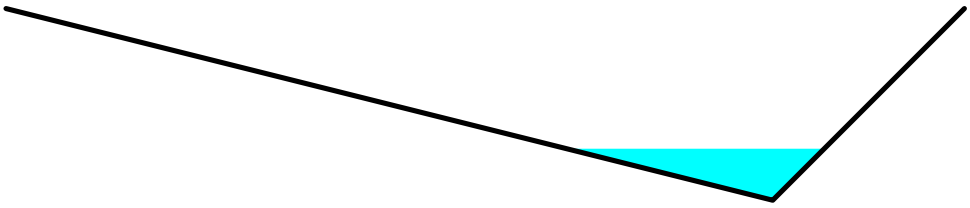
Summary for Reach 1R: Pillsbury Rd Swale

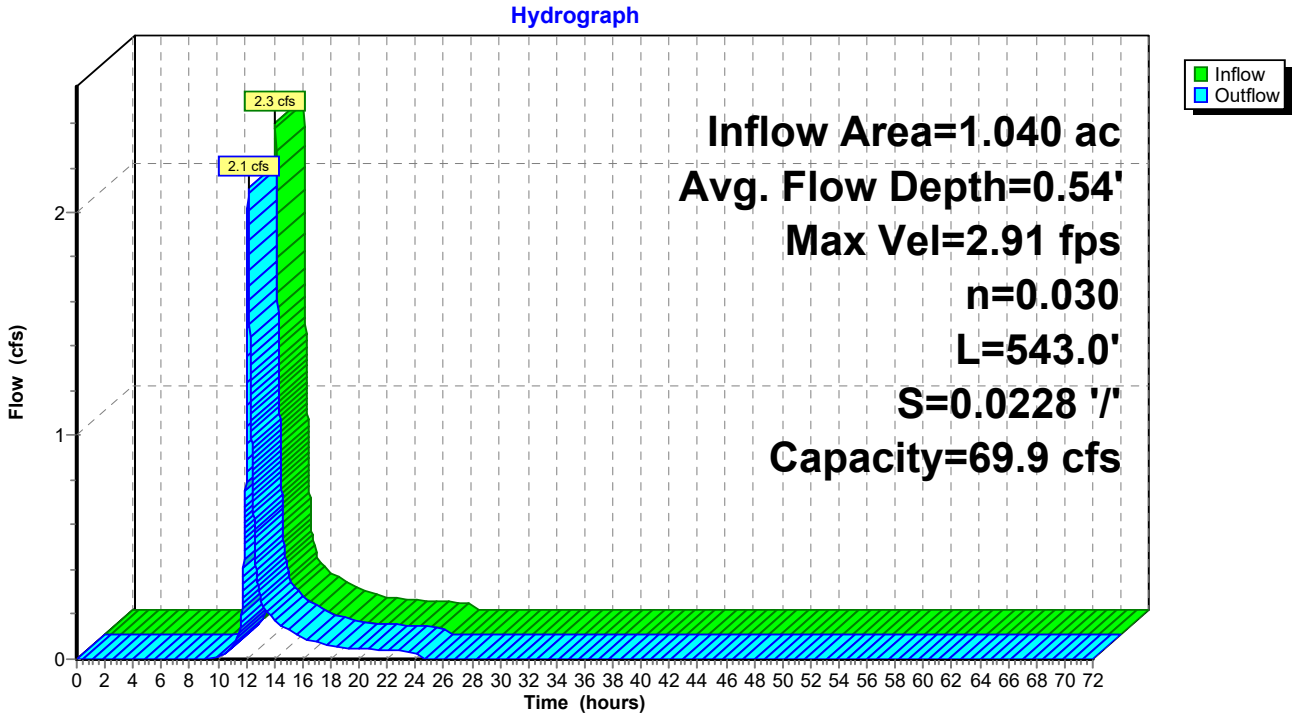
Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 1.94" for 10-YR event
Inflow = 2.3 cfs @ 12.10 hrs, Volume= 0.168 af
Outflow = 2.1 cfs @ 12.14 hrs, Volume= 0.168 af, Atten= 8%, Lag= 2.2 min
Routed to Link DP-4 : DP-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.91 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 7.6 min

Peak Storage= 392 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.54' , Surface Width= 2.69'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'





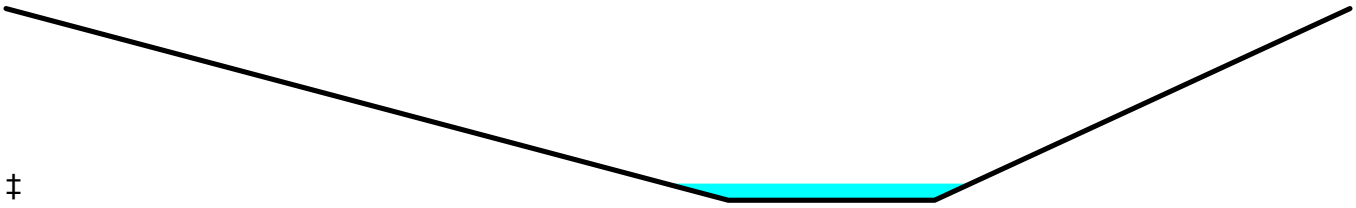
Summary for Reach 2R: Stream South

Inflow Area = 5.248 ac, 0.00% Impervious, Inflow Depth = 1.78" for 10-YR event
Inflow = 7.2 cfs @ 12.27 hrs, Volume= 0.778 af
Outflow = 7.2 cfs @ 12.29 hrs, Volume= 0.778 af, Atten= 0%, Lag= 0.7 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.78 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 2.7 min

Peak Storage= 435 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.30' , Surface Width= 5.91'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0588 '/'
Inlet Invert= 16.99', Outlet Invert= 0.00'



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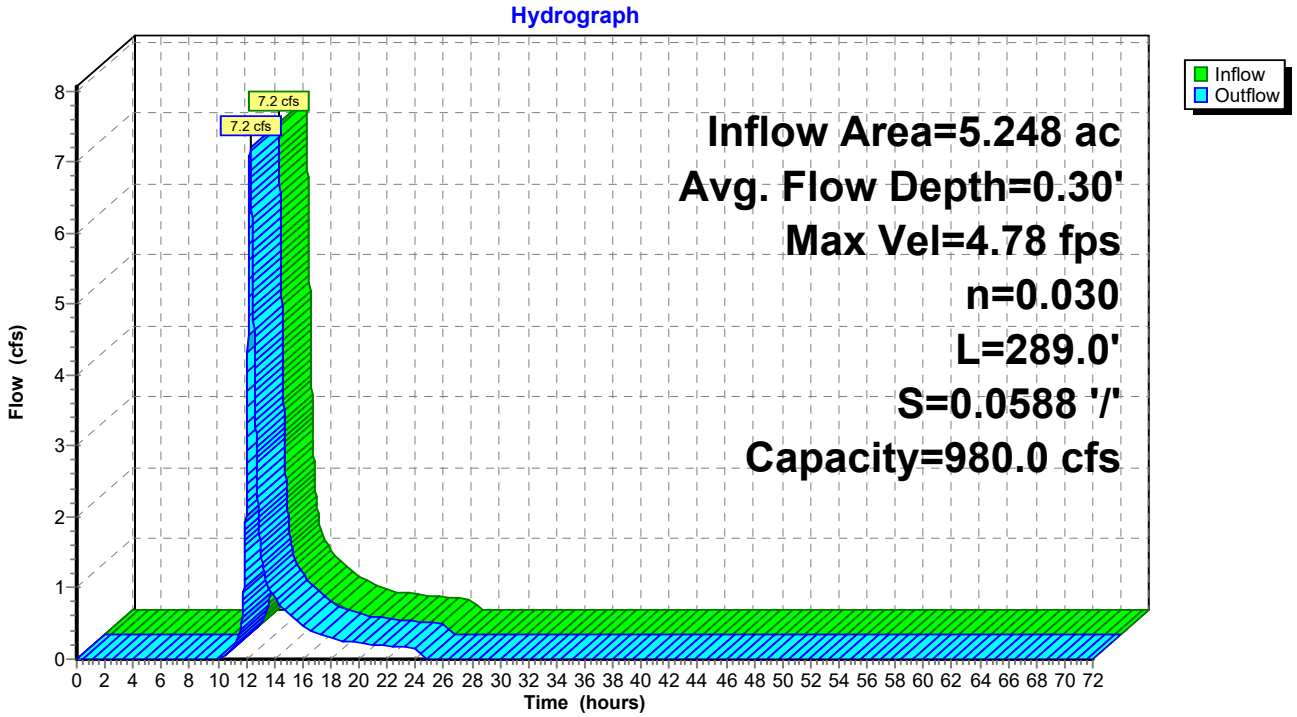


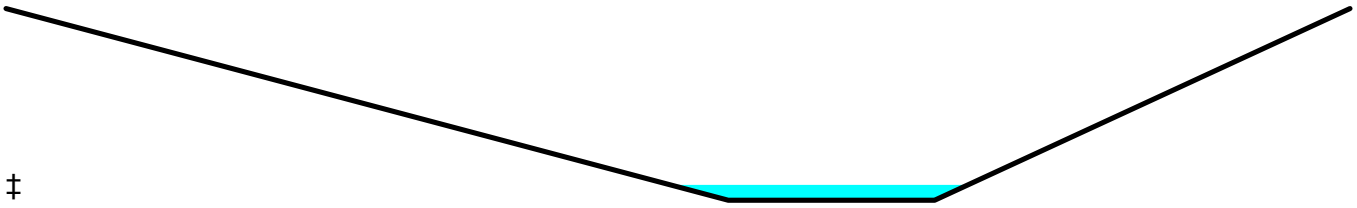
Summary for Reach 3R: Stream North

Inflow Area = 4.472 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 6.3 cfs @ 12.28 hrs, Volume= 0.667 af
Outflow = 6.3 cfs @ 12.29 hrs, Volume= 0.667 af, Atten= 0%, Lag= 0.7 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.57 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 3.1 min

Peak Storage= 434 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.28' , Surface Width= 5.77'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 316.0' Slope= 0.0588 '/'
Inlet Invert= 35.57', Outlet Invert= 16.99'



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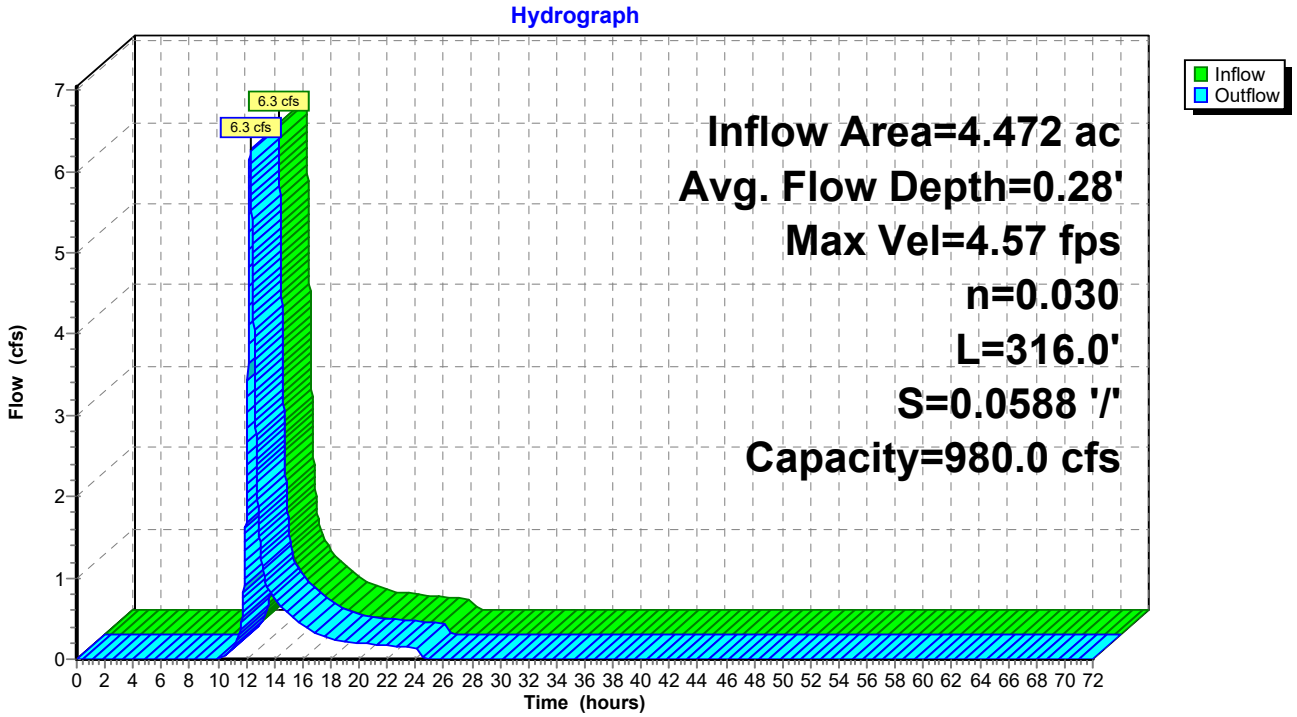
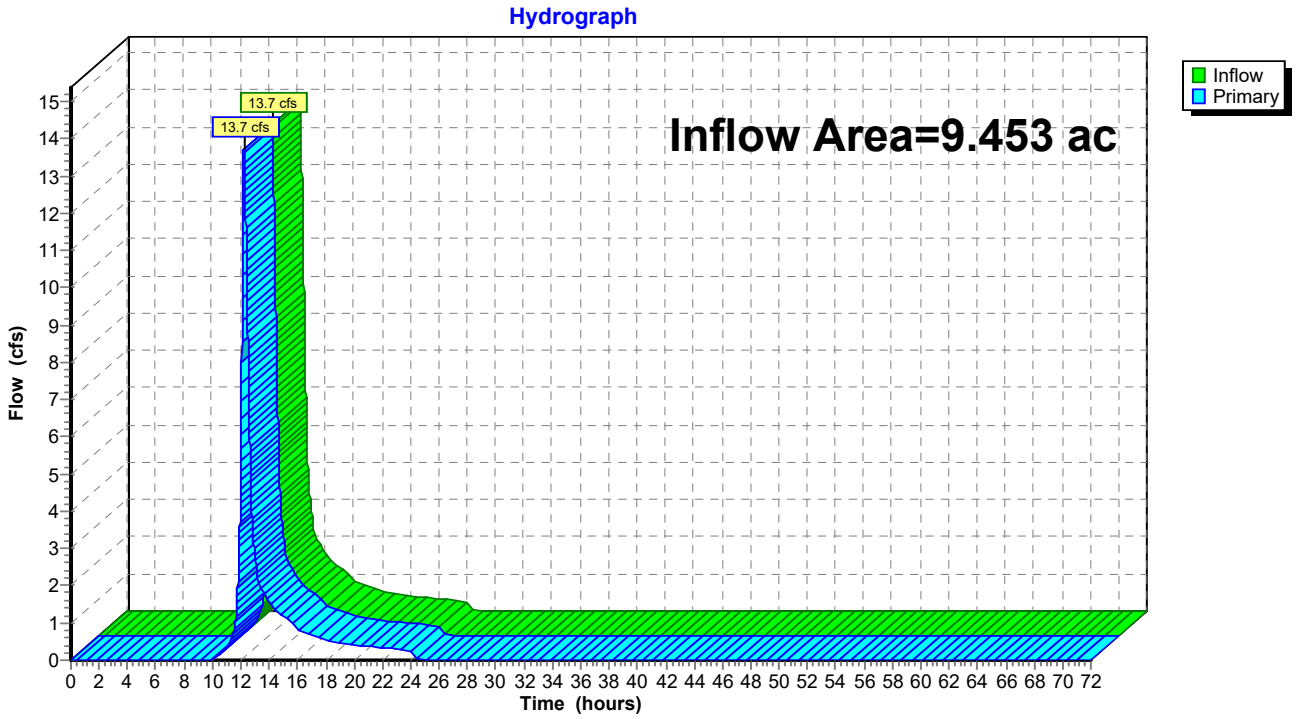


Summary for Link DP-1: DP-1

Inflow Area = 9.453 ac, 1.52% Impervious, Inflow Depth = 1.82" for 10-YR event
Inflow = 13.7 cfs @ 12.22 hrs, Volume= 1.432 af
Primary = 13.7 cfs @ 12.22 hrs, Volume= 1.432 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

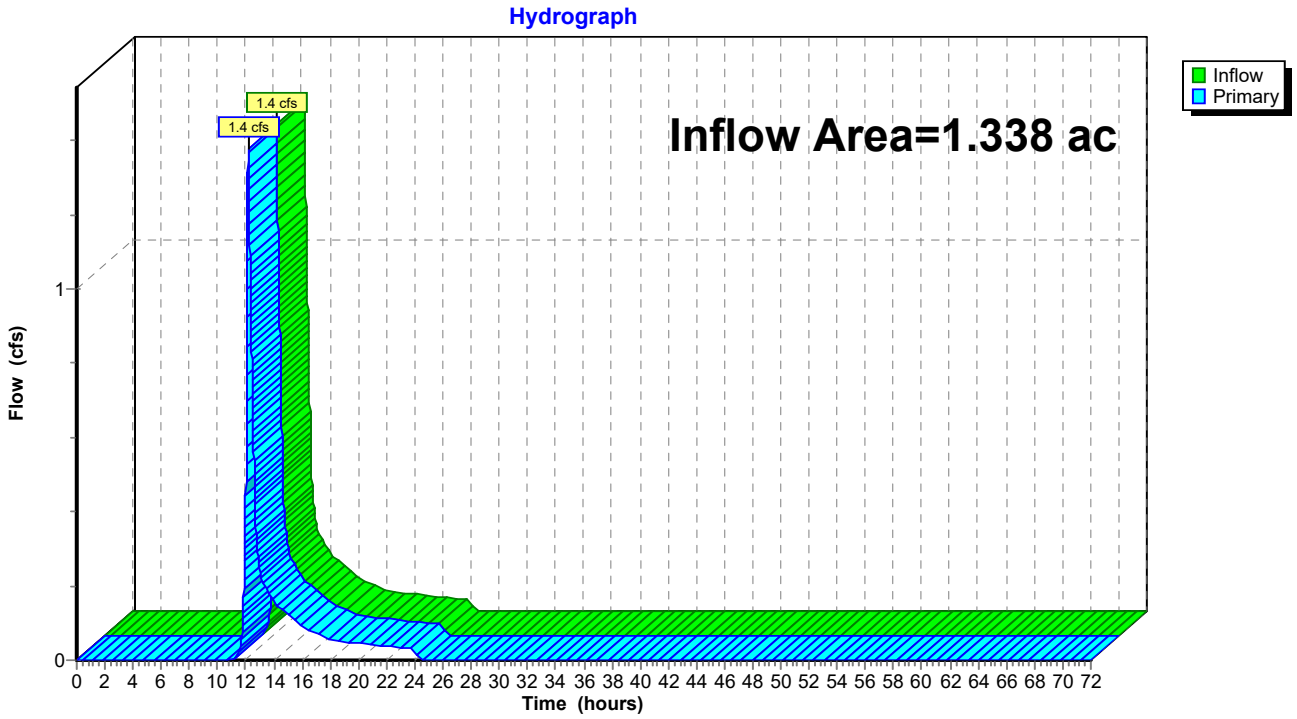


Summary for Link DP-2: DP-2

Inflow Area = 1.338 ac, 0.00% Impervious, Inflow Depth = 1.18" for 10-YR event
Inflow = 1.4 cfs @ 12.17 hrs, Volume= 0.131 af
Primary = 1.4 cfs @ 12.17 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

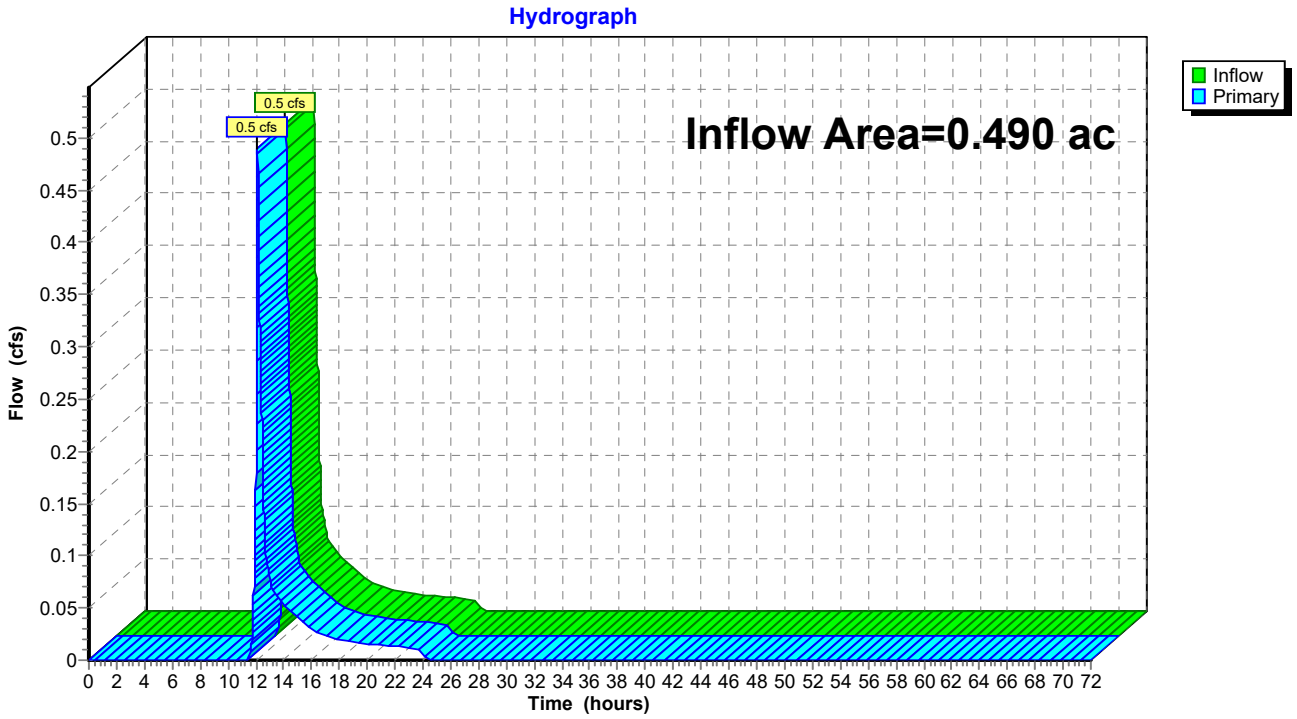


Summary for Link DP-3: DP-3

Inflow Area = 0.490 ac, 0.00% Impervious, Inflow Depth = 1.06" for 10-YR event
Inflow = 0.5 cfs @ 12.13 hrs, Volume= 0.043 af
Primary = 0.5 cfs @ 12.13 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3

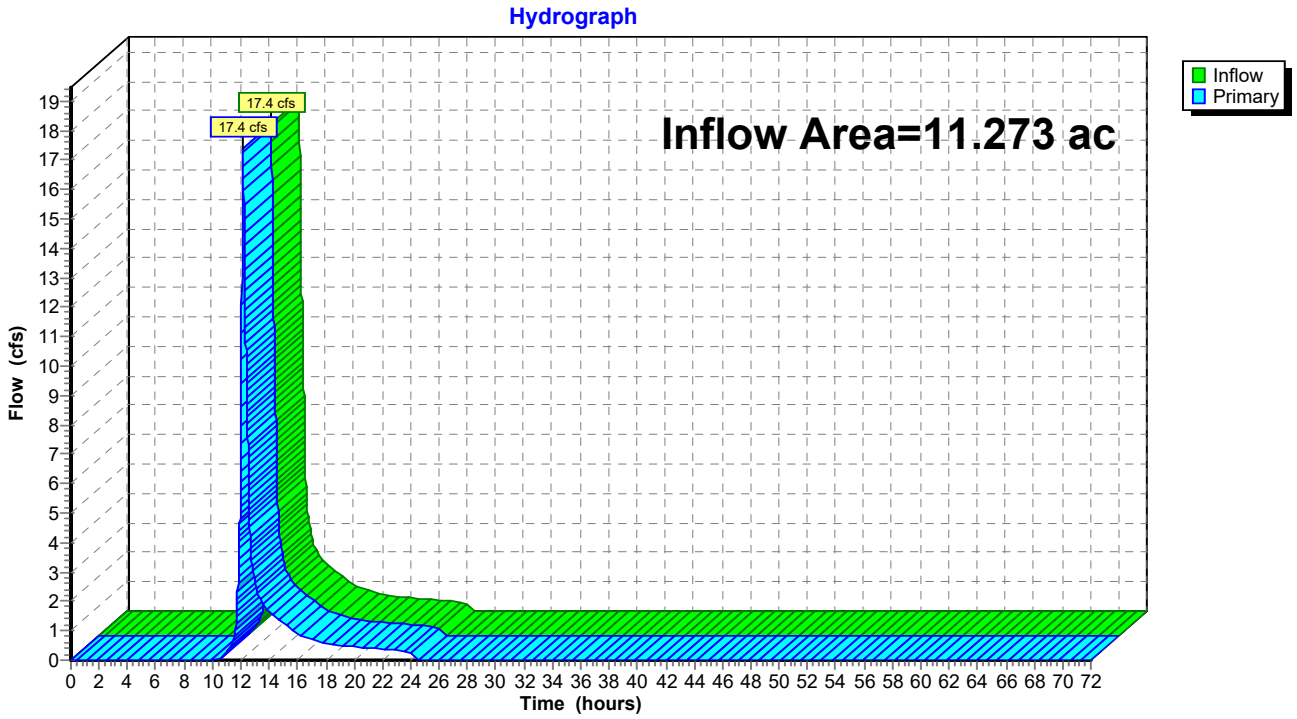


Summary for Link DP-4: DP-4

Inflow Area = 11.273 ac, 0.09% Impervious, Inflow Depth = 1.61" for 10-YR event
Inflow = 17.4 cfs @ 12.16 hrs, Volume= 1.511 af
Primary = 17.4 cfs @ 12.16 hrs, Volume= 1.511 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-4: DP-4

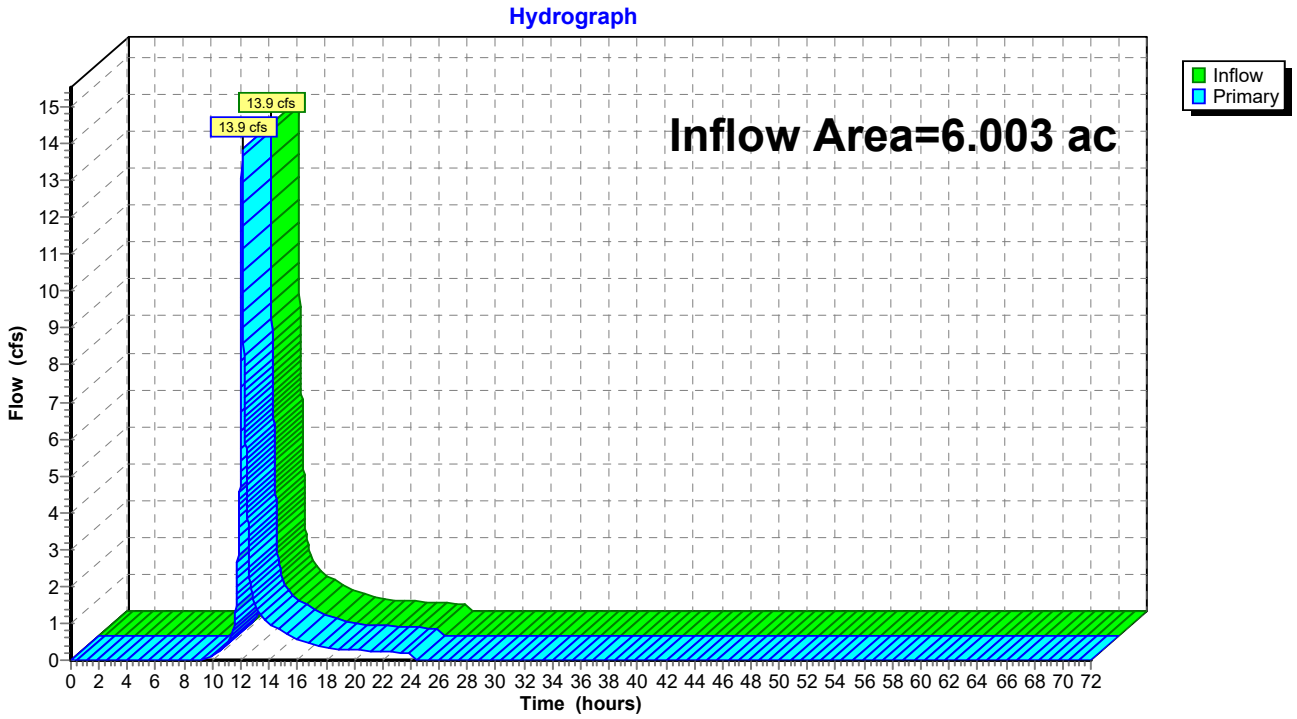


Summary for Link DP-5: DP-5

Inflow Area = 6.003 ac, 4.56% Impervious, Inflow Depth = 2.02" for 10-YR event
Inflow = 13.9 cfs @ 12.10 hrs, Volume= 1.010 af
Primary = 13.9 cfs @ 12.10 hrs, Volume= 1.010 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-5: DP-5



Summary for Subcatchment EX-1: Subcat EX-1

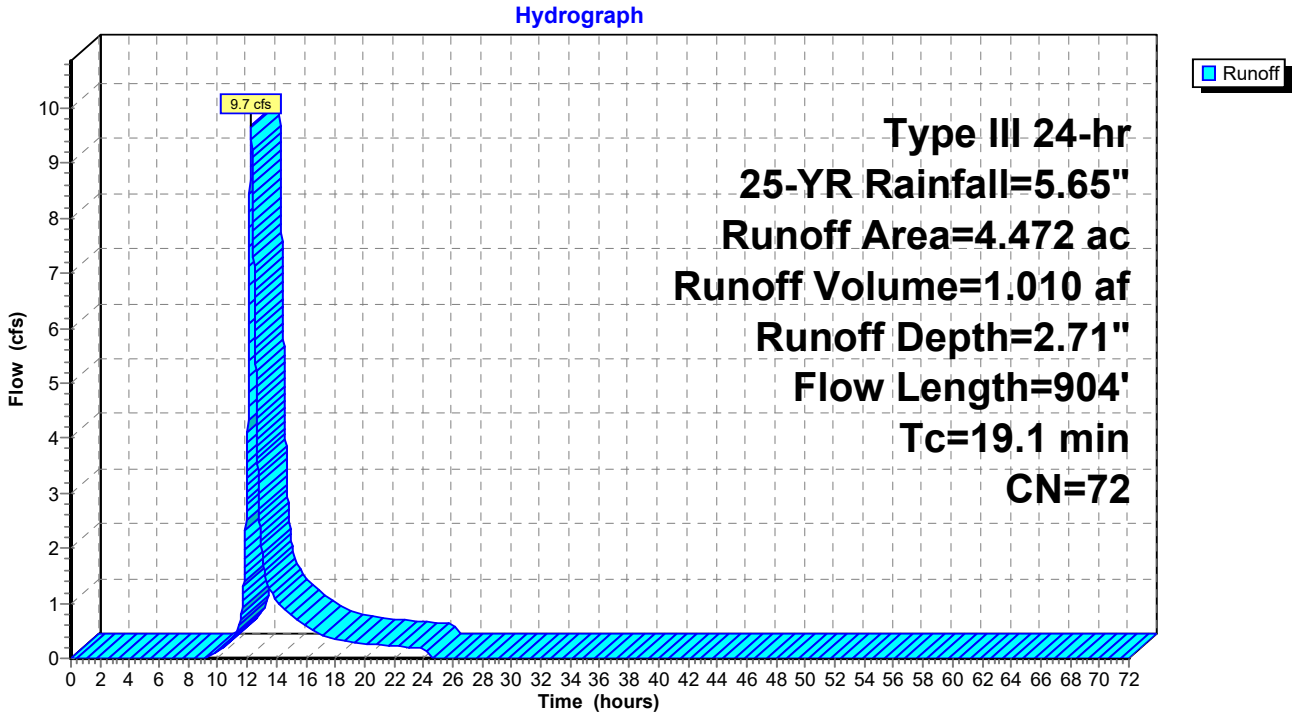
Runoff = 9.7 cfs @ 12.27 hrs, Volume= 1.010 af, Depth= 2.71"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.073	61	>75% Grass cover, Good, HSG B
1.670	74	>75% Grass cover, Good, HSG C
0.007	80	>75% Grass cover, Good, HSG D
0.024	55	Woods, Good, HSG B
0.513	70	Woods, Good, HSG C
0.172	77	Woods, Good, HSG D
0.026	58	Woods/grass comb., Good, HSG B
1.989	72	Woods/grass comb., Good, HSG C
4.472	72	Weighted Average
4.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0511	0.21		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
6.3	357	0.0183	0.95		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.4	162	0.0719	1.88		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
7.4	335	0.0229	0.76		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
19.1	904	Total			

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

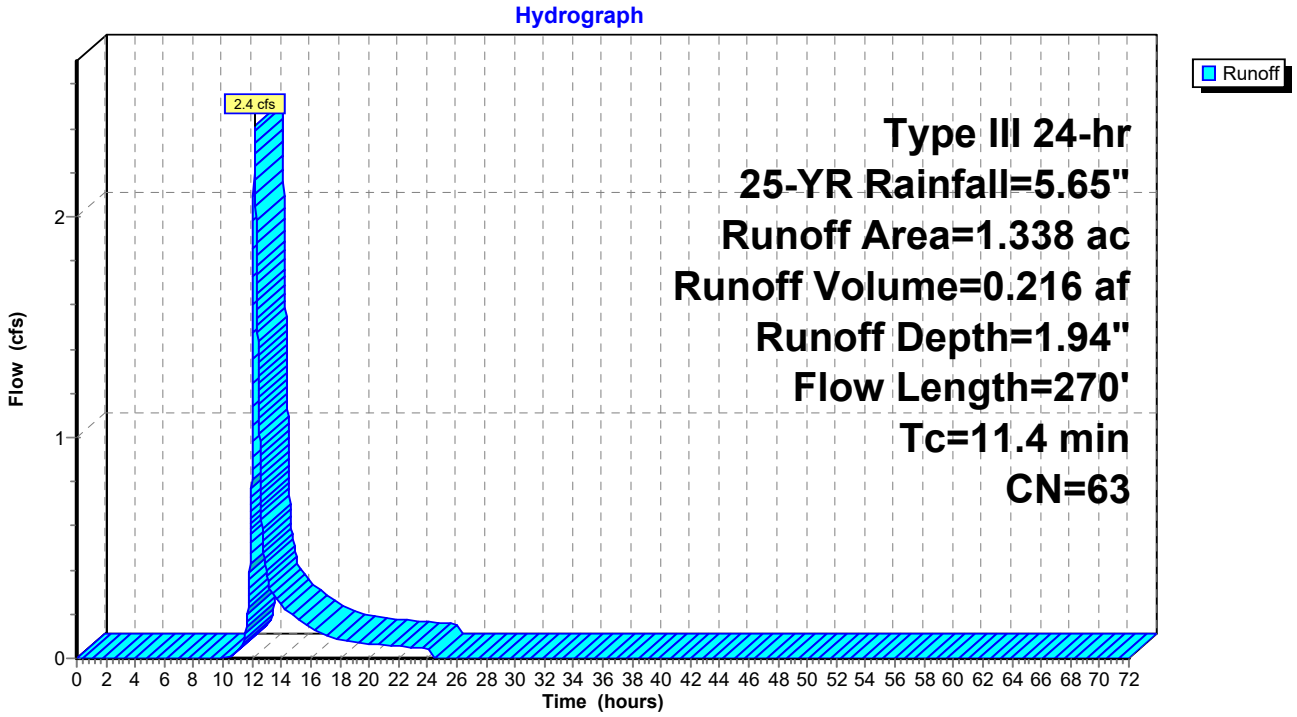
Runoff = 2.4 cfs @ 12.17 hrs, Volume= 0.216 af, Depth= 1.94"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.406	61	>75% Grass cover, Good, HSG B
0.012	74	>75% Grass cover, Good, HSG C
0.308	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.191	58	Woods/grass comb., Good, HSG B
0.410	72	Woods/grass comb., Good, HSG C
1.338	63	Weighted Average
1.338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0236	0.15		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.8	50	0.0236	1.08		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.2	87	0.0285	1.18		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
3.9	83	0.0050	0.35		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
11.4	270	Total			

Subcatchment EX-2: Subcat EX-2



Summary for Subcatchment EX-3: Subcat EX-3

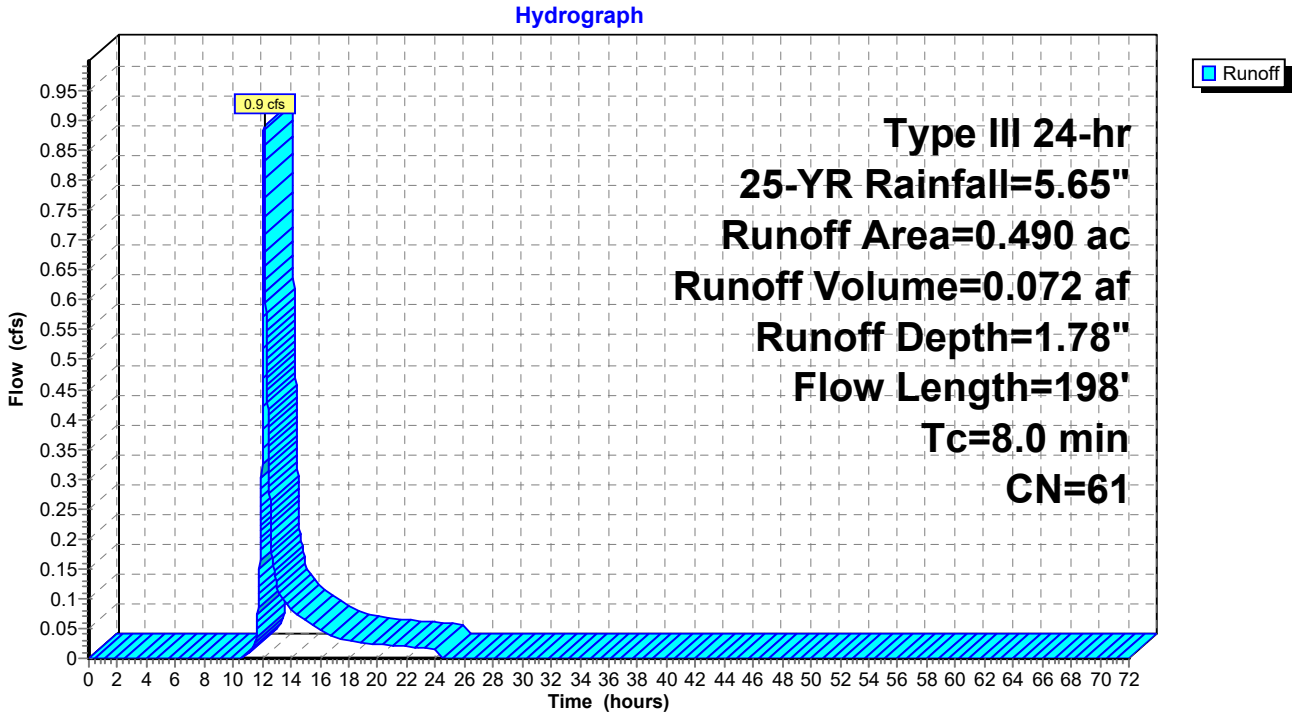
Runoff = 0.9 cfs @ 12.12 hrs, Volume= 0.072 af, Depth= 1.78"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.085	61	>75% Grass cover, Good, HSG B
0.142	55	Woods, Good, HSG B
0.129	58	Woods/grass comb., Good, HSG B
0.133	72	Woods/grass comb., Good, HSG C
0.490	61	Weighted Average
0.490		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0295	0.17		**Sheet Flow, Sheet Flow Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.9	84	0.0505	1.57		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.2	13	0.0180	0.94		**Shallow Concentrated Flow, Shallow Concentrated Gress** Short Grass Pasture Kv= 7.0 fps
1.9	51	0.0080	0.45		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
8.0	198	Total			

Subcatchment EX-3: Subcat EX-3



Summary for Subcatchment EX-4: Subcat EX-4

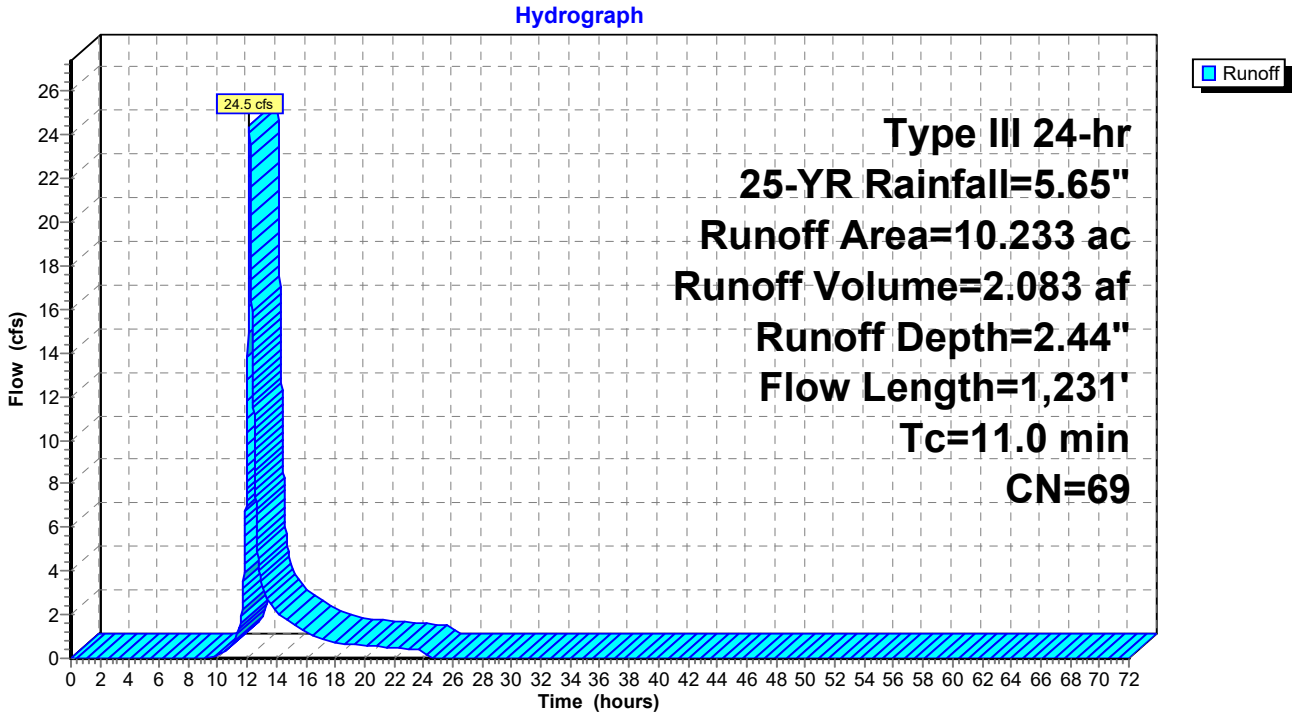
Runoff = 24.5 cfs @ 12.16 hrs, Volume= 2.083 af, Depth= 2.44"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.812	61	>75% Grass cover, Good, HSG B
1.755	74	>75% Grass cover, Good, HSG C
0.008	80	>75% Grass cover, Good, HSG D
0.010	98	Roofs, HSG C
0.255	55	Woods, Good, HSG B
2.954	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
0.956	58	Woods/grass comb., Good, HSG B
2.987	72	Woods/grass comb., Good, HSG C
10.233	69	Weighted Average
10.223		99.91% Pervious Area
0.010		0.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0502	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	202	0.0731	1.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	243	0.0862	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
11.0	1,231	Total			

Subcatchment EX-4: Subcat EX-4



Summary for Subcatchment EX-5: Subcat EX-5

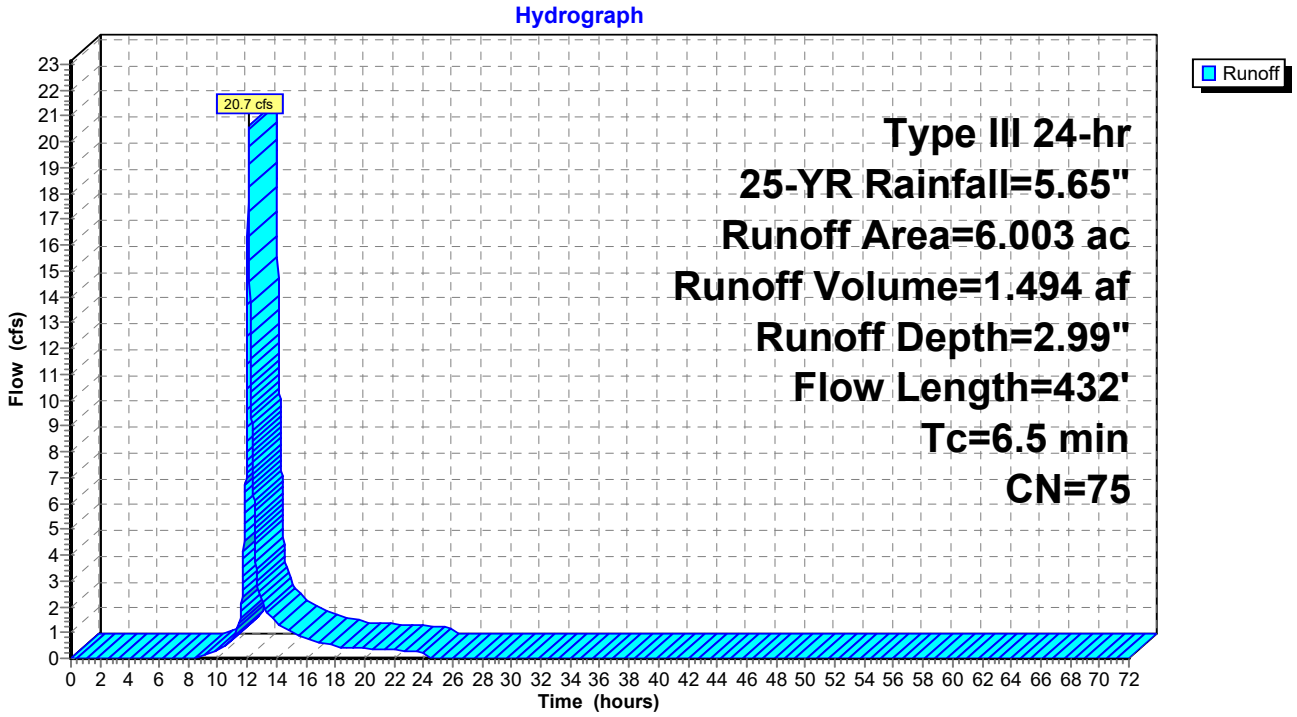
Runoff = 20.7 cfs @ 12.10 hrs, Volume= 1.494 af, Depth= 2.99"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
2.532	74	>75% Grass cover, Good, HSG C
0.029	80	>75% Grass cover, Good, HSG D
0.192	89	Gravel roads, HSG C
0.186	91	Gravel roads, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
1.160	70	Woods, Good, HSG C
0.001	77	Woods, Good, HSG D
1.630	72	Woods/grass comb., Good, HSG C
6.003	75	Weighted Average
5.730		95.44% Pervious Area
0.274		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0710	0.24		**Sheet Flow, Sheet Flow Grass/Woods** Grass: Short n= 0.150 P2= 2.95"
0.2	21	0.0571	1.67		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.8	97	0.0766	1.94		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.7	95	0.1039	2.26		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.3	45	0.0981	2.19		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.4	46	0.0956	2.16		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.6	78	0.0857	2.05		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
6.5	432	Total			

Subcatchment EX-5: Subcat EX-5



Summary for Subcatchment EX-6: Subcat EX-6

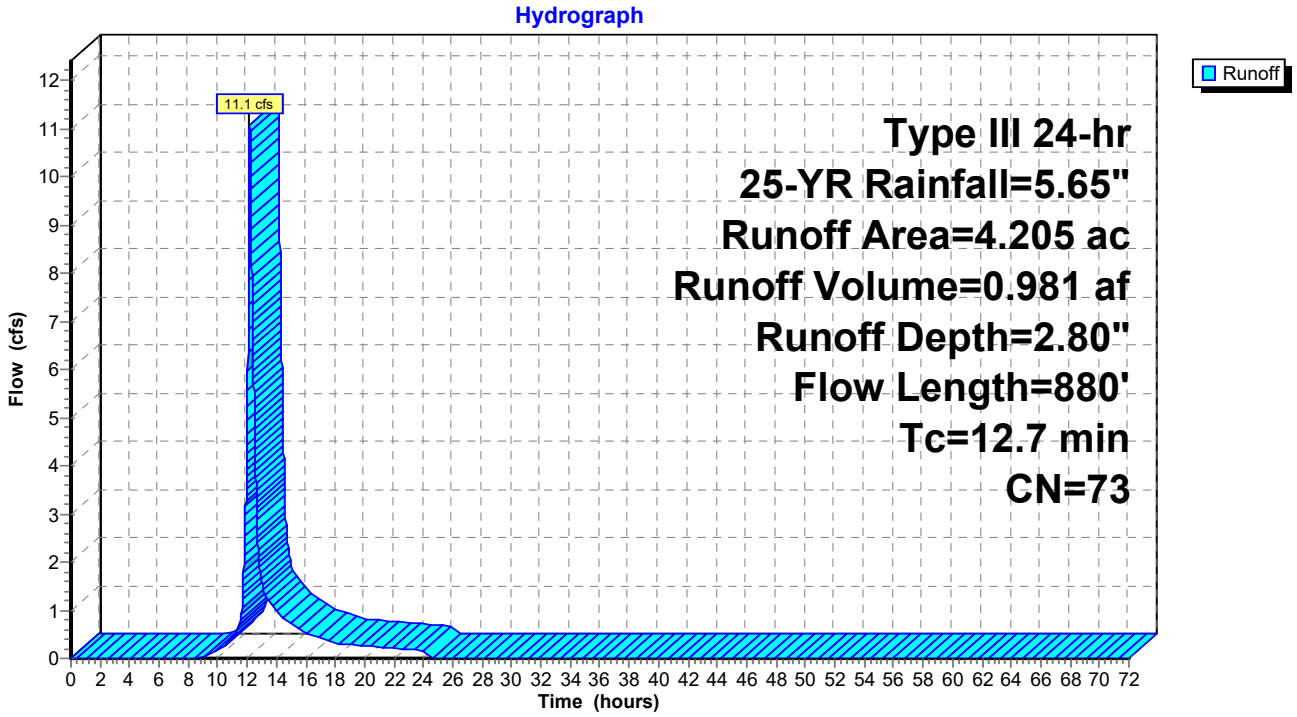
Runoff = 11.1 cfs @ 12.18 hrs, Volume= 0.981 af, Depth= 2.80"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
1.452	74	>75% Grass cover, Good, HSG C
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.419	70	Woods, Good, HSG C
0.065	77	Woods, Good, HSG D
0.125	72	Woods/grass comb., Good, HSG C
4.205	73	Weighted Average
4.061		96.57% Pervious Area
0.144		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0862	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.4	149	0.0627	1.75		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	212	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0449	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1063	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	55	0.0682	1.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.7	880	Total			

Subcatchment EX-6: Subcat EX-6



Summary for Subcatchment EX-7: Subcat EX-7

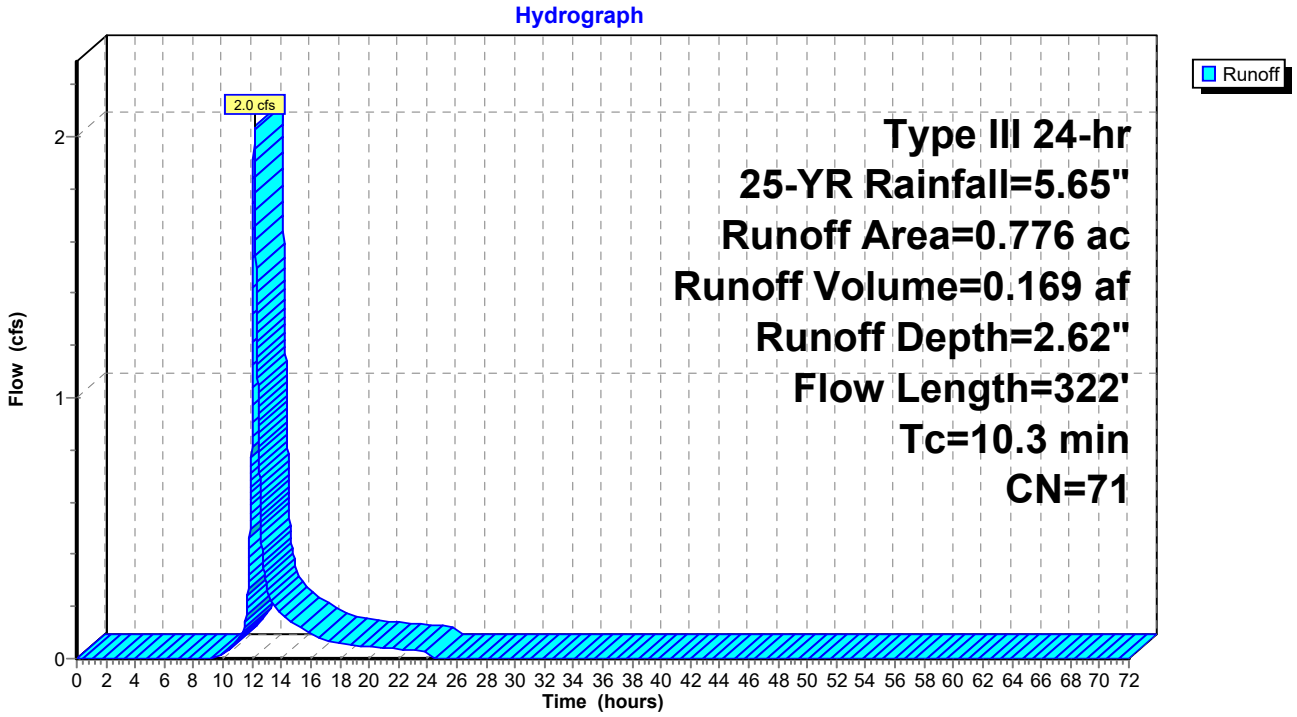
Runoff = 2.0 cfs @ 12.15 hrs, Volume= 0.169 af, Depth= 2.62"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.633	70	Woods, Good, HSG C
0.143	77	Woods, Good, HSG D
0.776	71	Weighted Average
0.776		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment EX-7: Subcat EX-7



Summary for Subcatchment EX-8: Subcat EX-8

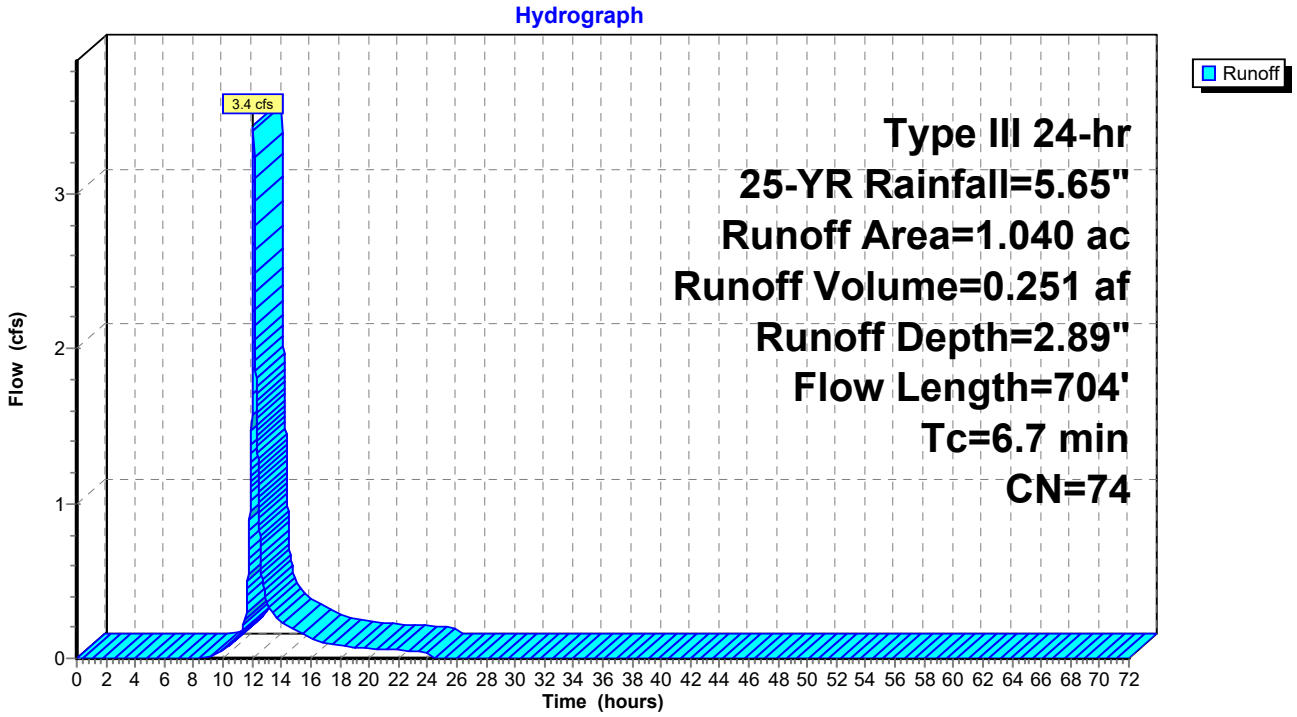
Runoff = 3.4 cfs @ 12.10 hrs, Volume= 0.251 af, Depth= 2.89"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.578	74	>75% Grass cover, Good, HSG C
0.103	80	>75% Grass cover, Good, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
0.277	72	Woods/grass comb., Good, HSG C
1.040	74	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0768	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0814	2.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	141	0.1014	2.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	704	Total			

Subcatchment EX-8: Subcat EX-8



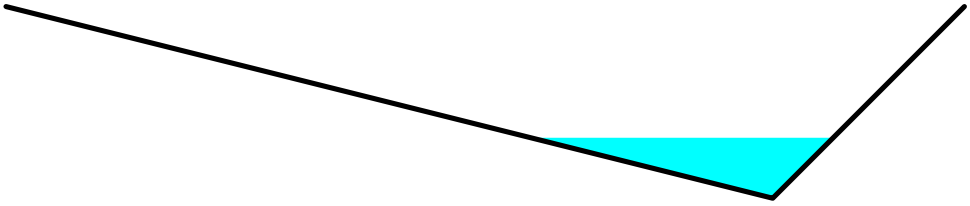
Summary for Reach 1R: Pillsbury Rd Swale

Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 2.89" for 25-YR event
Inflow = 3.4 cfs @ 12.10 hrs, Volume= 0.251 af
Outflow = 3.2 cfs @ 12.13 hrs, Volume= 0.251 af, Atten= 7%, Lag= 2.0 min
Routed to Link DP-4 : DP-4

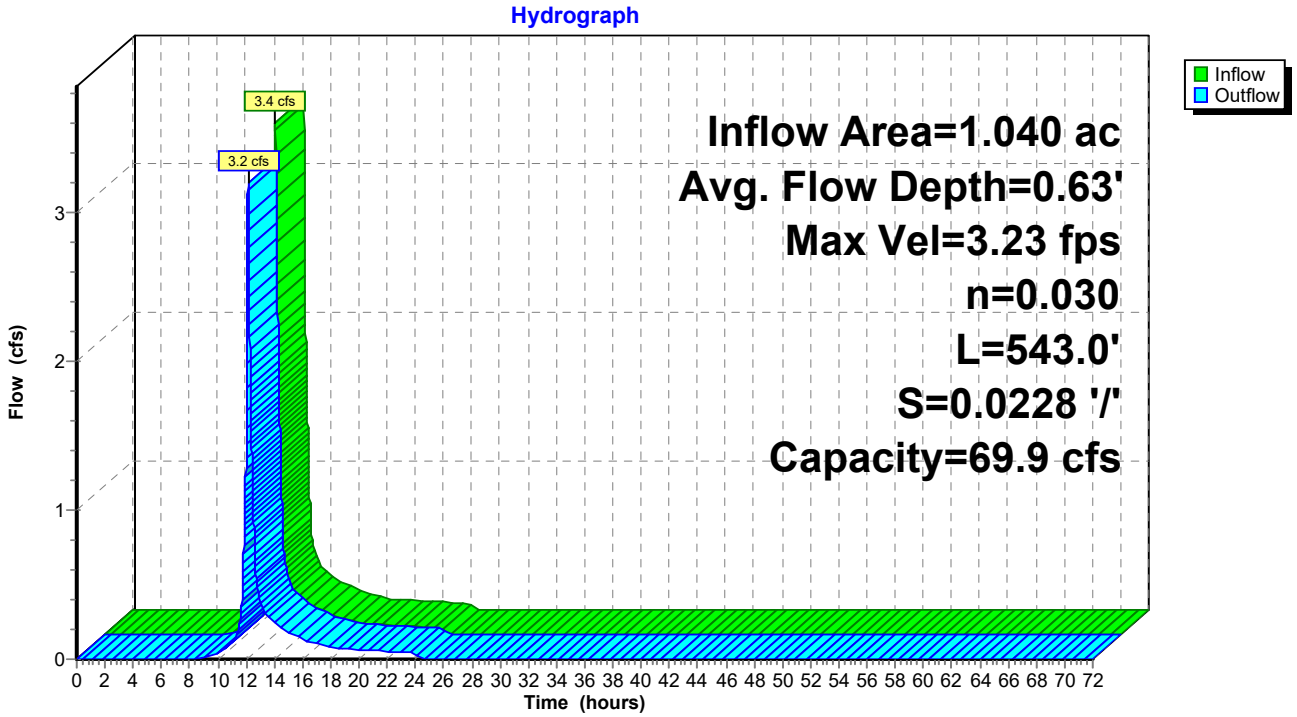
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.23 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 7.1 min

Peak Storage= 539 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.63' , Surface Width= 3.15'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'



Reach 1R: Pillsbury Rd Swale



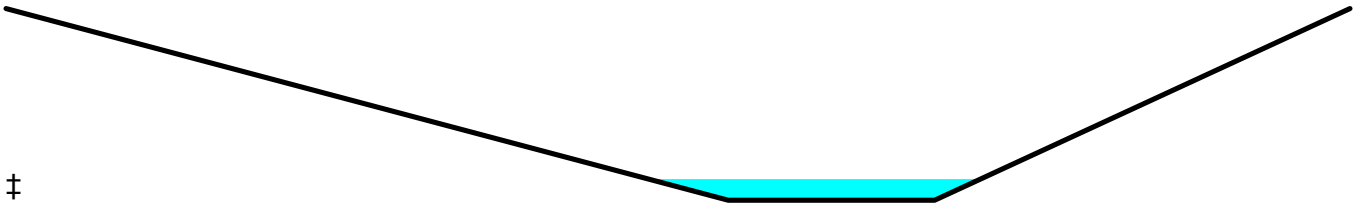
Summary for Reach 2R: Stream South

Inflow Area = 5.248 ac, 0.00% Impervious, Inflow Depth = 2.70" for 25-YR event
Inflow = 11.1 cfs @ 12.26 hrs, Volume= 1.179 af
Outflow = 11.1 cfs @ 12.27 hrs, Volume= 1.179 af, Atten= 0%, Lag= 0.7 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.48 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 2.4 min

Peak Storage= 585 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 6.44'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0588 '/'
Inlet Invert= 16.99', Outlet Invert= 0.00'



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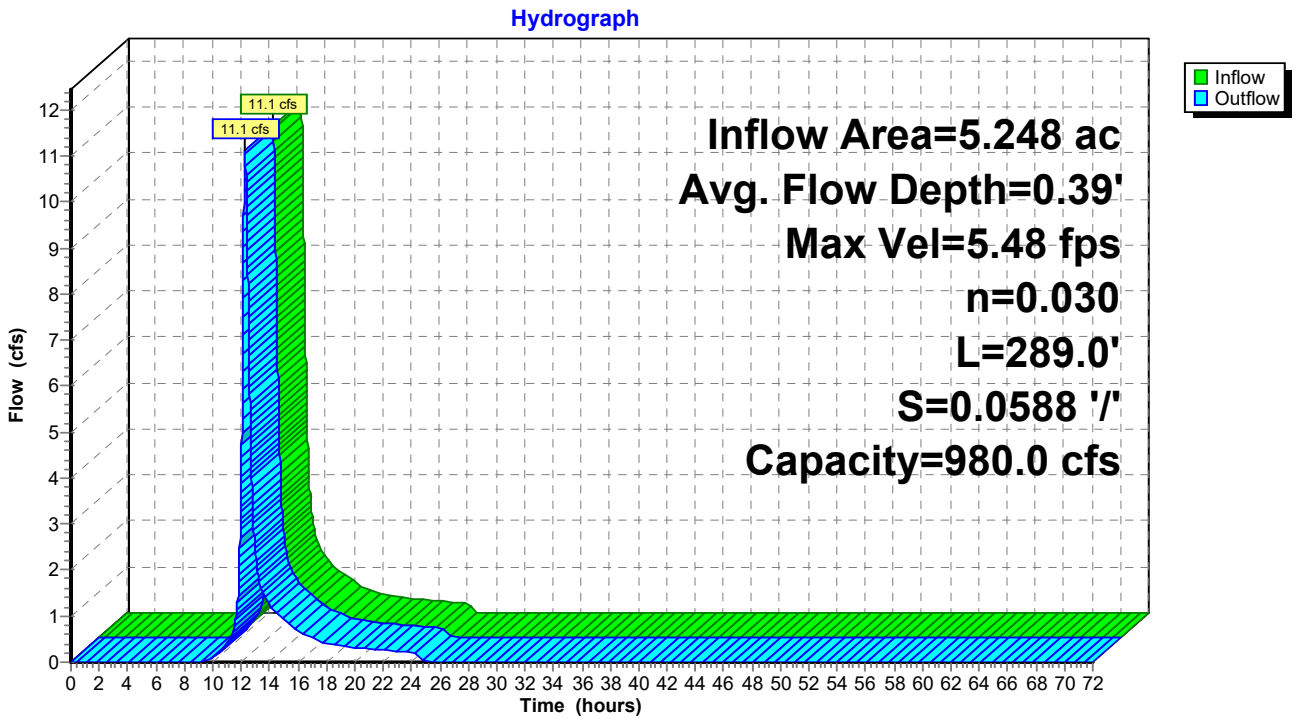


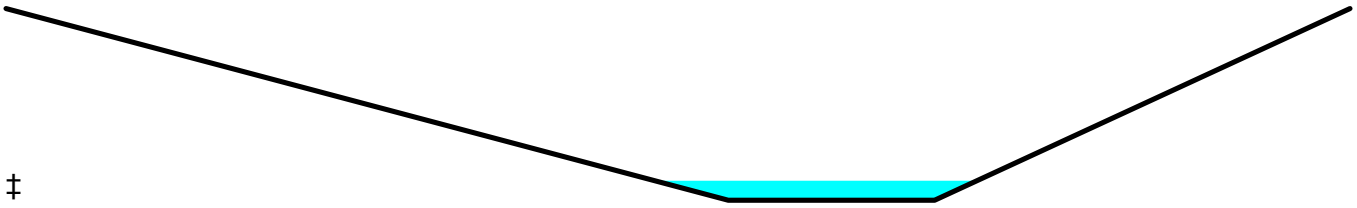
Summary for Reach 3R: Stream North

Inflow Area = 4.472 ac, 0.00% Impervious, Inflow Depth = 2.71" for 25-YR event
Inflow = 9.7 cfs @ 12.27 hrs, Volume= 1.010 af
Outflow = 9.7 cfs @ 12.28 hrs, Volume= 1.010 af, Atten= 0%, Lag= 0.7 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.25 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 2.8 min

Peak Storage= 582 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.36' , Surface Width= 6.26'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 316.0' Slope= 0.0588 '/'
Inlet Invert= 35.57', Outlet Invert= 16.99'



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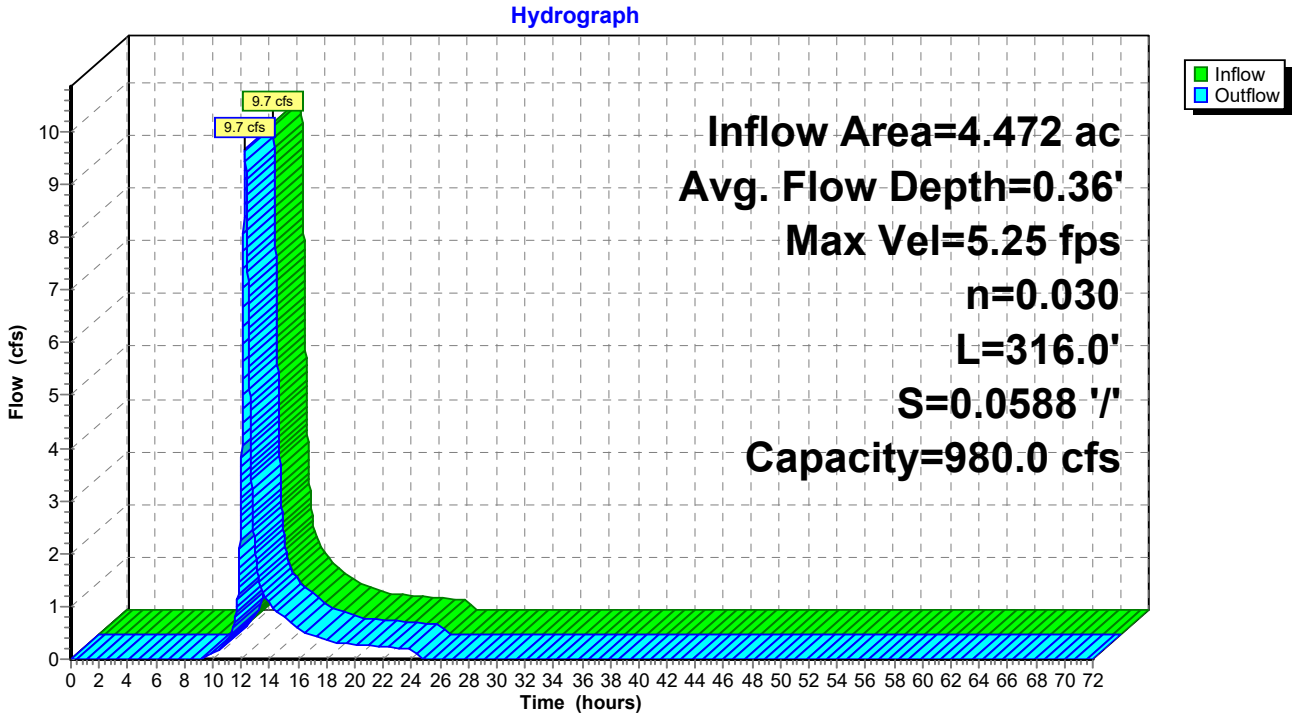
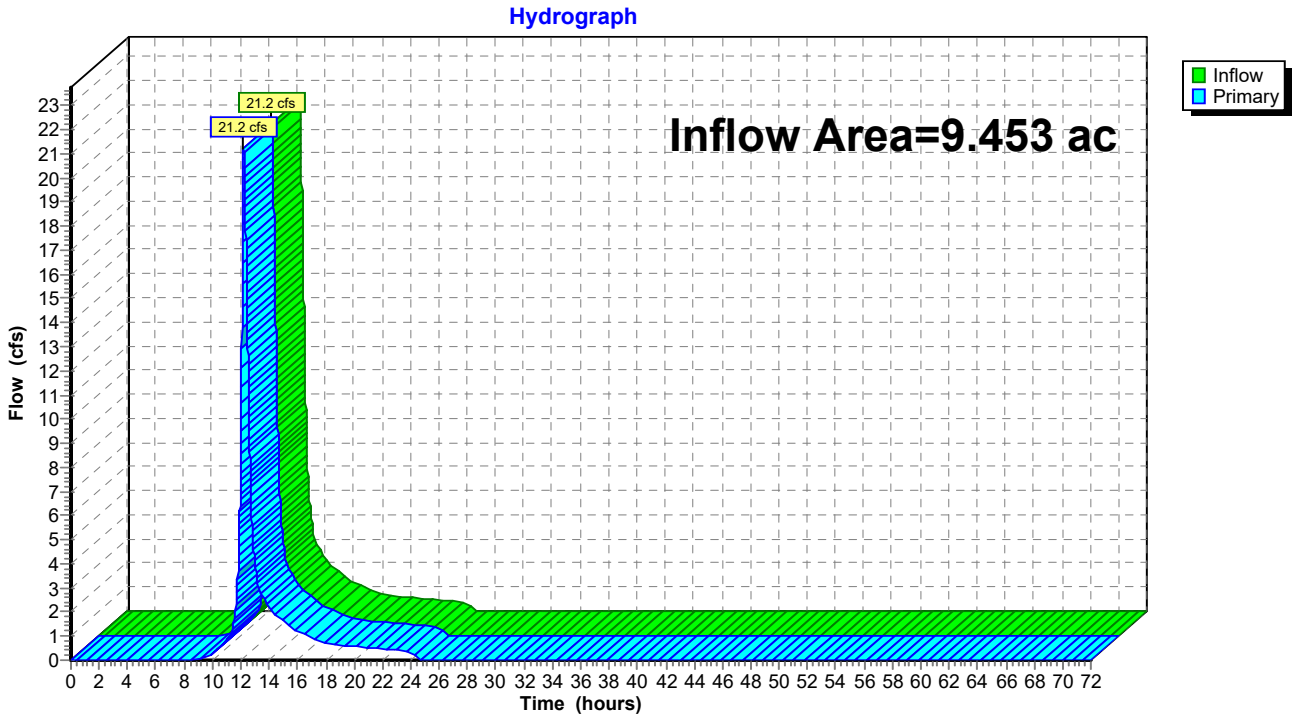


Summary for Link DP-1: DP-1

Inflow Area = 9.453 ac, 1.52% Impervious, Inflow Depth = 2.74" for 25-YR event
Inflow = 21.2 cfs @ 12.21 hrs, Volume= 2.161 af
Primary = 21.2 cfs @ 12.21 hrs, Volume= 2.161 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

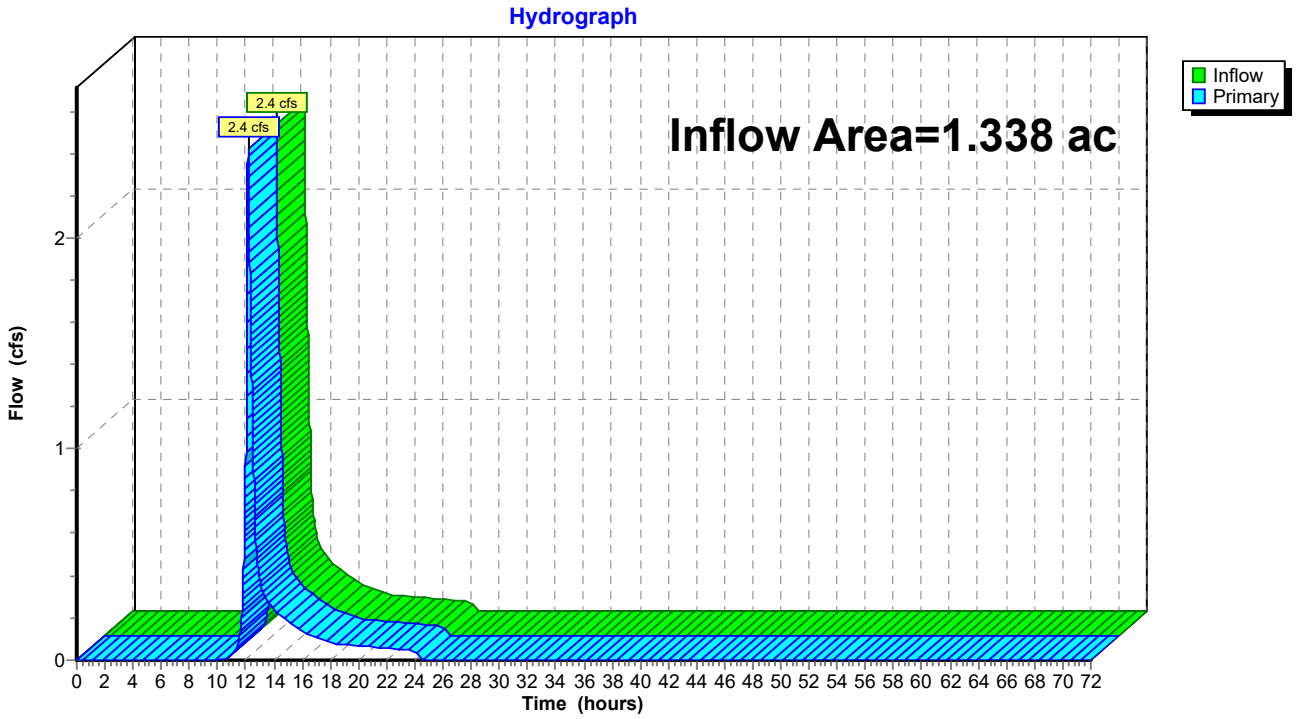


Summary for Link DP-2: DP-2

Inflow Area = 1.338 ac, 0.00% Impervious, Inflow Depth = 1.94" for 25-YR event
Inflow = 2.4 cfs @ 12.17 hrs, Volume= 0.216 af
Primary = 2.4 cfs @ 12.17 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

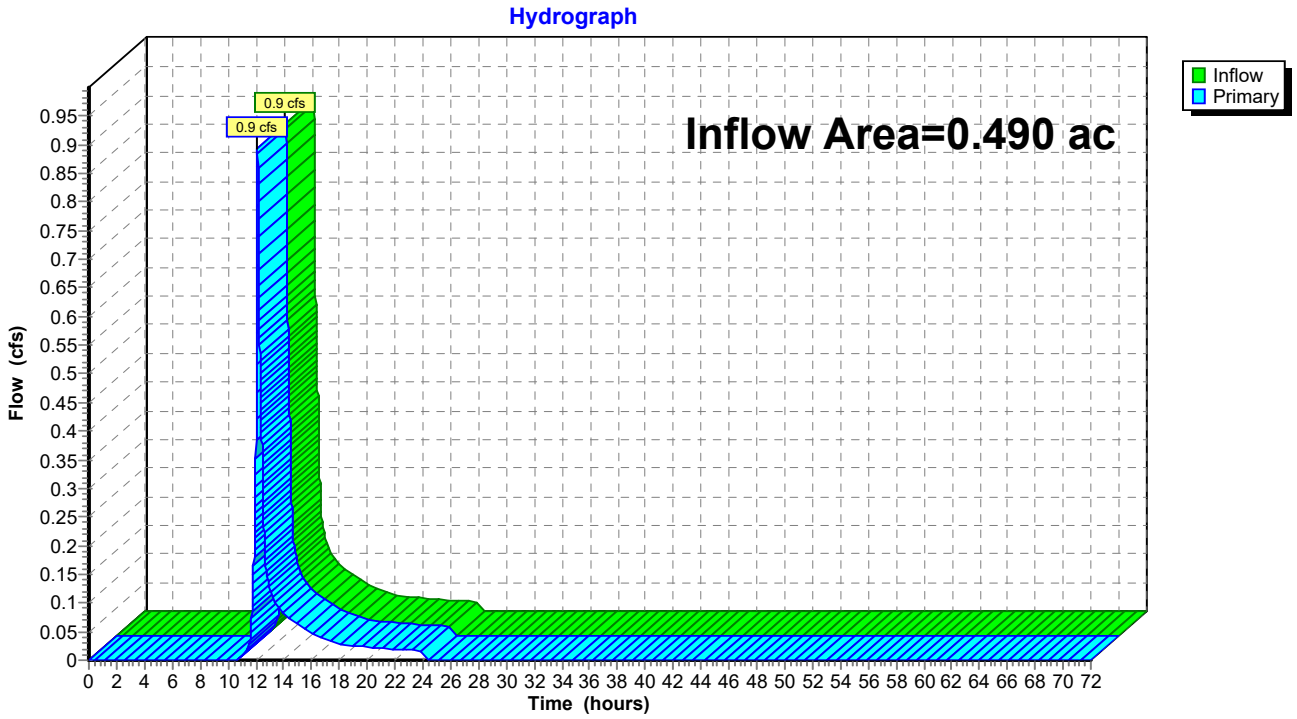


Summary for Link DP-3: DP-3

Inflow Area = 0.490 ac, 0.00% Impervious, Inflow Depth = 1.78" for 25-YR event
Inflow = 0.9 cfs @ 12.12 hrs, Volume= 0.072 af
Primary = 0.9 cfs @ 12.12 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3

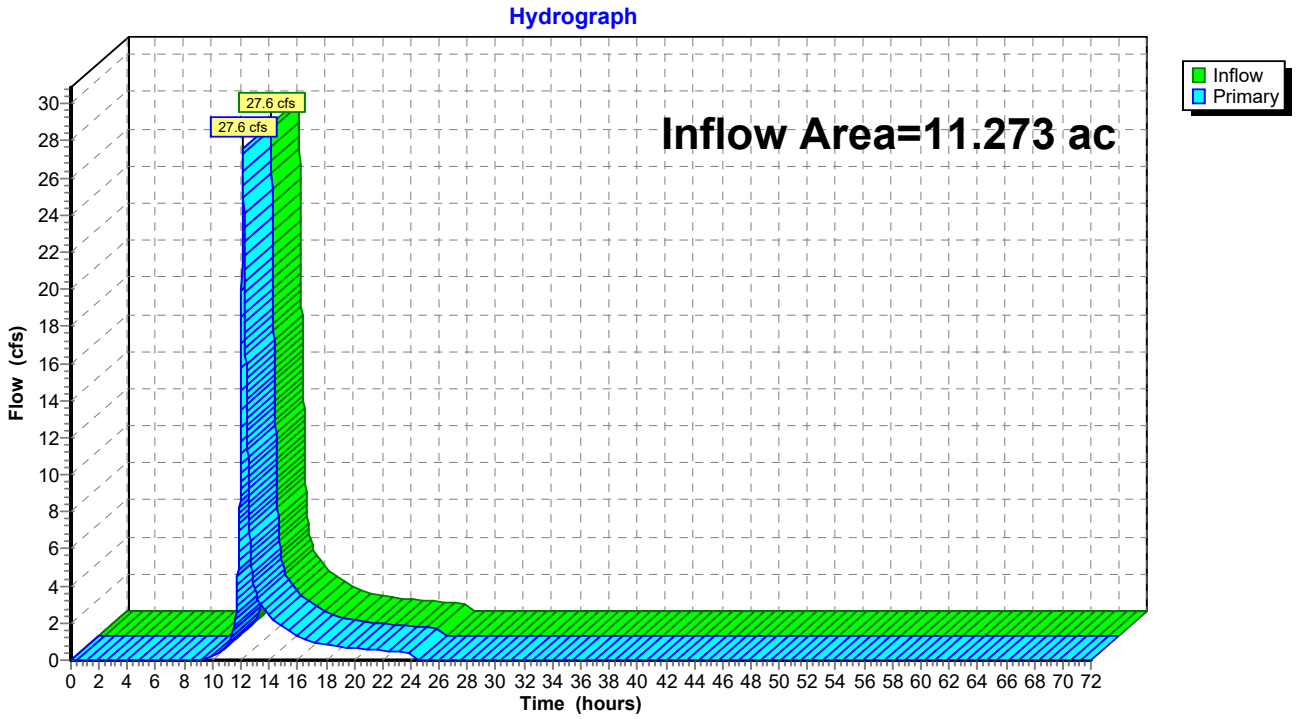


Summary for Link DP-4: DP-4

Inflow Area = 11.273 ac, 0.09% Impervious, Inflow Depth = 2.48" for 25-YR event
Inflow = 27.6 cfs @ 12.16 hrs, Volume= 2.333 af
Primary = 27.6 cfs @ 12.16 hrs, Volume= 2.333 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-4: DP-4

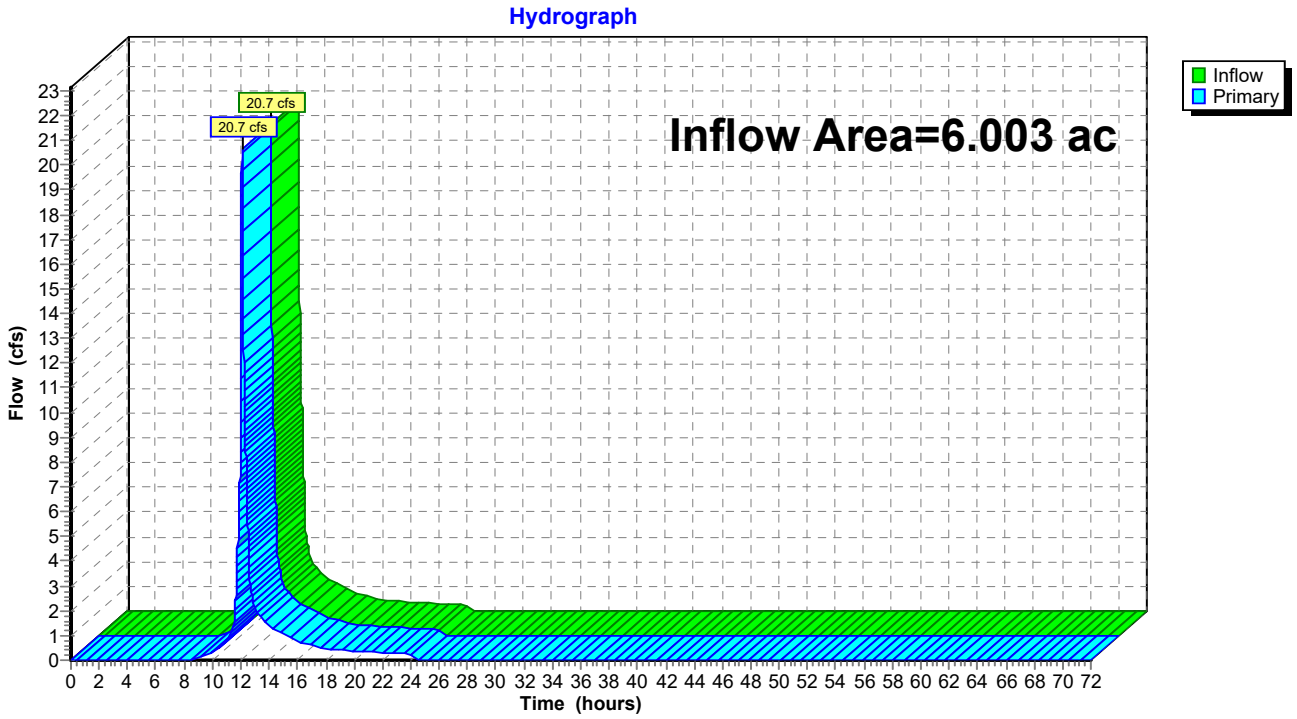


Summary for Link DP-5: DP-5

Inflow Area = 6.003 ac, 4.56% Impervious, Inflow Depth = 2.99" for 25-YR event
Inflow = 20.7 cfs @ 12.10 hrs, Volume= 1.494 af
Primary = 20.7 cfs @ 12.10 hrs, Volume= 1.494 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-5: DP-5



Summary for Subcatchment EX-1: Subcat EX-1

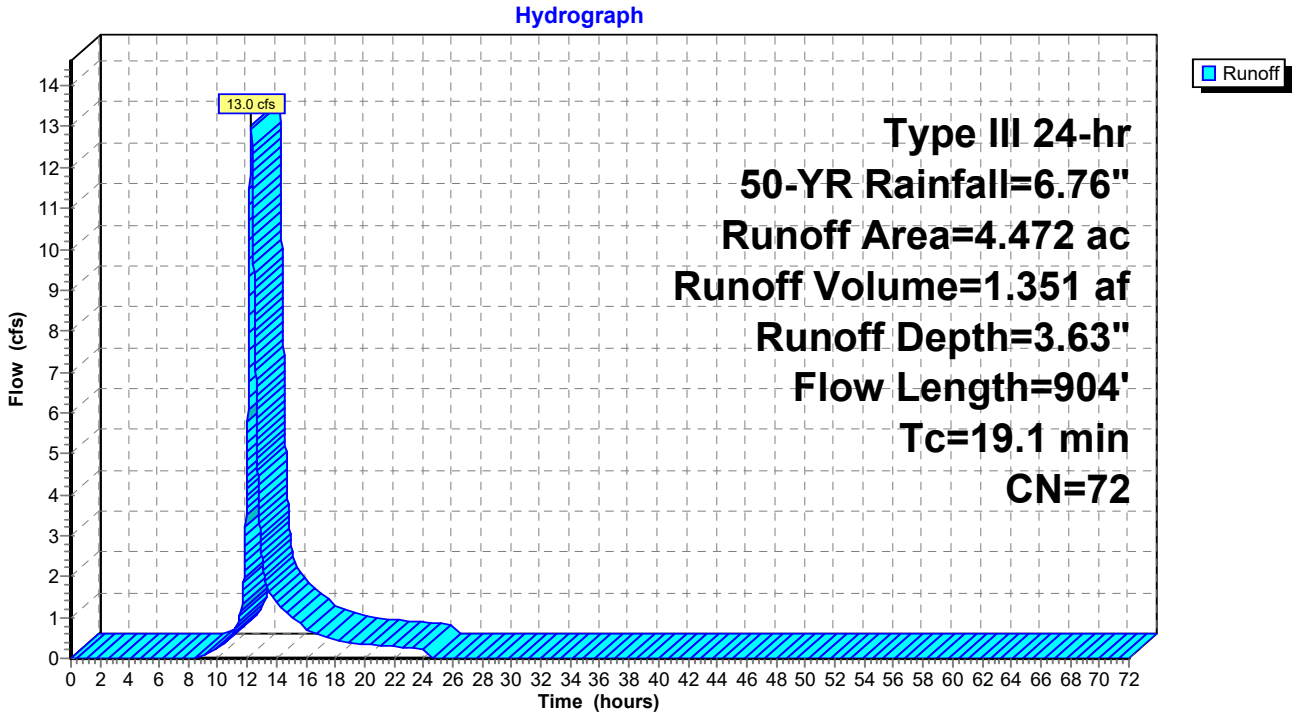
Runoff = 13.0 cfs @ 12.26 hrs, Volume= 1.351 af, Depth= 3.63"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.073	61	>75% Grass cover, Good, HSG B
1.670	74	>75% Grass cover, Good, HSG C
0.007	80	>75% Grass cover, Good, HSG D
0.024	55	Woods, Good, HSG B
0.513	70	Woods, Good, HSG C
0.172	77	Woods, Good, HSG D
0.026	58	Woods/grass comb., Good, HSG B
1.989	72	Woods/grass comb., Good, HSG C
4.472	72	Weighted Average
4.472		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0511	0.21		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
6.3	357	0.0183	0.95		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.4	162	0.0719	1.88		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
7.4	335	0.0229	0.76		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
19.1	904	Total			

Subcatchment EX-1: Subcat EX-1



Summary for Subcatchment EX-2: Subcat EX-2

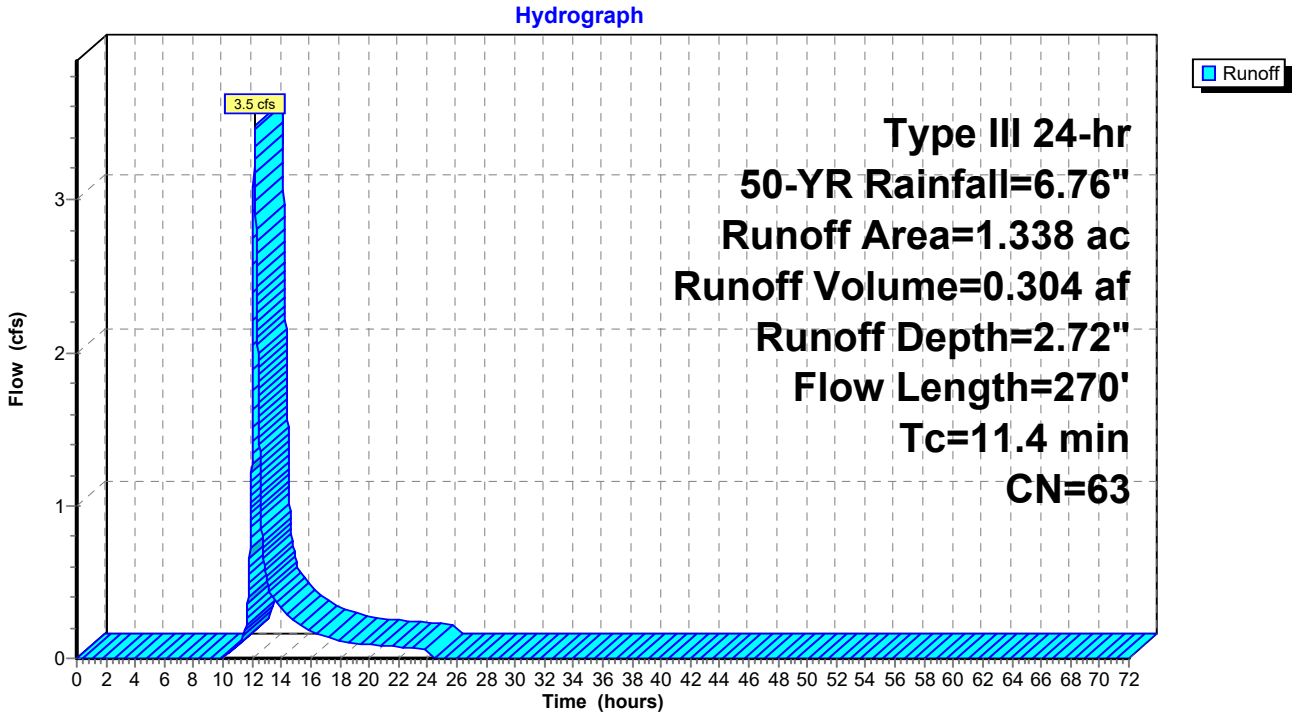
Runoff = 3.5 cfs @ 12.17 hrs, Volume= 0.304 af, Depth= 2.72"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.406	61	>75% Grass cover, Good, HSG B
0.012	74	>75% Grass cover, Good, HSG C
0.308	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.191	58	Woods/grass comb., Good, HSG B
0.410	72	Woods/grass comb., Good, HSG C
1.338	63	Weighted Average
1.338		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0236	0.15		**Sheet Flow, Sheet Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.8	50	0.0236	1.08		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
1.2	87	0.0285	1.18		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
3.9	83	0.0050	0.35		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
11.4	270	Total			

Subcatchment EX-2: Subcat EX-2



Summary for Subcatchment EX-3: Subcat EX-3

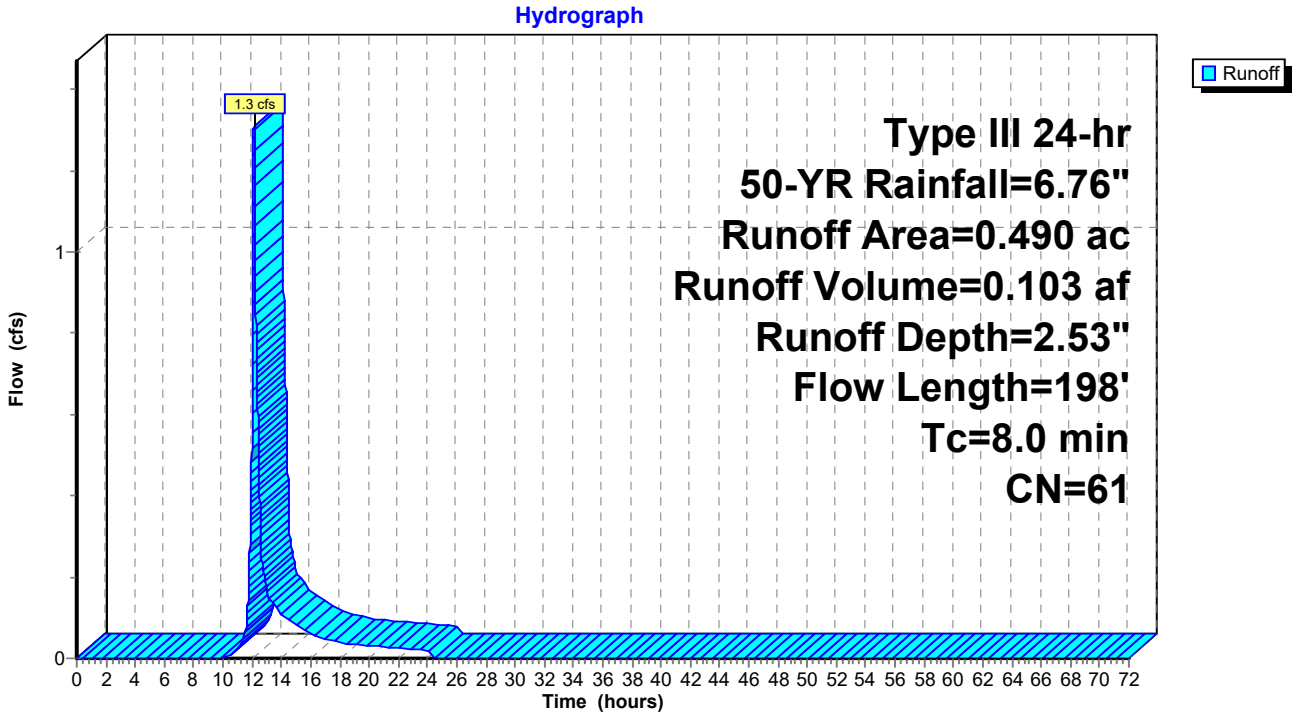
Runoff = 1.3 cfs @ 12.12 hrs, Volume= 0.103 af, Depth= 2.53"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.085	61	>75% Grass cover, Good, HSG B
0.142	55	Woods, Good, HSG B
0.129	58	Woods/grass comb., Good, HSG B
0.133	72	Woods/grass comb., Good, HSG C
0.490	61	Weighted Average
0.490		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0295	0.17		**Sheet Flow, Sheet Flow Wood/Grass** Grass: Short n= 0.150 P2= 2.95"
0.9	84	0.0505	1.57		**Shallow Concentrated Flow, Shallow Concentrated Wood/Grass** Short Grass Pasture Kv= 7.0 fps
0.2	13	0.0180	0.94		**Shallow Concentrated Flow, Shallow Concentrated Gress** Short Grass Pasture Kv= 7.0 fps
1.9	51	0.0080	0.45		**Shallow Concentrated Flow, Shallow Concentrated Woods** Woodland Kv= 5.0 fps
8.0	198	Total			

Subcatchment EX-3: Subcat EX-3



Summary for Subcatchment EX-4: Subcat EX-4

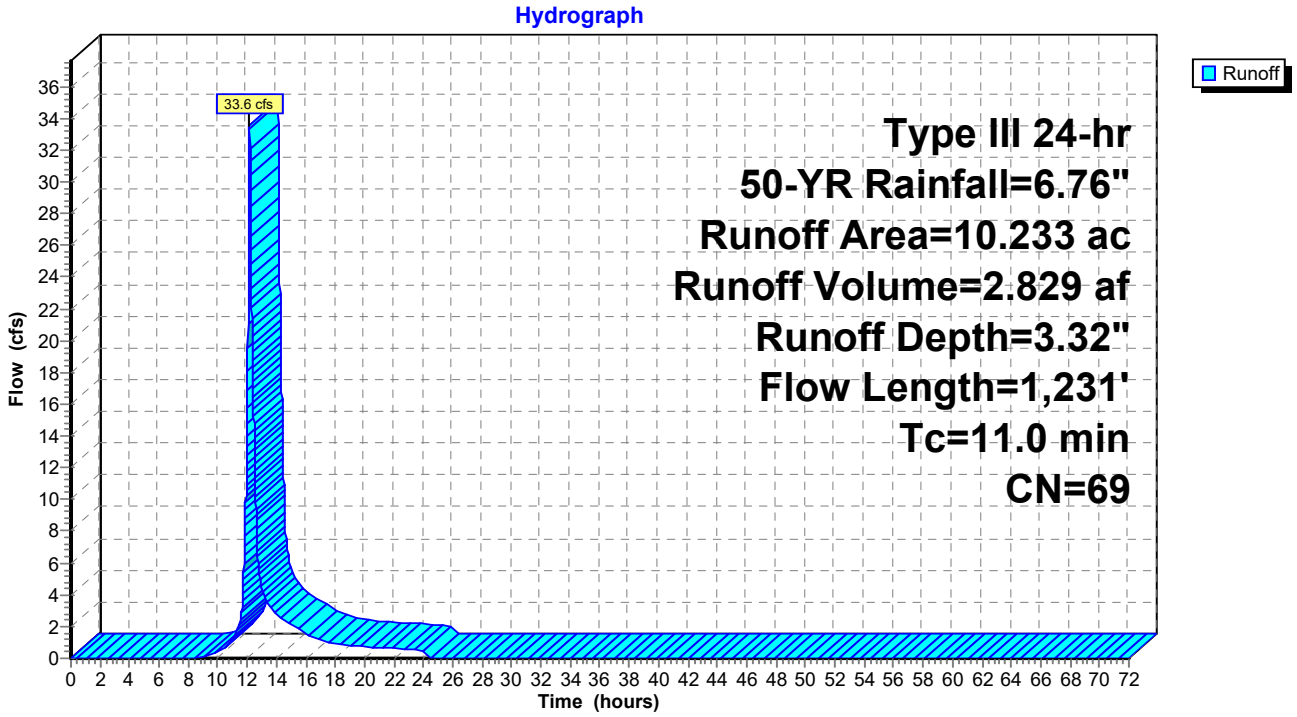
Runoff = 33.6 cfs @ 12.16 hrs, Volume= 2.829 af, Depth= 3.32"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.812	61	>75% Grass cover, Good, HSG B
1.755	74	>75% Grass cover, Good, HSG C
0.008	80	>75% Grass cover, Good, HSG D
0.010	98	Roofs, HSG C
0.255	55	Woods, Good, HSG B
2.954	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
0.956	58	Woods/grass comb., Good, HSG B
2.987	72	Woods/grass comb., Good, HSG C
10.233	69	Weighted Average
10.223		99.91% Pervious Area
0.010		0.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0502	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	202	0.0731	1.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	243	0.0862	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
11.0	1,231	Total			

Subcatchment EX-4: Subcat EX-4



Summary for Subcatchment EX-5: Subcat EX-5

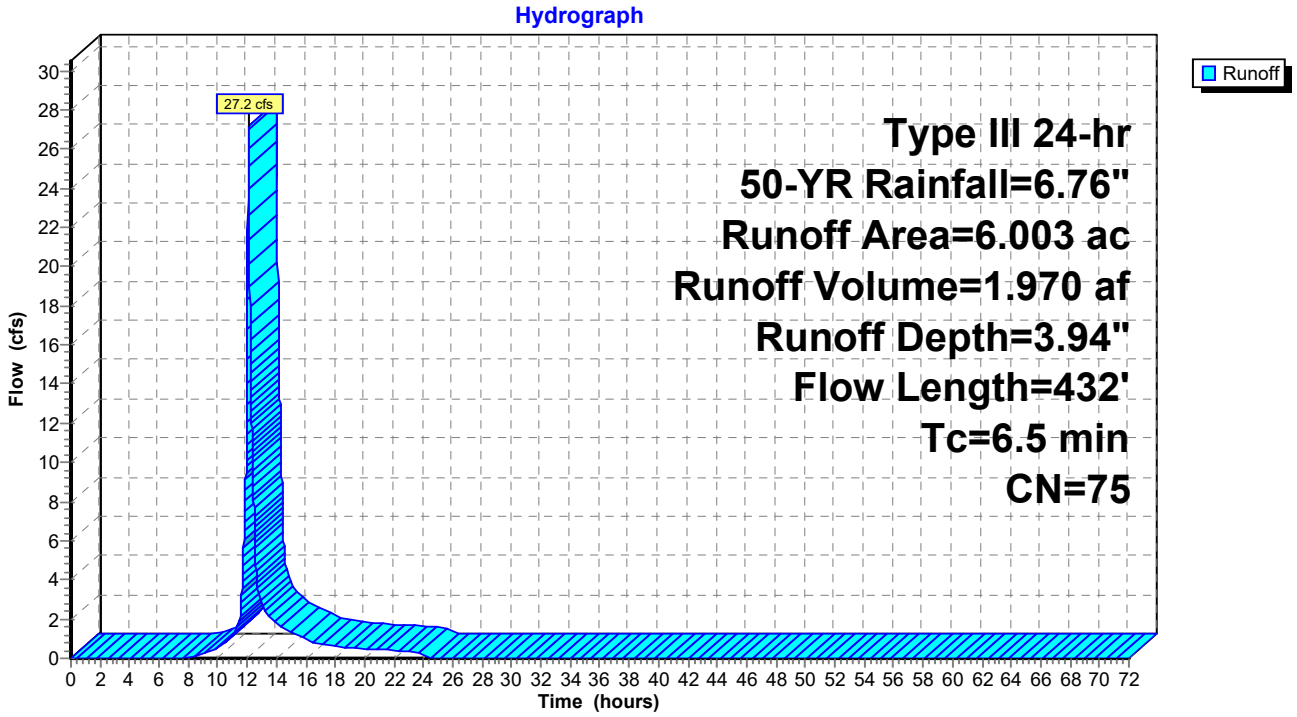
Runoff = 27.2 cfs @ 12.09 hrs, Volume= 1.970 af, Depth= 3.94"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
2.532	74	>75% Grass cover, Good, HSG C
0.029	80	>75% Grass cover, Good, HSG D
0.192	89	Gravel roads, HSG C
0.186	91	Gravel roads, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
1.160	70	Woods, Good, HSG C
0.001	77	Woods, Good, HSG D
1.630	72	Woods/grass comb., Good, HSG C
6.003	75	Weighted Average
5.730		95.44% Pervious Area
0.274		4.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0710	0.24		**Sheet Flow, Sheet Flow Grass/Woods** Grass: Short n= 0.150 P2= 2.95"
0.2	21	0.0571	1.67		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.8	97	0.0766	1.94		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.7	95	0.1039	2.26		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.3	45	0.0981	2.19		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
0.4	46	0.0956	2.16		**Shallow Concentrated Flow, Shallow Concentrated Grass/Woods** Short Grass Pasture Kv= 7.0 fps
0.6	78	0.0857	2.05		**Shallow Concentrated Flow, Shallow Concentrated Grass** Short Grass Pasture Kv= 7.0 fps
6.5	432	Total			

Subcatchment EX-5: Subcat EX-5



Summary for Subcatchment EX-6: Subcat EX-6

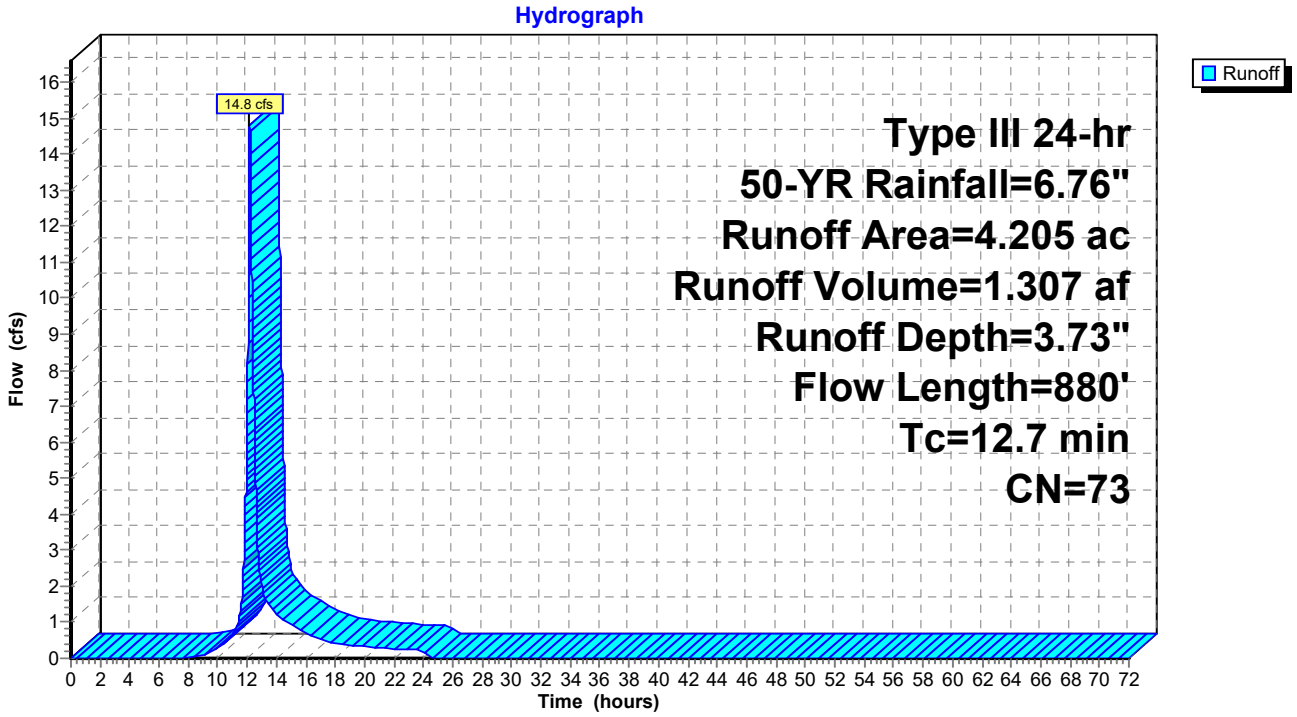
Runoff = 14.8 cfs @ 12.18 hrs, Volume= 1.307 af, Depth= 3.73"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
1.452	74	>75% Grass cover, Good, HSG C
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.419	70	Woods, Good, HSG C
0.065	77	Woods, Good, HSG D
0.125	72	Woods/grass comb., Good, HSG C
4.205	73	Weighted Average
4.061		96.57% Pervious Area
0.144		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0862	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.4	149	0.0627	1.75		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.2	212	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0449	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1063	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	55	0.0682	1.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.7	880	Total			

Subcatchment EX-6: Subcat EX-6



Summary for Subcatchment EX-7: Subcat EX-7

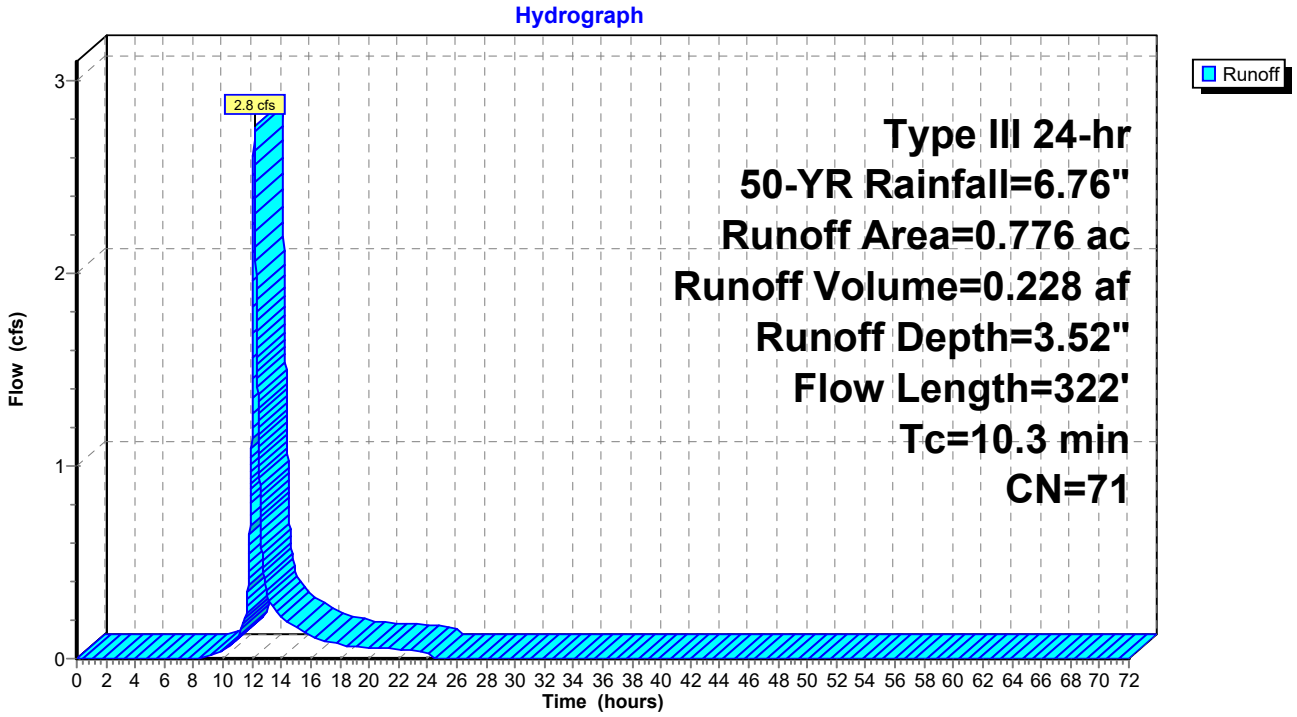
Runoff = 2.8 cfs @ 12.14 hrs, Volume= 0.228 af, Depth= 3.52"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.633	70	Woods, Good, HSG C
0.143	77	Woods, Good, HSG D
0.776	71	Weighted Average
0.776		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment EX-7: Subcat EX-7



Summary for Subcatchment EX-8: Subcat EX-8

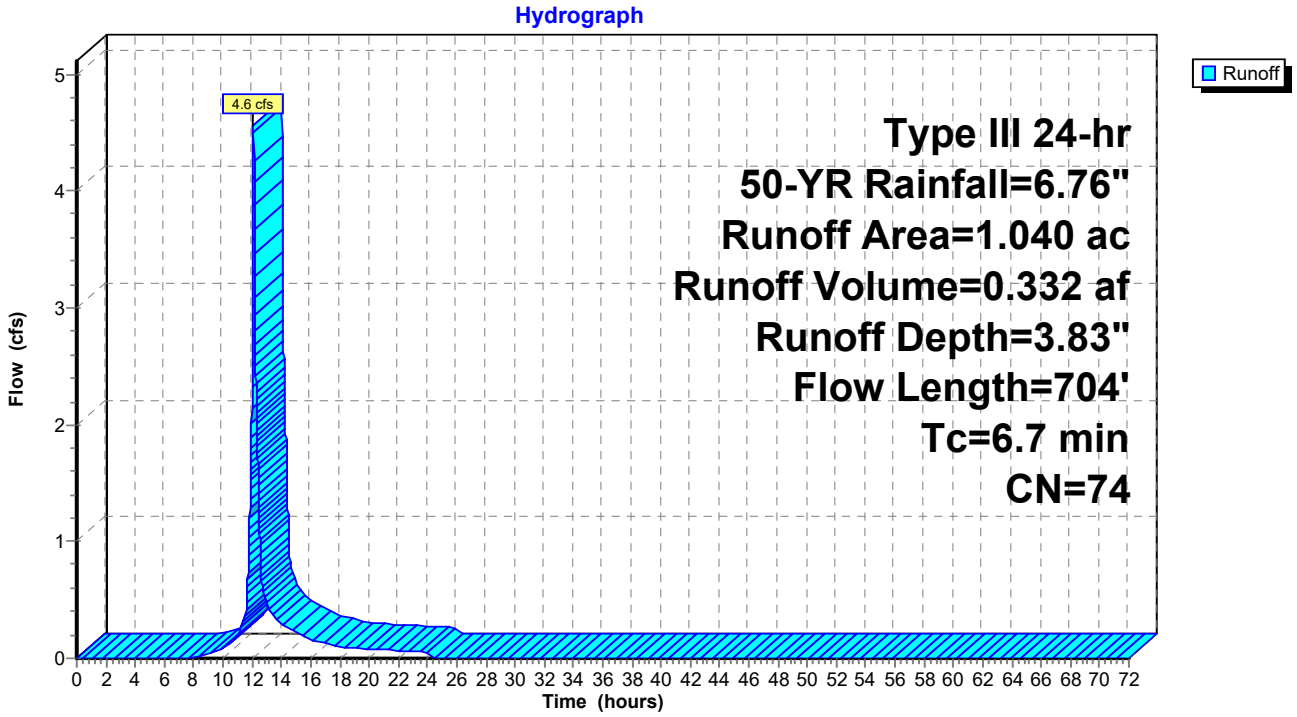
Runoff = 4.6 cfs @ 12.10 hrs, Volume= 0.332 af, Depth= 3.83"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.578	74	>75% Grass cover, Good, HSG C
0.103	80	>75% Grass cover, Good, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
0.277	72	Woods/grass comb., Good, HSG C
1.040	74	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0768	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0814	2.00		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	141	0.1014	2.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	704	Total			

Subcatchment EX-8: Subcat EX-8



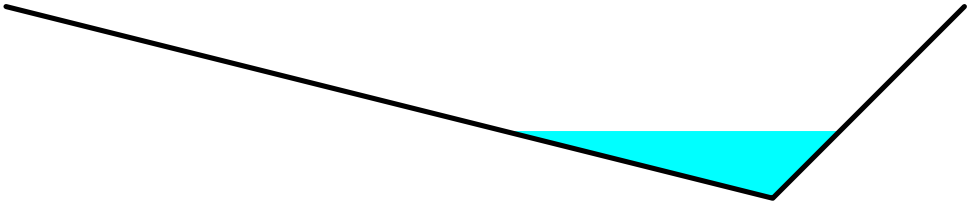
Summary for Reach 1R: Pillsbury Rd Swale

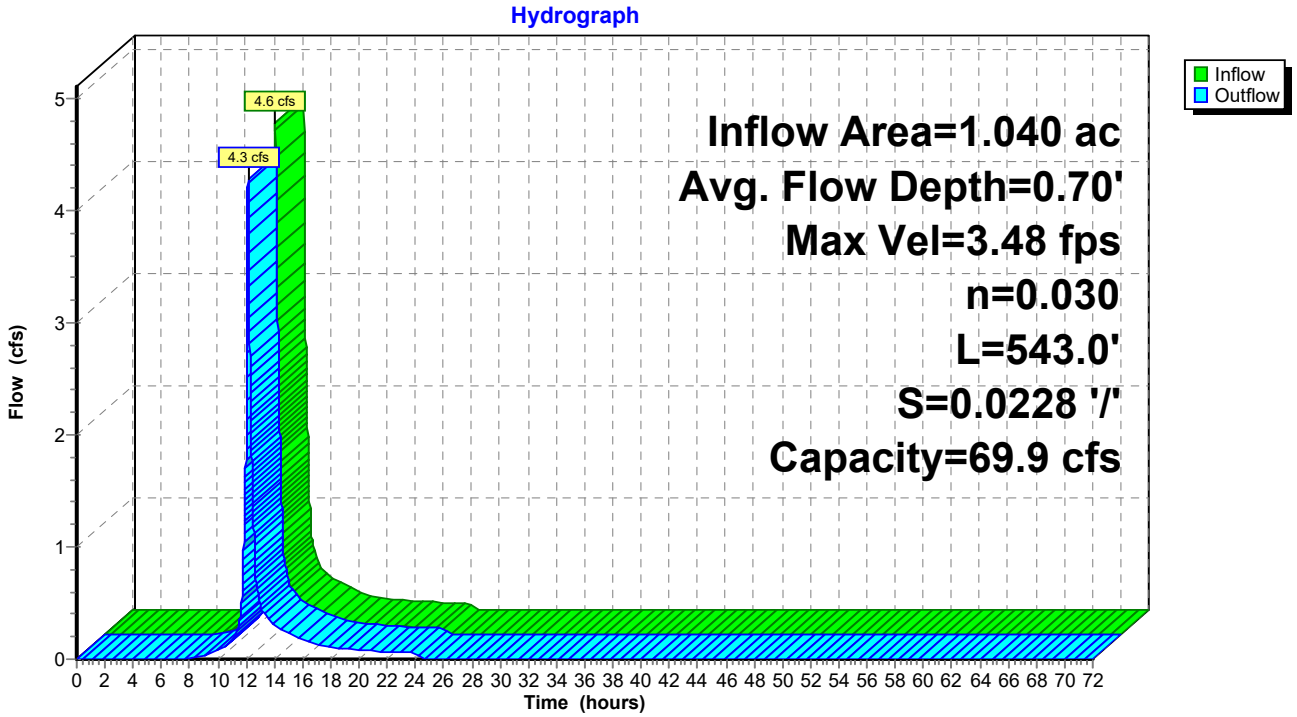
Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 3.83" for 50-YR event
Inflow = 4.6 cfs @ 12.10 hrs, Volume= 0.332 af
Outflow = 4.3 cfs @ 12.13 hrs, Volume= 0.332 af, Atten= 6%, Lag= 1.8 min
Routed to Link DP-4 : DP-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.48 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 6.7 min

Peak Storage= 670 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.70' , Surface Width= 3.51'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'





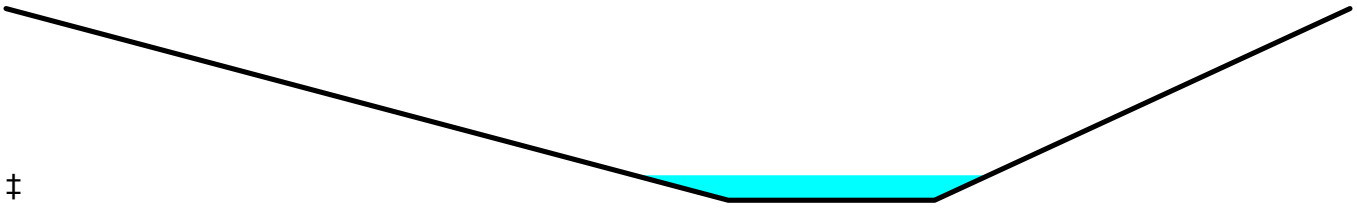
Summary for Reach 2R: Stream South

Inflow Area = 5.248 ac, 0.00% Impervious, Inflow Depth = 3.61" for 50-YR event
Inflow = 15.0 cfs @ 12.26 hrs, Volume= 1.579 af
Outflow = 15.0 cfs @ 12.27 hrs, Volume= 1.579 af, Atten= 0%, Lag= 0.6 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.01 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 2.3 min

Peak Storage= 719 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.46' , Surface Width= 6.88'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0588 '/'
Inlet Invert= 16.99', Outlet Invert= 0.00'



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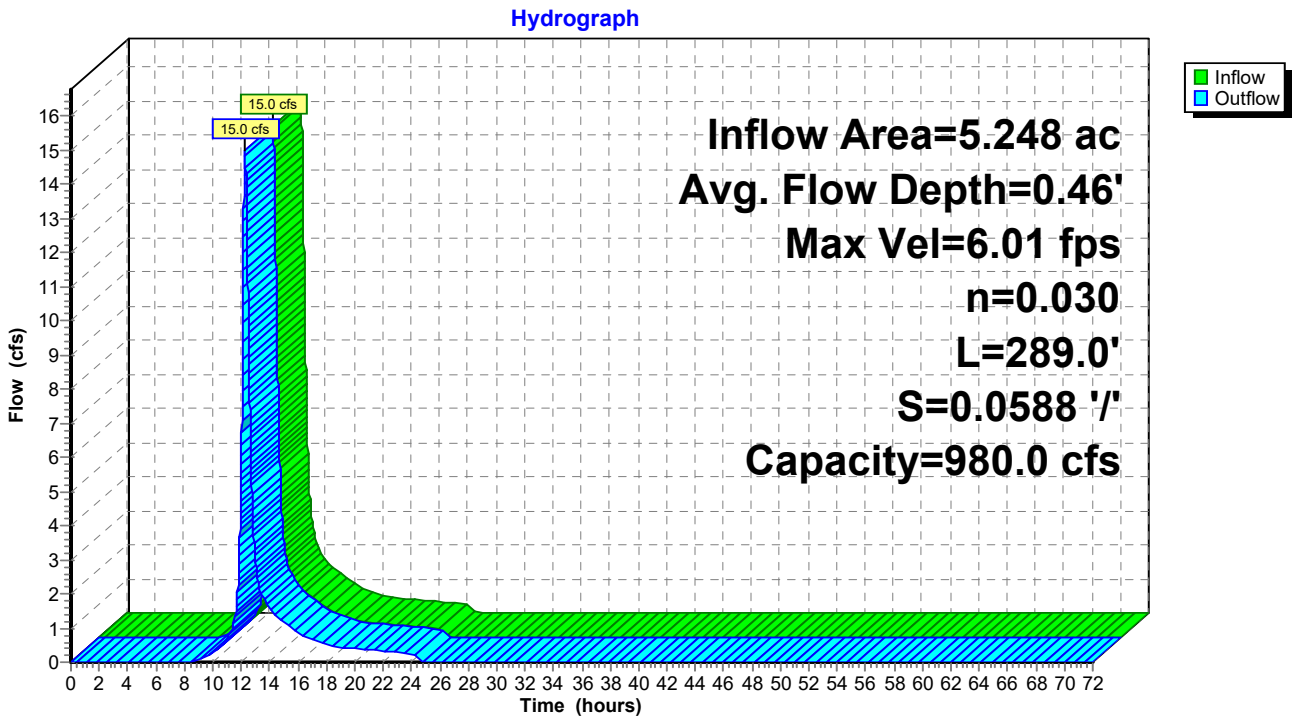


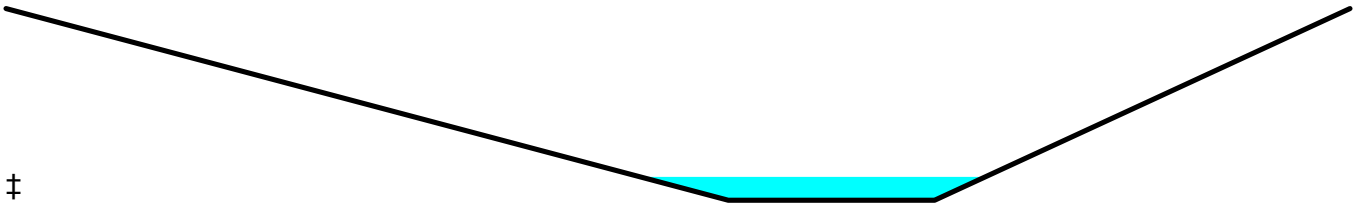
Summary for Reach 3R: Stream North

Inflow Area = 4.472 ac, 0.00% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 13.0 cfs @ 12.26 hrs, Volume= 1.351 af
Outflow = 13.0 cfs @ 12.28 hrs, Volume= 1.351 af, Atten= 0%, Lag= 0.7 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.76 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 2.6 min

Peak Storage= 714 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.42' , Surface Width= 6.67'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 980.0 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 316.0' Slope= 0.0588 '/'
Inlet Invert= 35.57', Outlet Invert= 16.99'



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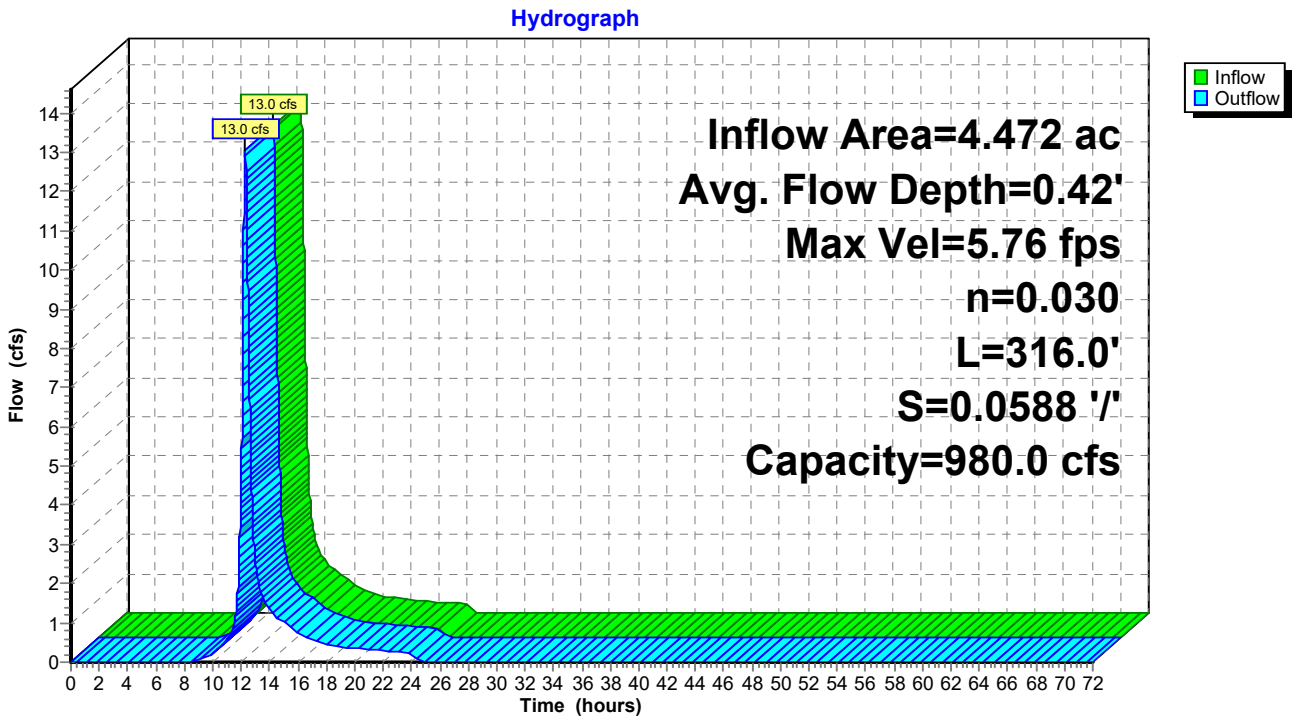
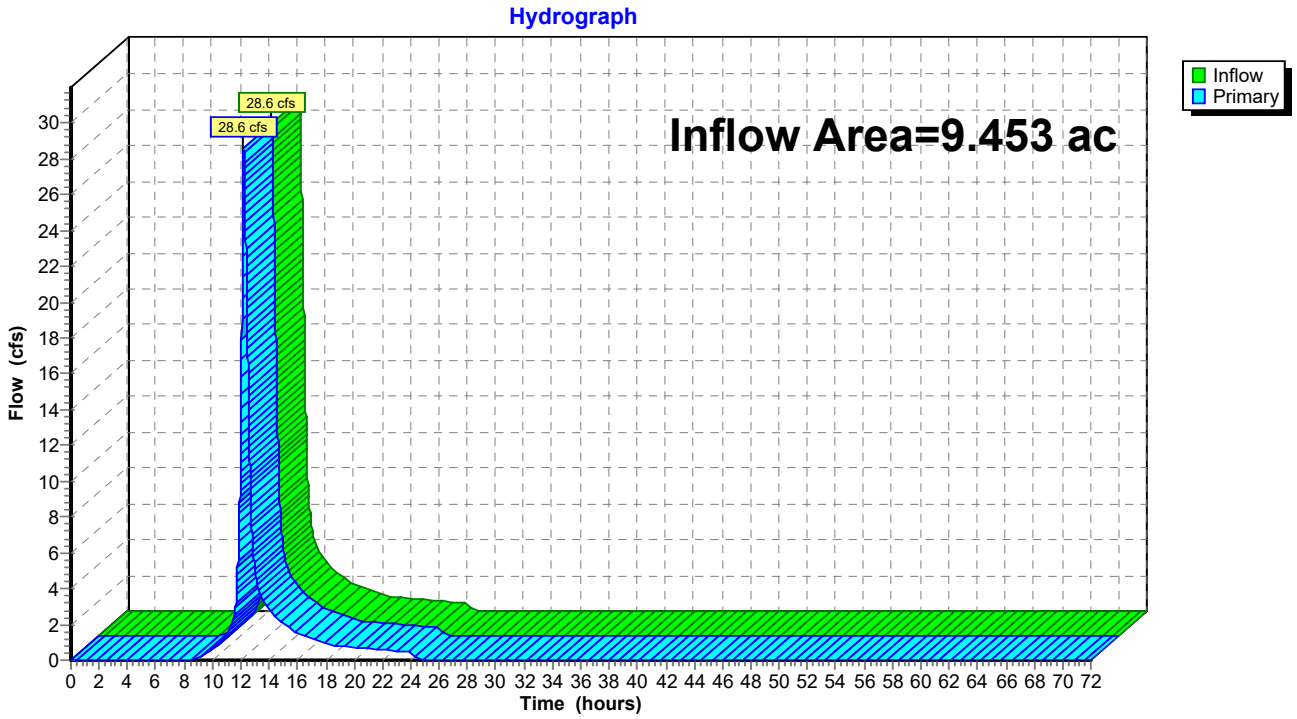


Summary for Link DP-1: DP-1

Inflow Area = 9.453 ac, 1.52% Impervious, Inflow Depth = 3.66" for 50-YR event
Inflow = 28.6 cfs @ 12.21 hrs, Volume= 2.886 af
Primary = 28.6 cfs @ 12.21 hrs, Volume= 2.886 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: DP-1

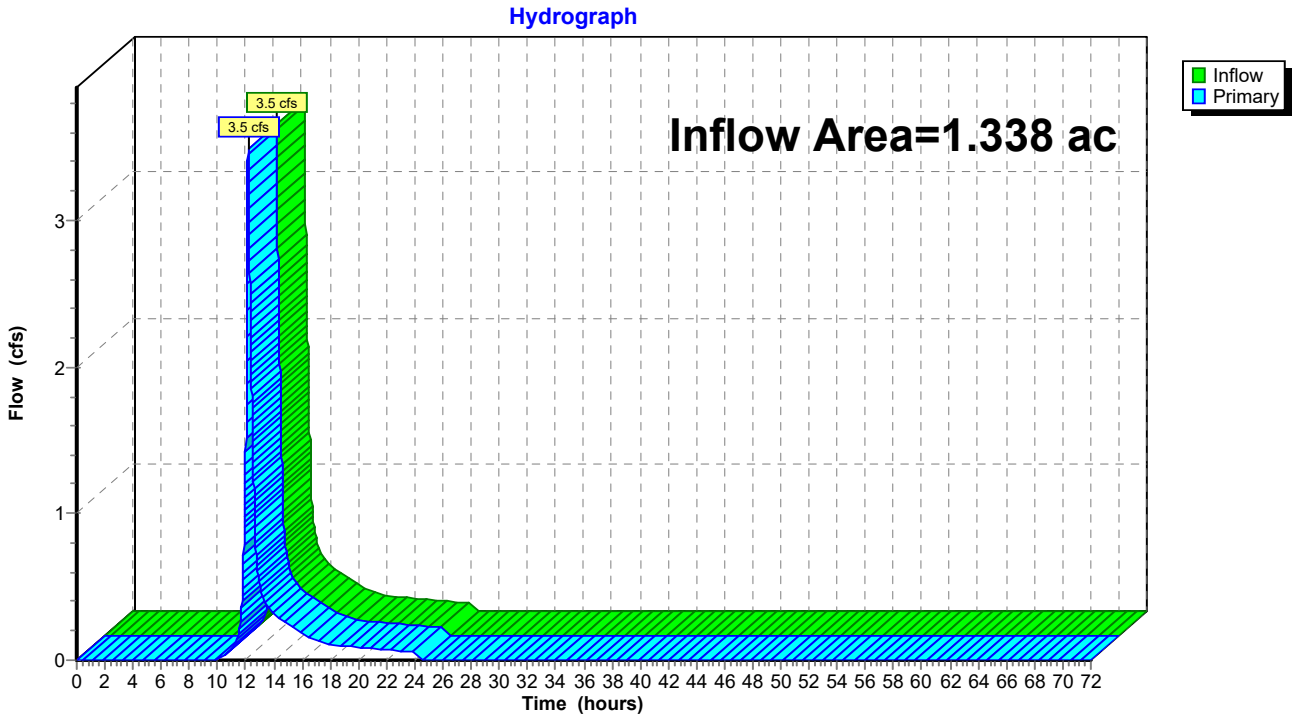


Summary for Link DP-2: DP-2

Inflow Area = 1.338 ac, 0.00% Impervious, Inflow Depth = 2.72" for 50-YR event
Inflow = 3.5 cfs @ 12.17 hrs, Volume= 0.304 af
Primary = 3.5 cfs @ 12.17 hrs, Volume= 0.304 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: DP-2

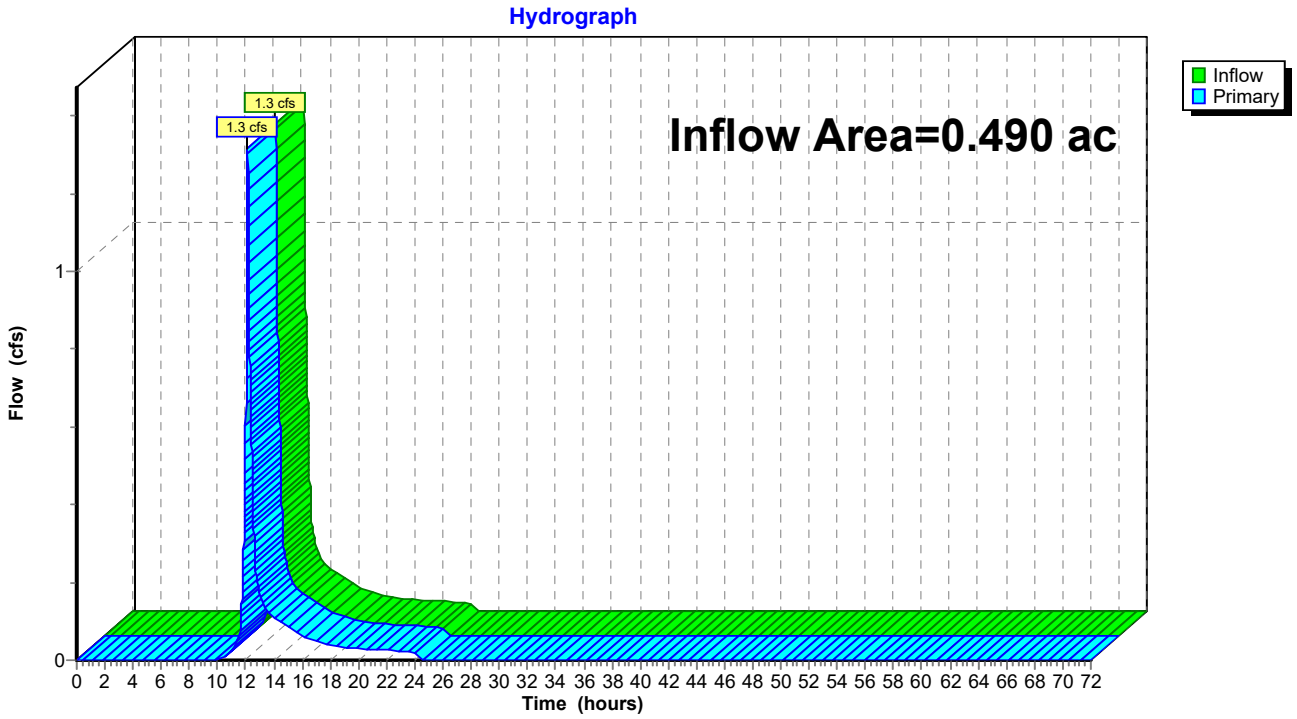


Summary for Link DP-3: DP-3

Inflow Area = 0.490 ac, 0.00% Impervious, Inflow Depth = 2.53" for 50-YR event
Inflow = 1.3 cfs @ 12.12 hrs, Volume= 0.103 af
Primary = 1.3 cfs @ 12.12 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-3: DP-3

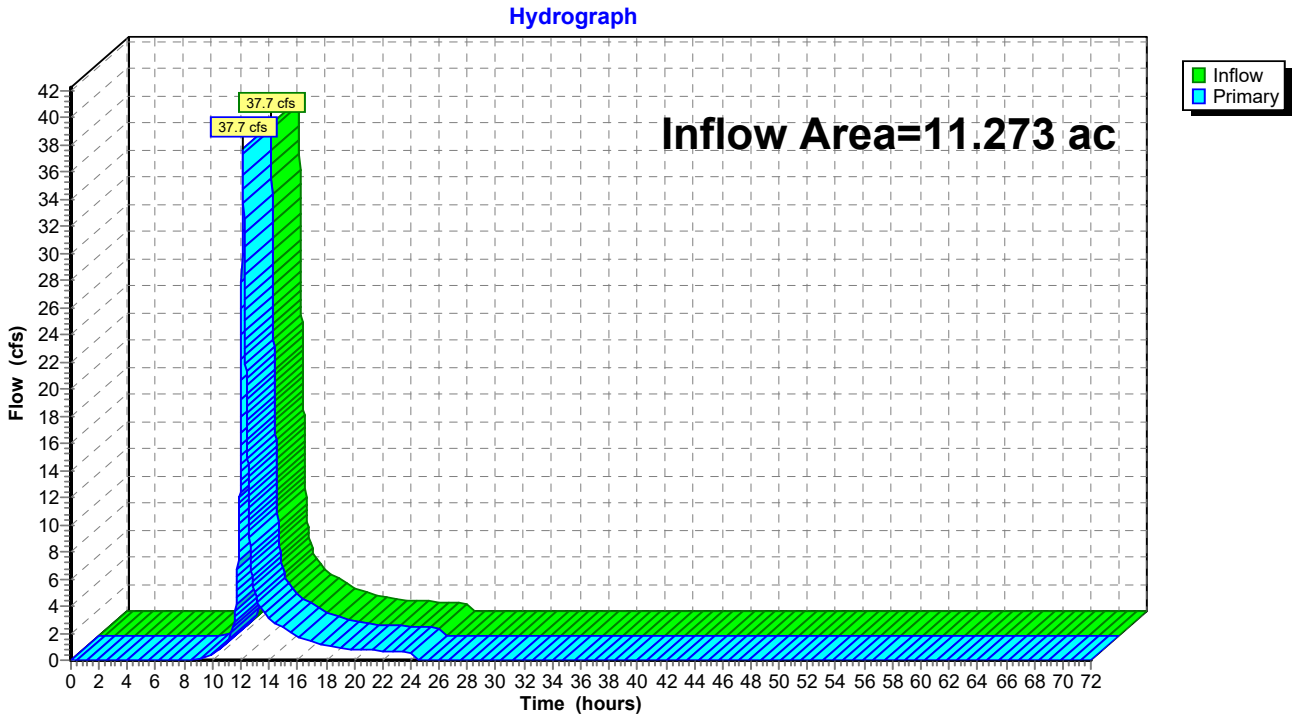


Summary for Link DP-4: DP-4

Inflow Area = 11.273 ac, 0.09% Impervious, Inflow Depth = 3.37" for 50-YR event
Inflow = 37.7 cfs @ 12.15 hrs, Volume= 3.162 af
Primary = 37.7 cfs @ 12.15 hrs, Volume= 3.162 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-4: DP-4

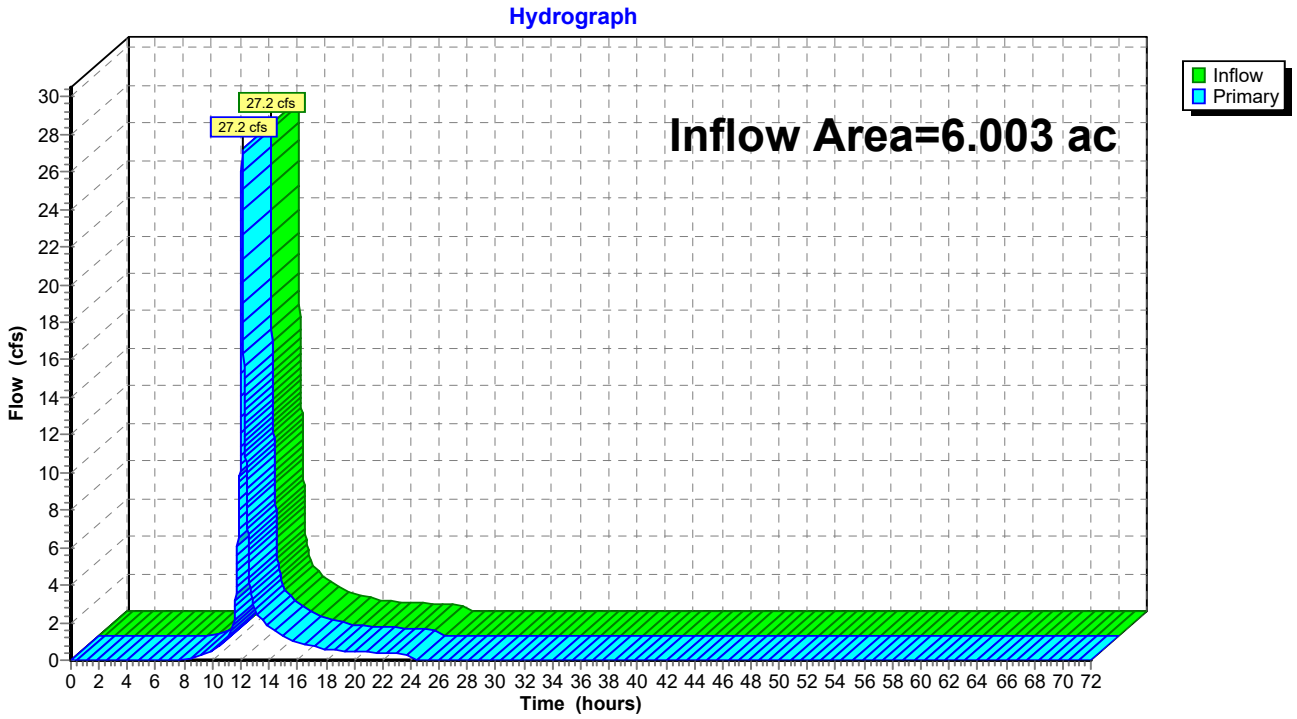


Summary for Link DP-5: DP-5

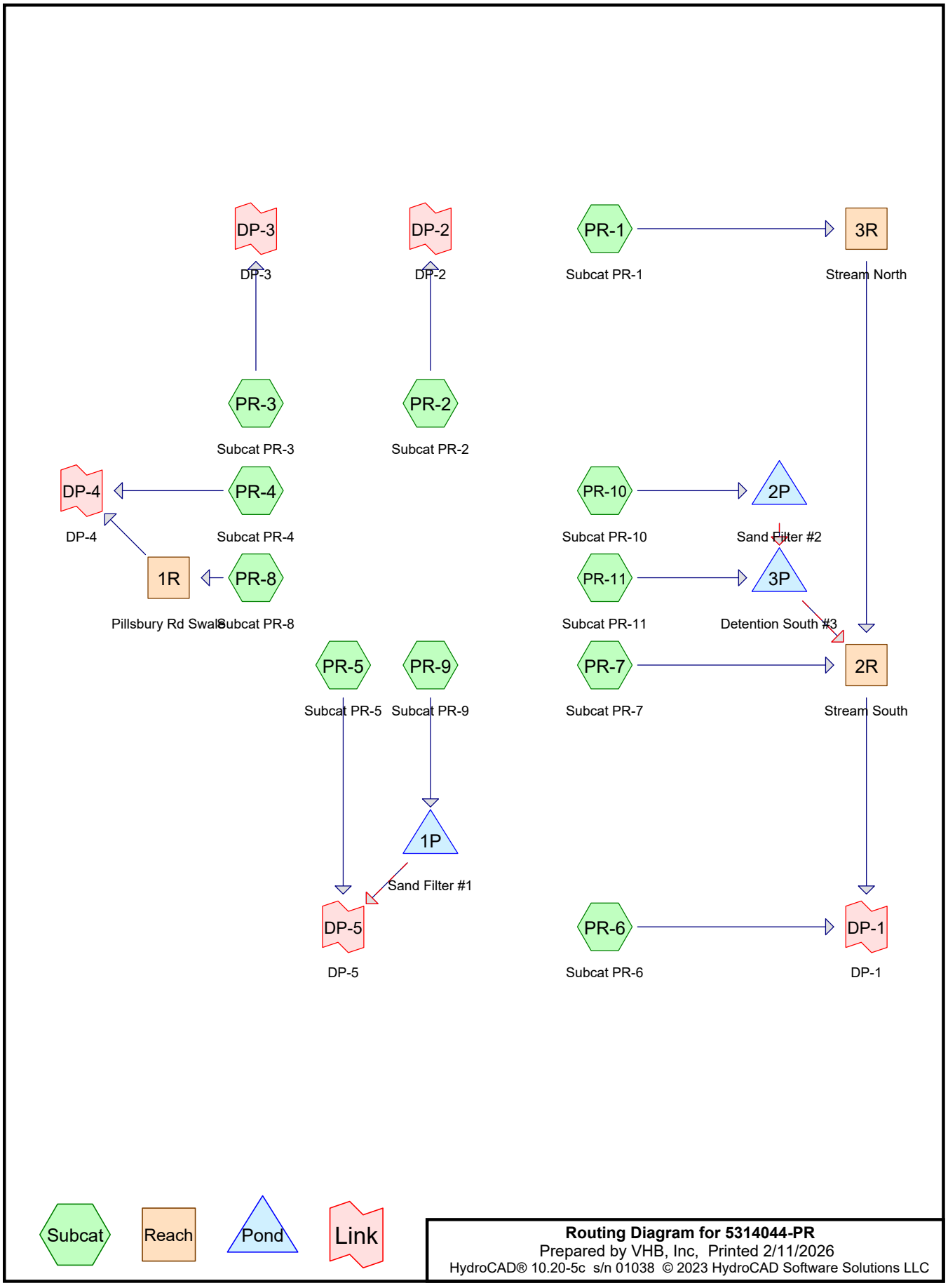
Inflow Area = 6.003 ac, 4.56% Impervious, Inflow Depth = 3.94" for 50-YR event
Inflow = 27.2 cfs @ 12.09 hrs, Volume= 1.970 af
Primary = 27.2 cfs @ 12.09 hrs, Volume= 1.970 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-5: DP-5



Proposed Conditions



Routing Diagram for 5314044-PR
Prepared by VHB, Inc, Printed 2/11/2026
HydroCAD® 10.20-5c s/n 01038 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type III 24-hr		Default	24.00	1	2.95	2
2	10-YR	Type III 24-hr		Default	24.00	1	4.46	2
3	25-YR	Type III 24-hr		Default	24.00	1	5.65	2
4	50-YR	Type III 24-hr		Default	24.00	1	6.76	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.301	61	>75% Grass cover, Good, HSG B (PR-1, PR-10, PR-2, PR-3, PR-4, PR-9)
8.969	74	>75% Grass cover, Good, HSG C (PR-1, PR-10, PR-11, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9)
0.280	80	>75% Grass cover, Good, HSG D (PR-11, PR-5, PR-7)
0.033	96	Gravel surface, HSG C (PR-5, PR-9)
0.110	96	Gravel surface, HSG D (PR-5)
0.047	58	Meadow, non-grazed, HSG B (PR-1, PR-4)
4.325	71	Meadow, non-grazed, HSG C (PR-1, PR-10, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9)
0.243	78	Meadow, non-grazed, HSG D (PR-1, PR-4, PR-5, PR-6, PR-7, PR-8)
0.493	98	Paved parking, HSG B (PR-10, PR-9)
2.176	98	Paved parking, HSG C (PR-1, PR-10, PR-5, PR-6, PR-9)
0.778	98	Roofs, HSG B (PR-10, PR-9)
1.776	98	Roofs, HSG C (PR-10, PR-5, PR-6, PR-9)
0.637	55	Woods, Good, HSG B (PR-1, PR-2, PR-3, PR-4)
6.758	70	Woods, Good, HSG C (PR-1, PR-2, PR-4, PR-5, PR-6, PR-7, PR-8)
0.631	77	Woods, Good, HSG D (PR-1, PR-2, PR-4, PR-8)

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.255	HSG B	PR-1, PR-10, PR-2, PR-3, PR-4, PR-9
24.038	HSG C	PR-1, PR-10, PR-11, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
1.264	HSG D	PR-1, PR-11, PR-2, PR-4, PR-5, PR-6, PR-7, PR-8
0.000	Other	

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.301	8.969	0.280	0.000	10.550	>75% Grass cover, Good	PR-1, PR-10, PR-11, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
0.000	0.000	0.033	0.110	0.000	0.143	Gravel surface	PR-5, PR-9
0.000	0.047	4.325	0.243	0.000	4.615	Meadow, non-grazed	PR-1, PR-10, PR-4, PR-5, PR-6, PR-7, PR-8, PR-9
0.000	0.493	2.176	0.000	0.000	2.669	Paved parking	PR-1, PR-10, PR-5, PR-6, PR-9
0.000	0.778	1.776	0.000	0.000	2.554	Roofs	PR-10, PR-5, PR-6, PR-9
0.000	0.637	6.758	0.631	0.000	8.026	Woods, Good	PR-1, PR-2, PR-3, PR-4, PR-5, PR-6, PR-7, PR-8

Summary for Subcatchment PR-1: Subcat PR-1

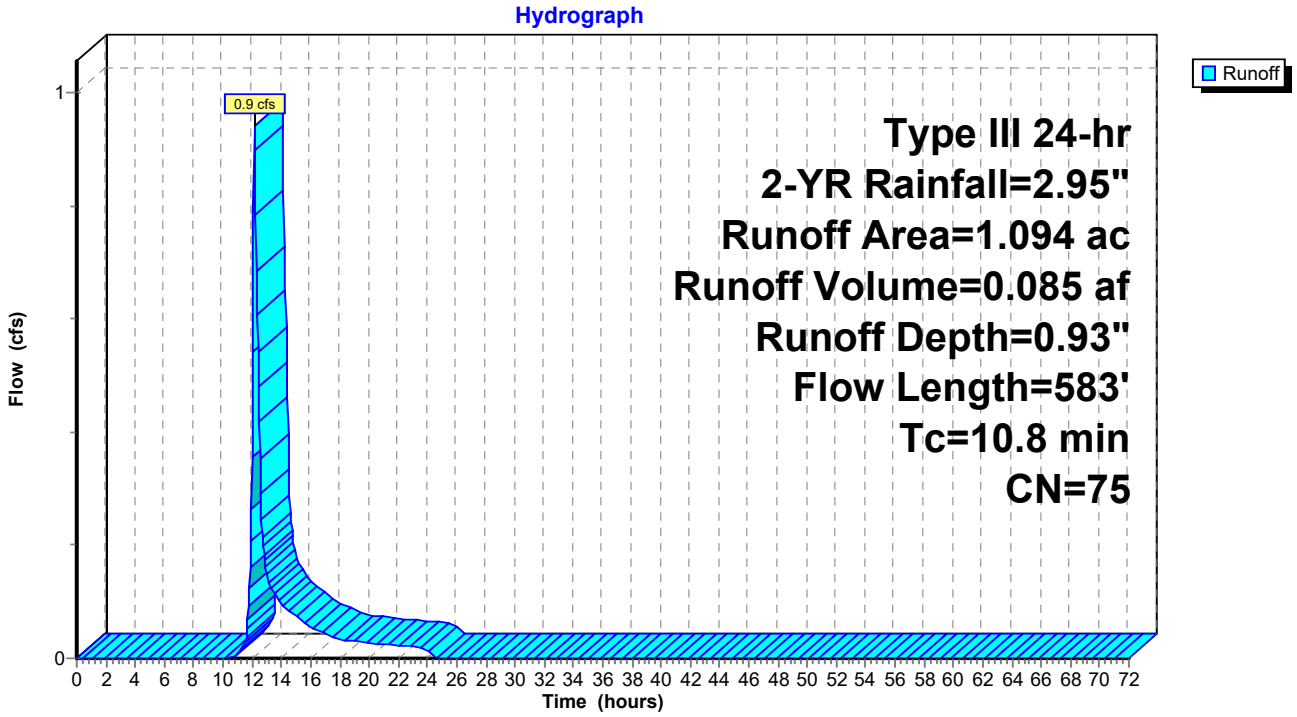
Runoff = 0.9 cfs @ 12.16 hrs, Volume= 0.085 af, Depth= 0.93"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.020	61	>75% Grass cover, Good, HSG B
0.374	74	>75% Grass cover, Good, HSG C
0.005	58	Meadow, non-grazed, HSG B
0.238	71	Meadow, non-grazed, HSG C
0.006	78	Meadow, non-grazed, HSG D
0.114	98	Paved parking, HSG C
0.024	55	Woods, Good, HSG B
0.233	70	Woods, Good, HSG C
0.079	77	Woods, Good, HSG D
1.094	75	Weighted Average
0.979		89.56% Pervious Area
0.114		10.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0334	0.17		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
4.4	379	0.0427	1.45		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0706	1.86		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	99	0.0441	1.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
10.8	583	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

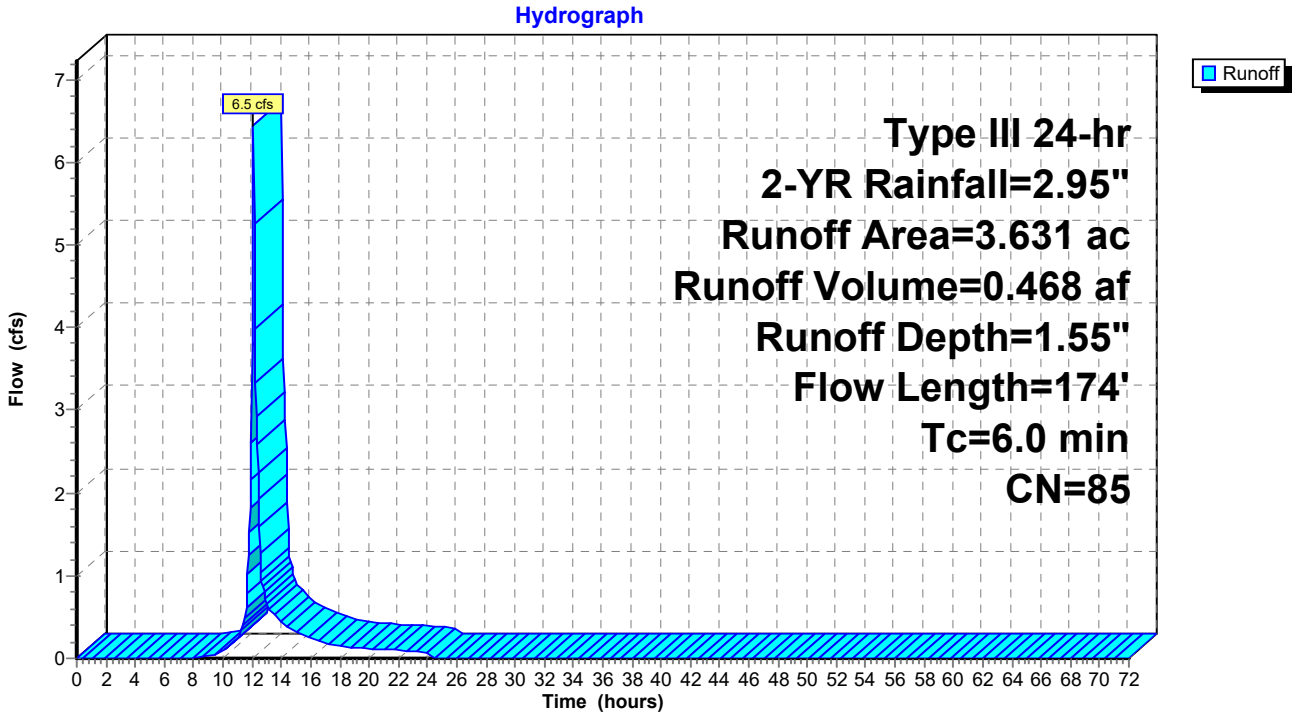
Runoff = 6.5 cfs @ 12.09 hrs, Volume= 0.468 af, Depth= 1.55"
Routed to Pond 2P : Sand Filter #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.119	61	>75% Grass cover, Good, HSG B
1.777	74	>75% Grass cover, Good, HSG C
0.022	71	Meadow, non-grazed, HSG C
0.056	98	Paved parking, HSG B
0.803	98	Paved parking, HSG C
0.176	98	Roofs, HSG B
0.678	98	Roofs, HSG C
3.631	85	Weighted Average
1.918		52.82% Pervious Area
1.713		47.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0738	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.2	124	0.0614	1.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3					**Direct Entry,**
6.0	174	Total			

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

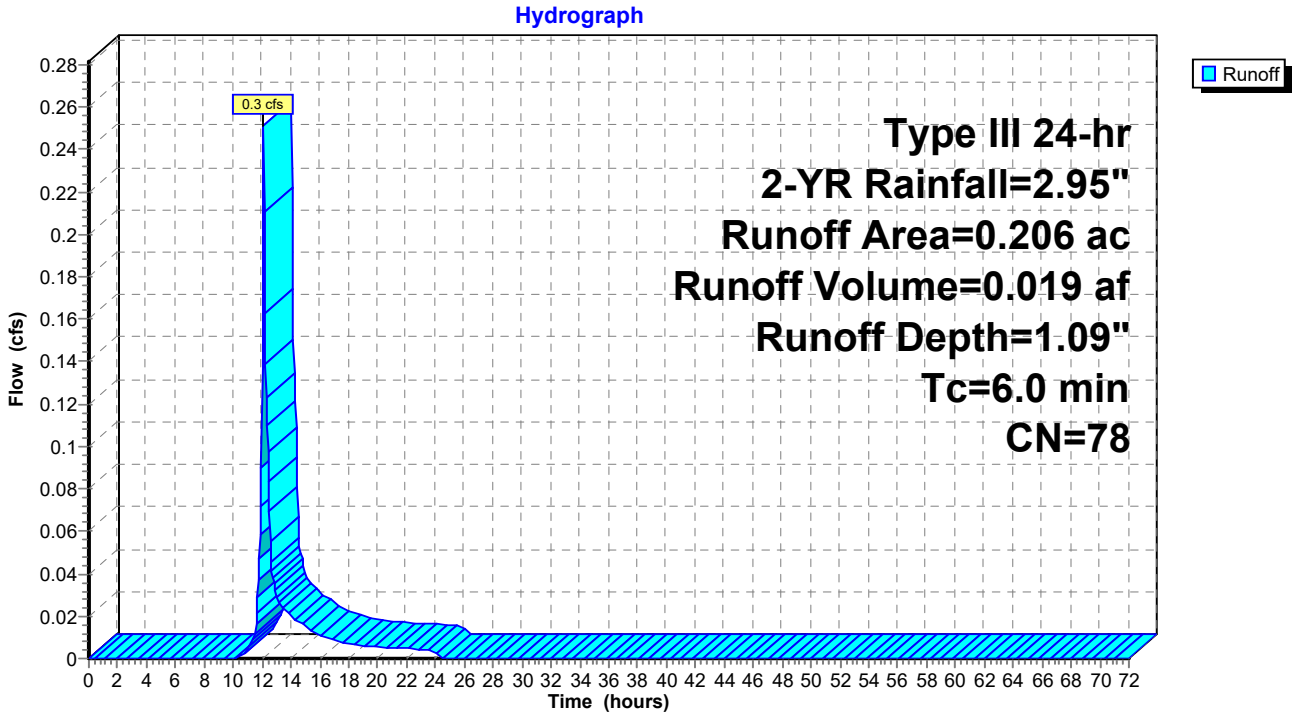
Runoff = 0.3 cfs @ 12.10 hrs, Volume= 0.019 af, Depth= 1.09"
Routed to Pond 3P : Detention South #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.136	80	>75% Grass cover, Good, HSG D
0.206	78	Weighted Average
0.206		100.00% Pervious Area

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

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-2: Subcat PR-2

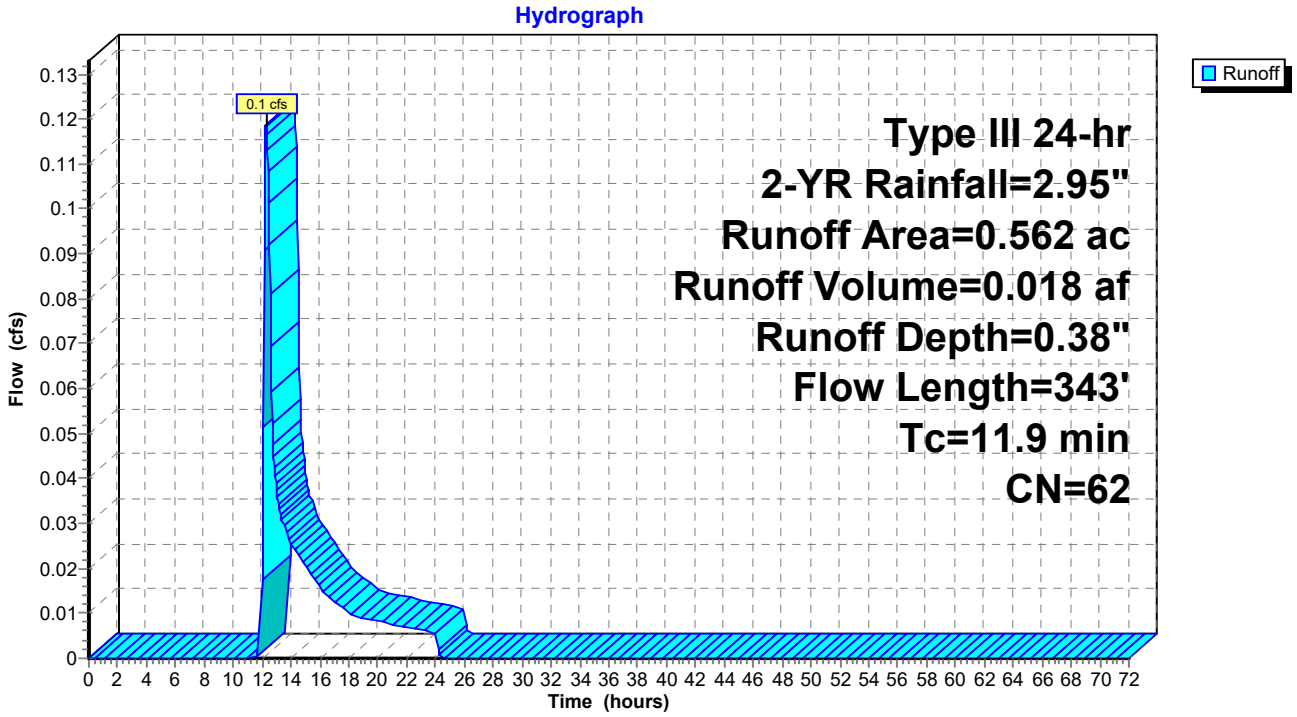
Runoff = 0.1 cfs @ 12.26 hrs, Volume= 0.018 af, Depth= 0.38"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.136	61	>75% Grass cover, Good, HSG B
0.157	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG B
0.258	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.562	62	Weighted Average
0.562		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0219	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
3.3	210	0.0227	1.05		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
2.9	83	0.0046	0.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.9	343	Total			

Subcatchment PR-2: Subcat PR-2



Summary for Subcatchment PR-3: Subcat PR-3

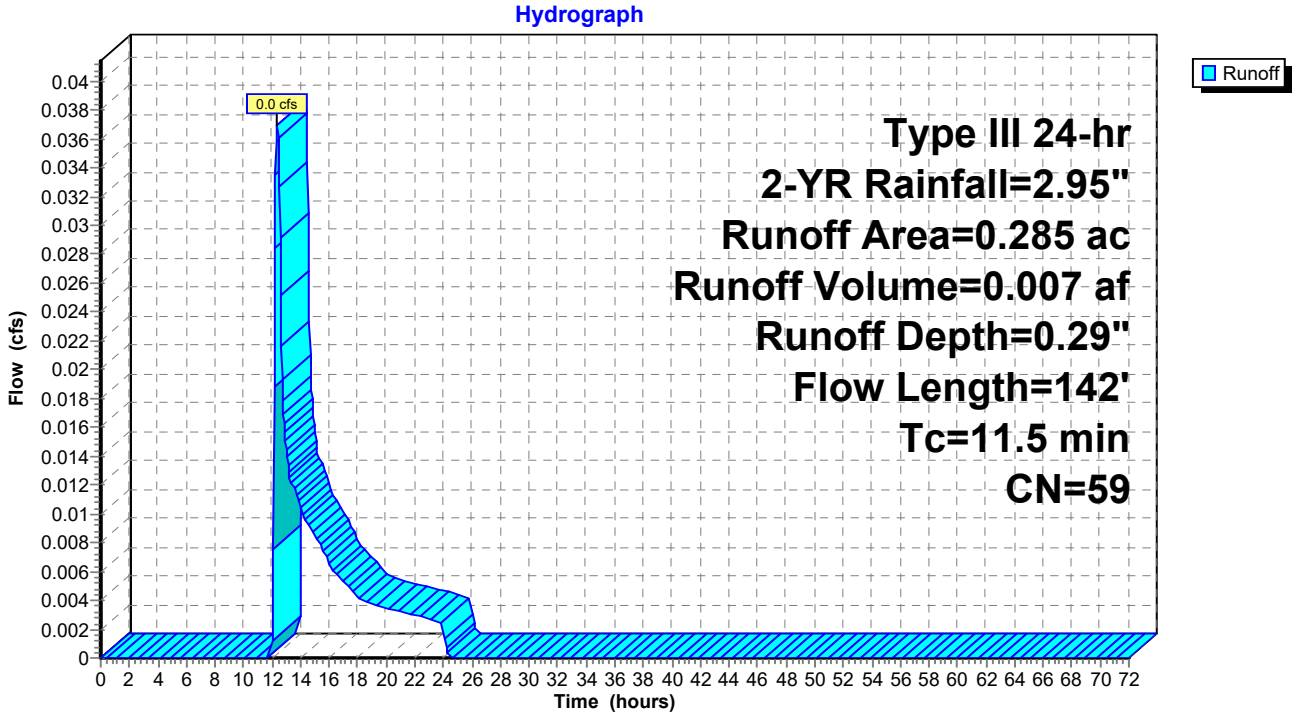
Runoff = 0.0 cfs @ 12.37 hrs, Volume= 0.007 af, Depth= 0.29"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.126	61	>75% Grass cover, Good, HSG B
0.017	74	>75% Grass cover, Good, HSG C
0.142	55	Woods, Good, HSG B
0.285	59	Weighted Average
0.285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0060	0.09		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
0.6	19	0.0060	0.54		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.4	73	0.0163	0.89		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.5	142	Total			

Subcatchment PR-3: Subcat PR-3



Summary for Subcatchment PR-4: Subcat PR-4

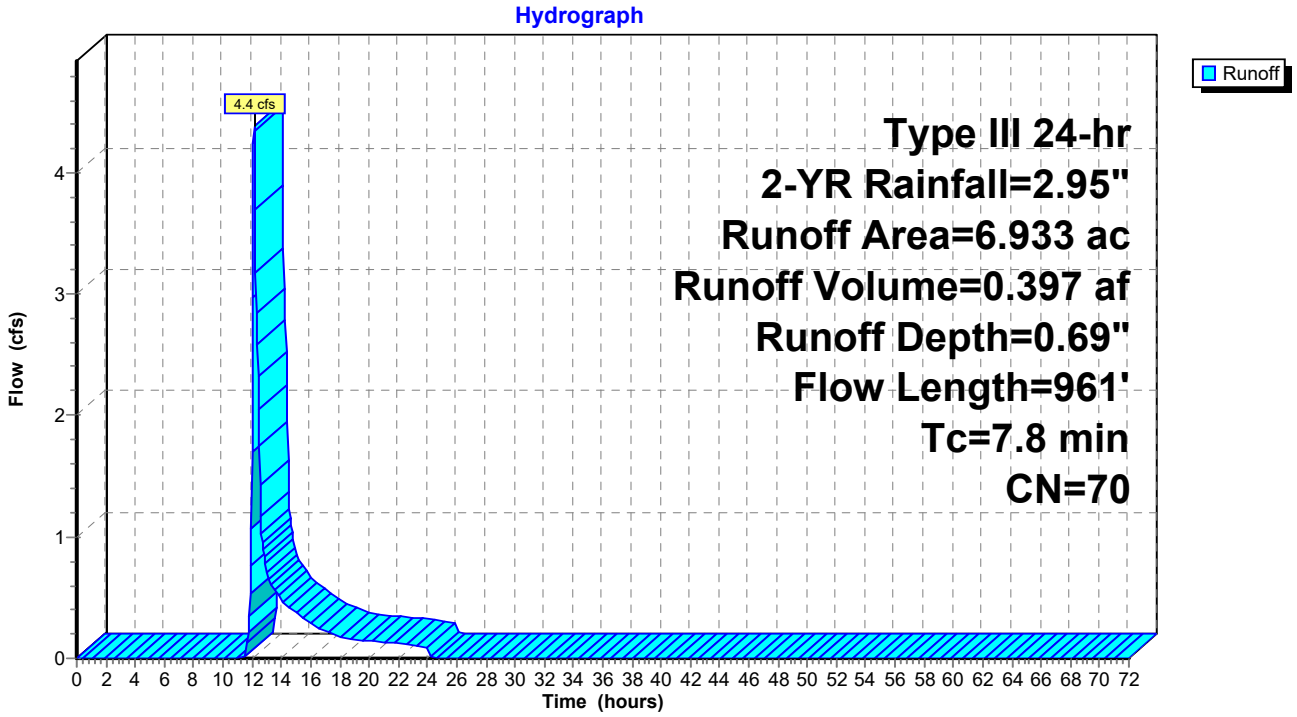
Runoff = 4.4 cfs @ 12.13 hrs, Volume= 0.397 af, Depth= 0.69"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.450	61	>75% Grass cover, Good, HSG B
0.719	74	>75% Grass cover, Good, HSG C
0.041	58	Meadow, non-grazed, HSG B
2.069	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.214	55	Woods, Good, HSG B
2.935	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
6.933	70	Weighted Average
6.933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0831	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
0.2	20	0.0831	2.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	155	0.0873	2.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
7.8	961	Total			

Subcatchment PR-4: Subcat PR-4



Summary for Subcatchment PR-5: Subcat PR-5

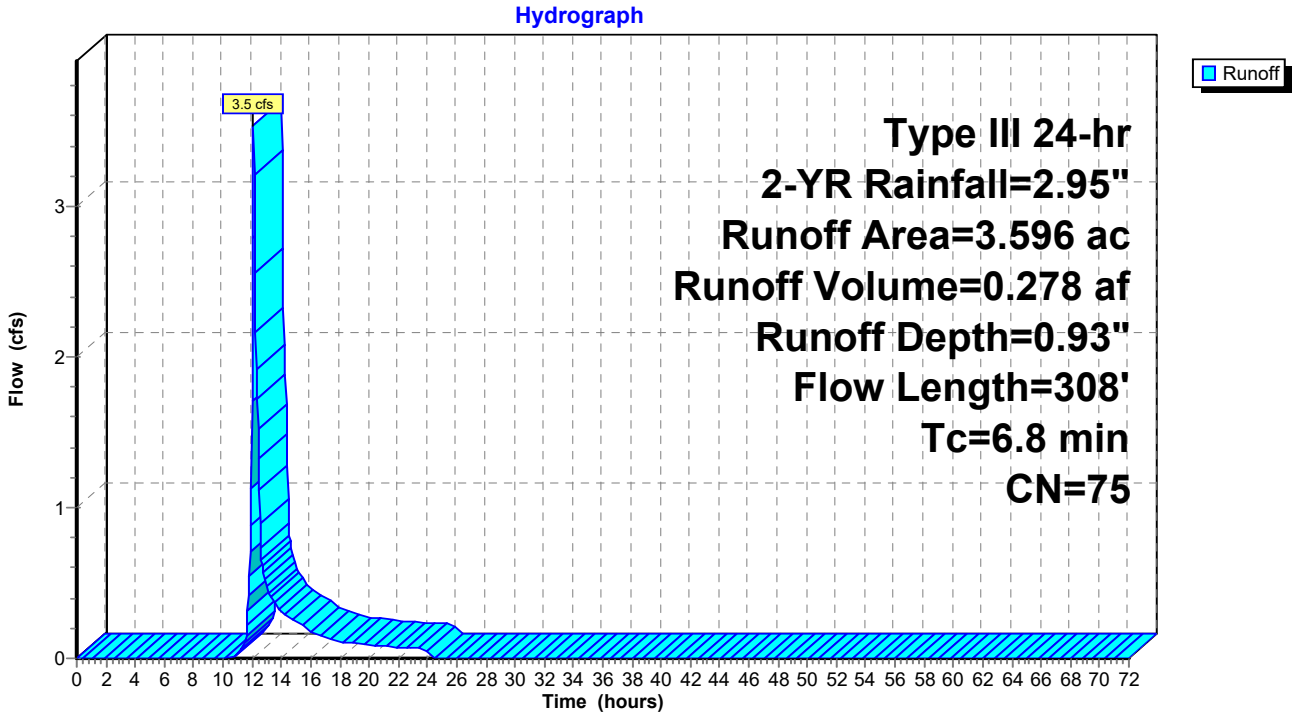
Runoff = 3.5 cfs @ 12.11 hrs, Volume= 0.278 af, Depth= 0.93"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
1.555	74	>75% Grass cover, Good, HSG C
0.077	80	>75% Grass cover, Good, HSG D
0.032	96	Gravel surface, HSG C
0.110	96	Gravel surface, HSG D
0.708	71	Meadow, non-grazed, HSG C
0.028	78	Meadow, non-grazed, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
0.812	70	Woods, Good, HSG C
3.596	75	Weighted Average
3.322		92.39% Pervious Area
0.274		7.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0826	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.95"
1.2	146	0.0792	1.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	112	0.1088	2.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.8	308	Total			

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

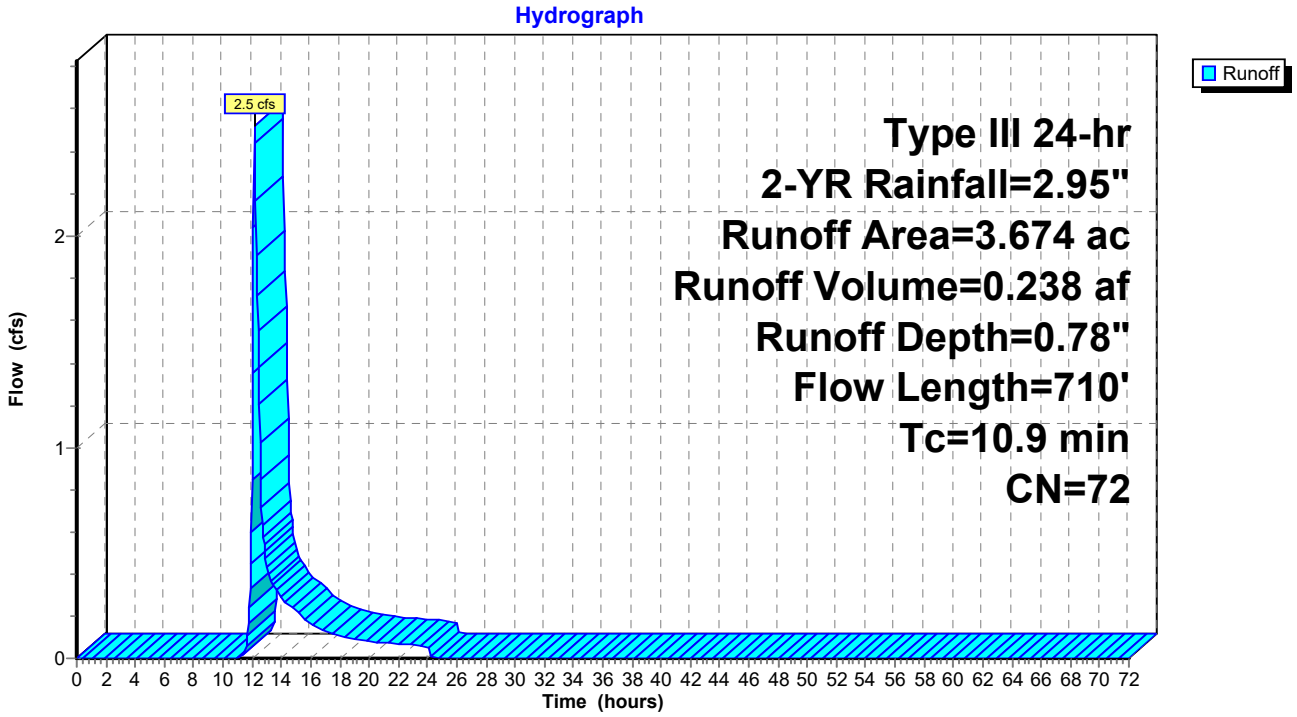
Runoff = 2.5 cfs @ 12.17 hrs, Volume= 0.238 af, Depth= 0.78"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.908	74	>75% Grass cover, Good, HSG C
0.303	71	Meadow, non-grazed, HSG C
0.091	78	Meadow, non-grazed, HSG D
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.229	70	Woods, Good, HSG C
3.674	72	Weighted Average
3.530		96.08% Pervious Area
0.144		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	67	0.1495	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	175	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0447	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1064	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	54	0.0694	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	710	Total			

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

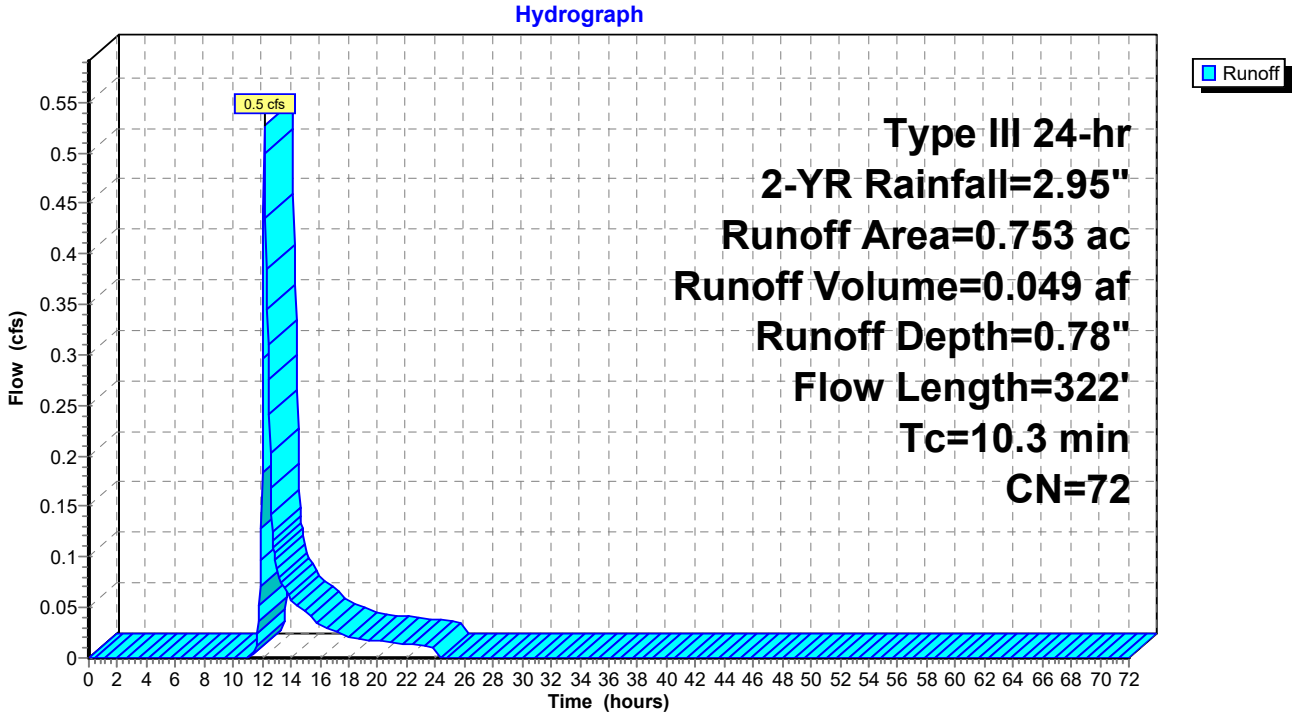
Runoff = 0.5 cfs @ 12.16 hrs, Volume= 0.049 af, Depth= 0.78"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.067	80	>75% Grass cover, Good, HSG D
0.012	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.510	70	Woods, Good, HSG C
0.753	72	Weighted Average
0.753		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-8: Subcat PR-8

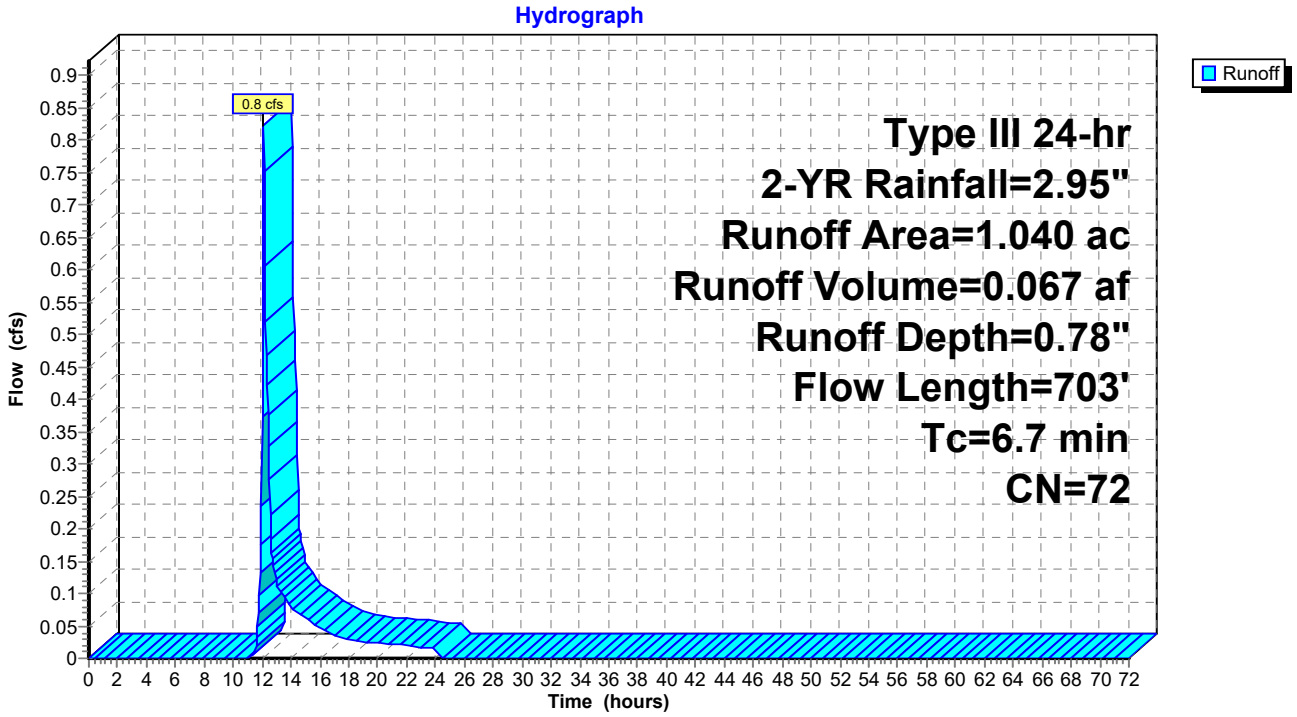
Runoff = 0.8 cfs @ 12.11 hrs, Volume= 0.067 af, Depth= 0.78"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.012	74	>75% Grass cover, Good, HSG C
0.843	71	Meadow, non-grazed, HSG C
0.103	78	Meadow, non-grazed, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
1.040	72	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0794	0.25		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0800	1.98		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	140	0.1004	2.22		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	703	Total			

Subcatchment PR-8: Subcat PR-8



Summary for Subcatchment PR-9: Subcat PR-9

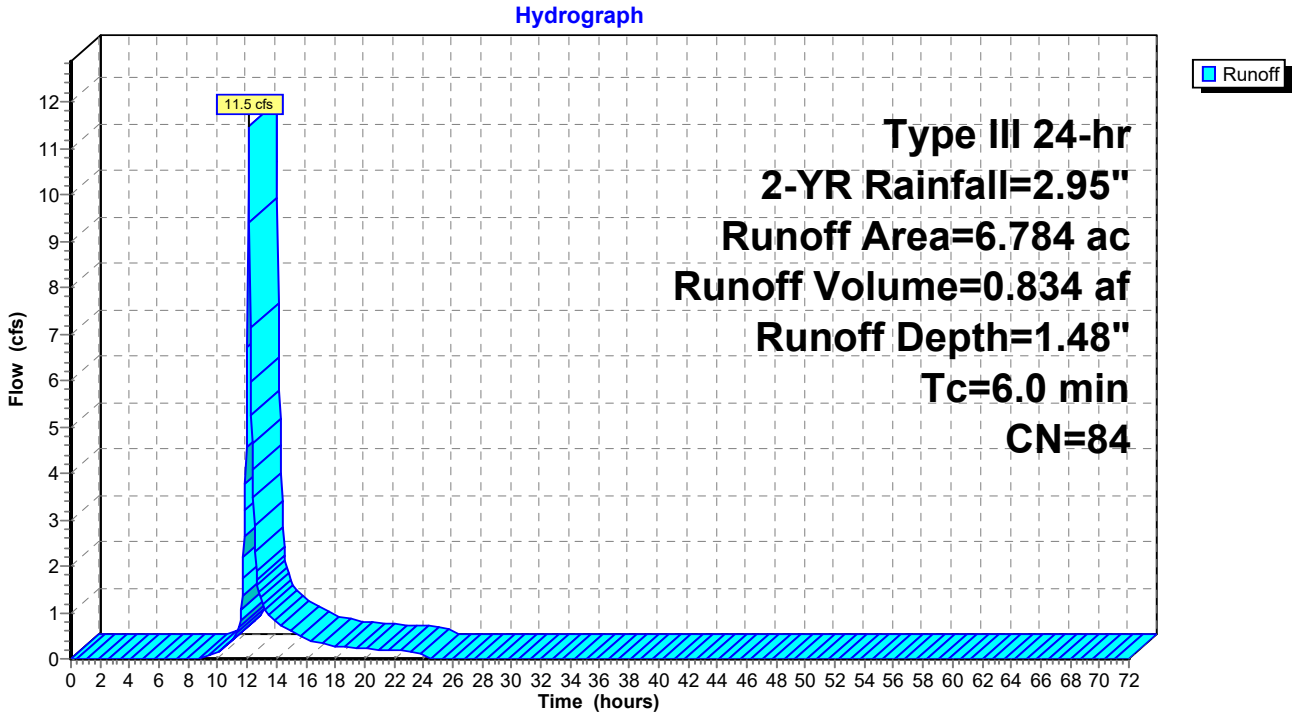
Runoff = 11.5 cfs @ 12.09 hrs, Volume= 0.834 af, Depth= 1.48"
Routed to Pond 1P : Sand Filter #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=2.95"

Area (ac)	CN	Description
0.449	61	>75% Grass cover, Good, HSG B
3.226	74	>75% Grass cover, Good, HSG C
0.001	96	Gravel surface, HSG C
0.130	71	Meadow, non-grazed, HSG C
0.437	98	Paved parking, HSG B
1.056	98	Paved parking, HSG C
0.602	98	Roofs, HSG B
0.883	98	Roofs, HSG C
6.784	84	Weighted Average
3.806		56.10% Pervious Area
2.978		43.90% Impervious Area

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

Subcatchment PR-9: Subcat PR-9



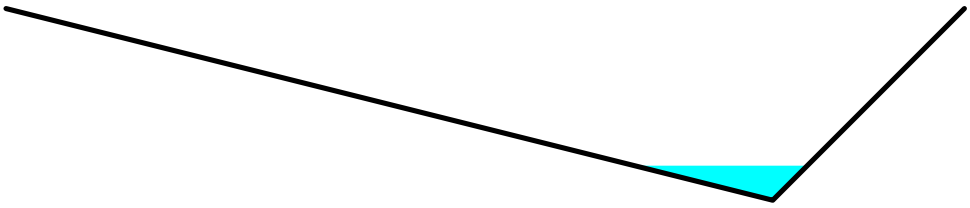
Summary for Reach 1R: Pillsbury Rd Swale

Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 0.78" for 2-YR event
Inflow = 0.8 cfs @ 12.11 hrs, Volume= 0.067 af
Outflow = 0.7 cfs @ 12.17 hrs, Volume= 0.067 af, Atten= 12%, Lag= 3.3 min
Routed to Link DP-4 : DP-4

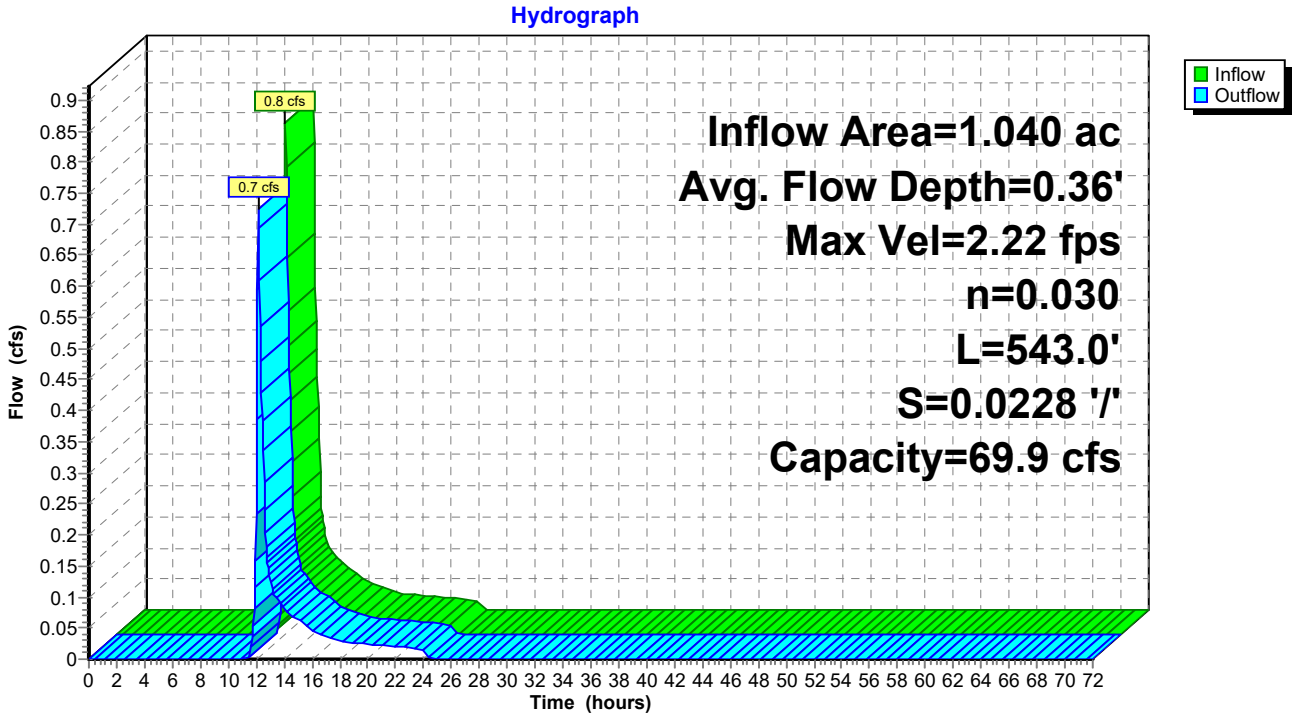
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.22 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 9.0 min

Peak Storage= 177 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.36' , Surface Width= 1.80'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'



Reach 1R: Pillsbury Rd Swale



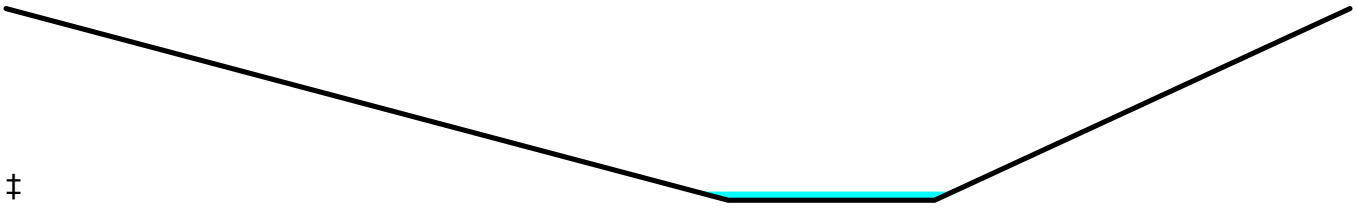
Summary for Reach 2R: Stream South

Inflow Area = 5.683 ac, 32.15% Impervious, Inflow Depth = 1.31" for 2-YR event
Inflow = 1.7 cfs @ 12.20 hrs, Volume= 0.620 af
Outflow = 1.6 cfs @ 12.23 hrs, Volume= 0.620 af, Atten= 1%, Lag= 1.3 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 4.2 min

Peak Storage= 202 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 4.98'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 711.7 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0310 '/'
Inlet Invert= 8.96', Outlet Invert= 0.00'



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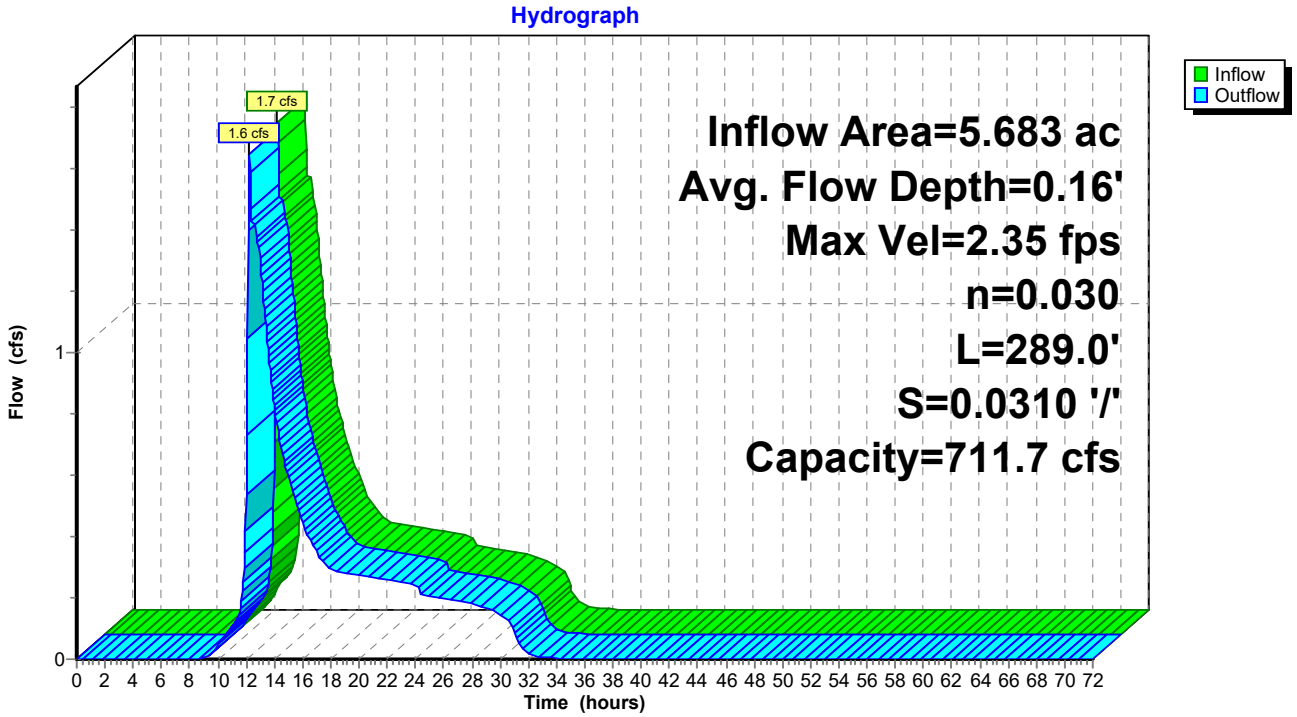
Reach 2R: Stream South



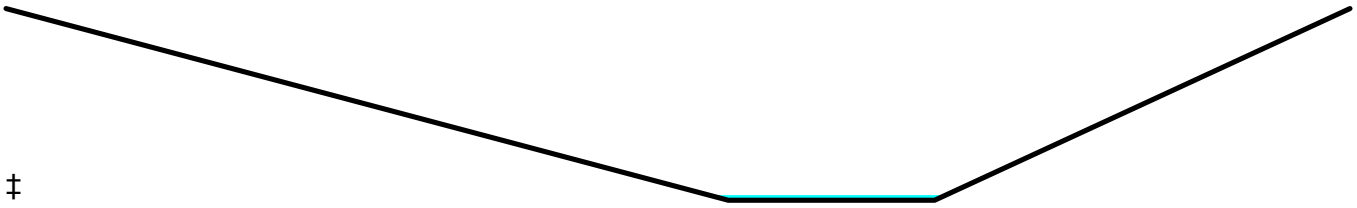
Summary for Reach 3R: Stream North

Inflow Area = 1.094 ac, 10.44% Impervious, Inflow Depth = 0.93" for 2-YR event
Inflow = 0.9 cfs @ 12.16 hrs, Volume= 0.085 af
Outflow = 0.9 cfs @ 12.22 hrs, Volume= 0.085 af, Atten= 7%, Lag= 3.0 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 7.5 min

Peak Storage= 214 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 4.59'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 901.4 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 535.0' Slope= 0.0497 '/'
Inlet Invert= 35.57', Outlet Invert= 8.96'



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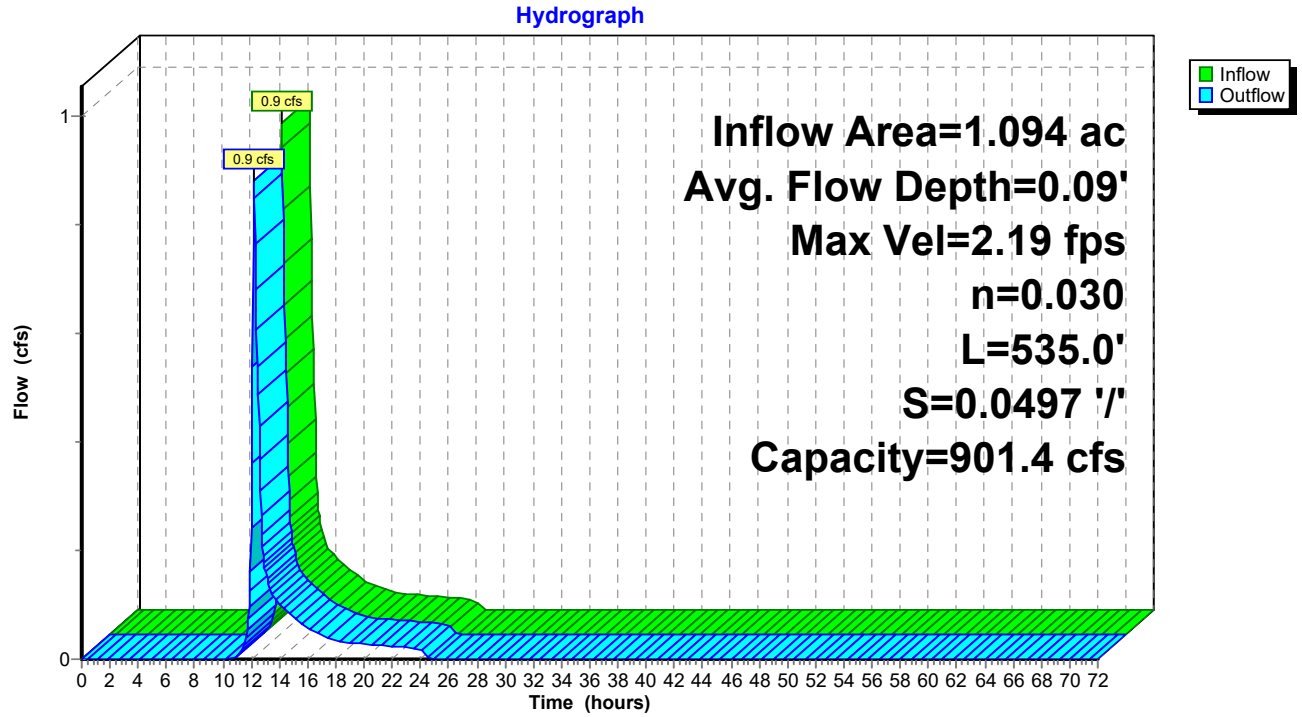


Summary for Pond 1P: Sand Filter #1

Inflow Area = 6.784 ac, 43.90% Impervious, Inflow Depth = 1.48" for 2-YR event
Inflow = 11.5 cfs @ 12.09 hrs, Volume= 0.834 af
Outflow = 0.5 cfs @ 15.79 hrs, Volume= 0.675 af, Atten= 96%, Lag= 222.0 min
Primary = 0.5 cfs @ 15.79 hrs, Volume= 0.675 af
Routed to Link DP-5 : DP-5
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-5 : DP-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 399.96' @ 15.79 hrs Surf.Area= 8,782 sf Storage= 23,878 cf
Flood Elev= 402.80' Surf.Area= 8,782 sf Storage= 62,743 cf

Plug-Flow detention time= 909.5 min calculated for 0.674 af (81% of inflow)
Center-of-Mass det. time= 834.8 min (1,668.2 - 833.4)

Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,952 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	398.00'	79,237 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		83,189 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
396.50	8,782	461.4	0.0	0	0	8,782
398.00	8,782	461.4	30.0	3,952	3,952	9,474

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
398.00	8,782	461.4	0.0	0	0	8,782
398.80	9,907	476.4	100.0	7,471	7,471	9,963
404.00	18,104	574.5	100.0	71,766	79,237	18,610

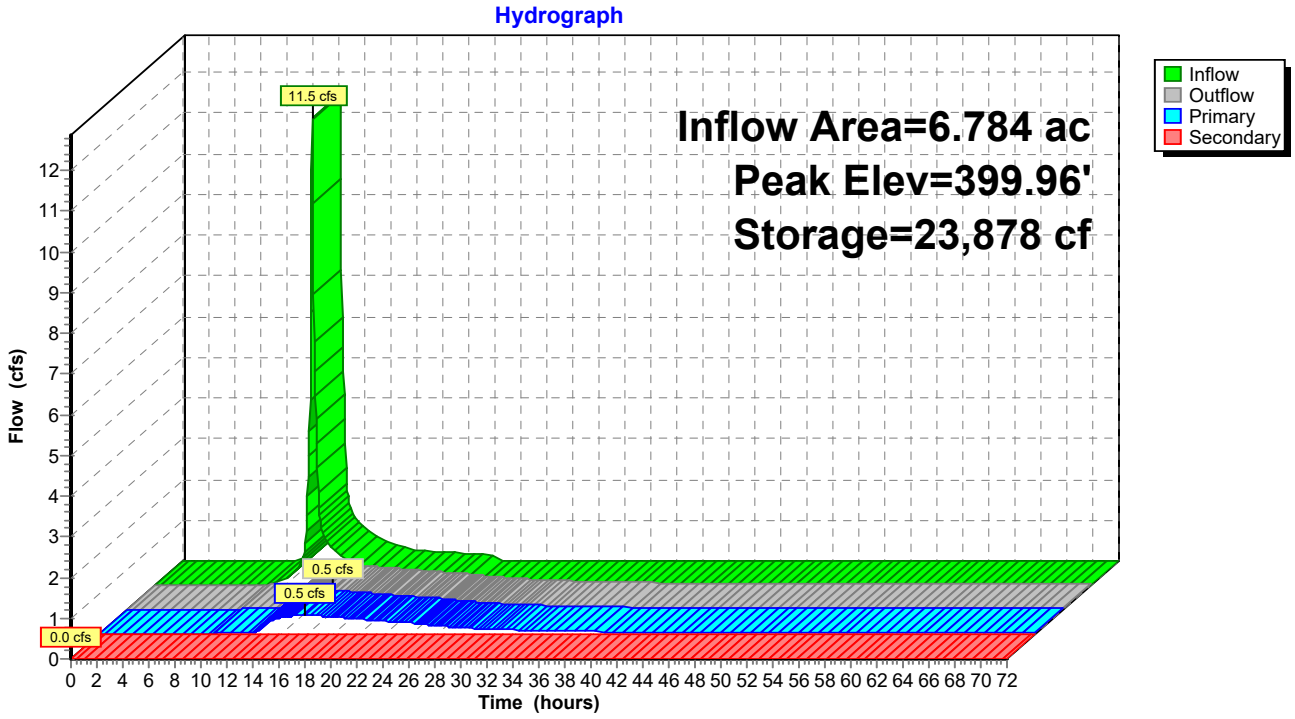
Device	Routing	Invert	Outlet Devices
#1	Primary	395.30'	**15.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 395.30' / 394.00' S= 0.0232 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	395.42'	**1.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	395.42'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 395.42' / 395.42' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	396.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	398.80'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.80 1.80 3.90 Width (feet) 0.10 0.10 1.25 1.25
#6	Device 1	402.70'	**2.5" x 2.5" Horiz. Grate X 12.00 columns** X 12 rows C= 0.600 in 48.0" x 48.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	403.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.5 cfs @ 15.79 hrs HW=399.96' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.5 cfs of 11.9 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.1 cfs @ 10.22 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.4 cfs potential flow)
      - **4=Exfiltration** (Passes 0.1 cfs of 2.0 cfs potential flow)
  - **5=Slotted Weir** (Weir Controls 0.4 cfs @ 3.53 fps)
  - **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=396.50' TW=0.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Sand Filter #1



Summary for Pond 2P: Sand Filter #2

Inflow Area = 3.631 ac, 47.18% Impervious, Inflow Depth = 1.55" for 2-YR event
Inflow = 6.5 cfs @ 12.09 hrs, Volume= 0.468 af
Outflow = 1.2 cfs @ 12.57 hrs, Volume= 0.468 af, Atten= 81%, Lag= 28.4 min
Primary = 1.2 cfs @ 12.57 hrs, Volume= 0.468 af
Routed to Pond 3P : Detention South #3
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3P : Detention South #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 415.54' @ 12.57 hrs Surf.Area= 2,199 sf Storage= 8,610 cf
Flood Elev= 417.80' Surf.Area= 2,199 sf Storage= 19,346 cf

Plug-Flow detention time= 265.5 min calculated for 0.468 af (100% of inflow)
Center-of-Mass det. time= 265.7 min (1,095.5 - 829.8)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	990 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	413.00'	25,811 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		26,801 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.50	2,199	197.3	0.0	0	0	2,199
413.00	2,199	197.3	30.0	990	990	2,495

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
413.00	2,199	197.3	0.0	0	0	2,199
415.00	3,495	235.0	100.0	5,644	5,644	3,566
419.00	6,767	310.4	100.0	20,167	25,811	7,016

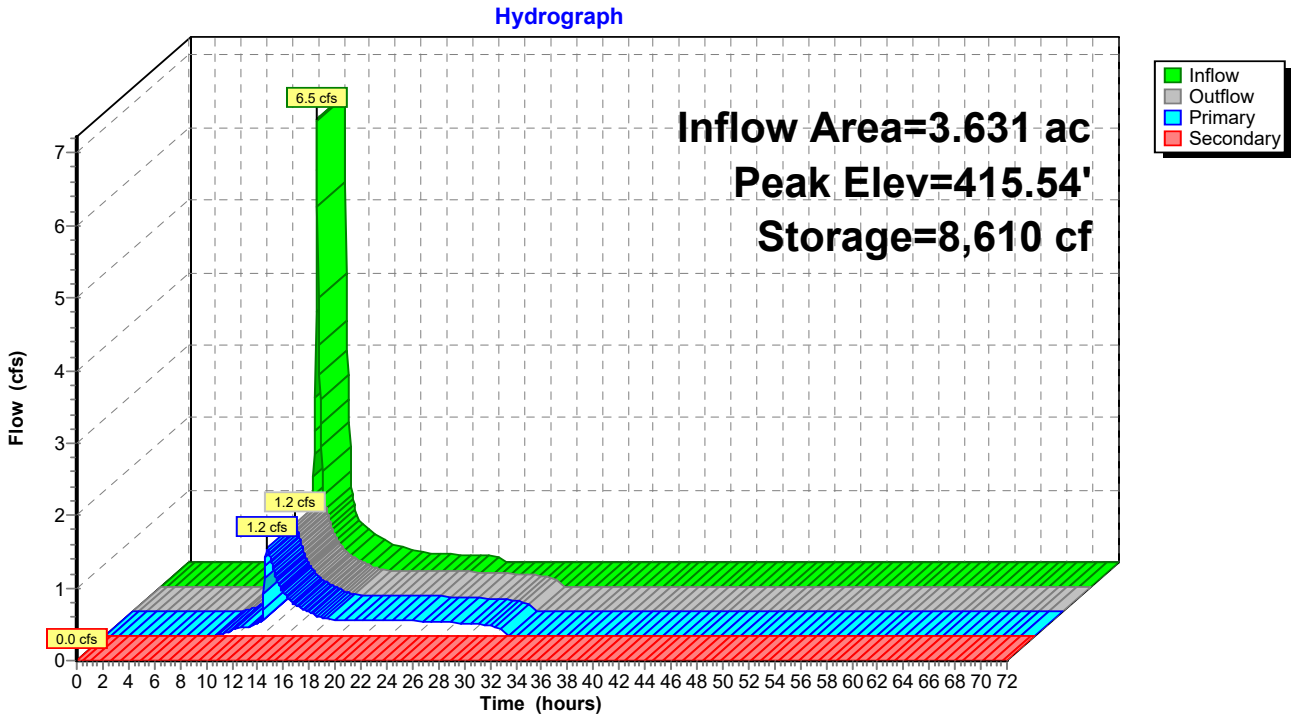
Device	Routing	Invert	Outlet Devices
#1	Primary	410.30'	**18.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.30' / 408.50' S= 0.0196 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	410.33'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	410.33'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.33' / 410.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	411.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	415.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 0.75 0.75
#6	Device 1	417.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	418.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=1.2 cfs @ 12.57 hrs HW=415.54' TW=408.48' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.2 cfs of 18.0 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.2 cfs @ 10.90 fps)
    - **3=Culvert** (Passes 0.2 cfs of 1.5 cfs potential flow)
      - **4=Exfiltration** (Passes 0.2 cfs of 0.5 cfs potential flow)
  - **5=Slotted Weir** (Weir Controls 1.0 cfs @ 2.40 fps)
  - **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=411.50' TW=408.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Sand Filter #2



Summary for Pond 3P: Detention South #3

Inflow Area = 3.837 ac, 44.65% Impervious, Inflow Depth = 1.52" for 2-YR event
Inflow = 1.3 cfs @ 12.55 hrs, Volume= 0.487 af
Outflow = 1.0 cfs @ 12.90 hrs, Volume= 0.487 af, Atten= 17%, Lag= 20.8 min
Primary = 1.0 cfs @ 12.90 hrs, Volume= 0.487 af
Routed to Reach 2R : Stream South
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 408.57' @ 12.90 hrs Surf.Area= 2,499 sf Storage= 1,305 cf
Flood Elev= 410.80' Surf.Area= 4,359 sf Storage= 8,866 cf

Plug-Flow detention time= 30.9 min calculated for 0.487 af (100% of inflow)
Center-of-Mass det. time= 30.3 min (1,116.5 - 1,086.2)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	14,810 cf	**Storage (Irregular)**Listed below (Recalc)

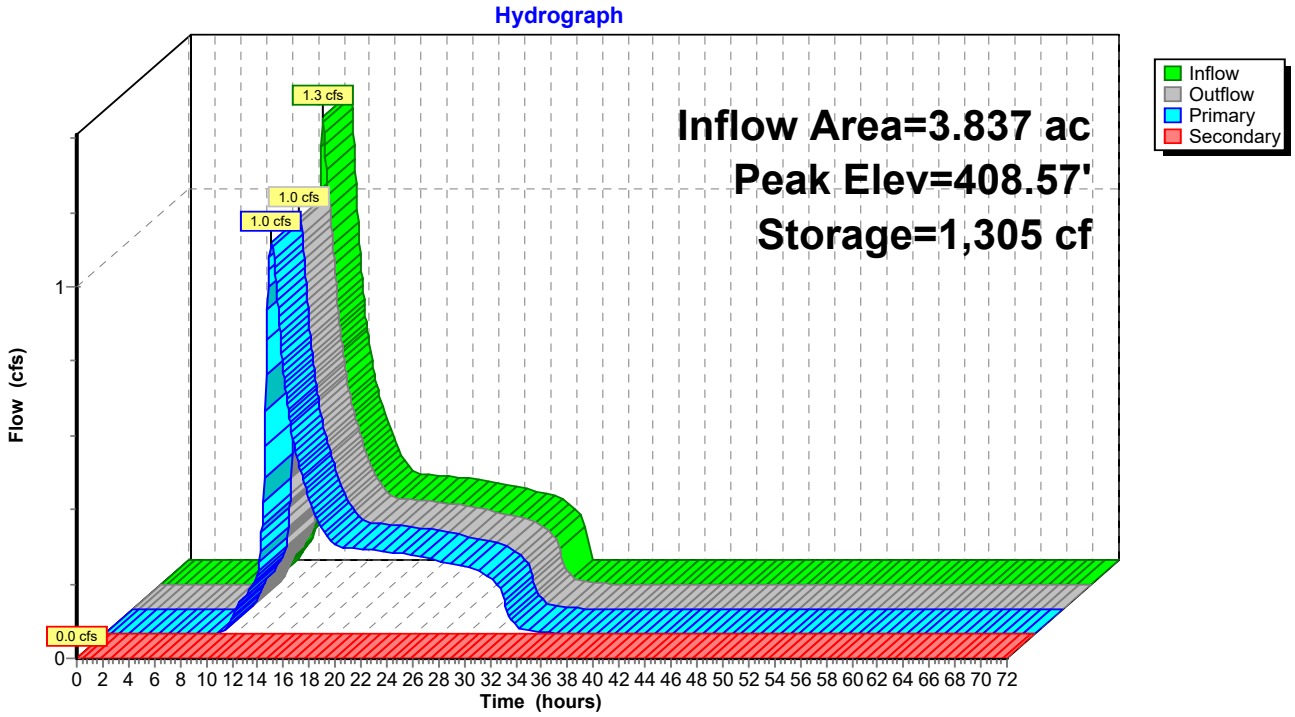
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
408.00	2,108	251.0	0.0	0	0	2,108
412.00	5,572	326.4	100.0	14,810	14,810	5,760

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**15.0" Round Culvert** L= 61.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 404.00' S= 0.0328 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	408.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 1.50 1.50
#3	Device 1	410.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#4	Secondary	411.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.0 cfs @ 12.90 hrs HW=408.57' TW=9.10' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.0 cfs of 8.2 cfs potential flow)
└**2=Slotted Weir** (Weir Controls 1.0 cfs @ 2.47 fps)
└**3=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=408.00' TW=8.96' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond 3P: Detention South #3

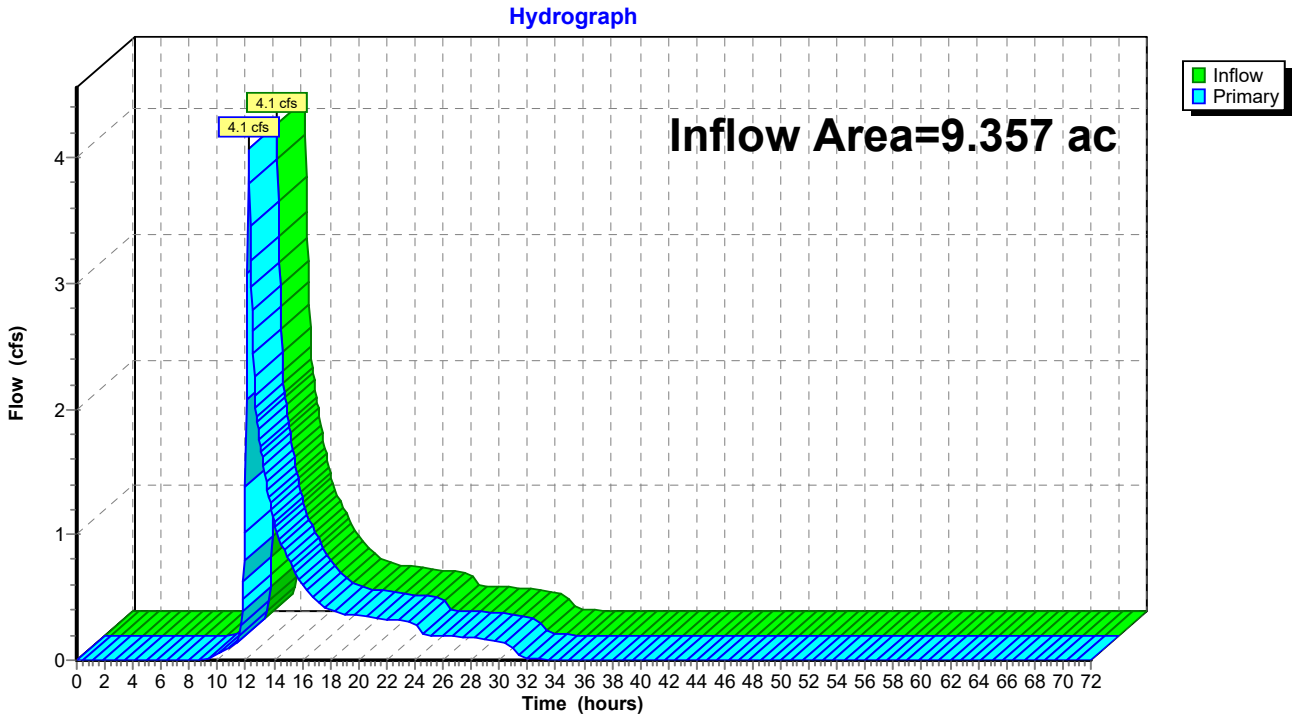


Summary for Link DP-1: DP-1

Inflow Area = 9.357 ac, 21.07% Impervious, Inflow Depth = 1.10" for 2-YR event
Inflow = 4.1 cfs @ 12.20 hrs, Volume= 0.858 af
Primary = 4.1 cfs @ 12.20 hrs, Volume= 0.858 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

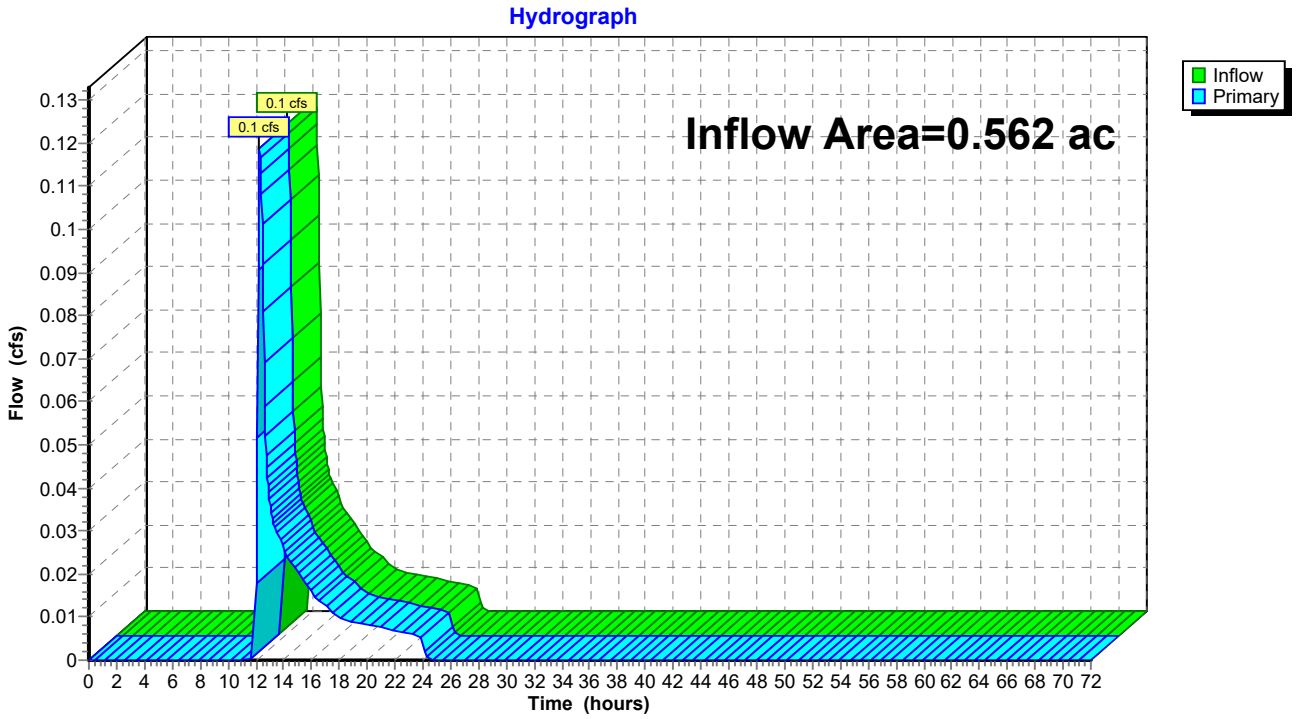


Summary for Link DP-2: DP-2

Inflow Area = 0.562 ac, 0.00% Impervious, Inflow Depth = 0.38" for 2-YR event
Inflow = 0.1 cfs @ 12.26 hrs, Volume= 0.018 af
Primary = 0.1 cfs @ 12.26 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-2: DP-2

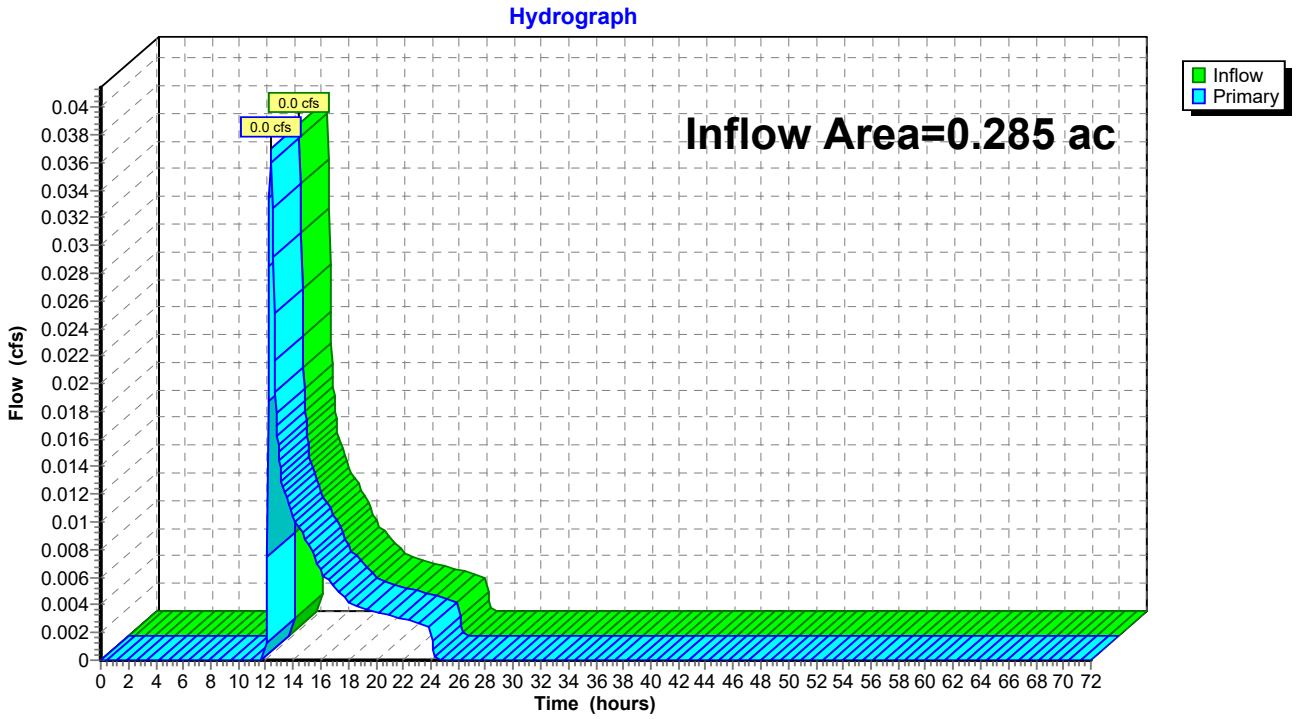


Summary for Link DP-3: DP-3

Inflow Area = 0.285 ac, 0.00% Impervious, Inflow Depth = 0.29" for 2-YR event
Inflow = 0.0 cfs @ 12.37 hrs, Volume= 0.007 af
Primary = 0.0 cfs @ 12.37 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-3: DP-3

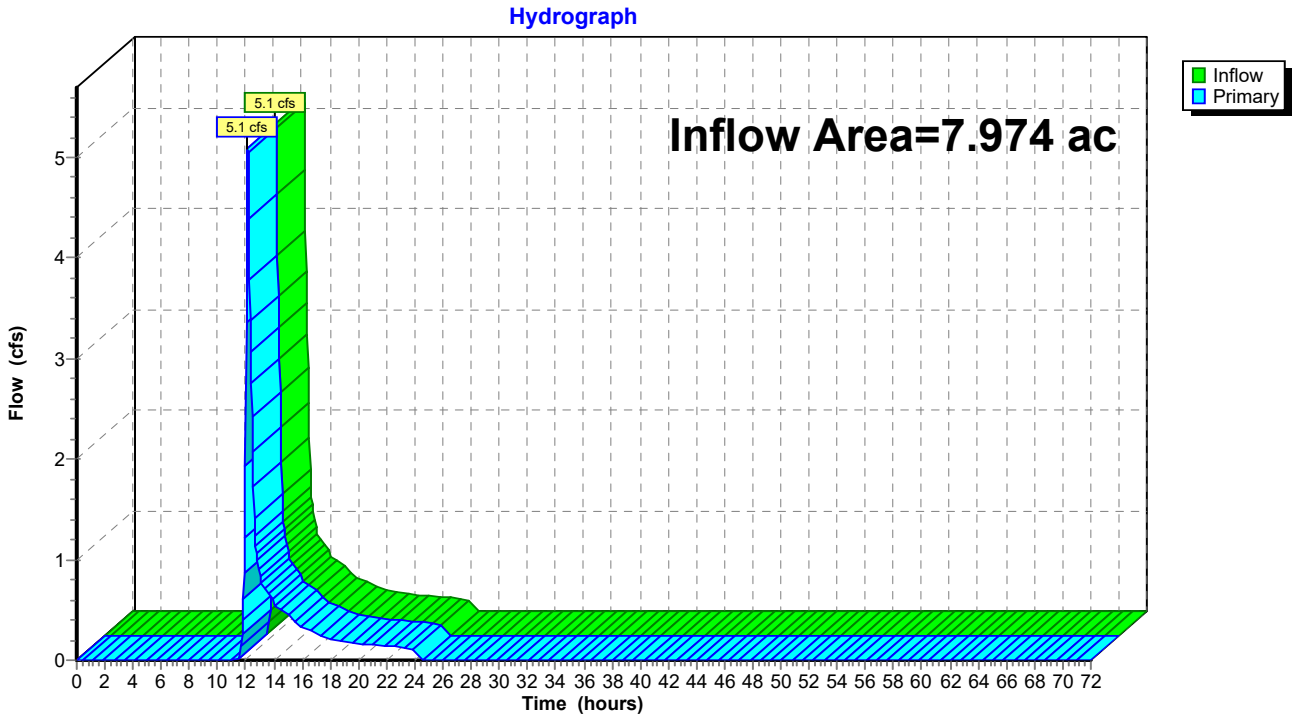


Summary for Link DP-4: DP-4

Inflow Area = 7.974 ac, 0.00% Impervious, Inflow Depth = 0.70" for 2-YR event
Inflow = 5.1 cfs @ 12.14 hrs, Volume= 0.464 af
Primary = 5.1 cfs @ 12.14 hrs, Volume= 0.464 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-4: DP-4

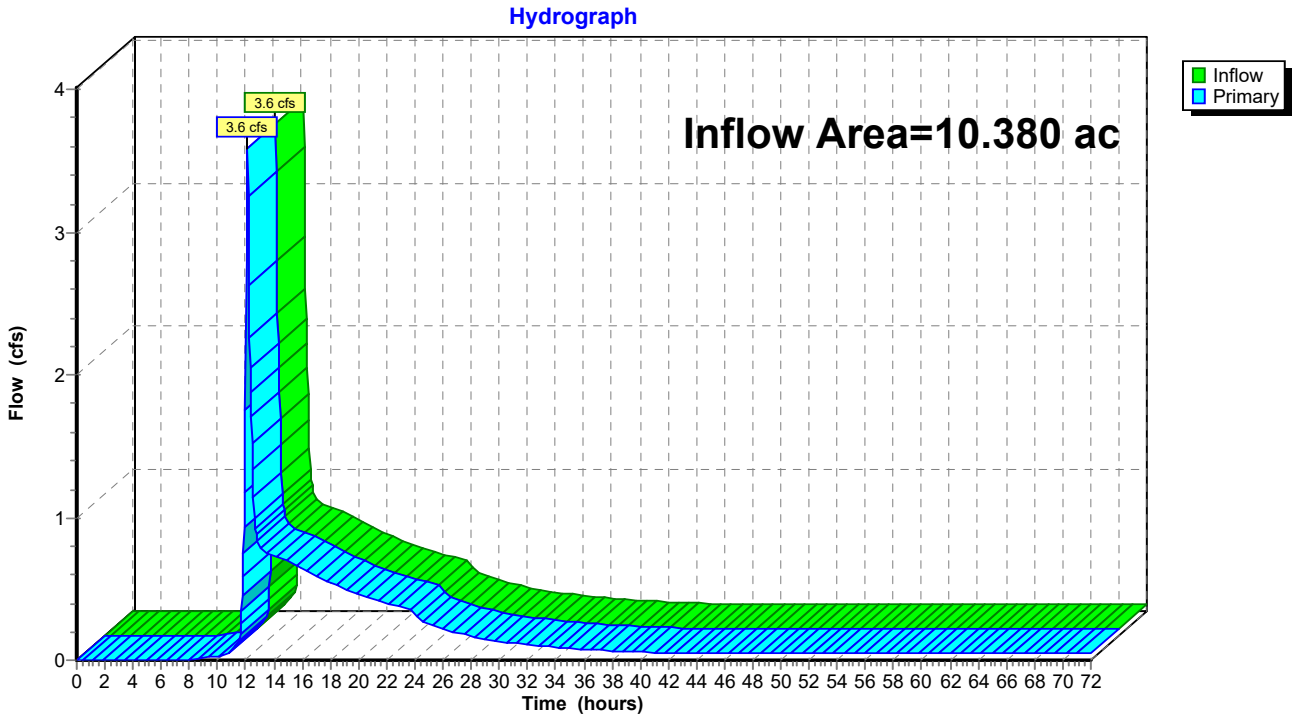


Summary for Link DP-5: DP-5

Inflow Area = 10.380 ac, 31.33% Impervious, Inflow Depth > 1.10" for 2-YR event
Inflow = 3.6 cfs @ 12.11 hrs, Volume= 0.953 af
Primary = 3.6 cfs @ 12.11 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-5: DP-5



Summary for Subcatchment PR-1: Subcat PR-1

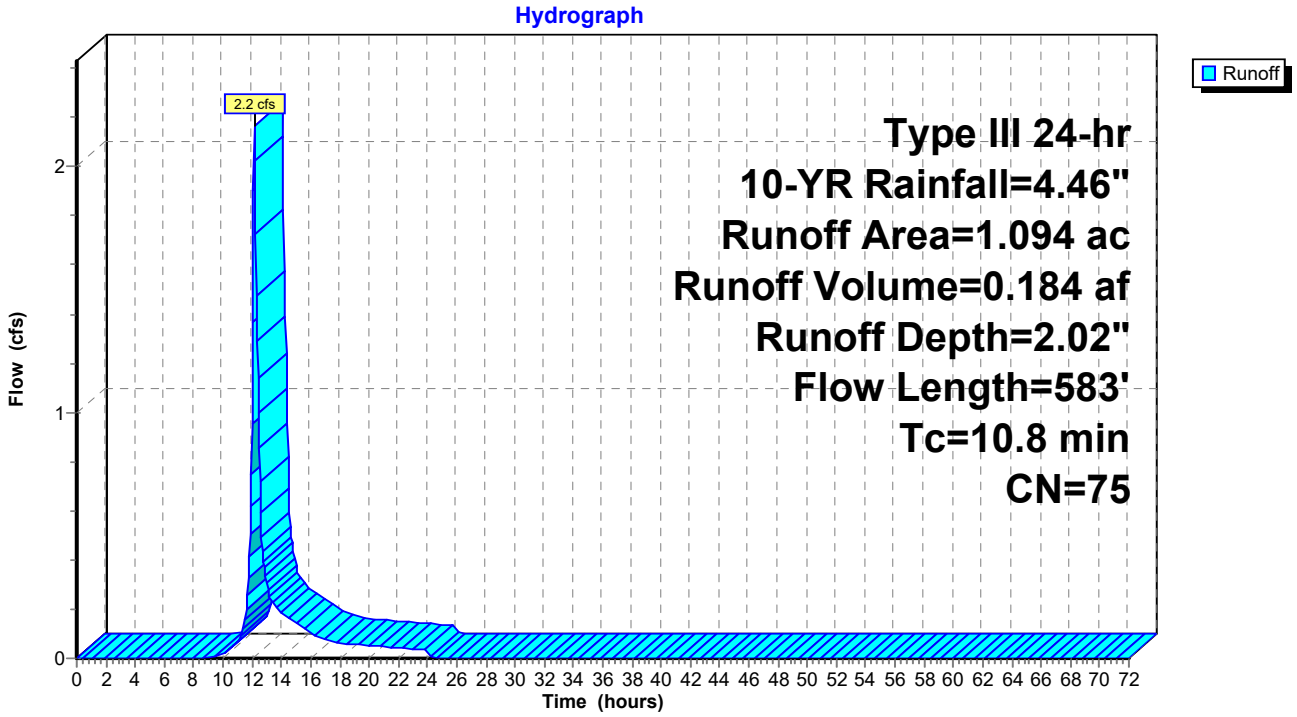
Runoff = 2.2 cfs @ 12.16 hrs, Volume= 0.184 af, Depth= 2.02"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.020	61	>75% Grass cover, Good, HSG B
0.374	74	>75% Grass cover, Good, HSG C
0.005	58	Meadow, non-grazed, HSG B
0.238	71	Meadow, non-grazed, HSG C
0.006	78	Meadow, non-grazed, HSG D
0.114	98	Paved parking, HSG C
0.024	55	Woods, Good, HSG B
0.233	70	Woods, Good, HSG C
0.079	77	Woods, Good, HSG D
1.094	75	Weighted Average
0.979		89.56% Pervious Area
0.114		10.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0334	0.17		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
4.4	379	0.0427	1.45		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0706	1.86		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	99	0.0441	1.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
10.8	583	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

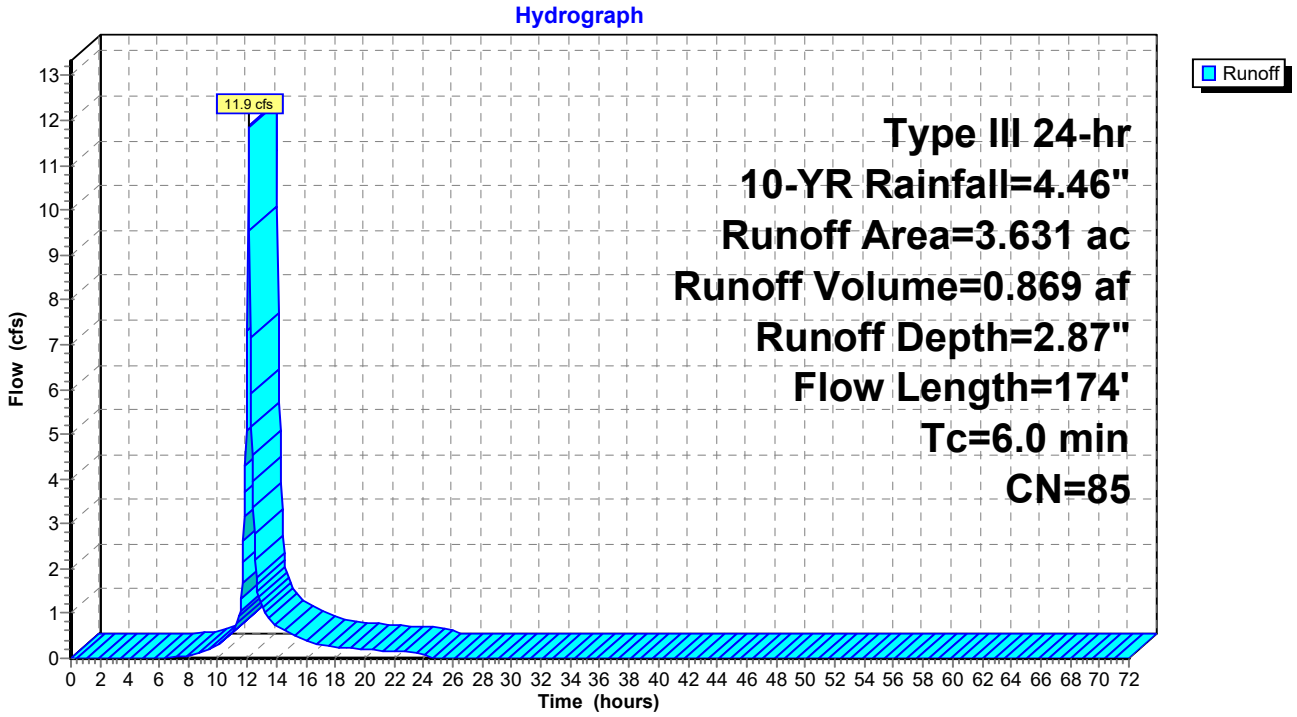
Runoff = 11.9 cfs @ 12.09 hrs, Volume= 0.869 af, Depth= 2.87"
Routed to Pond 2P : Sand Filter #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.119	61	>75% Grass cover, Good, HSG B
1.777	74	>75% Grass cover, Good, HSG C
0.022	71	Meadow, non-grazed, HSG C
0.056	98	Paved parking, HSG B
0.803	98	Paved parking, HSG C
0.176	98	Roofs, HSG B
0.678	98	Roofs, HSG C
3.631	85	Weighted Average
1.918		52.82% Pervious Area
1.713		47.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0738	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.2	124	0.0614	1.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3					**Direct Entry,**
6.0	174	Total			

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

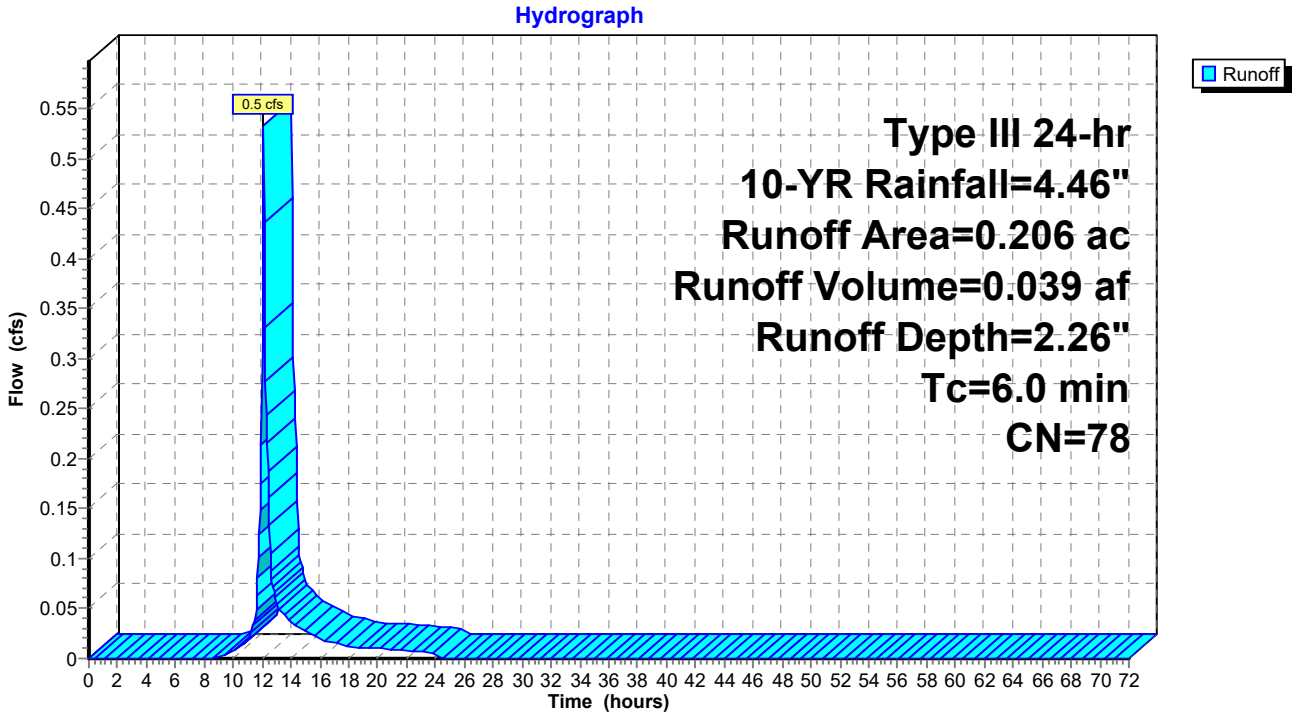
Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 2.26"
Routed to Pond 3P : Detention South #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.136	80	>75% Grass cover, Good, HSG D
0.206	78	Weighted Average
0.206		100.00% Pervious Area

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

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-2: Subcat PR-2

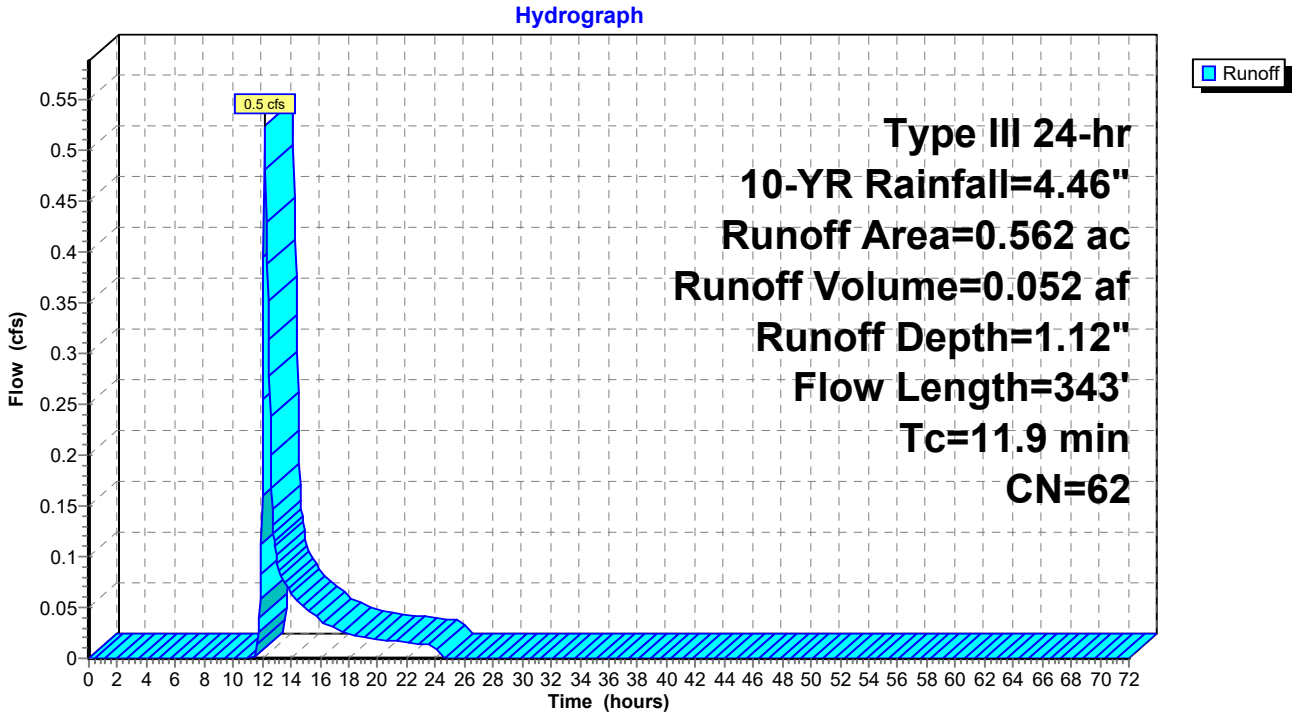
Runoff = 0.5 cfs @ 12.19 hrs, Volume= 0.052 af, Depth= 1.12"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.136	61	>75% Grass cover, Good, HSG B
0.157	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG B
0.258	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.562	62	Weighted Average
0.562		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0219	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
3.3	210	0.0227	1.05		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
2.9	83	0.0046	0.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.9	343	Total			

Subcatchment PR-2: Subcat PR-2



Summary for Subcatchment PR-3: Subcat PR-3

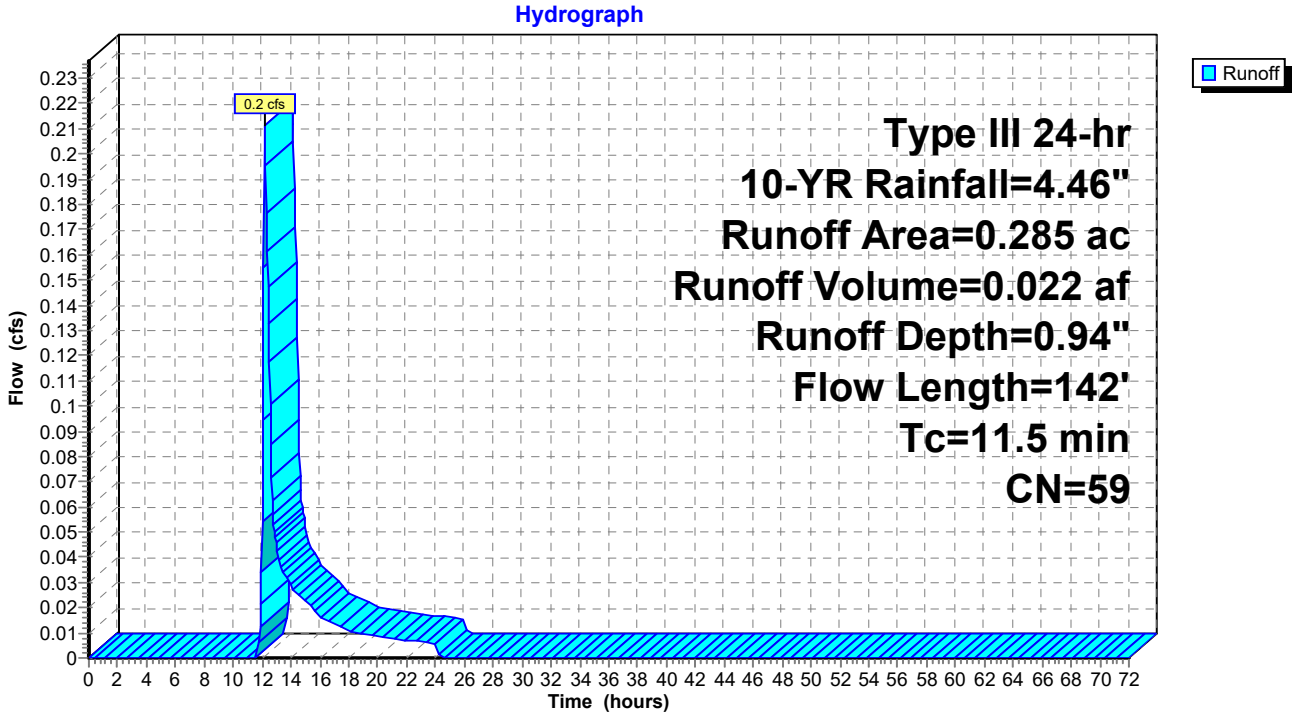
Runoff = 0.2 cfs @ 12.19 hrs, Volume= 0.022 af, Depth= 0.94"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.126	61	>75% Grass cover, Good, HSG B
0.017	74	>75% Grass cover, Good, HSG C
0.142	55	Woods, Good, HSG B
0.285	59	Weighted Average
0.285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0060	0.09		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
0.6	19	0.0060	0.54		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.4	73	0.0163	0.89		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.5	142	Total			

Subcatchment PR-3: Subcat PR-3



Summary for Subcatchment PR-4: Subcat PR-4

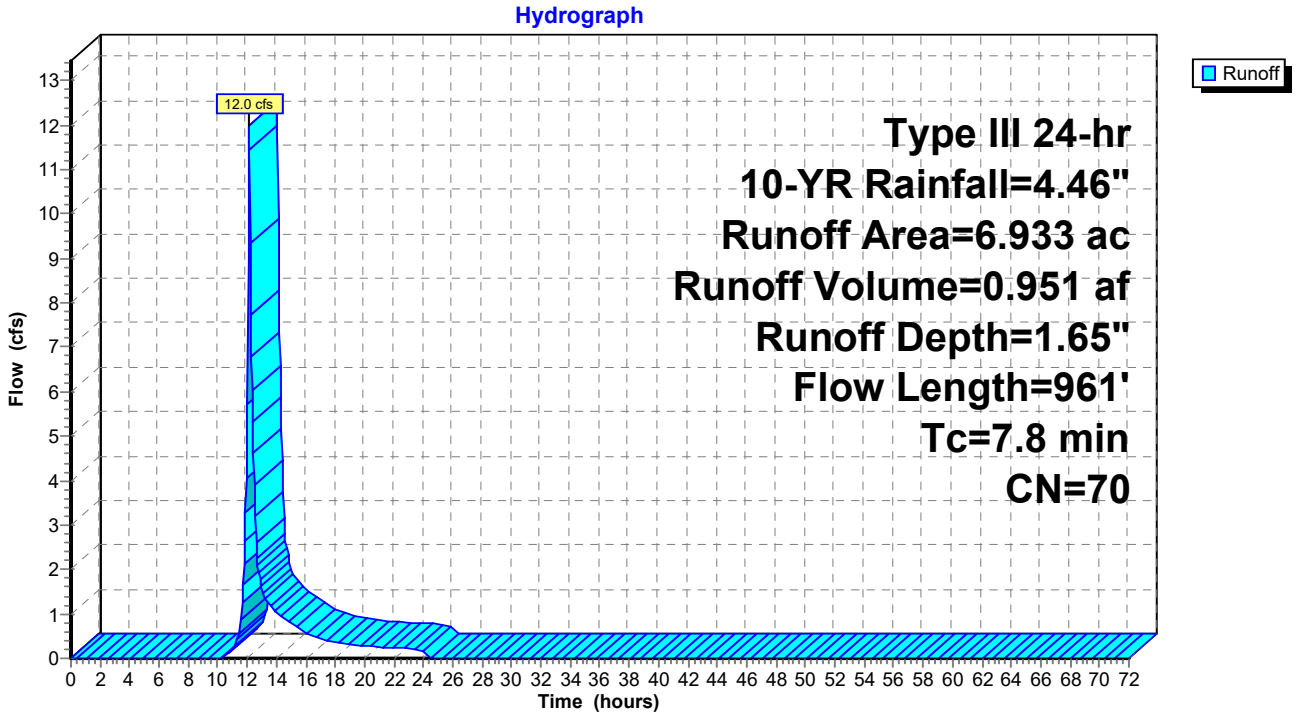
Runoff = 12.0 cfs @ 12.12 hrs, Volume= 0.951 af, Depth= 1.65"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.450	61	>75% Grass cover, Good, HSG B
0.719	74	>75% Grass cover, Good, HSG C
0.041	58	Meadow, non-grazed, HSG B
2.069	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.214	55	Woods, Good, HSG B
2.935	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
6.933	70	Weighted Average
6.933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0831	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
0.2	20	0.0831	2.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	155	0.0873	2.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
7.8	961	Total			

Subcatchment PR-4: Subcat PR-4



Summary for Subcatchment PR-5: Subcat PR-5

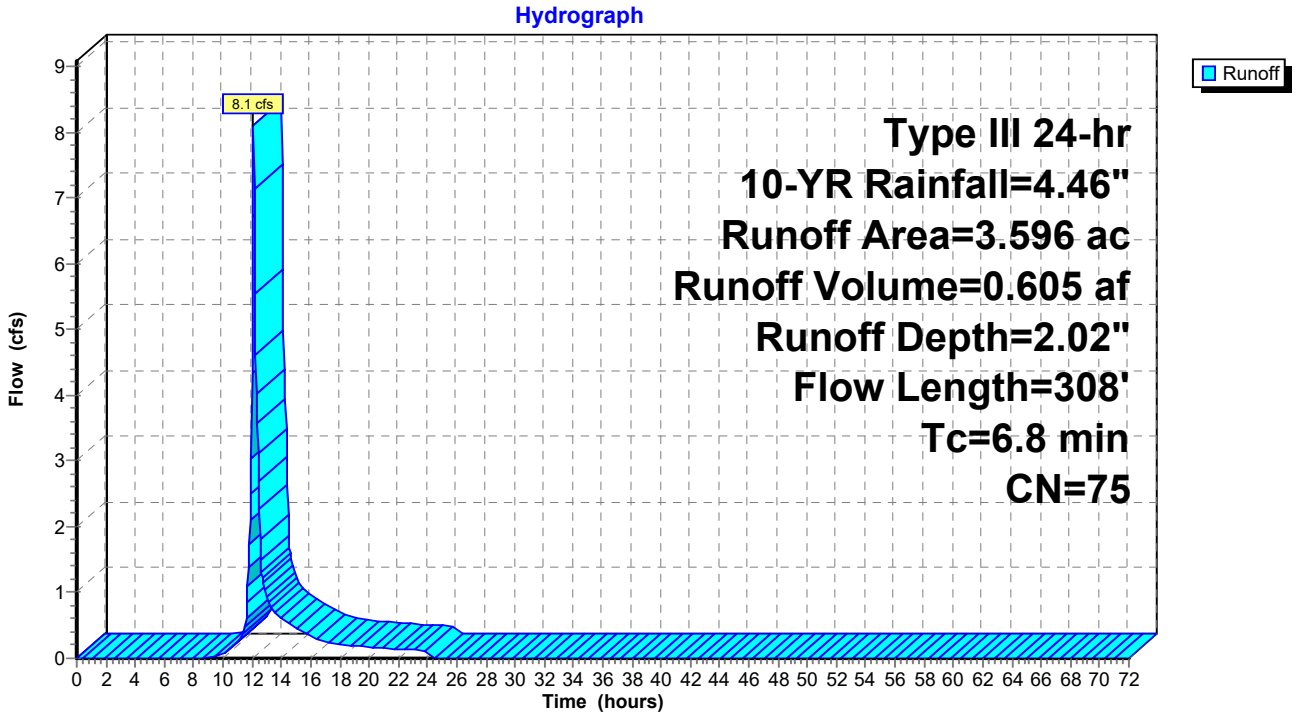
Runoff = 8.1 cfs @ 12.10 hrs, Volume= 0.605 af, Depth= 2.02"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
1.555	74	>75% Grass cover, Good, HSG C
0.077	80	>75% Grass cover, Good, HSG D
0.032	96	Gravel surface, HSG C
0.110	96	Gravel surface, HSG D
0.708	71	Meadow, non-grazed, HSG C
0.028	78	Meadow, non-grazed, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
0.812	70	Woods, Good, HSG C
3.596	75	Weighted Average
3.322		92.39% Pervious Area
0.274		7.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0826	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.95"
1.2	146	0.0792	1.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	112	0.1088	2.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.8	308	Total			

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

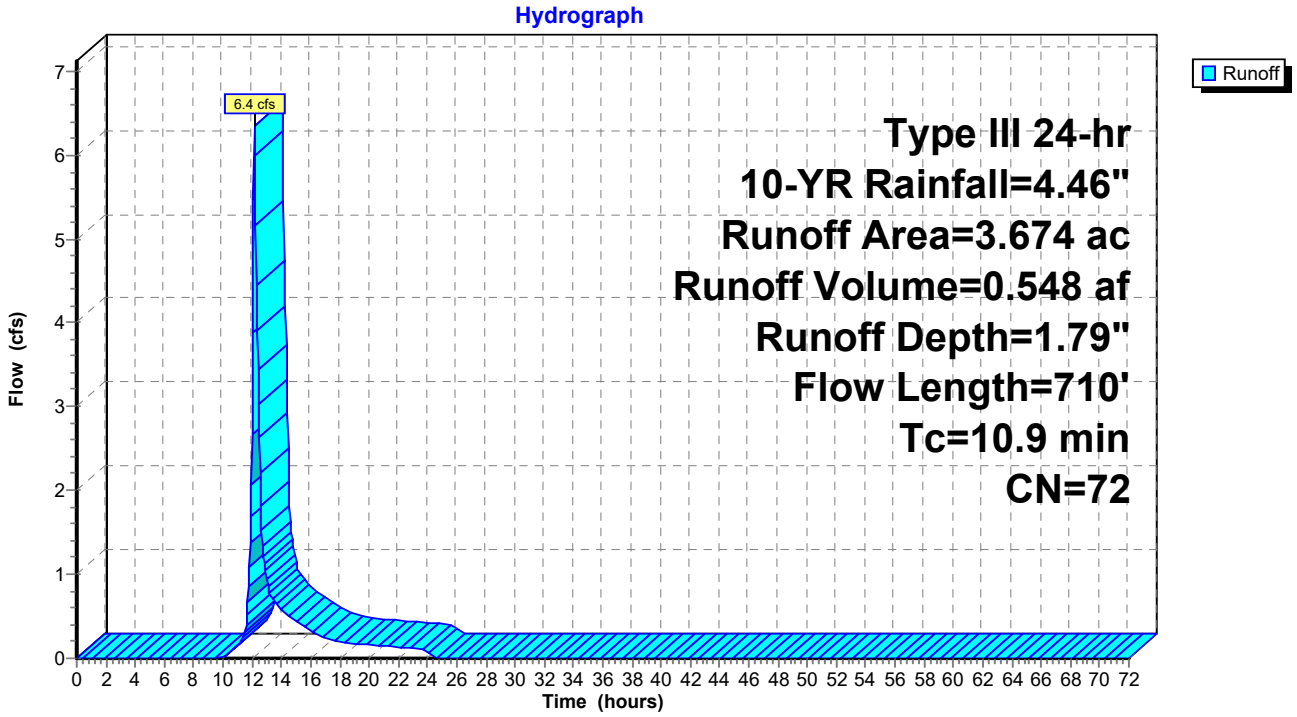
Runoff = 6.4 cfs @ 12.16 hrs, Volume= 0.548 af, Depth= 1.79"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.908	74	>75% Grass cover, Good, HSG C
0.303	71	Meadow, non-grazed, HSG C
0.091	78	Meadow, non-grazed, HSG D
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.229	70	Woods, Good, HSG C
3.674	72	Weighted Average
3.530		96.08% Pervious Area
0.144		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	67	0.1495	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	175	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0447	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1064	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	54	0.0694	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	710	Total			

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

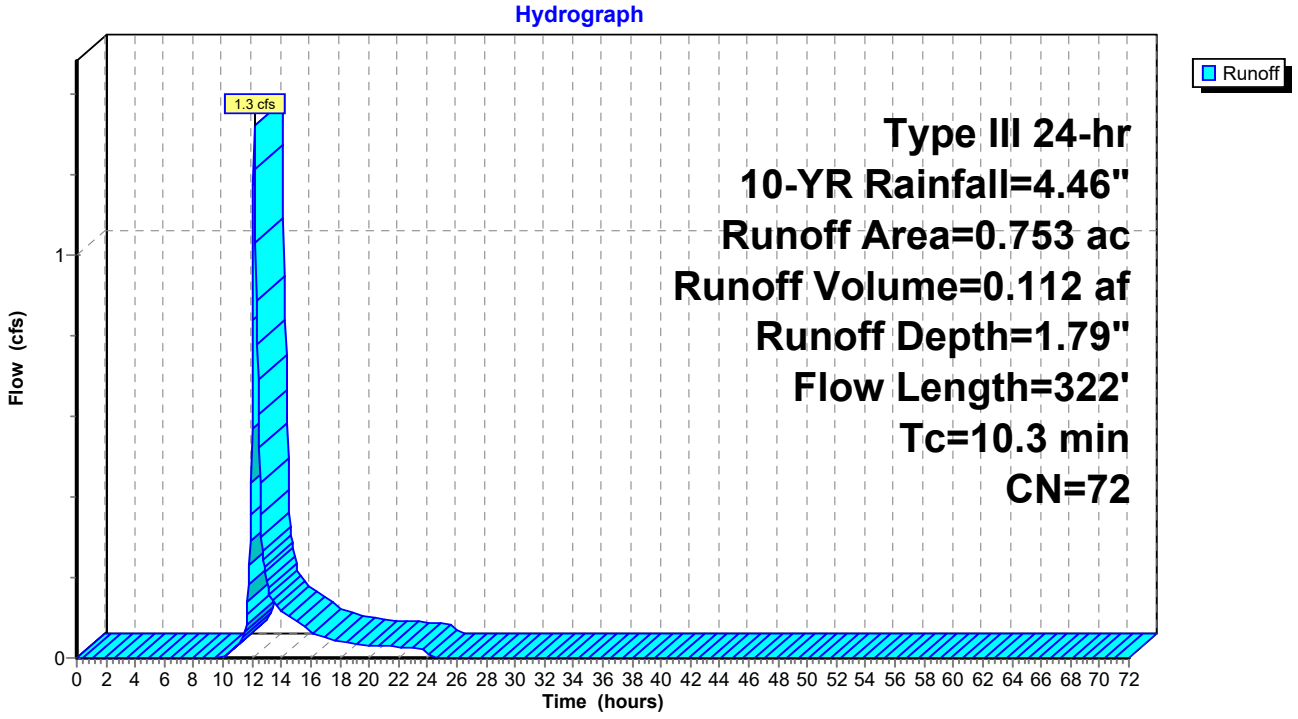
Runoff = 1.3 cfs @ 12.15 hrs, Volume= 0.112 af, Depth= 1.79"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.067	80	>75% Grass cover, Good, HSG D
0.012	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.510	70	Woods, Good, HSG C
0.753	72	Weighted Average
0.753		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-8: Subcat PR-8

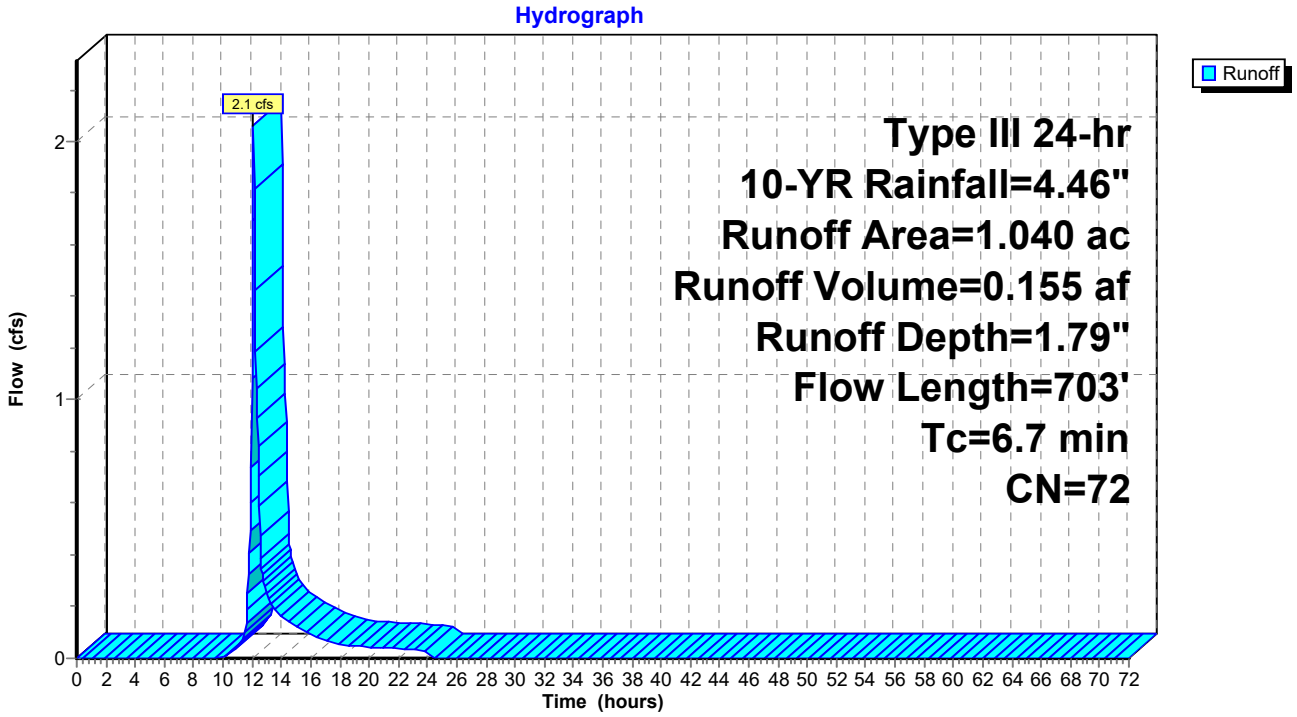
Runoff = 2.1 cfs @ 12.11 hrs, Volume= 0.155 af, Depth= 1.79"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.012	74	>75% Grass cover, Good, HSG C
0.843	71	Meadow, non-grazed, HSG C
0.103	78	Meadow, non-grazed, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
1.040	72	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0794	0.25		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0800	1.98		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	140	0.1004	2.22		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	703	Total			

Subcatchment PR-8: Subcat PR-8



Summary for Subcatchment PR-9: Subcat PR-9

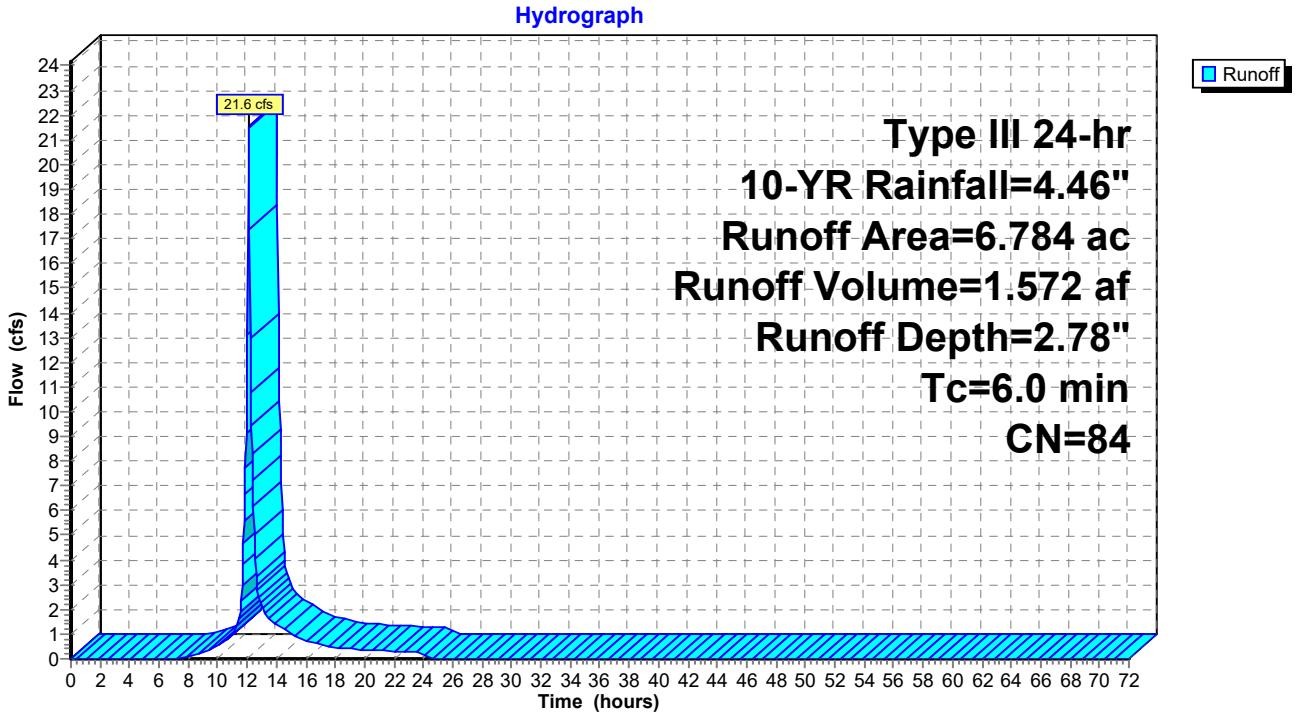
Runoff = 21.6 cfs @ 12.09 hrs, Volume= 1.572 af, Depth= 2.78"
Routed to Pond 1P : Sand Filter #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.46"

Area (ac)	CN	Description
0.449	61	>75% Grass cover, Good, HSG B
3.226	74	>75% Grass cover, Good, HSG C
0.001	96	Gravel surface, HSG C
0.130	71	Meadow, non-grazed, HSG C
0.437	98	Paved parking, HSG B
1.056	98	Paved parking, HSG C
0.602	98	Roofs, HSG B
0.883	98	Roofs, HSG C
6.784	84	Weighted Average
3.806		56.10% Pervious Area
2.978		43.90% Impervious Area

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

Subcatchment PR-9: Subcat PR-9



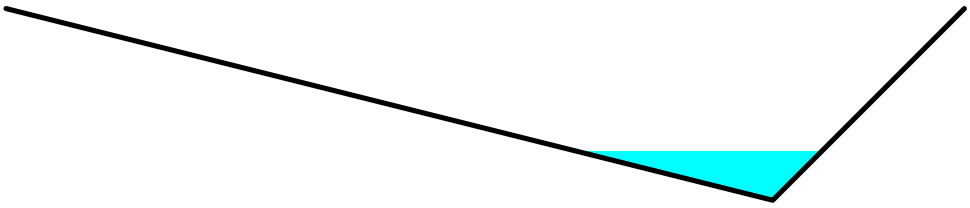
Summary for Reach 1R: Pillsbury Rd Swale

Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 1.79" for 10-YR event
Inflow = 2.1 cfs @ 12.11 hrs, Volume= 0.155 af
Outflow = 1.9 cfs @ 12.15 hrs, Volume= 0.155 af, Atten= 9%, Lag= 2.6 min
Routed to Link DP-4 : DP-4

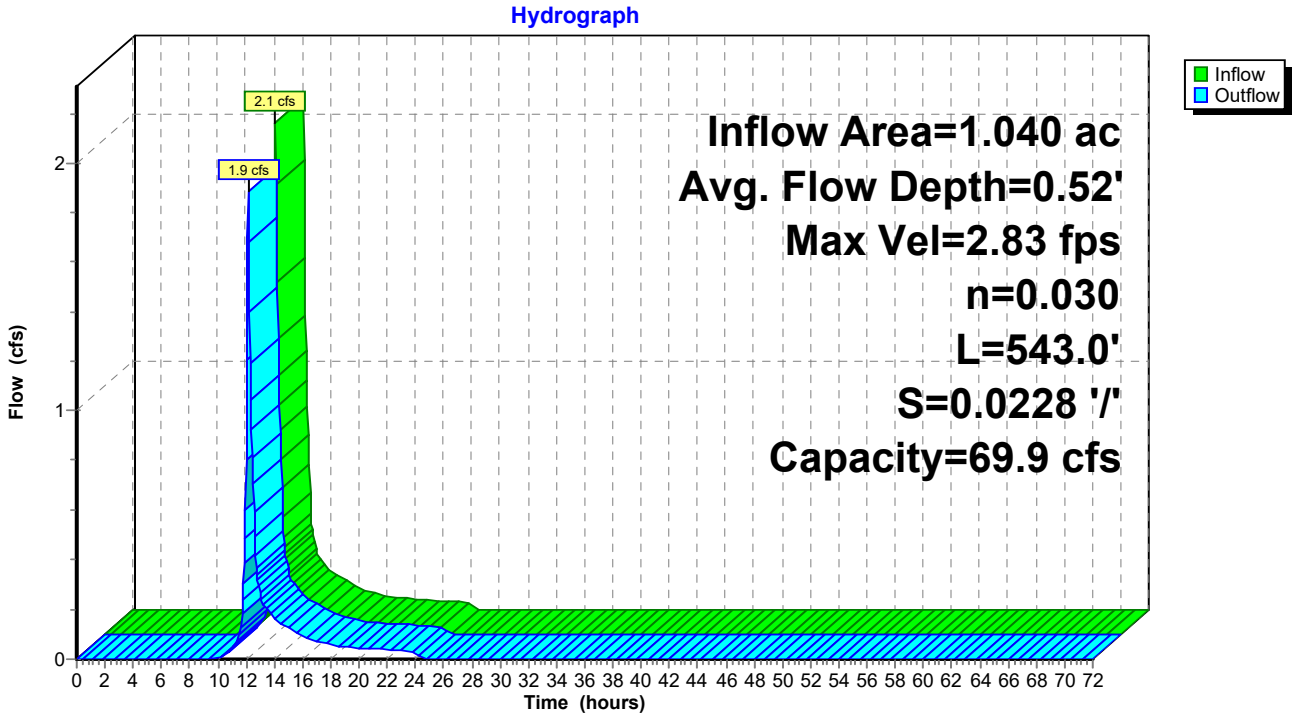
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.83 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 7.7 min

Peak Storage= 361 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.52' , Surface Width= 2.58'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'



Reach 1R: Pillsbury Rd Swale



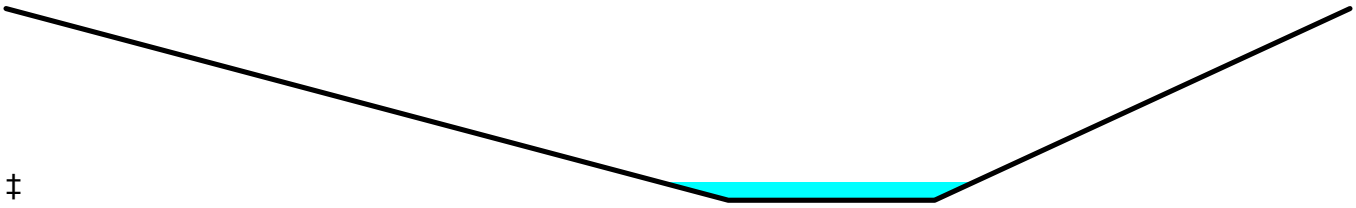
Summary for Reach 2R: Stream South

Inflow Area = 5.683 ac, 32.15% Impervious, Inflow Depth = 2.54" for 10-YR event
Inflow = 6.2 cfs @ 12.41 hrs, Volume= 1.204 af
Outflow = 6.2 cfs @ 12.43 hrs, Volume= 1.204 af, Atten= 0%, Lag= 0.9 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.67 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 3.9 min

Peak Storage= 491 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 6.12'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 711.7 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0310 '/'
Inlet Invert= 8.96', Outlet Invert= 0.00'



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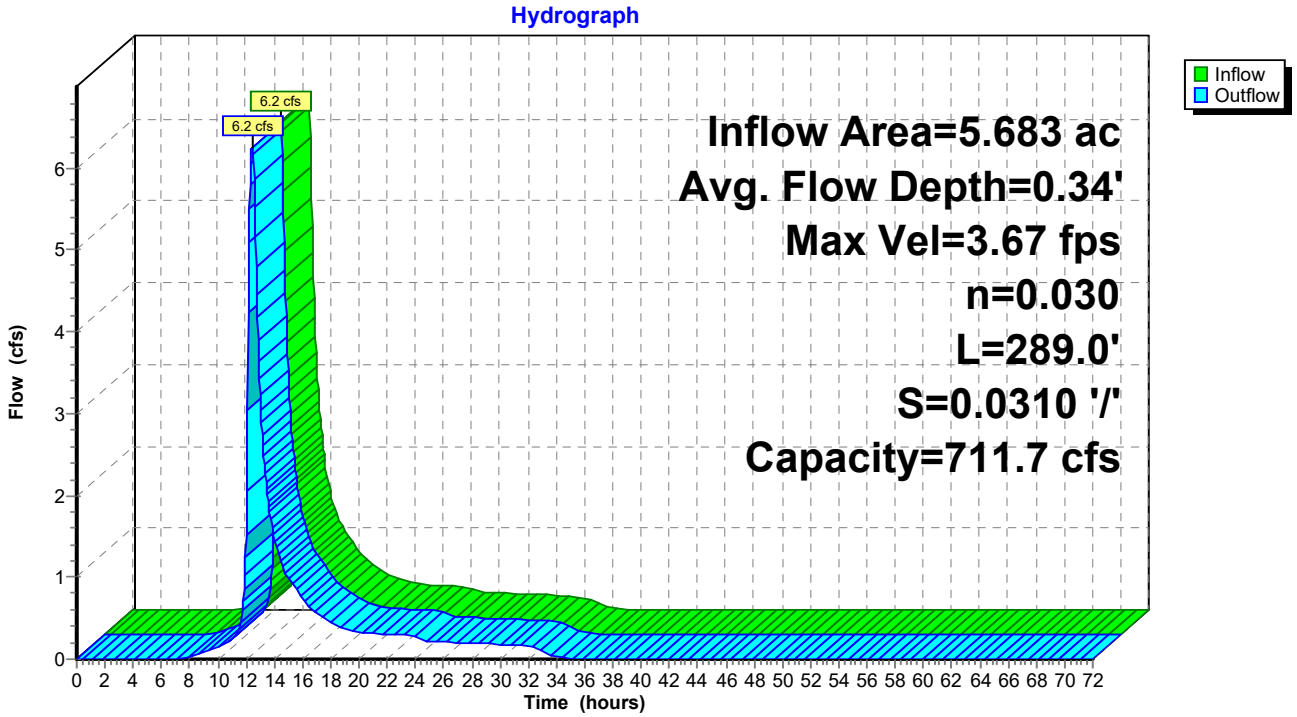


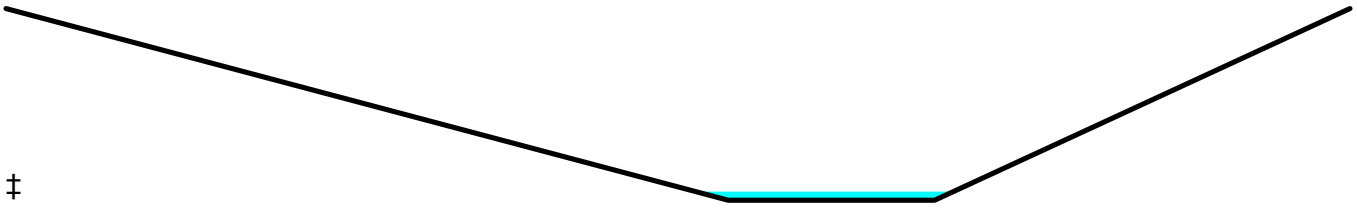
Summary for Reach 3R: Stream North

Inflow Area = 1.094 ac, 10.44% Impervious, Inflow Depth = 2.02" for 10-YR event
Inflow = 2.2 cfs @ 12.16 hrs, Volume= 0.184 af
Outflow = 2.1 cfs @ 12.20 hrs, Volume= 0.184 af, Atten= 4%, Lag= 2.3 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.98 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 7.1 min

Peak Storage= 373 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 4.98'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 901.4 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 535.0' Slope= 0.0497 '/'
Inlet Invert= 35.57', Outlet Invert= 8.96'



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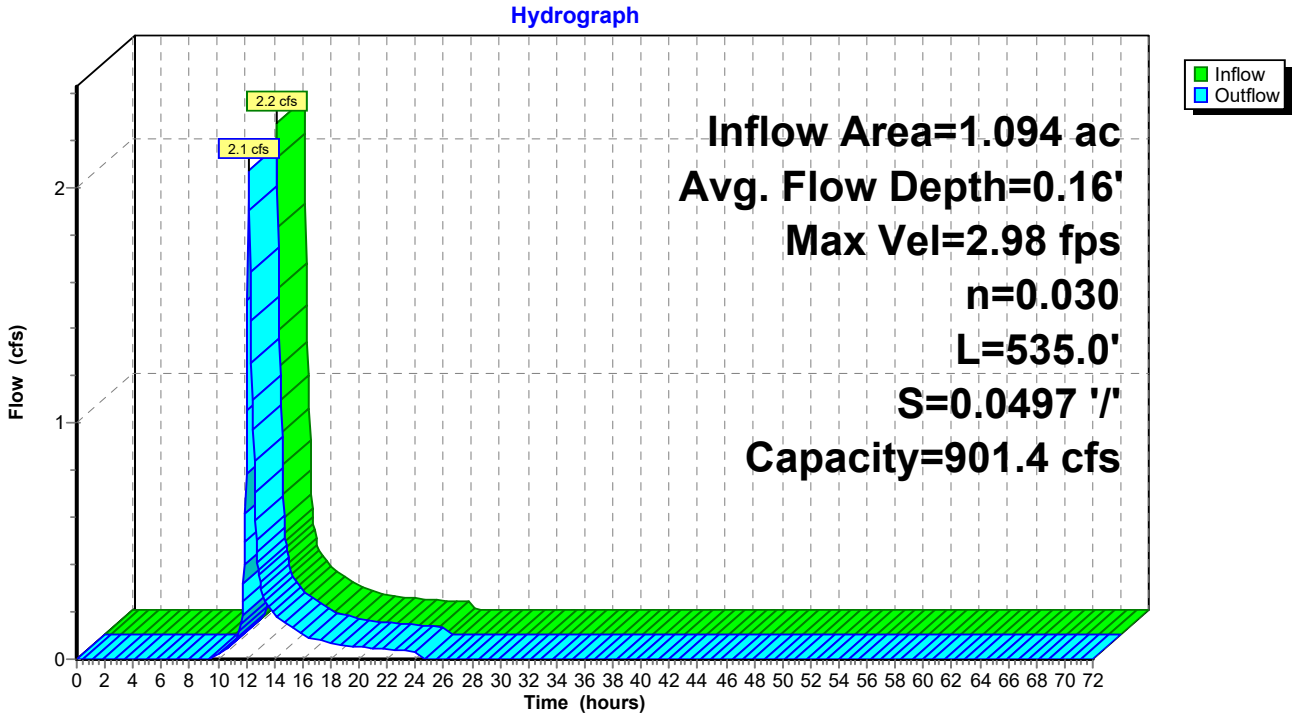


Summary for Pond 1P: Sand Filter #1

Inflow Area = 6.784 ac, 43.90% Impervious, Inflow Depth = 2.78" for 10-YR event
Inflow = 21.6 cfs @ 12.09 hrs, Volume= 1.572 af
Outflow = 2.4 cfs @ 12.89 hrs, Volume= 1.400 af, Atten= 89%, Lag= 47.9 min
Primary = 2.4 cfs @ 12.89 hrs, Volume= 1.400 af
Routed to Link DP-5 : DP-5
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-5 : DP-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 401.06' @ 12.89 hrs Surf.Area= 8,782 sf Storage= 37,435 cf
Flood Elev= 402.80' Surf.Area= 8,782 sf Storage= 62,743 cf

Plug-Flow detention time= 580.5 min calculated for 1.400 af (89% of inflow)
Center-of-Mass det. time= 528.7 min (1,343.8 - 815.1)

Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,952 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	398.00'	79,237 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		83,189 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
396.50	8,782	461.4	0.0	0	0	8,782
398.00	8,782	461.4	30.0	3,952	3,952	9,474

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
398.00	8,782	461.4	0.0	0	0	8,782
398.80	9,907	476.4	100.0	7,471	7,471	9,963
404.00	18,104	574.5	100.0	71,766	79,237	18,610

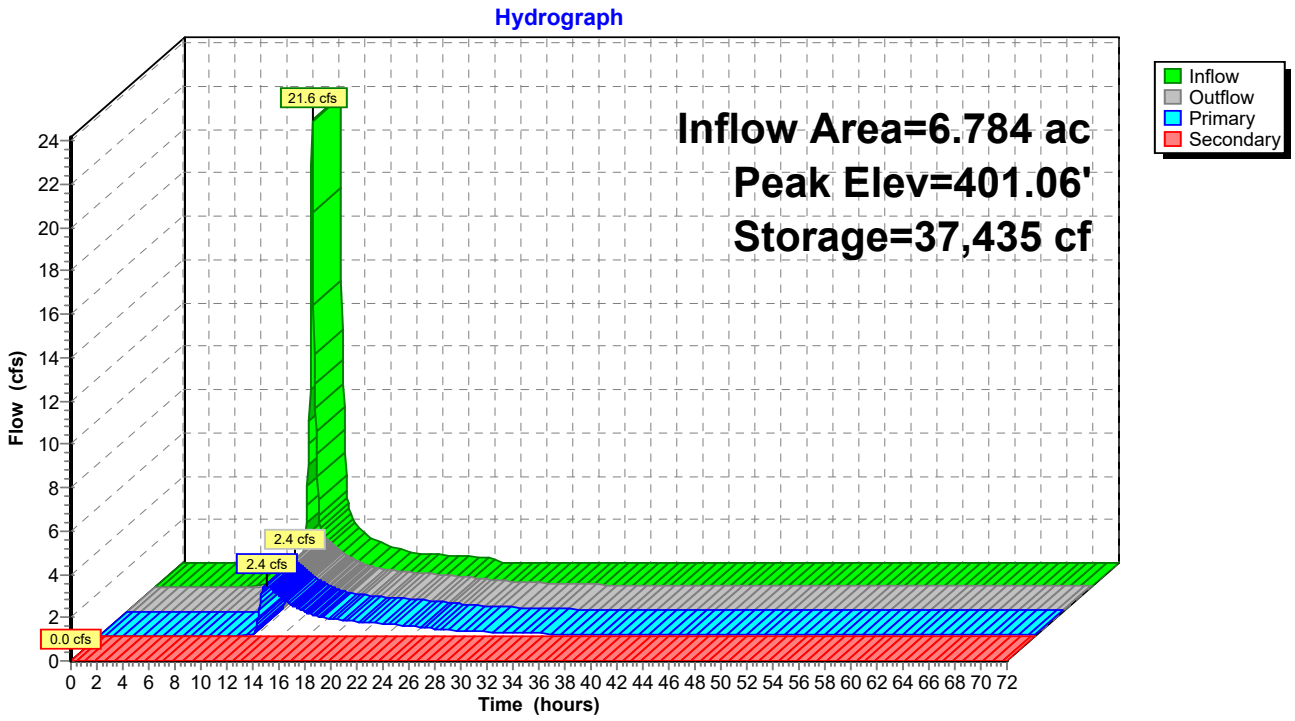
Device	Routing	Invert	Outlet Devices
#1	Primary	395.30'	**15.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 395.30' / 394.00' S= 0.0232 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	395.42'	**1.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	395.42'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 395.42' / 395.42' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	396.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	398.80'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.80 1.80 3.90 Width (feet) 0.10 0.10 1.25 1.25
#6	Device 1	402.70'	**2.5" x 2.5" Horiz. Grate X 12.00 columns** X 12 rows C= 0.600 in 48.0" x 48.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	403.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.4 cfs @ 12.89 hrs HW=401.06' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.4 cfs of 13.4 cfs potential flow)
  └─**2=Underdrain Cap/Orifice** (Orifice Controls 0.1 cfs @ 11.39 fps)
    └─**3=Culvert** (Passes 0.1 cfs of 1.5 cfs potential flow)
      └─**4=Exfiltration** (Passes 0.1 cfs of 2.0 cfs potential flow)
  └─**5=Slotted Weir** (Weir Controls 2.3 cfs @ 3.03 fps)
  └─**6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=396.50' TW=0.00' (Dynamic Tailwater)
└─**7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Sand Filter #1



Summary for Pond 2P: Sand Filter #2

Inflow Area = 3.631 ac, 47.18% Impervious, Inflow Depth = 2.87" for 10-YR event
Inflow = 11.9 cfs @ 12.09 hrs, Volume= 0.869 af
Outflow = 5.0 cfs @ 12.31 hrs, Volume= 0.869 af, Atten= 58%, Lag= 13.4 min
Primary = 5.0 cfs @ 12.31 hrs, Volume= 0.869 af
Routed to Pond 3P : Detention South #3
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3P : Detention South #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 416.56' @ 12.31 hrs Surf.Area= 2,199 sf Storage= 12,940 cf
Flood Elev= 417.80' Surf.Area= 2,199 sf Storage= 19,346 cf

Plug-Flow detention time= 184.0 min calculated for 0.869 af (100% of inflow)
Center-of-Mass det. time= 184.3 min (996.4 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	990 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	413.00'	25,811 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		26,801 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.50	2,199	197.3	0.0	0	0	2,199
413.00	2,199	197.3	30.0	990	990	2,495

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
413.00	2,199	197.3	0.0	0	0	2,199
415.00	3,495	235.0	100.0	5,644	5,644	3,566
419.00	6,767	310.4	100.0	20,167	25,811	7,016

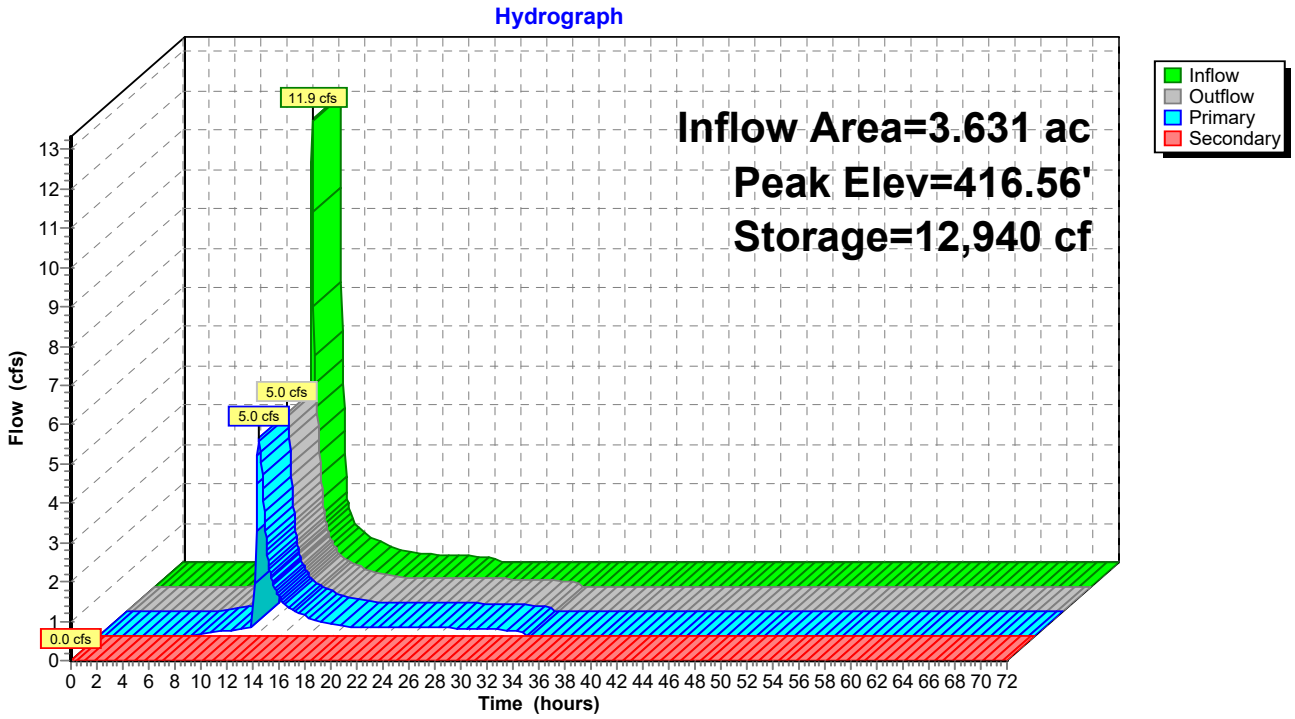
Device	Routing	Invert	Outlet Devices
#1	Primary	410.30'	**18.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.30' / 408.50' S= 0.0196 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	410.33'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	410.33'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.33' / 410.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	411.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	415.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 0.75 0.75
#6	Device 1	417.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	418.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=5.0 cfs @ 12.31 hrs HW=416.55' TW=409.21' (Dynamic Tailwater)
- **1=Culvert** (Passes 5.0 cfs of 20.0 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.3 cfs @ 11.93 fps)
    - **3=Culvert** (Passes 0.3 cfs of 1.6 cfs potential flow)
      - **4=Exfiltration** (Passes 0.3 cfs of 0.5 cfs potential flow)
  - **5=Slotted Weir** (Weir Controls 4.8 cfs @ 4.08 fps)
  - **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=411.50' TW=408.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond 2P: Sand Filter #2



Summary for Pond 3P: Detention South #3

Inflow Area = 3.837 ac, 44.65% Impervious, Inflow Depth = 2.84" for 10-YR event
Inflow = 5.3 cfs @ 12.30 hrs, Volume= 0.908 af
Outflow = 4.6 cfs @ 12.50 hrs, Volume= 0.908 af, Atten= 13%, Lag= 11.9 min
Primary = 4.6 cfs @ 12.50 hrs, Volume= 0.908 af
Routed to Reach 2R : Stream South
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 409.38' @ 12.50 hrs Surf.Area= 3,117 sf Storage= 3,584 cf
Flood Elev= 410.80' Surf.Area= 4,359 sf Storage= 8,866 cf

Plug-Flow detention time= 23.9 min calculated for 0.907 af (100% of inflow)
Center-of-Mass det. time= 24.2 min (1,013.6 - 989.4)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	14,810 cf	**Storage (Irregular)**Listed below (Recalc)

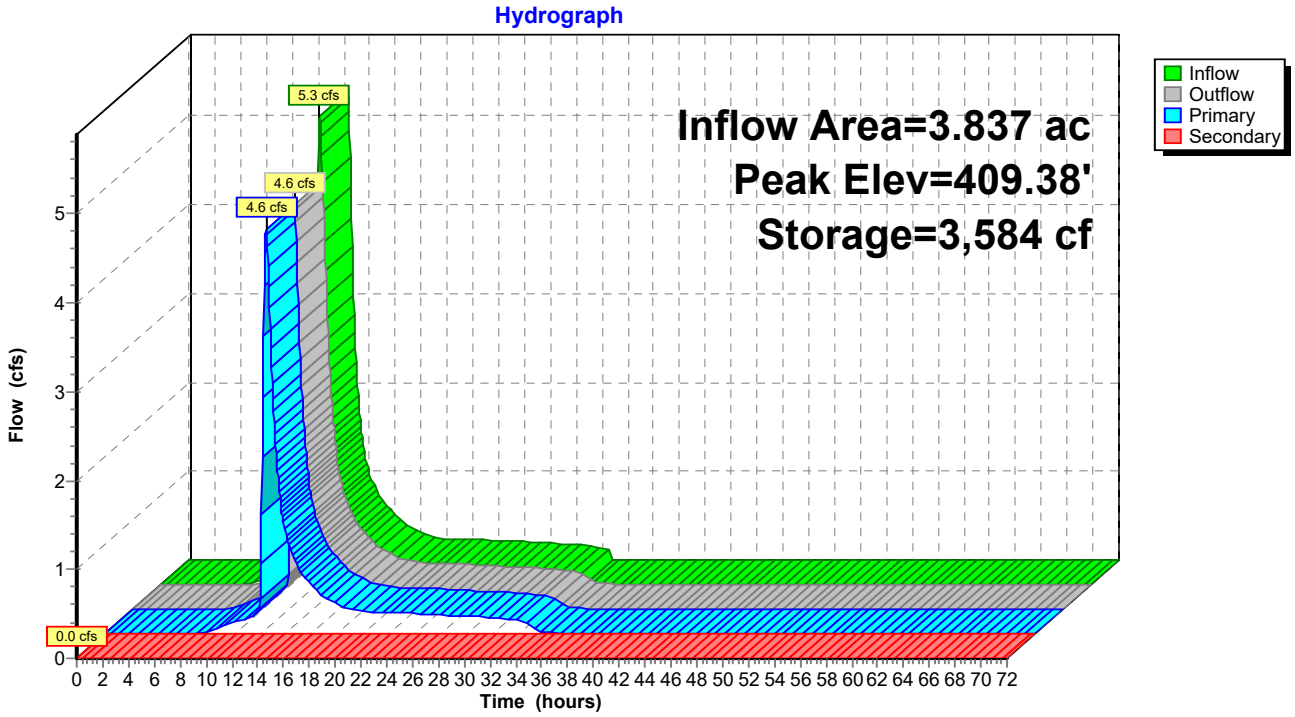
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
408.00	2,108	251.0	0.0	0	0	2,108
412.00	5,572	326.4	100.0	14,810	14,810	5,760

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**15.0" Round Culvert** L= 61.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 404.00' S= 0.0328 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	408.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 1.50 1.50
#3	Device 1	410.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#4	Secondary	411.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.6 cfs @ 12.50 hrs HW=409.38' TW=9.29' (Dynamic Tailwater)
└**1=Culvert** (Passes 4.6 cfs of 9.8 cfs potential flow)
└**2=Slotted Weir** (Weir Controls 4.6 cfs @ 3.45 fps)
└**3=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=408.00' TW=8.96' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3P: Detention South #3

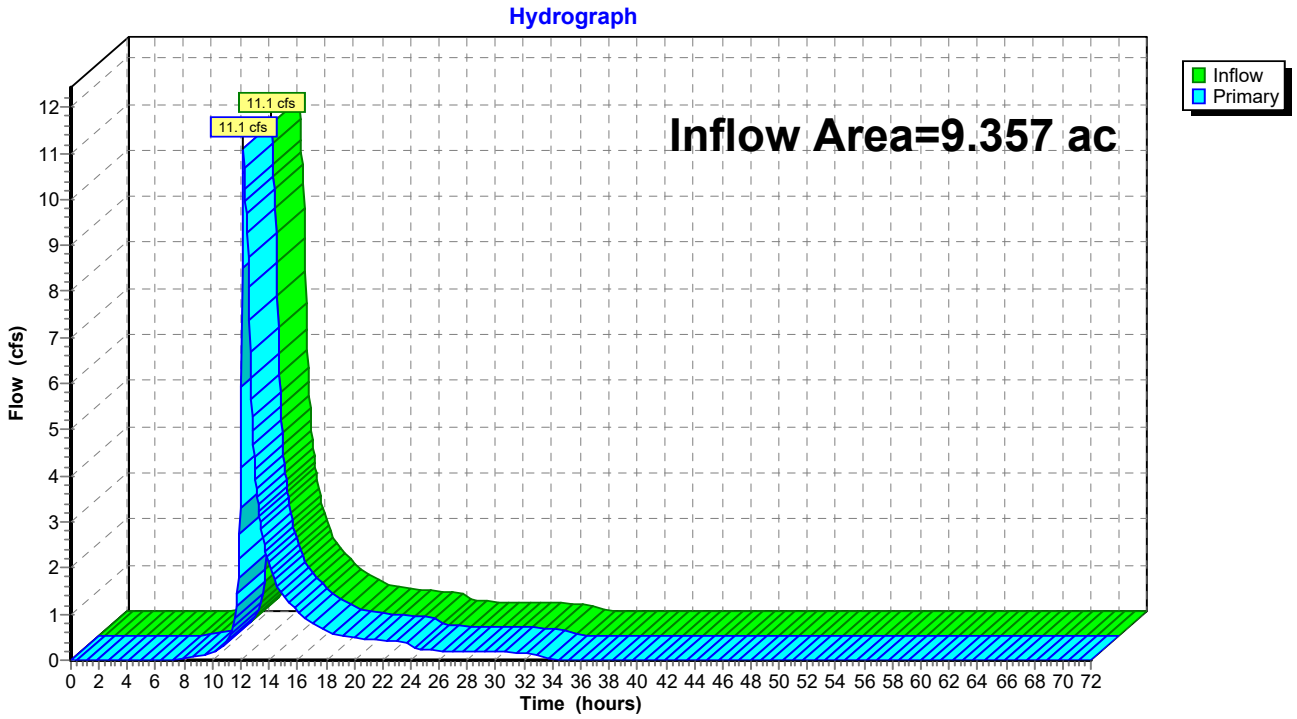


Summary for Link DP-1: DP-1

Inflow Area = 9.357 ac, 21.07% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 11.1 cfs @ 12.20 hrs, Volume= 1.753 af
Primary = 11.1 cfs @ 12.20 hrs, Volume= 1.753 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

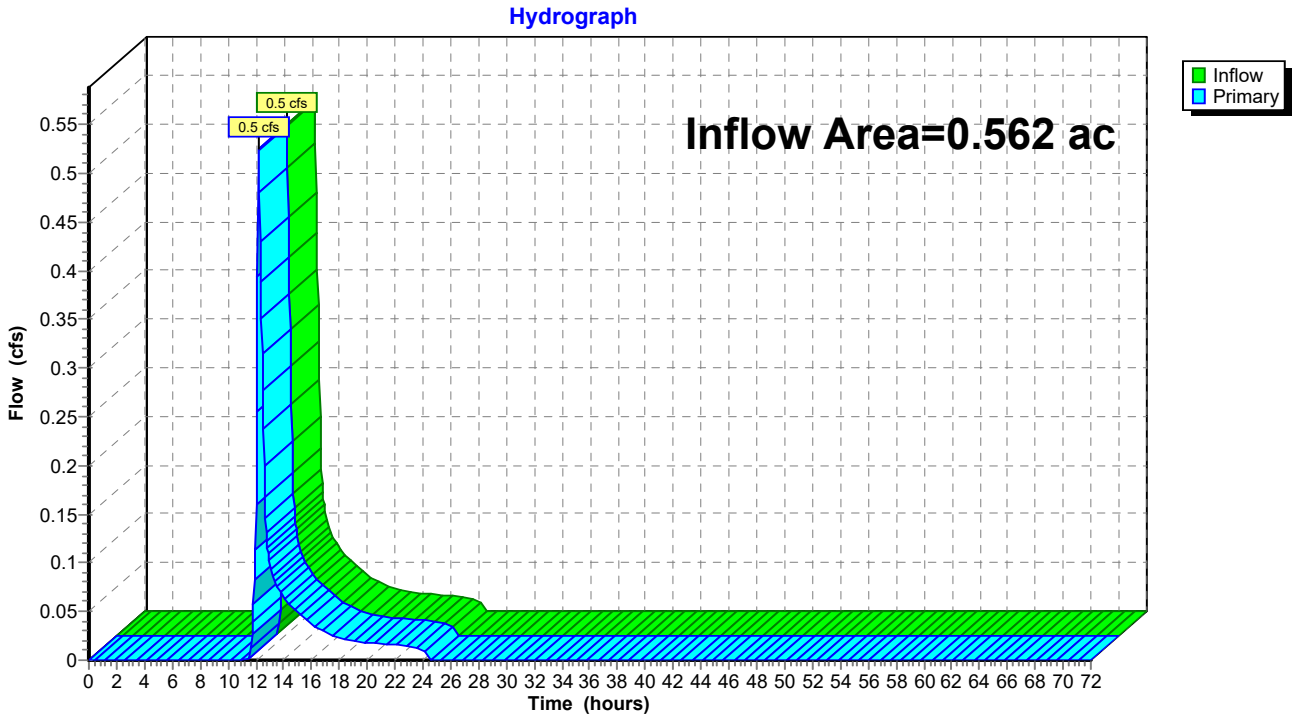


Summary for Link DP-2: DP-2

Inflow Area = 0.562 ac, 0.00% Impervious, Inflow Depth = 1.12" for 10-YR event
Inflow = 0.5 cfs @ 12.19 hrs, Volume= 0.052 af
Primary = 0.5 cfs @ 12.19 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-2: DP-2

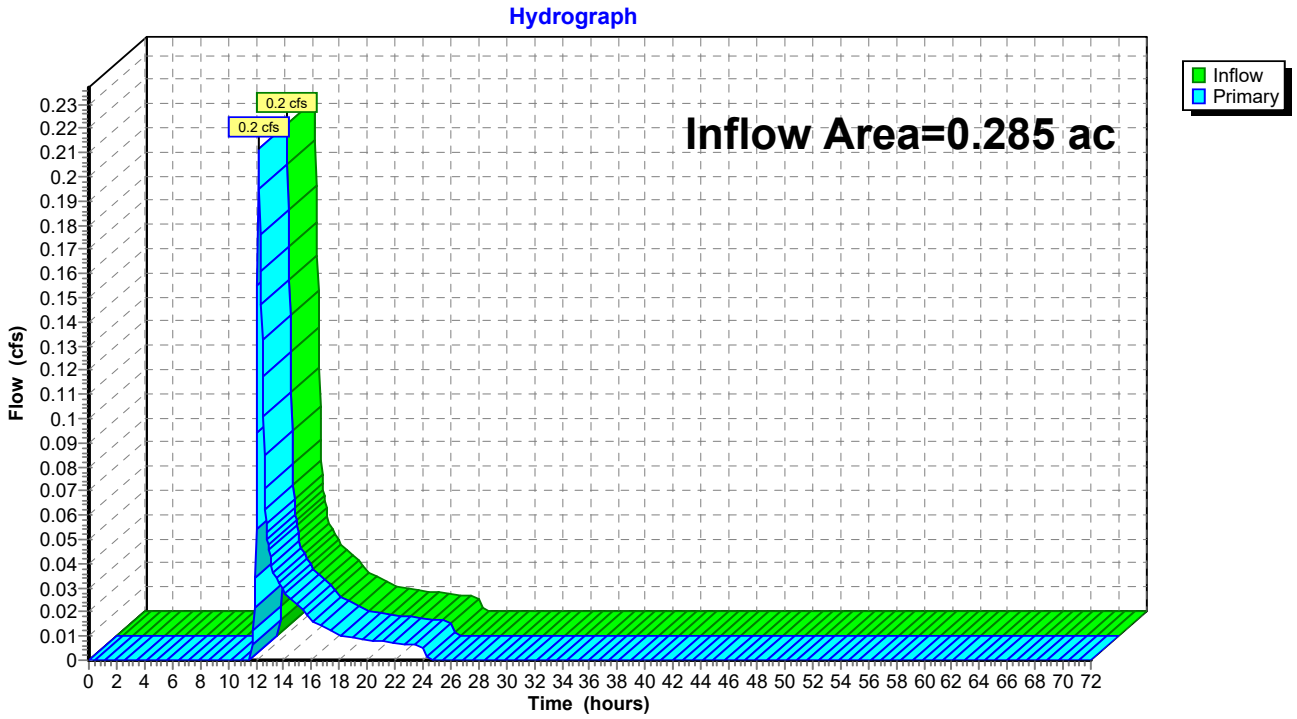


Summary for Link DP-3: DP-3

Inflow Area = 0.285 ac, 0.00% Impervious, Inflow Depth = 0.94" for 10-YR event
Inflow = 0.2 cfs @ 12.19 hrs, Volume= 0.022 af
Primary = 0.2 cfs @ 12.19 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-3: DP-3

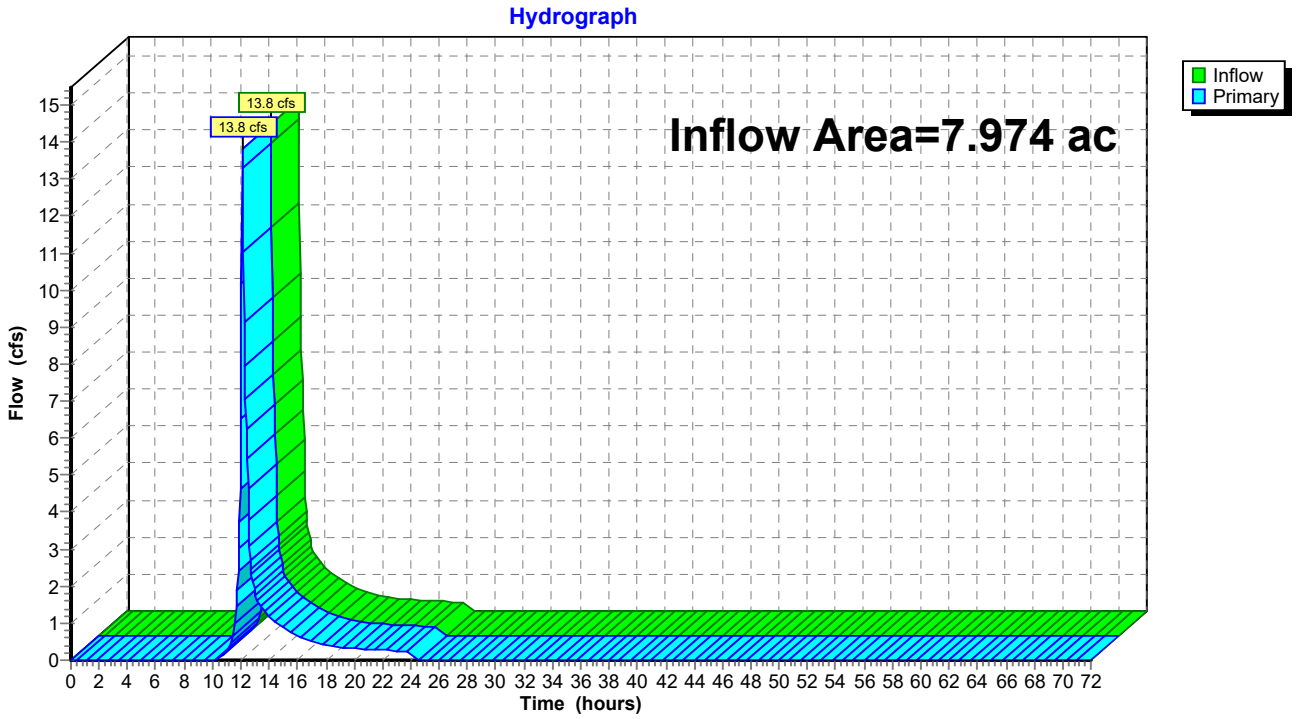


Summary for Link DP-4: DP-4

Inflow Area = 7.974 ac, 0.00% Impervious, Inflow Depth = 1.66" for 10-YR event
Inflow = 13.8 cfs @ 12.12 hrs, Volume= 1.106 af
Primary = 13.8 cfs @ 12.12 hrs, Volume= 1.106 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-4: DP-4

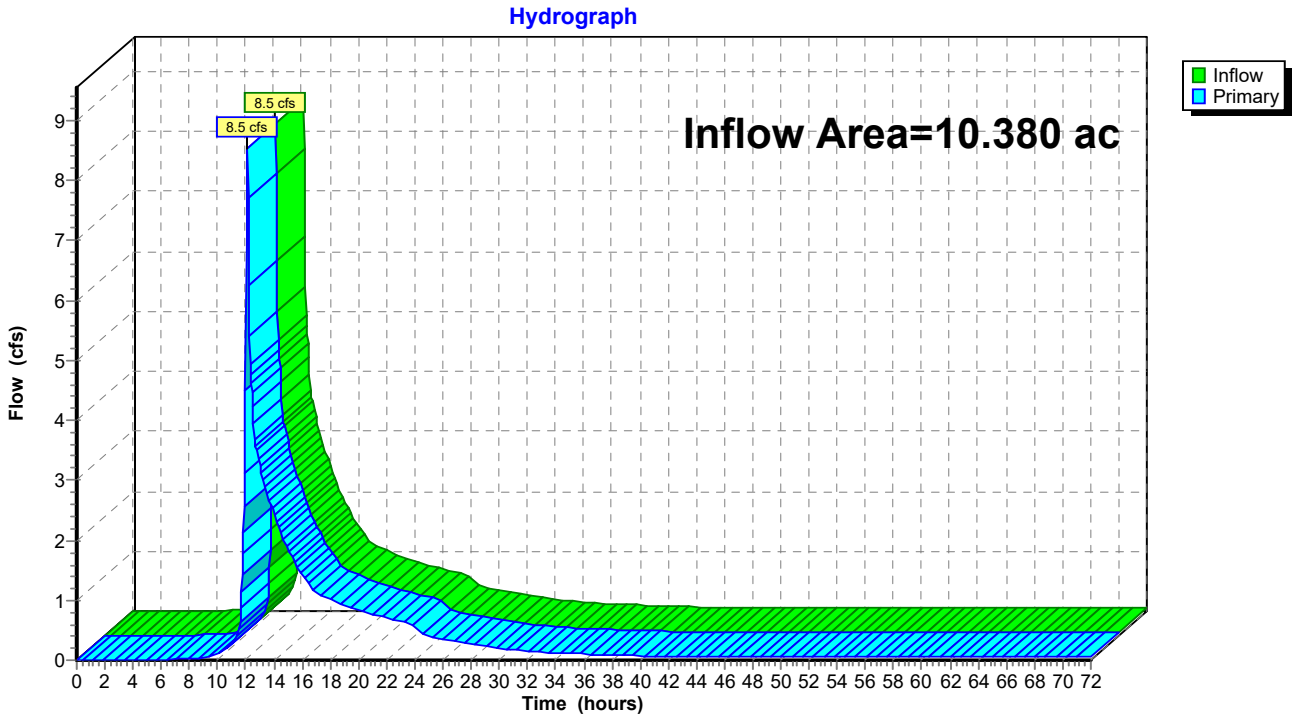


Summary for Link DP-5: DP-5

Inflow Area = 10.380 ac, 31.33% Impervious, Inflow Depth > 2.32" for 10-YR event
Inflow = 8.5 cfs @ 12.11 hrs, Volume= 2.005 af
Primary = 8.5 cfs @ 12.11 hrs, Volume= 2.005 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-5: DP-5



Summary for Subcatchment PR-1: Subcat PR-1

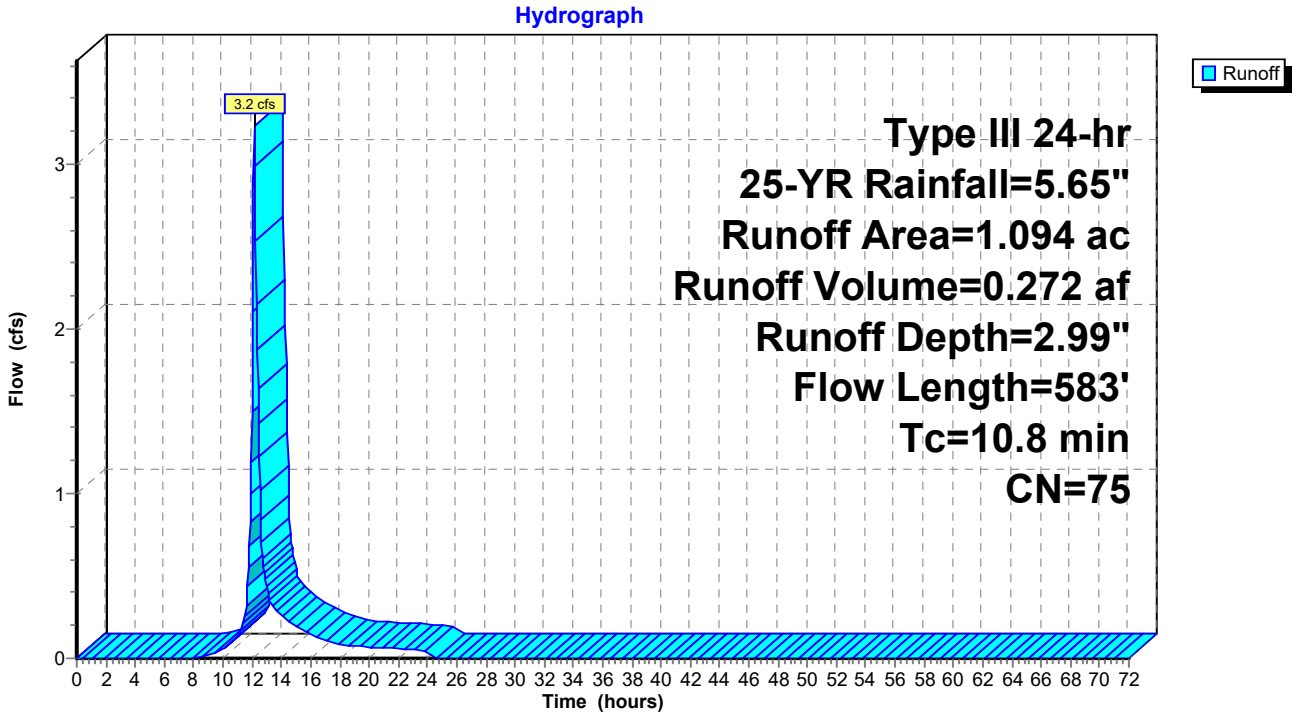
Runoff = 3.2 cfs @ 12.15 hrs, Volume= 0.272 af, Depth= 2.99"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.020	61	>75% Grass cover, Good, HSG B
0.374	74	>75% Grass cover, Good, HSG C
0.005	58	Meadow, non-grazed, HSG B
0.238	71	Meadow, non-grazed, HSG C
0.006	78	Meadow, non-grazed, HSG D
0.114	98	Paved parking, HSG C
0.024	55	Woods, Good, HSG B
0.233	70	Woods, Good, HSG C
0.079	77	Woods, Good, HSG D
1.094	75	Weighted Average
0.979		89.56% Pervious Area
0.114		10.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0334	0.17		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
4.4	379	0.0427	1.45		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0706	1.86		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	99	0.0441	1.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
10.8	583	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

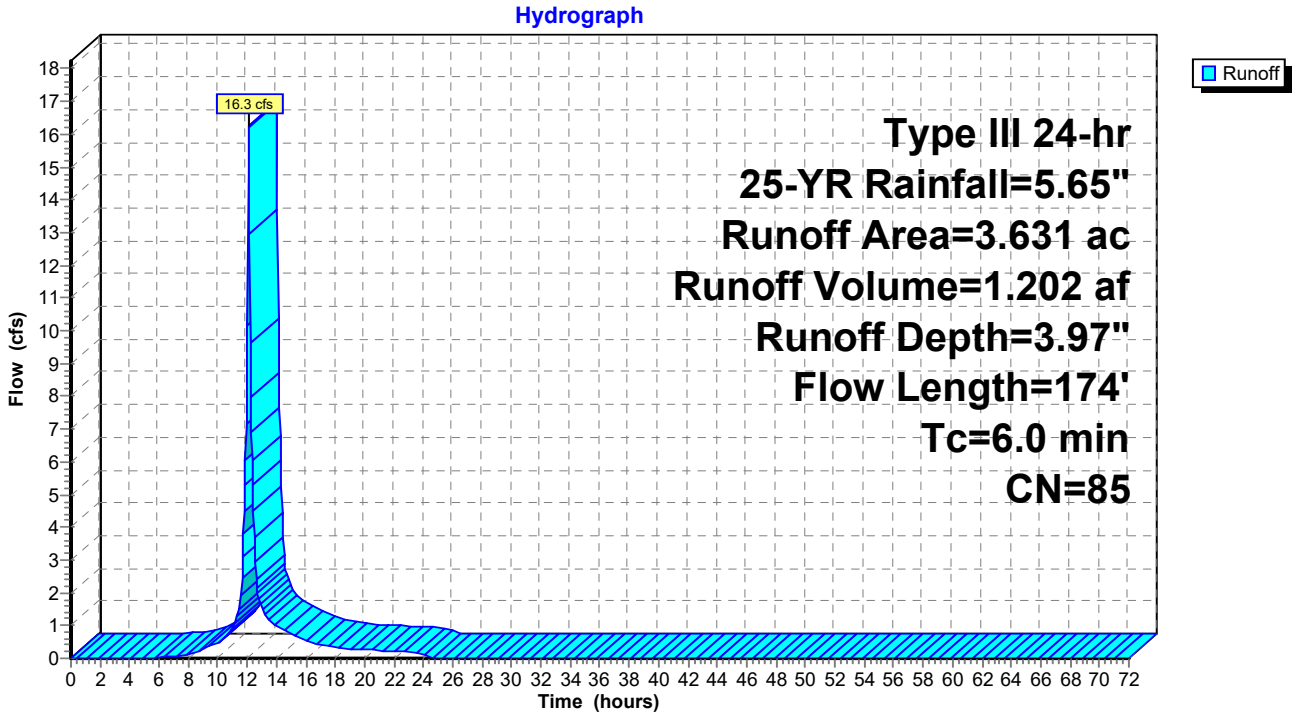
Runoff = 16.3 cfs @ 12.09 hrs, Volume= 1.202 af, Depth= 3.97"
Routed to Pond 2P : Sand Filter #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.119	61	>75% Grass cover, Good, HSG B
1.777	74	>75% Grass cover, Good, HSG C
0.022	71	Meadow, non-grazed, HSG C
0.056	98	Paved parking, HSG B
0.803	98	Paved parking, HSG C
0.176	98	Roofs, HSG B
0.678	98	Roofs, HSG C
3.631	85	Weighted Average
1.918		52.82% Pervious Area
1.713		47.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0738	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.2	124	0.0614	1.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3					**Direct Entry,**
6.0	174	Total			

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

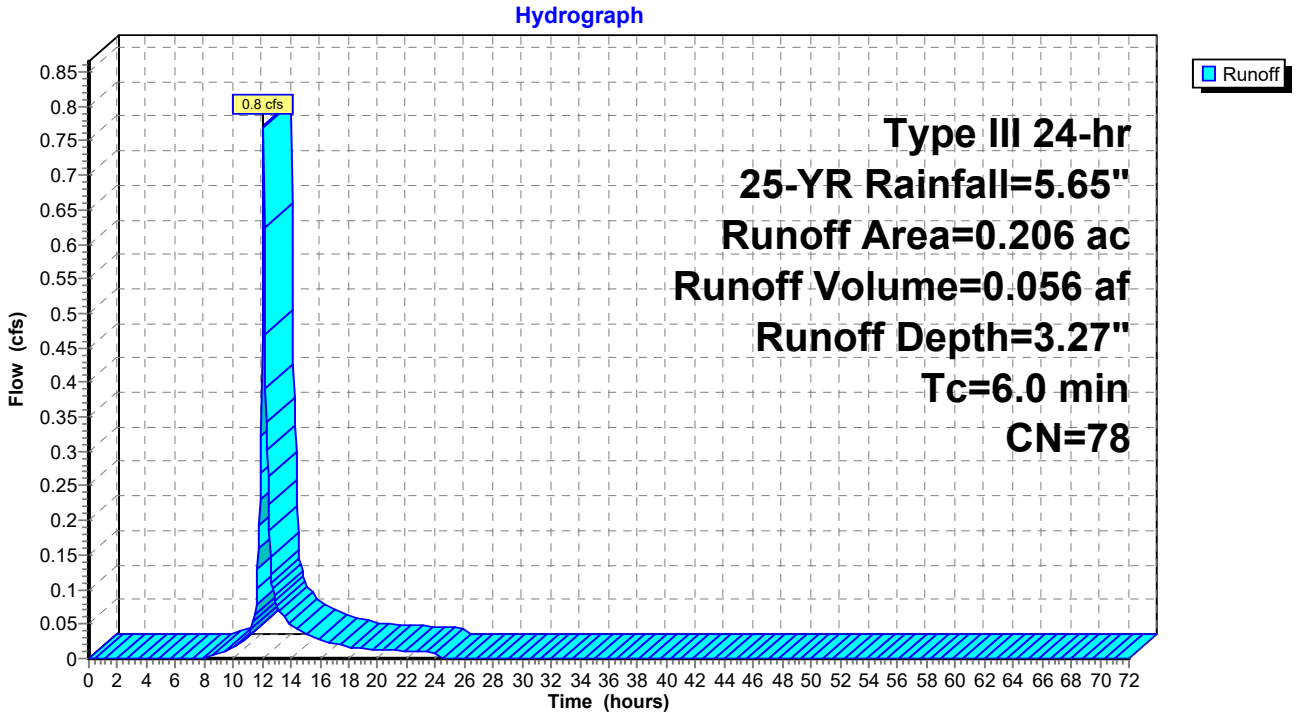
Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 3.27"
Routed to Pond 3P : Detention South #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.136	80	>75% Grass cover, Good, HSG D
0.206	78	Weighted Average
0.206		100.00% Pervious Area

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

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-2: Subcat PR-2

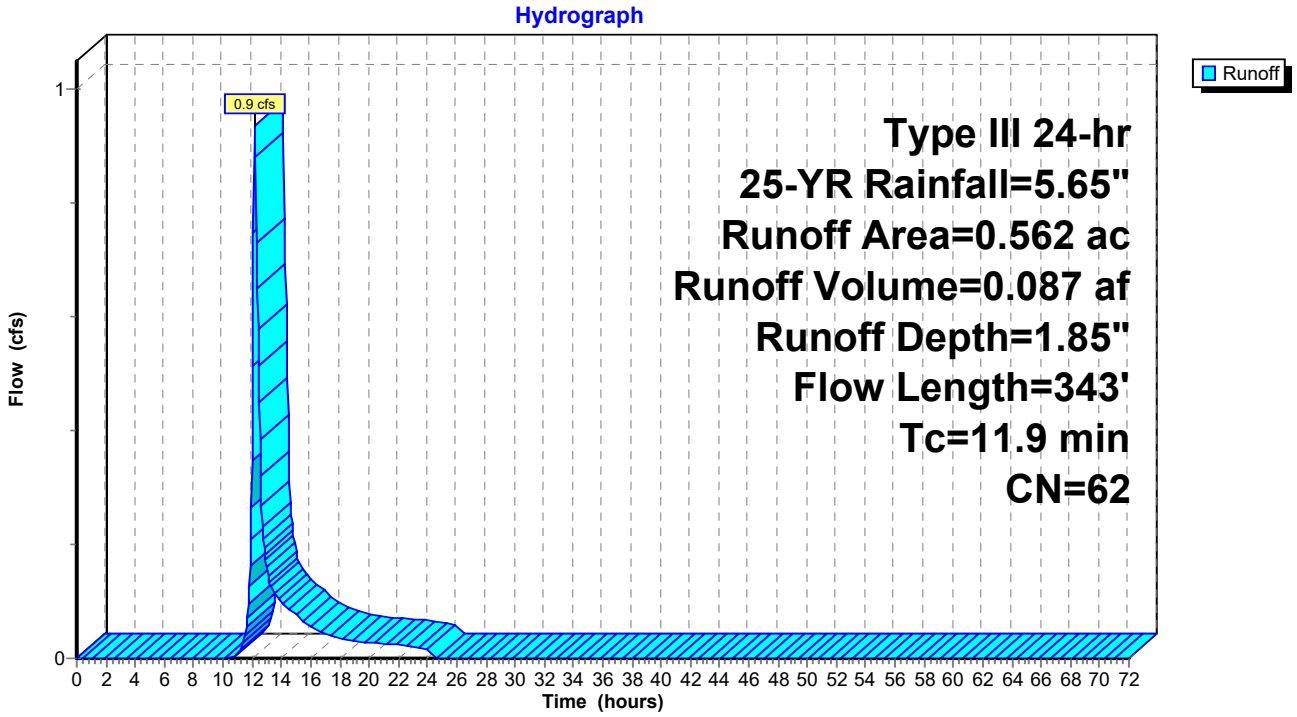
Runoff = 0.9 cfs @ 12.18 hrs, Volume= 0.087 af, Depth= 1.85"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.136	61	>75% Grass cover, Good, HSG B
0.157	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG B
0.258	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.562	62	Weighted Average
0.562		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0219	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
3.3	210	0.0227	1.05		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
2.9	83	0.0046	0.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.9	343	Total			

Subcatchment PR-2: Subcat PR-2



Summary for Subcatchment PR-3: Subcat PR-3

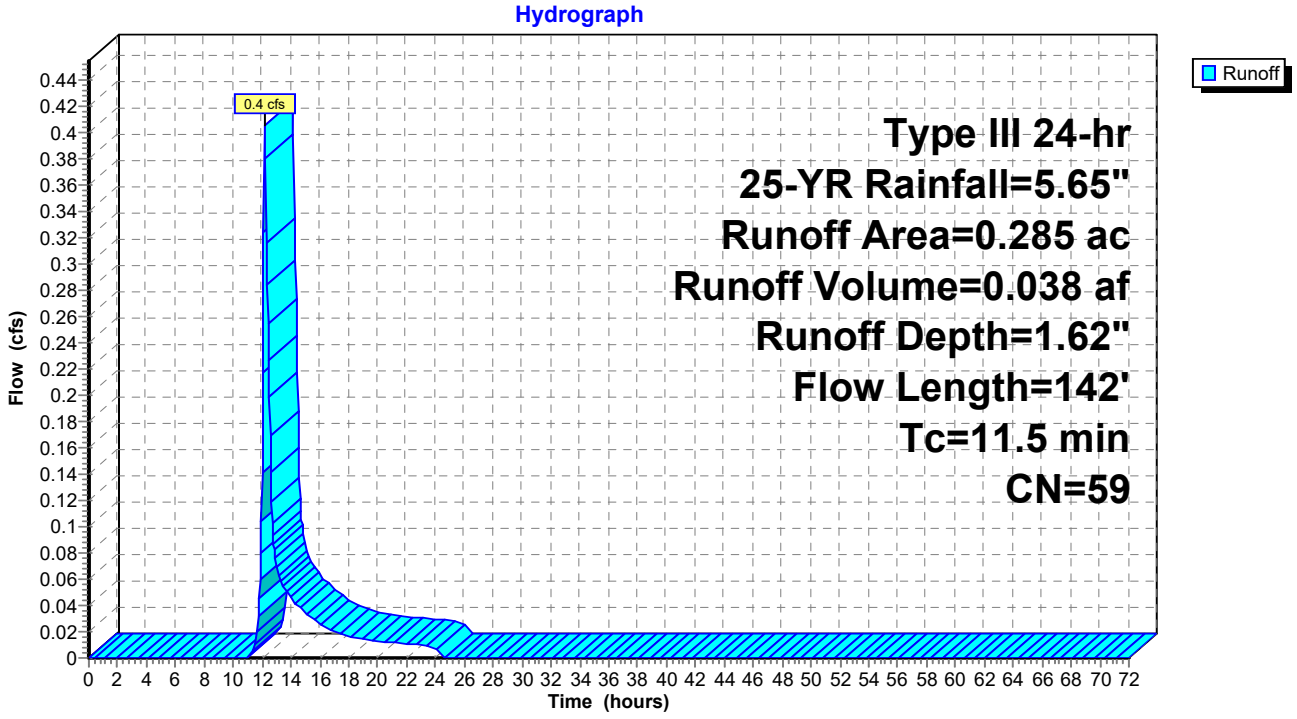
Runoff = 0.4 cfs @ 12.18 hrs, Volume= 0.038 af, Depth= 1.62"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.126	61	>75% Grass cover, Good, HSG B
0.017	74	>75% Grass cover, Good, HSG C
0.142	55	Woods, Good, HSG B
0.285	59	Weighted Average
0.285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0060	0.09		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
0.6	19	0.0060	0.54		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.4	73	0.0163	0.89		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.5	142	Total			

Subcatchment PR-3: Subcat PR-3



Summary for Subcatchment PR-4: Subcat PR-4

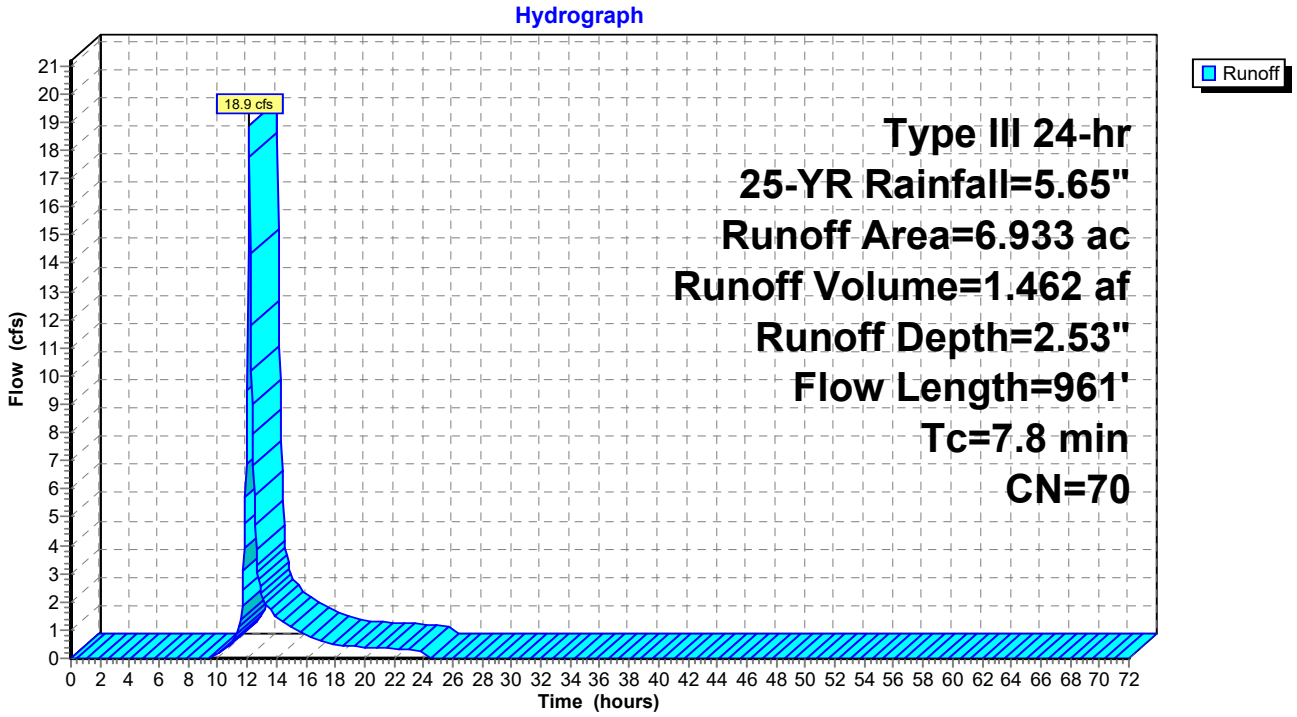
Runoff = 18.9 cfs @ 12.12 hrs, Volume= 1.462 af, Depth= 2.53"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.450	61	>75% Grass cover, Good, HSG B
0.719	74	>75% Grass cover, Good, HSG C
0.041	58	Meadow, non-grazed, HSG B
2.069	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.214	55	Woods, Good, HSG B
2.935	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
6.933	70	Weighted Average
6.933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0831	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
0.2	20	0.0831	2.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	155	0.0873	2.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
7.8	961	Total			

Subcatchment PR-4: Subcat PR-4



Summary for Subcatchment PR-5: Subcat PR-5

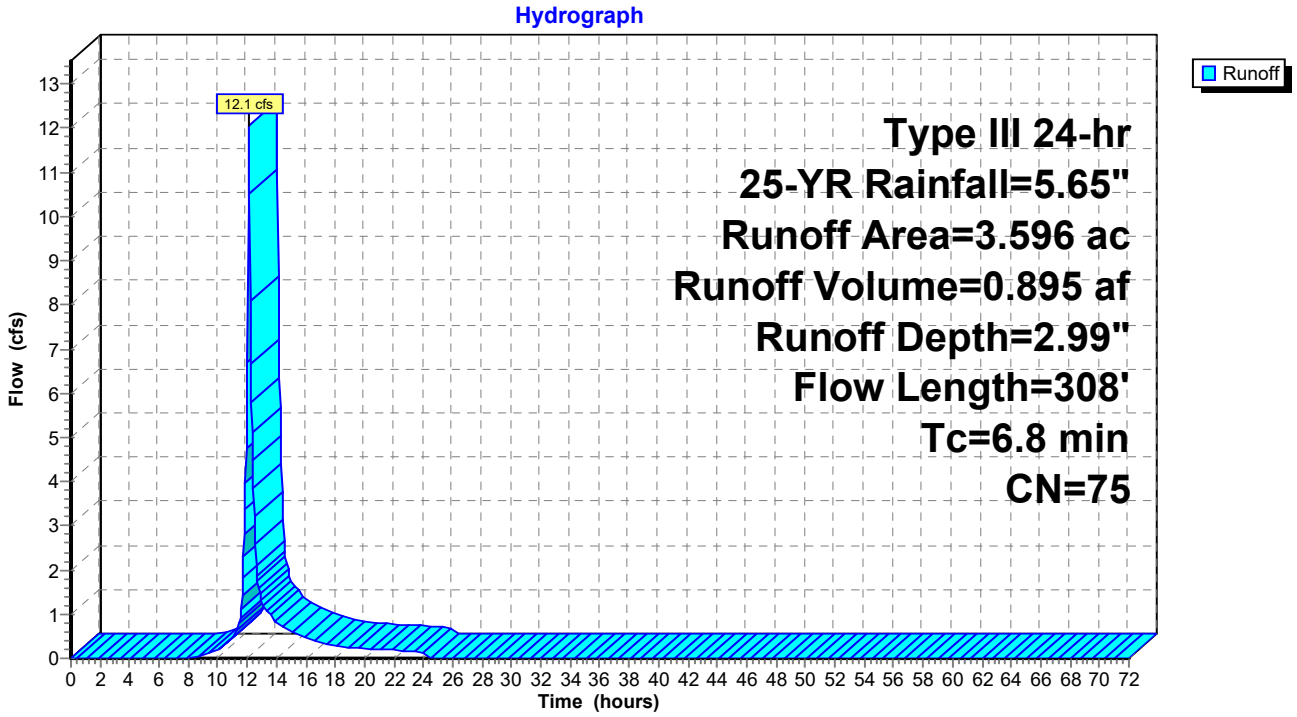
Runoff = 12.1 cfs @ 12.10 hrs, Volume= 0.895 af, Depth= 2.99"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
1.555	74	>75% Grass cover, Good, HSG C
0.077	80	>75% Grass cover, Good, HSG D
0.032	96	Gravel surface, HSG C
0.110	96	Gravel surface, HSG D
0.708	71	Meadow, non-grazed, HSG C
0.028	78	Meadow, non-grazed, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
0.812	70	Woods, Good, HSG C
3.596	75	Weighted Average
3.322		92.39% Pervious Area
0.274		7.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0826	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.95"
1.2	146	0.0792	1.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	112	0.1088	2.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.8	308	Total			

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

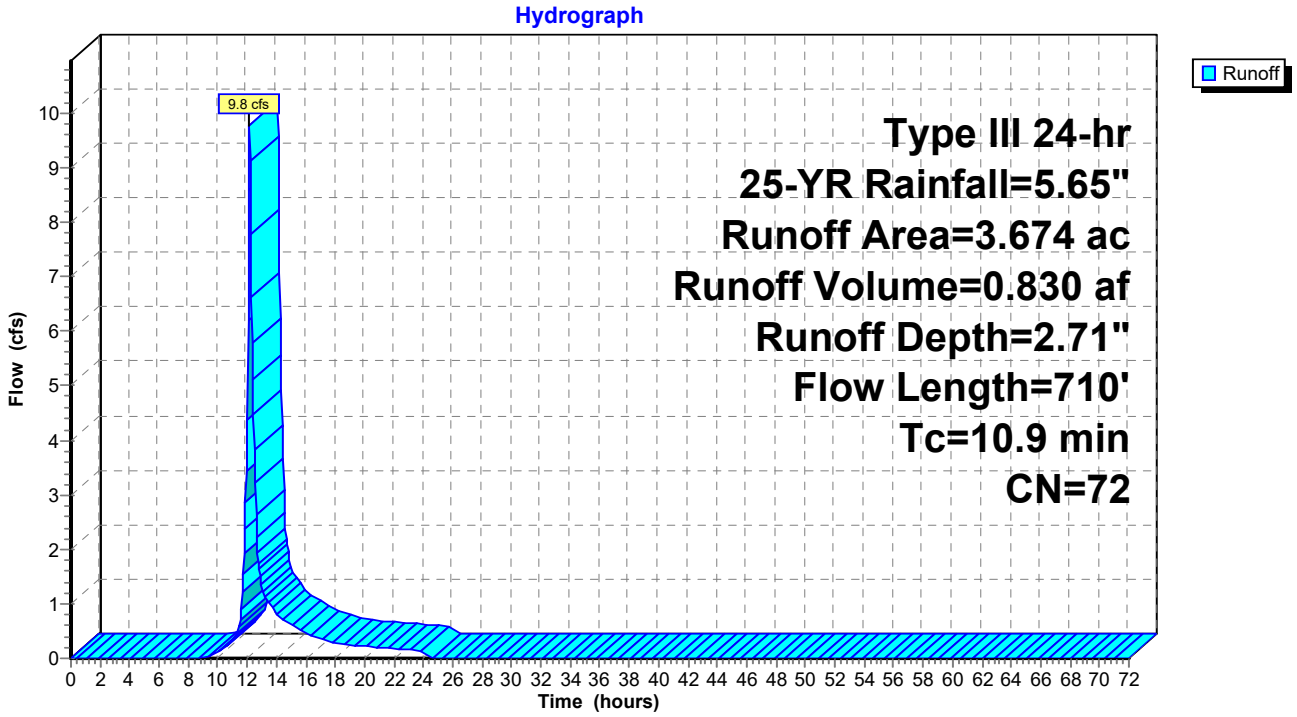
Runoff = 9.8 cfs @ 12.16 hrs, Volume= 0.830 af, Depth= 2.71"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.908	74	>75% Grass cover, Good, HSG C
0.303	71	Meadow, non-grazed, HSG C
0.091	78	Meadow, non-grazed, HSG D
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.229	70	Woods, Good, HSG C
3.674	72	Weighted Average
3.530		96.08% Pervious Area
0.144		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	67	0.1495	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	175	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0447	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1064	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	54	0.0694	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	710	Total			

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

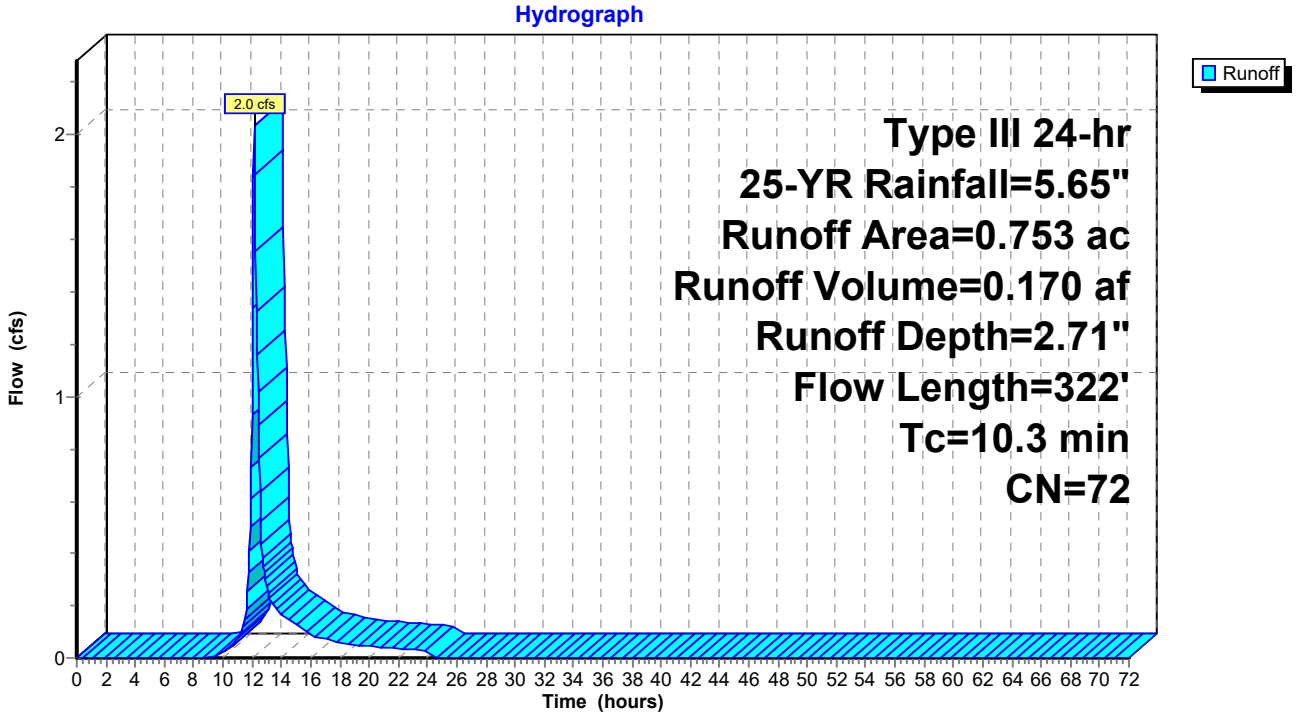
Runoff = 2.0 cfs @ 12.15 hrs, Volume= 0.170 af, Depth= 2.71"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.067	80	>75% Grass cover, Good, HSG D
0.012	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.510	70	Woods, Good, HSG C
0.753	72	Weighted Average
0.753		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-8: Subcat PR-8

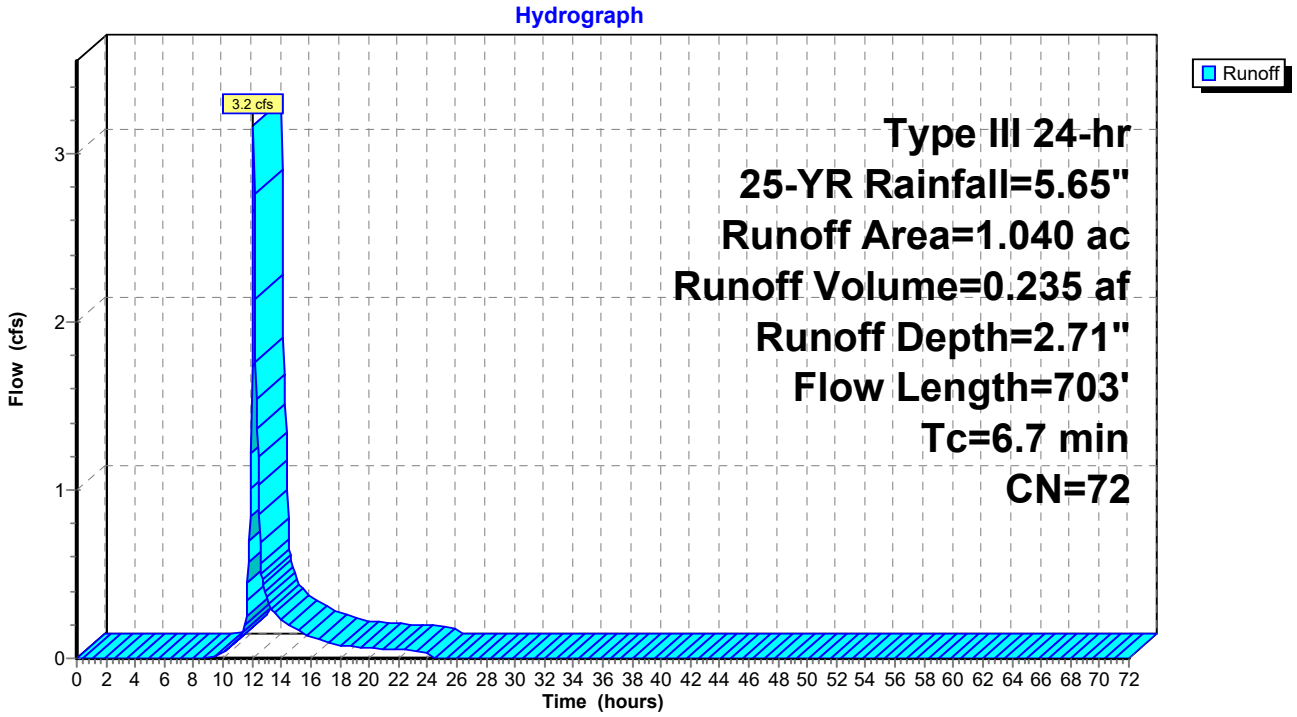
Runoff = 3.2 cfs @ 12.10 hrs, Volume= 0.235 af, Depth= 2.71"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.012	74	>75% Grass cover, Good, HSG C
0.843	71	Meadow, non-grazed, HSG C
0.103	78	Meadow, non-grazed, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
1.040	72	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0794	0.25		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0800	1.98		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	140	0.1004	2.22		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	703	Total			

Subcatchment PR-8: Subcat PR-8



Summary for Subcatchment PR-9: Subcat PR-9

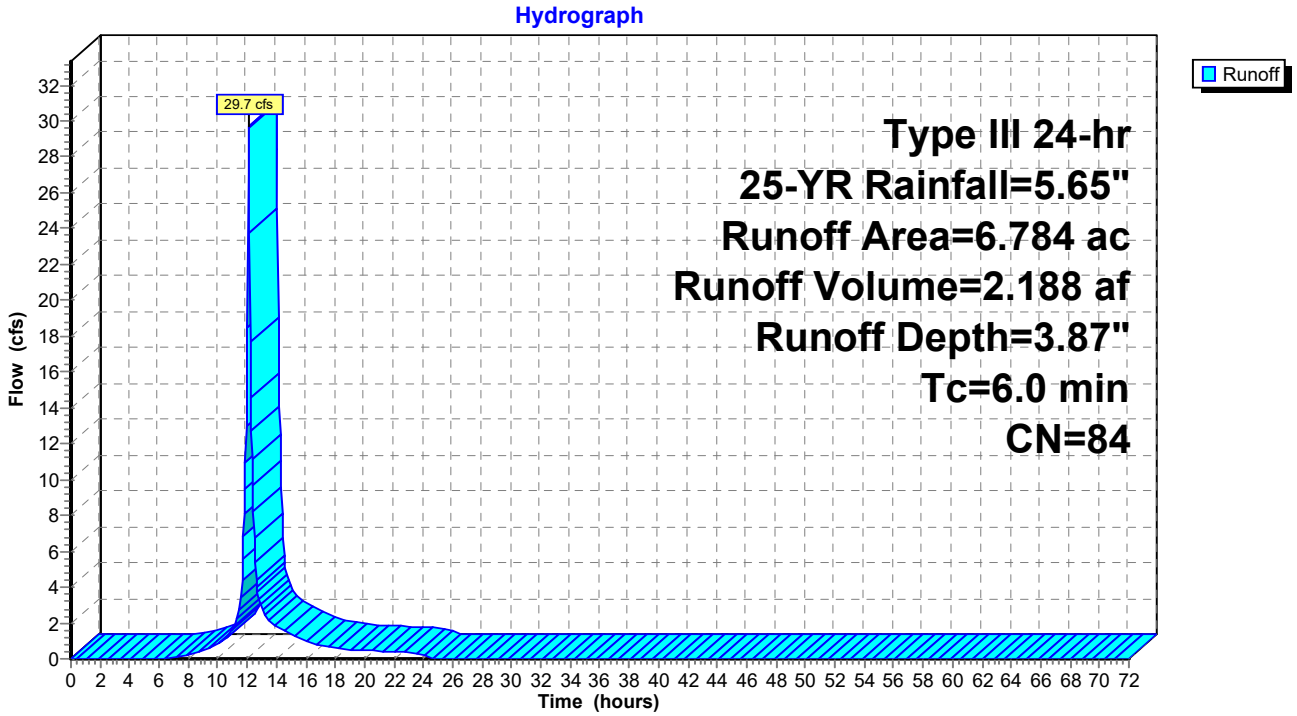
Runoff = 29.7 cfs @ 12.09 hrs, Volume= 2.188 af, Depth= 3.87"
Routed to Pond 1P : Sand Filter #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.449	61	>75% Grass cover, Good, HSG B
3.226	74	>75% Grass cover, Good, HSG C
0.001	96	Gravel surface, HSG C
0.130	71	Meadow, non-grazed, HSG C
0.437	98	Paved parking, HSG B
1.056	98	Paved parking, HSG C
0.602	98	Roofs, HSG B
0.883	98	Roofs, HSG C
6.784	84	Weighted Average
3.806		56.10% Pervious Area
2.978		43.90% Impervious Area

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

Subcatchment PR-9: Subcat PR-9



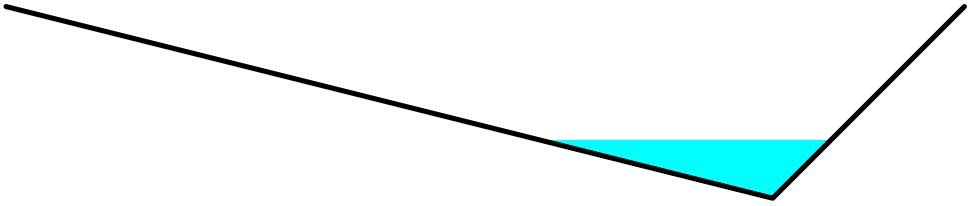
Summary for Reach 1R: Pillsbury Rd Swale

Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 2.71" for 25-YR event
Inflow = 3.2 cfs @ 12.10 hrs, Volume= 0.235 af
Outflow = 2.9 cfs @ 12.14 hrs, Volume= 0.235 af, Atten= 8%, Lag= 2.3 min
Routed to Link DP-4 : DP-4

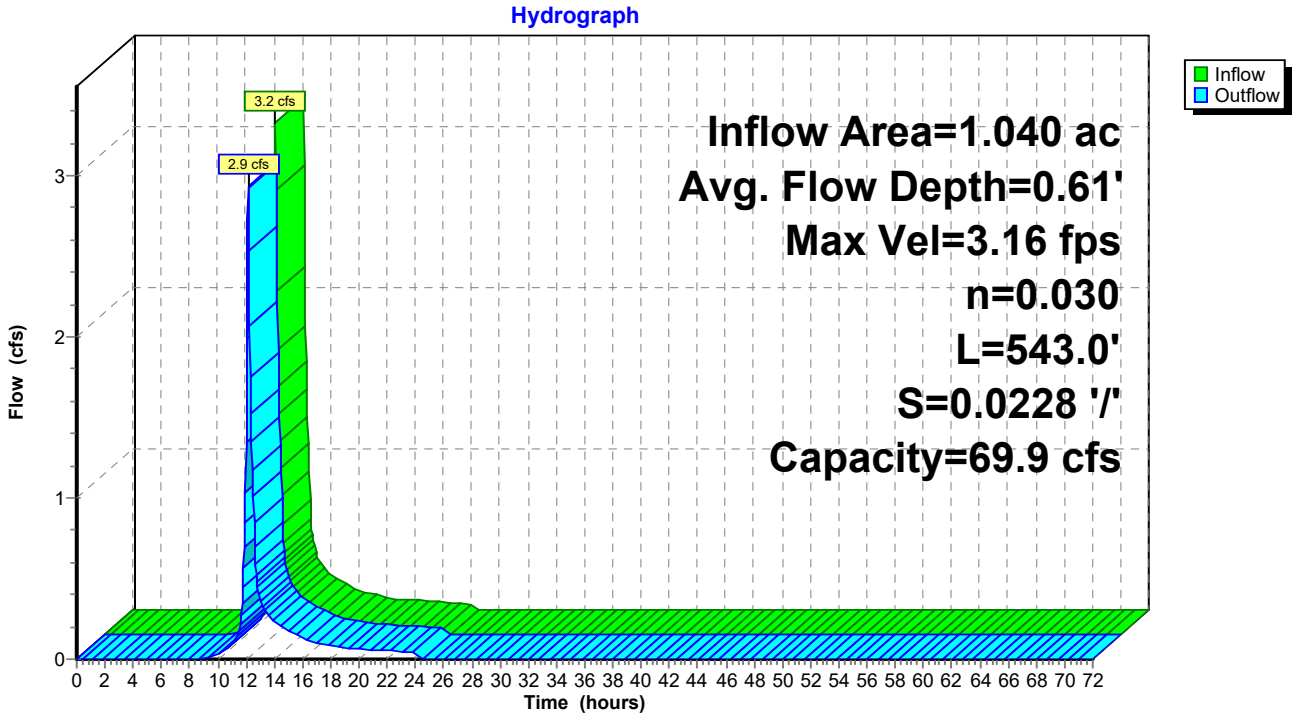
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.16 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 7.1 min

Peak Storage= 503 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 3.04'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'



Reach 1R: Pillsbury Rd Swale



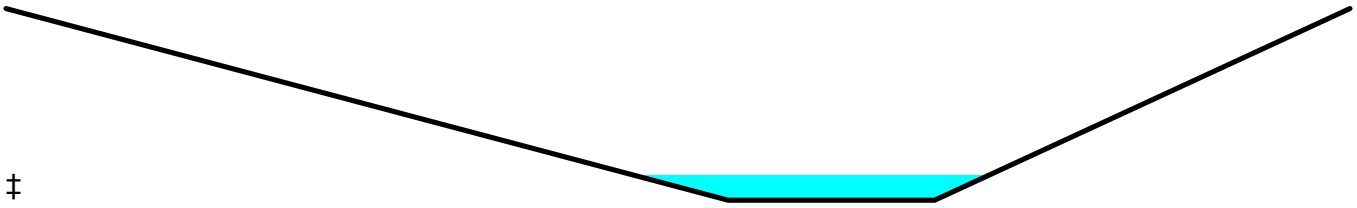
Summary for Reach 2R: Stream South

Inflow Area = 5.683 ac, 32.15% Impervious, Inflow Depth = 3.59" for 25-YR event
Inflow = 11.1 cfs @ 12.29 hrs, Volume= 1.701 af
Outflow = 11.1 cfs @ 12.31 hrs, Volume= 1.701 af, Atten= 0%, Lag= 0.8 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.39 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 3.8 min

Peak Storage= 729 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.46' , Surface Width= 6.91'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 711.7 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0310 '/'
Inlet Invert= 8.96', Outlet Invert= 0.00'



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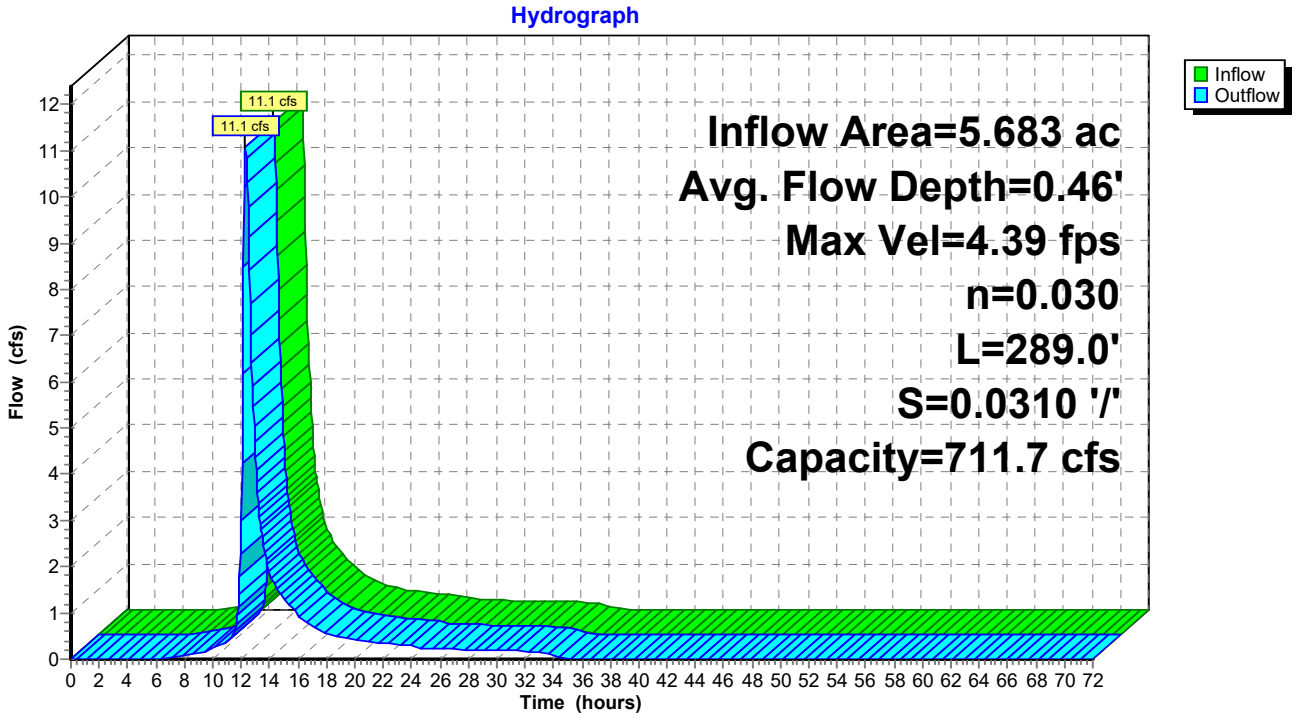
Reach 2R: Stream South



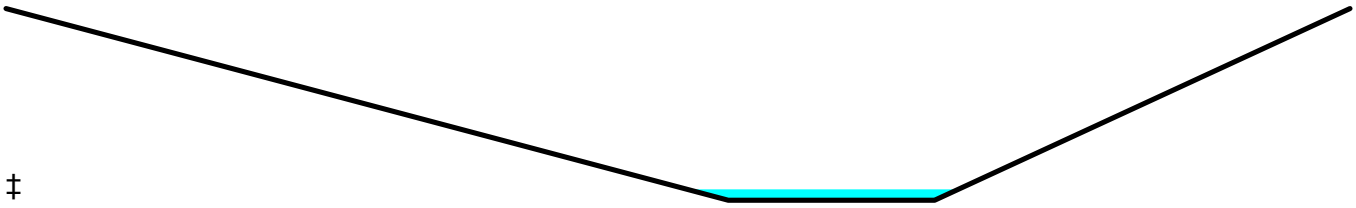
Summary for Reach 3R: Stream North

Inflow Area = 1.094 ac, 10.44% Impervious, Inflow Depth = 2.99" for 25-YR event
Inflow = 3.2 cfs @ 12.15 hrs, Volume= 0.272 af
Outflow = 3.1 cfs @ 12.19 hrs, Volume= 0.272 af, Atten= 4%, Lag= 2.0 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 6.9 min

Peak Storage= 487 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 5.24'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 901.4 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 535.0' Slope= 0.0497 '/'
Inlet Invert= 35.57', Outlet Invert= 8.96'



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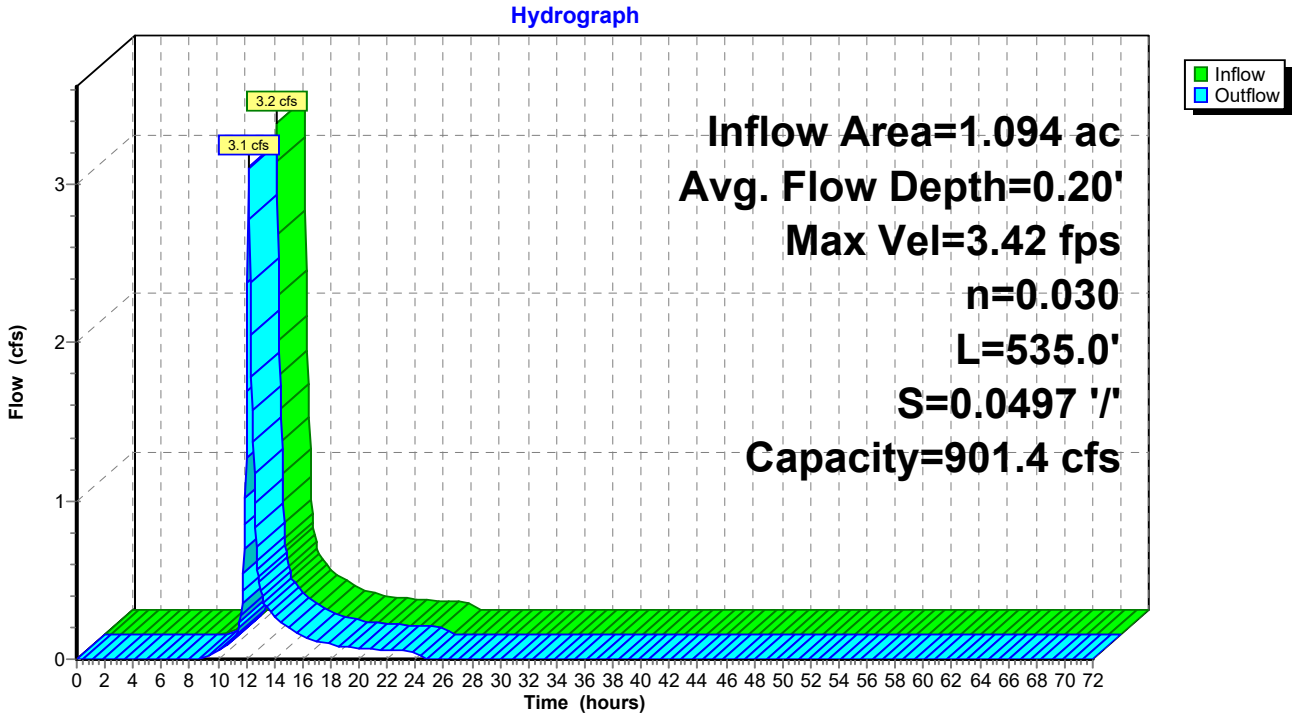


Summary for Pond 1P: Sand Filter #1

Inflow Area = 6.784 ac, 43.90% Impervious, Inflow Depth = 3.87" for 25-YR event
Inflow = 29.7 cfs @ 12.09 hrs, Volume= 2.188 af
Outflow = 6.6 cfs @ 12.51 hrs, Volume= 2.013 af, Atten= 78%, Lag= 25.0 min
Primary = 6.6 cfs @ 12.51 hrs, Volume= 2.013 af
Routed to Link DP-5 : DP-5
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-5 : DP-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 401.79' @ 12.51 hrs Surf.Area= 8,782 sf Storage= 47,387 cf
Flood Elev= 402.80' Surf.Area= 8,782 sf Storage= 62,743 cf

Plug-Flow detention time= 440.6 min calculated for 2.013 af (92% of inflow)
Center-of-Mass det. time= 399.6 min (1,205.4 - 805.8)

Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,952 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	398.00'	79,237 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		83,189 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
396.50	8,782	461.4	0.0	0	0	8,782
398.00	8,782	461.4	30.0	3,952	3,952	9,474

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
398.00	8,782	461.4	0.0	0	0	8,782
398.80	9,907	476.4	100.0	7,471	7,471	9,963
404.00	18,104	574.5	100.0	71,766	79,237	18,610

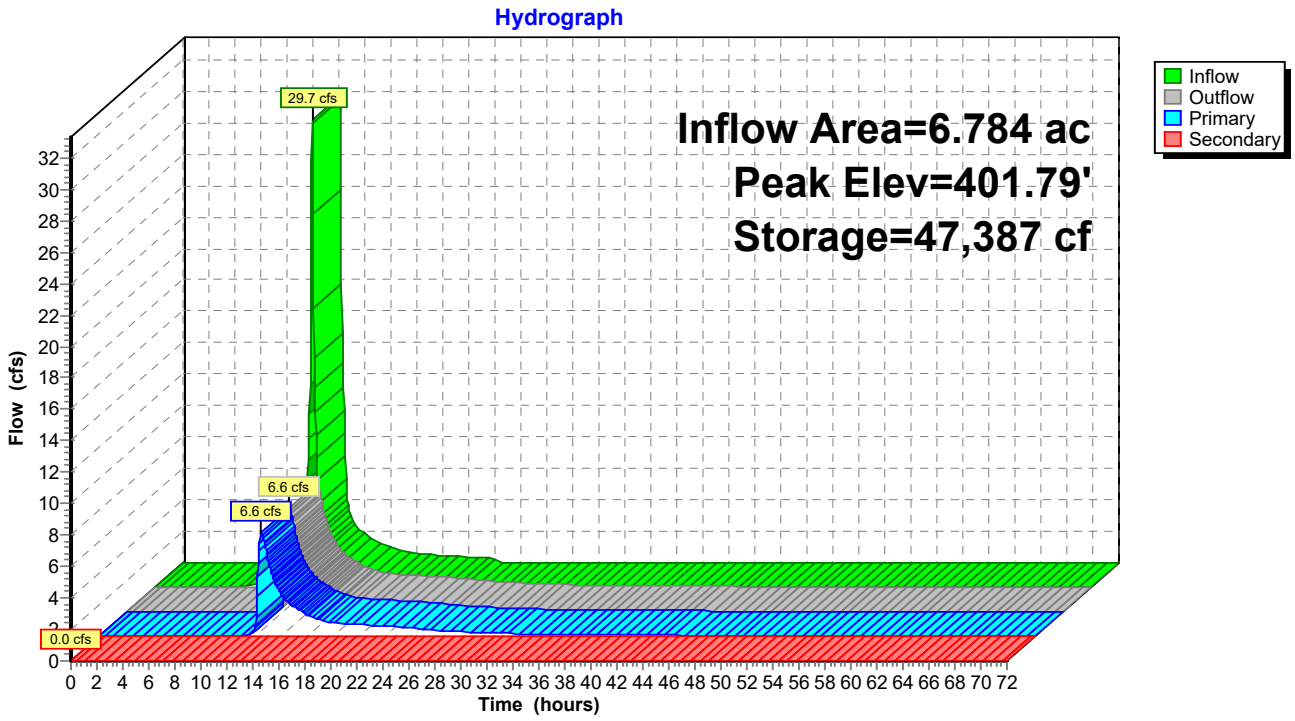
Device	Routing	Invert	Outlet Devices
#1	Primary	395.30'	**15.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 395.30' / 394.00' S= 0.0232 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	395.42'	**1.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	395.42'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 395.42' / 395.42' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	396.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	398.80'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.80 1.80 3.90 Width (feet) 0.10 0.10 1.25 1.25
#6	Device 1	402.70'	**2.5" x 2.5" Horiz. Grate X 12.00 columns** X 12 rows C= 0.600 in 48.0" x 48.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	403.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.6 cfs @ 12.51 hrs HW=401.79' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.6 cfs of 14.3 cfs potential flow)
  └─**2=Underdrain Cap/Orifice** (Orifice Controls 0.1 cfs @ 12.11 fps)
    └─**3=Culvert** (Passes 0.1 cfs of 1.6 cfs potential flow)
      └─**4=Exfiltration** (Passes 0.1 cfs of 2.0 cfs potential flow)
  └─**5=Slotted Weir** (Weir Controls 6.5 cfs @ 3.94 fps)
  └─**6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=396.50' TW=0.00' (Dynamic Tailwater)
└─**7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Sand Filter #1



Summary for Pond 2P: Sand Filter #2

Inflow Area = 3.631 ac, 47.18% Impervious, Inflow Depth = 3.97" for 25-YR event
Inflow = 16.3 cfs @ 12.09 hrs, Volume= 1.202 af
Outflow = 8.4 cfs @ 12.24 hrs, Volume= 1.202 af, Atten= 48%, Lag= 9.1 min
Primary = 8.4 cfs @ 12.24 hrs, Volume= 1.202 af
Routed to Pond 3P : Detention South #3
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3P : Detention South #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 417.22' @ 12.24 hrs Surf.Area= 2,199 sf Storage= 16,216 cf
Flood Elev= 417.80' Surf.Area= 2,199 sf Storage= 19,346 cf

Plug-Flow detention time= 150.4 min calculated for 1.202 af (100% of inflow)
Center-of-Mass det. time= 150.8 min (953.6 - 802.9)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	990 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	413.00'	25,811 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		26,801 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.50	2,199	197.3	0.0	0	0	2,199
413.00	2,199	197.3	30.0	990	990	2,495

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
413.00	2,199	197.3	0.0	0	0	2,199
415.00	3,495	235.0	100.0	5,644	5,644	3,566
419.00	6,767	310.4	100.0	20,167	25,811	7,016

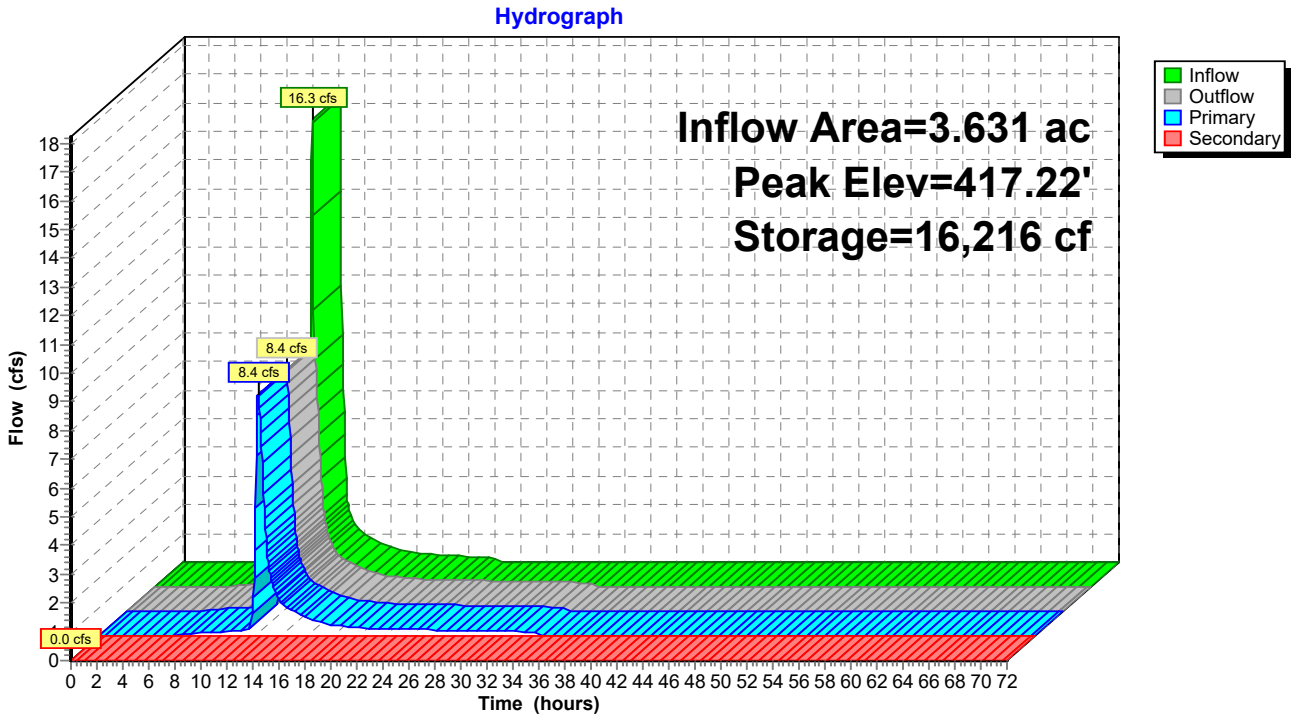
Device	Routing	Invert	Outlet Devices
#1	Primary	410.30'	**18.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.30' / 408.50' S= 0.0196 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	410.33'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	410.33'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.33' / 410.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	411.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	415.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 0.75 0.75
#6	Device 1	417.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	418.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=8.4 cfs @ 12.24 hrs HW=417.22' TW=409.64' (Dynamic Tailwater)
- **1=Culvert** (Passes 8.4 cfs of 21.1 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.3 cfs @ 12.56 fps)
    - **3=Culvert** (Passes 0.3 cfs of 1.7 cfs potential flow)
      - **4=Exfiltration** (Passes 0.3 cfs of 0.5 cfs potential flow)
  - **5=Slotted Weir** (Weir Controls 8.1 cfs @ 4.88 fps)
  - **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=411.50' TW=408.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Sand Filter #2



Summary for Pond 3P: Detention South #3

Inflow Area = 3.837 ac, 44.65% Impervious, Inflow Depth = 3.94" for 25-YR event
Inflow = 8.8 cfs @ 12.23 hrs, Volume= 1.258 af
Outflow = 7.8 cfs @ 12.40 hrs, Volume= 1.258 af, Atten= 11%, Lag= 10.5 min
Primary = 7.8 cfs @ 12.40 hrs, Volume= 1.258 af
Routed to Reach 2R : Stream South
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 409.82' @ 12.40 hrs Surf.Area= 3,477 sf Storage= 5,024 cf
Flood Elev= 410.80' Surf.Area= 4,359 sf Storage= 8,866 cf

Plug-Flow detention time= 21.8 min calculated for 1.258 af (100% of inflow)
Center-of-Mass det. time= 21.2 min (969.0 - 947.8)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	14,810 cf	**Storage (Irregular)**Listed below (Recalc)

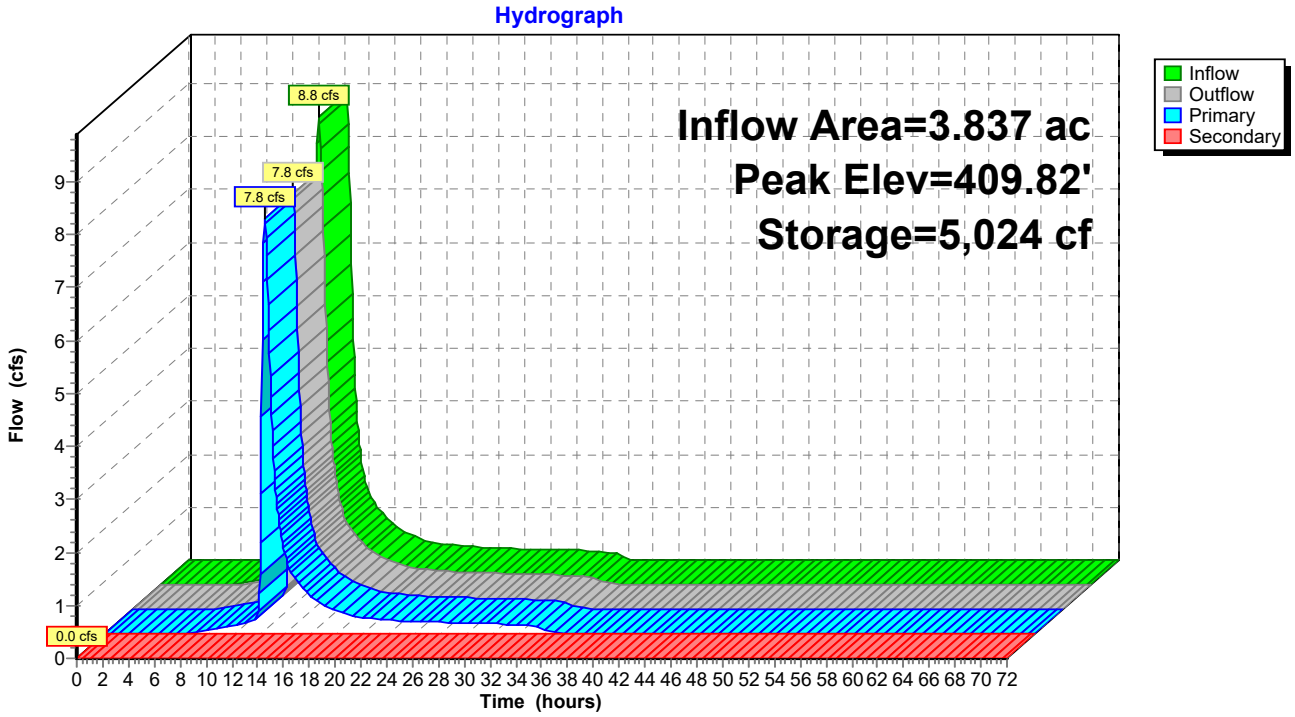
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
408.00	2,108	251.0	0.0	0	0	2,108
412.00	5,572	326.4	100.0	14,810	14,810	5,760

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**15.0" Round Culvert** L= 61.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 404.00' S= 0.0328 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	408.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 1.50 1.50
#3	Device 1	410.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#4	Secondary	411.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.8 cfs @ 12.40 hrs HW=409.82' TW=9.41' (Dynamic Tailwater)
└**1=Culvert** (Passes 7.8 cfs of 10.6 cfs potential flow)
└**2=Slotted Weir** (Weir Controls 7.8 cfs @ 3.96 fps)
└**3=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=408.00' TW=8.96' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3P: Detention South #3

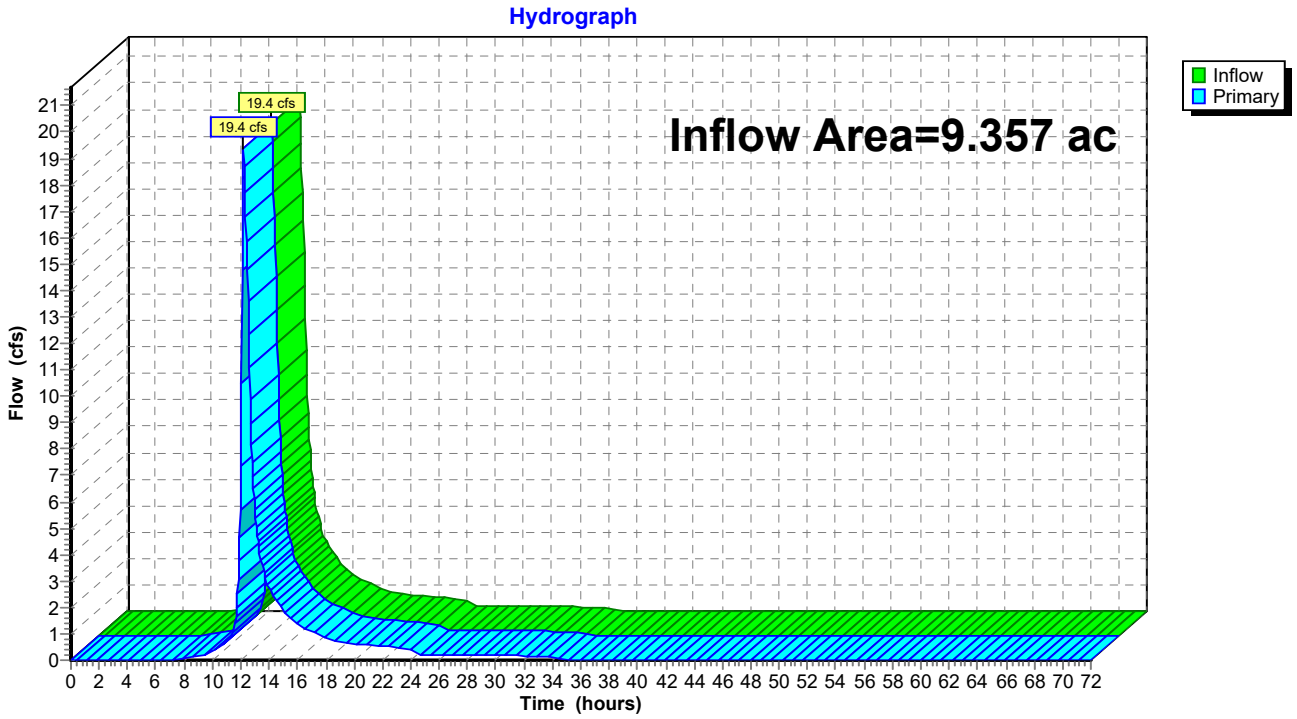


Summary for Link DP-1: DP-1

Inflow Area = 9.357 ac, 21.07% Impervious, Inflow Depth = 3.24" for 25-YR event
Inflow = 19.4 cfs @ 12.21 hrs, Volume= 2.530 af
Primary = 19.4 cfs @ 12.21 hrs, Volume= 2.530 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

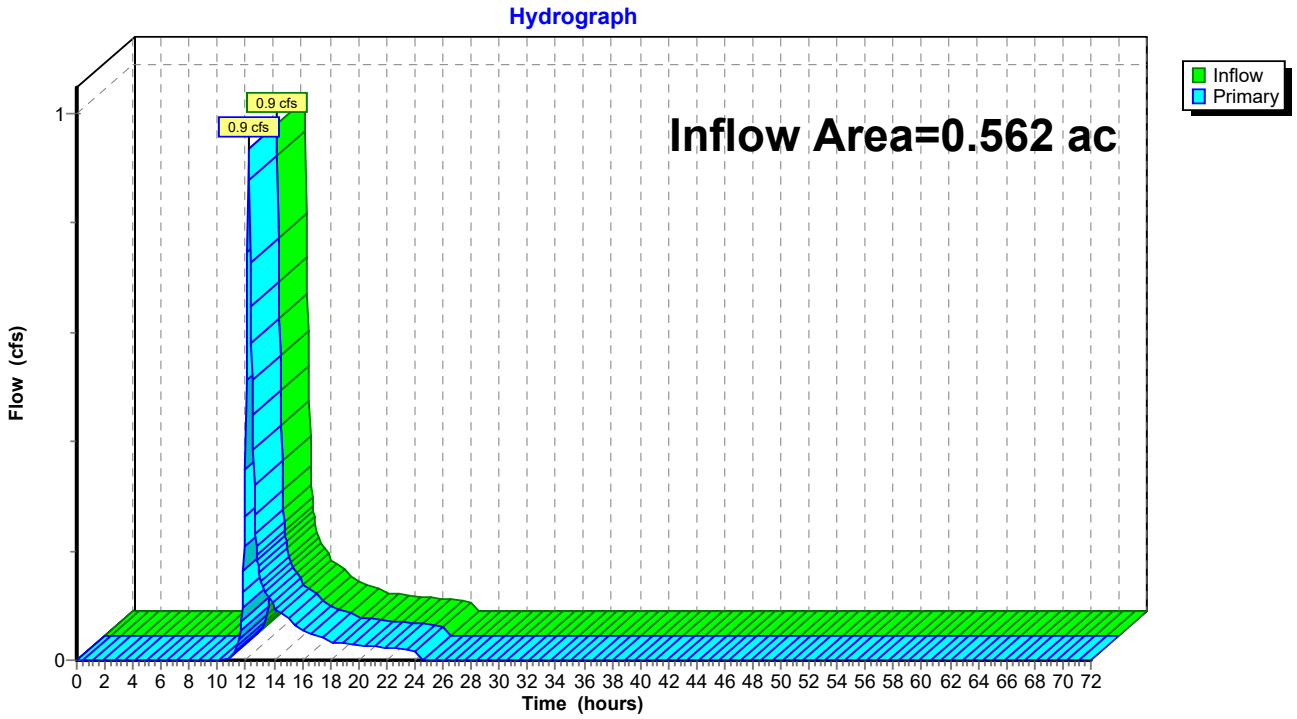


Summary for Link DP-2: DP-2

Inflow Area = 0.562 ac, 0.00% Impervious, Inflow Depth = 1.85" for 25-YR event
Inflow = 0.9 cfs @ 12.18 hrs, Volume= 0.087 af
Primary = 0.9 cfs @ 12.18 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-2: DP-2

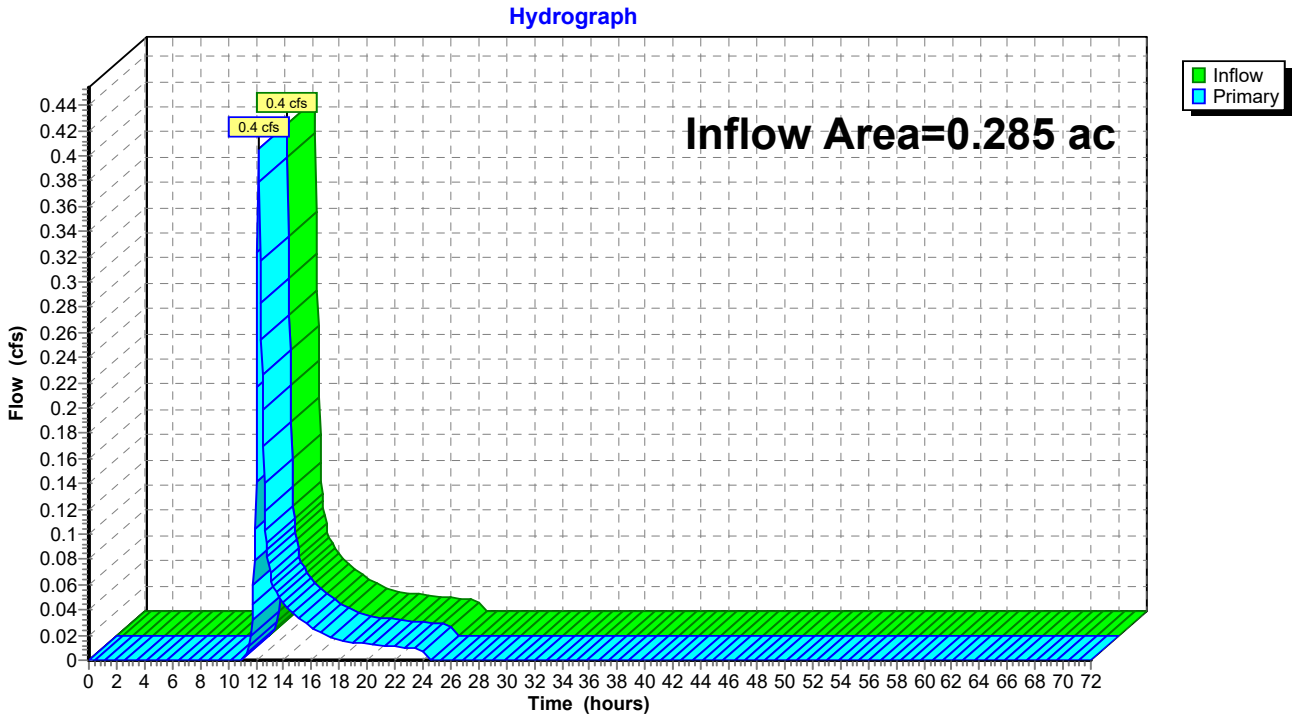


Summary for Link DP-3: DP-3

Inflow Area = 0.285 ac, 0.00% Impervious, Inflow Depth = 1.62" for 25-YR event
Inflow = 0.4 cfs @ 12.18 hrs, Volume= 0.038 af
Primary = 0.4 cfs @ 12.18 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-3: DP-3

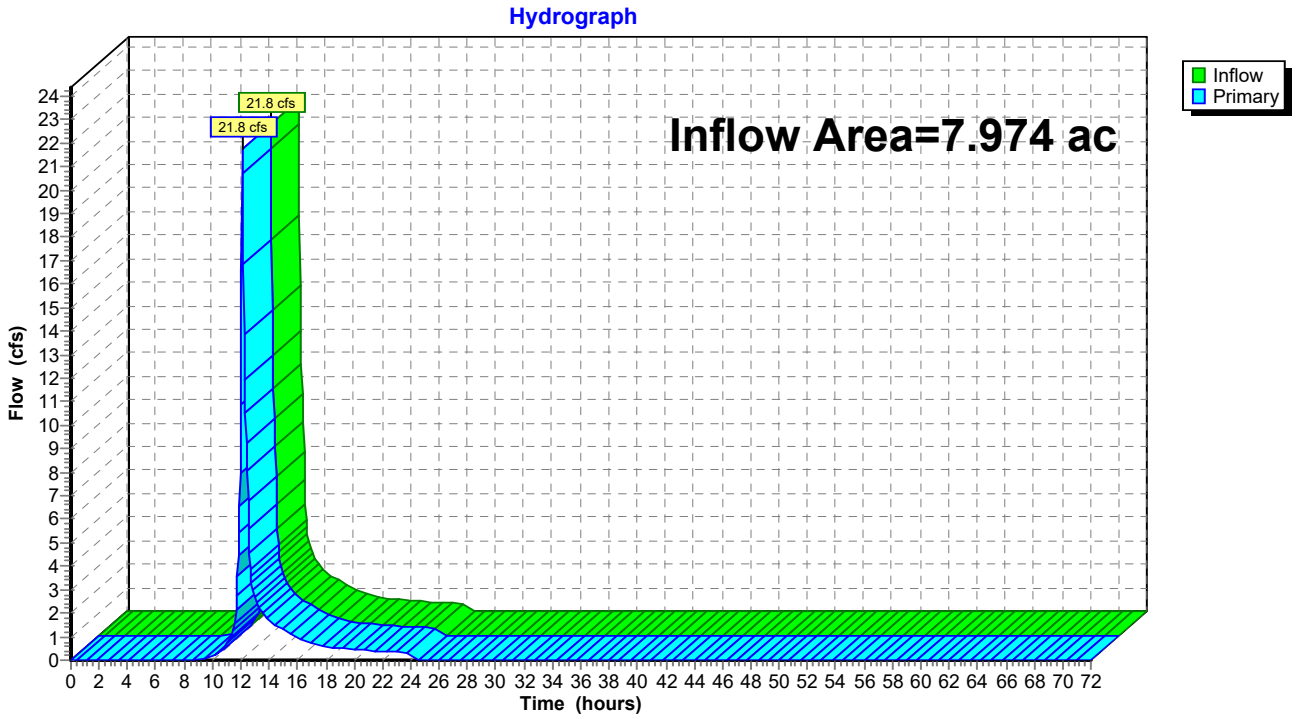


Summary for Link DP-4: DP-4

Inflow Area = 7.974 ac, 0.00% Impervious, Inflow Depth = 2.55" for 25-YR event
Inflow = 21.8 cfs @ 12.12 hrs, Volume= 1.697 af
Primary = 21.8 cfs @ 12.12 hrs, Volume= 1.697 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-4: DP-4

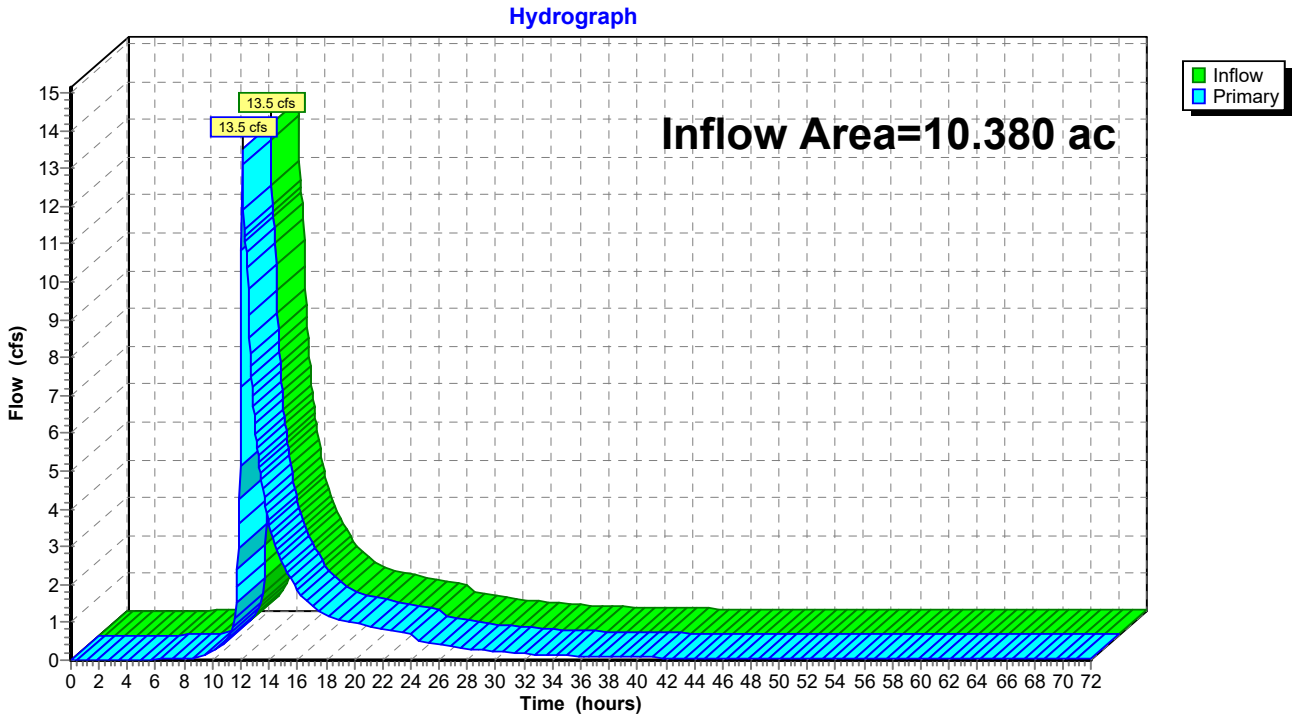


Summary for Link DP-5: DP-5

Inflow Area = 10.380 ac, 31.33% Impervious, Inflow Depth > 3.36" for 25-YR event
Inflow = 13.5 cfs @ 12.12 hrs, Volume= 2.908 af
Primary = 13.5 cfs @ 12.12 hrs, Volume= 2.908 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-5: DP-5



Summary for Subcatchment PR-1: Subcat PR-1

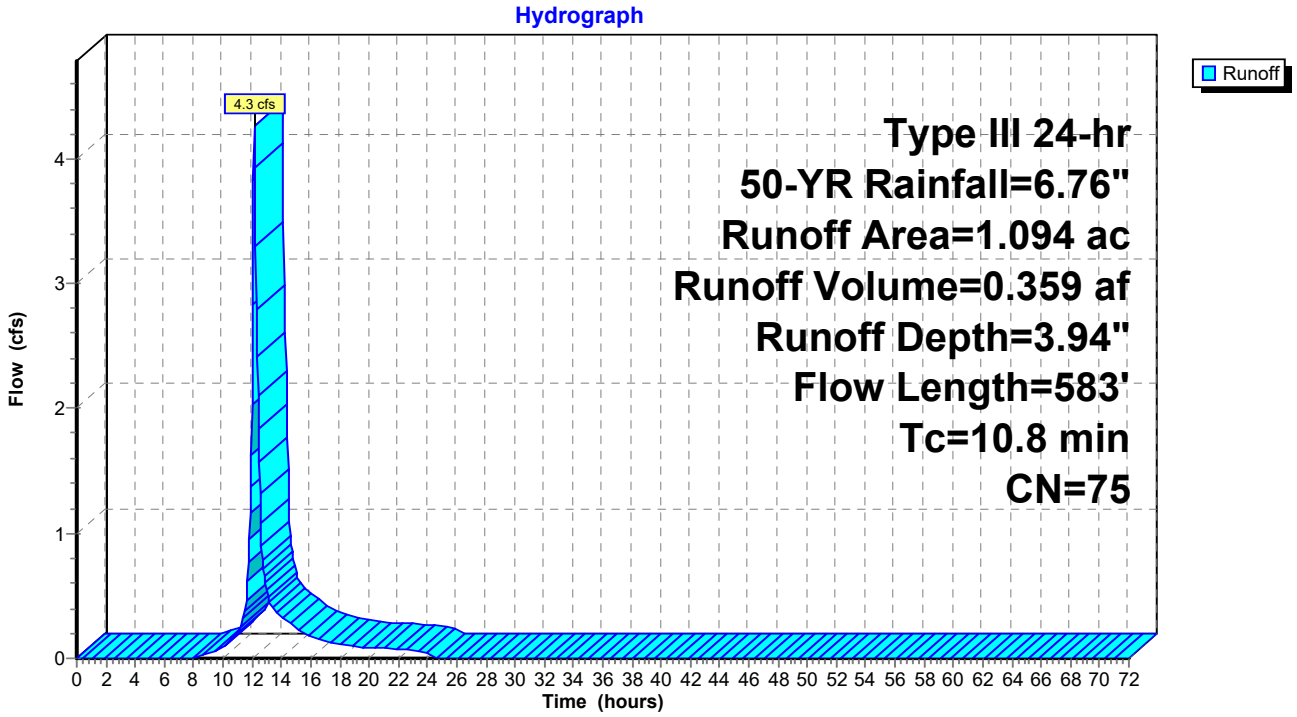
Runoff = 4.3 cfs @ 12.15 hrs, Volume= 0.359 af, Depth= 3.94"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.020	61	>75% Grass cover, Good, HSG B
0.374	74	>75% Grass cover, Good, HSG C
0.005	58	Meadow, non-grazed, HSG B
0.238	71	Meadow, non-grazed, HSG C
0.006	78	Meadow, non-grazed, HSG D
0.114	98	Paved parking, HSG C
0.024	55	Woods, Good, HSG B
0.233	70	Woods, Good, HSG C
0.079	77	Woods, Good, HSG D
1.094	75	Weighted Average
0.979		89.56% Pervious Area
0.114		10.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0334	0.17		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
4.4	379	0.0427	1.45		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0706	1.86		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	99	0.0441	1.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
10.8	583	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

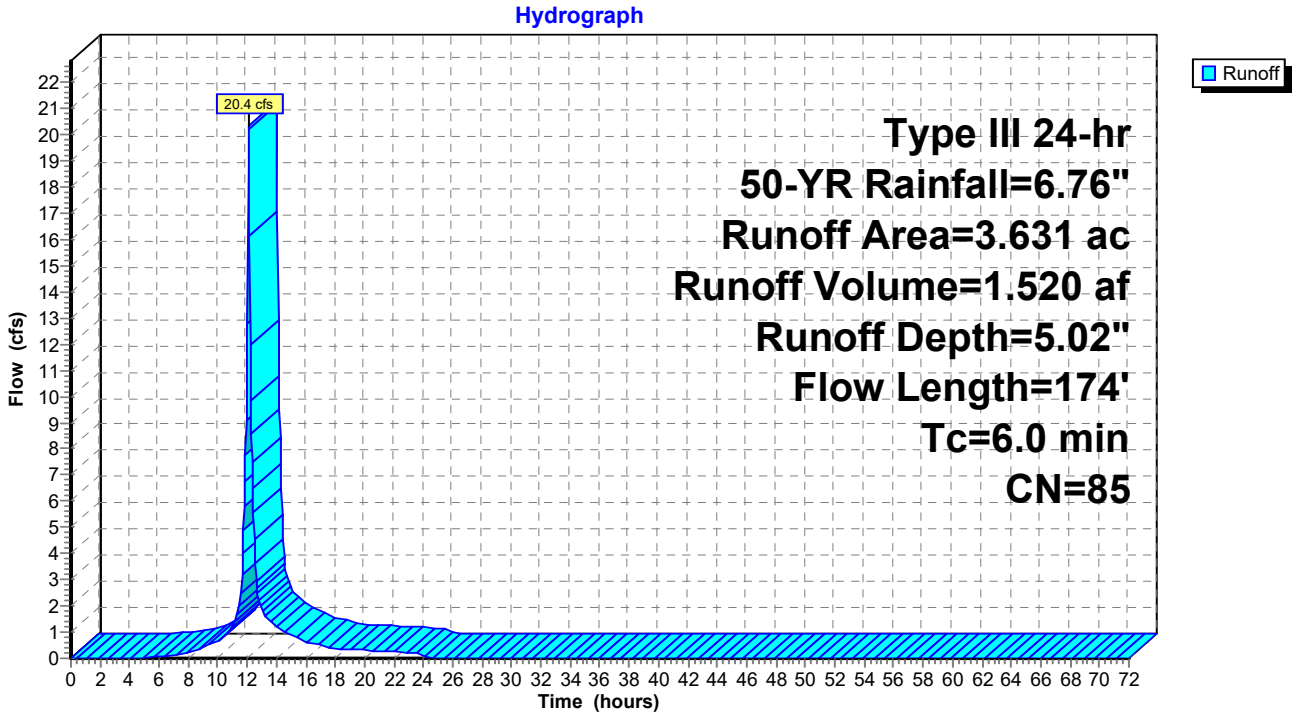
Runoff = 20.4 cfs @ 12.09 hrs, Volume= 1.520 af, Depth= 5.02"
Routed to Pond 2P : Sand Filter #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.119	61	>75% Grass cover, Good, HSG B
1.777	74	>75% Grass cover, Good, HSG C
0.022	71	Meadow, non-grazed, HSG C
0.056	98	Paved parking, HSG B
0.803	98	Paved parking, HSG C
0.176	98	Roofs, HSG B
0.678	98	Roofs, HSG C
3.631	85	Weighted Average
1.918		52.82% Pervious Area
1.713		47.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0738	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.2	124	0.0614	1.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3					**Direct Entry,**
6.0	174	Total			

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

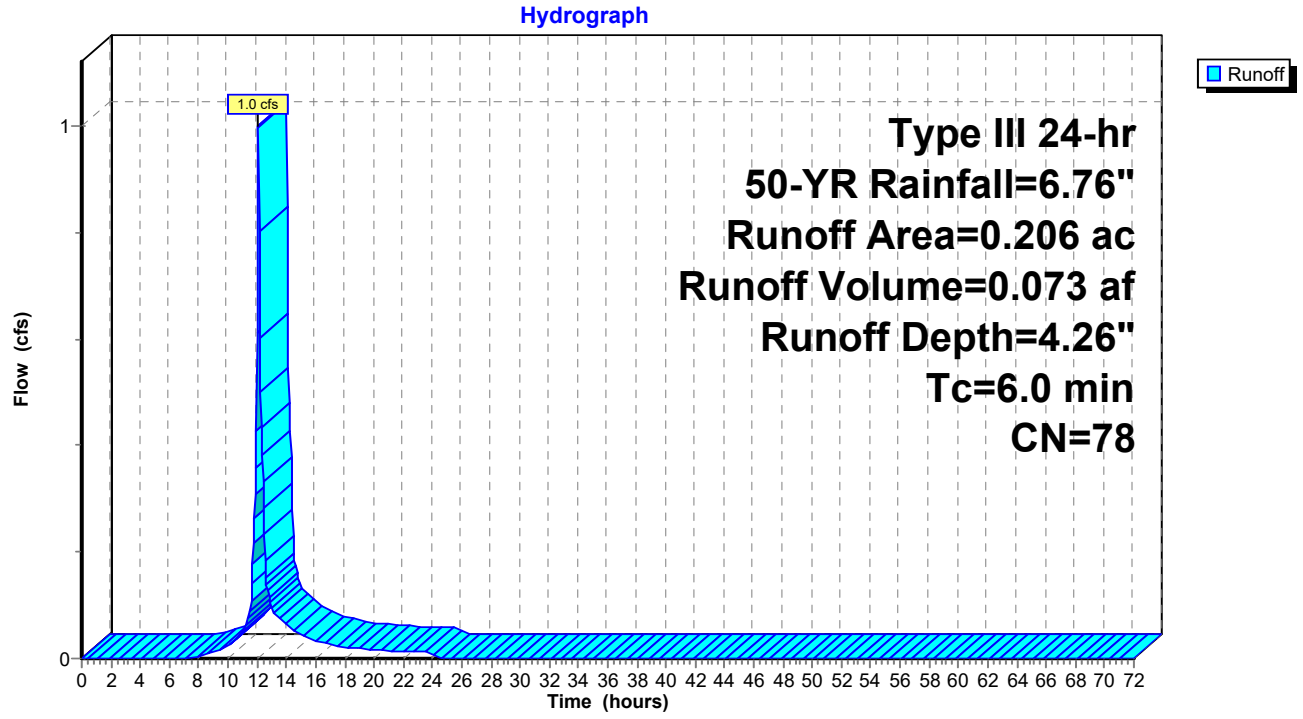
Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 4.26"
Routed to Pond 3P : Detention South #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.136	80	>75% Grass cover, Good, HSG D
0.206	78	Weighted Average
0.206		100.00% Pervious Area

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

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-2: Subcat PR-2

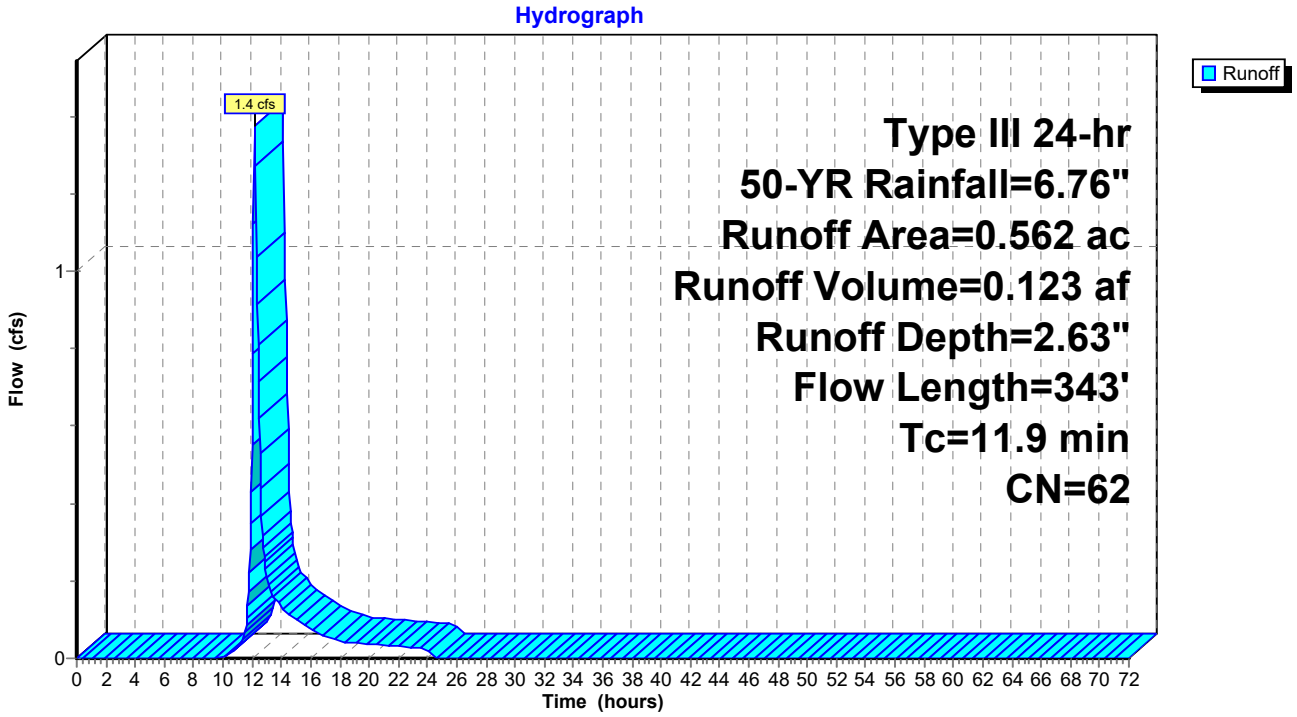
Runoff = 1.4 cfs @ 12.17 hrs, Volume= 0.123 af, Depth= 2.63"
Routed to Link DP-2 : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.136	61	>75% Grass cover, Good, HSG B
0.157	74	>75% Grass cover, Good, HSG C
0.000	98	Paved parking, HSG B
0.258	55	Woods, Good, HSG B
0.009	70	Woods, Good, HSG C
0.002	77	Woods, Good, HSG D
0.562	62	Weighted Average
0.562		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0219	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
3.3	210	0.0227	1.05		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
2.9	83	0.0046	0.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.9	343	Total			

Subcatchment PR-2: Subcat PR-2



Summary for Subcatchment PR-3: Subcat PR-3

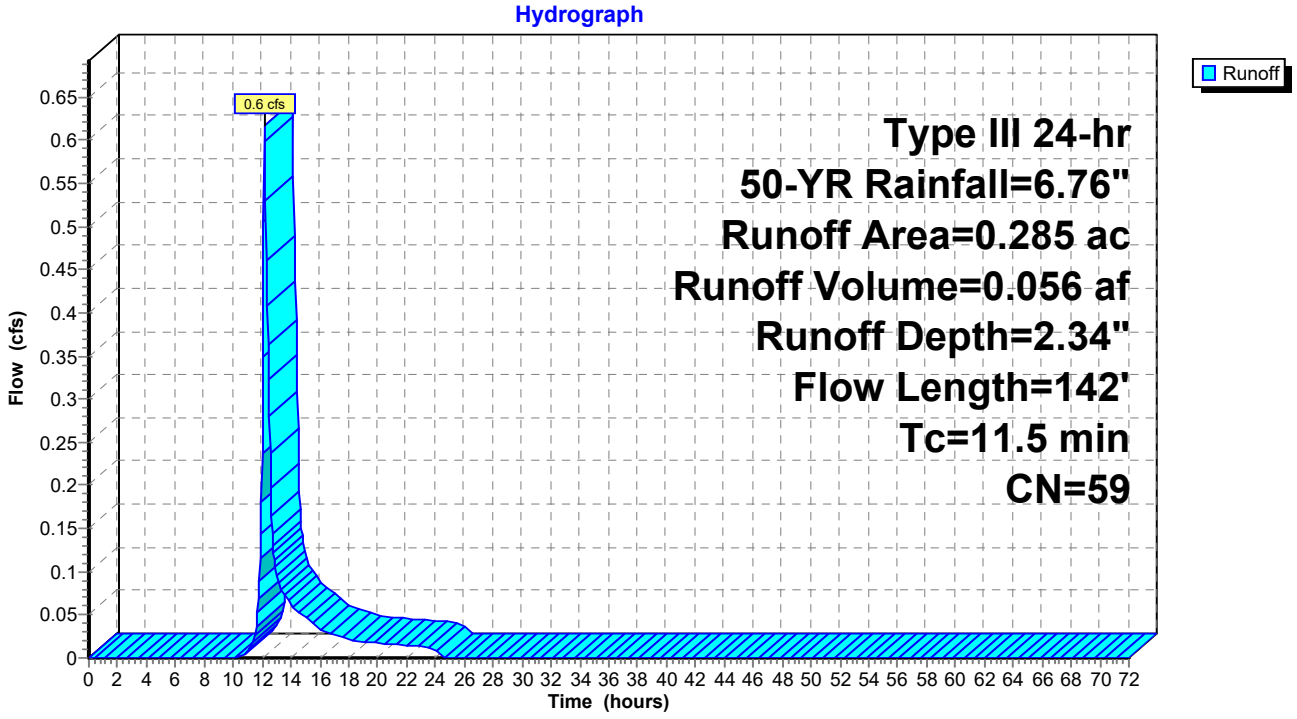
Runoff = 0.6 cfs @ 12.17 hrs, Volume= 0.056 af, Depth= 2.34"
Routed to Link DP-3 : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.126	61	>75% Grass cover, Good, HSG B
0.017	74	>75% Grass cover, Good, HSG C
0.142	55	Woods, Good, HSG B
0.285	59	Weighted Average
0.285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0060	0.09		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
0.6	19	0.0060	0.54		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.4	73	0.0163	0.89		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
11.5	142	Total			

Subcatchment PR-3: Subcat PR-3



Summary for Subcatchment PR-4: Subcat PR-4

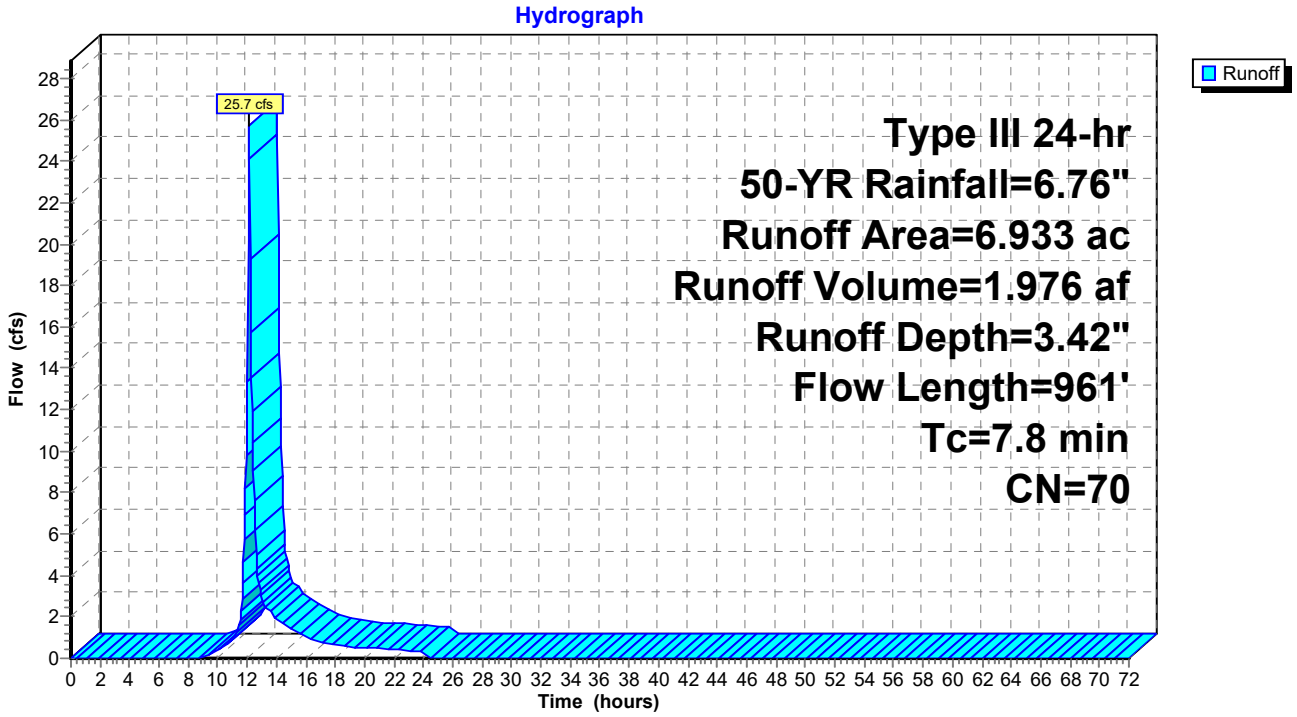
Runoff = 25.7 cfs @ 12.11 hrs, Volume= 1.976 af, Depth= 3.42"
Routed to Link DP-4 : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.450	61	>75% Grass cover, Good, HSG B
0.719	74	>75% Grass cover, Good, HSG C
0.041	58	Meadow, non-grazed, HSG B
2.069	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.214	55	Woods, Good, HSG B
2.935	70	Woods, Good, HSG C
0.497	77	Woods, Good, HSG D
6.933	70	Weighted Average
6.933		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0831	0.25		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
0.2	20	0.0831	2.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	155	0.0873	2.07		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.8	193	0.1306	1.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	543	0.0228	6.99	69.87	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=2.00' Z= 4.0 & 1.0 '/' Top.W=10.00' n= 0.030 Earth, grassed & winding
7.8	961	Total			

Subcatchment PR-4: Subcat PR-4



Summary for Subcatchment PR-5: Subcat PR-5

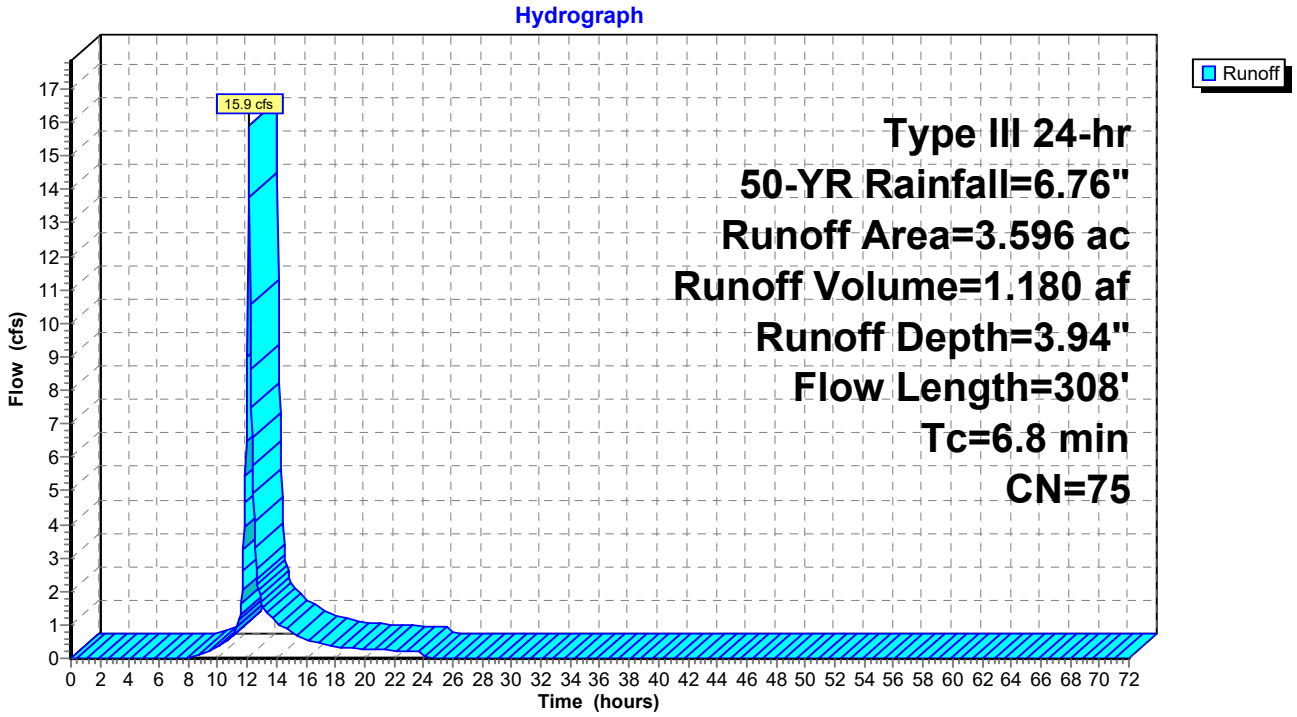
Runoff = 15.9 cfs @ 12.10 hrs, Volume= 1.180 af, Depth= 3.94"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
1.555	74	>75% Grass cover, Good, HSG C
0.077	80	>75% Grass cover, Good, HSG D
0.032	96	Gravel surface, HSG C
0.110	96	Gravel surface, HSG D
0.708	71	Meadow, non-grazed, HSG C
0.028	78	Meadow, non-grazed, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
0.812	70	Woods, Good, HSG C
3.596	75	Weighted Average
3.322		92.39% Pervious Area
0.274		7.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0826	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.95"
1.2	146	0.0792	1.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	112	0.1088	2.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.8	308	Total			

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

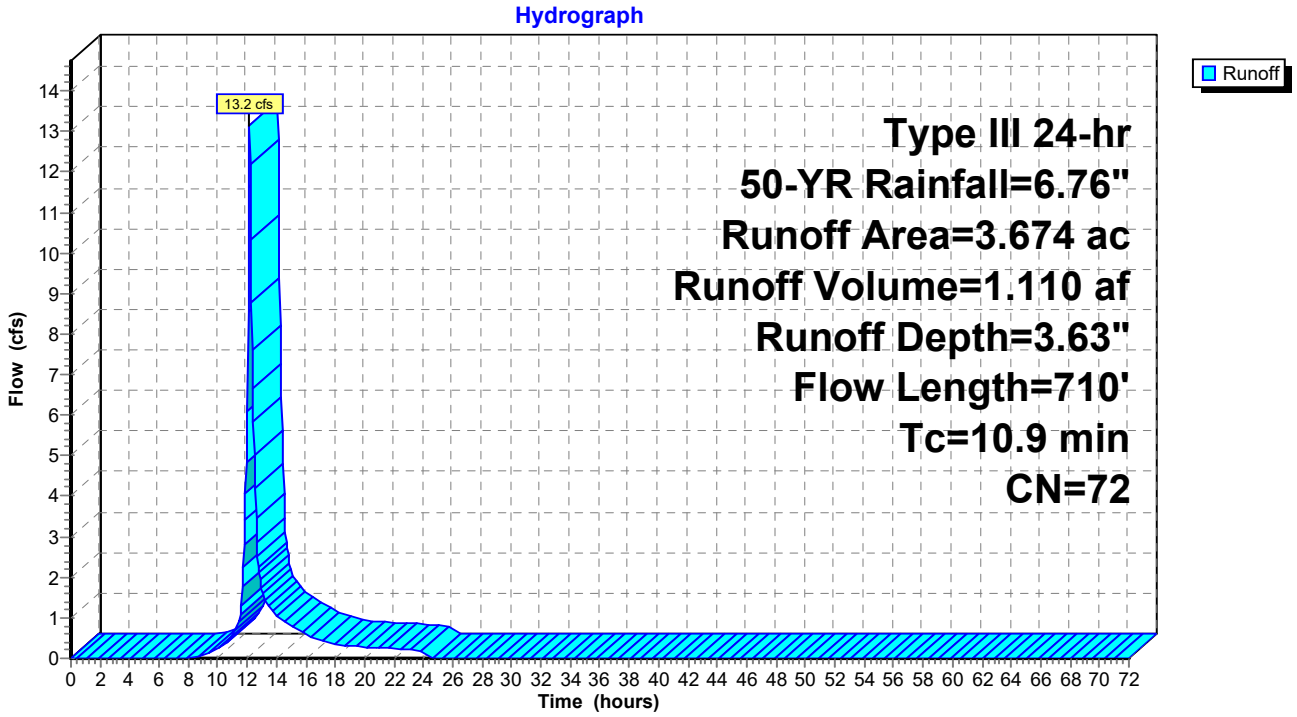
Runoff = 13.2 cfs @ 12.16 hrs, Volume= 1.110 af, Depth= 3.63"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.908	74	>75% Grass cover, Good, HSG C
0.303	71	Meadow, non-grazed, HSG C
0.091	78	Meadow, non-grazed, HSG D
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.229	70	Woods, Good, HSG C
3.674	72	Weighted Average
3.530		96.08% Pervious Area
0.144		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	67	0.1495	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	175	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0447	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1064	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	54	0.0694	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	710	Total			

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

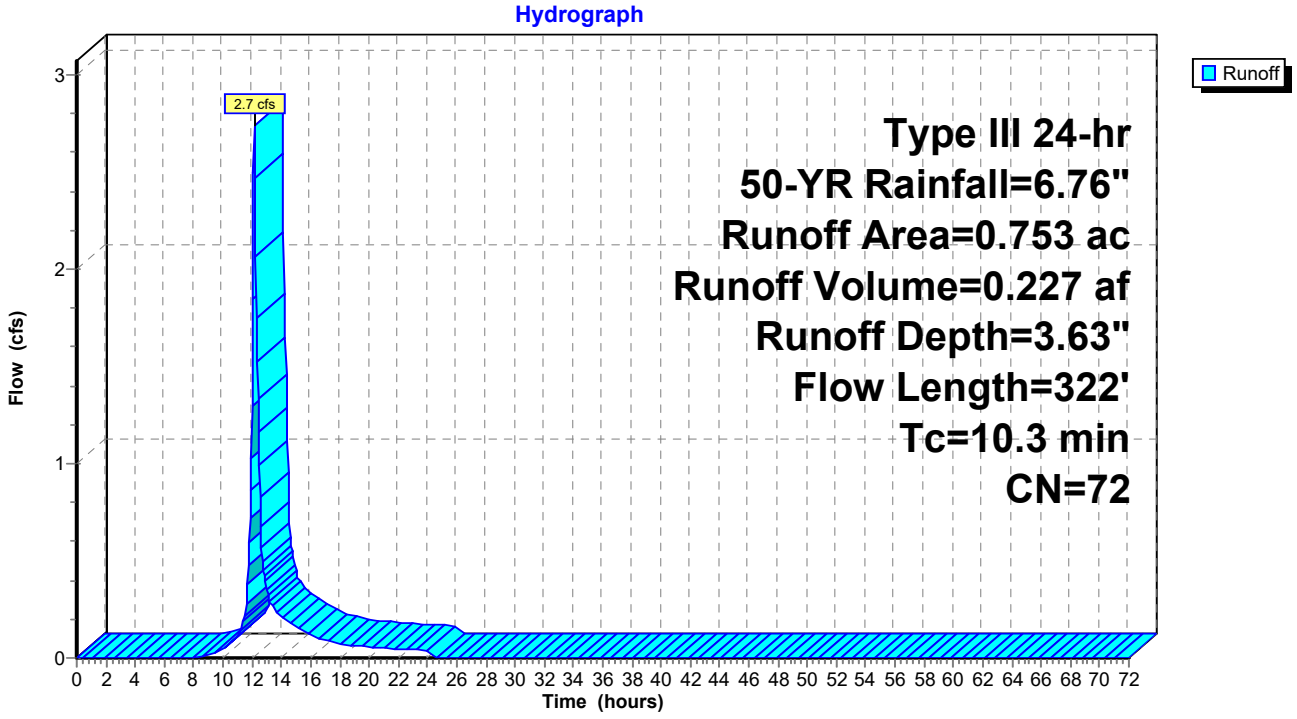
Runoff = 2.7 cfs @ 12.15 hrs, Volume= 0.227 af, Depth= 3.63"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.067	80	>75% Grass cover, Good, HSG D
0.012	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.510	70	Woods, Good, HSG C
0.753	72	Weighted Average
0.753		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-8: Subcat PR-8

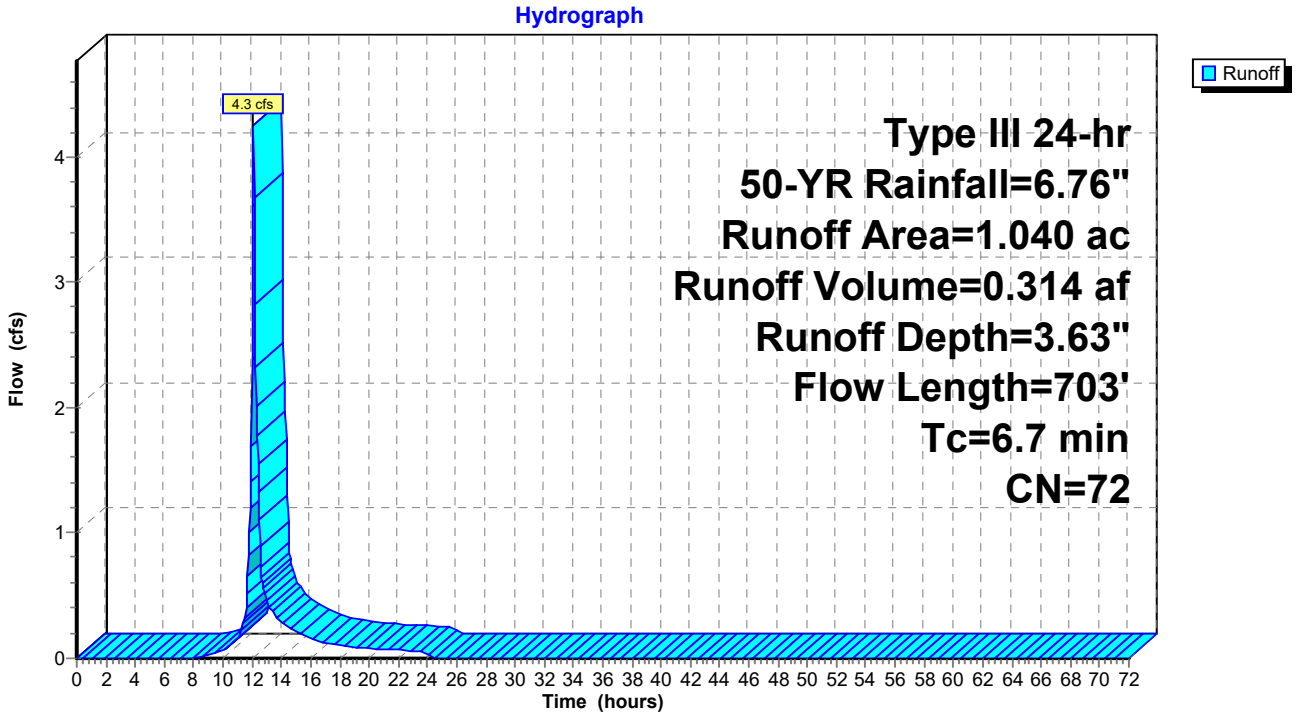
Runoff = 4.3 cfs @ 12.10 hrs, Volume= 0.314 af, Depth= 3.63"
Routed to Reach 1R : Pillsbury Rd Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.012	74	>75% Grass cover, Good, HSG C
0.843	71	Meadow, non-grazed, HSG C
0.103	78	Meadow, non-grazed, HSG D
0.031	70	Woods, Good, HSG C
0.052	77	Woods, Good, HSG D
1.040	72	Weighted Average
1.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	50	0.0794	0.25		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
1.0	118	0.0800	1.98		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	140	0.1004	2.22		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.2	395	0.0336	5.52	16.57	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=1.00' Z= 3.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
6.7	703	Total			

Subcatchment PR-8: Subcat PR-8



Summary for Subcatchment PR-9: Subcat PR-9

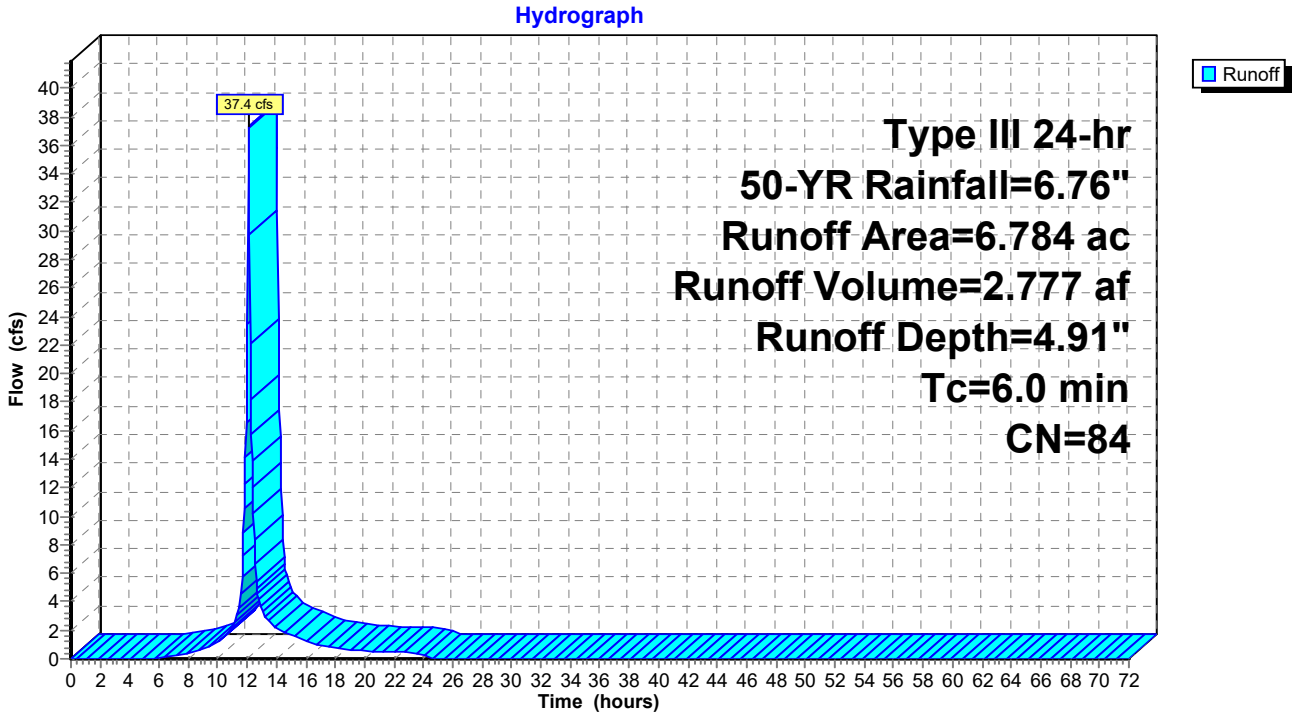
Runoff = 37.4 cfs @ 12.09 hrs, Volume= 2.777 af, Depth= 4.91"
Routed to Pond 1P : Sand Filter #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.449	61	>75% Grass cover, Good, HSG B
3.226	74	>75% Grass cover, Good, HSG C
0.001	96	Gravel surface, HSG C
0.130	71	Meadow, non-grazed, HSG C
0.437	98	Paved parking, HSG B
1.056	98	Paved parking, HSG C
0.602	98	Roofs, HSG B
0.883	98	Roofs, HSG C
6.784	84	Weighted Average
3.806		56.10% Pervious Area
2.978		43.90% Impervious Area

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

Subcatchment PR-9: Subcat PR-9



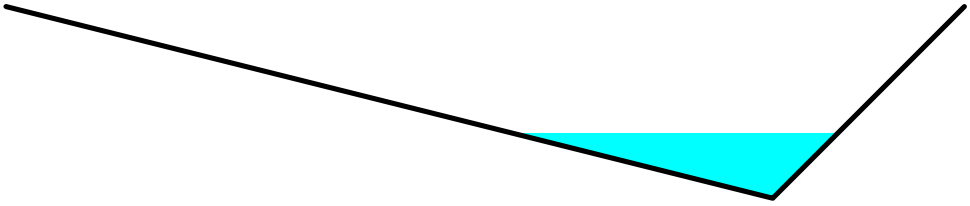
Summary for Reach 1R: Pillsbury Rd Swale

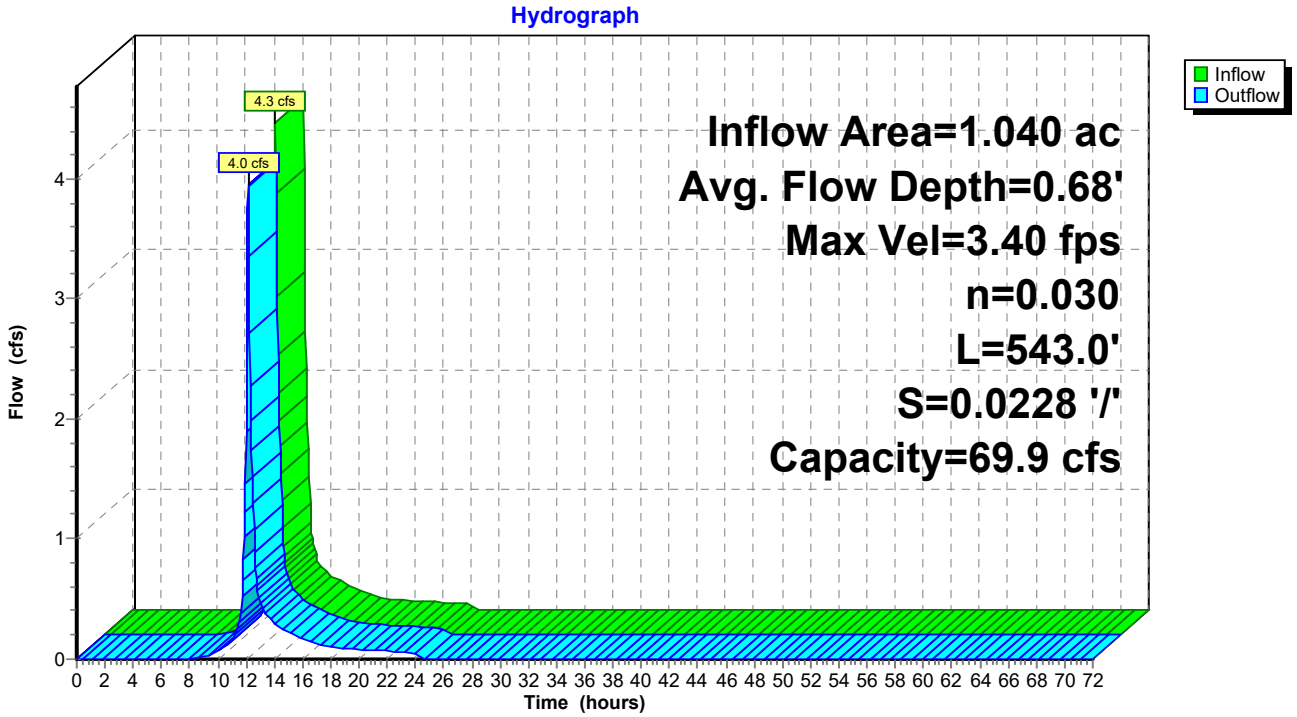
Inflow Area = 1.040 ac, 0.00% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 4.3 cfs @ 12.10 hrs, Volume= 0.314 af
Outflow = 4.0 cfs @ 12.14 hrs, Volume= 0.314 af, Atten= 7%, Lag= 2.2 min
Routed to Link DP-4 : DP-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.40 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 6.7 min

Peak Storage= 630 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.68' , Surface Width= 3.41'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 69.9 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 1.0 '/' Top Width= 10.00'
Length= 543.0' Slope= 0.0228 '/'
Inlet Invert= 12.38', Outlet Invert= 0.00'





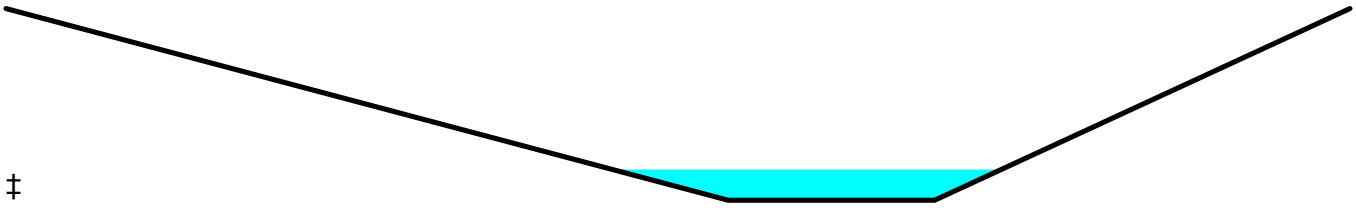
Summary for Reach 2R: Stream South

Inflow Area = 5.683 ac, 32.15% Impervious, Inflow Depth = 4.60" for 50-YR event
Inflow = 15.7 cfs @ 12.24 hrs, Volume= 2.179 af
Outflow = 15.7 cfs @ 12.26 hrs, Volume= 2.179 af, Atten= 0%, Lag= 0.8 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.88 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 3.6 min

Peak Storage= 932 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.56' , Surface Width= 7.53'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 711.7 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0310 '/'
Inlet Invert= 8.96', Outlet Invert= 0.00'



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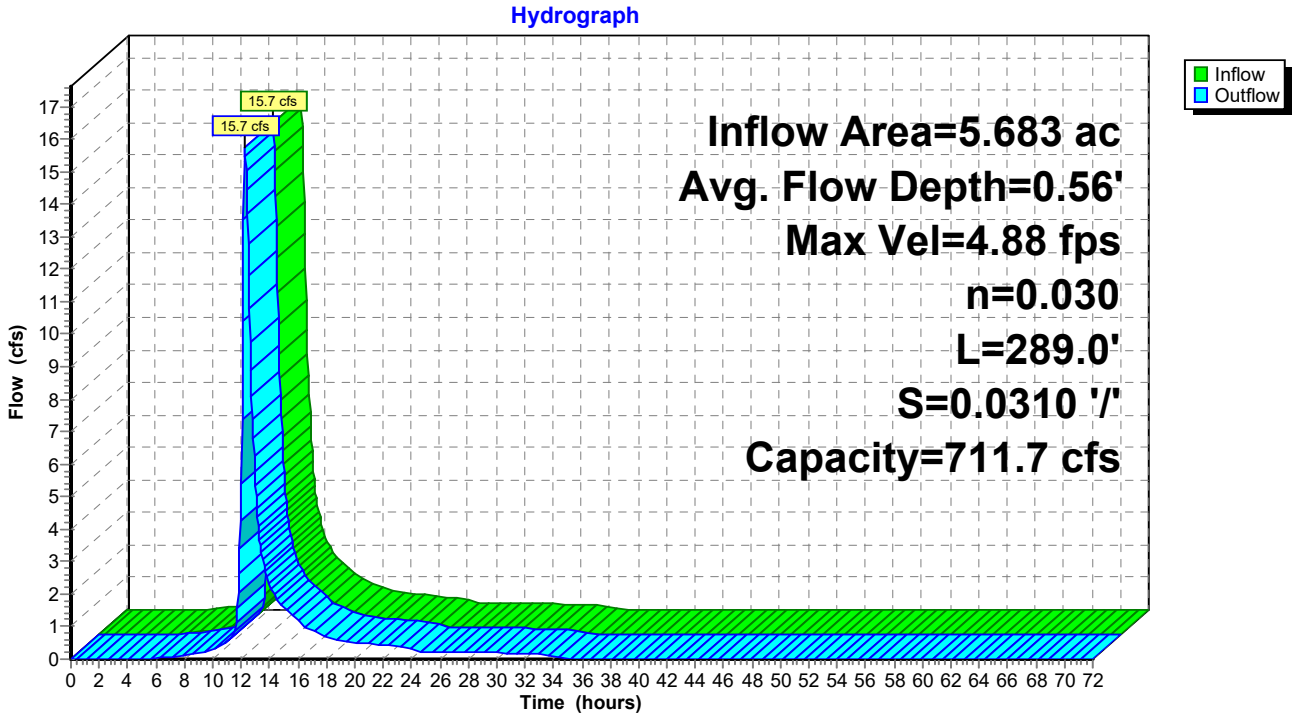
Reach 2R: Stream South



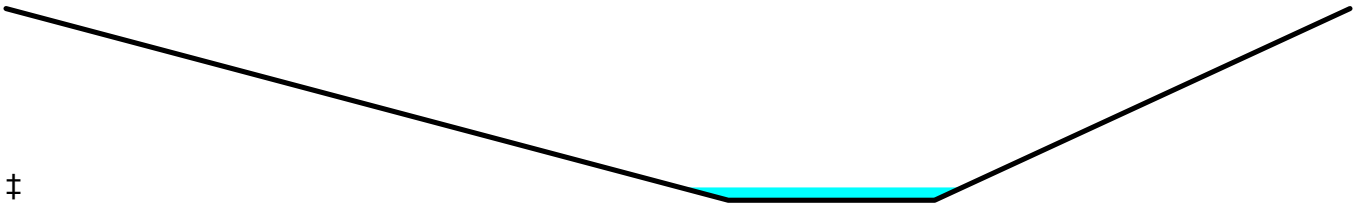
Summary for Reach 3R: Stream North

Inflow Area = 1.094 ac, 10.44% Impervious, Inflow Depth = 3.94" for 50-YR event
Inflow = 4.3 cfs @ 12.15 hrs, Volume= 0.359 af
Outflow = 4.1 cfs @ 12.18 hrs, Volume= 0.359 af, Atten= 3%, Lag= 1.8 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.75 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 6.7 min

Peak Storage= 587 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 5.46'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 901.4 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 535.0' Slope= 0.0497 '/'
Inlet Invert= 35.57', Outlet Invert= 8.96'



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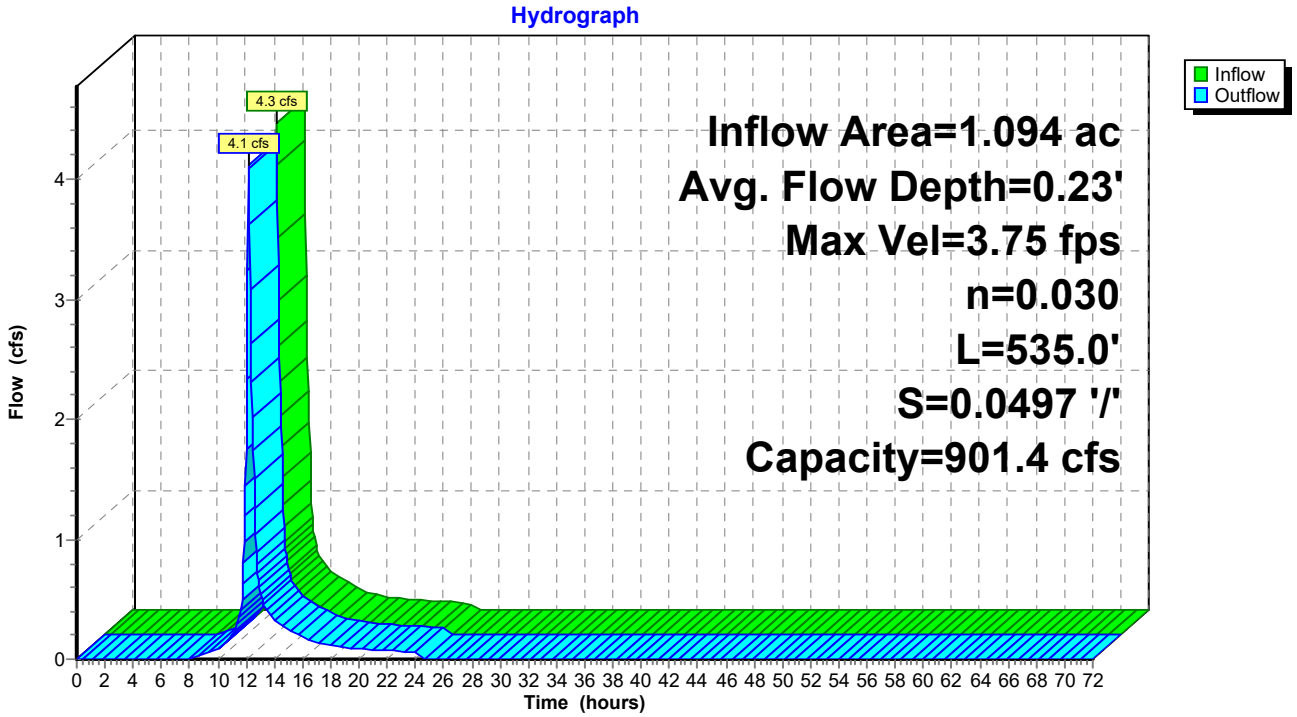


Summary for Pond 1P: Sand Filter #1

Inflow Area = 6.784 ac, 43.90% Impervious, Inflow Depth = 4.91" for 50-YR event
Inflow = 37.4 cfs @ 12.09 hrs, Volume= 2.777 af
Outflow = 11.2 cfs @ 12.42 hrs, Volume= 2.600 af, Atten= 70%, Lag= 20.0 min
Primary = 11.2 cfs @ 12.42 hrs, Volume= 2.600 af
Routed to Link DP-5 : DP-5
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-5 : DP-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 402.38' @ 12.42 hrs Surf.Area= 8,782 sf Storage= 56,100 cf
Flood Elev= 402.80' Surf.Area= 8,782 sf Storage= 62,743 cf

Plug-Flow detention time= 364.5 min calculated for 2.600 af (94% of inflow)
Center-of-Mass det. time= 330.2 min (1,129.3 - 799.1)

Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	3,952 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	398.00'	79,237 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		83,189 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
396.50	8,782	461.4	0.0	0	0	8,782
398.00	8,782	461.4	30.0	3,952	3,952	9,474

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
398.00	8,782	461.4	0.0	0	0	8,782
398.80	9,907	476.4	100.0	7,471	7,471	9,963
404.00	18,104	574.5	100.0	71,766	79,237	18,610

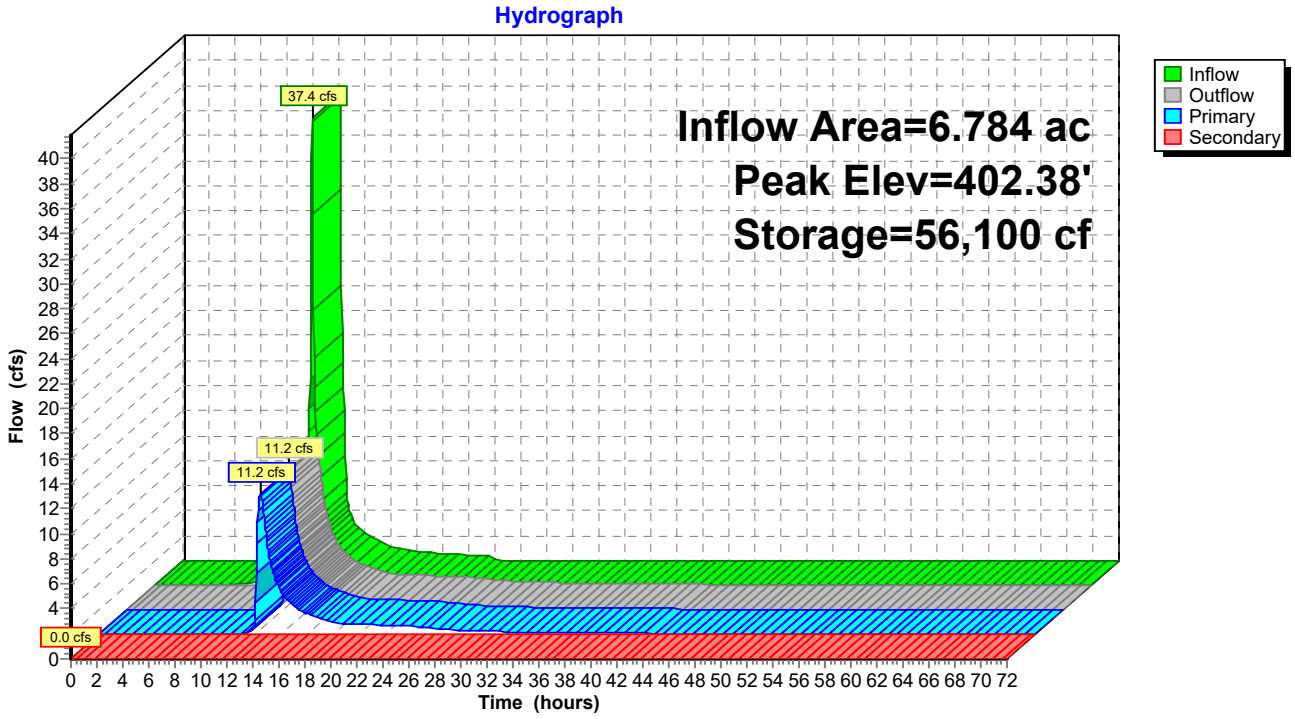
Device	Routing	Invert	Outlet Devices
#1	Primary	395.30'	**15.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 395.30' / 394.00' S= 0.0232 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	395.42'	**1.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	395.42'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 395.42' / 395.42' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	396.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	398.80'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.80 1.80 3.90 Width (feet) 0.10 0.10 1.25 1.25
#6	Device 1	402.70'	**2.5" x 2.5" Horiz. Grate X 12.00 columns** X 12 rows C= 0.600 in 48.0" x 48.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	403.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=11.2 cfs @ 12.42 hrs HW=402.37' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 11.2 cfs of 15.0 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Orifice Controls 0.1 cfs @ 12.66 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.7 cfs potential flow)
      - **4=Exfiltration** (Passes 0.1 cfs of 2.0 cfs potential flow)
  - **5=Slotted Weir** (Weir Controls 11.1 cfs @ 4.63 fps)
  - **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=396.50' TW=0.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Sand Filter #1



Summary for Pond 2P: Sand Filter #2

Inflow Area = 3.631 ac, 47.18% Impervious, Inflow Depth = 5.02" for 50-YR event
Inflow = 20.4 cfs @ 12.09 hrs, Volume= 1.520 af
Outflow = 11.5 cfs @ 12.21 hrs, Volume= 1.520 af, Atten= 44%, Lag= 7.5 min
Primary = 11.5 cfs @ 12.21 hrs, Volume= 1.520 af
Routed to Pond 3P : Detention South #3
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3P : Detention South #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 417.73' @ 12.22 hrs Surf.Area= 2,199 sf Storage= 18,956 cf
Flood Elev= 417.80' Surf.Area= 2,199 sf Storage= 19,346 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 129.1 min (925.4 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	990 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	413.00'	25,811 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		26,801 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.50	2,199	197.3	0.0	0	0	2,199
413.00	2,199	197.3	30.0	990	990	2,495

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
413.00	2,199	197.3	0.0	0	0	2,199
415.00	3,495	235.0	100.0	5,644	5,644	3,566
419.00	6,767	310.4	100.0	20,167	25,811	7,016

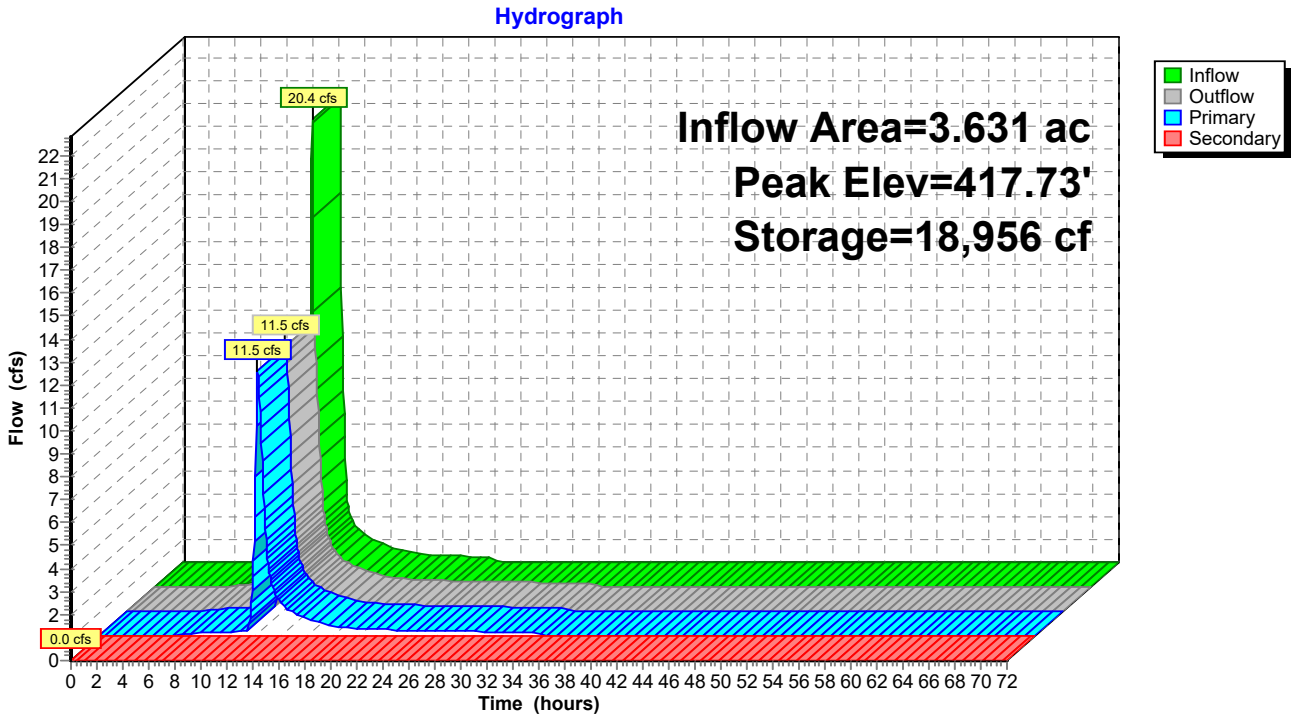
Device	Routing	Invert	Outlet Devices
#1	Primary	410.30'	**18.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.30' / 408.50' S= 0.0196 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	410.33'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	410.33'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.33' / 410.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	411.50'	**10.000 in/hr Exfiltration over Surface area**
#5	Device 1	415.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 0.75 0.75
#6	Device 1	417.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	418.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Primary OutFlow Max=11.4 cfs @ 12.21 hrs HW=417.72' TW=409.98' (Dynamic Tailwater)
- **1=Culvert** (Passes 11.4 cfs of 22.0 cfs potential flow)
- **2=Underdrain Cap/Orifice** (Orifice Controls 0.3 cfs @ 13.01 fps)
  - **3=Culvert** (Passes 0.3 cfs of 1.8 cfs potential flow)
    - **4=Exfiltration** (Passes 0.3 cfs of 0.5 cfs potential flow)
- **5=Slotted Weir** (Orifice Controls 11.0 cfs @ 5.44 fps)
- **6=Grate** (Weir Controls 0.1 cfs @ 0.45 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=411.50' TW=408.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Sand Filter #2



Summary for Pond 3P: Detention South #3

Inflow Area = 3.837 ac, 44.65% Impervious, Inflow Depth = 4.98" for 50-YR event
Inflow = 12.1 cfs @ 12.21 hrs, Volume= 1.593 af
Outflow = 10.7 cfs @ 12.35 hrs, Volume= 1.593 af, Atten= 11%, Lag= 8.9 min
Primary = 10.7 cfs @ 12.35 hrs, Volume= 1.593 af
Routed to Reach 2R : Stream South
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 410.15' @ 12.35 hrs Surf.Area= 3,762 sf Storage= 6,215 cf
Flood Elev= 410.80' Surf.Area= 4,359 sf Storage= 8,866 cf

Plug-Flow detention time= 20.0 min calculated for 1.593 af (100% of inflow)
Center-of-Mass det. time= 19.3 min (939.7 - 920.4)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	14,810 cf	**Storage (Irregular)**Listed below (Recalc)

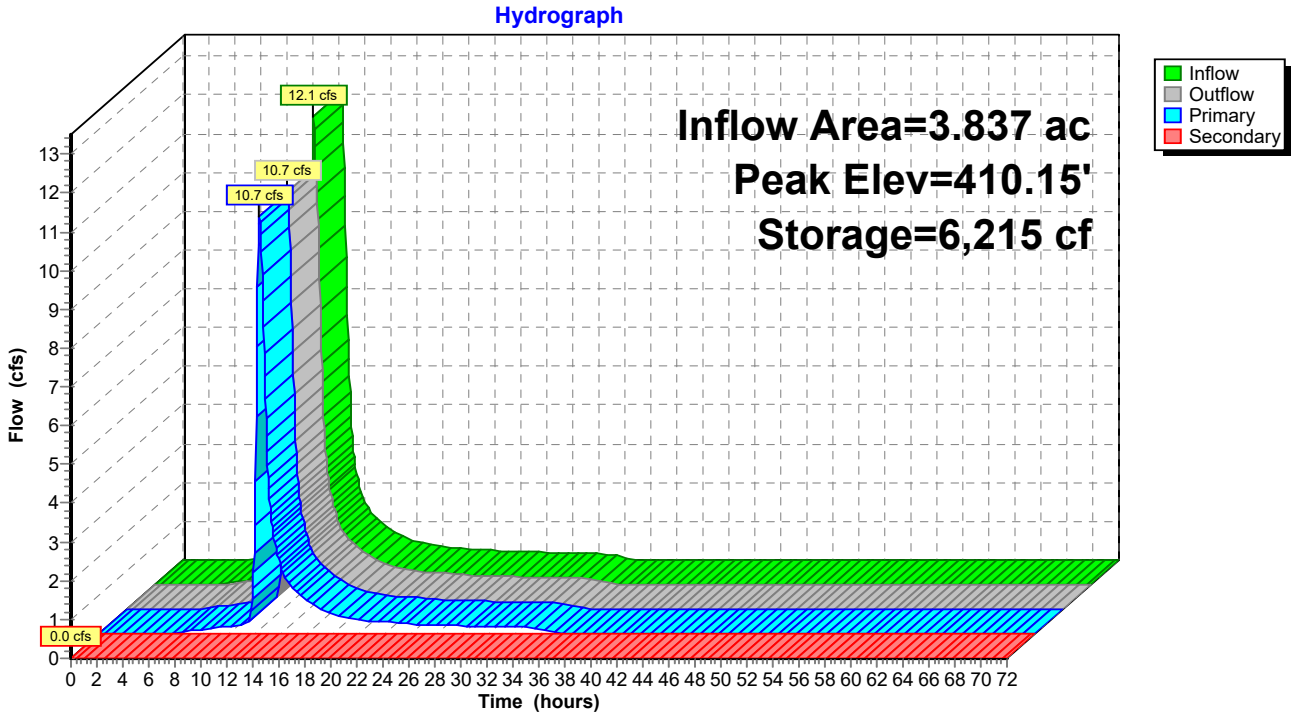
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
408.00	2,108	251.0	0.0	0	0	2,108
412.00	5,572	326.4	100.0	14,810	14,810	5,760

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**15.0" Round Culvert** L= 61.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 404.00' S= 0.0328 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	408.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 1.50 1.50
#3	Device 1	410.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#4	Secondary	411.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=10.7 cfs @ 12.35 hrs HW=410.15' TW=9.50' (Dynamic Tailwater)
1=Culvert (Passes 10.7 cfs of 11.1 cfs potential flow)
2=Slotted Weir (Weir Controls 10.7 cfs @ 4.35 fps)
3=Grate (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=408.00' TW=8.96' (Dynamic Tailwater)
4=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: Detention South #3

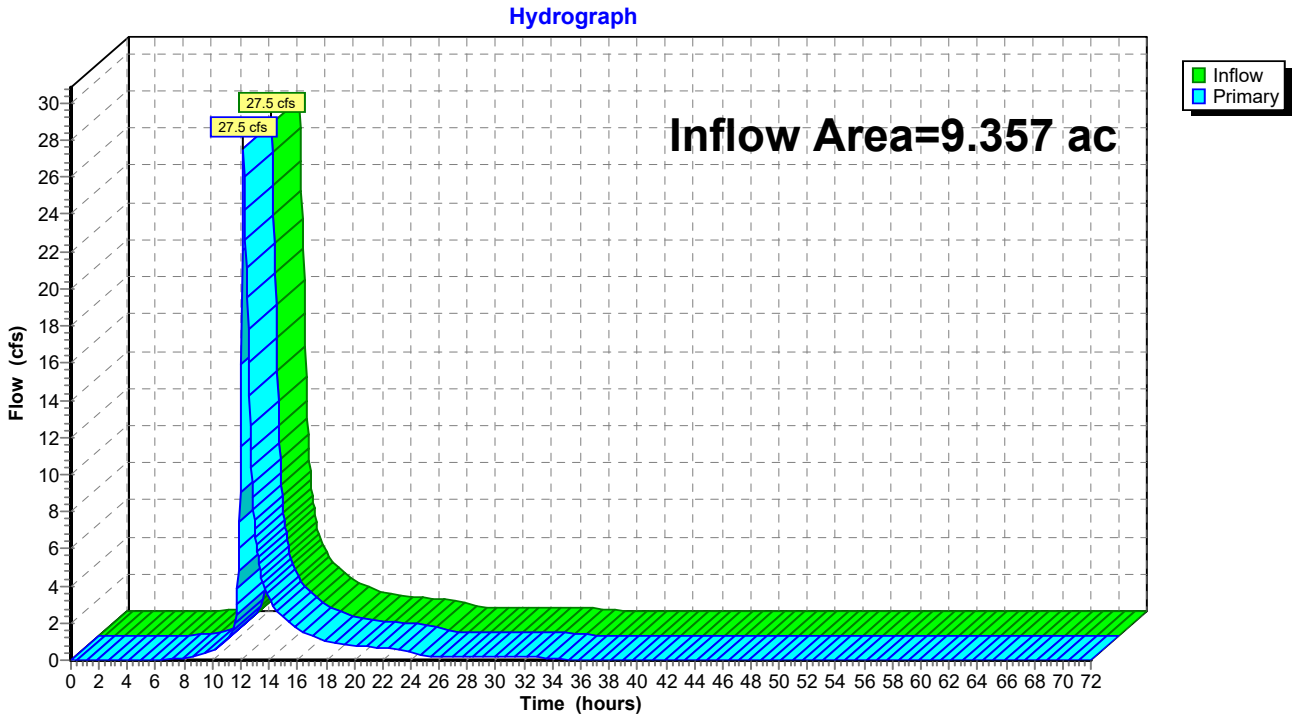


Summary for Link DP-1: DP-1

Inflow Area = 9.357 ac, 21.07% Impervious, Inflow Depth = 4.22" for 50-YR event
Inflow = 27.5 cfs @ 12.19 hrs, Volume= 3.289 af
Primary = 27.5 cfs @ 12.19 hrs, Volume= 3.289 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

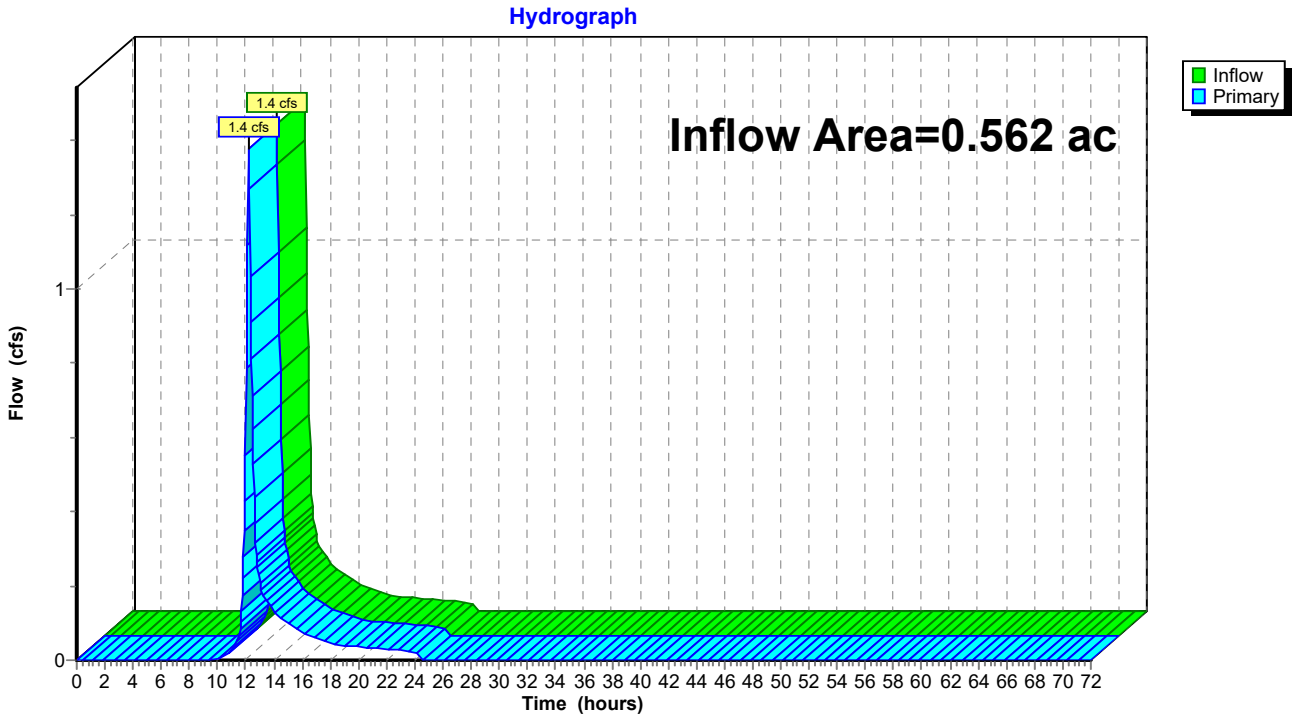


Summary for Link DP-2: DP-2

Inflow Area = 0.562 ac, 0.00% Impervious, Inflow Depth = 2.63" for 50-YR event
Inflow = 1.4 cfs @ 12.17 hrs, Volume= 0.123 af
Primary = 1.4 cfs @ 12.17 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-2: DP-2

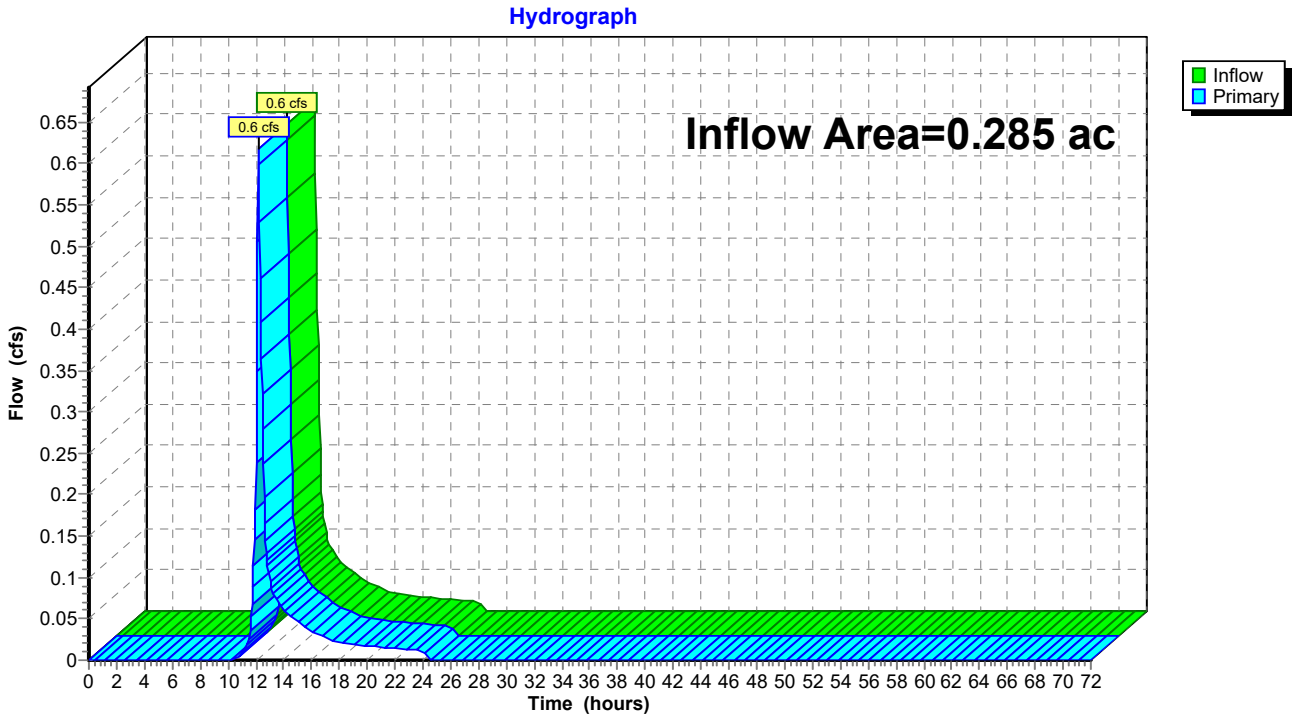


Summary for Link DP-3: DP-3

Inflow Area = 0.285 ac, 0.00% Impervious, Inflow Depth = 2.34" for 50-YR event
Inflow = 0.6 cfs @ 12.17 hrs, Volume= 0.056 af
Primary = 0.6 cfs @ 12.17 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-3: DP-3

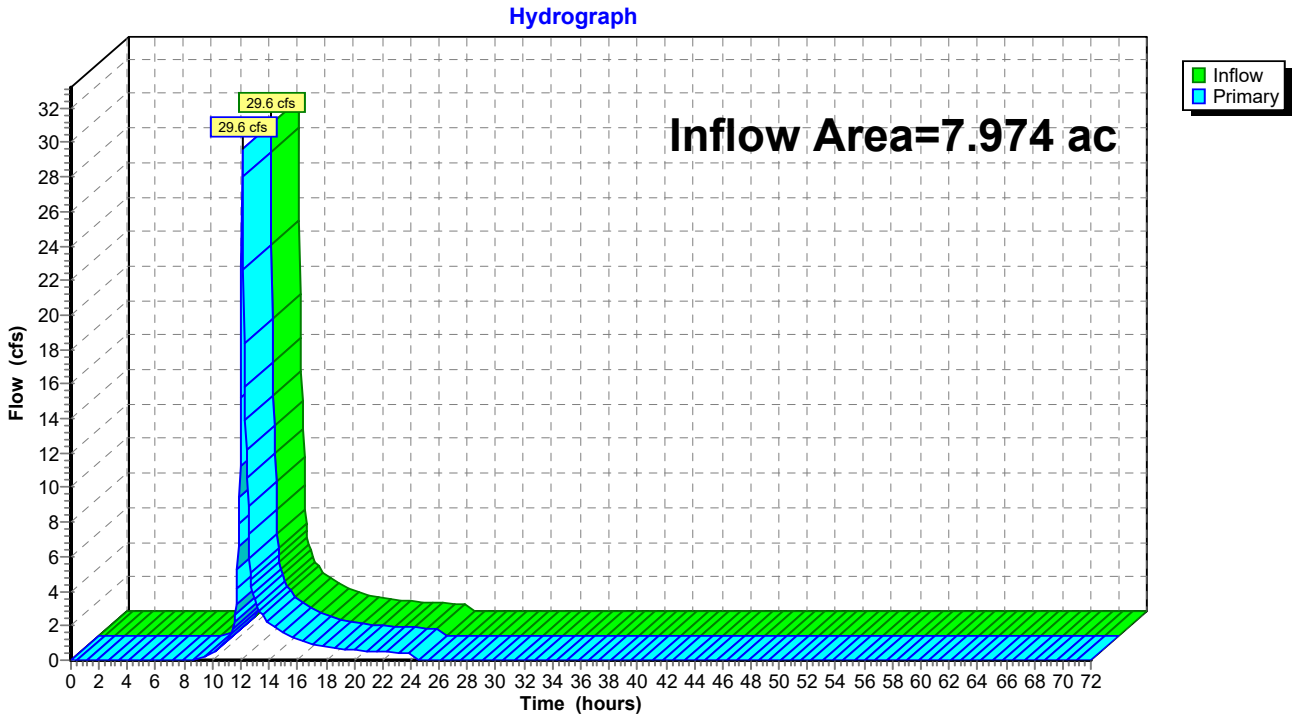


Summary for Link DP-4: DP-4

Inflow Area = 7.974 ac, 0.00% Impervious, Inflow Depth = 3.45" for 50-YR event
Inflow = 29.6 cfs @ 12.12 hrs, Volume= 2.290 af
Primary = 29.6 cfs @ 12.12 hrs, Volume= 2.290 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-4: DP-4

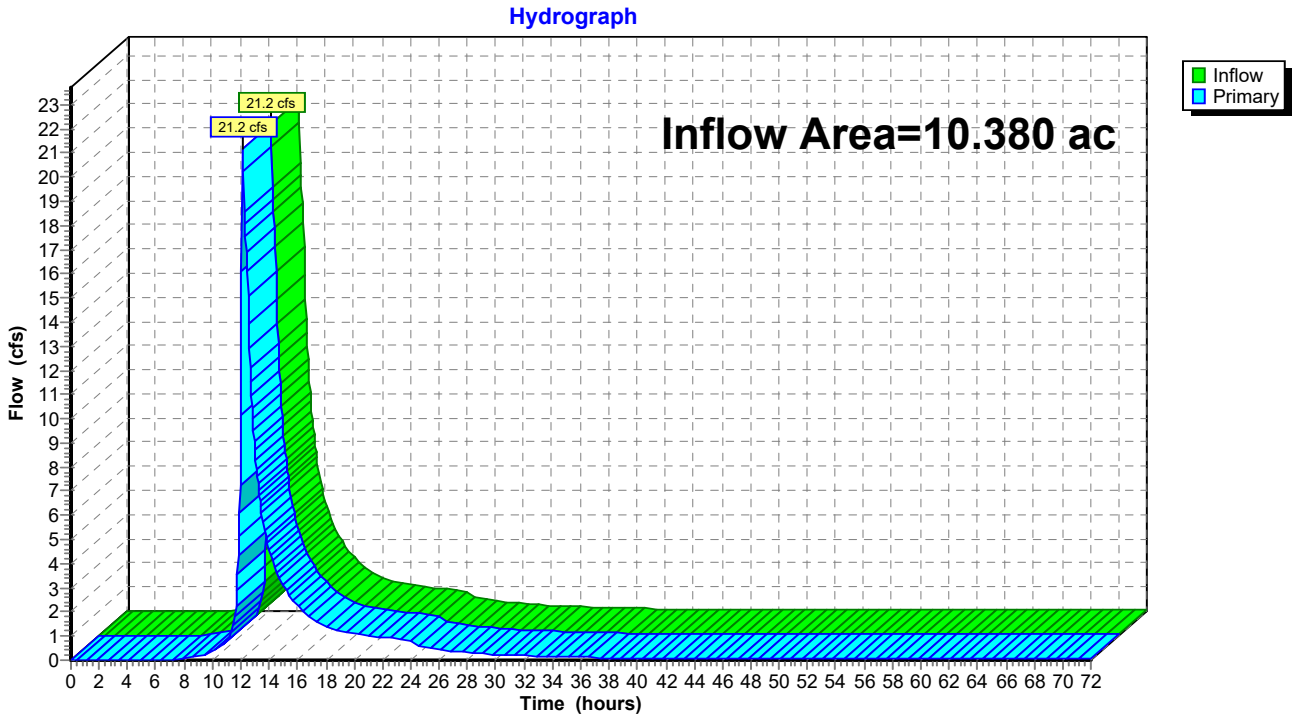


Summary for Link DP-5: DP-5

Inflow Area = 10.380 ac, 31.33% Impervious, Inflow Depth > 4.37" for 50-YR event
Inflow = 21.2 cfs @ 12.13 hrs, Volume= 3.780 af
Primary = 21.2 cfs @ 12.13 hrs, Volume= 3.780 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-5: DP-5



Summary for Subcatchment PR-1: Subcat PR-1

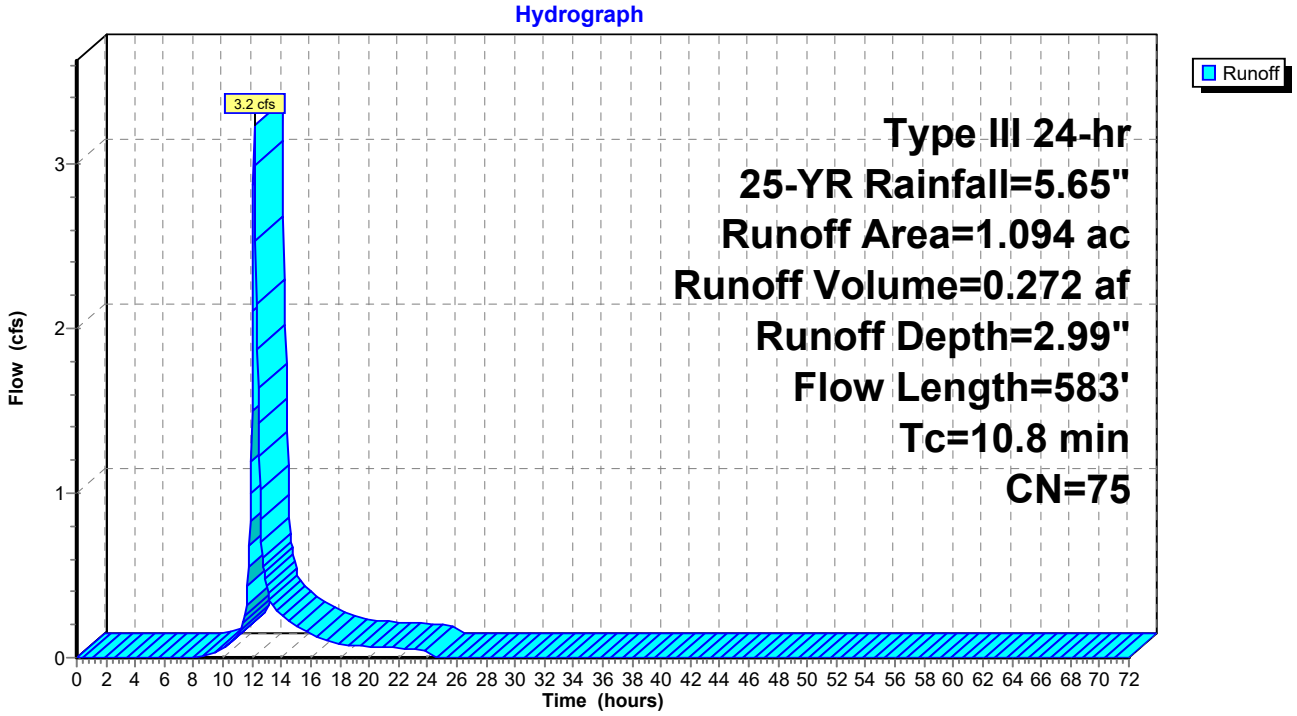
Runoff = 3.2 cfs @ 12.15 hrs, Volume= 0.272 af, Depth= 2.99"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.020	61	>75% Grass cover, Good, HSG B
0.374	74	>75% Grass cover, Good, HSG C
0.005	58	Meadow, non-grazed, HSG B
0.238	71	Meadow, non-grazed, HSG C
0.006	78	Meadow, non-grazed, HSG D
0.114	98	Paved parking, HSG C
0.024	55	Woods, Good, HSG B
0.233	70	Woods, Good, HSG C
0.079	77	Woods, Good, HSG D
1.094	75	Weighted Average
0.979		89.56% Pervious Area
0.114		10.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0334	0.17		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
4.4	379	0.0427	1.45		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0706	1.86		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	99	0.0441	1.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
10.8	583	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

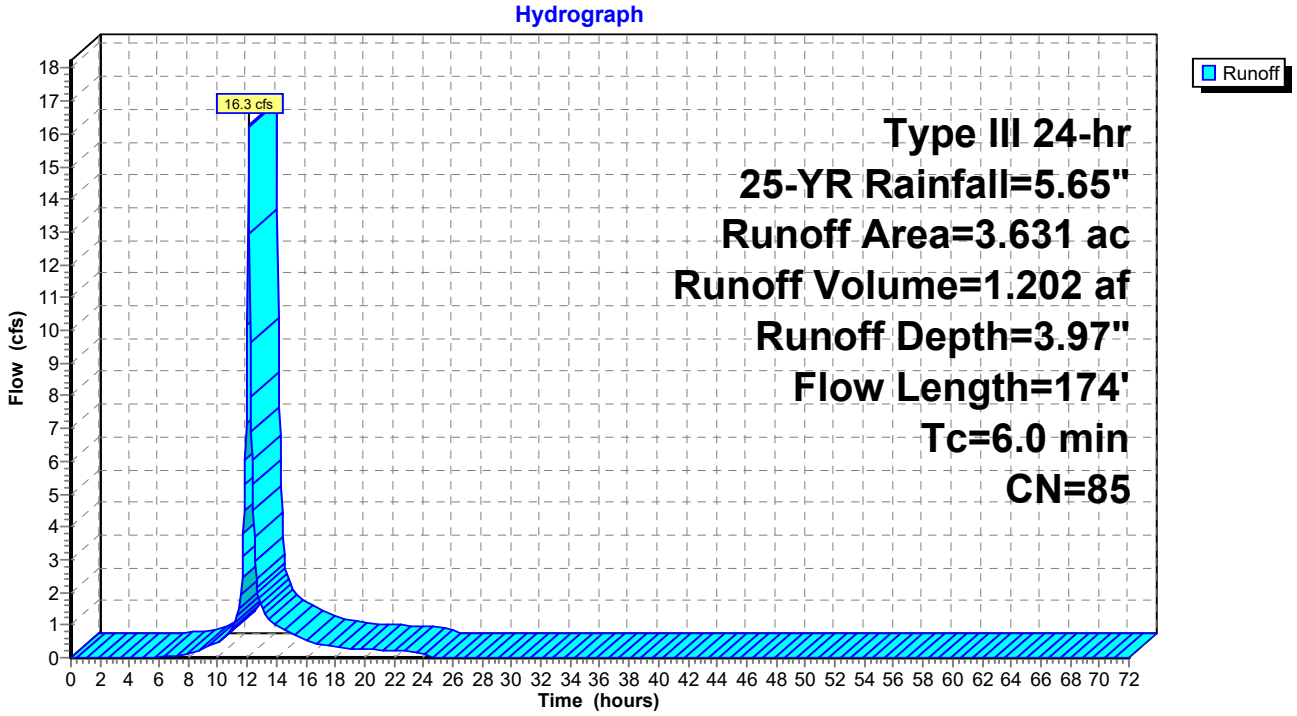
Runoff = 16.3 cfs @ 12.09 hrs, Volume= 1.202 af, Depth= 3.97"
Routed to Pond 2P : Sand Filter #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.119	61	>75% Grass cover, Good, HSG B
1.777	74	>75% Grass cover, Good, HSG C
0.022	71	Meadow, non-grazed, HSG C
0.056	98	Paved parking, HSG B
0.803	98	Paved parking, HSG C
0.176	98	Roofs, HSG B
0.678	98	Roofs, HSG C
3.631	85	Weighted Average
1.918		52.82% Pervious Area
1.713		47.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0738	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.2	124	0.0614	1.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3					**Direct Entry,**
6.0	174	Total			

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

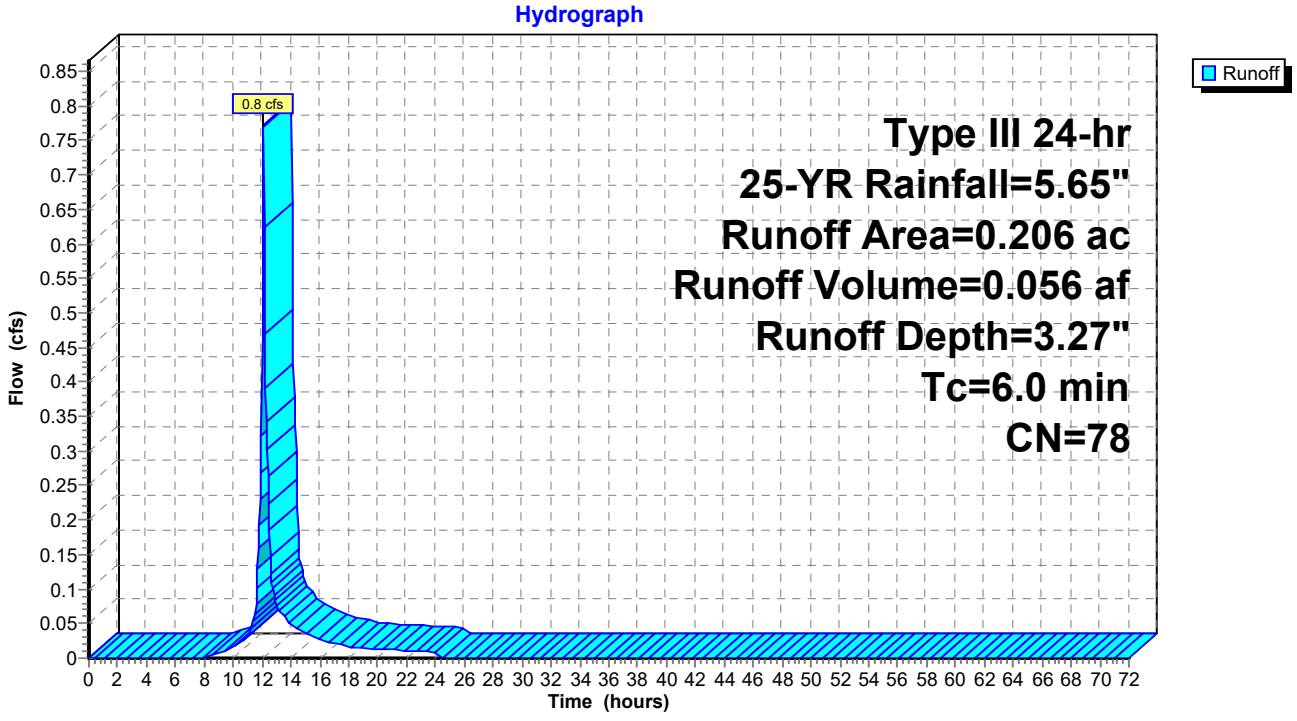
Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 3.27"
Routed to Pond 3P : Detention South #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.136	80	>75% Grass cover, Good, HSG D
0.206	78	Weighted Average
0.206		100.00% Pervious Area

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

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-5: Subcat PR-5

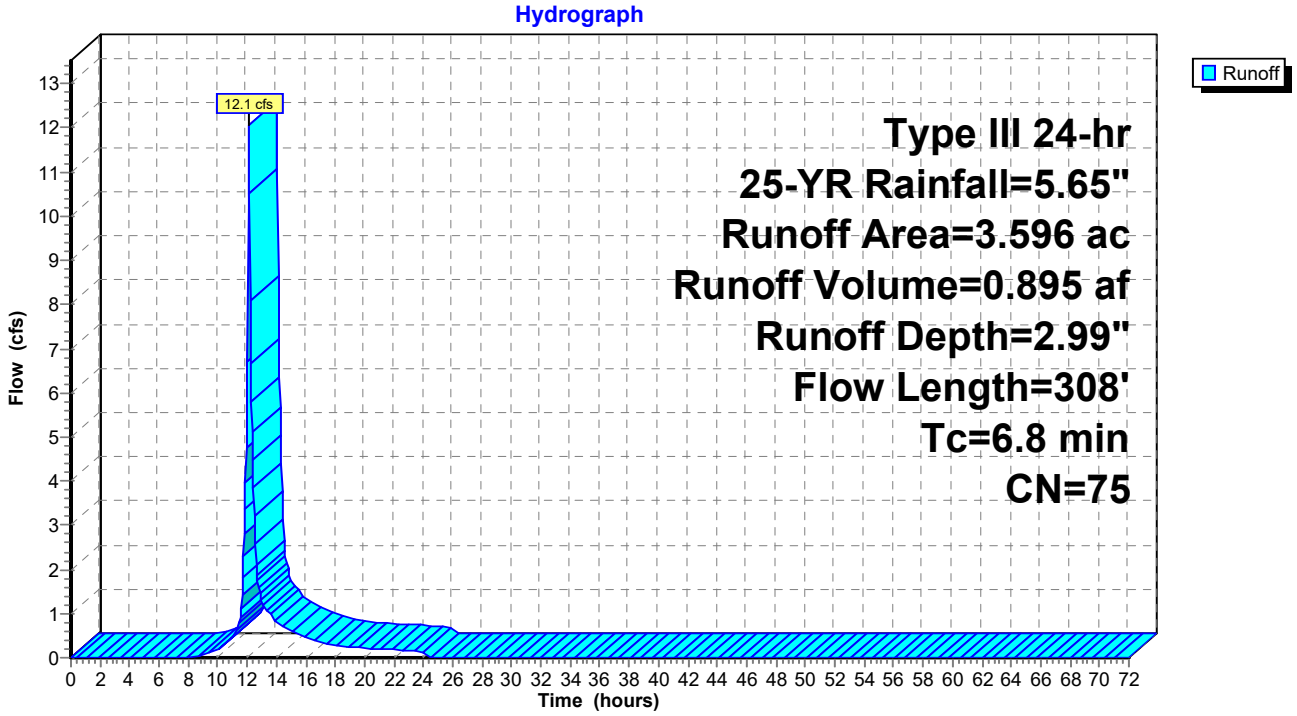
Runoff = 12.1 cfs @ 12.10 hrs, Volume= 0.895 af, Depth= 2.99"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
1.555	74	>75% Grass cover, Good, HSG C
0.077	80	>75% Grass cover, Good, HSG D
0.032	96	Gravel surface, HSG C
0.110	96	Gravel surface, HSG D
0.708	71	Meadow, non-grazed, HSG C
0.028	78	Meadow, non-grazed, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
0.812	70	Woods, Good, HSG C
3.596	75	Weighted Average
3.322		92.39% Pervious Area
0.274		7.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0826	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.95"
1.2	146	0.0792	1.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	112	0.1088	2.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.8	308	Total			

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

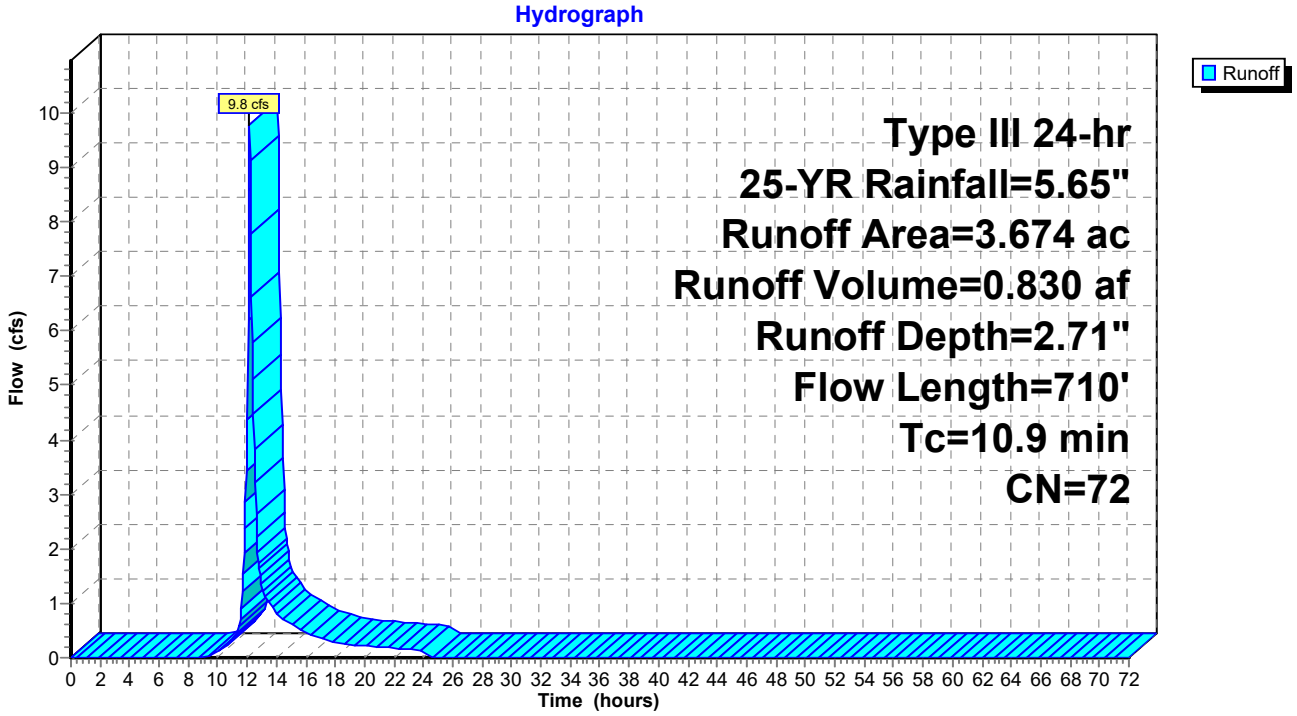
Runoff = 9.8 cfs @ 12.16 hrs, Volume= 0.830 af, Depth= 2.71"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.908	74	>75% Grass cover, Good, HSG C
0.303	71	Meadow, non-grazed, HSG C
0.091	78	Meadow, non-grazed, HSG D
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.229	70	Woods, Good, HSG C
3.674	72	Weighted Average
3.530		96.08% Pervious Area
0.144		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	67	0.1495	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	175	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0447	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1064	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	54	0.0694	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	710	Total			

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

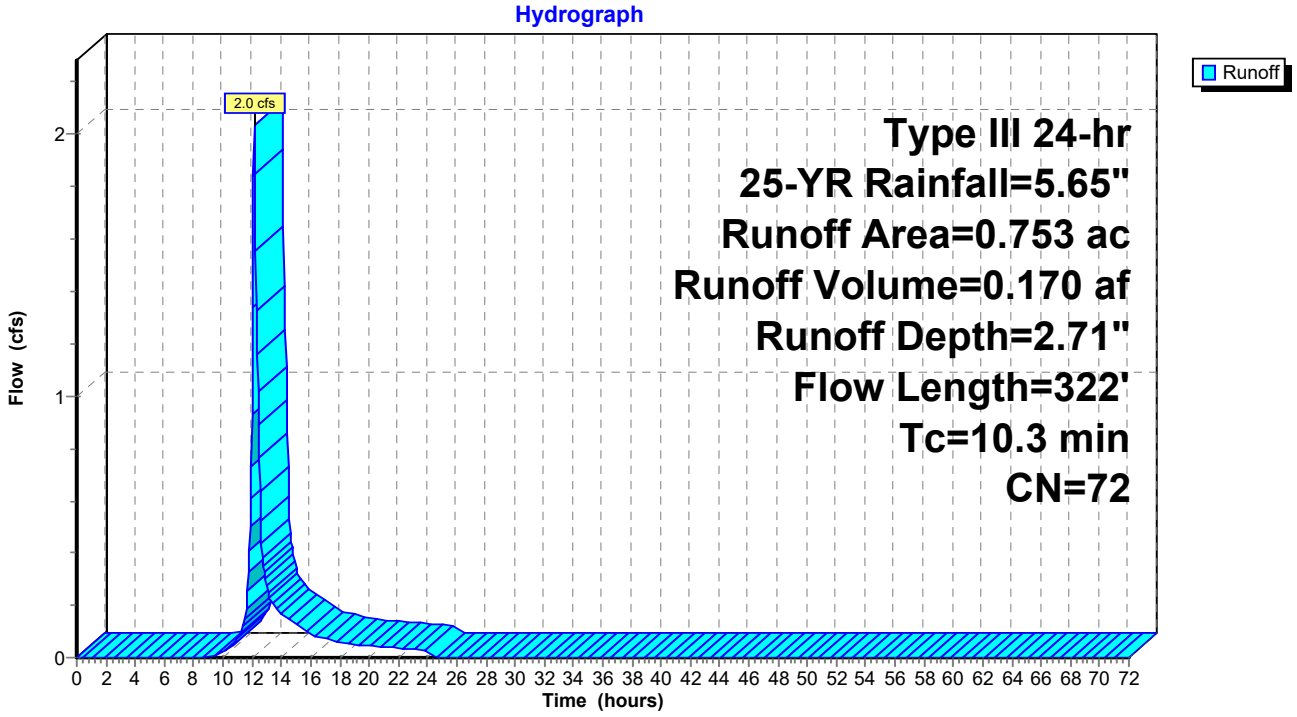
Runoff = 2.0 cfs @ 12.15 hrs, Volume= 0.170 af, Depth= 2.71"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.067	80	>75% Grass cover, Good, HSG D
0.012	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.510	70	Woods, Good, HSG C
0.753	72	Weighted Average
0.753		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-9: Subcat PR-9

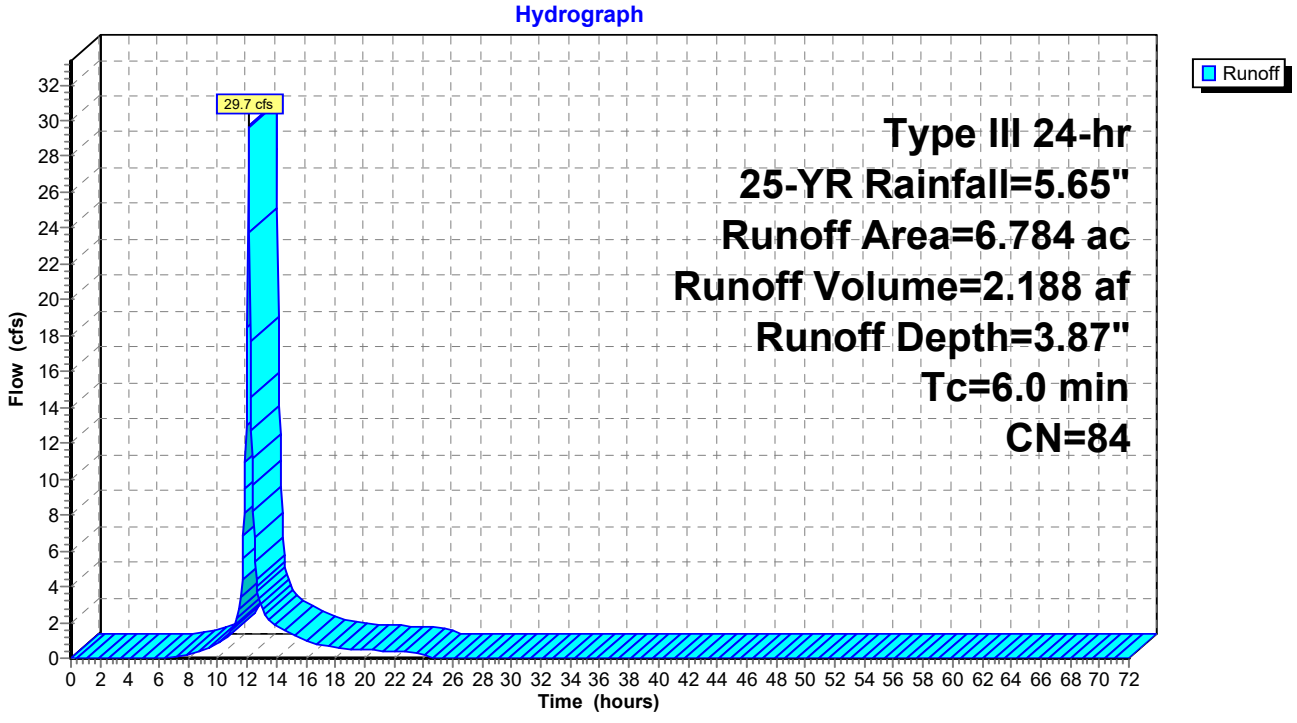
Runoff = 29.7 cfs @ 12.09 hrs, Volume= 2.188 af, Depth= 3.87"
Routed to Pond 1P : Sand Filter #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.65"

Area (ac)	CN	Description
0.449	61	>75% Grass cover, Good, HSG B
3.226	74	>75% Grass cover, Good, HSG C
0.001	96	Gravel surface, HSG C
0.130	71	Meadow, non-grazed, HSG C
0.437	98	Paved parking, HSG B
1.056	98	Paved parking, HSG C
0.602	98	Roofs, HSG B
0.883	98	Roofs, HSG C
6.784	84	Weighted Average
3.806		56.10% Pervious Area
2.978		43.90% Impervious Area

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

Subcatchment PR-9: Subcat PR-9



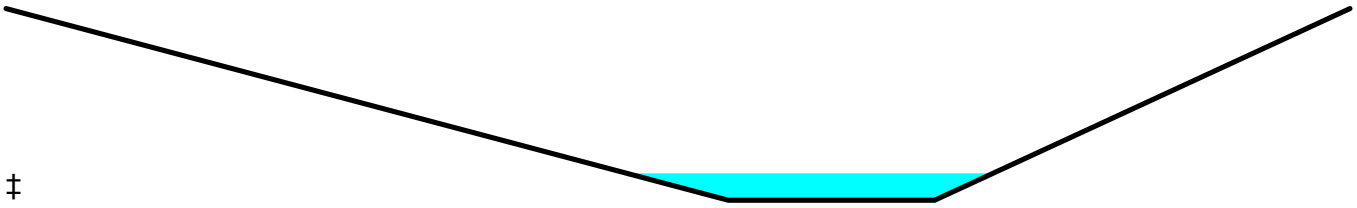
Summary for Reach 2R: Stream South

Inflow Area = 5.683 ac, 32.15% Impervious, Inflow Depth = 3.59" for 25-YR event
Inflow = 12.3 cfs @ 12.25 hrs, Volume= 1.700 af
Outflow = 12.3 cfs @ 12.26 hrs, Volume= 1.700 af, Atten= 0%, Lag= 0.7 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.53 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 3.9 min

Peak Storage= 786 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 7.09'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 711.7 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0310 '/'
Inlet Invert= 8.96', Outlet Invert= 0.00'



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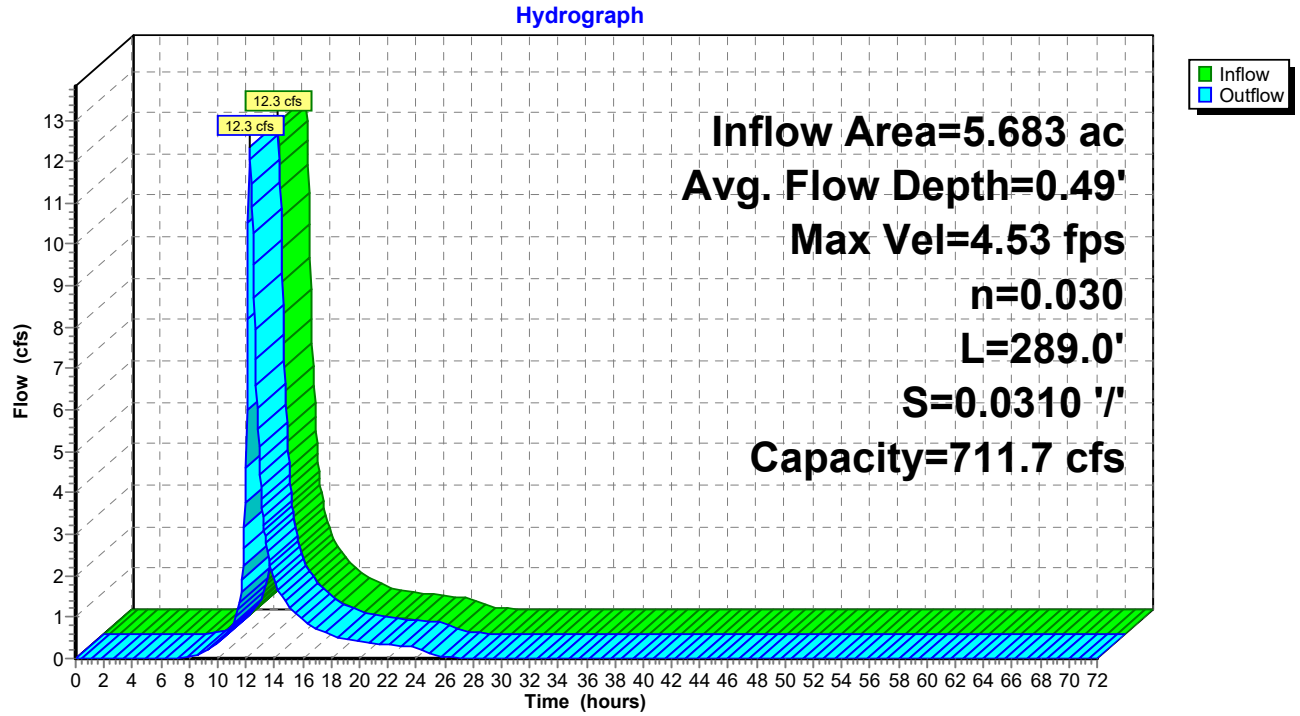
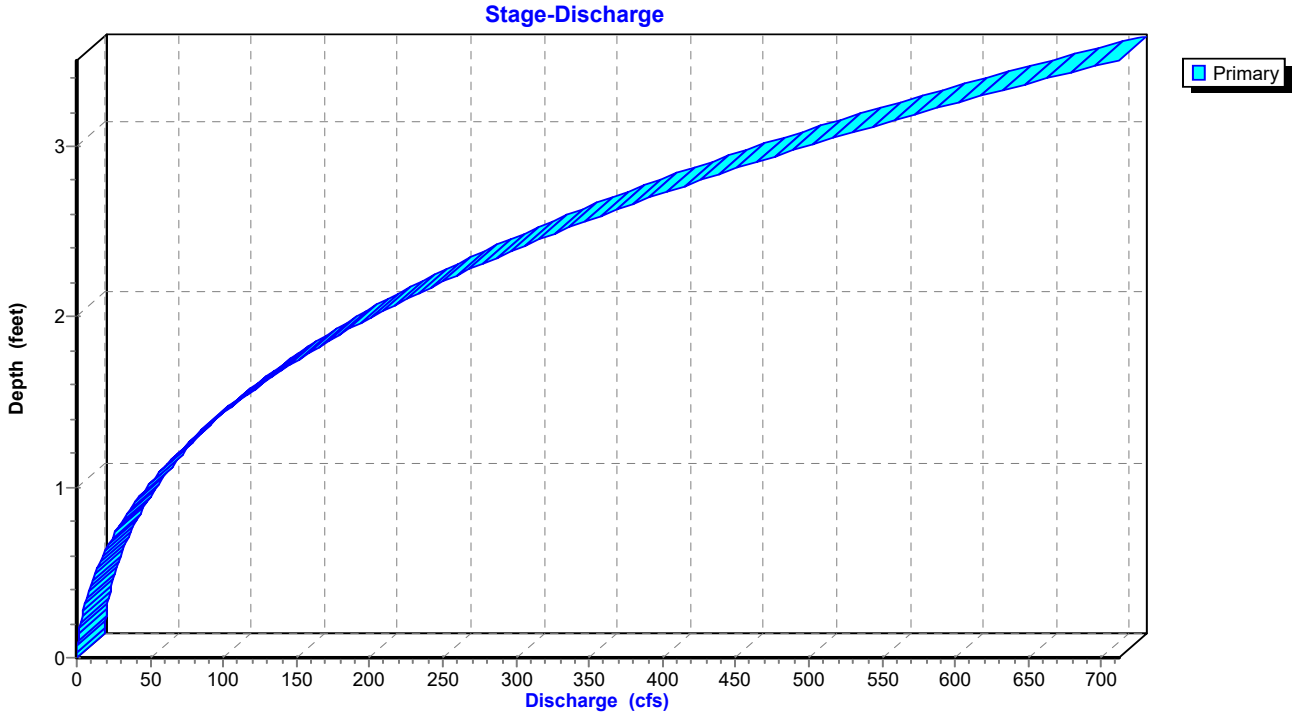
Reach 2R: Stream South



Reach 2R: Stream South



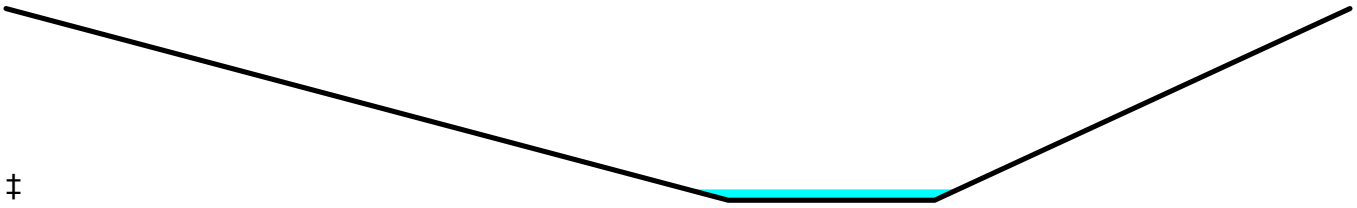
Summary for Reach 3R: Stream North

Inflow Area = 1.094 ac, 10.44% Impervious, Inflow Depth = 2.99" for 25-YR event
Inflow = 3.2 cfs @ 12.15 hrs, Volume= 0.272 af
Outflow = 3.1 cfs @ 12.19 hrs, Volume= 0.272 af, Atten= 4%, Lag= 2.0 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 6.9 min

Peak Storage= 487 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 5.24'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 901.4 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 535.0' Slope= 0.0497 '/'
Inlet Invert= 35.57', Outlet Invert= 8.96'



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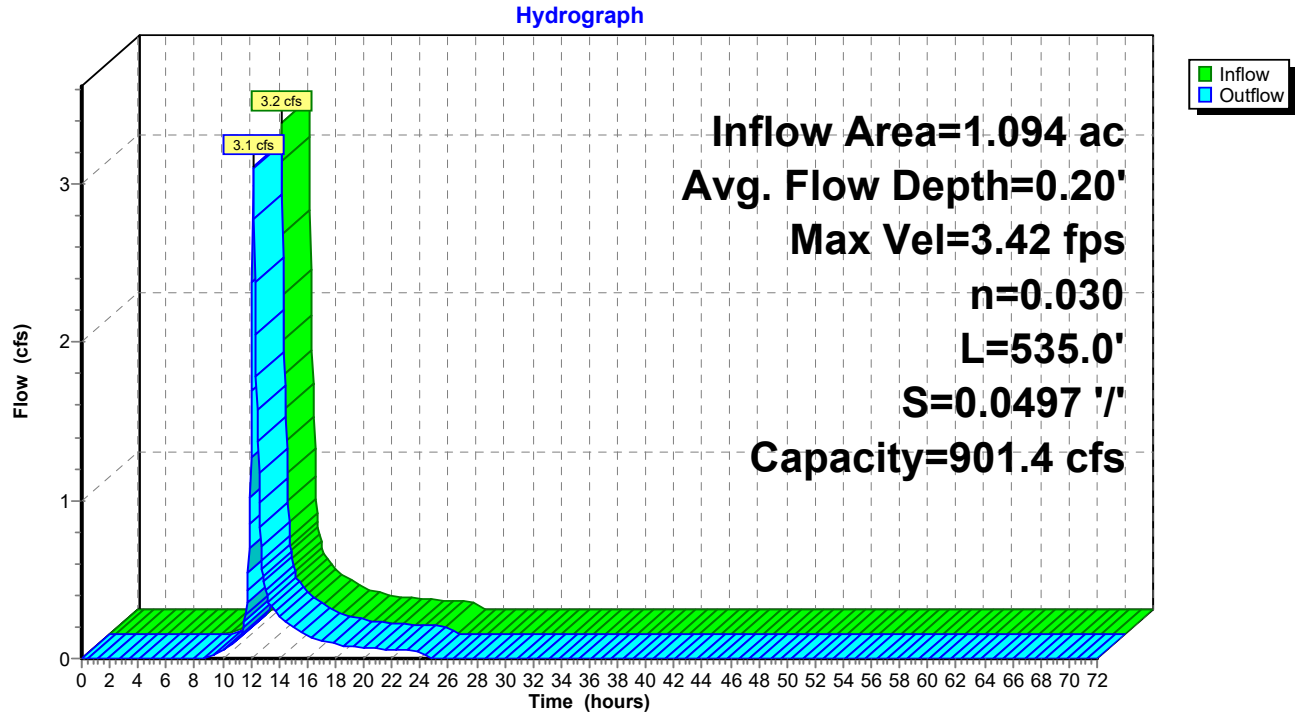
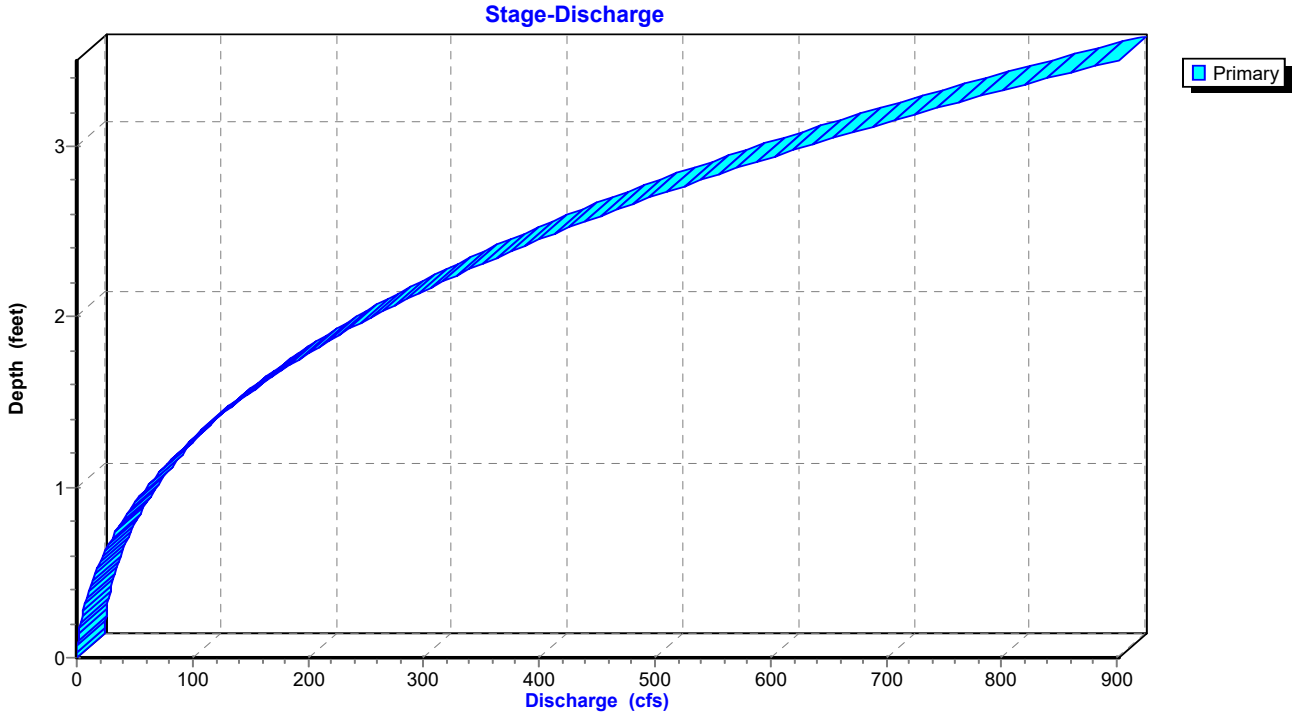
Reach 3R: Stream North



Reach 3R: Stream North



Summary for Pond 1P: Sand Filter #1

Inflow Area = 6.784 ac, 43.90% Impervious, Inflow Depth = 3.87" for 25-YR event
Inflow = 29.7 cfs @ 12.09 hrs, Volume= 2.188 af
Outflow = 9.2 cfs @ 12.42 hrs, Volume= 2.170 af, Atten= 69%, Lag= 19.7 min
Primary = 9.2 cfs @ 12.42 hrs, Volume= 2.170 af
Routed to Link DP-5 : DP-5
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-5 : DP-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 402.14' @ 12.42 hrs Surf.Area= 8,782 sf Storage= 41,093 cf
Flood Elev= 402.80' Surf.Area= 8,782 sf Storage= 51,320 cf

Plug-Flow detention time= 270.2 min calculated for 2.170 af (99% of inflow)
Center-of-Mass det. time= 265.1 min (1,070.8 - 805.8)

Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	0 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	398.00'	71,766 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		71,766 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
396.50	8,782	461.4	0.0	0	0	8,782
398.00	8,782	461.4	0.0	0	0	9,474

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
398.00	8,782	461.4	0.0	0	0	8,782
398.80	9,907	476.4	0.0	0	0	9,963
404.00	18,104	574.5	100.0	71,766	71,766	18,610

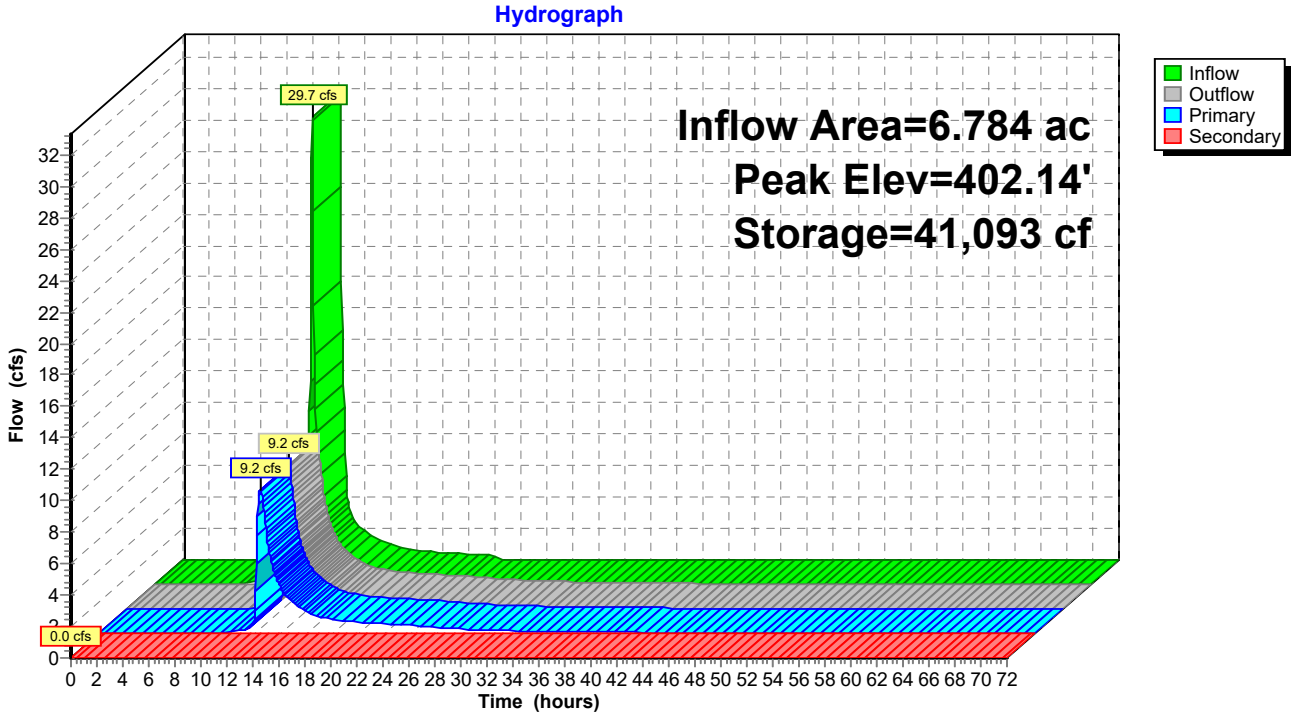
Device	Routing	Invert	Outlet Devices
#1	Primary	395.30'	**15.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 395.30' / 394.00' S= 0.0232 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	395.42'	**1.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	395.42'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 395.42' / 395.42' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	396.50'	**10.000 in/hr Exfiltration X 0.00 over Surface area**
#5	Device 1	398.80'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.80 1.80 3.90 Width (feet) 0.10 0.10 1.25 1.25
#6	Device 1	402.70'	**2.5" x 2.5" Horiz. Grate X 12.00 columns** X 12 rows C= 0.600 in 48.0" x 48.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	403.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

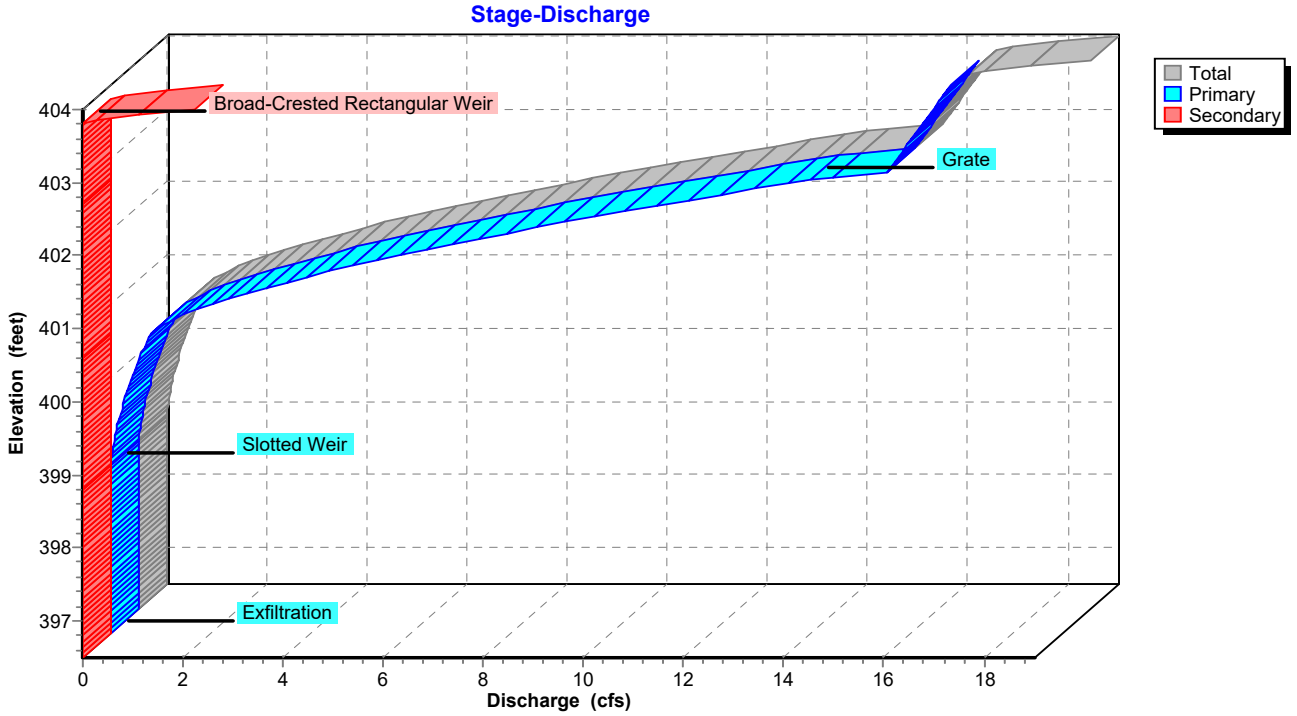
Primary OutFlow Max=9.2 cfs @ 12.42 hrs HW=402.14' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 9.2 cfs of 14.7 cfs potential flow)
- **2=Underdrain Cap/Orifice** (Passes 0.0 cfs of 0.1 cfs potential flow)
  - **3=Culvert** (Passes 0.0 cfs of 1.7 cfs potential flow)
    - **4=Exfiltration** (Controls 0.0 cfs)
- **5=Slotted Weir** (Weir Controls 9.2 cfs @ 4.36 fps)
- **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=396.50' TW=0.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Sand Filter #1



Pond 1P: Sand Filter #1



Summary for Pond 2P: Sand Filter #2

Inflow Area = 3.631 ac, 47.18% Impervious, Inflow Depth = 3.97" for 25-YR event
Inflow = 16.3 cfs @ 12.09 hrs, Volume= 1.202 af
Outflow = 9.1 cfs @ 12.22 hrs, Volume= 1.202 af, Atten= 44%, Lag= 7.8 min
Primary = 9.1 cfs @ 12.22 hrs, Volume= 1.202 af
Routed to Pond 3P : Detention South #3
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3P : Detention South #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 417.40' @ 12.22 hrs Surf.Area= 2,199 sf Storage= 10,508 cf
Flood Elev= 417.80' Surf.Area= 2,199 sf Storage= 12,713 cf

Plug-Flow detention time= 31.3 min calculated for 1.201 af (100% of inflow)
Center-of-Mass det. time= 31.8 min (834.6 - 802.9)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	0 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	413.00'	20,167 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		20,167 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.50	2,199	197.3	0.0	0	0	2,199
413.00	2,199	197.3	0.0	0	0	2,495

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
413.00	2,199	197.3	0.0	0	0	2,199
415.00	3,495	235.0	0.0	0	0	3,566
419.00	6,767	310.4	100.0	20,167	20,167	7,016

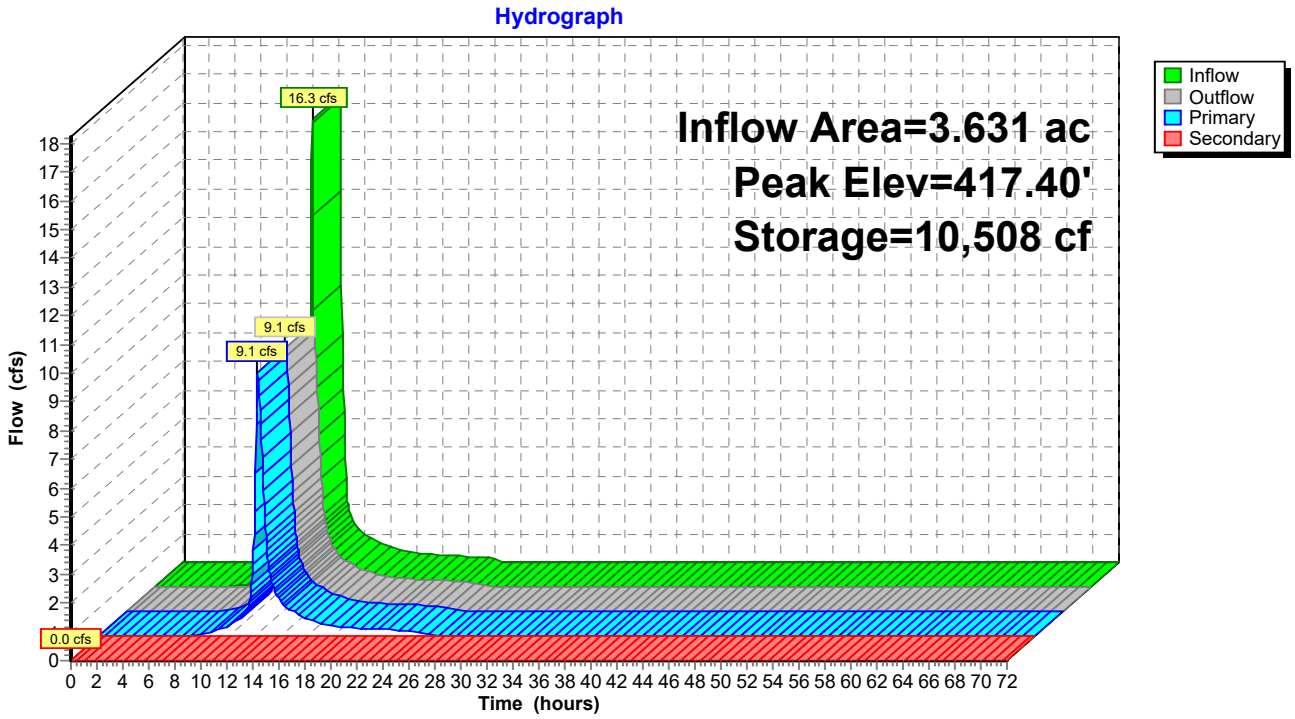
Device	Routing	Invert	Outlet Devices
#1	Primary	410.30'	**18.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.30' / 408.50' S= 0.0196 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	410.33'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	410.33'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.33' / 410.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	411.50'	**10.000 in/hr Exfiltration X 0.00 over Surface area**
#5	Device 1	415.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 0.75 0.75
#6	Device 1	417.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads

#7	Secondary	418.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

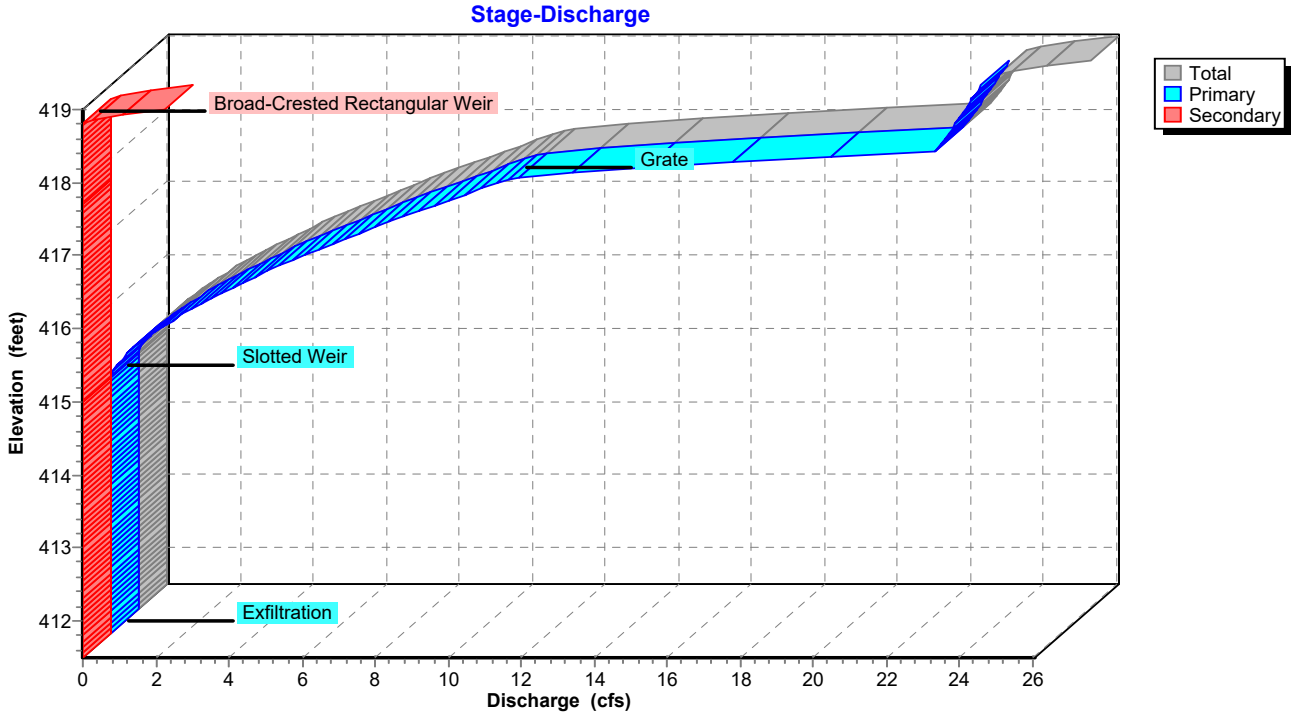
Primary OutFlow Max=9.1 cfs @ 12.22 hrs HW=417.39' TW=409.78' (Dynamic Tailwater)
- **1=Culvert** (Passes 9.1 cfs of 21.4 cfs potential flow)
- **2=Underdrain Cap/Orifice** (Passes 0.0 cfs of 0.3 cfs potential flow)
  - **3=Culvert** (Passes 0.0 cfs of 1.7 cfs potential flow)
    - **4=Exfiltration** (Controls 0.0 cfs)
- **5=Slotted Weir** (Weir Controls 9.1 cfs @ 5.06 fps)
- **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=411.50' TW=408.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Sand Filter #2



Pond 2P: Sand Filter #2



Summary for Pond 3P: Detention South #3

Inflow Area = 3.837 ac, 44.65% Impervious, Inflow Depth = 3.94" for 25-YR event
Inflow = 9.6 cfs @ 12.21 hrs, Volume= 1.258 af
Outflow = 8.6 cfs @ 12.36 hrs, Volume= 1.258 af, Atten= 10%, Lag= 9.0 min
Primary = 8.6 cfs @ 12.36 hrs, Volume= 1.258 af
Routed to Reach 2R : Stream South
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 409.91' @ 12.36 hrs Surf.Area= 3,555 sf Storage= 5,344 cf
Flood Elev= 410.80' Surf.Area= 4,359 sf Storage= 8,866 cf

Plug-Flow detention time= 19.2 min calculated for 1.258 af (100% of inflow)
Center-of-Mass det. time= 19.0 min (853.1 - 834.1)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	14,810 cf	**Storage (Irregular)**Listed below (Recalc)

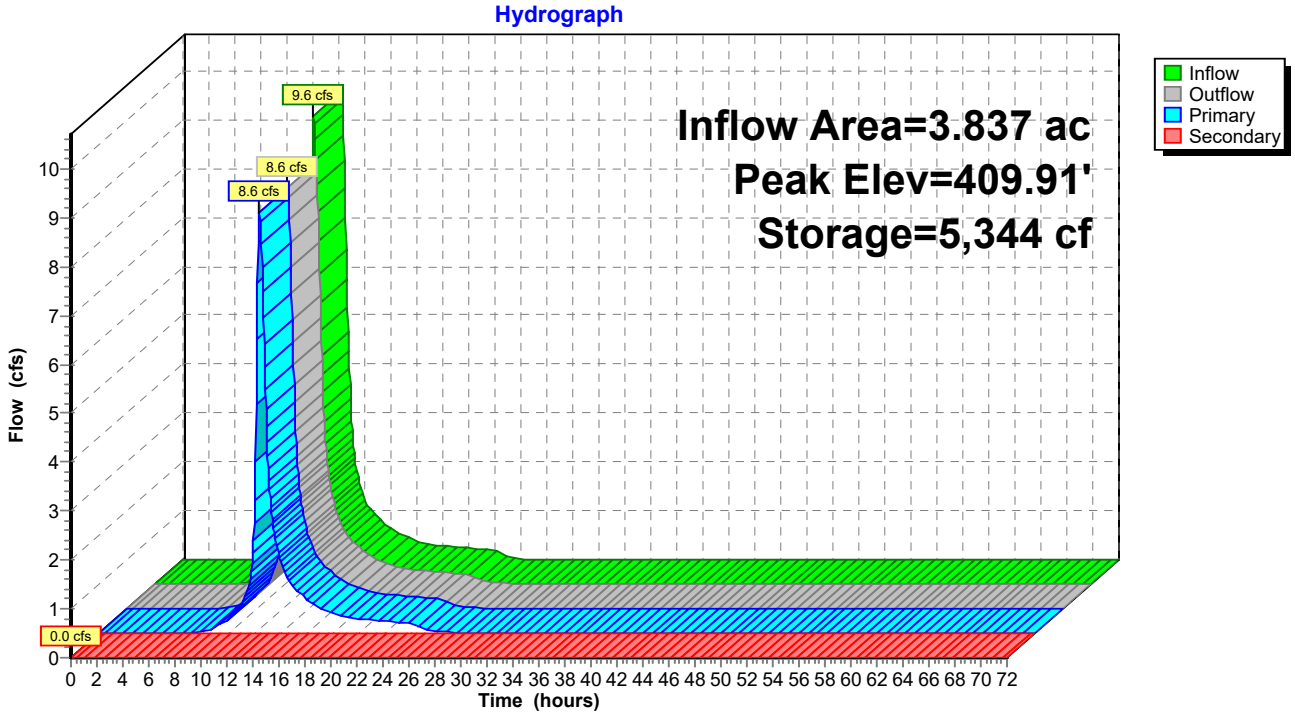
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
408.00	2,108	251.0	0.0	0	0	2,108
412.00	5,572	326.4	100.0	14,810	14,810	5,760

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**15.0" Round Culvert** L= 61.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 404.00' S= 0.0328 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	408.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 1.50 1.50
#3	Device 1	410.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#4	Secondary	411.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

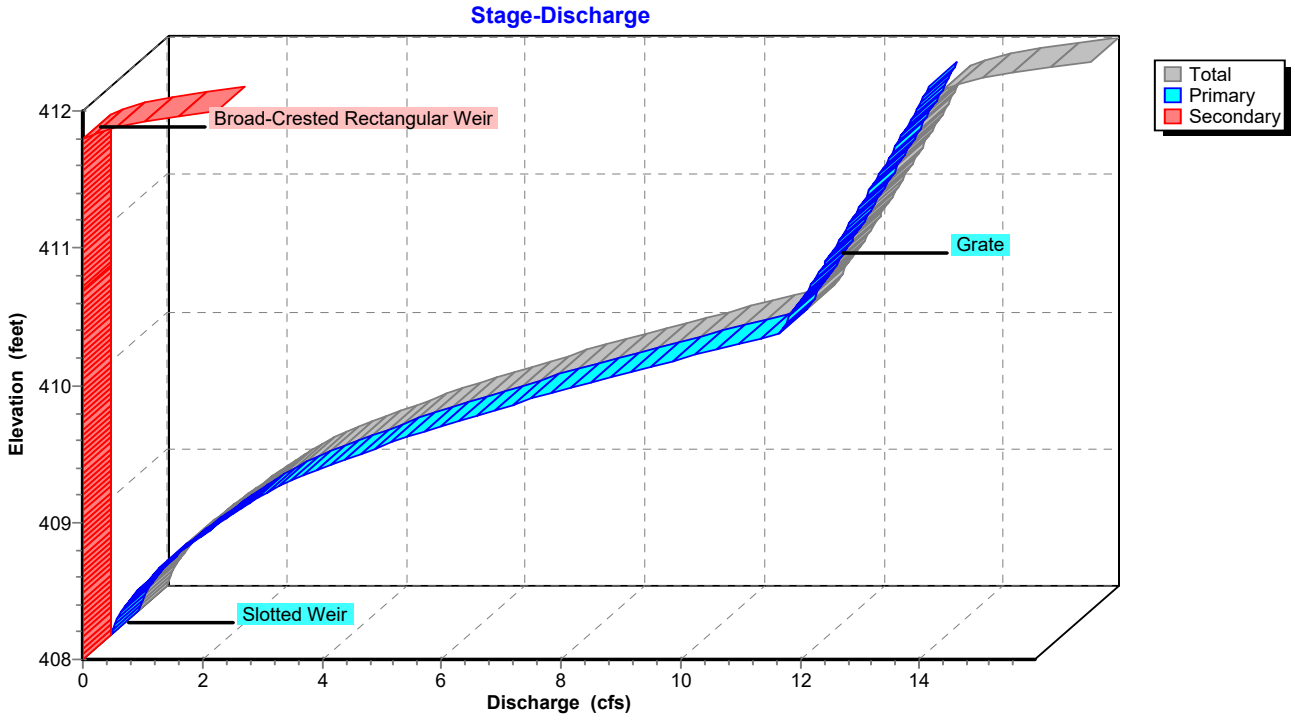
Primary OutFlow Max=8.6 cfs @ 12.36 hrs HW=409.91' TW=9.44' (Dynamic Tailwater)
└**1=Culvert** (Passes 8.6 cfs of 10.7 cfs potential flow)
├**2=Slotted Weir** (Weir Controls 8.6 cfs @ 4.07 fps)
└**3=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=408.00' TW=8.96' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond 3P: Detention South #3



Pond 3P: Detention South #3

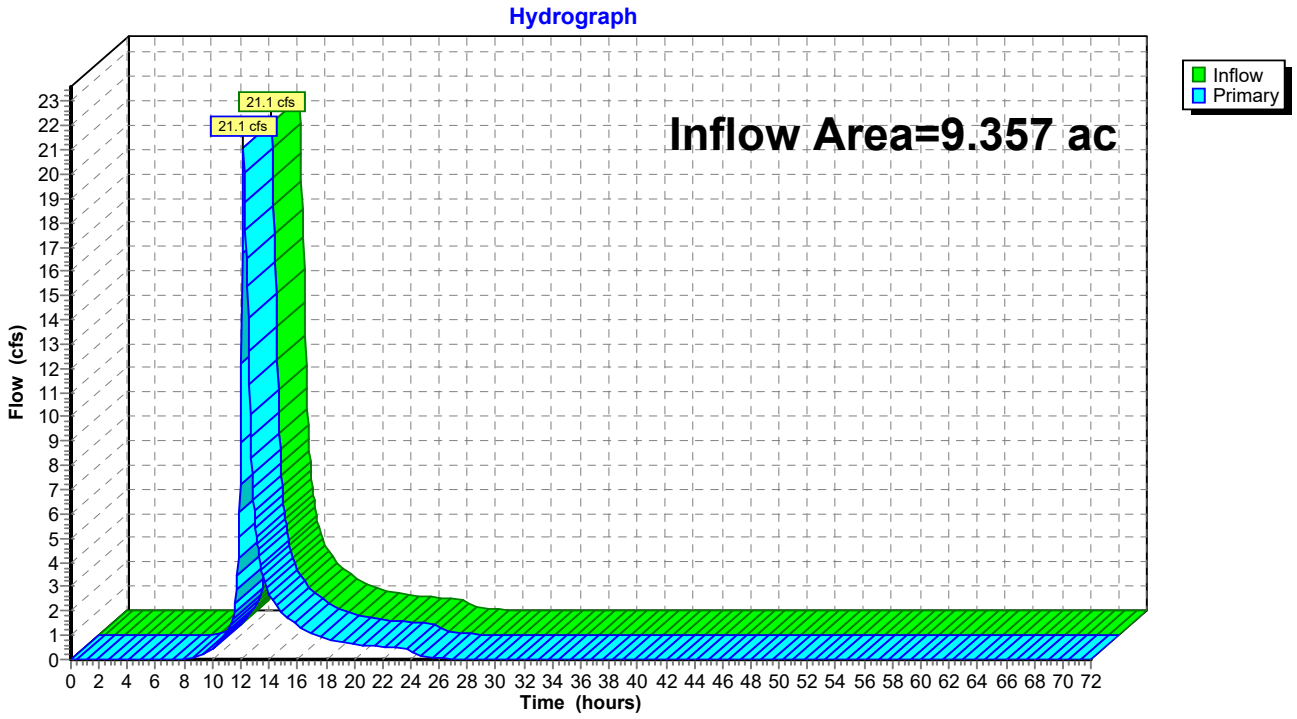


Summary for Link DP-1: DP-1

Inflow Area = 9.357 ac, 21.07% Impervious, Inflow Depth = 3.24" for 25-YR event
Inflow = 21.1 cfs @ 12.20 hrs, Volume= 2.530 af
Primary = 21.1 cfs @ 12.20 hrs, Volume= 2.530 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

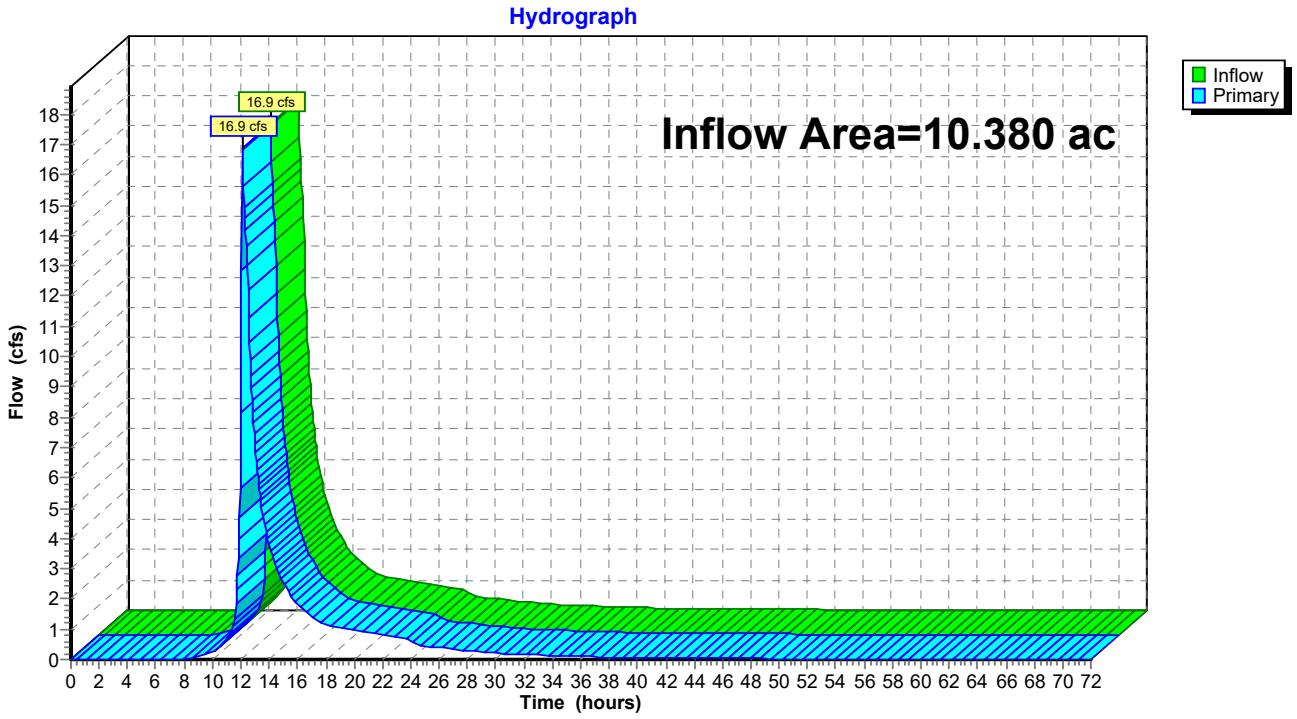


Summary for Link DP-5: DP-5

Inflow Area = 10.380 ac, 31.33% Impervious, Inflow Depth > 3.54" for 25-YR event
Inflow = 16.9 cfs @ 12.13 hrs, Volume= 3.065 af
Primary = 16.9 cfs @ 12.13 hrs, Volume= 3.065 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-5: DP-5



Summary for Subcatchment PR-1: Subcat PR-1

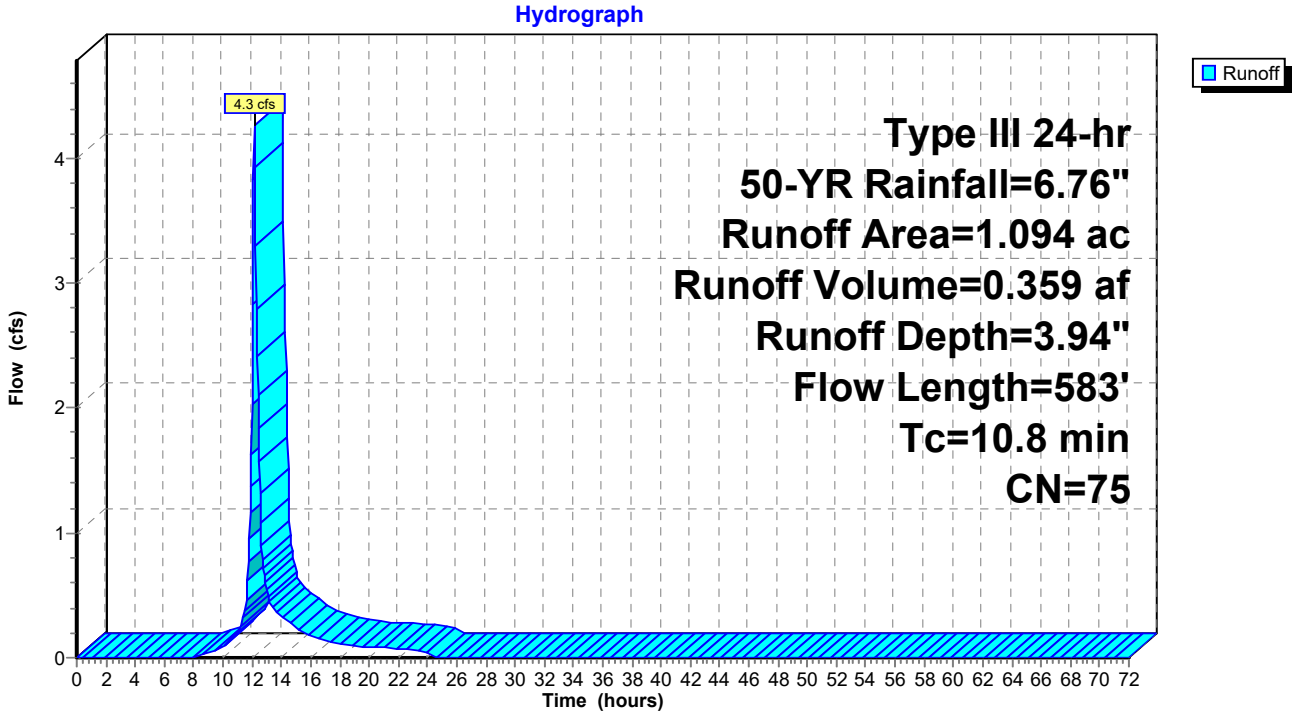
Runoff = 4.3 cfs @ 12.15 hrs, Volume= 0.359 af, Depth= 3.94"
Routed to Reach 3R : Stream North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.020	61	>75% Grass cover, Good, HSG B
0.374	74	>75% Grass cover, Good, HSG C
0.005	58	Meadow, non-grazed, HSG B
0.238	71	Meadow, non-grazed, HSG C
0.006	78	Meadow, non-grazed, HSG D
0.114	98	Paved parking, HSG C
0.024	55	Woods, Good, HSG B
0.233	70	Woods, Good, HSG C
0.079	77	Woods, Good, HSG D
1.094	75	Weighted Average
0.979		89.56% Pervious Area
0.114		10.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0334	0.17		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 2.95"
4.4	379	0.0427	1.45		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0706	1.86		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
1.1	99	0.0441	1.47		**Shallow Concentrated Flow, Shallow Conc Grass** Short Grass Pasture Kv= 7.0 fps
10.8	583	Total			

Subcatchment PR-1: Subcat PR-1



Summary for Subcatchment PR-10: Subcat PR-10

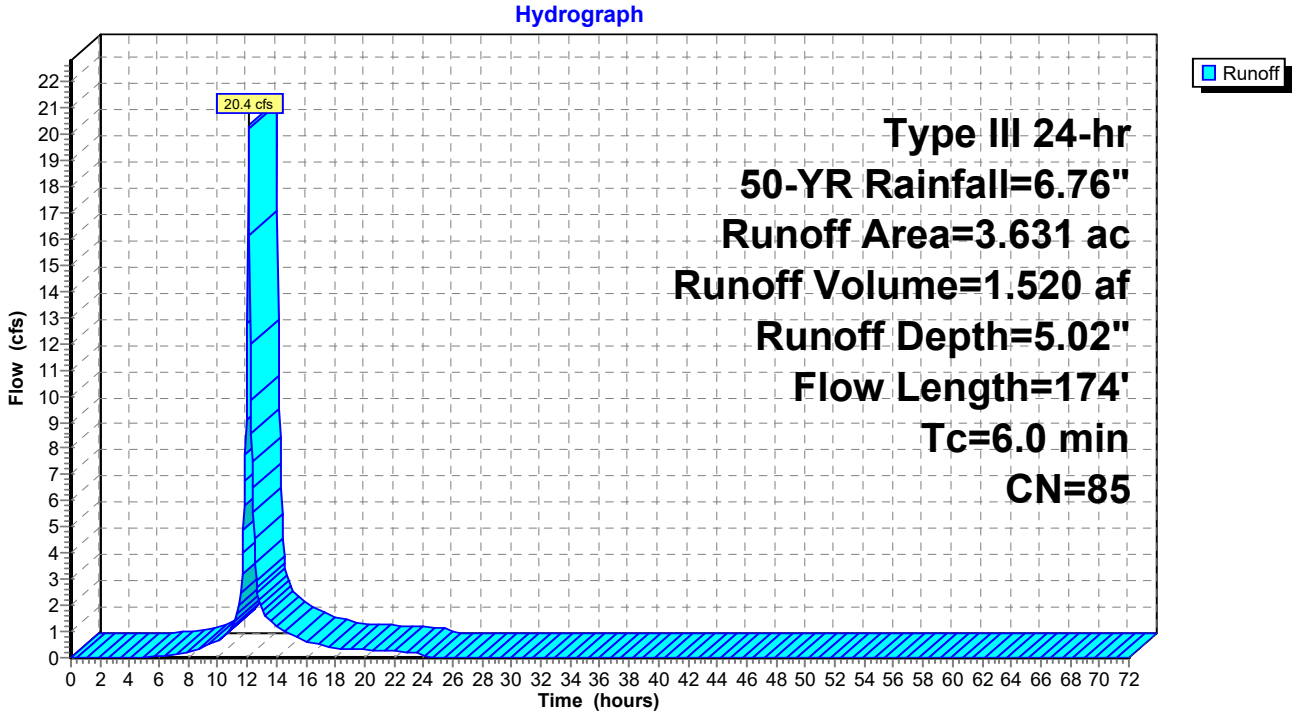
Runoff = 20.4 cfs @ 12.09 hrs, Volume= 1.520 af, Depth= 5.02"
Routed to Pond 2P : Sand Filter #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.119	61	>75% Grass cover, Good, HSG B
1.777	74	>75% Grass cover, Good, HSG C
0.022	71	Meadow, non-grazed, HSG C
0.056	98	Paved parking, HSG B
0.803	98	Paved parking, HSG C
0.176	98	Roofs, HSG B
0.678	98	Roofs, HSG C
3.631	85	Weighted Average
1.918		52.82% Pervious Area
1.713		47.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0738	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.2	124	0.0614	1.73		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3					**Direct Entry,**
6.0	174	Total			

Subcatchment PR-10: Subcat PR-10



Summary for Subcatchment PR-11: Subcat PR-11

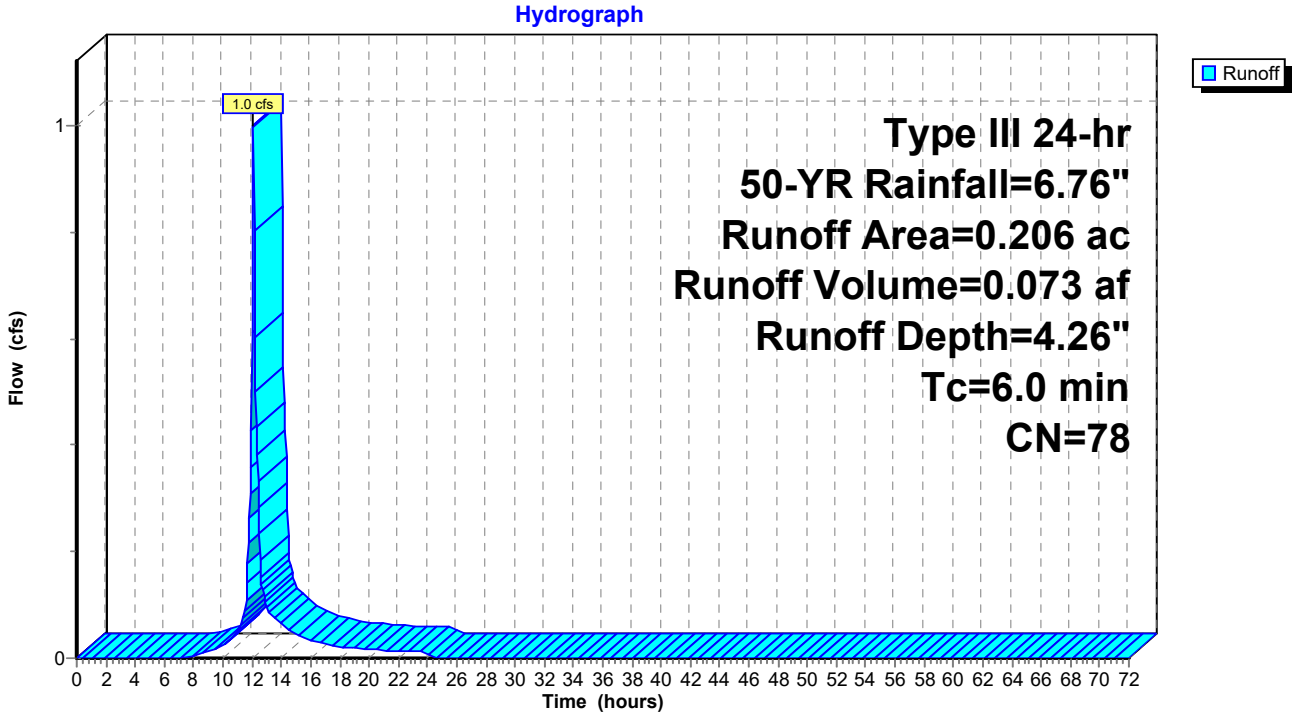
Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.073 af, Depth= 4.26"
Routed to Pond 3P : Detention South #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.136	80	>75% Grass cover, Good, HSG D
0.206	78	Weighted Average
0.206		100.00% Pervious Area

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

Subcatchment PR-11: Subcat PR-11



Summary for Subcatchment PR-5: Subcat PR-5

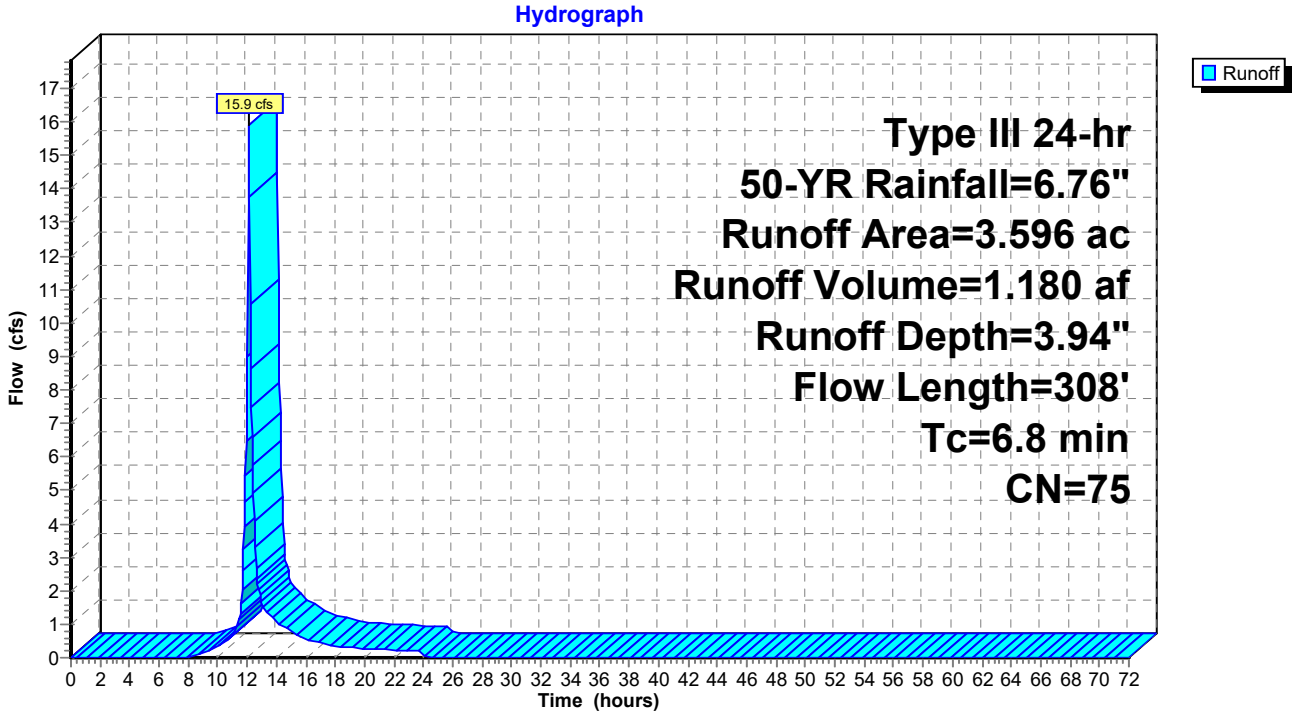
Runoff = 15.9 cfs @ 12.10 hrs, Volume= 1.180 af, Depth= 3.94"
Routed to Link DP-5 : DP-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
1.555	74	>75% Grass cover, Good, HSG C
0.077	80	>75% Grass cover, Good, HSG D
0.032	96	Gravel surface, HSG C
0.110	96	Gravel surface, HSG D
0.708	71	Meadow, non-grazed, HSG C
0.028	78	Meadow, non-grazed, HSG D
0.084	98	Paved parking, HSG C
0.190	98	Roofs, HSG C
0.812	70	Woods, Good, HSG C
3.596	75	Weighted Average
3.322		92.39% Pervious Area
0.274		7.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0826	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.95"
1.2	146	0.0792	1.97		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	112	0.1088	2.31		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.8	308	Total			

Subcatchment PR-5: Subcat PR-5



Summary for Subcatchment PR-6: Subcat PR-6

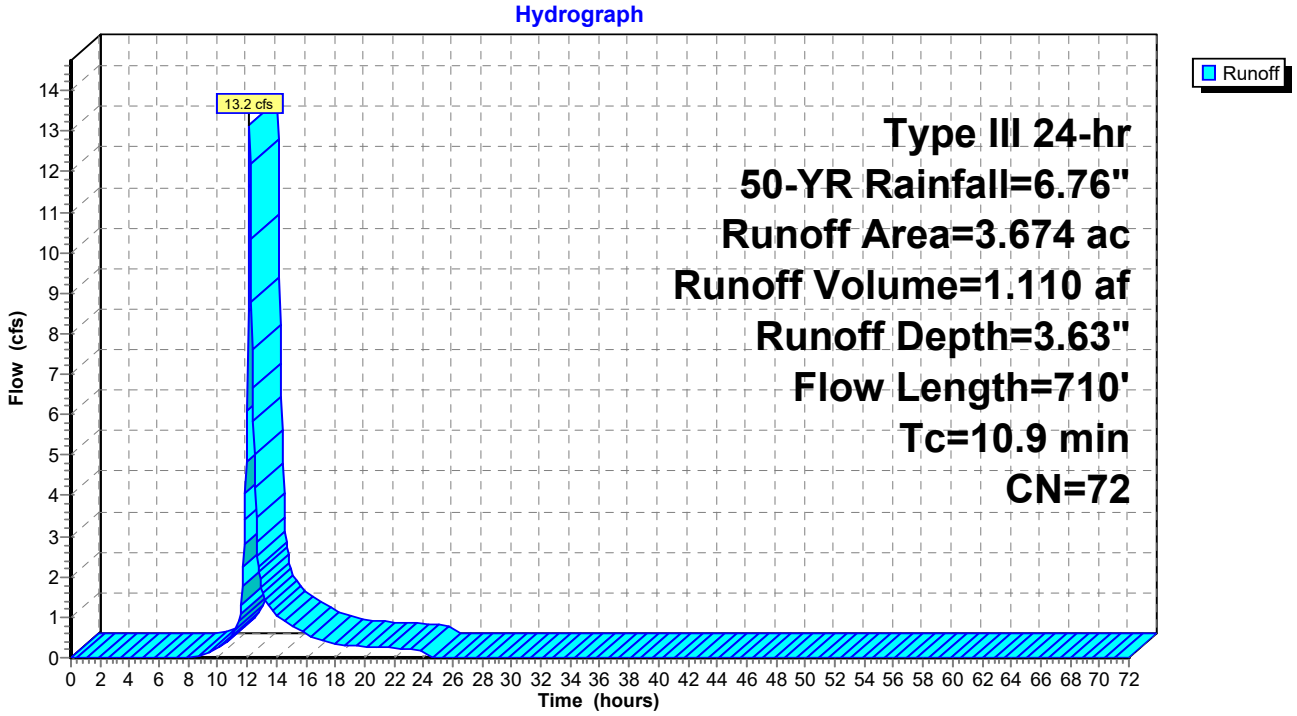
Runoff = 13.2 cfs @ 12.16 hrs, Volume= 1.110 af, Depth= 3.63"
Routed to Link DP-1 : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.908	74	>75% Grass cover, Good, HSG C
0.303	71	Meadow, non-grazed, HSG C
0.091	78	Meadow, non-grazed, HSG D
0.119	98	Paved parking, HSG C
0.025	98	Roofs, HSG C
2.229	70	Woods, Good, HSG C
3.674	72	Weighted Average
3.530		96.08% Pervious Area
0.144		3.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	67	0.1495	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.95"
1.8	175	0.1027	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.2	195	0.0447	1.48		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.1064	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	54	0.0694	1.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	161	0.0461	1.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	710	Total			

Subcatchment PR-6: Subcat PR-6



Summary for Subcatchment PR-7: Subcat PR-7

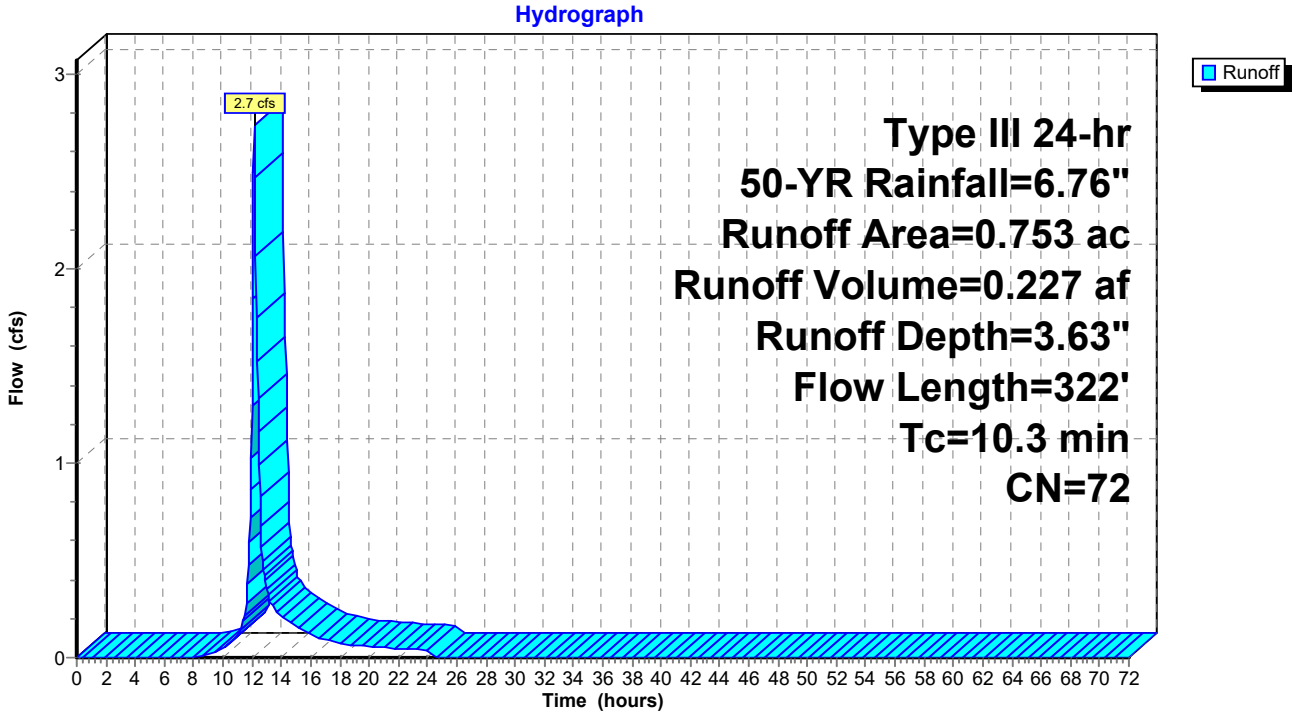
Runoff = 2.7 cfs @ 12.15 hrs, Volume= 0.227 af, Depth= 3.63"
Routed to Reach 2R : Stream South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.156	74	>75% Grass cover, Good, HSG C
0.067	80	>75% Grass cover, Good, HSG D
0.012	71	Meadow, non-grazed, HSG C
0.008	78	Meadow, non-grazed, HSG D
0.510	70	Woods, Good, HSG C
0.753	72	Weighted Average
0.753		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0842	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.95"
3.1	272	0.0858	1.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.3	322	Total			

Subcatchment PR-7: Subcat PR-7



Summary for Subcatchment PR-9: Subcat PR-9

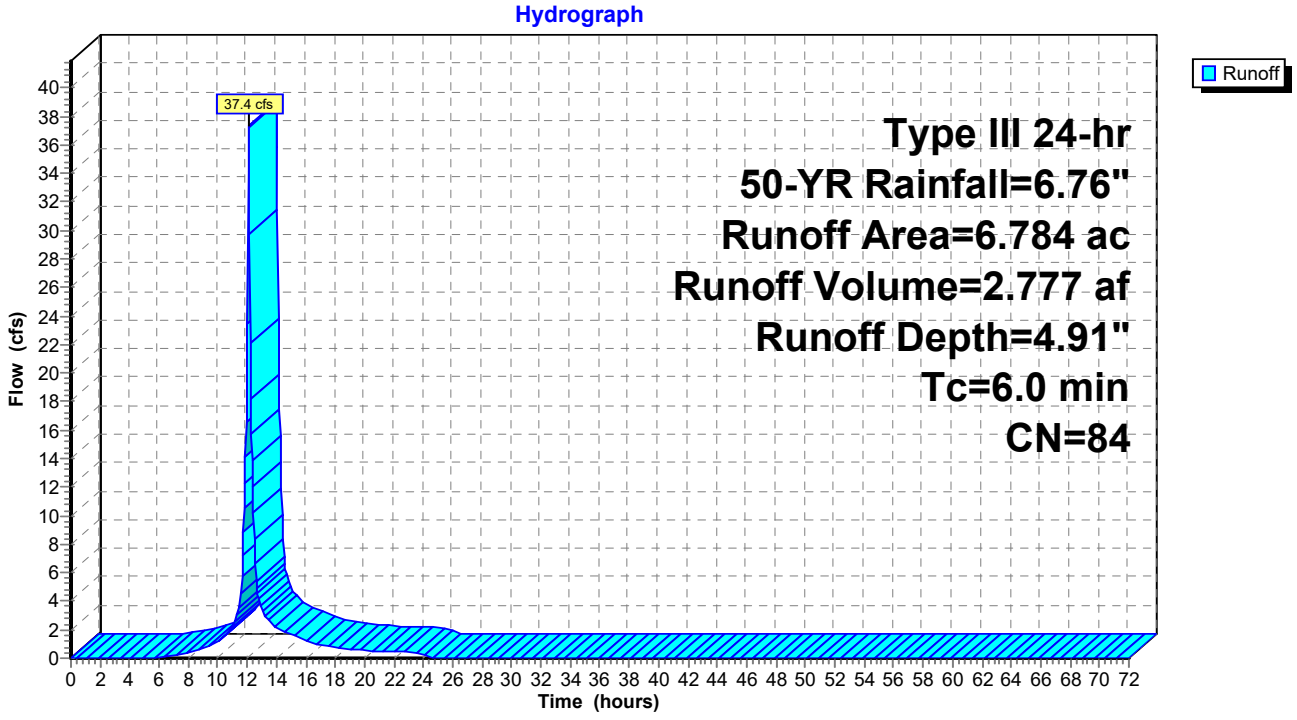
Runoff = 37.4 cfs @ 12.09 hrs, Volume= 2.777 af, Depth= 4.91"
Routed to Pond 1P : Sand Filter #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR Rainfall=6.76"

Area (ac)	CN	Description
0.449	61	>75% Grass cover, Good, HSG B
3.226	74	>75% Grass cover, Good, HSG C
0.001	96	Gravel surface, HSG C
0.130	71	Meadow, non-grazed, HSG C
0.437	98	Paved parking, HSG B
1.056	98	Paved parking, HSG C
0.602	98	Roofs, HSG B
0.883	98	Roofs, HSG C
6.784	84	Weighted Average
3.806		56.10% Pervious Area
2.978		43.90% Impervious Area

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

Subcatchment PR-9: Subcat PR-9



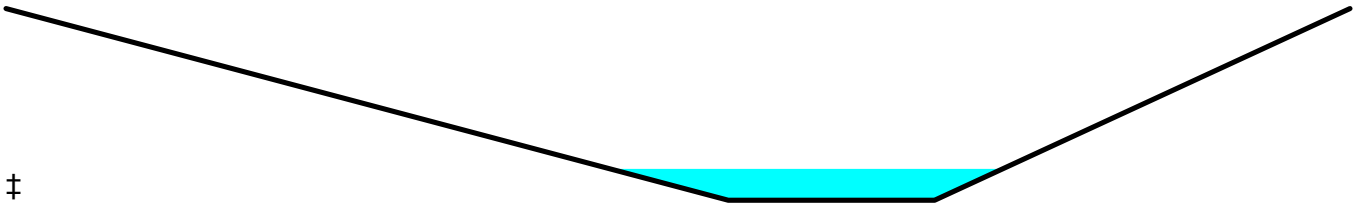
Summary for Reach 2R: Stream South

Inflow Area = 5.683 ac, 32.15% Impervious, Inflow Depth = 4.60" for 50-YR event
Inflow = 16.5 cfs @ 12.24 hrs, Volume= 2.179 af
Outflow = 16.5 cfs @ 12.25 hrs, Volume= 2.179 af, Atten= 0%, Lag= 0.8 min
Routed to Link DP-1 : DP-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.95 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 3.8 min

Peak Storage= 964 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.57' , Surface Width= 7.62'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 711.7 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 289.0' Slope= 0.0310 '/'
Inlet Invert= 8.96', Outlet Invert= 0.00'



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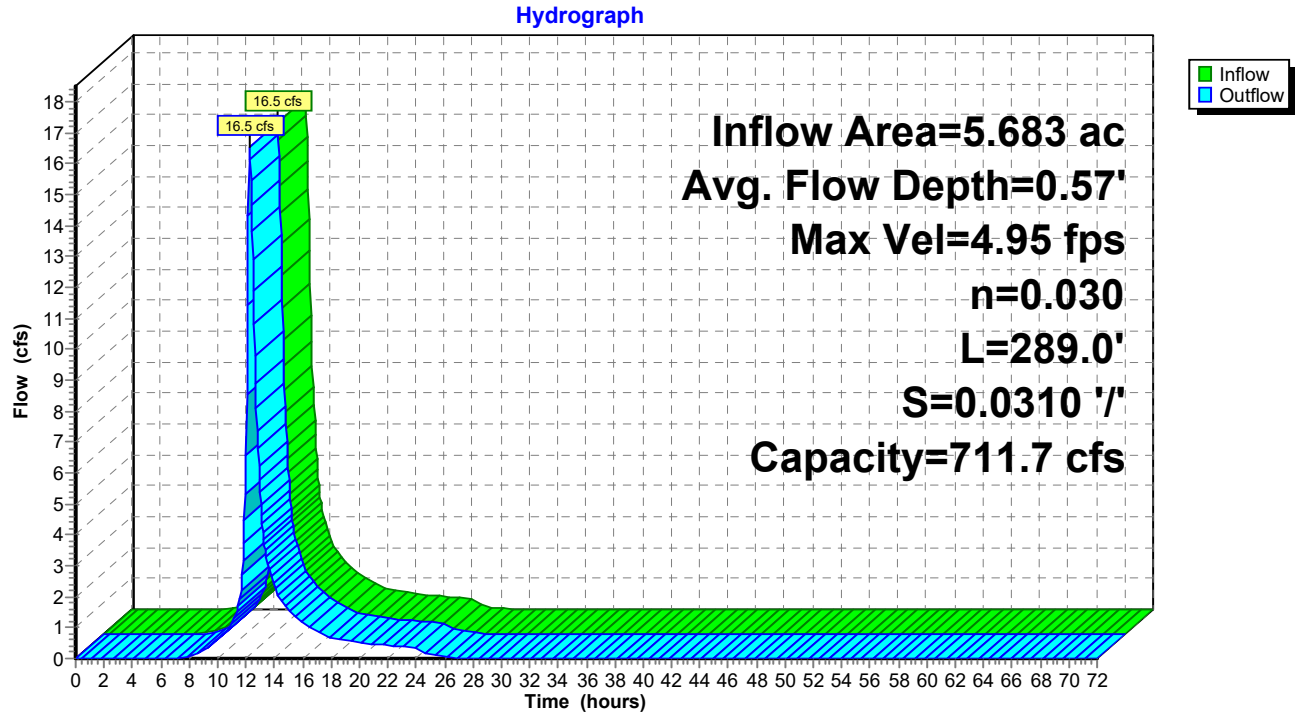
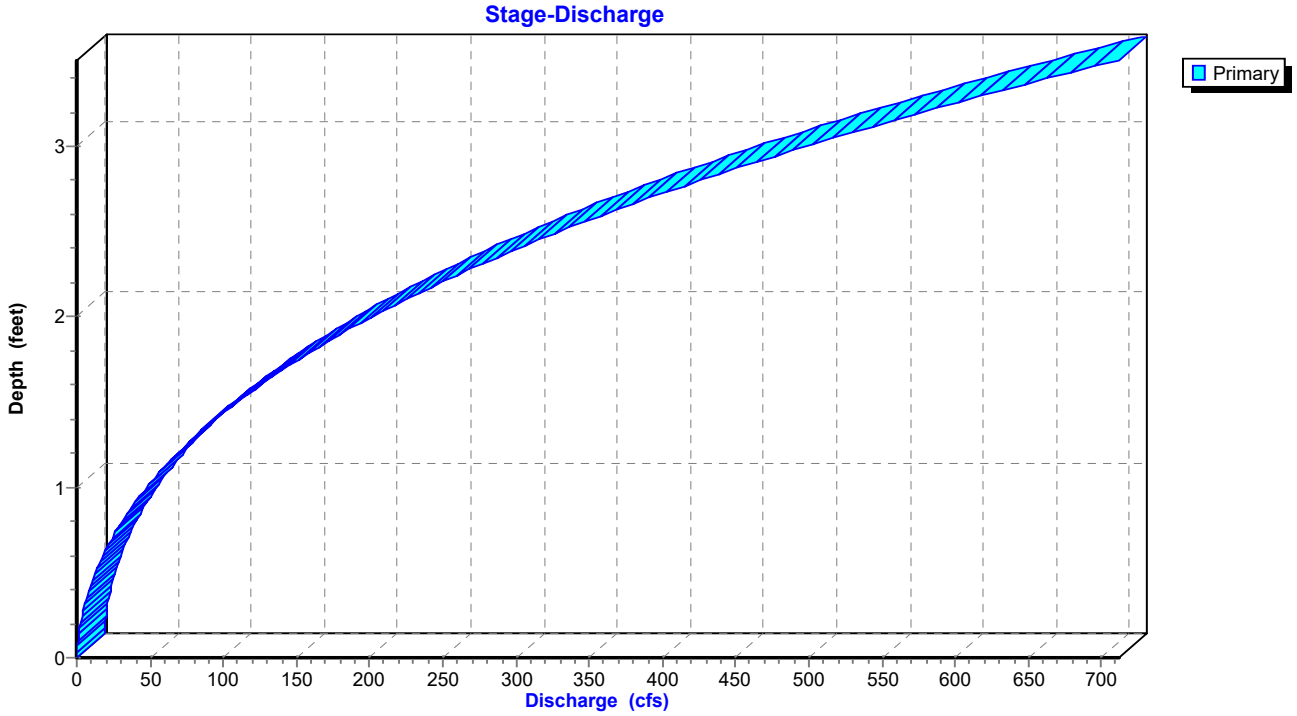
Reach 2R: Stream South



Reach 2R: Stream South



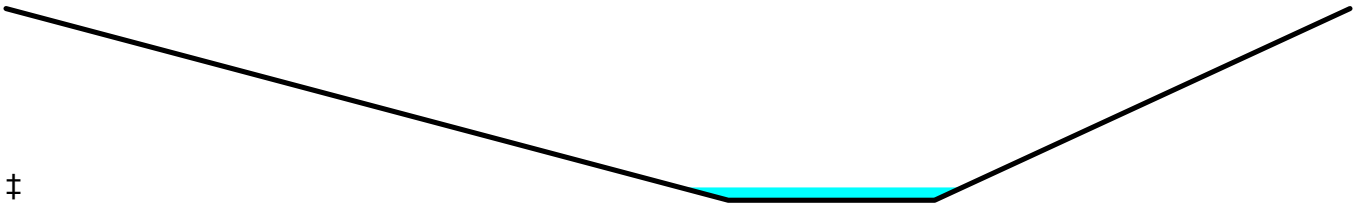
Summary for Reach 3R: Stream North

Inflow Area = 1.094 ac, 10.44% Impervious, Inflow Depth = 3.94" for 50-YR event
Inflow = 4.3 cfs @ 12.15 hrs, Volume= 0.359 af
Outflow = 4.1 cfs @ 12.18 hrs, Volume= 0.359 af, Atten= 3%, Lag= 1.8 min
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.75 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 6.7 min

Peak Storage= 587 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 5.46'
Bank-Full Depth= 3.50' Flow Area= 52.6 sf, Capacity= 901.4 cfs

4.00' x 3.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 2.3 '/' Top Width= 26.05'
Length= 535.0' Slope= 0.0497 '/'
Inlet Invert= 35.57', Outlet Invert= 8.96'



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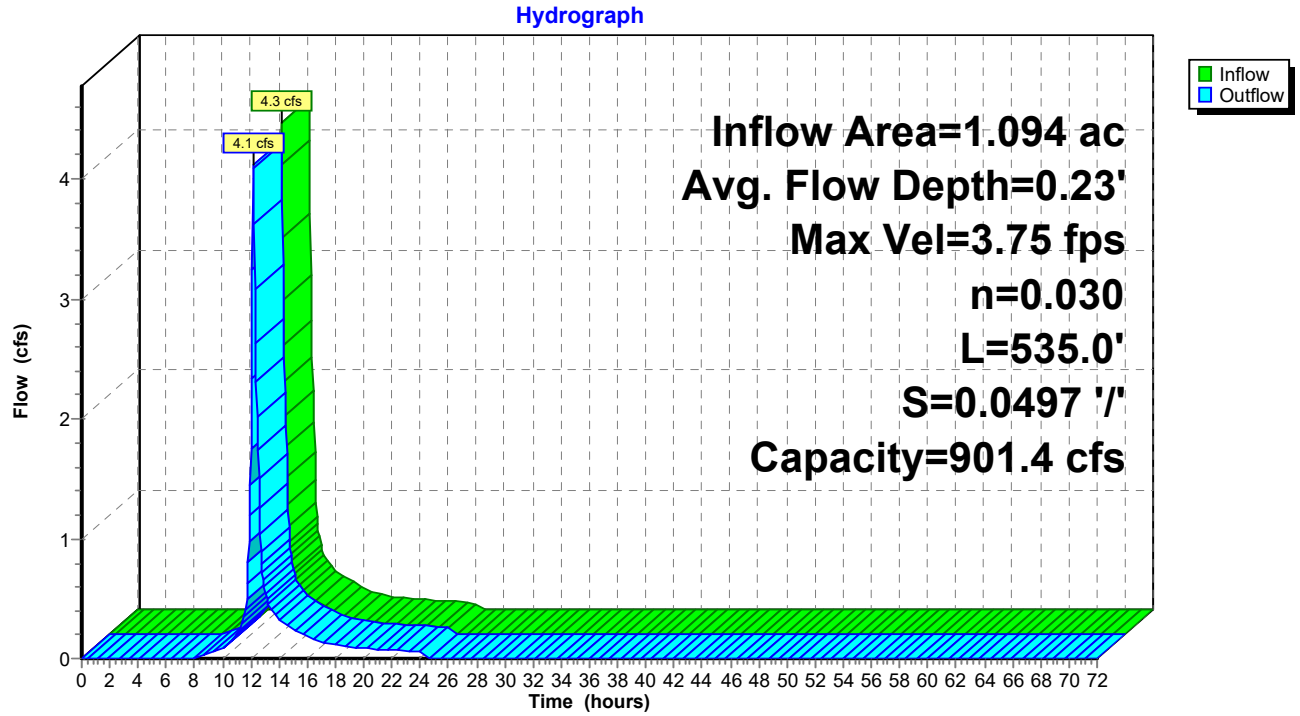
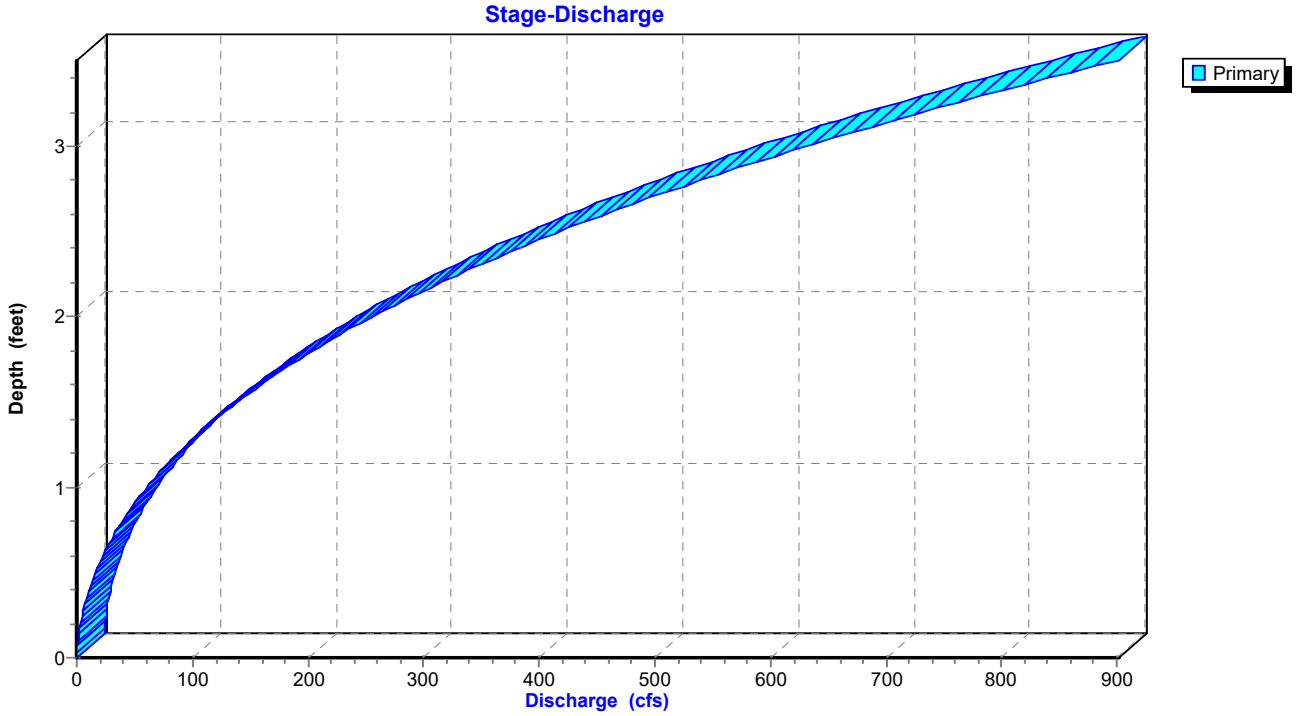
Reach 3R: Stream North



Reach 3R: Stream North



Summary for Pond 1P: Sand Filter #1

Inflow Area = 6.784 ac, 43.90% Impervious, Inflow Depth = 4.91" for 50-YR event
Inflow = 37.4 cfs @ 12.09 hrs, Volume= 2.777 af
Outflow = 13.5 cfs @ 12.36 hrs, Volume= 2.759 af, Atten= 64%, Lag= 16.2 min
Primary = 13.5 cfs @ 12.36 hrs, Volume= 2.759 af
Routed to Link DP-5 : DP-5
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link DP-5 : DP-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 402.65' @ 12.36 hrs Surf.Area= 8,782 sf Storage= 48,938 cf
Flood Elev= 402.80' Surf.Area= 8,782 sf Storage= 51,320 cf

Plug-Flow detention time= 230.5 min calculated for 2.757 af (99% of inflow)
Center-of-Mass det. time= 228.1 min (1,027.2 - 799.1)

Volume	Invert	Avail.Storage	Storage Description
#1	396.50'	0 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	398.00'	71,766 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		71,766 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
396.50	8,782	461.4	0.0	0	0	8,782
398.00	8,782	461.4	0.0	0	0	9,474

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
398.00	8,782	461.4	0.0	0	0	8,782
398.80	9,907	476.4	0.0	0	0	9,963
404.00	18,104	574.5	100.0	71,766	71,766	18,610

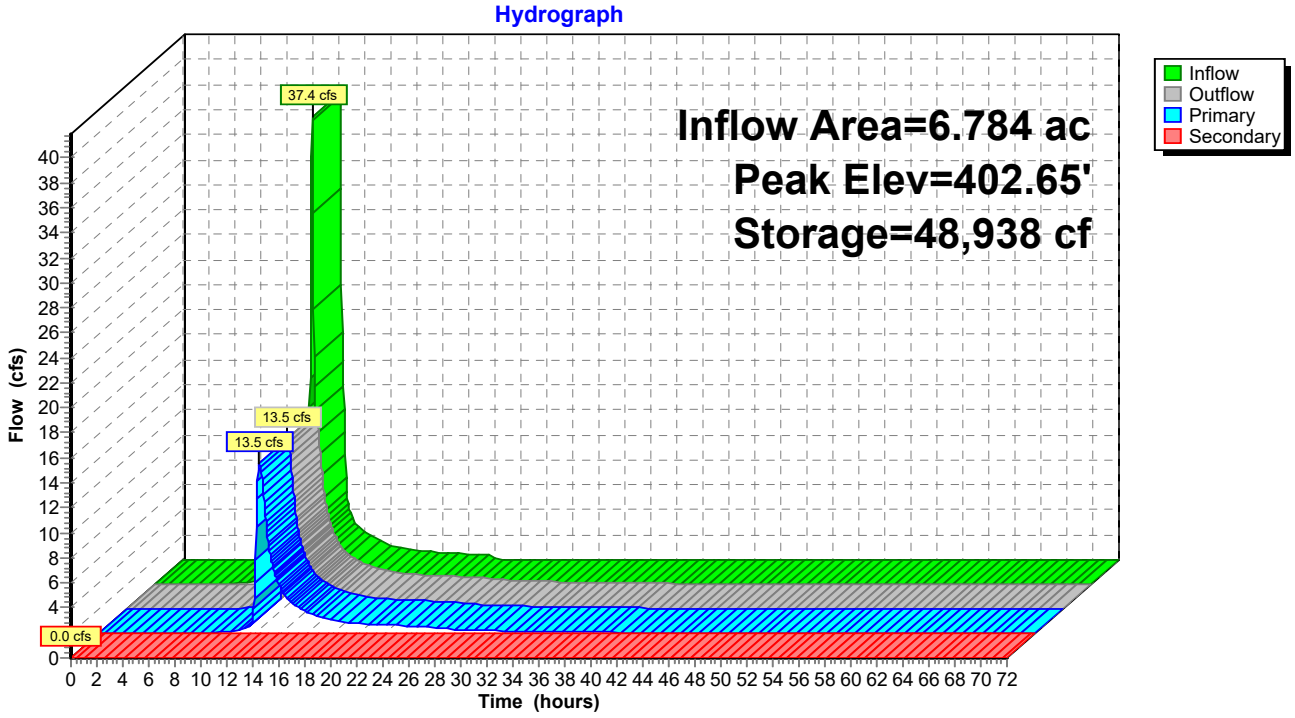
Device	Routing	Invert	Outlet Devices
#1	Primary	395.30'	**15.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 395.30' / 394.00' S= 0.0232 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	395.42'	**1.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	395.42'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 395.42' / 395.42' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	396.50'	**10.000 in/hr Exfiltration X 0.00 over Surface area**
#5	Device 1	398.80'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.80 1.80 3.90 Width (feet) 0.10 0.10 1.25 1.25
#6	Device 1	402.70'	**2.5" x 2.5" Horiz. Grate X 12.00 columns** X 12 rows C= 0.600 in 48.0" x 48.0" Grate (39% open area) Limited to weir flow at low heads
#7	Secondary	403.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

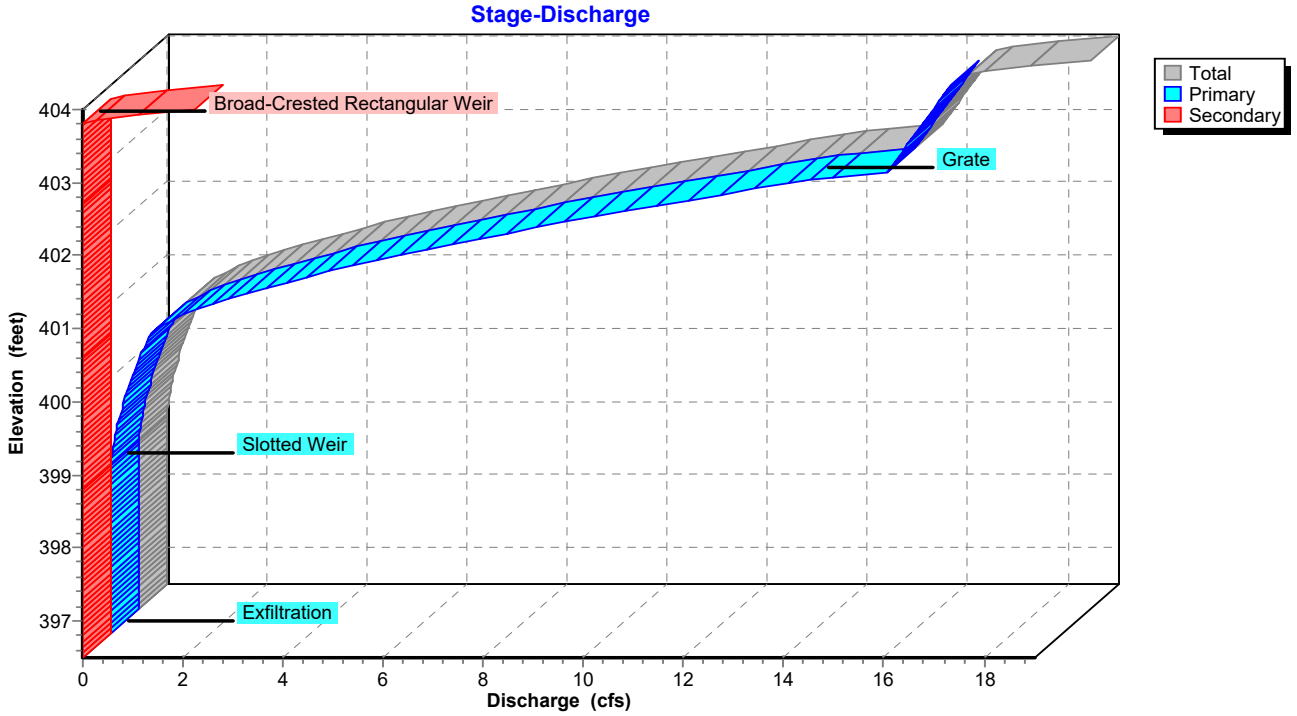
Primary OutFlow Max=13.5 cfs @ 12.36 hrs HW=402.65' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 13.5 cfs of 15.3 cfs potential flow)
  - **2=Underdrain Cap/Orifice** (Passes 0.0 cfs of 0.1 cfs potential flow)
    - **3=Culvert** (Passes 0.0 cfs of 1.7 cfs potential flow)
      - **4=Exfiltration** (Controls 0.0 cfs)
  - **5=Slotted Weir** (Weir Controls 13.5 cfs @ 4.93 fps)
  - **6=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=396.50' TW=0.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond 1P: Sand Filter #1



Pond 1P: Sand Filter #1



Summary for Pond 2P: Sand Filter #2

Inflow Area = 3.631 ac, 47.18% Impervious, Inflow Depth = 5.02" for 50-YR event
Inflow = 20.4 cfs @ 12.09 hrs, Volume= 1.520 af
Outflow = 12.5 cfs @ 12.21 hrs, Volume= 1.520 af, Atten= 38%, Lag= 7.0 min
Primary = 12.5 cfs @ 12.21 hrs, Volume= 1.520 af
Routed to Pond 3P : Detention South #3
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 3P : Detention South #3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 417.80' @ 12.21 hrs Surf.Area= 2,199 sf Storage= 12,685 cf
Flood Elev= 417.80' Surf.Area= 2,199 sf Storage= 12,713 cf

Plug-Flow detention time= 30.5 min calculated for 1.520 af (100% of inflow)
Center-of-Mass det. time= 29.9 min (826.2 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1	411.50'	0 cf	**Sand Filter (Irregular)**Listed below (Recalc)
#2	413.00'	20,167 cf	**Storage (Irregular)**Listed below (Recalc) -Impervious
		20,167 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
411.50	2,199	197.3	0.0	0	0	2,199
413.00	2,199	197.3	0.0	0	0	2,495

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
413.00	2,199	197.3	0.0	0	0	2,199
415.00	3,495	235.0	0.0	0	0	3,566
419.00	6,767	310.4	100.0	20,167	20,167	7,016

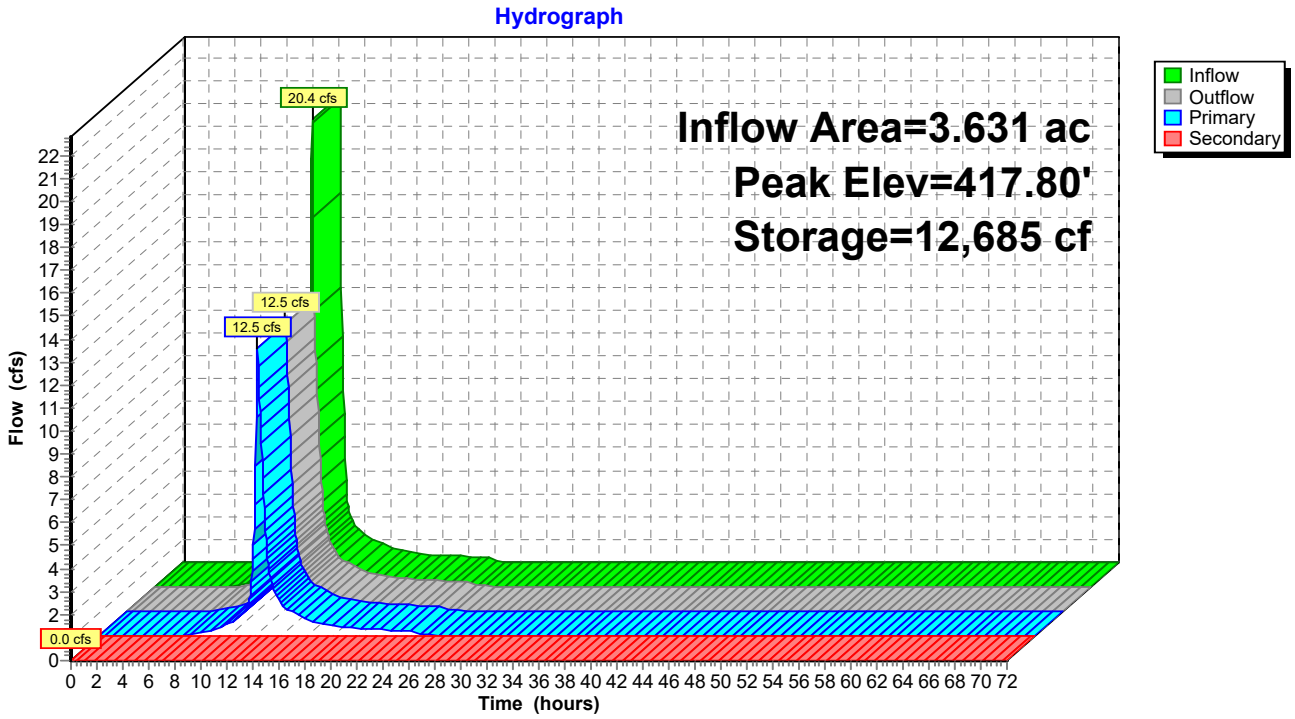
Device	Routing	Invert	Outlet Devices
#1	Primary	410.30'	**18.0" Round Culvert** L= 92.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.30' / 408.50' S= 0.0196 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	410.33'	**2.0" Vert. Underdrain Cap/Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 2	410.33'	**6.0" Round Culvert** L= 50.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 410.33' / 410.33' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#4	Device 3	411.50'	**10.000 in/hr Exfiltration X 0.00 over Surface area**
#5	Device 1	415.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 0.75 0.75
#6	Device 1	417.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads

#7	Secondary	418.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

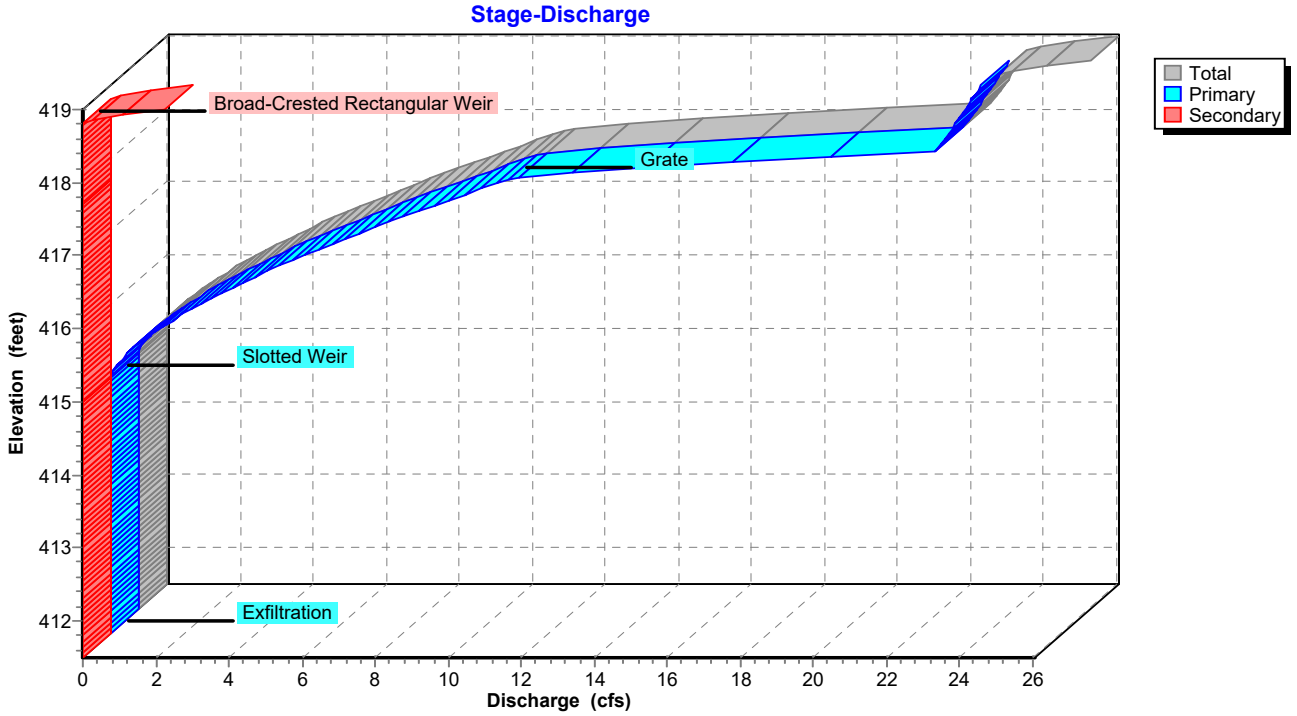
Primary OutFlow Max=12.4 cfs @ 12.21 hrs HW=417.79' TW=410.05' (Dynamic Tailwater)
- **1=Culvert** (Passes 12.4 cfs of 22.1 cfs potential flow)
- **2=Underdrain Cap/Orifice** (Passes 0.0 cfs of 0.3 cfs potential flow)
  - **3=Culvert** (Passes 0.0 cfs of 1.8 cfs potential flow)
    - **4=Exfiltration** (Controls 0.0 cfs)
- **5=Slotted Weir** (Orifice Controls 11.4 cfs @ 5.62 fps)
- **6=Grate** (Weir Controls 1.0 cfs @ 0.98 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=411.50' TW=408.00' (Dynamic Tailwater)
- **7=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Sand Filter #2



Pond 2P: Sand Filter #2



Summary for Pond 3P: Detention South #3

Inflow Area = 3.837 ac, 44.65% Impervious, Inflow Depth = 4.98" for 50-YR event
Inflow = 13.1 cfs @ 12.20 hrs, Volume= 1.593 af
Outflow = 11.2 cfs @ 12.32 hrs, Volume= 1.593 af, Atten= 15%, Lag= 6.9 min
Primary = 11.2 cfs @ 12.32 hrs, Volume= 1.593 af
Routed to Reach 2R : Stream South
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 2R : Stream South

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 410.19' @ 12.32 hrs Surf.Area= 3,802 sf Storage= 6,389 cf
Flood Elev= 410.80' Surf.Area= 4,359 sf Storage= 8,866 cf

Plug-Flow detention time= 17.6 min calculated for 1.592 af (100% of inflow)
Center-of-Mass det. time= 17.7 min (843.4 - 825.6)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	14,810 cf	**Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
408.00	2,108	251.0	0.0	0	0	2,108
412.00	5,572	326.4	100.0	14,810	14,810	5,760

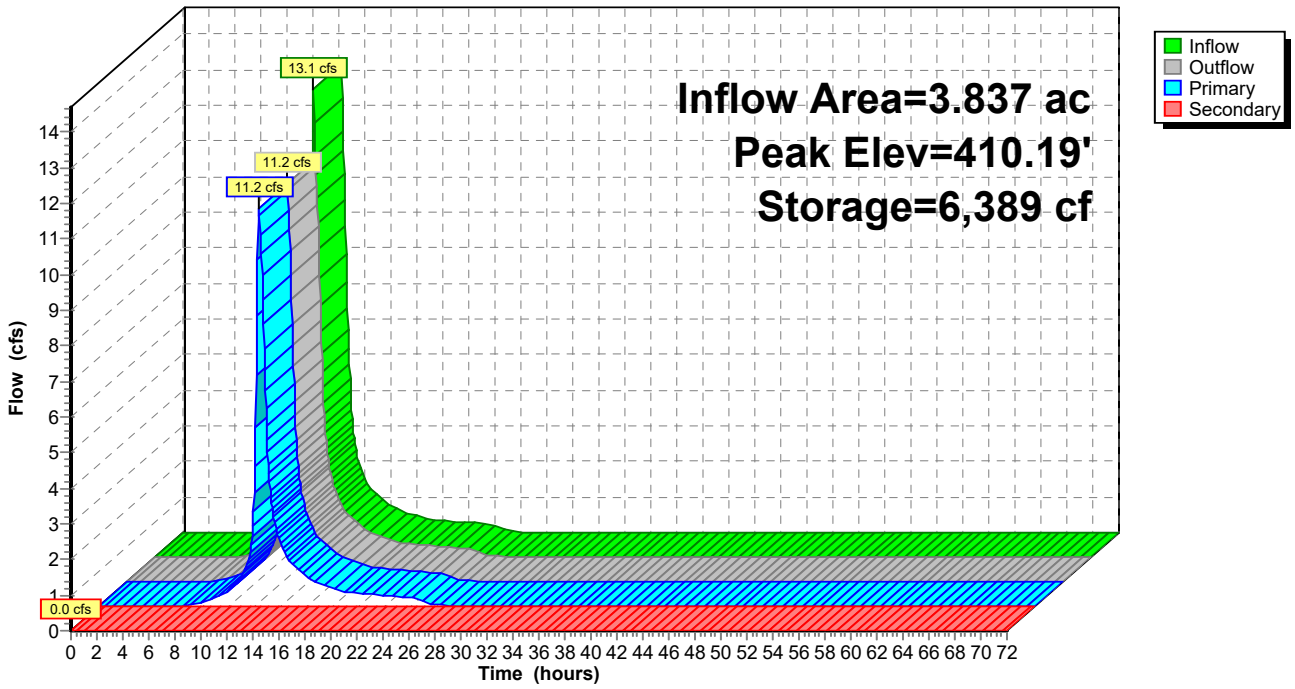
Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	**15.0" Round Culvert** L= 61.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 404.00' S= 0.0328 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	408.00'	**Slotted Weir, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 1.00 2.70 Width (feet) 0.75 0.75 1.50 1.50
#3	Device 1	410.70'	**2.5" x 2.5" Horiz. Grate X 9.00 columns** X 9 rows C= 0.600 in 36.0" x 36.0" Grate (39% open area) Limited to weir flow at low heads
#4	Secondary	411.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=11.1 cfs @ 12.32 hrs HW=410.19' TW=9.52' (Dynamic Tailwater)
└**1=Culvert** (Passes 11.1 cfs of 11.2 cfs potential flow)
├**2=Slotted Weir** (Weir Controls 11.1 cfs @ 4.40 fps)
└**3=Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=408.00' TW=8.96' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

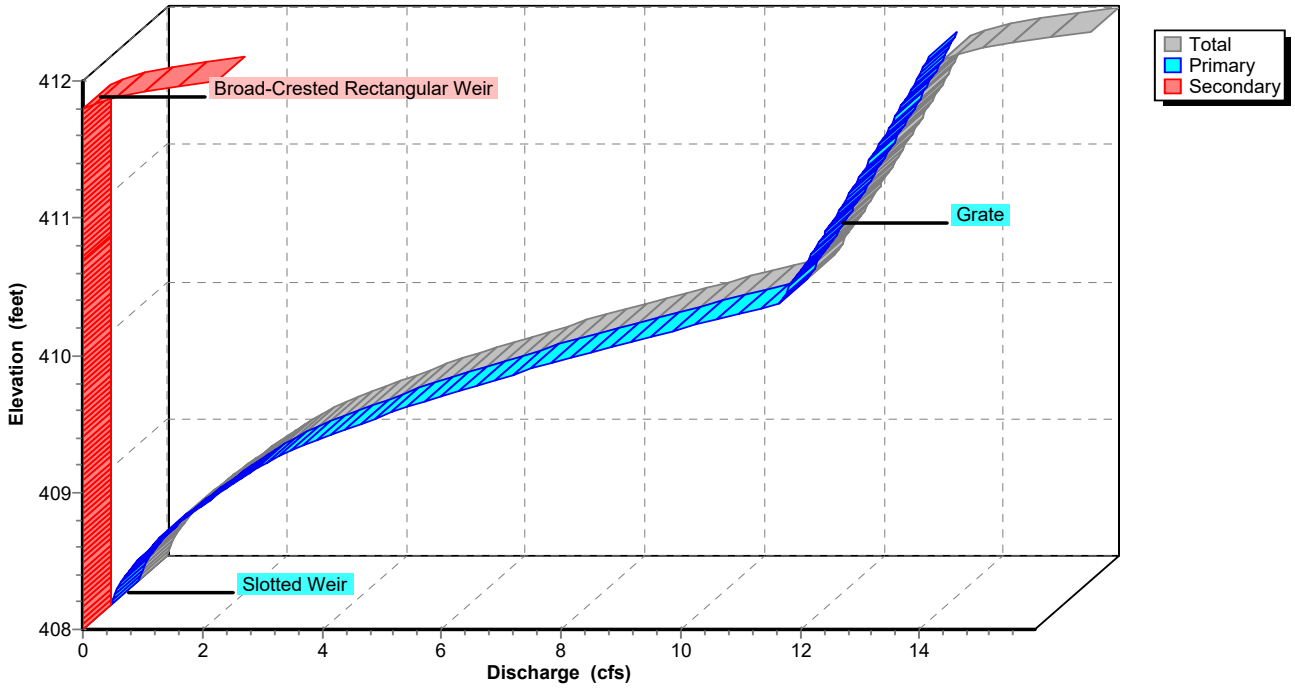
Pond 3P: Detention South #3

Hydrograph



Pond 3P: Detention South #3

Stage-Discharge

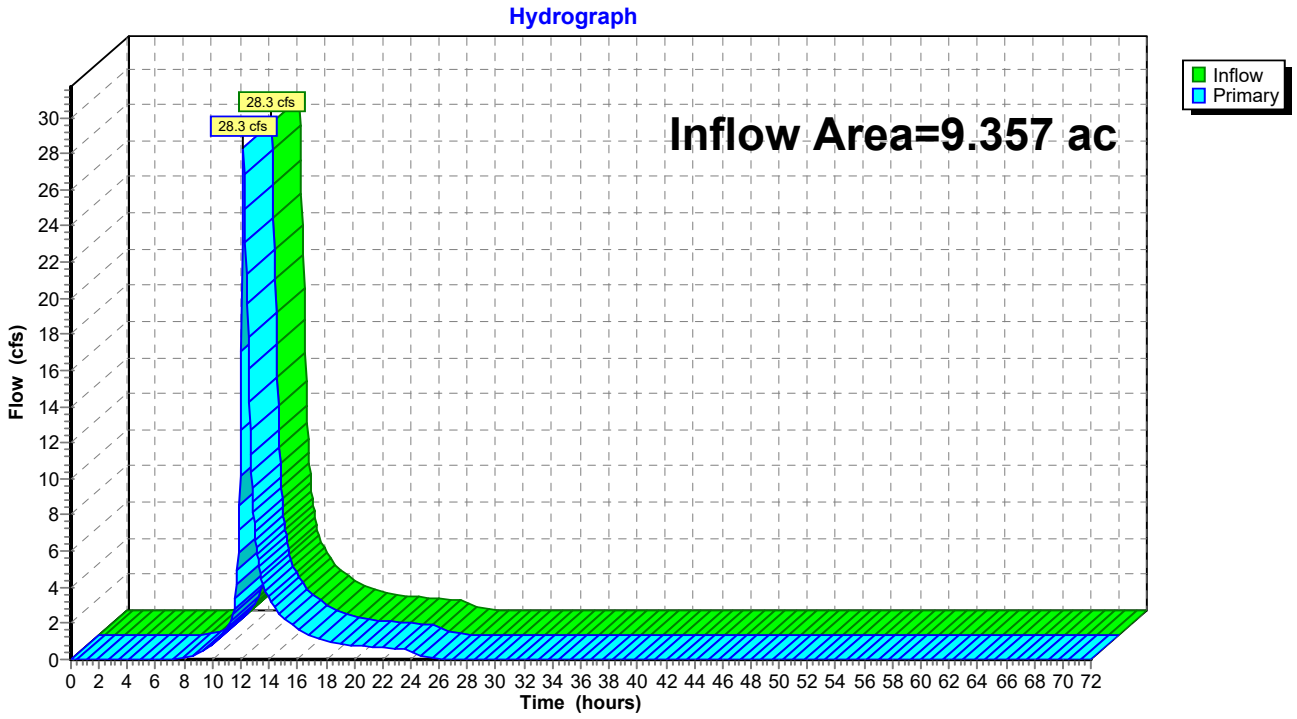


Summary for Link DP-1: DP-1

Inflow Area = 9.357 ac, 21.07% Impervious, Inflow Depth = 4.22" for 50-YR event
Inflow = 28.3 cfs @ 12.19 hrs, Volume= 3.289 af
Primary = 28.3 cfs @ 12.19 hrs, Volume= 3.289 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

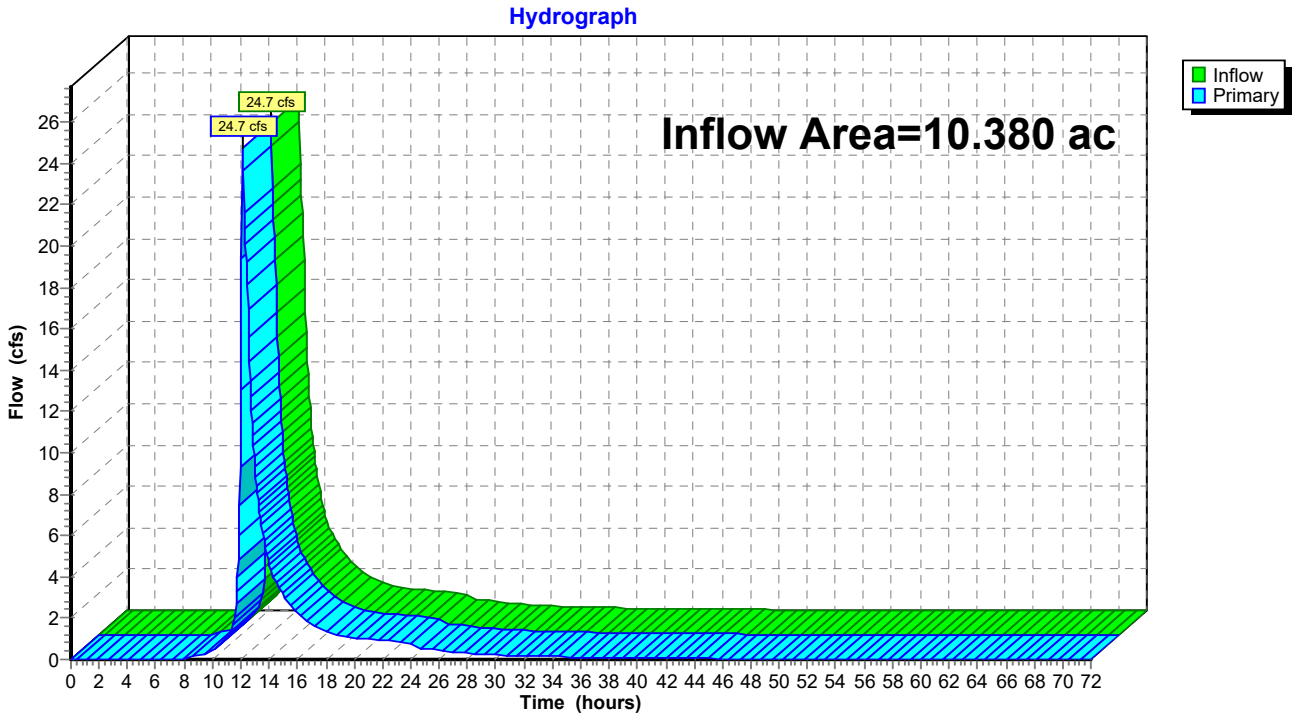


Summary for Link DP-5: DP-5

Inflow Area = 10.380 ac, 31.33% Impervious, Inflow Depth > 4.55" for 50-YR event
Inflow = 24.7 cfs @ 12.13 hrs, Volume= 3.939 af
Primary = 24.7 cfs @ 12.13 hrs, Volume= 3.939 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link DP-5: DP-5



Appendix C: Hydraulic Calculations

- Storm Drain Piping Calculations
- Riprap Apron/Energy Dissipation Calculations

Storm Drain Piping Calculations

FlexTable: Conduit Table

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Diameter (in)	Manning's n	Slope (Calculated) (ft/ft)	Length (Scaled) (ft)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Flow / Capacity (Design) (%)	Elevation Ground (Start) (ft)	Hydraulic Grade Line (In) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (Out) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)
CB-209	CB-208	0.050	0.640	0.032	6.138	15.0	0.013	0.021	24.0	0.20	9.32	3.06	2.1	430.09	425.67	430.09	425.29	425.50	425.00
CB-109	CB-108	0.200	0.340	0.068	6.138	15.0	0.013	0.012	24.0	0.42	7.22	3.21	5.8	427.65	423.35	427.65	423.01	423.10	422.80
CB-108	CB-102	0.110	0.560	0.130	6.104	15.0	0.013	0.031	270.0	0.80	11.32	5.32	7.0	427.65	423.05	419.46	414.63	422.70	414.40
CB-207	CB-206	0.190	0.590	0.112	6.138	15.0	0.013	0.017	24.0	0.69	8.34	4.12	8.3	426.28	422.23	426.28	421.86	421.90	421.50
CB-107	CB-106	0.239	0.590	0.141	6.138	15.0	0.013	0.017	24.0	0.87	8.34	4.40	10.5	426.85	422.77	426.86	422.27	422.40	422.00
CB-106	CB-105	0.210	0.580	0.263	6.113	15.0	0.013	0.021	169.2	1.62	9.29	5.69	17.4	426.86	420.41	420.99	417.14	419.90	416.40
CB-206	CB-205	0.250	0.420	0.217	6.112	15.0	0.013	0.010	115.3	1.34	6.31	4.08	21.2	426.28	421.86	424.84	421.09	421.40	420.30
CB-305	CB-304	0.430	0.610	0.262	6.138	15.0	0.013	0.012	24.0	1.62	7.22	4.75	22.5	430.69	426.71	430.69	426.41	426.20	425.90
CB-212	CB-211	0.620	0.600	0.372	6.138	15.0	0.013	0.012	24.0	2.30	7.22	5.23	31.9	431.84	427.91	431.84	427.67	427.30	427.00
CB-304	CB-303	0.310	(N/A)	0.381	6.115	15.0	0.013	0.010	182.9	2.35	6.58	4.91	35.7	430.69	426.41	428.47	424.69	425.80	423.90
CB-303	CB-302	0.880	(N/A)	0.801	5.946	15.0	0.013	0.025	24.0	4.80	10.21	8.20	47.0	428.47	424.69	428.46	423.85	423.80	423.20
CB-302	DMH-306	0.150	0.560	0.885	5.933	15.0	0.013	0.030	84.0	5.29	11.14	8.97	47.5	428.46	418.93	418.27	416.11	418.00	415.50
CB-211	DMH-210	0.510	0.420	0.586	6.117	15.0	0.013	0.013	23.6	3.61	7.28	5.92	49.7	431.84	427.67	432.67	427.24	426.90	426.60
DMH-210	CB-208	(N/A)	(N/A)	0.586	6.099	15.0	0.013	0.011	92.5	3.60	6.72	5.57	53.6	432.67	426.27	430.09	425.29	425.50	424.50
CB-105	CB-104	0.900	0.490	0.704	5.978	15.0	0.013	0.012	24.0	4.24	7.22	6.12	58.7	420.99	417.14	420.99	417.01	416.30	416.00
CB-208	CB-205	0.320	0.550	0.794	6.024	15.0	0.013	0.016	278.1	4.82	8.12	6.90	59.4	430.09	425.29	424.84	421.09	424.40	420.00
CB-102	FES 101	0.180	0.180	1.632	5.874	18.0	0.013	0.020	34.3	9.66	14.99	9.01	64.4	419.46	408.40	411.34	407.42	407.20	406.50
DMH-306	FES-301	0.530	0.570	1.187	5.890	15.0	0.013	0.028	43.3	7.05	10.75	9.34	65.6	418.27	414.26	416.34	412.77	413.20	412.00
CB-204	DMH-203	0.270	0.580	1.771	5.828	18.0	0.013	0.020	99.6	10.40	14.87	9.10	69.9	424.84	412.24	413.43	409.93	411.00	409.00
CB-205	CB-204	1.182	0.510	1.614	5.841	18.0	0.013	0.017	24.0	9.50	13.56	8.30	70.1	424.84	421.09	424.84	420.48	419.90	419.50
CB-103	CB-102	0.350	0.490	1.470	5.935	18.0	0.013	0.012	24.5	8.79	11.61	7.22	75.7	419.37	415.85	419.46	415.40	414.70	414.40
CB-104	CB-103	1.010	(N/A)	1.298	5.961	15.0	0.013	0.022	49.2	7.80	9.66	8.76	80.7	420.99	417.01	419.37	415.67	415.90	414.80
DMH-202	FES-201	(N/A)	(N/A)	2.173	5.696	18.0	0.013	0.020	25.0	12.48	14.85	9.42	84.0	406.95	404.83	399.34	404.12	403.50	403.00
DMH-203	DMH-202	0.670	0.600	2.173	5.778	18.0	0.013	0.018	162.5	12.66	14.03	8.99	90.2	413.43	407.84	406.95	404.72	406.50	403.60

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Roof Header/French Drain Capacity Analysis

Project	Rosecrans Drive at Thornton Hill	Project #	53140
Calculated by	BJZ	Date	2/11/2026
Checked by	TMD	Date	2/12/2026

FLOWS:

Combined flow from roof runoff of units 71-81, as well as ground runoff captured via french drian header pipe — 2.1 cfs

DESCRIPTION	LOCATION		DESIGN					CAPACITY			PROFILE						
	FROM	TO	Q cfs	V fps	n	PIPE SIZE	SLOPE	Q full cfs	Q full MGD	V full ft/s	LENGTH ft	FALL ft	RIM	INV UPPER	INV LOWER	Cover Upstream	Cover Downstream
Worst Case Scenario Header Pipe	Pipe between Units 79 & 81	DCB 109	2.1	8.5	0.013	8	0.0740	3.29	2.12	9.4	81	5.99	428.5	425.0	419.0	2.8	4.0

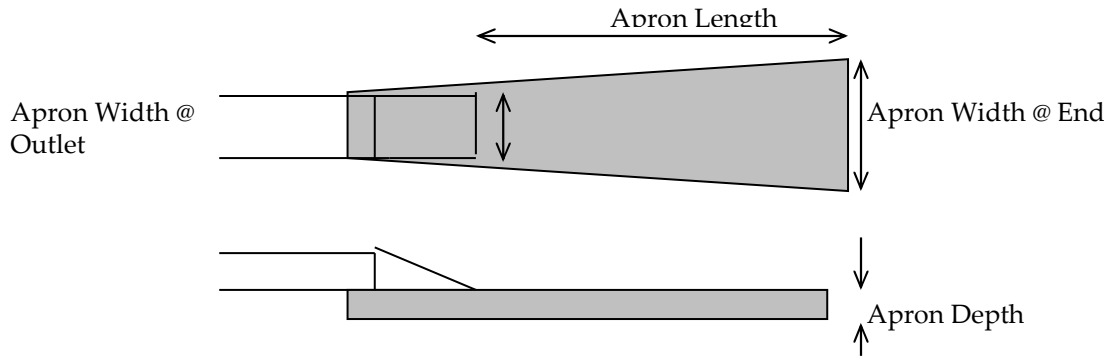
The above pipe capacity analysis represents the roof drain header pipe which receives the most flow, due to it's collection of both 6 unit roofs, as well as a large area of 18,250 square feet of internal open space. A peak flow in the 25-year storm was determined to be 2.1 cfs, per HydroCAD modeling. This pipe run can be found in the project's Site Plan Set, Grading & Drainge Plan 1, sheet C3.01. 81 feet of header pipe proceeds south, in between Units 79 & 81, towards DCB 109, and conveys all driange accumulated in it's header network. The assumption is made that if this 'worst case scenario' does not violate calculated pipe capacty, then all other header pipes onsite shall also have sufficient capacity, since every other header pipe proposed on site shall receive less flow under peak conditions than 2.1 cfs.

Riprap Apron/Energy Dissipation Calculations

Computations

Project #:	53140.44		
Project:	44 Pillsbury Road		
Location:	Londonderry, NH		
Calculated by:	AP	Date:	2/11/2026
Checked by:	BJZ	Date:	2/12/2026
Title:	Riprap Outlet Protection Sizing		

Source: New Hampshire Stormwater Manual, Volume 2,
Post-Construction Best Management Practices Selection & Design
NHDES, December 2008, Section 4-6.6. p. 172.



Apron Width at Outlet:	Width = 3*pipe dia. (or width of channel)	
Apron Length:	Length = (1.8*Q) / (dia.^3/2) + 7*dia.	if Tw depth is < 1/2 dia.
	Length = (3.0*Q) / (dia^3/2) + 7*dia.	if Tw dwpth is >= 1/2 dia.
Apron Width at End:	Width = 3*dia. + apron length	if Tw depth is < 1/2 dia.
	Width = 3*dia. + 0.4*apron length	if Tw dwpth is >= 1/2 dia.
	or apron width = channel width if a well defined channel exists	
Rock Riprap:	Median Diameter = (0.02 * Q^4/3) / (Tw * dia)	
	Depth = 6" or 1.5 * largest stone dia	(largest stone dia = 1.5 * d50)

Design Element	Outlet Description FES 100	FES 102	FES 400
Design Storm (yr):	25	25	25
Defined Channel (yes/no)	no	no	no
Channel Width, ft	n/a	n/a	n/a
Pipe Dia (D), in	15	18	15
Tail Water (Tw), ft	1.8	1.8	0.0
	Tw>=0.5D	Tw>=0.5D	Tw<0.5D
Flow (Q), cfs	7.8	8.4	6.6
Apron Width (outlet), ft	3.8	4.5	3.8
Apron Length, ft	25.5	24.2	17.3
Apron Width (end), ft	14	14	21
Apron Width (channel), ft	n/a	n/a	n/a
Median Stone Dia., ft	0.50	0.50	0.50
Median Stone Dia., in	6.00	6.00	6.00
Largest Stone Dia., ft	0.75	0.75	0.75
Largest Stone Dia., in	9.00	9.00	9.00
Apron Depth, ft	1.1	1.1	1.1
Apron Depth, in	13.5	13.5	13.5

Appendix D: Soil Report

Memorandum

To: Dave Fenstermacher, PE

Date: December 22, 2025

Project #: 175183.000

From: Sherrie Trefry, CSS
Trent Delehanty

Re: 44 Pilsbury Road Site-Specific Mapping Report

Introduction

Vanasse Hangen Brustlin, Inc. (VHB) has prepared this Site-Specific Soil Mapping Report to accompany the soils map that was prepared for Procopio Companies for the property located at 44 Pilsbury Road in Londonderry, NH (Site). Certified Soil Scientist, Sherrie Trefry, CSS #93, developed a soils map on October 29th of 2025 to classify the soils within the 36±–acre site (Tax Map 10 Lot 15 and a portion of lot 41) located at 44 Pillsbury Road in Londonderry, NH. The property is being evaluated for a 62-unit detached condominium development. This Site Specific Soil Map (SSSM) and Report were developed in accordance with Site-Specific Soil Mapping Standards For New Hampshire and Vermont, Special Publication No. 3, Version 7.0 (July 2021). The soils map was prepared on an existing condition plan at a scale of 1" = 80' Attachment 1.

The Site is bordered by Pillsbury Road to the south and Hardy Road to the west. There are residential properties that abut the property to the north and southeast. Directly to the east there is another property previously operated as an apple orchard like the subject property. Cultivated rows of apples remain throughout the Site. The site topography is fairly level on the north/northeast portion and slopes steeply downward towards Hardy Road and Pillsbury Road to the south and west. Exposed bedrock was observed at the site, primarily at the higher elevations on the north and north central portions of the Site. There is an existing gravel road that accesses the site from Pillsbury Road from the south, and semi-vegetated gravel roads around the boundary of the historic apple orchard and bisecting some of the cultivated rows. There are two small patches of forest, one on the western boundary of the site parallel to Hardy Road, and another on the southeast boundary adjacent to a residential lot. There is an area of fill in the eastern corner of the property where rocks and other natural material were piled. During previous natural resource delineations conducted by VHB Environmental Scientists, no wetlands were observed within the site boundaries.

The Site evaluated, as depicted on the SSSM, contains soils formed from glacial till (active ice). Much of the Site is classified by soils that are controlled by depth to bedrock. Depth to bedrock was documented using soil test pit logs, a ledge probe, use of a soil auger, and the digging of test pits. The dominant soil texture on the Site is fine sandy loam as described within Test pit 1.

At the highest elevations in the middle of the site Hollis soil series was mapped because bedrock was observed at or within 20 inches of the soil surface. Ledge was observed at the surface in areas and depth to bedrock was shallow. Saturated hydraulic conductivity is moderately high or high within the mineral soil. Hollis soils are classified as Hydrologic Soil Group C. Refer to the Hollis official soils series description (OSD) provided in **Attachment B** for additional information about the characteristics of this soil series.

As the site trends downward to the west and south depth to bedrock becomes more variable. Depth to bedrock within these areas varied from near the surface to 40 inches. With the varying levels of depth to ledge, and lack of diagnostic

landform features, these locations were mapped as a Hollis-Chatfield complex to capture the variable of depth to ledge. Both Hollis and Chatfield soils have moderately high to high saturated hydraulic conductivity within the mineral soil. Hydrologic Soil Group of C should be used for this map unit though the Chatfield soil series is Hydrologic Soil Group B. Refer to the Chatfield OSD provided in **Attachment B** for additional information about the characteristics of the Chatfield soil series.

On the northern boundary of the site deeper soils were observed. These soils were mapped as Charlton soils in which ledge was deeper than 40 inches from the soil profile. Similarly to Hollis and Chatfield, Charlton soils are formed in glacial till and contain fine sandy loams. Charlton soils have moderately high or high saturated hydraulic conductivity. Charlton soils are classified as Hydrologic Soil Group B. Small bands of Charlton-Chatfield complex were noted within the transitional areas between these soils and the mapped Hollis map units up slope where depth to ledge varied between 20 inches and greater than 40 inches. These complexes have moderately high to high saturated hydraulic conductivity are Classified Hydrologic Soil Group of B. Refer to the Charlton OSD provided in **Attachment B** for additional information about the characteristics of this soil series.

In the southern and eastern portion of the site, a densic contact was observed in soil at 34 inches. These soils were classified as Bernardston soils due to the presence of hardpan and lack of ledge within 40 inches of the soil profile. Bernardston soils have moderately high or high saturated hydraulic conductivity in the solum and low to moderately high saturated hydraulic conductivity in the substratum. Bernardston soils have a Hydrologic Soil Group C designation due to the densic layer that restricts drainage. Refer to the Bernardston OSD provided in **Attachment B** for additional information about the characteristics of this soil series.

In addition to the naturally occurring soils, human disturbed soils were also observed. These soil units were described using the *Site Specific Soil Mapping Standards for New Hampshire and Vermont- Version 7.0* published by the Society of Soil Scientists of Northern New England in July 2021, and the *New Hampshire State-Wide Numerical Soil Legend Issue# 10* by the Natural Resources Conservation Service in January 2011. The legend and modifiers used to describe these disturbed soil units is proved in **Attachment C**.

Within the mapped Bernardston unit in the southern and eastern portion of the site there was a large dump of stones, cobbles, and boulders. These stones were likely stacked during land clearing associated with agricultural activities. In addition, on the northeastern corner of the site another stone dump was recorded. The saturated hydraulic conductivity within these areas is considered low due to the restrictive features of the stones and are classified as Hydrologic Soil Group D.

Smoothed udorthents disturbed soil units were observed in two locations which historic grading occurred. One of these locations is located on the southeastern portion of the site where an access road was built from Pillsbury Road. This roadway is still functional and is currently used to access the central portion of the site. The second location of smoothed udorthents was mapped where a historical access road that was observed within the site. This roadway is no longer functional but the impacts to the soils persist. This historic roadway once followed Hardy Road parallel on the western site boundary before it entered the site at the southeastern corner of the site. Due to the compaction of these soils and fill used, the saturated hydraulic conductivity is moderate and is classified as Hydrologic Soil Group D.

Memorandum

Stockpiling of soils, stones, and materials associated with the grading and road building of the historic access road was observed in berms next to the roadway feature. The saturated hydraulic conductivity of these soils is moderate, and the Hydrologic Soil Group is C.

Attachments:

Attachment A: Site Specific Soils Map

Attachment B: Official Soil Series Descriptions

Attachment C: Disturbed Soils Legend and Disturbed Soil Modifiers

Memorandum

Test Pit Observations

Pit 1	Located in the northern portion of the site near an existing structure associated with the orchard. The pit was located on a 0-3% slope. This pit is representative of the soils sampled throughout the site. These soils are well drained and somewhat excessively drained soil formed in a thin mantle of till. These soils are shallow to bedrock. Soil classification: Hollis Ledge observed at 13" in the test pit and auger samples in adjacent areas ranged from the soil surface to 20" depth. Many rock fragments were observed in the test pit.	

Depth	**Horizon**	**Color**	**Texture**	**Structure**	**Consistence**	**Redox**	**Other observations**
0-8"	Ap	7.5YR 3/1	Fine Sandy Loam	Subangular Blocky	Friable	None	5% gravel
8-13"	Bw	7.5YR 4/4	Fine Sandy Loam	Subangular Blocky	Friable	None	10-15% gravel/cobble inclusions
>13"	R						Ledge at 13"

Memorandum

Test pit 2	Located at the southeastern portion of the site within the wooded area, a different soil series was observed that had a densic contact and was deep to bedrock. Soil classification: Bernardston No observed seasonal high-water table or bedrock. Hardpan was observed at 34". Rock fragments were observed within the profile.						
Depth	**Horizon**	**Color**	**Texture**	**Structure**	**Consistence**	**Redox**	**Other observations**
0-12"	Ap	10 YR 3/3	Loam	Subangular blocky	Friable	no redox	10% Gravel/cobble
12-19"	Bw_1	7.5YR 4/6	Loam	Subangular blocky	Friable	no redox	30% Gravel/cobble
19-23"	Bw_2	10YR 6/6	Very fine sandy loam	Subangular blocky	Friable	no redox	30% Gravel/cobble
23-34"	C	2.5Y 6/4	Silt Loam	Platy	Friable	no redox	10% Gravel
34-40"	Cd	2.5Y 7/3	Silt Loam	Massive	Firm	no redox	

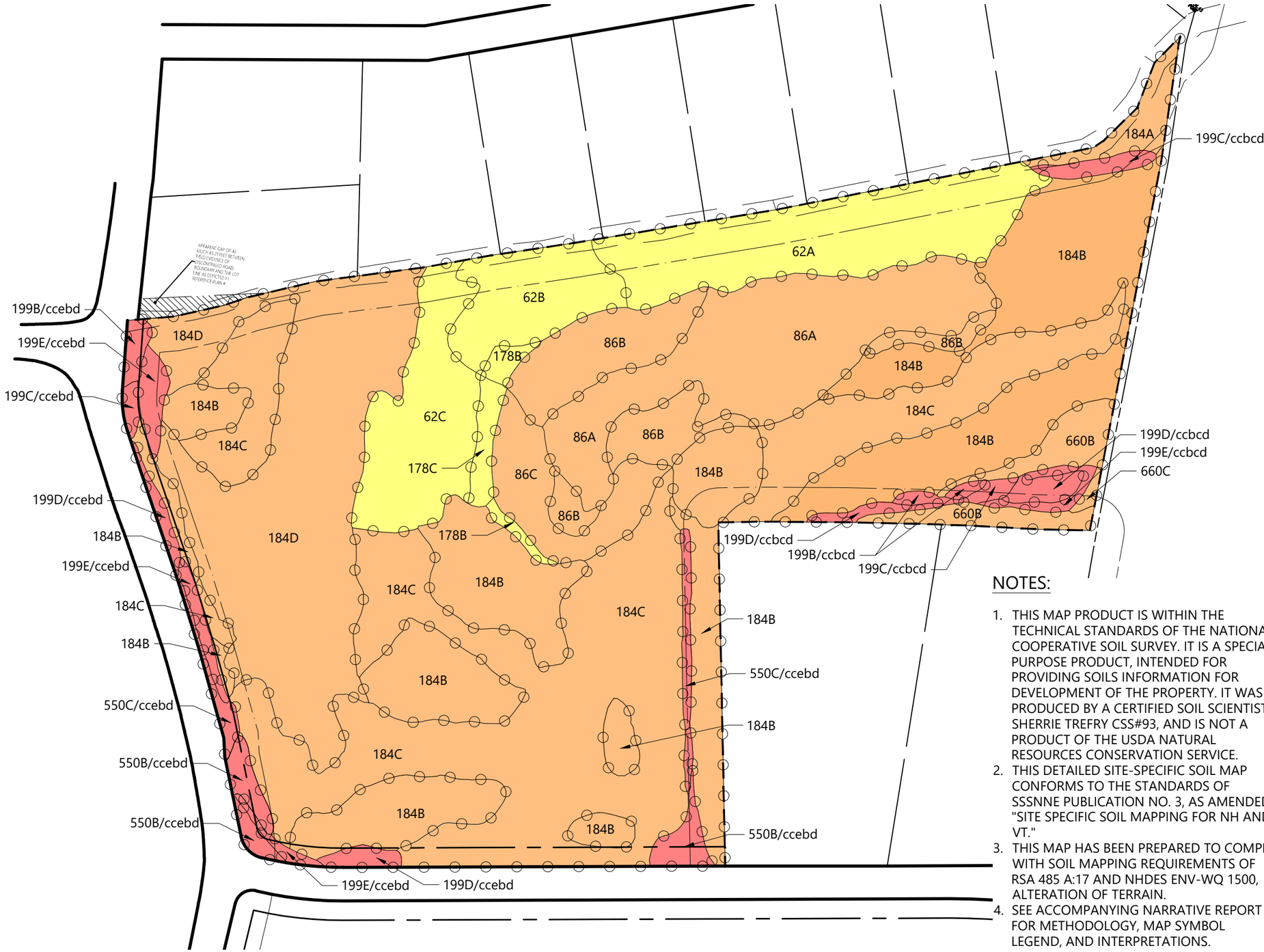
Soil symbol	Soil series; Taxonomic class	Soil Unit Map Description
199B/ccbcd	Dump of stones, cobbles, and boulders	This unit represents an area filled from rock and stone from the adjacent historical farm land. Shallow soils have begun to form in places, allowing for shallow rooting plants to be dispersed. Majority of these mapped units contain exposed and stacked stones, cobbles, and boulders. These rocks and stones are providing a restrictive layer near the surface throughout the area. The soils have low hydraulic saturated conductivity. Hydrologic soil group D. This soil is on a 3-8% Slope.
199C/ccbcd	Dump of stones, cobbles, and boulders	This unit represents an area filled from rock and stone from the adjacent historical farm land. Shallow soils have begun to form in places, allowing for shallow rooting plants to be dispersed. Majority of these mapped units contain exposed and stacked stones, cobbles, and boulders. These rocks and stones are providing a restrictive layer near the surface throughout the area. The soils have low hydraulic saturated conductivity. Hydrologic soil group D. This soil is on a 8-15% slope.
199D/ccbcd	Dump of stones, cobbles, and boulders	This unit represents an area filled from rock and stone from the adjacent historical farm land. Shallow soils have begun to form in places, allowing for shallow rooting plants to be dispersed. Majority of these mapped units contain exposed and stacked stones, cobbles, and boulders. These rocks and stones are providing a restrictive layer near the surface throughout the area. The soils have low hydraulic saturated conductivity. Hydrologic soil group C. This soil is on a 15-25% slope.
199B/ccebd	Stockpiling of soils, stones, and materials from road building activities	This unit represents an area where stockpiling of material from historic road building activities occurred. These soils are stockpiled over soils with ledge in the profile between 0-40 inches. These soils have regrown with a herbaceous, shrub, and sapling growth. These soils have moderate hydraulic conductivity. Hydrologic soil group C. This soil is on a 3-8% slope.
199C/ccebd	Stockpiling of soils, stones, and materials from road building activities	This unit represents an area where stockpiling of material from historic road building activities occurred. These soils are stockpiled over soils with ledge in the profile between 0-40 inches. These soils have regrown with a herbaceous, shrub, and sapling growth. These soils have moderate hydraulic conductivity. Hydrologic soil group C. This soil is on a 8-15% slope.
199D/ccebd	Stockpiling of soils, stones, and materials from road building activities	This unit represents an area where stockpiling of material from historic road building activities occurred. These soils are stockpiled over soils with ledge in the profile between 0-40 inches. These soils have regrown with a herbaceous, shrub, and sapling growth. These soils have moderate hydraulic conductivity. Hydrologic soil group C. This soil is on a 15-25% slope.
199E/ccebd	Stockpiling of soils, stones, and materials from road building activities	This unit represents an area where stockpiling of material from historic road building activities occurred. These soils are stockpiled over soils with ledge in the profile between 0-40 inches. These soils have regrown with a

		herbaceous, shrub, and sapling growth. These soils have moderate hydraulic conductivity. Hydrologic soil group C. This soil is on a 25-50 slope.
86A	Hollis; Loamy, mixed, superactive, mesic Lithic Dystrudepts	Well drained soils formed in a thin mantle of till. They are shallow to bedrock (<20 inches). They are nearly level on the northeastern portion of the site and slope downwards towards Pillsbury and Hardy Roads. Series has inclusion of up to 5% rock outcrops and 15% Charlton series. Saturated hydraulic conductivity is moderately high or high. This soil is on 0-3% slope. Hydrologic Soil Group C.
86B	Hollis; Loamy, mixed, superactive, mesic Lithic Dystrudepts	Well drained soils formed in a thin mantle of till. They are shallow to bedrock (<20 inches). They are nearly level on the northeastern portion of the site and slope downwards towards Pillsbury and Hardy Roads. Series has inclusion of up to 5% rock outcrops and 15% Charlton series. Saturated hydraulic conductivity is moderately high or high. This soil is on 3-8% slope. Hydrologic Soil Group C.
86C	Hollis; Loamy, mixed, superactive, mesic Lithic Dystrudepts	Well drained soils formed in a thin mantle of till. They are shallow to bedrock (<20 inches). They are nearly level on the northeastern portion of the site and slope downwards towards Pillsbury and Hardy Roads. Series has inclusion of up to 5% rock outcrops and 15% Charlton series. Saturated hydraulic conductivity is moderately high or high. This soil is on 8-15% slope. Hydrologic Soil Group C.
62B	Charlton; Coarse- Loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils were observed on the northern portion of the site where depth to ledge exceeded 40 inches. Saturated conductivity is moderately high or high. This soil is on a 3-8% slope. Hydrologic Soil Group B.
62C	Charlton; Coarse- Loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils were observed on the northern portion of the site where depth to ledge exceeded 40 inches. Saturated conductivity is moderately high or high. This soil is on a 8-15% slope. Hydrologic Soil Group B.
62D	Charlton; Coarse- Loamy, mixed, superactive, mesic Typic Dystrudepts	Very deep, well drained soils formed in loamy melt-out till. These soils were observed on the northern portion of the site where depth to ledge exceeded 40 inches. Saturated conductivity is moderately high or high. This soil is on a 15-25% slope. Hydrologic Soil Group B.
178B	Charlton-Chatfield (well drained) complex	Well drained soils formed from melt out till. These soils are moderately deep to deep to bedrock. Depth to bedrock is 20" or greater. This complex is found within the transitional area between Hollis and Charlton on the central portion of the site. Saturated conductivity is moderately high or high. This soil is on 3-8% slope. Hydrological Soil Group B.
178C	Charlton-Chatfield (well drained) complex	Well drained soils formed from melt out till. These soils are moderately deep to deep to bedrock. Depth to bedrock is 20" or greater. This complex is found within the transitional area between Hollis and Charlton on the central portion of the site. Saturated conductivity is moderately high or high. This soil is on 8-15% slope. Hydrological Soil Group B.
184B	Hollis (well drained)-Chatfield (well drained) complex	Well drained soils formed from till. These soils are shallow to moderately deep to bedrock. Depth to bedrock ranges from the 10 to 40". This complex comprises the south and western slopes on the site. Saturated conductivity is moderately high to high. This soil is on a 3-8% slope. Hydrological Soil Group C.
184C	Hollis (well drained)-Chatfield (well drained) complex	Well drained soils formed from till. These soils are shallow to moderately deep to bedrock. Depth to bedrock ranges from the 10 to 40". This complex comprises the south and western slopes on the site. Saturated conductivity

		is moderately high to high. This soil is on a 8-15% slope. Hydrological Soil Group C.
184D	Hollis (well drained)-Chatfield (well drained) complex	Well drained soils formed from till. These soils are shallow to moderately deep to bedrock. Depth to bedrock ranges from the 10 to 40". This complex comprises the south and western slopes on the site. Saturated conductivity is moderately high to high. This soil is on a 15-25% slope. Hydrological Soil Group C.
660B	Bernardston; Coarse-loamy, mixed, active, mesic Oxyqauic Dystrudepts	Very deep, well drained soils formed in till. They are moderately deep to dense till. These soils are located on the southern portion of the site within a wooded area, outside of the historical apple orchard. Densic material is found between 20-65". Saturated hydraulic conductivity is low. This soil is on a 3-8% Slope. Hydrologic Soil Group C.
660C	Bernardston; Coarse-loamy, mixed, active, mesic Oxyqauic Dystrudepts	Very deep, well drained soils formed in till. They are moderately deep to dense till. These soils are located on the southern portion of the site within a wooded area, outside of the historical apple orchard. Densic material is found between 20-65". Saturated hydraulic conductivity is low. This soil is on a 8-15% Slope. Hydrologic Soil Group C.
550B/ccebd	Udorthents; Bedrock substratum	This map unit is characterized by well drained sandy loam soil textures with a depth to bedrock that ranges between 10 to 24 inches. These glacial till soils are located on the graded gravel access road that enters the site from Pillsbury Road on the southern boundary of the site to the center of the site, and within a historical access road that connects to access road on the southwestern corner of the site. Saturated hydraulic conductivity (Ksat) is moderate. This soil is on a 3-8% slopes. Hydrologic Soil Group D.
550C/ccebd	Udorthents; Bedrock substratum	This map unit is characterized by well drained sandy loam soil textures with a depth to bedrock that ranges between 10 to 24 inches. These glacial till soils are located on the graded gravel access road that enters the site from Pillsbury Road on the southern boundary of the site to the center of the site, and within a historical access road that connects to access road on the southwestern corner of the site. Saturated hydraulic conductivity (Ksat) is moderate. This soil is on a 8-15% slopes. Hydrologic Soil Group D.

A

Site Specific Soils Map



Legend

LINETYPES

- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- IMPERVIOUS AREA
- LIMITS OF SITE SPECIFIC SOIL SURVEY

SITE SPECIFIC SOIL MAP UNIT LEGEND

199B/ccbcd - DUMP OF STONES, COBBLES, AND BOULDERS; 3-8% SLOPE

199C/ccbcd - DUMP OF STONES, COBBLES, AND BOULDERS; 8-15% SLOPE

199D/ccbcd - DUMP OF STONES, COBBLES, AND BOULDERS; 15-25% SLOPE

199B/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 3-8% SLOPE

199C/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 8-15% SLOPE

199D/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 15-25% SLOPE

199E/ccebd - STOCKPILING OF SOILS, STONES, AND MATERIALS FROM ROAD; 25-50% SLOPE

86A - HOLLIS; 0-3% SLOPE

86B - HOLLIS; 3-8% SLOPE

86C - HOLLIS; 8-15% SLOPE

62A - CHARLTON; 0-3% SLOPE

62B - CHARLTON; 3-8% SLOPE

62C - CHARLTON; 8-15% SLOPE

178B - CHARLTON-CHATFIELD; 3-8% SLOPE

178C - CHARLTON-CHATFIELD; 8-15% SLOPE

184A - HOLLIS-CHATFIELD; 0-3% SLOPE

184B - HOLLIS-CHATFIELD; 3-8% SLOPE

184C - HOLLIS-CHATFIELD; 8-15% SLOPE

184D - HOLLIS-CHATFIELD; 15-25% SLOPE

660B - BERNARDSTON; 3-8% SLOPE

660C - BERNARDSTON; 8-15% SLOPE

550B/ccebd - UDORTHENTS; BEDROCK SUBSTRATUM; 3-8% SLOPE

550C/ccebd - UDORTHENTS; BEDROCK SUBSTRATUM; 8-15% SLOPE

NOTES:

1. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR PROVIDING SOILS INFORMATION FOR DEVELOPMENT OF THE PROPERTY. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST SHERRIE TREFRY CSS#93, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE.
2. THIS DETAILED SITE-SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE SPECIFIC SOIL MAPPING FOR NH AND VT."
3. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A:17 AND NHDES ENV-WQ 1500, ALTERATION OF TERRAIN.
4. SEE ACCOMPANYING NARRATIVE REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS.

NOTE:

THE SITE SPECIFIC SOIL SURVEY FOR THIS STUDY AREA WAS CONDUCTED BY SHERRIE TREFRY (NH CERTIFIED SOIL SCIENTIST #0093) OF VHB ON OCTOBER 25, 2025.

vhb

Existing Color Coded Soil Map
44 Pillsbury Road
Londonderry, New Hampshire

January 2025

B

Official Soil Series Descriptions

LOCATION HOLLIS CT+MA NH NJ NY

Established Series
Rev. MFF-SMF-SJM-DCP
05/2016

HOLLIS SERIES

The Hollis series consists of well drained and somewhat excessively drained soils formed in a thin mantle of till. They are shallow to bedrock. They are nearly level to very steep upland soils on bedrock-controlled hills and ridges. Slope ranges from 0 through 60 percent. Saturated hydraulic conductivity is moderately high or high. Depth to hard bedrock ranges from 25 to 50 cm. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Loamy, mixed, superactive, mesic Lithic Dystrudepts

TYPICAL PEDON: Hollis gravelly fine sandy loam, 3 to 15 percent slopes, forested. (Colors are for moist soil.)

Oi--0 to 3 cm; slightly decomposed plant material.

Oa--3 to 5 cm; black (10YR 2/1) highly decomposed plant material; moderate fine granular structure; very friable; many fine and very fine roots; abrupt smooth boundary. (Combined thickness of the O horizons is 0 to 10 cm.)

A--5 to 18 cm; very dark grayish brown (10YR 3/2) gravelly fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common fine, very fine, medium, and coarse roots; 10 percent gravel, 5 percent channers; very strongly acid; clear smooth boundary. (3 to 15 cm thick)

Bw1--18 to 25 cm; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots, common medium roots; 10 percent gravel, 10 percent channers; strongly acid; clear wavy boundary.

Bw2--25 to 41 cm; yellowish brown (10YR 5/6) gravelly fine sandy loam; moderate medium and coarse subangular blocky structure; friable; few fine and very fine roots, common medium roots; 10 percent gravel, 5 percent channers; strongly acid; abrupt smooth boundary. (Combined thickness of the Bw horizons is 18 to 48 cm.)

2R--41 cm; schist bedrock.

TYPE LOCATION: Middlesex County, Connecticut, town of East Hampton, 1000 feet due west of Connecticut Route 196 and 3200 feet due north of Connecticut Route 151; USGS Moodus, CT topographic quadrangle, Latitude 41 degrees 31, minutes 28, seconds N., Longitude 72 degrees, 29 minutes, 48 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the solum and depth to bedrock range from 25 to 50 cm. Rock fragments commonly range from 5 through 35 percent by volume, but some pedons have less than 5 percent rock fragments. The fragments are mostly subrounded gravel, except where the surface is stony. The soil has 20 percent or more silt in the particle-size control section. Unless limed, reaction ranges from extremely acid through moderately acid in the organic horizons and very strongly acid through moderately acid in the mineral horizons.

The O horizon, where present, ranges from slightly decomposed to highly decomposed plant material.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction. Consistence is friable or very friable.

Some pedons have a BA horizon with colors similar to the A horizon and other properties similar to the Bw horizon.

The Bw horizon commonly has hue of 10YR or 2.5Y, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, value of 4 or 5, and chroma of 4 through 8. It is sandy loam, fine sandy loam, or loam in the fine-earth fraction. The Bw horizon has granular or subangular blocky structure. Consistence is friable or very friable.

Some pedons have a thin BC or C horizon with color like the Bw horizon, except it includes hue of 5Y. Texture, structure, and consistence are similar to the Bw horizon.

Some pedons have a thin 2Cr horizon that is typically weathered schist and moderately cemented.

COMPETING SERIES: This is the Holyoke series. Holyoke soils formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale, and typically overly basalt, red sandstone, conglomerate, or shale bedrock.

The Cleveland, Kearsarge, and Brimfield series are in closely related families. Cleveland soils have less than 20 percent silt in the particle-size control section and lack a 2R horizon. Kearsarge soils lack a 2R horizon and have rock fragments of phyllite, slate, or schist. Brimfield soils formed in parent materials derived from sulfur bearing schist and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron of less than 0.15. They have pedogenic iron contents of greater than 1 percent throughout the pedon.

GEOGRAPHIC SETTING: Hollis soils are nearly level to very steep soils on bedrock controlled hills, modified by glacial processes. Slope ranges from 0 to 60 percent. The soils formed in a thin mantle of till derived from local bedrock of schist, granite, and gneiss. Mean annual temperature ranges from 7 to 13 degrees C and mean annual precipitation ranges from 910 to 1295 mm, but the range includes as low as 660 mm in some places east of Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 through 185 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brimfield, Acton, Broadbrook, Brookfield, Canton, Charlton, Chatfield, Essex, Gloucester, Hibernia, Leicester, Montauk, Narragansett, Paxton, Rainbow, Ridgebury, Rockaway, Scituate, Sutton, Wapping, Whitman, and Woodbridge soils on nearby landscapes. All are very deep upland soils formed in till except for the

Brimfield and Chatfield soils. Acton, Rainbow, Rockaway, Scituate, Sutton, Wapping, and Woodbridge soils are moderately well drained. The Broadbrook, Brookfield, Canton, Charlton, Essex, Montauk, Narragansett, and Paxton soils are well drained. Chatfield soils have bedrock within a depth of 50 to 100 cm. Gloucester soils are somewhat excessively drained. Hibernia, Leicester, and Ridgebury soils are somewhat poorly drained or poorly drained soils in drainageways or low lying areas.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained and somewhat excessively drained. Surface runoff is negligible to very high. Saturated hydraulic conductivity is moderately high or high.

USE AND VEGETATION: Mostly forested. Small areas with few rock outcrops are cleared of stones and used for cultivated crops, but most cleared areas are in hay or pasture. Scattered areas are used for community development. Common trees are northern red, white, black, and chestnut oak, hickory, eastern white pine, eastern hemlock, and gray and black birch.

DISTRIBUTION AND EXTENT: Glaciated uplands in Connecticut, Massachusetts, New Jersey, New Hampshire, and eastern New York. MLRAs 101, 142, 144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Nashua Area, New Hampshire, 1909.

REMARKS: Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 18 cm (O and A horizons).
2. Cambic horizon - the zone from 18 to 41 cm (Bw1 and Bw2 horizons).
3. Lithic contact - hard bedrock at 41 cm (2R horizon).
4. Particle-size control section - the zone from 30 to 41 cm.
5. Loamy (coarse-loamy) particle-size class - the control section from 30 to 41 cm averages less than 35 percent clay in fine-earth fraction and the soil is in a Lithic subgroup.
6. Lithologic discontinuity - till with rock fragments from mixed sources overlying single kind of hard bedrock at 41 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for sample no.1999CT005001, 2000CT007004, S2002CT005001, S2002CT005004, S2002CT005005, S2002CT005006, S1998NY061001, S2000NY119001. Partial characterization data for sample no. S99NY061003 and S99NY061003A-3D. Analyzed by the NSSL, Lincoln, NE.

LOCATION CHATFIELD NH+CT MA NJ NY

Established Series
Rev. LWK-ERS-JTI
04/2017

CHATFIELD SERIES

The Chatfield series consists of well drained soils formed in loamy melt-out till. They are moderately deep to bedrock. They are nearly level to very steep soils on bedrock-controlled hills and ridges. Slope ranges from 0 to 70 percent. Crystalline bedrock is at depths of 50 to 100 cm. Saturated hydraulic conductivity is moderately high or high in the mineral soil. Mean annual temperature is about 9 degrees C, and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Chatfield fine sandy loam, on a 13 percent slope in a wooded area. (Colors are for moist soil unless otherwise noted).

Oi -- 0 to 3 cm, slightly decomposed leaf, needle, and twig litter; extremely acid, pH 4.2. (0 to 15 cm thick.)

A -- 3 to 5 cm, very dark gray (10YR 3/1) fine sandy loam, gray (10YR 5/1), dry; weak fine subangular blocky structure; friable; many fine and medium roots throughout; 5 percent mixed gravel and cobbles; very strongly acid, pH 4.5; abrupt smooth boundary. (1 to 25 cm thick.)

Bw1-- 5 to 33 cm, strong brown (7.5YR 5/6) gravelly fine sandy loam; weak fine subangular blocky structure; friable; common fine roots throughout and common medium roots throughout; 15 percent mixed gravel and cobbles; very strongly acid, pH 4.5; abrupt wavy boundary.

Bw2 -- 33 to 76 cm, strong brown (7.5YR 5/6) gravelly fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots throughout; 20 percent mixed rock fragments; very strongly acid, pH 4.5; abrupt irregular boundary. (Combined thickness of the Bw horizons is 10 to 80 cm.)

2R -- 76 cm; fractured slightly-weathered schist bedrock.

TYPE LOCATION: Merrimack County, New Hampshire; Town of Epsom, 450 feet north-northwest from point 3,550 feet southwest along Old Mountain Road from intersection of Mountain Road and Tarlton Road. USGS Gossville, NH topographic quadrangle; Latitude 43 degrees, 11 minutes, 55.79 seconds N. and Longitude 71 degrees, 19 minutes, 22.31 seconds W., WGS 1984.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 40 to 97 cm. Depth to bedrock ranges from 50 to 100 cm from the mineral soil surface. Rock fragments range from 5 to 50 percent by volume in the A horizon and from 5 to 35 percent in the B and C horizons. Rock fragments are

typically gravel or channers, but include cobbles, stones, boulders and flagstones, particularly just above the bedrock.

The O horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 0 to 2. It is slightly, intermediately, and/or highly decomposed plant material. Reaction ranges from extremely acid to moderately acid.

The A, or Ap horizon where present, has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 4. Dry value is 6 or higher. Texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction. Structure is granular. Consistence is friable or very friable. Reaction ranges from extremely acid to moderately acid, unless limed.

The AB or BA horizon, where present, has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. Texture is similar to the A horizon.

The Bw horizon commonly has hue of 10YR or 2.5Y, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, value of 3 to 6, and chroma of 4 to 6. Texture is similar to the A horizon. The Bw horizon has subangular blocky or granular structure and is friable or very friable. Reaction ranges from very strongly acid to moderately acid.

Some pedons have a BC horizon with color and texture similar to the C horizon.

The C horizon, where present, has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4, and the 7.5YR hue is limited to horizons having a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (> 0.15). Texture is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction and may have lenses or pockets of loamy sand. It is massive and may have plate-like divisions. It is friable or firm. Reaction ranges from very strongly through moderately acid.

The 2R horizon is dominantly schist, granite, or gneiss bedrock. In places it is massive, but it dominantly has vertical and horizontal fractures in the upper 30 to 76 cm.

COMPETING SERIES: These are the Chadakoin, Charlton, Maplecrest, Riverhead, Stinger, and Valois series. Chadakoin, Maplecrest, and Valois soils formed in till derived primary from sedimentary rock parent materials and are greater than 100 cm to bedrock. Charlton soils formed in similar parent material to that of Chatfield but are greater than 150 cm to bedrock. Riverhead soils formed in glacial outwash deposits and are greater than 100 cm to bedrock. Stinger soils are not from Region R and have a paralithic contact.

GEOGRAPHIC SETTING: Chatfield soils are nearly level through very steep, and are on bedrock-controlled glaciated upland landscapes. The soils formed in a moderately thick mantle of melt-out till overlying granite, gneiss, or schist bedrock. Slope ranges from 0 to 70 percent. Mean annual precipitation ranges from 660 to 1270 mm, mean annual temperature ranges from 7 to 13 degrees C, and the frost free season ranges from 130 to 180 days. Elevation ranges from 0 to 305 meters above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brimfield, Brookfield, Cardigan, Charlton, Hollis, Narragansett, Nipmuck, and Paxton soils and their wetter associates on nearby

landscapes where the soil mantle is deeper than 100 cm. Brimfield, Brookfield and Nipmuck soils formed in sulfur bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Brookfield, Charlton, Narragansett, and Paxton soils are very deep soils. Cardigan soils are moderately deep soils that formed in till derived from phyllite, slate, shale, and schist. Hollis soils are shallow to bedrock and are on nearby ridge crests and areas adjacent to rock outcrops.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Potential for surface runoff ranges from low to high. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Most areas of Chatfield soils are in woodland. Major tree species include white and northern red oaks, sugar maple, beech, eastern hemlock, eastern white pine, eastern red cedar, and shagbark hickory. Some small cleared areas are used for pasture, are idle, or are sites for residential and recreational development.

DISTRIBUTION AND EXTENT: Connecticut, eastern New York, Massachusetts, New Jersey, and New Hampshire. MLRAs 142, 143, 144A and 145. The soils are of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Orange County, New York, 1940.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon - the zone from 0 to 5 cm (Oi and A horizons).
Cambic horizon - the zone from 5 to 76 cm (Bw1 and Bw2 horizons).
Lithic contact - bedrock at 76 cm (2R horizon).
Particle-size control section - the zone from 28 to 76 cm (part of the Bw1 horizon and all of the Bw2 horizon).
Lithologic discontinuity - at a depth of 76 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for pedons with User Pedon IDs of S1955NH015003, S1982CT007005, S1982CT007005, S1982NY061001, S1995NH013003, S1995NJ037003, S1998NY005001, S1999NY005004, S2000NY005002, S2000NY005004, S2000NY005008, S2000NY119002, S2000NY119003, S2002CT005007, and S2002CT005008. Pedons analyzed by the NSSL, Lincoln, NE. The laboratory characterization data for these pedons and similar soils is available through the National Cooperative Soil Survey Soil Characterization Database:
http://ncsslabdatamart.sc.egov.usda.gov/

LOCATION CHARLTON CT+MA NH NY RI

Established Series
Rev. SJM-DCP-SMF
05/2016

CHARLTON SERIES

The Charlton series consists of very deep, well drained soils formed in loamy melt-out till. They are nearly level to very steep soils on moraines, hills, and ridges. Slope ranges from 0 to 60 percent. Saturated hydraulic conductivity is moderately high or high. Mean annual temperature is about 9 degrees C and mean annual precipitation is about 1205 mm.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Dystrudepts

TYPICAL PEDON: Charlton fine sandy loam - forested, very stony, at an elevation of about 170 meters. (Colors are for moist soil unless otherwise noted.)

Oe -- 0 to 4 cm; black (10YR 2/1) moderately decomposed forest plant material. (0 to 5 cm thick.)

A -- 4 to 10 cm; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; 5 percent gravel; very strongly acid; abrupt smooth boundary. (2 to 15 cm thick.)

Bw1 -- 10 to 18 cm; brown (7.5YR 4/4) fine sandy loam; weak coarse granular structure; very friable; many fine and medium roots; 5 percent gravel; very strongly acid; clear wavy boundary.

Bw2 -- 18 to 48 cm; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 10 percent gravel and cobbles; very strongly acid; clear wavy boundary.

Bw3 -- 48 to 69 cm; light olive brown (2.5Y 5/4) gravelly fine sandy loam; massive; very friable; few medium roots; 15 percent gravel and cobbles; very strongly acid; abrupt wavy boundary. (Combined thickness of the Bw horizons is 35 to 91 cm.)

C -- 69 to 165 cm; grayish brown (2.5Y 5/2) gravelly fine sandy loam with thin lenses of loamy sand; massive; friable, some lenses firm; few medium roots; 25 percent gravel and cobbles; strongly acid.

TYPE LOCATION: New Haven County, Connecticut; town of Middlebury, 3800 feet along Long Meadow Road from the intersection with South Street, 450 feet southeast along a gravel road and 50 feet west of the gravel road, 400 feet northeast of Long Meadow Pond, in a wooded area. USGS Naugatuck topographic quadrangle, Latitude 41 degrees 29 minutes 48.40 seconds N., Longitude 73 degrees 7 minutes 04.59 seconds W., NAD 1983.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 31 to 109 cm. Depth to bedrock is commonly more than 180 cm. Rock fragments range from 5 to 35 percent by volume to a depth of 100 cm and up to 50 percent below 100 cm. Except where the surface layer is stony, the fragments are mostly subrounded gravel and typically make up 60 percent or more of the total rock fragments. Unless limed, reaction ranges from extremely acid to moderately acid.

The O horizon, where present, ranges from slightly decomposed to highly decomposed plant material.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. Disturbed pedons have an Ap horizon with value of 3 or 4 and chroma of 2 to 4. The A or Ap horizon is sandy loam, fine sandy loam, or loam in the fine-earth fraction. It has weak or moderate granular structure and is friable or very friable.

Some pedons have a thin AE or E horizon below the O horizon or a thin E horizon below the A horizon. It has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. Texture, structure, and consistence are like the A horizon.

The upper part of the Bw horizon has commonly hue of 7.5YR or 10YR, and includes 7.5YR when a high ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron (greater than 0.15) exists, and value and chroma of 4 to 6. The lower part of the Bw horizon has hue of 10YR or 2.5Y and value and chroma of 4 to 6. Texture of the Bw horizon is loam, fine sandy loam, or sandy loam with less than 65 percent silt plus very fine sand in the fine earth fraction. It has weak granular or subangular blocky structure. Consistence is friable or very friable.

Some pedons have a BC horizon with value and chroma like the lower part of the Bw horizon, but includes hue of 5Y. The BC horizon commonly has texture, structure, and consistence like the Bw horizon but the range includes geologically derived structure appearing in the form of thin plates.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. Texture is loam, fine sandy loam, or sandy loam in the fine-earth fraction, with pockets or thin lenses of loamy sand. The horizon is massive or has plates of geogenic origin. Consistence commonly is very friable or friable but in some pedons includes firm.

COMPETING SERIES: These are Chadakoin, Chatfield, Maplecrest, Riverhead, Stinger and Valois. Chadakoin and Valois soils formed in till derived primary from sedimentary rock parent materials. Chatfield soils have a lithic contact at 50 to 100 cm below the mineral soil surface. Maplecrest soils formed in till derived from red sedimentary rock parent materials. Riverhead soils formed in glacial outwash deposits and have sandy textures in the substratum. Stinger soils are moderately deep to a paralithic contact and formed in colluvium on mountain side slopes in Oregon.

GEOGRAPHIC SETTING: Charlton soils are nearly level to very steep soils on moraines and glaciated upland hills and ridges. Slope ranges from 0 to 60 percent. The soils formed in acid melt-out till derived mainly from schist, gneiss, or granite. Mean annual temperature ranges from 7 to 11 degrees C and mean annual precipitation commonly ranges from 940 to 1245 cm, but the range includes as low as 660 cm in some places east of the Adirondack Mountains in the Champlain Valley of New York. The growing season ranges from 115 to 185 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Acton, Brookfield, Chatfield, Essex, Hollis, Leicester, Rainbow, Ridgebury, Sutton, Wapping, Whitman, and Woodbridge soils on nearby landscapes. The moderately well drained Sutton and the poorly drained Leicester soils are associated in a drainage sequence. Acton and Wapping soils are moderately well drained. Brookfield soils formed in iron sulfide bearing parent materials and have a ratio of ammonium oxalate extractable iron to dithionite-citrate extractable iron less than 0.15 and have pedogenic iron contents greater than 1 percent throughout the pedon. Chatfield soils have bedrock within a depth of 50 to 100 cm. Essex soils have a sandy particle-size control section and a dense substratum. Hollis soils have bedrock within a depth of 25 to 50 cm. Rainbow and Woodbridge soils are moderately well drained with a dense substratum. Ridgebury soils are poorly drained and have a dense substratum. Whitman soils are very poorly drained with a dense substratum.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Well drained. Runoff is negligible to medium. Saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Areas cleared of stones are used for cultivated crops, specialty crops, hay, and pasture. Many scattered areas are used for community development. Stony areas are mostly wooded. Common

trees are northern red, white, and black oak, hickory, sugar maple, red maple, black and gray birch, white ash, beech, white pine, and hemlock.

DISTRIBUTION AND EXTENT: Glaciated uplands in Connecticut, Massachusetts, New Hampshire, New York, and Rhode Island. MLRAs 142,144A, and 145. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Worcester County, Massachusetts, 1922.

REMARKS: Diagnostic horizons and features recognized in this pedon include:
1. Ochric epipedon - the zone from 0 to 10 cm (Oe and A horizons).
2. Cambic horizon - the zone from 10 to 69 cm (Bw1, Bw2, and Bw3 horizons).
3. Particle-size class - coarse-loamy in the control section from 29 to 109 cm.

ADDITIONAL DATA: M.S. Thesis work by Shawn McVey, University of Connecticut, 2006. Full characterization data for sample numbers S1999NY005001 and S1999CT013003. Pedons analyzed by the KSSL, Lincoln, NE.

National Cooperative Soil Survey
U.S.A.

LOCATION BERNARDSTON MA+CT NH NY VT

Established Series
Rev. SMF-DAF-MFF
07/2004

BERNARDSTON SERIES

The Bernardston series consists of very deep, well drained soils formed in till derived mainly from dark gray phyllite, slate, or schist. The soils are moderately deep to dense till. They are nearly level to very steep soils on uplands. Saturated hydraulic conductivity is moderately high or high in the solum and low to moderately high in the substratum. Slope ranges from 0 to 50 percent. The mean annual temperature is about 49 degrees F. and the mean annual precipitation is about 45 inches.

TAXONOMIC CLASS: Coarse-loamy, mixed, active, mesic Oxyaquic Dystrudepts

TYPICAL PEDON: Bernardston silt loam, on a 10 percent slope in a cultivated field. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; very friable; 5 percent phyllite channers; many fine roots; strongly acid; abrupt smooth boundary. (5 to l0 inches thick)

Bw1--6 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; 10 percent phyllite channers; many fine roots; strongly acid; gradual smooth boundary.

Bw2--10 to 20 inches; olive brown (2.5Y 4/4) channery silt loam; weak fine granular structure; very friable; common fine roots; 15 percent phyllite channers; strongly acid; abrupt wavy boundary. (Combined thickness of the Bw horizons is 7 to 25 inches.)

Cd1--20 to 36 inches; olive gray (5Y 4/2) channery silt loam; weak medium platy structure; very firm; few roots in upper part; few to common fine discontinuous vesicular pores; thin discontinuous films in pores; 25 percent phyllite and slate channers; strongly acid; gradual smooth boundary. (10 to 25 inches thick)

Cd2--36 to 65 inches; olive gray (5Y 4/2) channery silt loam; weak medium platy structure; firm; 30 percent phyllite and slate channers; strongly acid.

TYPE LOCATION: Franklin County, Massachusetts; town of Bernardston, 100 feet west of U.S. Route 5 at a point 0.4 miles north of the intersection of U.S. Route 5 and Massachusetts Route 10. Bernardston 7 1/2 minute quadrangle; latitude 42 degrees 40 minutes 38 seconds North and longitude 72 degrees 33 minutes 10 seconds West, NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness commonly ranges from 20 to 30 inches and generally is the same as the depth to the dense substratum. The solum is silt loam, loam, or very fine sandy loam in the fine-earth fraction with more than 65 percent silt plus very fine sand. The volume of rock fragments larger than 3 inches ranges from 0 to 25 percent in the A horizon and 0 to 10 percent in the B and C horizons. Rock fragments smaller than 3 inches range from 5 to 25 percent in the A and B

horizons, and 5 to 35 percent in the C horizon. The soil ranges from very strongly acid to moderately acid except where limed.

Some pedons have an O horizon 1 to 4 inches thick.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. The A horizon has weak or moderate, fine or medium granular structure and friable or very friable consistence.

Some pedons have an E horizon 1 to 3 inches thick that has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 0 to 2.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 6. Hue of 7.5YR is restricted to the upper part of the Bw horizon. The Bw horizon has weak or moderate, fine or medium granular structure or weak, fine or medium subangular blocky structure and very friable or friable consistence.

Some pedons have a BC horizon with characteristics similar to the lower part of the Bw.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 2 to 4. It has weak or moderate, medium platy structure or it is massive. Fine-earth texture is silt loam, loam, or very fine sandy loam. It is firm or very firm.

COMPETING SERIES: Amostown, Broadbrook, Horseneck (tentative), Nantucket, Paxton, Scituate, and Wethersfield soils are in the same family. Amostown soils are underlain by stratified very fine sand or silt within a depth of 40 inches. Broadbrook soils have a lithologic discontinuity at the top of the substratum. Horseneck soils do not have dense materials in the substratum. Scituate soils have sandy substrata. Nantucket soils have a lithologic discontinuity and formed in till mixed with Pleistocene Age silts and clays. Paxton soils have less than 65 percent silt plus very fine sand in the solum. Wethersfield soils have hues of 2.5YR or 5YR in the B horizon.

GEOGRAPHIC SETTING: Bernardston soils are nearly level to very steep and are on glaciated uplands and drumlins. Slope is commonly 8 to 25 percent, but ranges from 0 to 50 percent. The soils formed in acid, dense till derived mainly from dark gray phyllite, shale, slate, and schist. Mean annual temperature ranges from 45 to 52 degrees F. Mean annual precipitation ranges from 40 to 50 inches. The frost-free period ranges from 120 to 180 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Cardigan, Dutchess, Kearsarge, Mansfield, Nassau, Pittstown, Quonset, Stissing, and Warwick soils on nearby landscapes. Kearsarge and Nassau soils have a lithic contact within a depth of 20 inches. The moderately well drained Pittstown, the poorly drained Stissing, and the very poorly drained Mansfield soils are associated in a drainage sequence. Quonset and Warwick soils are on outwash plains, terraces, eskers, and kames.

DRAINAGE AND PERMEABILITY: Well drained. Saturated hydraulic conductivity is moderately high or high in the solum and low to moderately high in the substratum. Runoff is low to high.

USE AND VEGETATION: Mostly woodland. Cleared areas are used mainly for growing hay, pasture, silage, corn, and apples. Common trees in woodlots include sugar maple, beech, white birch, white pine, red maple, northern red oak, white oak, and hemlock.

DISTRIBUTION AND EXTENT: Glacial uplands in Connecticut, Massachusetts, New Hampshire, Vermont, and eastern New York (MLRAs 142, 144A, 144B, and 145). The series is of moderate extent, about 20,000 acres.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Connecticut Valley Area, Connecticut-Massachusetts, 1903.

REMARKS: Cation exchange activity class was determined from a review of available data and similar soils.

The Second Edition of the Keys to Soil Taxonomy, Agricultural Handbook 436 (1999) distinguishes a shallow soil depth class family based upon the presence of a densic contact at a depth less than 50 cm. from the mineral soil surface. Soils correlated and/or published as the Bernardston series prior to 1996 may have included what would now be classified as a shallow family of Oxyaquic Dystrudepts. These soils are of minor extent throughout the range of the Bernardston series.

Diagnostic horizons and features recognized in this pedon include:

1. Ochric epipedon - from 0 to 6 inches (Ap horizon).
2. Cambic horizon - from 6 to 20 inches (Bw horizons).
3. Densic material - unaltered very firm and firm basal till at a depth of 20 to 65 inches (Cd horizon).
4. Oxyaquic feature - based upon saturation in one or more layers within 100 cm of the mineral soil surface, for one month or more per year, in 6 out of 10 years. A perched water table is at 18 to 24 inches February to April.

ADDITIONAL DATA: Full characterization data for samples S93MA011005, S78NH005024, S77NH019001, and S68VT021005. Analyzed by the National Soil Survey Laboratory, Lincoln, NE.

National Cooperative Soil Survey
U.S.A.

C

Disturbed Soils Legend and Disturbed Soil Modifiers

Disturbed Map Units

This edition of the New Hampshire State-Wide Numerical Soil Legend contains eleven distinct map units used for identifying areas of soils altered or disturbed by human influence and the addition of one naturally formed map unit. These map units were designed for the Order 2 and Order 3 levels of mapping intensity, but can be used in Order 1 mapping if appropriate.

The definition of disturbed map units is intentionally brief and vague. Classification at the Great Group level allows for a wide range in soil properties and behavioral characteristics. The variability in soil properties typically requires on-site investigations before any interpretation can be developed. The map unit descriptions are intended to provide guidance in differentiating map units. The author of the soil map is expected to provide additional information to reflect the nature of the disturbed areas within the survey area.

I. Excavated land

300 Udipsamments

This map unit is characterized by soil textures of loamy fine sand to sand and gravel throughout the entire particle-size class control section (25 - 100 cm or 10 - 40 inches). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from excessively drained to well drained. The Hydrologic Soil Group (HSG) is A. Typical sand pit.

350 Udipsamments, wet substratum

This map unit is characterized by soil textures of loamy fine sand to sand and gravel throughout the entire particle-size class control section (25 - 100 cm or 10 - 40 inches). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from moderately well drained to somewhat poorly drained.

400 Udorthents, sandy or gravelly

This map unit typically includes the following concepts: 1) very gravelly (> 35%) sand or very gravelly loamy sand; Or 2) sand or loamy sand textures that may have lenses of loamy very fine sand or finer somewhere in the particle-size class control section (25 - 100 cm or 10 - 40"). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class ranges from excessively drained to somewhat poorly drained. Typical gravel pit.

Disturbed Map Units (continued)

500 Udorthents, loamy

This map unit is characterized typically by soil textures that are sandy loam, loam, or silt loam within the particle size control section (25 – 100cm or 10 – 40”). Saturated hydraulic conductivity (K_{sat}) is low through high. Drainage class ranges from well drained to somewhat poorly drained. These areas typically represent excavated glacial till or perhaps areas where sand and gravel was excavated down to the loamy underlying material.

550 Udorthents, Bedrock substratum

This map unit is characterized by soil textures of sandy loam, loam, or silt loam within the particle-size class control section (25 - 100 cm or 10 - 40 inches). These areas typically represent excavated soil materials where the range in depth to bedrock is 10 - 60 inches (25 - 152 cm). Saturated hydraulic conductivity (K_{sat}) is low through high. Drainage class ranges from somewhat excessively drained to somewhat poorly drained.

600 Endoaquents, loamy

This map unit represents areas where soil material was excavated down to, or near the water table. Soil material is typically sandy loam, loam or silt loam within the particle-size class control section (25 - 100 cm or 10 - 40 inches). Saturated hydraulic conductivity (K_{sat}) is low through high. Drainage class is poorly or very poorly drained. The Hydrologic Soil Group (HSG) is D.

900 Endoaquents, sandy or gravelly

This map unit represents areas where soil material was excavated down to / near the water table. This map unit is characterized typically by soil textures of: 1) very gravelly (> 35% gravel) sand or very gravelly loamy sand or; 2) sand or loamy sand textures that may have lenses of loamy very fine sand or finer somewhere in the particle-size class control section (25 - 100 cm or 10 - 40"). Saturated hydraulic conductivity (K_{sat}) is high or very high. Drainage class is poorly or very poorly drained. The Hydrologic Soil Group (HSG) is D. Typical gravel pit dug down to or close to the water table.

Disturbed Map Units (continued)

II. Filled land

100 Udorthents, wet substratum

This map unit represents areas that have been filled and leveled over what were originally hydric soils.

199 Dumps, bark chips, and organic material

This map unit consists of man-made deposits of bark, wood chips, sawdust, paper mill sludge, cinders, waste paper, ashes, and other similar refuse from the operation of paper mills and sawmills.

200 Udorthents, refuse substratum

This map unit represents alternating layers of soil and refuse such as in sanitary landfills. Closed landfills typically have 2 feet of loamy material capping the area.

299 Udorthents, smoothed

This map unit represents areas that have been cut and filled to create a large level or nearly level area. Soil material making up the map units typically came from the immediate area. School athletic fields are an example (unless they were created on hydric soils – see Map Unit 100).

III. Bottom Land

7 Fluvaquents

This map unit represents areas of various kinds of soil materials on the bottom lands of streams and rivers. The soil material ranges in texture from silt loam to sand and gravel within the particle-size class control section (25 - 100 cm or 10 - 40 inches). Drainage class is poorly or very poorly drained. The Hydrologic Soil Group (HSG) is D.

Disturbed Map Units (continued)

Catena Key for Excavated & Bottom Land

Disturbed Map Units	Map Unit						
	Drainage Class						
Parent Material	Excessively Drained	Somewhat Excessively Drained	Well Drained	Moderately Well Drained	Somewhat Poorly Drained	Poorly Drained	Very Poorly Drained
I. Excavated Land							
Typically sands	**300** Udipsamments nearly level	**300** Udipsamments nearly level	**300** Udipsamment nearly level	**350** Udipsamments wet substratum	**350** Udipsamments wet substratum	**900** Endoaquents sandy or gravelly	**900** Endoaquents, sandy or gravelly
Typically gravels	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**400** Udorthents, sandy or gravelly	**900** Endoaquents sandy or gravelly	**900** Endoaquent, sandy or gravelly
Typically loams			**500** Udorthents, loamy	**500** Udorthents, loamy	**500** Udorthents, loamy	**600** Endoaquents loamy	**600** Endoaquent, loamy
Bedrock controlled loams		**550** Udorthents, Bedrock substratum	**550** Udorthents, Bedrock substratum	**550** Udorthents, Bedrock substratum	**550** Udorthents, Bedrock substratum	**600** Endoaquents loamy	**600** Endoaquent, loamy
III. Bottom Land							
Typically silt loam to sands and gravels						**7** Fluvaquents	**7** Fluvaquents

NOTE: Filled soils in Section II page 21 are too variable to place into the above key.

Disturbed Map Unit (Anthropogenic Soils) Supplement for New Hampshire DES AoT Site-Specific Soil Maps

Introduction

The NRCS NH State-Wide Legend, as amended, contains a number of distinct map units used for identifying areas of soils altered or disturbed by human influence. However, in preparing the required Site-Specific Soil Maps for compliance with NH Department of Environmental Services Alteration of Terrain (AoT) rules, additional information is often needed and desired. This supplement provides a means to supply the user a more detailed soil mapping unit description to meet this need.

Purpose

The purpose of the following map units is to provide Soil Scientists with additional soil mapping tools for disturbed sites (Anthropogenic soils). These map units are intended to enhance Site-Specific Soil Maps and interpretations, reflecting requirements under NHDES, Alteration of Terrain (AoT) regulations (Env-Wq 1500). This supplement allows for the creation of soil maps with mapping units that can be expanded beyond those listed in the USDA, NRCS NH State-Wide Numerical Legend and the standards of the National Cooperative Soil Survey.

Note that the disturbed soil supplement has been created by SSSNNE and is not a product of the NRCS or the National Cooperative Soil Survey. This supplemental legend can only be used in conjunction with the Site-Specific Soil Mapping standards and cannot be used to create a stand-alone soils map.

For the purposes of this supplement, the definition of disturbed soil, includes: areas where the natural soils have been partially removed and areas where human-transported soil material (HTM) has been placed on top of a native soil, other disturbed soil or bedrock, as defined by RSA 485-A: 6, VIII; RSA 485-A: 17, and NHDES Env-Wq 1500, etc.

Map Notation

Notation on the Site-Specific Soil Map completed to comply with the NH AoT rules should include the following disclaimer:

1. ***This detailed Site-Specific Soil Map conforms to the standards of SSSNNE Publication No. 3, as amended, "Site-Specific Soil Mapping Standards for NH and VT".***

2. ***This map has been prepared to comply with soil mapping requirements of RSA 485 A: 17and NHDES Env-Wq 1500, Alteration of Terrain.***

3. ***See accompanying narrative report for methodology, map symbol legend, and interpretations.***

4. ***Use of the map symbol denominators for disturbed or altered soils, is at the discretion of the Certified Soil Scientist.***

Map Symbol Denominators for Disturbed or Altered Soil Map Units

The map symbols for Site-Specific Soil Mapping of disturbed or altered soils in New Hampshire is a two-part symbol with parts separated by a forward slash (***/***).

The first part consists of the USDA-NRCS Disturbed Map Unit symbol from the NH State-Wide Numerical Soil Legend. The map symbol is composed of 1 to 3 digits followed by a capital letter designating slope.

The second part consists of symbols of the SSSNNE NH Disturbed or Altered Soil Supplement to the Site-Specific Soil Survey Standards, as detailed below. The disturbed map symbol is composed of 5 lower case letters.

A Site-Specific Map symbol for a map prepared for an AoT application would be formatted as follows: ***400A/aaaaa***

These New Hampshire Disturbed Soil Supplemental symbols can only be used in conjunction with the USDA-NRCS Disturbed Map Unit symbols for the NH Statewide Numerical Soil Legend.

Supplemental Symbols

Supplemental symbols may be used at the discretion of the Certified Soil Scientist who creates the Site-Specific Soil Survey. The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

Symbol 1: Drainage Class
a -Excessively 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 wetlands
i- Organic Materials-Tidal wetlands

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 hard pan, 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 layers, see “Soil Manual for Site evaluations in NH” 2 Ed., (page 3-17, figure 3-14)
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 limiting 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 surface impervious/restrictive layers

Appendix E: Inspection and Maintenance Manual

Rosecrans Drive at Thornton Hill

44 Pillsbury Road, Londonderry, NH

PREPARED FOR

The Procopio Companies
35 Village Road, 7th, Floor (702)
Middleton, MA 01949

PREPARED BY

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

October 27, 2025

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Introduction

VHB has prepared the following Stormwater Management System Inspection & Maintenance Manual for the residential project located at 44 Pillsbury Road, Londonderry, New Hampshire. The intent of this plan is to provide the applicant/owner with a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this development.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. By following the enclosed procedures, the applicant will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Responsible Party

The oversight of the inspection and maintenance program will be provided by:

Will Nuccio
Procopio Enterprises, LLC
35 Village Road, 7th Floor (702)
Middleton, MA 01949
(617) 594-5945
droache@procopiocompanies.com

Stormwater Management System Components

The Stormwater Management System is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

Non-Structural BMPs

Non-structural best management practices (BMPs) are designed to minimize and/or remove contaminants before they enter the stormwater collection system. Several of these BMPs have been incorporated into the Stormwater Management System,

including reduced use of road deicing agents, and litter/trash removal. These types of BMPs are a highly effective initial treatment measure for reducing stormwater pollutant loading.

Structural BMPs

Structural BMPs have been incorporated into the overall stormwater management plan. Structural BMPs include deep sump catch basins, sand filters, and detention basins.

Inspection & Maintenance Plan

By implementing the following procedures, the applicant will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

Source Control

- Routinely empty all outside waste receptacles provided for public use.
- Clearing litter from the parking area, islands, and perimeter landscape areas.

Vegetated Areas Maintenance

Although not a specific component of the drainage system, the maintenance of vegetated areas may affect the functioning of stormwater management practices. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

- Inspect planted areas on a semi-annual basis and remove any litter.
- Maintain planted areas adjacent to pavement to prevent soil washout.
- Immediately clean any soil deposited on pavement.
- Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative mixture of grass species in the event of unsuccessful establishment.
- The grass vegetation should be cut to a height between three and four inches.

- Pesticide/Herbicide Usage – No pesticides are to be used unless a single spot treatment is required for a specific control application.
- Fertilizer usage should be avoided. If deemed necessary, slow-release fertilizer should be used. Fertilizer may be used to begin the establishment of vegetation in bare or damaged areas but should not be applied on a regular basis unless necessary.

Deicing Agents

Deicing agents should be used in accordance with the following:

- Use sand as the primary agent for parking lot safety during ice and snow conditions.
- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Maintain a Deicing Log to track the amount and type of deicing materials applied to the site.
- Deicing operations should be conducted in accordance with the Salt Minimization Plan for the Project.

Snow Management

Snow storage areas shall be maintained as follows:

- Snow storage areas will be managed to prevent blockage of storm drain catch basins. Snow combined with sand and debris may block a storm drainage system, diminishing the infiltration capacity of the system and causing localized flooding.
- Sand and debris deposited on vegetated or paved areas shall be cleared from the site and properly disposed of at the end of the snow season, no later than May 15.
- Snow shall not be dumped into any water body, pond, wetland resource area or stormwater detention basin.
- Snow Management operations should be conducted in accordance with the Salt Minimization Plan for the Project.

Catch Basins

The proposed catch basins are constructed with sumps (minimum 3 feet) to trap debris, sediments, and floating contaminants. Disposal of all sediments must be in accordance with applicable local, state, and federal guidelines.

- Inspect catch basins at least two times per year and clean a minimum of once per year.
- Sediment greater than half the sump depth and/or floatable pollutants shall be pumped from the basin and disposed of at an approved offsite facility in accordance with all applicable regulations.
- Any structural damage or other indication of malfunction will be reported to the site manager and repaired as necessary.
- During colder periods, the catch basin grates must be kept free from snow and ice.
- During warmer periods, the catch basin grates must be kept free of leaves, litter, sand and debris.

Stormwater Outfalls

- Inspect outfall locations monthly for the first three months after construction to ensure proper functioning and correct any areas that have settled or experienced washouts.
- Inspect outfalls annually after initial three-month period.
- Annual inspections should be supplemented after large storms when washouts may occur.
- Maintain/cut vegetation around outfalls to prevent blockages at the outfall.
- Maintain rip-rap pad below each outfall and repair any washouts or other damage immediately.
- Remove and dispose of any trash or debris at the outfall.

Structural Water Quality Devices (Sand Filter)

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7
- Sand filter basins should be inspected after every major storm for the first few months to ensure proper stabilization and function.

- Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Trash and debris should be removed at each inspection.
- Manufactured filter media should be replaced periodically per manufacturer's specifications.
- Deep tilling can be used to break up a clogged surface area.
- At least once annually, system should be inspected for drawdown time. If a filtration system does not drain within 72 hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore filtration function, including but not limited to removal of accumulated sediments or reconstruction of the filter.

Storm Drain Manholes

- Inspect at least once annually for clogging or sediment accumulation and clean as needed to ensure proper stormwater conveyance.

Detention Basins

- Maintenance activities need to comply with laws that protect wildlife, including but not limited to RSA 209:8, RSA 209:9, RSA 209:10, and RSA 212-A:7.
- Vegetation should be inspected at least annually, and maintained in healthy condition, including pruning, removal, and replacement of dead or diseased vegetation, and removal of invasive species.
- Vegetated embankments that serve as "berms" or "dams" that impound water should be mowed on the bottoms, interior and exterior side slopes, and crest at least once annually to prevent establishment of woody vegetation.
- Embankments should be inspected at least annually by a qualified professional for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability. Immediate corrective action should be implemented if any such conditions are found in accordance with Dam Safety Regulations.
- Inlet and outlet pipes, inlet and outlet structures, energy dissipation structures or practices, and other structural accessories should be inspected at least annually by a qualified professional, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- Trash and debris should be removed from basin and any inlet/outlet structures whenever observed by inspection.

- Accumulated sediment should be removed when it significantly affects basin capacity.

Invasive Plant Species Control

- Invasive plant species are alien or non-native plants which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control or food crops; or arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some of these exotic plants become invasive and cause harm by:
  - becoming weedy and overgrown;
  - killing established shade trees;
  - obstructing pipes and drainage systems;
  - forming dense beds in water;
  - lowering water levels in lakes, streams and wetlands;
  - destroying natural communities;
  - promoting erosion on stream banks and hillsides; and
  - resisting control except by hazardous chemical.

- As part of the routine inspections of the drainage system and stormwater outfalls, the site should be checked for the presence of invasive plant species as defined by the New Hampshire Department of Agriculture, Markets & Food (a list is provide at the end of this manual).
- If invasive plant species are found to be present they should be controlled as described in the "Control of Invasive Plants" document prepared by the NH Department of Agriculture, Markets & Food. A copy is provided at the end of this manual.

Record Keeping

- Inspections of the stormwater management system shall be conducted in accordance with the Inspection & Maintenance Checklist provided in this Manual.
- An Inspection & Maintenance Log shall be completed for each inspection and maintenance activity.
- All record keeping required by the I&M manual shall be maintained by the Responsible Party.
- A deicing log shall be maintained that tracks the amount and type of deicing materials applied to the site.

- Any transfer of responsibility for the I&M activities or transfer of ownership shall be documented to the NHDES Water Division in writing.
- Inspection Reports shall be filed with the Town of Londonderry Department of Engineering and Environmental Services on an annual basis.

Inspection & Maintenance Checklist/Log

The following pages contain an Inspection & Maintenance Checklist, a blank copy of the Stormwater Management System's Inspection & Maintenance Log, and a reduced copy of the Grading and Utility Plans. These forms/plans are provided to assist the applicant with the inspection and maintenance of the Stormwater Management System.

Invasive Species Information

A copy of the New Hampshire Department of Agriculture, Markets & Food's document "Control of Invasive Plants" is provided at the end of this manual.

Stormwater Management System

Inspection & Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Source Control	Routinely	Inspect outdoor waste receptacles areas for spillage. Inspect and clear litter from parking area, islands and perimeter landscape areas.	Clean as required.
Deicing Agents	N/A	N/A	Use sand as primary agent for site roadway and parking safety during winter.

Stormwater Management System

Inspection & Maintenance Checklist

Closed Drainage System			
Catch Basins	2 times per year	Check for sediment accumulation. Check for floatable contaminants.	≥ 2 ft. sediment depth. ≥ 3 in. floatable depth.
Storm Drain Manholes	1 time per 2 years	Check for sediment accumulation.	≥ 3 in. sediment depth.
Drainage Pipes	1 time per 2 years	Check for sediment accumulation/clogging.	≥ 2 in. sediment depth.
Detention Basin/Surface Sand Filter	2 times per year	Check for sediment accumulation, clogging, trash and debris.	Clean/repair as needed.
Outlet Control Structure	2 times per year	Check for sediment accumulation/clogging	Clean/repair as needed.
Outfalls	Monthly for first 3 months and 1 time per year thereafter	-Check for sediment, trash and debris accumulation. -Check for vegetation blocking outfall. Inspect rip rap for washout.	Clean/repair as needed.

Stormwater Management System

Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed *(List Items/Comments)*	Date of Cleaning/Repair	Performed By

Inspection & Maintenance Log

Inspection & Maintenance Log

Inspection & Maintenance Log

Inspection & Maintenance Log

Notes:

Stormwater Management System

Deicing Log

Date	Type	Location/Amount	Name(s) of Maintenance Personnel

Appendix F: Salt Minimization Plan

TECHNICAL MANUAL

Salt Minimization Plan

44 Pillsbury Road
Londonderry, NH

PREPARED FOR

PROCOPIO

The Procopio Companies
35 Village Road, 7th Floor (702)
Middleton, MA 01949
781.233.3190

PREPARED BY

2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

October 27, 2025

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Analysis of Alternative De-icing Materials and Site Design Considerations **7**

Appendices

New Hampshire Salt Reduction Best Management Practices

Hydraulic-Run Spreader Calibration

Pony Motor-Run Spreader Calibration

How Salt Works

Anti-Icing

Pre-wetting

Brine Making

Material Storage and Housekeeping

Smart Salting Practices

1

Introduction and Background

The proposed development is within the surface watershed of the Merrimack River. This watershed has been identified by the New Hampshire Department of Environmental Services (NHDES) as being impaired by chlorides. The NHDES has identified the primary source of chlorides as salt used for winter snow and ice management. Nevertheless, snow and ice on roadways, parking lots, and sidewalks create a public safety hazard for users. Thus, the goal of this Salt Minimization Plan is to reduce the amount of chloride entering sensitive environmental areas while maintaining site safety. The best management practices (BMPs) described in this document can generate long-term cost savings via salt purchase decreases, vegetation health improvements, and infrastructure and vehicle corrosion reductions.

2

Project Area Description

The 22.6-acre Site is located along Pillsbury Road in Londonderry, New Hampshire. The Site is presently vacant and was previously occupied by an apple orchard. The proposed development of the site includes the construction of 60 freestanding residential dwelling units, arranged around an internal site drive, Liberty Court. In total, approximately 5.2 acres of new pavement and other impervious surfaces will be added to the site.

3

Responsibility

All property managers of the site should implement and comply with the Salt Minimization Plan, review the success of the Plan, and update the Plan as new requirements, products, and practices are developed. A copy of this plan shall be provided to all personnel who handle snow and ice maintenance within the site.

4

Operational Guidelines

4.1 Winter Operator Certification Requirements

All employed or contracted winter maintenance operators shall be New Hampshire Certified Green SnowPro or equivalent. Green SnowPro training is provided by the University of New Hampshire. It is preferred that operators also have NHDES Salt Applicator Certification. Information on these certifications can be found at the links below:

https://www.des.nh.gov/land/roads/road-salt-reduction

https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification

4.2 Weather Monitoring

Operators providing winter maintenance to the site shall monitor winter storm events using the National Weather Service (www.weather.gov) or other sources that rely on National Weather Service data, like local TV and radio stations and other weather websites and apps. All vehicles that apply de-icing agents shall be equipped with air and ground surface temperature monitors. These temperature monitors shall be calibrated annually. Operators shall monitor air and ground temperatures before, during, and immediately after expected storm events to ensure that this information is taken into consideration when making decisions about deicing material placement and timing. Dry salt is ineffective below 15°F and most deicers are ineffective once the temperature drops below -10°F. Monitoring air and ground temperatures and acting accordingly will aid the effective use of these materials.

4.3 Equipment Calibration Requirements

Salt spreaders shall have ground speed control applications to regulate the amount of salt that is deposited. Winter maintenance operators shall calibrate equipment each fall using an application rate chart. After each storm, equipment should be

checked and recalibrated, if necessary. For more information, refer to the attached "Hydraulic-Run Spreader Calibration" and "Pony Motor-Run Spreader Calibration" NH Best Management Practices sheets from the Technology Transfer Center at University of New Hampshire.

4.4 Plowing

Snow shall be mechanically removed to the maximum extent practicable before deicers are applied to pavement. Snow will be plowed from the traveled way and stored at the roadside in the typical fashion for residential roadways. Snow shall be stored in zones that do not interfere with navigation of the site and do not drain directly into wetlands. Snow storage areas shall not be situated on top of catch basins or within detention areas. It is preferred that snow storage zones do not drain back across cleared areas, where the meltwater can refreeze.

4.5 Deicer Storage and Application

Winter maintenance operators should be proactive and apply small amounts of pre-wetted de-icer, salt brine, or liquid de-icers to pavement prior to frost or snow accumulation to prevent ice from bonding with the pavement surface. This anti-icing method is most effective when applied 1-2 hours before precipitation. It can be applied up to 24 hours in advance if necessary. Salt shall be pre-wet or pre-treated with a brine solution to reduce salt loss from bounce and scatter and improve melting times. Pretreating paved areas has been shown to reduce the amount of salt needed in most winter storms. For more information, refer to the "How Salt Works", "Anti-Icing", "Pre-wetting" and "Brine Making" NH Best Management Practices sheets from the Technology Transfer Center at University of New Hampshire.

On roadways, deicers should be applied to the crown of the road or the high side of a curve. On sidewalks, salt should be deposited by drop spreaders. If using a rotary spreader, shields must be installed to restrict the spread to the sidewalk. Salt brine or liquid de-icers shall not be applied before a rainstorm, but can be applied before a light freezing drizzle. Salt shall not be used to "burn off" snow. If the pavement temperature is below 15°F, contractor shall wait until the temperature rises before applying salt, if possible. Otherwise, contractor shall use pre-wetted deicing materials. If the pavement temperature is below -10°F, operator shall use mechanical methods to clear snow and ice and wait until the temperature rises before applying deicers.

Salt and sand shall be applied separately since their purposes—melting and traction, respectively—are different. Salt shall be stored in a building or under secure cover, away from water flow or water bodies. For more information, refer to the "Material Storage and Housekeeping" NH Best Management Practices sheet from the Technology Transfer Center at University of New Hampshire.

5

Salt Usage Evaluation and Monitoring

Monitoring salt usage and winter maintenance activities are the keys to identifying what methods are successful in deicing the site, how much salt or other material was used, how much is needed for the next winter season, and the effectiveness of the salt minimization plan at reducing salt loads in the watershed. For each application, operators shall record the following:

- What activity is being performed and/or what equipment is being used
- Where the maintenance is occurring
- When activity is being performed (date, start and end time)
- Weather conditions
  - Event timing (Start and end time)
  - Snow fall or ice totals
  - Air and ground temperatures
- Application rates
- Results

Operators shall periodically compare salt usage between vehicles to confirm spreader calibrations. Operators are also encouraged to provide feedback on effectiveness of BMPs in practice and suggest others that should be considered for implementation. Shortly following the winter season, a report should be developed summarizing this data and analyzing the results. The report should also be provided to the local jurisdiction for the purposes of tracking chloride applications throughout the watershed. The Salt Minimization Plan should also be reviewed and updated each year, preferably when the report is complete. The attached checklist for snow and ice maintenance can be used as a guide for best management practices.

6

Analysis of Alternative De-icing Materials and Site Design Considerations

Alternative de-icing materials, such as potassium acetate and calcium magnesium acetate (CMA), and limited use of abrasives, like sand, sawdust, or cat litter, should also be considered to reduce chloride application in the watershed. Pavement should be kept free of potholes to minimize the ability of water to pond and freeze. Cracks should also be filled before the winter season since cracks can allow chlorides to leach into the ground and migrate into the groundwater. Pavement that is in good condition also aids the mechanical removal of snow and ice.

New Hampshire Salt Reduction Best Management Practices

Calibration Chart (Hydraulic Type)

Material: _____ Truck/Spreader ID: _____

Date: _____ Performed by: _____

Tarp/Canvas/Bucket Weight: _____

Conveyor or Auger Setting	W	A	Discharge Rate (lb/min.)			B	D					
	Spread Width (ft.)	5.28 × W	Run 1	Run 2	Run 3	Average Discharge Rate *((Run1 + Run2 + Run3)/3)*	Pounds of Material Discharged per 1000 square ft. *(D = B × C ÷ A)*					
							5 mph (C = 12)	10 mph (C = 6)	15 mph (C = 4)	20 mph (C = 3)	25 mph (C = 2.4)	30 mph (C = 2)
1												
2												
3												
4												
5												
EX	14	5.28 × 14= **73.92**	87	92	93	(87+92+93)÷3= **90.67**	12 × 90.67 ÷ 73.92= **14.72**	6 × 90.67 ÷ 73.92= **7.36**	4 × 90.67 ÷ 73.92= **4.91**	3 × 90.67 ÷ 73.92= **3.68**	2.4 × 90.67 ÷ 73.92= **2.94**	2 × 90.67 ÷ 73.92= **2.45**

Calculation Instructions: Multiply the spread width from column **W** by **5.28** and record the answer in column **A**. For each conveyor/auger setting, add **Run 1**, **Run 2**, and **Run 3** together. Divide the result by **3** and record in column **B** to get the average discharge rate. To find the pounds of material discharge per 1000 square feet, you must know the number of minutes it takes to travel one mile at every truck speed you intend to calibrate for. These numbers are designated as variable "**C**". The "**C**" value for each travel speed is shown in red under that given speed. Multiply column **B** by the "**C**" value for that speed and divide by the **A** column to find the number of pounds of material discharged per 1000 square feet for the given speed. Record these numbers in the **D** columns. The full equation is shown here:

$$D = \frac{B \times C}{A}$$

Pony Motor-Run Spreader Calibration

NH Best Management Practices

WHY CALIBRATE?

You can't reduce your salt use if you don't know how much salt you actually use! The goal of calibrating is to know how much material you are putting down on a roadway or parking lot for every setting on your truck that you use. This is why calibrating your equipment is the first step to reducing salt use and saving money!

REMEMBER:

Each truck must be independently calibrated for each material it will be used to spread (the salt calibration card *will* be different than the sand calibration card).

Calibrations should be preformed annually, or after a spreader is serviced.

CALCULATIONS:

There are a few simple calculations you must perform in order to complete the calibration. Once all of the necessary data is recorded, head back inside and warm up! Refer to the reverse side of this fact sheet for calculation instructions.



Step 1: Load the Truck

Partially load the truck. Half of a full load should be more than adequate for calibration purposes.



Step 2: Set Your Controls

Gate Height: Set the gate height to its lowest practical setting to start (approximately 1" to 1.5"). After the truck is calibrated for the lowest gate setting, calibrate for each 1/2" increment greater than the lowest setting. Continue until all gate settings you use are calibrated.

Engine Speed: Set the pony motor speed to the maximum setting, or to the setting you would normally use.



Step 3: Measure Spread Width

Measure the width that the material covers during spreading. Do this for each gate setting you are calibrating. Round your numbers to the nearest half foot and record them in column "**W**" of the calibration chart (see reverse side).



Step 4: Collect & Weigh Material

You will need either a sheet of canvas, a tarp, or a bucket to collect the material that is dispensed from the spreader, as well as a scale. Weight the object you are using to collect the material in, and record that value in the purple box above the discharge rate column. Collect material for 1 minute. Weigh the collected material and subtract the weight of the tarp/canvas/bucket. Record this value in the first purple column of the calibration chart. Do this 3 times for each gate opening that is typically used. Average these three values together and record in the orange column in the calibration chart.

Step 5: Perform Calculations

Go inside and calculate your discharge rate using the calibration chart for each truck speed and gate setting you normally use. Refer to the reverse side of this fact sheet for calculation instructions. The formula you will be using is shown below:

$$D = \frac{B \times C}{A}$$

Step 6: Distribute Completed Calibration Cards!

Put a copy of the calibration card in the truck you just calibrated. Also, leave a copy of the calibration card in the office so you have a copy incase the original is damaged.

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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Calibration Chart (Pony Motor Type)

Material: _____ Truck/Spreader ID: _____

Date: _____ Performed by: _____

Tarp/Canvas/Bucket Weight: _____

Gate Opening	W	A	Discharge Rate (lb/min.)			B	D					
	Spread Width (ft.)	5.28 × W	Run 1	Run 2	Run 3	Average Discharge Rate *((Run1 + Run2 + Run3)/3)*	Pounds of Material Discharged per 1000 square ft. *(D = B × C ÷ A)*					
							5 mph (C = 12)	10 mph (C = 6)	15 mph (C = 4)	20 mph (C = 3)	25 mph (C = 2.4)	30 mph (C = 2)
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Calculation Instructions: Multiply the spread width from column **W** by **5.28** and record the answer in column **A**. For each gate setting, add **Run 1**, **Run 2**, and **Run 3** together. Divide the result by **3** and record in column **B** to get the average discharge rate. To find the pounds of material discharge per 1000 square feet, you must know the number of minutes it takes to travel one mile at every truck speed you intend to calibrate for. These numbers are designated as variable “**C**”. The “**C**” value for each travel speed is shown in red under that given speed. Multiply column **B** by the “**C**” value for that speed and divide by the **A** column to find the number of pounds of material discharged per 1000 square feet for the given speed. Record these numbers in the **D** columns. The full equation is shown here:

$$D = \frac{B \times C}{A}$$

How Salt Works

NH Best Management Practices

BE PROACTIVE - ANTI-ICE

Anti-icing is the proactive method of preventing snow and ice from bonding to pavement. It can be more than 50% more efficient than deicing. See the NH Anti-Icing Factsheet for more information.

PRE-WETTING FOR FASTER ACTING SALT

Adding brine to salt before you apply it to pavement jump starts the melting process which means your pavement will be clear sooner. See the Pre-wetting Fact Sheet for more information.

KNOW YOUR LIMITS

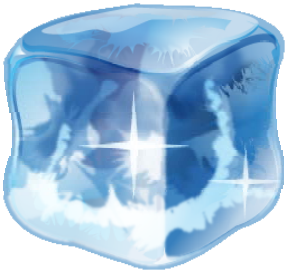
Dry salt becomes ineffective below 15°F if possible wait until the temperature rises before applying salt. At 30°F 1 lb of salt can melt 46.3 lb of ice in 5 minutes. At 15°F 1 lb of salt can melt 6.3 lb of ice in 1 hour.

PLOW FIRST

Always plow before applying any kind of chemical deicer to avoid pushing it away!

How Do We Melt Ice?

Ice can be melted by increasing the temperature, or lowering the freezing point of the water. It's not cost effective to use heat to melt ice on our roads so we use chemicals to reduce the freezing point—anything that will dissolve in water will work, including: salt, sugar, even alcohol!



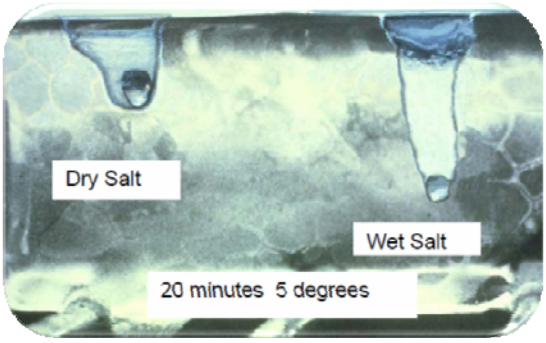


Why Use Salt?

Salt (Sodium Chloride) is the cheapest and most readily available chemical that efficiently melts ice and can be easily applied to our roadways and parking lots. However salt does corrode our cars and bridges, contaminates drinking water and pollutes our streams. Alternatives include potassium acetate, and calcium magnesium acetate (CMA), — all of which are considerably more expensive than calcium chloride, and have their own environmental concerns.

Brine Makes It Happen

The first step in melting ice is the formation of a brine. Salt crystals pull water molecules out of ice formation which creates a brine with a lower freeze point. Once the brine is formed melting is greatly accelerated. Save time and money by pre-wetting your salt with a brine before it hits the pavement to jump start melting! See the Pre-Wetting fact sheet for more information.



Source: Wisconsin DOT Transportation Bulletin #22



Save $$ and the Environment

In New Hampshire there are over 40 watersheds currently contaminated from road salt. As the pavement temperature drops more salt is required. As the pavement temperature rises less salt is required. Save money and the environment by using only what is needed to do the job. See NH application rate charts for recommended rates.

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New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Anti-Icing

NH Best Management Practices

GET OUT EARLY

Typically anti-icing is most effective if applied 1-2 hours before the precipitation begins however it can be applied up to 24 hours in advance.

TRY IT FIRST

Trying anti-icing for the first time? Make a 23.3% brine solution and before a storm spray pavement on your own property using a masonry/ plant sprayer. Use this experiment to determine how best to use it with your clients.

LEAVE SOME PAVEMENT BARE

It's always best to use stream nozzles instead of fan tip to avoid creating a slippery condition. If the anti-icing liquid freezes the bare pavement will still provide a traction surface.

USE A FILTER

Having a filter in your liquid dispensing system will reduce clogs in your nozzle. Automotive in line fuel filters work quiet well. If your liquid dispenser is not functioning properly be sure to check the filter first.

A Proactive Treatment

Anti-Icing before a storm is very similar to using a non-stick spray on a pan before cooking. Just like a non-stick spray prevents food from bonding to the pan, anti-icing prevents snow and ice from bonding to the pavement so that it can be plowed away. Anti-icing can save you money as it costs 50% less than reactive deicing.





Make Your Own Salt Brine

When making brine it is important to add enough salt to produce a 23.3% solution which freezes around 0°F. Roughly 2.5lb per gallon of water will produce a 23.3% solution. You can verify using a salometer (~$20) a 23.3% solution will have a specific gravity of 1.176, or 85% salinity. Consult the Brine Making BMP sheet for more info.

How Much Should I Use and When?

You can apply brine up to 24 hours in advance of the storm. Typical application rates range from 0.5 to 0.75 gallon per 1000 sq.ft. (10' x 100' area). Other chemicals such as magnesium are also available—consult your supplier for application rates. Anti-icing is not advised prior to freezing rain events.





Getting Started

Try making your own salt brine by putting 13 lb of salt in 5 gallons of water to get a 23.3% salt brine solution. Mix the brine until all of the salt is dissolved. Using a masonry sprayer apply the liquid several hours before a storm. Start by applying about 0.25—0.5 gallons to a 10' x 50' area. Adjust the application rates based on your experience. Being careful not to over apply and cause a slippery condition.

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New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Pre-wetting

NH Best Management Practices

PRE-WETTING?

Pre-wetting is the process of coating a solid de-icer with a liquid before it is spread on a roadway.

WHY PRE-WET?

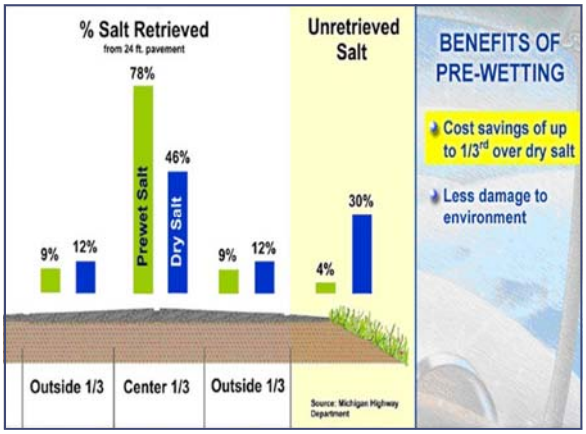
De-icing chemicals must form a brine before they can begin melting ice. Pre-wetting your chemicals accelerates the brine making process, which improves the melting action of the material. Pre-wetting also reduces bounce and scatter of material during spreading, and reduces the total amount of de-icer needed to obtain the desired results.

REDUCED RATES

If you are pre-wetting, don't forget to reduce your application rates accordingly. Reductions in the range of 15-20% are typical.

HOW MUCH LIQUID?

A good rule of thumb is to use 8-10 gallons of pre-wetting liquid for every ton of de-icer. For other chemicals, such as magnesium chloride, consult your supplier for application rates

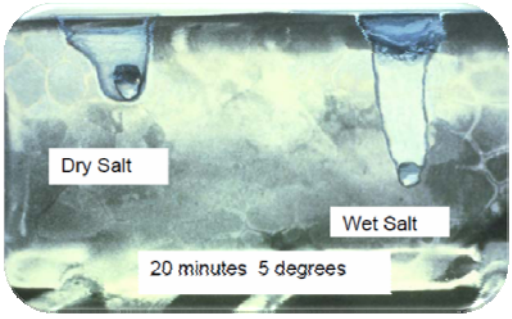


Pre-wetting Liquids

You have a few options for pre-wetting liquids. The most commonly used is a 23% sodium chloride brine solution. Calcium chloride at 32% solution is also used, as well as Magic Minus Zero™ and other patented products.

Getting Started

Wet the pile! There are two ways to pre-wet your de-icing chemicals. The easiest way to get started with pre-wetting is to spread your salt pile, spray it with pre-wetting liquid, mix it around, and re-pile it. More advanced truck mounted pre-wet systems can be installed on your trucks if you decide to make the investment.



Source: Wisconsin DOT Transportation Bulletin

Spraying the Pile

This is the easiest and most cost effective way to get started in pre-wetting. The first step is to spread your salt pile on a flat, impermeable surface. Next, spray the salt while it is spread out, and mix it around to ensure adequate and consistent liquid coverage. After the salt is sufficiently covered, re-stack the salt in your storage shed for later use.



Truck Mounted Systems

These systems are mounted in the truck bed and coat the de-icer with liquid as it comes off the conveyor/auger onto the spinner. These systems have the benefit of applying liquid only to the material you use as you use it. However, these systems must be installed on every truck that will be used to spread pre-wetted material.



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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Brine Making

NH Best Management Practices

GET THE LOWEST FREEZE POINT

When salt brine is 23% salt (measured with a hydrometer: 1.176, or with a salimeter: 85%) it has the lowest freeze point possible (about 0°F).

BRINE STORAGE

23% brine solution may be stored outside, however if temperatures get below 0°F the brine may freeze. A circulator pump will reduce the risk of freezing. If possible store brine indoors to eliminate risk of freezing.

COST OF BRINE

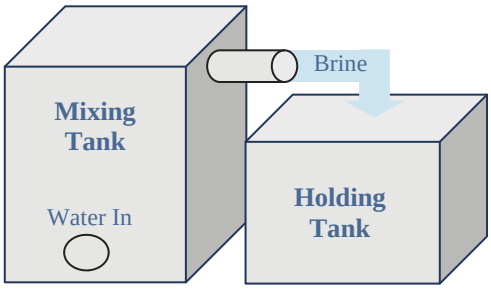
Calcium chloride brine costs about 7¢ / gallon (assuming $58/ton for salt) after you have your equipment setup.

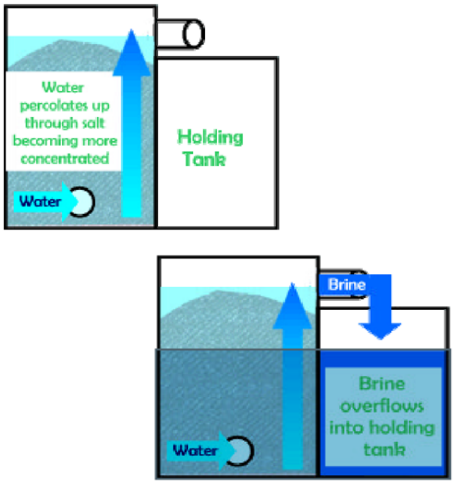
MULTIPLE USES

Brine can be used directly for anti-icing, for prewetting salt as it is dispensed from your truck, or to pretreat salt before it is loaded into your truck. Brine can be safely stored for up to a year, however, the concentration should be tested before use.

What Do You Need?

Brine making is a fairly simple process—the only ingredients are salt and water, and the only equipment you'll need is an open top mixing tank, a holding tank, a small pump, and a salimeter.





Images courtesy of Iowa DOT

Step 1: Fill Mixing Tank

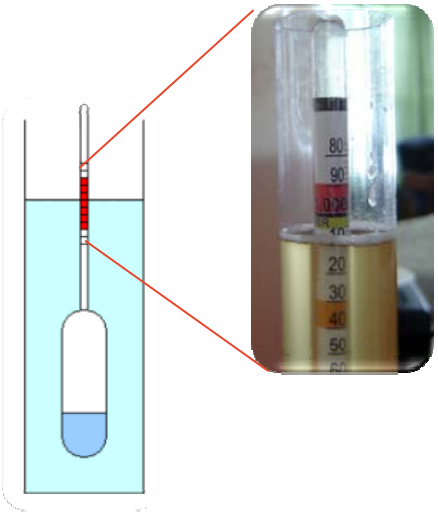
Add Salt: Add about 2.5 lb of salt per gallon of water you plan to add. Make sure your mixing tank has a large opening to make adding salt easy.

Add Water: Slowly add water from the bottom of your brine mixing tank. This will allow it to percolate up through the salt and overflow into the holding tank.

Step 2: Check Concentration

Float a hydrometer or salimeter directly in your holding tank and read the value at the surface of the water. The number should be either 85% or 1.176 depending on the units of your device.

If the values are too low, pump some brine from your holding tank back into the mixing tank and allow it to overflow. If values are too high simply add some fresh water





Quality Control & Documentation

Make sure that you record the date when you create each batch of brine and document who mixed it and checked the concentration. It is also a good idea to note the final concentration. These records should be kept for at least two years to protect your group in the event of litigation.

Produced in partnership with:

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Material Storage and Housekeeping

NH Best Management Practices

IMPERMEABLE SURFACE STORAGE

Store salt and liquids on an impermeable surface to prevent groundwater contamination.

COVERED STORAGE AREAS

If possible, store your salt in a covered shed to prevent runoff. If there is not a shed available, cover your salt pile well with an impermeable membrane or tarp.

SECONDARY CONTAINMENT

Keep your liquids in an appropriate storage container. Secondary containment should be used incase a leak develops in the primary container.

PROPER DRAINAGE & COLLECTION

Protect your ground water supply! A drainage system should be in place to collect runoff from your salt pile, as well as to collect any liquids that may escape containment. Remember, the collected liquid can be used as a base for salt brine.

Proper Material Storage

Proper storage of materials (especially chemicals) is essential. If impermeable surfaces are NOT used in your storage facilities and brine infiltrates the ground or groundwater, you need to register with the DES under the Groundwater Discharge Permit and Registration Rules, Env-Wq 402. It is a free registration used for tracking potential contaminant sources.





Secondary Containment

Secondary containment for your liquid storage is a HIGHLY recommended technique to help reduce soil and groundwater contamination. If a tank Begins leak, the secondary containment prevents liquid from seeping into sensitive environments.

Liquid Storage

Brine stored using holding tanks must be managed so that there are no releases to drains, groundwater or surface water.




ENVIRONMENTAL
Fact Sheet
Environmental Services

Storage and Management of Deicing Materials

Need for Proper Management

NHDES Fact Sheet DWGB-22-30

This fact sheet outlines the basic required specifications for salt and chemical storage facilities. For additional information, please contact the Drinking Water and Groundwater Bureau at (603)271-2513 or dwgbinfo@des.nh.gov, or visit their website at: http://des.nh.gov/organization/divisions/water/dwgb/index.html. *The Salt Storage Handbook* contains more information and guidelines that should be referenced.

Produced in partnership with:

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

New Hampshire DOT

Technology Transfer Center
New Hampshire LTAP at UNH

Smart Salting Practices

SMART SALTING PRACTICES

A checklist for snow and ice maintenance contractors.

Recommended practice	Check which response applies to current practices and anticipated site maintenance activities for job site.				
	Already do	Will do	Might do	Will not do	If "will not do"….why not?
Use an application rate chart.					
Calibrate equipment each year.					
Learn about the deicer ingredients and use the appropriate one for the condition.					
Look for reasons if and why materials are leaking or spilling from vehicles and fix them (e.g. gaps, overfilling, etc).					
Develop a comprehensive winter maintenance policy. Follow your policy.					
Measure and use pavement temperatures.					
Use anti-icing appropriately prior to the storm.					
Plow before applying deicers.					
Use wet materials (pre-wet or pre-treated).					
Don't apply sodium chloride (road salt) for pavement temperatures below 15ºF.					
Don't apply deicers for pavement temps under -10º F. It's too cold.					
Separate salt and sand. Use salt for melting. Use sand for traction.					
Apply deicers in the center of the road or on the high side of the curve.					
Store the salt in a building or under secure cover.					
Store salt away from water flow and direct the water away from storage area.					
Store snow away from lakes, ponds and wetlands.					
Sweep up sand, dispose of properly.					
For each event, document what you did and how well it worked. Use this information to make improvements.					

Checklist is adapted from worksheet created by Fortin Consulting as a part of the Minnesota Pollution Control Agency Smart Salting Voluntary Certification Program.

DEVINE MILLIMET

ATTORNEYS AT LAW

LAURA J. GANDIA
Admitted in NH and MA

Devine, Millimet & Branch
111 Amherst Street
Manchester, NH 03101

Direct Dial: 603.695-8722
[redacted]

February 12, 2026

VIA HAND DELIVERY
Town of Londonderry Planning Board
268B Mammoth Road
Londonderry, NH 03053

RE: Mack's apples- Agritourism – Formal Submission

Dear Planning Board members:

Enclosed please find the following as part of our formal application submittal:

1. Formal Application (two copies);
2. Plan Set (two copies);
3. Waiver request letter (two copies);
4. Traffic report and letter (two copies);
5. Abutter letters in support of project (two copies); and
6. Abutter list and labels (two copies).

We look forward to presenting our project to the Board on March 4, 2026.

Thank you.

Sincerely,

Laura J. Gandia

/LJG
Enclosures

LONDONDERRY PLANNING BOARD
SITE PLAN APPLICATION & CHECKLIST

Planning Department Date Stamp

☐ **Design Review** ☒ **Formal Application**

All information provided and submitted with this Application Checklist shall conform to the Londonderry Site Plan Regulations. ***Please note that the Planning Board may not accept and consider the application complete if the required items as outlined in the checklist are missing from the submittal.***

☐ Site Plan Amendment

I. General Information:

A. **Project Name:** Mack's Apples — 6 *(Map)* 21 *(Lot)*

B. **Project Location:** 230A Mammoth Road — **Zone:** AR-1

C. **Primary Contact:** Laura Gandia — **Phone:** (603) 695-8722

☐ Applicant ☐ Owner ☒ Agent **E-Mail:** [redacted]

D. **Applicant's Name:** MHO Acquisition, LLC

Address: P.O. Box 202 **City:** Exeter **State:** NH **Zip:** 03833

Phone: _____ **Fax:** _____ **E-Mail** [redacted]

Applicant Signature: _____ **Date:** 12/18/2025

E. **Owner's Name:** same

Address: _____ **City:** _____ **State:** _____ **Zip:** _____

Phone: _____ **Fax:** _____ **E-Mail:** _____

Owner's Signature: _____ **Date:** _____

F. Engineer/Surveyor (Firm Name): Brown Engineering

Address: 34 Whittier Highway City: Moultonborough State: NH Zip: 03254

Phone: (603) 744-1044 Fax: _____ E-Mail [redacted]

1) Name of Licensed Land Surveyor: Kevin French

Signature: [signature]

2) Name of Licensed Professional Engineer: Kent Brown

Signature: [signature]

3) Name of Certified Soil Scientist: Luke Powell

4) Name of Certified Wetland Scientist: Luke Powell

5) Name of Licensed Traffic Engineer: Kim Hazarvatian

G. Lot Area (SF) 350,562 Existing Building Footprint (SF): 21,809 Proposed Addition (SF) N/A

☐ Change or ☐ Additional Use(s): agritourism

Site Plan Application Checklist

☐ Additional Pavement (SF): N/A ☐ Other Modification: N/A

II. General Requirements (All Applications):

		Provided	N/A
1.	Executed Site Plan Application Form	☒	
2.	Complete Abutters list, 3 sets mailing labels	☒	
3.	Application Fees	☒	
4.	Four (4) sets of plans and electronic "PDF" plans (See #11)	☒	
5.	Copies of proposed easement deeds, protective covenants or other legal documents	☐	☒
6.	Waiver request(s) with justifications	☒	☐
7.	Technical reports and supporting documents (Drainage report, Traffic Study, etc.)	☒	☐
8.	Completed Site Plan Application Checklist	☒	
9..	Escrow Agreement and Fees	☒	☐
10..	Conditional Use Permit request(s) with justifications per Zoning	☐	☒
11.	Response Letter to DRC Review and 2 highlighted plans (Plans may substitute for 2 sets required in #4 above)	☐	☐

III. General Plan Information (All Plans):

		Provided	N/A
1.	Size and presentation of sheet(s) per requirements of the site plan regulations	☒	
2.	Title block information:		
	a. Drawing title	☒	
	b. Name of site plan	☒	
	c. Location of site plan	☒	
	d. Tax map & lot #s of subject parcel(s)	☒	
	e. Name & address of owner(s)	☒	
	f. Date of plan	☒	
	g. Scale of plan	☒	
	h. Sheet number	☒	
	i. Name, address, & telephone number of design firm	☒	
	j. Name and address of Applicant	☒	
3.	Revision block	☒	
4.	Planning Board approval block provided on appropriate sheets (Cover sheet, site plan, landscape plan only)	☒	
5.	Certification block (for engineer, surveyor, soil scientist, or wetland scientist)	☒	
6.	Match lines (if any)	☐	☒

Site Plan Application Checklist

IV. **Master Site Plan Sheet**: (Applicant may provide separate Title Sheet)

			Provided	N/A
1.		The following notes shall be provided:		
	a.	Purpose of plan	☒	
	b.	Tax map and lot #s of all subject parcels	☒	
	c.	Area (existing & proposed) of subject parcel(s)	☒	
	d.	Zoning designation of subject parcel(s)	☒	
	e.	Min. lot area, frontages & setback dimensions	☒	
	f.	Existing and proposed uses	☒	
	g.	Parking calculations, as outlined in the Regulations	☒	
	h.	% green area, as outlined in the Zoning Ordinance	☒	
	i.	% building coverage, as outlined in the Zoning Ordinance	☒	
	j.	Sanitary sewer source (name of provider company if offsite)	☒	
	k.	Water supply source (name of provider company if offsite)	☒	
	l.	Zoning variances/special exceptions with conditions	☒	☐
	m.	List FEMA sheet(s) used to identify 100-year flood elevation. (Note if no flood zone present as applicable)	☒	
	n.	List of required permits and permit approval numbers	☒	☐
	o.	List of Planning Board waivers and Conditional Use Permits with Regulation or Ordinance section reference (if applicable)	☐	☒
	p.	Note identifying which plans are on file at the Town	☒	☐
	q.	Note the following: "If, during construction, it becomes apparent that deficiencies exist in the approved design drawings, the Owner shall be required to correct the deficiencies to meet the requirements of the regulations at no expense to the Town."	☒	☐
	r.	Note the following: "If, during construction, it becomes apparent that additional erosion control measures are required to stop any erosion on the construction site due to actual site conditions, the Owner shall be required to install the necessary erosion protection at no expense to the Town."	☒	☐
	s.	Note the following: "All materials and methods of construction shall conform to Town of Londonderry Site Plan Regulations and the latest edition of the New Hampshire Department of Transportation's Standard Specifications for Road & Bridge Construction."	☒	☐
	t.	Note the following: "In accordance with Section 6.01 of the Londonderry Site Plan Regulations and RSA § 676:13, all improvements specified on these site plans shall be constructed, completed, and inspected and approved by the Town of Londonderry prior to the issuance of a certificate of occupancy."	☒	☐

	u.	For sites requiring off-site improvements, note the following: "In accordance with Section 6.01 of the Londonderry Site Plan Regulations and RSA § 676:12, all off-site improvements specified on these site plans shall be constructed, completed, and inspected and approved by the Town of Londonderry (and/or the NHDOT, if applicable) prior to the issuance of a certificate of occupancy."	☒	☐
2.		Vicinity plan (at a scale of 1"=2500')	☒	
3.		Plan index indicating all sheets	☒	☐

V. **Existing Conditions Plan:**

			Provided	N/A
1.		Surveyor's certification stamped and signed by LLS	☒	
2.		Boundary of entire property by metes and bounds	☒	☐
3.		Boundary monuments:		
	a.	Monuments found	☒	☐
	b.	Monuments to be set	☒	☐
4.		Map # and Lot #, name addresses, and zoning of all abutting land owners	☒	
5.		Existing streets:		
	a.	Name labeled	☒	☐
	b.	Status noted or labeled	☒	☐
	c.	Right-of-way dimensioned	☒	☐
	d.	Pavement width dimensioned	☒	☐
6.		Municipal boundaries (if any)	☒	☐
7.		Existing easements (identified by type)	☒	☐
8.		North arrow	☒	
9.		Locus map (at a scale of 1" = 2,500)	☒	
10.		Limits of wetlands & CO District Boundary	☒	☐
11.		Wetland delineation criteria & Certification	☒	☐
12.		SCS Soils (Boundary & Type)	☒	
13.		Owner(s) signature(s)	☒	
14.		All required setbacks (including any applicable buffers)	☒	
15.		Existing physical features:		
		Buildings	☒	☐
		Wells	☒	☐
		Septic systems	☒	☐
		Stone walls	☒	☐
		Paved drives	☒	☐
		Gravel drives	☒	☐
16.		Location & name (if any) of any streams or waterbodies	☒	☐
17.		Location & elevation(s) of 100-year flood zone per FEMA Flood Insurance Study or as determined by drainage study	☒	☐
18.		Location of existing overhead utility lines, poles, towers, etc.	☒	☐
19.		Plan and deed references	☒	☐
20.		Zoning District boundary lines (if any)	☒	☐

VI. **Improvement Plans (Grading Plan, Utility Plan, etc. and Stamped by Engineer Licensed in NH):**

		Provided	N/A
1.	**Grading and Drainage Plan:**		
a.	Existing topography (two-foot contour interval minimum)	☐	☒
b.	Proposed contours	☐	☒
c.	Existing spot elevations	☐	☒
d.	Proposed spot elevations	☐	☒
e.	Existing edge of pavement	☐	☒
f.	Proposed edge of pavement	☐	☒
g.	Existing curb line	☐	☒
h.	Proposed curb line	☐	☒
i.	Existing buildings and structures	☐	☒
j.	Proposed buildings and structures	☐	☒
k.	Existing retaining walls	☐	☒
l.	Proposed retaining walls	☐	☒
m.	Existing stone walls	☐	☒
n.	Proposed and reconstructed stone walls	☐	☒
o.	Wetland Mapping		
	1.) Wetland limits identified	☐	☒
	2.) Impact Area in square feet for each individual location	☐	☒
	3.) Mitigation areas (as may be required)	☐	☒
p.	Existing treeline	☐	☒
q.	Proposed treeline	☐	☒
r.	Benchmarks	☐	☒
s.	Existing drainage systems:		
	1) Pipes/culverts (each location):		
	i. Type	☐	☒
	ii. Size	☐	☒
	iii. Length and slope	☐	☒
	iv. Inverts	☐	☒
	v. End sections/Headwalls	☐	☒
	2) Structures (catch basins, drain manholes, special structures):		
	i. Location (station and off-set)	☐	☒
	ii. Type	☐	☒
	iii. Size	☐	☒
	iv. Rim Elevations	☐	☒
	v. Inverts	☐	☒
	3) Swales/Ditches/Waterways:		
	i. Flow arrows (direction of flow)	☐	☒
	ii. Topography	☐	☒
	iii. Spot elevations	☐	☒
t.	Proposed Drainage Systems:		
	1) Pipes/culverts (each location):		
	i. Type	☐	☒
	ii. Size	☐	☒
	iii. Length and slope	☐	☒
	iv. Inverts	☐	☒
	v. End sections/headwalls	☐	☒
	vi. Identify minimum cover and location	☐	☒
	vii. Outlet erosion protection	☐	☒

Site Plan Application Checklist

		Provided	N/A
2)	Structures (catchbasins, drain manholes, special structures):		
	i. Location (sta. and off-set)	☐	☒
	ii. Type	☐	☒
	iii. Size	☐	☒
	iv. Rim elevations	☐	☒
	v. Inverts	☐	☒
3)	Swales/ditches/waterways:		
	i. Flow arrows (direction of flow)	☐	☒
	ii. Grading	☐	☒
	iii. Spot elevations	☐	☒
	iv. Erosion protection (riprap, matting, etc.)	☐	☒
u.	Temporary erosion protection during construction:		
1)	Silt fence, haybales, etc.	☐	☒
2)	Matting, mulch, etc.	☐	☒
v.	Tree protection for existing areas and/or individual trees 15" in diameter or greater	☐	☒
w.	Plan note stating that the edge of the Conservation Overlay District and Non-Distubance Zones shall be appropriately delineated in the field prior to construction	☐	☒

2. Utilities Plan:

		Provided	N/A
a.	Existing sanitary sewer system:		
1)	Pipes:		
	i. Type	☐	☒
	ii. Size	☐	☒
	iii. Length and slope	☐	☒
2)	Structures:		
	i. Location (sta. and off-set)	☐	☒
	ii. Type	☐	☒
	iii. Size	☐	☒
	iv. Rim elevations	☐	☒
	v. Inverts	☐	☒
b.	Proposed sanitary sewer system:		
1)	Pipes (gravity):		
	i. Type	☒	☐
	ii. Size	☒	☐
	iii. Length and slope	☒	☐
	iv. Separation (18" below water)	☒	☐
	v. Identify minimum cover and locations	☒	☐
2)	Force Main:		
	i. Type	☒	☐
	ii. Size	☒	☐
	iii. Direction of flow (flow arrows)	☒	☐
	iv. Bends and thrust blocking	☒	☐
	v. Air relief valves and structures	☒	☐
	vi. Clean-out structures	☒	☐
	vii. Identify minimum cover and locations	☒	☐
3)	Structures:		
	i. Location (sta. and off-set)	☒	☐
	ii. Type	☒	☐
	iii. Size	☒	☐
	iv. Rim elevations	☒	☐
	v. Inverts	☒	☐
4)	Service laterals to each individual lot:		
	i. Type	☒	☐

			Provided	N/A
	ii.	Size	☒	☐
	iii.	Length and slope	☒	☐
	iv.	Separation (18" below water)	☒	☐
	v.	Minimum cover and locations identified	☒	☐
	vi.	Location of connection	☒	☐
c.	Existing Water System:			
1)	Pipes:			
	i.	Type	☒	☐
	ii.	Size	☒	☐
2)	Hydrants		☒	☐
3)	Valves		☒	☐
4)	Bends and thrust blocks		☒	☐
5)	Tees		☒	☐
d.	Proposed Water System:			
1)	Pipes:			
	i.	Type	☒	☐
	ii.	Size	☒	☐
2)	Hydrants			
	i.	Locations approved by Fire Department	☒	☐
3)	Valves		☒	☐
4)	Bends and thrust blocks		☒	☐
5)	Tees		☒	☐
e.	Existing Gas Lines:			
1)	Pipes:			
	i.	Type	☐	☒
	ii.	Size	☐	☒
2)	Valves		☐	☒
f.	Proposed Gas Lines:			
1)	Pipes:			
	i.	Type	☐	☒
	ii.	Size	☐	☒
2)	Valves		☐	☒
3)	Services to each lot		☐	☒
g.	Telephone/Electrical/Cable:			
1)	U-poles		☒	☐
2)	Pedestals/transformers		☒	☐
3)	Overhead lines		☒	☐
4)	Underground lines		☒	☐
5)	Services to each lot		☒	☐

3. **Roadways:** If streets are to be built as part of a site plan (e.g., for a multi-family residential site plan), then the design of such streets shall comply with Section 3.09 of the Londonderry Subdivision Regulations, please see Subdivision Application Checklist.

VII. **Landscape Plan (Section 3.09):**

			Provided	N/A
1.	General Information			
a.	Native Plants as suggested by Appendix LS1		☐	☒
b.	No use of Invasive materials as listed in Appendix LS2		☐	☒
c.	Plant materials meet winter hardiness requirement		☐	☒

Site Plan Application Checklist

			Provided	N/A
	d.	Proposed materials are of proper caliper or height	☐	☒
	e.	Stone walls incorporated into Landscape Plan	☐	☒
	f.	Existing vegetation preservation (no-cut) areas described by metes and bounds and monumented	☐	☒
	g.	Landscaping Calculations	☐	☒
	h.	Plant Schedule	☐	☒
	i.	Landscaping Details	☐	☒
	j.	Tree Protection Detail	☐	☒
	k.	Note on Plan stating No Plant Conflicts with Snow Storage Areas, Light Fixtures, Underground Utilities	☐	☒
	l.	Note on Plan stating No Landscaping Conflicts with Sight Distance	☐	☒
	m.	Submit a Landscape Master Sheet for Review (Landscaping, site features, snow storage, light poles, detention basin edges, grading, utilities)	☐	☒
2.		Parking Lot Landscaping		
	a.	Interior landscaping percentage based on Section 3.11e	☐	☒
	b.	Interior shade trees @ 1 per 15 parking spaces	☐	☒
	c.	Perimeter shade trees @ 1 per 20 parking spaces OR 1 per 50 feet of perimeter with buffer required	☐	☒
	d.	Screening provides proper vertical opacity per Section 3.11e	☐	☒

VIII.	**Illumination Plan & Lighting Details (Section 3.13):**		Provided	N/A
1.		Full Cut-Off Fixtures with plan note stating all lights are full cut-off fixtures as required	☒	☐
2.		Shielded, downcast building/external signage lighting	☒	☐
3.		No direct light source at residential property lines	☒	☐
4.		Plan to scale with illumination levels shown in footcandles	☒	☐
5.		Specification (details) for all proposed lighting fixtures including photometric data, designation as IESNA "cut-off" fixtures, Color Rendering Index (CRI) of all lamps (bulbs), and other descriptive information about fixtures	☒	☐
6.		Proposed mounting height of all exterior lighting fixtures	☒	☐
7.		Illumination levels not to exceed 0.2 footcandles at any property line (Except at driveway intersections per Regulations)	☒	☐
8.		Gas Station Canopies to meet requirements of Appendix Light 2	☒	☐

IX.	**Building Design & Renderings (Section 3.12):**		
1.	Building Elevations/Renderings in compliance with Section 3.13	☒	☐
2.	Signage renderings/details	☒	☐
3.	Large Retail Establishments - Comply with Section 3.13H	☒	☐

Site Plan Application Checklist

X. Construction Detail Drawings:

Note: *Construction details to conform with NHDOT Standards & Specifications for Roads & Bridges, Town of Londonderry Department of Public Works requirements, and Subdivision & Site Plan Regulations*

		Provided	N/A
1.	Typical cross-section of pavement	☐	☒
2.	Typical driveway apron detail	☐	☒
3.	Curbing detail	☐	☒
4.	Guardrail detail	☐	☒
5.	Sidewalk detail	☐	☒
6.	Traffic signs and pavement markings	☒	☐
7.	Typical underdrain trench detail	☐	☒
8.	Drainage structure(s):		
	a. Catchbasin (including frame and grate)	☐	☒
	b. Manhole (including frame and cover)	☐	☒
	c. Outlet structure (detention basins)	☐	☒
	d. Headwalls	☐	☒
	e. Flared end sections	☐	☒
9.	Outlet protection riprap apron	☐	☒
10.	Level spreader	☐	☒
11.	Treatment swale	☐	☒
12.	Typical section at detention basin	☐	☒
13.	Typical pipe trench:		
	a. Drainage	☐	☒
	b. Sewer	☐	☒
	c. Water	☐	☒
	d. Utilities	☐	☒
14.	Sewer structures:		
	a. Manholes (including frame and cover, inverts)	☐	☒
	b. Drop manholes	☐	☒
	c. Special structures (pump stations, blowoffs, etc.)	☐	☒
	d. Pipe manhole joint details	☐	☒
15.	Typical sewer lateral service connection detail	☐	☒
16.	Project specific sewer details (sleeves, etc.)	☐	☒
17.	Typical sewer notes (per NHDES & Sewer Div. requirements)	☐	☒
18.	Hydrant detail	☐	☒
19.	Thrust block details	☐	☒
20.	Valve box detail	☐	☒
21.	Typical water connection service detail	☐	☒
22.	Erosion control details:		
	a. Haybale barriers at waterways	☐	☒
	b. Silt fence	☒	☐
	c. Stone check dam	☐	☒
	d. Stone construction entrance	☐	☒
	e. Inlet filter basket	☐	☒
	f. Haybale barrier at catchbasin	☐	☒

24.	Notes:			
	a.	General notes as required by the Department of Public Works	☐	☒
	b.	Construction sequence	☐	☒
	c.	Erosion control notes	☒	☐
	d.	Turf establishment notes	☐	☒
	e.	Sewer construction notes (as required by Sewer Ordinance)	☐	☒
	f.	Water system construction notes (as required by local water company)	☐	☒
25.	Tree protection details		☐	☒

XI. Supporting Documentation:

			Provided	N/A
1.	Traffic Impact Analysis:			
	a.	Traffic Impact analysis as required by Section 3.14	☒	☐
2.	Stormwater management report including the following:			
	a.	Table of contents	☐	☒
	b.	Narrative statement (including conclusions)	☐	☒
	c.	Summary table comparing existing and post-development conditions	☐	☒
	d.	Summary table of data for each pipe & piping system:		
		1.) Discharge	☐	☒
		2.) Depth of flow	☐	☒
		3.) Velocity	☐	☒
	e.	Summary table of data for each swale & channel:		
		1.) Discharge	☐	☒
		2.) Depth of flow	☐	☒
		3.) Velocity	☐	☒
	f.	Project location plan (on USGS quadrangle)	☐	☒
	g.	Watershed area plan for existing condition	☐	☒
	h.	Watershed area plan for post-development condition	☐	☒
	i.	Runoff calculations for existing & post-development conditions	☐	☒
	j.	Flood routing calculations for each detention basin	☐	☒
	k.	Design for water quality treatment facilities (level spreaders, treatment swales, etc.)	☐	☒
	l.	Riprap design calculations	☐	☒
	m.	Report stamped by licensed professional engineer in NH	☐	☒
3.	Fiscal impact study provided (if required)		☐	☒
4.	Off-site improvements:			
	a.	Design plans included in the project drawings	☐	☒
	b.	Arrangements and agreements	☐	☒
	c.	Easements	☐	☒
5.	Utility clearance letters (as applicable):			
	a.	Electric	☐	☒
	b.	Telephone	☐	☒
	c.	Cable television	☐	☒
	d.	Gas	☐	☒
	e.	Water	☐	☒
	f.	Sewer	☐	☒
6.	Other project-specific information as required by the Design Review Committee (DRC)		☐	☒

Site Plan Application Checklist

XII. Required Project Permits (as applicable to applications):

		Provided	N/A	App Submitted
1.	NHDES site-specific approval	☐	☒	☐
2.	NHDES wetlands permit	☐	☒	☐
3.	NHDES sewer discharge permit	☐	☒	☐
4.	NHDES water supply permit	☐	☒	☐
5.	NHDES dam permit	☐	☒	☐
6.	NHDOT driveway permit	☐	☐	☒
7.	Londonderry ZBA variance(s)/special exception(s)	☐	☒	☐
8.	Londonderry sewer discharge permit	☐	☒	☐
9.	Army Corps of Engineers	☐	☒	☐
10.	Federal Aviation Administration	☐	☒	☐
11.	Other federal, state or local permits (if applicable) for project	☐	☐	☒

XIII. Acknowledgment and Signature:

The undersigned acknowledges he/she has read and understands all of the Town's current zoning, subdivision, site plan, and health regulations and requirements for obtaining all required local, state, and federal permits. .

(Signature of person preparing plans)

KENT BROWN

(Name)

PROJECT ENGINEER

(Title)

2/12/2026

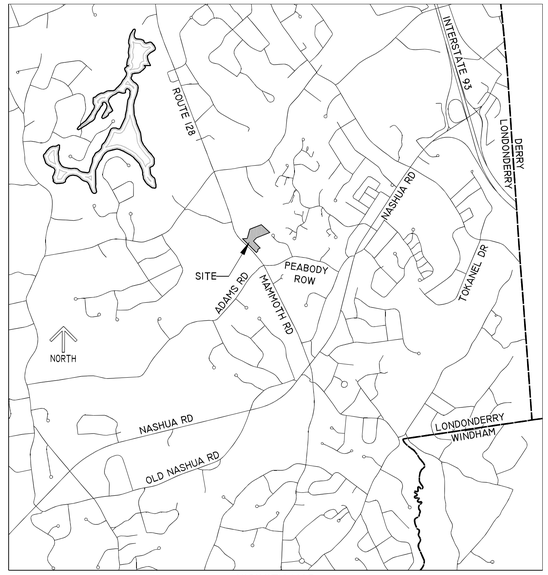
(Date)

MACK'S APPLES FARM MARKET
TAX MAP 6 - LOT 21
230 MAMMOTH ROAD
LONDONDERRY, NH 03053

SYMBOLS LEGEND

- EXISTING PROPERTY LINE
- EXISTING ABUTTERS PROPERTY LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY SETBACK LINE
- EXISTING 2 FOOT CONTOUR
- EXISTING 10 FOOT CONTOUR
- EXISTING SOIL DELINEATION LINE
- EXISTING FENCE LINE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING SEWER SERVICE W.CLEAN OUT
- EXISTING DRAIN LINE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING OVERHEAD ELECTRIC
- EXISTING WETLAND BOUNDARY
- EXISTING BUILDING
- EXISTING GRAVEL DRIVEWAY
- EXISTING PICNIC TABLE
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
- EXISTING SEWER MANHOLE
- EXISTING WATER GATE VALVE
- EXISTING FIRE HYDRANT
- EXISTING WELL
- EXISTING GAS GATE
- EXISTING TREE AND CALIPER
- EXISTING LIGHT POLE
- EXISTING POWER POLE
- TEMPORARY BENCH MARK (TBM)
- TEST PIT LOCATION (TP)
- STONE BOUND FOUND (SBF)
- DRILL HOLE FOUND (DHF)
- IRON PIPE FOUND (IPF)
- RE-BAR FOUND (RBF)
- PHOTO NUMBER AND DIRECTION

- PROPOSED 2 FOOT CONTOUR
- PROPOSED 10 FOOT CONTOUR
- PROPOSED 1 FOOT CONTOUR
- PROPOSED SPOT GRADE
- PROPOSED BUILDING
- PROPOSED WATER LINE
- PROPOSED SEPTIC GRAVITY LINE
- PROPOSED FORCE-MAIN LINE
- PROPOSED DRAIN LINE
- PROPOSED ROOF DRAIN
- PROPOSED UNDER DRAIN
- PROPOSED GAS LINE
- PROPOSED OVERHEAD ELECTRIC
- PROPOSED OVERHEAD ELECTRIC
- PROPOSED LIGHTING UNITS
- PROPOSED DRAIN MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE OUTLET STRUCTURE
- PROPOSED SEWER MANHOLE
- PROPOSED WATER GATE VALVE
- PROPOSED WELL
- PROPOSED GAS GATE VALVE
- PROPSOED FES WITH RIP-RAP OUTLET PROTECTION
- STONE BOUND TO BE SET
- RE-BAR TO BE SET
- PROPOSED LIGHT POLE
- PROPOSED DRAINAGE FLOW ARROWS
- PROPOSED PAVEMENT
- PROPOSED DREDGE AND FILL PERM. DISTURBANCE
- PROPOSED DREDGE AND FILL TEMP. DISTURBANCE



VICINITY MAP
SCALE 1" = 2500'

LIST OF DRAWINGS

DWG	SHT NO.	DESCRIPTION
C-1	1 OF 12	COVER SHEET
EB-1	2 OF 12	EXISTING BOUNDARY PLAN
EC-1	3 OF 12	EXISTING CONDITIONS PLAN
SP-1	4 OF 12	PROPOSED SITE PLAN
ED-1	5 OF 12	ENTRANCE DETAIL PLAN
SEP-1	6 OF 12	SEPTIC DESIGN AND UTILITY PLAN
SEP-2	7 OF 12	SEPTIC DESIGN PLAN
LPP-1	8 OF 12	LIGHTING PLAN
MD-1	9 OF 12	MISCELLANEOUS DETAIL SHEET
MD-2	10 OF 12	MISCELLANEOUS DETAIL SHEET
ARCH-1	11 OF 12	FLOOR PLAN OF PROPOSED RESTAURANT
ARCH-2	12 OF 12	ELEVATION PROPOSED RESTAURANT

OWNER / APPLICANT:

MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053

PROFESSIONAL CONSULTANTS LIST

ENGINEER: BROWN ENGINEERING, LLC
34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
OFFICE PHONE - 603-744-1044

SURVEYOR: FRENCH LAND SERVICES INC.
581 SCHOOL STREET
RUMNEY, NH 03266
OFFICE PHONE - 603786-9790

SOIL SCIENTIST & WELTAND SCIENTIST: POWELL ASSET MAPPING, LLC
234 CRYSTAL LAKE ROAD
GILMINTON IRON WORKS, NH 03837
OFFICE PHONE - 603-364-0136

DIG SAFE
ME NH VT
CALL 1-888-DIG-SAFE TOLL FREE
UTILITY UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

CONTACT DIG SAFE 72 HOURS PRIOR TO CONSTRUCTION

THE LOCATION OF ANY UTILITY INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE. BROWN ENGINEERING, LLC MAKES NO CLAIM TO THE ACCURACY OR COMPLETENESS OF UTILITIES SHOWN. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ANY UTILITIES WHETHER THEY BE ABOVE OR BELOW GROUND. PRIOR TO ANY EXCAVATION ON SITE THE CONTRACTOR SHALL CONTACT DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233).

AGENCY APPROVALS

NH DOT DRIVEWAY PERMIT # 269-206

NHDES SUBSURFACE SEWAGE DISPOSAL PERMIT # PENDING

INITIAL PLAN SET SUBMISSION DATE

DECEMBER 18, 2025

LATEST REVISION DATE:
FEBRUARY 12/2026

NO.	DATE	DESCRIPTION	BY

OWNERS CERTIFICATION

APPROVED BY THE LONDONDERRY, NH PLANNING BOARD
ON DATE: _____
CERTIFIED BY: _____

NOTE:

ALL MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE TOWN OF LONDONDERRY REGULATIONS AND THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", LATEST EDITION.

PREPARED BY:

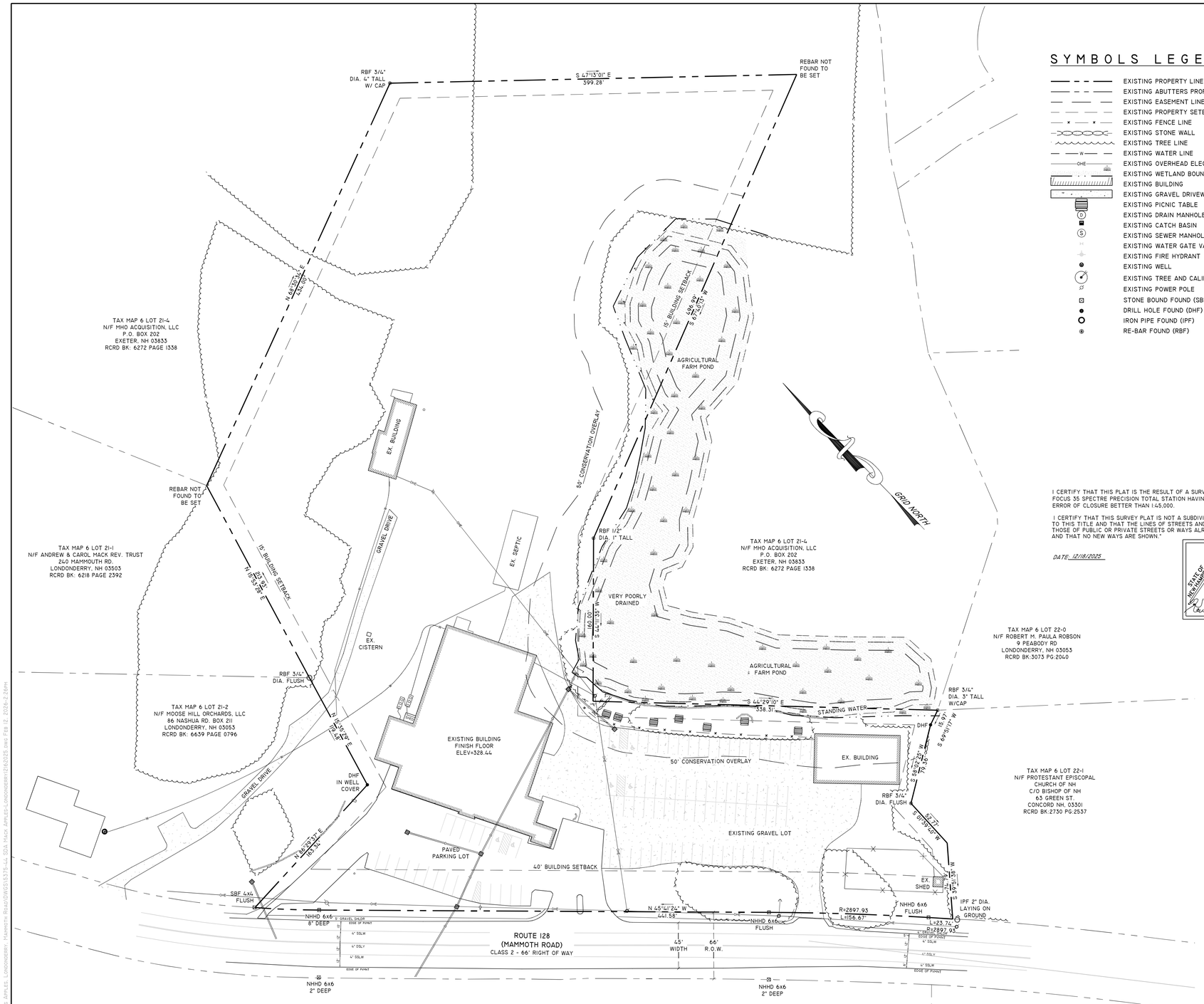
BROWN ENGINEERING LLC
34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

BROWN ENGINEERING
CIVIL ENGINEERS

FRENCH LAND SERVICES INC.
581 SCHOOL STREET
RUMNEY, N.H. 03266
TEL: (603) 786-9790
FRENCH@WORLDPATH.NET

FRENCH
LAND SERVICES INC.

G:\CLIENTS\5375-LL SDA-Macks Apples, Londonderry, Mammoth Road\DWGS\5379-LL SDA Macs Apples-Londonderry2262025.dwg Feb 12, 2026-2:26pm



SYMBOLS LEGEND

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- EXISTING BUILDING
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- EXISTING FIRE HYDRANT
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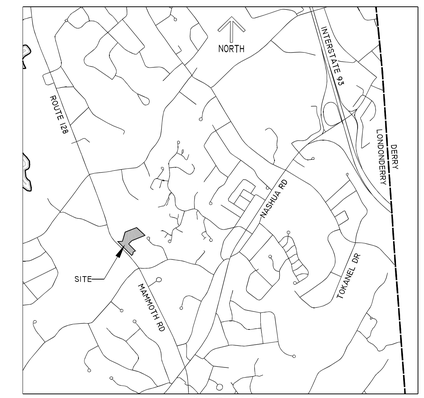
- EXISTING POWER POLE
- STONE BOUND FOUND (SBF)
- DRILL HOLE FOUND (DHF)
- IRON PIPE FOUND (IPF)
- RE-BAR FOUND (RBF)

I CERTIFY THAT THIS PLAT IS THE RESULT OF A SURVEY DONE WITH A FOCUS 35 SPECTRE PRECISION TOTAL STATION HAVING AN UNADJUSTED ERROR OF CLOSURE BETTER THAN 1:45,000.

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN."

DATE: 12/18/2025

STATE OF NEW HAMPSHIRE — No. 664 — KEVIN L. FRENCH — LICENSED LAND SURVEYOR



VICINITY MAP
SCALE 1" = 2500'

GENERAL NOTES:

1. THE PROPERTY IS DESIGNATED TAX MAP 6 LOT 21.
   THE PROPERTY IS 8.0± ACRES IN SIZE.
   THE OWNER OF RECORD IS:
   MHO ACQUISITION LLC.
   230 MAMMOTH ROAD
   LONDONDERRY, NH 03053
   BOOK 6272 PAGE 1338 ROCKINGHAM COUNTY
2. THE PROPERTY IS ZONED AGRICULTURAL RESIDENTIAL (AR-1).
3. EXISTING USE IS AGRICULTURAL AND PROPOSED USE IS AGRICULTURAL.
4. TOWN OF LONDONDERRY BUILDING SETBACKS:
   40' FRONT
   15' SIDE YARD
   15' REAR
   35' BUILDING HEIGHT
5. TOPOGRAPHY SHOWN IN PLAN IS A MIXTURE OF ON GROUND TOPO BY BROWN ENGINEERING LLC. AND LIDAR FROM FLIGHTS PROVIDED BY EARTH SYSTEMS RESEARCH CENTER, INSTITUTE FOR THE STUDY OF EARTH OCEANS AND SPACE, & UNIVERSITY OF NEW HAMPSHIRE. DATUM IS BASED ON NAD 1983.
6. NO PORTION OF THE SUBJECT PARCEL IS IN THE FLOODPLAIN PER FEMA PANEL # 33015C0526E.
7. ABUTTING PARCELS PROPERTY LINES ARE BASED ON TAX MAP INFORMATION AND ARE APPROXIMATE.
8. BOUNDARY INFORMATION DEPICTED IS FROM FIELD LOCATION OF MONUMENTS AND DEPENDENT UPON A PLAN ENTITLED " TAX MAP 6 LOT 21 SUBDIVISION PLAN PREPARED FOR MOOSE HILL ORCHARDS, INC. LAND OF MOOSE HILL ORCHARDS, INC. 230 MAMMOTH RD., LONDONDERRY, NH SCALE: 1"= 50' DATE: OCTOBER 2, 1998 SHEETS 1 THROUGH 5 REVISED 5/8/99, 2/8/99 BY BEDFORD DESIGN CONSULTANTS " RECORDED IN RCRD PLAN #D-27284.
9. BEARINGS ESTABLISHED USING GPS OBSERVATIONS PREFORMED MAY 2025.

PLANS OF REFERENCE:

1. PLAN ENTITLED "TAX MAP 6 LOT 21 SUBDIVISION PLAN PREPARED FOR MOOSE HILL ORCHARDS, INC. LAND OF MOOSE HILL ORCHARDS, INC. 230 MAMMOTH RD." LONDONDERRY, NH SCALE: 1"= 50' DATE: OCTOBER 2, 1998 SHEETS 1 THRU 5 REVISED 5/8/99, 2/8/99 BY BEDFORD DESIGN CONSULTANTS " RECORDED IN RCRD PLAN #D-27284.

FRENCH LAND SERVICES INC.
581 SCHOOL STREET
RUMNEY, N.H. 03266
TEL: (603) 786-9790
FRENCHLS@WORLDPATH.NET

FRENCH LAND SERVICES INC.

MACK'S APPLES FARM MARKET
EXISTING BOUNDARY PLAN
TAX MAP 6 LOT 21
230 MAMMOTH ROAD, LONDONDERRY, NH 03053

PREPARED FOR:
MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

PREPARED BY:
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34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

BROWN ENGINEERING
CIVIL ENGINEERS

GRAPHIC SCALE
50' 20' 0 50'
SCALE: 1" = 50'

REV.	DATE	DESCRIPTION	BY
1	2/6/2026	ADD EXIST RTE 28 STRIPPING	KLB

DATE: 12-18-2025
JOB NO: 5375-44

EB-1
2 OF 12

G:\CLIENTS\5375-44_SDA-Macks Apples, Londonderry, Mammoth Road\DWGS\5375-44 SDA Macks Apples-Londonderry12626205 dwg Feb 12, 2026 - 2:24pm

SYMBOLS LEGEND

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- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING OVERHEAD ELECTRIC
- EXISTING WETLAND BOUNDARY
- EXISTING BUILDING
- EXISTING GRAVEL DRIVEWAY
- EXISTING PICNIC TABLE
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
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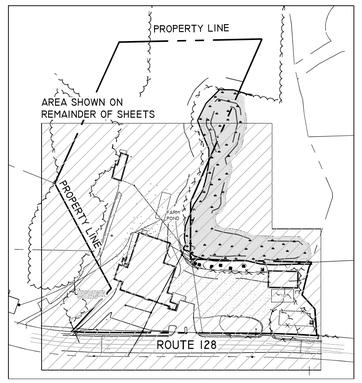
- IRON PIPE FOUND (IPF)
- RE-BAR FOUND (RBF)
- PHOTO NUMBER AND DIRECTION



AREA MAP
SCALE 1" = 200'

TEST PIT #1

0"-6"	DARK GRAYISH BROWN - 10YR 4/2 GRAVELLY SAND, 15% FINE GRAVEL, LOOSE FINE ROOTS
6"-26"	LIGHT OLIVE BROWN - 2.5Y 5/3 SANDY LOAM, SUBANGULAR BLOCKY STRUCTURE, 10% COBBLES, FINE ROOTS
26"-34"	LIGHT YELLOWISH BROWN - 2.5Y 6/3 SANDY LOAM, FRIABLE, 10% COBBLES
34"-49"	BROWN - 10YR 5/3 GRAVELLY SAND, LOOSE, 10% COBBLES
49"-60"	LIGHT YELLOWISH BROWN - 2.5Y 6/3 GRAVELLY SAND, LOOSE, 15% FINE GRAVEL, 10% COBBLES

ESHWT = 26"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #2

0"-10"	VERY DARK BROWN - 10YR 2/2 TRANSPORTED CRUSHED GRAVEL
10"-25"	DARK GRAYISH BROWN - 2.5Y 4/2 LOAMY SAND, FRIABLE,
25"-36"	VERY DARK GRAY - 2.5Y 3/1 LOAMY SAND, FRIABLE

ESHWT = 25"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #3

0"-13"	DARK GRAYISH BROWN - 10YR 3/2 FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, FINE ROOTS
13"-16"	DARK BROWN - 10YR 3/3 FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, FINE ROOTS
16"-27"	BROWN - 10YR 4/3 LOAMY SAND, MEDIUM SUBANGULAR BLOCKY, FRIABLE, FINE ROOTS, 5% COBBLES
27"-45"	LIGHT YELLOWISH BROWN - 2.5Y 6/3 LOAMY SAND, MASSIVE, FRIABLE
45"-60"	LIGHT OLIVE BROWN - 2.5Y 5/4 LOAMY SAND, MEDIUM SUBANGULAR BLOCKY, FRIABLE

ESHWT = 49"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #4

0"-12"	BLACK - 10YR 2/1 COBBLY FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, 20% COBBLES
12"-18"	VERY DARK GRAY - 10YR 3/1 SANDY LOAM, MODERATE MEDIUM SUBANGULAR BLOCKY, FRIABLE, FEW FINE ROOTS
18"-35"	GRAYISH BROWN - 10YR 5/2 GRAVELLY FINE SANDY LOAM, MODERATE MEDIUM SUBANGULAR BLOCKY, FRIABLE, 15% COARSE GRAVEL
35"-51"	LIGHT OLIVE BROWN - 2.5Y 5/3 GRAVELLY MEDIUM SAND, LOOSE, 15% COARSE GRAVEL
51"-60"	DARK YELLOWISH BROWN - 10YR 3/6 GRAVELLY SAND, MASSIVE, FRIABLE, 15% FINE GRAVEL

ESHWT = 18"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #5

0"-9"	VERY DARK GRAYISH BROWN - 10YR 3/2 FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, FINE ROOTS
9"-13"	DARK BROWN - 7.5YR 3/4 SANDY LOAM, MODERATE MEDIUM SUBANGULAR BLOCKY, FRIABLE, 3% COARSE GRAVEL
13"-27"	LIGHT OLIVE BROWN - 2.5Y 5/3 SANDY LOAM, MODERATE MEDIUM SUBANGULAR BLOCKY, FRIABLE
27"-60"	LIGHT OLIVE BROWN - 2.5Y 5/4 GRAVEL SAND, LOOSE, 15% COARSE GRAVEL

ESHWT = 34"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #6

0"-10"	DARK GRAYISH BROWN - 10YR 4/2 LOAM, LOOSE, MANY FINE AND MEDIUM ROOTS
10"-42"	BROWN - 7.5YR 5/4 FINE SANDY LOAM, FRIABLE
42"-90"	LIGHT BROWNISH GRAY - 7.5Y 5/4 FINE SANDY LOAM FRIABLE

ESHWT = 42"
NO OBSERVED WATER
NO OBSERVED LEDGE
PERC RATE = 6 MIN./INCH @ 12"

TEST PIT #7

0"-8"	DARK GRAYISH BROWN - 10YR 3/2 LOAM, LOOSE, MANY FINE ROOTS
8"-12"	REDDISH BROWN - 2.5YR 4/4 FINE SANDY LOAM, LOOSE
12"-36"	BROWN - 7.5Y 5/4 FINE SANDY LOAM , LOOSE, NO ROOTS
36"-42"	BROWNISH YELLOW - 10YR 6/6 SAND, GRANULER
42"-90"	STRONG BROWN - 7.5YR 5/6 SILTY SAND AND GRAVEL FRIABLE

ESHWT = 36"
NO OBSERVED WATER
NO OBSERVED LEDGE
PERC RATE = 6 MIN./INCH @ 12"

STATE OF NEW HAMPSHIRE
LUKE P. POWELL
No. 050
CERTIFIED WETLAND SCIENTIST

WETLAND DELINEATION CERTIFICATION

WETLANDS WERE DELINEATED BY CHRISTOPHER HUYLER AND FIELD CHECKED ON 11-20-2025 BY LUKE POWELL, CERTIFIED WETLAND SCIENTIST #50, ACCORDING TO THE STANDARDS PUBLISHED IN THE US ARMY CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL (TECHNICAL REPORT Y-87-1) ALONG WITH THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION (VERSION 2.0, JANUARY 2012). HYDRIC SOILS WERE DETERMINED UTILIZING FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND (VERSION 4, JUNE 2020).

WETLAND CLASSIFICATION

WETLANDS WERE CLASSIFIED ACCORDING TO THE STANDARDS PUBLISHED IN CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES, BY LEWIS COWARDIN ET. AL., DECEMBER 1979, FWS/OBSS-79/31 US FISH & WILDLIFE SERVICE.

PFOI/SSIE – PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS OVER SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED WETLAND.
PUB2HX – PALUSTRINE, UNCONSOLIDATED BOTTOM, SAND, PERMANENTLY FLOODED, EXCAVATED (MAN-MADE IRRIGATION POND CONSTRUCTED IN 1948 +/-).

SOILS MAPPING CERTIFICATION

A SITE SPECIFIC SOIL SURVEY WAS COMPLETED NOVEMBER 20, 2025 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. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED TO SUPPORT ENGINEERING AND PERMITTING FOR PROPOSED SITE DEVELOPMENT. IT WAS PRODUCED BY NH CERTIFIED SOIL SCIENTIST LUKE POWELL (CSS NO. 81). THIS MAP IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP.

SOILS LEGEND

42	CANTON
444	NEWFIELDS
496	NATCHAUG
921	NEWFIELDS VARIANT (SOMEWHAT POORLY DRAINED)

DISTURBED SOILS
299A-B/DCAAA – UDORTHENTS, SMOOTHED ON AN A AND B SLOPES/MODERATELY WELL DRAINED; GLACIAL TILL PARENT MATERIAL; NO RESTRICTIVE LAYERS; ESTIMATED KSAT IS HIGH; HYDROLOGIC SOIL GROUP IS A.

SLOPE PHASES

A	0 - 3%
B	3 - 8%
C	8 - 15%
D	15 - 25%
E	25 - 50%
F	50% +

OWNERS CERTIFICATION

MACK'S APPLES FARM MARKET

EXISTING CONDITIONS PLAN

TAX MAP 6 LOT 21

230 MAMMOTH ROAD, LONDONDERRY, NH 03053

PREPARED FOR:
MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

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CIVIL ENGINEERS

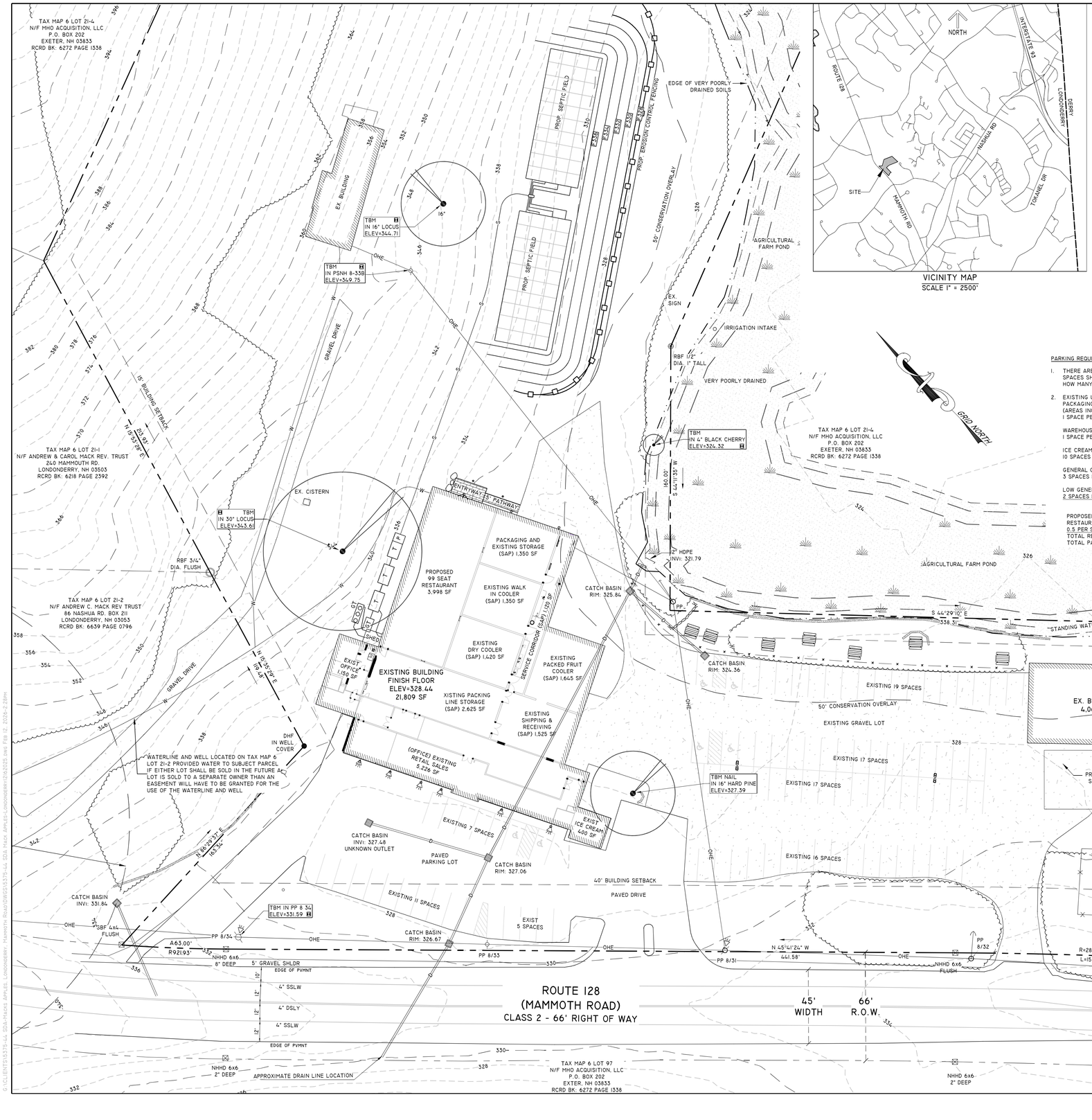
GRAPHIC SCALE
30' 15' 0 30'
SCALE: 1" = 30'

DATE: 12-18-2025
JOB NO: 5375-44

REV.	DATE	DESCRIPTION	BY
1	2/6/2026	ADD EXIST RTE 28 STRIPPING	KLB
2	2/12/2026	REVISIONS PER THIRD PARTY REVIEW	KLB

EC-1
3 OF 12

G:\CLIENTS\5375-44 -SDA-Macks Apples, Londonderry, Maximo Road\DWGS\5375-44 -SDA Macks Apples-Londonderry-2-6-2026.dwg Feb 12, 2026-2:27pm


TAX MAP 6 LOT 21-4
N/F MHO ACQUISITION, LLC
P.O. BOX 202
EXETER, NH 03833
RCRD BK: 6272 PAGE 1338
TAX MAP 6 LOT 21-1
N/F ANDREW & CAROL MACK REV. TRUST
240 MAMMOTH RD.
LONDONDERRY, NH 03503
RCRD BK: 6218 PAGE 2392
TAX MAP 6 LOT 21-2
N/F ANDREW C. MACK REV TRUST
86 NASHUA RD. BOX 211
LONDONDERRY, NH 03053
RCRD BK: 6639 PAGE 0796
EDGE OF VERY POORLY DRAINED SOILS
PROP. SEPTIC FIELD
PROP. EROSION CONTROL FENCING
50' CONSERVATION OVERLAY
AGRICULTURAL FARM POND
EX. BUILDING
TBM IN 16" LOCUS ELEV=344.71
TBM IN PSNH 8-33B ELEV=349.75
TBM IN 30" LOCUS ELEV=343.61
TBM IN 4" BLACK CHERRY ELEV=324.32
TBM IN PP 8 34 ELEV=331.59
TBM NAIL IN 16" HARD PINE ELEV=327.39
EX. SIGN
IRRIGATION INTAKE
RBF 1/2" DIA. 1' TALL
VERY POORLY DRAINED
GRAVEL DRIVE
15' BUILDING SETBACK
EX. CISTERN
ENTRYWAY
5' PATHWAY
RBF 3/4" DIA. FLUSH
PROPOSED 99 SEAT RESTAURANT 3,998 SF
EXISTING WALK IN COOLER (SAP) 1,350 SF
EXISTING DRY COOLER (SAP) 1,420 SF
EXISTING PACKED FRUIT COOLER (SAP) 1,665 SF
SERVICE CORRIDOR (SAP) 1,120 SF
XISTING PACKING LINE STORAGE (SAP) 2,625 SF
EXISTING SHIPPING & RECEIVING (SAP) 1,525 SF
PACKAGING AND EXISTING STORAGE (SAP) 1,350 SF
EXIST OFFICE 1,150 SF
EXISTING BUILDING FINISH FLOOR ELEV=328.44 21,809 SF
(OFFICE) EXISTING RETAIL SALES 5,226 SF
EXIST ICE CREAM 400 SF
SHED
WATERLINE AND WELL LOCATED ON TAX MAP 6 LOT 21-2 PROVIDED WATER TO SUBJECT PARCEL IF EITHER LOT SHALL BE SOLD IN THE FUTURE AS A LOT IS SOLD TO A SEPARATE OWNER THAN AN EASEMENT WILL HAVE TO BE GRANTED FOR THE USE OF THE WATERLINE AND WELL
DHF IN WELL COVER
CATCH BASIN INVI: 327.48 UNKNOWN OUTLET
CATCH BASIN RIM: 327.06
CATCH BASIN RIM: 325.84
CATCH BASIN RIM: 324.36
CATCH BASIN INVI: 331.84
12" HDPE INVI: 321.79
PAVED PARKING LOT
EXISTING 7 SPACES
EXISTING 11 SPACES
EXISTING 5 SPACES
EXISTING 16 SPACES
EXISTING 17 SPACES
EXISTING 19 SPACES
EXISTING GRAVEL LOT
50' CONSERVATION OVERLAY
40' BUILDING SETBACK
PAVED DRIVE
EX. BUILDING 4,060 SF
PRO SNOW STORAGE
EX. SHED
RBF 3/4" DIA. FLUSH
RBF 3/4" DIA. 3" TALL W/CAP
IPF 2" DIA. LAYING ON GROUND
SBF 4X4 FLUSH
NHHD 6X6 FLUSH
NHHD 6X6 8" DEEP
NHHD 6X6 2" DEEP
5' GRAVEL SHLDR
EDGE OF PVMNT
4" SSLW
4" DSLY
APPROXIMATE DRAIN LINE LOCATION
ROUTE 128
(MAMMOTH ROAD)
CLASS 2 - 66' RIGHT OF WAY
45' WIDTH
66' R.O.W.
TAX MAP 6 LOT 97
N/F MHO ACQUISITION, LLC
P.O. BOX 202
EXTER, NH 03833
RCRD BK: 6272 PAGE 1338
TAX MAP 6 LOT 22-0
N/F ROBERT M. PAULA ROBSON
9 PEABODY RD
LONDONDERRY, NH 03053
RCRD BK:3073 PG:2040
TAX MAP 6 LOT 22-1
N/F PROTESTANT EPISCOPAL CHURCH OF NH
C/O BISHOP OF NH
63 GREEN ST.
CONCORD, NH, 03301
RCRD BK:2730 PG:2537
GRID NORTH
S 44°29'10" E 338.31'
S 89°02'25" W 77.36'
S 00°39'20" W 52.77'
S 00°51'17" W 15.97'
S 44°41'35" W 460.00'
N 45°41'24" W 441.58'
R=2897.93 L=156.67'
R=2897.93 L=23.74'
A63.00' R921.93'
N 86°00'37" E 163.52'
N 11°52'08" E 204.92'
N 08°45'29" E 104.48'
S 89°15'58" W 74.17'
STANDING WATER
EXISTING 8 SPACES
EXISTING 4 SPACES
EXISTING 2 SPACES
EXISTING 3 SPACES
EXISTING 1 SPACE

PROP BOULDER RETAINING WALL

ENTRYWAY TO BE PERMEABLE PAVERS

ENTRYWAY

FF 328.44

5' SIDEWALK

EXIST GRAVEL AREA

EX. CISTERN

TBM
IN 30" LOCUS
ELEV=343.61

1000 GALLON PUMP TANK

1600 GALLON SEPTIC TANK

2000 GALLON SEPTIC TANK

2000 GALLON SEPTIC TANK

500/1500 GREASE TRAP

500/1500 GREASE TRAP

SHED

PROPOSED 99 SEAT RESTAURANT

EXISTING STORAGE

EXIST WALK IN COOLER

EXIST DRY COOLER

SERVICE CORRIDOR

EXISTING PACKED FRUIT COOLER

EXIST OFFICE

EXISTING BUILDING FINISH FLOOR ELEV=328.44

EXIST PACKING LINE STORAGE

EXISTING SHIPPING & RECEIVING

N 15°35'29" E
119.48'

TBM
IN 4" BLACK CHERRY
ELEV=324.32

160.00'
S 44°11'35" W

PP

GRID NORTH

SYMBOLS LEGEND

- EXISTING PROPERTY LINE
- EXISTING PROPERTY SETBACK LINE
- EXISTING 2 FOOT CONTOUR
- EXISTING 10 FOOT CONTOUR
- EXISTING TREE LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING OVERHEAD ELECTRIC
- EXISTING WETLAND BOUNDARY
- EXISTING BUILDING
- EXISTING GRAVEL DRIVEWAY
- EXISTING CATCH BASIN
- EXISTING WELL
- EXISTING TREE AND CALIPER
- EXISTING POWER POLE
- TEMPORARY BENCH MARK (TBM)
- STONE BOUND FOUND (SBF)
- DRILL HOLE FOUND (DHF)
- IRON PIPE FOUND (IPF)
- PROPOSED 2 FOOT CONTOUR
- PROPOSED 10 FOOT CONTOUR
- PROPOSED BUILDING
- PROPOSED SEPTIC GRAVITY LINE
- PROPOSED FORCE-MAIN LINE
- PROPOSED LIGHTING UNITS

STATE OF NEW HAMPSHIRE
KENT L BROWN
No. 7456
LICENSED PROFESSIONAL ENGINEER

MACK'S APPLES FARM MARKET

ENTRANCE DETAIL PLAN

TAX MAP 6 LOT 21

230 MAMMOTH ROAD, LONDONDERRY, NH 03053

MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

PREPARED BY:
BROWN ENGINEERING LLC
34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

GRAPHIC SCALE
10' 5' 0 10'
SCALE: 1" = 10'

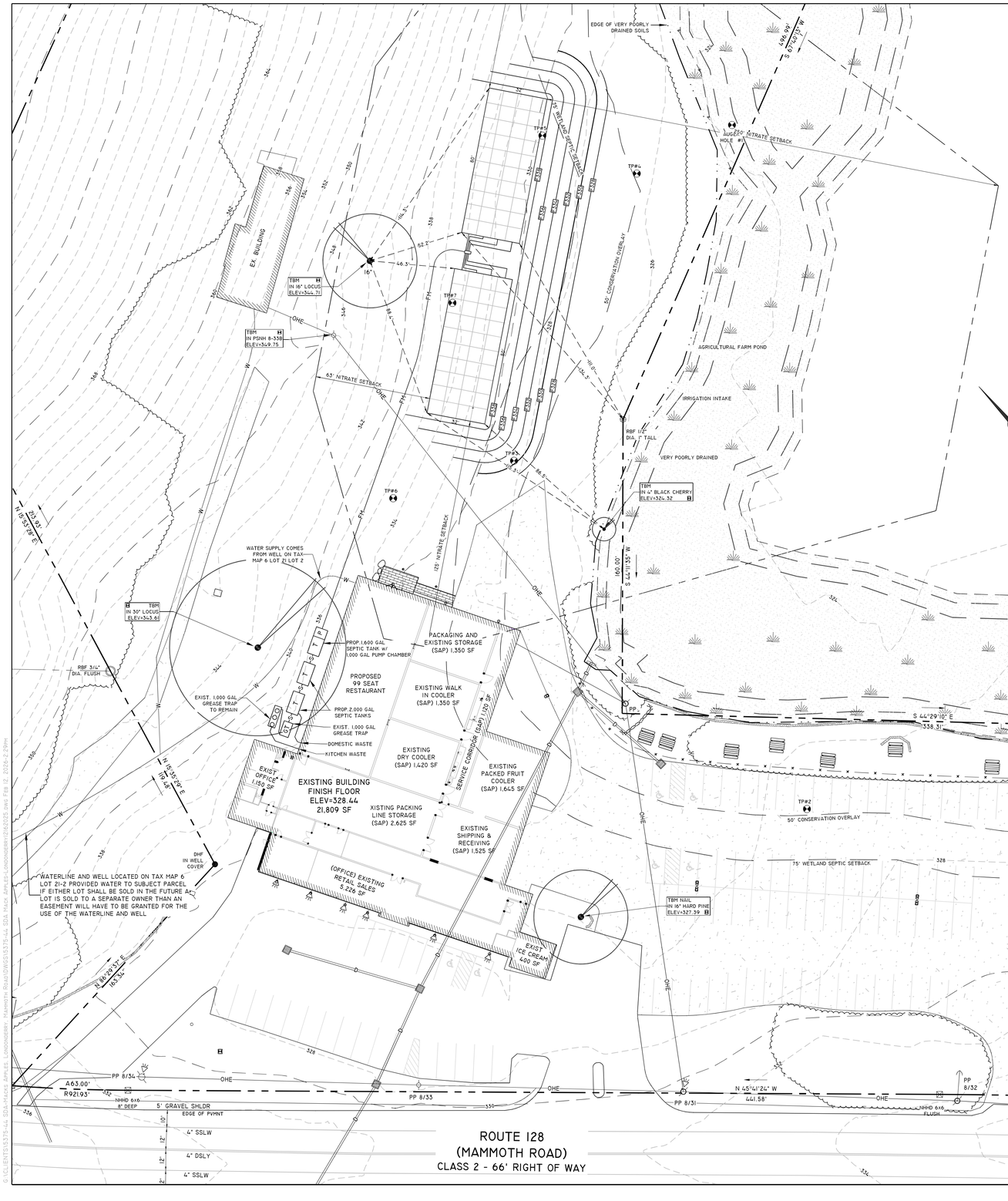
BROWN ENGINEERING
CIVIL ENGINEERS

REV.	DATE	DESCRIPTION	BY
1	2/12/2026	REVISIONS PER THIRD PARTY REVIEW	KLB

DATE: 12-18-2025
JOB NO: 5375-44

ED-1
5 OF 12

© CIVIL ENGINEERS 5375-44 ENTRANCE DETAIL (MACK'S FARM MARKET, LONDONDERRY, ROCKINGHAM COUNTY, NEW HAMPSHIRE) 5375-44 ED1 ENTRANCE DETAIL.DWG, 2/12/2026 2:08:11 PM, JAMES LONGMEMORY



SYSTEM DESIGN CALCULATIONS:

PROPOSED FLOW RATE:
99 SEAT RESTAURANT x 40 GPD/SEAT = 3,960 GPD
14 EMPLOYEES x 20 GPD/EMPLOYEE = 280 GPD
(1 EMPLOYEE PER 12 SEATS)

EXISTING FLOW RATE:
RETAIL SPACE:
2 EMPLOYEES x 20 GPD/EMPLOYEE = 40 GPD
PLUS 5 GPD/100SF x 250 SF = 12.5 GPD

OFFICE:
3 EMPLOYEES x 10 GPD/EMPLOYEE = 30 GPD

ICE CREAM STAND:
4 EMPLOYEES x 20 GPD/EMPLOYEE = 300 GPD
4 EMPLOYEES x 20 GPD/EMPLOYEE = 80 GPD

WAREHOUSE/FOOD MAUFACTURING:
9 EMPLOYEES x 10 GPD/EMPLOYEE = 90 GPD
TOTAL = 4,792.5 GPD

EFFLUENT DISPOSAL AREA (EDA)
PERC RATE 6 MINUTES/INCH
155 SF OF CONCRETE CHAMBERS/100 GPD x 4,792.5 GPD = 7,428.4 SF
PER ENV-WQ 1016.02(B) BED SIZE IS 60% OF 7,428.4 SF = 4,457.1 SF REQUIRED
TWO SYSTEMS 80' LONG x 32' WIDE = 2,560 LF X 2 = 5,120 LF PROVIDED
80 TOTAL CONCRETE CHAMBERS (8' WIDE X 8' LENGTH X 15" TALL)

TANK SIZE:
2,000 GALLONS PLUS 70% OF GPD
4,792.5 x 0.7 + 2,000 = 5,355 GALLONS REQUIRED
TWO 2,000 GALLON + ONE 1600/1000 TANK HD = 5,600 GALLONS PROVIDED

GREASE TRAP SIZE:
99 SEAT RESTAURANT x 2 MEALS/DAY = 198 MEALS/DAY
198 MEALS/DAY x 3 GPD/MEAL = 594 GPD
14 EMPLOYEES x 20 GPD/EMPLOYEE = 280 GPD
TOTAL KITCHEN FLOW = 874 GPD

PER ENV-WQ 1012.02 GREASE TANK SHALL BE SIZED TO HOLD 36 HOURS OF HYDRAULIC DETENTION.
874 GPD x 1.5 DAY = 1,311 GALLONS REQUIRED
TWO 1,000 GALLON TANKS PROPOSED = 2,000 GALLONS

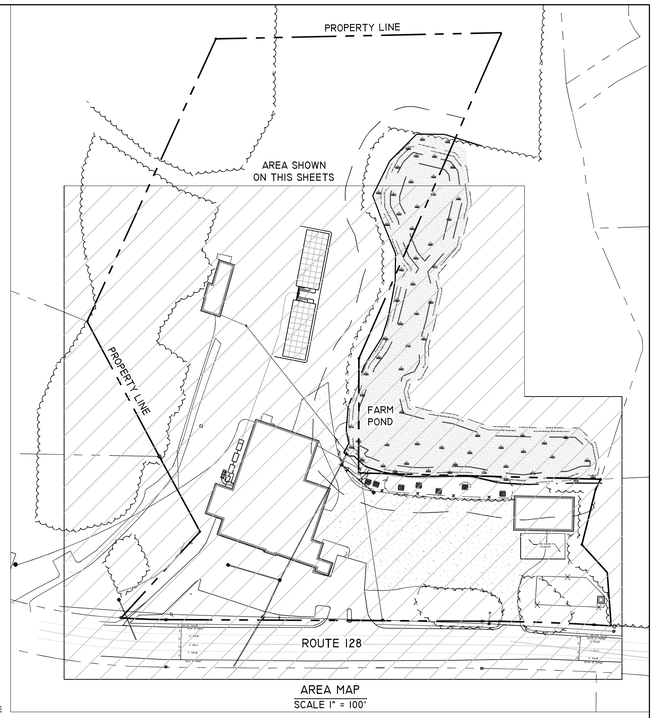
NITRATE SETBACKS:
DOWN GRADIENT 250 FT
SIDE GRADIENT 125 FT
UP GRADIENT 63 FT

WELL RADIUS:
150 FT

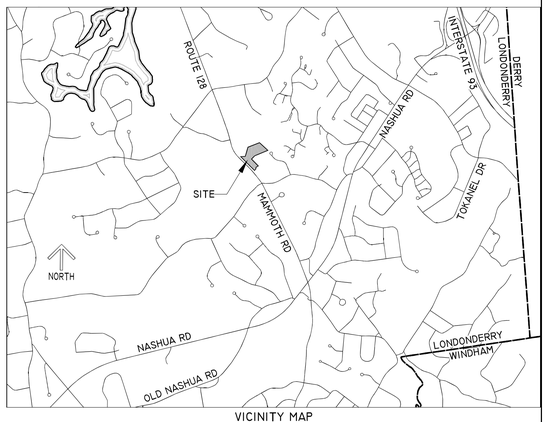
GRID NORTH

SYMBOLS LEGEND

- UTILITY POLE (PP)
- IRON PIPE FPUND (IPF)
- STONE BOUND FOUND (SPF)
- PROPERTY LINE
- 538 EXISTING CONTOUR
- F538 PROPOSED CONTOUR
- TREELINE
- STONE RETAINING WALL
- W PROPOSED WELL AND WATER LINE
- FM 2" FORCE MAIN SEPTIC LINE
- S 4" GRAVITY SEPTIC LINE
- VERY POORLY DRAINED SOILS CREATED BY AGRICULTURAL POND
- BENCHMARK
- TEST PIT



AREA MAP
SCALE 1" = 100'



VICINITY MAP
SCALE 1" = 2500'

MACK'S APPLES FARM MARKET

SANITARY SYSTEM DESIGN PLAN

TAX MAP 6 LOT 21
230 MAMMOTH ROAD, LONDONDERRY, NH 03053

PREPARED FOR:
MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

PREPARED BY:
BROWN ENGINEERING LLC
34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

GRAPHIC SCALE
20' 10' 0 20'
SCALE: 1" = 20'

BROWN ENGINEERING
CIVIL ENGINEERS

DATE: 1-14-2026
JOB NO: 5375-44

REV.	DATE	DESCRIPTION	BY

SEP-1
1 OF 1

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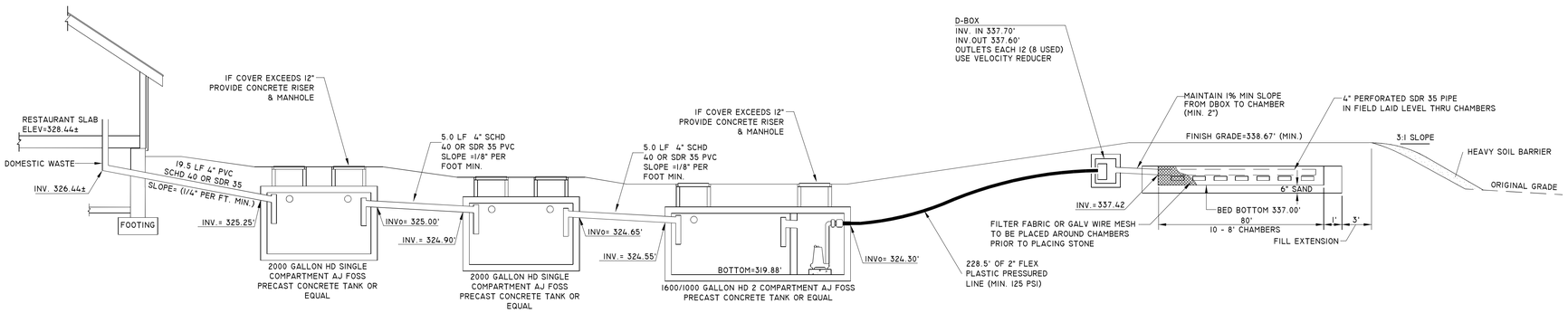
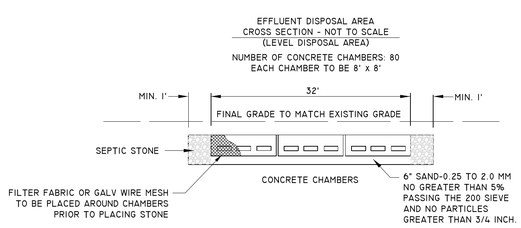
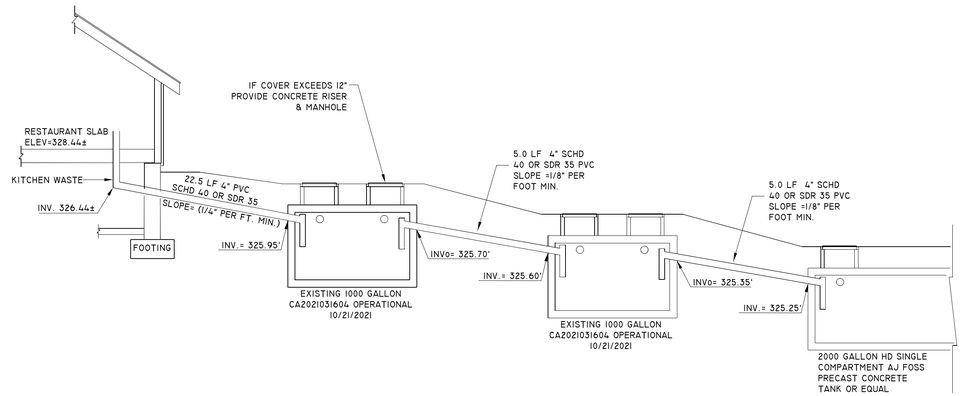


PROFILE
NOT TO SCALE



TYPICAL CROSS SECTION
NOT TO SCALE



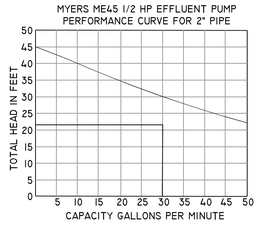
PROFILE
NOT TO SCALE

PUMP CALCULATIONS FOR PUMP
IN TANK ATTACHED TO MAIN HOUSE:
USE MYERS EFFLUENT PUMP ME45 1/2 HP.

ELEVATION DIFF. PUMP OFF TO D-BOX= 15.48'
FRICTION LOSS FOR 2" PLASTIC = ±6.75'
TOTAL HEAD = ±22.23'

PUMP ON = 321.91'
PUMP OFF = 320.38'
HIGH WATER ALARM = 321.96'

400 GALLONS/DOSE 12 TIMES/DAY=4792.5 GPD



TEST PIT #3

0"-13"	DARK GRAYISH BROWN - 10YR 3/2 FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, FINE ROOTS
13"-16"	DARK BROWN - 10YR 3/3 FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, FINE ROOTS
16"-27"	BROWN - 10YR 4/3 LOAMY SAND, MEDIUM SUBANGULAR BLOCKY, FRIABLE, FINE ROOTS, 5% COBBLES
27"-45"	LIGHT YELLOWISH BROWN - 2.5Y 6/3 LOAMY SAND, MASSIVE, FRIABLE
45"-60"	LIGHT OLIVE BROWN - 2.5Y 5/4 LOAMY SAND, MEDIUM SUBANGULAR BLOCKY, FRIABLE

ESHWT = 49"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #5

0"-9"	VERY DARK GRAYISH BROWN - 10YR 3/2 FINE SANDY LOAM, WEAK FINE GRANULAR, FRIABLE, FINE ROOTS
9"-13"	DARK BROWN - 7.5YR 3/4 SANDY LOAM, MODERATE MEDIUM SUBANGULAR BLOCKY, FRIABLE, 3% COARSE GRAVEL
13"-27"	LIGHT OLIVE BROWN - 2.5Y 5/3 SANDY LOAM, MODERATE MEDIUM SUBANGULAR BLOCKY, FRIABLE
27"-60"	LIGHT OLIVE BROWN - 2.5Y 5/4 GRAVEL SAND, LOOSE, 15% COARSE GRAVEL

ESHWT = 36"
NO OBSERVED WATER
NO OBSERVED LEDGE

TEST PIT #6

0"-10"	DARK GRAYISH BROWN - 10YR 4/2 LOAM, LOOSE, MANY FINE AND MEDIUM ROOTS
10"-42"	BROWN - 7.5YR 5/4 FINE SANDY LOAM, FRIABLE
42"-90"	LIGHT BROWNISH GRAY - 7.5Y 5/4 FINE SANDY LOAM FRIABLE

ESHWT = 42"
NO OBSERVED WATER
NO OBSERVED LEDGE
PERC RATE = 6 MIN./INCH @ 12"

TEST PIT #7

0"-8"	DARK GRAYISH BROWN - 10YR 3/2 LOAM, LOOSE, MANY FINE ROOTS
8"-12"	REDDISH BROWN - 2.5YR 4/4 FINE SANDY LOAM, LOOSE
12"-36"	BROWN - 7.5Y 5/4 FINE SANDY LOAM , LOOSE, NO ROOTS
36"-42"	BROWNISH YELLOW - 10YR 6/6 SAND, GRANULER
42"-90"	STRONG BROWN - 7.5YR 5/6 SILTY SAND AND GRAVEL FRIABLE

ESHWT = 36"
NO OBSERVED WATER
NO OBSERVED LEDGE
PERC RATE = 6 MIN./INCH @ 12"

NOTES

1. THIS IS NOT A PROPERTY LINE SURVEY. NO CERTIFICATION OR OPINION AS TO THE ACCURACY OF PROPERTY LINES IS EITHER EXPRESSED OR IMPLIED. DATA SHOWN HEREON IS BASED UPON IMMEDIATE PUBLIC RECORDS AND MAY NOT BE ACCURATE. ALL PROPERTY LINES ARE TO BE VERIFIED BY THE CONTRACTOR OR OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THE INSTALLER SHALL NOT ALLOW ANY VEHICULAR TRAVEL TO OCCUR ACROSS THE PROPOSED LEACH FIELD AREA AT ANY TIME EXCEPT DURING THE CONSTRUCTION OF THE LEACH FIELD.
3. THERE ARE NO OPEN WATER OR HYDRIC "A" SOILS WITHIN 75' OF THIS PROPOSED SYSTEM OR ITS COMPONENTS, AND THERE ARE NO HYDRIC "B" SOILS WITHIN 50' OF THIS PROPOSED SYSTEM OR ITS' COMPONENTS
4. FIELD IS TO BE REBUILT IN PLACE IF REPLACEMENT BECOMES NECESSARY.
5. ALL CONNECTIONS BETWEEN A SEPTIC TANK AND THE PIPES LEADING TO AND EXITING FROM THE SEPTIC TANK SHALL BE SEALED WITH WATERTIGHT, FLEXIBLE JOINT CONNECTOR
6. ALL INVERT ELEVATIONS AND GRADES ARE REFERENCED FROM T.B.M. DEPICTED HEREON
7. CAUTION TO BE EXERCISED DURING FILL PLACEMENT/SITE PREPARATION TO AVOID COMPACTION OR SMEARING OF THE INFILTRATIVE SURFACE.
8. MAINTAIN 8-12 INCHES OF FILL BETWEEN EQUIPMENT TRACKS AND PREPARED SURFACE.
9. FILL MATERIAL SHALL BE A MEDIUM TO COARSE TEXTURED SAND, AS DEFINED BY THE USDA, SCS CLASSIFICATION, WITH AN EFFECTIVE SIZE OF 0.25 TO 2.0 MM.
10. SOILS DATA AT THE LEACH FIELD: 140D-CHATFIELD-HOLLIS-CANTON COMPLEX
11. SUBDIVISION APPR. NO.: 5+ ACRES
12. PREVIOUS CONSTRUCTION APPR.: CA2021091604 (OPERATIONAL 10/12/2021 CAI870I2)
13. DEED REFERENCE: BK. 6272 PG. 1338 REGISTRY OF DEEDS: ROCKINGHAM
    OWNER: MHO ACQUISITION LLC.
    230 MAMMOTH ROAD
    LONDONDERRY, NH 03053
14. WATER IS SUPPLIED BY ON-SITE WELL
15. REMOVE ANY RESTRICTIVE LAYERS FOUND DURING CONSTRUCTION TO THE ESHWT.
16. REMOVE TREES WITHIN 10' OF THE LEACH FIELD.
17. THE SEPTIC SYSTEM HAS NOT BEEN DESIGNED TO ACCOMMODATE A GARBAGE DISPOSAL OR A WATER FILTRATION SYSTEM.
18. ANY DISCREPANCIES OF DESIGN INFORMATION FOUND DURING CONSTRUCTION SHALL BE REPORTED.
19. THE PROPOSED SYSTEM IS NOT WITHIN 100' OF ANY KNOWN BURIAL SITES OR CEMETERIES.
20. WETLAND SOILS WERE DELINEATED IN ACCORDANCE WITH ENV-1014.06.

DESIGN INTENT:

THE BOTTOM OF THE EFFLUENT DISPOSAL SYSTEM (EDS) SHALL BE CONSTRUCTED AT 335.17' ELEVATION, WHICH IS APPROXIMATELY 0.83 FEET BELOW ORIGINAL HIGH GROUND ON THE HIGH CONTOUR OF THE DESIGNED EDS (336.0').

THIS DOCUMENT HAS BEEN PREPARED TO ASSIST IN THE CONSTRUCTION OF A SUBSURFACE SANITARY WASTE DISPOSAL SYSTEM ONLY. THE LICENSED DESIGNER ASSUMES NO LIABILITY TO ANY PERSONS USING THIS DOCUMENT FOR PURPOSES OTHER THAN THE CONSTRUCTION OF A SUBSURFACE SANITARY WASTE DISPOSAL SYSTEM.

THIS OFFICE ASSUMES NO LIABILITY FOR ANY ALTERATIONS TO THIS DESIGN DURING CONSTRUCTION. OR SYSTEMS NOT INSTALLED PROPERLY. THE LICENSED DESIGNER SHALL BE NOTIFIED OF ANY CONDITIONS CONTRARY TO THOSE DEPICTED ON THIS PLAN.

MACK'S APPLES FARM MARKET

SANITARY SYSTEM DESIGN PLAN

TAX MAP 6 LOT 21

230 MAMMOTH ROAD, LONDONDERRY, NH 03053

PREPARED FOR:
MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

PREPARED BY:
BROWN ENGINEERING LLC
34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

BROWN ENGINEERING
CIVIL ENGINEERS

DATE: 1-14-2026
JOB NO: 5375-44

REV.	DATE	DESCRIPTION	BY

G:\CLIENTS\5375-44 (SOUTHWICK APPLES, LONDONDERRY, 74SOUTH ROAD)\DWGS\5375-44 SDA (MHO APPLES-LONDONDERRY)26.DWG Feb 12, 2026 - 3:31pm

LUMINAIRE SCHEDULE

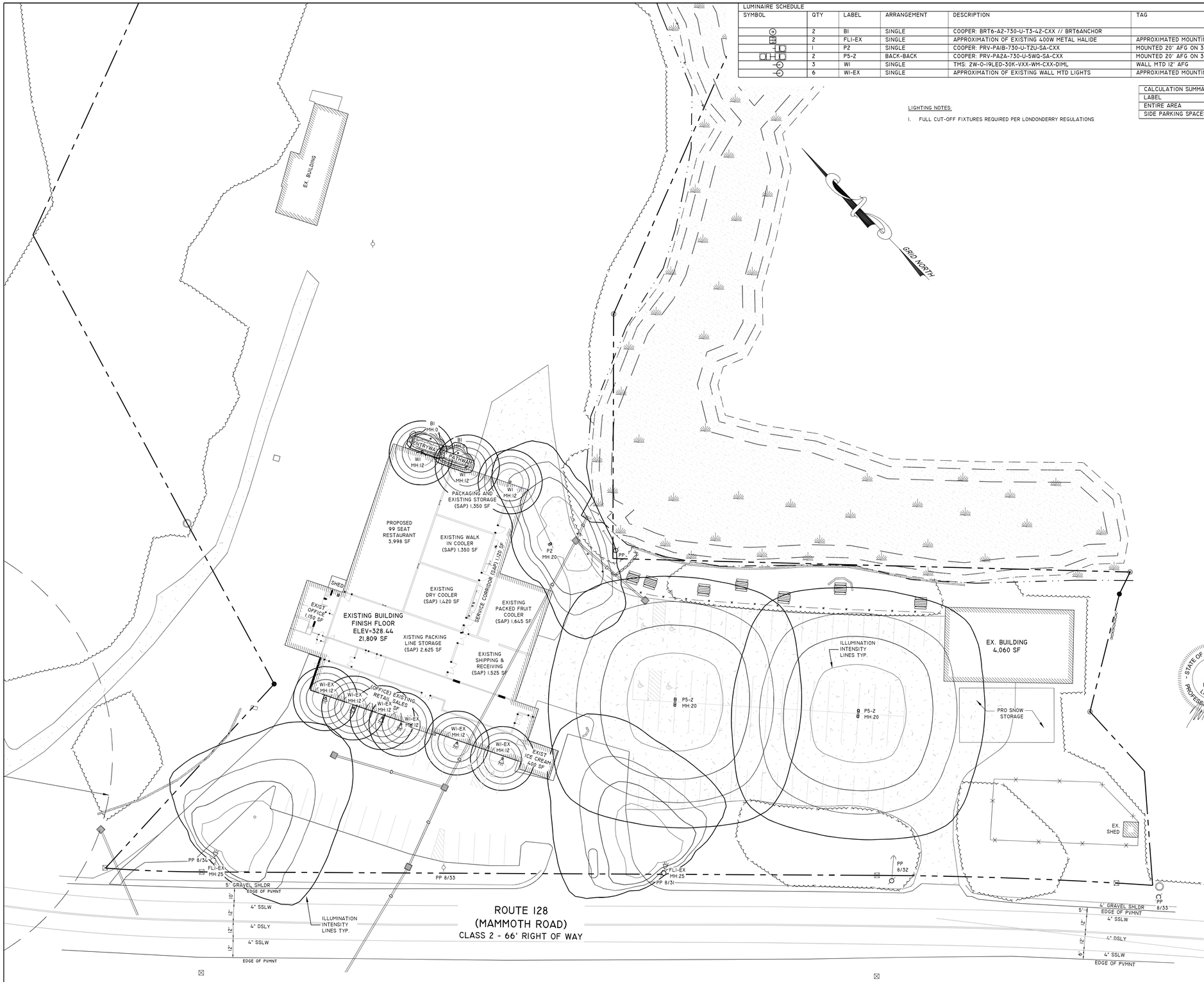
SYMBOL	QTY	LABEL	ARRANGEMENT	DESCRIPTION	TAG	LLF	LUMINAIRE LUMENS
	2	BI	SINGLE	COOPER: BRT6-A2-730-U-T3-42-CXX // BRT6ANCHOR		0.900	979
	2	FLI-EX	SINGLE	APPROXIMATION OF EXISTING 400W METAL HALIDE	APPROXIMATED MOUNTING HEIGHT AT 25' AFG	0.600	30500
	1	P2	SINGLE	COOPER: PRV-PAIB-730-U-T2U-SA-CXX	MOUNTED 20' AFG ON 3' CONCRETE BASE AND 17' COOPER POLE: SSS-17' SPECIAL LENGTH-4-11-AB-M1-CXX	0.900	9003
	2	P5-2	BACK-BACK	COOPER: PRV-PA2A-730-U-SWQ-SA-CXX	MOUNTED 20' AFG ON 3' CONCRETE BASE AND 17' COOPER POLE: SSS-17' SPECIAL LENGTH-4-11-AB-M2-CXX	0.900	14827
	3	WI	SINGLE	TMS: 2W-0-19LED-30K-VXX-WM-CXX-DIML	WALL MTD 12' AFG	0.900	1803
	6	WI-EX	SINGLE	APPROXIMATION OF EXISTING WALL MTD LIGHTS	APPROXIMATED MOUNTING HEIGHT AT 12' AFG	0.900	1803

CALCULATION SUMMARY

LABEL	CALCTYPE	UNITS	AVG	MAX	MIN	AVG/MIN	MAX/MIN
ENTIRE AREA	ILLUMINANCE	FC	0.31	5.4	0.0	N.A.	N.A.
SIDE PARKING SPACES	ILLUMINANCE	FC	1.62	4.8	0.4	4.05	12.00

LIGHTING NOTES:

1. FULL CUT-OFF FIXTURES REQUIRED PER LONDONDERRY REGULATIONS



SYMBOLS LEGEND

- EXISTING PROPERTY LINE
- EXISTING ABUTTERS PROPERTY LINE
- EXISTING EASEMENT LINE
- EXISTING PROPERTY SETBACK LINE
- EXISTING FENCE LINE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING WETLAND BOUNDARY
- EXISTING BUILDING
- EXISTING GRAVEL DRIVEWAY
- EXISTING PICNIC TABLE
- EXISTING DRAIN MANHOLE
- EXISTING CATCH BASIN
- EXISTING SEWER MANHOLE
- EXISTING WATER GATE VALVE
- EXISTING FIRE HYDRANT
- EXISTING WELL
- EXISTING TREE AND CALIPER
- EXISTING POWER POLE
- STONE BOUND FOUND (SBF)
- DRILL HOLE FOUND (DHF)
- IRON PIPE FOUND (IPF)
- RE-BAR FOUND (RBF)
- PROPOSED LIGHTING UNITS

STATE OF NEW HAMPSHIRE
KENT L BROWN No. 7456 LICENSED PROFESSIONAL ENGINEER

MACK'S APPLES FARM MARKET

LIGHTING PLAN

TAX MAP 6 LOT 21

230 MAMMOTH ROAD, LONDONDERRY, NH 03053

MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

PREPARED BY:
BROWN ENGINEERING LLC
34 WHITTIER HIGHWAY
MOULTONBOROUGH, NH 03254
TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

GRAPHIC SCALE
30' 15' 0 30'
SCALE: 1" = 30'

BROWN ENGINEERING
CIVIL ENGINEERS

REV.	DATE	DESCRIPTION	BY

DATE: 12-18-2025
JOB NO: 5375-44

LP-1
8 OF 12

G:\ACTIVE\5375\44 SDA\Mack's Apples\Condition* Plans\Plan Sheets\5375-44 SDA Mack Apples-Condition*(12.02).dwg FEB 12, 2026 2:32pm

Project		Catalog #		Type	
Prepared by		Notes		Date	



McGraw-Edison

BRT6 Bollard

Round LED Pedestrian Luminaire

Product Features

BAA · TAA · BABA GREEN · DLC LISTED · DLC LISTED PREMIUM

Product Certifications

ISTI · 3G VIB · IP66 · IK10 · cULus · Certified to Certified.com · 5 YEAR

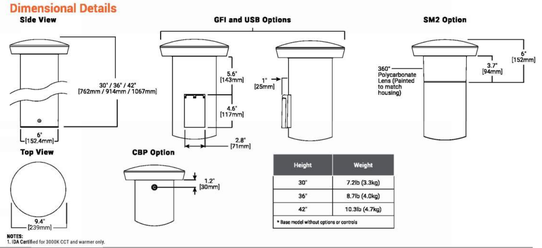
Interactive Menu

- Ordering Information page 2
- Product Specifications page 2
- Optical Distributions page 2
- Energy and Performance Data page 3

Quick Facts

- 4 Optical Distributions
- Available in 30", 36", and 42"
- Lumen packages range from 560 - 4400 (5W - 49W)
- Efficacy up to 122 lumens per watt
- Zero uplight on all configurations

Dimensional Details



Height	Weight
30"	7.2lb (3.3kg)
36"	8.7lb (4.0kg)
42"	10.3lb (4.7kg)

* Base model without options or controls

NOTES:
1. UA Certified for 3000K CCT and warmer only.

Project		Catalog #		Type	
Prepared by		Notes		Date	



Lumark

Prevail Discrete LED

Area / Site Luminaire

Product Features

BAA · TAA · BABA GREEN · FADC

Product Certifications

ISTI · cULus · DLC LISTED · DLC LISTED PREMIUM · FC · RoHS · IP66 · Certified to Certified.com · 5 YEAR

Interactive Menu

- Ordering Information page 2
- Mounting Details page 3,4
- Optical Configurations page 5
- Product Specifications page 5
- Energy and Performance Data page 6
- Control Options page 8

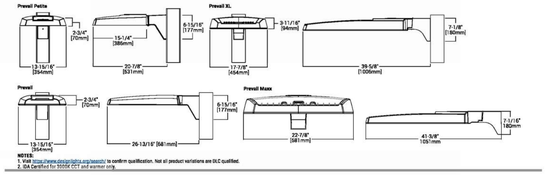
Connected Systems

- WaveLinx PRO Wireless
- WaveLinx LITE Wireless

Quick Facts

- Direct-mounted discrete light engine for improved optical uniformity and visual comfort
- Lumen packages range from 4,300 - 68,000 nominal lumens (30W - 550W)
- Replaces 70W up to 1,000W HID equivalents
- Efficacies up to 157 lumens per watt
- Standard universal quick mount arm with universal drill pattern

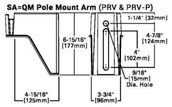
Dimensional Details



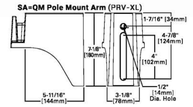
NOTES:
1. Visit https://www.designlights.org/search/ to confirm qualification. Not all product variations are DLC qualified.
2. IDA Certified for 3000K CCT and warmer only.

Mounting Details

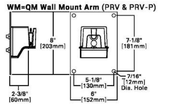
SA=QM Pole Mount Arm (PRV & PRV-P)



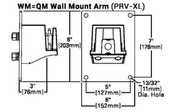
SA=QM Pole Mount Arm (PRV-XL)



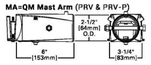
WM=QM Wall Mount Arm (PRV & PRV-P)



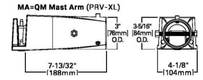
WM=QM Wall Mount Arm (PRV-XL)



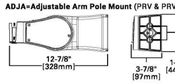
MA=QM Mast Arm (PRV & PRV-P)



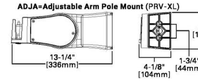
MA=QM Mast Arm (PRV-XL)



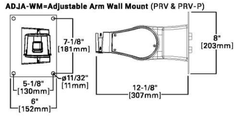
ADJA=Adjustable Arm Pole Mount (PRV & PRV-P)



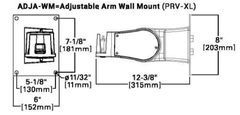
ADJA=Adjustable Arm Pole Mount (PRV-XL)



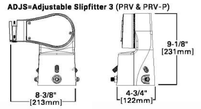
ADJA-WM=Adjustable Arm Wall Mount (PRV & PRV-P)



ADJA-WM=Adjustable Arm Wall Mount (PRV-XL)



ADJS=Adjustable Slipfitter 3 (PRV & PRV-P)

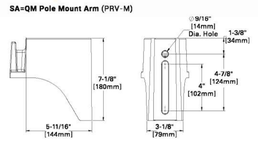


ADJS=Adjustable Slipfitter 3 (PRV-XL)

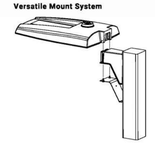


Mounting Details

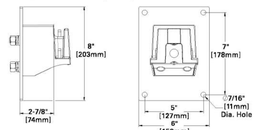
SA=QM Pole Mount Arm (PRV-M)



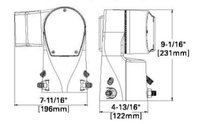
Versatile Mount System



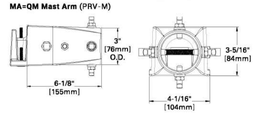
WM=QM Wall Mount Arm (PRV-M)



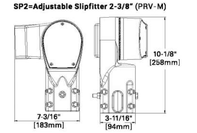
ADJS=Adjustable Slipfitter (PRV-M)



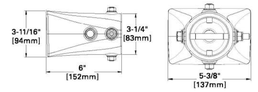
MA=QM Mast Arm (PRV-M)



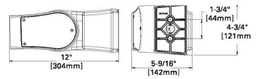
SP2=Adjustable Slipfitter 2-3/8" (PRV-M)



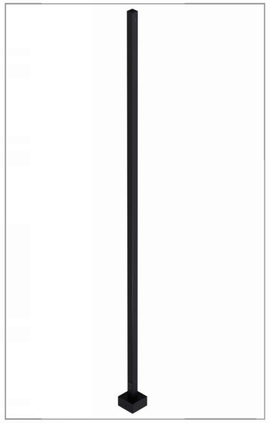
FMA=Fixed Mast Arm (PRV-M)



ADJA=Adjustable Pole Mount Arm (PRV-M)



Project		Catalog #		Type	
Prepared by		Notes		Date	



Cooper Poles

Square Straight Steel - SSS

Anchor Base Installation

Product Certifications & Features

ISTI · BABA GREEN · AASHTO · RoHS · cULus · cULus

Base Cover

- 2-piece metal cover, painted to match pole
- Optional ABS cover, 3 basic finishes
- Corrosion resistant hardware

Handhole

- Handhole Assembly, 3"x5", 14" minimum above base
- Grounding provision included
- Extra handhole locations available
- Metal handhole cover, painted to match pole
- Optional ABS Handhole cover, 3 basic finishes
- Corrosion resistant hardware
- Optional vandal resistant mechanism

Finish

- Highly durable TGIC polyester powder paint
- ASTM D3359 5B classification
- Optional hot-dipped galvanized pre-treat
- 10+ colors, custom finishes available

BK - Black, Smooth · BZ - Bronze, Smooth

Featured Colors

Domestic Preferences

BABA option supports both the USA Buy America (BAA) and Infrastructure Investment and Jobs Act (IIJA) domestic preference procurement requirements.

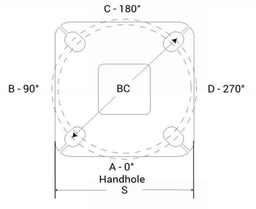
Quick Facts

- Weldable grade carbon steel
- One-year limited warranty
- Fully galvanized anchor bolts & template included

Interactive Menu

- Ordering Information page 2
- Base Plate Details page 3
- Mounting Type Details page 4
- Options Details page 5
- Certification & Additional Details Page 7
- EPA Data page 8
- Considerations page 14

Mounting Plate Details

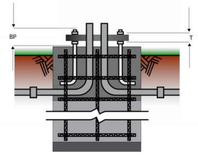


A/B/C/D denote pole quadrants. Handhole always at 'A' or '0'

Shaft size & guage	Base Size		Anchor Bolt Details [1]		
	Square Size (S)	Thickness (T)	Bolt Circle (BC)	Bolt Size	Bolt projection (BP)
4-11, & 4-7	8	0.75	8.5	.75 x 17 x 3	3.0 - 3.5
5-11	11	0.75	11	.75 x 17 x 3	3.0 - 3.5
5-7 & 5-3	11	1	11	1 x 36 x 4	3.5 - 4.0
6-11, 6-7, & 6-3	11.5	1	11.5	1 x 36 x 4	3.5 - 4.0

NOTES: Dimensions in inches

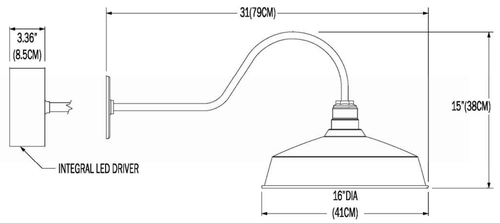
1. Anchor Bolts and template included.



NOTE:
If custom base option required, please specify BM0Xxxx option and provide drawing. Approval required, additional lead times may apply. Premium metal base cover included.

2W

PROFILE



CHARRON REFLEXLIGHTING

FOR MORE INFORMATION ON LIGHTING OR LIGHTING DETAILS PLEASE REACH OUT TO CONTACT:MOBRIEN@REFLEXLIGHTING.COM

MACK'S APPLES FARM MARKET

MISCELLANEOUS DETAIL SHEET

TAX MAP 6 LOT 21

230 MAMMOTH ROAD, LONDONDERRY, NH 03053

MHO ACQUISITION LLC.
230 MAMMOTH ROAD
LONDONDERRY, NH 03053
BOOK 6272 PAGE 1338

PREPARED BY:
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34 WHITTIER HIGHWAY
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TEL: (603) 744-1044
WWW.BROWNENGINEERINGLLC.COM

STATE OF NEW HAMPSHIRE · KENT L BROWN No. 7456 LICENSED PROFESSIONAL ENGINEER

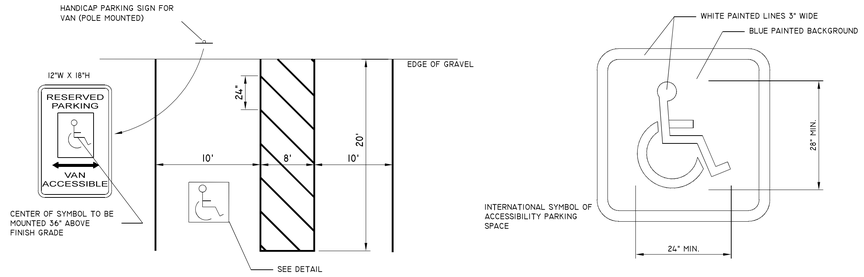
BROWN ENGINEERING
CIVIL ENGINEERS

DATE: 12-10-2025
JOB NO: 5375-44

REV.	DATE	DESCRIPTION	BY

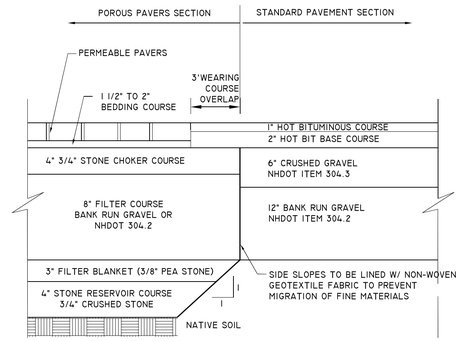
MD-1
9 OF 12

G:\CLIENTS\5375-44 GOFF-MACKS APPLES, LONDONDERRY (HAMPSHIRE ROAD)\DWGS\5375-44 GOFF MACK APPLES-LONDONDERRY.DWG 2026-2:37PM



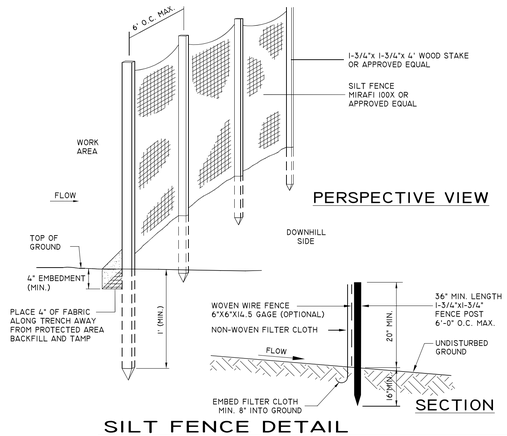
HANDICAP PARKING STRIPING AND SIGN DETAIL

NOT TO SCALE



PERMEABLE PAVERS DETAIL

NOT TO SCALE



SILT FENCE DETAIL

NOT TO SCALE

SHORELAND NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW THE LIMIT OF WORK WITHIN THE 250' SHORELAND PROTECTION SETBACK LINE.
2. THE TOTAL LOT AREA IS 0.46 ACRES - 20,038 SF.
3. NO TREES WILL BE CUT IN THE 50' SETBACK.
4. A DRIP EDGE INFILTRATION WILL BE INSTALLED AROUND THE PROPOSED HOUSE IN ORDER TO CREATE INFILTRATION.
5. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY GROUND DISTURBANCE OF THE SITES SURFACE AREA AND SHALL BE MAINTAINED THROUGH THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES. IF DURING CONSTRUCTION IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED THE OWNER AND CONTRACTOR SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION.

MAINTENANCE

1. SILT FENCES ARE TO BE INSPECTED IMMEDIATELY AFTER EVERY RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE
2. MADE IMMEDIATELY.

3. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.

4. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF OF THE BARRIER.

SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED, SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.



MACK'S APPLES FARM MARKET

MISCELLANEOUS DETAIL SHEET

TAX MAP 6 LOT 21

230 MAMMOTH ROAD, LONDONDERRY, NH 03053

MHO ACQUISITION LLC.
230 MAMMOTH ROAD
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BOOK 6272 PAGE 1338

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WWW.BROWNENGINEERINGLLC.COM

BROWN ENGINEERING
CIVIL ENGINEERS

DATE: 12-10-2025
JOB NO: 5375-44

REV.	DATE	DESCRIPTION	BY

MD-2
10 OF 12

© LCL\DATA\5375-44 604 Mack Apples, Londonderry, Mammoth Road\DWG\5375-44 604 Mack Apples-Landscape.dwg 12/10/25 2:13pm

KEY NOTES_PROPOSED PLAN

CONSTRUCTION LEGEND

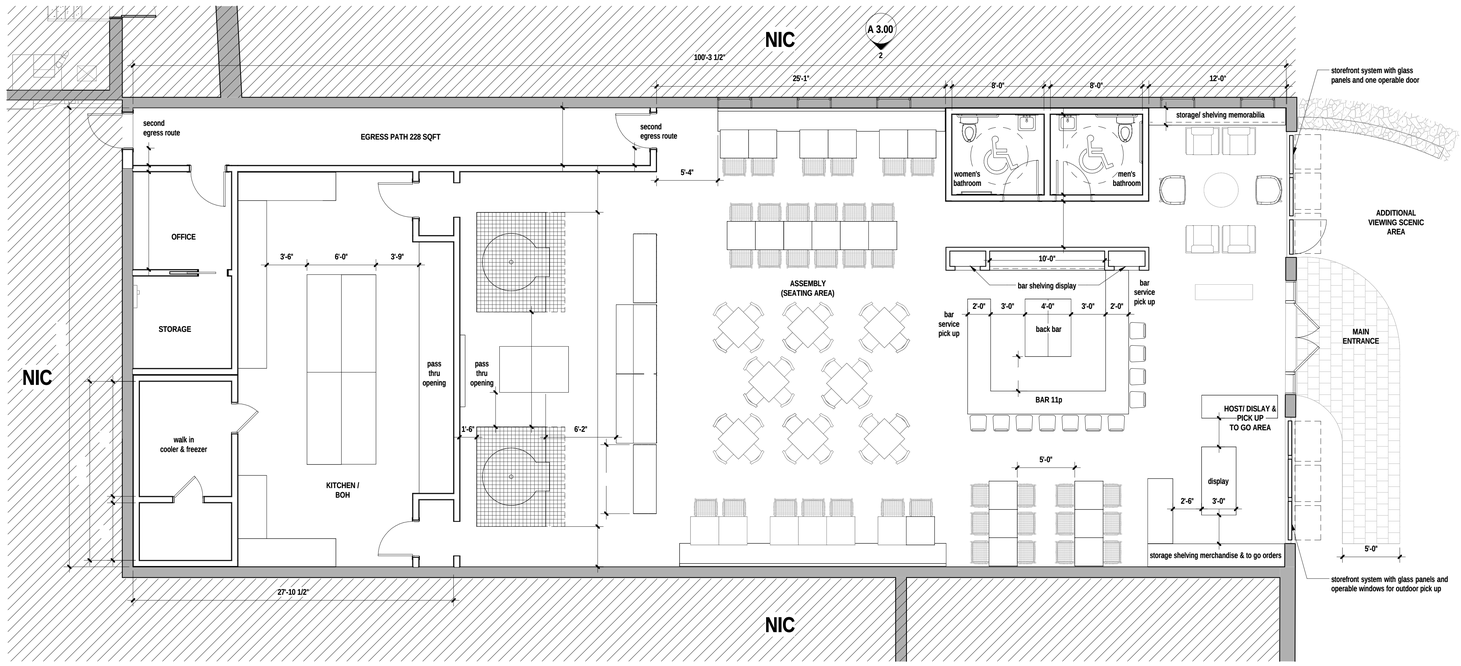
SYMBOL	DEFINITION
	EXISTING DOOR TO REMAIN
	EXISTING GWB PARTITION TO REMAIN
	EXISTING GLAZED PARTITION TO REMAIN
	NEW GWB PARTITION
	NEW GLAZED PARTITION
	NEW DOOR AND FRAME
FEC	NEW FIRE EXTINGUISHER
	NIC - NOT IN CONTRACT HATCH

GENERAL NOTES - CONSTRUCTION

1. SEE INTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION ON WALL FINISH MATERIALS AND TYPICAL MOUNTING HEIGHTS REQUIRED.
2. SEE GENERAL CONSTRUCTION NOTES ON SHEET G001.
3. SEE REFLECTED CEILING PLANS FOR CEILING FINISH MATERIALS.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AFTER DEMOLITION IS COMPLETED.
5. ALL LOCATIONS WHERE INFILL WALLS MEET EXISTING WALLS WITH NEW GWB FINISH SURFACES SHALL ALIGN AT ADJACENT EDGES UNLESS OTHERWISE NOTED.
6. EXISTING WALLS SHOWN WITH ADDITIONAL LINES GRAPHICALLY REPRESENT NEW FINISHES AND SHOULD NOT BE SCALED OR DIMENSIONED FROM. PARTITIONS SHOULD BE BUILT AND FINISHED ACCORDING TO PARTITION AND FINISH SCHEDULE.
7. COORDINATE AREAWAY DRAINS AND FLOOR DRAINS WITH PLUMBING DRAWINGS.
8. PROVIDE BLOCKING FOR GRAB BARS, PLUMBING FIXTURES, MILL WORK AT ALL REQUIRE LOCATIONS.
9. ALL DIMENSIONS INDICATED WITH A ± REPRESENT FIELD MEASUREMENTS TO BE PROVIDED TO ARCHITECT AND VERIFIED BY CONTRACTOR.
10. SEE DOOR SCHEDULE FOR ALL DOOR SIZES, DOOR INFO AND DETAILS.
11. ALL GLASS WITHIN 18" A.F.F. AND/OR WITHIN 4'-0" OF A DOOR SWING SHALL BE TEMPERED SAFETY GLASS.
12. ALL EXISTING WALLS TO BE PATCHED WHERE EXISTING WALLS WERE REMOVED.
13. PROVIDE LEVELING COMPOUND OVER ALL EXISTING CONCRETE FLOOR AREAS TO RECEIVE NEW FLOOR COVERING. NO FLOORING TRANSITIONS ARE TO EXCEED 1/2" IN HEIGHT.
14. PROVIDE IN-WALL BLOCKING AS REQUIRED.
15. PROVIDE IN-WALL BLOCKING FOR ALL FUTURE BUILT-IN CASEWORK WHERE INDICATED.
16. PATCH EXISTING GWB AT ALL LOCATIONS WHERE A PARTITION HAS BEEN REMOVED.
17. AT ALL AREAS OF MEP/FP EQUIPMENT REMOVED FROM WALLS, CONTRACTOR TO PATCH / REPAIR HOLES IN FINISH FROM REMOVED FASTENERS. BLEND PATCHING TO MATCH EXISTING FINISH TO REMAIN.
18. SEAL AIR TIGHT ANY PENETRATIONS MADE THROUGH AIR & VAPOR BARRIERS.
19. PAINT ALL (N) AND (E) GWB & PLASTER FINISHES IN WORK AREA UNLESS NOTED
20. INTERIOR DIMENSIONS ARE INDICATED TO FINISH WALL (CMU OR GYPSUM BOARD) MATERIALS. U.N.O.
21. MEP/FP ELEMENTS SHOWN ARE SCHEMATIC AND ARE PROVIDED FOR REFERENCE. ONLY. REFER TO MEP/FP DRAWINGS & SPECIFICATIONS FOR MORE INFORMATION.
22. EXTERIOR MASONRY DIMENSIONS ARE INDICATED TO CENTERLINE OF JOINTS.
23. WINDOW DIMENSIONS ARE TO CENTER LINE OF OPENING. DIMENSIONS ARE NOMINAL. SEE CURTAIN WALL, DOOR & WINDOW SCHEDULE AND DETAILS FOR ACTUAL OPENING DIMENSION REQUIRED.
24. PROVIDE LEVELING COMPOUND AS REQ. FOR PROPER TILE INSTALLATION TO ACHIEVE SMOOTH, LEVEL, FLUSH FINISH.
25. ALL MATERIAL INSTALLATION TO BE LEVEL & PLUMB.
26. SEE A130 SERIES FOR ALL FINISHES.

DESIGN/BUILD NOTES:

1. MEP/FP ELEMENTS SHOWN ARE SCHEMATIC AND ARE PROVIDED FOR REFERENCE ONLY. REFER TO MEP/FP DRAWINGS & SPECIFICATIONS FOR MORE INFORMATION.
2. ALL MEP/FP WORK IS TO BE PROVIDED BY THE GENERAL CONTRACTOR ON A DESIGN/BUILD BASIS.



1 A 3.00

OCCUPANCY COUNT INSIDE SPACE (99p max.):

assembly/ dining seats up to 88p
bar 11p

1 A 1.00 **FLOOR 01_NEW CONSTRUCTION**
3/16" = 1'-0"

CLIENT

Moose Hill Orchards, LLC

230 Mammoth Rd.,
Londonderry, NH 03053

DESIGN FIRM

Joe The Architect, LLC
343 Medford Street, Suite 4C Somerville, MA 02145
t: +1(617) 764-3593 e: askjoe@joethearchitect.com
www.joethearchitect.com

CONSULTANT

BROWN ENGINEERING

34 Whittier Highway, Moultonborough, NH 03254

SEAL

PROJECT INFORMATION

25077 MACK'S APPLES RESTAURANT

230 Mammoth Rd,
Londonderry, NH 03053

FOR SITE PLAN APPROVAL

12/16/2025 3:02:03 PM

WARNING:
Joe The Architect, Inc., all drawings and written material herein constitute the original and unpublished work of the architect, and the same may not be duplicated, used, or disclosed without the written consent of the architect. Contractors to use Architectural drawings for set out. Contractors to check and verify all Dimensions on Site prior to Construction/Fabrication. Figured Dimensions take precedence over Scaled Dimensions. Any discrepancies should be immediately referred to the Architect. The project manager shall be notified in writing of any discrepancies prior to proceeding with the work. The scale of drawings may change when copied or faxed. All work to comply with I.B.C. Regulations and relevant American Standards.
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ISSUE CHART

1	BUILDING DESIGN & RENDERINGS SECTION 3.12	12/18/2025

N	ISSUE	DATE

25077	PROJECT NUMBER
Checker	CHECKED
Approver	APPROVED
As indicated	SCALE

SHEET NAME

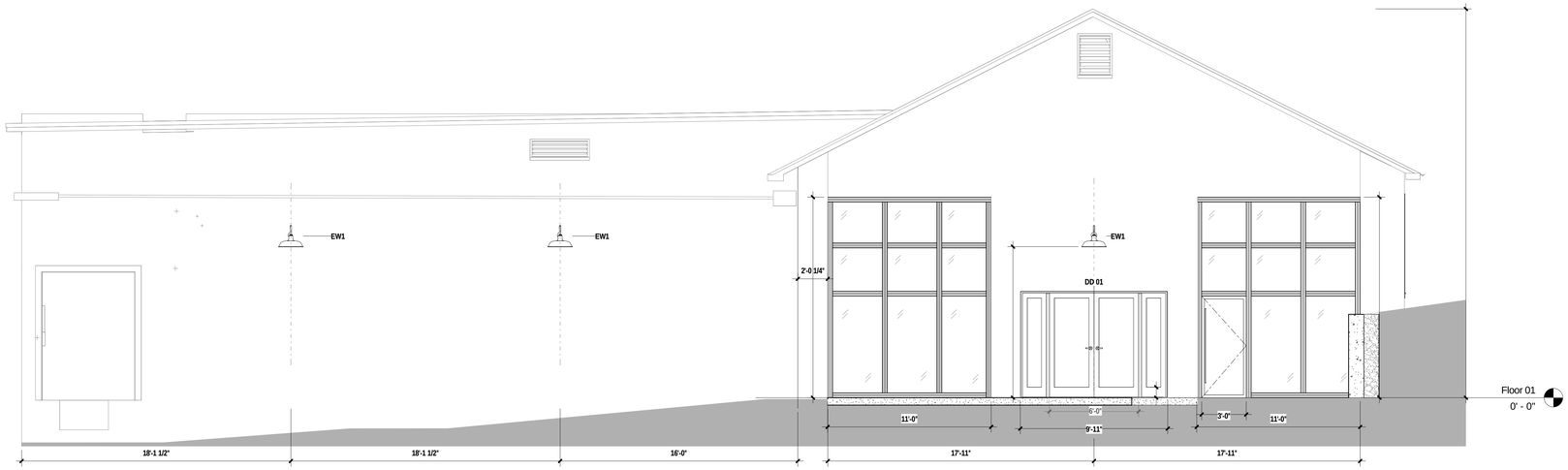
FLOOR PLAN _PROPOSED

DATE: 12-18-2025
JOB NO: 5375-44
ARCH-01
SHEET 11 OF 12

C:\Users\mcallee\Documents\25077 Mack's Orchard_MayerWVS8.rvt 12/16/2025 3:02:03 PM



2 A 3.00 EXTERIOR ELEVATION_SIDE
1/4" = 1'-0"



1 A 3.00 EXTERIOR ELEVATION_MAIN ENTRANCE
1/4" = 1'-0"

CLIENT

Moose Hill Orchards, LLC

230 Mommoth Rd.,
Londonderry, NH 03053

DESIGN FIRM

JtA

Joe The Architect, LLC
343 Medford Street, Suite 4C Somerville, MA 02145
t: +1(617) 764-3593 e: askjoe@joethearchitect.com
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CONSULTANT

BROWN ENGINEERING

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34 Whittier Highway, Moultonborough, NH 03254

SEAL

PROJECT INFORMATION

25077 MACK'S APPLES RESTAURANT

230 Mammoth Rd,
Londonderry, NH 03053

FOR SITE PLAN APPROVAL

12/16/2025 3:11:16 PM

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ISSUE CHART

N	ISSUE	DATE
1	BUILDING DESIGN & RENDERINGS SECTION 3.12	12/18/2025

25077	PROJECT NUMBER
Checker	CHECKED
Approver	APPROVED
1/4" = 1'-0"	SCALE

SHEET NAME

EXTERIOR ELEVATIONS PROPOSED

DATE: 12-18-2025
JOB NO: 5375-44
ARCH-01
SHEET 12 OF 12

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Town of Londonderry, New Hampshire

Planning & Economic Development Department 603-432-1100
268B Mammoth Road 603-432-1128
Town Hall – 2nd Floor www.londonderrynh.org

Planning – Zoning – Economic Development – Conservation

MEMORANDUM

TO: Planning Board

FROM: Kellie Caron, Deputy Town Manager & Director of Economic Development

DATE: March 4, 2026

RE: Public hearing for a formal review of a site plan for renovation of an existing building to add a restaurant and associated parking in support of an agritourism operation at 230 Mammoth Road (Map 06, Lot 21), zoned Agricultural-Residential (AR-1). MHO Acquisition, LLC, (owner/applicant).

The applicant, Moose Hill Orchards, LLC, proposes to convert approximately 3,998 square feet of existing interior space within the Mack's Apples farm market building into an accessory restaurant use as part of the agricultural operation at 230 Mammoth Road. The project will operate in support of the farm's ongoing agritourism activities as defined under RSA 21:34-a with no expansion of the existing building footprint.

The Board will need to consider action on completeness, waiver requests and the site plan application.

Completeness: There are nine outstanding checklist items**.** If the Board decides to accept the application as complete, these items should be waived for ***acceptance only***.

1. The Applicant's submission does not include a landscape plan per items II.4 and VII of the checklist to demonstrate compliance with section 3.10 of the Site Plan Regulations.
   The Applicant has submitted a written waiver request for these requirements for Planning Board consideration.

2. The Applicant's proposed development includes alteration of the site to construct improvements and creation of impervious areas (sidewalk and entrance, retaining wall, light poles, etc.). The existing conditions plans indicate existing stormwater facilities are present but it is unknown if the current system provides proper surface drainage per section 3.07 of the Site Plan Regulations and item XI.2 of the checklist. The submission is absent of a stormwater management report (drainage report) to demonstrate proper surface drainage and compliance with section 3.07 of the Site Plan Regulations – no increase in runoff.
   The Applicant has submitted a written waiver request for these requirements for Planning Board consideration.

3. The Applicant's proposed development does not include CO District Signage in accordance with section 5.06 of the Site Plan Regulations and items V.3.b and V.10 of the checklist. *The Applicant has submitted a written waiver request for these requirements for Planning Board consideration.*

4. The Applicant's submission to the Planning Board did not include a response letter to the DRC review comments or highlighted plans per item II.11 of the checklist.

5. The Applicant's updated existing conditions plan submission did not include the zoning of each abutter per section 4.12.c. 5 and Use per section 4.12.c.25 of the regulations and per item V.4 of the checklist.

6. The Applicant's updated site plan submission did not include the % green area per section 4.11.h of the Site Plan Regulations and item IV.1.h of the checklist.

7. The Applicant's updated site plan submission did not include the % building coverage per section 4.11.i of the Site Plan Regulations and item IV.1.i of the checklists

8. The Applicant's updated site plan submission did not include or label the proposed utility line to serve the proposed parking lot lights per section 4.14.b.7.iv. of the Site Plan Regulations and per item VI.2.g.4 of the checklist or include a utility line trench detail in the plan set per item X.13.d of the checklist for proper construction.

9. The Applicant's updated site plan submission did not include /address construction sequence notes, erosion control notes, and turf establishment notes per section 4.14.c.24 of the Site Plan Regulations and item X.24 of the checklist.

Waivers:

The applicant has submitted a letter dated February 12, 2026, that includes the eleven waiver requests outlined below with justification. The board should review the letter and justification provided by the applicant. Staff also offer the comments below.

For the purposes of Agritourism NHRSA 674:32-c, II is applied when the Board is considering waiver requests. The statute reads:

> *Nothing in this subdivision, or in RSA 674:32-b, shall exempt new, re-established, or expanded agricultural operations or activities from generally applicable building and site requirements such as dimensional standards, setbacks, driveway and traffic regulations, parking requirements, noise, odor, or vibration restrictions or sign regulations; provided, however, that in circumstances where their literal application would effectively prohibit an agricultural use or activity allowed by this subdivision, or would otherwise be unreasonable in the context of an agricultural use or activity, in accordance with the provisions of RSA 672:1, III-b, the board of adjustment, building code board of appeals, or other applicable local board, after due notice and hearing, shall grant a waiver from such requirement to the extent necessary to reasonably permit the agricultural use or activity, unless such waiver would have a demonstrated adverse effect on public health or safety, or on the value of adjacent property. Such waiver shall continue only as long as utilized for the permitted agricultural use or activity.*

In summary, municipal boards *must* grant a waiver from generally applicable site or building requirements *if*:

1. Literal application would:
    a. Effectively prohibit an agricultural use; **or**
    b. Be unreasonable in the context of agricultural use;
2. The waiver is necessary to reasonably permit the agricultural use; **and**
3. The waiver will not have a demonstrated adverse effect on:
    a. Public health or safety; or
    b. The value of adjacent property.

The is not an automatic exemption. The burden remains on the applicant to justify waiver requests.

Staff recommends that that the Board vote with respect to any requested waivers utilizing the RSA 674:32-c, II and consider the justification provided by the applicant.

Waiver requests:

1. SPR Section 3.11, Section 5.06 and Section 3.02.C and Checklist V.10: waiver from the requirement to delineate wetlands limits and the Conservation Overlay District boundary on the plan.

2. SPR Section 3.07 and Checklist VI (Grading Plan Requirement): waiver from the requirement to submit a grading and drainage plan.

3. SPR Section 3.10 and Checklist VII (Landscape Plan Requirement): waiver from the requirement to submit a landscape plan.

4. SPR Section 3.07 and Checklist XI.2 (Stormwater Management Report Requirement): waiver from the requirement to submit a stormwater management report.

5. SPR Section 3.09.k (Parking Surface Standards/Alternative Surfacing): waiver to allow gravel surfacing for parking and access areas in lieu of paved construction.

6. SPR Section 3.14 (Traffic Impact Analysis Requirement): waiver from the requirement to submit a full traffic impact analysis.

7. SPR Section 3.08.C.2 (Sidewalk Requirement): waiver from the requirement to install sidewalks along the site frontage.

8. SPR Section 3.08.B.3 (Driveway Design Standards): waiver from the driveway design standards for the two existing NHDOT-jurisdiction driveways.

9. SPR Section 4.12.C.19.viii (Tree Identification > 15"): waiver from the requirement to identify trees greater than 15 inches in diameter on the plan.

10. SPR Section 4.14.C.27 (Tree Protection Details): waiver from the requirement to provide detailed tree protection measures.

11. RSA 674:32-c, II (General Agritourism Relief Request): acknowledgment of agritourism protections under RSA 674:32-c, II for the overall project.

SITE PLAN APPLICATION Recommendation:

Conditional approval is appropriate when the project reaches the point at which Board involvement is no longer required, and outstanding items can be resolved with staff. Once the Board has made these decisions, there is no reason to require the Applicant to return to the Board.

If the Board CONTINUES the application, it should be continued to April 8, 2026.

If the Board CONDITIONALLY APPROVES this application the Notice of Decision should read substantially as follows:

"Applicant", herein, refers to the property owner, business owner, or organization submitting this application and to his/its agents, successors, and assigns.

PRECEDENT CONDITIONS

All of the precedent conditions below must be met by the Applicant, at the expense of the Applicant, prior to certification of the plans by the Planning Board. Certification of the plans is required prior to commencement of any site work, any construction on the site or issuance of a building permit.

1. The Applicant shall address all appropriate items from the Planning & Economic Development Department/Department of Engineering and Environmental Services/Stantec Review Memo and Traffic Impact Assessment dated March 4, 2026.

2. The Applicant shall obtain and note any and all applicable state, local, or other permitting on the plans.

3. Owner's signature shall be provided on the plans.

4. The Applicant shall provide a digital copy of the complete final plan to the Town prior to plan signature by the Planning Board in accordance with the Site Plan Regulations.

5. Third-party review fees shall be paid within 30 days of conditional site plan approval.

6. Financial guarantees be provided to the satisfaction of the Department of Public Works and Engineering.

7. Final engineering review.

PLEASE NOTE – If these conditions are not met within 120 days of the meeting at which the Planning Board grants approval, the Board's approval will be considered to have lapsed and re-submission of the application will be required.

GENERAL AND SUBSEQUENT CONDITIONS

All of the conditions below are attached to this approval.

1. **No construction or site work may be undertaken until a pre-construction meeting with Town staff has taken place, filing of an NPDES – EPA Permit (if required), and**

posting of the site-restoration financial guaranty with the Town. Contact the Department of Public Works to arrange the pre-construction meeting.

2. The project must be built and executed as specified in the approved application package unless modifications are approved by the Planning Department & Department of Public Works, or, if Staff deems applicable, the Planning Board.

3. All of the documentation submitted in the application package by the applicant and any requirements imposed by other agencies are part of this approval unless otherwise updated, revised, clarified in some manner, or superseded in full or in part. In the case of conflicting information between documents, the most recent documentation and this notice herein shall generally be determining.

4. Fire department access roads shall be provided at the start of the project and maintained throughout construction. Fire department access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with an all-weather driving surface.

5. It is the responsibility of the applicant to obtain all other local, state, and federal permits, licenses, and approvals which may be required as part of this project (that were not received prior to certification of the plans). Contact the Building Division at extension 115 regarding building permits.

6. Prior to issuance of a certificate of occupancy, all site improvements and off-site improvements shall be completed in accordance with the plan approved by the Planning Board. In accordance with Section 6.01.d of the Site Plan Regulations, in circumstances that prevent landscaping to be completed (due to weather conditions or other unique circumstance), the Building Division may issue a certificate of occupancy prior to the completion of landscaping improvements, if agreed upon by the Planning Division & Public Works Department, when a financial guaranty (see forms available from the Public Works Department) and agreement to complete improvements are placed with the Town. The landscaping shall be completed within 6 months from the issuance of the certificate of occupancy, or the Town shall utilize the financial guaranty to contract out the work to complete the improvements as stipulated in the agreement to complete landscaping improvements. ***No other improvements shall be permitted to use a financial guaranty for their completion for purposes of receiving a certificate of occupancy***.

7. As built site plans must to be submitted to the Public Works Department prior to the release of the applicant's financial guaranty.

Design Review Committee

Conservation Commission Comment Sheet

Project: Mack's Apples
Location: 230A Mammoth Rd Map 6 Lot 21
Date: Feb. 24 - 2026

Please return comments by .

Please return comments to Michael Bazegian mbazegian@londonderrynh.org **Thank You.**

	Yes	No	N/A
Are there wetlands on the site?	☑	☐	☐
Are they high quality wetlands?	☐	☐	☐
Will they be impacted?	☐	☐	☐
Could the impacts be mitigated?	☐	☐	☐
Are there other important natural resources?	☐	☐	☐
Will they be impacted?	☐	☐	☐
Could the impacts be mitigated?	☐	☐	☐

Comments:

- No parking in 25' buffer
- Place conservation signs on trees along North + West edges of pond
- limit salt usage in parking lot
- Indicate snow storage area on plan
- Custom signage covering a message similar to the standard buffer signs in a "friendlier" manner could be an option for the area where the picnic tables are

Submitted by: MBazegian Date: 2-24-26

Design Review Committee

Fire Department Comment Sheet

Project: Mack's Apples
Location: 230 Mammoth Road Tax Map 6 Lot 21
Date:12/31/2025

Please send all comments by January 14, 2026

Please Return Comments to Alecia LaFlamme alaflamme@londonderrynh.gov Thank you.

Are there any particular concerns regarding the following items? (Check item of concern, explain below)

- ☐ Access into the site
- ☐ Circulation within the site
- ☐ Road/Driveway design
- ☐ Availability of water
- ☐ Other issues (explain below)
- ☐ Water lines
- ☐ Fire Hydrants
- ☐ Lighting of site
- ☐ Access to sides/rear of building

Comments:

Per 2021 NFPA 1 Fire Code:
18.2.3.2.2 Fire apparatus access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire apparatus access roads as measured by an approved route around the exterior of the building or facility.

18.2.3.5.1.1* Fire apparatus access roads shall have an unobstructed width of not less than 20 ft (6.1 m).

18.2.3.5.2* Surface. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with an all-weather driving surface.

18.2.3.6.1 Where required by the AHJ, approved signs, approved roadway surface markings, or other approved notices shall be provided and maintained to identify fire apparatus access roads or to prohibit the obstruction thereof or both. NO PARKING FIRE LANE signs shall be provided.

Submitted by: Brian Johnson, Division Chief Date: 01/07/2026

Design Review Committee

Assessing Department Comment Sheet

Project: Mack's Apples
Location: 230 Mammoth Road Tax Map 6 Lot 21
Date:12/31/2025

Please send all comments by January 14, 2026

Please Return Comments to Alecia LaFlamme alaflamme@londonderrynh.gov Thank you.

Is any of the subject property in Current Use: ☒ Yes ☐ No

Are there any particular concerns regarding the following items?
(Check item of concern, explain below)

☐ Street Numbering ☐ Street Naming
☐ Lot Numbers ☐ Fiscal Impact

Please fill out the following for all subdivision applications creating new lots:

Existing Map and Lot/Street Address: _____

Proposed Map and Lot/Street Address: _____

_____

_____

Comments:

There are currently 4 acres in Farm/Current Use. If the restaurant stays within the current building, and the parking lot stays the same size, no land will need to be removed from current use. If there is an addition onto the existing building or the parking lot is enlarged, land may need to come out of current use.

Submitted by: Laura Keeley Date: 1-12-26

C. **Subdivision for 16 residential lots and associated site improvements in the Agricultural Residential (AR-1) District. 35 Elwood Road, Map 5 Lot 39; 16 Dan Hill Road, Map 5 Lot 39-5; 54A Elwood Road, Map 5 Lot 40; 68 Rear Elwood Road, and Map 5 Lot 72, Estate of Wayne Elwood c/o Linda & Christina Elwood (owner) & Belize Real Estate Holdings, LLC (applicant).**

No applicant appeared. D. Ellis asked about the barn that exists on the property in one of the proposed lots as it is listed on one of the state's historic websites as an old structure. There are many stone walls on the property, some or all of which may require preservation. J. Mahon asked about the plan to preserve the apple trees on these properties. T. Combes asked if this former orchard was part of the historic Apple Way.

Action: Applicant to be advised of discussion about the preservation of the old barn, stone walls, and apple trees. No further recommendation to the Planning Board.

D. **Site plan for renovation of an existing building to add a restaurant and associated parking in support of an agritourism operation at 230 Mammoth Road (Map 06, Lot 21), zoned Agricultural-Residential (AR-1). MHO Acquisition, LLC, (owner/applicant).**

Laura Gandia, Attorney, Devine Millimet presented. This plan would call for the addition of a 4000 sq. ft., 99-seat farm-to-table restaurant in the rear section of Mack's Apples. The rear and side exterior of the building – concrete and wood – would be

refurbished and painted red with the addition of windows, signage, and lighting. Some additional landscaping near the building is anticipated potentially including lilacs. No additional parking is planned beyond the 92 existing spaces. Additional lighting would be added to the front area, the parking lot, and to the rear of the building. J. Mahon suggested that the applicant consider more rustic lighting fixtures to match the style of the building versus the modern fixtures in the lighting plan.
Action: Recommended as presented to the Planning Board with a note to consider more rustic lighting fixtures in the parking lot.

V. **Other business:**

A. Discussion of potential special meeting on or about 2/26/26.

B. Discussion of warrant articles relating to the Rev. Morrison Meeting House. Two articles were discussed. The first proposed by the Town is to renovate the building for about $3.4 million via a bond; the second, a citizen's petition sponsored by the Londonderry Historical Society, is for $950,000, half of which would come from the undesignated fund balance. The Heritage and Historic District Commission was asked to take a position on these warrant articles.
Action: J. Mahon made a motion for the Commission to support the warrant article calling for the $3.4 million dollar renovation of the Reverand Morrison Meeting House; T. Combes seconded. The motion passed 6-0. D. Ellis made a motion for the Commission to support the warrant article calling for $950,000 to renovate the Reverend Morrisson Meeting House; T. Combes seconded. The motion passed 5-1 (J. Mahon).

VI. **Public input:** None

VII. **Adjournment:** J. Mahon made a motion to adjourn: T. Combes seconded. The motion passed 6-0.

MEMORANDUM

To: Planning Board

Date: March 4, 2026

From: Planning and Economic Development
Engineering & Environmental Services Dept.
Stantec Consulting Services, Inc.

Re: Tax Map 6 Lot 21
Mack's Apples Restaurant Site
230 Mammoth Road

Owner/Applicant: MHO Acquisition, LLC

Brown Engineering LLC submitted plans and supporting information for the above-referenced project. DRC and the Town's engineering consultant, Stantec Consulting Services Inc. reviewed the submitted plans and information, and review comments were forwarded to the Applicant's engineer. The Applicant submitted revised plans and information and we offer the following comments:

Checklist Items:

1. The Applicant's submission does not include a landscape plan per items II.4 and VII of the checklist to demonstrate compliance with section 3.10 of the Site Plan Regulations. We recommend the Applicant prepare and provide a landscape plan to demonstrate the proposed development complies with section 3.10 of the Site Plan Regulations. The Applicant has submitted a written **waiver request** for these requirements for Planning Board consideration.

2. The Applicant's proposed development includes alteration of the site to construct improvements and creation of impervious areas (sidewalk and entrance, retaining wall, light poles, etc.). The existing conditions plans indicate existing stormwater facilities are present but it is unknown if the current system provides proper surface drainage per section 3.07 of the Site Plan Regulations and item XI.2 of the checklist. Based upon a recent Google aerial view search, it appears stormwater runoff ponding occurs in the existing gravel parking lot. The submission is absent of a stormwater management report (drainage report) to demonstrate proper surface drainage and compliance with section 3.07 of the Site Plan Regulations – no increase in runoff. We recommend the Applicant prepare and provide a stormwater management report to demonstrate the proposed development complies with section 3.07 of the Site Plan Regulations. The Applicant has submitted a written **waiver request** for these requirements for Planning Board consideration.

3. The Applicant's proposed development does not include CO District Signage in accordance with section 5.06 of the Site Plan Regulations and items V.3.b and V.10 of the checklist. The Applicant has submitted a written **waiver request** for these requirements for Planning Board consideration.

4. The Applicant's submission to the Planning Board did not include a response letter to the DRC review comments or highlighted plans per item II.11 of the checklist.

5. The Applicant's updated existing conditions plan submission did not include the zoning of each abutter per section 4.12.c. 5 and Use per section 4.12.c.25 of the regulations and per item V.4 of the checklist.

6. The Applicant's updated site plan submission did not include the % green area per section 4.11.h of the Site Plan Regulations and item IV.1.h of the checklist.

7. The Applicant's updated site plan submission did not include the % building coverage per section 4.11.i of the Site Plan Regulations and item IV.1.i of the checklist.

8. The Applicant's updated site plan submission did not include or label the proposed utility line to serve the proposed parking lot lights per section 4.14.b.7.iv. of the Site Plan Regulations and per item VI.2.g.4 of the checklist or include a utility line trench detail in the plan set per item X.13.d of the checklist for proper construction.

9. The Applicant's updated site plan submission did not include /address construction sequence notes, erosion control notes, and turf establishment notes per section 4.14.c.24 of the Site Plan Regulations and item X.24 of the checklist.

Design Review Items:

1. The Applicant's updated existing conditions plans do not indicate the trees greater than 15" in diameter and species per section 4.12.c.19.viii of the Site Plan Regulations and item VI.1.v of the Site Plan Application & Checklist. The Applicant has submitted a written **waiver request** for this requirement for Planning Board consideration.

2. The Applicant's updated existing conditions plans indicates additional stormwater piping from the previous submission but the plans does not indicate the existing pipe sizes or inverts of the existing system and direction of flow per section 4.14.a.19.i and ii of the Site Plan Regulations and items VI.1.s1 and 2 of the Site Plan Application & Checklist. The Applicant has submitted a written **waiver request** for this requirement for Planning Board consideration.

3. The Applicant's proposed development appears to be within proximity of existing trees to remain but the revised submission does not include tree protection details per section 4.14.c.27 of the Site Plan Regulations and item X.25 of the checklist. The Applicant has submitted a written **waiver request** for this requirement for Planning Board consideration.

4. The Applicant's updated design does not appear to indicate/provide the minimum width of a sidewalk adjacent to buildings of 7 feet per section 3.08.c.2.v of the Site Plan Regulations. The Applicant has submitted a written **waiver request** for this requirement for Planning Board consideration.

5. The existing conditions plan indicates the two existing site driveways less than 200 feet apart which does not comply with section 3.08.b.3 of the regulations. It is our understanding the Planning Board may require closure of one driveway per section 3.08.b.4.2. We note the submission does not include driveway sight distance plans for the existing driveways to demonstrate the appropriate sight distance is available per section 3.08.b.8 of the regulations. The Applicant has submitted a written **waiver request** for this requirement for Planning Board consideration.

6. The Applicant's project design does not provide a proper parking lot design - a paved parking lot - per section 3.09.k of the Site Plan Regulations. The submission indicates a gravel parking lot exists at the site and there is no existing delineation of parking spaces as required per section 3.09.k.1.i of the regulations. We recommend the Applicant update the design to provide a proper parking lot design in compliance with section 3.09.k of the Site Plan Regulations. The Applicant has submitted a written **waiver request** for this requirement for Planning Board consideration.

7. The Applicant's project design does not provide proper paved parking for disabled persons and ADA compliance per section 3.09.e of the Site Plan Regulations. We note the proposed design

does not provide paved access aisles to the proposed wheelchair accessible ramp at the building as required. The existing conditions submission indicates gravel parking and the plan implies the markings for the designated parking lot spaces and access aisles are present/visible. However the spaces do not appear to be present. In addition, proper parking signage is absent from the design. We recommend the Applicant update the design to provide proper paved parking and access aisles for disabled persons and ADA compliance per section 3.09.e of the Site Plan Regulations.

8. The Applicant's design does not include any loading spaces per section 3.09.g.11 of the Site Plan Regulations. The Applicant shall review and update the plan to indicate loading spaces in accordance with the regulations and as acceptable to the Planning Department.

9. The Applicant's design indicates the proposed development will utilize an off-site well to serve the proposed restaurant, but the submission did not include information for compliance with section 3.05 of the Site Plan Regulations. We note the septic design calculations indicate the water demand will increase from 553 GPD to 4,793 GPD, which is an increase of more than 7.5 times. The submission information notes a well radius of 150 feet is required, but the well radius information is not shown in the submission. We note the boundary plan indicates the off-site well location is on a lot not owned by the Applicant and the well provides service to at least two other buildings. It is unknown what the water demand is for these other buildings and the total demand for the existing common water system. It is unknown if the existing well has sufficient capacity to address the additional water demand under this application. It is unknown if the Applicant has obtained a well permit for the project per RSA 485 and per NHDES for the small drinking water system (Env-Dw 305) for documentation which demonstrates compliance per section 3.05 of the Site Plan Regulations. Separately, it is our understanding that new water lines have been or will be constructed in Londonderry to address PFAS well contamination, but it is unknown if the existing well for this project has been tested for contamination for this new public use. We recommend the Applicant provide supporting documentation to demonstrate compliance with section 3.05 of the Site Plan Regulations as acceptable to the Town.

10. The proposed development indicates a new septic system is proposed that requires a NHDES approval to demonstrate compliance with section 3.06 of the Site Plan Regulations. In addition the proposed restaurant is a change in use and significant traffic generator that requires an updated NHDOT permit. Also, the project requires a Town of Londonderry Stormwater Permit for the proposed development and a permit from NHDES for the change to the water supply and well serving the project. The Applicant should submit for and obtain all project permits, indicate the permit approval numbers on sheet 1 and provide copies of all permits for the Planning Department files per sections 4.13 and 4.18.e of the Site Plan Regulations and Item XII of the Site Plan Application & Checklist.

11. We recommend the Applicant clarify/address the following on the **Existing Boundary and Existing Conditions Plan:**
    a. The existing condition plan does not provide the topography of the entire site per section 4.12.c.3 of the regulations. Please update the submission accordingly.
    b. Please update the boundary plan to provide the missing property line information at the northwesterly corner of the site at Route 128 per section 4.12.c.2 of the regulations and item V.2 of the checklist.
    c. Please update the plans to indicate all the proposed property monuments to be set per sections 3.02 and 4.12.c.4.ii of the regulations and item V.3.b of the checklist.

d. The plans do not indicate an easement exists for the waterline or driveway to the separate existing building across abutting lot 21-2 per section 4.12.c.8 of the regulations and per item V.7 of the checklist. Please clarify or note accordingly.
e. Please review and update the boundary plan to indicate the appropriate CO District setback along the entirety of the wetlands per sections 4.12.c.14 and 4.12.c.17. It appears the limits are not properly indicated along the northeasterly portion of the property.
f. Please update the plan to indicate and label the existing septic systems serving the separate existing buildings on the site per section 4.12.c.19.iii of the regulations and item V.15 of the checklist.
g. Please update the plan to indicate the location and extent of the irrigation line that is connected to the intake labeled on the abutting lot and shown at the limits of the existing pond per section 4.12.c.22 of the regulations and item V.18 of the checklist. Does this irrigation pipe conflict with the proposed septic system?
h. The plan does not indicate the location of existing utilities serving the existing separate building at the southerly portion of the site. Please update the plan accordingly and review and update all applicable sheets.

12. We recommend the Applicant clarify/address the following on the **Site Plan, Entrance Detail Plan, Sanitary System Design Plan and Details:**
    a. We recommend the Applicant note the type of anticipated delivery vehicle for the project on the site plan and demonstrate appropriate access is provided with templates as typically requested by the Town.
    b. The plans do not provide dimensions for the parking spaces and aisles to demonstrate compliance with section 3.09.c and Table A. Please update the plans accordingly.
    c. The parking lot calculations do not appear to address the existing separate building at the southerly portion of the site or the existing building at the northerly portion of the site or the use of the property for farm related activities (planting, picking, etc.) not related to the buildings. It is our understanding that parking along Mammoth Road occurs due to insufficient parking under the current site operations and it is unclear whether sufficient parking is available for the proposed use considering that more than half (50 spaces) of the 92 assumed existing spaces are needed for the proposed development use under this application. Please revise the parking calculations to properly address all existing uses and demonstrate sufficient/proposed parking will be provided as acceptable to the Town. In addition, please correct note 1 in the calculations to state 92 (versus 97) spaces.
    d. The existing conditions plan does not indicate a stop sign is provided at the existing driveway. We recommend the Applicant indicate and label stop bars and stop signs at the driveway exits on the site plan and include details in the plan set.
    e. The Applicant's entrance detail does not include the proposed grading to achieve the indicated finish floor elevation shown on the plan or properly indicate the entire entrance area development along the entire building as shown on the separate building plan. We recommend the Applicant update the plan to indicate the proposed grading and include spot elevations as necessary to achieve the indicated design elevation at the building entrance consistent with the proposed building plans for proper construction.
    f. The Applicant's entrance detail indicates a retaining wall is necessary to construct the proposed entrance. Based upon the indicated existing grading, it appears a retaining wall would be greater than 3 feet in height and considered a structure. Please note the top and toe elevations of the retaining wall and provide a detail for the proposed retaining wall structure in the plan set and provide a note on the site plan stating a building permit is required for the proposed retaining wall from the Building Department or other similar language as acceptable to the Planning Department.

g. The Applicant's proposed septic tanks shown on the sanitary sewer plan do not appear to meet the minimum setbacks from the water line of 10 feet per NHDES Env.Wq.1008.05 and Table 1008-2. We recommend the Applicant revise the design in compliance with the NHDES requirements and section 3.06 of the Site Plan Regulations. In addition, please correct the scale noted in the title block to the scale of the plan.
h. The Applicant's sanitary sewer plan is not properly designed to maintain the down gradient nitrate setbacks of 250 feet within the property per Env-Wq. 1008.06 and Table 1008-3. As presented, the Applicant's proposed nitrate impacts onto abutting lot 21-4 varying from 125 to 170 feet from the subject property line within the abutting property. We note the submission does not include documentation and acknowledgement from abutting lot 21-4 to allow the indicated nitrate impacts to the lot. Please revise the design in compliance with Env-Wq 1008-06 or provide documentation and acknowledgement from abutting lot 21-4 to allow the indicated nitrate impacts to the lot for inclusion in the Planning Board's project file.

13. The Applicant provided updated traffic report information. We recommend the Applicant address the traffic review comments noted in Stantec's letter dated March 4, 2026 as acceptable to the Town.

14. We recommend the Applicant verify the DRC comments for the project are adequately addressed as applicable:
    a. Please provide documentation that the comments of Planning Department have been adequately addressed with the Planning Department.
    b. Please provide documentation that the comments of Assessing Department have been adequately addressed with the Department.
    c. Please provide documentation that the comments of Building Department have been adequately addressed with the Department
    d. Please provide documentation that the comments of Conservation Commission have been adequately addressed with the Commission.
    e. Please provide documentation that the comments of Fire Department have been adequately addressed with the Department.

Board Action Items:

1. The Applicant has submitted a letter that includes eleven (11) separate waiver requests relative to a requirement of the Site Plan Regulations as noted in the letter dated February 12, 2026. The Board should carefully review and consider each of the waiver requests as part of the project review.

Stantec

Memo

To:	Ms. Kellie Caron and Ms. Kristan Farr Planning & Economic Development Londonderry, NH	From:	Evan Drew PE, PTOE, RSP1 Linda Greer PE, PTOE Michael Leach
CC:	Mr. John Trottier, PE Director of Engineering and Environmental Services Londonderry, NH		Stantec 5 Dartmouth Drive Suite 200 Auburn, NH 03032-3984
Project/File:	179451199	Date:	March 4, 2026

Reference: Proposed Re-Use to Restaurant – Mack's Apples Farm – 230 Mammoth Road – Traffic Peer Review

Stantec Consulting Services, Inc. ("Stantec") has reviewed the traffic assessment by Transportation Engineering, Planning and Policy, ("TEPP") prepared for Mack's Apples, regarding a change in use of an existing nearly 4,000 square feet (4 KSF) of building floor area into a proposed restaurant at Mack's Apples Farm, located at 230 Mammoth Road (NH Route 128) dated December 18th, 2025. TEPP submitted an additional revised traffic assessment dated February 11, 2026.

Stantec reviewed both memorandums following Section 3.14 of the most current Town of Londonderry's Site Plan regulations (Revised June 11th, 2025), the 11th Edition Trip Generation Manual[1] by the Institute of Transportation Engineers (ITE), and industry best practices. It is our understanding that a scoping meeting between TEPP, NHDOT, and the Town did not occur for the proposed project located along NH Route 128 in accordance with the Town's Site Plan Regulations. The memorandum provided covers a "short" analysis level of assessment per the Town's Site Plan Regulations (Section 3.14.c.).

Description of Site and Roadways

Per Site Plan Regulations Section 3.14.c.1 and c.2, TEPP provided description of roadways and the site.

Stantec finds TEPP's descriptions of the site unsatisfactory. Based on the information provided, the memorandum identifies only that 4 KSF of an existing building area will be converted to a restaurant but does not address the current conditions of the site. With the noted modification to the existing site, Stantec has the following comments/questions that are not identified or discussed in the report:

[1] While the Town of Londonderry's Site Plan Regulations identify applicants shall use the most current edition of the ITE Trip Generation Manual, the 12th Edition of the Manual was released August 2025 and the 11th Edition was the most current at the time of this development's original traffic impact assessments

- **What are the existing conditions for the entire site?**
- **What are the existing uses for the entire site?**
- **Is this new restaurant use taking over building area that is currently unused and not part of an existing use that may impact traffic generation?**
- **If this space is part of an existing use that currently has an impact to traffic and trip generation, what is the existing use and existing traffic related to that use and for comparison to the potential change in trip generation.**
- **Stantec is aware that the Town and NHDOT have knowledge of existing deficiencies or issues for this site location regarding demand during fall apple harvest season and potential for impacts at the site driveways and NH Route 128. This includes parking along NH Route 128.**

Stantec finds TEPP's description of the primary roadway, Mammoth Road, acceptable.

Trip Generation and Distribution

TEPP identified the proposed use as a fine dining restaurant (ITE Land Use Code 931) based on floor area.

Stantec notes that Land Use Code (LUC) 931 – Fine Dining is provided the following description in the ITE Trip Generation Manual:

"A fine dining restaurant is a full-service eating establishment with a typical duration of stay of at least 1 hour. A fine dining restaurant generally does not serve breakfast; some do not serve lunch; all serve dinner. This type of restaurant often requests and sometimes requires a reservation and is generally not part of a chain. A patron commonly waits to be seated, is served by wait staff, orders from a menu and pays after the meal. Some of the study sites have lounge or bar facilities (serving alcoholic beverages), but meal service is the primary draw to the restaurant."

Stantec recommends TEPP provide additional description as to the existing use that will be replaced or enhanced by the proposed use and, beyond potentially the square footage identified, explain why LUC Fine Dining is appropriate for this use, and not one of the other many restaurant land uses ITE has available.

TEPP does not identify if the build square footage will be revising an existing, utilized space that attributes to existing traffic generation at the site, or if a currently unoccupied and nonfunctional or traffic inducing space that will be attributing this additional use. TEPP identifies 316 daily weekday trips and 32 PM peak hour and 28 Saturday midday peak hour trips associated with this specific new use.

Based on a review of the specific Land Use Code, its square footage, and the 12th Edition's calculations, Stantec finds the summary of estimated trips associated with this development (4K SF Restaurant) accurate to the most current edition of the ITE Trip Generation Manual.

However, TEPP notes "These vehicle-trips do not reflect offsets for the existing trips of the floor area to be converted to restaurant use." As noted in previous comments, Stantec would request

additional information from TEPP regarding existing uses and how the reuse blends with existing trips and traffic volumes, which have not been provided.

Stantec finds TEPP revised traffic assessment provides satisfactory trip distribution, using the flow direction of NH Route 128, which is appropriate for this type of site.

Sight Distance

TEPP included sight-distance measurements for each driveway as required for Section 3.14.c.3. Based on Table 1 – Sight Distances provided in the report, it appears that the driveways exceed the minimum required intersection sight distance of 365 feet as required by the Town and 400 feet as required by NHDOT.

However, Table 1 identifies the North Driveway and South Driveway and the intersection sight distance (ISD) and stopping sight distance (SSD) available. No figures, descriptions, or photos are provided with the document to identify these proposed driveway locations. In addition, the site appears to only have one primary driveway and Stantec does not know if the "North" and "South" driveways are part of the current NHDOT driveway permit for the site or are intended to be under this proposal.

Stantec recommends TEPP provide additional figures or photos or other indications of how sight distances were measured and if the Applicant is expecting to revise the site driveway into two separate driveways or if the current primary site driveway is to be retained.

Existing Traffic Volumes

The February 11th, 2026, traffic assessment included count data collected by Accurate Counts on Thursday November 6 through Saturday November 8, 2025, in the revised report. Automatic Traffic recorder (ATR) counts were collected on NH 128, south of the site, and turning movement counts were collected at both site driveways. Requirements dealing with existing count data and traffic projections are described in Site Plan Regulations Section 3.14.d.3 and d.4, which states that traffic counts shall be seasonally adjusted to average and peak conditions. Unfortunately, this step was excluded and ultimately effects all volume calculations for 2026 existing, 2027 and 2037 No-Build, 2027 and 2037 Build.

It should be noted that the TMC data with respect to the site driveway was collected in November, which is after the peak Apple season in New Hampshire. Information should be provided with respect to the site driveways' traffic volume off peak and during peak season. Traffic volume figures should include both site driveways for peak season and nonpeak season.

Stantec recommends TEPP use NHDOT standards for adjusting traffic volumes to average and peak month for the NH 128 (Mammoth Road) volumes. For the site driveways the Applicant will need to determine what the average and peak month volumes are, since the major roadway adjustment factor would not apply to a site driveway that has its own seasonal peak such as the apple growing season. TEPP should include both driveways in all traffic volume figures.

Per Site Plan Regulations Section 3.14.4.i., iii, iv TEPP correctly determined the design year, applied the proper procedure for calculation and documentation of background growth rate, along with justification for the assumed trip distribution. However, per Site Plan Regulations Section 3.14.4.ii the report makes no

mention of obtaining a list from the Town of Londonderry containing all proposed developments permitted to date within the study area.

Stantec recommends that during future coordination with NHDOT and Town of Londonderry discussions of any approved proposed site developments should be considered for inclusion within this project background traffic volumes.

Turn Treatment

TEPP uses the proper guidelines for evaluation of left turn lane warrants, **for a major-road left-turn bay**. Analysis shows that warrants are met for 2027 and 2037 PM peak, but not met for 2027 and 2037 Saturday peak, using the volumes provided in the report.

This warrant is for when a standard left turn bay should be considered, however the alternative suggested in the report is for the shoulder to be used for through movements to bypass left turns. Stantec understands this to mean the Applicant will design proposed pavement marking plans separating the left turns and the through movements within the current roadway width, utilizing the existing shoulder for the through lane. The design of the left turn bay length should be based on left turn queue length and proper lane change and deceleration length based on AASHTO and NHDOT guidelines. The left turn lane design should be part of the Applicant's NHDOT permit application for this new use.

Conclusion

TEPPs conclusion summarizes that the relevant sight distances at the existing driveway intersections are adequate.

Stantec generally concurs with this conclusion but asks for documentation.

TEPPs conclusion summarizes that that the proposed restaurant is not anticipated to add significant new traffic to the area and left-turn-treatment analysis indicates no modification to Mammoth Road.

Stantec does not find this conclusion TEPP presents in their study to be represented or validated in the report since the submission lacks significant information about the existing site as noted above. It is our understanding that the Town currently requests Applicant's to provide development data to clarify the percent increase in traffic at the roadway associated with each project and substantiate what the anticipated new traffic is to the area.

It is unclear that this project has meet the minimum requirements of a "Short" Analysis per the Town's Site Plan Regulations Section 3.14.c at this time. A full traffic study may be necessary for consideration by NHDOT for the review of a revised driveway permit, which is required for this project. Stantec recommends TEPP coordinate with NHDOT and Town of Londonderry for a traffic scoping meeting for this project driveway application to determine the appropriate type of traffic report needed for this project. The updated and revised report, as determined by NHDOT and Town of Londonderry, should include additional details to resolve outstanding comments such as the following:

- **Additional existing conditions and proposed change in use information**

- **Existing traffic operations at the site, either quantitative or qualitative to support some of the conclusions within the report**
- **Coordination and determination of other approved site developments for background traffic volume considered**
- **Updated base traffic volumes developed for average and peak month**
- **Traffic volume figures which include both site driveways**
- **New left-turn lane warrant analysis based on updated traffic volumes**
- **Pavement marking layout provided if it is determined that left-turn warrant is met.**

Stantec appreciates the opportunity to conduct a design review of these studies on behalf of the Town of Londonderry. Please reach out for any additional questions or comments.