Drainage Narrative

607 Calef Highway
Barrington, NH
Tax Map 238, Lot 44

Prepared for

TURBOCAM, INC.
607 Calef Highway Suite 200
Barrington, NH 03825

Land of

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Barrington, NH 03825

Prepared By

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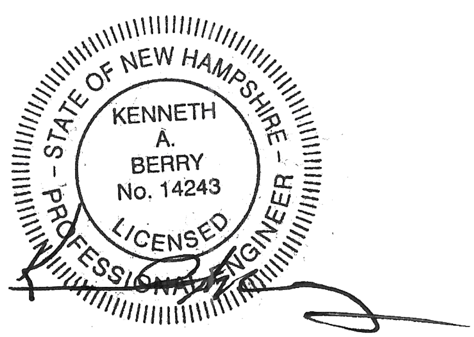

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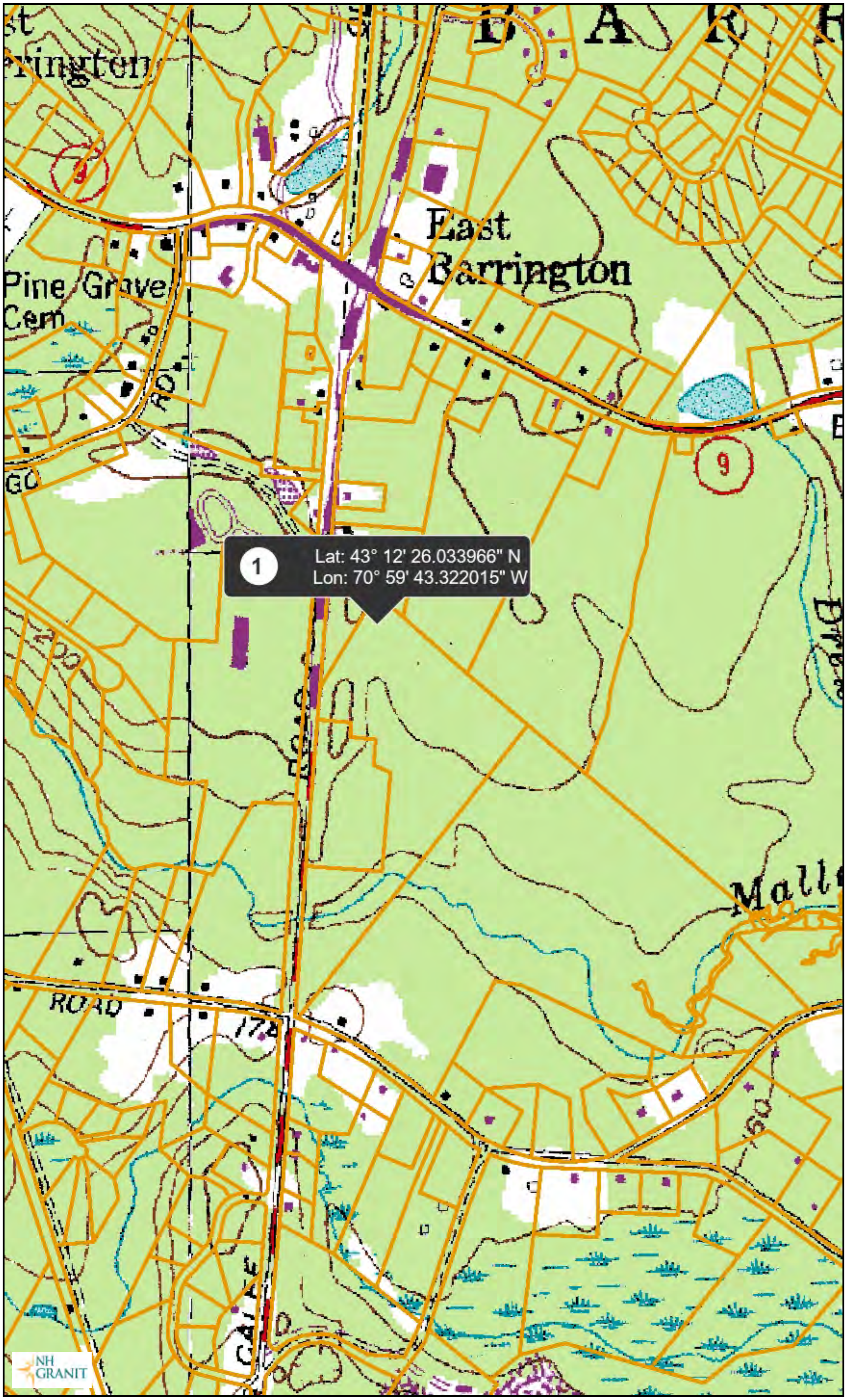

Legend

- Parcels
- State
- County
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Map Scale

1: 10,000

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Notes

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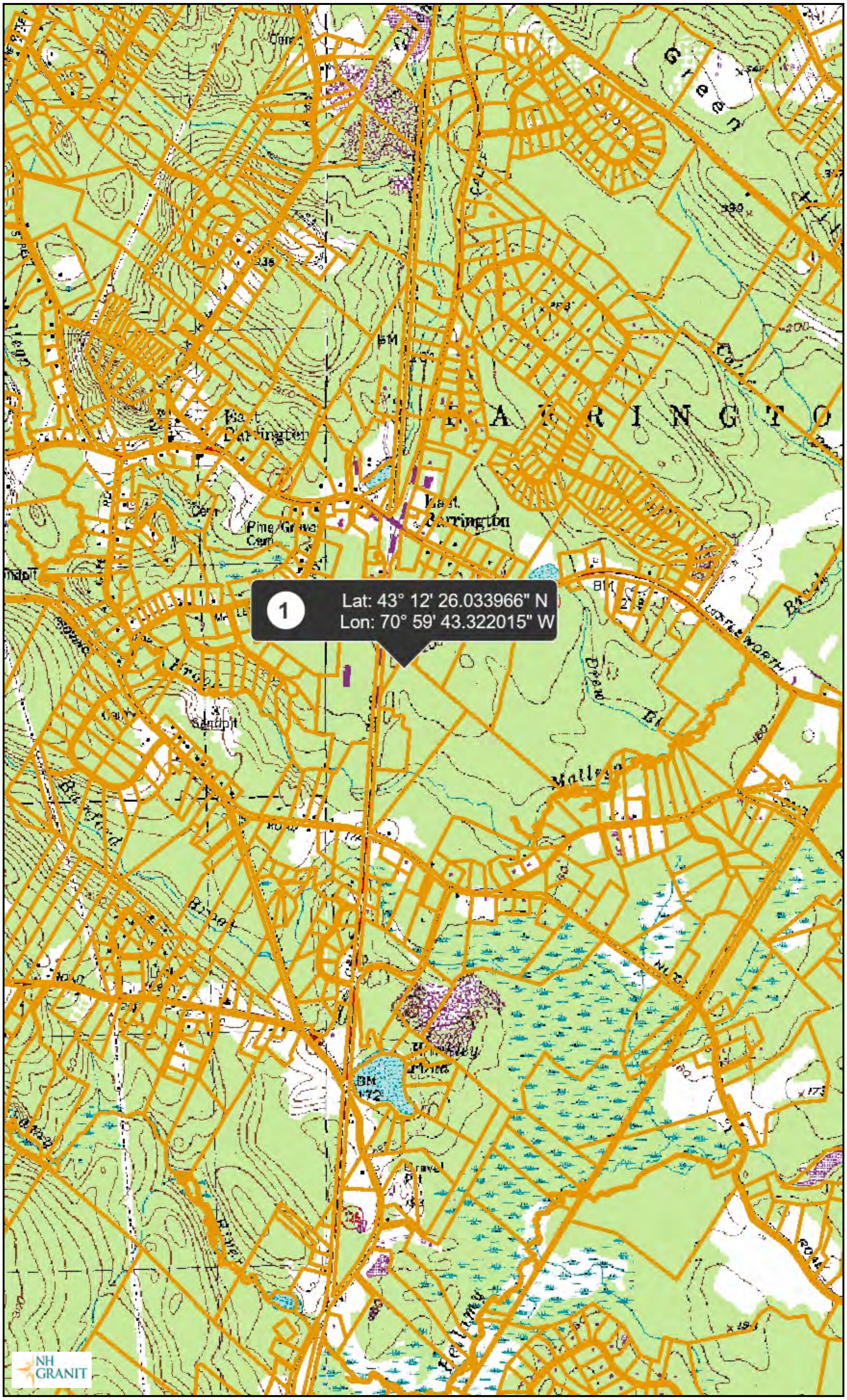

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DESIGN METHOD OBJECTIVES

The owner / developer of Tax Map 238, Lot 44, TURBOCAM, INC. is proposing to develop the property at 607 Calef Highway. The site is currently vacant land. TURBOCAM, INC. is proposing two parking areas with a total of 113 parking spaces and outdoor recreation improvements.

An on-site topography survey was completed by field crews of Berry Surveying & Engineering in April of 2023 and a Site Specific Soil Survey was completed by John P. Hayes with a report generated on May 5, 2023. Soils on site are included in all four hydrologic soil groups: HSG A, HSG B, HSG C, and HSG D (No HSG D in analysis). (See attached report). A wetland delineation was completed as part of the existing conditions package. The off-site land which drains onto the locus parcel has been delineated by USDA / NRCS soils in Websoil and USGS Equivalent contours from public sources. (Google Tin & NH Lidar)

An Existing and Proposed Conditions analysis was conducted for the purpose of calculating the peak rate of stormwater run-off and to subsequently design adequate mitigation of drainage. There are three existing drainage discharge point which was identified in the existing analysis and duplicated in the proposed conditions analysis. This Discharge Point, or Point of Analysis, is considered the area contributing runoff to the westerly side of the wetlands, south of the existing Turbocam driveway, located on Lot 44-1 and Lot 44. Designing two watershed models we have compared the differences in these rates of peak run-off and surface water volume. Sheet W1, Existing Conditions Watershed Plan, outlines the characteristics of the site in its existing or pre-construction conditions. The second analysis displays the proposed (post-construction) conditions (See Sheet W2). HydroCAD uses a series of node suffixes for numbering purposes (S = Subcatchment, P = Pond Device, R = Reach), to simplify annotation these suffixes are left off the watershed plans and node type is denoted by the symbol shape according to the displayed legend which coincides with HydroCAD graphics. The analysis was conducted using data for; 2 Yr - 24 Hr (3.08”), 10 Yr - 24 Hr (4.65”), 25 Yr - 24 Hr (5.87”), 50 Yr - 24 Hr (7.02”), and 100 YR - 24 Hr (8.39”) storm events. Storm event analysis was accomplished using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. Rainfall quantities are based on the Extreme Precipitation Table for this location from the Northeast Regional Climate Center / Cornell University (http://precip.eas.cornell.edu).

1.0 Existing Conditions Analysis:

Reference: Sheet W1 - Existing Conditions Watershed Plan (Enclosed)
Existing Conditions Plan

The existing parcel is currently an operating light manufacturing facility. The analyzed soils within the locus parcel are made up of multiple soil types, containing Hydrologic Soil Group (HSG) A, B, C, & D. See Site Specific Soils Map and report for more information. The land cover types involved are grassed land, woods, roofs, gravel, and pavement. Off-site soils are likewise HSG A and based on USDA / NRCS Websoil.

The land area analyzed consists of 11.40 acres of the 27.94 acre parcel as well as offsite land. The total area of analysis for the Existing Conditions Analysis is 16.92 acres. The land analyzed is made up of nine subcatchments analyzed at three individual non-point final reaches. These reaches include the westerly sideline of the jurisdictional wetland, to the south of the existing Turbocam driveway, the southeastern property line, and the existing drainage practice in front of the Turbocam building. There is a discrepancy in the area between the two models, due to the addition of 0.006 Ac in subcatchment #70 from the grading of the swale line adjacent to the parking area.

<u>Receiving Waters and Impairments</u>: The Mallego Brook (NHRIV600030903-02) watershed will receive all of the runoff from the site directly. The impairment of the watershed are as follows:

Mercury, NE Regional Mercury TMDL, December 20, 2008, TMDL #33883
pH, Low Priority TMDL
Dissolved Oxygen Saturation, Low Priority TMDL
Oxygen, Dissolved, Low Priority TMDL

<u>Final Reach #400</u>

Subcatchment #72 is made up exclusively of offsite land along the eastern side of Calef Highway north of the locus parcel. The subcatchment extends back to the roof lines of the businesses along the highway, following the existing topography of the land. Runoff generally flows south down the side of Calef Highway and into an existing roadside depression (**Pond #72**) where it is infiltrated into the soil. Excess runoff flows over an offsite driveway and along a roadside swale (**Reach #72**) into a catch basin adjacent to the locus parcel (**Pond #71**) where it is directed onto the parcel through an outlet pipe and a swale (**Reaches #71a & #71b**).

Subcatchment #71 encompasses offsite land spanning Calef Highway and extending up the driveway of the plaza across Calef Highway northwest of the parcel. This subcatchment encompasses a closed drainage system being analyzed as a single pond at the outlet of the final catch basin (**Pond #71**) before it directs runoff onto the parcel. This is done to analyze the runoff flowing onto the parcel and not to analyze the performance of the offsite drainage system.

Subcatchment #70 consists of partially wooded land at the front of the parcel along Calef Highway. The subcatchment is defined by the crown of Calef Highway and the crown of the Turbocam driveway. Runoff generally flows east and southeast to a catch basin (**Pond #70**) which directs runoff through a driveway culvert to an existing detention pond being analyzed as **Final Reach #100**.

<u>Final Reach #200</u>

Subcatchment #2 is made up of land southwest of the Turbocam building extending from the crown of the main Turbocam driveway downhill through a recreation area and into undisturbed wooded land generally following the natural topography of the parcel. Runoff flows southwest to the eastern edge of the delineated wetland. The eastern wetland line is being evaluated as **Final Reach #200**.

<u>Final Reach #300</u>

Subcatchment #3 is land area beginning at the high point of the open field to the east of the existing Turbocam building extending east to the property line. Runoff flows generally in a southeasterly direction to the property line being analyzed at **Final Reach #300**, which flows offsite.

Subcatchment #30 is made up of a large portion of mostly grassed land south of the Turbocam building. Runoff flows to the stone trench toward the middle of the subcatchment (**Pond #30**) where a portion of runoff is infiltrated before outletting to a catch basin (**Pond #E03**) which is part of the closed drainage system eventually draining to the perforated HDPE infiltration pipe and the final catch basin in the system (**Pond #E04**) draining to **Final Reach #300** through the overland reaches (**Reaches #34a-#34d**). In some cases, the stone trench may flood and contribute runoff to **Final Reach #200** through a series of overland reaches (**Reaches #30a-#30d**). Catch Basin #3 (**Pond #E03**) also overflows in some cases contributing runoff to **Final Reach #300** through a separate series of overland reaches (**Reaches #33a & #34b-#34d**).

Subcatchment #31 consists of a small portion of mostly paved parking area at the southeastern corner of the Turbocam building. Runoff flows in a northeast direction to a catch basin (**Pond #E01**) which is the first in a closed drainage system eventually draining to a perforated HDPE pipe which infiltrates a portion of runoff into the soils. Runoff that is not infiltrated will eventually exceed the storage of the system overflowing the final catch basin in the system (**Pond #E04**) and drain to **Final Reach #300** through a series of overland reaches (**Reaches #34a-#34d**)

Subcatchment #32 encompasses a portion of mostly paved parking area at the southern corner of the Turbocam building. Runoff flows in a southeast direction to a catch basin (**Pond #E02**) which is part of the closed drainage system eventually draining to the perforated HDPE infiltration pipe and the final catch basin in the system

(**Pond #E04**) draining to **Final Reach #300** through the overland reaches (**Reaches #34a-#34d**).

Subcatchment #34 is a small area of land surrounding a catch basin (Pond #E04) which collects runoff as part of the closed drainage system eventually draining to the perforated HDPE infiltration pipe and the final catch basin in the system (**Pond #E04**) draining to **Final Reach #300** through the overland reaches (**Reaches #34a-#34d**)

2.0 Proposed Conditions Analysis:

Reference: Sheet W2 - Proposed Conditions Watershed Plan (Enclosed)
Proposed Grading & Drainage Plan

The applicant is proposing to improve the parcel with multiple parking areas and an outdoor function area. The proposal is supported by two Bioretention w/ ISR Systems, an Infiltration Basin, a Detention Pond, and a closed drainage system of catch basins and drain manholes to direct runoff to the practices.

Final Reach #400

Subcatchments #72 & #71 are exclusively offsite and remain unchanged.

Subcatchment #50 consists of a small portion of partially offsite land between the parcel and Calef Highway. The purpose of this subcatchment is the proposed inlet sump (**Pond #C50**) that intercepts the offsite runoff from **Subcatchments #72 & #71** and directs it to the existing detention and fire pond being analyzed as **Final Reach #400**.

Subcatchment #70 is moderately decreased in size due to the construction of the inlet sump (**Pond #C50**). Land area in this subcatchment includes wooded, grassed, and paved areas. Runoff generally flows south and southeast to **Bioretention Pond w/ ISR #201** directed to **Final Reach #400** through Drain Manhole #51 (**Pond #D51**) which is an upgraded catch basin structure (formerly **Pond #70**).

Final Reach #200

Subcatchment #2 is mostly unchanged in area from existing to proposed. Runoff flows southwest to the eastern edge of the delineated wetland. This wetland line is being evaluated as **Final Reach #200**.

Final Reach #300

Subcatchment #3 is greatly reduced in size due to the proposed development of the parcel and the construction of two drainage practices near the property line. The remaining are of **Subcatchment #3** consists of onsite, largely undisturbed land. Runoff still flows to the property line analyzed as **Final Reach #300**.

Subcatchment #4 is made up of the remaining portion of the existing **Subcatchment #3** which crosses the northeast property line consisting of largely offsite land. Runoff still flows generally toward the southeast property line being analyzed as **Final Reach #300**.

Subcatchments #43 & #44 encompass the majority of the western portion of the proposed paved parking area including the grassed island in the middle of the parking area. Runoff from these subcatchments flows southeast to their respective catch basins (**Ponds #C43 & #C44**) and into the closed drainage system that outlets to **Infiltration Pond #203** through **Bioretention Pond w/ISR #202**.

Subcatchments #45 & #46 consist of the eastern portion of the proposed paved parking area extending north to the rear of the existing storage building and east to the curbed edge of the pavement and the roof line of two proposed storage sheds. Runoff from these subcatchments flows southeast to the respective catch basins (**Ponds #C45 & #C46**) and into the closed drainage system directed to **Infiltration Pond #203** through **Bioretention Pond w/ISR #202**.

Subcatchment #47 includes a small portion of pavement at the southernmost edge of the paved parking area. Runoff flows generally south to a catch basin at the low point of the paved parking (**Pond #C47**) where it enters the closed drainage system combining with runoff from **Ponds #C44 & #C46** and is directed to **Infiltration Pond #203** through **Bioretention Pond w/ISR #202**.

Subcatchment #62 is made up of the land area contributing runoff directly to **Bioretention Pond w/ISR #202**. The limits of this subcatchment extend north to the edge of the proposed paved parking area and west to the high point of the existing grassed field south of the Turbocam building. Runoff is treated in the ISR of the practice and outlets through an outlet structure and an emergency spillway to **Infiltration Pond #203** where it is infiltrated into the soil.

Subcatchment #63 encompasses the land area contributing runoff directly to **Infiltration Pond #203**. The limits of the subcatchment extend west from the drainage practice to the high point of the field. Runoff flows east into the practice where it is infiltrated into the soil with any excess runoff flowing to **Final Reach #300** through an emergency spillway.

Subcatchment #30 is slightly reduced in size due to the construction of the outdoor function area and the related gabion basket seating. Runoff still flows inward to the infiltration trench (**Pond #30**) near the middle of the subcatchment where it infiltrates and excess runoff flows to a six-inch drain pipe which outlets into the closed drainage system through a catch basin structure (**Pond #C42**) and subsequently proposed Drain Manhole #52 (**Pond #D52)** which is an upgraded catch basin structure (formerly **Pond #E04**). The closed drainage system directs runoff through a series of catch basins and drain manholes to **Detention Pond #204** and subsequently **Final Reach**

#300. In some cases, excess runoff may also flood the trench and contribute to **Final Reach #200** through a series of overland reaches (**Reaches #30a-#30c**). The conveyance swale around the proposed EDA for lot 44-1 causes both the Tc. and the overflow reach to be longer in the proposed conditions than in the existing conditions.

Subcatchment #41 is made up of the outer edge of the existing parking area and driveway along the southern end of the existing Turbocam building and extends northeast along the edge of pavement around the southeast corner of the building. Runoff flows generally northeast to a catch basin (**Pond #C41**) where it enters the closed drainage system which eventually outlets to Detention Pond #204 (**Pond #204**).

Subcatchments #31 & #32 are both undisturbed subcatchments. Runoff in each subcatchment still flows to each catch basin (**Ponds #E01 & #E02** respectively) and into the closed drainage system flowing to **Detention Pond #204**.

Subcatchment #64 consists of the land area directly contributing runoff to **Detention Pond #204**. This area is mostly the disturbed grassed land in and around the pond with the exception of a small portion of wooded land. Runoff is directed to **Final Reach #300** through an outlet structure and an emergency spillway, both mitigated by a stone level spreader.

3.0a Stormwater Treatment:

Treatment takes place within the two Bioretention W/ ISRs designed to support the development on site. Pre-treatment will be provided in the sediment forebays of Bioretention W/ ISR #201 & #202. The water quality volume is treated within provided treatment area of the practices.

3.0b Stormwater Infiltration:

Groundwater recharge volume requirements are satisfied by Infiltration Basin #203 (Pond #203) (Sheet P-203). See Infiltration Feasibility Study also prepared by Berry Surveying & Engineering and published on the same day.

3.1 FULL COMPARATIVE ANALYSIS

ANALYSIS COMPONENT: PEAK RATE DISCHARGE (Cubic Feet / Second)

		2 Yr	10 Yr	25 Yr	50 Yr
Final Reach #200	Existing	0.78	3.31	5.85	8.53
	Proposed	0.77	3.28	5.80	8.45
Final Reach #300	Existing	2.33	4.69	6.68	9.01
	Proposed	1.55	3.49	4.82	6.43
Final Reach #400	Existing	0.40	2.18	4.22	6.45
	Proposed	0.36	1.84	4.05	6.44

ANALYSIS COMPONENT: VOLUME (Acre Feet)

		2 Yr	10 Yr	25 Yr	50 Yr
Final Reach #200	Existing	0.123	0.362	0.598	0.857
	Proposed	0.124	0.365	0.602	0.852
Final Reach #300	Existing	0.276	0.696	1.117	1.561
	Proposed	0.217	0.599	1.034	1.461
Final Reach #400	Existing	0.095	0.373	0.663	0.978
	Proposed	0.089	0.367	0.668	0.991

3.2 SWALE CAPACITY ANALYSIS

ANALYSIS COMPONENT: PEAK RATE DISCHARGE (Cubic Feet / Second)

50YR 24-HR Storm Event Used	Area (Ac.)	Swale Depth (ft.)	Bottom Width (Ft.)	Lt. Slope (X:1)	Rt. Slope (X:1)	Peak Rate (CFS)	50Yr Avg. Depth (Ft.)	Manning's "n"
Reach #70a	0.219	2	2	4	3	0.51	0.11	0.022

4.0 EROSION and SEDIMENT CONTROL PLAN & BEST MANAGEMENT PRACTICES (BMP's)

Reference: Proposed Site Plan and Grading Plan
Erosion & Sediment Control Plan
Erosion & Sediment Control Details

The proposed site development is protected from erosion and the abutting easements and properties are protected from sediment by the use of Best Management Practices as outlined in the New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA). Any area disturbed by construction will be temporarily or permanently re-stabilized within 30 days and abutting easements and properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. Reference is also made to the Stormwater System Management: Inspection & Maintenance Manual and Stormwater Operations, Inspection & Maintenance Plan which has been developed specifically for this project and available to the owner.

Perimeter Control (Silt Fence / SiltSoxx / Erosion Control Mix Berm)

The plan set demonstrates the location of perimeter sediment control. The Erosion and Sediment Control Details, Sheet E-101, has the specifications for installation and maintenance of the silt fence, Filtrexx mulch filled SiltSoxx (or approved equal), and Erosion Control Mix Berm. There are locations on the site, for example bio-media rain garden protection, where SiltSoxx protection is specified. An area of permanent perimeter control is shown by the well house for wetland buffer protection from steeper slopes.

Catch Basins (Without Sumps) & Drain Manholes

Description: Catch Basins are used throughout the site to capture and, along with culvert pipes and manhole, route surface water runoff to stormwater treatment and detention infrastructure. During construction the catch basins will be protected by inlet protection per the approved construction plans. The practice of street sweeping on a bi-annual basis will help reduce maintenance of these catch basins and culvert pipes.

Note: Deep sump catch basins are not allowed to be used on this proposed development due to wildlife concerns and any manufacturer sump resulting in a catch basin must be filled with washed crushed stone. Sediment should be trapped in the sediment forebays but is also a concern in earlier structures. See construction details for specifications of these conveyance practices.

Maintenance Considerations: Sediment must be removed from Catch Basins and Manholes on a regular basis, at least twice a year and more often if post-winter maintenance and street sweeping is not conducted. Inspections should be conducted periodically. At a minimum they should be cleaned after snow-melt and after leaf-drop. Disposal of all material, sediment, and debris must be done in accordance with state and federal regulations. Culvert pipes will be inspected to ensure that surface water runoff is capable of leaving the structures. Drain manholes will be inspected to make sure there is not sediment build-up or blockages.

Conveyance Swale

Description: Conveyance swales are stabilized channels designed to convey runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance channels may provide incidental water quality benefits, but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pretreatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/Pretreatment Practice as described elsewhere in this Chapter. See SWM Volume 2, 4-6.3 Conveyance Practices, Conveyance Swale, page 166.
Maintenance Considerations: 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 based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

Sediment Forebay

Description: A sediment forebay is an impoundment, basin, or other storage structure designed to dissipate the energy of incoming runoff and allow for initial settling of coarse sediments. Forebays are used for pretreatment of runoff prior to discharge into the primary water quality treatment BMP. In some cases, forebays may be constructed as separate structures but often, they are integrated into the design of larger stormwater management structures. See SWM Volume 2, 4-4.1 Pre-treatment Practices, Sediment Forebay, page 140.
Maintenance Considerations: Forebays help reduce the sediment load to downstream BMPs, and will therefore require more frequent cleaning. Inspect at least annually; Conduct periodic mowing of embankments (generally two times per year) to control growth of woody vegetation on embankments; Remove debris from outlet structures at least once annually; Remove and dispose of accumulated sediment based on inspection; Install and maintain a staff gage or other measuring device, to indicate depth of sediment accumulation and level at which clean-out is required. Preserving the drainage between the Sediment Forebay and the stormwater BMP by inspecting and maintaining the connecting drainage pipes and perforations should be completed semi annually or as required to ensure the forebay is dry.

Bioretention W/ Internal Storage Reservoir (ISR)

Description: A practice that provides temporary storage of runoff for filtering through an engineered soil media, augmented for enhanced phosphorus removal, followed by detention and denitrification in a subsurface internal storage reservoir (ISR) comprised of gravel. Runoff flows are routed through filter media and directed to the underlying ISR via an impermeable membrane for temporary storage. An elevated outlet control at the top of the ISR is designed to provide a retention time of at least 24 hours in the system to allow for sufficient time for denitrification and nitrogen reduction to occur prior to discharge. The design storage capacity for using the cumulative performance curves is comprised of void spaces in the filter media, temporary ponding at the surface of the practice and the void spaces in the gravel ISR. The volume of the ISR will exceed 26% of the Water Quality Volume (WQV). Reference: 2017 NH Small MS4 General Permit, Appendix F Attachment 3, and UNH Stormwater Center, "UNH Stormwater Center Hybrid Bioretention Template" (2020). *UNH Stormwater Center*. 73. https://scholars.unh.edu/stormwater/73

Maintenance Considerations: The outlet to the Internal Storage Reservoir consists of a 1.25” or 1.5” orifice in a threaded end-cap after the goose-neck pipe within the concrete outlet structure. The inlet manifold and threaded pipe outlet manifold system is designed so that the ISR, or anaerobic reservoir can be completely drained and the sump of the outlet structure pumped dry. The orifice requires periodic inspection, initially on a semi-annual basis. This time increment may need to be adjusted based on the experience on the maintenance of the device. The draining of the ISR would only be accomplished if issues developed.
The enhanced bio-media will require additional material rototilled into the top 10-inches to foot of the rain garden after a period of approximately 20 years. The timing of this maintenance period is a factor of the methodology applied during construction and will need to be evaluated as the rain gardens age.
Rain Gardens should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation the drawdown time. If the bioretention system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the rain garden to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Proposed side slopes of 2:1 will be maintained with a weedwhacker, with vegetation being removed from the BMP with each maintenance application.

Detention Basins

Description: A detention basin is an impoundment designed to temporarily store runoff and release it at a controlled rate, reducing the intensity of peak flows during storm events. Conventional detention basins are typically designed to control peak runoff rates under a range of storm conditions, and can be used to control discharges as required under the AoT Regulations and other requirements, including, but not necessarily limited to: Storage and peak rate control to meet Channel Protection Requirements (see Section 2-17); Storage and peak rate control to meet Peak Runoff Control Requirements (see Section 2-18) (10-year and 50-year frequency, 24-hour storm events); Storage and peak rate control to prevent flood impacts within the 100-year flood plain; Storage and peak rate control to meet other regulatory requirements, including local permitting standards.

Detention basins may consist of surface basins (pond-type structures) or subsurface basins (enclosed structures located below ground. Surface basins should be designed with an emergency spillway or bypass meeting applicable dam safety standards (Env-Wr 100 - 700: Dam Safety Rules). Subsurface basins should also be designed to safely bypass flows exceeding the engineered capacity of the structure. Detention basins may be combined with treatment BMPs discussed in this guidance document, to provide for other stormwater management objectives. For example, a stormwater pond may be designed to provide treatment as well as detention. However, a detention basin is not by itself considered a "Treatment Practice" under the AoT Regulations. See SWM Volume 2, 4-6.1 Conveyance Practices, Detention Basins, page 156.

Maintenance Considerations: The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed, and the vegetation maintained in healthy condition, as appropriate to the function of the facility and type of vegetation. Vegetated embankments that serve as "berms" or "dams" that impound water should be mowed at least once annually to prevent the establishment of woody vegetation.

In-Ground Infiltration Basin

Description: Infiltration basins are impoundments designed to temporarily store runoff, allowing all or a portion of the water to infiltrate into the ground. An infiltration basin is designed to completely drain between storm events. An infiltration basin is specifically designed to retain and infiltrate the entire Water Quality Volume. Some infiltration basins may infiltrate additional volumes during larger storm events, but many will be designed to release stormwater exceeding the water quality volume from the larger storms. In a properly sited and designed infiltration basin, water quality treatment is provided by runoff pollutants binding to soil particles beneath the basin as water percolates into the subsurface. Biological and chemical processes occurring in the soil also contribute to the breakdown of pollutants. Infiltrated water is used by plants to support growth or it is recharged to the underlying groundwater. As with all impoundment BMPs, surface infiltration basins should be designed with an outlet structure to pass peak flows during a range of storm events, as well as with an

emergency spillway to pass peak flows around the embankment during extreme storm events that exceed the combined infiltration capacity and outlet structure capacity of the facility. See SWM Volume 2, 4-3.3b, Treatment Practices, In-Ground Infiltration Basin, page 88.
Maintenance Considerations: Removal of debris from inlet and outlet structures. Removal of accumulated sediment. Inspection and repair of outlet structures and appurtenances. Inspection of infiltration components 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. Inspection of pretreatment measures at least twice annually, and removal of accumulated sediment as warranted by inspection, but no less than once annually. If an infiltration 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 infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

Stone Berm Level Spreader

Description: A stone berm level spreader is an outlet structure constructed at zero percent grade across a slope used to convert concentrated flow to “sheet flow.” It disperses or “spreads” flow thinly over a receiving area, usually consisting of undisturbed, vegetated ground. The conversion of concentrated flow to shallow, sheet flow allows runoff to be discharged at non-erosive velocities onto natural ground. To stabilize the spreader outlet, a stone berm is provided to dissipate flow energy, and help disperse flows along the length of the spreader. Level spreaders are not designed to remove pollutants from stormwater; however, some suspended sediment and associated phosphorous, nitrogen, metals and hydrocarbons will settle out of the runoff through settlement, filtration, infiltration, absorption, decomposition and volatilization. See SWM Volume 2, 4-6.6 Conveyance Practices, Stone Berm Level Spreader, page 162.

Maintenance Considerations: Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, spreader channel or down-slope of the spreader. Remove debris whenever observed during inspection. Remove sediment when accumulation exceeds 25% of spreader channel depth. Mow as required by landscaping design. At a minimum, mow annually to control woody vegetation within the spreader. Snow should not be stored within or down-slope of the level spreader or its approach channel. Repair any erosion and re-grade or replace stone berm material, as warranted by inspection. Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated, and corrections cannot be made through minor re-grading.

Stockpiled Sediment or Soil

Stockpiled materials including topsoil, excavated materials, borrow materials imported onto the site, construction aggregates, and sediment removed from temporary sediment traps will be located in designated areas at least 50 feet away form concentrated flows. All stockpiles will have erosion protection in the form of silt fence and diversion swales will be applied to protect the material and surrounding areas. Inactive stockpiles will be seeded for temporary stabilization. Erosion control measures will be inspected in accordance with the schedule for all other activities on site.

At a minimum, you must comply with following (EPA 2012 CGP Part 2.1.2.4d) “Do no hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance (unless connected to a sediment basin, sediment trap, or similar effective control,) storm drain inlet, or surface water.”

Dewatering Practices

Dewatering practices are not known to be required on this site. If during construction this becomes required, an addendum will be published specific for the requirements. As a general rule, ground water that needs to be removed from an excavation will be pumped to a sediment basin or a storm drain inlet prior to discharge from the site.

At a minimum, you must comply with following (EPA CGP Part 2.1.3.4) “With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer’s specifications.”

Regarding dewatering practices in the State of New Hampshire, specifically see Construction General Permit Section 9.1.2 NHR12000 State of New Hampshire and “Clarification of Section 9.1.2 ... and other New Hampshire specific information for the U.S. EPA 2012 NPDES Construction General Permit (CGP), May 3, 2012”

Please be advised that should dewatering become required, the EPA CGP 2022 requires daily inspections, monitoring, and reporting quarterly to the agency.

Stabilization for Long Term Cover

Vegetated Stabilization – Original Planting

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutter's property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specification and on Sheet E-102 using seeding mixture C, as follows:

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	48	1.10

Conservation Mix

Virginia Wild Rye	Native	FACW-
Little Bluestem	Native	FACU
Big Bluestem	Native	FAC
Red Fescue	Native	FACU
Switch Grass	Native	FAC
Partridge Pea	Native	FACU
Showy Tick Trefoil	Native	FAC
Butterfly Milkweed	Native	NI
Beggar Ticks	Native	FACW
Purple Joe Pye Weed	Native	FAC
Black Eyed Susan	Native	FACU-
Total	**25**	**0.57**

Conservation Mix to be provided by New England Wetland Plants, Inc., Amherst, MA as outline in their New England Conservation / Wildlife Mix or approved equal. Mix to be applied at a rate of 25 lbs. per acre or one-lb. per 1750 square feet. Ratio of seed is proprietary and substitutions are not allowed.

Conservation Mix will used to stabilize all 2:1 slopes and all land area disturbed within the wetland buffer.

Stormwater BMP Mix:

The grass that is planted within a stormwater BMP will be a mix designed for both inundation and dry conditions such as Ernst Seeds, Retention Basin Floor Mix ERNMX-126.

Maintenance Considerations: Permanent seeded areas for long-term cover will be inspected on a periodic basis looking for signs of growth loss or erosion. Any areas found to be damaged will be repaired and replanted to reestablish the growth. The grass should be mowed at least twice per year and any dead material removed. Any woody growth that becomes established will need to be cut and removed.

Long-term maintenance of the land cover is critical and must be maintained at least 85% grass / vegetation coverage, must be inspected for concentrated flow, rills, and channels; and must be repaired as necessary to prevent erosion.

Rolled Erosion Control Blanket

Description: Rolled Erosion Control Blankets, such as American Excelsior Company Curlex III, (or equal), North American Green BioNet series, consist of interlocking fiber mesh which is bio-degradable, used to stabilize sloping earth while vegetation is being established. The product comes in rolls that are laid out over the earth, normally over-lapped, and secured to the soil by the use of anchors or staples. The RECB may be anchored in the earth at the top of the slope to prevent wash-out. Construction specifications are included in the plan set and New Hampshire Stormwater Manual, Volume 3, 4-1 Erosion Control Practices, Temporary Erosion Control Blanket. See the chart on E-102 for compatible products with given slopes.

Construction Considerations: It is recommended that the blanket be installed in the same direction as the water flow or perpendicular to the slope. The manufacturer will recommend the amount of over-lap from one row to the next and on longer slopes between sections. Care must be taken that the RECB is laid directly on the earth / topsoil and that any existing vegetation not cause tenting as this will cause an issue with the blanket not staying in place. The staples or stakes are to be placed according to the manufacturer based on the slope of the receiving soil and forces that may be encountered. Care must be taken to utilize the correct product as specified. The choice of product are all different and in most cases are not interchangeable. NHDES or NH F&G may specify that some RECBs not be used in some applications.

Maintenance Considerations: RECBs will be inspected during the regular inspection schedule and any construction corrections made if the blanket is compromised.

Inlet Protection / Storm Drain Inlets

Storm drain inlet protection will be installed per the Erosion & Sediment Control Details as a sediment barrier installed around a storm drain inlet, catch basin, or curb inlet to reduce sediment intrusion into a system after it has been constructed and existing catch basins. These are to be constructed in accordance with the Erosion & Sediment Control Details, Sheet E-101 and maintained after every rain event.

At a minimum, you must comply with following (EPA CGP Part 2.1.2.9.b) “Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, you must remove the deposited sediment by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible."

Stabilized Construction Entrance

Description: A temporary gravel construction entrance provides an area where mud can be dislodged from tires before the vehicle leaves the construction site to reduce the amount of mud and sediment transported onto paved municipal and state roads. The stone size for the pad should be 3" angular aggregate, and the pad itself constructed to a minimum length of 75' for the full width of the access road. The aggregate should be placed at least six inches thick applied over a non-woven engineered fabric such as Mirafi 140N. A plan view and profile are shown on Sheet E-101- Erosion & Sediment Control Detail Plan.

Maintenance Considerations: The stone must be refreshed and kept clean in order for the practice to prevent tracking on the abutting roadway. If vehicle traffic by-pass the practice, it should either be channelized or the practice widened to be properly utilized. Tracking on the abutting roadway is not allowed and materials that are deposited on the abutting highway or any internal roadway must be swept daily.

Environmental Dust Control

Dust will be controlled on the site by the use of multiple Best Management Practices. Mulching and temporary seeding will be the first line of protection to be utilized where problems occur. If dust problems are not solved by these applications, the use of water and calcium chloride can be applied. Calcium chloride will be applied at a rate that will keep the surface moist but not cause pollution.

Construction Sequence

1. Cut and remove trees in construction area only as required.

2. Construct and/or install temporary and permanent sediment erosion and detention control facilities as specified. Erosion and sediment control measures shall be installed prior to any soil land disturbance.

3. Erosion, sediment and detention control facility shall be installed & stabilized prior to directing runoff to them, temporary diversions may be required. <u>Post construction storm water management practices must be initiated and stabilized early in the process</u>.

4. Clear, cut and dispose of debris in approved facility. Grubbing and stockpiling shall not occur until after erosion & sediment control measures are installed.

5. Construct temporary water diversions (swales, basins, etc.) as needed until site is stabilized.

6. All swales are to be installed prior to rough grading of the site. Temporary water diversion (swales, etc.) must be used as necessary until areas are stabilized.

7. Construct roadways for access to desired construction areas. All roads shall be stabilized immediately.

8. Install pipe and construction associated appurtenances as required or directed. Install Bioretention W/ ISRs, Infiltration Pond, and stormtech system. All disturbed areas shall stabilized immediately after grading.

9. Begin permanent and temporary seeding and mulching. All cut and fill slopes and disturbed areas shall be seeded or mulched as required, or directed. Any area disturbed by construction will be re-stabilized within 45 days (Env-Wq 1504.16) and abutting properties will not be adversely affected by this development. All swales and drainage structures will be constructed and stabilized prior to having run-off directed to them. IAW EPA 2022 CGP 2.2.14, site stabilization will be initiated immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. The installation of stabilization will be completed as soon as practicable but no later than 14 calendar days. All roadways and parking areas shall be stabilized within 72 hours of achieving finished grades. All cut and fill slopes shall be stabilized within 72 hours of achieving finished grades.

10. Construct temporary berms, drains ditches, silt fences, sediment traps, etc. Mulch and seed as required.

11. Inspect and maintain all erosion and sediment control measures during construction. All SWPPP inspections must be conducted by a qualified professional such as a professional engineer (PE), a certified professional in erosion and sediment control (CPESC), a certified erosion sediment and storm water inspector (CESSWI), or a certified professional in storm water quality (CPSWQ). Inspection reports shall be submitted to the Planning Department. Inspections shall be conducted weekly and within 24 hours of a 0.25 inch rain event.

12. Complete permanent seeding and landscaping.

13. Remove temporary erosion control measures after seeding areas have established themselves and site improvements are complete.

14. Smooth and revegetate all disturbed areas. Stabilization should occur within 14 days or removing temporary measures.

15. Finish paving all roadways.

Temporary Erosion Control Measures

1. The smallest practical area of land shall be exposed at any one time.

2. Erosion, sediment and detention measures shall be installed as shown on the plans and at locations as required, directed by the engineer.

3. All disturbed areas shall be returned to original grades and elevations. Disturbed areas shall be loamed with a minimum of 4" of loam and seeded with not less than one pound of seed per 50 square yards of area. Apply hay or straw mulch or straw mulch with rye grass seed to temporarily stabilize the area until final grade is achieved.

4. All disturbed areas will be restabilized within 45 days. At any one time, no more than 5 acres, (217,800 sq. Ft.) Will be disturbed.

5. Silt fences and perimeter barriers shall be inspected periodically and after every rain during the life of the project. All damaged areas shall be repaired, sediment deposits shall periodically be removed and disposed of.

6. After all disturbed areas have been stabilized, the temporary erosion and sediment control measures are to be removed and the area disturbed by the removal smoothed and re-vegetated.

7. Per the EPA CGP requirements there will be reports of the erosion control inspections IAW SWPPP prepared by BS&E. All erosion controls shall be inspected weekly and within 24 hours after 0.25" or greater rain event.

8. Ditches, swales, and basins shall be stabilized prior to directing runoff to them.

9. Do not traffic exposed soil surfaces with construction equipment. If feasible, perform excavations with equipment positioned outside the limits of the infiltration system.

10. Roadways, driveways and cut and fill slopes must be stabilized within 72 hours of achieving final grade.

11. Stabilization means:
    - 11.1. A minimum of 85% of vegetative cover has been established.
    - 11.2. A minimum of 3 inches of non-erosive material such as stone or rip rap has been installed, or
    - 11.3. Erosion control blankets have been installed.

12. This project is to be managed in a manner that meets the requirements and intent of RSA 430:53 and chapter AGR 3800 relative to invasive species.

13. The NHDES stormwater manual, in three volumes, dated December 2008, is a part of this plan set and the more restrictive will govern. (NH SWM)

Inspection and Maintenance Schedule

Perimeter control and catch basin inlet protection will be inspected during and after storm events of 0.25" or greater to ensure that the BMP still has integrity and is not allowing sediment to pass. Depending on SWPPP criteria, all BMP controls will be inspected once every 7 days and after storm events. Inspection reports must be submitted to Town of Barrington Planning Department. See also Stormwater System Management: Inspection and Maintenance Manual with accompanying plan published separately also by Berry Surveying & Engineering. See also Storm Water Pollution Prevention Plan (SWPPP) developed in accordance with EPA NPDES requirements & the Town of Barrington Stormwater regulations.

Corrective Action measures will be made in accordance with SWPPP requirements and records maintained on site by the Contractor.

5.0 CONCLUSION

Peak rates of runoff flow are modeled to be reduced in the post-construction analysis, as compared to the pre-construction analysis. This reduction occurs at all storm events due to the installation of the low impact development stormwater devices.

The volume of stormwater discharge from the site at the final reaches is reduced at the 2Yr.-24Hr. storm event for channel protection purposes.

A Site Specific, Terrain Alteration Permit (RSA 485: A-17) is required for this site plan due to the area of disturbance being greater than 100,000 SF (162,000SF). This will be an amendment to the existing AoT Permit.

Respectfully Submitted,
BERRY SURVEYING & ENGINEERING

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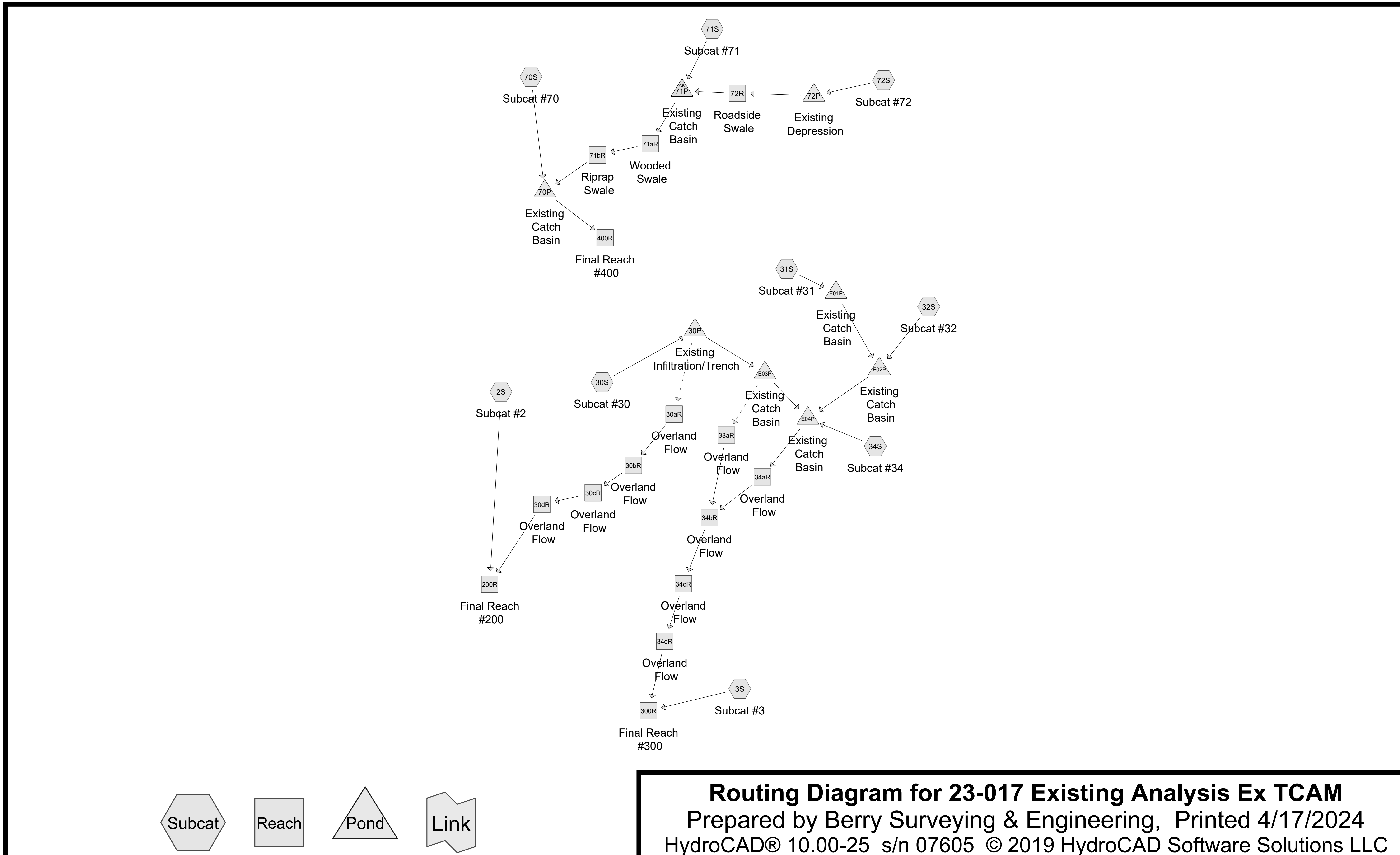
Appendix I –Existing Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr -24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing



Routing Diagram for 23-017 Existing Analysis Ex TCAM
Prepared by Berry Surveying & Engineering, Printed 4/17/2024
HydroCAD® 10.00-25 s/n 07605 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.193	39	>75% Grass cover, Good, HSG A (3S, 70S, 71S, 72S)
5.331	61	>75% Grass cover, Good, HSG B (2S, 3S, 30S, 31S, 32S, 34S, 70S)
0.867	96	Gravel surface, HSG B (2S, 3S, 30S, 34S)
1.541	98	Paved parking, HSG A (70S, 71S, 72S)
1.228	98	Paved parking, HSG B (3S, 30S, 31S, 32S, 70S)
0.044	98	Roofs, HSG B (3S, 31S, 32S)
0.086	98	Unconnected pavement, HSG B (2S)
0.001	98	Unconnected roofs, HSG B (2S)
2.953	30	Woods, Good, HSG A (3S, 70S, 71S, 72S)
2.697	55	Woods, Good, HSG B (2S, 3S, 30S, 32S, 34S)
16.942	**60**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
6.688	HSG A	3S, 70S, 71S, 72S
10.254	HSG B	2S, 3S, 30S, 31S, 32S, 34S, 70S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
16.942		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.193	5.331	0.000	0.000	0.000	7.524	>75% Grass cover, Good	2S, 3S, 30S, 31S, 32S, 34S, 70S, 71S, 72S
0.000	0.867	0.000	0.000	0.000	0.867	Gravel surface	2S, 3S, 30S, 34S
1.541	1.228	0.000	0.000	0.000	2.769	Paved parking	3S, 30S, 31S, 32S, 70S, 71S, 72S
0.000	0.044	0.000	0.000	0.000	0.044	Roofs	3S, 31S, 32S
0.000	0.086	0.000	0.000	0.000	0.086	Unconnected pavement	2S
0.000	0.001	0.000	0.000	0.000	0.001	Unconnected roofs	2S
2.953	2.697	0.000	0.000	0.000	5.651	Woods, Good	2S, 3S, 30S, 32S, 34S, 70S, 71S, 72S
6.688	**10.254**	**0.000**	**0.000**	**0.000**	**16.942**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	30P	183.15	183.15	1.0	0.0000	0.012	6.0	0.0	0.0
2	70P	180.14	179.01	62.8	0.0180	0.012	18.0	0.0	0.0
3	71P	187.90	187.80	10.2	0.0098	0.012	18.0	0.0	0.0
4	E01P	183.50	183.22	57.0	0.0049	0.012	15.0	0.0	0.0
5	E02P	183.02	179.71	122.2	0.0271	0.012	24.0	0.0	0.0
6	E03P	179.56	179.56	36.8	0.0000	0.012	15.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=163,452 sf 2.33% Impervious Runoff Depth>1.91"
Flow Length=301' Tc=15.8 min CN=61 Runoff=5.85 cfs 0.598 af

Subcatchment 3S: Subcat #3 Runoff Area=222,064 sf 1.16% Impervious Runoff Depth>1.42"
Flow Length=682' Tc=43.7 min CN=55 Runoff=3.57 cfs 0.605 af

Subcatchment 30S: Subcat #30 Runoff Area=58,317 sf 10.64% Impervious Runoff Depth>2.25"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=65 Runoff=2.87 cfs 0.251 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=82 Runoff=1.99 cfs 0.145 af

Subcatchment 32S: Subcat #32 Runoff Area=40,270 sf 63.40% Impervious Runoff Depth>4.07"
Tc=6.0 min CN=84 Runoff=4.26 cfs 0.314 af

Subcatchment 34S: Subcat #34 Runoff Area=1,936 sf 0.00% Impervious Runoff Depth>2.52"
Tc=6.0 min CN=68 Runoff=0.13 cfs 0.009 af

Subcatchment 70S: Subcat #70 Runoff Area=62,561 sf 28.86% Impervious Runoff Depth>1.44"
Flow Length=380' Tc=15.2 min CN=55 Runoff=1.58 cfs 0.172 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>1.28"
Flow Length=563' Tc=39.5 min CN=53 Runoff=1.48 cfs 0.246 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>2.07"
Flow Length=478' Tc=32.0 min CN=63 Runoff=2.04 cfs 0.273 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.01' Max Vel=0.28 fps Inflow=0.01 cfs 0.000 af
n=0.022 L=43.0' S=0.0105 '/' Capacity=16.58 cfs Outflow=0.01 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.01' Max Vel=0.56 fps Inflow=0.01 cfs 0.000 af
n=0.030 L=63.5' S=0.1339 '/' Capacity=43.48 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.01' Max Vel=0.18 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=230.5' S=0.0130 '/' Capacity=13.56 cfs Outflow=0.00 cfs 0.000 af

Reach 30dR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.41 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=11.0' S=0.1364 '/' Capacity=43.88 cfs Outflow=0.00 cfs 0.000 af

Reach 33aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.016 L=50.0' S=0.0198 '/' Capacity=31.35 cfs Outflow=0.00 cfs 0.000 af

Reach 34aR: Overland Flow Avg. Flow Depth=0.25' Max Vel=3.36 fps Inflow=6.40 cfs 0.513 af
n=0.016 L=35.0' S=0.0140 '/' Capacity=26.36 cfs Outflow=6.08 cfs 0.513 af

Reach 34bR: Overland Flow Avg. Flow Depth=0.27' Max Vel=3.03 fps Inflow=6.08 cfs 0.513 af
n=0.016 L=194.0' S=0.0103 '/' Capacity=22.62 cfs Outflow=6.18 cfs 0.512 af

Reach 34cR: Overland Flow Avg. Flow Depth=0.20' Max Vel=5.07 fps Inflow=6.18 cfs 0.512 af
n=0.030 L=36.0' S=0.1597 '/' Capacity=47.49 cfs Outflow=6.19 cfs 0.512 af

Reach 34dR: Overland Flow Avg. Flow Depth=0.33' Max Vel=2.35 fps Inflow=6.19 cfs 0.512 af
n=0.030 L=43.0' S=0.0174 '/' Capacity=15.69 cfs Outflow=6.20 cfs 0.512 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.46' Max Vel=1.53 fps Inflow=3.40 cfs 0.492 af
n=0.035 L=125.0' S=0.0064 '/' Capacity=79.88 cfs Outflow=3.39 cfs 0.492 af

Reach 71bR: Riprap Swale Avg. Flow Depth=0.35' Max Vel=1.61 fps Inflow=3.39 cfs 0.492 af
n=0.041 L=147.7' S=0.0135 '/' Capacity=31.94 cfs Outflow=3.39 cfs 0.491 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.25' Max Vel=1.71 fps Inflow=2.00 cfs 0.247 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=1.95 cfs 0.246 af

Reach 200R: Final Reach #200 Inflow=5.85 cfs 0.598 af
Outflow=5.85 cfs 0.598 af

Reach 300R: Final Reach #300 Inflow=6.68 cfs 1.117 af
Outflow=6.68 cfs 1.117 af

Reach 400R: Final Reach #400 Inflow=4.22 cfs 0.663 af
Outflow=4.22 cfs 0.663 af

Pond 30P: Existing Infiltration/Trench Peak Elev=183.96' Storage=3,170 cf Inflow=2.87 cfs 0.251 af
Discarded=0.93 cfs 0.189 af Primary=0.65 cfs 0.053 af Secondary=0.01 cfs 0.000 af Outflow=1.47 cfs 0.242 af

Pond 70P: Existing Catch Basin Peak Elev=181.13' Storage=0.000 af Inflow=4.22 cfs 0.663 af
18.0" Round Culvert n=0.012 L=62.8' S=0.0180 '/' Outflow=4.22 cfs 0.663 af

Pond 71P: Existing Catch Basin Peak Elev=188.93' Inflow=3.40 cfs 0.492 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=3.40 cfs 0.492 af

Pond 72P: Existing Depression Peak Elev=196.21' Storage=160 cf Inflow=2.04 cfs 0.273 af
Discarded=0.02 cfs 0.024 af Primary=2.00 cfs 0.247 af Outflow=2.02 cfs 0.271 af

Pond E01P: Existing Catch Basin Peak Elev=185.04' Storage=19 cf Inflow=1.99 cfs 0.145 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=1.92 cfs 0.145 af

Pond E02P: Existing Catch Basin Peak Elev=184.97' Storage=135 cf Inflow=6.18 cfs 0.459 af
Discarded=0.01 cfs 0.006 af Primary=6.73 cfs 0.453 af Outflow=6.73 cfs 0.459 af

Pond E03P: Existing Catch Basin Peak Elev=184.31' Storage=60 cf Inflow=0.65 cfs 0.053 af
Primary=0.42 cfs 0.052 af Secondary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.052 af

Pond E04P: Existing Catch Basin Peak Elev=184.75' Storage=75 cf Inflow=6.85 cfs 0.514 af
Outflow=6.40 cfs 0.513 af

Total Runoff Area = 16.942 ac Runoff Volume = 2.614 af Average Runoff Depth = 1.85"
82.88% Pervious = 14.041 ac 17.12% Impervious = 2.901 ac

Summary for Subcatchment 2S: Subcat #2

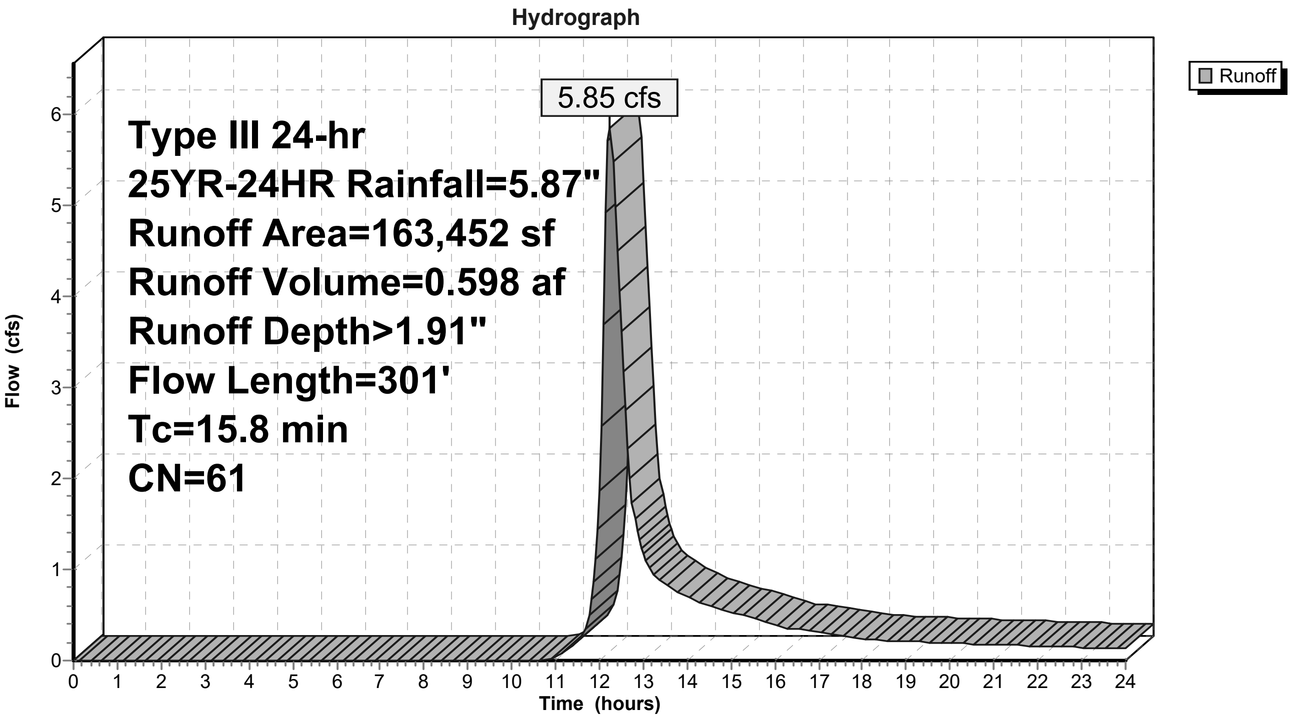
Runoff = 5.85 cfs @ 12.24 hrs, Volume= 0.598 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
86,449	61	>75% Grass cover, Good, HSG B
3,761	98	Unconnected pavement, HSG B
48	98	Unconnected roofs, HSG B
7,782	96	Gravel surface, HSG B
65,412	55	Woods, Good, HSG B
163,452	61	Weighted Average
159,643		97.67% Pervious Area
3,809		2.33% Impervious Area
3,809		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0100	0.13		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
1.6	78	0.0128	0.79		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
0.3	45	0.2000	2.24		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
0.4	49	0.1071	2.29		**Shallow Concentrated Flow, Segment #4** Short Grass Pasture Kv= 7.0 fps
0.3	29	0.0690	1.84		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
15.8	301	Total			

Subcatchment 2S: Subcat #2



Summary for Subcatchment 3S: Subcat #3

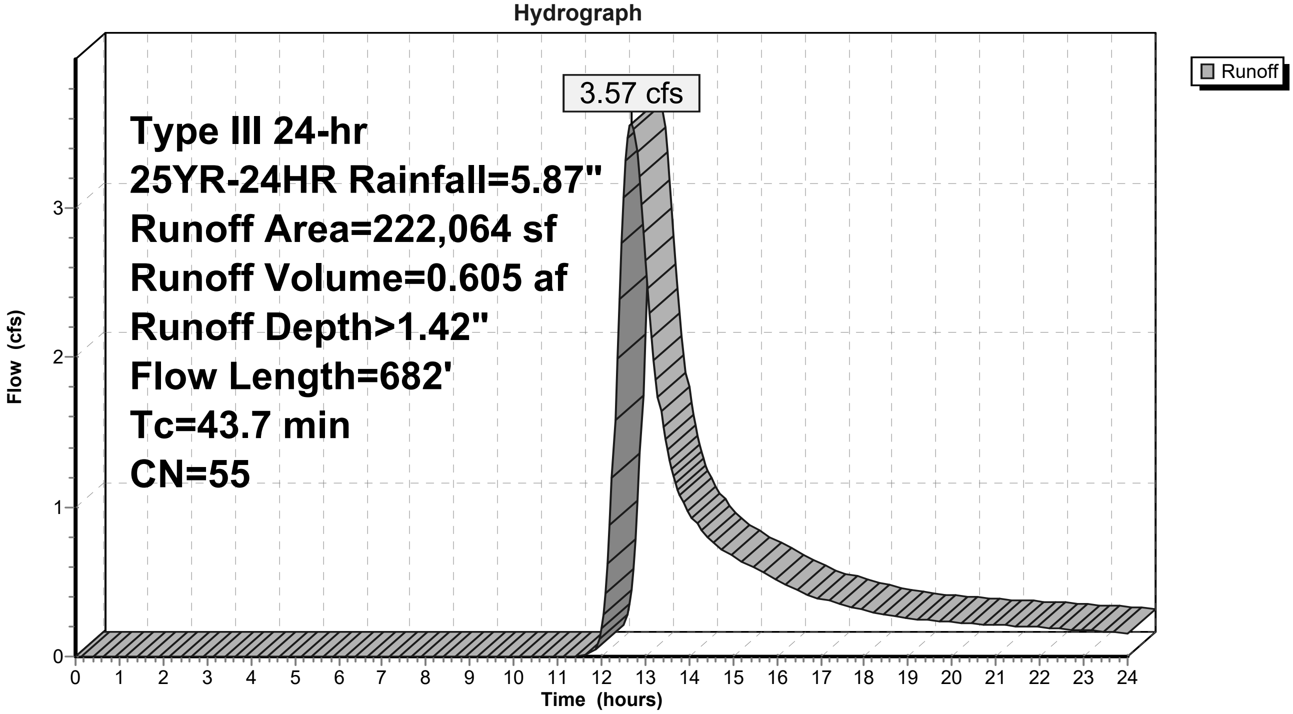
Runoff = 3.57 cfs @ 12.68 hrs, Volume= 0.605 af, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
10,402	39	>75% Grass cover, Good, HSG A
65,404	30	Woods, Good, HSG A
1,526	98	Roofs, HSG B
74,474	61	>75% Grass cover, Good, HSG B
1,060	98	Paved parking, HSG B
40,852	55	Woods, Good, HSG B
28,346	96	Gravel surface, HSG B
222,064	55	Weighted Average
219,478		98.84% Pervious Area
2,586		1.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	100	0.0100	0.06		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
10.0	252	0.0070	0.42		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
1.8	157	0.0828	1.44		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
1.5	99	0.0505	1.12		**Shallow Concentrated Flow, Segment #5** Woodland Kv= 5.0 fps
43.7	682	Total			

Subcatchment 3S: Subcat #3



Summary for Subcatchment 30S: Subcat #30

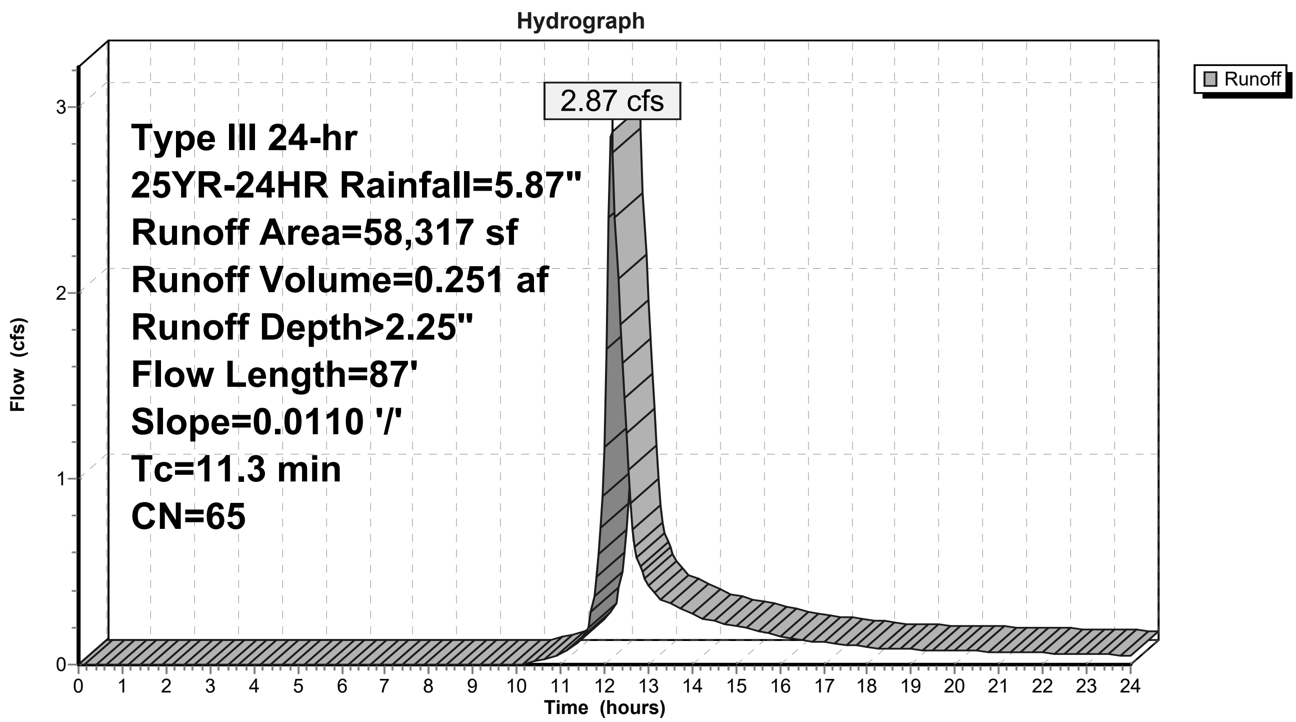
Runoff = 2.87 cfs @ 12.17 hrs, Volume= 0.251 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
45,589	61	>75% Grass cover, Good, HSG B
6,207	98	Paved parking, HSG B
1,222	96	Gravel surface, HSG B
5,299	55	Woods, Good, HSG B
58,317	65	Weighted Average
52,110		89.36% Pervious Area
6,207		10.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	87	0.0110	0.13		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"

Subcatchment 30S: Subcat #30



Summary for Subcatchment 31S: Subcat #31

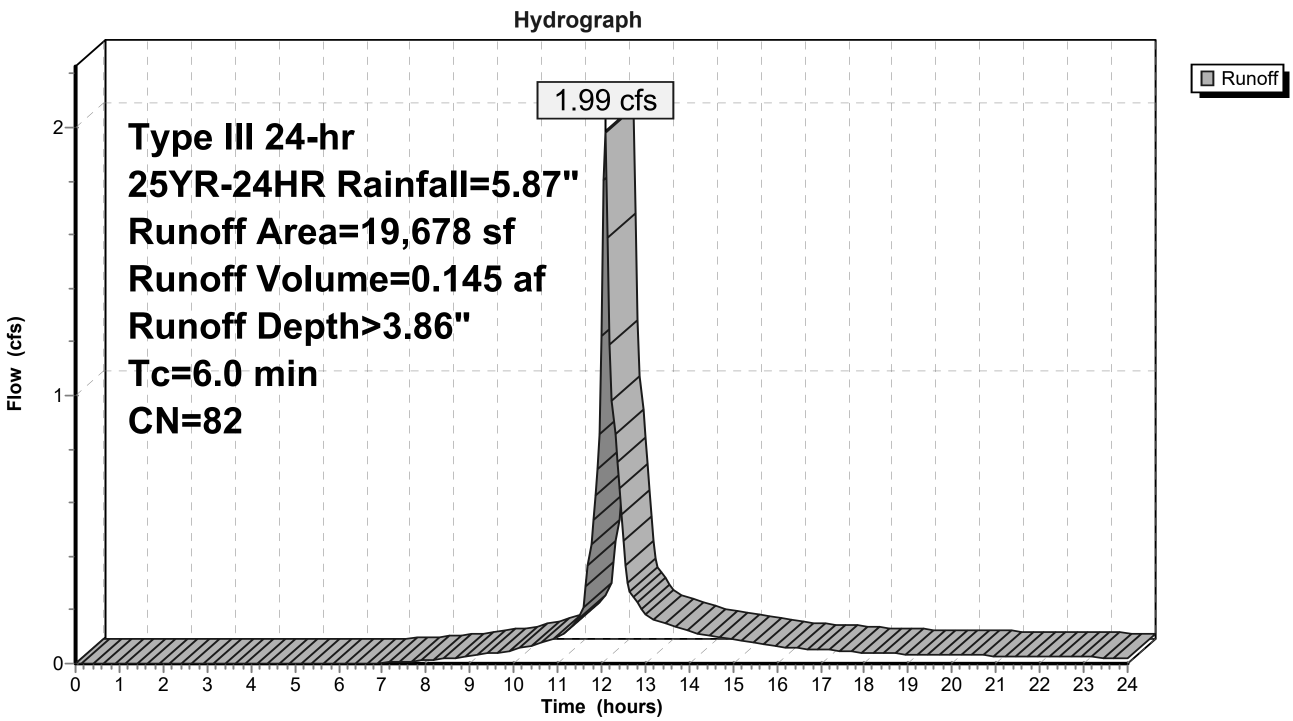
Runoff = 1.99 cfs @ 12.09 hrs, Volume= 0.145 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
57	98	Roofs, HSG B
8,646	61	>75% Grass cover, Good, HSG B
10,975	98	Paved parking, HSG B
19,678	82	Weighted Average
8,646		43.94% Pervious Area
11,032		56.06% Impervious Area

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

Subcatchment 31S: Subcat #31



Summary for Subcatchment 32S: Subcat #32

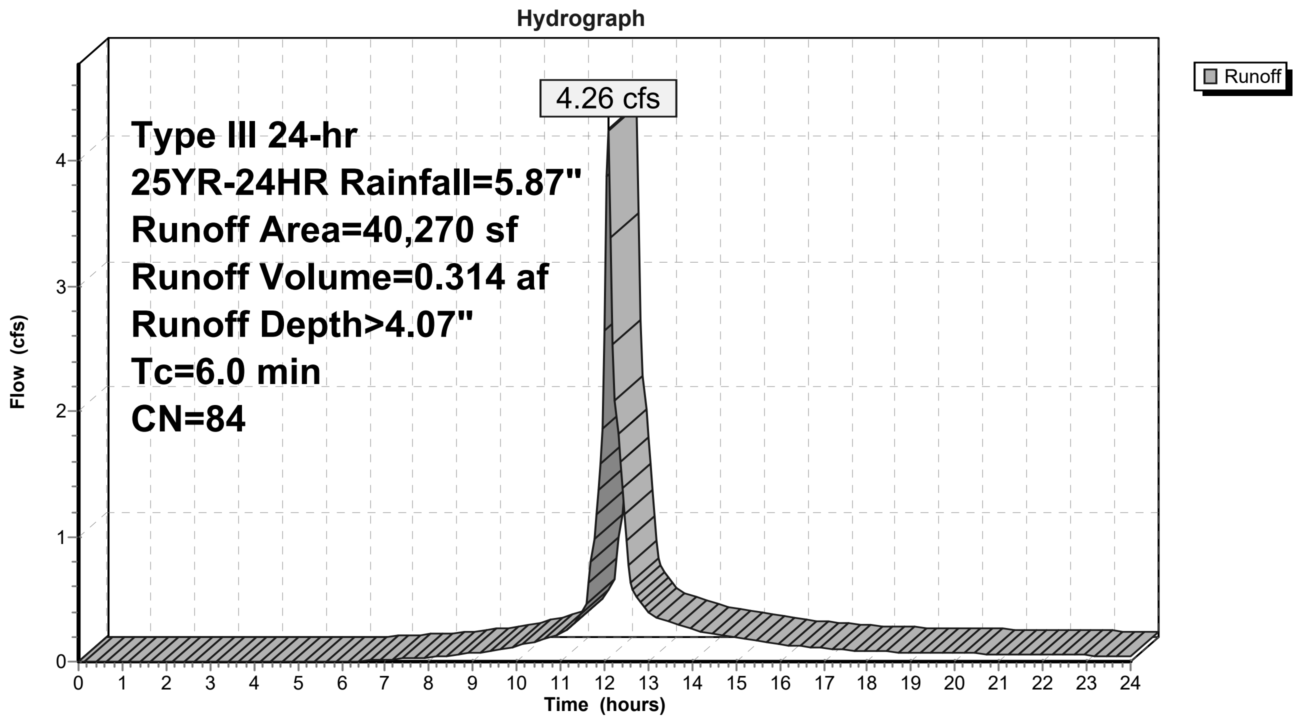
Runoff = 4.26 cfs @ 12.09 hrs, Volume= 0.314 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
341	98	Roofs, HSG B
9,068	61	>75% Grass cover, Good, HSG B
25,189	98	Paved parking, HSG B
5,672	55	Woods, Good, HSG B
40,270	84	Weighted Average
14,740		36.60% Pervious Area
25,530		63.40% Impervious Area

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

Subcatchment 32S: Subcat #32



Summary for Subcatchment 34S: Subcat #34

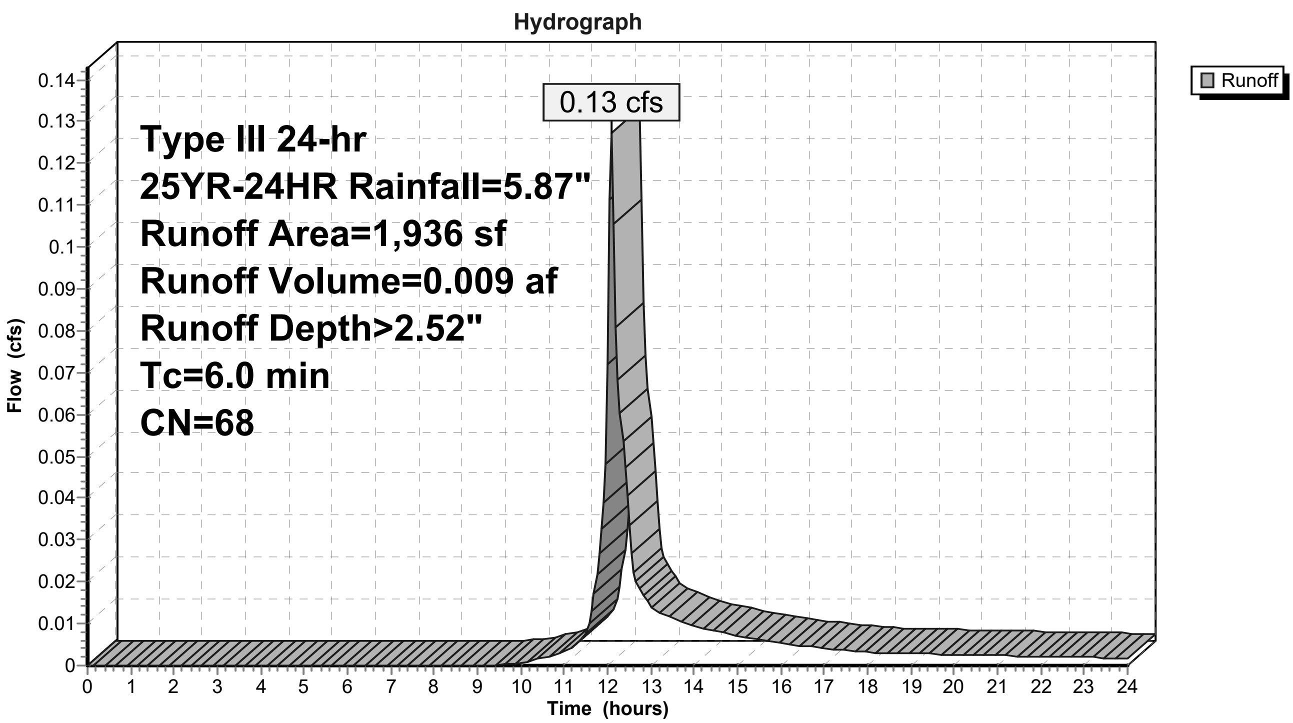
Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.009 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
1,270	61	>75% Grass cover, Good, HSG B
260	55	Woods, Good, HSG B
406	96	Gravel surface, HSG B
1,936	68	Weighted Average
1,936		100.00% Pervious Area

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

Subcatchment 34S: Subcat #34



Summary for Subcatchment 70S: Subcat #70

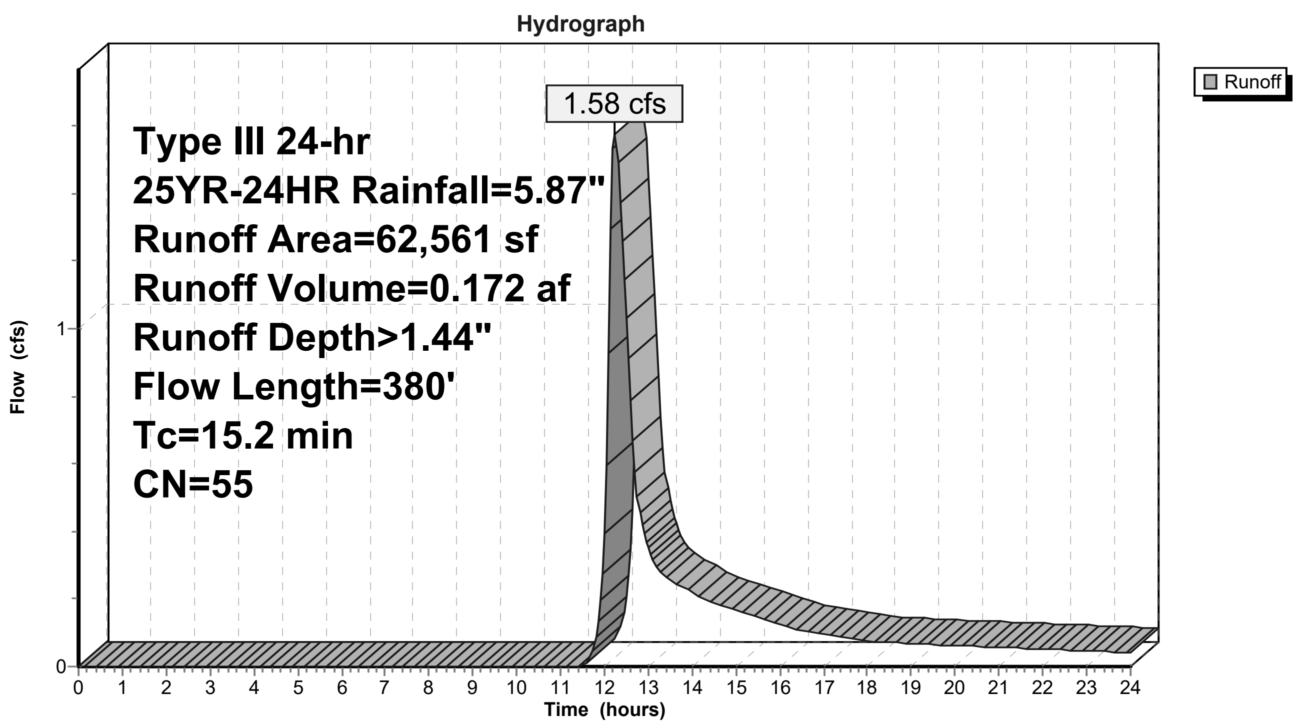
Runoff = 1.58 cfs @ 12.24 hrs, Volume= 0.172 af, Depth> 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
17,367	39	>75% Grass cover, Good, HSG A
8,001	98	Paved parking, HSG A
20,432	30	Woods, Good, HSG A
6,708	61	>75% Grass cover, Good, HSG B
10,053	98	Paved parking, HSG B
62,561	55	Weighted Average
44,507		71.14% Pervious Area
18,054		28.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	94	0.0319	0.20		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
5.9	136	0.0060	0.39		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
1.4	150	0.0135	1.74		**Shallow Concentrated Flow, Segment #3** Grassed Waterway Kv= 15.0 fps
15.2	380	Total			

Subcatchment 70S: Subcat #70



Summary for Subcatchment 71S: Subcat #71

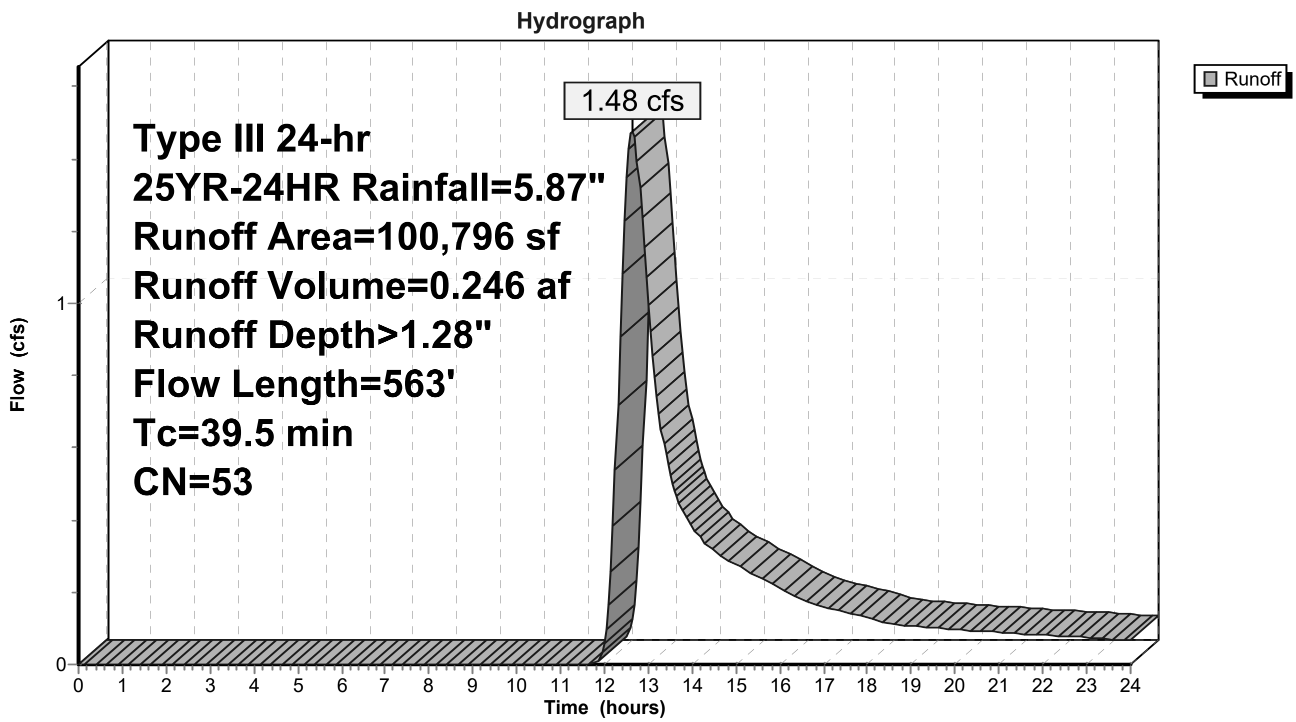
Runoff = 1.48 cfs @ 12.63 hrs, Volume= 0.246 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
35,048	39	>75% Grass cover, Good, HSG A
29,681	98	Paved parking, HSG A
36,067	30	Woods, Good, HSG A
100,796	53	Weighted Average
71,115		70.55% Pervious Area
29,681		29.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	100	0.0150	0.07		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
11.4	285	0.0070	0.42		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.6	65	0.0615	1.74		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
2.9	113	0.0088	0.66		**Shallow Concentrated Flow, Segment #4** Short Grass Pasture Kv= 7.0 fps
39.5	563	Total			

Subcatchment 71S: Subcat #71



Summary for Subcatchment 72S: Subcat #72

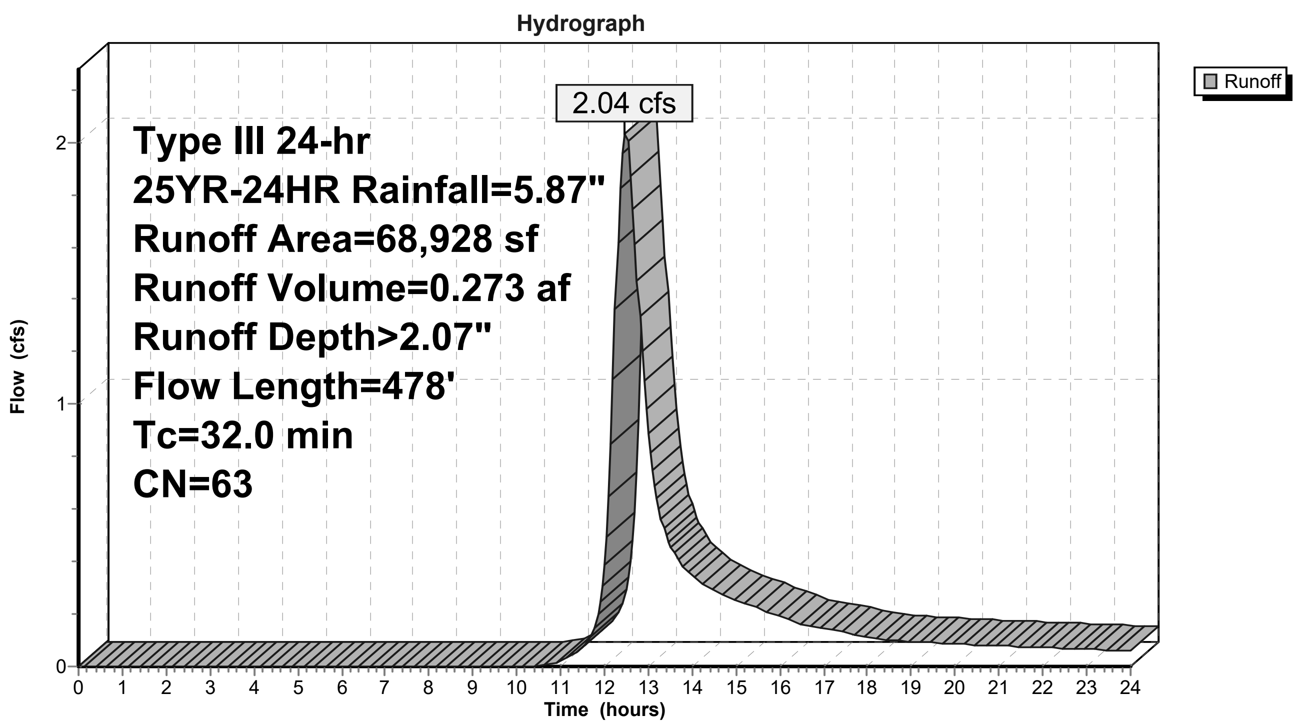
Runoff = 2.04 cfs @ 12.48 hrs, Volume= 0.273 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
32,729	39	>75% Grass cover, Good, HSG A
29,456	98	Paved parking, HSG A
6,743	30	Woods, Good, HSG A
68,928	63	Weighted Average
39,472		57.27% Pervious Area
29,456		42.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	100	0.0150	0.07		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.7	27	0.0150	0.61		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
6.7	351	0.0157	0.88		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
32.0	478	Total			

Subcatchment 72S: Subcat #72



Summary for Reach 30aR: Overland Flow

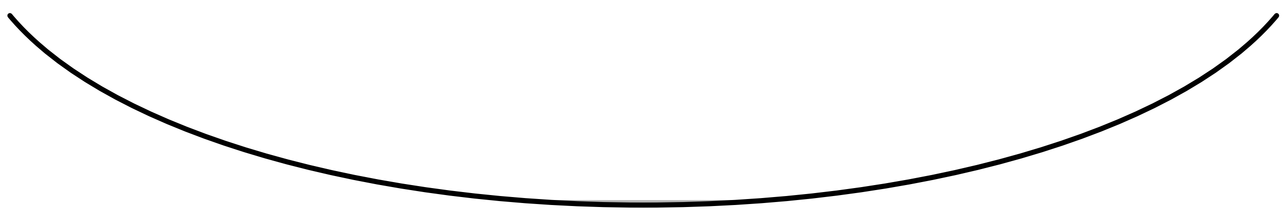
[80] Warning: Exceeded Pond 30P by 0.33' @ 14.70 hrs (0.00 cfs 0.000 af)

Inflow	=	0.01 cfs @	12.65 hrs,	Volume=	0.000 af
Outflow	=	0.01 cfs @	12.68 hrs,	Volume=	0.000 af, Atten= 48%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.28 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.20 fps, Avg. Travel Time= 3.6 min

Peak Storage= 1 cf @ 12.68 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 16.58 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 43.0' Slope= 0.0105 '/'
Inlet Invert= 183.95', Outlet Invert= 183.50'



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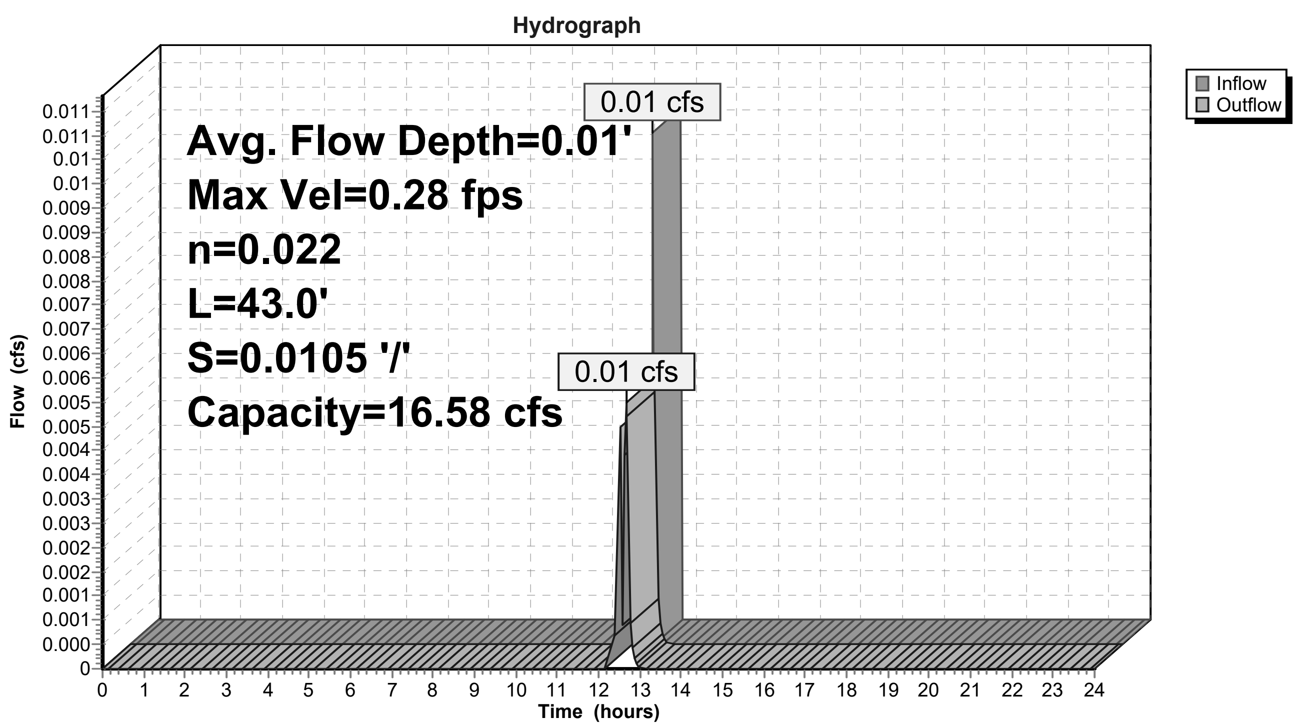
Reach 30aR: Overland Flow



Summary for Reach 30bR: Overland Flow

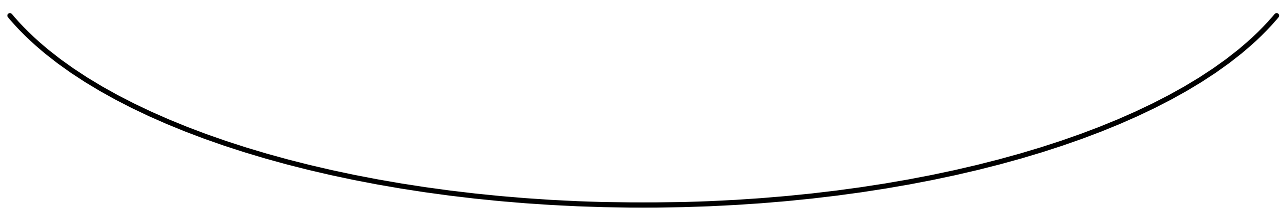
[61] Hint: Exceeded Reach 30aR outlet invert by 0.01' @ 12.70 hrs

Inflow	=	0.01 cfs @ 12.68 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @ 12.70 hrs, Volume=	0.000 af, Atten= 11%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.56 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 2.4 min

Peak Storage= 1 cf @ 12.70 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 43.48 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 63.5' Slope= 0.1339 '/'
Inlet Invert= 183.50', Outlet Invert= 175.00'



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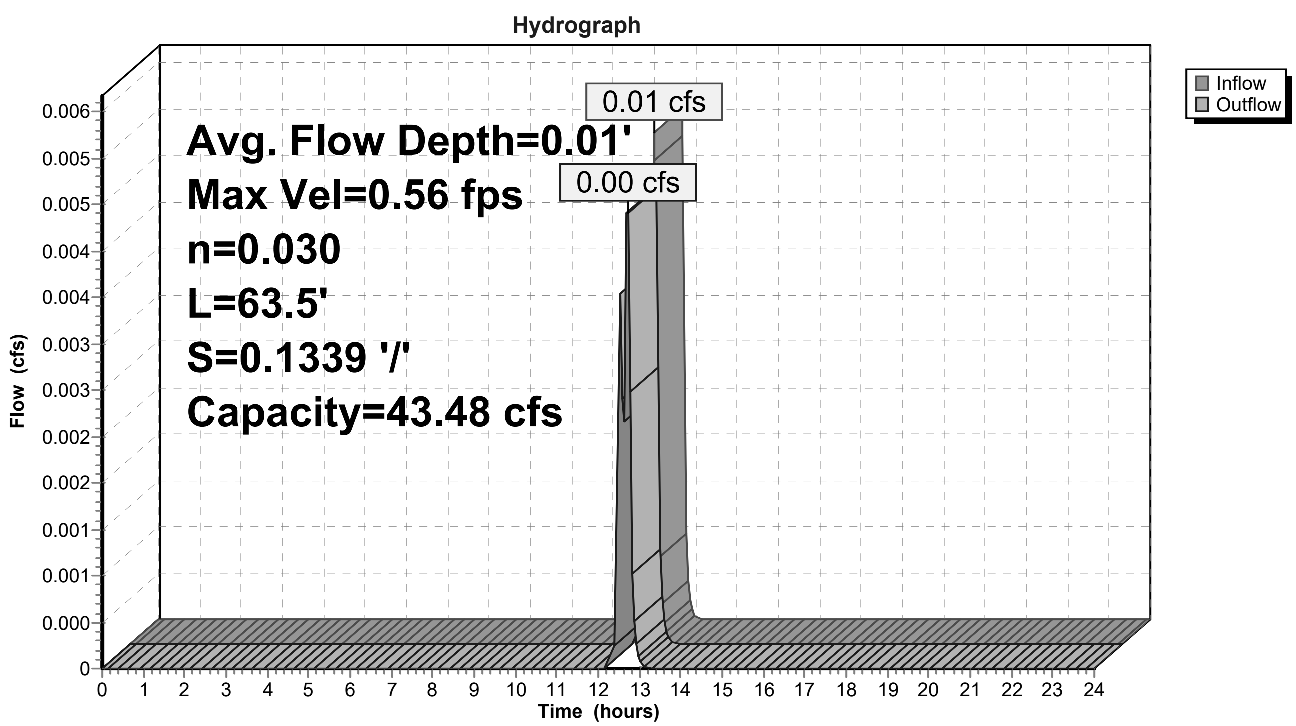
Reach 30bR: Overland Flow



Summary for Reach 30cR: Overland Flow

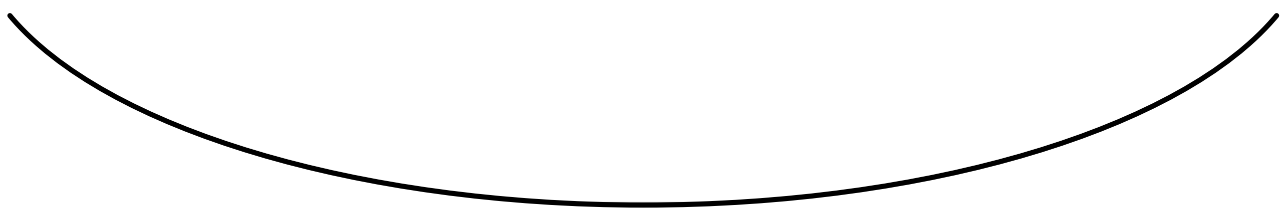
[62] Hint: Exceeded Reach 30bR OUTLET depth by 0.01' @ 12.90 hrs

Inflow	=	0.00 cfs @ 12.70 hrs, Volume=	0.000 af	
Outflow	=	0.00 cfs @ 12.78 hrs, Volume=	0.000 af,	Atten= 61%, Lag= 4.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.18 fps, Min. Travel Time= 20.8 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 28.8 min

Peak Storage= 2 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 13.56 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 230.5' Slope= 0.0130 '/'
Inlet Invert= 175.00', Outlet Invert= 172.00'



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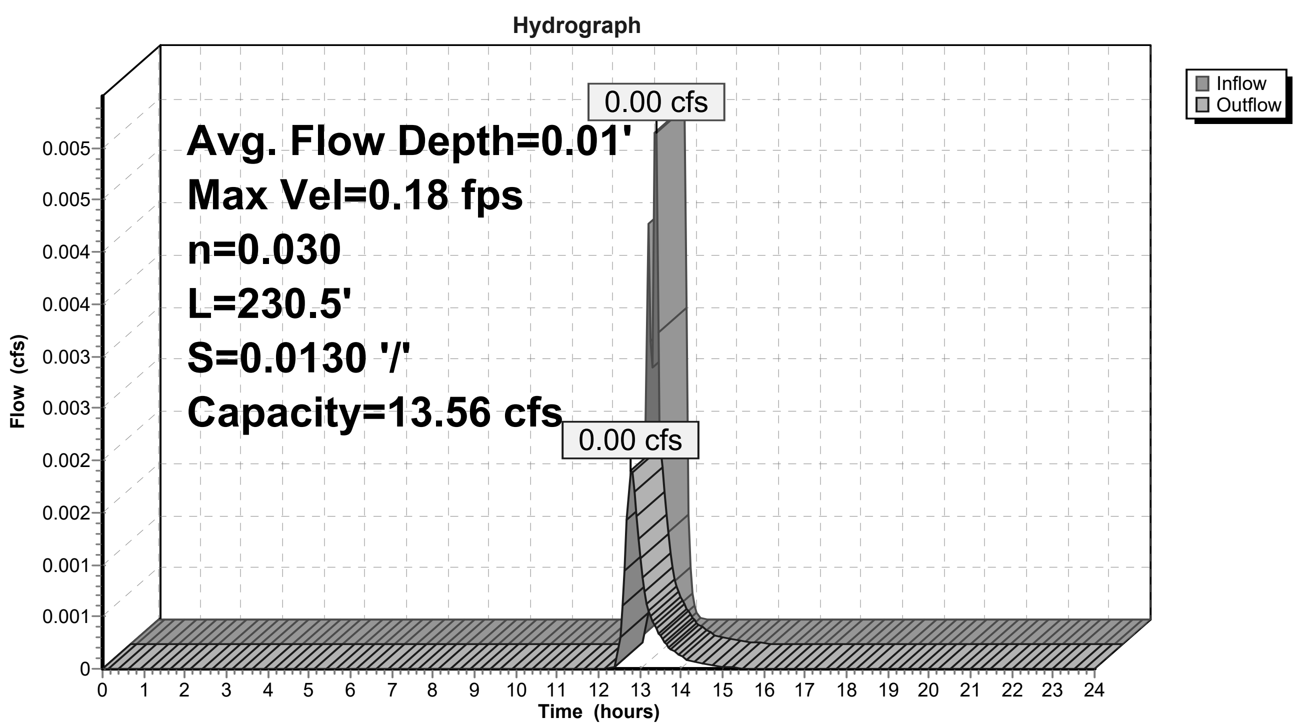
Reach 30cR: Overland Flow



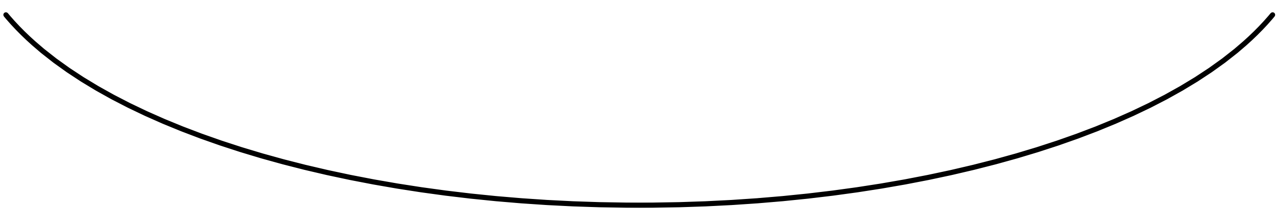
Summary for Reach 30dR: Overland Flow

Inflow	=	0.00 cfs @	12.78 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	12.79 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.41 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.41 fps, Avg. Travel Time= 0.4 min

Peak Storage= 0 cf @ 12.79 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 43.88 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 11.0' Slope= 0.1364 '/'
Inlet Invert= 172.00', Outlet Invert= 170.50'



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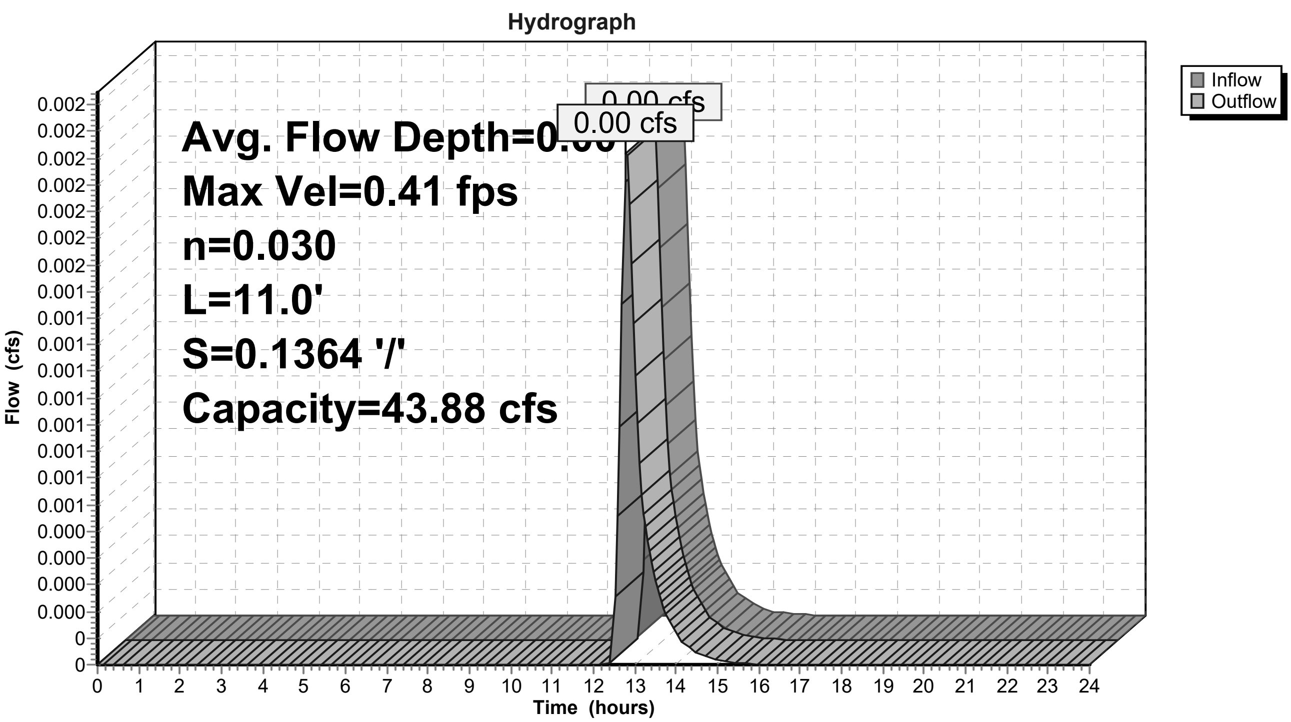
Reach 30dR: Overland Flow



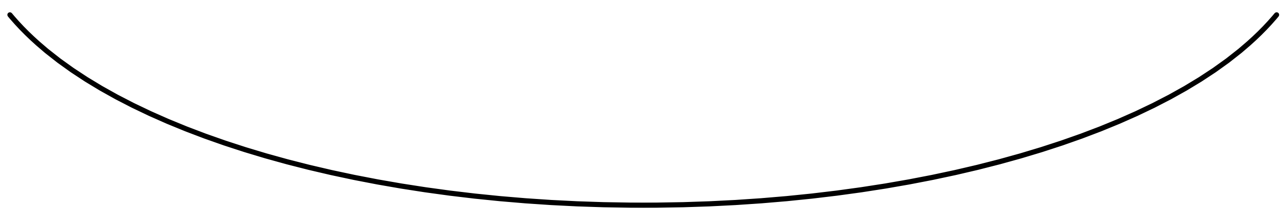
Summary for Reach 33aR: Overland Flow

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af	
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 31.35 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.016 Asphalt, rough
Length= 50.0' Slope= 0.0198 '/'
Inlet Invert= 184.49', Outlet Invert= 183.50'



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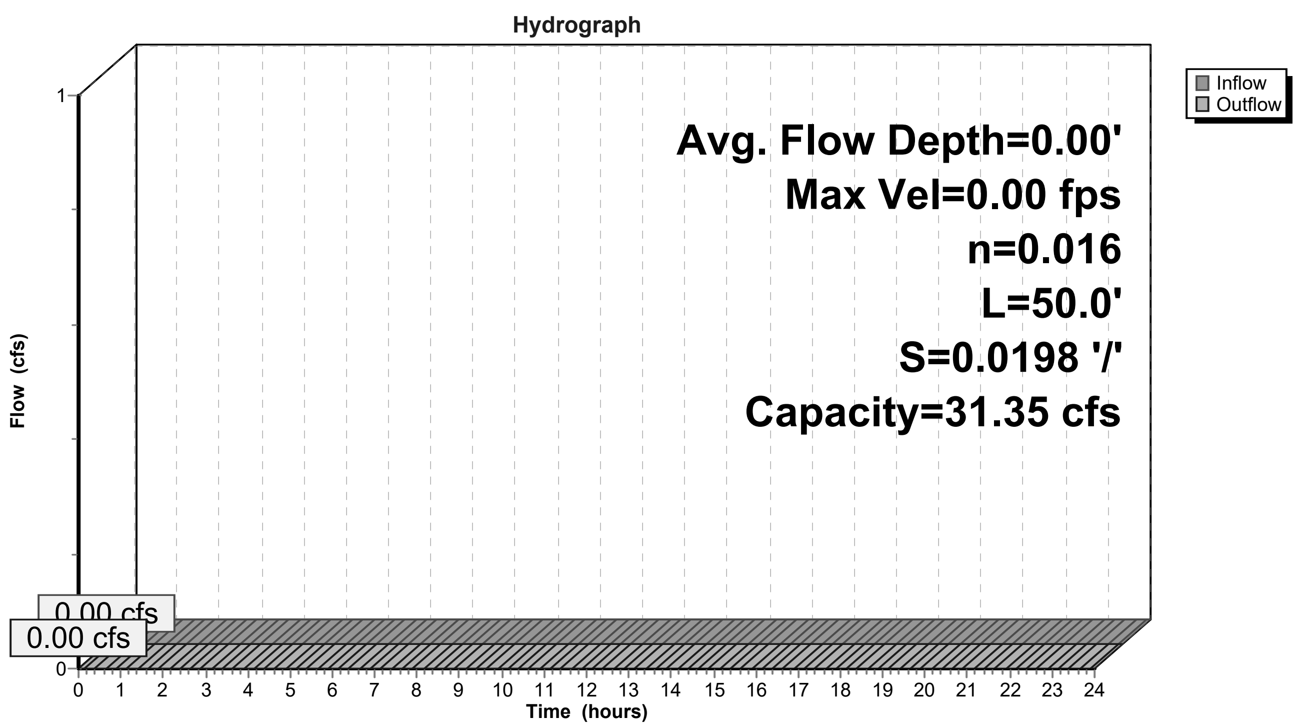
Reach 33aR: Overland Flow



Summary for Reach 34aR: Overland Flow

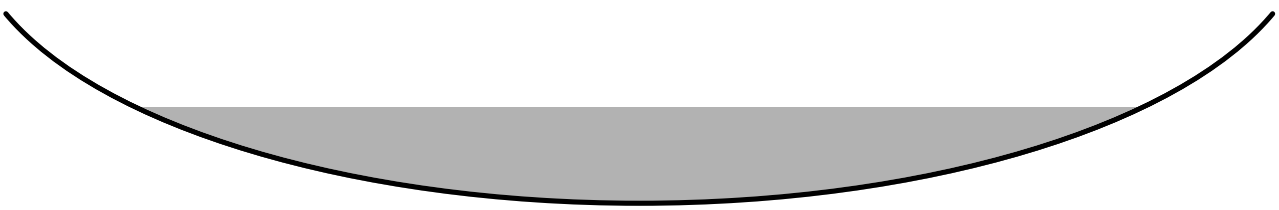
[80] Warning: Exceeded Pond E04P by 0.75' @ 15.85 hrs (0.14 cfs 0.003 af)

Inflow Area =	2.759 ac, 35.58% Impervious,	Inflow Depth > 2.23"	for 25YR-24HR event	
Inflow =	6.40 cfs @	12.10 hrs, Volume=	0.513 af	
Outflow =	6.08 cfs @	12.10 hrs, Volume=	0.513 af,	Atten= 5%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.36 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 0.5 min

Peak Storage= 63 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 26.36 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.016 Asphalt, rough
Length= 35.0' Slope= 0.0140 '/'
Inlet Invert= 183.99', Outlet Invert= 183.50'



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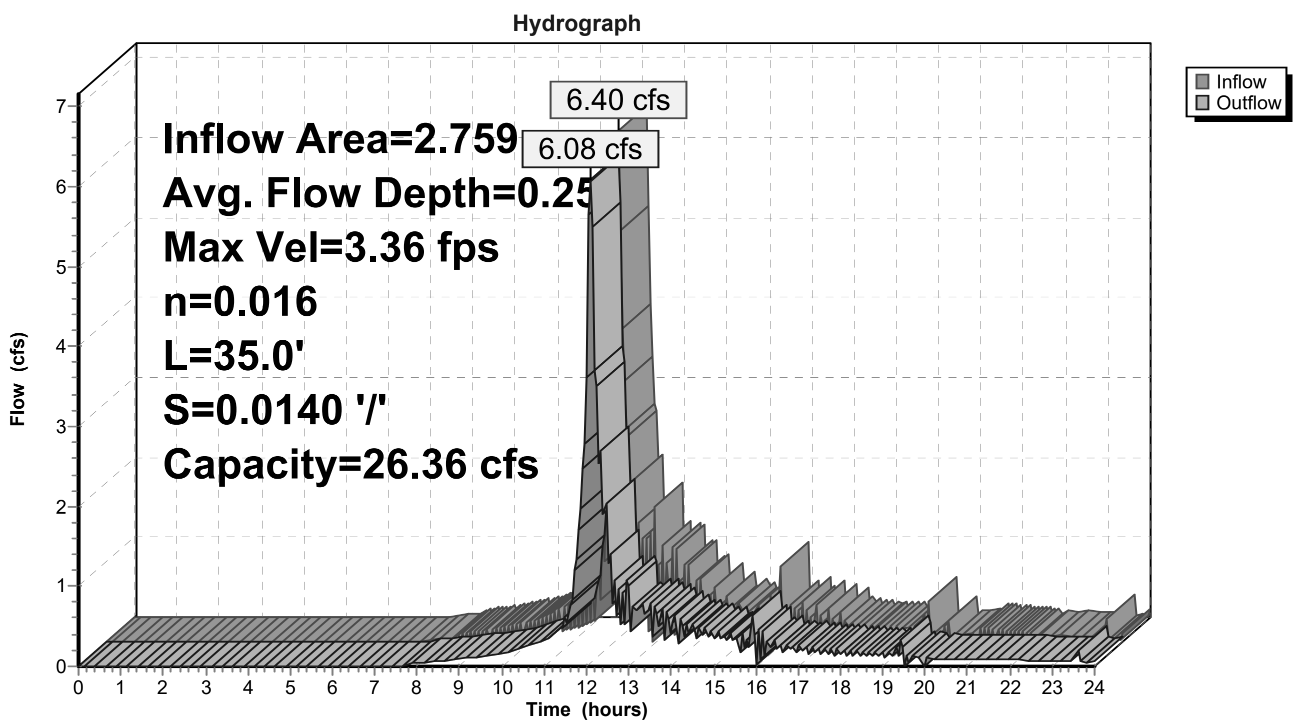
Reach 34aR: Overland Flow



Summary for Reach 34bR: Overland Flow

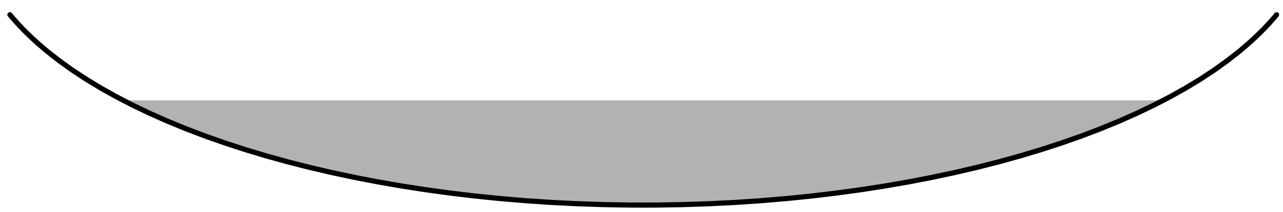
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 33aR OUTLET depth by 0.27' @ 12.10 hrs
[62] Hint: Exceeded Reach 34aR OUTLET depth by 0.05' @ 19.50 hrs

Inflow Area = 2.759 ac, 35.58% Impervious, Inflow Depth > 2.23" for 25YR-24HR event
Inflow = 6.08 cfs @ 12.10 hrs, Volume= 0.513 af
Outflow = 6.18 cfs @ 12.11 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 2.9 min

Peak Storage= 395 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 22.62 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.016 Asphalt, rough
Length= 194.0' Slope= 0.0103 '/'
Inlet Invert= 183.50', Outlet Invert= 181.50'



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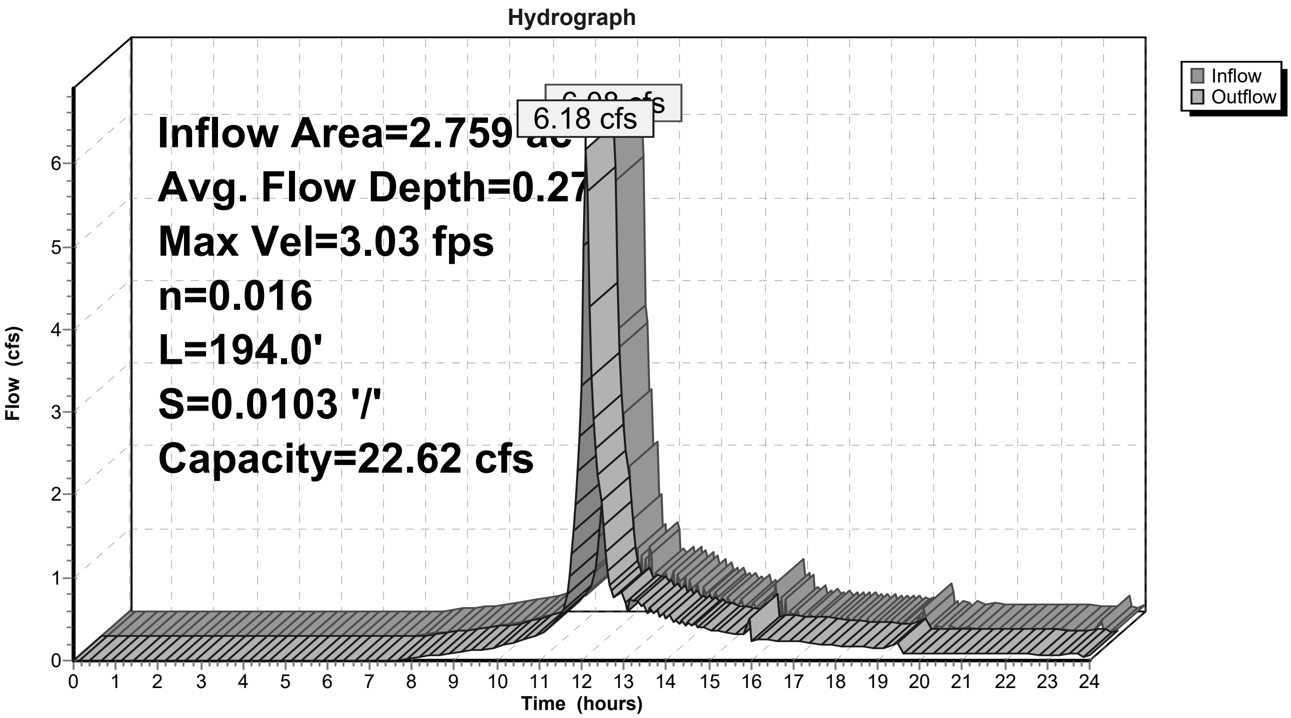
Reach 34bR: Overland Flow



Summary for Reach 34cR: Overland Flow

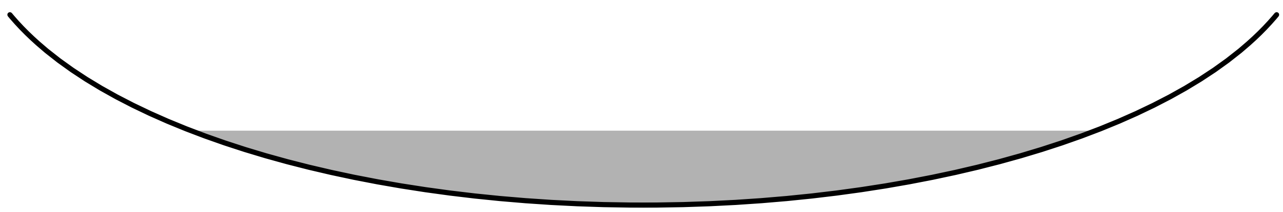
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)
[61] Hint: Exceeded Reach 34bR outlet invert by 0.19' @ 12.10 hrs

Inflow Area = 2.759 ac, 35.58% Impervious, Inflow Depth > 2.23" for 25YR-24HR event
Inflow = 6.18 cfs @ 12.11 hrs, Volume= 0.512 af
Outflow = 6.19 cfs @ 12.11 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.07 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 0.3 min

Peak Storage= 44 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 47.49 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 36.0' Slope= 0.1597 '/'
Inlet Invert= 181.50', Outlet Invert= 175.75'



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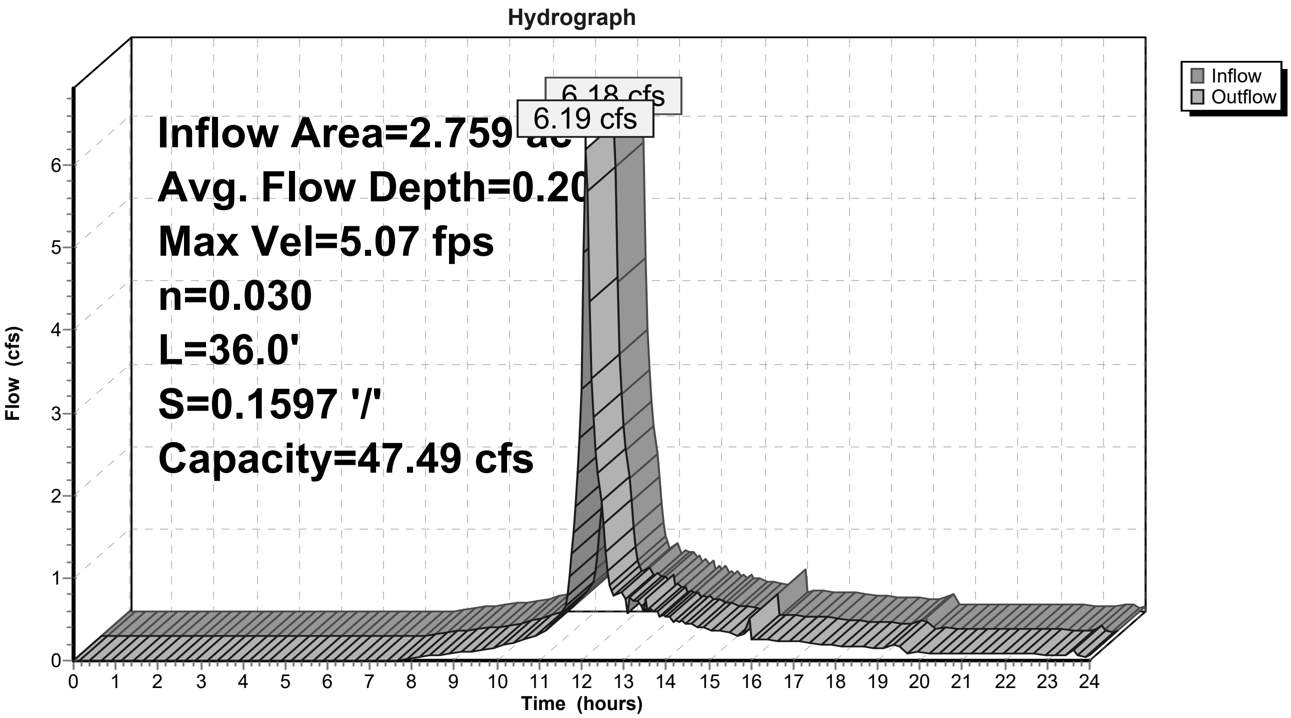
Reach 34cR: Overland Flow



Summary for Reach 34dR: Overland Flow

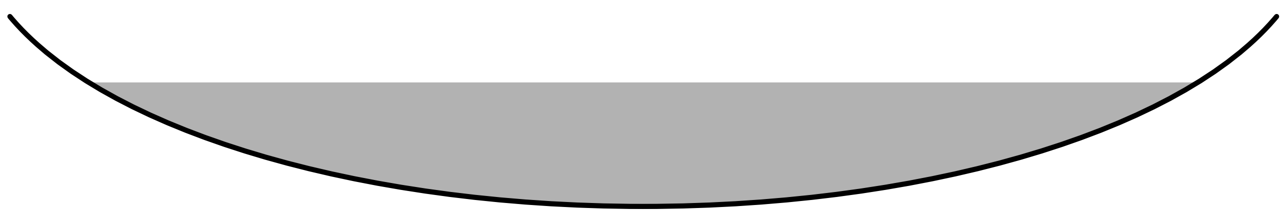
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 34cR OUTLET depth by 0.13' @ 12.10 hrs

Inflow Area = 2.759 ac, 35.58% Impervious, Inflow Depth > 2.23" for 25YR-24HR event
Inflow = 6.19 cfs @ 12.11 hrs, Volume= 0.512 af
Outflow = 6.20 cfs @ 12.11 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 0.8 min

Peak Storage= 113 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 15.69 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 43.0' Slope= 0.0174 '/'
Inlet Invert= 175.75', Outlet Invert= 175.00'



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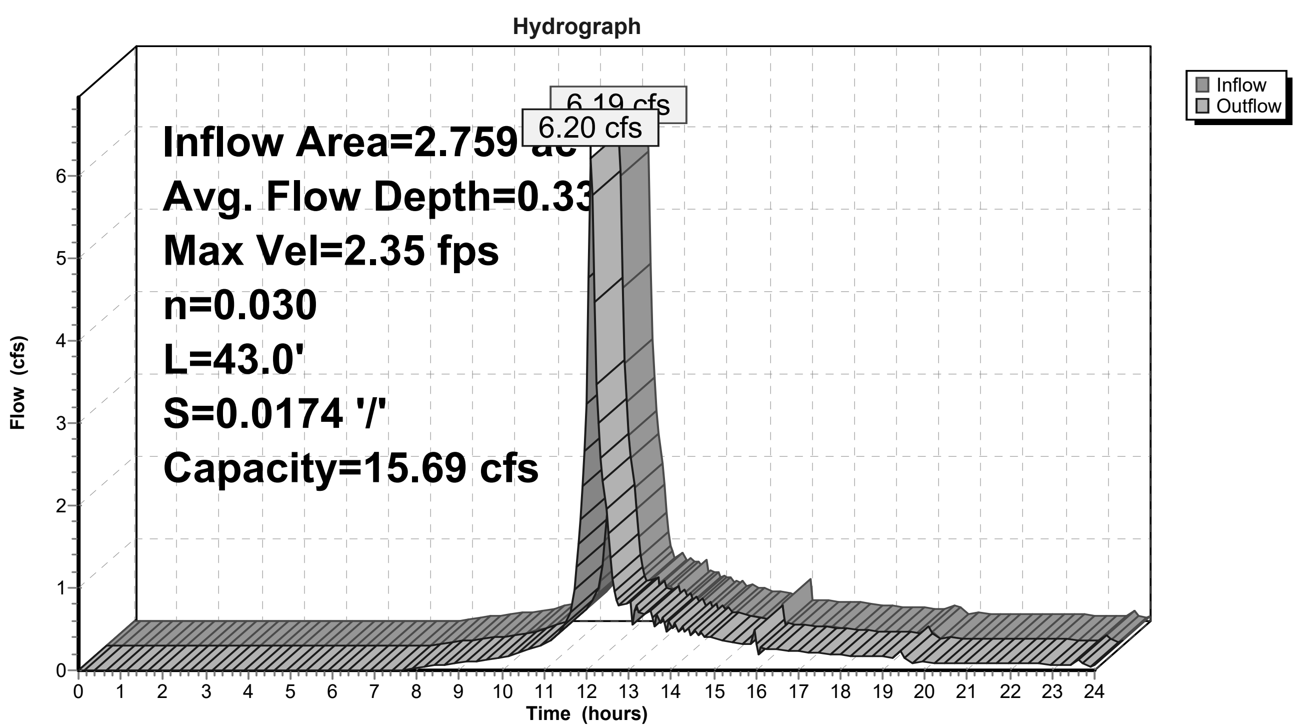
Reach 34dR: Overland Flow



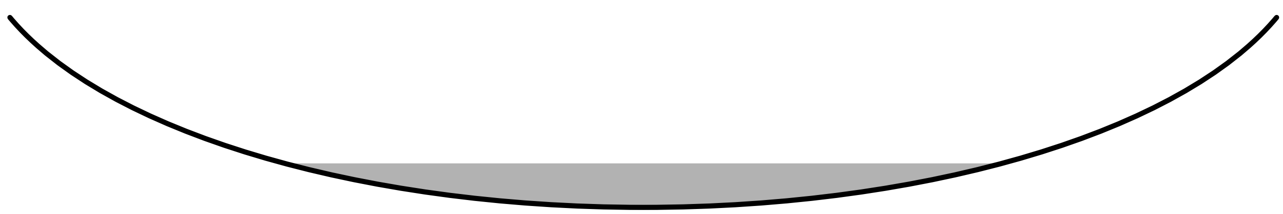
Summary for Reach 71aR: Wooded Swale

Inflow Area = 3.896 ac, 34.84% Impervious, Inflow Depth > 1.52" for 25YR-24HR event
Inflow = 3.40 cfs @ 12.58 hrs, Volume= 0.492 af
Outflow = 3.39 cfs @ 12.60 hrs, Volume= 0.492 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.53 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 2.8 min

Peak Storage= 276 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 79.88 cfs

15.00' x 2.00' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 125.0' Slope= 0.0064 '/'
Inlet Invert= 187.80', Outlet Invert= 187.00'



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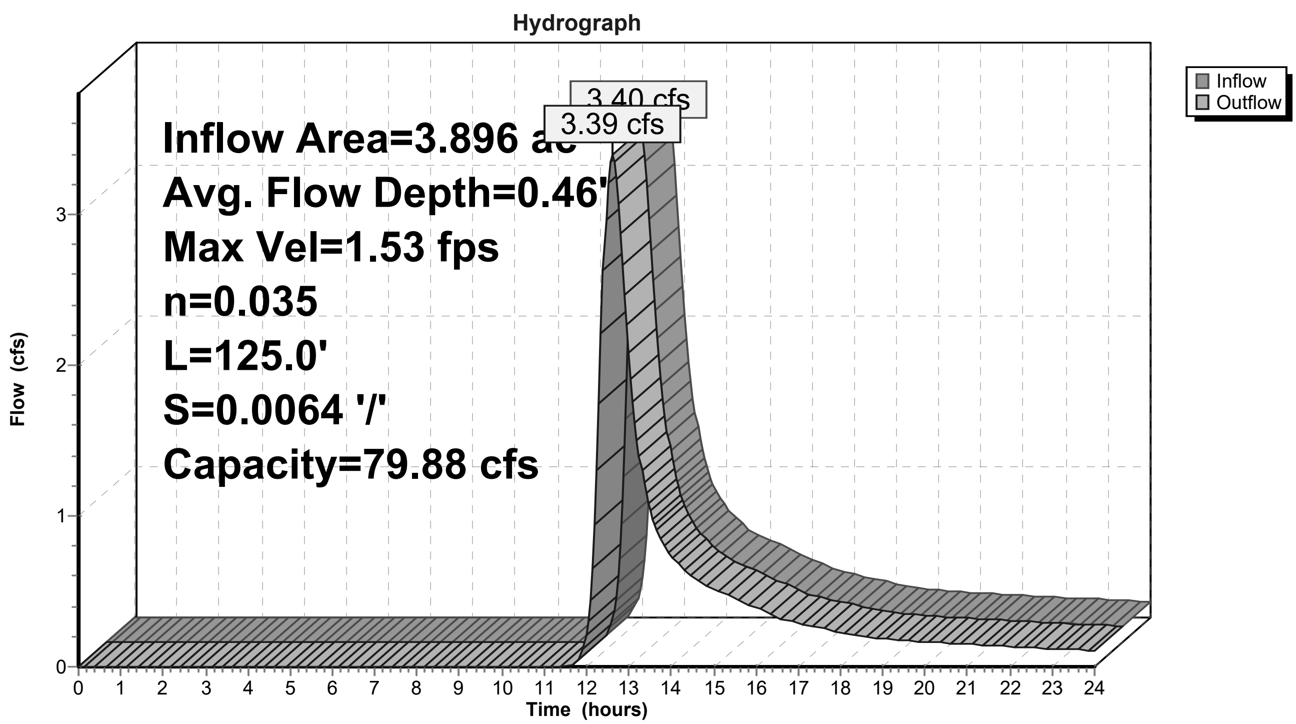
Reach 71aR: Wooded Swale



Summary for Reach 71bR: Riprap Swale

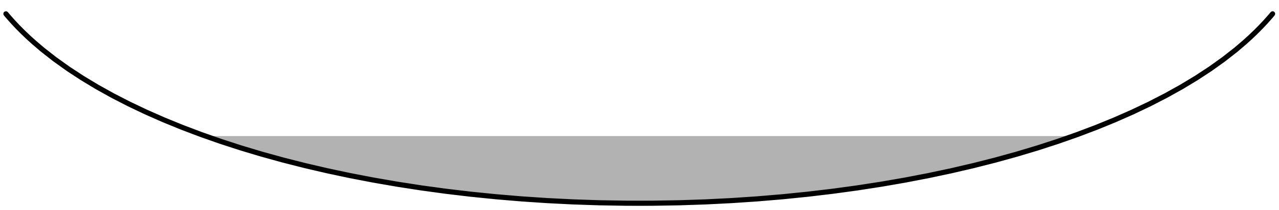
[61] Hint: Exceeded Reach 71aR outlet invert by 0.35' @ 12.60 hrs

Inflow Area = 3.896 ac, 34.84% Impervious, Inflow Depth > 1.51" for 25YR-24HR event
Inflow = 3.39 cfs @ 12.60 hrs, Volume= 0.492 af
Outflow = 3.39 cfs @ 12.62 hrs, Volume= 0.491 af, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.61 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 3.2 min

Peak Storage= 311 cf @ 12.62 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00' Flow Area= 10.0 sf, Capacity= 31.94 cfs

15.00' x 1.00' deep Parabolic Channel, n= 0.041 Riprap, 2-inch
Length= 147.7' Slope= 0.0135 '/'
Inlet Invert= 187.00', Outlet Invert= 185.00'



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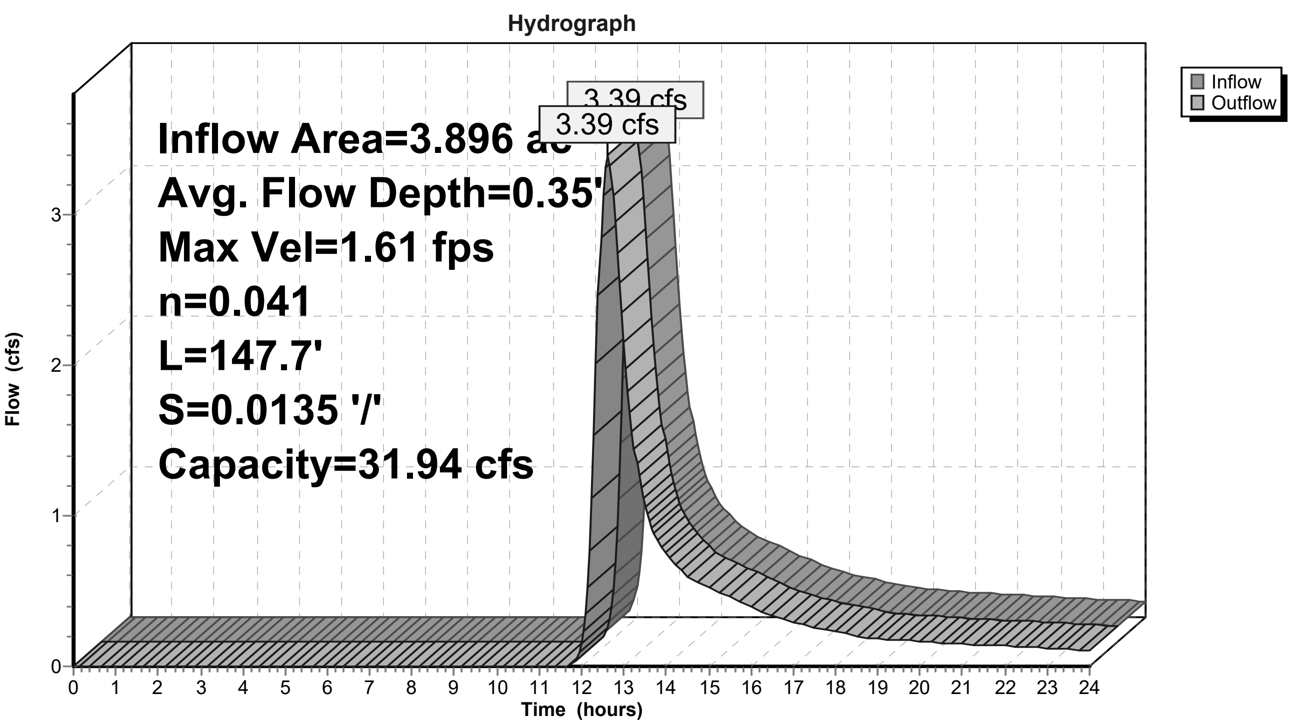
Reach 71bR: Riprap Swale



Summary for Reach 72R: Roadside Swale

[80] Warning: Exceeded Pond 72P by 0.02' @ 12.25 hrs (1.74 cfs 0.063 af)

Inflow Area = 1.582 ac, 42.73% Impervious, Inflow Depth > 1.87" for 25YR-24HR event
Inflow = 2.00 cfs @ 12.49 hrs, Volume= 0.247 af
Outflow = 1.95 cfs @ 12.55 hrs, Volume= 0.246 af, Atten= 2%, Lag= 3.7 min

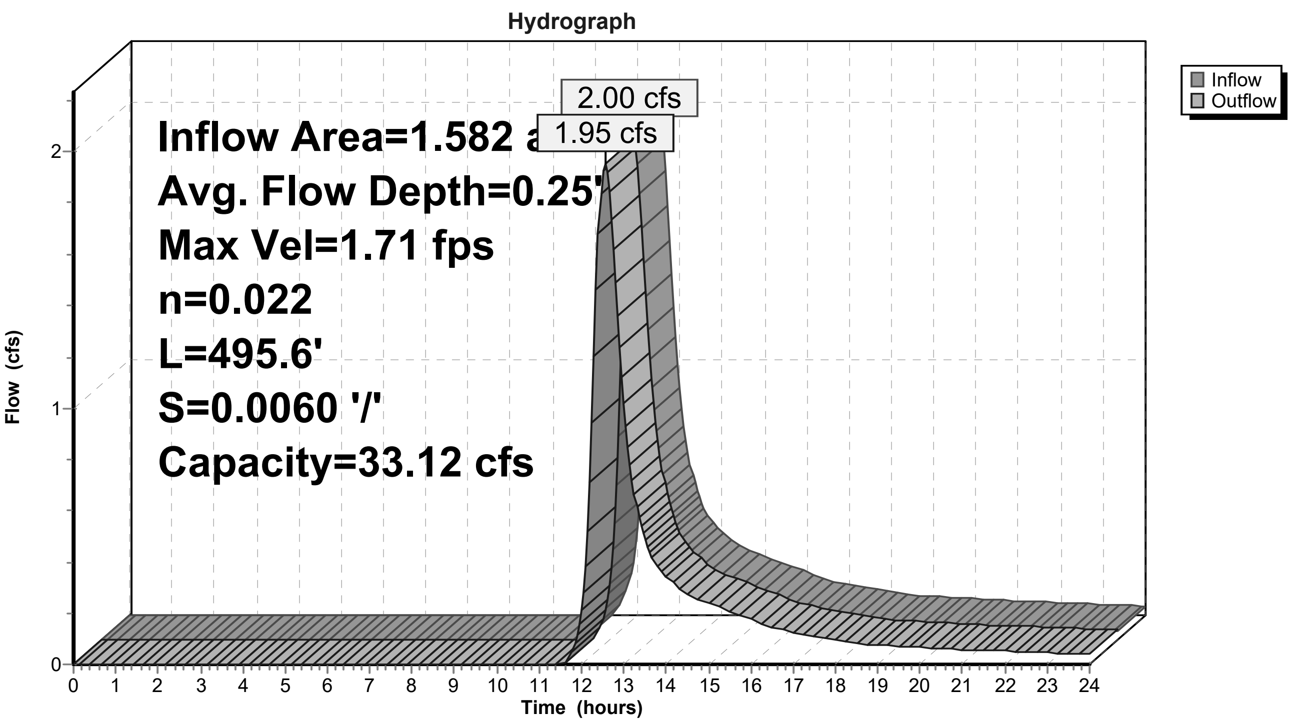
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 11.2 min

Peak Storage= 566 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 9.0 sf, Capacity= 33.12 cfs

3.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 6.0 '/' Top Width= 15.00'
Length= 495.6' Slope= 0.0060 '/'
Inlet Invert= 195.95', Outlet Invert= 193.00'

‡

Reach 72R: Roadside Swale



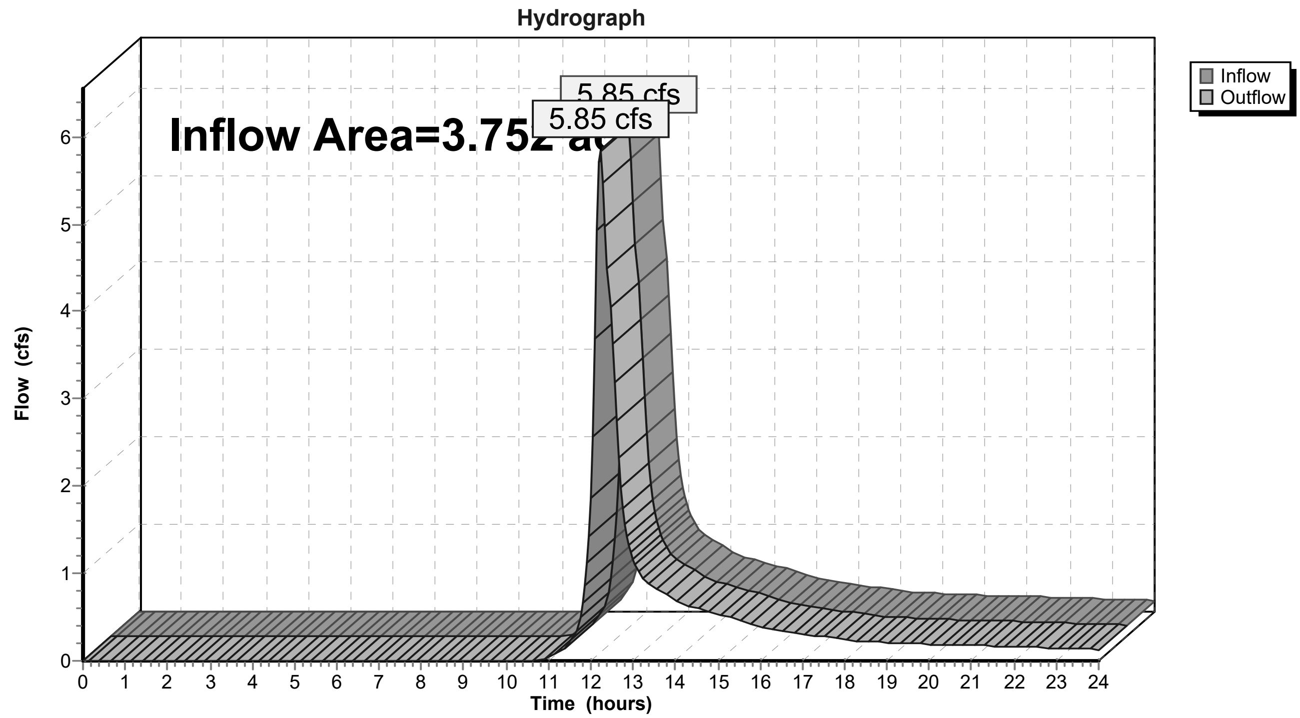
Summary for Reach 200R: Final Reach #200

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	3.752 ac,	2.33% Impervious,	Inflow Depth > 1.91"	for 25YR-24HR event	
Inflow =	5.85 cfs @	12.24 hrs,	Volume=	0.598 af	
Outflow =	5.85 cfs @	12.24 hrs,	Volume=	0.598 af,	Atten= 0%, Lag= 0.0 min

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

Reach 200R: Final Reach #200



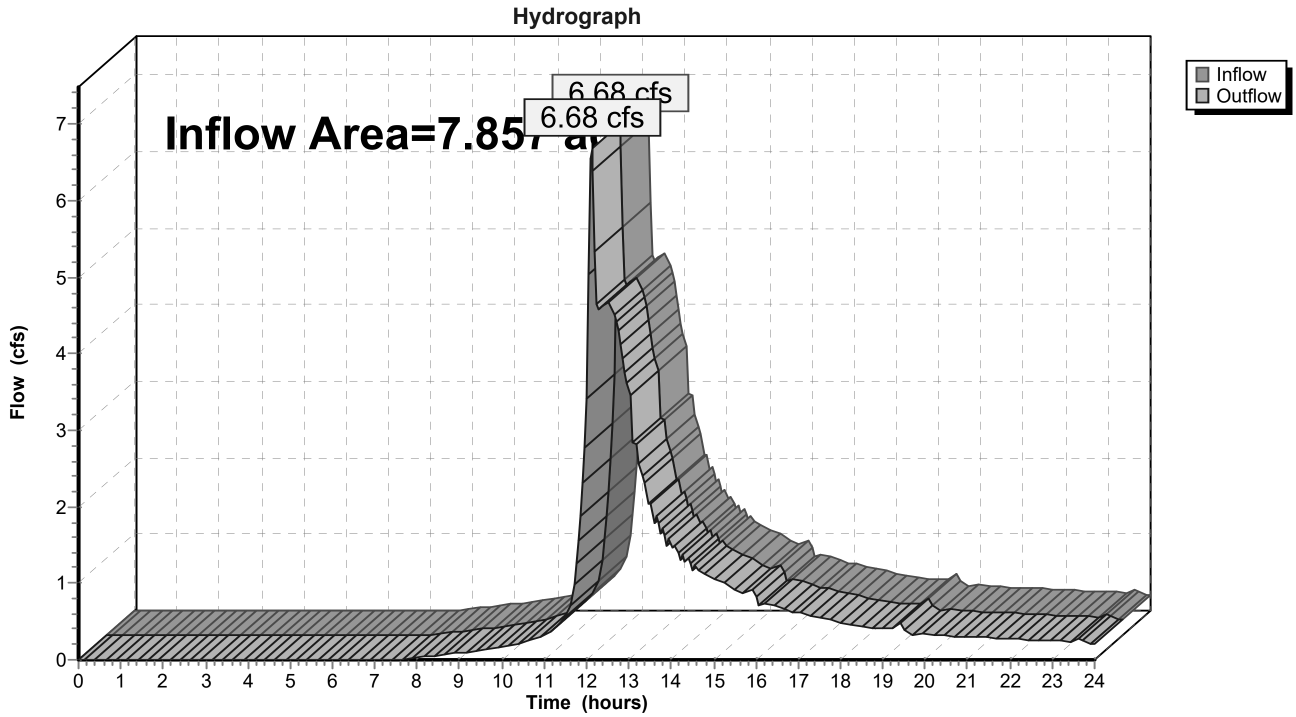
Summary for Reach 300R: Final Reach #300

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	7.857 ac, 13.25% Impervious, Inflow Depth > 1.71"		for 25YR-24HR event	
Inflow =	6.68 cfs @ 12.12 hrs, Volume=	1.117 af		
Outflow =	6.68 cfs @ 12.12 hrs, Volume=	1.117 af, Atten= 0%, Lag= 0.0 min		

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

Reach 300R: Final Reach #300



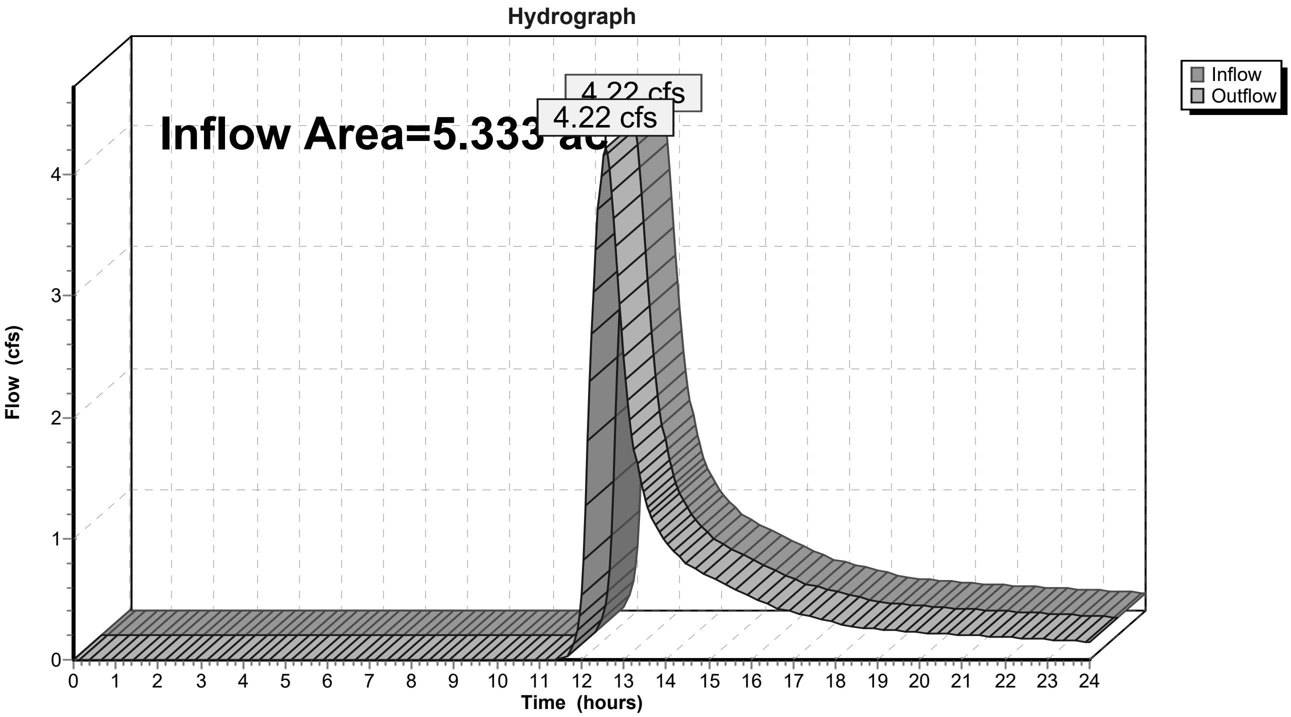
Summary for Reach 400R: Final Reach #400

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.333 ac, 33.23% Impervious, Inflow Depth > 1.49" for 25YR-24HR event
Inflow = 4.22 cfs @ 12.55 hrs, Volume= 0.663 af
Outflow = 4.22 cfs @ 12.55 hrs, Volume= 0.663 af, Atten= 0%, Lag= 0.0 min

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

Reach 400R: Final Reach #400



Summary for Pond 30P: Existing Infiltration/Trench

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=43)

Inflow Area = 1.339 ac, 10.64% Impervious, Inflow Depth > 2.25" for 25YR-24HR event
Inflow = 2.87 cfs @ 12.17 hrs, Volume= 0.251 af
Outflow = 1.47 cfs @ 13.00 hrs, Volume= 0.242 af, Atten= 49%, Lag= 49.9 min
Discarded = 0.93 cfs @ 12.59 hrs, Volume= 0.189 af
Primary = 0.65 cfs @ 13.00 hrs, Volume= 0.053 af
Secondary = 0.01 cfs @ 12.65 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 183.96' @ 12.59 hrs Surf.Area= 13,324 sf Storage= 3,170 cf
Flood Elev= 184.10' Surf.Area= 14,890 sf Storage= 5,159 cf

Plug-Flow detention time= 47.6 min calculated for 0.242 af (96% of inflow)
Center-of-Mass det. time= 28.2 min (883.1 - 854.9)

Volume	Invert	Avail.Storage	Storage Description
#1	183.50'	6,797 cf	**Ponding Area (Irregular)**Listed below (Recalc)
#2	182.75'	468 cf	**Stone Trench (Irregular)**Listed below (Recalc) 533 cf Overall - 65 cf Embedded = 468 cf
#3	183.15'	48 cf	**6.0" Round Pipe Storage** Inside #2 L= 244.0' 65 cf Overall - 0.5" Wall Thickness = 48 cf
		7,313 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
183.50	538	154.3	0	0	538
183.75	6,179	527.1	712	712	20,753
184.00	14,357	677.3	2,496	3,208	35,149
184.25	14,357	677.3	3,589	6,797	35,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.75	533	495.9	0	0	533
183.75	533	495.9	533	533	1,029

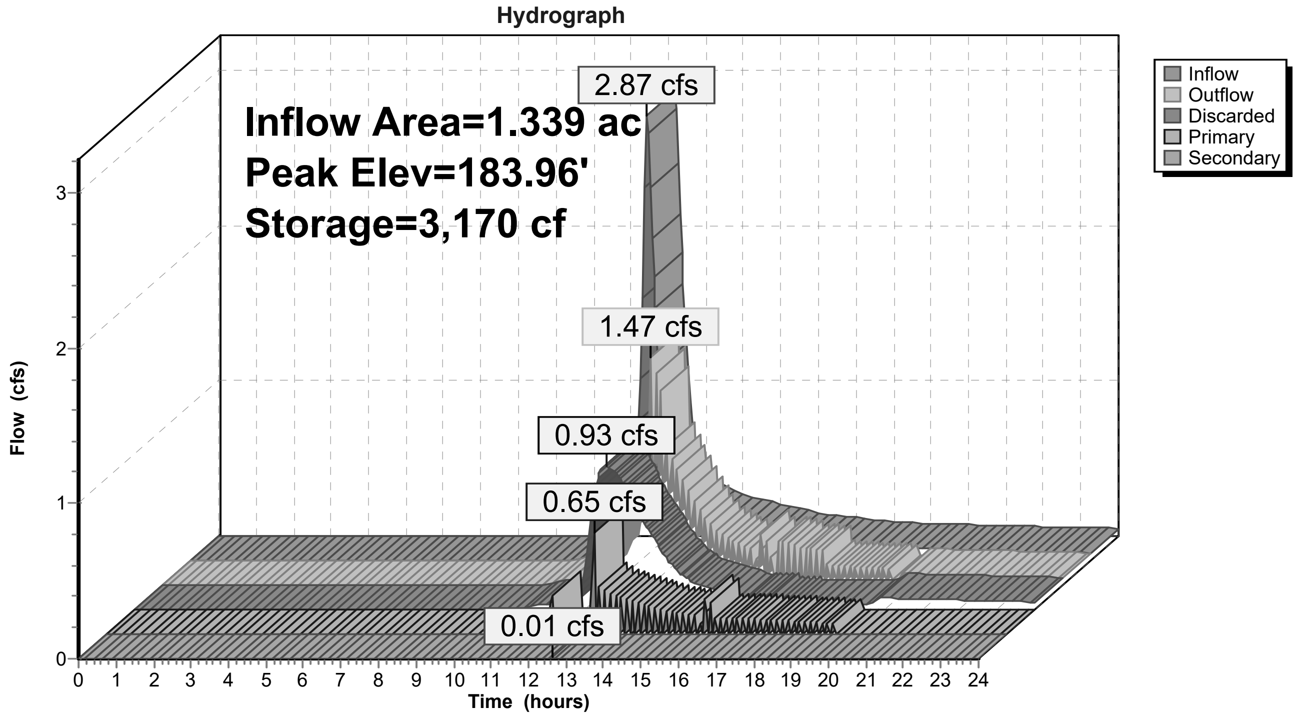
Device	Routing	Invert	Outlet Devices
#1	Discarded	182.75'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	183.15'	**6.0" Round 6" HDPE N-12** L= 1.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.15' / 183.15' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#3	Secondary	183.95'	**10.0' long x 10.0' breadth Overflow to Wetland** 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

Discarded OutFlow Max=0.92 cfs @ 12.59 hrs HW=183.96' (Free Discharge)
└─**1=Infiltration** (Exfiltration Controls 0.92 cfs)

Primary OutFlow Max=0.00 cfs @ 13.00 hrs HW=183.92' TW=184.30' (Dynamic Tailwater)
└─**2=6" HDPE N-12** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.65 hrs HW=183.96' TW=183.96' (Dynamic Tailwater)
└─**3=Overflow to Wetland** (Controls 0.00 cfs)

Pond 30P: Existing Infiltration/Trench



Summary for Pond 70P: Existing Catch Basin

Inflow Area = 5.333 ac, 33.23% Impervious, Inflow Depth > 1.49" for 25YR-24HR event
Inflow = 4.22 cfs @ 12.55 hrs, Volume= 0.663 af
Outflow = 4.22 cfs @ 12.55 hrs, Volume= 0.663 af, Atten= 0%, Lag= 0.0 min
Primary = 4.22 cfs @ 12.55 hrs, Volume= 0.663 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 181.13' @ 12.55 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 185.00' Surf.Area= 0.000 ac Storage= 0.001 af

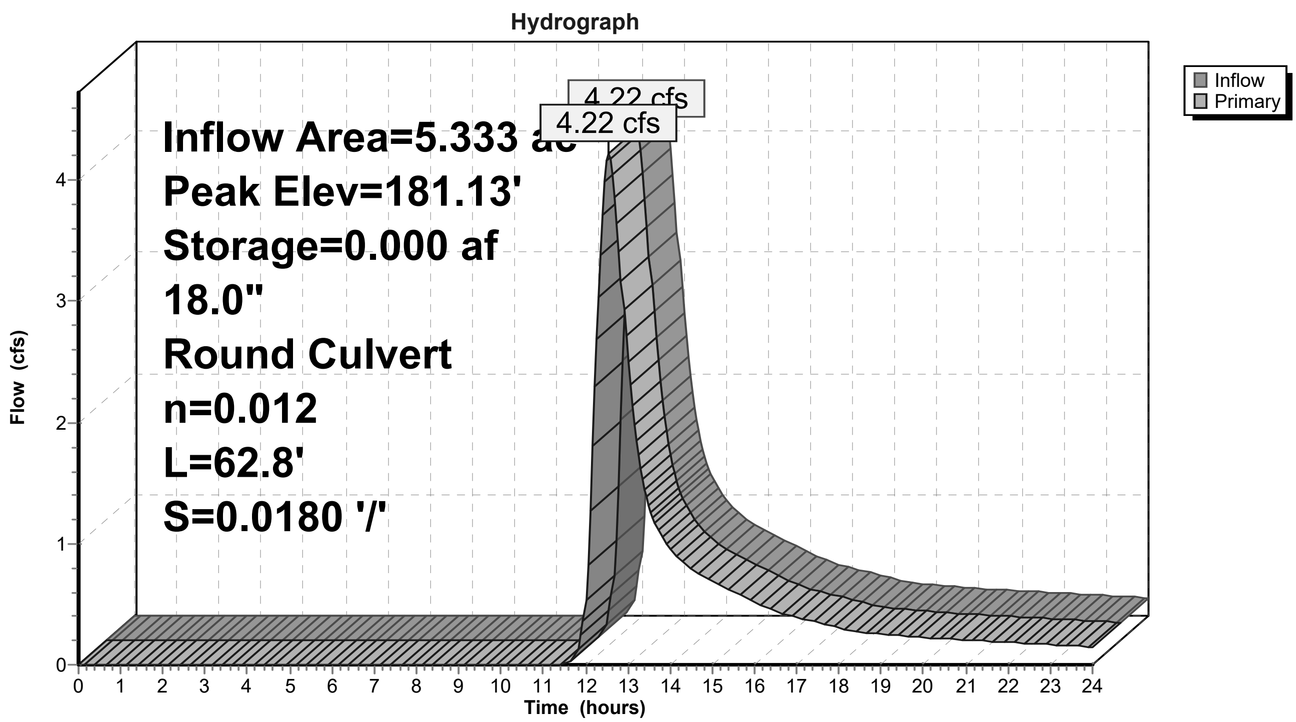
Plug-Flow detention time= 0.1 min calculated for 0.663 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (889.9 - 889.8)

Volume	Invert	Avail.Storage	Storage Description
#1	180.14'	0.001 af	**4.00'D x 3.60'H Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	180.14'	**18.0" Round 18" RCP** L= 62.8' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.14' / 179.01' S= 0.0180 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=4.22 cfs @ 12.55 hrs HW=181.13' TW=0.00' (Dynamic Tailwater)
└**1=18" RCP** (Inlet Controls 4.22 cfs @ 3.39 fps)

Pond 70P: Existing Catch Basin



Summary for Pond 71P: Existing Catch Basin

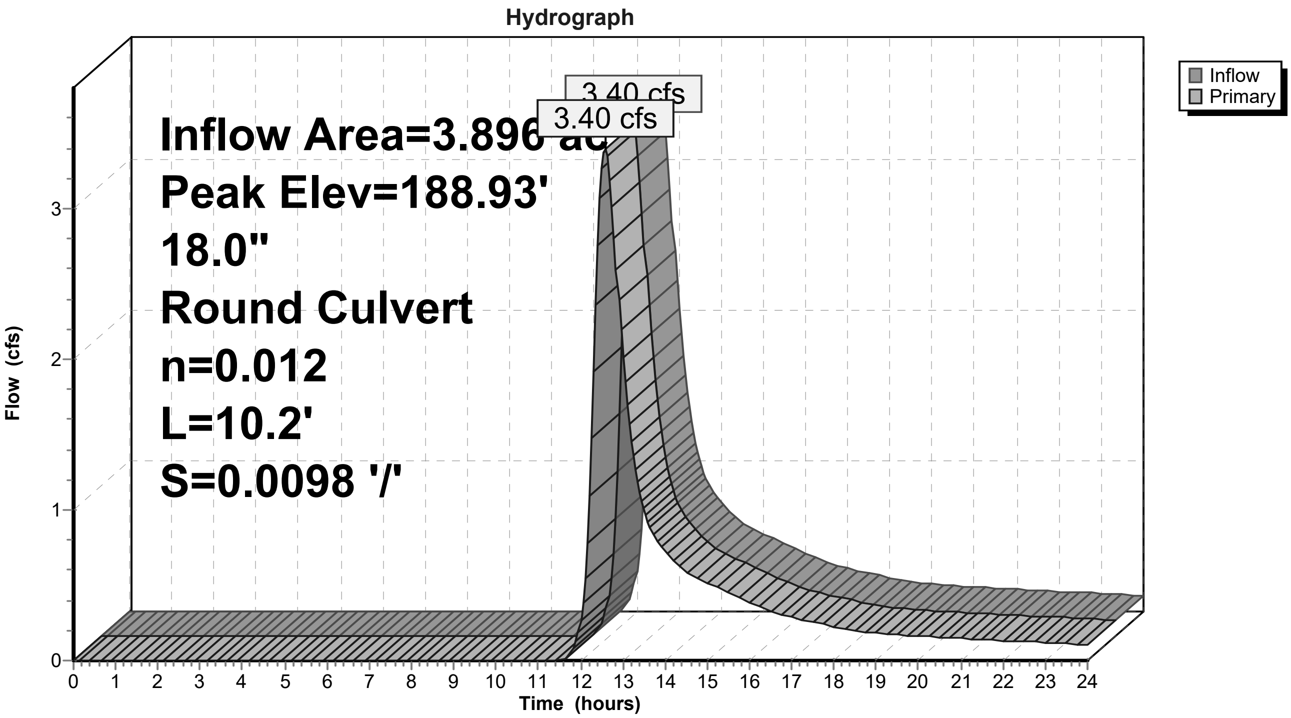
Inflow Area = 3.896 ac, 34.84% Impervious, Inflow Depth > 1.52" for 25YR-24HR event
Inflow = 3.40 cfs @ 12.58 hrs, Volume= 0.492 af
Outflow = 3.40 cfs @ 12.58 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min
Primary = 3.40 cfs @ 12.58 hrs, Volume= 0.492 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 188.93' @ 12.58 hrs
Flood Elev= 192.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	187.90'	**18.0" Round 18" RCP** L= 10.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 187.90' / 187.80' S= 0.0098 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.39 cfs @ 12.58 hrs HW=188.92' TW=188.26' (Dynamic Tailwater)
└─**1=18" RCP** (Barrel Controls 3.39 cfs @ 3.72 fps)

Pond 71P: Existing Catch Basin



Summary for Pond 72P: Existing Depression

[58] Hint: Peaked 0.21' above defined flood level

Inflow Area = 1.582 ac, 42.73% Impervious, Inflow Depth > 2.07" for 25YR-24HR event
Inflow = 2.04 cfs @ 12.48 hrs, Volume= 0.273 af
Outflow = 2.02 cfs @ 12.49 hrs, Volume= 0.271 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.02 cfs @ 11.95 hrs, Volume= 0.024 af
Primary = 2.00 cfs @ 12.49 hrs, Volume= 0.247 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.21' @ 12.59 hrs Surf.Area= 333 sf Storage= 160 cf
Flood Elev= 196.00' Surf.Area= 333 sf Storage= 91 cf

Plug-Flow detention time= 6.1 min calculated for 0.270 af (99% of inflow)
Center-of-Mass det. time= 2.2 min (878.0 - 875.8)

Volume	Invert	Avail.Storage	Storage Description
#1	195.50'	257 cf	**Ponding Area (Irregular)**Listed below (Recalc)

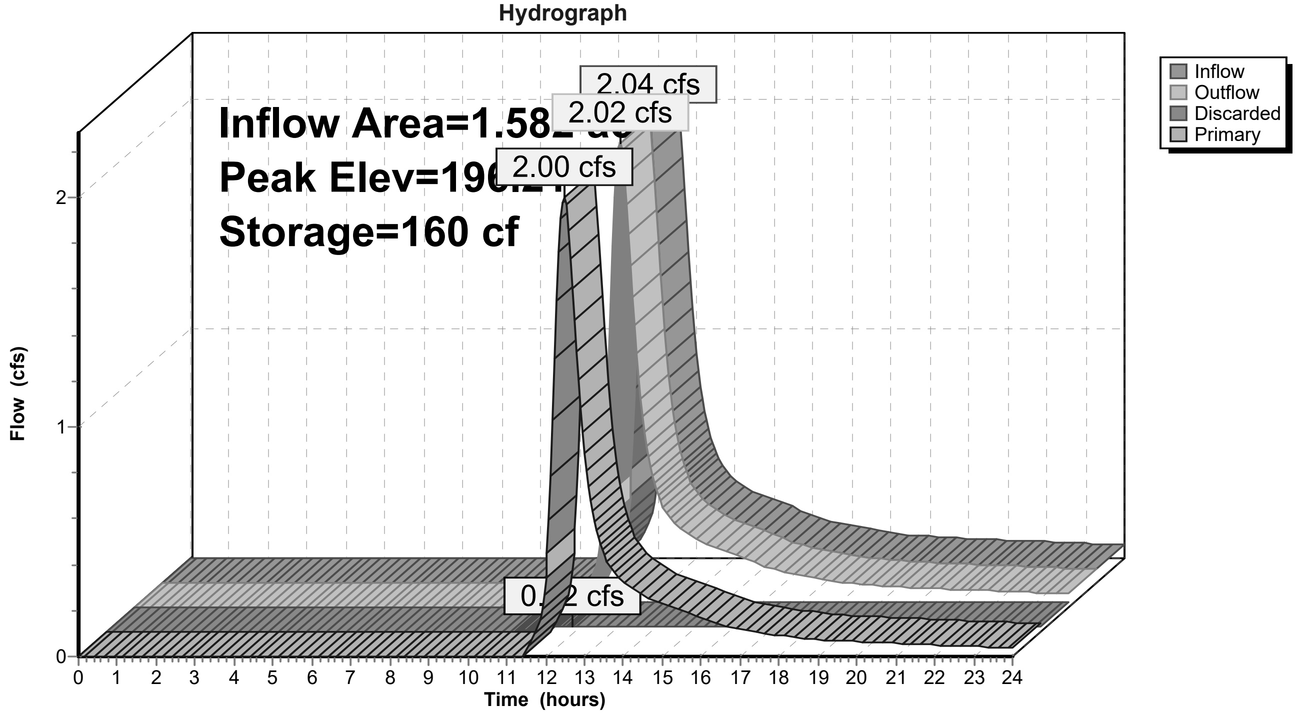
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
195.50	55	32.6	0	0	55
195.75	179	63.6	28	28	293
196.00	333	92.1	63	91	646
196.50	333	92.1	167	257	692

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.50'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	195.95'	**20.0' long x 50.0' breadth Overflow over DW** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.02 cfs @ 11.95 hrs HW=196.00' (Free Discharge)
└─**1=Infiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 12.49 hrs HW=196.20' TW=196.20' (Dynamic Tailwater)
└─**2=Overflow over DW** (Controls 0.00 cfs)

Pond 72P: Existing Depression



Summary for Pond E01P: Existing Catch Basin

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=126)

Inflow Area = 0.452 ac, 56.06% Impervious, Inflow Depth > 3.86" for 25YR-24HR event
Inflow = 1.99 cfs @ 12.09 hrs, Volume= 0.145 af
Outflow = 1.92 cfs @ 12.08 hrs, Volume= 0.145 af, Atten= 3%, Lag= 0.0 min
Primary = 1.92 cfs @ 12.08 hrs, Volume= 0.145 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 185.04' @ 12.16 hrs Surf.Area= 13 sf Storage= 19 cf
Flood Elev= 190.33' Surf.Area= 13 sf Storage= 86 cf

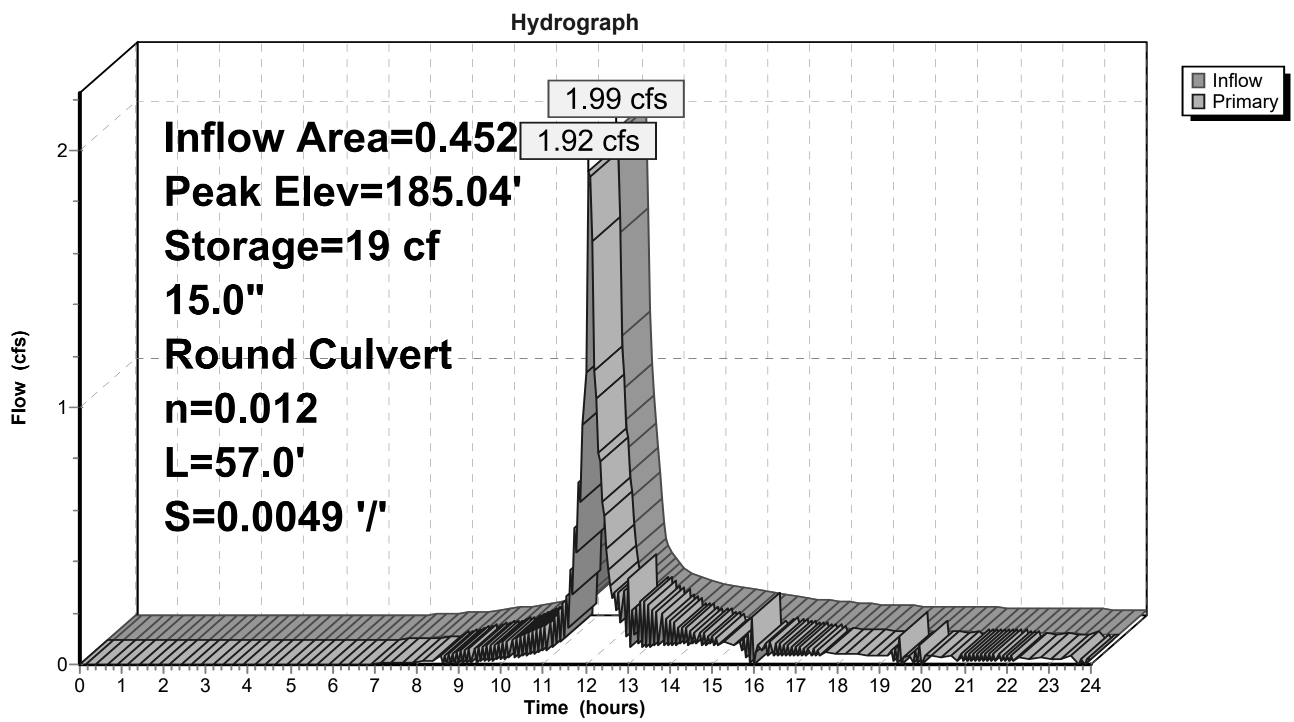
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (809.8 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	183.50'	86 cf	**4.00'D x 6.83'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	183.50'	**15.0" Round 15" HDPE N-12** L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.50' / 183.22' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=184.82' TW=184.88' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Controls 0.00 cfs)

Pond E01P: Existing Catch Basin



Summary for Pond E02P: Existing Catch Basin

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=73)
[80] Warning: Exceeded Pond E01P by 0.57' @ 16.00 hrs (1.08 cfs 0.160 af)

Inflow Area =	1.376 ac, 60.99% Impervious, Inflow Depth > 4.00" for 25YR-24HR event			
Inflow =	6.18 cfs @	12.09 hrs, Volume=	0.459 af	
Outflow =	6.73 cfs @	12.10 hrs, Volume=	0.459 af,	Atten= 0%, Lag= 0.6 min
Discarded =	0.01 cfs @	12.12 hrs, Volume=	0.006 af	
Primary =	6.73 cfs @	12.10 hrs, Volume=	0.453 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.97' @ 12.11 hrs Surf.Area= 116 sf Storage= 135 cf
Flood Elev= 189.42' Surf.Area= 0 sf Storage= 464 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.2 min (806.9 - 805.7)

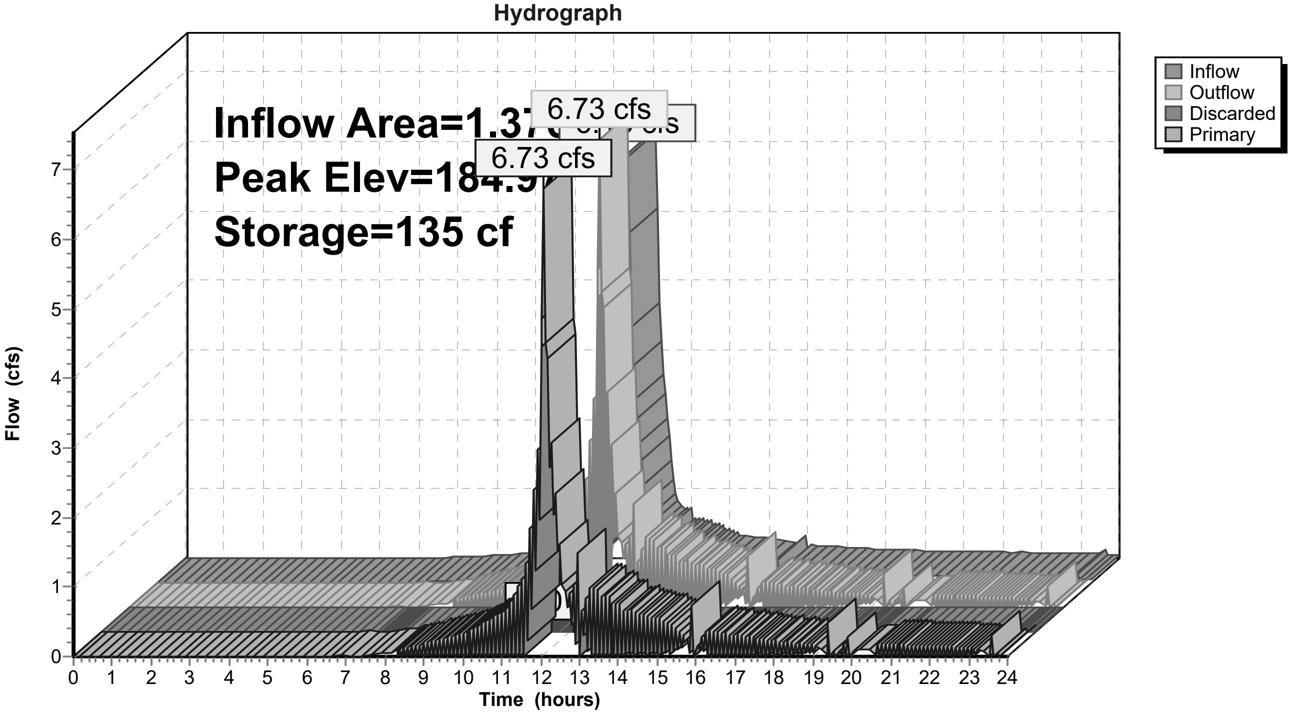
Volume	Invert	Avail.Storage	Storage Description
#1	183.02'	80 cf	**4.00'D x 6.40'H 4' Structure**-Impervious
#2	183.02'	384 cf	**24.0" Round 24" HDPE N-12 Perf** L= 122.2' S= 0.0270 '/'
		464 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	183.02'	**24.0" Round 24" HDPE N-12** L= 122.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.02' / 179.71' S= 0.0271 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Discarded	183.02'	**3.000 in/hr Infiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.12 hrs HW=184.94' (Free Discharge)
└─**2=Infiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=5.53 cfs @ 12.10 hrs HW=184.95' TW=184.75' (Dynamic Tailwater)
└─**1=24" HDPE N-12** (Outlet Controls 5.53 cfs @ 2.27 fps)

Pond E02P: Existing Catch Basin



Summary for Pond E03P: Existing Catch Basin

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)
[80] Warning: Exceeded Pond 30P by 0.76' @ 11.90 hrs (0.83 cfs 0.353 af)

Inflow Area = 1.339 ac, 10.64% Impervious, Inflow Depth = 0.47" for 25YR-24HR event
Inflow = 0.65 cfs @ 13.00 hrs, Volume= 0.053 af
Outflow = 0.42 cfs @ 13.01 hrs, Volume= 0.052 af, Atten= 35%, Lag= 0.5 min
Primary = 0.42 cfs @ 13.01 hrs, Volume= 0.052 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.31' @ 11.90 hrs Surf.Area= 13 sf Storage= 60 cf
Flood Elev= 184.49' Surf.Area= 17 sf Storage= 62 cf

Plug-Flow detention time= 10.7 min calculated for 0.052 af (98% of inflow)
Center-of-Mass det. time= 5.2 min (917.4 - 912.2)

Volume	Invert	Avail.Storage	Storage Description
#1	179.56'	62 cf	**4.00'D x 4.93'H 4' Structure**
#2	184.49'	21 cf	**Ponding Area (Irregular)** Listed below (Recalc)
		83 cf	Total Available Storage

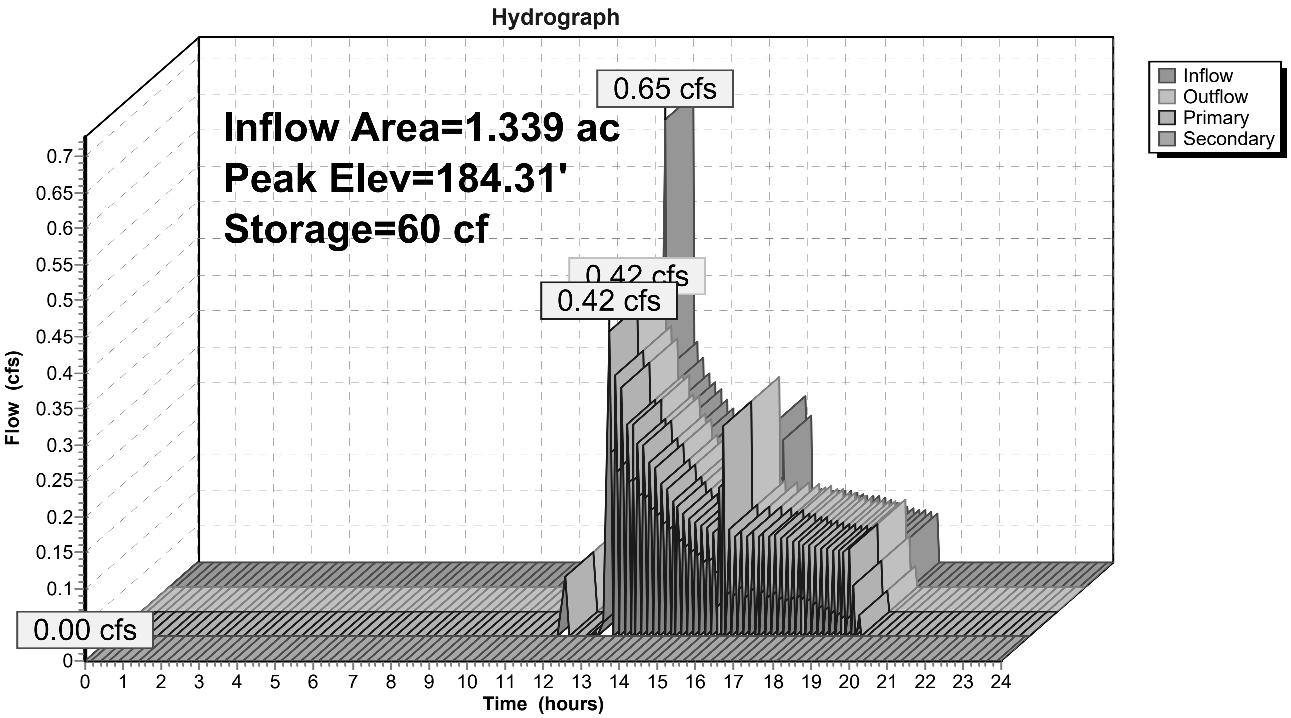
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
184.49	4	4.0	0	0	4
185.00	100	20.0	21	21	35

Device	Routing	Invert	Outlet Devices
#1	Primary	179.56'	**15.0" Round 15" HDPE N-12** L= 36.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 179.56' / 179.56' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Secondary	184.49'	**4.0' long x 2.0' breadth Overflow** 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=2.10 cfs @ 13.01 hrs HW=184.28' TW=184.15' (Dynamic Tailwater)
1=15" HDPE N-12 (Inlet Controls 2.10 cfs @ 1.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=179.56' TW=184.49' (Dynamic Tailwater)
2=Overflow (Controls 0.00 cfs)

Pond E03P: Existing Catch Basin



Summary for Pond E04P: Existing Catch Basin

[58] Hint: Peaked 0.76' above defined flood level
[80] Warning: Exceeded Pond E02P by 1.12' @ 13.00 hrs (6.11 cfs 0.885 af)
[80] Warning: Exceeded Pond E03P by 4.72' @ 11.70 hrs (11.97 cfs 7.920 af)

Inflow Area = 2.759 ac, 35.58% Impervious, Inflow Depth > 2.23" for 25YR-24HR event
Inflow = 6.85 cfs @ 12.10 hrs, Volume= 0.514 af
Outflow = 6.40 cfs @ 12.10 hrs, Volume= 0.513 af, Atten= 7%, Lag= 0.0 min
Primary = 6.40 cfs @ 12.10 hrs, Volume= 0.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.75' @ 12.10 hrs Surf.Area= 76 sf Storage= 75 cf
Flood Elev= 183.99' Surf.Area= 17 sf Storage= 54 cf

Plug-Flow detention time= 2.5 min calculated for 0.513 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (818.3 - 817.3)

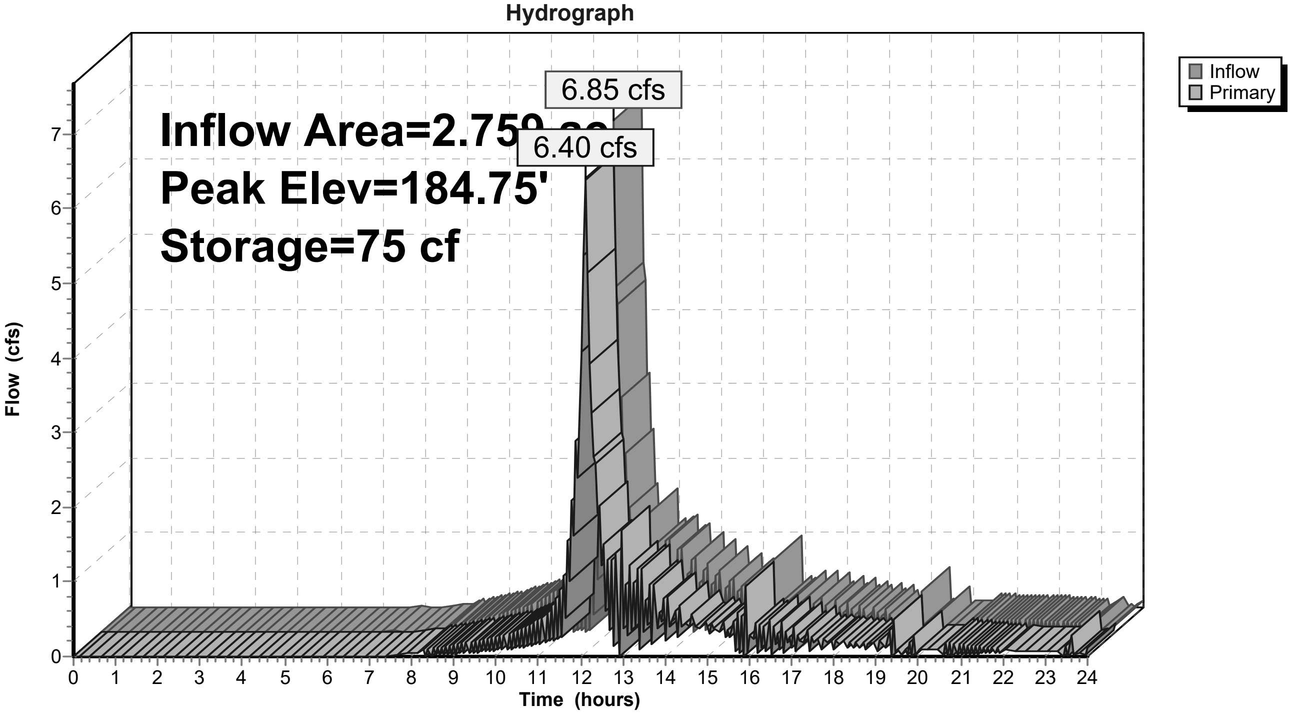
Volume	Invert	Avail.Storage	Storage Description
#1	179.71'	54 cf	**4.00'D x 4.28'H 4' Structure**
#2	183.99'	41 cf	**Flood Storage (Irregular)**Listed below (Recalc)
		95 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
183.99	4	8.0	0	0	4
185.00	98	45.2	41	41	164

Device	Routing	Invert	Outlet Devices
#1	Primary	183.99'	**4.0' long x 2.0' breadth Overflow** 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=6.31 cfs @ 12.10 hrs HW=184.75' TW=184.24' (Dynamic Tailwater)
└─**1=Overflow** (Weir Controls 6.31 cfs @ 2.08 fps)

Pond E04P: Existing Catch Basin



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=163,452 sf 2.33% Impervious Runoff Depth>0.39"
Flow Length=301' Tc=15.8 min CN=61 Runoff=0.78 cfs 0.123 af

Subcatchment 3S: Subcat #3 Runoff Area=222,064 sf 1.16% Impervious Runoff Depth>0.21"
Flow Length=682' Tc=43.7 min CN=55 Runoff=0.26 cfs 0.090 af

Subcatchment 30S: Subcat #30 Runoff Area=58,317 sf 10.64% Impervious Runoff Depth>0.54"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=65 Runoff=0.53 cfs 0.060 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>1.44"
Tc=6.0 min CN=82 Runoff=0.75 cfs 0.054 af

Subcatchment 32S: Subcat #32 Runoff Area=40,270 sf 63.40% Impervious Runoff Depth>1.58"
Tc=6.0 min CN=84 Runoff=1.68 cfs 0.122 af

Subcatchment 34S: Subcat #34 Runoff Area=1,936 sf 0.00% Impervious Runoff Depth>0.67"
Tc=6.0 min CN=68 Runoff=0.03 cfs 0.002 af

Subcatchment 70S: Subcat #70 Runoff Area=62,561 sf 28.86% Impervious Runoff Depth>0.21"
Flow Length=380' Tc=15.2 min CN=55 Runoff=0.11 cfs 0.026 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>0.16"
Flow Length=563' Tc=39.5 min CN=53 Runoff=0.07 cfs 0.032 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>0.46"
Flow Length=478' Tc=32.0 min CN=63 Runoff=0.34 cfs 0.061 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=43.0' S=0.0105 '/' Capacity=16.58 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=63.5' S=0.1339 '/' Capacity=43.48 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=230.5' S=0.0130 '/' Capacity=13.56 cfs Outflow=0.00 cfs 0.000 af

Reach 30dR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=11.0' S=0.1364 '/' Capacity=43.88 cfs Outflow=0.00 cfs 0.000 af

Reach 33aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.016 L=50.0' S=0.0198 '/' Capacity=31.35 cfs Outflow=0.00 cfs 0.000 af

Reach 34aR: Overland Flow Avg. Flow Depth=0.16' Max Vel=2.51 fps Inflow=2.56 cfs 0.186 af
n=0.016 L=35.0' S=0.0140 '/' Capacity=26.36 cfs Outflow=2.37 cfs 0.187 af

Reach 34bR: Overland Flow Avg. Flow Depth=0.18' Max Vel=2.25 fps Inflow=2.37 cfs 0.187 af
n=0.016 L=194.0' S=0.0103 '/' Capacity=22.62 cfs Outflow=2.36 cfs 0.186 af

Reach 34cR: Overland Flow Avg. Flow Depth=0.13' Max Vel=3.75 fps Inflow=2.36 cfs 0.186 af
n=0.030 L=36.0' S=0.1597 '/' Capacity=47.49 cfs Outflow=2.36 cfs 0.186 af

Reach 34dR: Overland Flow Avg. Flow Depth=0.21' Max Vel=1.73 fps Inflow=2.36 cfs 0.186 af
n=0.030 L=43.0' S=0.0174 '/' Capacity=15.69 cfs Outflow=2.33 cfs 0.186 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.16' Max Vel=0.76 fps Inflow=0.34 cfs 0.070 af
n=0.035 L=125.0' S=0.0064 '/' Capacity=79.88 cfs Outflow=0.34 cfs 0.069 af

Reach 71bR: Riprap Swale Avg. Flow Depth=0.12' Max Vel=0.79 fps Inflow=0.34 cfs 0.069 af
n=0.041 L=147.7' S=0.0135 '/' Capacity=31.94 cfs Outflow=0.33 cfs 0.069 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.09' Max Vel=0.92 fps Inflow=0.31 cfs 0.038 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=0.28 cfs 0.038 af

Reach 200R: Final Reach #200 Inflow=0.78 cfs 0.123 af
Outflow=0.78 cfs 0.123 af

Reach 300R: Final Reach #300 Inflow=2.33 cfs 0.276 af
Outflow=2.33 cfs 0.276 af

Reach 400R: Final Reach #400 Inflow=0.40 cfs 0.095 af
Outflow=0.40 cfs 0.095 af

Pond 30P: Existing Infiltration/Trench Peak Elev=183.58' Storage=516 cf Inflow=0.53 cfs 0.060 af
Discarded=0.15 cfs 0.043 af Primary=0.28 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.059 af

Pond 70P: Existing Catch Basin Peak Elev=180.42' Storage=0.000 af Inflow=0.40 cfs 0.095 af
18.0" Round Culvert n=0.012 L=62.8' S=0.0180 '/' Outflow=0.40 cfs 0.095 af

Pond 71P: Existing Catch Basin Peak Elev=188.18' Inflow=0.34 cfs 0.070 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=0.34 cfs 0.070 af

Pond 72P: Existing Depression Peak Elev=196.04' Storage=103 cf Inflow=0.34 cfs 0.061 af
Discarded=0.02 cfs 0.021 af Primary=0.31 cfs 0.038 af Outflow=0.33 cfs 0.059 af

Pond E01P: Existing Catch Basin Peak Elev=184.47' Storage=12 cf Inflow=0.75 cfs 0.054 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=0.82 cfs 0.054 af

Pond E02P: Existing Catch Basin Peak Elev=184.45' Storage=75 cf Inflow=2.50 cfs 0.176 af
Discarded=0.01 cfs 0.005 af Primary=2.67 cfs 0.171 af Outflow=2.68 cfs 0.176 af

Pond E03P: Existing Catch Basin Peak Elev=184.28' Storage=59 cf Inflow=0.28 cfs 0.015 af
Primary=0.23 cfs 0.014 af Secondary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.014 af

Pond E04P: Existing Catch Basin Peak Elev=184.40' Storage=59 cf Inflow=2.69 cfs 0.187 af
Outflow=2.56 cfs 0.186 af

Total Runoff Area = 16.942 ac Runoff Volume = 0.570 af Average Runoff Depth = 0.40"
82.88% Pervious = 14.041 ac 17.12% Impervious = 2.901 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=163,452 sf 2.33% Impervious Runoff Depth>1.16"
Flow Length=301' Tc=15.8 min CN=61 Runoff=3.31 cfs 0.362 af

Subcatchment 3S: Subcat #3 Runoff Area=222,064 sf 1.16% Impervious Runoff Depth>0.80"
Flow Length=682' Tc=43.7 min CN=55 Runoff=1.76 cfs 0.339 af

Subcatchment 30S: Subcat #30 Runoff Area=58,317 sf 10.64% Impervious Runoff Depth>1.42"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=65 Runoff=1.73 cfs 0.159 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>2.77"
Tc=6.0 min CN=82 Runoff=1.43 cfs 0.104 af

Subcatchment 32S: Subcat #32 Runoff Area=40,270 sf 63.40% Impervious Runoff Depth>2.95"
Tc=6.0 min CN=84 Runoff=3.12 cfs 0.227 af

Subcatchment 34S: Subcat #34 Runoff Area=1,936 sf 0.00% Impervious Runoff Depth>1.63"
Tc=6.0 min CN=68 Runoff=0.08 cfs 0.006 af

Subcatchment 70S: Subcat #70 Runoff Area=62,561 sf 28.86% Impervious Runoff Depth>0.81"
Flow Length=380' Tc=15.2 min CN=55 Runoff=0.76 cfs 0.097 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>0.69"
Flow Length=563' Tc=39.5 min CN=53 Runoff=0.68 cfs 0.134 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>1.28"
Flow Length=478' Tc=32.0 min CN=63 Runoff=1.20 cfs 0.169 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=43.0' S=0.0105 '/' Capacity=16.58 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=63.5' S=0.1339 '/' Capacity=43.48 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=230.5' S=0.0130 '/' Capacity=13.56 cfs Outflow=0.00 cfs 0.000 af

Reach 30dR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=11.0' S=0.1364 '/' Capacity=43.88 cfs Outflow=0.00 cfs 0.000 af

Reach 33aR: Overland Flow Avg. Flow Depth=0.03' Max Vel=1.01 fps Inflow=0.08 cfs 0.001 af
n=0.016 L=50.0' S=0.0198 '/' Capacity=31.35 cfs Outflow=0.08 cfs 0.001 af

Reach 34aR: Overland Flow Avg. Flow Depth=0.22' Max Vel=3.09 fps Inflow=4.93 cfs 0.356 af
n=0.016 L=35.0' S=0.0140 '/' Capacity=26.36 cfs Outflow=4.62 cfs 0.357 af

Reach 34bR: Overland Flow Avg. Flow Depth=0.24' Max Vel=2.76 fps Inflow=4.66 cfs 0.358 af
n=0.016 L=194.0' S=0.0103 '/' Capacity=22.62 cfs Outflow=4.60 cfs 0.357 af

Reach 34cR: Overland Flow Avg. Flow Depth=0.17' Max Vel=4.62 fps Inflow=4.60 cfs 0.357 af
n=0.030 L=36.0' S=0.1597 '/' Capacity=47.49 cfs Outflow=4.61 cfs 0.357 af

Reach 34dR: Overland Flow Avg. Flow Depth=0.28' Max Vel=2.14 fps Inflow=4.61 cfs 0.357 af
n=0.030 L=43.0' S=0.0174 '/' Capacity=15.69 cfs Outflow=4.60 cfs 0.357 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.34' Max Vel=1.26 fps Inflow=1.78 cfs 0.277 af
n=0.035 L=125.0' S=0.0064 '/' Capacity=79.88 cfs Outflow=1.78 cfs 0.277 af

Reach 71bR: Riprap Swale Avg. Flow Depth=0.26' Max Vel=1.32 fps Inflow=1.78 cfs 0.277 af
n=0.041 L=147.7' S=0.0135 '/' Capacity=31.94 cfs Outflow=1.77 cfs 0.277 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.19' Max Vel=1.45 fps Inflow=1.16 cfs 0.144 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=1.12 cfs 0.144 af

Reach 200R: Final Reach #200 Inflow=3.31 cfs 0.362 af
Outflow=3.31 cfs 0.362 af

Reach 300R: Final Reach #300 Inflow=4.69 cfs 0.696 af
Outflow=4.69 cfs 0.696 af

Reach 400R: Final Reach #400 Inflow=2.18 cfs 0.373 af
Outflow=2.18 cfs 0.373 af

Pond 30P: Existing Infiltration/Trench Peak Elev=183.82' Storage=1,764 cf Inflow=1.73 cfs 0.159 af
Discarded=0.61 cfs 0.122 af Primary=0.47 cfs 0.028 af Secondary=0.00 cfs 0.000 af Outflow=0.94 cfs 0.150 af

Pond 70P: Existing Catch Basin Peak Elev=180.82' Storage=0.000 af Inflow=2.18 cfs 0.373 af
18.0" Round Culvert n=0.012 L=62.8' S=0.0180 '/' Outflow=2.18 cfs 0.373 af

Pond 71P: Existing Catch Basin Peak Elev=188.60' Inflow=1.78 cfs 0.277 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=1.78 cfs 0.277 af

Pond 72P: Existing Depression Peak Elev=196.14' Storage=138 cf Inflow=1.20 cfs 0.169 af
Discarded=0.02 cfs 0.023 af Primary=1.16 cfs 0.144 af Outflow=1.18 cfs 0.167 af

Pond E01P: Existing Catch Basin Peak Elev=184.80' Storage=16 cf Inflow=1.43 cfs 0.104 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=1.43 cfs 0.104 af

Pond E02P: Existing Catch Basin Peak Elev=184.75' Storage=108 cf Inflow=4.48 cfs 0.331 af
Discarded=0.01 cfs 0.005 af Primary=5.01 cfs 0.325 af Outflow=5.02 cfs 0.330 af

Pond E03P: Existing Catch Basin Peak Elev=184.60' Storage=63 cf Inflow=0.47 cfs 0.028 af
Primary=0.27 cfs 0.026 af Secondary=0.08 cfs 0.001 af Outflow=0.27 cfs 0.027 af

Pond E04P: Existing Catch Basin Peak Elev=184.63' Storage=68 cf Inflow=5.26 cfs 0.358 af
Outflow=4.93 cfs 0.356 af

Total Runoff Area = 16.942 ac Runoff Volume = 1.597 af Average Runoff Depth = 1.13"
82.88% Pervious = 14.041 ac 17.12% Impervious = 2.901 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=163,452 sf 2.33% Impervious Runoff Depth>1.91"
Flow Length=301' Tc=15.8 min CN=61 Runoff=5.85 cfs 0.598 af

Subcatchment 3S: Subcat #3 Runoff Area=222,064 sf 1.16% Impervious Runoff Depth>1.42"
Flow Length=682' Tc=43.7 min CN=55 Runoff=3.57 cfs 0.605 af

Subcatchment 30S: Subcat #30 Runoff Area=58,317 sf 10.64% Impervious Runoff Depth>2.25"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=65 Runoff=2.87 cfs 0.251 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=82 Runoff=1.99 cfs 0.145 af

Subcatchment 32S: Subcat #32 Runoff Area=40,270 sf 63.40% Impervious Runoff Depth>4.07"
Tc=6.0 min CN=84 Runoff=4.26 cfs 0.314 af

Subcatchment 34S: Subcat #34 Runoff Area=1,936 sf 0.00% Impervious Runoff Depth>2.52"
Tc=6.0 min CN=68 Runoff=0.13 cfs 0.009 af

Subcatchment 70S: Subcat #70 Runoff Area=62,561 sf 28.86% Impervious Runoff Depth>1.44"
Flow Length=380' Tc=15.2 min CN=55 Runoff=1.58 cfs 0.172 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>1.28"
Flow Length=563' Tc=39.5 min CN=53 Runoff=1.48 cfs 0.246 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>2.07"
Flow Length=478' Tc=32.0 min CN=63 Runoff=2.04 cfs 0.273 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.01' Max Vel=0.28 fps Inflow=0.01 cfs 0.000 af
n=0.022 L=43.0' S=0.0105 '/' Capacity=16.58 cfs Outflow=0.01 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.01' Max Vel=0.56 fps Inflow=0.01 cfs 0.000 af
n=0.030 L=63.5' S=0.1339 '/' Capacity=43.48 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.01' Max Vel=0.18 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=230.5' S=0.0130 '/' Capacity=13.56 cfs Outflow=0.00 cfs 0.000 af

Reach 30dR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.41 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=11.0' S=0.1364 '/' Capacity=43.88 cfs Outflow=0.00 cfs 0.000 af

Reach 33aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.016 L=50.0' S=0.0198 '/' Capacity=31.35 cfs Outflow=0.00 cfs 0.000 af

Reach 34aR: Overland Flow Avg. Flow Depth=0.25' Max Vel=3.36 fps Inflow=6.40 cfs 0.513 af
n=0.016 L=35.0' S=0.0140 '/' Capacity=26.36 cfs Outflow=6.08 cfs 0.513 af

Reach 34bR: Overland Flow Avg. Flow Depth=0.27' Max Vel=3.03 fps Inflow=6.08 cfs 0.513 af
n=0.016 L=194.0' S=0.0103 '/' Capacity=22.62 cfs Outflow=6.18 cfs 0.512 af

Reach 34cR: Overland Flow Avg. Flow Depth=0.20' Max Vel=5.07 fps Inflow=6.18 cfs 0.512 af
n=0.030 L=36.0' S=0.1597 '/' Capacity=47.49 cfs Outflow=6.19 cfs 0.512 af

Reach 34dR: Overland Flow Avg. Flow Depth=0.33' Max Vel=2.35 fps Inflow=6.19 cfs 0.512 af
n=0.030 L=43.0' S=0.0174 '/' Capacity=15.69 cfs Outflow=6.20 cfs 0.512 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.46' Max Vel=1.53 fps Inflow=3.40 cfs 0.492 af
n=0.035 L=125.0' S=0.0064 '/' Capacity=79.88 cfs Outflow=3.39 cfs 0.492 af

Reach 71bR: Riprap Swale Avg. Flow Depth=0.35' Max Vel=1.61 fps Inflow=3.39 cfs 0.492 af
n=0.041 L=147.7' S=0.0135 '/' Capacity=31.94 cfs Outflow=3.39 cfs 0.491 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.25' Max Vel=1.71 fps Inflow=2.00 cfs 0.247 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=1.95 cfs 0.246 af

Reach 200R: Final Reach #200 Inflow=5.85 cfs 0.598 af
Outflow=5.85 cfs 0.598 af

Reach 300R: Final Reach #300 Inflow=6.68 cfs 1.117 af
Outflow=6.68 cfs 1.117 af

Reach 400R: Final Reach #400 Inflow=4.22 cfs 0.663 af
Outflow=4.22 cfs 0.663 af

Pond 30P: Existing Infiltration/Trench Peak Elev=183.96' Storage=3,170 cf Inflow=2.87 cfs 0.251 af
Discarded=0.93 cfs 0.189 af Primary=0.65 cfs 0.053 af Secondary=0.01 cfs 0.000 af Outflow=1.47 cfs 0.242 af

Pond 70P: Existing Catch Basin Peak Elev=181.13' Storage=0.000 af Inflow=4.22 cfs 0.663 af
18.0" Round Culvert n=0.012 L=62.8' S=0.0180 '/' Outflow=4.22 cfs 0.663 af

Pond 71P: Existing Catch Basin Peak Elev=188.93' Inflow=3.40 cfs 0.492 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=3.40 cfs 0.492 af

Pond 72P: Existing Depression Peak Elev=196.21' Storage=160 cf Inflow=2.04 cfs 0.273 af
Discarded=0.02 cfs 0.024 af Primary=2.00 cfs 0.247 af Outflow=2.02 cfs 0.271 af

Pond E01P: Existing Catch Basin Peak Elev=185.04' Storage=19 cf Inflow=1.99 cfs 0.145 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=1.92 cfs 0.145 af

Pond E02P: Existing Catch Basin Peak Elev=184.97' Storage=135 cf Inflow=6.18 cfs 0.459 af
Discarded=0.01 cfs 0.006 af Primary=6.73 cfs 0.453 af Outflow=6.73 cfs 0.459 af

Pond E03P: Existing Catch Basin Peak Elev=184.31' Storage=60 cf Inflow=0.65 cfs 0.053 af
Primary=0.42 cfs 0.052 af Secondary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.052 af

Pond E04P: Existing Catch Basin Peak Elev=184.75' Storage=75 cf Inflow=6.85 cfs 0.514 af
Outflow=6.40 cfs 0.513 af

Total Runoff Area = 16.942 ac Runoff Volume = 2.614 af Average Runoff Depth = 1.85"
82.88% Pervious = 14.041 ac 17.12% Impervious = 2.901 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=163,452 sf 2.33% Impervious Runoff Depth>2.71"
Flow Length=301' Tc=15.8 min CN=61 Runoff=8.53 cfs 0.846 af

Subcatchment 3S: Subcat #3 Runoff Area=222,064 sf 1.16% Impervious Runoff Depth>2.11"
Flow Length=682' Tc=43.7 min CN=55 Runoff=5.59 cfs 0.897 af

Subcatchment 30S: Subcat #30 Runoff Area=58,317 sf 10.64% Impervious Runoff Depth>3.11"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=65 Runoff=4.03 cfs 0.347 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>4.93"
Tc=6.0 min CN=82 Runoff=2.52 cfs 0.186 af

Subcatchment 32S: Subcat #32 Runoff Area=40,270 sf 63.40% Impervious Runoff Depth>5.16"
Tc=6.0 min CN=84 Runoff=5.34 cfs 0.397 af

Subcatchment 34S: Subcat #34 Runoff Area=1,936 sf 0.00% Impervious Runoff Depth>3.42"
Tc=6.0 min CN=68 Runoff=0.17 cfs 0.013 af

Subcatchment 70S: Subcat #70 Runoff Area=62,561 sf 28.86% Impervious Runoff Depth>2.13"
Flow Length=380' Tc=15.2 min CN=55 Runoff=2.49 cfs 0.255 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>1.93"
Flow Length=563' Tc=39.5 min CN=53 Runoff=2.39 cfs 0.372 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>2.89"
Flow Length=478' Tc=32.0 min CN=63 Runoff=2.91 cfs 0.382 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.09' Max Vel=1.01 fps Inflow=0.37 cfs 0.010 af
n=0.022 L=43.0' S=0.0105 '/' Capacity=16.58 cfs Outflow=0.35 cfs 0.010 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.05' Max Vel=1.92 fps Inflow=0.35 cfs 0.010 af
n=0.030 L=63.5' S=0.1339 '/' Capacity=43.48 cfs Outflow=0.32 cfs 0.010 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.08' Max Vel=0.80 fps Inflow=0.32 cfs 0.010 af
n=0.030 L=230.5' S=0.0130 '/' Capacity=13.56 cfs Outflow=0.26 cfs 0.010 af

Reach 30dR: Overland Flow Avg. Flow Depth=0.05' Max Vel=1.80 fps Inflow=0.26 cfs 0.010 af
n=0.030 L=11.0' S=0.1364 '/' Capacity=43.88 cfs Outflow=0.26 cfs 0.010 af

Reach 33aR: Overland Flow Avg. Flow Depth=0.06' Max Vel=1.37 fps Inflow=0.32 cfs 0.004 af
n=0.016 L=50.0' S=0.0198 '/' Capacity=31.35 cfs Outflow=0.25 cfs 0.004 af

Reach 34aR: Overland Flow Avg. Flow Depth=0.29' Max Vel=3.68 fps Inflow=7.96 cfs 0.661 af
n=0.016 L=35.0' S=0.0140 '/' Capacity=26.36 cfs Outflow=8.20 cfs 0.661 af

Reach 34bR: Overland Flow Avg. Flow Depth=0.31' Max Vel=3.28 fps Inflow=8.23 cfs 0.665 af
n=0.016 L=194.0' S=0.0103 '/' Capacity=22.62 cfs Outflow=7.96 cfs 0.664 af

Reach 34cR: Overland Flow Avg. Flow Depth=0.22' Max Vel=5.47 fps Inflow=7.96 cfs 0.664 af
n=0.030 L=36.0' S=0.1597 '/' Capacity=47.49 cfs Outflow=7.94 cfs 0.664 af

Reach 34dR: Overland Flow Avg. Flow Depth=0.36' Max Vel=2.54 fps Inflow=7.94 cfs 0.664 af
n=0.030 L=43.0' S=0.0174 '/' Capacity=15.69 cfs Outflow=7.91 cfs 0.664 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.56' Max Vel=1.74 fps Inflow=5.16 cfs 0.725 af
n=0.035 L=125.0' S=0.0064 '/' Capacity=79.88 cfs Outflow=5.16 cfs 0.724 af

Reach 71bR: Riprap Swale Avg. Flow Depth=0.43' Max Vel=1.83 fps Inflow=5.16 cfs 0.724 af
n=0.041 L=147.7' S=0.0135 '/' Capacity=31.94 cfs Outflow=5.15 cfs 0.723 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.31' Max Vel=1.90 fps Inflow=2.86 cfs 0.354 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=2.82 cfs 0.353 af

Reach 200R: Final Reach #200 Inflow=8.53 cfs 0.857 af
Outflow=8.53 cfs 0.857 af

Reach 300R: Final Reach #300 Inflow=9.01 cfs 1.561 af
Outflow=9.01 cfs 1.561 af

Reach 400R: Final Reach #400 Inflow=6.45 cfs 0.978 af
Outflow=6.45 cfs 0.978 af

Pond 30P: Existing Infiltration/Trench Peak Elev=184.03' Storage=4,209 cf Inflow=4.03 cfs 0.347 af
Discarded=1.03 cfs 0.249 af Primary=0.70 cfs 0.079 af Secondary=0.37 cfs 0.010 af Outflow=1.87 cfs 0.338 af

Pond 70P: Existing Catch Basin Peak Elev=181.46' Storage=0.000 af Inflow=6.45 cfs 0.978 af
18.0" Round Culvert n=0.012 L=62.8' S=0.0180 '/' Outflow=6.45 cfs 0.978 af

Pond 71P: Existing Catch Basin Peak Elev=189.23' Inflow=5.16 cfs 0.725 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=5.16 cfs 0.725 af

Pond 72P: Existing Depression Peak Elev=196.26' Storage=179 cf Inflow=2.91 cfs 0.382 af
Discarded=0.02 cfs 0.026 af Primary=2.86 cfs 0.354 af Outflow=2.89 cfs 0.380 af

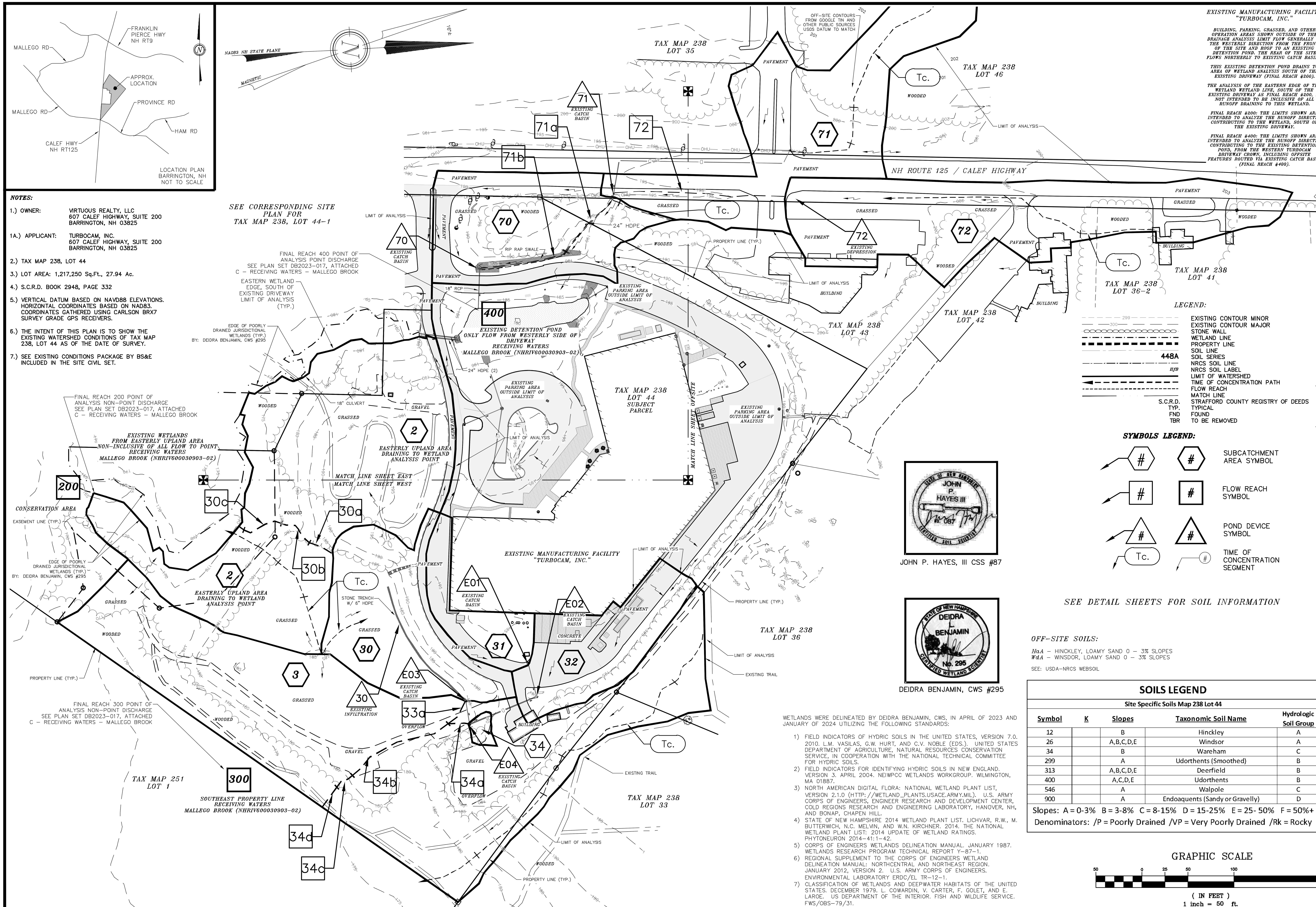
Pond E01P: Existing Catch Basin Peak Elev=185.20' Storage=21 cf Inflow=2.52 cfs 0.186 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=2.54 cfs 0.185 af

Pond E02P: Existing Catch Basin Peak Elev=185.13' Storage=156 cf Inflow=7.88 cfs 0.583 af
Discarded=0.01 cfs 0.006 af Primary=7.86 cfs 0.576 af Outflow=7.86 cfs 0.582 af

Pond E03P: Existing Catch Basin Peak Elev=184.59' Storage=63 cf Inflow=0.70 cfs 0.079 af
Primary=0.59 cfs 0.074 af Secondary=0.32 cfs 0.004 af Outflow=0.59 cfs 0.078 af

Pond E04P: Existing Catch Basin Peak Elev=184.86' Storage=83 cf Inflow=8.01 cfs 0.662 af
Outflow=7.96 cfs 0.661 af

Total Runoff Area = 16.942 ac Runoff Volume = 3.694 af Average Runoff Depth = 2.62"
82.88% Pervious = 14.041 ac 17.12% Impervious = 2.901 ac



NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING WATERSHED CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE EXISTING CONDITIONS PACKAGE BY BS&E INCLUDED IN THE SITE CIVIL SET.

EXISTING MANUFACTURING FACILITY "TURBOCAM, INC."

BUILDING, PARKING, GRASSED, AND OTHER OPERATION AREAS SHOWN OUTSIDE OF THE DRAINAGE ANALYSIS LIMIT FLOW GENERALLY IN THE WESTERLY DIRECTION FROM THE FRONT OF THE SITE AND ROOF TO AN EXISTING DETENTION POND. THE REAR OF THE SITE FLOWS NORTHERLY TO EXISTING CATCH BASINS.

THIS EXISTING DETENTION POND DRAINS TO AREA OF WETLAND ANALYSIS SOUTH OF THE EXISTING DRIVEWAY (FINAL REACH #200).

THE ANALYSIS OF THE EASTERN EDGE OF THE WETLAND WETLAND LINE, SOUTH OF THE EXISTING DRIVEWAY AS FINAL REACH #200, IS NOT INTENDED TO BE INCLUSIVE OF ALL RUNOFF DRAINING TO THIS WETLAND.

FINAL REACH #200: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE WETLAND, SOUTH OF THE EXISTING DRIVEWAY.

FINAL REACH #400: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE EXISTING DETENTION POND, FROM THE WESTERN TURBOCAM DRIVEWAY CROWN, INCLUDING OFFSITE FEATURES ROUTED VIA EXISTING CATCH BASIN (FINAL REACH #400).

LEGEND:

EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
STONE WALL
WETLAND LINE
PROPERTY LINE
SOIL LINE
448A SOIL SERIES
NRCS SOIL LINE
NRCS SOIL LABEL
LIMIT OF WATERSHED
TIME OF CONCENTRATION PATH
FLOW REACH
MATCH LINE
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
TBR TO BE REMOVED

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL
FLOW REACH SYMBOL
POND DEVICE SYMBOL
TIME OF CONCENTRATION SEGMENT

OFF-SITE SOILS:

HaA – HINCKLEY, LOAMY SAND 0 – 3% SLOPES
WdA – WINDSOR, LOAMY SAND 0 – 3% SLOPES

SEE: USDA–NRCS WEBSOIL

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014–41:1–42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y–87–1.
6) REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. JANUARY 2012, VERSION 2. U.S. ARMY CORPS OF ENGINEERS. ENVIRONMENTAL LABORATORY ERDC/EL TR–12–1.
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS–79/31.

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (EXISTING)

W-1 EXISTING WATERSHED PLAN

FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14743
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING WATERSHED CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE EXISTING CONDITIONS PACKAGE BY BS&E INCLUDED IN THE SITE CIVIL SET.

LEGEND:

EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
STONE WALL
WETLAND LINE
PROPERTY LINE
SOIL LINE
448A SOIL SERIES
NRCS SOIL LINE
NRCS SOIL LABEL
LIMIT OF WATERSHED
TIME OF CONCENTRATION PATH
FLOW REACH
MATCH LINE
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
TBR TO BE REMOVED

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL
FLOW REACH SYMBOL
POND DEVICE SYMBOL
TIME OF CONCENTRATION SEGMENT

JOHN P. HAYES, III CSS #87

DEIDRA BENJAMIN, CWS #295

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
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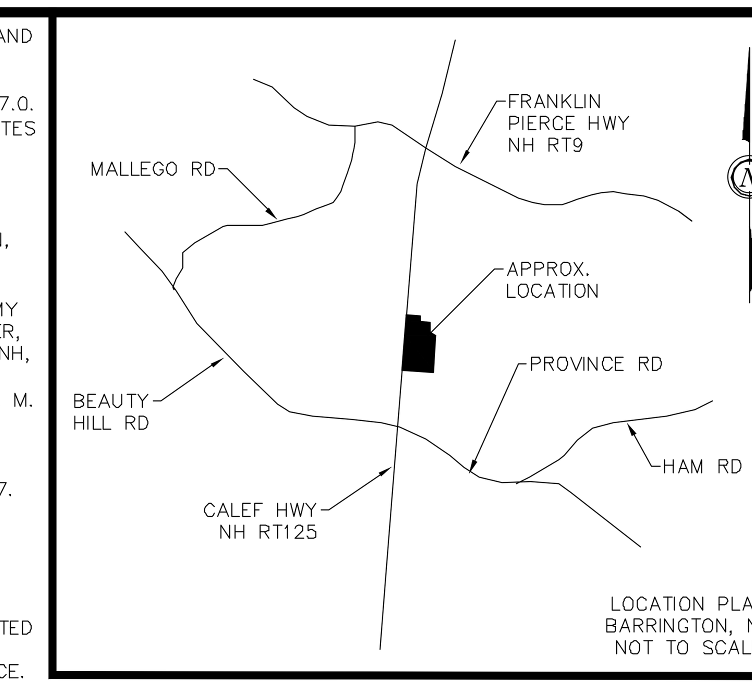

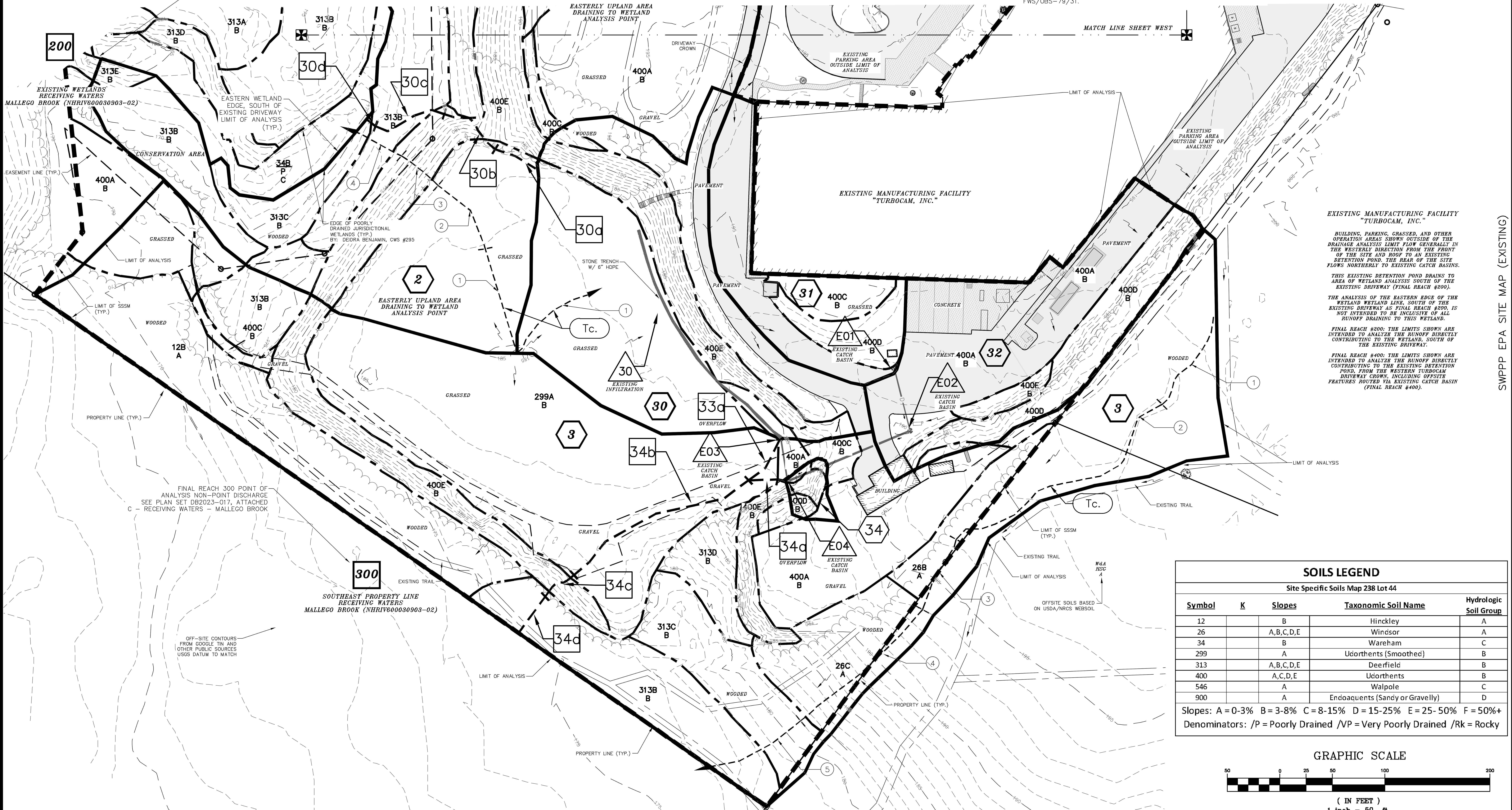

EXISTING MANUFACTURING FACILITY "TURBOCAM, INC."

BUILDING, PARKING, GRASSED, AND OTHER OPERATION AREAS SHOWN OUTSIDE OF THE DRAINAGE ANALYSIS LIMIT FLOW GENERALLY IN THE WESTERLY DIRECTION FROM THE FRONT OF THE SITE AND ROOF TO AN EXISTING DETENTION POND. THE REAR OF THE SITE FLOWS NORTHERLY TO EXISTING CATCH BASINS.

THIS EXISTING DETENTION POND DRAINS TO AREA OF WETLAND ANALYSIS SOUTH OF THE EXISTING DRIVEWAY (FINAL REACH #200).

THE ANALYSIS OF THE EASTERN EDGE OF THE WETLAND WETLAND LINE, SOUTH OF THE EXISTING DRIVEWAY AS FINAL REACH #200, IS NOT INTENDED TO BE INCLUSIVE OF ALL RUNOFF DRAINING TO THIS WETLAND.

FINAL REACH #200: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE WETLAND, SOUTH OF THE EXISTING DRIVEWAY.

FINAL REACH #400: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE EXISTING DETENTION POND. FROM THE WESTERN TURBOCAM DRIVEWAY CROWN, INCLUDING OFFSITE FEATURES ROUTED VIA EXISTING CATCH BASIN (FINAL REACH #400).

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25-50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

SWPPP EPA SITE MAP (EXISTING)

REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN EAST
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE KENNETH A. BERRY No. 14243 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING WATERSHED CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE EXISTING CONDITIONS PACKAGE BY BS&E INCLUDED IN THE SITE CIVIL SET.

LEGEND:

299	EXISTING CONTOUR MINOR
300	EXISTING CONTOUR MAJOR
	STONE WALL
	WETLAND LINE
	PROPERTY LINE
	SOIL LINE
448A	SOIL SERIES
	NRCS SOIL LINE
HfB	NRCS SOIL LABEL
	LIMIT OF WATERSHED
	TIME OF CONCENTRATION PATH
	FLOW REACH
	MATCH LINE
S.C.R.D.	STRAFFORD COUNTY REGISTRY OF DEEDS
TYP.	TYPICAL
FND	FOUND
TBR	TO BE REMOVED

SYMBOLS LEGEND:

#	SUBCATCHMENT AREA SYMBOL
#	FLOW REACH SYMBOL
#	POND DEVICE SYMBOL
Tc.	TIME OF CONCENTRATION SEGMENT

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

STATE OF NEW HAMPSHIRE
JOHN P. HAYES III
No. 087
CERTIFIED SOIL SCIENTIST

JOHN P. HAYES, III CSS #87

STATE OF NEW HAMPSHIRE
DEIDRA L BENJAMIN
No. 295
CERTIFIED WETLAND SCIENTIST

DEIDRA BENJAMIN, CWS #295

NAD83 NH STATE PLANE
MAGNETIC
16°±

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
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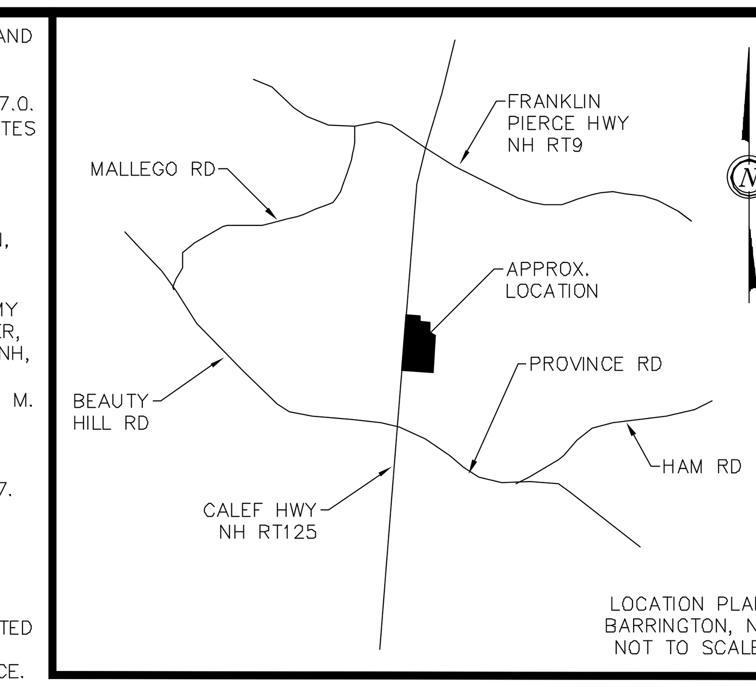

LOCATION PLAN
BARRINGTON, NH
NOT TO SCALE

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
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546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

OFF-SITE SOILS:

HaA – HINCKLEY, LOAMY SAND 0 – 3% SLOPES
WdA – WINSDOR, LOAMY SAND 0 – 3% SLOPES

SEE: USDA-NRCS WEBSOIL

EXISTING MANUFACTURING FACILITY "TURBOCAM, INC."

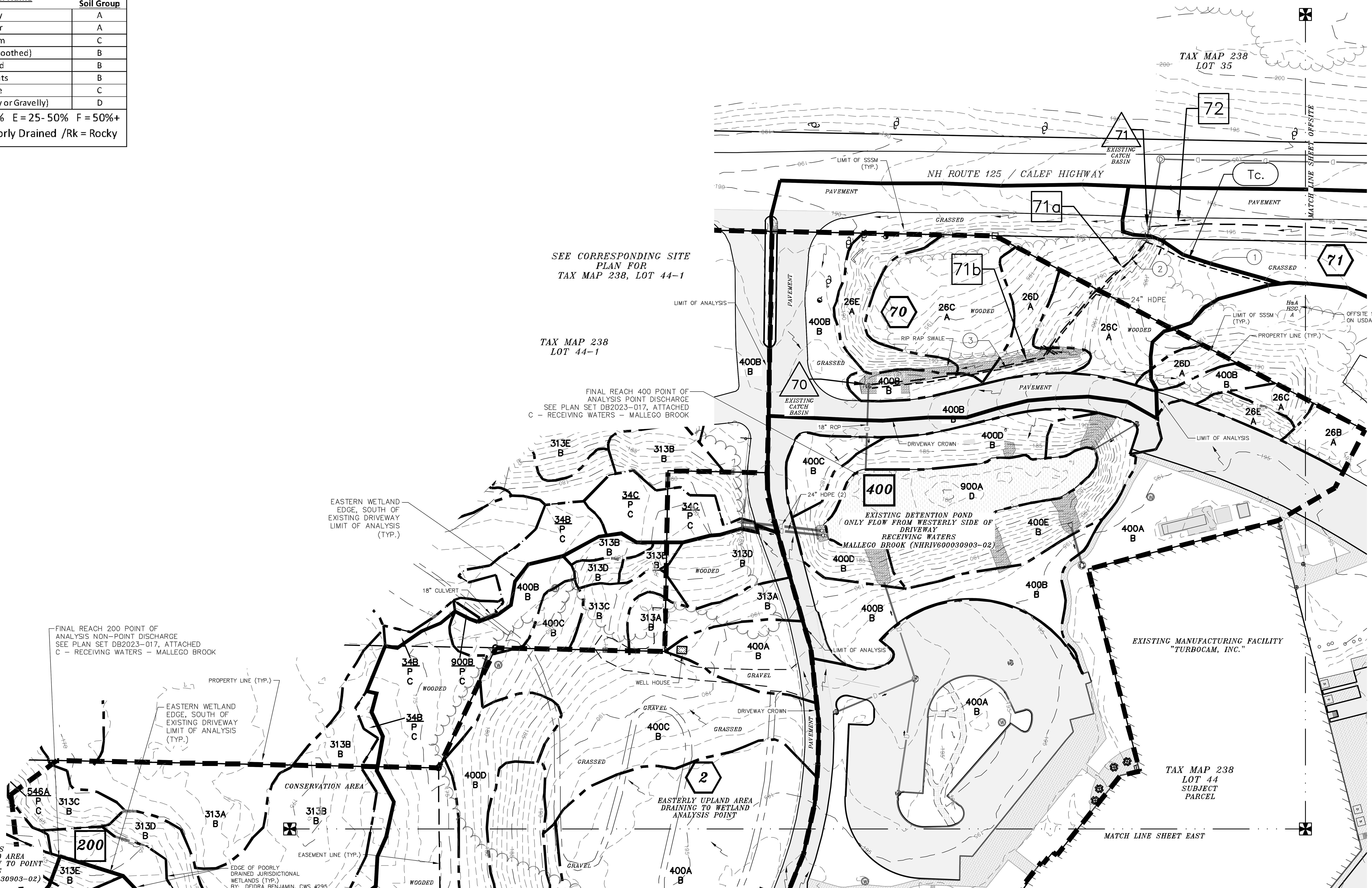
BUILDING, PARKING, GRASSED, AND OTHER OPERATION AREAS SHOWN OUTSIDE OF THE DRAINAGE ANALYSIS LIMIT FLOW GENERALLY IN THE WESTERLY DIRECTION FROM THE FRONT OF THE SITE AND ROOF TO AN EXISTING DETENTION POND. THE REAR OF THE SITE FLOWS NORTHERLY TO EXISTING CATCH BASINS.

THIS EXISTING DETENTION POND DRAINS TO AREA OF WETLAND ANALYSIS SOUTH OF THE EXISTING DRIVEWAY (FINAL REACH #200).

THE ANALYSIS OF THE EASTERN EDGE OF THE WETLAND WETLAND LINE, SOUTH OF THE EXISTING DRIVEWAY AS FINAL REACH #200, IS NOT INTENDED TO BE INCLUSIVE OF ALL RUNOFF DRAINING TO THIS WETLAND.

FINAL REACH #200: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE WETLAND, SOUTH OF THE EXISTING DRIVEWAY.

FINAL REACH #400: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE EXISTING DETENTION POND, FROM THE WESTERN TURBOCAM DRIVEWAY CROWN, INCLUDING OFFSITE FEATURES ROUTED VIA EXISTING CATCH BASIN (FINAL REACH #400).



REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (EXISTING)
W-1 EXISTING WATERSHED PLAN WEST

FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14743
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE EXISTING WATERSHED CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE EXISTING CONDITIONS PACKAGE BY BS&E INCLUDED IN THE SITE CIVIL SET.

LEGEND:

- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- STONE WALL
- WETLAND LINE
- PROPERTY LINE
- SOIL LINE
- 448A SOIL SERIES
- NRCS SOIL LINE
- HfB NRCS SOIL LABEL
- LIMIT OF WATERSHED
- TIME OF CONCENTRATION PATH
- FLOW REACH
- MATCH LINE
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- TYP. TYPICAL
- FND FOUND
- TBR TO BE REMOVED

SYMBOLS LEGEND:

- SUBCATCHMENT AREA SYMBOL
- FLOW REACH SYMBOL
- POND DEVICE SYMBOL
- TIME OF CONCENTRATION SEGMENT

JOHN P. HAYES, III CSS #87

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

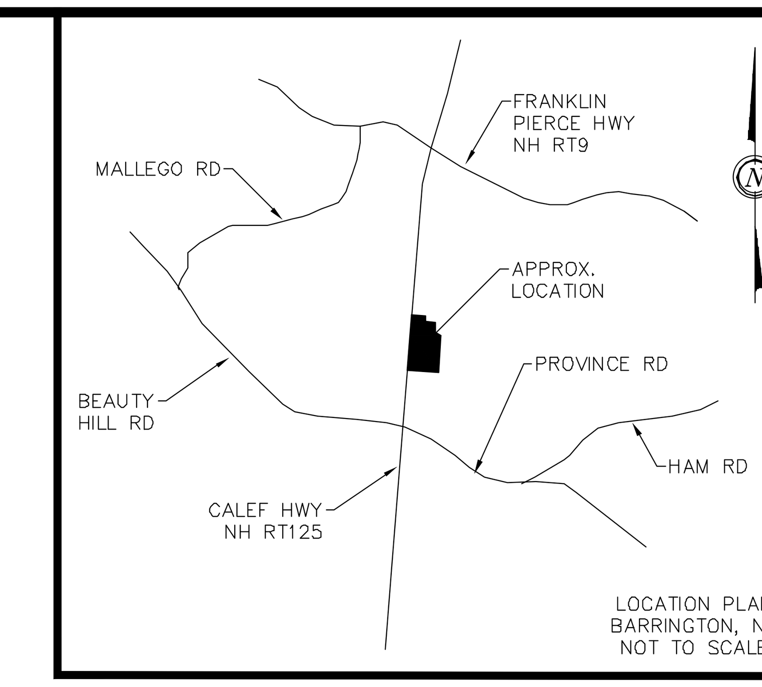
Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

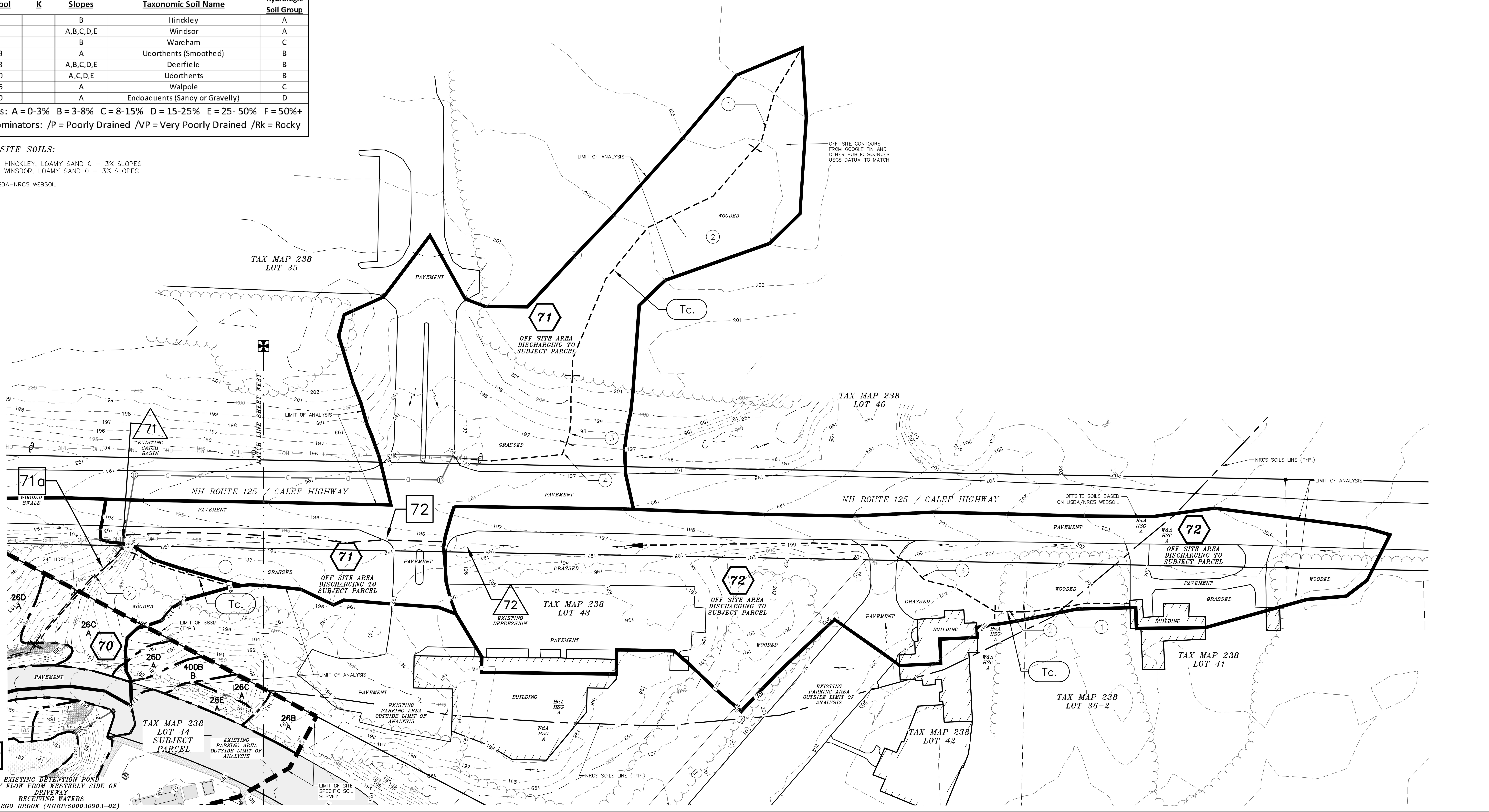
Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

OFF-SITE SOILS:

HaA – HINCKLEY, LOAMY SAND 0 – 3% SLOPES
WdA – WINSDOR, LOAMY SAND 0 – 3% SLOPES

SEE: USDA-NRCS WEBSOIL





SWPPP EPA SITE MAP (EXISTING)

REVISION	DATE	DESCRIPTION

W-1 EXISTING WATERSHED PLAN OFFSITE
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

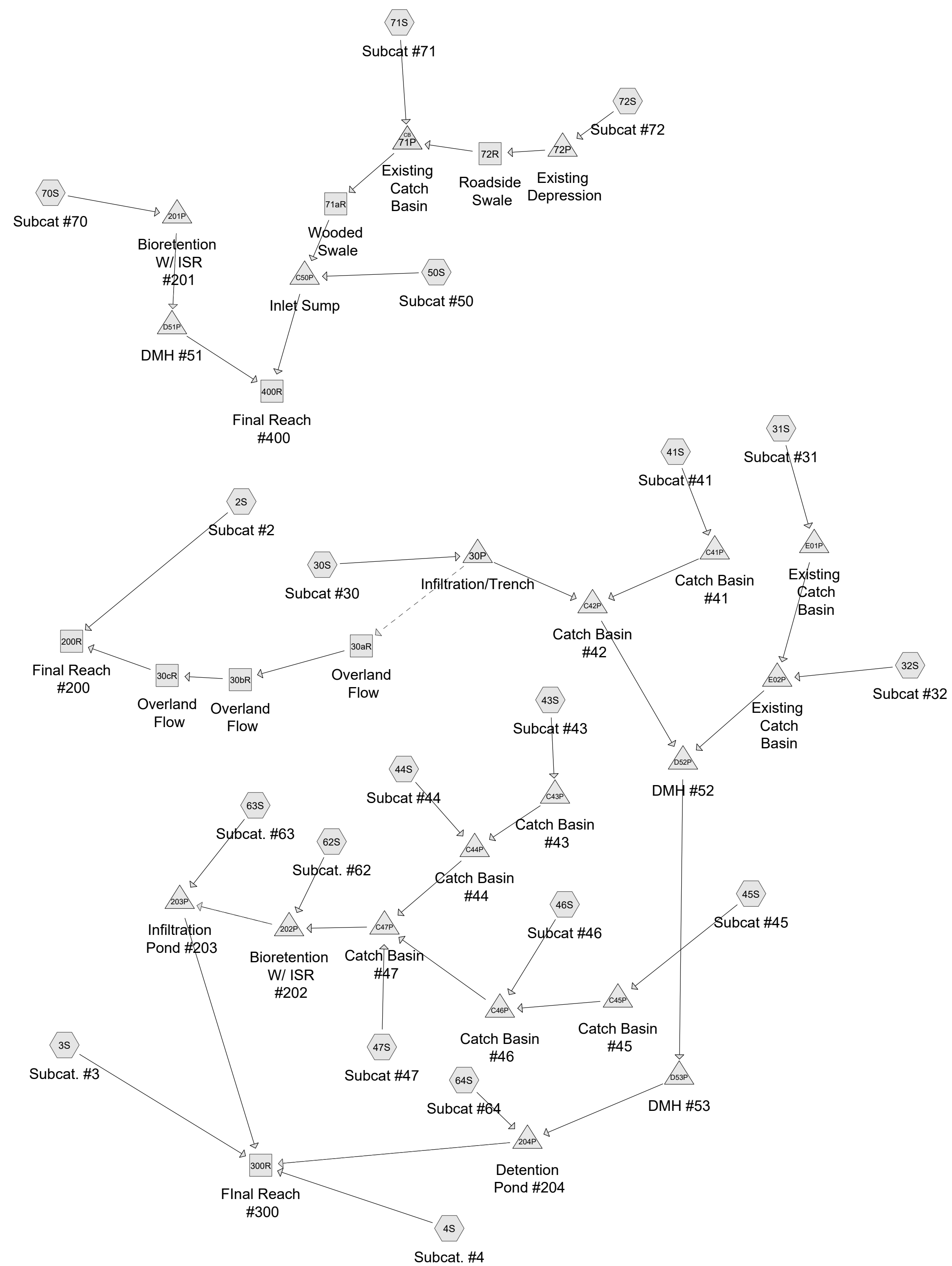
SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

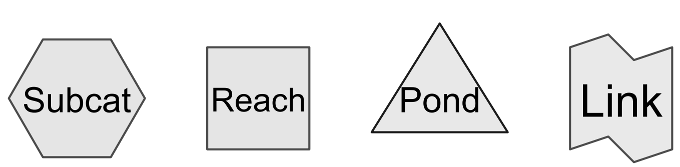
STATE OF NEW HAMPSHIRE KENNETH A. BERRY No. 14743 LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

Appendix II - Proposed Conditions Analysis

25 Yr - 24 Hr. Full Summary
2 Yr - 24 Hr. Node Listing
10 Yr -24 Hr. Node Listing
25 Yr -24 Hr. Node Listing
50 Yr - 24 Hr. Node Listing
50 YR-24-Hr. Swale Capacity Analysis





Routing Diagram for 23-017 Pro Analysis Ex TCAM Site Mods
Prepared by Berry Surveying & Engineering, Printed 4/17/2024
HydroCAD® 10.00-25 s/n 07605 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.514	39	>75% Grass cover, Good, HSG A (3S, 4S, 45S, 50S, 62S, 63S, 64S, 70S, 71S, 72S)
5.641	61	>75% Grass cover, Good, HSG B (2S, 3S, 4S, 30S, 31S, 32S, 41S, 43S, 44S, 45S, 62S, 63S, 64S, 70S)
0.005	96	Gravel surface, HSG A (4S)
0.453	96	Gravel surface, HSG B (2S, 3S, 4S, 30S, 41S, 43S, 44S, 45S, 62S, 63S, 64S)
1.746	98	Paved parking, HSG A (45S, 46S, 70S, 71S, 72S)
2.042	98	Paved parking, HSG B (31S, 32S, 41S, 43S, 44S, 45S, 46S, 62S, 70S)
0.073	98	Paved roads w/curbs & sewers, HSG B (47S)
0.007	98	Roofs, HSG A (45S)
0.094	98	Roofs, HSG B (30S, 31S, 32S, 43S, 45S)
0.086	98	Unconnected pavement, HSG B (2S)
0.018	98	Unconnected roofs, HSG B (2S)
2.421	30	Woods, Good, HSG A (3S, 4S, 50S, 64S, 70S, 71S, 72S)
1.847	55	Woods, Good, HSG B (2S, 3S, 4S, 32S)
16.948	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
6.694	HSG A	3S, 4S, 45S, 46S, 50S, 62S, 63S, 64S, 70S, 71S, 72S
10.254	HSG B	2S, 3S, 4S, 30S, 31S, 32S, 41S, 43S, 44S, 45S, 46S, 47S, 62S, 63S, 64S, 70S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
16.948		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.514	5.641	0.000	0.000	0.000	8.155	>75% Grass cover, Good	2S, 3S, 4S, 30S, 31S, 32S, 41S, 43S, 44S, 45S, 50S, 62S, 63S, 64S, 70S, 71S, 72S
0.005	0.453	0.000	0.000	0.000	0.459	Gravel surface	2S, 3S, 4S, 30S, 41S, 43S, 44S, 45S, 62S, 63S, 64S

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.746	2.042	0.000	0.000	0.000	3.788	Paved parking	31S, 32S, 41S, 43S, 44S, 45S, 46S, 62S, 70S, 71S, 72S
0.000	0.073	0.000	0.000	0.000	0.073	Paved roads w/curbs & sewers	47S
0.007	0.094	0.000	0.000	0.000	0.100	Roofs	30S, 31S, 32S, 43S, 45S
0.000	0.086	0.000	0.000	0.000	0.086	Unconnected pavement	2S
0.000	0.018	0.000	0.000	0.000	0.018	Unconnected roofs	2S
2.421	1.847	0.000	0.000	0.000	4.269	Woods, Good	2S, 3S, 4S, 32S, 50S, 64S, 70S, 71S, 72S

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
6.694	**10.254**	**0.000**	**0.000**	**0.000**	**16.948**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	30P	183.15	183.15	1.0	0.0000	0.012	6.0	0.0	0.0
2	71P	187.90	187.80	10.2	0.0098	0.012	18.0	0.0	0.0
3	201P	182.00	181.70	33.0	0.0091	0.012	6.0	0.0	0.0
4	201P	182.00	181.70	26.0	0.0115	0.012	15.0	0.0	0.0
5	202P	173.75	173.50	30.0	0.0083	0.012	6.0	0.0	0.0
6	202P	173.75	173.50	30.0	0.0083	0.012	15.0	0.0	0.0
7	204P	176.25	176.00	29.0	0.0086	0.012	18.0	0.0	0.0
8	C41P	184.00	180.25	54.7	0.0686	0.012	15.0	0.0	0.0
9	C42P	180.15	179.81	63.0	0.0054	0.012	15.0	0.0	0.0
10	C43P	180.50	179.10	60.0	0.0233	0.012	15.0	0.0	0.0
11	C44P	179.00	178.60	48.0	0.0083	0.012	15.0	0.0	0.0
12	C45P	181.40	180.10	87.2	0.0149	0.012	15.0	0.0	0.0
13	C46P	180.00	178.60	68.0	0.0206	0.012	15.0	0.0	0.0
14	C47P	178.50	178.25	40.0	0.0063	0.012	18.0	0.0	0.0
15	C50P	183.50	182.95	107.5	0.0051	0.012	18.0	0.0	0.0
16	D51P	181.60	181.25	68.0	0.0051	0.012	18.0	0.0	0.0
17	D52P	179.71	179.10	110.0	0.0055	0.012	24.0	0.0	0.0
18	D53P	179.00	178.00	120.0	0.0083	0.012	24.0	0.0	0.0
19	E01P	183.50	183.22	57.0	0.0049	0.012	15.0	0.0	0.0
20	E02P	183.02	179.71	122.2	0.0271	0.012	24.0	0.0	0.0

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=164,530 sf 2.77% Impervious Runoff Depth>1.91"
Flow Length=298' Tc=16.6 min UI Adjusted CN=61 Runoff=5.80 cfs 0.602 af

Subcatchment 3S: Subcat. #3 Runoff Area=46,611 sf 0.00% Impervious Runoff Depth>0.94"
Flow Length=158' Slope=0.0200 '/' Tc=11.3 min CN=48 Runoff=0.69 cfs 0.084 af

Subcatchment 4S: Subcat. #4 Runoff Area=55,483 sf 0.00% Impervious Runoff Depth>0.45"
Flow Length=674' Tc=43.2 min CN=40 Runoff=0.15 cfs 0.048 af

Subcatchment 30S: Subcat #30 Runoff Area=47,823 sf 4.45% Impervious Runoff Depth>2.08"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=63 Runoff=2.15 cfs 0.190 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=82 Runoff=1.99 cfs 0.145 af

Subcatchment 32S: Subcat #32 Runoff Area=37,918 sf 67.33% Impervious Runoff Depth>4.18"
Tc=6.0 min CN=85 Runoff=4.10 cfs 0.303 af

Subcatchment 41S: Subcat #41 Runoff Area=7,421 sf 61.70% Impervious Runoff Depth>4.49"
Flow Length=342' Tc=14.7 min CN=88 Runoff=0.66 cfs 0.064 af

Subcatchment 43S: Subcat #43 Runoff Area=15,256 sf 64.41% Impervious Runoff Depth>4.39"
Flow Length=100' Tc=7.0 min CN=87 Runoff=1.67 cfs 0.128 af

Subcatchment 44S: Subcat #44 Runoff Area=14,458 sf 76.68% Impervious Runoff Depth>4.83"
Flow Length=98' Tc=7.7 min CN=91 Runoff=1.66 cfs 0.133 af

Subcatchment 45S: Subcat #45 Runoff Area=16,893 sf 94.23% Impervious Runoff Depth>5.39"
Flow Length=330' Tc=6.0 min CN=96 Runoff=2.15 cfs 0.174 af

Subcatchment 46S: Subcat #46 Runoff Area=7,602 sf 100.00% Impervious Runoff Depth>5.63"
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.082 af

Subcatchment 47S: Subcat #47 Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>5.63"
Tc=6.0 min CN=98 Runoff=0.41 cfs 0.034 af

Subcatchment 50S: Subcat #50 Runoff Area=11,704 sf 0.00% Impervious Runoff Depth>0.15"
Flow Length=182' Tc=11.7 min CN=33 Runoff=0.01 cfs 0.003 af

Subcatchment 62S: Subcat. #62 Runoff Area=45,124 sf 0.15% Impervious Runoff Depth>2.16"
Flow Length=165' Tc=14.3 min CN=64 Runoff=1.95 cfs 0.187 af

Subcatchment 63S: Subcat. #63 Runoff Area=16,040 sf 0.00% Impervious Runoff Depth>1.67"
Flow Length=150' Tc=10.8 min CN=58 Runoff=0.56 cfs 0.051 af

Subcatchment 64S: Subcat #64 Runoff Area=7,675 sf 0.00% Impervious Runoff Depth>1.67"
Tc=6.0 min CN=58 Runoff=0.31 cfs 0.025 af

Subcatchment 70S: Subcat #70 Runoff Area=51,128 sf 43.96% Impervious Runoff Depth>2.43"
Flow Length=345' Tc=14.1 min CN=67 Runoff=2.53 cfs 0.237 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>1.28"
Flow Length=563' Tc=39.5 min CN=53 Runoff=1.48 cfs 0.246 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>2.07"
Flow Length=478' Tc=32.0 min CN=63 Runoff=2.04 cfs 0.273 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=151.0' S=0.0063 '/' Capacity=12.85 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=35.0' S=0.2286 '/' Capacity=77.47 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=58.0' S=0.0948 '/' Capacity=31.37 cfs Outflow=0.00 cfs 0.000 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.52' Max Vel=1.28 fps Inflow=3.40 cfs 0.492 af
n=0.035 L=78.5' S=0.0038 '/' Capacity=61.73 cfs Outflow=3.39 cfs 0.492 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.25' Max Vel=1.71 fps Inflow=2.00 cfs 0.247 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=1.95 cfs 0.246 af

Reach 200R: Final Reach #200 Inflow=5.80 cfs 0.602 af
Outflow=5.80 cfs 0.602 af

Reach 300R: FInal Reach #300 Inflow=4.82 cfs 1.034 af
Outflow=4.82 cfs 1.034 af

Reach 400R: Final Reach #400 Inflow=4.05 cfs 0.668 af
Outflow=4.05 cfs 0.668 af

Pond 30P: Infiltration/Trench Peak Elev=183.82' Storage=1,384 cf Inflow=2.15 cfs 0.190 af
Discarded=0.59 cfs 0.081 af Primary=0.51 cfs 0.107 af Secondary=0.00 cfs 0.000 af Outflow=1.10 cfs 0.188 af

Pond 71P: Existing Catch Basin Peak Elev=188.93' Inflow=3.40 cfs 0.492 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=3.40 cfs 0.492 af

Pond 72P: Existing Depression Peak Elev=196.21' Storage=160 cf Inflow=2.04 cfs 0.273 af
Discarded=0.02 cfs 0.024 af Primary=2.00 cfs 0.247 af Outflow=2.02 cfs 0.271 af

Pond 201P: Bioretention W/ ISR #201 Peak Elev=185.45' Storage=4,286 cf Inflow=2.53 cfs 0.237 af
Primary=0.02 cfs 0.023 af Secondary=0.66 cfs 0.150 af Outflow=0.68 cfs 0.173 af

Pond 202P: Bioretention W/ ISR #202 Peak Elev=179.19' Storage=18,074 cf Inflow=8.23 cfs 0.739 af
Primary=0.09 cfs 0.103 af Secondary=0.60 cfs 0.463 af Tertiary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.566 af

Pond 203P: Infiltration Pond #203 Peak Elev=174.58' Storage=4,820 cf Inflow=1.08 cfs 0.617 af
Discarded=0.21 cfs 0.233 af Primary=0.52 cfs 0.277 af Outflow=0.73 cfs 0.510 af

Pond 204P: Detention Pond #204 Peak Elev=178.85' Storage=4,793 cf Inflow=7.28 cfs 0.630 af
Primary=4.16 cfs 0.625 af Secondary=0.00 cfs 0.000 af Outflow=4.16 cfs 0.625 af

Pond C41P: Catch Basin #41 Peak Elev=184.38' Storage=5 cf Inflow=0.66 cfs 0.064 af
15.0" Round Culvert n=0.012 L=54.7' S=0.0686 '/' Outflow=0.66 cfs 0.064 af

Pond C42P: Catch Basin #42 Peak Elev=181.09' Storage=12 cf Inflow=1.14 cfs 0.171 af
15.0" Round Culvert n=0.012 L=63.0' S=0.0054 '/' Outflow=1.14 cfs 0.171 af

Pond C43P: Catch Basin #43 Peak Elev=181.13' Storage=8 cf Inflow=1.67 cfs 0.128 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0233 '/' Outflow=1.67 cfs 0.128 af

Pond C44P: Catch Basin #44 Peak Elev=180.36' Storage=17 cf Inflow=3.33 cfs 0.262 af
15.0" Round Culvert n=0.012 L=48.0' S=0.0083 '/' Outflow=3.32 cfs 0.262 af

Pond C45P: Catch Basin #45 Peak Elev=182.13' Storage=9 cf Inflow=2.15 cfs 0.174 af
15.0" Round Culvert n=0.012 L=87.2' S=0.0149 '/' Outflow=2.15 cfs 0.174 af

Pond C46P: Catch Basin #46 Peak Elev=180.91' Storage=11 cf Inflow=3.13 cfs 0.256 af
15.0" Round Culvert n=0.012 L=68.0' S=0.0206 '/' Outflow=3.14 cfs 0.256 af

Pond C47P: Catch Basin #47 Peak Elev=180.08' Storage=20 cf Inflow=6.84 cfs 0.552 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0063 '/' Outflow=6.84 cfs 0.552 af

Pond C50P: Inlet Sump Peak Elev=184.47' Storage=12 cf Inflow=3.39 cfs 0.495 af
18.0" Round Culvert n=0.012 L=107.5' S=0.0051 '/' Outflow=3.39 cfs 0.495 af

Pond D51P: DMH #51 Peak Elev=182.01' Storage=0.000 af Inflow=0.68 cfs 0.173 af
18.0" Round Culvert n=0.012 L=68.0' S=0.0051 '/' Outflow=0.68 cfs 0.173 af

Pond D52P: DMH #52 Peak Elev=180.99' Storage=16 cf Inflow=6.97 cfs 0.606 af
24.0" Round Culvert n=0.012 L=110.0' S=0.0055 '/' Outflow=6.97 cfs 0.606 af

Pond D53P: DMH #53 Peak Elev=180.16' Storage=15 cf Inflow=6.97 cfs 0.606 af
24.0" Round Culvert n=0.012 L=120.0' S=0.0083 '/' Outflow=6.97 cfs 0.606 af

Pond E01P: Existing Catch Basin Peak Elev=184.38' Storage=11 cf Inflow=1.99 cfs 0.145 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=1.98 cfs 0.145 af

Pond E02P: Existing Catch Basin Peak Elev=184.10' Storage=224 cf Inflow=6.08 cfs 0.448 af
Discarded=0.02 cfs 0.013 af Primary=6.08 cfs 0.435 af Outflow=6.09 cfs 0.448 af

Total Runoff Area = 16.948 ac Runoff Volume = 3.011 af Average Runoff Depth = 2.13"
76.01% Pervious = 12.882 ac 23.99% Impervious = 4.066 ac

Summary for Subcatchment 2S: Subcat #2

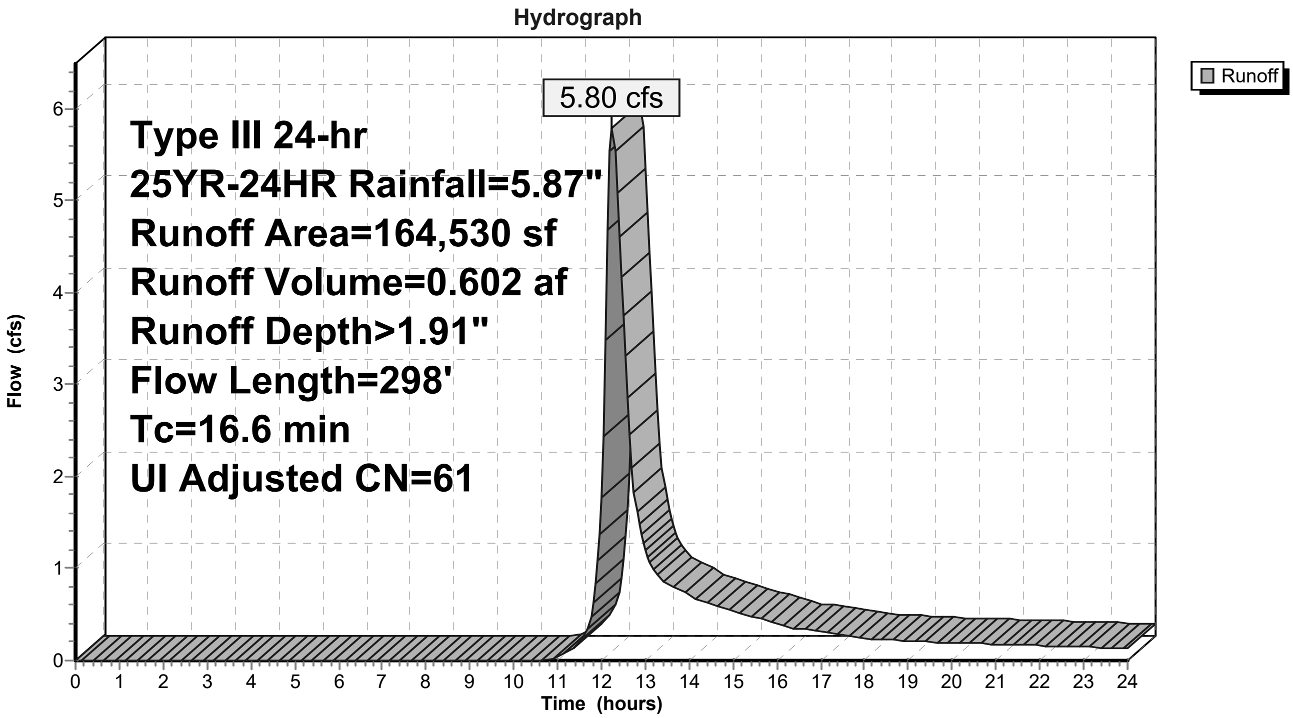
Runoff = 5.80 cfs @ 12.25 hrs, Volume= 0.602 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Adj	Description
93,834	61		>75% Grass cover, Good, HSG B
3,750	98		Unconnected pavement, HSG B
800	98		Unconnected roofs, HSG B
7,747	96		Gravel surface, HSG B
58,399	55		Woods, Good, HSG B
164,530	62	61	Weighted Average, UI Adjusted
159,980			97.23% Pervious Area
4,550			2.77% Impervious Area
4,550			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0100	0.13		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
2.6	105	0.0095	0.68		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
0.2	35	0.2290	3.35		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
0.6	58	0.0950	1.54		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
16.6	298	Total			

Subcatchment 2S: Subcat #2



Summary for Subcatchment 3S: Subcat. #3

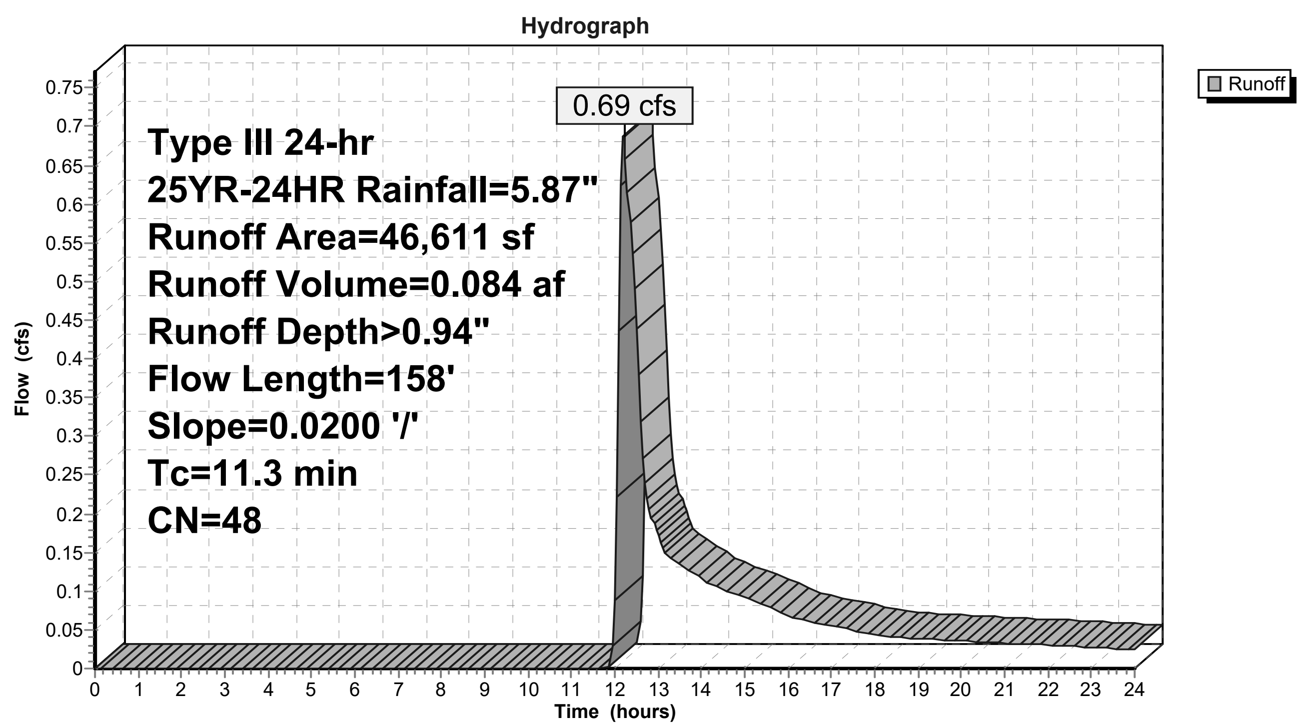
Runoff = 0.69 cfs @ 12.21 hrs, Volume= 0.084 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
6,149	39	>75% Grass cover, Good, HSG A
16,252	30	Woods, Good, HSG A
14,263	61	>75% Grass cover, Good, HSG B
8,052	55	Woods, Good, HSG B
1,895	96	Gravel surface, HSG B
46,611	48	Weighted Average
46,611		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0200	0.17		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
0.2	12	0.0200	0.99		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
1.1	46	0.0200	0.71		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
11.3	158	Total			

Subcatchment 3S: Subcat. #3



Summary for Subcatchment 4S: Subcat. #4

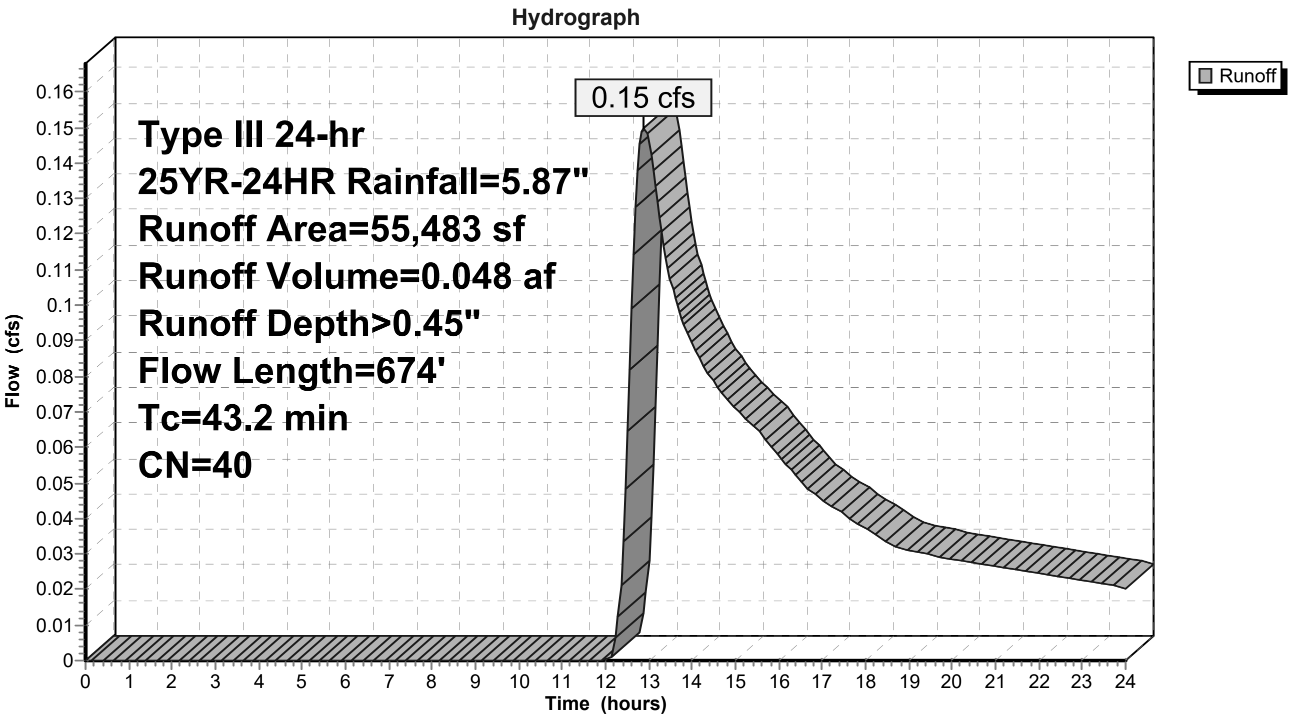
Runoff = 0.15 cfs @ 12.90 hrs, Volume= 0.048 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
3,884	39	>75% Grass cover, Good, HSG A
34,310	30	Woods, Good, HSG A
238	96	Gravel surface, HSG A
8,394	61	>75% Grass cover, Good, HSG B
8,339	55	Woods, Good, HSG B
318	96	Gravel surface, HSG B
55,483	40	Weighted Average
55,483		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	100	0.0100	0.06		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
10.0	252	0.0070	0.42		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, Segment #3** Woodland Kv= 5.0 fps
1.8	157	0.0828	1.44		**Shallow Concentrated Flow, Segment #4** Woodland Kv= 5.0 fps
1.0	91	0.0440	1.47		**Shallow Concentrated Flow, Segment #5** Short Grass Pasture Kv= 7.0 fps
43.2	674	Total			

Subcatchment 4S: Subcat. #4



Summary for Subcatchment 30S: Subcat #30

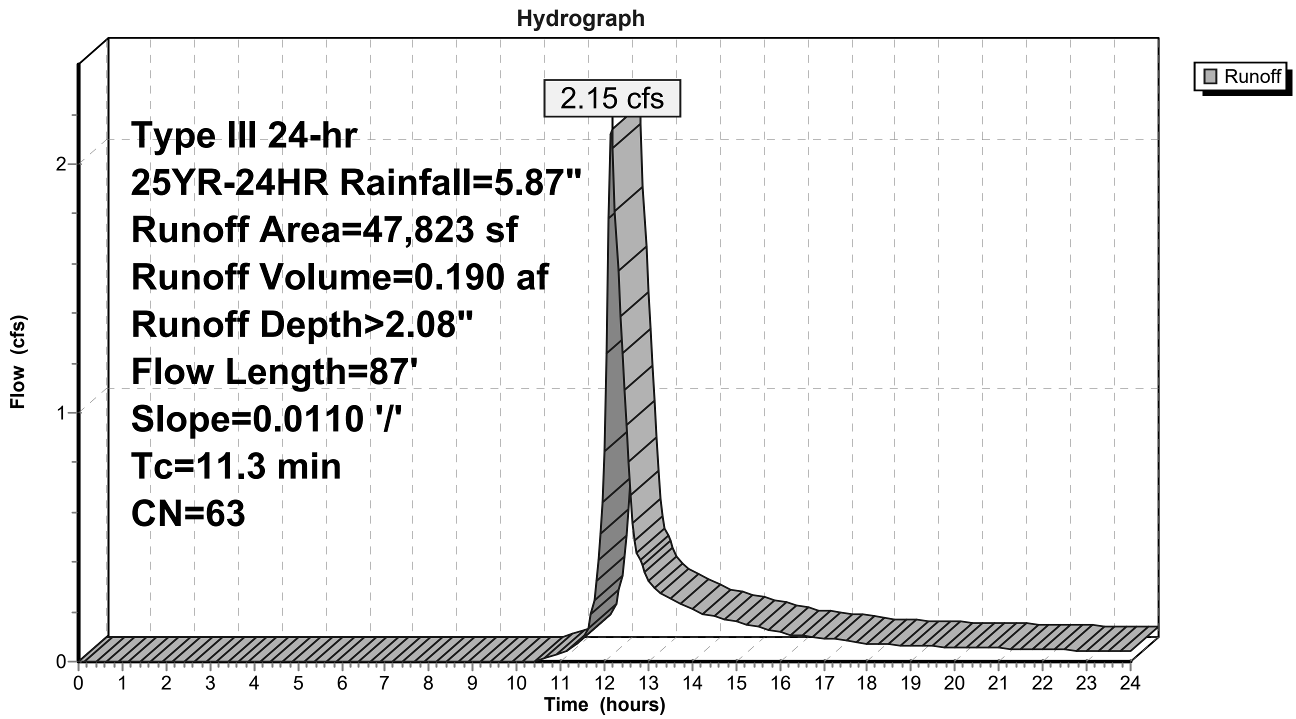
Runoff = 2.15 cfs @ 12.17 hrs, Volume= 0.190 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
45,515	61	>75% Grass cover, Good, HSG B
2,126	98	Roofs, HSG B
182	96	Gravel surface, HSG B
47,823	63	Weighted Average
45,697		95.55% Pervious Area
2,126		4.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	87	0.0110	0.13		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"

Subcatchment 30S: Subcat #30



Summary for Subcatchment 31S: Subcat #31

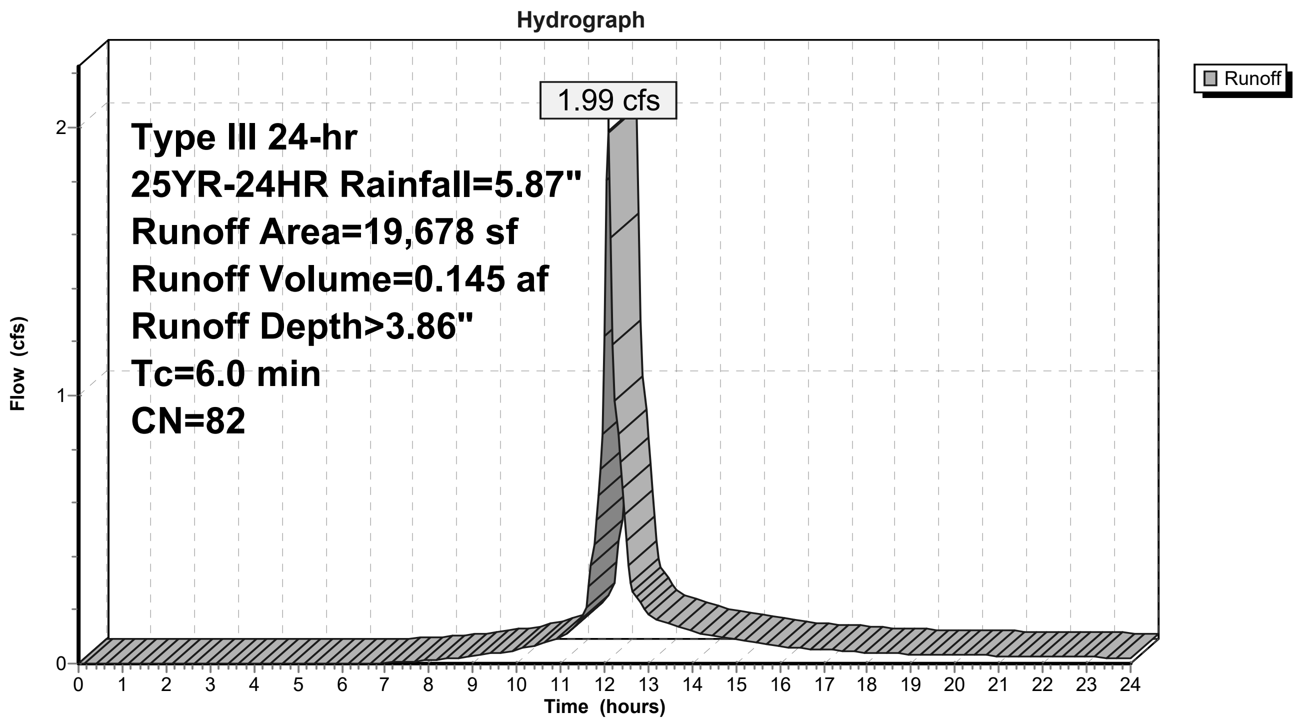
Runoff = 1.99 cfs @ 12.09 hrs, Volume= 0.145 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
57	98	Roofs, HSG B
8,646	61	>75% Grass cover, Good, HSG B
10,975	98	Paved parking, HSG B
19,678	82	Weighted Average
8,646		43.94% Pervious Area
11,032		56.06% Impervious Area

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

Subcatchment 31S: Subcat #31



Summary for Subcatchment 32S: Subcat #32

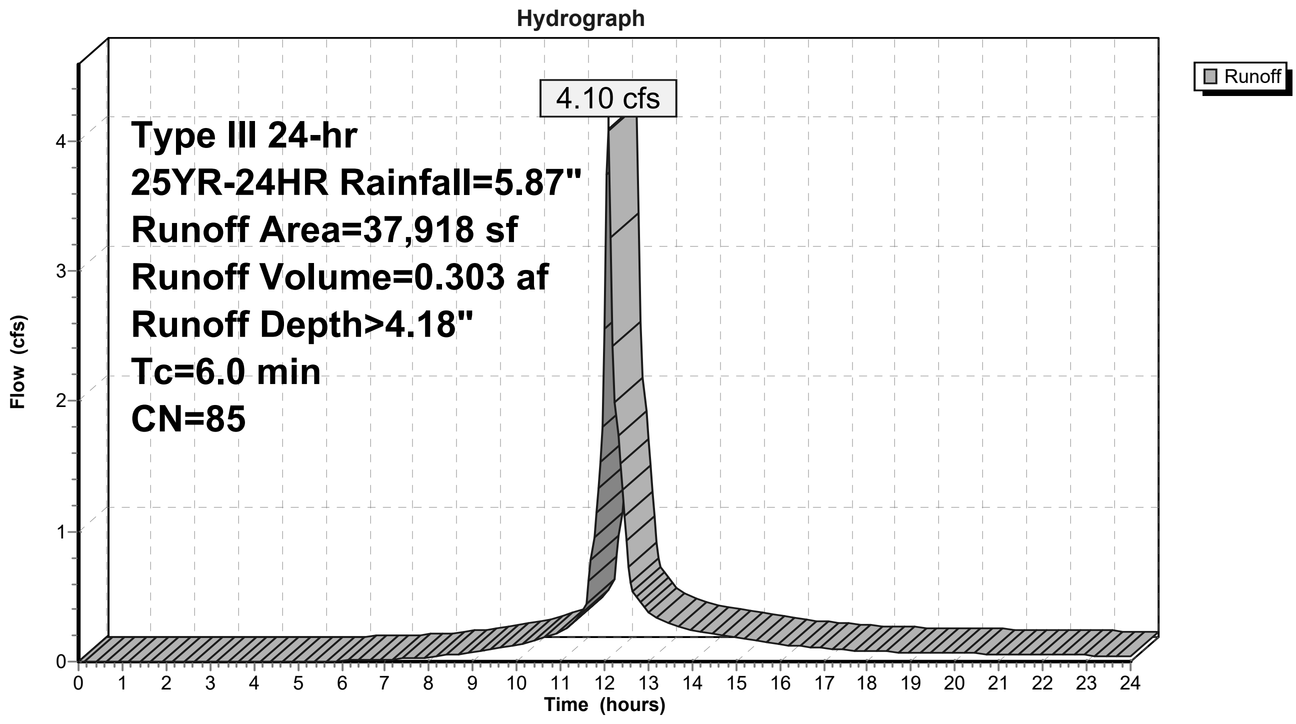
Runoff = 4.10 cfs @ 12.09 hrs, Volume= 0.303 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
341	98	Roofs, HSG B
6,716	61	>75% Grass cover, Good, HSG B
25,189	98	Paved parking, HSG B
5,672	55	Woods, Good, HSG B
37,918	85	Weighted Average
12,388		32.67% Pervious Area
25,530		67.33% Impervious Area

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

Subcatchment 32S: Subcat #32



Summary for Subcatchment 41S: Subcat #41

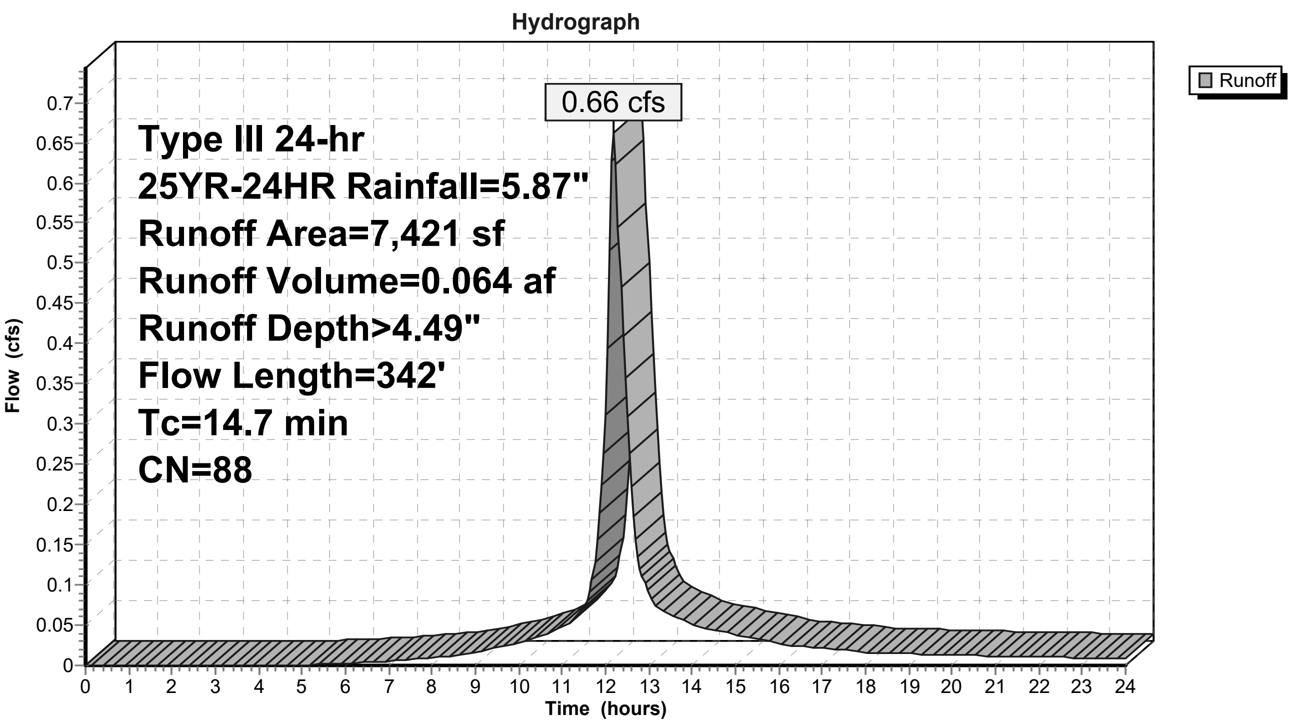
Runoff = 0.66 cfs @ 12.20 hrs, Volume= 0.064 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
1,989	61	>75% Grass cover, Good, HSG B
4,579	98	Paved parking, HSG B
853	96	Gravel surface, HSG B
7,421	88	Weighted Average
2,842		38.30% Pervious Area
4,579		61.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0100	0.13		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
1.5	242	0.0186	2.77		**Shallow Concentrated Flow, Segment #2** Paved Kv= 20.3 fps
14.7	342	Total			

Subcatchment 41S: Subcat #41



Summary for Subcatchment 43S: Subcat #43

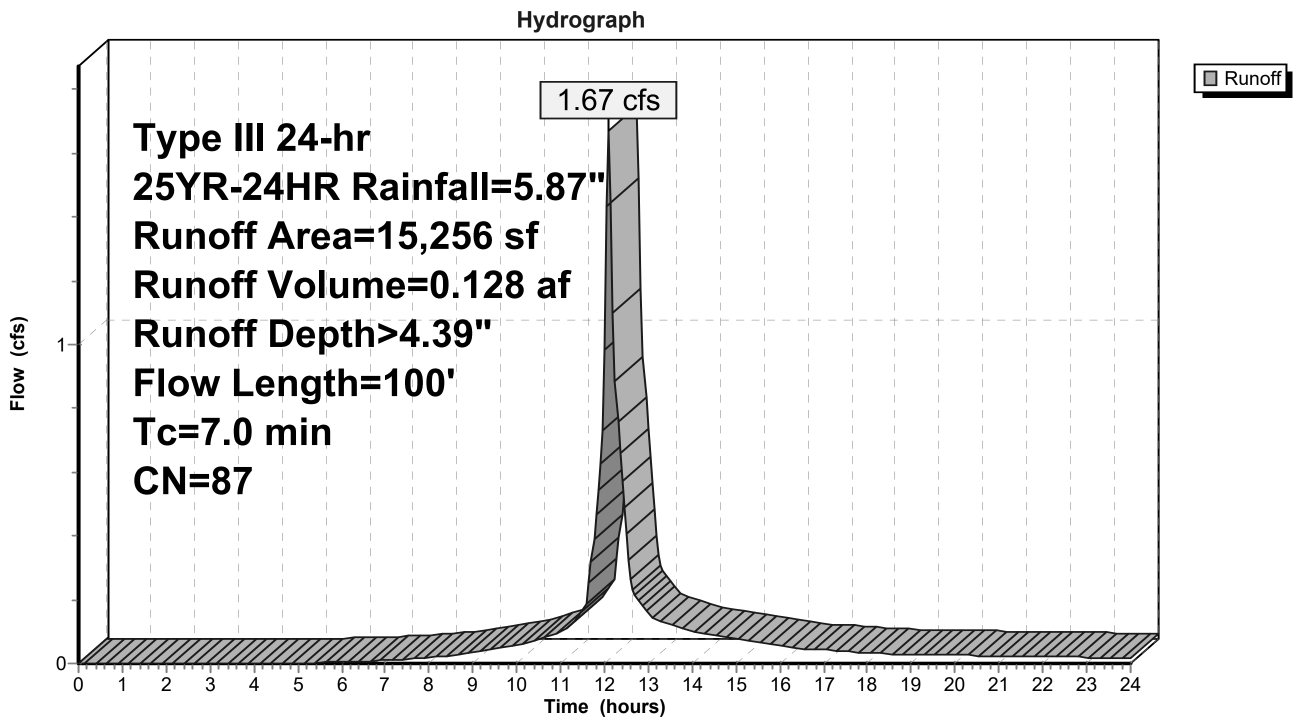
Runoff = 1.67 cfs @ 12.10 hrs, Volume= 0.128 af, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
417	98	Roofs, HSG B
4,449	61	>75% Grass cover, Good, HSG B
9,410	98	Paved parking, HSG B
980	96	Gravel surface, HSG B
15,256	87	Weighted Average
5,429		35.59% Pervious Area
9,827		64.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	40	0.0693	0.23		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
4.1	60	0.0663	0.24		**Sheet Flow, Segment #2** Grass: Short n= 0.150 P2= 3.08"
7.0	100	Total			

Subcatchment 43S: Subcat #43



Summary for Subcatchment 44S: Subcat #44

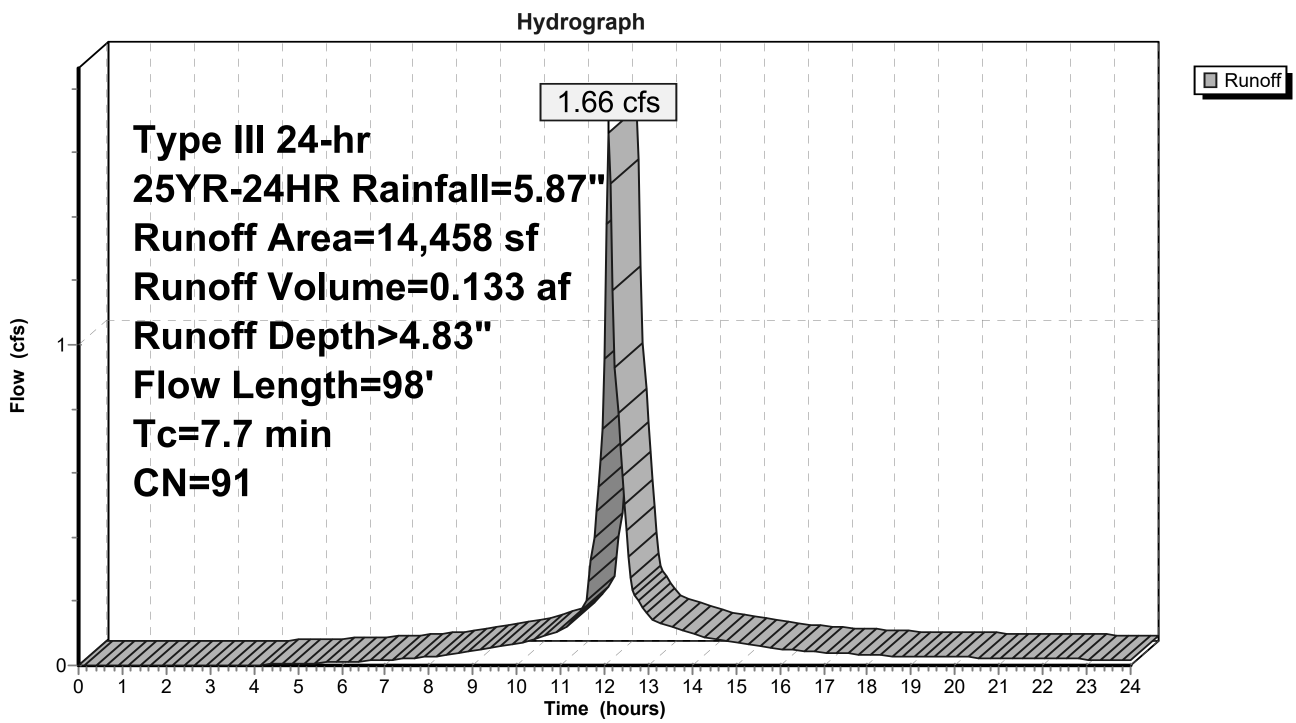
Runoff = 1.66 cfs @ 12.11 hrs, Volume= 0.133 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
2,611	61	>75% Grass cover, Good, HSG B
11,087	98	Paved parking, HSG B
760	96	Gravel surface, HSG B
14,458	91	Weighted Average
3,371		23.32% Pervious Area
11,087		76.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	37	0.1002	0.26		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
5.3	61	0.0370	0.19		**Sheet Flow, Segment #2** Grass: Short n= 0.150 P2= 3.08"
7.7	98	Total			

Subcatchment 44S: Subcat #44



Summary for Subcatchment 45S: Subcat #45

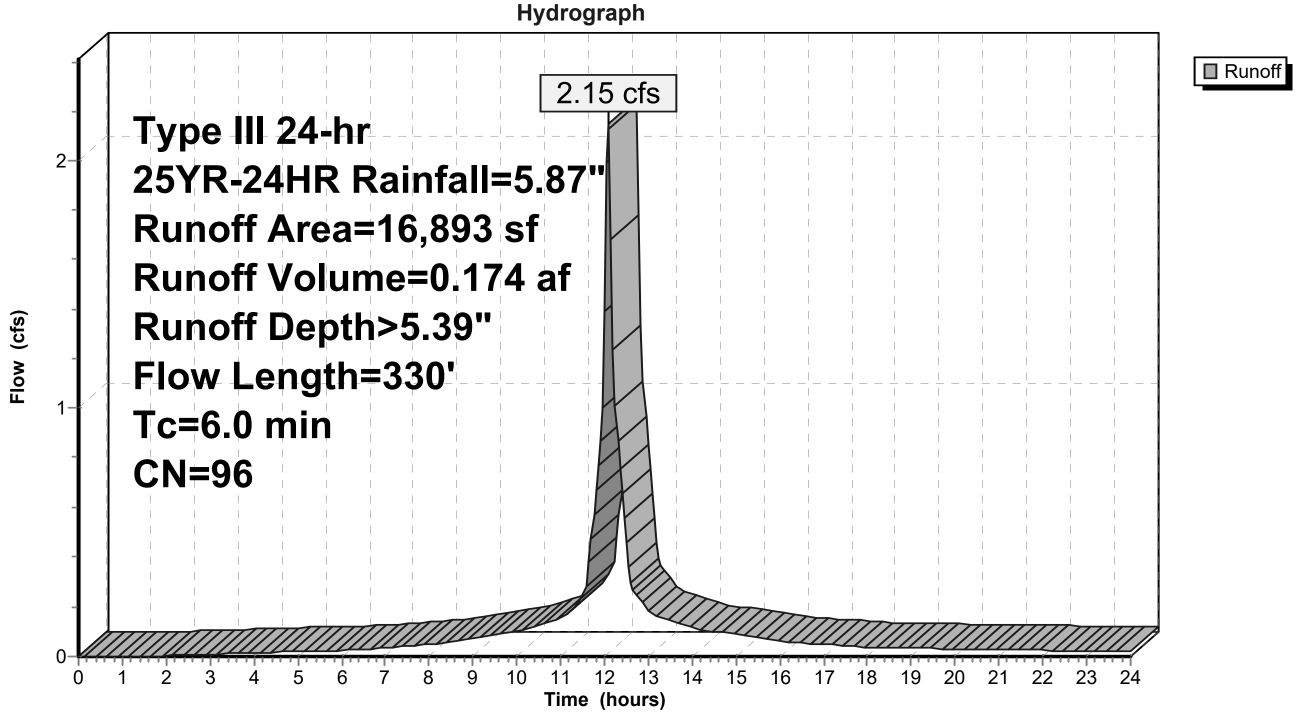
Runoff = 2.15 cfs @ 12.09 hrs, Volume= 0.174 af, Depth> 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
290	98	Roofs, HSG A
12	39	>75% Grass cover, Good, HSG A
5,939	98	Paved parking, HSG A
1,139	98	Roofs, HSG B
784	61	>75% Grass cover, Good, HSG B
8,550	98	Paved parking, HSG B
179	96	Gravel surface, HSG B
16,893	96	Weighted Average
975		5.77% Pervious Area
15,918		94.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	18	0.3010	0.35		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
2.9	18	0.0140	0.10		**Sheet Flow, Segment #2** Grass: Short n= 0.150 P2= 3.08"
1.3	294	0.0365	3.88		**Shallow Concentrated Flow, Segment #3** Paved Kv= 20.3 fps
5.1	330	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 45S: Subcat #45



Summary for Subcatchment 46S: Subcat #46

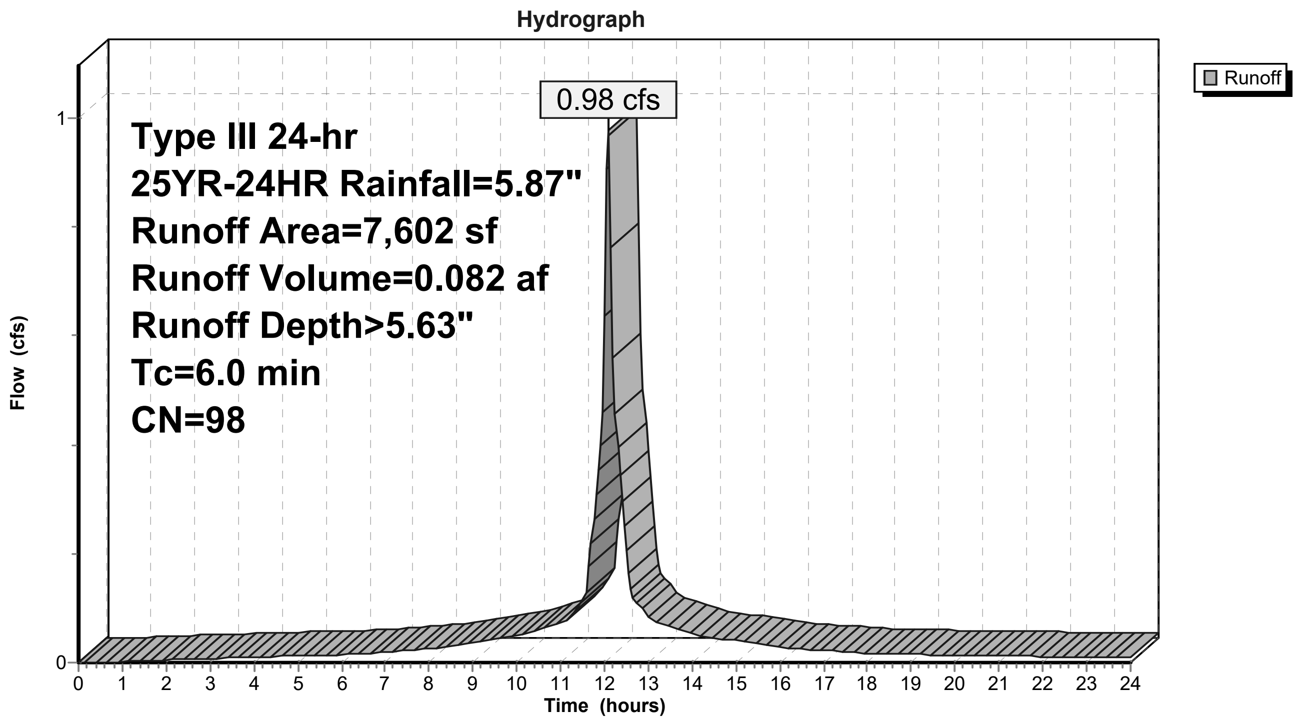
Runoff = 0.98 cfs @ 12.09 hrs, Volume= 0.082 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
74	98	Paved parking, HSG A
7,528	98	Paved parking, HSG B
7,602	98	Weighted Average
7,602		100.00% Impervious Area

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

Subcatchment 46S: Subcat #46



Summary for Subcatchment 47S: Subcat #47

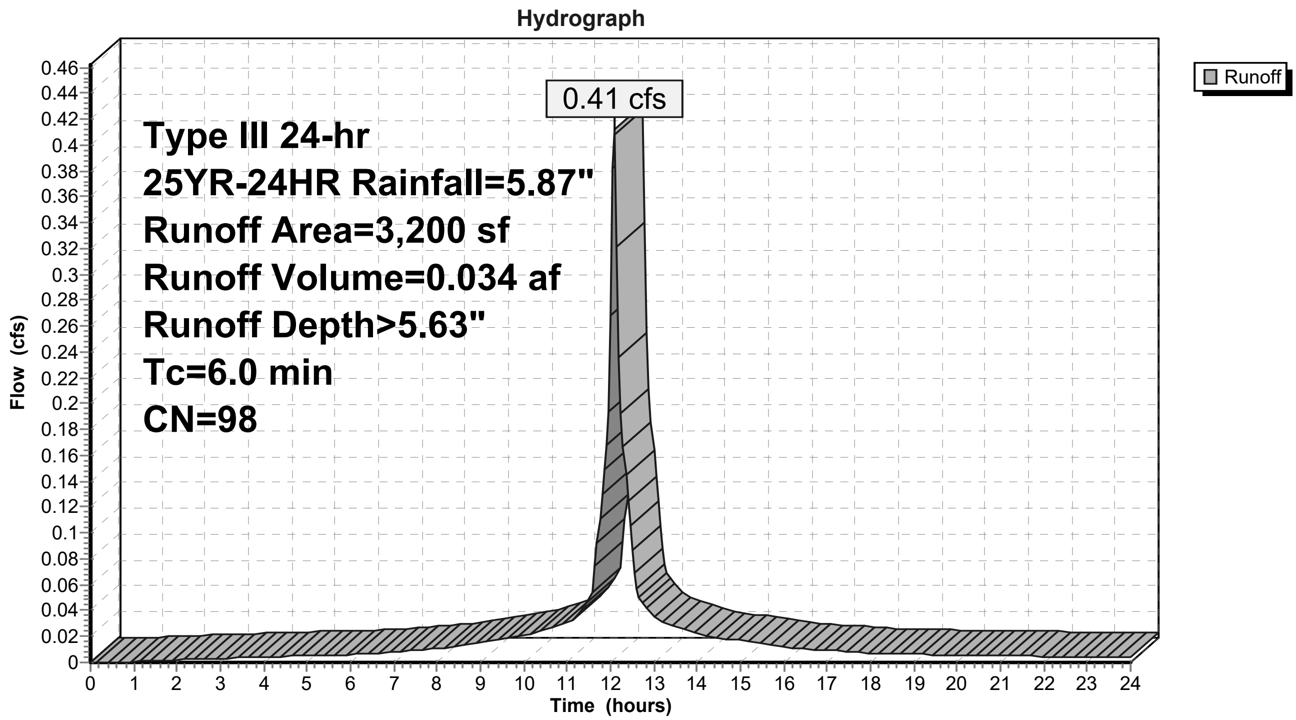
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
3,200	98	Paved roads w/curbs & sewers, HSG B
3,200		100.00% Impervious Area

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

Subcatchment 47S: Subcat #47



Summary for Subcatchment 50S: Subcat #50

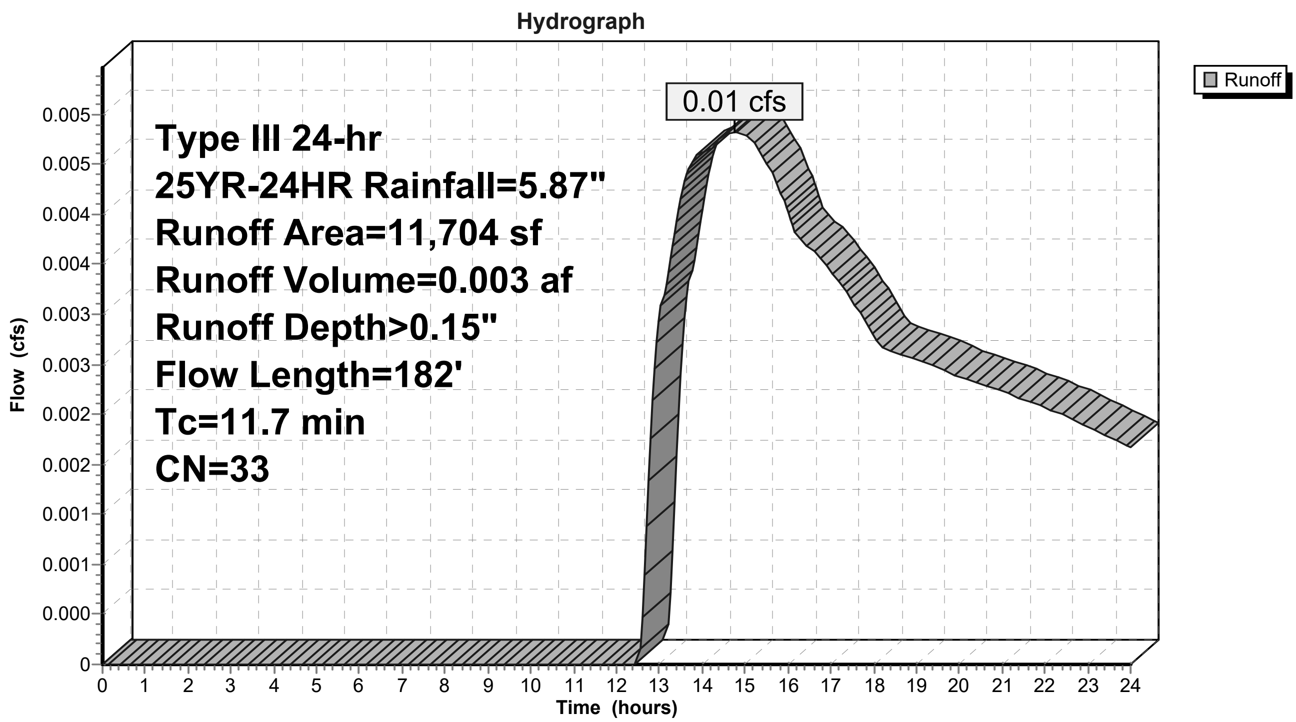
Runoff = 0.01 cfs @ 14.77 hrs, Volume= 0.003 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
3,587	39	>75% Grass cover, Good, HSG A
8,117	30	Woods, Good, HSG A
11,704	33	Weighted Average
11,704		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	94	0.0319	0.20		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
3.8	88	0.0060	0.39		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
11.7	182	Total			

Subcatchment 50S: Subcat #50



Summary for Subcatchment 62S: Subcat. #62

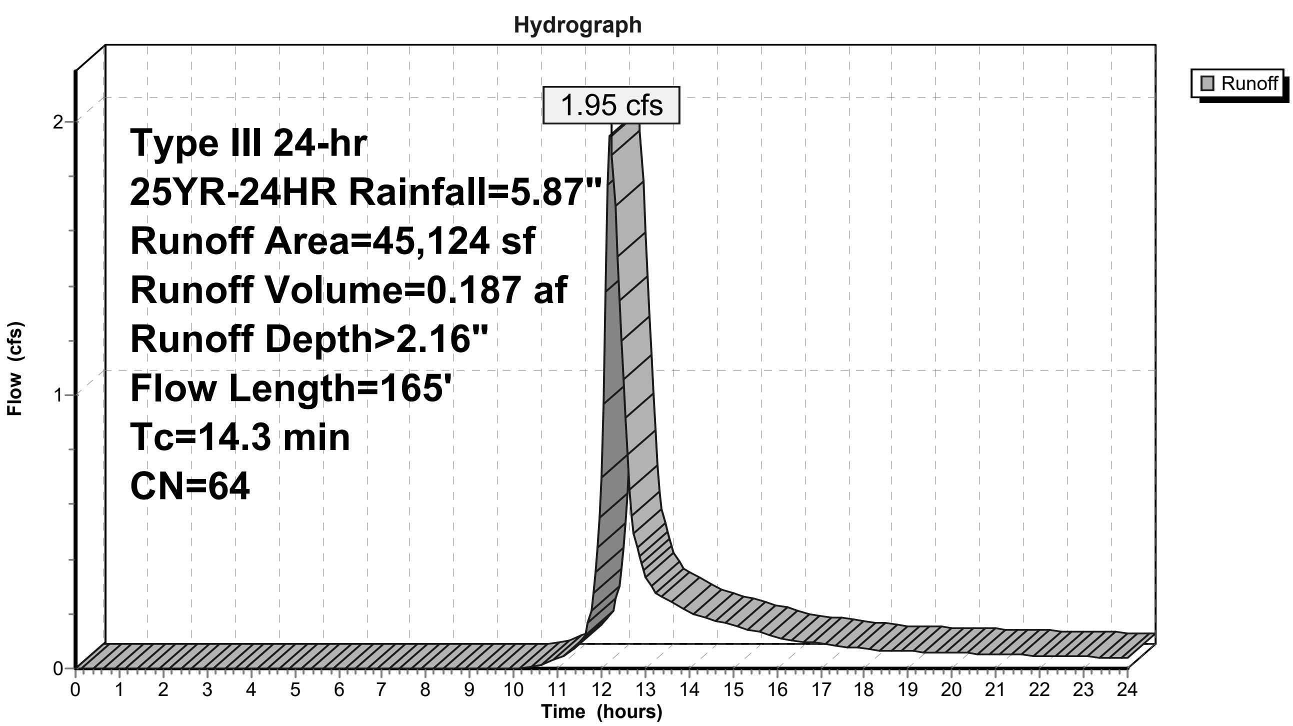
Runoff = 1.95 cfs @ 12.21 hrs, Volume= 0.187 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
3,607	39	>75% Grass cover, Good, HSG A
66	98	Paved parking, HSG B
35,835	61	>75% Grass cover, Good, HSG B
5,616	96	Gravel surface, HSG B
45,124	64	Weighted Average
45,058		99.85% Pervious Area
66		0.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0100	0.13		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
1.1	65	0.0200	0.99		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
14.3	165	Total			

Subcatchment 62S: Subcat. #62



Summary for Subcatchment 63S: Subcat. #63

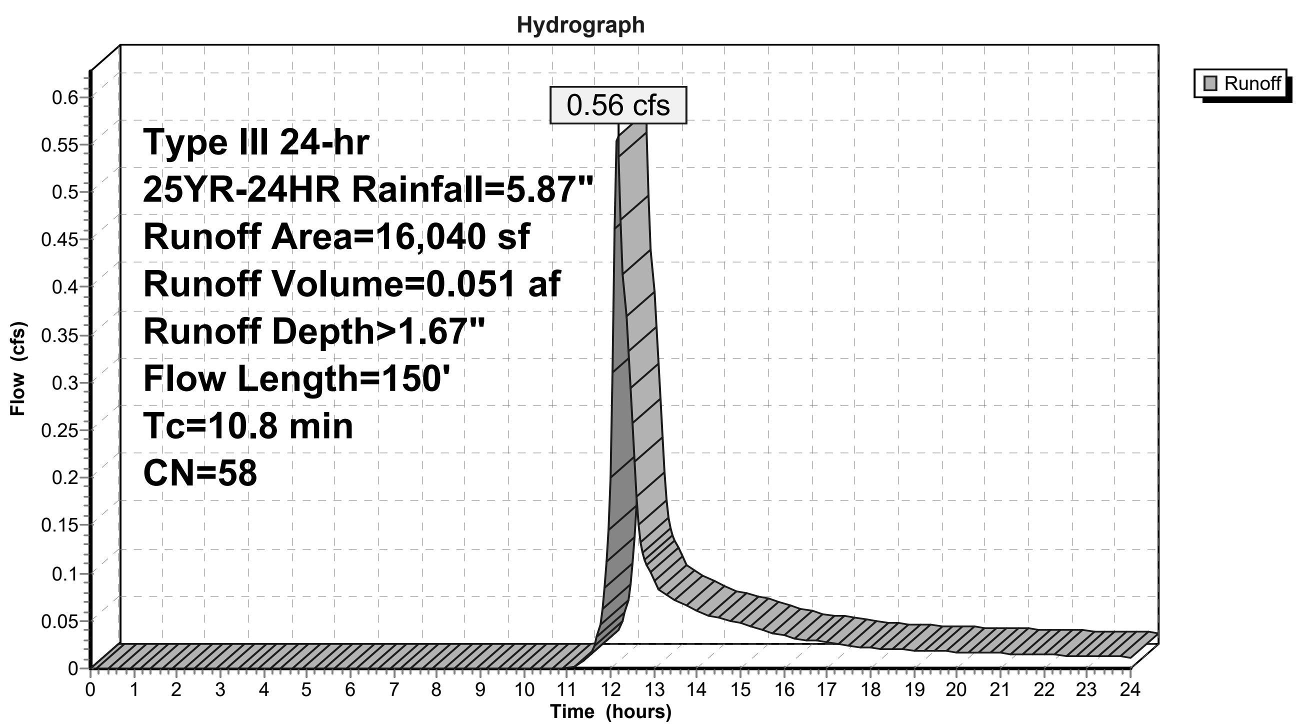
Runoff = 0.56 cfs @ 12.17 hrs, Volume= 0.051 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
3,476	39	>75% Grass cover, Good, HSG A
11,805	61	>75% Grass cover, Good, HSG B
759	96	Gravel surface, HSG B
16,040	58	Weighted Average
16,040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0175	0.16		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
0.2	21	0.0595	1.71		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
0.1	29	0.2410	3.44		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
10.8	150	Total			

Subcatchment 63S: Subcat. #63



Summary for Subcatchment 64S: Subcat #64

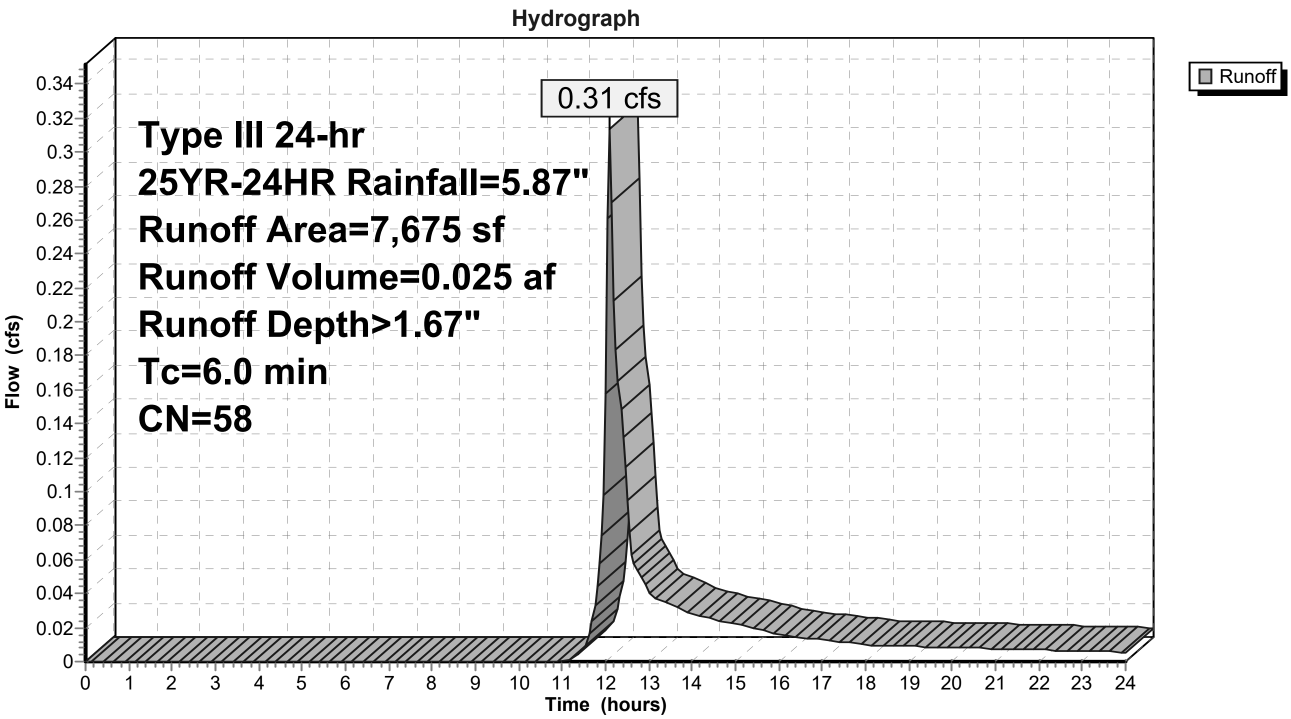
Runoff = 0.31 cfs @ 12.10 hrs, Volume= 0.025 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
1,389	39	>75% Grass cover, Good, HSG A
178	30	Woods, Good, HSG A
265	96	Gravel surface, HSG B
5,653	61	>75% Grass cover, Good, HSG B
190	96	Gravel surface, HSG B
7,675	58	Weighted Average
7,675		100.00% Pervious Area

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

Subcatchment 64S: Subcat #64



Summary for Subcatchment 70S: Subcat #70

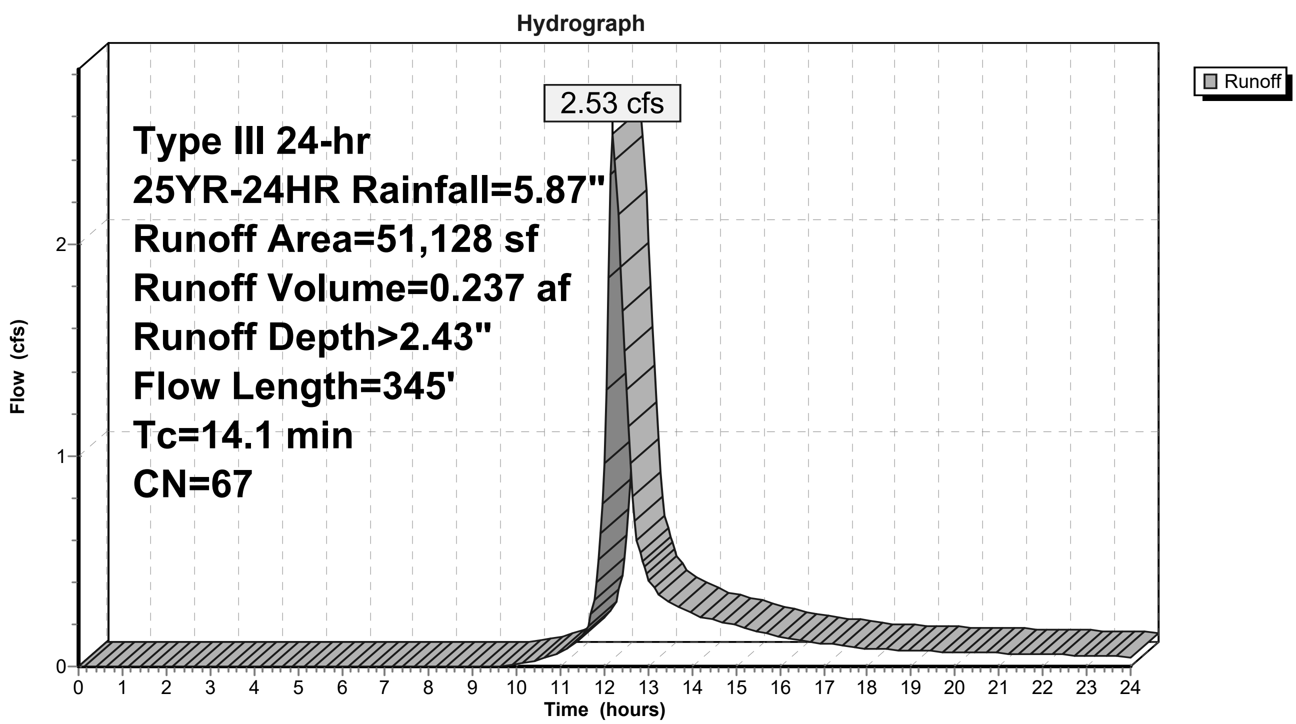
Runoff = 2.53 cfs @ 12.21 hrs, Volume= 0.237 af, Depth> 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
19,630	39	>75% Grass cover, Good, HSG A
10,924	98	Paved parking, HSG A
3,813	30	Woods, Good, HSG A
5,208	61	>75% Grass cover, Good, HSG B
11,553	98	Paved parking, HSG B
51,128	67	Weighted Average
28,651		56.04% Pervious Area
22,477		43.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.0200	0.17		**Sheet Flow, Segment #1** Grass: Short n= 0.150 P2= 3.08"
4.1	245	0.0204	1.00		**Shallow Concentrated Flow, Segment #2** Short Grass Pasture Kv= 7.0 fps
14.1	345	Total			

Subcatchment 70S: Subcat #70



Summary for Subcatchment 71S: Subcat #71

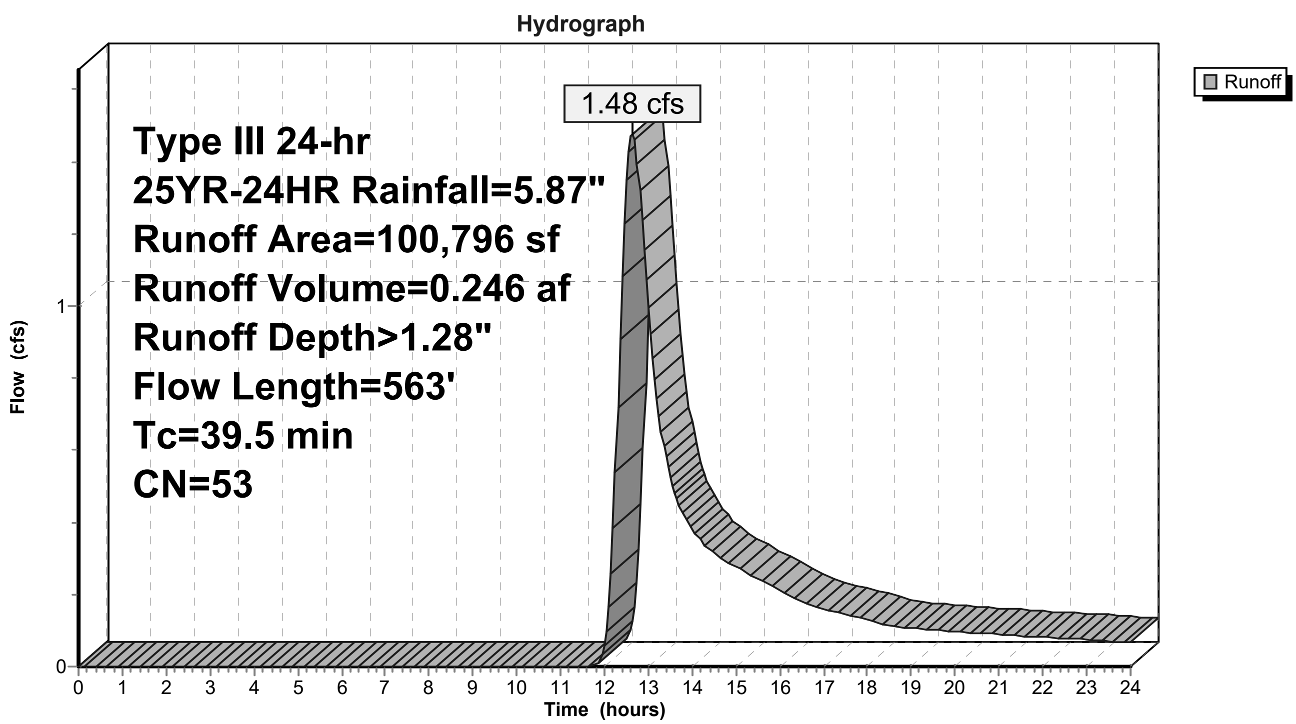
Runoff = 1.48 cfs @ 12.63 hrs, Volume= 0.246 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
35,048	39	>75% Grass cover, Good, HSG A
29,681	98	Paved parking, HSG A
36,067	30	Woods, Good, HSG A
100,796	53	Weighted Average
71,115		70.55% Pervious Area
29,681		29.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	100	0.0150	0.07		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
11.4	285	0.0070	0.42		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
0.6	65	0.0615	1.74		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
2.9	113	0.0088	0.66		**Shallow Concentrated Flow, Segment #4** Short Grass Pasture Kv= 7.0 fps
39.5	563	Total			

Subcatchment 71S: Subcat #71



Summary for Subcatchment 72S: Subcat #72

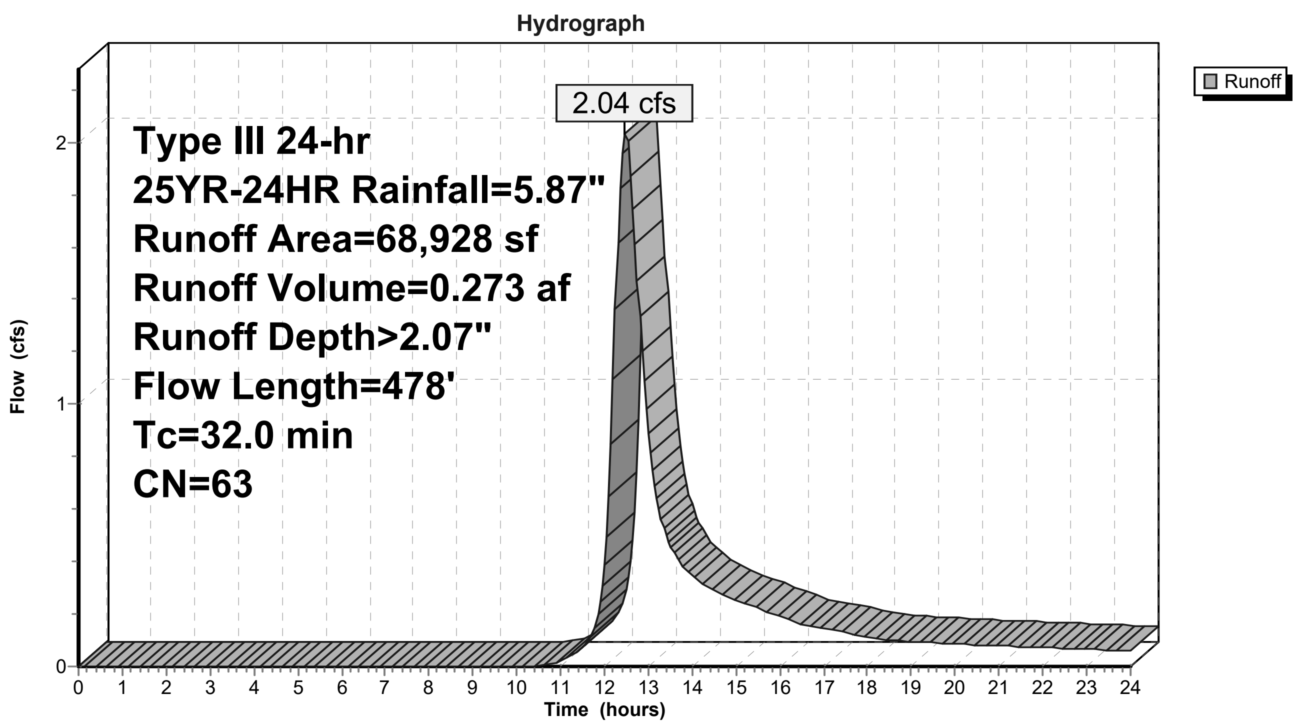
Runoff = 2.04 cfs @ 12.48 hrs, Volume= 0.273 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YR-24HR Rainfall=5.87"

Area (sf)	CN	Description
32,729	39	>75% Grass cover, Good, HSG A
29,456	98	Paved parking, HSG A
6,743	30	Woods, Good, HSG A
68,928	63	Weighted Average
39,472		57.27% Pervious Area
29,456		42.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	100	0.0150	0.07		**Sheet Flow, Segment #1** Woods: Light underbrush n= 0.400 P2= 3.08"
0.7	27	0.0150	0.61		**Shallow Concentrated Flow, Segment #2** Woodland Kv= 5.0 fps
6.7	351	0.0157	0.88		**Shallow Concentrated Flow, Segment #3** Short Grass Pasture Kv= 7.0 fps
32.0	478	Total			

Subcatchment 72S: Subcat #72



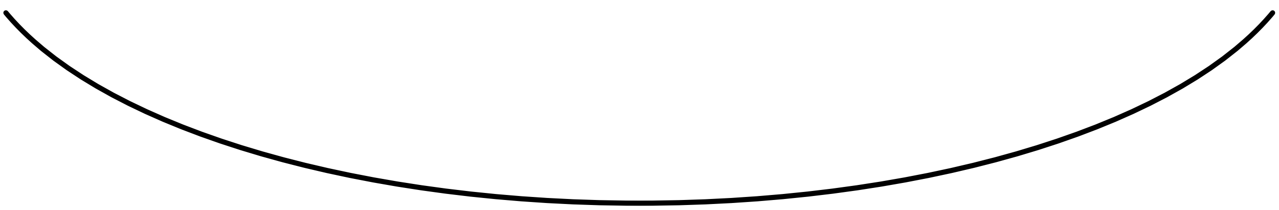
Summary for Reach 30aR: Overland Flow

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af	
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 12.85 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 151.0' Slope= 0.0063 '/'
Inlet Invert= 183.95', Outlet Invert= 183.00'



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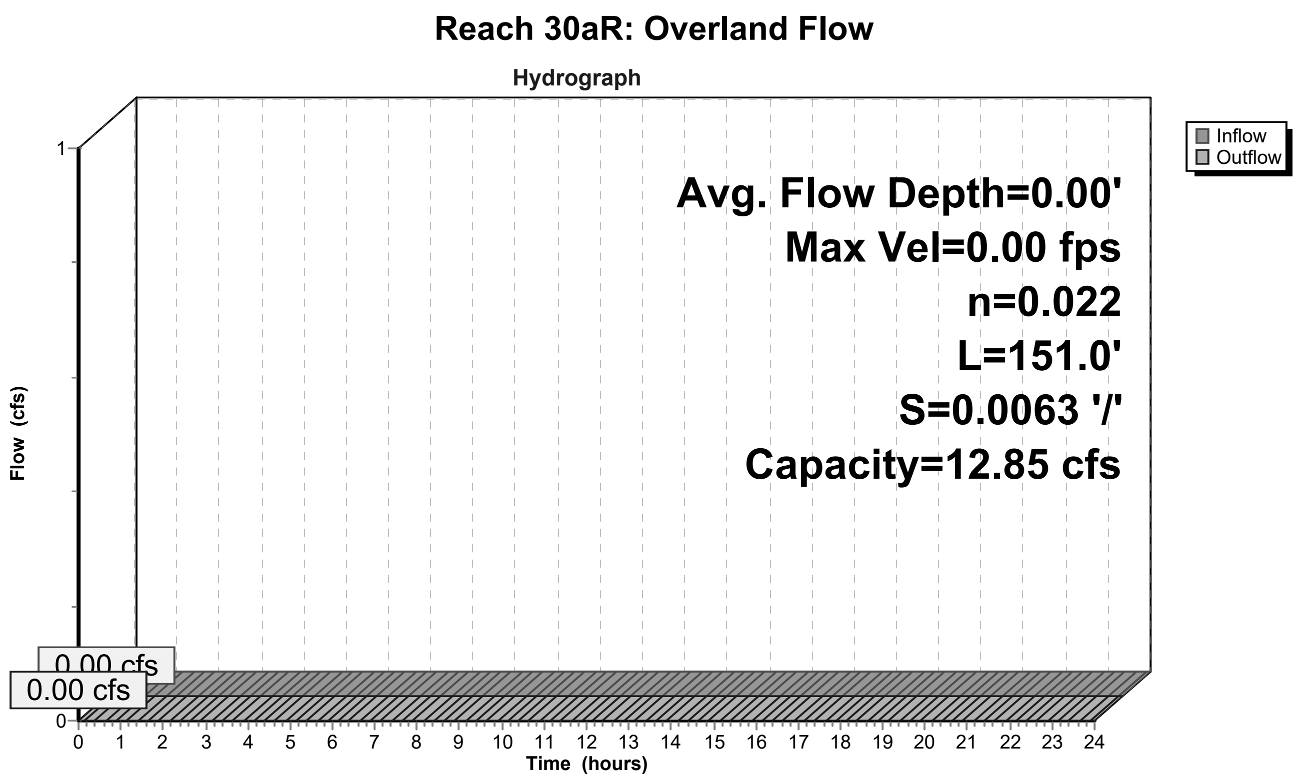


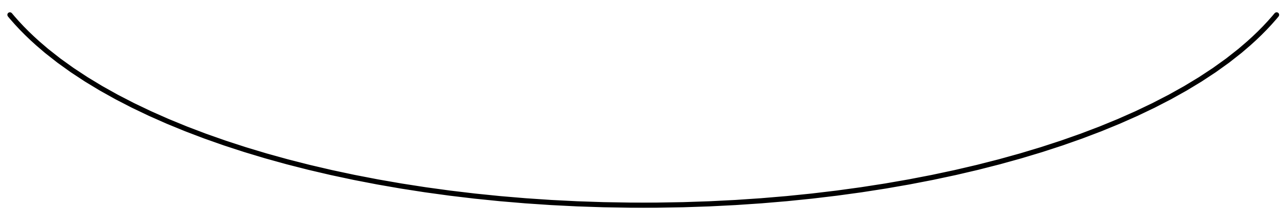
Summary for Reach 30bR: Overland Flow

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 77.47 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 35.0' Slope= 0.2286 '/'
Inlet Invert= 183.00', Outlet Invert= 175.00'



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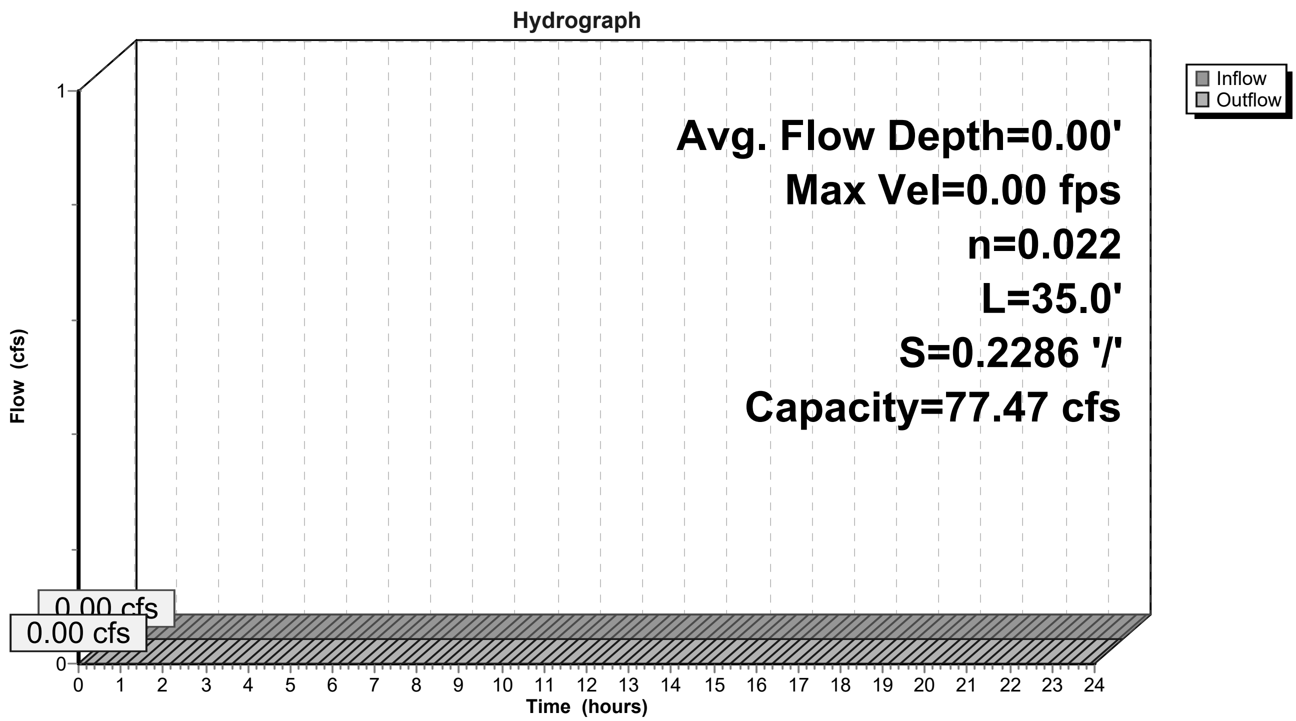
Reach 30bR: Overland Flow



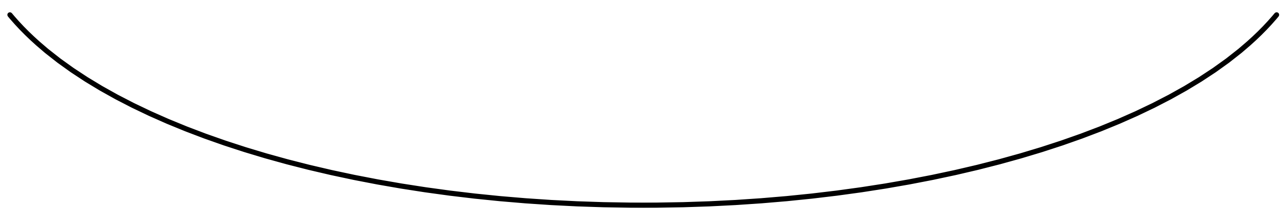
Summary for Reach 30cR: Overland Flow

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 5.0 sf, Capacity= 31.37 cfs

15.00' x 0.50' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 58.0' Slope= 0.0948 '/'
Inlet Invert= 175.00', Outlet Invert= 169.50'



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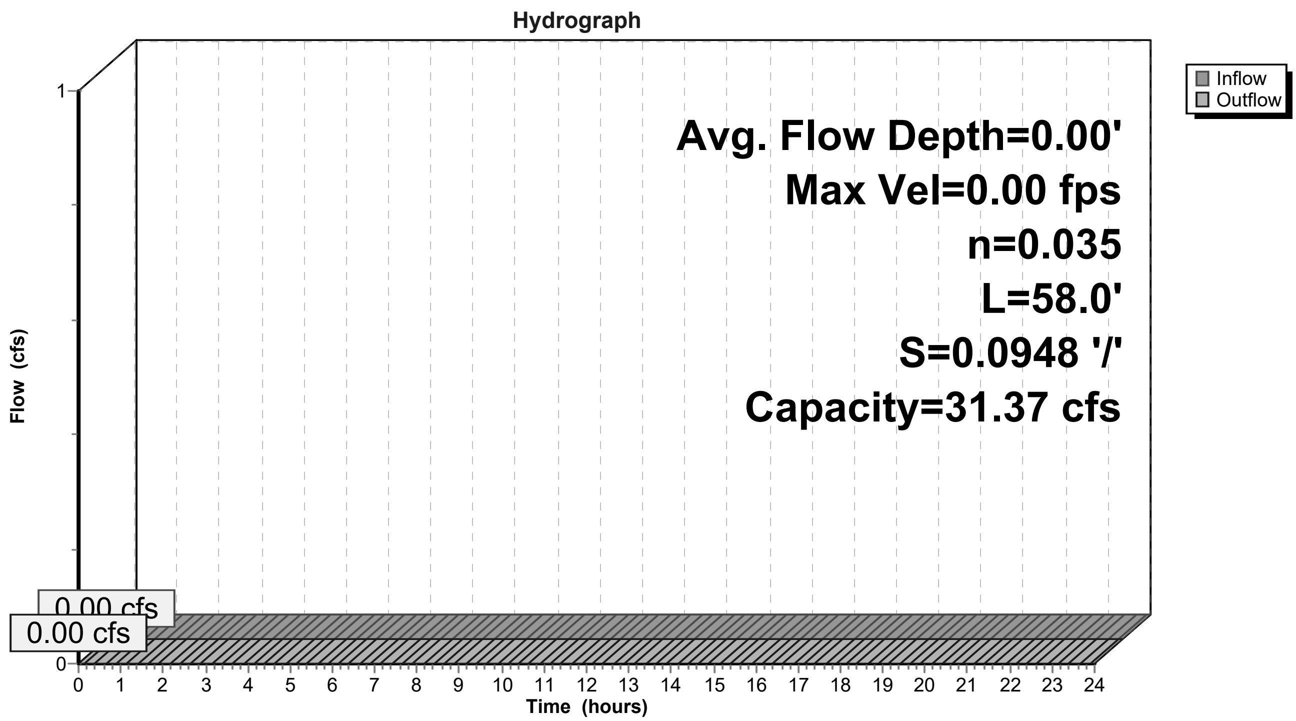
Reach 30cR: Overland Flow



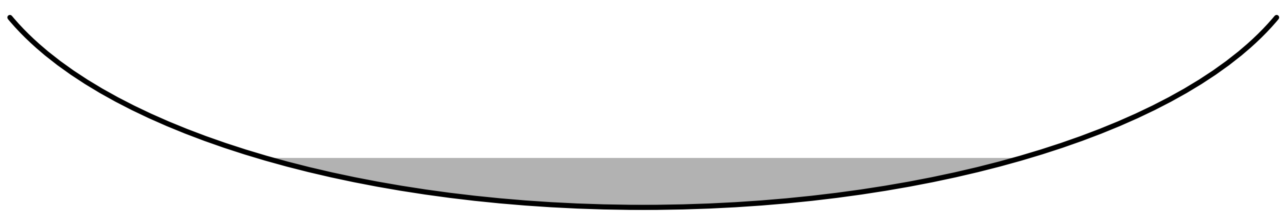
Summary for Reach 71aR: Wooded Swale

Inflow Area = 3.896 ac, 34.84% Impervious, Inflow Depth > 1.52" for 25YR-24HR event
Inflow = 3.40 cfs @ 12.58 hrs, Volume= 0.492 af
Outflow = 3.39 cfs @ 12.59 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.28 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 2.1 min

Peak Storage= 208 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 61.73 cfs

15.00' x 2.00' deep Parabolic Channel, n= 0.035
Length= 78.5' Slope= 0.0038 '/'
Inlet Invert= 187.80', Outlet Invert= 187.50'



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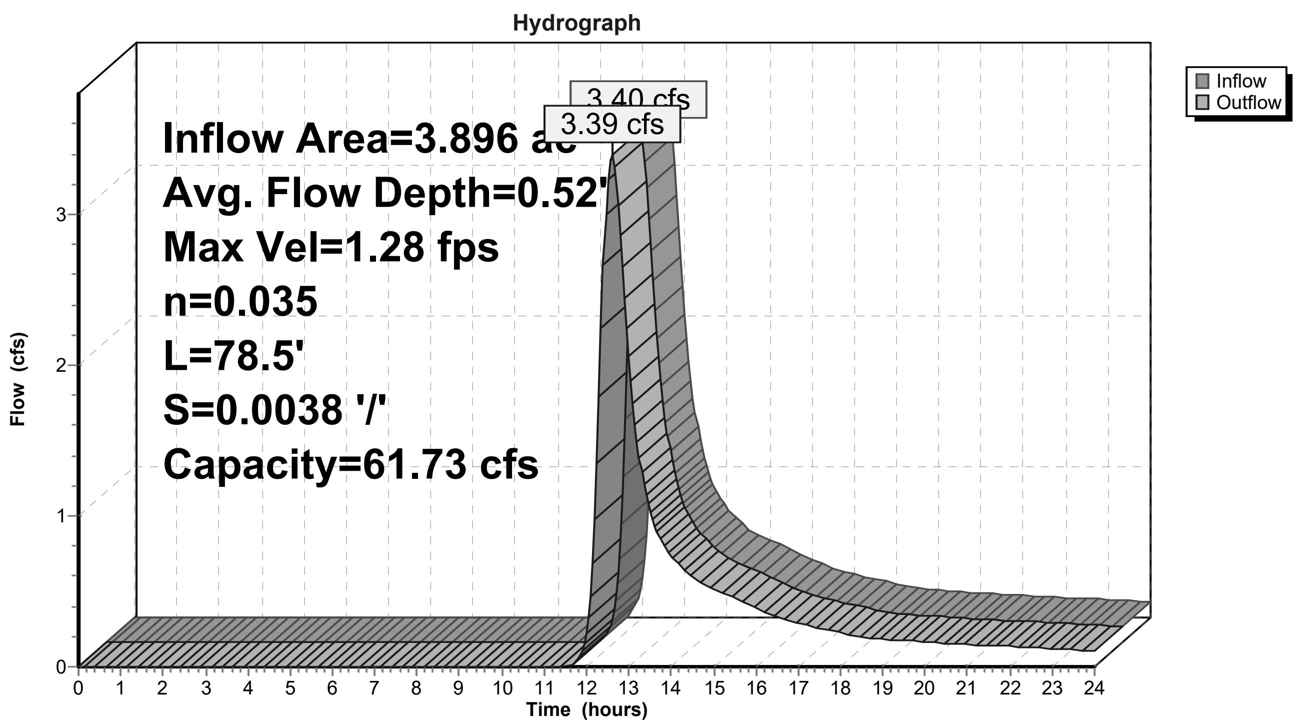
Reach 71aR: Wooded Swale



Summary for Reach 72R: Roadside Swale

[80] Warning: Exceeded Pond 72P by 0.02' @ 12.25 hrs (1.74 cfs 0.063 af)

Inflow Area =	1.582 ac, 42.73% Impervious, Inflow Depth >	1.87"	for 25YR-24HR event	
Inflow =	2.00 cfs @ 12.49 hrs, Volume=	0.247 af		
Outflow =	1.95 cfs @ 12.55 hrs, Volume=	0.246 af,	Atten= 2%,	Lag= 3.7 min

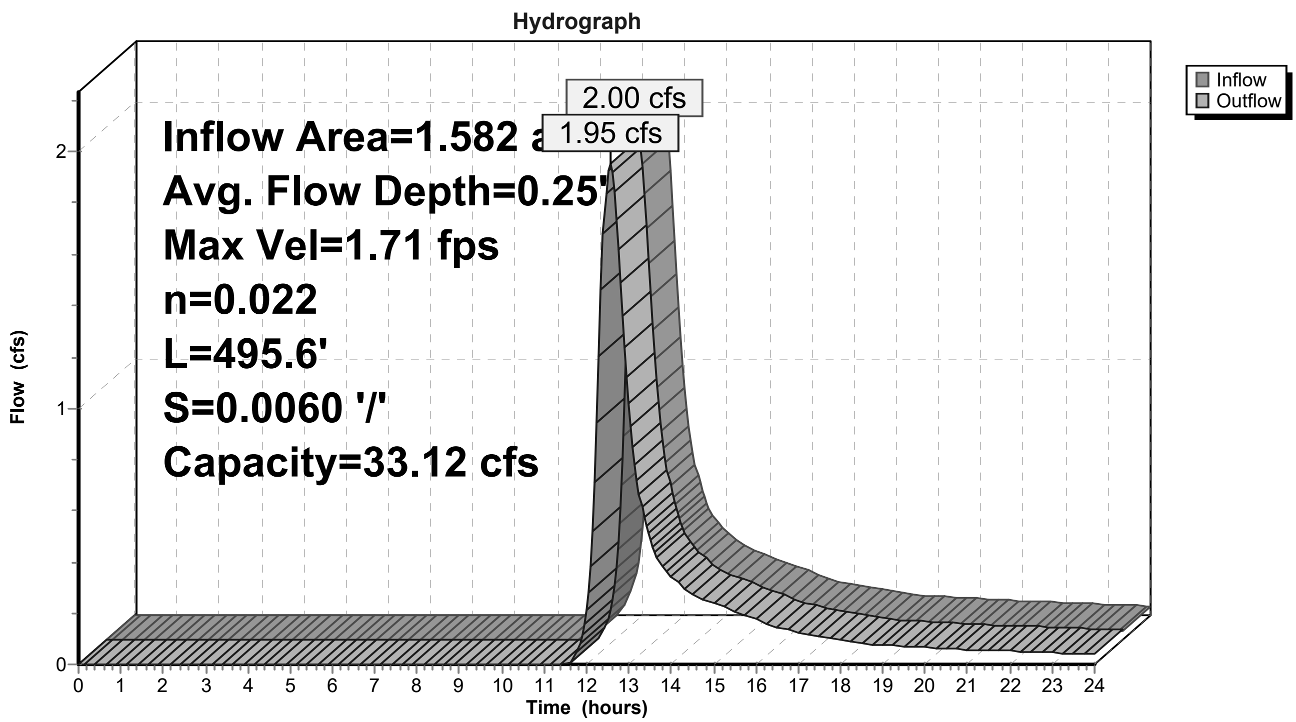
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 11.2 min

Peak Storage= 566 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 9.0 sf, Capacity= 33.12 cfs

3.00' x 1.00' deep channel, n= 0.022
Side Slope Z-value= 6.0 '/' Top Width= 15.00'
Length= 495.6' Slope= 0.0060 '/'
Inlet Invert= 195.95', Outlet Invert= 193.00'

‡

Reach 72R: Roadside Swale



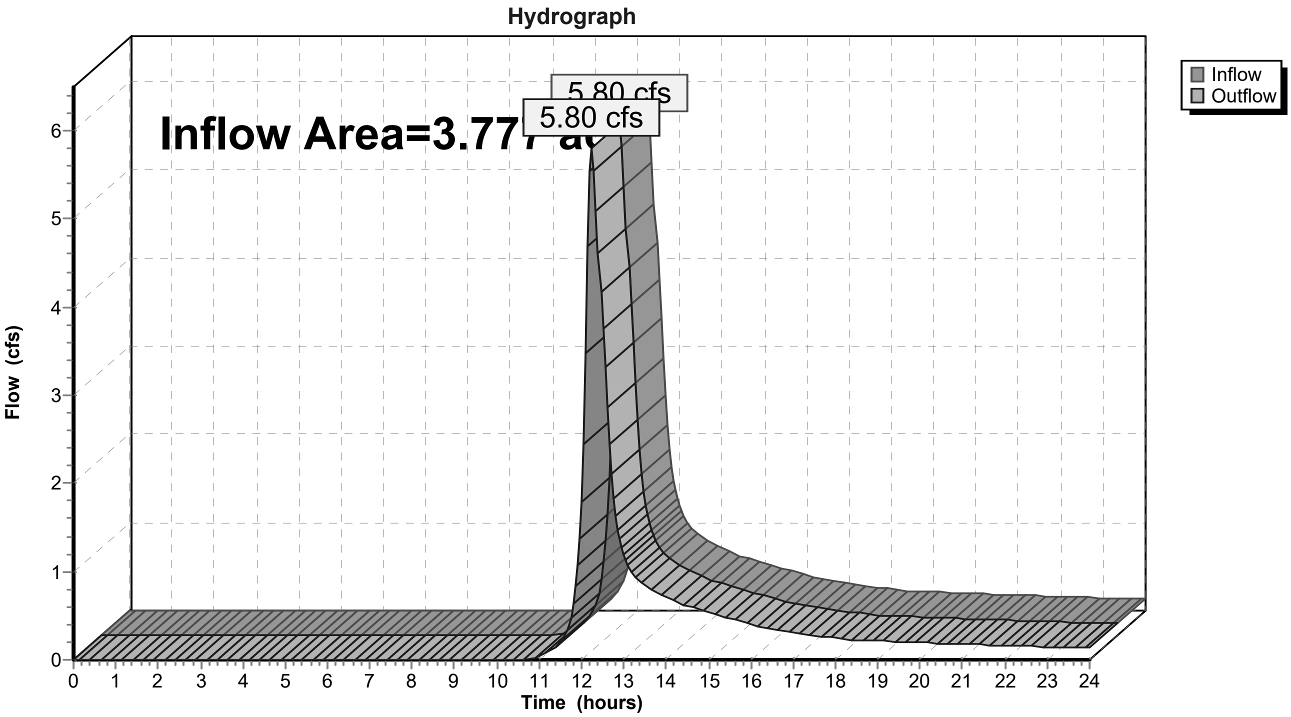
Summary for Reach 200R: Final Reach #200

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.777 ac, 2.77% Impervious, Inflow Depth > 1.91" for 25YR-24HR event
Inflow = 5.80 cfs @ 12.25 hrs, Volume= 0.602 af
Outflow = 5.80 cfs @ 12.25 hrs, Volume= 0.602 af, Atten= 0%, Lag= 0.0 min

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

Reach 200R: Final Reach #200



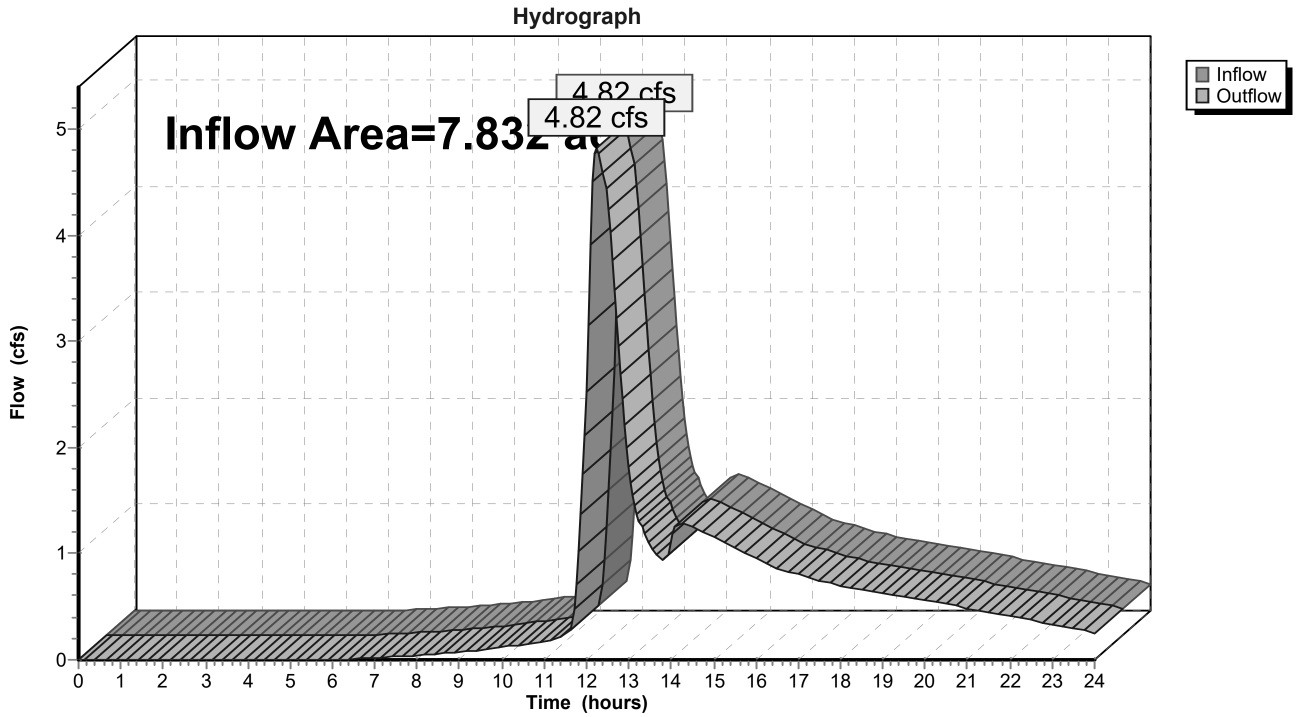
Summary for Reach 300R: FInal Reach #300

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	7.832 ac, 26.66% Impervious, Inflow Depth > 1.58"		for 25YR-24HR event
Inflow =	4.82 cfs @ 12.25 hrs, Volume=	1.034 af	
Outflow =	4.82 cfs @ 12.25 hrs, Volume=	1.034 af, Atten= 0%, Lag= 0.0 min	

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

Reach 300R: FInal Reach #300



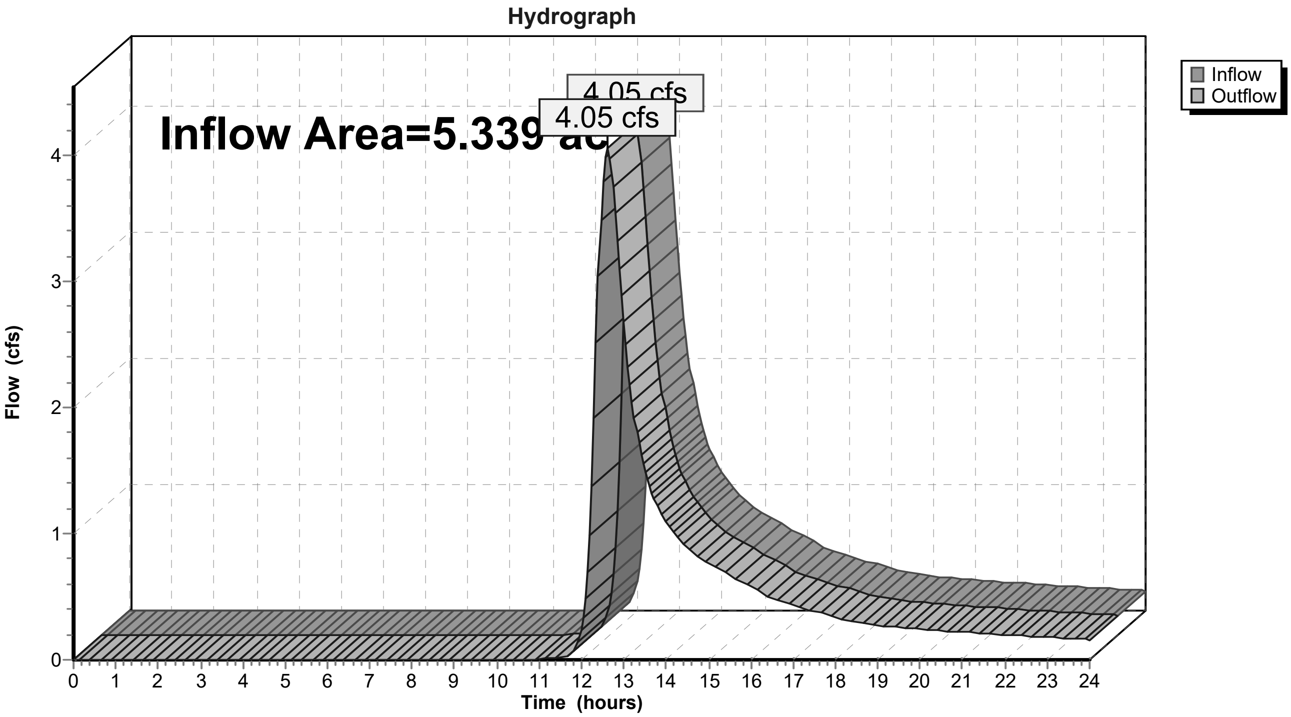
Summary for Reach 400R: Final Reach #400

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	5.339 ac,	35.09% Impervious,	Inflow Depth > 1.50"	for 25YR-24HR event	
Inflow =	4.05 cfs @	12.61 hrs,	Volume=	0.668 af	
Outflow =	4.05 cfs @	12.61 hrs,	Volume=	0.668 af,	Atten= 0%, Lag= 0.0 min

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

Reach 400R: Final Reach #400



Summary for Pond 30P: Infiltration/Trench

Inflow Area = 1.098 ac, 4.45% Impervious, Inflow Depth > 2.08" for 25YR-24HR event
Inflow = 2.15 cfs @ 12.17 hrs, Volume= 0.190 af
Outflow = 1.10 cfs @ 12.45 hrs, Volume= 0.188 af, Atten= 49%, Lag= 16.7 min
Discarded = 0.59 cfs @ 12.45 hrs, Volume= 0.081 af
Primary = 0.51 cfs @ 12.45 hrs, Volume= 0.107 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 183.82' @ 12.45 hrs Surf.Area= 8,493 sf Storage= 1,384 cf
Flood Elev= 184.10' Surf.Area= 14,837 sf Storage= 4,848 cf

Plug-Flow detention time= 17.4 min calculated for 0.188 af (99% of inflow)
Center-of-Mass det. time= 11.5 min (871.3 - 859.8)

Volume	Invert	Avail.Storage	Storage Description
#1	183.50'	6,797 cf	**Ponding Area (Irregular)**Listed below (Recalc)
#2	182.75'	162 cf	**Stone Trench (Irregular)**Listed below (Recalc) 480 cf Overall - 75 cf Embedded = 405 cf x 40.0% Voids
#3	183.15'	42 cf	**6.0" Round 6" HDPE N-12** Inside #2 L= 215.0' 75 cf Overall - 1.0" Wall Thickness = 42 cf
		7,001 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
183.50	538	154.3	0	0	538
183.75	6,179	527.1	712	712	20,753
184.00	14,357	677.3	2,496	3,208	35,149
184.25	14,357	677.3	3,589	6,797	35,319

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.75	480	432.4	0	0	480
183.75	480	432.4	480	480	912

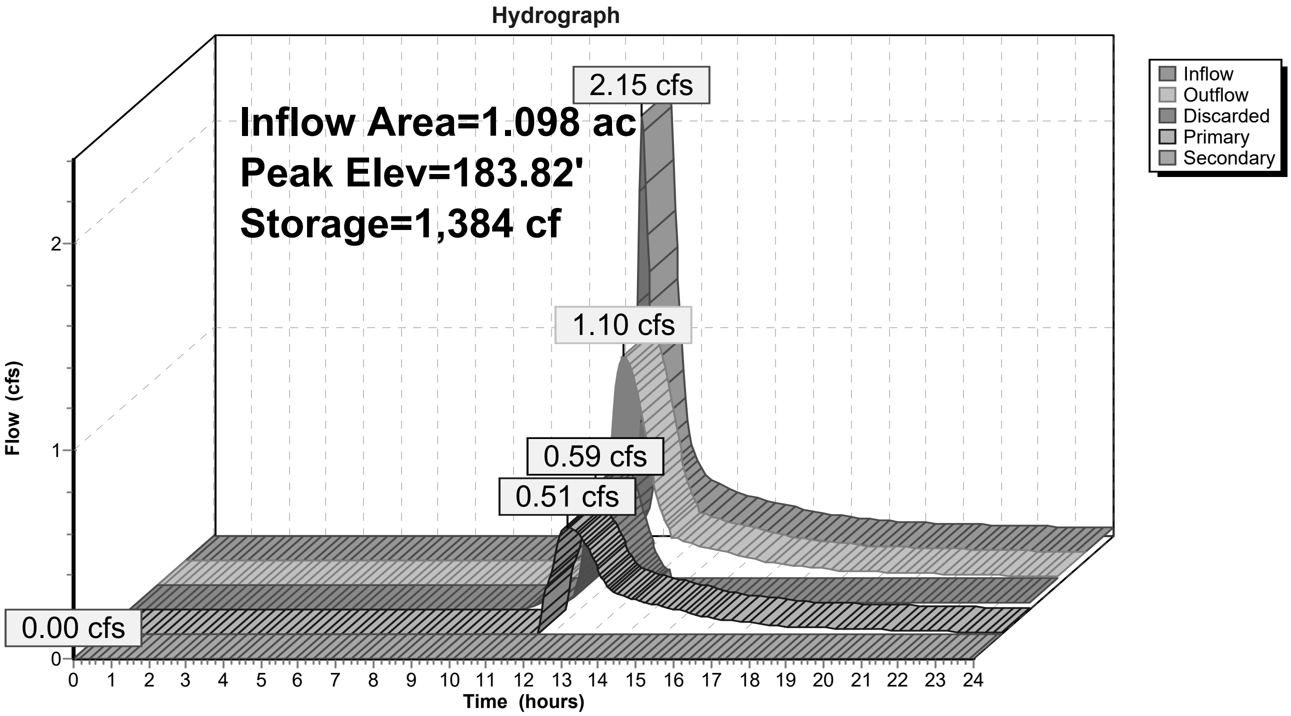
Device	Routing	Invert	Outlet Devices
#1	Discarded	182.75'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	183.15'	**6.0" Round 6" HDPE N-12** L= 1.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.15' / 183.15' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#3	Secondary	183.95'	**10.0' long x 10.0' breadth Overflow to Wetland** 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

Discarded OutFlow Max=0.59 cfs @ 12.45 hrs HW=183.82' (Free Discharge)
└─**1=Infiltration** (Exfiltration Controls 0.59 cfs)

Primary OutFlow Max=0.51 cfs @ 12.45 hrs HW=183.82' TW=180.76' (Dynamic Tailwater)
└─**2=6" HDPE N-12** (Barrel Controls 0.51 cfs @ 2.62 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=182.75' TW=183.95' (Dynamic Tailwater)
└─**3=Overflow to Wetland** (Controls 0.00 cfs)

Pond 30P: Infiltration/Trench



Summary for Pond 71P: Existing Catch Basin

[57] Hint: Peaked at 188.93' (Flood elevation advised)

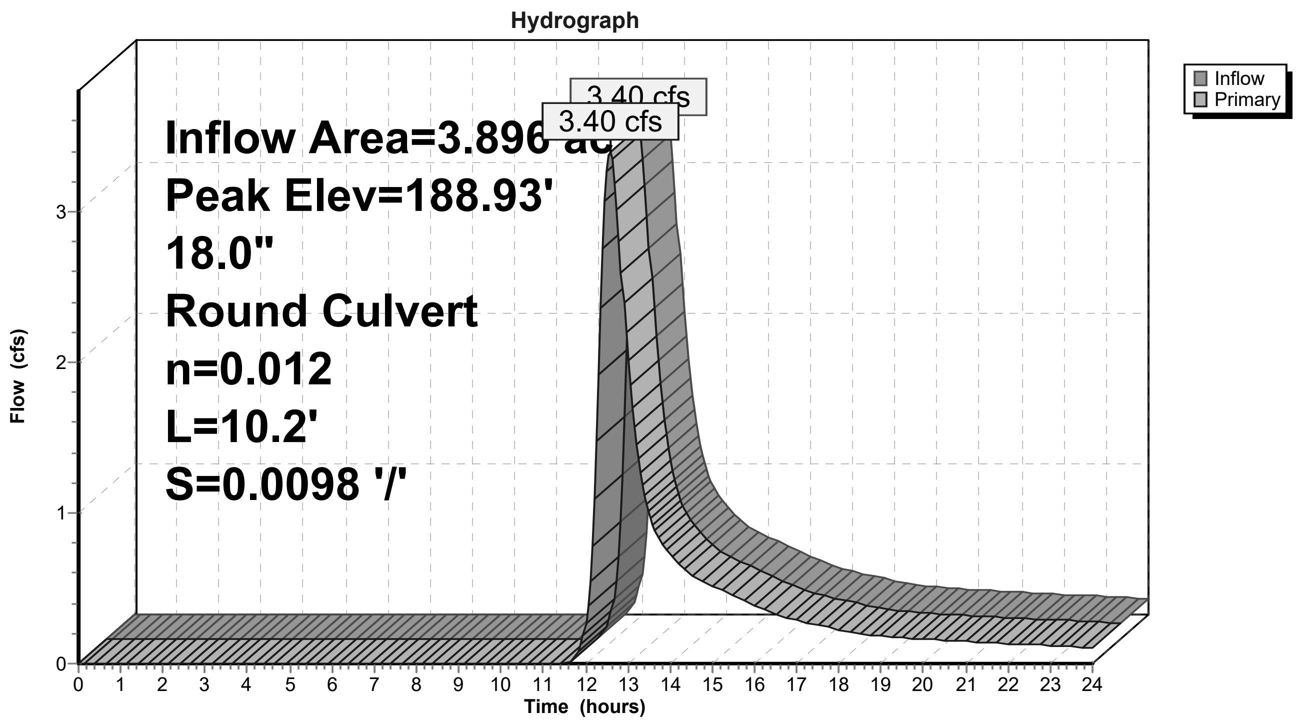
Inflow Area =	3.896 ac, 34.84% Impervious, Inflow Depth > 1.52" for 25YR-24HR event			
Inflow =	3.40 cfs @	12.58 hrs, Volume=	0.492 af	
Outflow =	3.40 cfs @	12.58 hrs, Volume=	0.492 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.40 cfs @	12.58 hrs, Volume=	0.492 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 188.93' @ 12.58 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	187.90'	**18.0" Round 18" RCP** L= 10.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 187.90' / 187.80' S= 0.0098 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.39 cfs @ 12.58 hrs HW=188.92' TW=188.32' (Dynamic Tailwater)
└─**1=18" RCP** (Barrel Controls 3.39 cfs @ 3.72 fps)

Pond 71P: Existing Catch Basin



Summary for Pond 72P: Existing Depression

[58] Hint: Peaked 0.21' above defined flood level

Inflow Area = 1.582 ac, 42.73% Impervious, Inflow Depth > 2.07" for 25YR-24HR event
Inflow = 2.04 cfs @ 12.48 hrs, Volume= 0.273 af
Outflow = 2.02 cfs @ 12.49 hrs, Volume= 0.271 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.02 cfs @ 11.95 hrs, Volume= 0.024 af
Primary = 2.00 cfs @ 12.49 hrs, Volume= 0.247 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.21' @ 12.59 hrs Surf.Area= 333 sf Storage= 160 cf
Flood Elev= 196.00' Surf.Area= 333 sf Storage= 91 cf

Plug-Flow detention time= 6.1 min calculated for 0.270 af (99% of inflow)
Center-of-Mass det. time= 2.2 min (878.0 - 875.8)

Volume	Invert	Avail.Storage	Storage Description
#1	195.50'	257 cf	**Ponding Area (Irregular)**Listed below (Recalc)

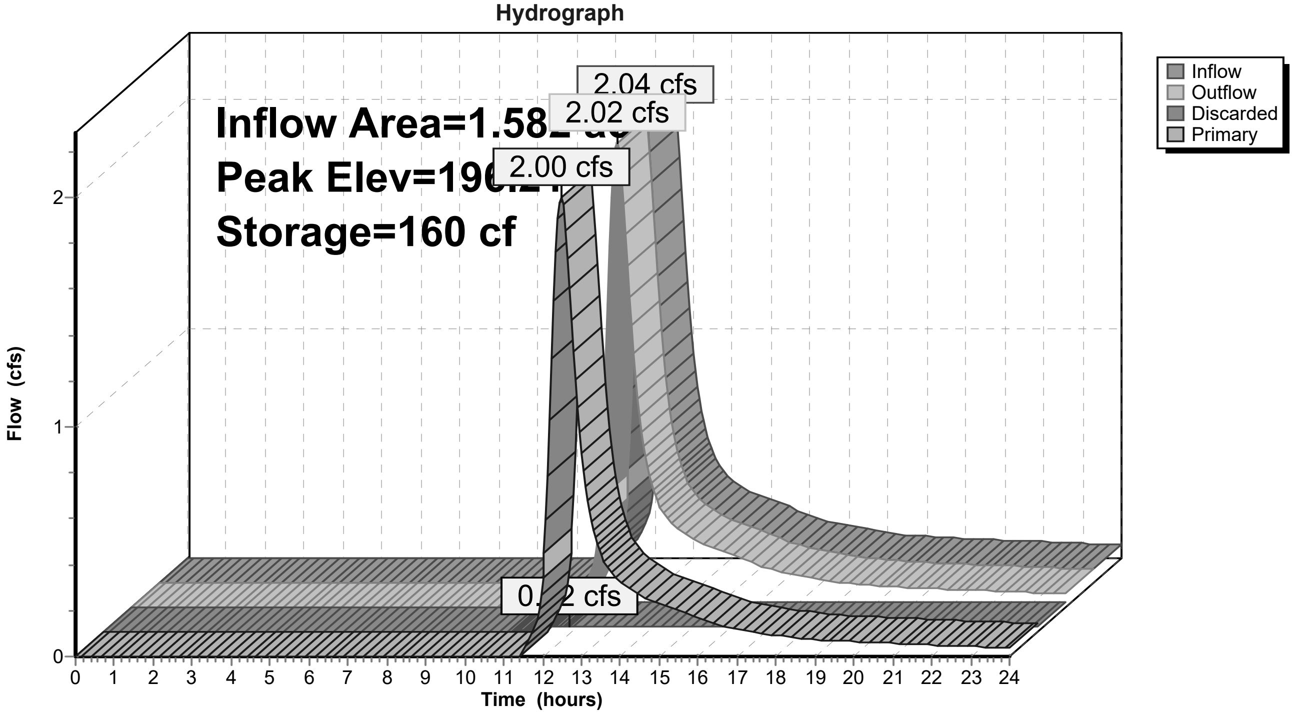
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
195.50	55	32.6	0	0	55
195.75	179	63.6	28	28	293
196.00	333	92.1	63	91	646
196.50	333	92.1	167	257	692

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.50'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	195.95'	**20.0' long x 50.0' breadth Overflow over DW** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.02 cfs @ 11.95 hrs HW=196.00' (Free Discharge)
1=Infiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 12.49 hrs HW=196.20' TW=196.20' (Dynamic Tailwater)
2=Overflow over DW (Controls 0.00 cfs)

Pond 72P: Existing Depression



Summary for Pond 201P: Bioretention W/ ISR #201

Inflow Area = 1.174 ac, 43.96% Impervious, Inflow Depth > 2.43" for 25YR-24HR event
Inflow = 2.53 cfs @ 12.21 hrs, Volume= 0.237 af
Outflow = 0.68 cfs @ 12.71 hrs, Volume= 0.173 af, Atten= 73%, Lag= 30.1 min
Primary = 0.02 cfs @ 12.71 hrs, Volume= 0.023 af
Secondary = 0.66 cfs @ 12.71 hrs, Volume= 0.150 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 185.45' @ 12.71 hrs Surf.Area= 1,118 sf Storage= 4,286 cf
Flood Elev= 186.00' Surf.Area= 1,118 sf Storage= 6,720 cf

Plug-Flow detention time= 175.9 min calculated for 0.173 af (73% of inflow)
Center-of-Mass det. time= 82.6 min (934.8 - 852.2)

Volume	Invert	Avail.Storage	Storage Description
#1	182.00'	112 cf	**Stone (Irregular)** Listed below (Recalc) -Impervious 280 cf Overall x 40.0% Voids
#2	182.25'	335 cf	**Bio Media (Irregular)** Listed below (Recalc) 1,677 cf Overall x 20.0% Voids
#3	184.00'	1,032 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) -Impervious
#4	183.75'	2,979 cf	**Cell (Irregular)** Listed below (Recalc) -Impervious
#5	185.50'	2,262 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		6,720 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.00	1,118	165.5	0	0	1,118
182.25	1,118	165.5	280	280	1,159

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.25	1,118	165.5	0	0	1,118
183.75	1,118	165.5	1,677	1,677	1,366

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
184.00	160	53.5	0	0	160
185.00	822	223.7	448	448	3,917
185.50	1,551	276.6	584	1,032	6,027

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
183.75	1,118	165.5	0	0	1,118
184.00	1,459	183.1	321	321	1,608
185.00	1,877	199.3	1,664	1,985	2,137
185.50	2,101	207.6	994	2,979	2,424

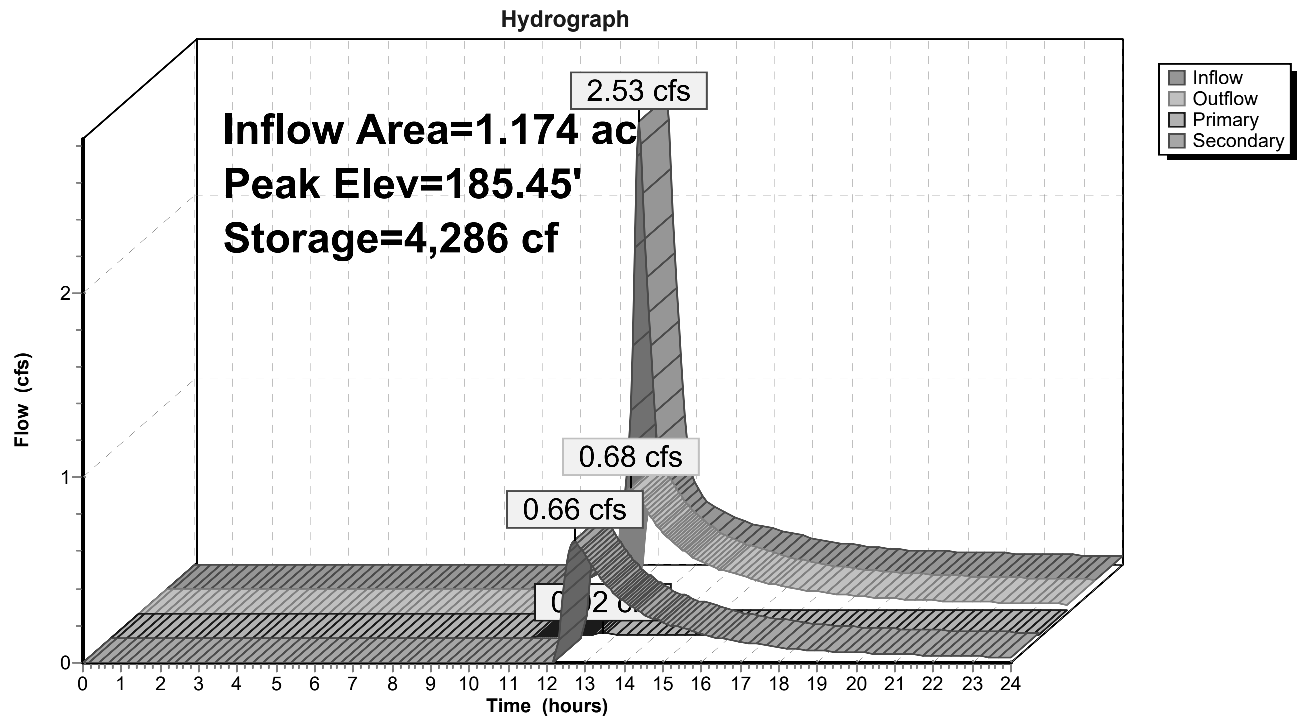
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
185.50	3,838	302.2	0	0	3,838
186.00	5,247	335.0	2,262	2,262	5,509

Device	Routing	Invert	Outlet Devices
#1	Primary	182.00'	**6.0" Round 6" HDPE N-12** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 182.00' / 181.70' S= 0.0091 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	182.00'	**15.0" Round 15" HDPE N-12** L= 26.0' Ke= 0.500 Inlet / Outlet Invert= 182.00' / 181.70' S= 0.0115 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	182.00'	**0.7" Vert. 0.75" Orifice** C= 0.600
#4	Device 3	182.25'	**10.000 in/hr Bio Media over Surface area**
#5	Device 2	184.90'	**6.0" W x 10.0" H Vert. 6"W x 10" T Notch** C= 0.600
#6	Device 2	185.75'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 12.71 hrs HW=185.45' TW=182.01' (Dynamic Tailwater)
└─**1=6" HDPE N-12** (Passes 0.02 cfs of 1.47 cfs potential flow)
  └─**3=0.75" Orifice** (Orifice Controls 0.02 cfs @ 8.91 fps)
    └─**4=Bio Media** (Passes 0.02 cfs of 0.26 cfs potential flow)

Secondary OutFlow Max=0.66 cfs @ 12.71 hrs HW=185.45' TW=182.01' (Dynamic Tailwater)
└─**2=15" HDPE N-12** (Passes 0.66 cfs of 9.93 cfs potential flow)
  ├─**5=6"W x 10" T Notch** (Orifice Controls 0.66 cfs @ 2.38 fps)
  └─**6=48" Outlet Structure** (Controls 0.00 cfs)

Pond 201P: Bioretention W/ ISR #201



Summary for Pond 202P: Bioretention W/ ISR #202

Inflow Area = 2.354 ac, 46.52% Impervious, Inflow Depth > 3.77" for 25YR-24HR event
Inflow = 8.23 cfs @ 12.11 hrs, Volume= 0.739 af
Outflow = 0.68 cfs @ 13.37 hrs, Volume= 0.566 af, Atten= 92%, Lag= 75.8 min
Primary = 0.09 cfs @ 12.99 hrs, Volume= 0.103 af
Secondary = 0.60 cfs @ 13.69 hrs, Volume= 0.463 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 179.19' @ 13.69 hrs Surf.Area= 1,981 sf Storage= 18,074 cf
Flood Elev= 180.50' Surf.Area= 1,981 sf Storage= 28,868 cf

Plug-Flow detention time= 304.9 min calculated for 0.564 af (76% of inflow)
Center-of-Mass det. time= 219.9 min (1,012.9 - 793.0)

Volume	Invert	Avail.Storage	Storage Description
#1	173.75'	198 cf	**Stone (Irregular)** Listed below (Recalc) -Impervious 495 cf Overall x 40.0% Voids
#2	174.00'	594 cf	**Bio Media (Irregular)** Listed below (Recalc) 2,972 cf Overall x 20.0% Voids
#3	175.50'	903 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) -Impervious
#4	175.50'	6,102 cf	**Cell (Irregular)** Listed below (Recalc) -Impervious
#5	177.50'	21,071 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		28,868 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
173.75	1,981	351.5	0	0	1,981
174.00	1,981	351.5	495	495	2,069

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	1,981	351.5	0	0	1,981
175.50	1,981	351.5	2,972	2,972	2,508

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
175.50	243	61.9	0	0	243
176.00	337	70.7	144	144	342
177.00	563	89.6	445	590	596
177.50	693	98.2	313	903	732

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
175.50	1,981	351.5	0	0	1,981
176.00	2,509	360.4	1,120	1,120	2,516
177.00	3,604	379.0	3,040	4,160	3,671
177.50	4,170	387.1	1,942	6,102	4,201

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
177.50	4,925	448.8	0	0	4,925
178.00	5,605	458.3	2,631	2,631	5,647
179.00	7,008	477.1	6,293	8,924	7,123
180.00	8,468	496.0	7,726	16,651	8,665
180.50	9,219	505.4	4,420	21,071	9,455

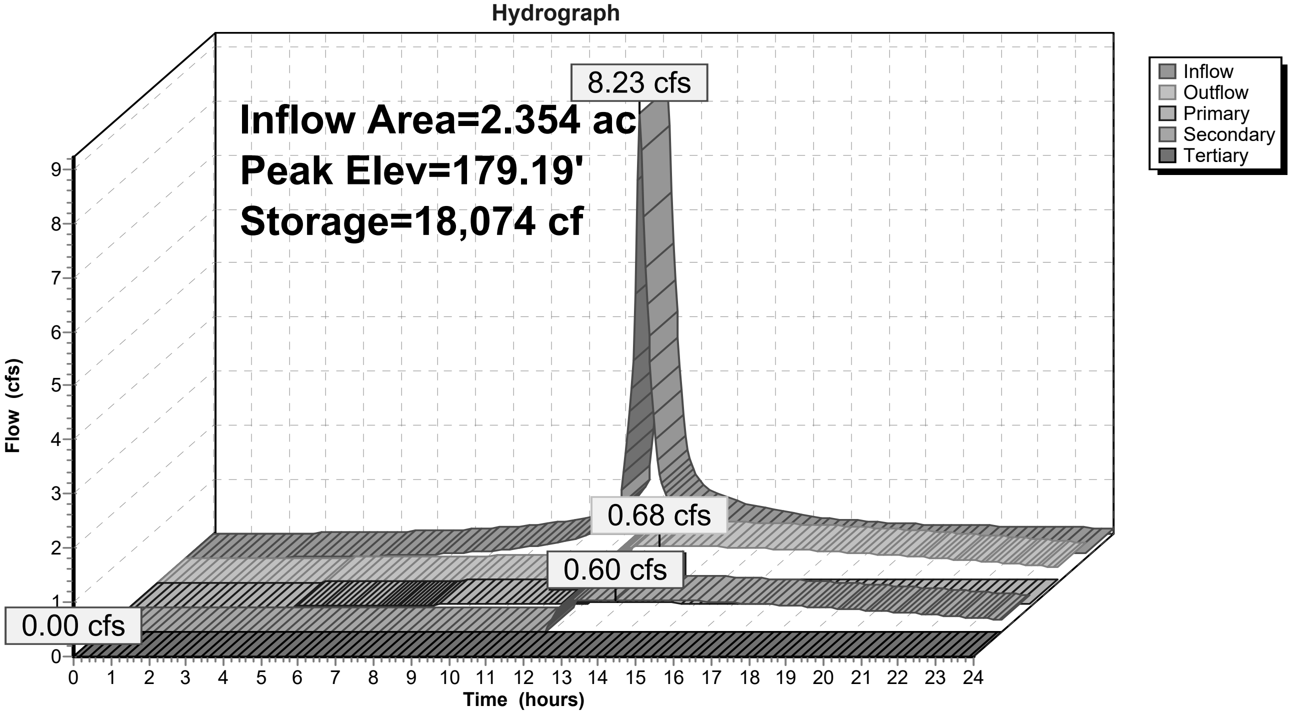
Device	Routing	Invert	Outlet Devices
#1	Primary	173.75'	**6.0" Round 6" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 173.75' / 173.50' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	173.75'	**15.0" Round 15" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 173.75' / 173.50' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	173.75'	**1.2" Vert. 1.25" Orifice** C= 0.600
#4	Device 3	174.00'	**10.000 in/hr Bio Media over Surface area**
#5	Device 2	177.00'	**4.0" Vert. 4" Orifice** C= 0.600
#6	Device 2	179.75'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads
#7	Tertiary	180.00'	**10.0' long x 8.5' breadth Spillway** 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) 2.45 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.65 2.66 2.67 2.69 2.71

Primary OutFlow Max=0.09 cfs @ 12.99 hrs HW=179.15' TW=173.82' (Dynamic Tailwater)
└─**1=6" HDPE N-12** (Passes 0.09 cfs of 1.91 cfs potential flow)
  └─**3=1.25" Orifice** (Orifice Controls 0.09 cfs @ 11.12 fps)
    └─**4=Bio Media** (Passes 0.09 cfs of 0.46 cfs potential flow)

Secondary OutFlow Max=0.60 cfs @ 13.69 hrs HW=179.19' TW=174.35' (Dynamic Tailwater)
└─**2=15" HDPE N-12** (Passes 0.60 cfs of 12.97 cfs potential flow)
  ├─**5=4" Orifice** (Orifice Controls 0.60 cfs @ 6.85 fps)
  └─**6=48" Outlet Structure** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.75' TW=172.50' (Dynamic Tailwater)
└─**7=Spillway** (Controls 0.00 cfs)

Pond 202P: Bioretention W/ ISR #202



Summary for Pond 203P: Infiltration Pond #203

Inflow Area = 2.722 ac, 40.23% Impervious, Inflow Depth > 2.72" for 25YR-24HR event
Inflow = 1.08 cfs @ 12.20 hrs, Volume= 0.617 af
Outflow = 0.73 cfs @ 14.44 hrs, Volume= 0.510 af, Atten= 32%, Lag= 134.8 min
Discarded = 0.21 cfs @ 14.44 hrs, Volume= 0.233 af
Primary = 0.52 cfs @ 14.44 hrs, Volume= 0.277 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 174.58' @ 14.44 hrs Surf.Area= 3,058 sf Storage= 4,820 cf
Flood Elev= 175.00' Surf.Area= 3,385 sf Storage= 6,181 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 50.7 min (1,051.9 - 1,001.2)

Volume	Invert	Avail.Storage	Storage Description
#1	172.50'	6,181 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

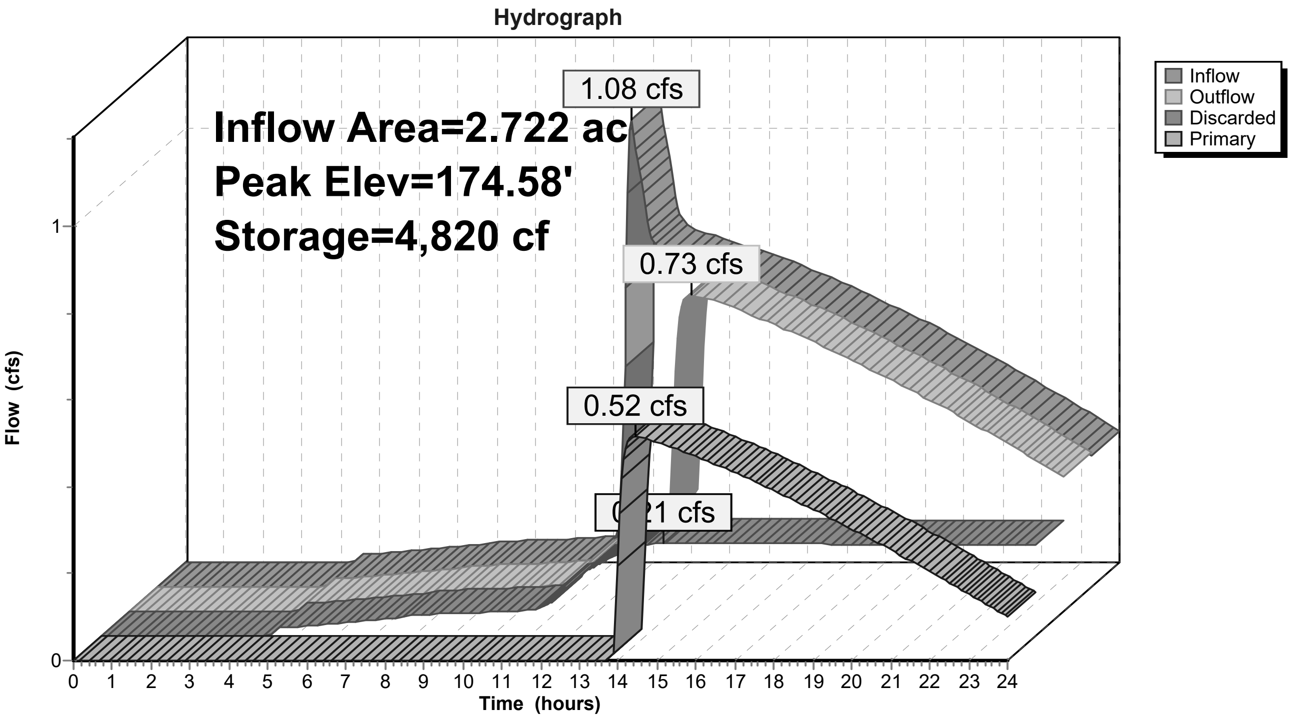
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
172.50	1,574	204.2	0	0	1,574
173.00	1,967	225.0	883	883	2,292
174.00	2,638	239.5	2,294	3,178	2,877
175.00	3,385	258.5	3,004	6,181	3,670

Device	Routing	Invert	Outlet Devices
#1	Discarded	172.50'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	174.50'	**10.0' long x 7.0' breadth Spillway** 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Discarded OutFlow Max=0.21 cfs @ 14.44 hrs HW=174.58' (Free Discharge)
↑—**1=Infiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.52 cfs @ 14.44 hrs HW=174.58' TW=0.00' (Dynamic Tailwater)
↑—**2=Spillway** (Weir Controls 0.52 cfs @ 0.67 fps)

Pond 203P: Infiltration Pond #203



Summary for Pond 204P: Detention Pond #204

Inflow Area = 2.767 ac, 35.90% Impervious, Inflow Depth > 2.73" for 25YR-24HR event
Inflow = 7.28 cfs @ 12.10 hrs, Volume= 0.630 af
Outflow = 4.16 cfs @ 12.27 hrs, Volume= 0.625 af, Atten= 43%, Lag= 10.2 min
Primary = 4.16 cfs @ 12.27 hrs, Volume= 0.625 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 178.85' @ 12.27 hrs Surf.Area= 2,707 sf Storage= 4,793 cf
Flood Elev= 180.00' Surf.Area= 3,505 sf Storage= 8,346 cf

Plug-Flow detention time= 38.8 min calculated for 0.624 af (99% of inflow)
Center-of-Mass det. time= 33.7 min (848.1 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	176.25'	8,346 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

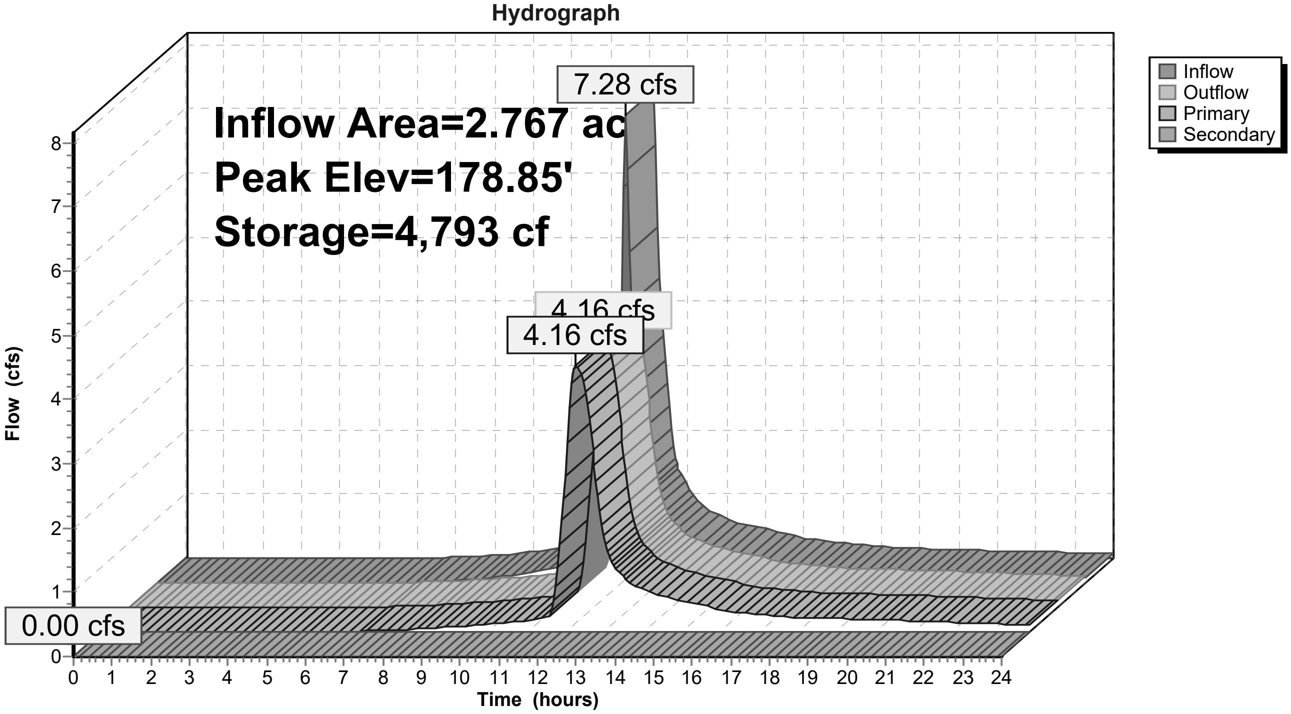
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
176.25	4	4.0	0	0	4
176.50	1,320	155.0	116	116	1,915
177.00	1,578	170.7	724	840	2,330
178.00	2,183	202.8	1,872	2,712	3,302
179.00	2,803	222.5	2,487	5,199	4,002
180.00	3,505	242.8	3,147	8,346	4,789

Device	Routing	Invert	Outlet Devices
#1	Primary	176.25'	**18.0" Round 18" HDPE N-12** L= 29.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 176.25' / 176.00' S= 0.0086 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Device 1	176.25'	**3.0" Vert. 3" Orifice** C= 0.600
#3	Device 1	177.25'	**8.0" Vert. 8" Orifice (2) X 2.00** C= 0.600
#4	Device 1	179.25'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads
#5	Secondary	179.50'	**10.0' long x 9.0' breadth Spillway** 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) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69

Primary OutFlow Max=4.15 cfs @ 12.27 hrs HW=178.85' TW=0.00' (Dynamic Tailwater)
└─**1=18" HDPE N-12** (Passes 4.15 cfs of 11.56 cfs potential flow)
  ├─**2=3" Orifice** (Orifice Controls 0.37 cfs @ 7.57 fps)
  ├─**3=8" Orifice (2)** (Orifice Controls 3.78 cfs @ 5.41 fps)
  └─**4=48" Outlet Structure** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=176.25' TW=0.00' (Dynamic Tailwater)
└─**5=Spillway** (Controls 0.00 cfs)

Pond 204P: Detention Pond #204



Summary for Pond C41P: Catch Basin #41

Inflow Area = 0.170 ac, 61.70% Impervious, Inflow Depth > 4.49" for 25YR-24HR event
Inflow = 0.66 cfs @ 12.20 hrs, Volume= 0.064 af
Outflow = 0.66 cfs @ 12.20 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.1 min
Primary = 0.66 cfs @ 12.20 hrs, Volume= 0.064 af

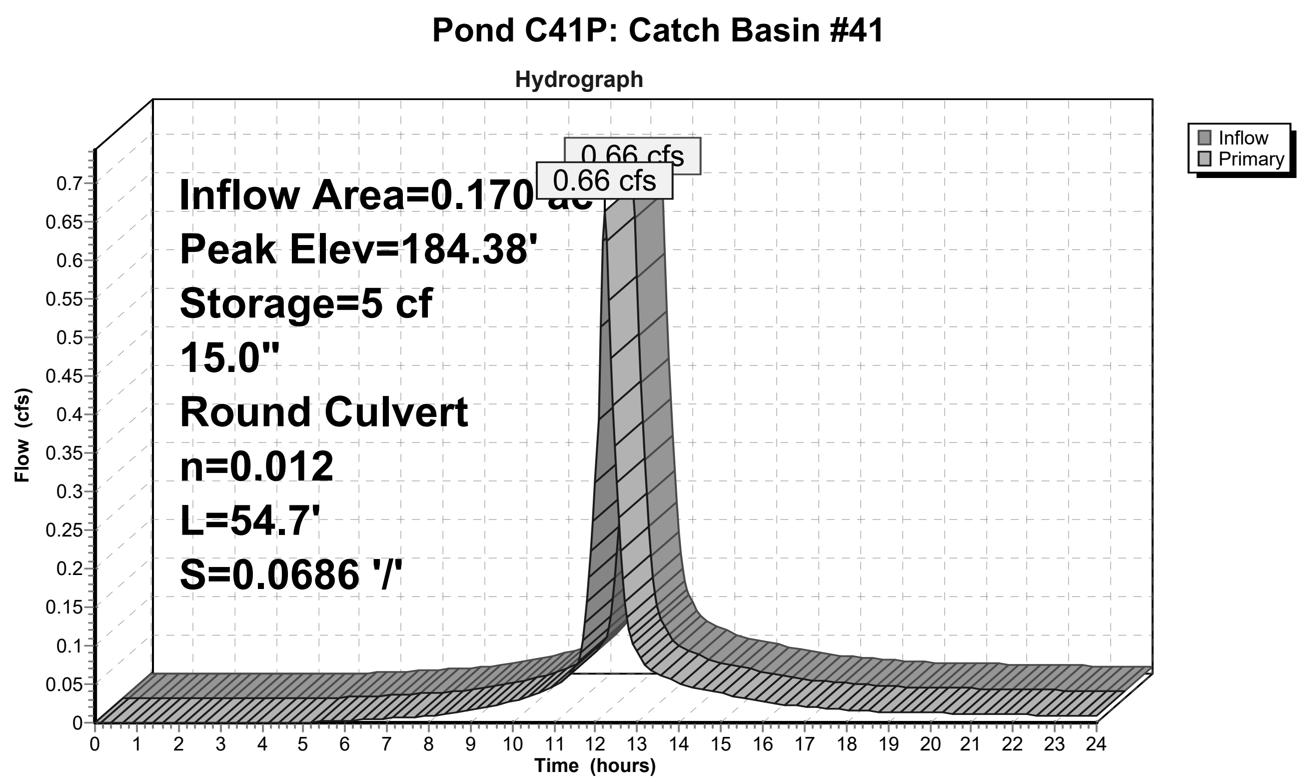
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.38' @ 12.20 hrs Surf.Area= 13 sf Storage= 5 cf
Flood Elev= 191.00' Surf.Area= 13 sf Storage= 88 cf

Plug-Flow detention time= 0.4 min calculated for 0.064 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (799.1 - 798.9)

Volume	Invert	Avail.Storage	Storage Description
#1	184.00'	88 cf	**4.00'D x 7.00'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round 15" HDPE N-12** L= 54.7' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 184.00' / 180.25' S= 0.0686 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.66 cfs @ 12.20 hrs HW=184.38' TW=181.06' (Dynamic Tailwater)
1=15" HDPE N-12 (Inlet Controls 0.66 cfs @ 2.10 fps)



Summary for Pond C42P: Catch Basin #42

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

Inflow Area = 1.268 ac, 12.14% Impervious, Inflow Depth > 1.62" for 25YR-24HR event
Inflow = 1.14 cfs @ 12.22 hrs, Volume= 0.171 af
Outflow = 1.14 cfs @ 12.22 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.3 min
Primary = 1.14 cfs @ 12.22 hrs, Volume= 0.171 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 181.09' @ 12.17 hrs Surf.Area= 13 sf Storage= 12 cf
Flood Elev= 184.50' Surf.Area= 13 sf Storage= 55 cf

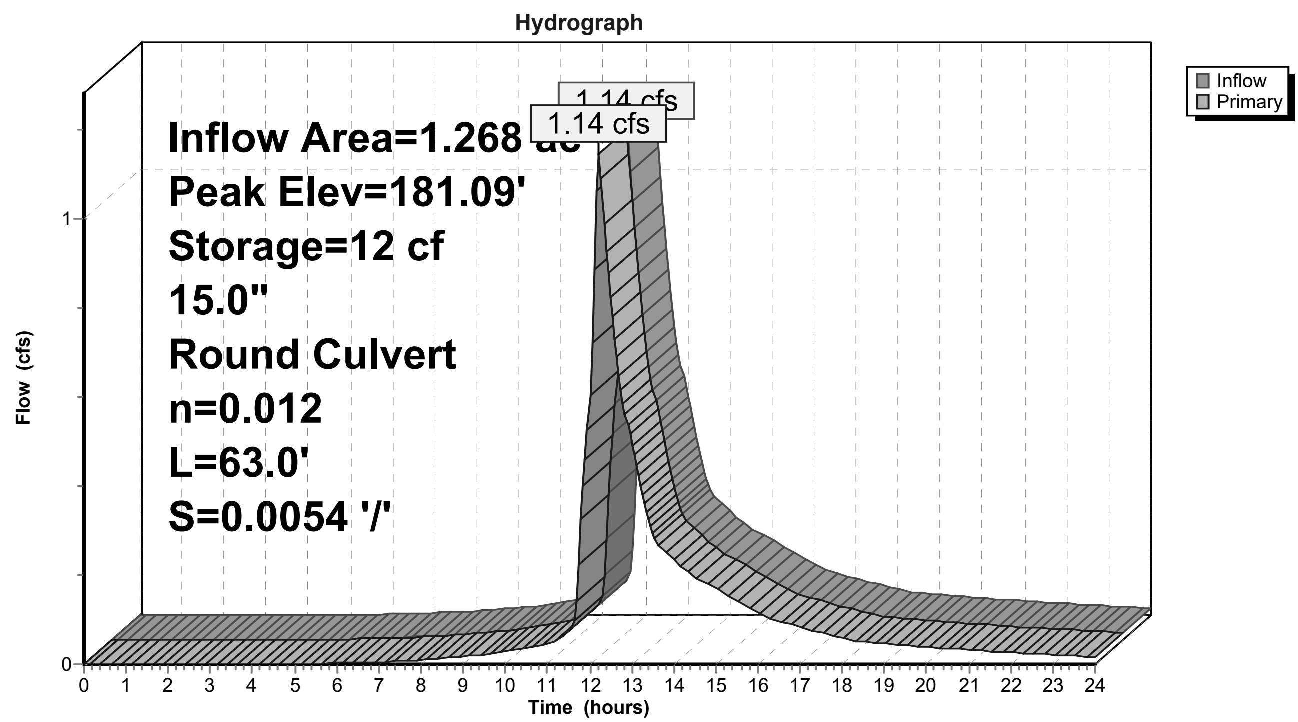
Plug-Flow detention time= 0.3 min calculated for 0.171 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (837.7 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	180.15'	136 cf	**4.00'D x 10.85'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	180.15'	**15.0" Round 15" HDPE N-12** L= 63.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.15' / 179.81' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.62 cfs @ 12.22 hrs HW=181.03' TW=180.77' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Outlet Controls 1.62 cfs @ 2.48 fps)

Pond C42P: Catch Basin #42



Summary for Pond C43P: Catch Basin #43

Inflow Area = 0.350 ac, 64.41% Impervious, Inflow Depth > 4.39" for 25YR-24HR event
Inflow = 1.67 cfs @ 12.10 hrs, Volume= 0.128 af
Outflow = 1.67 cfs @ 12.10 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Primary = 1.67 cfs @ 12.10 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 181.13' @ 12.10 hrs Surf.Area= 13 sf Storage= 8 cf
Flood Elev= 186.00' Surf.Area= 13 sf Storage= 69 cf

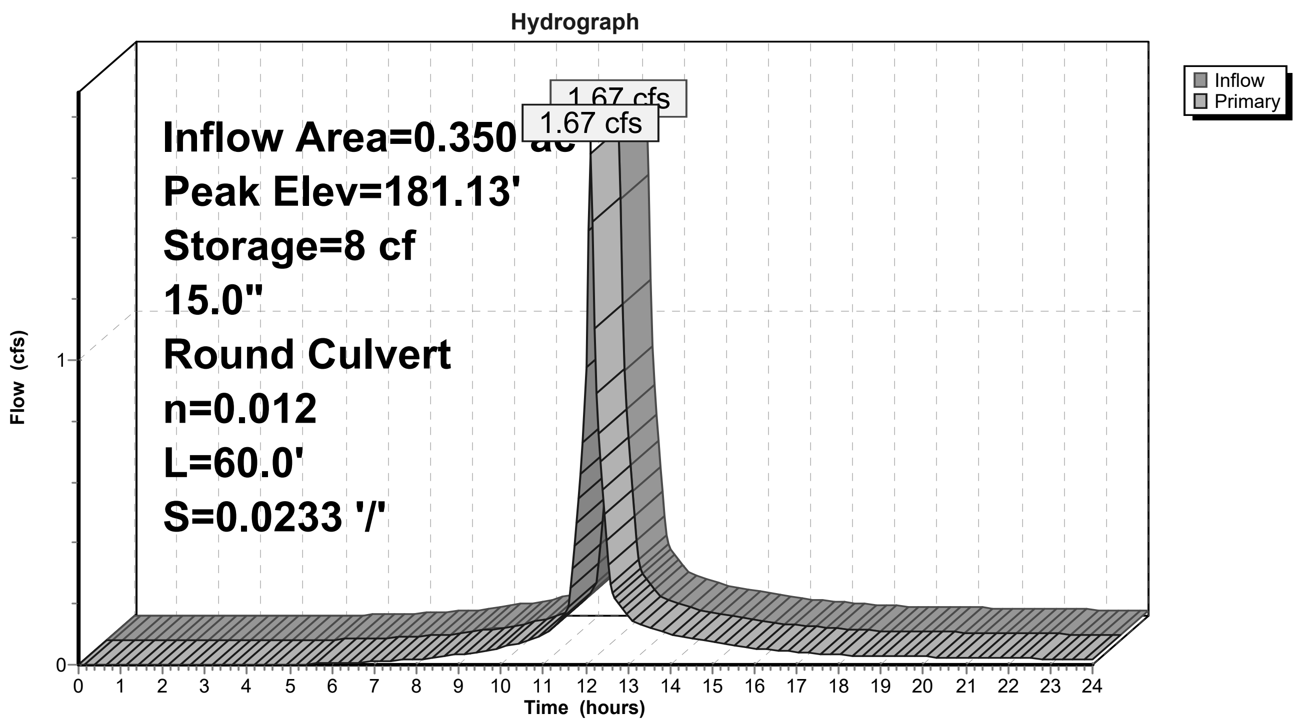
Plug-Flow detention time= 0.3 min calculated for 0.128 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (795.9 - 795.8)

Volume	Invert	Avail.Storage	Storage Description
#1	180.50'	69 cf	**4.00'D x 5.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	180.50'	**15.0" Round 15" HDPE N-12** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.50' / 179.10' S= 0.0233 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.67 cfs @ 12.10 hrs HW=181.13' TW=180.30' (Dynamic Tailwater)
1=15" HDPE N-12 (Inlet Controls 1.67 cfs @ 2.70 fps)

Pond C43P: Catch Basin #43



Summary for Pond C44P: Catch Basin #44

Inflow Area =	0.682 ac, 70.38% Impervious, Inflow Depth > 4.60" for 25YR-24HR event			
Inflow =	3.33 cfs @	12.10 hrs, Volume=	0.262 af	
Outflow =	3.32 cfs @	12.11 hrs, Volume=	0.262 af,	Atten= 0%, Lag= 0.1 min
Primary =	3.32 cfs @	12.11 hrs, Volume=	0.262 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 180.36' @ 12.13 hrs Surf.Area= 13 sf Storage= 17 cf
Flood Elev= 183.50' Surf.Area= 13 sf Storage= 57 cf

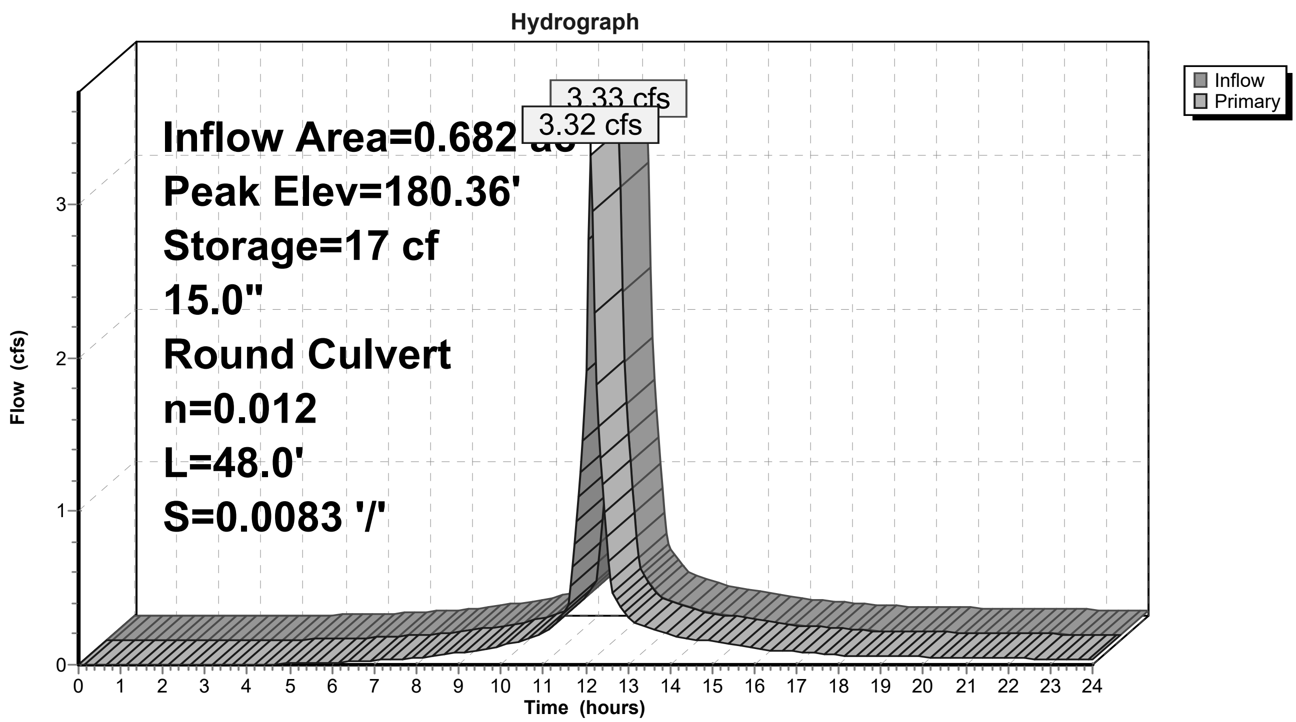
Plug-Flow detention time= 0.2 min calculated for 0.262 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (789.3 - 789.2)

Volume	Invert	Avail.Storage	Storage Description
#1	179.00'	57 cf	**4.00'D x 4.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	179.00'	**15.0" Round 15" HDPE N-12** L= 48.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 179.00' / 178.60' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.74 cfs @ 12.11 hrs HW=180.30' TW=180.06' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Outlet Controls 2.74 cfs @ 2.66 fps)

Pond C44P: Catch Basin #44



Summary for Pond C45P: Catch Basin #45

Inflow Area = 0.388 ac, 94.23% Impervious, Inflow Depth > 5.39" for 25YR-24HR event
Inflow = 2.15 cfs @ 12.09 hrs, Volume= 0.174 af
Outflow = 2.15 cfs @ 12.09 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.1 min
Primary = 2.15 cfs @ 12.09 hrs, Volume= 0.174 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 182.13' @ 12.09 hrs Surf.Area= 13 sf Storage= 9 cf
Flood Elev= 185.90' Surf.Area= 13 sf Storage= 57 cf

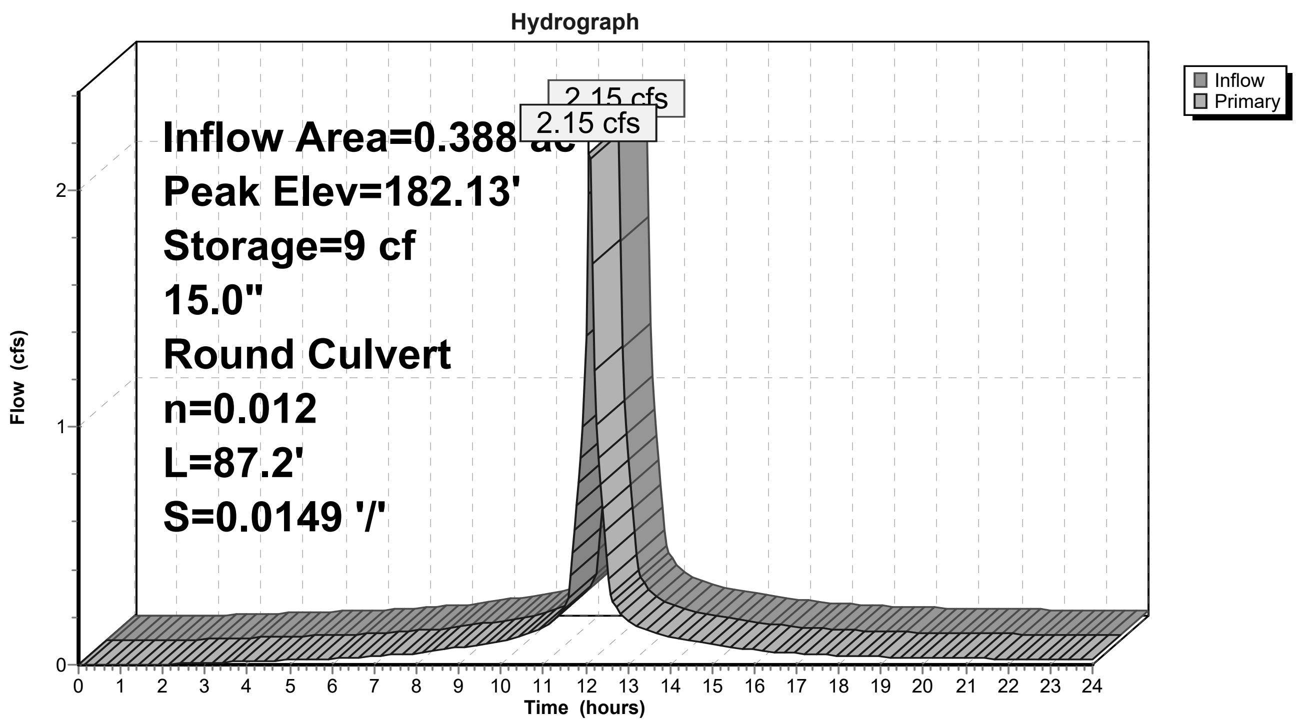
Plug-Flow detention time= 0.2 min calculated for 0.174 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (758.5 - 758.3)

Volume	Invert	Avail.Storage	Storage Description
#1	181.40'	57 cf	**4.00'D x 4.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	181.40'	**15.0" Round 15" HDPE N-12** L= 87.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 181.40' / 180.10' S= 0.0149 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.10 cfs @ 12.09 hrs HW=182.12' TW=180.90' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Inlet Controls 2.10 cfs @ 2.88 fps)

Pond C45P: Catch Basin #45



Summary for Pond C46P: Catch Basin #46

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

Inflow Area = 0.562 ac, 96.02% Impervious, Inflow Depth > 5.47" for 25YR-24HR event
Inflow = 3.13 cfs @ 12.09 hrs, Volume= 0.256 af
Outflow = 3.14 cfs @ 12.09 hrs, Volume= 0.256 af, Atten= 0%, Lag= 0.0 min
Primary = 3.14 cfs @ 12.09 hrs, Volume= 0.256 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 180.91' @ 12.09 hrs Surf.Area= 13 sf Storage= 11 cf
Flood Elev= 184.50' Surf.Area= 13 sf Storage= 57 cf

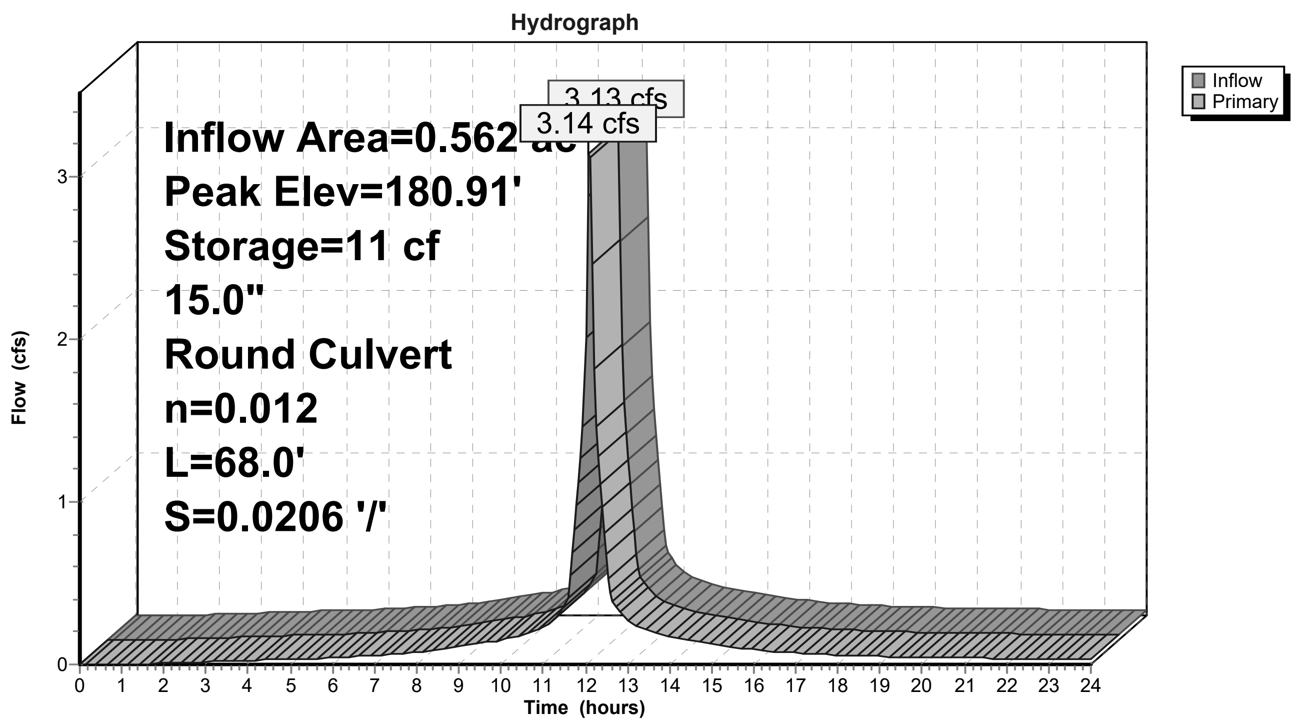
Plug-Flow detention time= 0.2 min calculated for 0.256 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (754.3 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1	180.00'	57 cf	**4.00'D x 4.50'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	180.00'	**15.0" Round 15" HDPE N-12** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 180.00' / 178.60' S= 0.0206 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.02 cfs @ 12.09 hrs HW=180.90' TW=180.04' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Outlet Controls 3.02 cfs @ 4.47 fps)

Pond C46P: Catch Basin #46



Summary for Pond C47P: Catch Basin #47

Inflow Area =	1.318 ac, 82.97% Impervious, Inflow Depth > 5.03" for 25YR-24HR event			
Inflow =	6.84 cfs @	12.10 hrs, Volume=	0.552 af	
Outflow =	6.84 cfs @	12.10 hrs, Volume=	0.552 af,	Atten= 0%, Lag= 0.0 min
Primary =	6.84 cfs @	12.10 hrs, Volume=	0.552 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 180.08' @ 12.10 hrs Surf.Area= 13 sf Storage= 20 cf
Flood Elev= 183.75' Surf.Area= 13 sf Storage= 66 cf

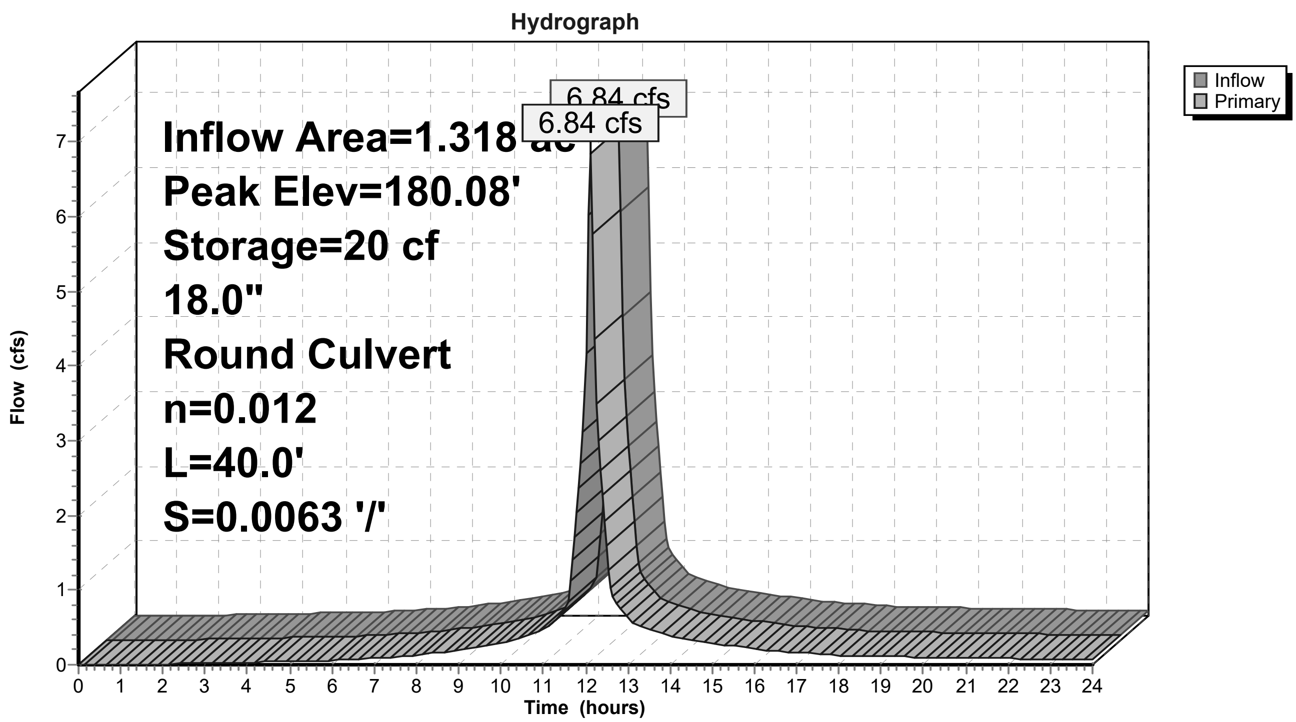
Plug-Flow detention time= 0.2 min calculated for 0.551 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (770.5 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	178.50'	66 cf	**4.00'D x 5.25'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	178.50'	**18.0" Round 18" HDPE N-12** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 178.50' / 178.25' S= 0.0063 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=6.78 cfs @ 12.10 hrs HW=180.07' TW=177.91' (Dynamic Tailwater)
↑—**1=18" HDPE N-12** (Barrel Controls 6.78 cfs @ 4.57 fps)

Pond C47P: Catch Basin #47



Summary for Pond C50P: Inlet Sump

Inflow Area = 4.165 ac, 32.60% Impervious, Inflow Depth > 1.43" for 25YR-24HR event
Inflow = 3.39 cfs @ 12.59 hrs, Volume= 0.495 af
Outflow = 3.39 cfs @ 12.60 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min
Primary = 3.39 cfs @ 12.60 hrs, Volume= 0.495 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.47' @ 12.60 hrs Surf.Area= 13 sf Storage= 12 cf
Flood Elev= 190.00' Surf.Area= 1,083 sf Storage= 1,167 cf

Plug-Flow detention time= 0.1 min calculated for 0.494 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (890.5 - 890.5)

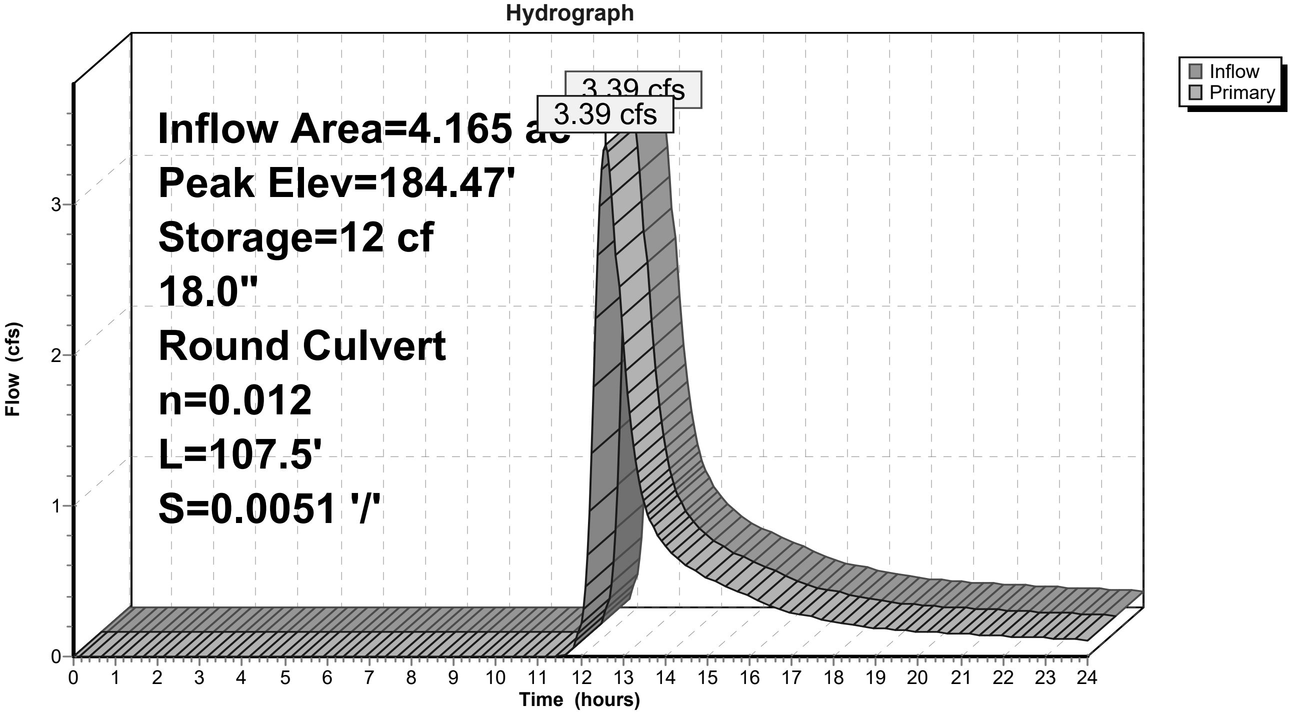
Volume	Invert	Avail.Storage	Storage Description
#1	187.50'	1,117 cf	**Ponding Area (Irregular)**Listed below (Recalc)
#2	183.50'	50 cf	**4.00'D x 4.00'H 4' Structure**
		1,167 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
187.50	71	52.1	0	0	71
188.00	156	61.5	55	55	161
189.00	483	101.0	304	360	678
190.00	1,070	143.1	757	1,117	1,505

Device	Routing	Invert	Outlet Devices
#1	Primary	183.50'	**18.0" Round 18" HDPE N-12** L= 107.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 183.50' / 182.95' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.39 cfs @ 12.60 hrs HW=184.47' TW=0.00' (Dynamic Tailwater)
└─**1=18" HDPE N-12** (Barrel Controls 3.39 cfs @ 3.98 fps)

Pond C50P: Inlet Sump



Summary for Pond D51P: DMH #51

Inflow Area = 1.174 ac, 43.96% Impervious, Inflow Depth > 1.77" for 25YR-24HR event
Inflow = 0.68 cfs @ 12.71 hrs, Volume= 0.173 af
Outflow = 0.68 cfs @ 12.73 hrs, Volume= 0.173 af, Atten= 0%, Lag= 1.3 min
Primary = 0.68 cfs @ 12.73 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 182.01' @ 12.73 hrs Surf.Area= 0.000 ac Storage= 0.000 af
Flood Elev= 185.75' Surf.Area= 0.000 ac Storage= 0.001 af

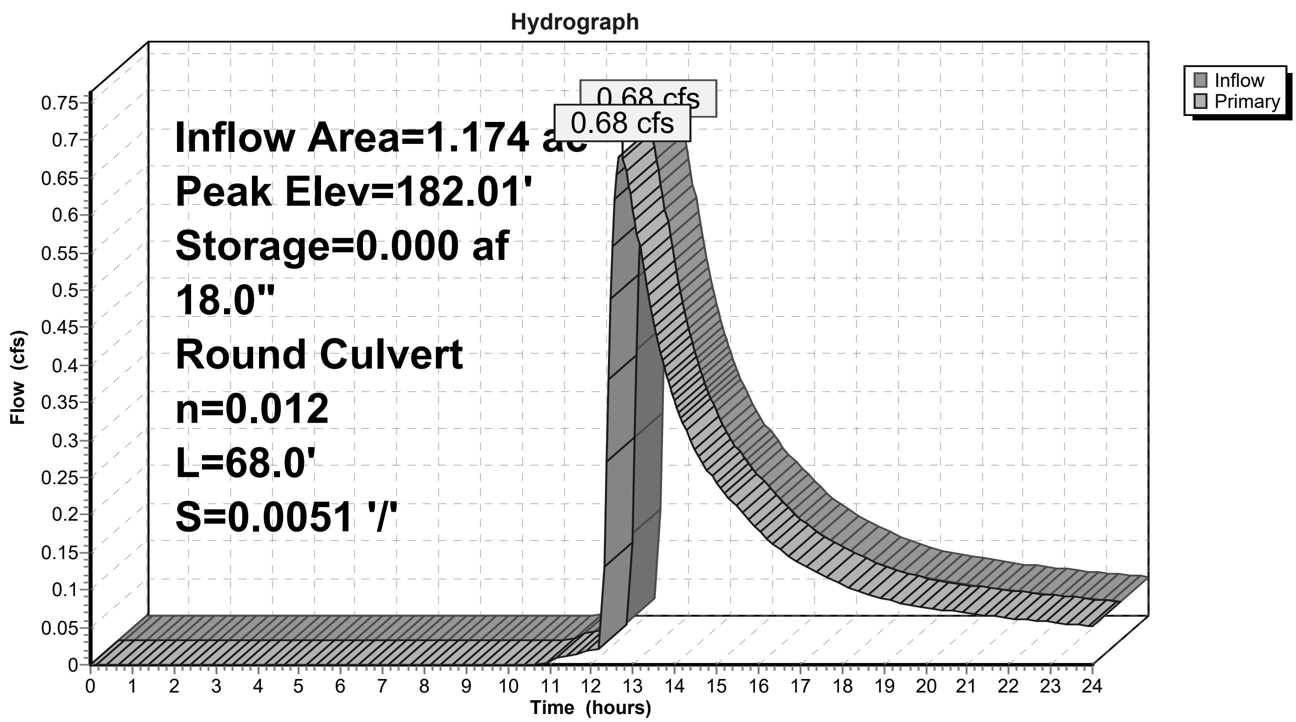
Plug-Flow detention time= 0.2 min calculated for 0.173 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (934.9 - 934.8)

Volume	Invert	Avail.Storage	Storage Description
#1	181.60'	0.001 af	**4.00'D x 4.05'H Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	181.60'	**18.0" Round 18" HDPE N-12** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 181.60' / 181.25' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.68 cfs @ 12.73 hrs HW=182.01' TW=0.00' (Dynamic Tailwater)
└─**1=18" HDPE N-12** (Barrel Controls 0.68 cfs @ 2.62 fps)

Pond D51P: DMH #51



Summary for Pond D52P: DMH #52

[80] Warning: Exceeded Pond C42P by 0.08' @ 12.05 hrs (0.69 cfs 0.005 af)

Inflow Area = 2.590 ac, 38.34% Impervious, Inflow Depth > 2.81" for 25YR-24HR event
Inflow = 6.97 cfs @ 12.10 hrs, Volume= 0.606 af
Outflow = 6.97 cfs @ 12.10 hrs, Volume= 0.606 af, Atten= 0%, Lag= 0.0 min
Primary = 6.97 cfs @ 12.10 hrs, Volume= 0.606 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 180.99' @ 12.11 hrs Surf.Area= 13 sf Storage= 16 cf
Flood Elev= 190.11' Surf.Area= 13 sf Storage= 131 cf

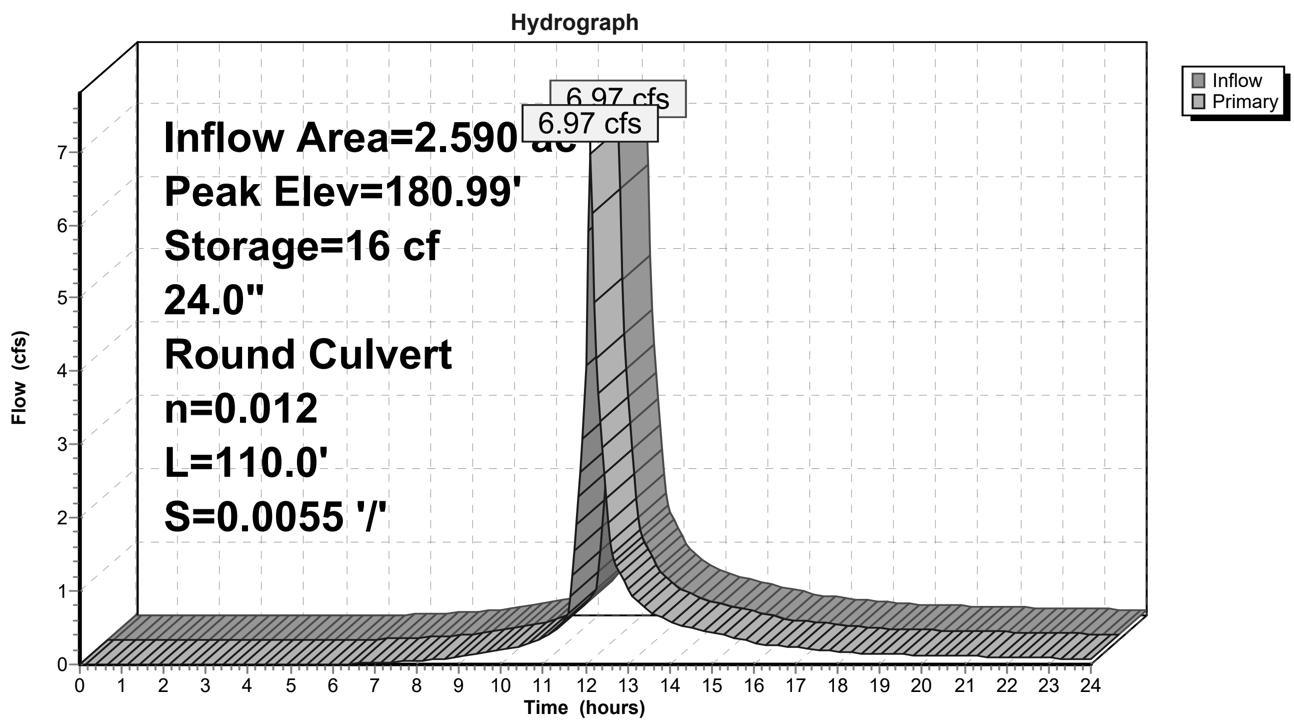
Plug-Flow detention time= 0.1 min calculated for 0.606 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (812.1 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	179.71'	131 cf	**4.00'D x 10.40'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	179.71'	**24.0" Round 24" HDPE N-12** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 179.71' / 179.10' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.55 cfs @ 12.10 hrs HW=180.98' TW=180.16' (Dynamic Tailwater)
1=24" HDPE N-12 (Outlet Controls 6.55 cfs @ 4.42 fps)

Pond D52P: DMH #52



Summary for Pond D53P: DMH #53

Inflow Area = 2.590 ac, 38.34% Impervious, Inflow Depth > 2.81" for 25YR-24HR event
Inflow = 6.97 cfs @ 12.10 hrs, Volume= 0.606 af
Outflow = 6.97 cfs @ 12.10 hrs, Volume= 0.606 af, Atten= 0%, Lag= 0.0 min
Primary = 6.97 cfs @ 12.10 hrs, Volume= 0.606 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 180.16' @ 12.10 hrs Surf.Area= 13 sf Storage= 15 cf
Flood Elev= 191.95' Surf.Area= 13 sf Storage= 163 cf

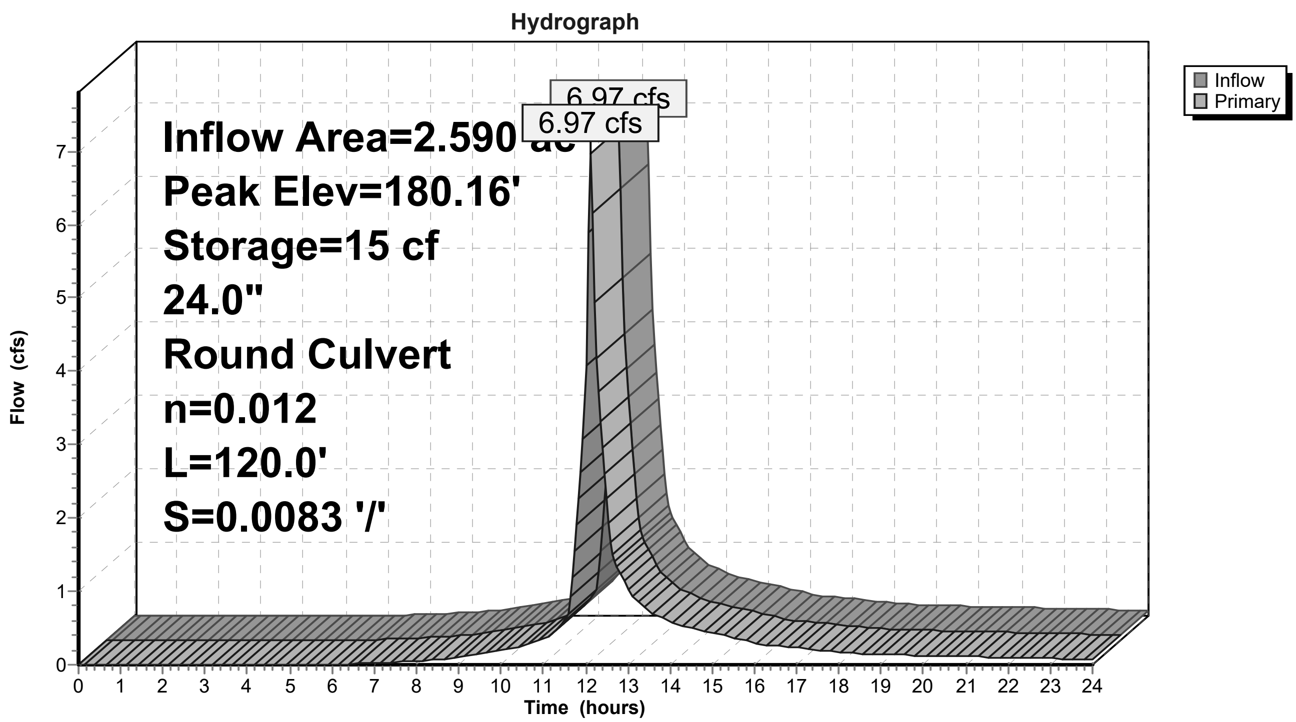
Plug-Flow detention time= 0.1 min calculated for 0.606 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (812.1 - 812.1)

Volume	Invert	Avail.Storage	Storage Description
#1	179.00'	163 cf	**4.00'D x 12.95'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	179.00'	**24.0" Round 24" HDPE N-12** L= 120.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 179.00' / 178.00' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.91 cfs @ 12.10 hrs HW=180.16' TW=178.47' (Dynamic Tailwater)
└─**1=24" HDPE N-12** (Inlet Controls 6.91 cfs @ 3.66 fps)

Pond D53P: DMH #53



Summary for Pond E01P: Existing Catch Basin

Inflow Area = 0.452 ac, 56.06% Impervious, Inflow Depth > 3.86" for 25YR-24HR event
Inflow = 1.99 cfs @ 12.09 hrs, Volume= 0.145 af
Outflow = 1.98 cfs @ 12.09 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min
Primary = 1.98 cfs @ 12.09 hrs, Volume= 0.145 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.38' @ 12.12 hrs Surf.Area= 13 sf Storage= 11 cf
Flood Elev= 190.33' Surf.Area= 13 sf Storage= 86 cf

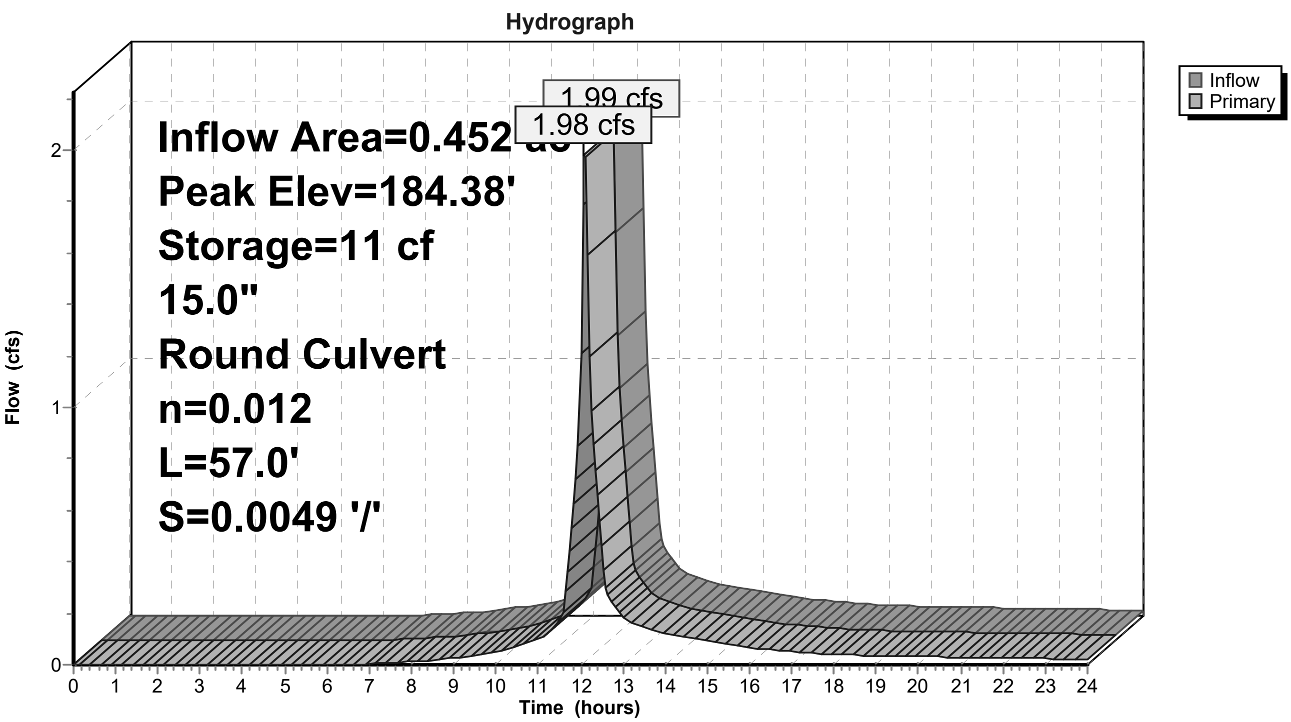
Plug-Flow detention time= 0.3 min calculated for 0.145 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (809.5 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	183.50'	86 cf	**4.00'D x 6.83'H 4' Structure**

Device	Routing	Invert	Outlet Devices
#1	Primary	183.50'	**15.0" Round 15" HDPE N-12** L= 57.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.50' / 183.22' S= 0.0049 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.65 cfs @ 12.09 hrs HW=184.36' TW=184.08' (Dynamic Tailwater)
└─**1=15" HDPE N-12** (Outlet Controls 1.65 cfs @ 2.61 fps)

Pond E01P: Existing Catch Basin



Summary for Pond E02P: Existing Catch Basin

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

Inflow Area = 1.322 ac, 63.48% Impervious, Inflow Depth > 4.07" for 25YR-24HR event
Inflow = 6.08 cfs @ 12.09 hrs, Volume= 0.448 af
Outflow = 6.09 cfs @ 12.10 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.02 cfs @ 12.05 hrs, Volume= 0.013 af
Primary = 6.08 cfs @ 12.10 hrs, Volume= 0.435 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 184.10' @ 12.10 hrs Surf.Area= 244 sf Storage= 224 cf
Flood Elev= 189.42' Surf.Area= 0 sf Storage= 464 cf

Plug-Flow detention time= 1.2 min calculated for 0.447 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (804.6 - 803.7)

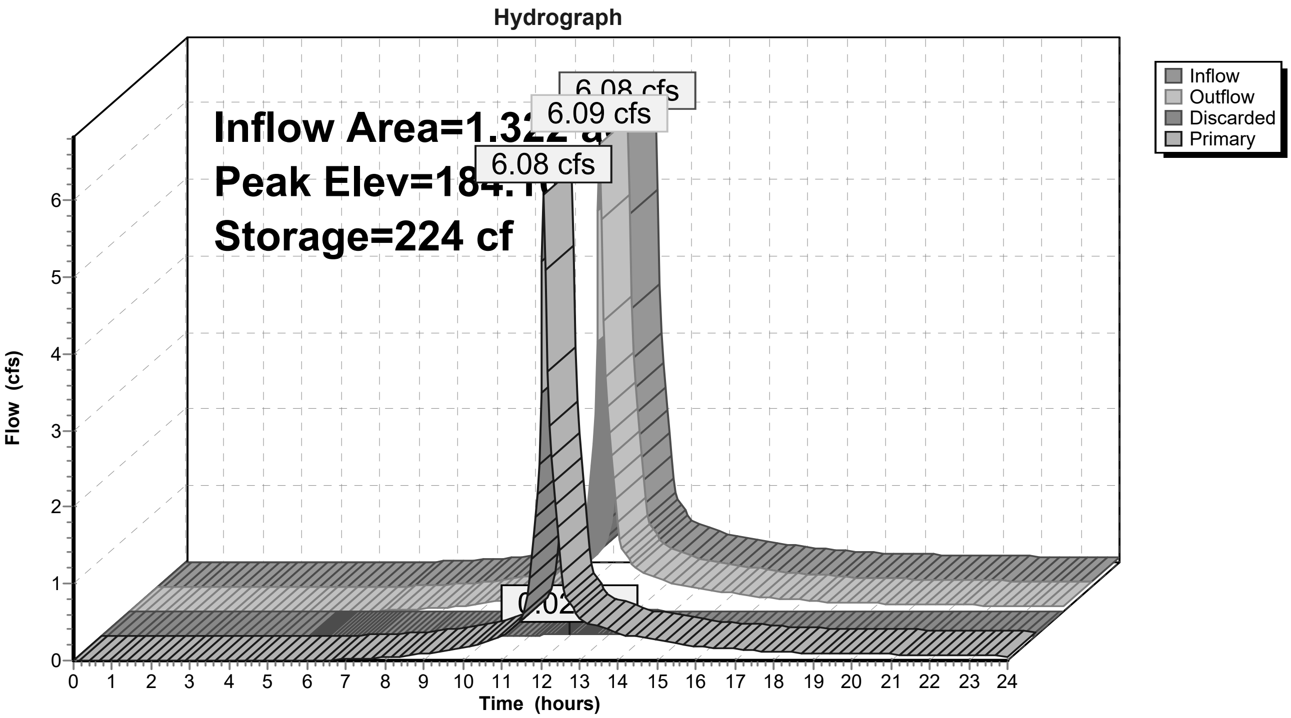
Volume	Invert	Avail.Storage	Storage Description
#1	183.02'	80 cf	**4.00'D x 6.40'H 4' Structure**-Impervious
#2	183.02'	384 cf	**24.0" Round 24" HDPE N-12 Perf** L= 122.2'
		464 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	183.02'	**24.0" Round 24" HDPE N-12 Perf** L= 122.2' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 183.02' / 179.71' S= 0.0271 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Discarded	183.02'	**3.000 in/hr Infiltration over Surface area**

Discarded OutFlow Max=0.02 cfs @ 12.05 hrs HW=184.01' (Free Discharge)
└─**2=Infiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=6.04 cfs @ 12.10 hrs HW=184.09' TW=180.98' (Dynamic Tailwater)
└─**1=24" HDPE N-12 Perf** (Inlet Controls 6.04 cfs @ 3.53 fps)

Pond E02P: Existing Catch Basin



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=164,530 sf 2.77% Impervious Runoff Depth>0.39"
Flow Length=298' Tc=16.6 min UI Adjusted CN=61 Runoff=0.77 cfs 0.124 af

Subcatchment 3S: Subcat. #3 Runoff Area=46,611 sf 0.00% Impervious Runoff Depth>0.07"
Flow Length=158' Slope=0.0200 '/' Tc=11.3 min CN=48 Runoff=0.01 cfs 0.006 af

Subcatchment 4S: Subcat. #4 Runoff Area=55,483 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=674' Tc=43.2 min CN=40 Runoff=0.00 cfs 0.000 af

Subcatchment 30S: Subcat #30 Runoff Area=47,823 sf 4.45% Impervious Runoff Depth>0.47"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=63 Runoff=0.34 cfs 0.043 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>1.44"
Tc=6.0 min CN=82 Runoff=0.75 cfs 0.054 af

Subcatchment 32S: Subcat #32 Runoff Area=37,918 sf 67.33% Impervious Runoff Depth>1.65"
Tc=6.0 min CN=85 Runoff=1.66 cfs 0.120 af

Subcatchment 41S: Subcat #41 Runoff Area=7,421 sf 61.70% Impervious Runoff Depth>1.88"
Flow Length=342' Tc=14.7 min CN=88 Runoff=0.29 cfs 0.027 af

Subcatchment 43S: Subcat #43 Runoff Area=15,256 sf 64.41% Impervious Runoff Depth>1.81"
Flow Length=100' Tc=7.0 min CN=87 Runoff=0.71 cfs 0.053 af

Subcatchment 44S: Subcat #44 Runoff Area=14,458 sf 76.68% Impervious Runoff Depth>2.14"
Flow Length=98' Tc=7.7 min CN=91 Runoff=0.77 cfs 0.059 af

Subcatchment 45S: Subcat #45 Runoff Area=16,893 sf 94.23% Impervious Runoff Depth>2.63"
Flow Length=330' Tc=6.0 min CN=96 Runoff=1.09 cfs 0.085 af

Subcatchment 46S: Subcat #46 Runoff Area=7,602 sf 100.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=98 Runoff=0.51 cfs 0.041 af

Subcatchment 47S: Subcat #47 Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.017 af

Subcatchment 50S: Subcat #50 Runoff Area=11,704 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=182' Tc=11.7 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment 62S: Subcat. #62 Runoff Area=45,124 sf 0.15% Impervious Runoff Depth>0.50"
Flow Length=165' Tc=14.3 min CN=64 Runoff=0.33 cfs 0.043 af

Subcatchment 63S: Subcat. #63 Runoff Area=16,040 sf 0.00% Impervious Runoff Depth>0.30"
Flow Length=150' Tc=10.8 min CN=58 Runoff=0.05 cfs 0.009 af

Subcatchment 64S: Subcat #64 Runoff Area=7,675 sf 0.00% Impervious Runoff Depth>0.30"
Tc=6.0 min CN=58 Runoff=0.03 cfs 0.004 af

Subcatchment 70S: Subcat #70 Runoff Area=51,128 sf 43.96% Impervious Runoff Depth>0.62"
Flow Length=345' Tc=14.1 min CN=67 Runoff=0.53 cfs 0.061 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>0.16"
Flow Length=563' Tc=39.5 min CN=53 Runoff=0.07 cfs 0.032 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>0.46"
Flow Length=478' Tc=32.0 min CN=63 Runoff=0.34 cfs 0.061 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=151.0' S=0.0063 '/' Capacity=12.85 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=35.0' S=0.2286 '/' Capacity=77.47 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=58.0' S=0.0948 '/' Capacity=31.37 cfs Outflow=0.00 cfs 0.000 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.18' Max Vel=0.63 fps Inflow=0.34 cfs 0.070 af
n=0.035 L=78.5' S=0.0038 '/' Capacity=61.73 cfs Outflow=0.34 cfs 0.069 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.09' Max Vel=0.92 fps Inflow=0.31 cfs 0.038 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=0.28 cfs 0.038 af

Reach 200R: Final Reach #200 Inflow=0.77 cfs 0.124 af
Outflow=0.77 cfs 0.124 af

Reach 300R: FInal Reach #300 Inflow=1.55 cfs 0.217 af
Outflow=1.55 cfs 0.217 af

Reach 400R: Final Reach #400 Inflow=0.36 cfs 0.089 af
Outflow=0.36 cfs 0.089 af

Pond 30P: Infiltration/Trench Peak Elev=183.51' Storage=162 cf Inflow=0.34 cfs 0.043 af
Discarded=0.08 cfs 0.027 af Primary=0.21 cfs 0.016 af Secondary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.043 af

Pond 71P: Existing Catch Basin Peak Elev=188.18' Inflow=0.34 cfs 0.070 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=0.34 cfs 0.070 af

Pond 72P: Existing Depression Peak Elev=196.04' Storage=103 cf Inflow=0.34 cfs 0.061 af
Discarded=0.02 cfs 0.021 af Primary=0.31 cfs 0.038 af Outflow=0.33 cfs 0.059 af

Pond 201P: Bioretention W/ ISR #201 Peak Elev=184.56' Storage=1,815 cf Inflow=0.53 cfs 0.061 af
Primary=0.02 cfs 0.020 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.020 af

Pond 202P: Bioretention W/ ISR #202 Peak Elev=177.39' Storage=7,276 cf Inflow=3.42 cfs 0.299 af
Primary=0.07 cfs 0.084 af Secondary=0.20 cfs 0.085 af Tertiary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.169 af

Pond 203P: Infiltration Pond #203 Peak Elev=173.49' Storage=1,933 cf Inflow=0.29 cfs 0.178 af
Discarded=0.16 cfs 0.158 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.158 af

Pond 204P: Detention Pond #204 Peak Elev=177.73' Storage=2,147 cf Inflow=2.61 cfs 0.211 af
Primary=1.55 cfs 0.211 af Secondary=0.00 cfs 0.000 af Outflow=1.55 cfs 0.211 af

Pond C41P: Catch Basin #41 Peak Elev=184.25' Storage=3 cf Inflow=0.29 cfs 0.027 af
15.0" Round Culvert n=0.012 L=54.7' S=0.0686 '/' Outflow=0.29 cfs 0.027 af

Pond C42P: Catch Basin #42 Peak Elev=180.56' Storage=5 cf Inflow=0.45 cfs 0.042 af
15.0" Round Culvert n=0.012 L=63.0' S=0.0054 '/' Outflow=0.45 cfs 0.042 af

Pond C43P: Catch Basin #43 Peak Elev=180.89' Storage=5 cf Inflow=0.71 cfs 0.053 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0233 '/' Outflow=0.71 cfs 0.053 af

Pond C44P: Catch Basin #44 Peak Elev=179.74' Storage=9 cf Inflow=1.47 cfs 0.112 af
15.0" Round Culvert n=0.012 L=48.0' S=0.0083 '/' Outflow=1.47 cfs 0.112 af

Pond C45P: Catch Basin #45 Peak Elev=181.90' Storage=6 cf Inflow=1.09 cfs 0.085 af
15.0" Round Culvert n=0.012 L=87.2' S=0.0149 '/' Outflow=1.09 cfs 0.085 af

Pond C46P: Catch Basin #46 Peak Elev=180.61' Storage=8 cf Inflow=1.60 cfs 0.126 af
15.0" Round Culvert n=0.012 L=68.0' S=0.0206 '/' Outflow=1.60 cfs 0.126 af

Pond C47P: Catch Basin #47 Peak Elev=179.47' Storage=12 cf Inflow=3.27 cfs 0.256 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0063 '/' Outflow=3.27 cfs 0.256 af

Pond C50P: Inlet Sump Peak Elev=183.78' Storage=4 cf Inflow=0.34 cfs 0.069 af
18.0" Round Culvert n=0.012 L=107.5' S=0.0051 '/' Outflow=0.34 cfs 0.069 af

Pond D51P: DMH #51 Peak Elev=181.67' Storage=0.000 af Inflow=0.02 cfs 0.020 af
18.0" Round Culvert n=0.012 L=68.0' S=0.0051 '/' Outflow=0.02 cfs 0.020 af

Pond D52P: DMH #52 Peak Elev=180.44' Storage=9 cf Inflow=2.59 cfs 0.207 af
24.0" Round Culvert n=0.012 L=110.0' S=0.0055 '/' Outflow=2.59 cfs 0.207 af

Pond D53P: DMH #53 Peak Elev=179.67' Storage=8 cf Inflow=2.59 cfs 0.207 af
24.0" Round Culvert n=0.012 L=120.0' S=0.0083 '/' Outflow=2.60 cfs 0.207 af

Pond E01P: Existing Catch Basin Peak Elev=183.97' Storage=6 cf Inflow=0.75 cfs 0.054 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=0.75 cfs 0.054 af

Pond E02P: Existing Catch Basin Peak Elev=183.66' Storage=115 cf Inflow=2.40 cfs 0.174 af
Discarded=0.02 cfs 0.010 af Primary=2.38 cfs 0.165 af Outflow=2.40 cfs 0.174 af

Total Runoff Area = 16.948 ac Runoff Volume = 0.840 af Average Runoff Depth = 0.59"
76.01% Pervious = 12.882 ac 23.99% Impervious = 4.066 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=164,530 sf 2.77% Impervious Runoff Depth>1.16"
Flow Length=298' Tc=16.6 min UI Adjusted CN=61 Runoff=3.28 cfs 0.365 af

Subcatchment 3S: Subcat. #3 Runoff Area=46,611 sf 0.00% Impervious Runoff Depth>0.46"
Flow Length=158' Slope=0.0200 '/' Tc=11.3 min CN=48 Runoff=0.23 cfs 0.041 af

Subcatchment 4S: Subcat. #4 Runoff Area=55,483 sf 0.00% Impervious Runoff Depth>0.16"
Flow Length=674' Tc=43.2 min CN=40 Runoff=0.03 cfs 0.017 af

Subcatchment 30S: Subcat #30 Runoff Area=47,823 sf 4.45% Impervious Runoff Depth>1.29"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=63 Runoff=1.26 cfs 0.118 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>2.77"
Tc=6.0 min CN=82 Runoff=1.43 cfs 0.104 af

Subcatchment 32S: Subcat #32 Runoff Area=37,918 sf 67.33% Impervious Runoff Depth>3.04"
Tc=6.0 min CN=85 Runoff=3.02 cfs 0.221 af

Subcatchment 41S: Subcat #41 Runoff Area=7,421 sf 61.70% Impervious Runoff Depth>3.33"
Flow Length=342' Tc=14.7 min CN=88 Runoff=0.50 cfs 0.047 af

Subcatchment 43S: Subcat #43 Runoff Area=15,256 sf 64.41% Impervious Runoff Depth>3.24"
Flow Length=100' Tc=7.0 min CN=87 Runoff=1.25 cfs 0.094 af

Subcatchment 44S: Subcat #44 Runoff Area=14,458 sf 76.68% Impervious Runoff Depth>3.64"
Flow Length=98' Tc=7.7 min CN=91 Runoff=1.27 cfs 0.101 af

Subcatchment 45S: Subcat #45 Runoff Area=16,893 sf 94.23% Impervious Runoff Depth>4.18"
Flow Length=330' Tc=6.0 min CN=96 Runoff=1.69 cfs 0.135 af

Subcatchment 46S: Subcat #46 Runoff Area=7,602 sf 100.00% Impervious Runoff Depth>4.41"
Tc=6.0 min CN=98 Runoff=0.77 cfs 0.064 af

Subcatchment 47S: Subcat #47 Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>4.41"
Tc=6.0 min CN=98 Runoff=0.33 cfs 0.027 af

Subcatchment 50S: Subcat #50 Runoff Area=11,704 sf 0.00% Impervious Runoff Depth>0.02"
Flow Length=182' Tc=11.7 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment 62S: Subcat. #62 Runoff Area=45,124 sf 0.15% Impervious Runoff Depth>1.35"
Flow Length=165' Tc=14.3 min CN=64 Runoff=1.16 cfs 0.117 af

Subcatchment 63S: Subcat. #63 Runoff Area=16,040 sf 0.00% Impervious Runoff Depth>0.98"
Flow Length=150' Tc=10.8 min CN=58 Runoff=0.29 cfs 0.030 af

Subcatchment 64S: Subcat #64 Runoff Area=7,675 sf 0.00% Impervious Runoff Depth>0.98"
Tc=6.0 min CN=58 Runoff=0.17 cfs 0.014 af

Subcatchment 70S: Subcat #70 Runoff Area=51,128 sf 43.96% Impervious Runoff Depth>1.56"
Flow Length=345' Tc=14.1 min CN=67 Runoff=1.57 cfs 0.152 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>0.69"
Flow Length=563' Tc=39.5 min CN=53 Runoff=0.68 cfs 0.134 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>1.28"
Flow Length=478' Tc=32.0 min CN=63 Runoff=1.20 cfs 0.169 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=151.0' S=0.0063 '/' Capacity=12.85 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=35.0' S=0.2286 '/' Capacity=77.47 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=58.0' S=0.0948 '/' Capacity=31.37 cfs Outflow=0.00 cfs 0.000 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.38' Max Vel=1.05 fps Inflow=1.78 cfs 0.277 af
n=0.035 L=78.5' S=0.0038 '/' Capacity=61.73 cfs Outflow=1.78 cfs 0.277 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.19' Max Vel=1.45 fps Inflow=1.16 cfs 0.144 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=1.12 cfs 0.144 af

Reach 200R: Final Reach #200 Inflow=3.28 cfs 0.365 af
Outflow=3.28 cfs 0.365 af

Reach 300R: FInal Reach #300 Inflow=3.49 cfs 0.599 af
Outflow=3.49 cfs 0.599 af

Reach 400R: Final Reach #400 Inflow=1.84 cfs 0.367 af
Outflow=1.84 cfs 0.367 af

Pond 30P: Infiltration/Trench Peak Elev=183.71' Storage=667 cf Inflow=1.26 cfs 0.118 af
Discarded=0.36 cfs 0.053 af Primary=0.42 cfs 0.063 af Secondary=0.00 cfs 0.000 af Outflow=0.78 cfs 0.117 af

Pond 71P: Existing Catch Basin Peak Elev=188.60' Inflow=1.78 cfs 0.277 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=1.78 cfs 0.277 af

Pond 72P: Existing Depression Peak Elev=196.14' Storage=138 cf Inflow=1.20 cfs 0.169 af
Discarded=0.02 cfs 0.023 af Primary=1.16 cfs 0.144 af Outflow=1.18 cfs 0.167 af

Pond 201P: Bioretention W/ ISR #201 Peak Elev=185.13' Storage=3,247 cf Inflow=1.57 cfs 0.152 af
Primary=0.02 cfs 0.022 af Secondary=0.18 cfs 0.067 af Outflow=0.20 cfs 0.090 af

Pond 202P: Bioretention W/ ISR #202 Peak Elev=178.40' Storage=12,765 cf Inflow=6.06 cfs 0.538 af
Primary=0.08 cfs 0.092 af Secondary=0.47 cfs 0.303 af Tertiary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.395 af

Pond 203P: Infiltration Pond #203 Peak Elev=174.56' Storage=4,756 cf Inflow=0.68 cfs 0.425 af
Discarded=0.21 cfs 0.221 af Primary=0.32 cfs 0.105 af Outflow=0.53 cfs 0.326 af

Pond 204P: Detention Pond #204 Peak Elev=178.35' Storage=3,509 cf Inflow=5.27 cfs 0.438 af
Primary=3.27 cfs 0.436 af Secondary=0.00 cfs 0.000 af Outflow=3.27 cfs 0.436 af

Pond C41P: Catch Basin #41 Peak Elev=184.33' Storage=4 cf Inflow=0.50 cfs 0.047 af
15.0" Round Culvert n=0.012 L=54.7' S=0.0686 '/' Outflow=0.50 cfs 0.047 af

Pond C42P: Catch Basin #42 Peak Elev=180.89' Storage=9 cf Inflow=0.88 cfs 0.110 af
15.0" Round Culvert n=0.012 L=63.0' S=0.0054 '/' Outflow=0.88 cfs 0.110 af

Pond C43P: Catch Basin #43 Peak Elev=181.04' Storage=7 cf Inflow=1.25 cfs 0.094 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0233 '/' Outflow=1.25 cfs 0.094 af

Pond C44P: Catch Basin #44 Peak Elev=180.08' Storage=14 cf Inflow=2.52 cfs 0.195 af
15.0" Round Culvert n=0.012 L=48.0' S=0.0083 '/' Outflow=2.51 cfs 0.195 af

Pond C45P: Catch Basin #45 Peak Elev=182.03' Storage=8 cf Inflow=1.69 cfs 0.135 af
15.0" Round Culvert n=0.012 L=87.2' S=0.0149 '/' Outflow=1.69 cfs 0.135 af

Pond C46P: Catch Basin #46 Peak Elev=180.79' Storage=10 cf Inflow=2.47 cfs 0.199 af
15.0" Round Culvert n=0.012 L=68.0' S=0.0206 '/' Outflow=2.47 cfs 0.199 af

Pond C47P: Catch Basin #47 Peak Elev=179.81' Storage=16 cf Inflow=5.28 cfs 0.421 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0063 '/' Outflow=5.28 cfs 0.421 af

Pond C50P: Inlet Sump Peak Elev=184.17' Storage=8 cf Inflow=1.78 cfs 0.278 af
18.0" Round Culvert n=0.012 L=107.5' S=0.0051 '/' Outflow=1.78 cfs 0.277 af

Pond D51P: DMH #51 Peak Elev=181.82' Storage=0.000 af Inflow=0.20 cfs 0.090 af
18.0" Round Culvert n=0.012 L=68.0' S=0.0051 '/' Outflow=0.20 cfs 0.090 af

Pond D52P: DMH #52 Peak Elev=180.78' Storage=13 cf Inflow=5.11 cfs 0.423 af
24.0" Round Culvert n=0.012 L=110.0' S=0.0055 '/' Outflow=5.11 cfs 0.423 af

Pond D53P: DMH #53 Peak Elev=179.97' Storage=12 cf Inflow=5.11 cfs 0.423 af
24.0" Round Culvert n=0.012 L=120.0' S=0.0083 '/' Outflow=5.11 cfs 0.423 af

Pond E01P: Existing Catch Basin Peak Elev=184.21' Storage=9 cf Inflow=1.43 cfs 0.104 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=1.43 cfs 0.104 af

Pond E02P: Existing Catch Basin Peak Elev=183.92' Storage=179 cf Inflow=4.45 cfs 0.325 af
Discarded=0.02 cfs 0.012 af Primary=4.44 cfs 0.313 af Outflow=4.46 cfs 0.325 af

Total Runoff Area = 16.948 ac Runoff Volume = 1.951 af Average Runoff Depth = 1.38"
76.01% Pervious = 12.882 ac 23.99% Impervious = 4.066 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=164,530 sf 2.77% Impervious Runoff Depth>1.91"
Flow Length=298' Tc=16.6 min UI Adjusted CN=61 Runoff=5.80 cfs 0.602 af

Subcatchment 3S: Subcat. #3 Runoff Area=46,611 sf 0.00% Impervious Runoff Depth>0.94"
Flow Length=158' Slope=0.0200 '/' Tc=11.3 min CN=48 Runoff=0.69 cfs 0.084 af

Subcatchment 4S: Subcat. #4 Runoff Area=55,483 sf 0.00% Impervious Runoff Depth>0.45"
Flow Length=674' Tc=43.2 min CN=40 Runoff=0.15 cfs 0.048 af

Subcatchment 30S: Subcat #30 Runoff Area=47,823 sf 4.45% Impervious Runoff Depth>2.08"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=63 Runoff=2.15 cfs 0.190 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>3.86"
Tc=6.0 min CN=82 Runoff=1.99 cfs 0.145 af

Subcatchment 32S: Subcat #32 Runoff Area=37,918 sf 67.33% Impervious Runoff Depth>4.18"
Tc=6.0 min CN=85 Runoff=4.10 cfs 0.303 af

Subcatchment 41S: Subcat #41 Runoff Area=7,421 sf 61.70% Impervious Runoff Depth>4.49"
Flow Length=342' Tc=14.7 min CN=88 Runoff=0.66 cfs 0.064 af

Subcatchment 43S: Subcat #43 Runoff Area=15,256 sf 64.41% Impervious Runoff Depth>4.39"
Flow Length=100' Tc=7.0 min CN=87 Runoff=1.67 cfs 0.128 af

Subcatchment 44S: Subcat #44 Runoff Area=14,458 sf 76.68% Impervious Runoff Depth>4.83"
Flow Length=98' Tc=7.7 min CN=91 Runoff=1.66 cfs 0.133 af

Subcatchment 45S: Subcat #45 Runoff Area=16,893 sf 94.23% Impervious Runoff Depth>5.39"
Flow Length=330' Tc=6.0 min CN=96 Runoff=2.15 cfs 0.174 af

Subcatchment 46S: Subcat #46 Runoff Area=7,602 sf 100.00% Impervious Runoff Depth>5.63"
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.082 af

Subcatchment 47S: Subcat #47 Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>5.63"
Tc=6.0 min CN=98 Runoff=0.41 cfs 0.034 af

Subcatchment 50S: Subcat #50 Runoff Area=11,704 sf 0.00% Impervious Runoff Depth>0.15"
Flow Length=182' Tc=11.7 min CN=33 Runoff=0.01 cfs 0.003 af

Subcatchment 62S: Subcat. #62 Runoff Area=45,124 sf 0.15% Impervious Runoff Depth>2.16"
Flow Length=165' Tc=14.3 min CN=64 Runoff=1.95 cfs 0.187 af

Subcatchment 63S: Subcat. #63 Runoff Area=16,040 sf 0.00% Impervious Runoff Depth>1.67"
Flow Length=150' Tc=10.8 min CN=58 Runoff=0.56 cfs 0.051 af

Subcatchment 64S: Subcat #64 Runoff Area=7,675 sf 0.00% Impervious Runoff Depth>1.67"
Tc=6.0 min CN=58 Runoff=0.31 cfs 0.025 af

Subcatchment 70S: Subcat #70 Runoff Area=51,128 sf 43.96% Impervious Runoff Depth>2.43"
Flow Length=345' Tc=14.1 min CN=67 Runoff=2.53 cfs 0.237 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>1.28"
Flow Length=563' Tc=39.5 min CN=53 Runoff=1.48 cfs 0.246 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>2.07"
Flow Length=478' Tc=32.0 min CN=63 Runoff=2.04 cfs 0.273 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=151.0' S=0.0063 '/' Capacity=12.85 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=35.0' S=0.2286 '/' Capacity=77.47 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=58.0' S=0.0948 '/' Capacity=31.37 cfs Outflow=0.00 cfs 0.000 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.52' Max Vel=1.28 fps Inflow=3.40 cfs 0.492 af
n=0.035 L=78.5' S=0.0038 '/' Capacity=61.73 cfs Outflow=3.39 cfs 0.492 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.25' Max Vel=1.71 fps Inflow=2.00 cfs 0.247 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=1.95 cfs 0.246 af

Reach 200R: Final Reach #200 Inflow=5.80 cfs 0.602 af
Outflow=5.80 cfs 0.602 af

Reach 300R: FInal Reach #300 Inflow=4.82 cfs 1.034 af
Outflow=4.82 cfs 1.034 af

Reach 400R: Final Reach #400 Inflow=4.05 cfs 0.668 af
Outflow=4.05 cfs 0.668 af

Pond 30P: Infiltration/Trench Peak Elev=183.82' Storage=1,384 cf Inflow=2.15 cfs 0.190 af
Discarded=0.59 cfs 0.081 af Primary=0.51 cfs 0.107 af Secondary=0.00 cfs 0.000 af Outflow=1.10 cfs 0.188 af

Pond 71P: Existing Catch Basin Peak Elev=188.93' Inflow=3.40 cfs 0.492 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=3.40 cfs 0.492 af

Pond 72P: Existing Depression Peak Elev=196.21' Storage=160 cf Inflow=2.04 cfs 0.273 af
Discarded=0.02 cfs 0.024 af Primary=2.00 cfs 0.247 af Outflow=2.02 cfs 0.271 af

Pond 201P: Bioretention W/ ISR #201 Peak Elev=185.45' Storage=4,286 cf Inflow=2.53 cfs 0.237 af
Primary=0.02 cfs 0.023 af Secondary=0.66 cfs 0.150 af Outflow=0.68 cfs 0.173 af

Pond 202P: Bioretention W/ ISR #202 Peak Elev=179.19' Storage=18,074 cf Inflow=8.23 cfs 0.739 af
Primary=0.09 cfs 0.103 af Secondary=0.60 cfs 0.463 af Tertiary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.566 af

Pond 203P: Infiltration Pond #203 Peak Elev=174.58' Storage=4,820 cf Inflow=1.08 cfs 0.617 af
Discarded=0.21 cfs 0.233 af Primary=0.52 cfs 0.277 af Outflow=0.73 cfs 0.510 af

Pond 204P: Detention Pond #204 Peak Elev=178.85' Storage=4,793 cf Inflow=7.28 cfs 0.630 af
Primary=4.16 cfs 0.625 af Secondary=0.00 cfs 0.000 af Outflow=4.16 cfs 0.625 af

Pond C41P: Catch Basin #41 Peak Elev=184.38' Storage=5 cf Inflow=0.66 cfs 0.064 af
15.0" Round Culvert n=0.012 L=54.7' S=0.0686 '/' Outflow=0.66 cfs 0.064 af

Pond C42P: Catch Basin #42 Peak Elev=181.09' Storage=12 cf Inflow=1.14 cfs 0.171 af
15.0" Round Culvert n=0.012 L=63.0' S=0.0054 '/' Outflow=1.14 cfs 0.171 af

Pond C43P: Catch Basin #43 Peak Elev=181.13' Storage=8 cf Inflow=1.67 cfs 0.128 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0233 '/' Outflow=1.67 cfs 0.128 af

Pond C44P: Catch Basin #44 Peak Elev=180.36' Storage=17 cf Inflow=3.33 cfs 0.262 af
15.0" Round Culvert n=0.012 L=48.0' S=0.0083 '/' Outflow=3.32 cfs 0.262 af

Pond C45P: Catch Basin #45 Peak Elev=182.13' Storage=9 cf Inflow=2.15 cfs 0.174 af
15.0" Round Culvert n=0.012 L=87.2' S=0.0149 '/' Outflow=2.15 cfs 0.174 af

Pond C46P: Catch Basin #46 Peak Elev=180.91' Storage=11 cf Inflow=3.13 cfs 0.256 af
15.0" Round Culvert n=0.012 L=68.0' S=0.0206 '/' Outflow=3.14 cfs 0.256 af

Pond C47P: Catch Basin #47 Peak Elev=180.08' Storage=20 cf Inflow=6.84 cfs 0.552 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0063 '/' Outflow=6.84 cfs 0.552 af

Pond C50P: Inlet Sump Peak Elev=184.47' Storage=12 cf Inflow=3.39 cfs 0.495 af
18.0" Round Culvert n=0.012 L=107.5' S=0.0051 '/' Outflow=3.39 cfs 0.495 af

Pond D51P: DMH #51 Peak Elev=182.01' Storage=0.000 af Inflow=0.68 cfs 0.173 af
18.0" Round Culvert n=0.012 L=68.0' S=0.0051 '/' Outflow=0.68 cfs 0.173 af

Pond D52P: DMH #52 Peak Elev=180.99' Storage=16 cf Inflow=6.97 cfs 0.606 af
24.0" Round Culvert n=0.012 L=110.0' S=0.0055 '/' Outflow=6.97 cfs 0.606 af

Pond D53P: DMH #53 Peak Elev=180.16' Storage=15 cf Inflow=6.97 cfs 0.606 af
24.0" Round Culvert n=0.012 L=120.0' S=0.0083 '/' Outflow=6.97 cfs 0.606 af

Pond E01P: Existing Catch Basin Peak Elev=184.38' Storage=11 cf Inflow=1.99 cfs 0.145 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=1.98 cfs 0.145 af

Pond E02P: Existing Catch Basin Peak Elev=184.10' Storage=224 cf Inflow=6.08 cfs 0.448 af
Discarded=0.02 cfs 0.013 af Primary=6.08 cfs 0.435 af Outflow=6.09 cfs 0.448 af

Total Runoff Area = 16.948 ac Runoff Volume = 3.011 af Average Runoff Depth = 2.13"
76.01% Pervious = 12.882 ac 23.99% Impervious = 4.066 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2S: Subcat #2 Runoff Area=164,530 sf 2.77% Impervious Runoff Depth>2.71"
Flow Length=298' Tc=16.6 min UI Adjusted CN=61 Runoff=8.45 cfs 0.852 af

Subcatchment 3S: Subcat. #3 Runoff Area=46,611 sf 0.00% Impervious Runoff Depth>1.50"
Flow Length=158' Slope=0.0200 '/' Tc=11.3 min CN=48 Runoff=1.28 cfs 0.133 af

Subcatchment 4S: Subcat. #4 Runoff Area=55,483 sf 0.00% Impervious Runoff Depth>0.83"
Flow Length=674' Tc=43.2 min CN=40 Runoff=0.38 cfs 0.089 af

Subcatchment 30S: Subcat #30 Runoff Area=47,823 sf 4.45% Impervious Runoff Depth>2.91"
Flow Length=87' Slope=0.0110 '/' Tc=11.3 min CN=63 Runoff=3.07 cfs 0.266 af

Subcatchment 31S: Subcat #31 Runoff Area=19,678 sf 56.06% Impervious Runoff Depth>4.93"
Tc=6.0 min CN=82 Runoff=2.52 cfs 0.186 af

Subcatchment 32S: Subcat #32 Runoff Area=37,918 sf 67.33% Impervious Runoff Depth>5.27"
Tc=6.0 min CN=85 Runoff=5.11 cfs 0.382 af

Subcatchment 41S: Subcat #41 Runoff Area=7,421 sf 61.70% Impervious Runoff Depth>5.60"
Flow Length=342' Tc=14.7 min CN=88 Runoff=0.82 cfs 0.080 af

Subcatchment 43S: Subcat #43 Runoff Area=15,256 sf 64.41% Impervious Runoff Depth>5.49"
Flow Length=100' Tc=7.0 min CN=87 Runoff=2.07 cfs 0.160 af

Subcatchment 44S: Subcat #44 Runoff Area=14,458 sf 76.68% Impervious Runoff Depth>5.95"
Flow Length=98' Tc=7.7 min CN=91 Runoff=2.02 cfs 0.165 af

Subcatchment 45S: Subcat #45 Runoff Area=16,893 sf 94.23% Impervious Runoff Depth>6.54"
Flow Length=330' Tc=6.0 min CN=96 Runoff=2.59 cfs 0.211 af

Subcatchment 46S: Subcat #46 Runoff Area=7,602 sf 100.00% Impervious Runoff Depth>6.78"
Tc=6.0 min CN=98 Runoff=1.17 cfs 0.099 af

Subcatchment 47S: Subcat #47 Runoff Area=3,200 sf 100.00% Impervious Runoff Depth>6.78"
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.041 af

Subcatchment 50S: Subcat #50 Runoff Area=11,704 sf 0.00% Impervious Runoff Depth>0.37"
Flow Length=182' Tc=11.7 min CN=33 Runoff=0.03 cfs 0.008 af

Subcatchment 62S: Subcat. #62 Runoff Area=45,124 sf 0.15% Impervious Runoff Depth>3.01"
Flow Length=165' Tc=14.3 min CN=64 Runoff=2.77 cfs 0.260 af

Subcatchment 63S: Subcat. #63 Runoff Area=16,040 sf 0.00% Impervious Runoff Depth>2.42"
Flow Length=150' Tc=10.8 min CN=58 Runoff=0.84 cfs 0.074 af

Subcatchment 64S: Subcat #64 Runoff Area=7,675 sf 0.00% Impervious Runoff Depth>2.42"
Tc=6.0 min CN=58 Runoff=0.47 cfs 0.036 af

Subcatchment 70S: Subcat #70 Runoff Area=51,128 sf 43.96% Impervious Runoff Depth>3.31"
Flow Length=345' Tc=14.1 min CN=67 Runoff=3.50 cfs 0.324 af

Subcatchment 71S: Subcat #71 Runoff Area=100,796 sf 29.45% Impervious Runoff Depth>1.93"
Flow Length=563' Tc=39.5 min CN=53 Runoff=2.39 cfs 0.372 af

Subcatchment 72S: Subcat #72 Runoff Area=68,928 sf 42.73% Impervious Runoff Depth>2.89"
Flow Length=478' Tc=32.0 min CN=63 Runoff=2.91 cfs 0.382 af

Reach 30aR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=151.0' S=0.0063 '/' Capacity=12.85 cfs Outflow=0.00 cfs 0.000 af

Reach 30bR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=35.0' S=0.2286 '/' Capacity=77.47 cfs Outflow=0.00 cfs 0.000 af

Reach 30cR: Overland Flow Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=58.0' S=0.0948 '/' Capacity=31.37 cfs Outflow=0.00 cfs 0.000 af

Reach 71aR: Wooded Swale Avg. Flow Depth=0.63' Max Vel=1.46 fps Inflow=5.16 cfs 0.725 af
n=0.035 L=78.5' S=0.0038 '/' Capacity=61.73 cfs Outflow=5.16 cfs 0.724 af

Reach 72R: Roadside Swale Avg. Flow Depth=0.31' Max Vel=1.90 fps Inflow=2.86 cfs 0.354 af
n=0.022 L=495.6' S=0.0060 '/' Capacity=33.12 cfs Outflow=2.82 cfs 0.353 af

Reach 200R: Final Reach #200 Inflow=8.45 cfs 0.852 af
Outflow=8.45 cfs 0.852 af

Reach 300R: FInal Reach #300 Inflow=6.43 cfs 1.461 af
Outflow=6.43 cfs 1.461 af

Reach 400R: Final Reach #400 Inflow=6.44 cfs 0.991 af
Outflow=6.44 cfs 0.991 af

Pond 30P: Infiltration/Trench Peak Elev=183.91' Storage=2,238 cf Inflow=3.07 cfs 0.266 af
Discarded=0.79 cfs 0.114 af Primary=0.64 cfs 0.150 af Secondary=0.00 cfs 0.000 af Outflow=1.43 cfs 0.264 af

Pond 71P: Existing Catch Basin Peak Elev=189.23' Inflow=5.16 cfs 0.725 af
18.0" Round Culvert n=0.012 L=10.2' S=0.0098 '/' Outflow=5.16 cfs 0.725 af

Pond 72P: Existing Depression Peak Elev=196.26' Storage=179 cf Inflow=2.91 cfs 0.382 af
Discarded=0.02 cfs 0.026 af Primary=2.86 cfs 0.354 af Outflow=2.89 cfs 0.380 af

Pond 201P: Bioretention W/ ISR #201 Peak Elev=185.74' Storage=5,447 cf Inflow=3.50 cfs 0.324 af
Primary=0.02 cfs 0.025 af Secondary=1.23 cfs 0.234 af Outflow=1.26 cfs 0.259 af

Pond 202P: Bioretention W/ ISR #202 Peak Elev=179.80' Storage=22,760 cf Inflow=10.32 cfs 0.936 af
Primary=0.09 cfs 0.112 af Secondary=1.10 cfs 0.597 af Tertiary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.709 af

Pond 203P: Infiltration Pond #203 Peak Elev=174.61' Storage=4,928 cf Inflow=1.46 cfs 0.783 af
Discarded=0.21 cfs 0.241 af Primary=0.90 cfs 0.433 af Outflow=1.12 cfs 0.674 af

Pond 204P: Detention Pond #204 Peak Elev=179.30' Storage=6,074 cf Inflow=9.17 cfs 0.818 af
Primary=5.24 cfs 0.806 af Secondary=0.00 cfs 0.000 af Outflow=5.24 cfs 0.806 af

Pond C41P: Catch Basin #41 Peak Elev=184.43' Storage=5 cf Inflow=0.82 cfs 0.080 af
15.0" Round Culvert n=0.012 L=54.7' S=0.0686 '/' Outflow=0.82 cfs 0.080 af

Pond C42P: Catch Basin #42 Peak Elev=181.27' Storage=14 cf Inflow=1.37 cfs 0.230 af
15.0" Round Culvert n=0.012 L=63.0' S=0.0054 '/' Outflow=1.38 cfs 0.230 af

Pond C43P: Catch Basin #43 Peak Elev=181.22' Storage=9 cf Inflow=2.07 cfs 0.160 af
15.0" Round Culvert n=0.012 L=60.0' S=0.0233 '/' Outflow=2.07 cfs 0.160 af

Pond C44P: Catch Basin #44 Peak Elev=180.78' Storage=22 cf Inflow=4.09 cfs 0.325 af
15.0" Round Culvert n=0.012 L=48.0' S=0.0083 '/' Outflow=4.06 cfs 0.325 af

Pond C45P: Catch Basin #45 Peak Elev=182.21' Storage=10 cf Inflow=2.59 cfs 0.211 af
15.0" Round Culvert n=0.012 L=87.2' S=0.0149 '/' Outflow=2.59 cfs 0.211 af

Pond C46P: Catch Basin #46 Peak Elev=181.04' Storage=13 cf Inflow=3.76 cfs 0.310 af
15.0" Round Culvert n=0.012 L=68.0' S=0.0206 '/' Outflow=3.76 cfs 0.310 af

Pond C47P: Catch Basin #47 Peak Elev=180.38' Storage=24 cf Inflow=8.28 cfs 0.676 af
18.0" Round Culvert n=0.012 L=40.0' S=0.0063 '/' Outflow=8.28 cfs 0.676 af

Pond C50P: Inlet Sump Peak Elev=184.77' Storage=16 cf Inflow=5.19 cfs 0.733 af
18.0" Round Culvert n=0.012 L=107.5' S=0.0051 '/' Outflow=5.19 cfs 0.732 af

Pond D51P: DMH #51 Peak Elev=182.16' Storage=0.000 af Inflow=1.26 cfs 0.259 af
18.0" Round Culvert n=0.012 L=68.0' S=0.0051 '/' Outflow=1.25 cfs 0.259 af

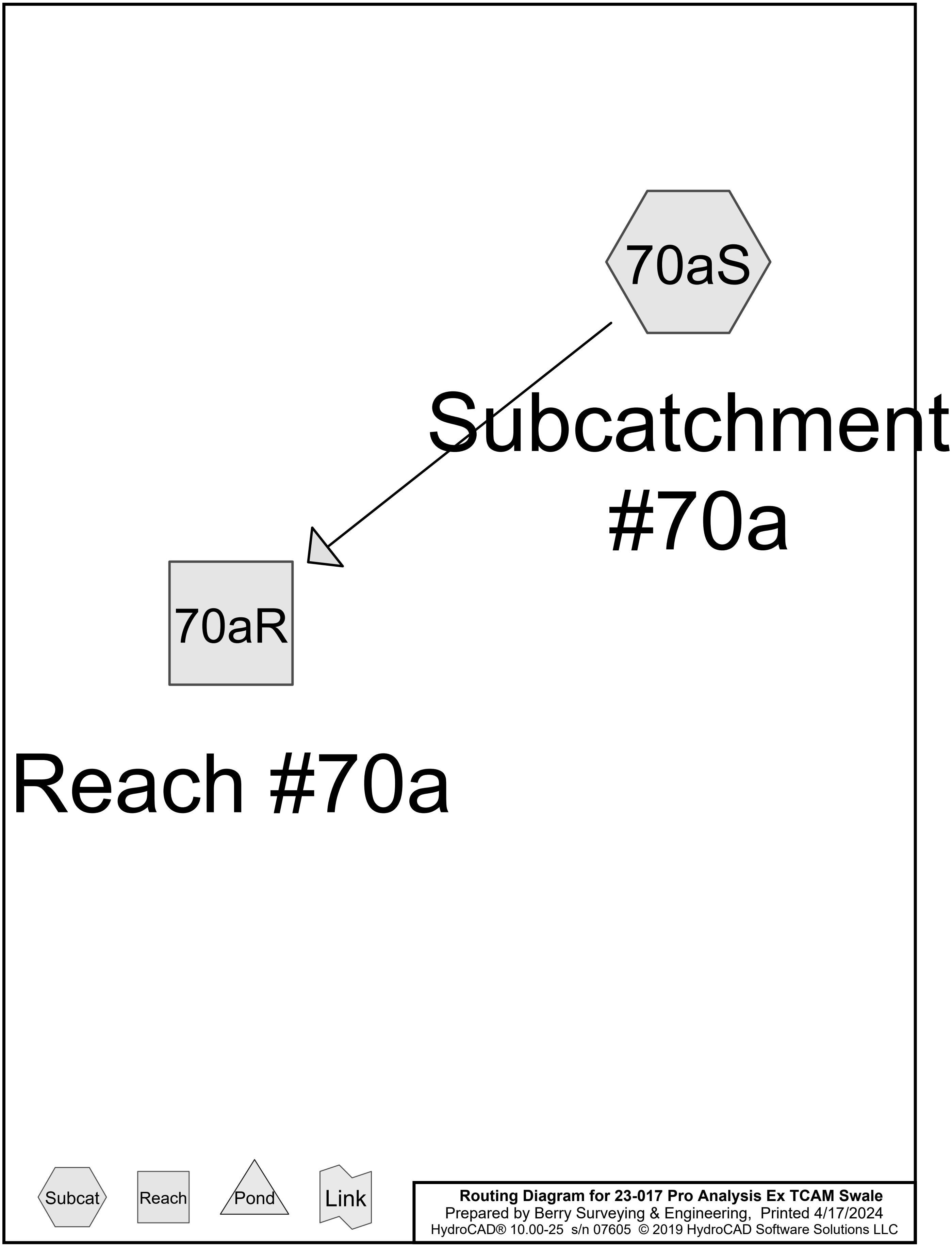
Pond D52P: DMH #52 Peak Elev=181.18' Storage=19 cf Inflow=8.70 cfs 0.783 af
24.0" Round Culvert n=0.012 L=110.0' S=0.0055 '/' Outflow=8.70 cfs 0.783 af

Pond D53P: DMH #53 Peak Elev=180.33' Storage=17 cf Inflow=8.70 cfs 0.783 af
24.0" Round Culvert n=0.012 L=120.0' S=0.0083 '/' Outflow=8.70 cfs 0.783 af

Pond E01P: Existing Catch Basin Peak Elev=184.54' Storage=13 cf Inflow=2.52 cfs 0.186 af
15.0" Round Culvert n=0.012 L=57.0' S=0.0049 '/' Outflow=2.51 cfs 0.186 af

Pond E02P: Existing Catch Basin Peak Elev=184.25' Storage=262 cf Inflow=7.62 cfs 0.568 af
Discarded=0.02 cfs 0.015 af Primary=7.63 cfs 0.553 af Outflow=7.64 cfs 0.568 af

Total Runoff Area = 16.948 ac Runoff Volume = 4.119 af Average Runoff Depth = 2.92"
76.01% Pervious = 12.882 ac 23.99% Impervious = 4.066 ac



Routing Diagram for 23-017 Pro Analysis Ex TCAM Swale
Prepared by Berry Surveying & Engineering, Printed 4/17/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.112	39	>75% Grass cover, Good, HSG A (70aS)
0.064	98	Paved parking, HSG A (70aS)
0.043	30	Woods, Good, HSG A (70aS)
0.219	**55**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.219	HSG A	70aS
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.219		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.112	0.000	0.000	0.000	0.000	0.112	>75% Grass cover, Good	70aS
0.064	0.000	0.000	0.000	0.000	0.064	Paved parking	70aS
0.043	0.000	0.000	0.000	0.000	0.043	Woods, Good	70aS
0.219	**0.000**	**0.000**	**0.000**	**0.000**	**0.219**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 70aS: Subcatchment #70a Runoff Area=9,558 sf 29.27% Impervious Runoff Depth>2.13"
Tc=6.0 min CN=55 Runoff=0.51 cfs 0.039 af

Reach 70aR: Reach #70a Avg. Flow Depth=0.11' Max Vel=1.94 fps Inflow=0.51 cfs 0.039 af
n=0.022 L=13.0' S=0.0192 '/' Capacity=178.16 cfs Outflow=0.51 cfs 0.039 af

Total Runoff Area = 0.219 ac Runoff Volume = 0.039 af Average Runoff Depth = 2.13"
70.73% Pervious = 0.155 ac 29.27% Impervious = 0.064 ac

Summary for Subcatchment 70aS: Subcatchment #70a

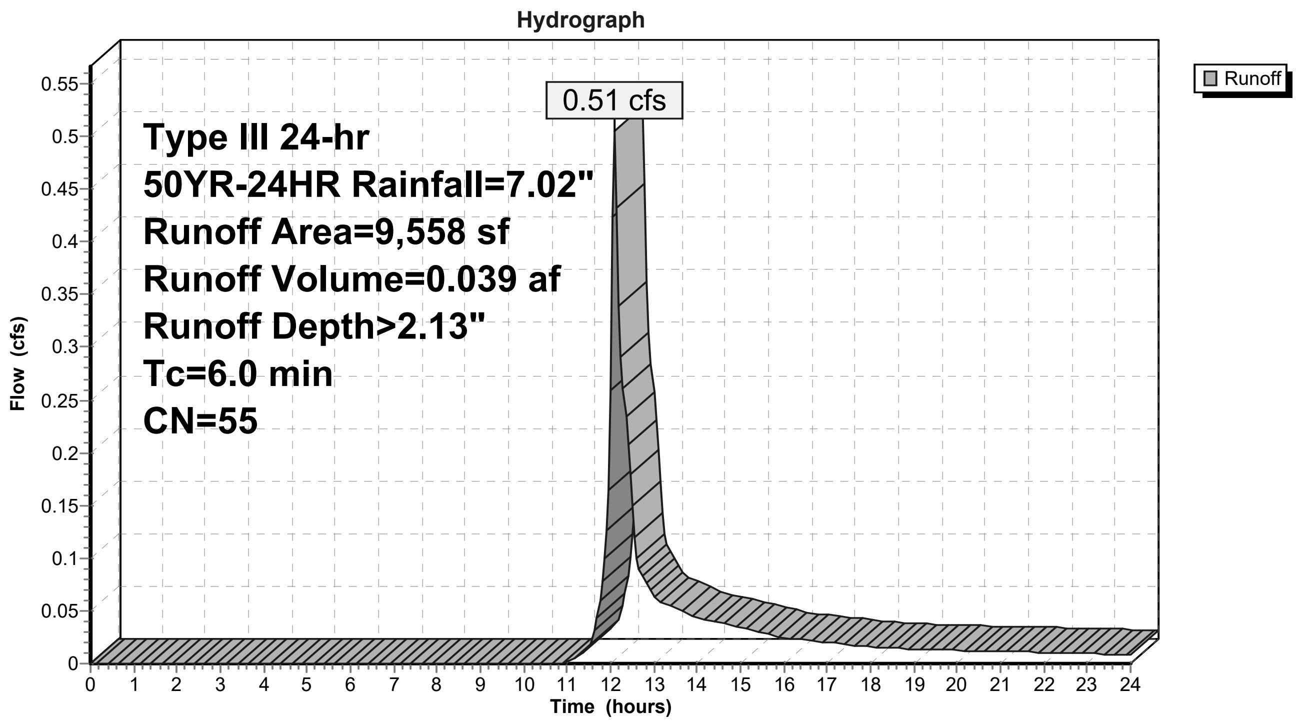
Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.039 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50YR-24HR Rainfall=7.02"

Area (sf)	CN	Description
4,896	39	>75% Grass cover, Good, HSG A
2,798	98	Paved parking, HSG A
1,864	30	Woods, Good, HSG A
9,558	55	Weighted Average
6,760		70.73% Pervious Area
2,798		29.27% Impervious Area

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

Subcatchment 70aS: Subcatchment #70a



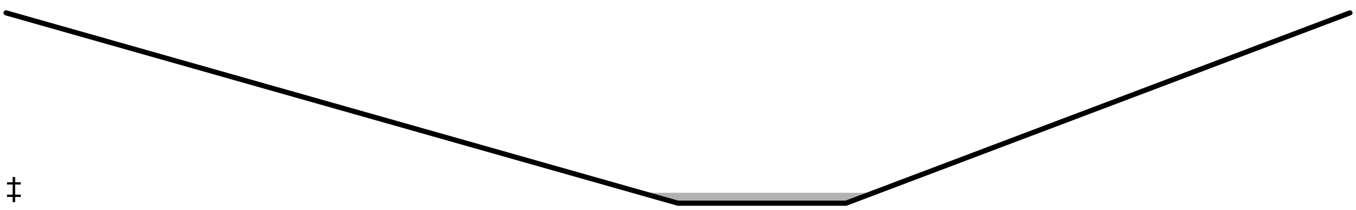
Summary for Reach 70aR: Reach #70a

Inflow Area = 0.219 ac, 29.27% Impervious, Inflow Depth > 2.13" for 50YR-24HR event
Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.039 af
Outflow = 0.51 cfs @ 12.10 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.94 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 0.3 min

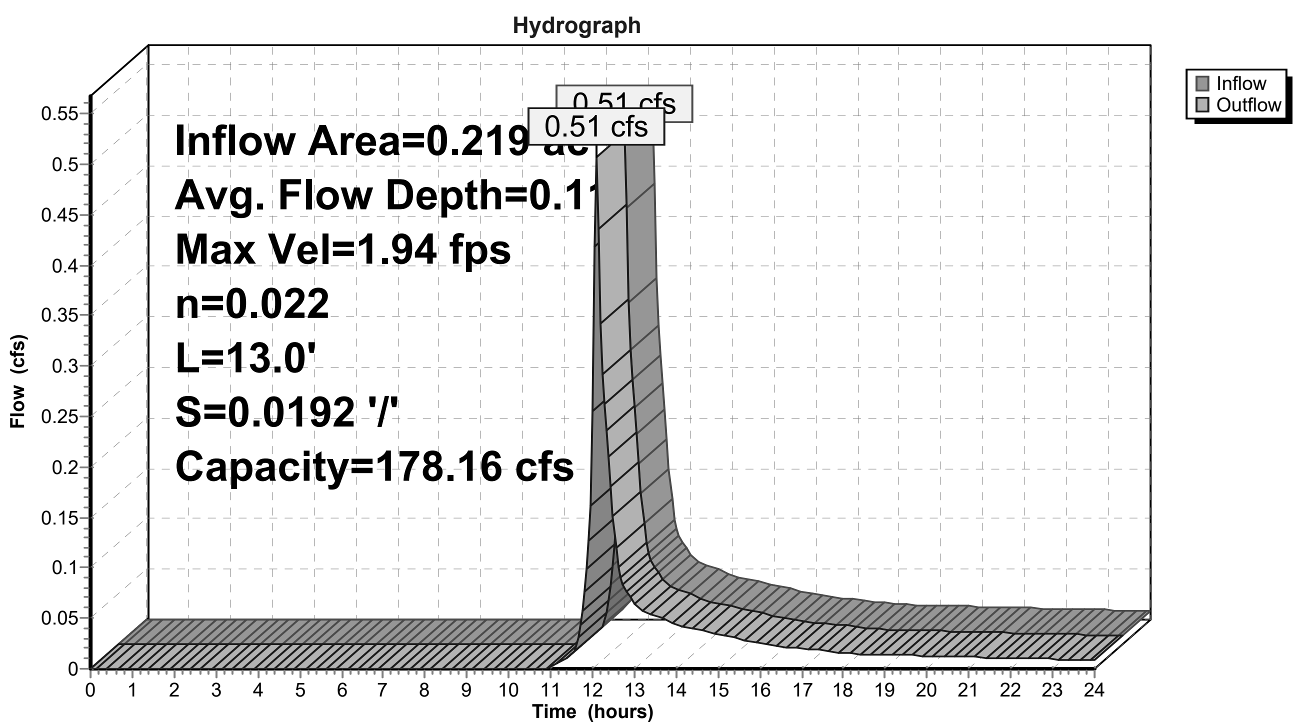
Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 178.16 cfs

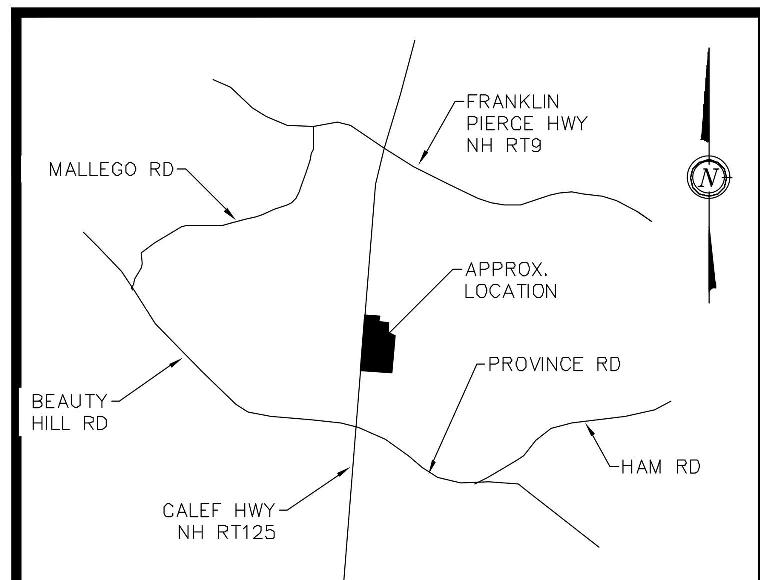
2.00' x 2.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 3.0 '/' Top Width= 16.00'
Length= 13.0' Slope= 0.0192 '/'
Inlet Invert= 185.50', Outlet Invert= 185.25'



‡

Reach 70aR: Reach #70a





LOCATION PLAN
BARRINGTON, NH
NOT TO SCALE

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

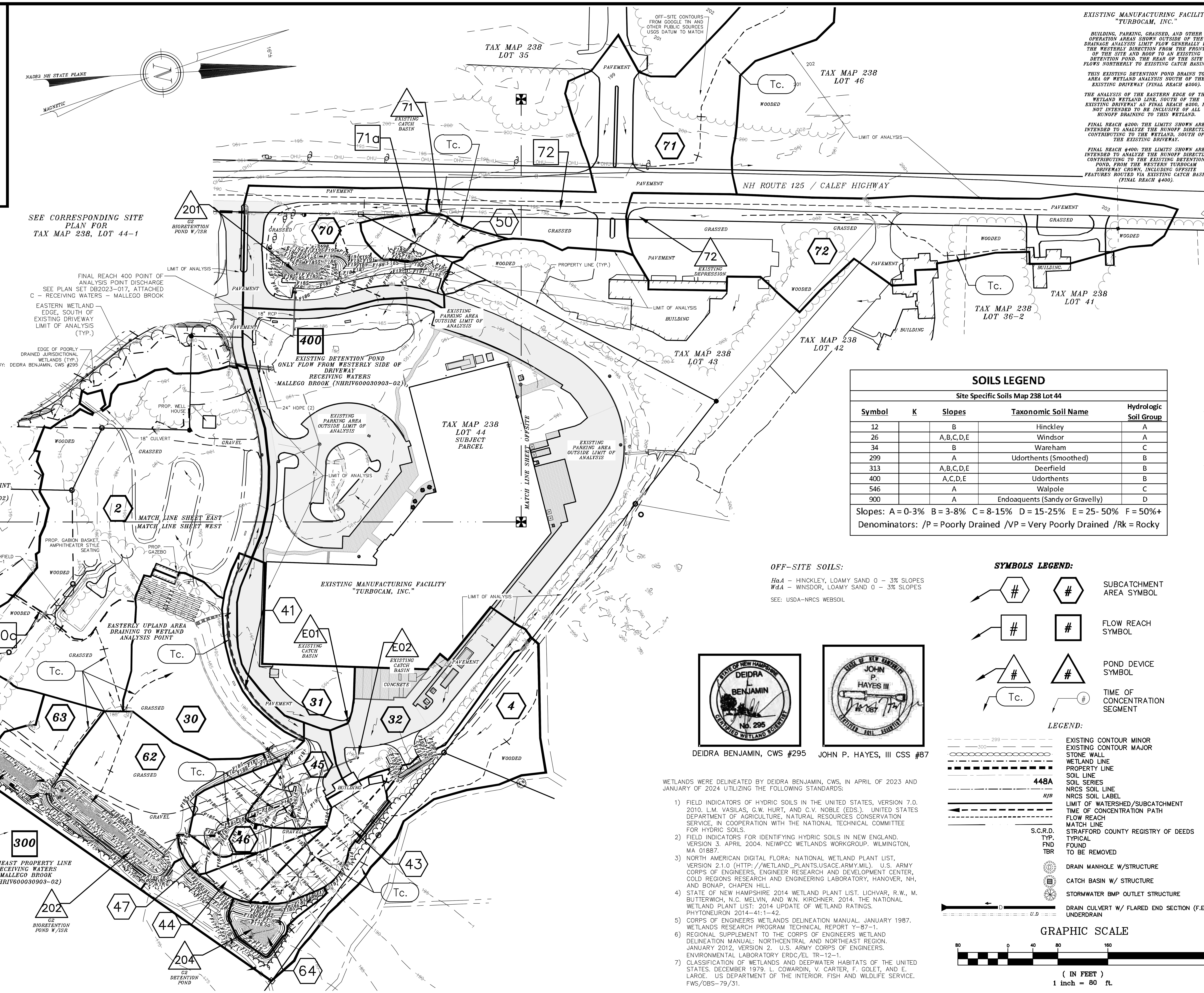
4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE POST CONSTRUCTION DRAINAGE CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE PROPOSED GRADING & DRAINAGE PLAN FOR SLOPES & EROSION & SEDIMENT CONTROL PLAN FOR STOCKPILE AREA AND CONSTRUCTION ENTRANCE.

8.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.



EXISTING MANUFACTURING FACILITY "TURBOCAM, INC."

BUILDING, PARKING, GRASSED, AND OTHER OPERATION AREAS SHOWN OUTSIDE OF THE DRAINAGE ANALYSIS LIMIT FLOW GENERALLY IN THE WESTERLY DIRECTION FROM THE FRONT OF THE SITE AND ROOF TO AN EXISTING DETENTION POND. THE REAR OF THE SITE FLOWS NORTHERLY TO EXISTING CATCH BASINS.

THIS EXISTING DETENTION POND DRAINS TO AREA OF WETLAND ANALYSIS SOUTH OF THE EXISTING DRIVEWAY (FINAL REACH #200).

THE ANALYSIS OF THE EASTERN EDGE OF THE WETLAND WETLAND LINE, SOUTH OF THE EXISTING DRIVEWAY AS FINAL REACH #200, IS NOT INTENDED TO BE INCLUSIVE OF ALL RUNOFF DRAINING TO THIS WETLAND.

FINAL REACH #200: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE WETLAND, SOUTH OF THE EXISTING DRIVEWAY.

FINAL REACH #400: THE LIMITS SHOWN ARE INTENDED TO ANALYZE THE RUNOFF DIRECTLY CONTRIBUTING TO THE EXISTING DETENTION POND, FROM THE WESTERN TURBOCAM DRIVEWAY CROWN, INCLUDING OFFSITE FEATURES ROUTED VIA EXISTING CATCH BASIN (FINAL REACH #400).

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

OFF-SITE SOILS:

HaA – HINCKLEY, LOAMY SAND 0 – 3% SLOPES
WdA – WINDSOR, LOAMY SAND 0 – 3% SLOPES
SEE: USDA–NRCS WEBSOIL

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL
FLOW REACH SYMBOL
POND DEVICE SYMBOL
TIME OF CONCENTRATION SEGMENT

DEIDRA BENJAMIN, CWS #295
JOHN P. HAYES, III CSS #87

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014–41:1–42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y–87–1.
6) REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. JANUARY 2012, VERSION 2. U.S. ARMY CORPS OF ENGINEERS. ENVIRONMENTAL LABORATORY ERDC/EL TR–12–1.
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS–79/31.

LEGEND:

EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
STONE WALL
WETLAND LINE
PROPERTY LINE
SOIL LINE
448A SOIL SERIES
NRCS SOIL LINE
NRCS SOIL LABEL
LIMIT OF WATERSHED/SUBCATCHMENT
TIME OF CONCENTRATION PATH
FLOW REACH
MATCH LINE
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
TBR TO BE REMOVED
DRAIN MANHOLE W/STRUCTURE
CATCH BASIN W/ STRUCTURE
STORMWATER BMP OUTLET STRUCTURE
DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
UNDERDRAIN

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (PROPOSED)

OVERVIEW W-2 PROPOSED WATERSHED PLAN
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 80 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

STATE OF NEW HAMPSHIRE – KENNETH A. BERRY No. 14243 LICENSED – PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE POST CONSTRUCTION DRAINAGE CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE PROPOSED GRADING & DRAINAGE PLAN FOR SLOPES & EROSION & SEDIMENT CONTROL PLAN FOR STOCKPILE AREA AND CONSTRUCTION ENTRANCE.

8.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.

LEGEND:

EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
STONE WALL
WETLAND LINE
PROPERTY LINE
SOIL LINE
448A SOIL SERIES
NRCS SOIL LINE
H/B NRCS SOIL LABEL
LIMIT OF WATERSHED/SUBCATCHMENT
TIME OF CONCENTRATION PATH
FLOW REACH
MATCH LINE
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
TBR TO BE REMOVED
DRAIN MANHOLE W/STRUCTURE
CATCH BASIN W/ STRUCTURE
STORMWATER BMP OUTLET STRUCTURE
DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
U.D. UNDERDRAIN

SYMBOLS LEGEND:

\# SUBCATCHMENT AREA SYMBOL
\# FLOW REACH SYMBOL
\# POND DEVICE SYMBOL
Tc. TIME OF CONCENTRATION SEGMENT

DEIDRA BENJAMIN, CWS #295

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

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LOCATION PLAN
BARRINGTON, NH
NOT TO SCALE

JOHN P. HAYES, III CSS #87

EXISTING MANUFACTURING FACILITY "TURBOCAM, INC."

BUILDING, PARKING, GRASSED, AND OTHER OPERATION AREAS SHOWN OUTSIDE OF THE DRAINAGE ANALYSIS LIMIT FLOW GENERALLY IN THE WESTERLY DIRECTION FROM THE FRONT OF THE SITE AND ROOF TO AN EXISTING DETENTION POND. THE REAR OF THE SITE FLOWS NORTHERLY TO EXISTING CATCH BASINS.

THIS EXISTING DETENTION POND DRAINS TO AREA OF WETLAND ANALYSIS SOUTH OF THE EXISTING DRIVEWAY (FINAL REACH #200).

THE ANALYSIS OF THE EASTERN EDGE OF THE WETLAND WETLAND LINE, SOUTH OF THE EXISTING DRIVEWAY AS FINAL REACH #200, IS NOT INTENDED TO BE INCLUSIVE OF ALL RUNOFF DRAINING TO THIS WETLAND.

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SOILS LEGEND

Site Specific Soils Map 238 Lot 44				
Symbol	**K**	**Slopes**	**Taxonomic Soil Name**	**Hydrologic Soil Group**
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

SWPPP EPA SITE MAP (PROPOSED)
DETAIL W-2 PROPOSED WATERSHED PLAN WEST

FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

REVISION	DATE	DESCRIPTION

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

NOT FOR CONSTRUCTION

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

6.) THE INTENT OF THIS PLAN IS TO SHOW THE POST CONSTRUCTION DRAINAGE CONDITIONS OF TAX MAP 238, LOT 44 AS OF THE DATE OF SURVEY.

7.) SEE PROPOSED GRADING & DRAINAGE PLAN FOR SLOPES & EROSION & SEDIMENT CONTROL PLAN FOR STOCKPILE AREA AND CONSTRUCTION ENTRANCE.

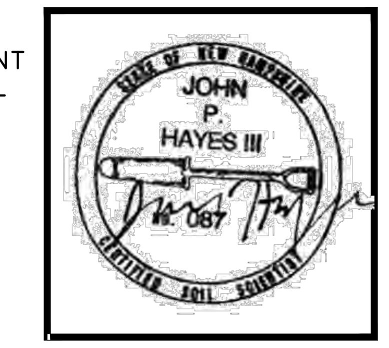
8.) HYDROCAD USES A SERIES OF NODE SUFFIXES FOR NUMBERING PURPOSES (S=SUBCATCHMENT, P=POND DEVICE, R=REACH), TO SIMPLIFY ANNOTATION THESE SUFFIXES ARE LEFT OFF THE WATERSHED PLANS AND NODE TYPE IS DENOTED BY THE SYMBOL SHAPE ACCORDING TO THE DISPLAYED LEGEND WHICH COINCIDES WITH HYDROCAD GRAPHICS.

LEGEND:

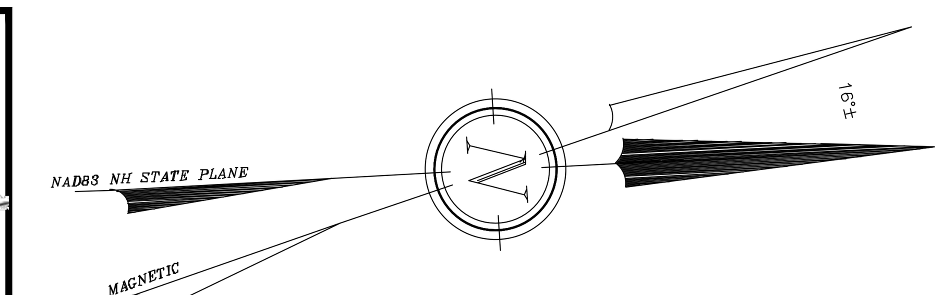
- 299 EXISTING CONTOUR MINOR
- 300 EXISTING CONTOUR MAJOR
- STONE WALL
- WETLAND LINE
- PROPERTY LINE
- SOIL LINE
- 448A SOIL SERIES
- NRCS SOIL LINE
- HfB NRCS SOIL LABEL
- LIMIT OF WATERSHED/SUBCATCHMENT
- TIME OF CONCENTRATION PATH
- FLOW REACH
- MATCH LINE
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
- TYP. TYPICAL
- FND FOUND
- TBR TO BE REMOVED
- DRAIN MANHOLE W/STRUCTURE
- CATCH BASIN W/ STRUCTURE
- STORMWATER BMP OUTLET STRUCTURE
- DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
- U.D. UNDERDRAIN

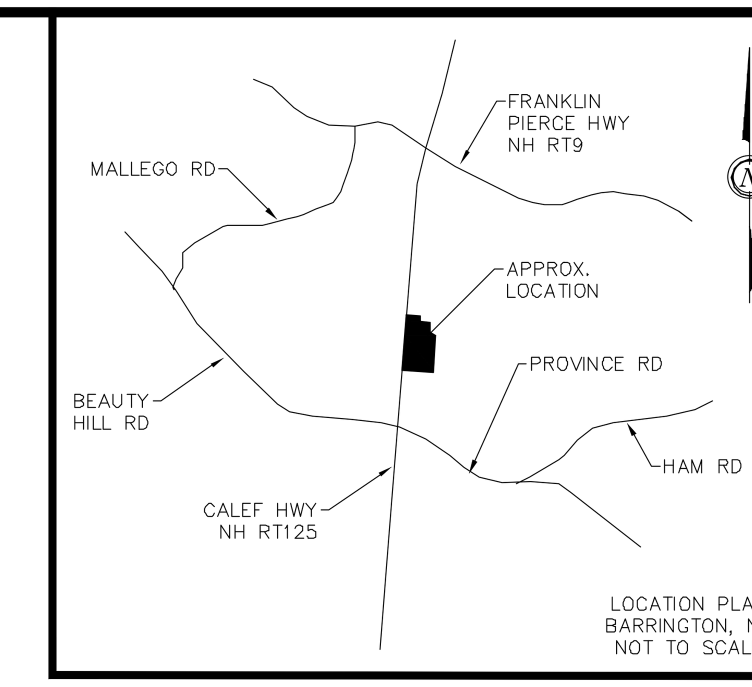
SYMBOLS LEGEND:

- # SUBCATCHMENT AREA SYMBOL
- # FLOW REACH SYMBOL
- # POND DEVICE SYMBOL
- Tc. # TIME OF CONCENTRATION SEGMENT



JOHN P. HAYES, III CSS #87





OFF-SITE SOILS:

HaA – HINCKLEY, LOAMY SAND 0 – 3% SLOPES
WdA – WINDSOR, LOAMY SAND 0 – 3% SLOPES

SEE: USDA–NRCS WEBSOIL

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+

Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

GRAPHIC SCALE

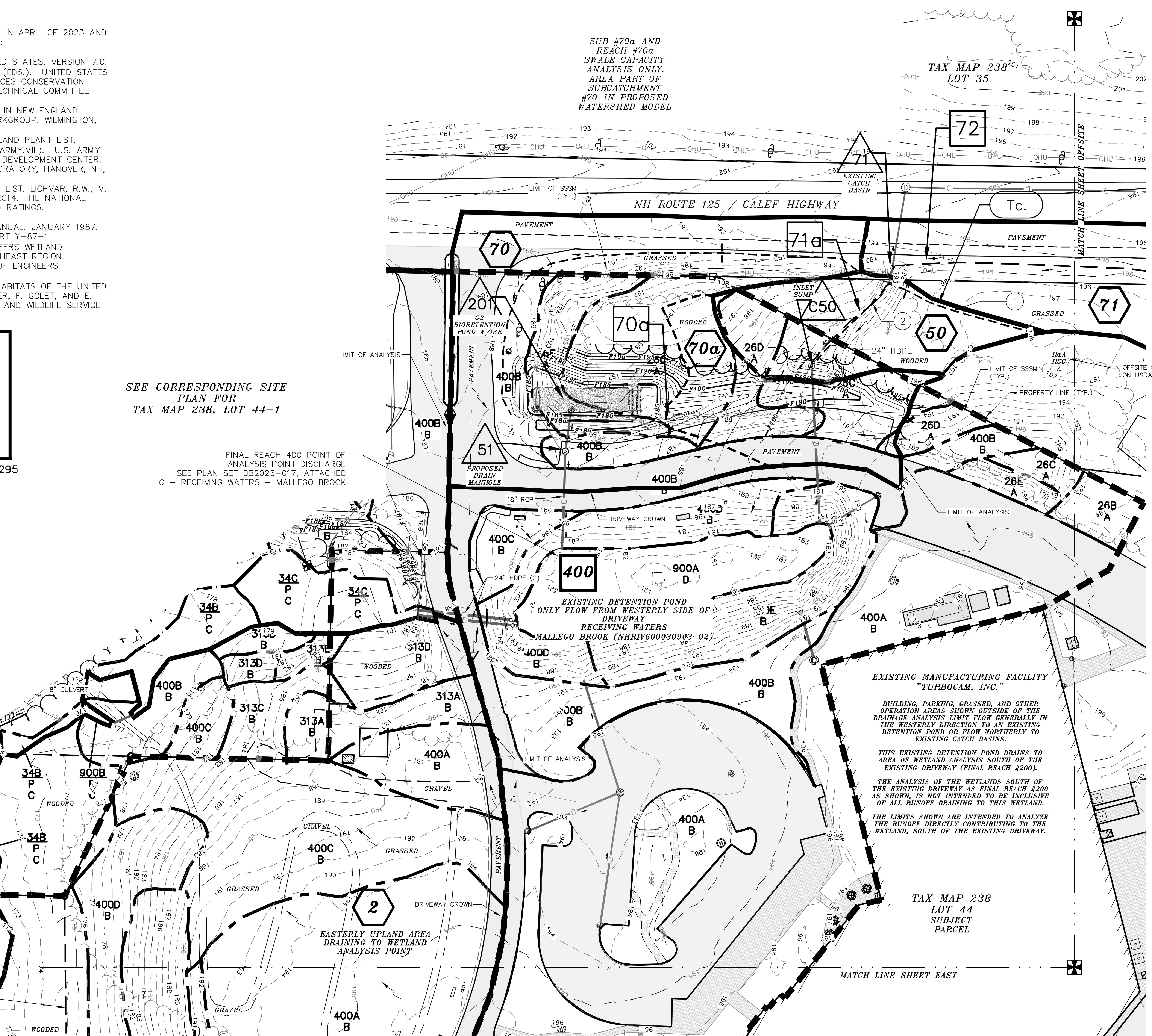
50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014–41:1–42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y–87–1.
6) REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION. JANUARY 2012, VERSION 2. U.S. ARMY CORPS OF ENGINEERS. ENVIRONMENTAL LABORATORY ERDC/EL TR–12–1.
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS–79/31.

DEIDRA BENJAMIN, CWS #295



REVISION	DATE	DESCRIPTION

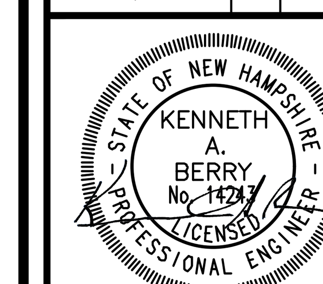
DETAIL W-2 PROPOSED WATERSHED PLAN WEST

SWPPP EPA SITE MAP (PROPOSED)

FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017



NOT FOR CONSTRUCTION

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

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5.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

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EXISTING CONTOUR MAJOR
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PROPERTY LINE
SOIL LINE
448A SOIL SERIES
NRCS SOIL LINE
HfB NRCS SOIL LABEL
LIMIT OF WATERSHED/SUBCATCHMENT
TIME OF CONCENTRATION PATH
FLOW REACH
MATCH LINE
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
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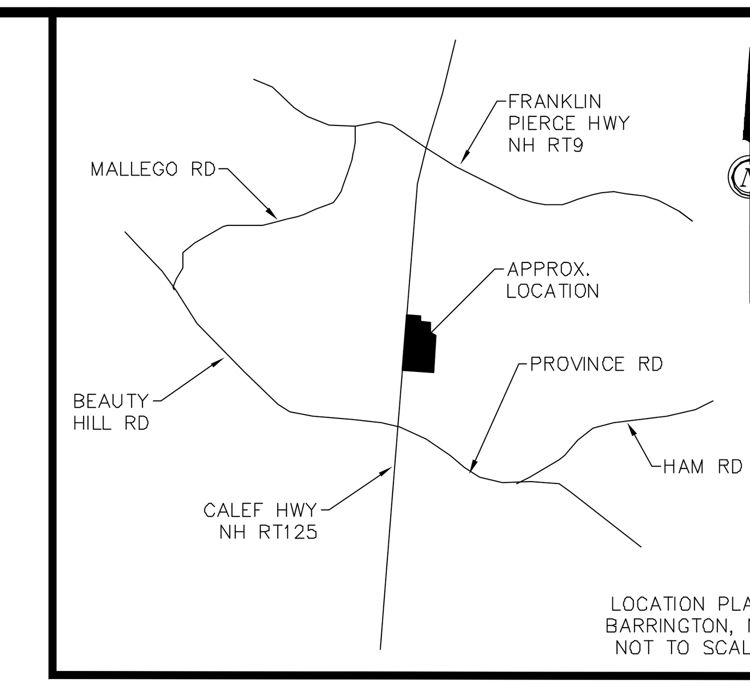
TBR TO BE REMOVED
DRAIN MANHOLE W/STRUCTURE
CATCH BASIN W/ STRUCTURE
STORMWATER BMP OUTLET STRUCTURE
DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
U.D. UNDERDRAIN

SYMBOLS LEGEND:

SUBCATCHMENT AREA SYMBOL
FLOW REACH SYMBOL
POND DEVICE SYMBOL
Tc. TIME OF CONCENTRATION SEGMENT

STATE OF NEW HAMPSHIRE
JOHN P. HAYES III
No. 087
CERTIFIED SOIL SCIENTIST
JOHN P. HAYES, III CSS #87

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.



SOILS LEGEND

Site Specific Soils Map 238 Lot 44

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400		A,C,D,E	Udorthents	B
546		A	Walpole	C
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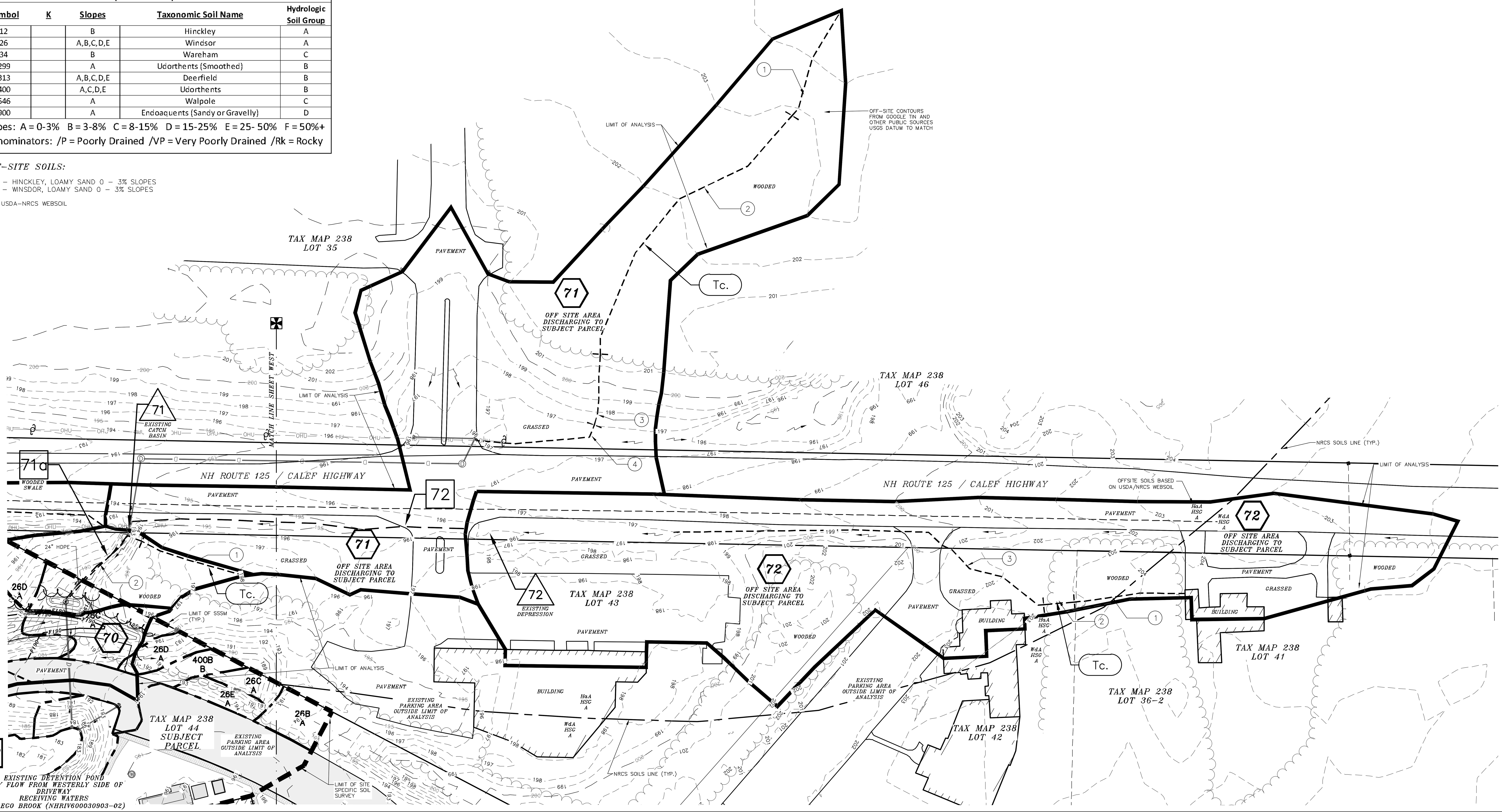
SEE: USDA-NRCS WEBSOIL



REVISION	DATE	DESCRIPTION

SWPPP EPA SITE MAP (PROPOSED)
DETAIL W-2 PROPOSED WATERSHED PLAN OFFSITE

FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14741
LICENSED
PROFESSIONAL ENGINEER

SHEET 8 OF 8

NOT FOR CONSTRUCTION

Appendix III - Calculations, Charts, & Graphs

Extreme Precipitation Tables
Rip Rap Calculations
AoT Stormwater Treatment Spreadsheets
NCRS USDA Web-soil Map
Site Specific Soil Survey Report & Plan
Stormwater System Management: Inspection & Maintenance Manual, Plan, Invasive Species & NHDES Green SnoPro Utilization Chart
Infiltration Feasibility Study & Report
Ksat Values for New Hampshire Soils, SSSNNE Special Publication #5, 2009
UNH Stormwater Center Hybrid Bioretention Template
Filtrexx Specifications Sheets

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	43.205 degrees North
Longitude	70.995 degrees West
Elevation	50 feet
Date/Time	Fri Apr 07 2023 13:37:20 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.53	1.97	2.56	2.81	**1yr**	2.27	2.71	3.12	3.84	4.41	**1yr**
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.16	1.49	1.89	2.41	3.08	3.43	**2yr**	2.73	3.30	3.80	4.52	5.15	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.57	**5yr**	1.06	1.44	1.84	2.36	3.03	3.89	4.39	**5yr**	3.45	4.22	4.83	5.70	6.45	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.84	**10yr**	1.22	1.69	2.17	2.80	3.61	4.65	5.29	**10yr**	4.11	5.08	5.81	6.80	7.65	**10yr**
25yr	0.46	0.74	0.94	1.30	1.72	2.27	**25yr**	1.49	2.08	2.69	3.50	4.54	5.87	6.77	**25yr**	5.20	6.51	7.41	8.58	9.59	**25yr**
50yr	0.52	0.83	1.06	1.49	2.00	2.66	**50yr**	1.73	2.45	3.17	4.15	5.41	7.02	8.17	**50yr**	6.21	7.85	8.91	10.24	11.39	**50yr**
100yr	0.58	0.94	1.21	1.71	2.33	3.12	**100yr**	2.01	2.88	3.74	4.92	6.43	8.39	9.86	**100yr**	7.42	9.48	10.72	12.23	13.53	**100yr**
200yr	0.64	1.05	1.37	1.96	2.71	3.68	**200yr**	2.34	3.39	4.42	5.85	7.68	10.03	11.90	**200yr**	8.87	11.44	12.89	14.61	16.07	**200yr**
500yr	0.76	1.25	1.63	2.37	3.32	4.55	**500yr**	2.86	4.21	5.49	7.32	9.67	12.70	15.27	**500yr**	11.24	14.68	16.47	18.49	20.21	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.36	0.45	0.60	0.74	0.90	**1yr**	0.64	0.88	0.91	1.25	1.52	1.94	2.49	**1yr**	1.72	2.39	2.92	3.28	3.96	**1yr**
2yr	0.31	0.48	0.60	0.81	0.99	1.18	**2yr**	0.86	1.15	1.36	1.82	2.34	2.99	3.33	**2yr**	2.65	3.21	3.69	4.41	5.03	**2yr**
5yr	0.35	0.54	0.67	0.92	1.16	1.40	**5yr**	1.01	1.37	1.61	2.14	2.77	3.61	4.05	**5yr**	3.20	3.89	4.50	5.35	6.03	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.56	1.82	2.43	3.12	4.14	4.69	**10yr**	3.66	4.51	5.22	6.18	6.90	**10yr**
25yr	0.44	0.67	0.83	1.19	1.57	1.91	**25yr**	1.35	1.87	2.12	2.84	3.64	4.94	5.67	**25yr**	4.37	5.45	6.37	7.49	8.28	**25yr**
50yr	0.49	0.74	0.92	1.33	1.79	2.20	**50yr**	1.54	2.15	2.37	3.20	4.08	5.65	6.54	**50yr**	5.00	6.29	7.40	8.65	9.55	**50yr**
100yr	0.55	0.83	1.03	1.49	2.05	2.52	**100yr**	1.77	2.46	2.67	3.60	4.55	6.44	7.54	**100yr**	5.70	7.25	8.61	10.00	10.92	**100yr**
200yr	0.61	0.92	1.16	1.68	2.34	2.89	**200yr**	2.02	2.83	2.99	4.05	5.08	7.34	8.85	**200yr**	6.50	8.51	10.03	11.55	12.51	**200yr**
500yr	0.71	1.06	1.37	1.99	2.82	3.50	**500yr**	2.44	3.42	3.50	4.72	5.91	8.68	10.73	**500yr**	7.68	10.32	12.28	14.00	14.91	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.07	**1yr**	0.75	1.05	1.23	1.72	2.18	2.76	3.02	**1yr**	2.44	2.90	3.34	4.12	4.73	**1yr**
2yr	0.33	0.50	0.62	0.84	1.03	1.24	**2yr**	0.89	1.21	1.46	1.94	2.50	3.19	3.54	**2yr**	2.82	3.41	3.92	4.66	5.30	**2yr**
5yr	0.39	0.60	0.75	1.02	1.30	1.57	**5yr**	1.12	1.54	1.84	2.47	3.16	4.18	4.71	**5yr**	3.70	4.53	5.18	6.06	6.85	**5yr**
10yr	0.45	0.70	0.87	1.21	1.56	1.90	**10yr**	1.35	1.86	2.21	3.01	3.80	5.16	5.87	**10yr**	4.57	5.64	6.42	7.40	8.32	**10yr**
25yr	0.55	0.84	1.05	1.49	1.96	2.44	**25yr**	1.70	2.39	2.84	3.91	4.87	6.83	7.84	**25yr**	6.04	7.54	8.50	9.75	10.75	**25yr**
50yr	0.64	0.97	1.21	1.74	2.34	2.94	**50yr**	2.02	2.87	3.44	4.75	5.90	8.45	9.79	**50yr**	7.48	9.41	10.54	11.96	13.15	**50yr**
100yr	0.74	1.12	1.41	2.03	2.79	3.54	**100yr**	2.41	3.46	4.17	5.80	7.15	10.45	12.22	**100yr**	9.25	11.75	13.05	14.70	16.05	**100yr**
200yr	0.86	1.30	1.64	2.38	3.32	4.28	**200yr**	2.86	4.18	5.06	7.08	8.66	12.98	15.08	**200yr**	11.49	14.50	16.16	18.04	19.63	**200yr**
500yr	1.05	1.56	2.01	2.93	4.16	5.48	**500yr**	3.59	5.35	6.52	9.23	11.17	17.33	20.20	**500yr**	15.33	19.42	21.45	23.71	25.63	**500yr**

RIP RAP CALCULATIONS

23-017 Calef Highway
TurboCam International Lot 44
Barrington, NH

Berry Surveying & Engineering

335 Second Crown Point Road
TURBOCAM, INC., Barrington, NH
17-Apr-24

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.* Rip Rap was sized for the 25 year storm event. (Some d50 sizes and T values have been modified)

TAILWATER < HALF THE Do

La = (1.8 x Q) / Do 3/2 + (7 x Do)   Q = Peak Flow & Do is Pipe Diameter
W = La + 3*Do or defined channel width
d50 = (0.02 x Q4/3) / (Tw x Do)   Tw = Tailwater Depth
T = Largest Stone Size x 1.5

Culvert or Catch Basin	Tailwater (Feet) Tw	Discharge (C.F.S.) Q	Diameter of Pipe Do	Length of Rip Rap La (feet)	Width of Rip Rap W (feet)	d50-Stone Rip Rap d50(ft.)	Actual Size	Thickness
18" HDPE (Pond #C50P)	0.30	3.39	1.50	13.8	18.3	0.23	0.50	1.20
18" RCP (Pond #D51P)	0.30	0.68	1.50	11.2	15.7	0.03	0.50	1.20
24" HDPE (Pond #D53P)	0.40	6.97	2.00	18.4	24.4	0.33	0.50	1.20
18" HDPE (Pond #204P)	0.30	4.16	1.50	14.6	19.1	0.30	0.50	1.20
18" HDPE (Pond #C47P)	0.30	6.84	1.50	17.2	21.7	0.58	0.67	2.00
15" HDPE (Pond #202P)	0.25	0.68	1.25	9.6	13.4	0.04	0.50	1.20

Please note that the designer chose to use the 25 Year Event for the dimensional calculations.

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	0.5	Feet	6	Inches
% of Weight Smaller Than the Given d50 Size		Size of Stone (Inches) From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3

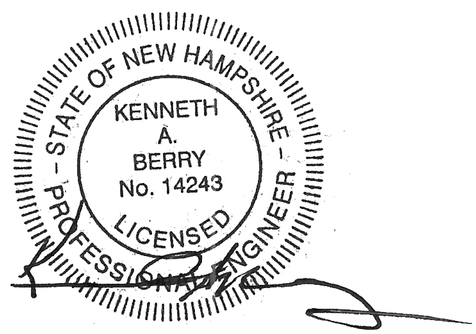


Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d50 Size =	0.67	Feet	8	Inches
% of Weight Smaller Than the Given d50 Size		Size of Stone (Inches) From		To
100%		12		16
85%		10		14
50%		8		12
15%		2		4

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION
(Env-Wq 1507.04)

0.22	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.54	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.29	inches	Rd = Weighted groundwater recharge depth	
0.2218	ac-in	GRV = AI * Rd	
805	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

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

Infiltration Pond #203 stores 4,586 cf below the lowest orifice elevation of 174.50 (Emergency Spillway)

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Bioretention W/ ISR #201 (Pond 201P)**

Enter the node name in the drainage analysis if applicable.

1.17	ac	A = Area draining to the practice	
0.52	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)	
0.52	ac-in	WQV= 1” x Rv x A	
1,899	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
190	cf	10% x WQV (check calc for sediment forebay)	
475	cf	25% x WQV (check calc for water stored in saturated zone)	
Sediment Forebay		Method of Pretreatment	
1,032	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**$\geq$ 10%WQV**
2,170	cf	Volume below lowest orifice[1]	**$\geq$ 100%WQV**
590	cf	Water stored in voids of saturated zone	**$\geq$ 26%WQV**
0.04	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
184.60	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.02	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
52.75	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**$\geq$ 24-hrs**
18.00	in	Depth of Filter Media	**$\geq$ 18"**
3.00	:1	Pond side slopes	**$\geq$ 3:1**
Angle Grate		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of $\leq$6”)?	
185.74	ft	Peak elevation of the 50-year storm event (E_{50})	
186.00	ft	Berm elevation of the pond	
YES		$E_{50} \leq$ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

26% WQV = 494 CF

1,118 SF Bottom Pond, Stone = 40% Voids, 18" ISR Stone Base

Min ISR height @ Liner Low Point = 1.17'

1.17FT*1,118 SF= 1,308 CF * 40% Voids = 523 CF

Triangle of ISR remaining between liner low and high point

Max ISR height above triangle = 0.3'

0.5*0.3FT*1,118 SF= 168 CF * 40% Voids =67 CF

523 CF + 67 CF = 590 CF Total ISR Storage

Summary for Pond 201P: Bioretention W/ ISR #201

Inflow Area = 1.174 ac, 43.96% Impervious, Inflow Depth > 3.31" for 50YR-24HR event
Inflow = 3.50 cfs @ 12.20 hrs, Volume= 0.324 af
Outflow = 1.26 cfs @ 12.61 hrs, Volume= 0.259 af, Atten= 64%, Lag= 24.3 min
Primary = 0.02 cfs @ 12.54 hrs, Volume= 0.025 af
Secondary = 1.23 cfs @ 12.61 hrs, Volume= 0.234 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 185.74' @ 12.61 hrs Surf.Area= 1,118 sf Storage= 5,447 cf
Flood Elev= 186.00' Surf.Area= 1,118 sf Storage= 6,720 cf

Plug-Flow detention time= 144.5 min calculated for 0.259 af (80% of inflow)
Center-of-Mass det. time= 66.2 min (909.4 - 843.2)

Volume	Invert	Avail.Storage	Storage Description
#1	182.00'	112 cf	**Stone (Irregular)** Listed below (Recalc) -Impervious 280 cf Overall x 40.0% Voids
#2	182.25'	335 cf	**Bio Media (Irregular)** Listed below (Recalc) 1,677 cf Overall x 20.0% Voids
#3	184.00'	1,032 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) -Impervious
#4	183.75'	2,979 cf	**Cell (Irregular)** Listed below (Recalc) -Impervious
#5	185.50'	2,262 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		6,720 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.00	1,118	165.5	0	0	1,118
182.25	1,118	165.5	280	280	1,159

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
182.25	1,118	165.5	0	0	1,118
183.75	1,118	165.5	1,677	1,677	1,366

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
184.00	160	53.5	0	0	160
185.00	822	223.7	448	448	3,917
185.50	1,551	276.6	584	1,032	6,027

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
183.75	1,118	165.5	0	0	1,118
184.00	1,459	183.1	321	321	1,608
185.00	1,877	199.3	1,664	1,985	2,137
185.50	2,101	207.6	994	2,979	2,424

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
185.50	3,838	302.2	0	0	3,838
186.00	5,247	335.0	2,262	2,262	5,509

Device	Routing	Invert	Outlet Devices
#1	Primary	182.00'	**6.0" Round 6" HDPE N-12** L= 33.0' Ke= 0.500 Inlet / Outlet Invert= 182.00' / 181.70' S= 0.0091 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	182.00'	**15.0" Round 15" HDPE N-12** L= 26.0' Ke= 0.500 Inlet / Outlet Invert= 182.00' / 181.70' S= 0.0115 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	182.00'	**0.7" Vert. 0.75" Orifice** C= 0.600
#4	Device 3	182.25'	**10.000 in/hr Bio Media over Surface area**
#5	Device 2	184.90'	**6.0" W x 10.0" H Vert. 6"W x 10" T Notch** C= 0.600
#6	Device 2	185.75'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 12.54 hrs HW=185.73' TW=182.16' (Dynamic Tailwater)
└─**1=6" HDPE N-12** (Passes 0.02 cfs of 1.53 cfs potential flow)
  └─**3=0.75" Orifice** (Orifice Controls 0.02 cfs @ 9.10 fps)
    └─**4=Bio Media** (Passes 0.02 cfs of 0.26 cfs potential flow)

Secondary OutFlow Max=1.23 cfs @ 12.61 hrs HW=185.74' TW=182.16' (Dynamic Tailwater)
└─**2=15" HDPE N-12** (Passes 1.23 cfs of 10.42 cfs potential flow)
  ├─**5=6"W x 10" T Notch** (Orifice Controls 1.23 cfs @ 2.95 fps)
  └─**6=48" Outlet Structure** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 201P: Bioretention W/ ISR #201

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
182.00	0	0
182.05	0	22
182.10	0	45
182.15	0	67
182.20	0	89
182.25	**1,118**	112
182.30	1,118	123
182.35	1,118	134
182.40	1,118	145
182.45	1,118	157
182.50	1,118	168
182.55	1,118	179
182.60	1,118	190
182.65	1,118	201
182.70	1,118	212
182.75	1,118	224
182.80	1,118	235
182.85	1,118	246
182.90	1,118	257
182.95	1,118	268
183.00	1,118	280
183.05	1,118	291
183.10	1,118	302
183.15	1,118	313
183.20	1,118	324
183.25	1,118	335
183.30	1,118	347
183.35	1,118	358
183.40	1,118	369
183.45	1,118	380
183.50	1,118	391
183.55	1,118	402
183.60	1,118	414
183.65	1,118	425
183.70	1,118	436
183.75	1,118	447
183.80	1,118	505
183.85	1,118	565
183.90	1,118	630
183.95	1,118	697
184.00	1,118	768
184.05	1,118	850
184.10	1,118	934
184.15	1,118	1,021
184.20	1,118	1,109
184.25	1,118	1,200
184.30	1,118	1,292
184.35	1,118	1,388
184.40	1,118	1,486
184.45	1,118	1,586
184.50	1,118	1,689
184.55	1,118	1,795
184.60	1,118	1,904
184.65	1,118	2,015
184.70	1,118	2,129
184.75	1,118	2,247
184.80	1,118	2,367
184.85	1,118	2,490
184.90	1,118	2,617
184.95	1,118	2,747
185.00	1,118	2,880
185.05	1,118	3,017
185.10	1,118	3,159
185.15	1,118	3,304
185.20	1,118	3,455
185.25	1,118	3,609
185.30	1,118	3,769
185.35	1,118	3,934
185.40	1,118	4,103
185.45	1,118	4,278
185.50	1,118	4,458
185.55	1,118	4,653
185.60	1,118	4,855
185.65	1,118	5,063
185.70	1,118	5,279
185.75	1,118	5,501
185.80	1,118	5,730
185.85	1,118	5,967
185.90	1,118	6,210
185.95	1,118	6,461
186.00	1,118	**6,720**

Low Orifice = 184.90
Cell Bottom = 183.75

2,617 cf
- 447 cf
2,170 cf

Volume Below Lowest Orifice Table

Stage-Area-Storage for Pond 201P: Bioretention W/ ISR #201

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
182.00	0	0	184.65	1,118	2,015
182.05	0	22	184.70	1,118	2,129
182.10	0	45	184.75	1,118	2,247
182.15	0	67	184.80	1,118	2,367
182.20	0	89	184.85	1,118	2,490
182.25	**1,118**	112	184.90	1,118	2,617
182.30	1,118	123	184.95	1,118	2,747
182.35	1,118	134	185.00	1,118	2,880
182.40	1,118	145	185.05	1,118	3,017
182.45	1,118	157	185.10	1,118	3,159
182.50	1,118	168	185.15	1,118	3,304
182.55	1,118	179	185.20	1,118	3,455
182.60	1,118	190	185.25	1,118	3,609
182.65	1,118	201	185.30	1,118	3,769
182.70	1,118	212	185.35	1,118	3,934
182.75	1,118	224	185.40	1,118	4,103
182.80	1,118	235	185.45	1,118	4,278
182.85	1,118	246	185.50	1,118	4,458
182.90	1,118	257	185.55	1,118	4,653
182.95	1,118	268	185.60	1,118	4,855
183.00	1,118	280	185.65	1,118	5,063
183.05	1,118	291	185.70	1,118	5,279
183.10	1,118	302	185.75	1,118	5,501
183.15	1,118	313	185.80	1,118	5,730
183.20	1,118	324	185.85	1,118	5,967
183.25	1,118	335	185.90	1,118	6,210
183.30	1,118	347	185.95	1,118	6,461
183.35	1,118	358	186.00	1,118	**6,720**
183.40	1,118	369			
183.45	1,118	380			
183.50	1,118	391			
183.55	1,118	402			
183.60	1,118	414			
183.65	1,118	425			
183.70	1,118	436			
183.75	1,118	447			
183.80	1,118	505			
183.85	1,118	565			
183.90	1,118	630			
183.95	1,118	697			
184.00	1,118	768			
184.05	1,118	850			
184.10	1,118	934			
184.15	1,118	1,021			
184.20	1,118	1,109			
184.25	1,118	1,200			
184.30	1,118	1,292			
184.35	1,118	1,388			
184.40	1,118	1,486			
184.45	1,118	1,586			
184.50	1,118	1,689			
184.55	1,118	1,795			
184.60	1,118	1,904			

WQV = 1,899 cf
Elev 184.60 = 1,904 cf

WQV Storage Table

Stage-Discharge for Pond 201P: Bioretention W/ ISR #201

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
182.00	0.00	0.00	0.00
182.05	0.00	0.00	0.00
182.10	0.00	0.00	0.00
182.15	0.00	0.00	0.00
182.20	0.00	0.00	0.00
182.25	0.01	0.01	0.00
182.30	0.01	0.01	0.00
182.35	0.01	0.01	0.00
182.40	0.01	0.01	0.00
182.45	0.01	0.01	0.00
182.50	0.01	0.01	0.00
182.55	0.01	0.01	0.00
182.60	0.01	0.01	0.00
182.65	0.01	0.01	0.00
182.70	0.01	0.01	0.00
182.75	0.01	0.01	0.00
182.80	0.01	0.01	0.00
182.85	0.01	0.01	0.00
182.90	0.01	0.01	0.00
182.95	0.01	0.01	0.00
183.00	0.01	0.01	0.00
183.05	0.01	0.01	0.00
183.10	0.01	0.01	0.00
183.15	0.01	0.01	0.00
183.20	0.01	0.01	0.00
183.25	0.01	0.01	0.00
183.30	0.01	0.01	0.00
183.35	0.01	0.01	0.00
183.40	0.02	0.02	0.00
183.45	0.02	0.02	0.00
183.50	0.02	0.02	0.00
183.55	0.02	0.02	0.00
183.60	0.02	0.02	0.00
183.65	0.02	0.02	0.00
183.70	0.02	0.02	0.00
183.75	0.02	0.02	0.00
183.80	0.02	0.02	0.00
183.85	0.02	0.02	0.00
183.90	0.02	0.02	0.00
183.95	0.02	0.02	0.00
184.00	0.02	0.02	0.00
184.05	0.02	0.02	0.00
184.10	0.02	0.02	0.00
184.15	0.02	0.02	0.00
184.20	0.02	0.02	0.00
184.25	0.02	0.02	0.00
184.30	0.02	0.02	0.00
184.35	0.02	0.02	0.00
184.40	0.02	0.02	0.00
184.45	0.02	0.02	0.00
184.50	0.02	0.02	0.00
184.55	0.02	0.02	0.00
184.60	0.02	0.02	0.00
184.65	0.02	0.02	0.00
184.70	0.02	0.02	0.00
184.75	0.02	0.02	0.00
184.80	0.02	0.02	0.00
184.85	0.02	0.02	0.00
184.90	0.02	0.02	0.00
184.95	0.04	0.02	0.02
185.00	0.07	0.02	0.05
185.05	0.12	0.02	0.09
185.10	0.17	0.02	0.14
185.15	0.22	0.02	0.20
185.20	0.29	0.02	0.26
185.25	0.36	0.02	0.33
185.30	0.43	0.02	0.41
185.35	0.51	0.02	0.48
185.40	0.59	0.02	0.57
185.45	0.68	0.02	0.65
185.50	0.77	0.02	0.75
185.55	0.87	0.02	0.84
185.60	0.96	0.02	0.94
185.65	1.07	0.02	1.04
185.70	1.17	0.02	1.15
185.75	1.28	0.02	1.25
185.80	1.83	0.02	1.80
185.85	2.75	0.03	2.72
185.90	3.91	0.03	3.88
185.95	5.27	0.03	5.24
186.00	**6.79**	**0.03**	**6.77**

WQV Discharge Table

$\boxed{\text{184.60 = 0.02CFS}}$

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Bioretention W/ ISR #202 (Pond 202P)**

Enter the node name in the drainage analysis if applicable.

2.35	ac	A = Area draining to the practice	
1.10	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)	
1.10	ac-in	WQV= 1” x Rv x A	
4,005	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	
400	cf	10% x WQV (check calc for sediment forebay)	
1,001	cf	25% x WQV (check calc for water stored in saturated zone)	
Sediment Forebay		Method of Pretreatment	
903	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**$\geq$ 10%WQV**
4,740	cf	Volume below lowest orifice[1]	**$\geq$ 100%WQV**
1,288	cf	Water stored in voids of saturated zone	**$\geq$ 26%WQV**
0.09	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
176.61	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.06	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
37.08	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**$\geq$ 24-hrs**
18.00	in	Depth of Filter Media	**$\geq$ 18"**
3.00	:1	Pond side slopes	**$\geq$ 3:1**
Angle Grate		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of $\leq$6”)?	
179.80	ft	Peak elevation of the 50-year storm event (E_{50})	
180.50	ft	Berm elevation of the pond	
YES		$E_{50} \leq$ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes:

26% WQV = 1,041 CF

1,981 SF Bottom Pond, Stone = 40% Voids, 24" ISR Stone Base

Min ISR height @ Liner Low Point = 1.25'

1.25FT*1,981 SF= 2,476 CF * 40% Voids = 991 CF

Triangle of ISR remaining between liner low and high point

Max ISR height above triangle = 0.75'

0.5*0.75FT*1,981 SF= 743 CF * 40% Voids = 297 CF

991 CF + 297 CF = 1,288 CF Total ISR Storage

Summary for Pond 202P: Bioretention W/ ISR #202

Inflow Area = 2.354 ac, 46.52% Impervious, Inflow Depth > 4.77" for 50YR-24HR event
Inflow = 10.32 cfs @ 12.11 hrs, Volume= 0.936 af
Outflow = 1.19 cfs @ 13.02 hrs, Volume= 0.709 af, Atten= 88%, Lag= 54.6 min
Primary = 0.09 cfs @ 12.64 hrs, Volume= 0.112 af
Secondary = 1.10 cfs @ 13.02 hrs, Volume= 0.597 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 179.80' @ 13.02 hrs Surf.Area= 1,981 sf Storage= 22,760 cf
Flood Elev= 180.50' Surf.Area= 1,981 sf Storage= 28,868 cf

Plug-Flow detention time= 312.0 min calculated for 0.709 af (76% of inflow)
Center-of-Mass det. time= 225.2 min (1,014.8 - 789.6)

Volume	Invert	Avail.Storage	Storage Description
#1	173.75'	198 cf	**Stone (Irregular)** Listed below (Recalc) -Impervious 495 cf Overall x 40.0% Voids
#2	174.00'	594 cf	**Bio Media (Irregular)** Listed below (Recalc) 2,972 cf Overall x 20.0% Voids
#3	175.50'	903 cf	**Sediment Forebay (Irregular)** Listed below (Recalc) -Impervious
#4	175.50'	6,102 cf	**Cell (Irregular)** Listed below (Recalc) -Impervious
#5	177.50'	21,071 cf	**Open Water Storage (Irregular)** Listed below (Recalc) -Impervious
		28,868 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
173.75	1,981	351.5	0	0	1,981
174.00	1,981	351.5	495	495	2,069

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
174.00	1,981	351.5	0	0	1,981
175.50	1,981	351.5	2,972	2,972	2,508

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
175.50	243	61.9	0	0	243
176.00	337	70.7	144	144	342
177.00	563	89.6	445	590	596
177.50	693	98.2	313	903	732

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
175.50	1,981	351.5	0	0	1,981
176.00	2,509	360.4	1,120	1,120	2,516
177.00	3,604	379.0	3,040	4,160	3,671
177.50	4,170	387.1	1,942	6,102	4,201

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
177.50	4,925	448.8	0	0	4,925
178.00	5,605	458.3	2,631	2,631	5,647
179.00	7,008	477.1	6,293	8,924	7,123
180.00	8,468	496.0	7,726	16,651	8,665
180.50	9,219	505.4	4,420	21,071	9,455

Device	Routing	Invert	Outlet Devices
#1	Primary	173.75'	**6.0" Round 6" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 173.75' / 173.50' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Secondary	173.75'	**15.0" Round 15" HDPE N-12** L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 173.75' / 173.50' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	173.75'	**1.2" Vert. 1.25" Orifice** C= 0.600
#4	Device 3	174.00'	**10.000 in/hr Bio Media over Surface area**
#5	Device 2	177.00'	**4.0" Vert. 4" Orifice** C= 0.600
#6	Device 2	179.75'	**48.0" Horiz. 48" Outlet Structure** C= 0.600 Limited to weir flow at low heads
#7	Tertiary	180.00'	**10.0' long x 8.5' breadth Spillway** 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) 2.45 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.65 2.66 2.67 2.69 2.71

Primary OutFlow Max=0.09 cfs @ 12.64 hrs HW=179.71' TW=173.86' (Dynamic Tailwater)
└─**1=6" HDPE N-12** (Passes 0.09 cfs of 2.01 cfs potential flow)
  └─**3=1.25" Orifice** (Orifice Controls 0.09 cfs @ 11.64 fps)
    └─**4=Bio Media** (Passes 0.09 cfs of 0.46 cfs potential flow)

Secondary OutFlow Max=1.10 cfs @ 13.02 hrs HW=179.80' TW=174.34' (Dynamic Tailwater)
└─**2=15" HDPE N-12** (Passes 1.10 cfs of 13.76 cfs potential flow)
  ├─**5=4" Orifice** (Orifice Controls 0.68 cfs @ 7.81 fps)
  └─**6=48" Outlet Structure** (Weir Controls 0.42 cfs @ 0.71 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.75' TW=172.50' (Dynamic Tailwater)
└─**7=Spillway** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 202P: Bioretention W/ ISR #202

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
173.75	0	0
173.85	0	79
173.95	**0**	158
174.05	**1,981**	218
174.15	1,981	258
174.25	1,981	297
174.35	1,981	337
174.45	1,981	376
174.55	1,981	416
174.65	1,981	456
174.75	1,981	495
174.85	1,981	535
174.95	1,981	574
175.05	1,981	614
175.15	1,981	654
175.25	1,981	693
175.35	1,981	733
175.45	1,981	773
175.55	1,981	905
175.65	1,981	1,139
175.75	1,981	1,386
175.85	1,981	1,644
175.95	1,981	1,916
176.05	1,981	2,200
176.15	1,981	2,497
176.25	1,981	2,806
176.35	1,981	3,128
176.45	1,981	3,462
176.55	1,981	3,810
176.65	1,981	4,170
176.75	1,981	4,545
176.85	1,981	4,933
176.95	1,981	5,335
177.05	1,981	5,752
177.15	1,981	6,182
177.25	1,981	6,626
177.35	1,981	7,084
177.45	1,981	7,556
177.55	1,981	8,045
177.65	1,981	8,551
177.75	1,981	9,070
177.85	1,981	9,603
177.95	1,981	10,149
178.05	1,981	10,710
178.15	1,981	11,284
178.25	1,981	11,871
178.35	1,981	12,472
178.45	1,981	13,087
178.55	1,981	13,715
178.65	1,981	14,358
178.75	1,981	15,015
178.85	1,981	15,687
178.95	1,981	16,373
179.05	1,981	17,073
179.15	1,981	17,788
179.25	1,981	18,517
179.35	1,981	19,260
179.45	1,981	20,018
179.55	1,981	20,790
179.65	1,981	21,577
179.75	1,981	22,378
179.85	1,981	23,195
179.95	1,981	24,026
180.05	1,981	24,873
180.15	1,981	25,735
180.25	1,981	26,611
180.35	1,981	27,502
180.45	1,981	**28,409**

Low Orifice = 177.00
Cell Bottom = 175.50

5,542 cf
\- 802 cf
4,740 cf

Volume Below Lowest Orifice Table

Stage-Area-Storage for Pond 202P: Bioretention W/ ISR #202

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
173.75	0	0
173.85	0	79
173.95	**0**	158
174.05	**1,981**	218
174.15	1,981	258
174.25	1,981	297
174.35	1,981	337
174.45	1,981	376
174.55	1,981	416
174.65	1,981	456
174.75	1,981	495
174.85	1,981	535
174.95	1,981	574
175.05	1,981	614
175.15	1,981	654
175.25	1,981	693
175.35	1,981	733
175.45	1,981	773
175.55	1,981	905
175.65	1,981	1,139
175.75	1,981	1,386
175.85	1,981	1,644
175.95	1,981	1,916
176.05	1,981	2,200
176.15	1,981	2,497
176.25	1,981	2,806
176.35	1,981	3,128
176.45	1,981	3,462
176.55	1,981	3,810
176.65	1,981	4,170
176.75	1,981	4,545
176.85	1,981	4,933
176.95	1,981	5,335
177.05	1,981	5,752
177.15	1,981	6,182
177.25	1,981	6,626
177.35	1,981	7,084
177.45	1,981	7,556
177.55	1,981	8,045
177.65	1,981	8,551
177.75	1,981	9,070
177.85	1,981	9,603
177.95	1,981	10,149
178.05	1,981	10,710
178.15	1,981	11,284
178.25	1,981	11,871
178.35	1,981	12,472
178.45	1,981	13,087
178.55	1,981	13,715
178.65	1,981	14,358
178.75	1,981	15,015
178.85	1,981	15,687
178.95	1,981	16,373
179.05	1,981	17,073
179.15	1,981	17,788
179.25	1,981	18,517
179.35	1,981	19,260
179.45	1,981	20,018
179.55	1,981	20,790
179.65	1,981	21,577
179.75	1,981	22,378
179.85	1,981	23,195
179.95	1,981	24,026
180.05	1,981	24,873
180.15	1,981	25,735
180.25	1,981	26,611
180.35	1,981	27,502
180.45	1,981	**28,409**

WQV Storage Table

WQV = 4,005 cf
Elev. 176.61 = 4,024 cf

Stage-Discharge for Pond 202P: Bioretention W/ ISR #202

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
173.75	0.00	0.00	0.00	0.00
173.95	0.00	0.00	0.00	0.00
174.15	0.02	0.02	0.00	0.00
174.35	0.03	0.03	0.00	0.00
174.55	0.03	0.03	0.00	0.00
174.75	0.04	0.04	0.00	0.00
174.95	0.04	0.04	0.00	0.00
175.15	0.04	0.04	0.00	0.00
175.35	0.05	0.05	0.00	0.00
175.55	0.05	0.05	0.00	0.00
175.75	0.05	0.05	0.00	0.00
175.95	0.06	0.06	0.00	0.00
176.15	0.06	0.06	0.00	0.00
176.35	0.06	0.06	0.00	0.00
176.55	0.06	0.06	0.00	0.00
176.75	0.06	0.06	0.00	0.00
176.95	0.07	0.07	0.00	0.00
177.15	0.12	0.07	0.05	0.00
177.35	0.25	0.07	0.18	0.00
177.55	0.33	0.07	0.26	0.00
177.75	0.40	0.08	0.32	0.00
177.95	0.45	0.08	0.37	0.00
178.15	0.50	0.08	0.42	0.00
178.35	0.54	0.08	0.46	0.00
178.55	0.58	0.08	0.49	0.00
178.75	0.61	0.08	0.53	0.00
178.95	0.65	0.09	0.56	0.00
179.15	0.68	0.09	0.59	0.00
179.35	0.71	0.09	0.62	0.00
179.55	0.74	0.09	0.65	0.00
179.75	0.77	0.09	0.68	0.00
179.95	4.47	0.09	4.38	0.00
180.15	12.64	0.10	11.12	1.42
180.35	**19.75**	**0.10**	**14.44**	**5.21**

WQV Discharge Table

176.61 =
0.06CFS

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

NEW HAMPSHIRE DEPARTMENT OF **Environmental Services**

Type/Node Name: **Infiltration Pond #203 (203P)**

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

Value	Unit	Description	Criteria
Yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	← yes
0.37	ac	A = Area draining to the practice	
-	ac	A_I = Impervious area draining to the practice	
-	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.05	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.02	ac-in	WQV= 1" x Rv x A	
67	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
17	cf	25% x WQV (check calc for sediment forebay volume)	
		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
4,586	cf	V = Volume[1] (attach a stage-storage table)	≥ WQV
1,574	sf	A_{SA} = Surface area of the bottom of the pond	
3.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
0.2	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ 72-hrs
172.50	feet	E_{BTM} = Elevation of the bottom of the basin	
170.21	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
168.17	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
2.29	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
4.3	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ 24"
	ft	D_T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←yes
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥3:1
174.56	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
174.61	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
175.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

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

Designer's Notes: Only land area contributing runoff directly to Pond #203 is considered for WQV calculation. Runoff treated by Pond #202 is not considered.

Summary for Pond 203P: Infiltration Pond #203

Inflow Area = 2.722 ac, 40.23% Impervious, Inflow Depth > 1.87" for 10YR-24HR event
Inflow = 0.68 cfs @ 12.33 hrs, Volume= 0.425 af
Outflow = 0.53 cfs @ 15.54 hrs, Volume= 0.326 af, Atten= 22%, Lag= 192.8 min
Discarded = 0.21 cfs @ 15.54 hrs, Volume= 0.221 af
Primary = 0.32 cfs @ 15.54 hrs, Volume= 0.105 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 174.56' @ 15.54 hrs Surf.Area= 3,042 sf Storage= 4,756 cf
Flood Elev= 175.00' Surf.Area= 3,385 sf Storage= 6,181 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 67.4 min (1,045.0 - 977.6)

Volume	Invert	Avail.Storage	Storage Description
#1	172.50'	6,181 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
172.50	1,574	204.2	0	0	1,574
173.00	1,967	225.0	883	883	2,292
174.00	2,638	239.5	2,294	3,178	2,877
175.00	3,385	258.5	3,004	6,181	3,670

Device	Routing	Invert	Outlet Devices
#1	Discarded	172.50'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	174.50'	**10.0' long x 7.0' breadth Spillway** 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Discarded OutFlow Max=0.21 cfs @ 15.54 hrs HW=174.56' (Free Discharge)
↑—**1=Infiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.32 cfs @ 15.54 hrs HW=174.56' TW=0.00' (Dynamic Tailwater)
↑—**2=Spillway** (Weir Controls 0.32 cfs @ 0.57 fps)

Summary for Pond 203P: Infiltration Pond #203

Inflow Area = 2.722 ac, 40.23% Impervious, Inflow Depth > 3.45" for 50YR-24HR event
Inflow = 1.46 cfs @ 12.17 hrs, Volume= 0.783 af
Outflow = 1.12 cfs @ 13.42 hrs, Volume= 0.674 af, Atten= 24%, Lag= 74.9 min
Discarded = 0.21 cfs @ 13.42 hrs, Volume= 0.241 af
Primary = 0.90 cfs @ 13.42 hrs, Volume= 0.433 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 174.61' @ 13.42 hrs Surf.Area= 3,084 sf Storage= 4,928 cf
Flood Elev= 175.00' Surf.Area= 3,385 sf Storage= 6,181 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 41.9 min (1,042.2 - 1,000.3)

Volume	Invert	Avail.Storage	Storage Description
#1	172.50'	6,181 cf	**Open Water Storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
172.50	1,574	204.2	0	0	1,574
173.00	1,967	225.0	883	883	2,292
174.00	2,638	239.5	2,294	3,178	2,877
175.00	3,385	258.5	3,004	6,181	3,670

Device	Routing	Invert	Outlet Devices
#1	Discarded	172.50'	**3.000 in/hr Infiltration over Surface area**
#2	Primary	174.50'	**10.0' long x 7.0' breadth Spillway** 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) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

Discarded OutFlow Max=0.21 cfs @ 13.42 hrs HW=174.61' (Free Discharge)
└**1=Infiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.90 cfs @ 13.42 hrs HW=174.61' TW=0.00' (Dynamic Tailwater)
└**2=Spillway** (Weir Controls 0.90 cfs @ 0.80 fps)

Stage-Area-Storage for Pond 203P: Infiltration Pond #203

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
172.50	1,574	0
172.55	1,611	80
172.60	1,649	161
172.65	1,687	245
172.70	1,726	330
172.75	1,765	417
172.80	1,805	506
172.85	1,845	598
172.90	1,885	691
172.95	1,926	786
173.00	1,967	883
173.05	1,998	983
173.10	2,030	1,083
173.15	2,061	1,186
173.20	2,093	1,289
173.25	2,126	1,395
173.30	2,158	1,502
173.35	2,191	1,611
173.40	2,224	1,721
173.45	2,257	1,833
173.50	2,290	1,947
173.55	2,324	2,062
173.60	2,358	2,179
173.65	2,392	2,298
173.70	2,426	2,418
173.75	2,461	2,540
173.80	2,496	2,664
173.85	2,531	2,790
173.90	2,566	2,918
173.95	2,602	3,047
174.00	2,638	3,178
174.05	2,673	3,311
174.10	2,709	3,445
174.15	2,744	3,581
174.20	2,780	3,719
174.25	2,816	3,859
174.30	2,852	4,001
174.35	2,889	4,145
174.40	2,926	4,290
174.45	2,963	4,437
174.50	3,000	4,586
174.55	3,037	4,737
174.60	3,075	4,890
174.65	3,113	5,045
174.70	3,151	5,201
174.75	3,190	5,360
174.80	3,228	5,520
174.85	3,267	5,683
174.90	3,306	5,847
174.95	3,345	6,013
175.00	**3,385**	**6,181**

Total Storage Capacity = 4,586 CF

United States Department of Agriculture

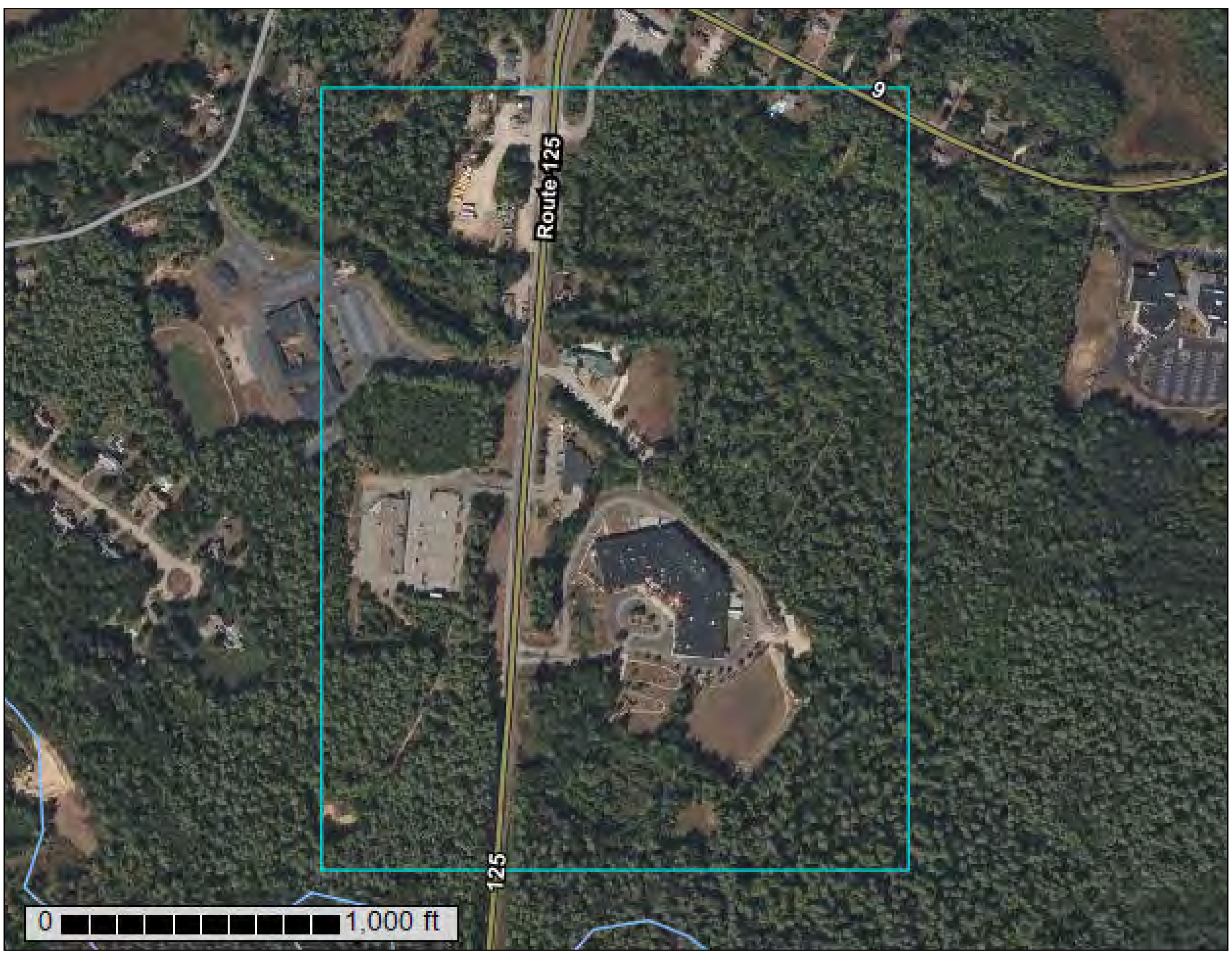
NRCS

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

Strafford County, New Hampshire



April 17, 2024

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Soil Map

Map Scale: 1:5,020 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 200, 400, 800, 1200

N

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil 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 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 24, Aug 22, 2023

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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
Gv	Gravel and borrow pits	0.1	0.1%
HaA	Hinckley loamy sand, 0 to 3 percent slopes	45.4	33.1%
HaB	Hinckley loamy sand, 3 to 8 percent slopes	10.3	7.5%
HaC	Hinckley loamy sand, 8 to 15 percent slopes	3.8	2.8%
Sb	Saugatuck loamy sand	7.6	5.6%
WdA	Windsor loamy sand, 0 to 3 percent slopes	69.9	51.0%
Totals for Area of Interest		**137.2**	**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.

Strafford County, New Hampshire

Gv—Gravel and borrow pits

Map Unit Setting

National map unit symbol: 9d7c
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

Gravel and borrow pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel And Borrow Pits

Typical profile

H1 - 0 to 6 inches: extremely gravelly sand
H2 - 6 to 60 inches: extremely gravelly sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

HaA—Hinckley loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svm7
Elevation: 0 to 1,420 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash deltas, kame terraces, outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 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 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, kame terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Kame terraces, outwash terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kame terraces, outwash terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

HaB—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8
Elevation: 0 to 1,430 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash plains, eskers, moraines, kame terraces, kames, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 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 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent
Landform: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope, side slope, base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

HaC—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 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

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Kame terraces, outwash plains, kames, eskers, moraines, outwash terraces, outwash deltas
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 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 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Eskers, moraines, outwash terraces, outwash plains, kames
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash terraces, kame terraces, outwash plains, moraines, outwash deltas
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, outwash terraces, outwash deltas, kames, eskers, moraines
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sb—Saugatuck loamy sand

Map Unit Setting

National map unit symbol: 9d8r
Elevation: 300 to 1,000 feet
Mean annual precipitation: 27 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 125 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Saugatuck and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saugatuck

Setting

Landform: Outwash terraces
Parent material: Outwash

Typical profile

H1 - 0 to 4 inches: loamy sand
H2 - 4 to 7 inches: sand
H3 - 7 to 26 inches: loamy sand
H4 - 26 to 42 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 16 inches to undefined
Drainage class: Poorly drained
Runoff class: High
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 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

Minor Components

Not named wet

Percent of map unit: 15 percent
Landform: Outwash terraces
Hydric soil rating: Yes

WdA—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg
Elevation: 0 to 990 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: Farmland of local importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 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 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

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Job # 23-006

Site Specific Soil Survey 1/24/23
Map 238 Lot 44
Calef Highway Barrington, NH

Dear Chris,

This letter report presents the findings of a Site Specific Soil Survey conducted on the referenced properties by John P. Hayes III on January 23, 2024. The soil survey was conducted in accordance with the New Hampshire Supplement of the Site-Specific Soil Mapping Standard For New Hampshire and Vermont, Special Publication # 3, Version 7.0 July 2021, published by the Society of Soil Scientist of Northern New England. Soil series information was also taken from the Soil Survey of Strafford County New Hampshire issued March 1973.

The parcel is located on the southeast side of Route 125, northeast of Providence road, and northwest of Mallego Brook, in Barrington,NH. Lot 44 is approximately 28 acres in size. Only a portion of Lot 44, in the northeast section, around the present structure, was mapped. The plans used for these soil maps are a 40 scale plan, where 1 inch equals 40 feet, with two foot contours.

The purpose of the soil survey is to provide the client with soils information for urban and suburban or rural land planning. Soil characteristics on the property were evaluated through observation of numerous test pits, and hand auger probes conducted throughout the property. Slope phases were determined with the use of the topography provided on the plan. The Site-specific Soil Map Units identified are taken from the New Hampshire State-Wide Numerical Soils Legend, Issue #10 January 2011, and are briefly described below. Official Series Descriptions (OSD) for each of these soil series are enclosed with this report. The soil map units comply with the Range In Characteristics described in the OSD. Any limiting inclusions on the site, do not exceed 15 percent of any of the soil map units. Dissimilar inclusions, if any, will be noted in the report. Limits of the Site Specific mapping units are highlighted on the plan. The Hydrological Soil Groups for each of the soil series was determined using SSSNNE Publication No. 5 Ksat Values for New Hampshire Soils September 2009. Limits of the Site Specific mapping units are highlighted on the plan.

The Hydrological Soil Groups for each of the soil series was determined using SSSNNE Publication No. 5 Ksat Values for New Hampshire Soils September 2009. Limits of the Site Specific mapping units are highlighted on the plan.

Portions of the soil map with the map unit denominator of P and VP contain poorly drained soils, and very poorly drained soils respectively. Portions of the soil map with the map unit 400, and 299, contain disturbed soils that have been excavated and/or regraded. They are well drained, to moderately well drained, and are sandy in texture. Portions of the soil map with the map unit 900, contain disturbed soils that have been excavated down to, or near the water table, and are poorly drained. These soils are also sandy in texture. A Disturbed Soil Mapping Unit Supplement for New Hampshire DES AoT Site Specific Soil Maps is also included. This supplement explains the additional information given about each disturbed soil map units that are present on the site.

MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDROLOGIC SOIL GROUP	DESCRIPTION
26	**Windsor**	**C**	**A**	The Windsor series consists of very deep, excessively drained soils formed in sandy outwash or eolian deposits. These soils are located in the northeastern portion of the property. The soil texture is loamy sand over sand. These soils are deep to bedrock. Saturated hydraulic conductivity is high or very high. Some inclusions of moderately drained Deerfield soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 38 to 60 inches.
34 P	**Wareham**	**B**	**C**	The Wareham series consists of very deep, poorly and drained sandy soils formed in outwash on plains, deltas, and terraces. These soils are located in the wetland areas in the southwestern portion of the property. The soil texture is loamy coarse sand over coarse sand. These soils are deep to bedrock. Permeability is rapid throughout these soils. Some inclusions of somewhat poorly drained Deerfield Variant soils may be present, but are less than 10 percent of the mapped area.Estimated seasonal high water tables in these soils range from 0 to 10 inches.
299 (cbadb)	**Udorthents (smoothed)**	**A**	**B**	The Udorthents smoothed map unit represents soils that have been cut and filled and made into level areas. The soil material typacally comes from the soils in the immediate surrounding areas. These soils are located in the southeastern portion of the property. These disturbed soils are mostly derived from the Windsor and/or Deerfield soil series, but also some fill material and concrete was found in the soil profile. The soil textures include loamy sand over coarse sand, and over stratified sand and fine sand. These soils are well drained, and are deep to bedrock. Saturated hydraulic conductivity is high or very high. Estimated seasonal high water tables in these soils are over 40 inches.

MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDRO LOGIC SOIL GROUP	DESCRIPTION
313	**Deerfield**	**A B C D E**	**B**	The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial deposits. These soils are located throughout the property. The soil texture is loamy sand over sand. These soils are deep to bedrock.Saturated hydraulic conductivity is high or very high. Some inclusions of excessively well drained Windsor, and somewhat poorly drained Deerfield Variant, soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 15 to 38 inches.
400 (c/dbadb)	**Udorthents (sandy or gravelly) (moderately well drained)**	**A C D E**	**B**	Udorthents are disturbed soils that have been excavated and/or regraded, and are sandy or gravelly in texture. These soils are located mostly in the northeast portion of the property.There is also an area of this disturbed map unit in the central portion of the lot. These disturbed soils are mostly derived from the Windsor and/or Deerfield soil series. The soil textures ore loamy sand over stratified sand. These soils are moderately well drained, and are deep to bedrock. Saturated hydraulic conductivity is high or very high. Estimated seasonal high water tables in these soils range from 15 to 50 inches.
546 P	**Walpole**	**A**	**C**	The Walpole Series consists of very deep, poorly drained sandy soils formed in outwash and stratified drift. A small area of these soils are located in the wetland, in the south central portion of the property. The soil texture is loamy sand over sandy loam over gravelly sand. Saturated hydraulic conductivity is moderately high or high in the surface layer and subsoil, and high or very high in the substratum. Some inclusions of the very poorly drained Scarboro soil series, and the somewhat poorly drained component of the Sudbury soils may be present, but are less than 10 percent of the mapped area. Estimated seasonal high water tables in these soils range from 0 to 10 inches.

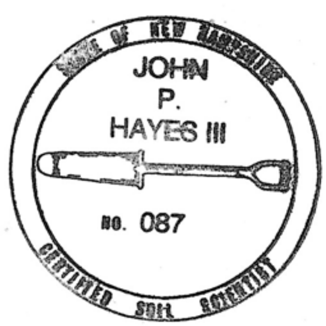
MAP UNIT #	SOIL TAXANOMIC NAME	SLOPES	HYDRO LOGIC SOIL GROUP	DESCRIPTION
900 **P** **(fbadd)**	**Endoaquents (sandy or gravelly)**	**A**	**D**	Endoaquents represents areas of disturbed soils where the soil material was excavated down to, or near, the water table, and are sandy or gravelly in texture. These soils are located in the northeastern portion of the property in a manmade detention basin. These disturbed soils appear to be the lower horizons of the Windsor or Deerfield soil series. These soils are deep to bedrock. Saturated hydraulic conductivity is mineral portion is high or very high. Estimated seasonal high water tables in these soils range from 0 to 10 inches

Slope Phases

Alpha Slope Symbol	Range
A	**0 – 3%**
B	**3 – 8%**
C	**8 – 15%**
D	**15 – 25%**
E	**25 – 50%**
F	**> 50%**

I trust that this Soil Survey and report meet your current planning needs. Please do not hesitate to contact me if you have any questions.

Sincerely:



John P. Hayes III

John P. Hayes III CSS, CWS

Disturbed Soil Mapping Unit 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 Soils 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

To provide soil scientists with additional soil mapping tools for disturbed sites and miscellaneous areas to enhance site specific soil maps and interpretations to reflect new requirements under the revised NH Alteration of Terrain regulations. This supplement is intended to allow the creation of soil maps with mapping units that can be expanded beyond those of the NRCS NH State-Wide Numerical Legend and the standards of the National Cooperative Soil Survey for disturbed units in order to provide specific information useful in preparation of site specific soils maps and reports to comply with NHDES Env-Wq 1500-Alteration of Terrain.

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. Additionally, the 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 land, including excavate and fill, is as defined by RSA 485-A: 6, VIII; RSA 485-A: 17, and NHDES Env-Wq 1500.

Map Notation

Notation on the Site Specific Soil Map completed to comply with the NH AoT rules should include the following disclaimer:

Site-Specific Soil Map

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.

Map Symbol Denominators for Disturbed Unit Supplements

The map symbols for Site-Specific Soil Mapping of disturbed 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 Soil Supplement to the Site Specific Soil Survey Standards, as detailed below. The disturbed map symbol is composed of 5 lower case letters.

Thus a Site Specific map symbol for a map prepared for an AoT application would be formatted as follows:

400A/aaaaa

These SSSNNE NH 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

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 Bogs, etc
i- Organic Materials-Tidal Marsh

Symbol 3: Restrictive/Impervious Layers
a-None
b-Bouldery surface with more than 15% of the surface covered with boulders
c-Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as 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" 2nd 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

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.

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Job# 23-006

Test Pit Logs 1/22/24
Map 238 Lot 44-1
607 Calef Highway Barrington NH

Test Pit 206

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-4	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
4-14	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
14-20	2.5Y 6/4 Light Yellowish Brown	Loamy Sand	Granular	Friable
20-28	2.5Y 6/3 Light Yellowish Brown	Sand with Redoximorphic features present	Single Grain	Loose
28-62	2.5YR 4/4 Reddish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 20 in. Restrictive Layer : None Observed H2O: 32 in. Refusal: None

Test Pit 207

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-4	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
4-16	7.5YR 5/6 Strong Brown	Loamy Sand	Granular	Friable
16-30	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
30-40	10YR 6/4 Light Yellowish Brown	Sand	Single Grain	Loose
40-65	2.5Y 6/3 Light Yellowish Brown	Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 40 in. Restrictive Layer : None Observed H2O: None Refusal: None

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Test Pit Logs 1/22/24
Map 238 Lot 44-1
607 Calef Highway Barrington NH

Test Pit 208

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-10	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
10-18	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
18-36	2.5Y 6/4 Light Yellowish Brown	Loamy Sand	Granular	Friable
36-65	2.5YR 4/4 Reddish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 36 in. Restrictive Layer : None Observed H2O: None Refusal: None

Test Pit 209

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-10	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
10-18	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
18-34	2.5Y 6/4 Light Yellowish Brown	Loamy Sand	Granular	Friable
34-65	2.5YR 4/4 Reddish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 34 in. Restrictive Layer : None Observed H2O: None Refusal: None

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Test Pit Logs 1/22/24
Map 238 Lot 44-1
607 Calef Highway Barrington NH

Test Pit 210

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-14	7.5YR 5/6 Strong Brown	Loamy Sand	Granular	Friable
14-24	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
24-32	10YR 6/4 Light Yellowish Brown	Sand	Single Grain	Loose
32-64	2.5Y 6/3 Light Yellowish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 32 in. Restrictive Layer : None Observed H2O: None Refusal: None

Test Pit 211

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-14	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
14-22	10YR 6/4 Light Yellowish Brown	Loamy Sand	Granular	Friable
22-60	2.5Y 6/3 Light Yellowish Brown	Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 22 in. Restrictive Layer : None Observed H2O: 32 in. Refusal: None

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Job# 23-006

Test Pit Logs 1/22/24
Map 238 Lot 44-1
607 Calef Highway Barrington NH

Test Pit 212

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-16	7.5YR 5/6 Strong Brown	Loamy Sand	Granular	Friable
16-28	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
26-38	10YR 6/4 Light Yellowish Brown	Sand	Single Grain	Loose
38-60	2.5Y 6/3 Light Yellowish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 38 in.   Restrictive Layer : None   Observed H2O: None   Refusal: None

Test Pit 213

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-10	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
10-24	10 YR 5/4 Yellowish Brown	Gravelly Sand	Single Grain	Loose
24-42	10YR 3/1 Very Dark Gray	Loamy Fine Sand	Massive	Friable
42-52	2.5Y 6/3 Light Yellowish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: None to 52 in.   Restrictive Layer : None   Observed H2O: None   Refusal: None

Note: 0 to 24 inches is fill material. Some concrete in fill material 10 to 24 in.

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Job# 23-006

Test Pit Logs 1/22/24
Map 238 Lot 44-1

Test Pit 214

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-28	10YR 6/4 Light Yellowish Brown	Loamy Sand	Granular	Friable
28-36	10YR 3/1 Very Dark Gray	Loamy Fine Sand	Granular	Friable
36-50	2.5Y 6/3 Light Yellowish Brown	Sand and Fine Sand with Redoximorphic features present	Massive	Friable

ESHWT: None to 36 in. **Restrictive Layer : None** **Observed H2O: None** **Refusal: None**

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Job# 23-006

Test Pit Logs 3/7/24
Map 238 Lot 44-1

Test Pit 301

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-18	10YR 5/6 Yellowish Brown	Gravelly Loamy Sand	Granular	Friable
18-30	10YR 6/4 Light Yellowish Brown	Gravelly Loamy Sand	Granular	Friable
30-44	10YR 6/4 Light Yellowish Brown	Sand	Single Grain	Loose
44-52	2.5Y 5/3 Light Yellowish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 44 in. Restrictive Layer : None Observed H2O: None Refusal: None

Test Pit 302

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-18	10YR 5/6 Yellowish Brown	Gravelly Loamy Sand	Granular	Friable
18-32	10YR 6/4 Light Yellowish Brown	Gravelly Loamy Sand	Granular	Friable
32-46	10YR 6/4 Light Yellowish Brown	Sand	Single Grain	Loose
46-52	2.5Y 5/3 Light Yellowish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 46 in. Restrictive Layer : None Observed H2O: None Refusal: None

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Test Pit Logs 3/7/24
Map 238 Lot 44-1

Test Pit 303

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-8	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
8-14	7.5YR 5/6 Strong Brown	Loamy Sand	Granular	Friable
14-26	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
26-32	10YR 6/4 Light Yellowish Brown	Sand	Single Grain	Loose
32-52	2.5Y 6/3 Light Yellowish Brown	Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 32 in. **Restrictive Layer : None** **Observed H2O: None** **Refusal: None**

Test Pit 304

Depth (inches)	Color	Textural Classification	Soil Structure	Soil Consistance
0-6	10YR 3/2 Dark Grayish Brown	Loamy Sand	Granular	Friable
6-14	7.5YR 5/6 Strong Brown	Loamy Sand	Granular	Friable
14-28	10YR 5/6 Yellowish Brown	Loamy Sand	Granular	Friable
28-42	10 YR 6/4 Yellowish Brown	Sand	Single Grain	Loose
42-52	2.5Y 6/3 Light Yellowish Brown	Gravelly Sand with Redoximorphic features present	Single Grain	Loose

ESHWT: 42 in. **Restrictive Layer : None** **Observed H2O: None** **Refusal: None**

JOHN P. HAYES, III CSS #87

DEIDRA BENJAMIN, CWS #295

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014-41:1-42.
5) CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. JANUARY 1987. WETLANDS RESEARCH PROGRAM TECHNICAL REPORT Y-87-1.
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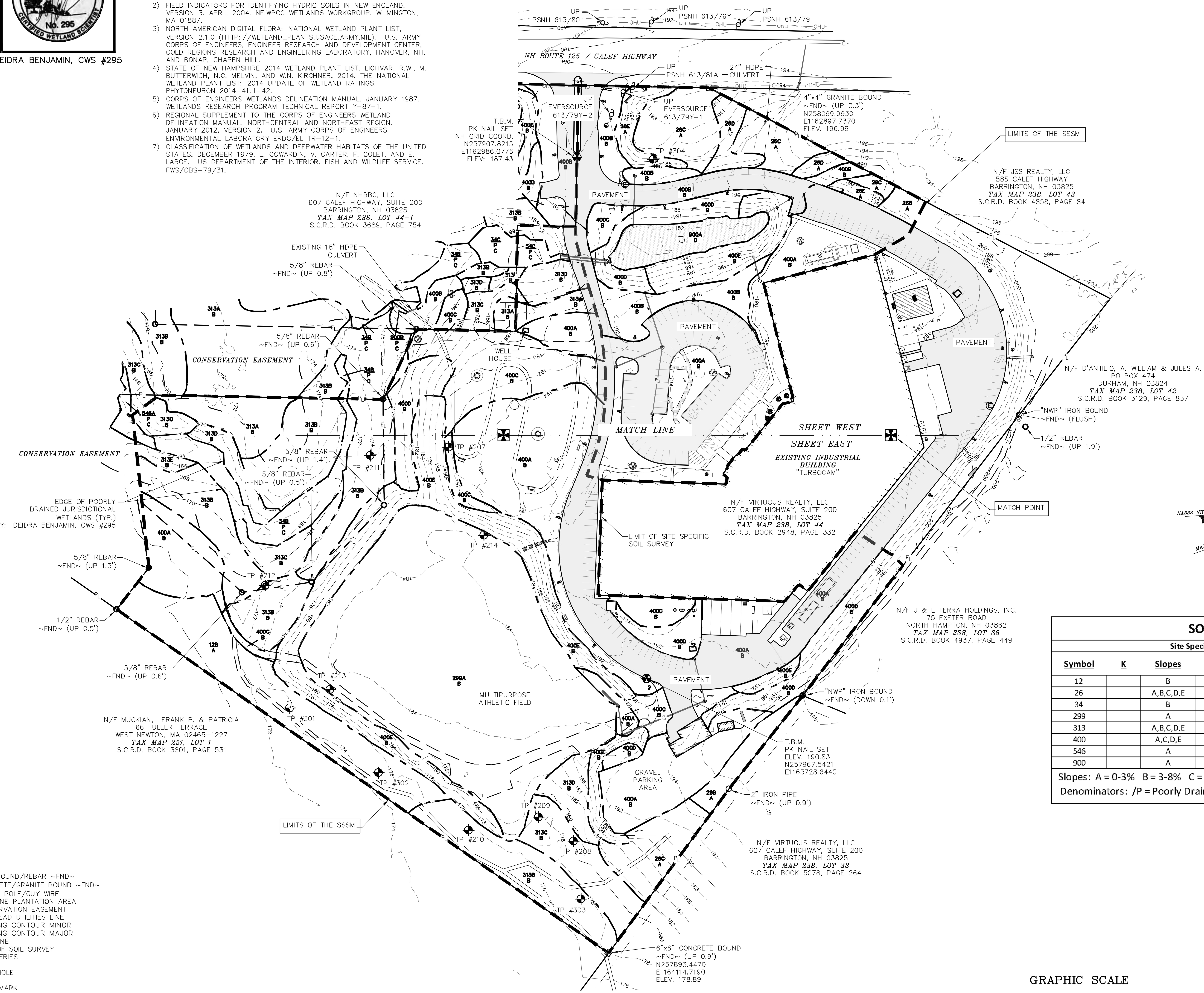
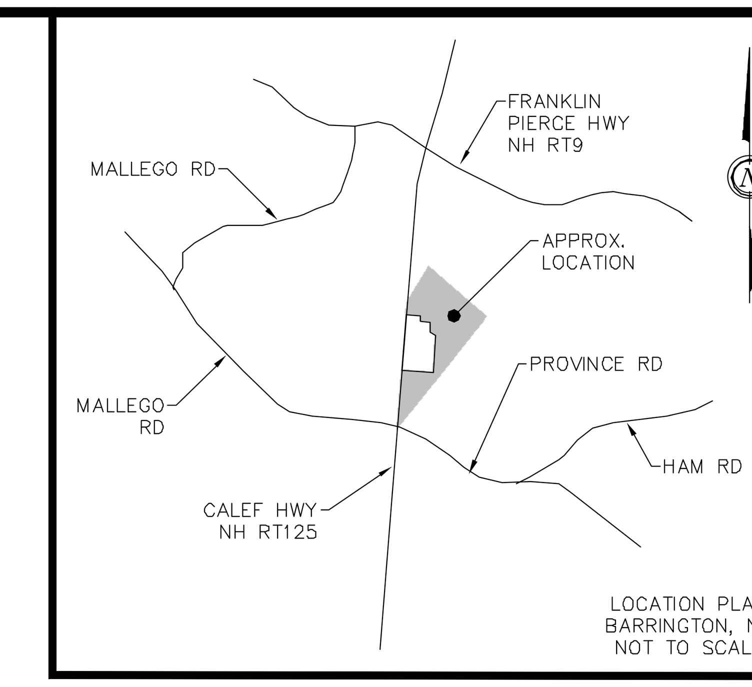
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS-79/31.





NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE & BELIEF, THIS PARCEL DOES NOT FALL WITHIN THE FLOOD PLAIN. FLOOD HAZARD REF.: FEMA, COMMUNITY# -330178, MAP# - 33017C0305E, DATED: SEPT. 30, 2015.

6.) VERTICAL DATUM BASED ON NAVD88 ELEVATIONS. HORIZONTAL COORDINATES BASED ON NAD83. COORDINATES GATHERED USING CARLSON BRX7 SURVEY GRADE GPS RECEIVERS.

7.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN APRIL OF 2023, WITH AN ERROR OF CLOSURE OF BETTER THAN 1 PART IN 10,000.

8.) THE INTENT OF THIS PLAN IS TO SHOW THE OVERVIEW OF THE SITE SPECIFIC SOIL SURVEY OF TAX MAP 238, LOT 44 AS OF THE DATE OF THE SURVEY (APRIL 2023 & JANUARY 2024).

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

LEGEND:

IRON BOUND/REBAR ~FND~
CONCRETE/GRANITE BOUND ~FND~
UTILITY POLE/GUY WIRE
RED PINE PLANTATION AREA
CONSERVATION EASEMENT
OVERHEAD UTILITIES LINE
EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
SOIL LINE
LIMIT OF SOIL SURVEY
448A SOIL SERIES
TEST HOLE
BENCHMARK
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
POORLY DRAINED JURISDICTIONAL WETLAND

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

FOR PLANNING BOARD APPROVAL PURPOSES:

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP – OVERVIEW

FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 80 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 805
LICENSED LAND SURVEYOR
SIGNATURE

SHEET 8 OF 43

NOT FOR CONSTRUCTION

JOHN P. HAYES, III CSS #87

DEIDRA BENJAMIN, CWS #295

WETLANDS WERE DELINEATED BY DEIDRA BENJAMIN, CWS, IN APRIL OF 2023 AND JANUARY OF 2024 UTILIZING THE FOLLOWING STANDARDS:

1) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7.0. 2010. L.M. VASILAS, G.W. HURT, AND C.V. NOBLE (EDS.). UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
2) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. VERSION 3. APRIL 2004. NEIWPCC WETLANDS WORKGROUP. WILMINGTON, MA 01887.
3) NORTH AMERICAN DIGITAL FLORA: NATIONAL WETLAND PLANT LIST, VERSION 2.1.0 (HTTP://WETLAND_PLANTS.USACE.ARMY.MIL). U.S. ARMY CORPS OF ENGINEERS, ENGINEER RESEARCH AND DEVELOPMENT CENTER, COLD REGIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NH, AND BONAP, CHAPEN HILL.
4) STATE OF NEW HAMPSHIRE 2014 WETLAND PLANT LIST. LICHVAR, R.W., M. BUTTERWICH, N.C. MELVIN, AND W.N. KIRCHNER. 2014. THE NATIONAL WETLAND PLANT LIST: 2014 UPDATE OF WETLAND RATINGS. PHYTONEURON 2014-41:1-42.
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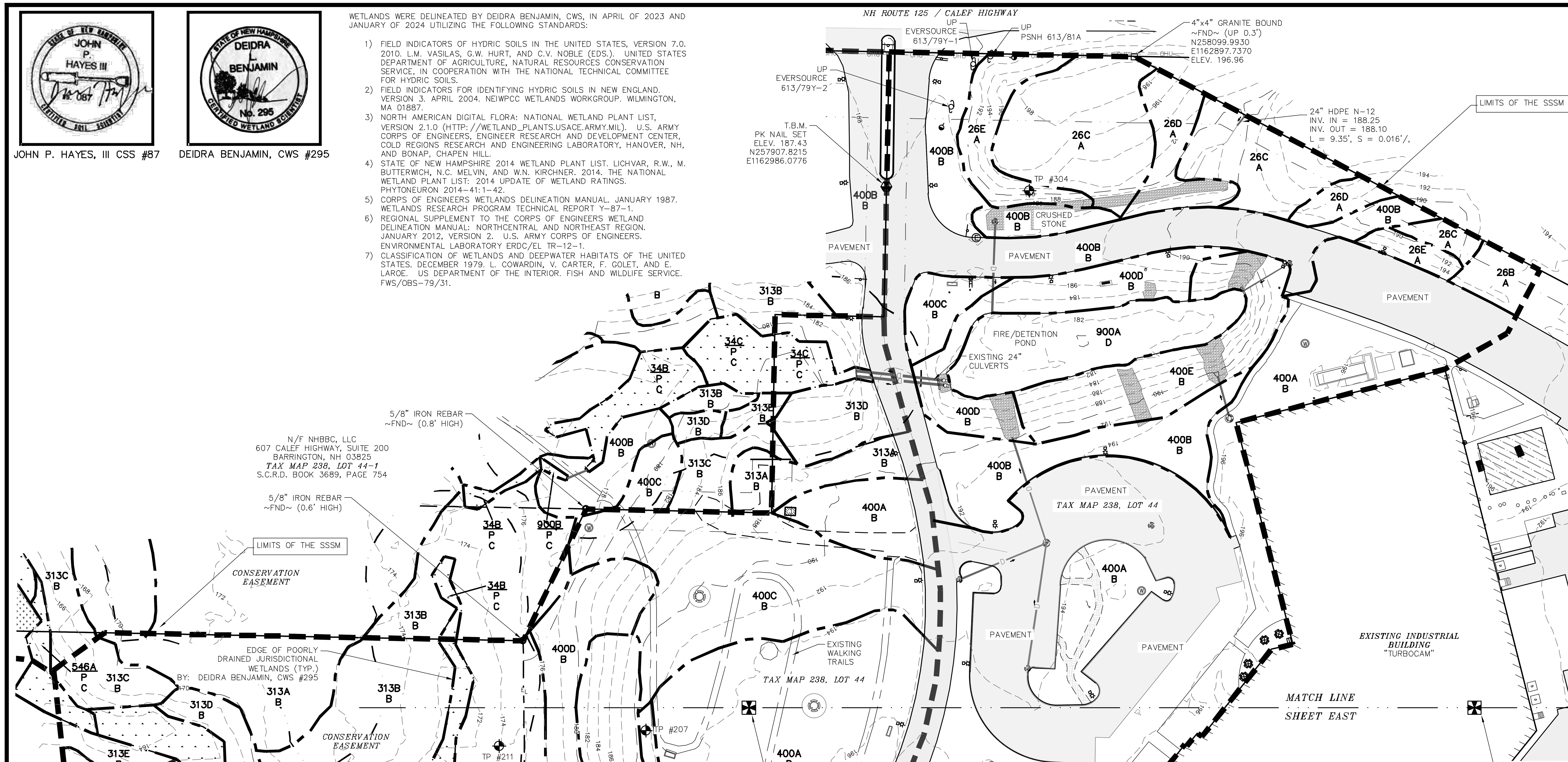
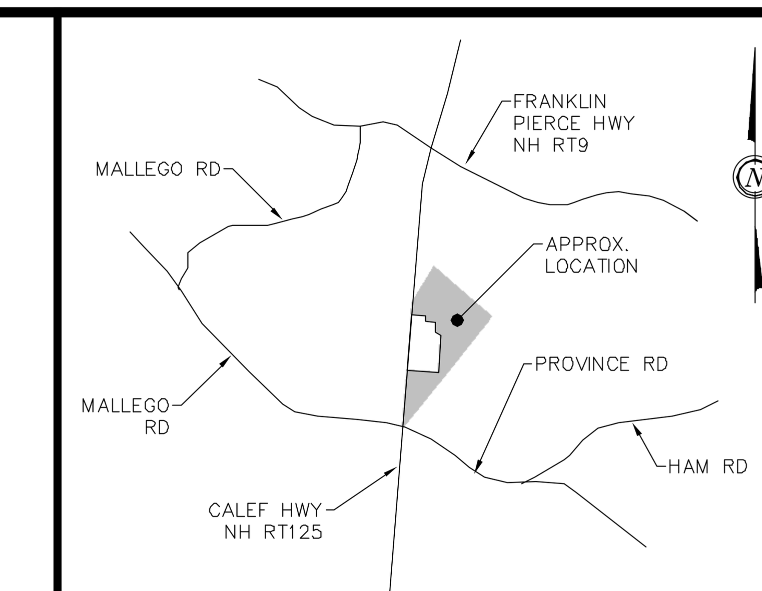
7) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. DECEMBER 1979. L. COWARDIN, V. CARTER, F. GOLET, AND E. LAROE. US DEPARTMENT OF THE INTERIOR. FISH AND WILDLIFE SERVICE. FWS/OBS-79/31.





LOCATION PLAN
BARRINGTON, NH
NOT TO SCALE

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

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7.) THE BOUNDARY LINES SHOWN ON THIS PLAN ARE THE RESULT OF A CLOSED TRAVERSE PERFORMED BY THIS OFFICE IN APRIL OF 2023, WITH AN ERROR OF CLOSURE OF BETTER THAN 1 PART IN 10,000.

8.) THE INTENT OF THIS PLAN IS TO SHOW DETAIL OF THE WEST SIDE OF THE SITE SPECIFIC SOIL SURVEY OF TAX MAP 238, LOT 44 AS OF THE DATE OF THE SURVEY (APRIL 2023 & JANUARY 2024).

LEGEND:

IRON BOUND/REBAR ~FND~
CONCRETE/GRANITE BOUND ~FND~
UTILITY POLE/GUY WIRE
RED PINE PLANTATION AREA
CONSERVATION EASEMENT
OVERHEAD UTILITIES LINE
EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
SOIL LINE
LIMIT OF SOIL SURVEY
448A SOIL SERIES
TEST HOLE
BENCHMARK
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
FND FOUND
POORLY DRAINED JURISDICTIONAL WETLAND

SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
12		B	Hinckley	A
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

FOR PLANNING BOARD APPROVAL PURPOSES:

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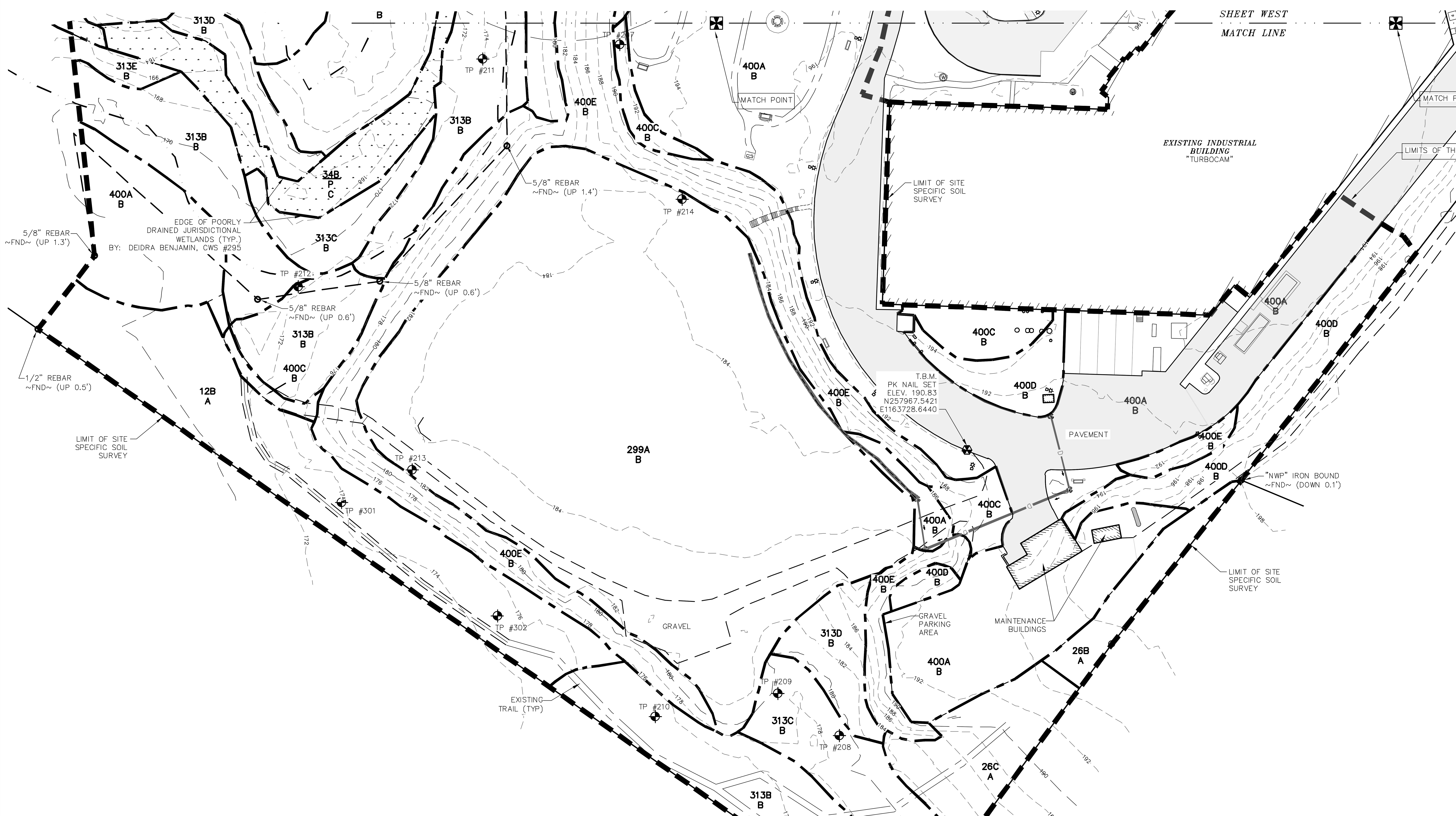
REVISION	DATE	DESCRIPTION

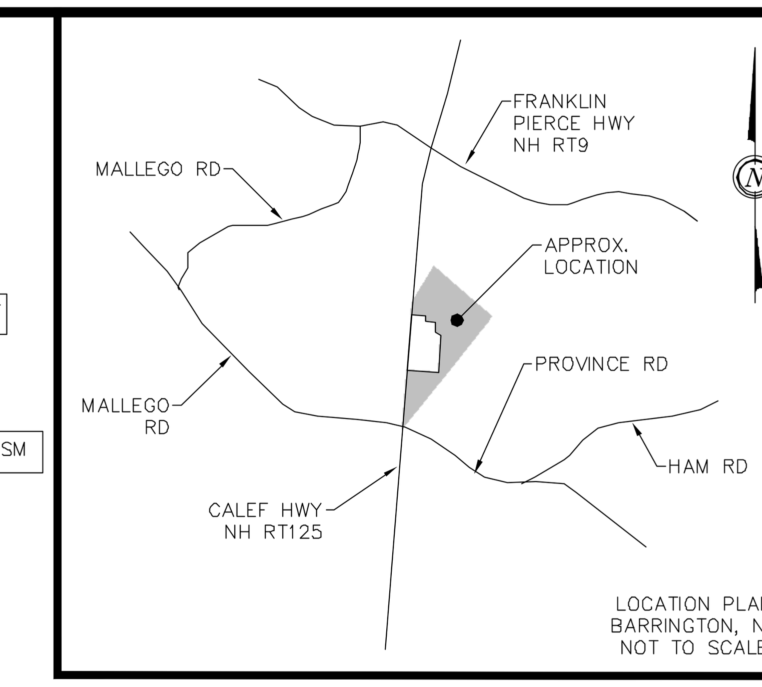
SITE SPECIFIC SOILS MAP – WEST
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

NOT FOR CONSTRUCTION





NOTES:

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607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

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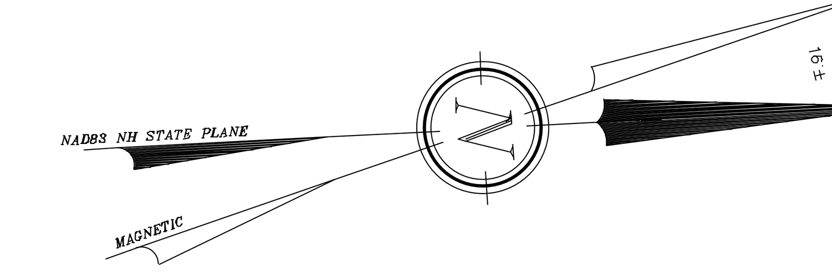
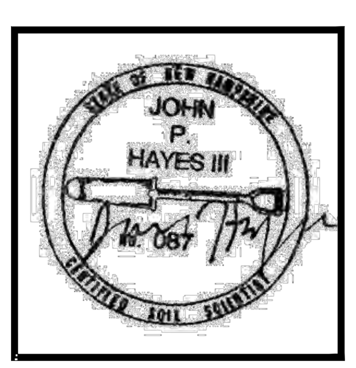
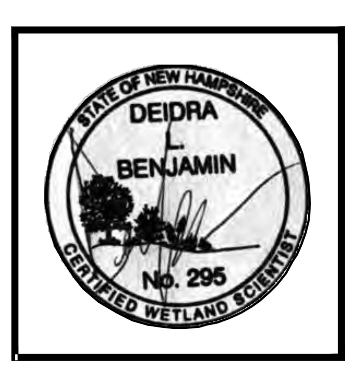




JOHN P. HAYES, III CSS #87



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LEGEND:

IRON BOUND/REBAR ~FND~
CONCRETE/GRANITE BOUND ~FND~
UTILITY POLE/GUY WIRE
RED PINE PLANTATION AREA
CONSERVATION EASEMENT
OVERHEAD UTILITIES LINE
EXISTING CONTOUR MINOR
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S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS
TYP. TYPICAL
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SOILS LEGEND

Site Specific Soils Map 238 Lot 44

Symbol	K	Slopes	Taxonomic Soil Name	Hydrologic Soil Group
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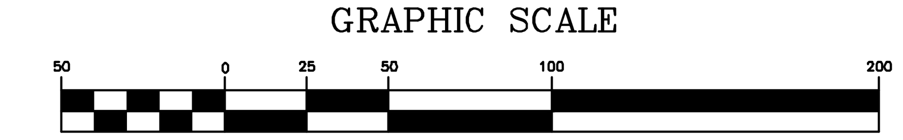
26		A,B,C,D,E	Windsor	A
34		B	Wareham	C
299		A	Udorthents (Smoothed)	B
313		A,B,C,D,E	Deerfield	B
400		A,C,D,E	Udorthents	B
546		A	Walpole	C
900		A	Endoaquents (Sandy or Gravelly)	D

Slopes: A = 0-3% B = 3-8% C = 8-15% D = 15-25% E = 25- 50% F = 50%+
Denominators: /P = Poorly Drained /VP = Very Poorly Drained /Rk = Rocky

GRAPHIC SCALE



(IN FEET)
1 inch = 50 ft.

FOR PLANNING BOARD APPROVAL PURPOSES:

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REVISION	DATE	DESCRIPTION

SITE SPECIFIC SOILS MAP – EAST
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 50 FT.
DATE : APRIL 17, 2024
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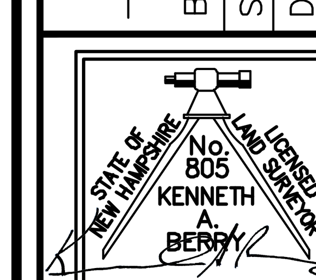


TEST PIT DATA:

DATE : 1/22/24

TEST PIT #207
0-4 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
4-16 7.5YR 5/6 STRONG BROWN, LOAMY SAND, GRANULAR, FRIABLE
16-30 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
30-40 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
40-65 2.5Y 6/3 LIGHT YELLOWISH BROWN, SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 40"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A"
TERMINATED @ 65"
REFUSAL @ N/A

TEST PIT #208
0-10 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
10-18 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
18-36 2.5Y 6/4 LIGHT YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
36-65 2.5YR 4/4 REDDISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 65"
REFUSAL @ N/A

TEST PIT #209
0-10 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
10-18 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
18-34 2.5Y 6/4 LIGHT YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
34-65 2.5YR 4/4 REDDISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 34"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 65"
REFUSAL @ N/A

TEST PIT #210
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-14 7.5YR 5/6 STRONG BROWN, LOAMY SAND, GRANULAR, FRIABLE
14-24 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
24-32 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
32-64 2.5Y 6/3 LIGHT YELLOWISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 32"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 64"
REFUSAL @ N/A

TEST PIT #211
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-14 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
14-22 10YR 6/4 LIGHT YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
22-60 2.5Y 6/3 LIGHT YELLOWISH BROWN, SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 22"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ 32"
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT #212
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-16 7.5YR 5/6 STRONG BROWN, LOAMY SAND, GRANULAR, FRIABLE
16-28 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
26-38 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
38-60 2.5Y 6/3 LIGHT YELLOWISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 38"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 60"
REFUSAL @ N/A

TEST PIT #213
0-10 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
10-24 10 YR 5/4 YELLOWISH BROWN, GRAVELLY SAND, SINGLE GRAIN, LOOSE
24-42 10YR 3/1 VERY DARK GRAY, LOAMY FINE SAND, MASSIVE, FRIABLE
42-52 2.5Y 6/3 LIGHT YELLOWISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 42"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 52"
REFUSAL @ N/A
NOTE: 0-24" IS FILL MATERIAL. SOME CONCRETE IN FILL MATERIAL 10-24"

TEST PIT #214
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-28 10YR 6/4 LIGHT YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
28-36 10YR 3/1 VERY DARK GRAY, LOAMY FINE SAND, GRANULAR, FRIABLE
36-50 2.5Y 6/3 LIGHT YELLOWISH BROWN, SAND AND FINE SAND WITH REDOX. FEAT. PRESENT, MASSIVE, FRIABLE
E.S.H.W.T. @ 36"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A"
TERMINATED @ 50"
REFUSAL @ N/A

TEST PIT DATA:

DATE : 3/7/24

TEST PIT #301
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-18 10YR 5/6 YELLOWISH BROWN, GRAVELLY LOAMY SAND, GRANULAR, FRIABLE
18-30 10YR 6/4 LIGHT YELLOWISH BROWN, GRAVELLY LOAMY SAND, GRANULAR, FRIABLE
30-44 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
44-52 2.5YR 5/3 LIGHT YELLOWISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 44"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 52"
REFUSAL @ N/A

TEST PIT #302
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-18 10YR 5/6 YELLOWISH BROWN, GRAVELLY LOAMY SAND, GRANULAR, FRIABLE
18-32 10YR 6/4 LIGHT YELLOWISH BROWN, GRAVELLY LOAMY SAND, GRANULAR, FRIABLE
32-46 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
46-52 2.5YR 5/3 LIGHT YELLOWISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 46"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 52"
REFUSAL @ N/A

TEST PIT #303
0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
8-14 7.5YR 5/6 STRONG BROWN, LOAMY SAND, GRANULAR, FRIABLE
14-26 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
26-32 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
32-52 2.5YR 6/3 LIGHT YELLOWISH BROWN, SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 32"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 52"
REFUSAL @ N/A

TEST PIT #304
0-6 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
6-14 7.5YR 5/6 STRONG BROWN, LOAMY SAND, GRANULAR, FRIABLE
14-28 10YR 5/6 YELLOWISH BROWN, LOAMY SAND, GRANULAR, FRIABLE
28-42 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE
42-52 2.5YR 6/3 LIGHT YELLOWISH BROWN, SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE
E.S.H.W.T. @ 42"
RESTRICTIVE LAYER @ N/A
GROUND WATER @ N/A
TERMINATED @ 52"
REFUSAL @ N/A

JOHN P. HAYES, III CSS #87

FOR PLANNING BOARD APPROVAL PURPOSES:

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

REVISION	DATE	DESCRIPTION

TEST PIT DATA
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : NONE
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

NOT FOR CONSTRUCTION

BERRY SURVEYING & ENGINEERING
335 Second Crown Point Road
Barrington, NH 03825
Phone: (603) 332-2863
Fax: (603) 335-4623
www.BerrySurveying.Com

Stormwater System Management:

Inspection and Maintenance Manual

607 Calef Highway
Barrington, NH
Tax Map 238, Lot 44

Prepared for

TURBOCAM, INC.
607 Calef Highway Suite 200
Barrington, NH 03825

Land of

Virtuous Realty, LLC
607 Calef Highway Suite 200
Barrington, NH 03825

Prepared By

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825
603-332-2863

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER - KENNETH A. BERRY No. 14243 LICENSED

File Number
DB2023-017

February 5, 2024
Revised: April 17, 2024

Table of Contents

Introduction

The Best Management Practices (BMP) described in this manual are specified in more detail within the plan set giving design details and specifications. The New Hampshire Stormwater Manual, Volume 2, Post-Construction Best Management Practices Selection & Design (December 2008, NHDES & US EPA) is included by reference to this manual. Additional details, construction specifications, and example drawings are provided within this reference. (http://des.nh.gov/organization/divisions/water/stormwater/)

The BMP's are covered below in the general order in which the storm water flows. Each BMP has a description and maintenance consideration listed. A Check List table is provided after the narrative to summarize the maintenance responsibilities and schedule. A Log Form is also provided for the owners use.

For details regarding the design of the Storm Water System see also Drainage Analysis & Sediment and Erosion Control Plan also published by Berry Surveying & Engineering originally dated April 17, 2024, as revised. See also plan set completed for TURBOCAM, INC. originally dated April 17, 2024, as revised.

Andrew Knapp, Director of EHS, Facilities & Maintenance, or his successor, is responsible for the Stormwater System Operation and Maintenance. A significant step in this responsibility is the Inspection and Maintenance of each component of the system. Ongoing, semi-annual, and annual inspection and maintenance requirement are documented below and must be taken seriously. Failure of any component of the system can result in surface water run-off ponding and/or freezing in the roadway and parking lots, leaving the developed site untreated, and/or causing violations to issued permits. The owner must maintain, and have available, plans of the Stormwater System in order to properly inspect and maintain the system. (Reduced copies attached.) The Director of EHS, Facilities & Maintenance, Andrew Knapp, or his successor / operator, is responsible to ensure that any subsequent owner or subcontractor has copies of the Log Form and Annual Report records and fully understands the responsibilities of this plan. The grantor owner will ensure this document is provided to the grantee owner by duplicating the Ownership Responsibility Sheet which is found toward the back of this document, which will be maintained with the Inspection & Maintenance Logs, provided to the Town of Barrington, Planning Department, with the Annual Report.

The operator of Tax Map 238, Lot 44, TURBOCAM, INC., and owner of the property, Virtuous Realty, LLC, are proposing the improvement of the parcel with two parking areas and an outdoor function area. Surface water runoff is being managed and treated by two Bioretention W/ ISRs, an infiltration pond, and a detention pond.

The following drainage features will all require periodic inspections and maintenance based on this manual:

Catch Basins #41-#47 (Ponds #C41-#C47)

Drain Manholes #51-#53 (Ponds #D51-#D53)

Inlet Sump (Pond #50)

Conveyance Swales and Roadside Ditches

Bioretention W/ ISR #201 – P-201 w/ Outlet Structures and Matted Spillway

Bioretention W/ ISR #202 – P-202 w/ Outlet Structures and Matted Spillway

Infiltration Pond #203 – P-203 w/ Matted Spillway

Detention Pond #204 – P-204 w/ Outlet Structure and Matted Spillway

Outlet Protection and Level Spreaders

Catch Basins (Without Sumps) & Drain Manholes

Description: Catch Basins are used throughout the site to capture and, along with culvert pipes and manhole, route surface water runoff to stormwater treatment and detention infrastructure. During construction the catch basins will be protected by inlet protection per the approved construction plans. The practice of street sweeping on a bi-annual basis will help reduce maintenance of these catch basins and culvert pipes.

Note: Deep sump catch basins are not allowed to be used on this proposed development due to wildlife concerns and any manufacturer sump resulting in a catch basin must be filled with washed crushed stone. Sediment should be trapped in the sediment forebays but is also a concern in earlier structures. See construction details for specifications of these conveyance practices.

Maintenance Considerations: Sediment must be removed from Catch Basins and Manholes on a regular basis, at least twice a year and more often if post-winter maintenance and street sweeping is not conducted. Inspections should be conducted periodically. At a minimum they should be cleaned after snow-melt and after leaf-drop. Disposal of all material, sediment, and debris must be done in accordance with state and federal regulations. Culvert pipes will be inspected to ensure that surface water runoff is capable of leaving the structures. Drain manholes will be inspected to make sure there is not sediment build-up or blockages.

Conveyance Swale

Description: Conveyance swales are stabilized channels designed to convey runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance channels may provide incidental water quality benefits, but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pretreatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/Pretreatment Practice as described elsewhere in this Chapter. See SWM Volume 2, 4-6.3 Conveyance Practices, Conveyance Swale, page 166.

Maintenance Considerations: 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 based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

Sediment Forebay

Description: A sediment forebay is an impoundment, basin, or other storage structure designed to dissipate the energy of incoming runoff and allow for initial settling of coarse sediments. Forebays are used for pretreatment of runoff prior to discharge into the primary water quality treatment BMP. In some cases, forebays may be constructed as separate structures but often, they are integrated into the design of larger stormwater management structures. See SWM Volume 2, 4-4.1 Pre-treatment Practices, Sediment Forebay, page 140.

Maintenance Considerations: Forebays help reduce the sediment load to downstream BMPs, and will therefore require more frequent cleaning. Inspect at least annually; Conduct periodic mowing of embankments (generally two times per year) to control growth of woody vegetation on embankments; Remove debris from outlet structures at least once annually; Remove and dispose of accumulated sediment based on inspection; Install and maintain a staff gage or other measuring device, to indicate depth of sediment accumulation and level at which clean-out is required. Preserving the drainage between the Sediment Forebay and the stormwater BMP by inspecting and maintaining the connecting drainage pipes and perforations should be completed semi annually or as required to ensure the forebay is dry.

Bioretention W/ Internal Storage Reservoir (ISR)

Description: A practice that provides temporary storage of runoff for filtering through an engineered soil media, augmented for enhanced phosphorus removal, followed by detention and denitrification in a subsurface internal storage reservoir (ISR) comprised of gravel. Runoff flows are routed through filter media and directed to the underlying ISR via an impermeable membrane for temporary storage. An elevated outlet control at the top of the ISR is designed to provide a retention time of at least 24 hours in the system to allow for sufficient time for denitrification and nitrogen reduction to occur prior to discharge. The design storage capacity for using the cumulative performance curves is comprised of void spaces in the filter media, temporary ponding at the surface of the practice and the void spaces in the gravel ISR. The volume of the ISR will exceed 26% of the Water Quality Volume (WQV). Reference: 2017 NH Small MS4 General Permit, Appendix F Attachment 3, and UNH Stormwater Center, "UNH Stormwater Center Hybrid Bioretention Template" (2020). *UNH Stormwater Center*. 73. https://scholars.unh.edu/stormwater/73

Maintenance Considerations: The outlet to the Internal Storage Reservoir consists of a 1.25” or 1.5” orifice in a threaded end-cap after the goose-neck pipe within the concrete outlet structure. The inlet manifold and threaded pipe outlet manifold system is designed so that the ISR, or anaerobic reservoir can be completely drained and the sump of the outlet structure pumped dry. The orifice requires periodic inspection, initially on a semi-annual basis. This time increment may need to be adjusted based on the experience on the maintenance of the device. The draining of the ISR would only be accomplished if issues developed.

The enhanced bio-media will require additional material rototilled into the top 10-inches to foot of the rain garden after a period of approximately 20 years. The timing of this maintenance period is a factor of the methodology applied during construction and will need to be evaluated as the rain gardens age.

Rain Gardens should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a twenty-four hour period. Maintenance rehabilitation will be conducted as warranted by each inspection. Trash and debris will be removed at each inspection.

On an annual basis the infiltration capabilities need to be confirmed by evaluation the drawdown time. If the bioretention system does not drain within 72-hours following a rainfall event, a qualified professional will assess the condition of the rain garden to determine measures required to restore the infiltration function. This is normally the direct result of sediment accumulation which will be removed to restore the filter media ratio.

Proposed side slopes of 2:1 will be maintained with a weedwhacker, with vegetation being removed from the BMP with each maintenance application.

Detention Basins

Description: A detention basin is an impoundment designed to temporarily store runoff and release it at a controlled rate, reducing the intensity of peak flows during storm events. Conventional detention basins are typically designed to control peak runoff rates under a range of storm conditions, and can be used to control discharges as required under the AoT Regulations and other requirements, including, but not necessarily limited to: Storage and peak rate control to meet Channel Protection Requirements (see Section 2-17); Storage and peak rate control to meet Peak Runoff Control Requirements (see Section 2-18) (10-year and 50-year frequency, 24-hour storm events); Storage and peak rate control to prevent flood impacts within the 100-year flood plain; Storage and peak rate control to meet other regulatory requirements, including local permitting standards.

Detention basins may consist of surface basins (pond-type structures) or subsurface basins (enclosed structures located below ground. Surface basins should be designed with an emergency spillway or bypass meeting applicable dam safety standards (Env-Wr 100 - 700: Dam Safety Rules). Subsurface basins should also be designed to safely bypass flows exceeding the engineered capacity of the structure. Detention basins may be combined with treatment BMPs discussed in this guidance document, to provide for other stormwater management objectives. For example, a stormwater pond may be designed to provide treatment as well as detention. However, a detention basin is not by itself considered a "Treatment Practice" under the AoT Regulations. See SWM Volume 2, 4-6.1 Conveyance Practices, Detention Basins, page 156.

Maintenance Considerations: The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed, and the vegetation maintained in healthy condition, as appropriate to the function of the facility and type of vegetation. Vegetated embankments that serve as "berms" or "dams" that impound water should be mowed at least once annually to prevent the establishment of woody vegetation.

In-Ground Infiltration Basin

Description: Infiltration basins are impoundments designed to temporarily store runoff, allowing all or a portion of the water to infiltrate into the ground. An infiltration basin is designed to completely drain between storm events. An infiltration basin is specifically designed to retain and infiltrate the entire Water Quality Volume. Some infiltration basins may infiltrate additional volumes during larger storm events, but many will be designed to release stormwater exceeding the water quality volume from the larger storms. In a properly sited and designed infiltration basin, water quality treatment is provided by runoff pollutants binding to soil particles beneath the basin as water percolates into the subsurface. Biological and chemical processes occurring in the soil also contribute to the breakdown of pollutants. Infiltrated water is used by plants to support growth or it is recharged to the underlying groundwater. As with all impoundment BMPs, surface infiltration basins should be designed with an outlet structure to pass peak flows during a range of storm events, as well as with an emergency spillway to pass peak flows around the embankment during extreme storm events that exceed the combined infiltration capacity and outlet structure capacity of the facility. See SWM Volume 2, 4-3.3b, Treatment Practices, In-Ground Infiltration Basin, page 88.

Maintenance Considerations: Removal of debris from inlet and outlet structures. Removal of accumulated sediment. Inspection and repair of outlet structures and appurtenances. Inspection of infiltration components 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. Inspection of pretreatment measures at least twice annually, and removal of accumulated sediment as warranted by inspection, but no less than once annually. If an infiltration 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 infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

Stone Berm Level Spreader

Description: A stone berm level spreader is an outlet structure constructed at zero percent grade across a slope used to convert concentrated flow to “sheet flow.” It disperses or “spreads” flow thinly over a receiving area, usually consisting of undisturbed, vegetated ground. The conversion of concentrated flow to shallow, sheet flow allows runoff to be discharged at non-erosive velocities onto natural ground. To stabilize the spreader outlet, a stone berm is provided to dissipate flow energy, and help disperse flows along the length of the spreader. Level spreaders are not designed to remove pollutants from stormwater; however, some suspended sediment and associated phosphorous, nitrogen, metals and hydrocarbons will settle out of the runoff through settlement, filtration, infiltration, absorption, decomposition and volatilization. See SWM Volume 2, 4-6.6 Conveyance Practices, Stone Berm Level Spreader, page 162.

Maintenance Considerations: Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, spreader channel or down-slope of the spreader. Remove debris whenever observed during inspection. Remove sediment when accumulation exceeds 25% of spreader channel depth. Mow as required by landscaping design. At a minimum, mow annually to control woody vegetation within the spreader. Snow should not be stored within or down-slope of the level spreader or its approach channel. Repair any erosion and re-grade or replace stone berm material, as warranted by inspection. Reconstruct the spreader if down-slope channelization indicates that the spreader is not level or that discharge has become concentrated, and corrections cannot be made through minor re-grading.

Stabilization for Long Term Cover

Vegetated Stabilization – Original Planting

All areas that are disturbed during construction will be stabilized with vegetated material within 30 days of breaking ground. Construction will be managed in such a manner that erosion is prevented and that no abutter’s property will be subjected to any siltation, unless otherwise permitted. All areas to be planted with grass for long-term cover will follow the specification and on Sheet E-102 using seeding mixture C, as follows:

Mixture	Pounds per Acre	Pounds per 1,000 Sq. Ft.
Tall Fescue	24	0.55
Creeping Red Fescue	24	0.55
Total	48	1.10

Conservation Mix

Virginia Wild Rye	Native	FACW-
Little Bluestem	Native	FACU
Big Bluestem	Native	FAC
Red Fescue	Native	FACU
Switch Grass	Native	FAC
Partridge Pea	Native	FACU
Showy Tick Trefoil	Native	FAC
Butterfly Milkweed	Native	NI
Beggar Ticks	Native	FACW
Purple Joe Pye Weed	Native	FAC
Black Eyed Susan	Native	FACU-
Total	**25**	**0.57**

Conservation Mix to be provided by New England Wetland Plants, Inc., Amherst, MA as outline in their New England Conservation / Wildlife Mix or approved equal. Mix to be applied at a rate of 25 lbs. per acre or one-lb. per 1750 square feet. Ratio of seed is proprietary and substitutions are not allowed.

Conservation Mix will used to stabilize all 2:1 slopes and all land area disturbed within the wetland buffer.

Stormwater BMP Mix: The grass that is planted within a stormwater BMP will be a mix designed for both inundation and dry conditions such as Ernst Seeds, Retention Basin Floor Mix ERNMX-126.

Maintenance Considerations: Permanent seeded areas for long-term cover will be inspected on a periodic basis looking for signs of growth loss or erosion. Any areas found to be damaged will be repaired and replanted to reestablish the growth. The grass should be mowed at least twice per year and any dead material removed. Any woody growth that becomes established will need to be cut and removed.

Long-term maintenance of the land cover is critical and must be maintained at least 85% grass / vegetation coverage, must be inspected for concentrated flow, rills, and channels; and must be repaired as necessary to prevent erosion.

Control of Invasive Plants

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Invasive plants are introduced, 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. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some 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.

Snow Removal & Winter Maintenance

Description: Drainage and stormwater systems need to be maintained during the winter months so that surface water runoff from a rain storm does not become a impounding and icing problem. Catch basins must remain viable and where sheet flow is a design factor, the edge of pavement and should need to be maintained so that runoff can leave the pavement area. Sand and salt should be used at the rate that prevents sedimentation problems or excess salt deposited but yet enough to allow for protection for pedestrians and vehicles.

Maintenance Considerations: Catch basins are required to be kept viable by removing snow that is block surface water runoff from entering the structure. The edge of pavement where surface water sheet flow is designed to leave the paved area, the edge of pavement and shoulder need to be plowed to allow runoff to leave the pavement. Snow is to piled in designated areas and removed from the site when the on-site storage locations have been exceeded. At the end of the winter season, sediment is to be swept from the paved surfaces and removed from the drainage system. (Sumps if provided, sediment forebays, swale lines.) (See catch basin and drainage pipe maintenance.) NHDES offers training (Green SnowPro Certification) for contractors and owners. https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification Please find attached NHDES Green SnoPro Utilization Chart which is required to be used.

Annual Report

Description: The owner is responsible to keep an **I & M Activity Log** that documents inspection, maintenance and repairs to the storm water management system, and a **Deicing Log** to track the amount and type of deicing material applied to the site. The original owner is responsible to ensure that any subsequent owner (s) have copies of the Stormwater System Operation: Inspection & Maintenance Manual, copies of past logs and check lists. This includes any owner association for potential condominium conversion of the property. The Annual Report will be prepared and submitted to the Town of Barrington, Planning Department with copies of both logs and check lists no later than December 15th of each year and made available to NHDES upon request. Upon an ownership change, the Annual Report will include the Transfer of Ownership Responsibility Forms duplicated from the form found below.

The plans that accompany this manual include a plan sheet, "Inspection & Maintenance Plan" and copies of the Stormwater Treatment Design Sheets. The owner will also maintain a complete set of the approved original design plans.

Respectfully
BERRY SURVEYING & ENGINEERING

Kenneth A. Berry, PE, LLS
CPSWQ, CPESC, CESSWI
Principal, VP – Technical Operations

Christopher R. Berry, SIT
Principal - President
Design Engineer

Kevin R. Poulin, PE
Design Engineer

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Inspection & Maintenance Manual Checklist

Calef Highway, Barrington, NH, Tax Map 238, Lot 44
TURBOCAM, INC.
607 Calef Highway Suite 200
Barrington, NH 03825

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Pavement Sweeping	Three Times Per Year	Clean Pavement	Pavement areas will be swept and sedimentation removed so the surface is clean
		Litter/Trash Removal	Routinely	Inspect dumpsters, outdoor waste receptacles area, and yard areas.	Parcel will be free of litter/trash.
		Deicing Agents	N/A	N/A	Use salt as the primary agent for roadway safety during winter.
		Invasive Species	Two times per year.	Inspect for Invasive Species	Remove and dispose invasive species.
		Closed Drainage System:			
		Drainage Pipes	1 time per 2 years	Check for sediment accumulation & clogging.	Less than 2" sediment depth
		Catch Basins & Drain Manholes	2 times per year	Check for sediment accumulation & clogging.	Any accumulated Sediment or debris.

☑	Date	BMP / System	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
		Bioretention W/ ISRs, & Infiltration Ponds	2 times per year	Check for sediment and debris accumulation buildup.	Remove sediment & debris when required. Remove Invasive Species
		Bioretention W/ ISR and system clean-outs.	Annually	72-Hour drawdown time evaluation and vegetation evaluation. Underdrain flushing.	Remove dead & diseased vegetation along with all debris, take corrective measures of filtration media if required. Flush underdrain clean-outs with a hose. Weed whacker required for 2:1 slopes. All weed whacked vegetation to be removed
		Infiltration Ponds	Annually after a storm event of greater than 2.5-inches	Evaluate the drawdown of the Infiltration Basin systems to ensure that through infiltration the system is completely drained in 72 hours.	Ensure sediment is not entering the Infiltration Basin.
		Riprap Outlet Protection	Annually	Check for sediment buildup and structure damage.	Remove excess sediment and repair damage.
		Winter Maintenance	Ongoing	Remove snow as directed.	Ongoing
		Post Winter Maintenance	Annually	Remove excess sand, gross solids, and repair vegetation and plantings	Parcel will be free of excess sand, litter/trash.
		Annual Report	1 time per year	Submit Annual Report to Barrington Planning Dept. and kept on file by the owner.	Report to be submitted on or before December 15th each year.

Inspection Check List: Page 3

Catch Basins #41-#47 (Ponds #C41-#C47)

Drain Manholes #51-#53 (Ponds #D51-#D53)

Inlet Sump (Pond #50)

Conveyance Swales and Roadside Ditches

Bioretention W/ ISR #201 – P-201 w/ Outlet Structures and Matted Spillway

Bioretention W/ ISR #202 – P-202 w/ Outlet Structures and Matted Spillway

Infiltration Pond #203 – P-203 w/ Matted Spillway

Detention Pond #204 – P-204 w/ Outlet Structure and Matted Spillway

Outlet Protection and Level Spreaders

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Inspection & Maintenance Manual Log Form

607 Calef Highway, Barrington, NH, Tax Map 238, Lot 44
TURBOCAM, INC. / Virtuous Realty, LLC
607 Calef Highway Suite 200
Barrington, NH 03825

BMP / System	Date Inspected	Inspector	Cleaning/Repair (List Items & Comments)	Repair Date	Performed By:

STORMWATER SYSTEM OPERATIONS: INSPECTION & MAINTENANCE MANUAL

Deicing Log Form

607 Calef Highway, Barrington, NH, Tax Map 238, Lot 44
TURBOCAM, INC. / Virtuous Realty, LLC
607 Calef Highway Suite 200
Barrington, NH 03825

Date	Amount Applied	Performed By:	Date	Amount Applied	Performed By:

STORMWATER SYSTEM OPERATION & MAINTENANCE PLAN CERTIFICATION

Owner	Responsibility
Name: TURBOCAM, INC. / Virtuous Realty, LLC Owner Andrew Knapp, Director of EHS, Facilities & Maintenance Address: 607 Calef Highway Suite 200 Barrington, NH 03825 Telephone: 1-603-905-0203 E-mail: andy.knapp@turbocam.com	The owner is responsible for the conduct of all construction activities, and ultimate compliance with all the provisions of the Stormwater System Operation & Maintenance Plan and the implementation of the Inspection and Maintenance Manual.

607 Calef Highway, Barrington, NH, Tax Map 238, Lot 44

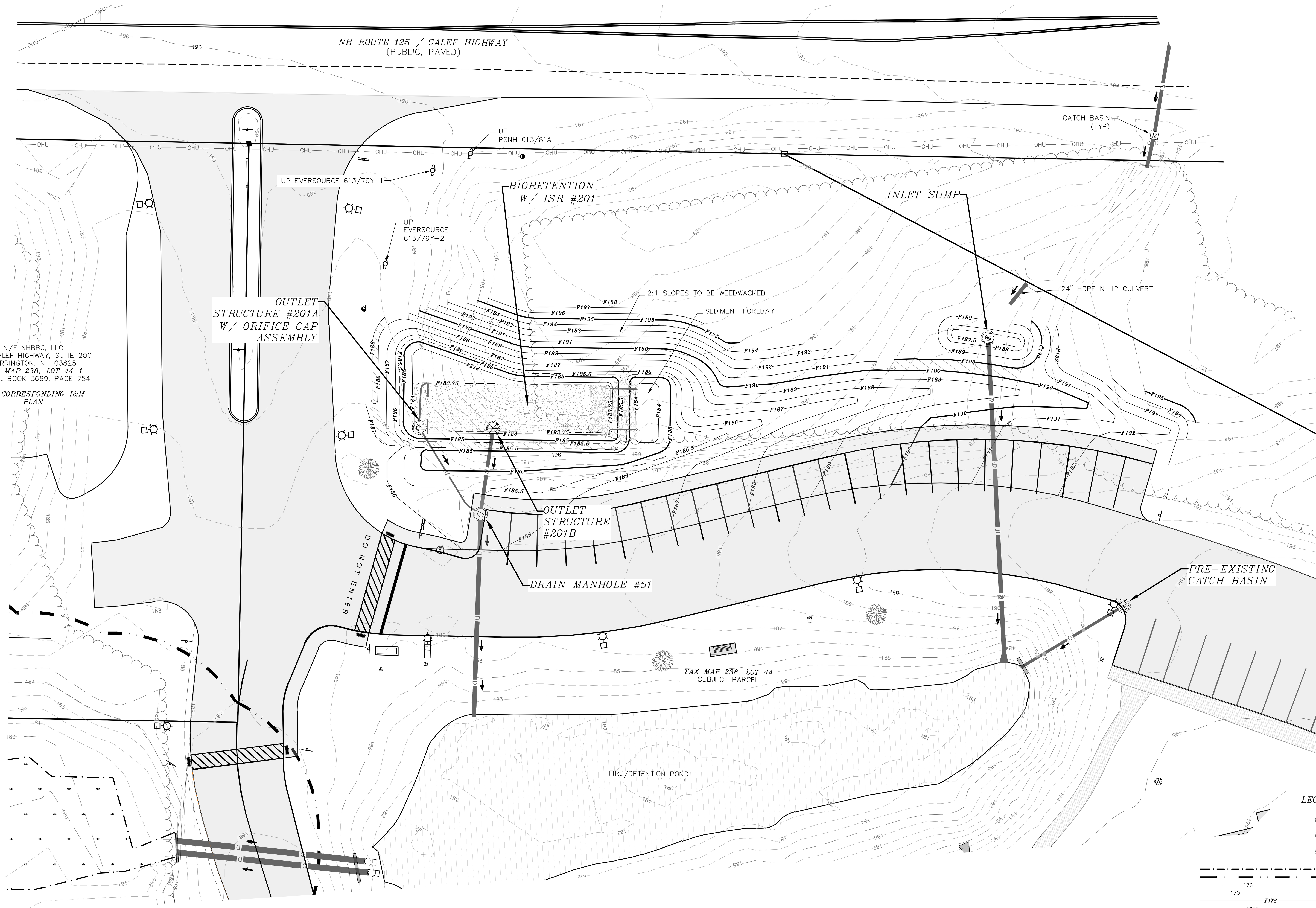
OWNER CERTIFICATION

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

Signed: ______________________________ Date: ____________________

Printed Name:

Representing:



NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

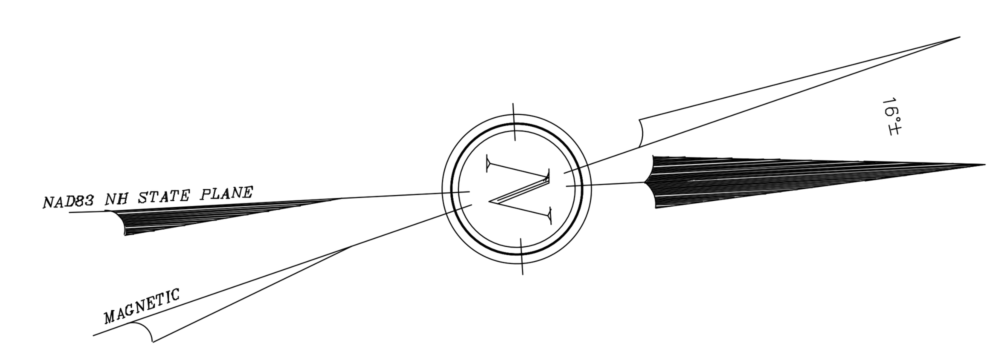
4.) S.C.R.D. BOOK 2948, PAGE 332

5.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE DRAINAGE INFRASTRUCTURE THAT REQUIRES PERIODIC INSPECTION AND MAINTENANCE. IT IS TO ACCOMPANY A DOCUMENT ENTITLED "STORMWATER SYSTEM MANAGEMENT; INSPECTION AND MAINTENANCE MANUAL" PUBLISHED BY BERRY SURVEYING & ENGINEERING ON THE SAME DATE.

6.) 11x17" PLANS ARE TWICE THE PUBLISHED SCALE.

LEGEND:

PROPOSED DRAIN MANHOLE W/ STRUCTURE
PROPOSED CATCH BASIN W/ STRUCTURE
PROPOSED STORMWATER BMP OUTLET STRUCTURE
POORLY DRAINED JURISDICTIONAL WETLAND
50' WETLAND BUFFER
CONTOUR MINOR, EXISTING
CONTOUR MAJOR, EXISTING
CONTOUR MINOR, PROPOSED
CONTOUR MAJOR, PROPOSED
EXISTING DRAINAGE LINE
PROPOSED DRAINAGE LINE
RIP RAP
STORMWATER BEST MANAGEMENT PRACTICE (BMP)
BERM



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REVISION	DATE	DESCRIPTION

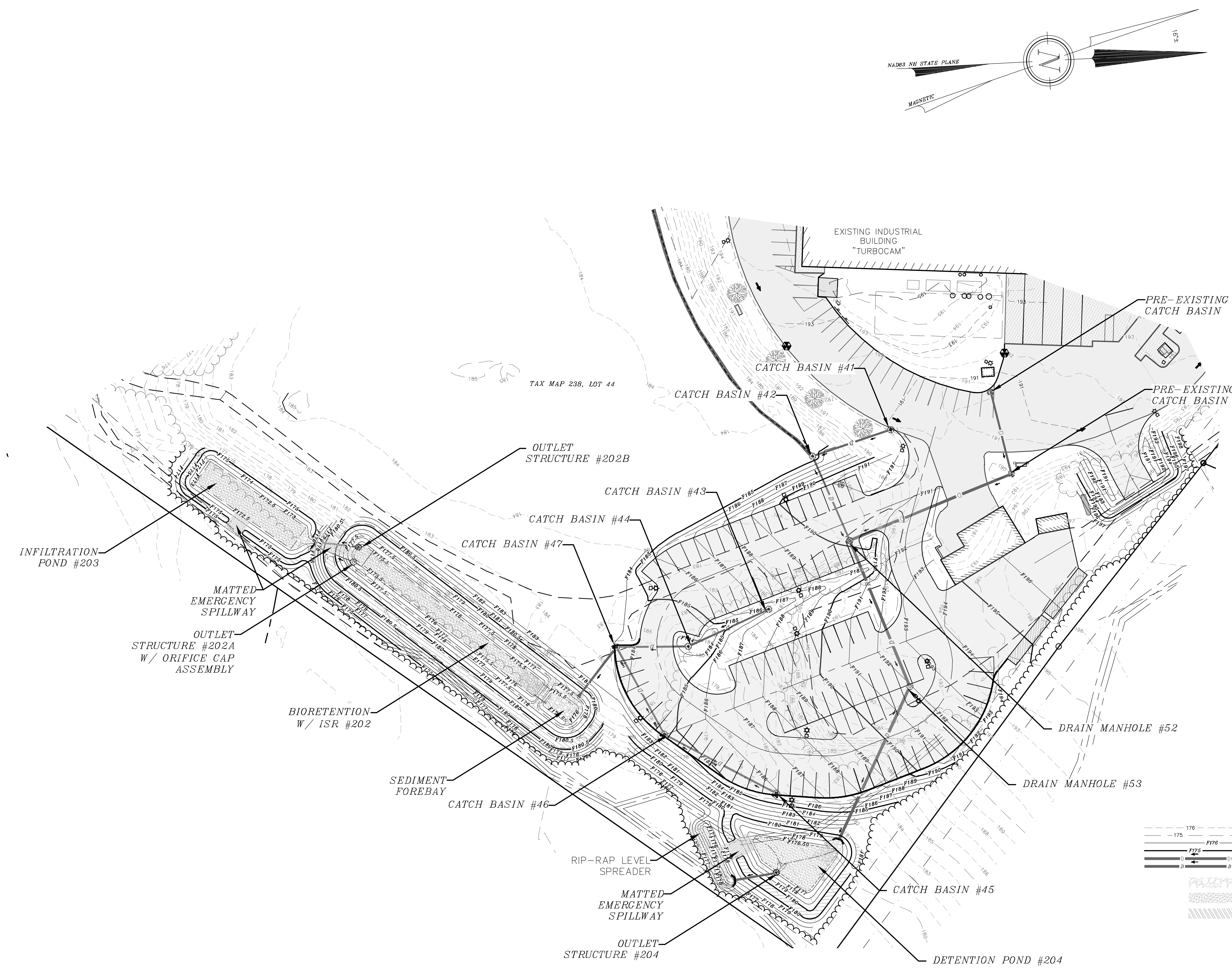
INSPECTION & MAINTENANCE PLAN
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No.
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION



NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) THE INTENT OF THIS PLAN IS TO DEMONSTRATE THE DRAINAGE INFRASTRUCTURE THAT REQUIRES PERIODIC INSPECTION AND MAINTENANCE. IT IS TO ACCOMPANY A DOCUMENT ENTITLED "STORMWATER SYSTEM MANAGEMENT; INSPECTION AND MAINTENANCE MANUAL" PUBLISHED BY BERRY SURVEYING & ENGINEERING ON THE SAME DATE.

6.) 11x17" PLANS ARE TWICE THE PUBLISHED SCALE.

LEGEND:

PROPOSED DRAIN MANHOLE W/ STRUCTURE
PROPOSED CATCH BASIN W/ STRUCTURE
PROPOSED STORMWATER BMP OUTLET STRUCTURE
CONTOUR MINOR, EXISTING
CONTOUR MAJOR, EXISTING
CONTOUR MINOR, PROPOSED
CONTOUR MAJOR, PROPOSED
EXISTING DRAINAGE LINE
PROPOSED DRAINAGE LINE
RIP RAP
STORMWATER BEST MANAGEMENT PRACTICE (BMP)
BERM

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REVISION	DATE	DESCRIPTION

INSPECTION & MAINTENANCE PLAN
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

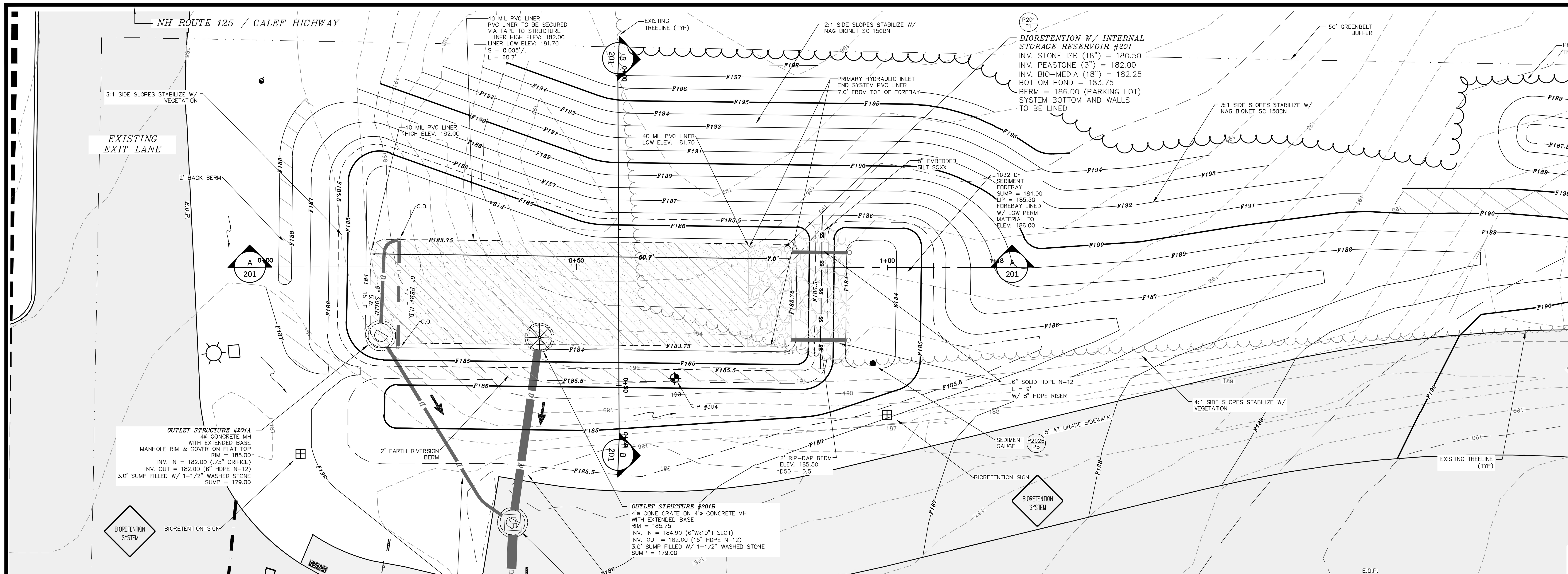
BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
LICENSED
PROFESSIONAL ENGINEER

SHEET 2 OF 2

NOT FOR CONSTRUCTION



GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

VERTICAL SCALE: 1" = 4'

GRAPHIC SCALE

(IN FEET)
1 inch = 10 ft.

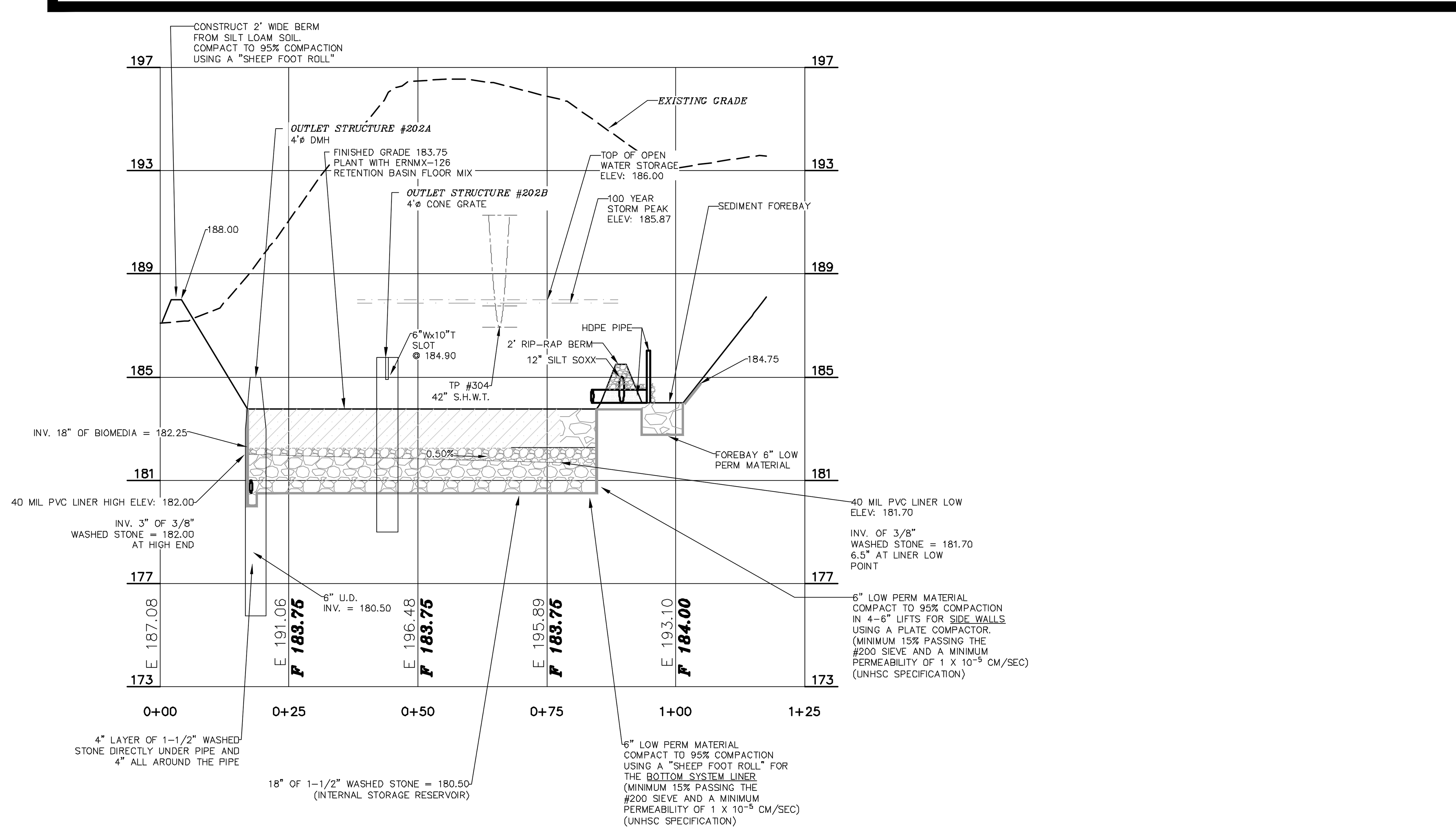
TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES		
d50 SIZE= 0.5 FEET 6 INCHES		
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

EXISTING LEGEND:

IRON BOUND/IRON ROD (FND)
IRON PIPE (FND)
STONE BOUND (FND)
UTILITY POLE / GUY WIRE
SINGLE POST SIGN
TEMPORARY BENCHMARK
WELL
TESTHOLE
PERIMETER BOUNDARY LINE
EXISTING CONSERVATION EASEMENT LINE
BUILDING SETBACK LINE
NHDES PROTECTIVE WELL RADIUS
OVERHEAD UTILITIES
EXISTING CONTOUR MINOR
EXISTING CONTOUR MAJOR
POORLY DRAINED WETLAND LINE
VERY POORLY DRAINED WETLAND LINE
50' WETLAND BUFFER LINE
TREE LINE
FND FOUND
TYP TYPICAL
S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS

PROPOSED LEGEND:

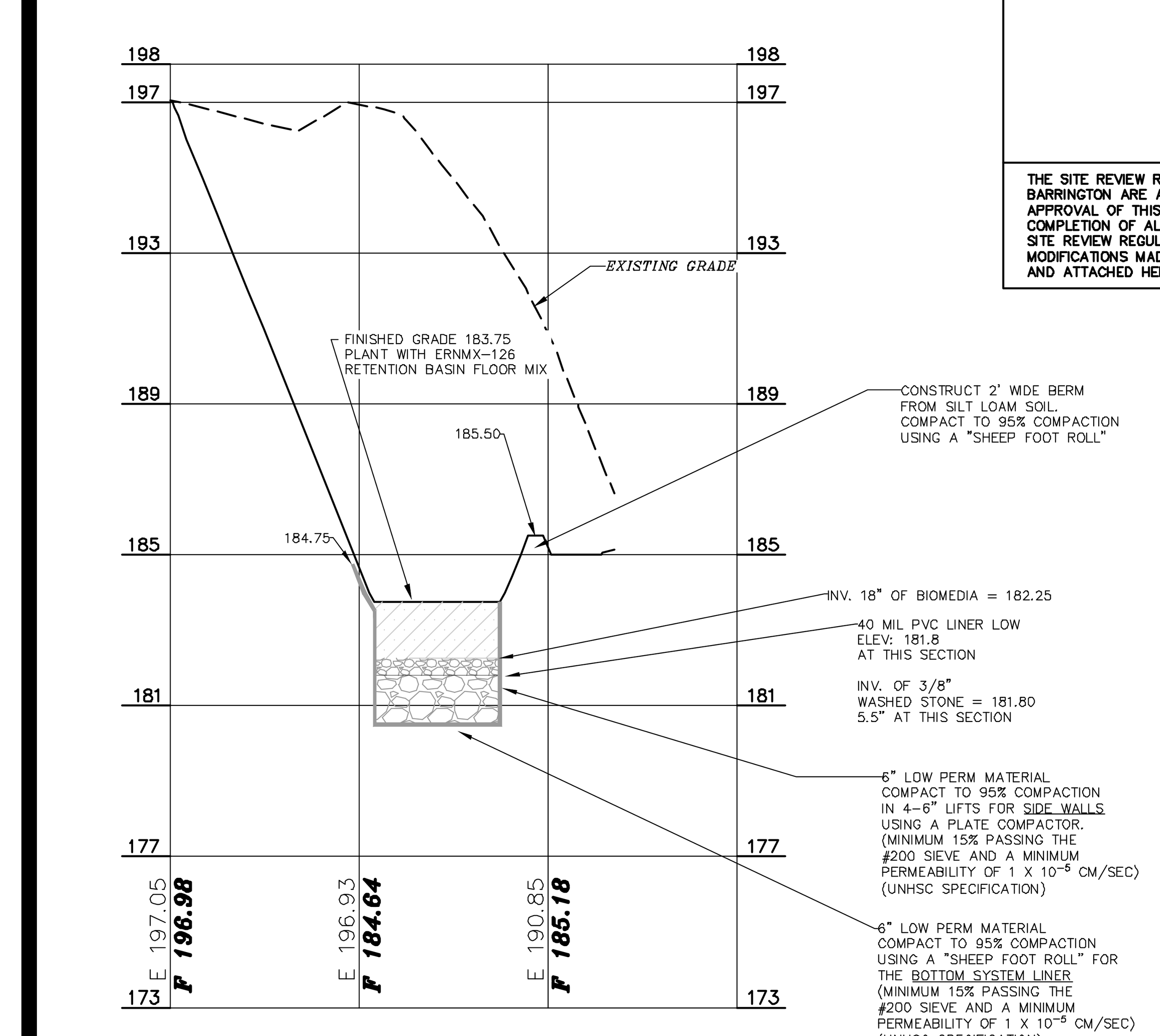
TEMPORARY BENCHMARK (T.B.M.)
DETAIL SHEET / DETAIL
CONTOUR MINOR, PROPOSED
CONTOUR MAJOR, PROPOSED
ROAD CENTERLINE
SHOULDER
PAVEMENT SEAM
DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
UNDERDRAIN
GUARD RAIL
EXISTING SPOT GRADE
PROPOSED SPOT GRADE
FLOW ARROW
RIP RAP
STORMWATER BEST MANAGEMENT PRACTICE (BMP)
BERM
DRAIN MANHOLE W/STRUCTURE
CATCH BASIN W/ STRUCTURE
STORMWATER BMP OUTLET STRUCTURE



SECTION OF BIORETENTION W/ ISR #201

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.



SECTION OF BIORETENTION W/ ISR #201

PLAN VIEW/ SECTIONS

P-201A

REVISION	DATE	DESCRIPTION

BIORETENTION W/ ISR #201 PLAN VIEW & PROFILES
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED
PROFESSIONAL ENGINEER

SHEET 21 OF 43

NOT FOR CONSTRUCTION

P1

UNH STORMWATER CENTER SPECIFICATIONS ACCEPTABLE PARTICLE SIZE DISTRIBUTION OF FINAL BIORETENTION SOIL MIX			
MEDIA TYPE	SIEVE #	SIZE (IN)	% PASSING
COURSE SAND	4	0.187	100
MEDIUM SAND	10	0.079	95
FINE SAND	40	0.017	15–40
SILTS	200	0.003	10–20
CLAYS	<200	PAN	0–5

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

1–1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1–1/2"	90 – 100
1"	20 – 55
1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

BIORETENTION SOIL MEDIA COMPONENTS
–AMOUNTS MIXED BY TOTAL VOLUME
*60–85% SAND
*15–25% LOAM OR TOPSOIL
*3–8% ORGANIC MATTER
*5% WATER TREATMENT RESIDUALS OR 0.5% IRON FILINGS

WATER TREATMENT RESIDUALS OR IRON FILINGS ARE REQUIRED DUE TO THE CLASS "A" RECEIVING WATERS

REFER TO THE "UNHSC STANDARD DETAIL, BIORETENTION ISR STORMWATER SYSTEM", FEBRUARY 2020 FOR FURTHER PUBLISHED GENERAL CONSTRUCTION GUIDELINES

DESIGN REFERENCES

1 UNH STORMWATER CENTER.
https://scholars.unh.edu/stormwater/73/

STABILIZATION NOTE:
SEE NOTE #6, SHEET E–102, DETAIL E–18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

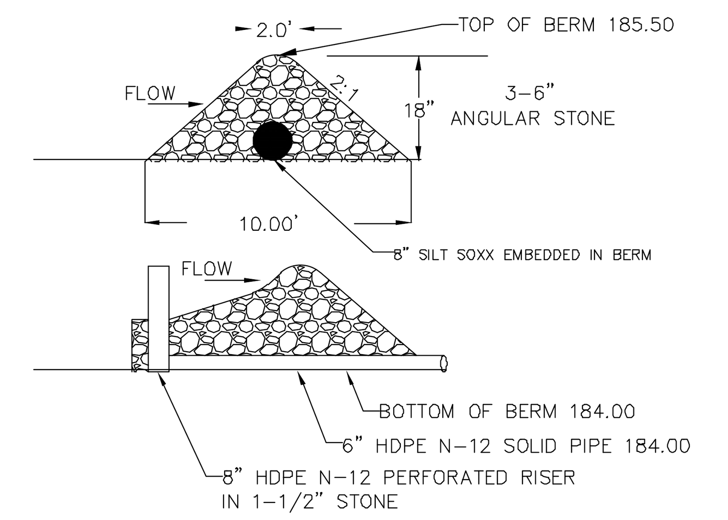
CONSTRUCTION NOTE: THE DESIGN ENGINEER IS TO BE ON SITE PRIOR TO AND DURING THE PLACEMENT OF THE RESERVOIR STONE, AND TO WITNESS THE INSTALLATION OF THE UNDER–DRAIN AND LINER. PLEASE PROVIDE 48 HOURS NOTICE PRIOR TO REQUESTED INSPECTION.

PVC LINER TO BE 40 TO 60 MIL, PREFERABLY SEAMLESS. IF SEAMS ARE UNAVOIDABLE, THE SEAMS SHOULD BE SEALED

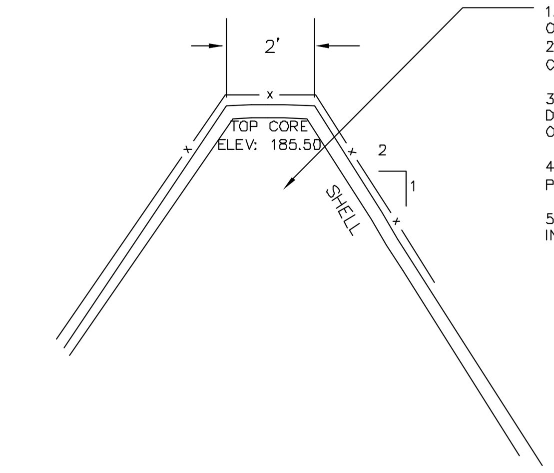
BIORETENTION W/ ISR CONSTRUCTION SPECIFICATIONS

P2

STONE BERM FOR FOREBAY



P3



1.) 2' BERM IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL
2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

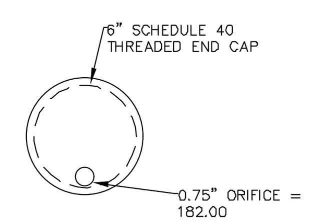
4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

BIORETENTION W/ ISR BERM CONSTRUCTION
NOT TO SCALE

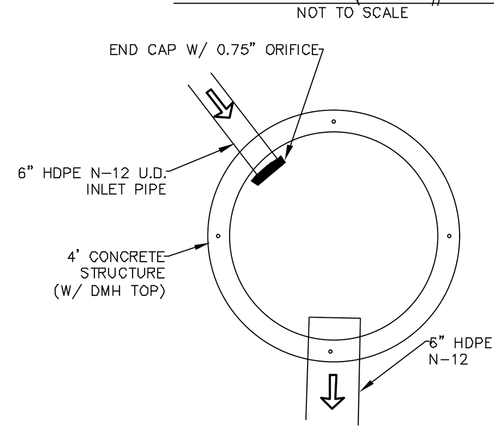
BIORETENTION W/ ISR STRUCTURES & DETAILS
NOT TO SCALE

P4

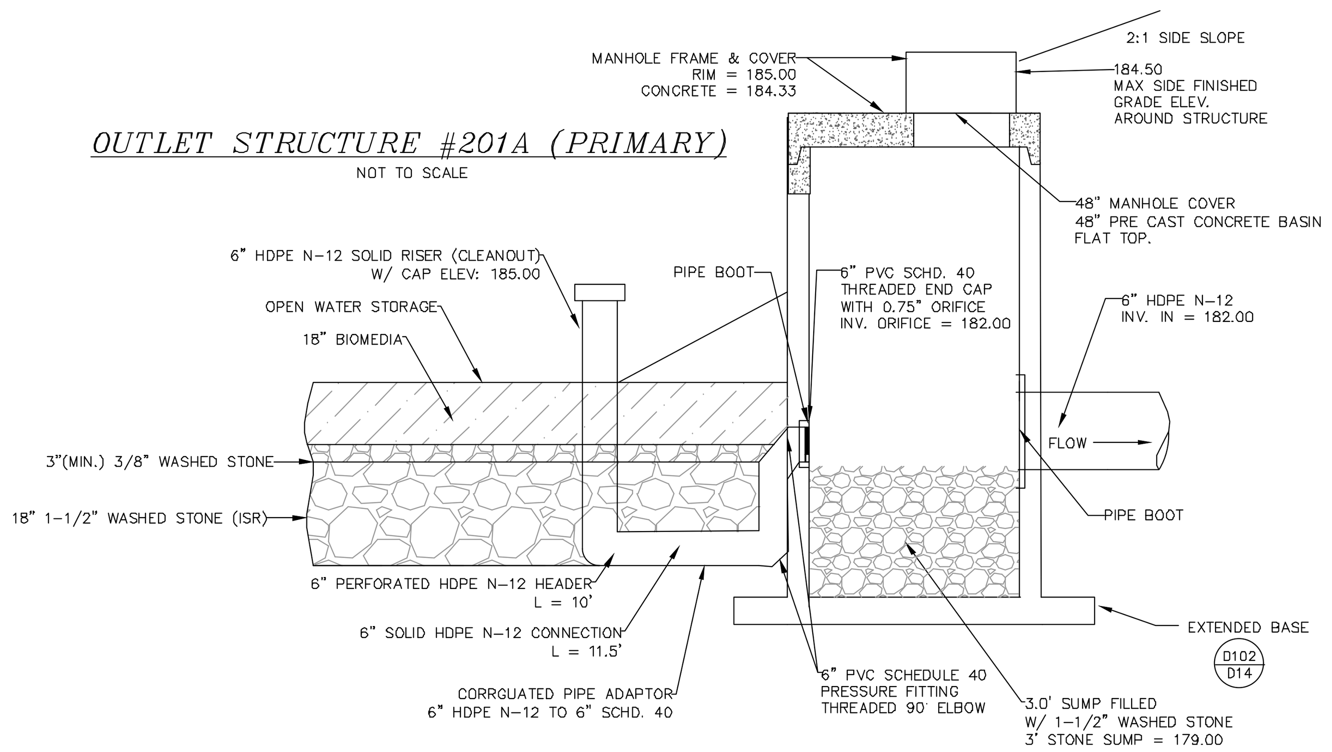


CAP WITH CONTROL ORIFICE (OS #201A)
NOT TO SCALE

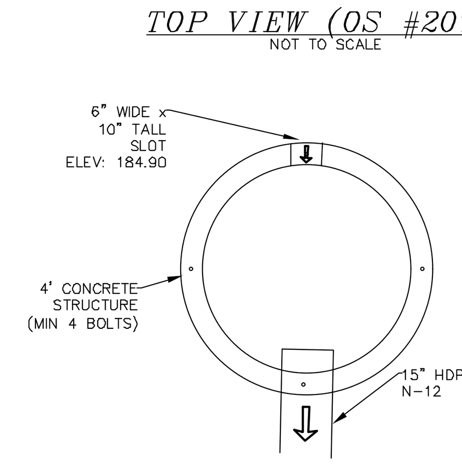
TOP VIEW (OS #201A)
NOT TO SCALE



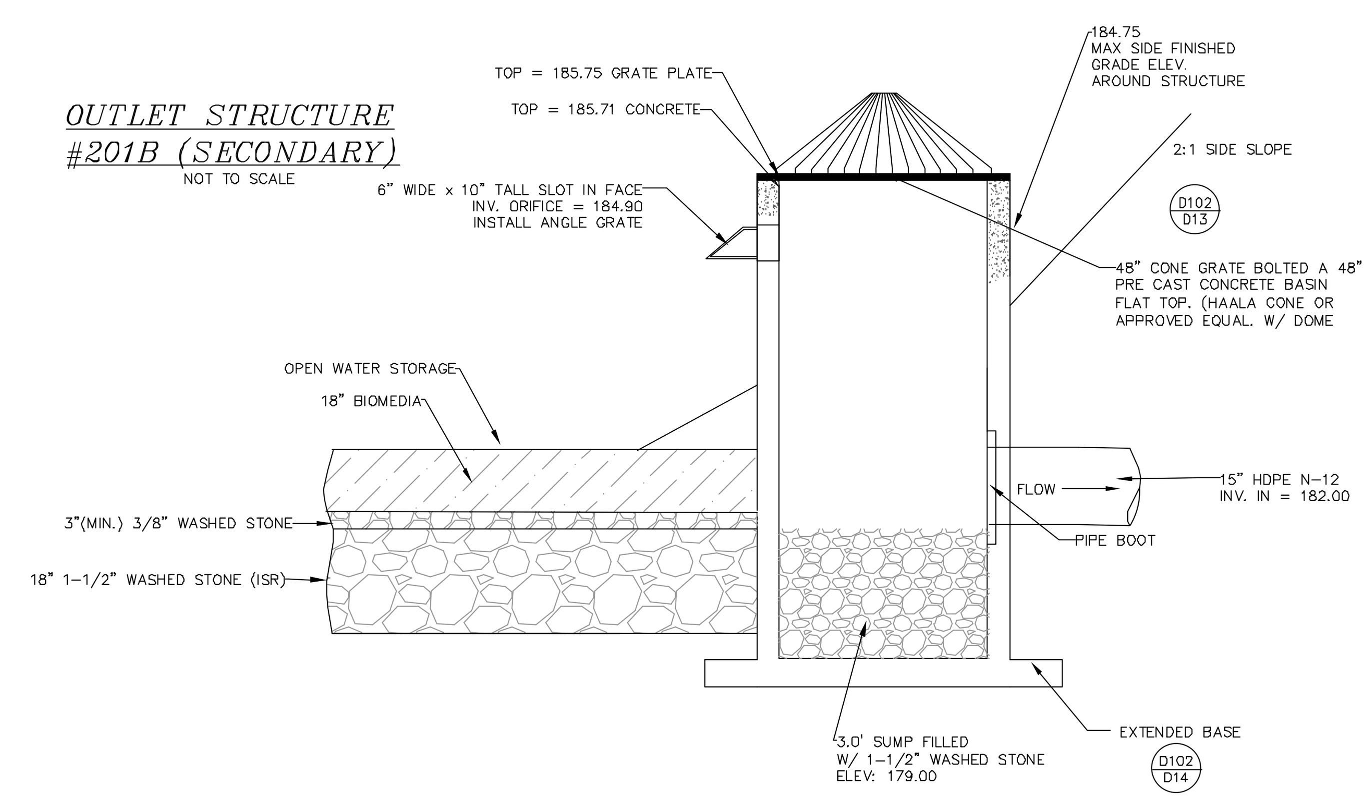
OUTLET STRUCTURE #201A (PRIMARY)
NOT TO SCALE



TOP VIEW (OS #201B)
NOT TO SCALE



OUTLET STRUCTURE #201B (SECONDARY)
NOT TO SCALE

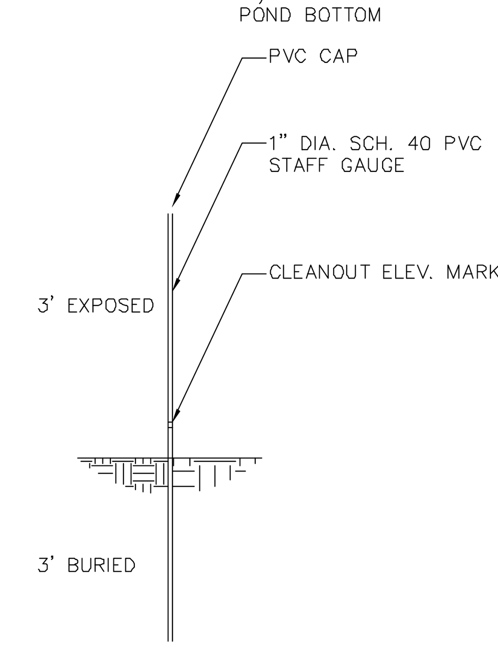


P5

SEDIMENT FORBAY GAUGE DETAIL

1.) SCHEDULE 40 PVC TO BE DRIVEN OR PLACED IN GROUND A MIN. 3'

2.) CLEANOUT MARK ON STAFF TO BE RED PAINT SET 6" ABOVE POND BOTTOM



FOR TOWN APPROVAL PURPOSES :

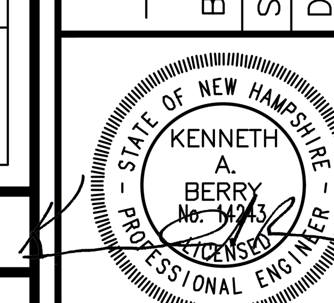
THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

REVISION	DATE	DESCRIPTION

BIORETENTION W/ ISR #201 DETAILS
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : N/A
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

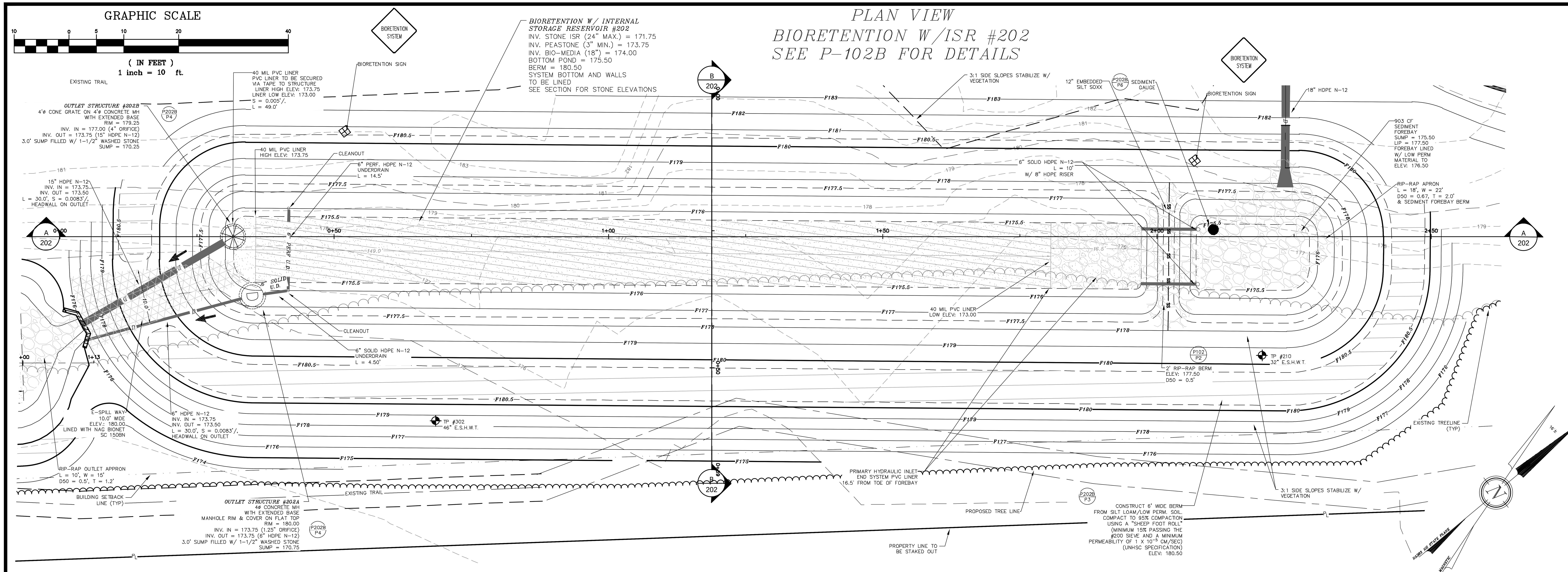


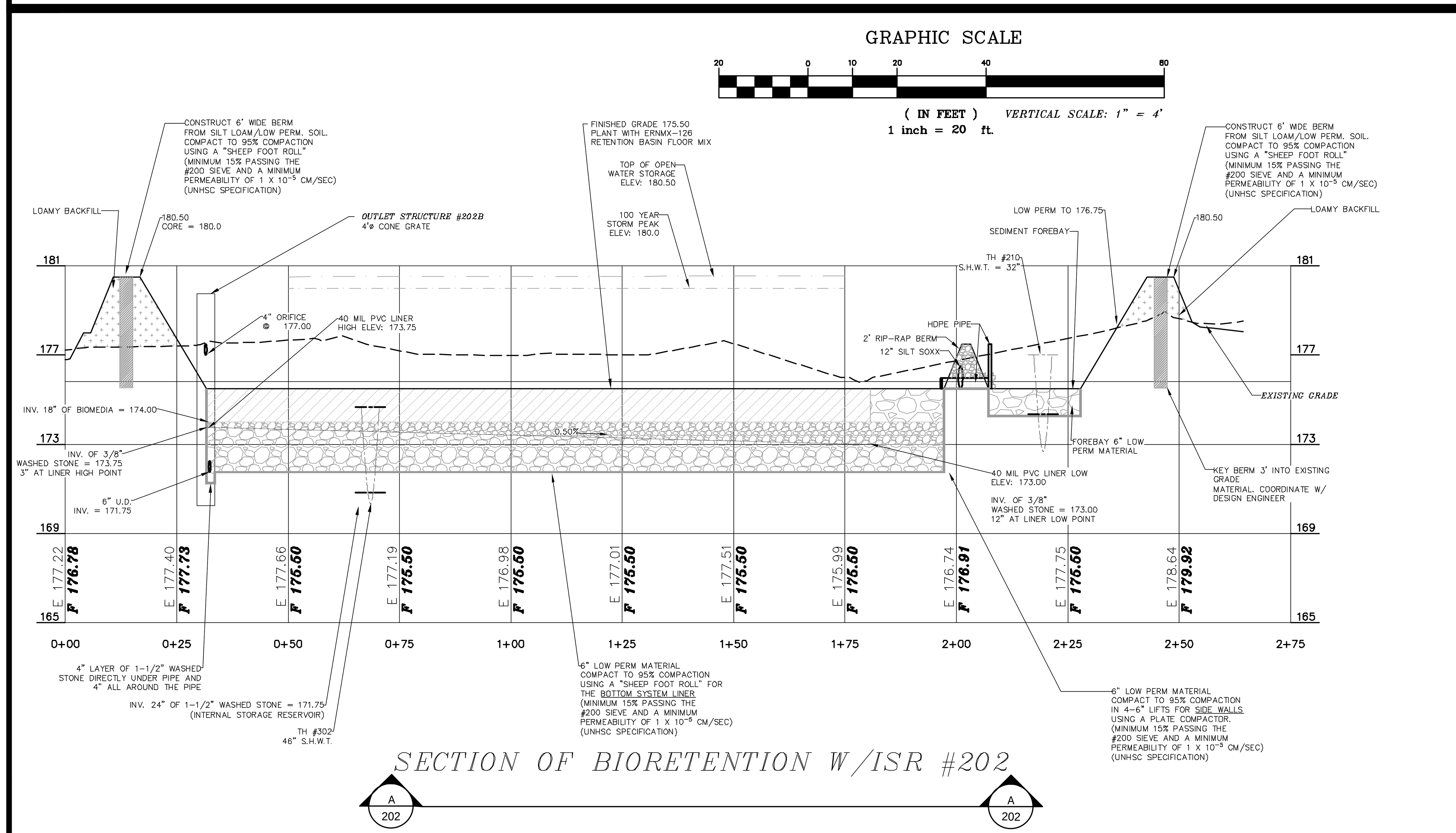
DETAILS

P–201B

SHEET 22 OF 43

NOT FOR CONSTRUCTION





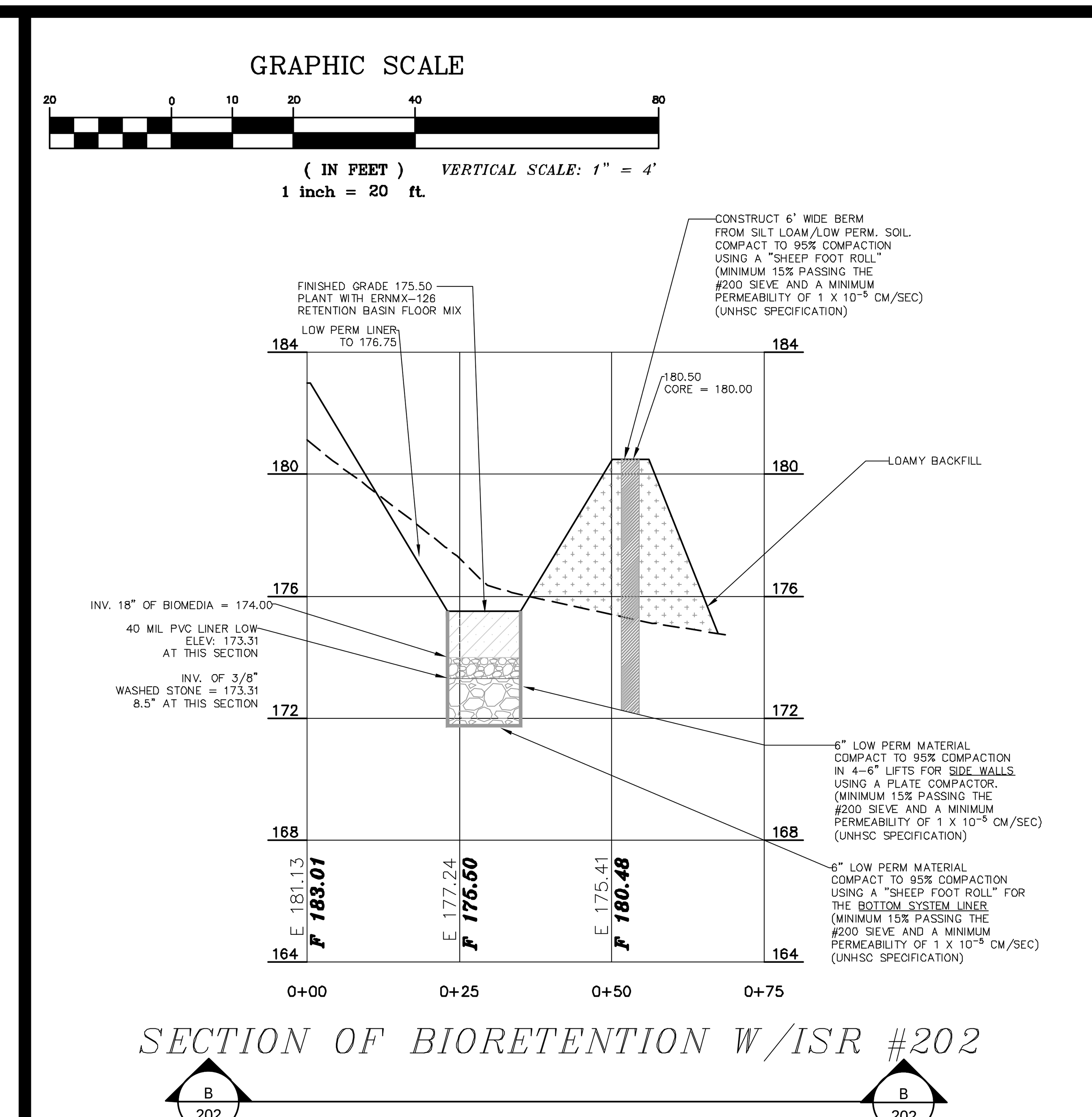


TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES

d50 SIZE= 0.5 FEET 6 INCHES

% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO
100%	9	12
85%	8	11
50%	6	9
15%	2	3

REVISION	DATE	DESCRIPTION

BIORETENTION W/ ISR #202 PLAN VIEW & PROFILES
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

PLAN VIEW/ SECTIONS

P-202A

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : AS SHOWN
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION

P1

UNH STORMWATER CENTER SPECIFICATIONS ACCEPTABLE PARTICLE SIZE DISTRIBUTION OF FINAL BIORETENTION SOIL MIX			
MEDIA TYPE	SIEVE #	SIZE (IN)	% PASSING
COURSE SAND	4	0.187	100
MEDIUM SAND	10	0.079	95
FINE SAND	40	0.017	15–40
SILTS	200	0.003	10–20
CLAYS	<200	PAN	0–5

BIORETENTION SOIL MEDIA COMPONENTS
–AMOUNTS MIXED BY TOTAL VOLUME
*60–85% SAND
*15–25% LOAM OR TOPSOIL
*3–8% ORGANIC MATTER
*5% WATER TREATMENT RESIDUALS OR 0.5% IRON FILINGS

WATER TREATMENT RESIDUALS OR IRON FILINGS ARE REQUIRED DUE TO THE CLASS "A" RECEIVING WATERS

REFER TO THE "UNHSC STANDARD DETAIL, BIORETENTION ISR STORMWATER SYSTEM", FEBRUARY 2020 FOR FURTHER PUBLISHED GENERAL CONSTRUCTION GUIDELINES

DESIGN REFERENCES

1 UNH STORMWATER CENTER.
https://scholars.unh.edu/stormwater/73/

3/8" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
1/2"	100
3/8"	95 – 100
# 4	22 – 55
# 8	0 – 10

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

1–1/2" WASHED CRUSHED STONE*

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1–1/2"	90 – 100
1"	20 – 55
1/2"	0 –15
3/8"	0 –5

* EQUIVALENT TO STANDARD WASHED STONE – SECTION 702 OF NHDOT NHDOT STANDARD SPECIFICATIONS

STABILIZATION NOTE:
SEE NOTE #6, SHEET E–102, DETAIL E–18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

CONSTRUCTION NOTE: THE DESIGN ENGINEER IS TO BE ON SITE PRIOR TO AND DURING THE PLACEMENT OF THE RESERVOIR STONE, AND TO WITNESS THE INSTALLATION OF THE UNDER–DRAIN AND LINER. PLEASE PROVIDE 48 HOURS NOTICE PRIOR TO REQUESTED INSPECTION.

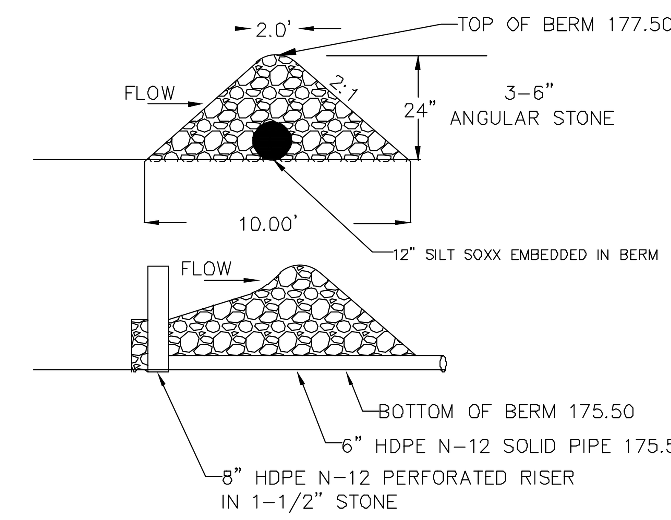
PVC LINER TO BE 40 TO 60 MIL. THE SEAMS SHALL BE SEALED

TESTING TO DETERMINE HYDRAULIC CONDUCTIVITY AND NEED FOR BOTTOM/SIDE SYSTEM LINER TO BE DETERMINED DURING CONSTRUCTION PROCESS.

BIORETENTION W/ ISR CONSTRUCTION SPECIFICATIONS

P2

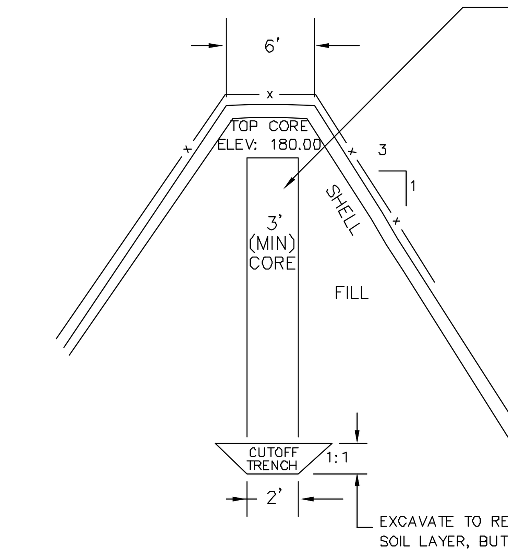
STONE BERM FOR FOREBAY



P3

LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 – 100
#40	60 – 95
#100	40 – 60
#200	25 – 45



1.) 3' CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL MEETING THE REQUIREMENT OF THE LOW PERM SPECIFICATION

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

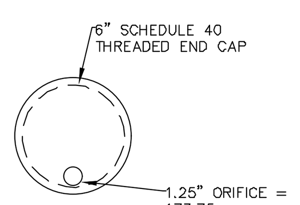
5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

BIORETENTION W/ ISR BERM CONSTRUCTION
NOT TO SCALE

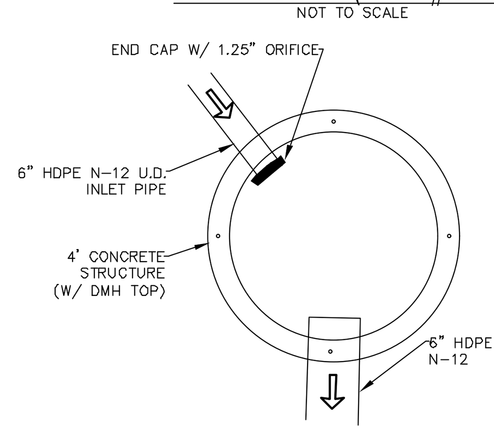
BIORETENTION W/ ISR STRUCTURES & DETAILS
NOT TO SCALE

P4

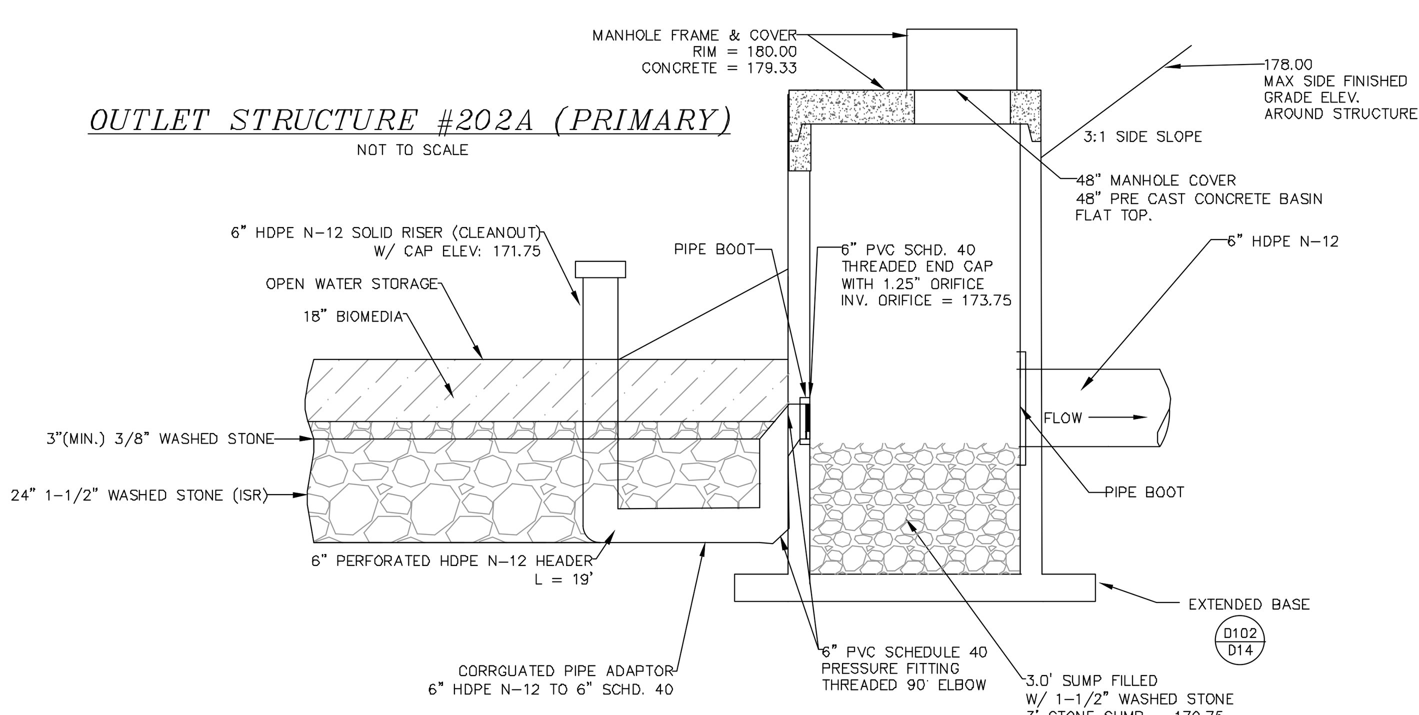


CAP WITH CONTROL ORIFICE (OS #202A)
NOT TO SCALE

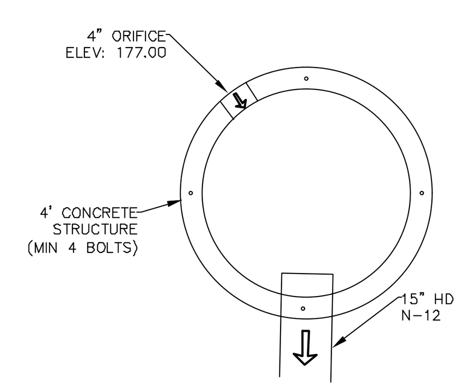
TOP VIEW (OS #202A)
NOT TO SCALE



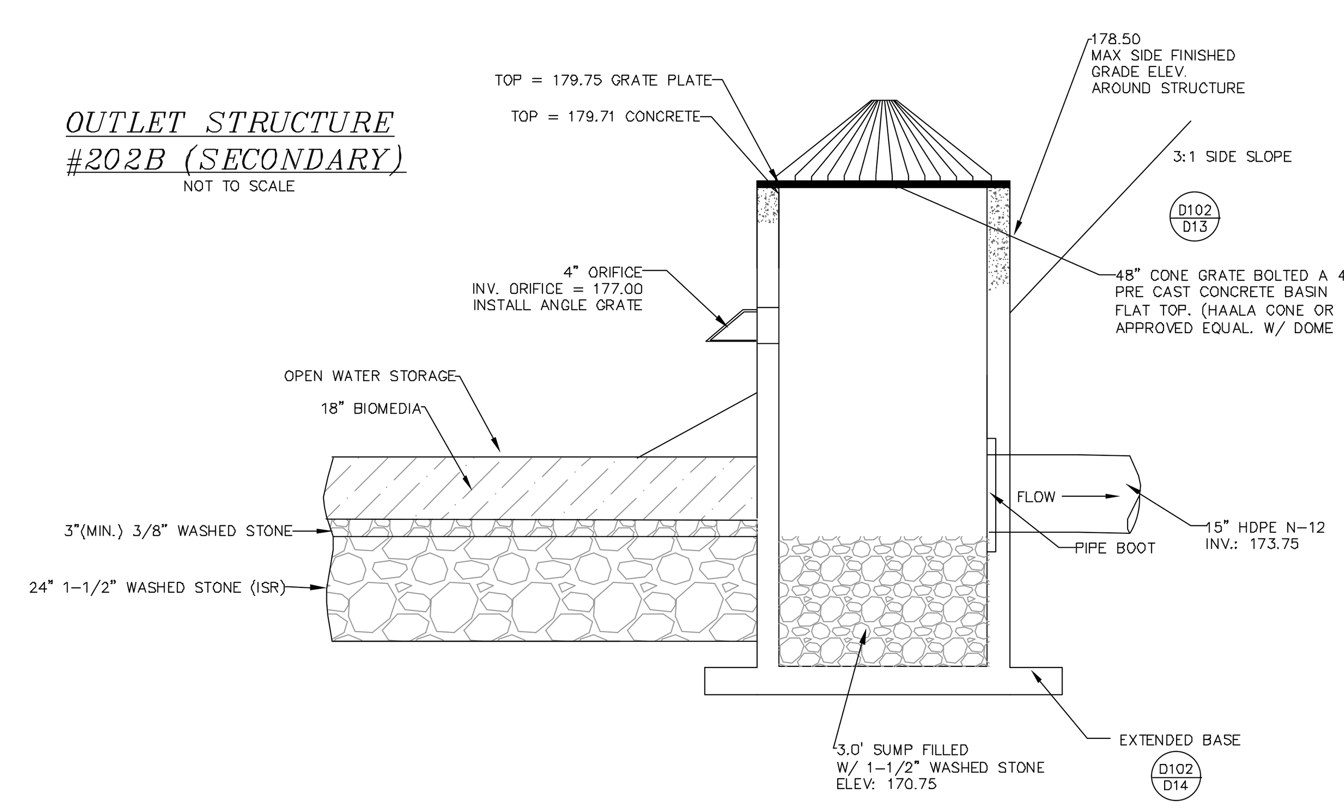
OUTLET STRUCTURE #202A (PRIMARY)
NOT TO SCALE



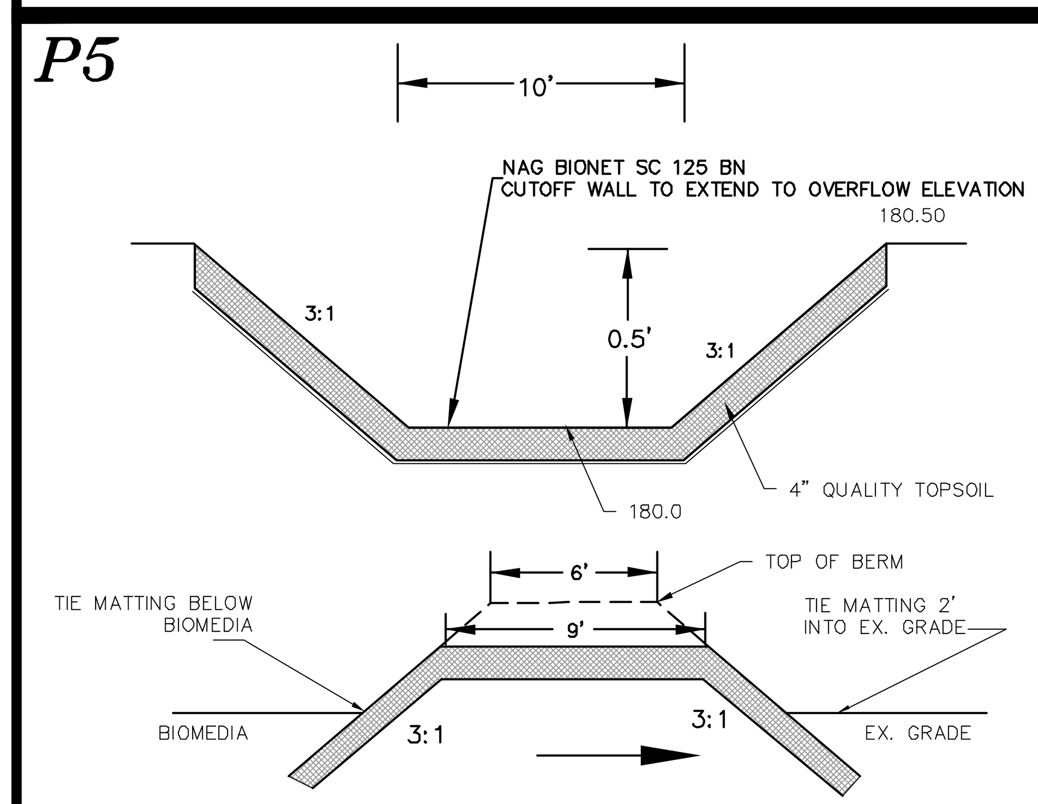
TOP VIEW (OS #202B)
NOT TO SCALE



OUTLET STRUCTURE #202B (SECONDARY)
NOT TO SCALE



P5



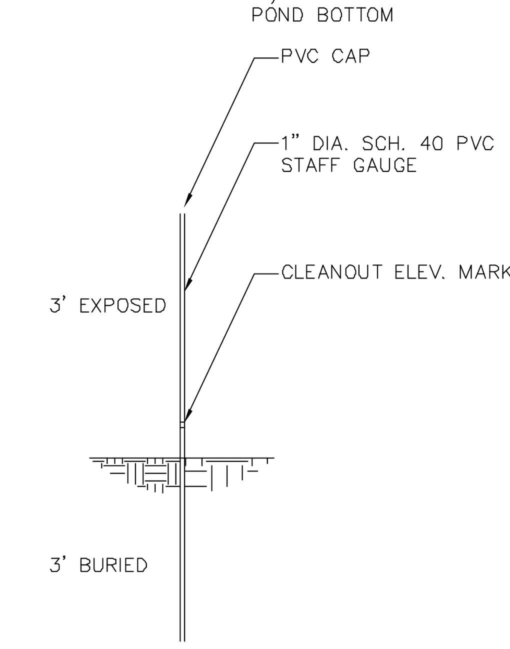
EMERGENCY SPILLWAY PROFILE
NOT TO SCALE

P6

SEDIMENT FORBAY GAUGE DETAIL

1.) SCHEDULE 40 PVC TO BE DRIVEN OR PLACED IN GROUND A MIN. 3'

2.) CLEANOUT MARK ON STAFF TO BE RED PAINT SET 6" ABOVE POND BOTTOM



REVISION	DATE	DESCRIPTION

BIORETENTION W/ ISR #202 DETAILS
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : N/A
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED
PROFESSIONAL ENGINEER

DETAILS

P–202B

NOT FOR CONSTRUCTION

EXISTING LEGEND:

- IRON BOUND/IRON ROD (FND)
- IRON PIPE (FND)
- STONE BOUND (FND)
- UTILITY POLE / GUY WIRE
- SINGLE POST SIGN
- TEMPORARY BENCHMARK
- WELL
- TESTHOLE
- PERIMETER BOUNDARY LINE
- EXISTING CONSERVATION EASEMENT LINE
- BUILDING SETBACK LINE
- NHDES PROTECTIVE WELL RADIUS
- OVERHEAD UTILITIES
- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- POORLY DRAINED WETLAND LINE
- VERY POORLY DRAINED WETLAND LINE
- 50' WETLAND BUFFER LINE
- TREE LINE
- FND FOUND
- TYP TYPICAL
- S.C.R.D. STRAFFORD COUNTY REGISTRY OF DEEDS

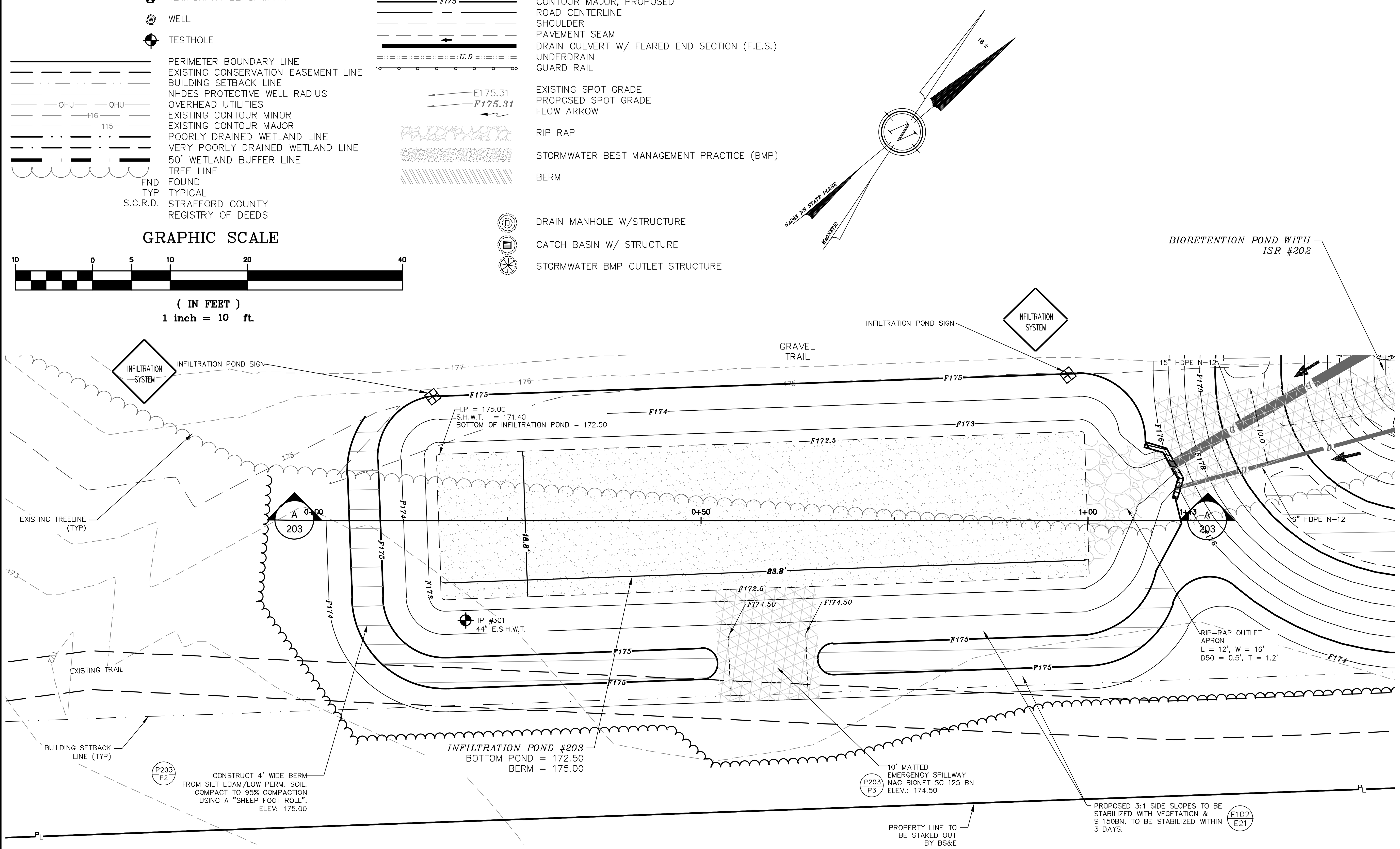
PROPOSED LEGEND:

- TEMPORARY BENCHMARK (T.B.M.)
- DETAIL SHEET / DETAIL
- CONTOUR MINOR, PROPOSED
- CONTOUR MAJOR, PROPOSED
- ROAD CENTERLINE
- SHOULDER
- PAVEMENT SEAM
- DRAIN CULVERT W/ FLARED END SECTION (F.E.S.)
- UNDERDRAIN
- GUARD RAIL
- EXISTING SPOT GRADE
- PROPOSED SPOT GRADE
- FLOW ARROW
- RIP RAP
- STORMWATER BEST MANAGEMENT PRACTICE (BMP)
- BERM
- DRAIN MANHOLE W/STRUCTURE
- CATCH BASIN W/ STRUCTURE
- STORMWATER BMP OUTLET STRUCTURE

GRAPHIC SCALE

(IN FEET)
1 inch = 10 ft.

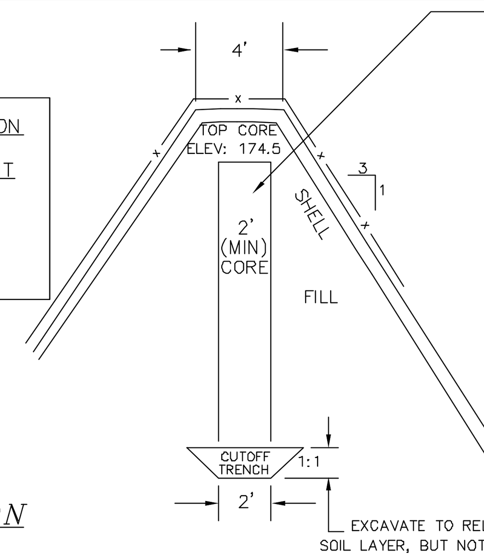
PLAN VIEW INFILTRATION POND #203



P1

LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 - 100
#40	60 - 95
#100	40 - 60
#200	25 - 45



BERM CONSTRUCTION

NOT TO SCALE

1.) 2' CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL.

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

P2

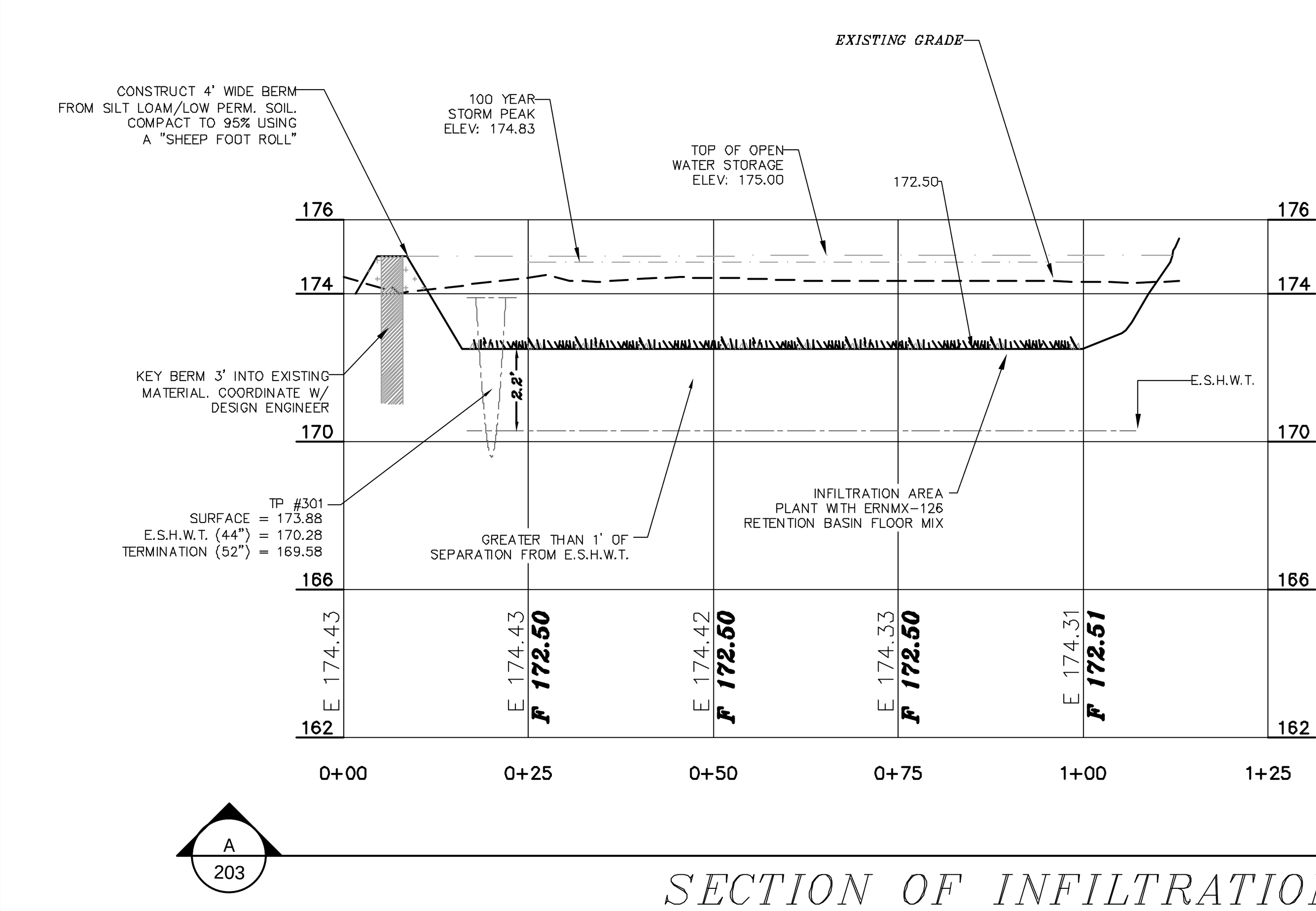
STABILIZATION NOTE:
SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

INFILTRATION SURFACE PROTECTION NOTE:
SEE EROSION AND SEDIMENT CONTROL PLAN
IT IS RECOMMENDED THAT THE CONTRACTOR TAKE MEASURES TO PROTECT THE INFILTRATION SURFACE FROM SEDIMENTATION CAUSED BY EROSION ON THE SIDE SLOPES

GRAPHIC SCALE

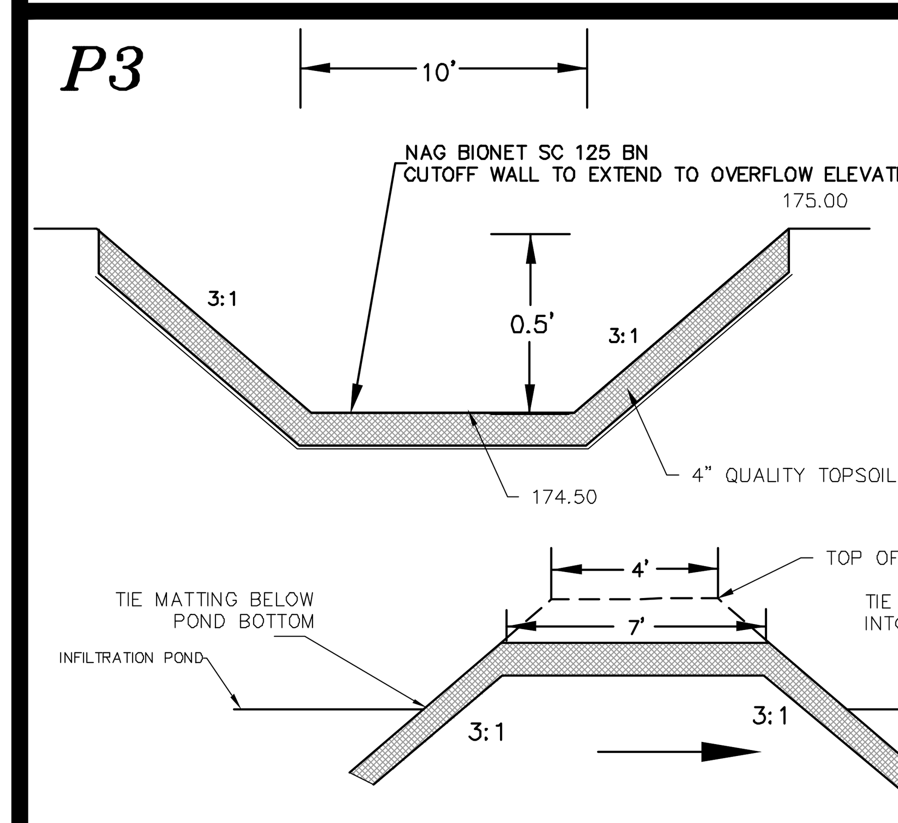
(IN FEET)
1 inch = 20 ft.

VERTICAL SCALE: 1" = 4'



SECTION OF INFILTRATION POND #203

P3



EMERGENCY SPILLWAY PROFILE

NOT TO SCALE

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

REVISION	DATE	DESCRIPTION

INFILTRATION POND #203
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

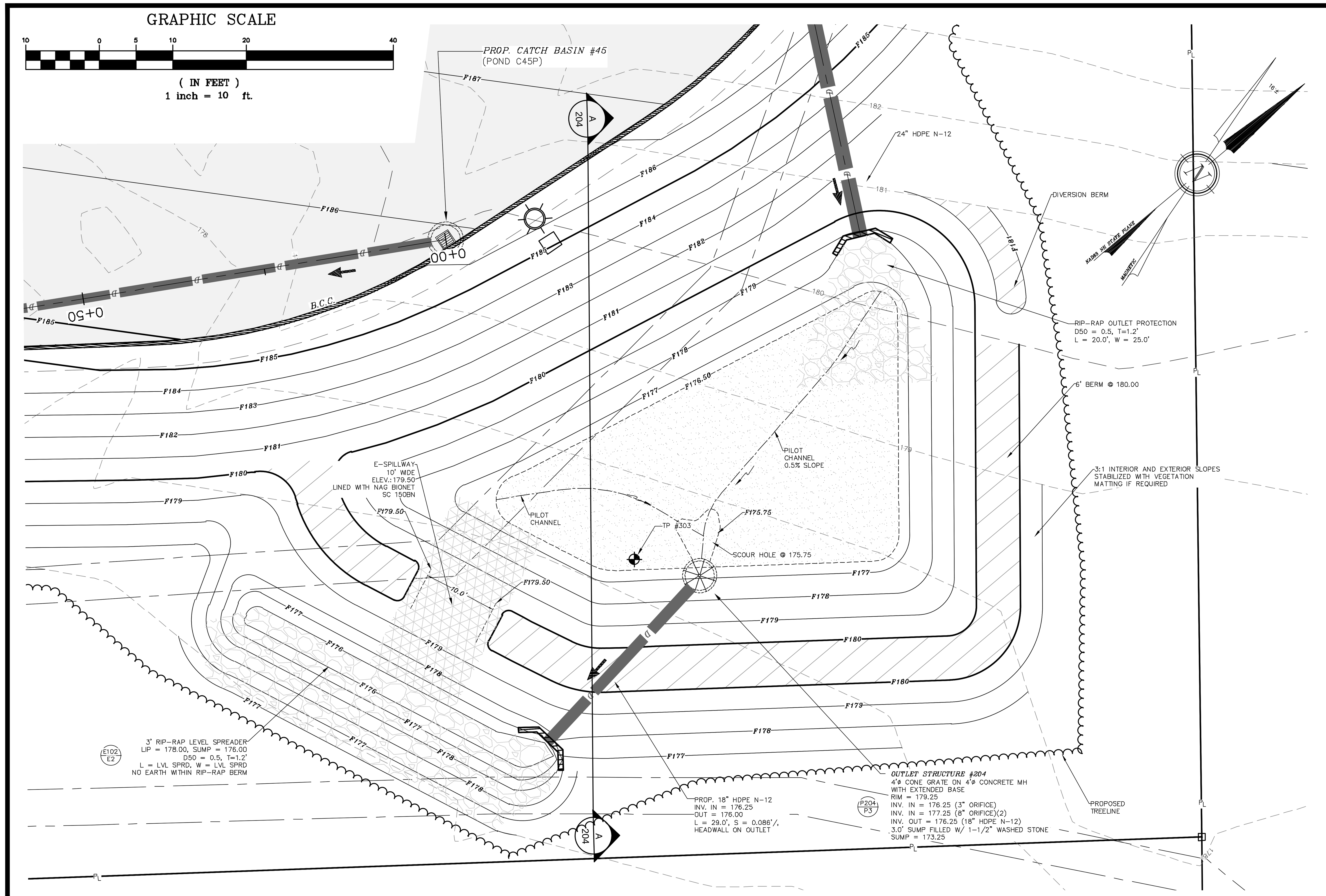
SCALE : 1 IN. EQUALS 20 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

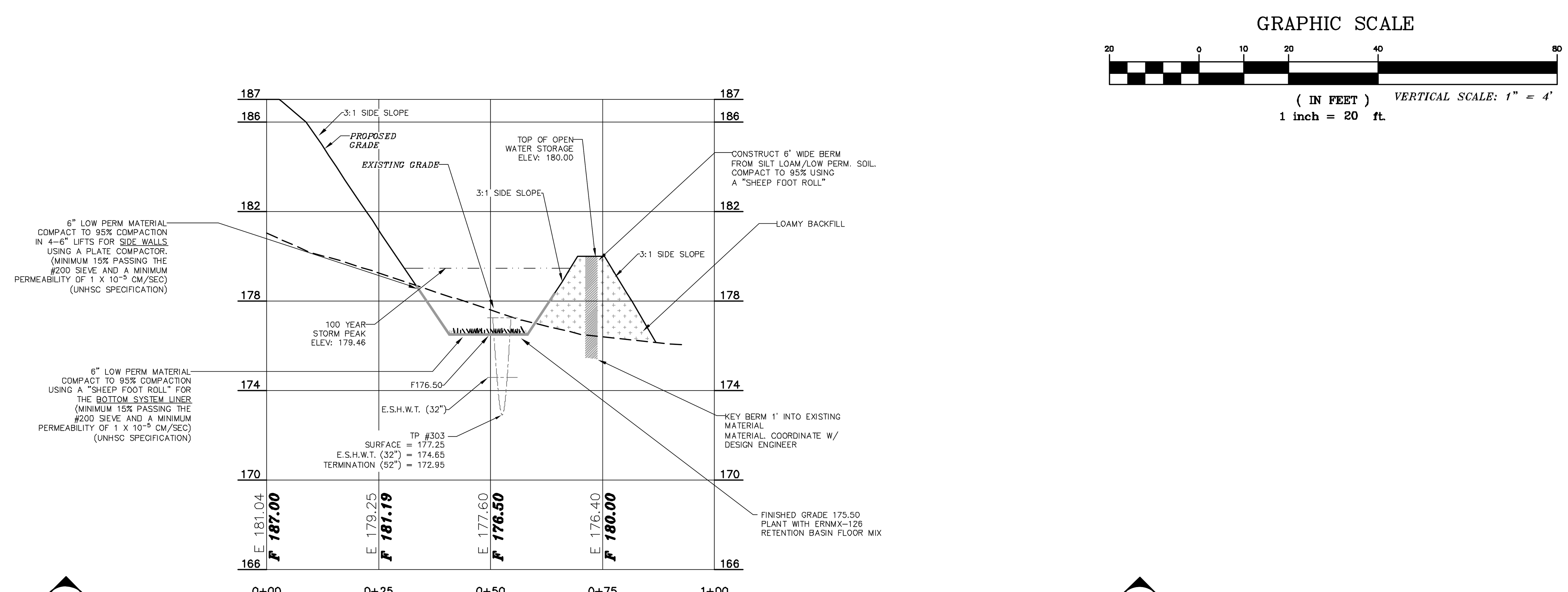
STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED PROFESSIONAL ENGINEER

P-203

SHEET 25 OF 43

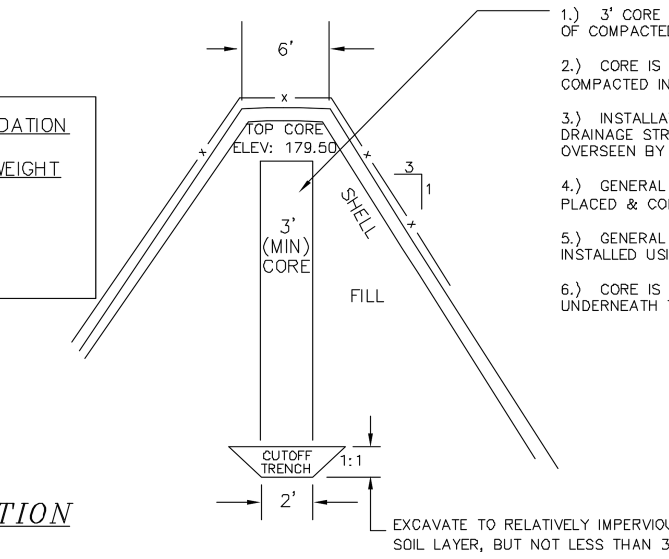
NOT FOR CONSTRUCTION





SECTION OF DETENTION POND #204

P1



LOW PERMEABILITY MATERIAL GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
#4	95 – 100
#40	60 – 95
#100	40 – 60
#200	25 – 45

1.) 3' CORE IS TO BE CONSTRUCTED OF COMPACTED LOAM MATERIAL.

2.) CORE IS TO BE INSTALLED & COMPACTED IN 12" LIFTS.

3.) INSTALLATION OF ENTIRE DRAINAGE STRUCTURE IS TO BE OVERSEEN BY DESIGN ENGINEER.

4.) GENERAL FILL MATERIALS ARE TO PLACED & COMPACTED IN 12" LIFTS.

5.) GENERAL FILL MATERIAL MAY BE INSTALLED USING ONSITE MATERIALS.

6.) CORE IS TO BE CONSTRUCTED UNDERNEATH THE PROPOSED SPILLWAY.

BERM CONSTRUCTION
NOT TO SCALE

P2

NOTES

1. DO NOT PLACE THE DETENTION SYSTEM INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
2. DO NOT DISCHARGE SEDIMENT–LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF WATER FROM EXCAVATIONS) TO THE DETENTION AREA DURING ANY STAGE OF CONSTRUCTION.
3. DETENTION AREA TO BE PLANTED WITH ERNMX–126 RETENTION BASIN FLOOR MIX.

MAINTENANCE REQUIREMENTS

1 SYSTEMS SHOULD BE INSPECTED AT LEAST TWICE ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 0.25 INCHES IN A 24–HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS A WARRANTED BY SUCH INSPECTION.

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.

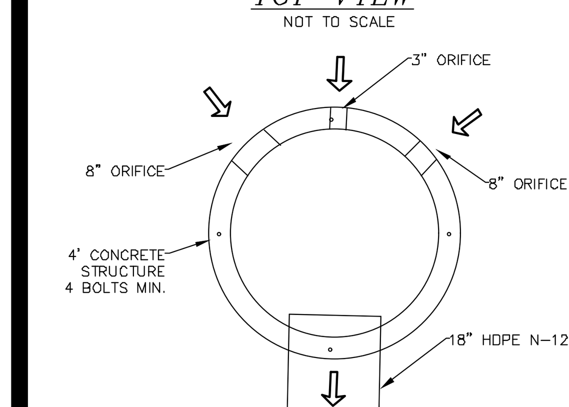
3 VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING, PRUNING, REMOVAL, AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

DESIGN REFERENCES

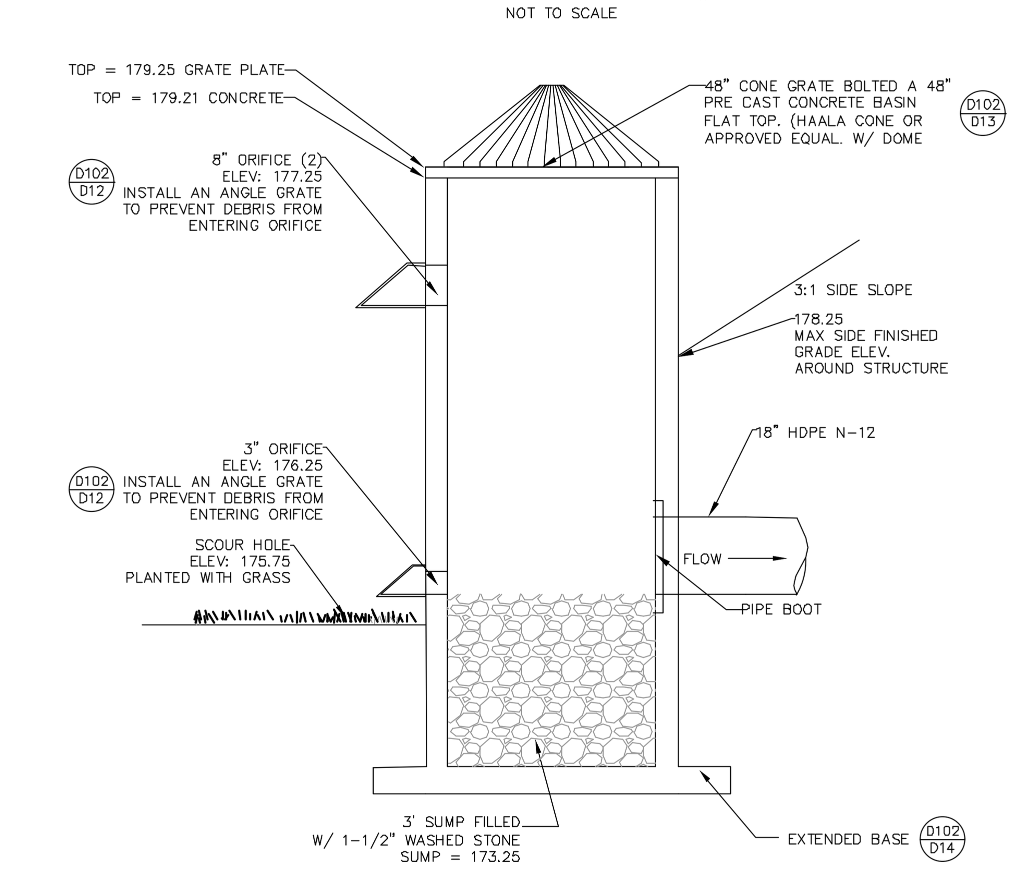
1 UNH STORMWATER CENTER
2 NEW HAMPSHIRE STORMWATER MANAGEMENT MANUAL, VOLUME 2, DECEMBER 2008 AS AMENDED.

P3

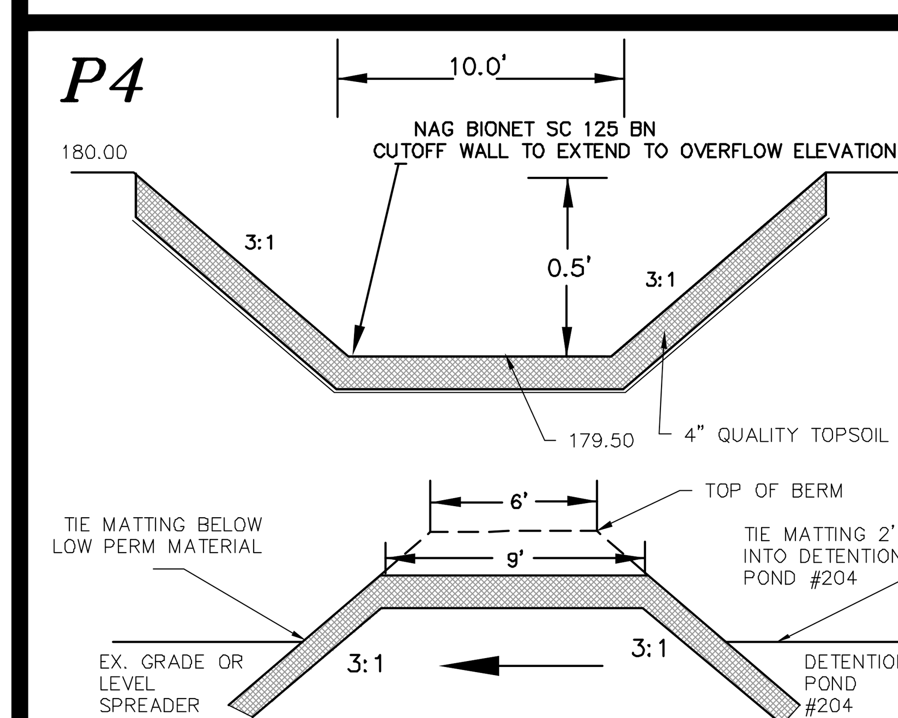
TOP VIEW
NOT TO SCALE



OUTLET STRUCTURE #104
NOT TO SCALE



P4



EMERGENCY SPILLWAY PROFILE
NOT TO SCALE

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

P– 204

REVISION	DATE	DESCRIPTION

DETENTION POND #204
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332–2863

SCALE : 1 IN. EQUALS 10 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 – 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED
PROFESSIONAL ENGINEER

Control of Invasive Plants

New Hampshire
Department of Agriculture,
Markets & Food
Douglas Cygan
603-271-3488
doug.cygan@agr.nh.gov

This guide lists garden plants and weeds which are already causing significant changes to natural areas in the Mid-Atlantic. **Measures for controlling each species are indicated by number, e.g., (3), in the text with a full explanation at the end of this article.** Click on the word Control: to jump to that section. Then click your "back" button to return to the text. Following each section suggested alternative plants are given. These alternatives are native plants, well adapted and needing little care, attractive to birds and butterflies, and an important part of the food web for our indigenous species.

INVASIVE TREES

NORWAY MAPLE (*Acer platanoides*) has large leaves similar to sugar maple. To easily confirm that the plant is Norway maple, break off a leaf and if it's truly Norway maple it will exude milky white sap. Fall foliage is yellow. (Exception: cultivars such as 'Crimson King,' which have red leaves in spring or summer, may have red autumn leaves.) The leaves turn color late, usually in late October after native trees have dropped their foliage. This tree suppresses growth of grass, garden plants, and forest understory beneath it, at least as far as the drip-line. Its wind-borne seeds can germinate and grow in deep shade. The presence of young Norway maples in our woodlands is increasing.
Control: (1); (7), (8), (9), or (10); (11) in mid-October to early November, before the leaves turn color.

TREE OF HEAVEN (*Ailanthus altissima*), is incredibly tough and can grow in the poorest conditions. It produces huge quantities of wind-borne seeds, grows rapidly, and secretes a toxin that kills other plants. Its long compound leaves, with 11-25 lance-shaped leaflets, smell like peanut butter or burnt coffee when crushed. Once established, this tree cannot be removed by mechanical means alone.
Control: (1) - seedlings only. Herbicide - use Garlon 3a (9) with no more than a 1" gap between cuts, or (10); plus (11) on re-growth. Or paint bottom 12" of bark with Garlon 4 Ultra (in February or March to protect surrounding plants). USE MAXIMUM STRENGTH SPECIFIED ON LABEL for all herbicide applications on Ailanthus. Glyphosate is not effective against Ailanthus.

INVASIVE SHRUBS

AUTUMN OLIVE (*Eleagnus umbellata*): Formerly recommended for erosion control and wildlife value, these have proved highly invasive and diminish the overall quality of wildlife habitat.
Control: (1) - up to 4" diameter trunks; (7) or (10) or bury stump. Do not mow.
MULTIFLORA ROSE (*Rosa multiflora*), formerly recommended for erosion control, hedges, and wildlife habitat, becomes a huge shrub that chokes out all other vegetation and is too dense for many species of birds to nest in, though a few favor it. In shade, it grows up trees like a vine. It is covered with white flowers in June. (Our native roses have fewer flowers, mostly pink.) Distinguish multiflora by its size, and by the presence of very hard, curved thorns, and a fringed edge to the leaf stalk.
Control: (1) - pull seedlings, dig out larger plants at least 6" from the crown and 6" down; (4) on extensive infestations; (10) or (11). It may remain green in winter, so herbicide may *applied when other plants are dormant. For foliar application, mix Rodeo with extra sticker-spreader, or use Roundup Sure Shot Foam on small plants.*

BUSH HONEYSUCKLES (*Lonicera spp.*), including Belle, Amur, Morrow's, and Tatarian honeysuckle. (In our region, assume that any honeysuckle is exotic unless it is a scarlet-flowered vine). Bush honeysuckles create denser shade than native shrubs, reducing plant diversity and eliminating nest sites for many forest interior species.
Control: (2) on ornamentals; (1); on shady sites only, brush cut in early spring and again in early fall (3); (4) during the growing season; (7); or (10) late in the growing season.

BLUNT-LEAVED PRIVET (*Ligustrum* obtusifolium). Control: (1); (7) or (10); or trim off all flowers. Do not cut back or mow.

BURNING BUSH, WINGED EUONYMUS (*Euonymus alatus*), identified by wide, corky wings on the branches.
Control: (1); (7) or (10); or trim off all flowers.

JAPANESE BARBERRY (*Berberis thunbergii*), and all cultivars and varieties.
Control: (1); (7) or (10); or trim off all flowers.

INVASIVE WOODY VINES

All of these vines shade out the shrubs and young trees of the forest understory, eventually killing them, and changing the open structure of the forest into a dense tangle. DO NOT PLANT NEXT TO OPEN SPACE.

JAPANESE HONEYSUCKLE (*Lonicera japonica*), including Hall's honeysuckle, has gold-and-white flowers with a heavenly scent and sweet nectar in June. This is probably the familiar honeysuckle of your childhood. It is a rampant grower that spirals around trees, often strangling them.
Control: (1); (3); (10); (11) in fall or early spring when native vegetation is dormant. Plan to re-treat repeatedly.

ORIENTAL BITTERSWEET (*Celastrus orbiculatus*) has almost completely displaced American bittersweet (*C. scandens*). The Asian plant has its flowers and bright orange seed capsules in clusters all along the stem, while the native species bears them only at the branch tips.
Control: (1); keep ornamental plants cut back, remove all fruits as soon as they open, and bag or burn fruits; to eradicate use Garlon 3a (10).

JAPANESE KNOTWEED, MEXICAN BAMBOO (*Polygonum cuspidatum*) can grow in shade. The stems have knotty joints, reminiscent of bamboo. It grows 6-10' tall and has large pointed oval or triangular leaves.
Control: Cut at least 3 times each growing season and/or treat with Rodeo (10) or (11). In gardens, heavy mulch or dense shade may kill it.

INVASIVE HERBACEOUS PLANTS

GARLIC MUSTARD (*Alliaria petiolata*, *A. officinalis*), a white-flowered biennial with rough, scalloped leaves (kidney-, heart- or arrow-shaped), recognizable by the smell of garlic and taste of mustard when its leaves are crushed. (The odor fades by fall.)
Control: Pull before it flowers in spring (1), removing crown and roots. Tamp down soil afterwards. Once it has flowered, cut (2), being careful not to scatter seed, then bag and burn or send to the landfill. (11) may be appropriate in some settings.

JAPANESE STILT GRASS (*Microstegium vimineum*) can be identified by its lime-green color and a line of silvery hairs down the middle of the 2-3" long blade. It tolerates sun or dense shade and quickly invades areas left bare or disturbed by tilling or flooding. An annual grass, it builds up a large seed bank in the soil.

Control: Easily pulled in early to mid-summer (1) - be sure to pull before it goes to seed. If seeds have formed, bag and burn or send to landfill. Mowing weekly or when it has just begun to flower may prevent it from setting seed (3). Use glyphosate (11) or herbicidal soap (less effective) on large infestations. Follow up with (5) in spring.

MILE-A-MINUTE VINE, DEVIL'S TAIL TEARTHUMB (*Polygonum perfoliatum*), a rapidly growing annual vine with triangular leaves, barbed stems, and turquoise berries in August which are spread by birds. It quickly covers and shades out herbaceous plants.
Control: same as for stilt grass.

SPOTTED KNAPWEED (*Centaurea maculosa*), a biennial with thistle-like flowers.
Control: Do NOT pull (1) unless the plant is young and the ground is very soft - the tap root will break off and produce several new plants. Wear sturdy gloves. (2); (6); (10) or (11).

~ ~ ~ ~ ~ ~ ~ ~

CONTROL MEASURES

(1) PULL seedlings and small or shallow-rooted plants when soil is moist. Dig out larger plants, including the root systems. Use a forked spade or weed wrench for trees or shrubs.
(2) DEADHEAD to prevent spread of seeds of invasive plants. Cut off seeds or fruits before they ripen. Bag, and burn or send to a landfill.
(3) MOW or CUTTING at least 4 times a season to deplete plants' store of nutrients and carbohydrates, reduce seed formation, and kill or minimize spread of plants. If necessary, repeat each year.
(4) CONTROLLED BURNING during the spring, repeated over several years, allows native vegetation to compete more effectively with the invasive species. This requires a permit. Spot treatment with glyphosate in late fall can be used to make this method more effective.
(5) Use a CORN-BASED PRE-EMERGENCE HERBICIDE on annual weeds. This product is also an organic fertilizer, i.e., it can stimulate growth of existing plants, including weeds, so it is appropriate for lawns and gardens but may not be appropriate in woodlands.
(6) In lawns, SPOT TREAT with BROAD-LEAF WEEDKILLER. Good lawn-care practices (test soil; use lime and fertilizer only when soil test shows a need; mow high and frequently; leave clippings on lawn) reduce weed infestations.
(7) CUT DOWN the tree. Grind out the stump, or clip off re-growth.
(8) GIRDLE tree: cut through the bark and growing layer (cambium) all around the trunk, about 6" above the ground. Girdling is most effective in spring when the sap is rising, and from middle to late summer when the tree is sending down food to the roots. Clip off sucker sprouts.
(9) FRILL: Using a machete, hatchet or similar device, hack scars (several holes in larger trees) downward into the cambium layer, and squirt in glyphosate (or triclopyr if recommended in text above). Follow label directions for Injection and Frill Applications. This is most effective from middle to late summer. Clip off any sucker sprouts or treat with glyphosate.
(10) CUT STEM / CUT STUMP WITH GLYPHOSATE (or triclopyr if specified above). Follow label directions for Cut Stump Application. Clip off sucker sprouts or paint with glyphosate. See Note on Herbicides.
(11) FOLIAR SPRAY WITH GLYPHOSATE herbicide (see Note on Herbicides). Use a backpack or garden sprayer or mist blower, following label directions. Avoid overspray and/or dripping onto non-target plants, because glyphosate kills most plants except moss. If it rolls off waxy or grass-like foliage, use additional sticker-spreader. Deciduous trees, shrubs, and perennials move nutrients down to the roots in late summer. Glyphosate is particularly effective at this time and when plants have just gone out of flowering. Several invasive species retain their foliage after native plants have lost theirs, and resume growth earlier in spring than most natives. This allows you to treat them without harming the natives. However, the plant must be actively growing for the herbicide to work. Retreatments may be necessary the following year if suckering occurs or the plant hasn't been entirely killed.

NOTE ON HERBICIDES: It is highly recommended that small populations try to be controlled using non-chemical methods wherever feasible. However, for large infestations, and for a few plants specified above, herbicide use is essential. Apply herbicides carefully to avoid non-target plants, glyphosate is the least environmentally damaging herbicide in most cases. Add food coloring for visibility, and a soap-based sticker such as Cide-Kick. Glyphosate is ineffective on some plants; for these, triclopyr (Garlon) may be indicated. When using herbicides, read the entire label and observe all precautions listed, including proper disposal. If in doubt, call your local Cooperative Extension Service.

Pavement Temp. (°F) and Trend (↑ ↓)	Weather Condition	Maintenance Actions	Application Rate (lbs/per 1000 sq.ft.)			
			Salt Prewetted/Pretreated with salt brine	Salt Prewetted/Pretreated with other blends	Dry salt	Winter sand
>30 ↑	Snow	Plow, treat intersections only				Not recommended
	Frz. Rain	Apply chemical				Not recommended
30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				Not recommended
25 - 30 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
20 - 25 ↑	Snow or frz. Rain	Plow and Apply chemical				3.25 for frz. Rain
20 - 25 ↓	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↑	Snow	Plow and apply chemical				Not recommended
	Frz. Rain	Apply chemical				3.25
15 - 20 ↓	Snow or Frz. Rain	Plow and apply chemical				3.25 for frz. Rain
0 to 15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not recommended		Not recommended	5.0 and spot-treat as needed

Table 19. Application Rates for Deicing

These rates & table format are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

Infiltration Feasibility Report

607 Calef Highway
Barrington, NH
Tax Map 238, Lot 44

Prepared for

TURBOCAM, INC.
607 Calef Highway Suite 200
Barrington, NH 03825

Land of

Virtuous Realty LLC
607 Calef Highway Suite 200
Barrington, NH 03825

Prepared By

Berry Surveying & Engineering
335 Second Crown Point Road
Barrington, NH 03825
603-332-2863

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED
PROFESSIONAL ENGINEER

File Number
DB2023-017

February 5, 2024
Revised: April 17, 2024

Table of Contents

1.0 Location of Practices:

The project proposes one location of infiltration for ground water recharge as well as channel flow protection purposes via Infiltration Pond #203.

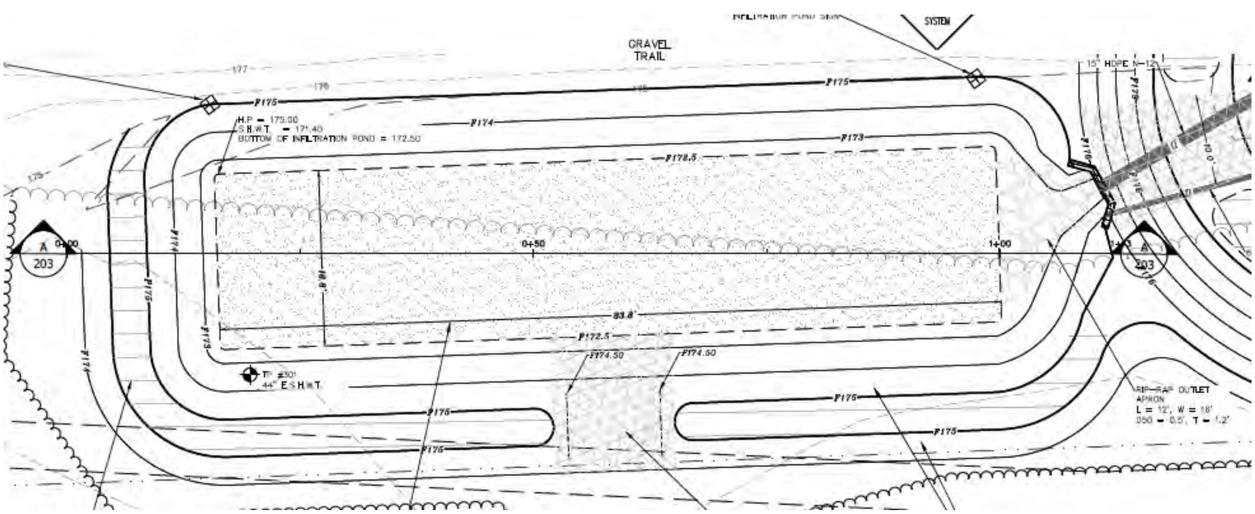
Infiltration Pond #203 (Pond #203) – This Infiltration Pond is on the easterly side of the parcel along the southeastern property line adjacent to the existing rec field to the northwest and Bioretention Pond w/ ISR #202 to the northeast. Treated flow is received from Bioretention W/ ISR #202 as well as overflow runoff during larger storms.

2.0 Existing Topography at the Location of the Practice

Infiltration Pond #203 (Pond #103) – The existing topography within the area is at a 2-3% slope. The area is currently vacant, unmaintained land with walking trails in the area.

3.0 Test Pit Locations

Infiltration Pond #203 (Pond #203) – The practice has a surface area of 1,575 SF at the lowest point. The practice is located over test pit #301. See test pit profile below. See test pit locations on Sheet P-203, Infiltration Pond #203 Plan. The test holes were completed in January & March 2024, (See Site Specific Soil Reports by John P Hayes III). The soils in the vicinity of this practice are Hinckley (12B) considered to be HSG A soil and Udorthents (400E) (Derived from Windsor and Deerfield soils) considered to be HSG B soil. The most restrictive published Ksat for both soils is 6 inches per hour. This practice was designed using 3 in. / hr.



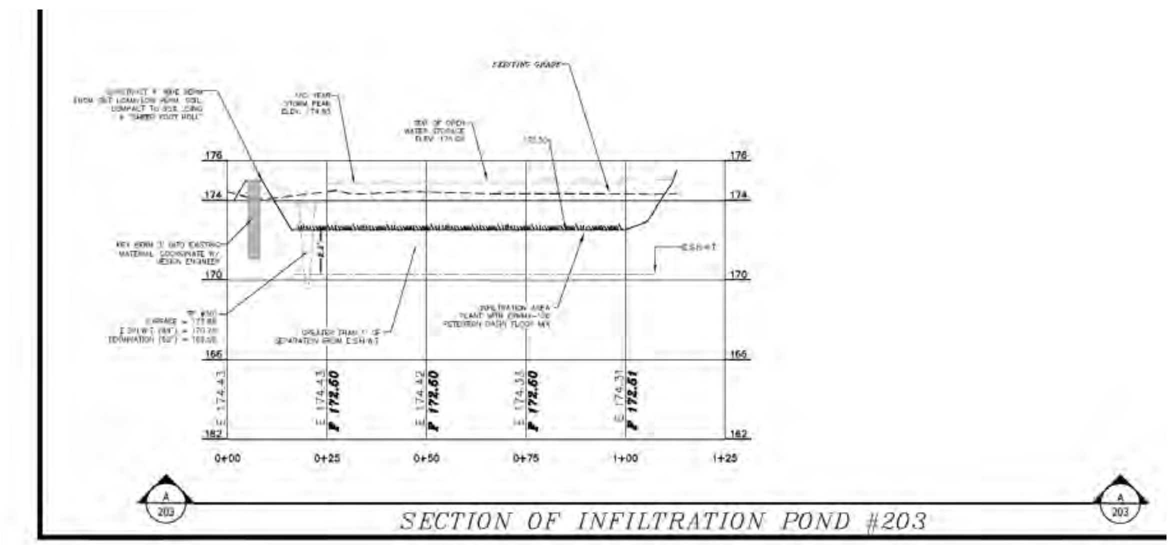
Infiltration Pond #203 (Pond #203) – (Reference Sheet P-203)

4.0 Seasonal High Water Table (SHWT) and Bedrock Elevations

TP #301:	Existing Surface Elevation of TP =	173.88’
	SHWT = 44 Inches	170.21’
	Bedrock > 52 Inches	<169.55’
	Ground Water > 52 Inches	<169.55’
	Deepest Elevation of TP = 52 Inches	169.55’

Infiltration Pond #203 (Pond #203):	Inv. Pond Bottom	172.50’

See cross section below.



SECTION OF INFILTRATION POND #203

5.0 Profile descriptions

The following test pit data was collected, see profiles below.

TEST PIT #301

0-8 10YR 3/2 DARK GRAYISH BROWN, LOAMY SAND, GRANULAR, FRIABLE

8-18 10YR 5/6 YELLOWISH BROWN, GRAVELLY LOAMY SAND, GRANULAR, FRIABLE

18-30 10YR 6/4 LIGHT YELLOWISH BROWN, GRAVELLY LOAMY SAND, GRANULAR, FRIABLE

30-44 10YR 6/4 LIGHT YELLOWISH BROWN, SAND, SINGLE GRAIN, LOOSE

44-52 2.5YR 5/3 LIGHT YELLOWISH BROWN, GRAVELLY SAND WITH REDOX. FEAT. PRESENT, SINGLE GRAIN, LOOSE

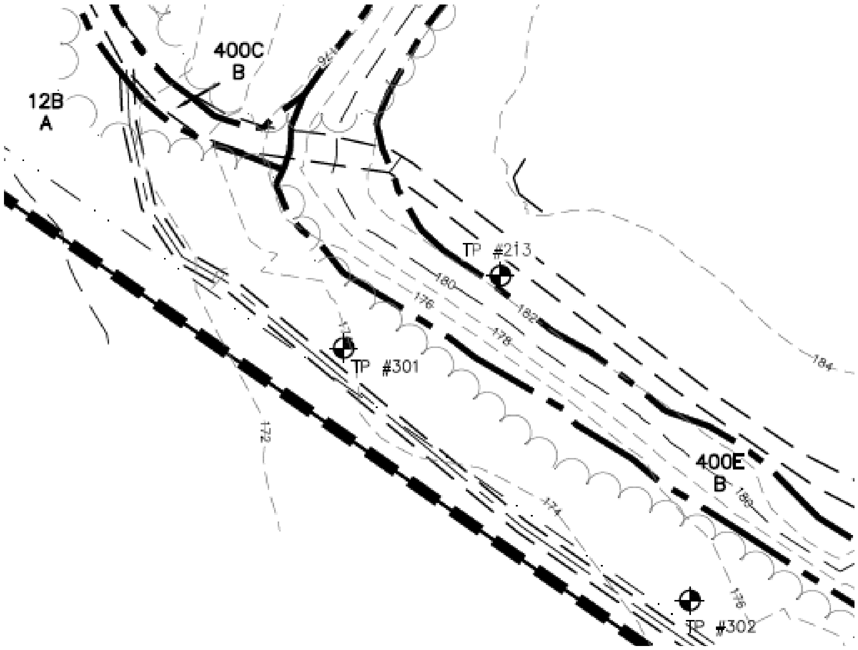
E.S.H.W.T. @ 44"

RESTRICTIVE LAYER @ N/A

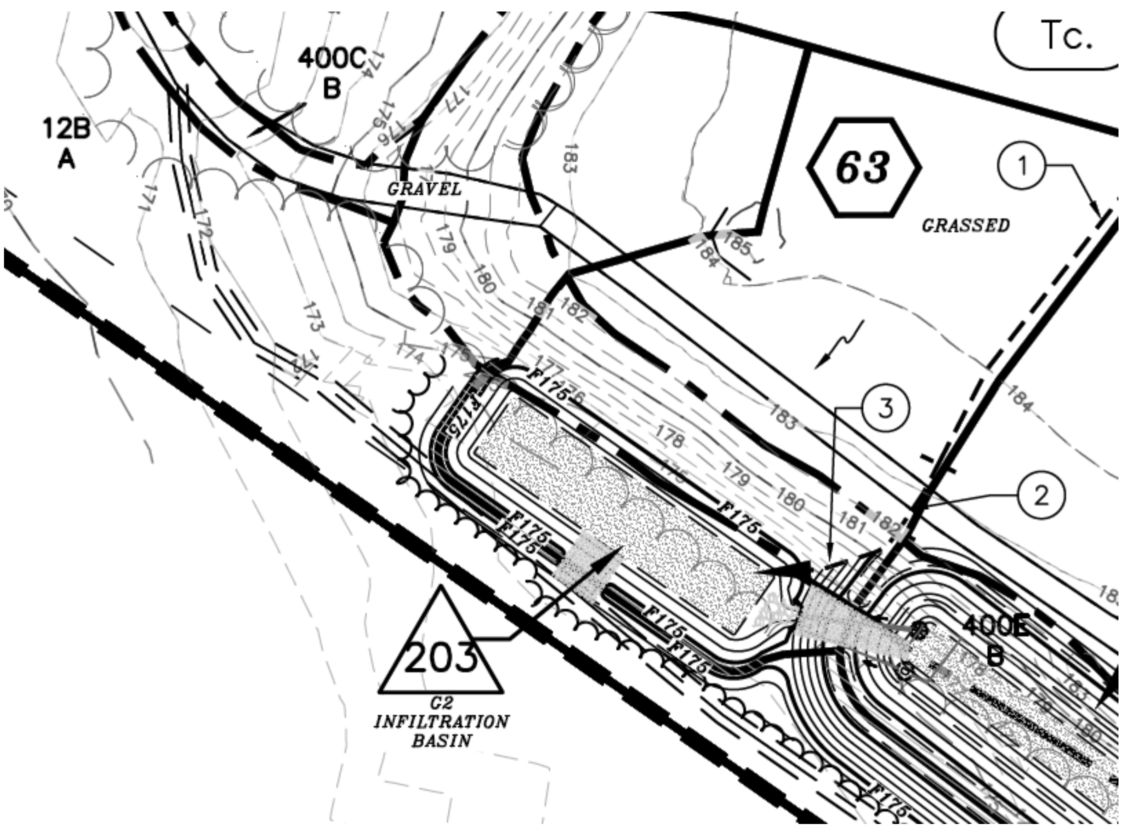
GROUND WATER @ N/A

TERMINATED @ 52"
REFUSAL @ N/A

6.0 Soil Plan in the Area of the Constructed Practice



Infiltration Pond #203 (Pond #203) is located over Hinckley and Udorthents (Derived from Windsor and Deerfield) soil. See Test Pits #301.



Infiltration Pond #203 (Pond #203)

7.0 Summary of Infiltration Rate

Infiltration Pond #203 is located in Hinckley (12B) which is considered to be HSG A and Udorthents (400E) (Derived from Windsor and Deerfield) which is considered to be HSG B, soil area as mapped by Site Specific Soil Survey by John P. Hayes III, CSS, with a documented Ksat of 6 inches per hour. The design exfiltration rate for the infiltration practices is 3 inches per hour.

Amoozemeter testing was not conducted on site and the alternate method of using the USDA / NRCS published values was employed. Reference is made to K Sat Values for New Hampshire Soils (Including Hydrologic and DES Soil Lot Sizing Groups, sponsored by the Society of Soil Scientists of Northern New England, Publication #5 dated September 2009.

Respectfully submitted:

BERRY SURVEYING & ENGINEERING

Kevin R. Poulin, PE
Project Engineer

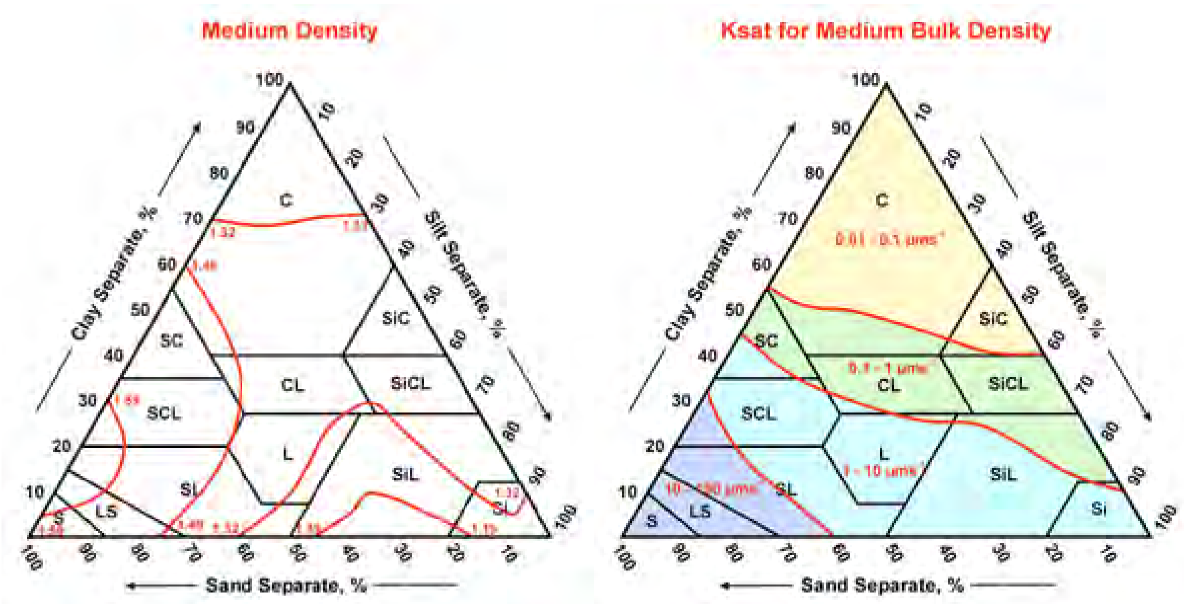
Kenneth A. Berry, PE, LLS
CPSWQ, CPESC, CESSWI
Principal, VP – Technical Operations

K_{sat} VALUES

FOR

NEW HAMPSHIRE SOILS

(Including Hydrologic and DES Soil Lot Sizing Groups)



From: Guide for Estimating Ksat from Soil Properties (**Exhibit 618-9**). (http://soils.usda.gov/technical/handbook/contents/part618ex.html)

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K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS

ABOUT THE SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND

The Society of Soil Scientists of Northern New England (SSSNNE) is a non-profit professional organization of soil scientists, both in the private and public sectors, which is dedicated to the advancement of soil science. The Society fosters the profession of soil classification, mapping and interpretation, and encourages the dissemination of information concerning soil science. With the intent of contributing to the general human welfare, the Society seeks to educate the public on the wise use of soils and the associated natural resources.

INTRODUCTION

The publication "K_{sat} Values for New Hampshire Soils" is designed to assist soil scientists, engineers, and other professionals by assembling tables of existing data for all soil series currently on the state soil legend with regard to K_{sat} values and hydrologic groupings (Hyd.Grp.). The need for this information has become more important since the adoption by the New Hampshire Department of Environmental Services of the revised Alteration of Terrain rules for stormwater management. Additional information has been provided for each soil series with regard to landform, temperature regime (Temp.), soil textures, NHDES Soil Lot Size Groupings (Group), whether the soil is a Spodosol (Spodosol?) and other information which will be valuable to a variety of soil information users.

The data for each soil series has been sorted 3 ways for ease of searching:

Table A-Sorted by Numerical Legend
Table B-Sorted by Soil Series Name
Table C-Sorted by NHDES Soil Group for Establishing Lot Size

The report represents cumulative efforts by private soil scientists and NHDES staff with assistance from the USDA Natural Resource Conservation Service.

Comments or inquires on the information in this publication may be directed to the Board of Directors at the following address:

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SATURATED HYDRAULIC CONDUCTIVITY (K_{SAT})

K_{sat} refers to the ease with which pores in a saturated soil transmit water. The estimates presented here are expressed in terms of inches per hour (NRCS official data presents K_{sat} in both micrometers per second and inches per hour). K_{sat} values are based on soil characteristics observed in the field, particularly structure, consistence, porosity, and texture. (USDA NRCS, Web Soil Survey)

Saturated flow occurs when the soil water pressure is positive; that is, when the soil matric potential is zero (satiated wet condition). In most soils this situation takes place when about 95 percent of the total pore space is filled with water. The remaining 5 percent is filled with entrapped air. Saturated hydraulic conductivity cannot be used to describe water movement under unsaturated conditions. (Soil Survey Manual, 1993)

It is commonly known that soil features (and thus data) for a certain soil series name may be slightly different from one county soil survey to the next and the range in characteristics (via the Typical Pedon) may be slightly different. For example – a Marlow soil (series) in Carroll County may have a higher sand content in its B horizon as opposed to a Marlow soil (series) in Coos County; resulting in a slightly different Ksat range for the B horizon.

The K_{sat} data for this publication was obtained from the USDA-NRCS Soil Data Mart using the Typical Pedon from the county that best reflected the soil and/or had the most acres of that soil. This data is presented in B and C horizons only as it is assumed that the topsoil (A or A_p horizon) will be removed in typical construction practices.

References:

Web Soil Survey. *Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.*

Soil Data Mart. *http://soildatamart.nrcs.usda.gov/*.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.*

HYDROLOGIC SOIL GROUPS

Hydrologic group is a group of soils having the same runoff potential under similar storm and cover conditions.

Hydrologic groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning stormwater management, watershed protection, and flood-prevention projects and for planning or designing structures for the use, control, and disposal of water.

Classifications assigned to soils were based on the use of rainfall-runoff data from small watersheds and infiltrometer plots. From these data, relationships between soil properties and hydrologic groups were established. Assignment of soils to hydrologic groups is based on the relationship between soil properties and hydrologic groups. Wetness characteristics, permeability after prolonged wetting, and depth to very slowly permeable layers are properties that assist in estimating hydrologic groups. Minimum annual steady ponded infiltration rate for a bare ground surface determines the hydrologic soil groups.

Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. (The influence of ground cover is treated independently, not in hydrologic soil groups.).

The soils in the United States are placed into four groups, A, B, C, and D, and three dual classes, *A/D, B/D,* and *C/D.* In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

Group A- Saturated hydraulic conductivity is very high or in the upper half of high and internal free water occurrence is very deep. Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group A are as follows. The saturated hydraulic conductivity of all soil layers exceeds 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer are in group A if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 10 micrometers per second (1.42 inches per hour).

Group B- Saturated hydraulic conductivity is in the lower half of high or in the upper half of moderately high and free water occurrence is deep or very deep. Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group B are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] ranges from 10.0 micrometers per second (1.42 inches per hour) to 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer or water table are in group B if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 4.0 micrometers per second (0.57 inches per hour) but is less than 10.0 micrometers per second (1.42 inches per hour).
Group C- Saturated hydraulic conductivity is in the lower half of moderately high or in the upper half of moderately low and internal free water occurrence is deeper than shallow. Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group C are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] is between 1.0 micrometers per second (0.14 inches per hour) and 10.0 micrometers per second (1.42 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a restriction or water table are in group C if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 0.40 micrometers per second (0.06 inches per hour) but is less than 4.0 micrometers per second (0.57 inches per hour). .
Group D- Saturated hydraulic conductivity is below the upper half of moderately low, and/or internal free water occurrence is shallow or very shallow and transitory through permanent. Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water impermeable layer less than 50 centimeters [20 inches] and all soils with a water table within 60 centimeters [24 inches] of the surface are in this group, although some may have a dual classification, as described in the next section, if they can be adequately drained. The limits on the physical diagnostic characteristics of group D are as follows. For soils with a water impermeable layer at a depth between 50 centimeters and 100 centimeters [20 and 40 inches], the saturated hydraulic conductivity in the least transmissive soil layer is less than or equal to 1.0 micrometers per second (0.14 inches per hour). For soils that are deeper than 100 centimeters [40 inches] to a restriction or water table, the saturated hydraulic

conductivity of all soil layers within 100 centimeters [40 inches] of the surface is less than or equal to 0.40 micrometers per second (0.06 inches per hour).

Dual hydrologic soil groups-Certain wet soils are placed in group D based solely on the presence of a water table within 60 centimeters [24 inches] of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, then they are assigned to dual hydrologic soil groups *(A/D, B/D,* and *C/D)* based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the undrained condition. For the purpose of hydrologic soil group, adequately drained means that the seasonal high water table is kept at least 60 centimeters [24 inches] below the surface in a soil where it would be higher in a natural state.

References:

National Engineering Handbook, Natural Resource Conservation Service, U.S. Department of Agriculture.

Soil Data Mart. *http://soildatamart.nrcs.usda.gov/*.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 18.*

TABLE A

NUMERICAL LEGEND

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Madawaska, aquentic	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over loam
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Ricker	674	2.0	6.0	2.00	6.0	A	4	Organic over bedrock (up to 4" of mineral)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep

(grey)	no longer recognized
(light shaded)	organic materials

TABLE B

SOIL SERIES

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
ladawaska, aquer	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	oamy over sandy, sandy-skeleta	yes	gravelly loamy sand in C
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Ricker	674	2.0	6.0	2.00	6.0	A	4	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

no longer recognized
organic materials

TABLE C

NHDES SOIL GROUPINGS

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Adams	36	1	6.0	20.0	20.00	99.0	A	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Caesar	526	1	20.0	100.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	coarse sand	no	
Champlain	35	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	gravelly sand	no	
Colton	22	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Gloucester	11	1	6.0	20.0	6.00	20.0	A	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hermon	55	1	2.0	20.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hoosic	510	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Masardis	23	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Merrimac	10	1	2.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Quonset	310	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Redstone	665	1	2.0	6.0	6.00	20.0	A	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Success	154	1	2.0	6.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	cemented
Suncook	2	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Warwick	210	1	2.0	6.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Windsor	26	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	sandy	no	
Abenaki	501	2	0.6	2.0	6.00	99.0	B	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Agawam	24	2	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	2	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Bangor	572	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Berkshire	72	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bice	226	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	no	sandy loam
Canton	42	2	2.0	6.0	6.00	20.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Charlton	62	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Dutchess	366	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Fryeburg	208	2	0.6	2.0	2.00	6.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Groveton	27	2	0.6	2.0	0.60	6.0	B	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	2	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	2	0.6	2.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Houghtonville	795	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Lombard	259	2	0.6	6.0	2.00	20.0	C/D	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Monadnock	142	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	oamy over sandy, sandy-skeleta	yes	gravelly loamy sand in C
Occum	1	2	0.6	2.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Salmon	630	2	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Stetson	523	2	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Unadilla	30	2	0.6	2.0	2.00	20.0	B	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Chichester	442	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Acton	146	3	2.0	20.0	2.00	20.0	B	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Becket	56	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	3	0.6	2.0	0.06	2.0	B	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bernardston	330	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Boxford	32	3	0.1	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	silty clay loam

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Buckland	237	3	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Buxton	232	3	0.1	0.6	0.00	0.2	C	Silt and Clay Deposits	frigid	fine	no	silty clay
Canterbury	166	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Chatfield Var.	289	3	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Colonel	927	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Croghan	613	3	20.0	100.0	20.00	100.0	B	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	3	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	3	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Eldridge	38	3	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elmridge	238	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116	3					C	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Gilmanton	478	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Henniker	46	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hitchcock	130	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Howland	566	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Lanesboro	228	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Lovewell	307	3	0.6	2.0	0.60	2.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Machias	520	3	2.0	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Madawaska	28	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Madawaska, aquer	48	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Melrose	37	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Metacomet	458	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	3	6.0	100.0	6.00	100.0	B	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39	3					C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Montauk	44	3	0.6	6.0	0.06	0.6	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Mundal	610	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Newfields	444	3	0.6	2.0	0.60	2.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	3	0.6	2.0	0.60	2.0	C	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	3	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Paxton	66	3	0.6	2.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Peru	78	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	
Pittstown	334	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	3	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Poocham	230	3	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Scio	531	3	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scituate	448	3	0.6	2.0	0.06	0.2	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Sheepscot	14	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Sudbury	118	3	2.0	6.0	2.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Suffield	536	3	0.6	2.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Surplus	669	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	3	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	
Telos	123	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Waumbeck	58	3	2.0	20.0	6.00	20.0	B	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Winooski	103	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Woodbridge	29	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Winooski	9	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Canaan	663	4	2.0	20.0	2.00	20.0	C	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Cardigan	357	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Chatfield	89	4	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Elliottsville	128	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Glebe	671	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Glover	NA	4	0.6	2.0	0.60	2	D	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Hogback	91	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	4	0.6	6.0	0.60	6.0	C/D	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Kearsarge	359	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Lyman	92	4	2.0	6.0	2.00	6.0	A/D	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Macomber	252	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Millsite	251	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monson	133	4	0.6	2.0	0.60	2.0	D	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Pennichuck	460	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Rawsonville	98	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Ricker	674	4	2.0	6.0	2.00	6.0	A	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Saddleback	673	4	0.6	2.0	0.60	2.0	C/D	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Shapleigh	136	4					C/D	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Thorndike	84	4	0.6	2.0	0.60	2.0	C/D	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Tunbridge	99	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Winnecook	88	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Woodstock	93	4	2.0	6.0	2.00	6.0	C/D	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Au Gres	516	5					B	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bemis	224	5	0.6	0.2	0.00	0.2	C	Firm, platy, loamy till	cryic	loamy	no	
Binghamville	534	5	0.2	2.0	0.06	0.2	D	Terraces and glacial lake plains	mesic	silty	no	
Brayton	240	5	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Cabot	589	5	0.6	2.0	0.06	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Charles	209	5	0.6	100.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	silty	no	
Cohas	505	5	0.6	2.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Grange	433	5	0.6	2.0	0.60	2.0	C	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Kinsman	614	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Leicester	514	5	0.6	6.0	0.60	20.0	C	Loose till, loamy textures	mesic	loamy	no	
Lim	3	5	0.6	2.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	5	0.6	2.0	0.60	2.0	C	Flood Plain (Bottom Land)	mesic	silty	no	
Lyme	246	5	0.6	6.0	0.60	6.0	C	Loose till, sandy textures	frigid	loamy	no	
Mashpee	315	5	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	yes	
Monarda	569	5	0.2	2.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Moosilauke	414	5	6.0	20.0	6.00	20.0	C	Loose till, sandy textures	frigid	sandy	no	
Naumburg	214	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Pemi	633	5	0.6	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	5	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314	5					B	Outwash and Stream Terraces	mesic	sandy	yes	
Raynham	533	5	0.2	2.0	0.06	0.2	C	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	5	0.6	2.0	6.00	100.0	D	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Ridgebury	656	5	0.6	6.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	5	0.2	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	frigid	loamy	no	

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Saugatuck	16	5	0.06	0.2	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	5	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	
Scitico	33	5	0.0	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	
Shaker	439	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Squamscott	538	5	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stissing	340	5	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Swanton	438	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Walpole	546	5	2.0	6.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Biddeford	234	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	organic over clay
Bucksport	895	6					D	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	6	0.2	6.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Catden	296	6					A/D	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Chocorua	395	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Greenwood	295	6					A/D	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Ipswich	397	6					D	Tidal Flat	mesic	hemic/sapric	no	deep organic
Matunuck	797	6			20.00	100.0	D	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	6	0.6	2.0	0.60	2.0	D	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Natchaug	496	6			0.20	2.0	D	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Ossipee	495	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497	6			20.00	100.0	D	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Peacham	549	6	0.6	2.0	0.00	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over loam
Pondicherry	992	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Saco	6	6	0.6	2.0	6.00	20.0	D	Flood Plain (Bottom Land)	mesic	silty	no	strata
Scarboro	115	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Searsport	15	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Timakwa	393	6			6.00	100.0	D	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Vassalboro	150	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waskish	195	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Westbrook	597	6			0.00	2.0	D	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	6	0.0	0.2	0.00	0.2	D	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Wonsqueak	995	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam

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Welcome to New Hampshire's Watershed Report Cards built from the 2020/2022, 305(b)/303(d)

Each Watershed Report Card covers a single 12-digit Hydrologic Unit Code (HUC12), on average a 34 square mile area. Each Watershed Report Card has three components;

1. REPORT CARD - A one page card that summarizes the overall use support for Aquatic Life Integrity, Primary Contact (i.e. Swimming), and Secondary Contact (i.e. Boating) Designated Uses on every Assessment Unit ID (AUID) within the HUC12.
2. HUC 12 MAP - A map of the watershed with abbreviated labels for each AUID within the HUC12.
3. ASSESSMENT DETAILS - Anywhere from one to forty pages with the detailed assessment information for each and every AUID in the Report Card and Map.

How are the Surface Water Quality Assessment determinations made?

All readily available data with reliable Quality Assurance/Quality Control is used in the biennial surface water quality assessments. For a full understanding of how the Surface Water Quality Standards (Env-Wq 1700) are translated into surface water quality assessments we urge the reader to review the 2020/2022 Consolidated Assessment and Listing Methodology (CALM).

Where can I find more advanced mapping resources?

GIS files are available by assessment cycle at the NHDES FTP site.

I'd like to see the more raw water quality data?

The web mapping tool allows you to download the data used in the assessment of the primary contact and aquatic life designated uses by clicking on the "Data Access Waterbody Data (Aquatic Life and Swimming Uses)" link for any assessment unit.

How are assessments coded in the report card?

Assessment outcomes are displayed on a color scale as well as an alpha numeric scale that provides additional distinctions for the designated use and parameter level assessments as outlined in the table below.

			Severe Not Supporting, Severe	**Poor** Not Supporting, Marginal	**Likely Bad** Insufficient Information – Potentially Not Supporting	**No Data** No Data	**Likely Good** Insufficient Information – Potentially Full Supporting	**Marginal** Full Support, Marginal	**Good** Full Support, Good
CATEGORY		**Description**							
Category 2		Meets standards						2-M or 2-OBS	2-G
Category 3		Insufficient Information			3-PNS	3-ND	3-PAS		
Category 4		Does not Meet Standards;							
	4A	TMDL* Completed	4A-P	4A-M or 4A-T					
	4B	Other enforceable measure will correct the issue.	4B-P	4B-M or 4B-T					
	4C	Non-pollutant (i.e. exotic weeds)	4C-P	4C-M					
Category 5		TMDL* Needed	5-P	5-M or 5-T					

* TMDL stands for Total Maximum Daily Load studies

Watershed 305(b) Assessment Summary Report:

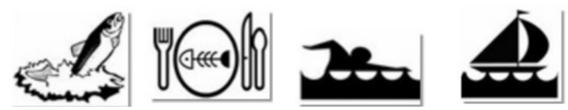
Assessment Cycle: 2020/2022

HUC 12: 010600030903

HUC 12 Name: Bellamy River

(Locator map on next page only applies to this HUC12)

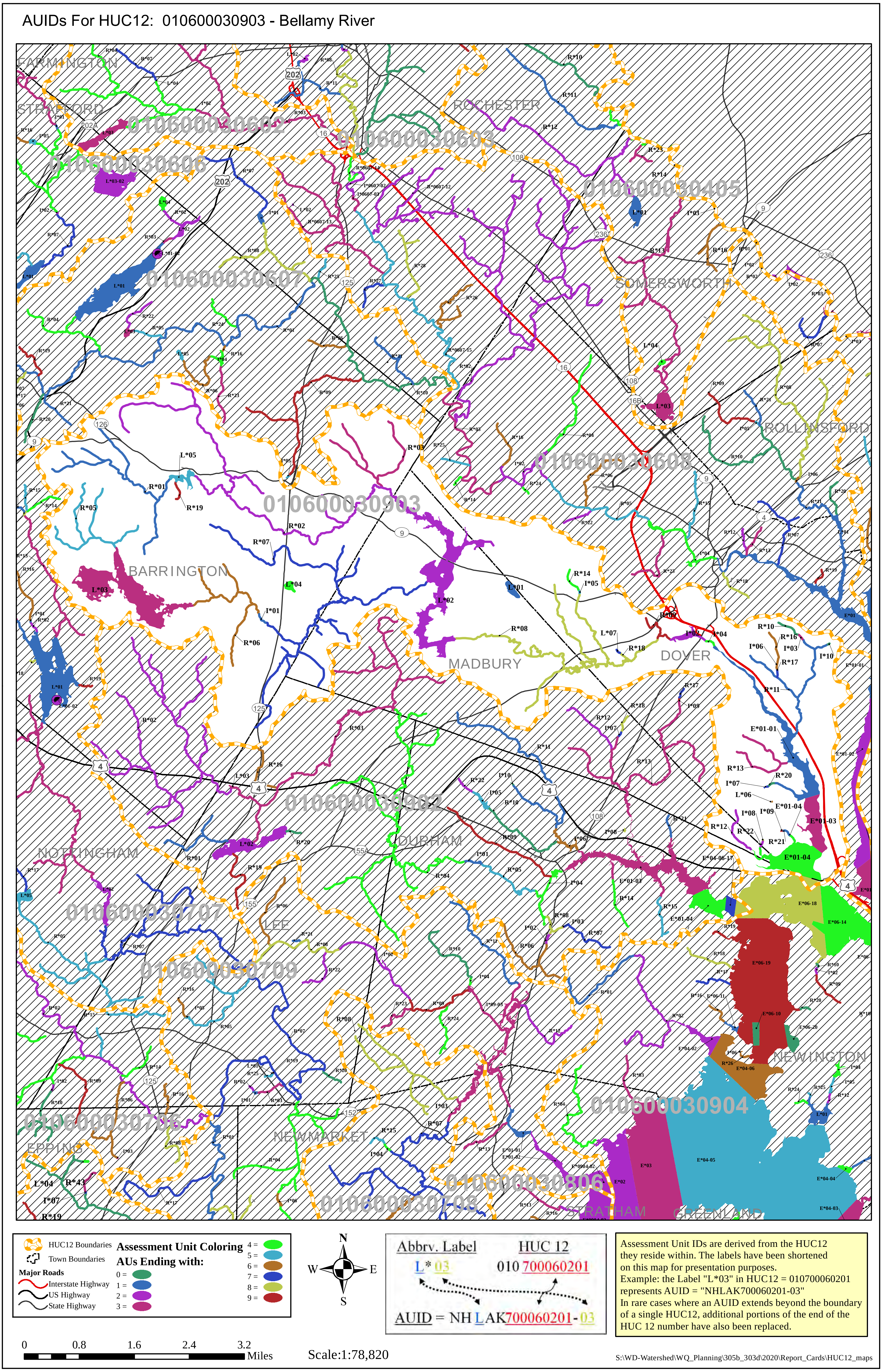
Good	Meets water quality standards/thresholds by a relatively large margin.
Marginal	Meets water quality standards/thresholds but only marginally.
Likely Good	Limited data available, however, the data that is available suggests that the parameter is Potentially Attaining Standards (PAS).
No Current Data	Insufficient information to make an assessment decision.
Likely Bad	Limited data available, however, the data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.
Poor	Not meeting water quality standards/thresholds. The impairment is marginal.
Severe	Not meeting water quality standards/thresholds. The impairment is more severe and causes poor water quality.



Assessment Unit ID	Map Label	Assessment Unit Name	Aquatic Life	Fish Consump.	Swimming	Boating
NHEST600030903-01-01	E*01-01	Bellamy River North		5-M	2-G	2-G
NHEST600030903-01-03	E*01-03	Bellamy River South Clement Point	5-P	5-M	2-G	2-G
NHEST600030903-01-04	E*01-04	Bellamy River South	5-P	5-M	2-G	2-G
NHIMP600030903-01	I*01	Bellamy River	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-02	I*02	Bellamy River - Sawyers Mill Dam Pond	5-M	4A-M	5-M	3-ND
NHIMP600030903-03	I*03	Canney Brook - Wildlife Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-04	I*04	Bellamy River Iv Dam	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-05	I*05	Knox Marsh Brook	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-06	I*06	Unnamed Brook - Thornwood Commons Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-07	I*07	Unnamed Brook - Bellamy River Wildlife Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-08	I*08	Unnamed Brook - Farm Pond	3-ND	4A-M	3-ND	3-ND
NHIMP600030903-09	I*09	Unnamed Brook - Webster Brook Dam	3-ND	4A-M	3-ND	3-ND

NHIMP600030903-10	I*10	Unnamed Brook - Farm Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-01	L*01	Barbadoes Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-02	L*02	Bellamy Reservoir	5-M	4A-M	3-ND	3-ND
NHLAK600030903-03	L*03	Swains Lake	5-P	4A-M	3-PAS	3-ND
NHLAK600030903-04	L*04	Winkley Pond	5-P	4A-M	3-ND	3-ND
NHLAK600030903-05	L*05	Branch Mallego Brook Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-06	L*06	Farm Pond	3-ND	4A-M	3-ND	3-ND
NHLAK600030903-07	L*07	Unnamed Pond	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-01	R*01	Madla Brook	5-M	4A-M	3-ND	3-ND
NHRIV600030903-02	R*02	Mallego Brook	5-P	4A-M	3-ND	3-ND
NHRIV600030903-03	R*03	Calef Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-05	R*05	Unnamed Brook - To Swains Lake	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-06	R*06	Bellamy River - Unnamed Brook	5-M	4A-M	3-ND	3-ND
NHRIV600030903-07	R*07	Bellamy River	5-P	4A-M	4A-P	4A-P
NHRIV600030903-08	R*08	Bellamy River - Kelly Brook - Knox Marsh Brook	5-P	4A-M	4A-P	3-PAS
NHRIV600030903-09	R*09	Bellamy River - Unnamed Brook	5-M	4A-M	4A-P	3-ND
NHRIV600030903-10	R*10	Canney Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-11	R*11	Varney Brook - Canney Brook	3-ND	4A-M	4A-P	4A-M
NHRIV600030903-12	R*12	Unnamed Brook - To Bellamy River Royalls Cove	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-13	R*13	Garrison Brook	3-ND	4A-M	4A-P	3-ND
NHRIV600030903-14	R*14	Knox Marsh Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-16	R*16	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-17	R*17	Varney Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-18	R*18	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-19	R*19	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-20	R*20	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-21	R*21	Unnamed Brook	3-ND	4A-M	3-ND	3-ND
NHRIV600030903-22	R*22	Unnamed Brook	3-ND	4A-M	3-ND	3-ND

AUIDs For HUC12: 010600030903 - Bellamy River



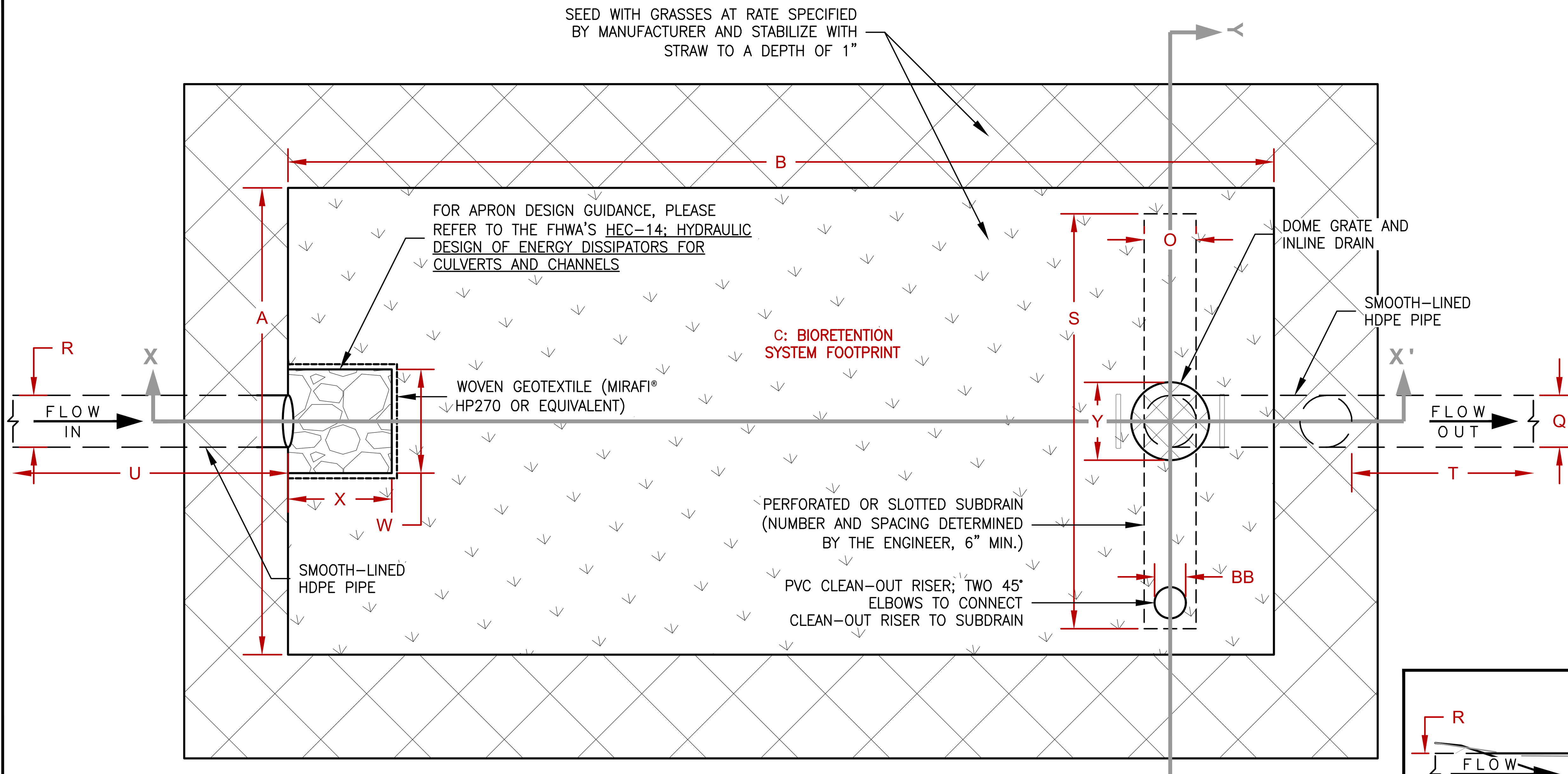
Assessment Unit ID: NHRIV600030903-02
Assessment Unit Name: Mallego Brook
Town(s) Primary Town is Listed First: Barrington, Madbury

Size: 9.5430 MILES
Assessment Unit Category: 5-P
Beach: N

2020/2022, 305(b)/303(d) - All Reviewed Parameters by Assessment Unit

Designated Use Description	Desig. Use Category	Parameter Name	Parameter Threatened (Y/N)	Last Sample	Last Exceed	Parameter Category	TMDL Priority
Aquatic Life Integrity	5-P	AMMONIA (TOTAL)	N	2016	N/A	3-PAS	
		Benthic-Macroinvertebrate Bioassessments (Streams)	N			3-ND	
		CHLORIDE	N	2019	N/A	3-PAS	
		DISSOLVED OXYGEN SATURATION	N	2019	2017	5-M	LOW
		Fishes Bioassessments (Streams)	N			3-PAS	
		OXYGEN, DISSOLVED	N	2019	2018	5-M	LOW
		PH	N	2019	2019	5-P	LOW
		TURBIDITY	N	2019	N/A	3-PAS	
Fish Consumption	4A-M	MERCURY - FISH CONSUMPTION ADVISORY	N			4A-M	
Potential Drinking Water Supply	2-G						
Primary Contact Recreation	3-ND	Escherichia coli	N			3-ND	
Secondary Contact Recreation	3-ND	Escherichia coli	N			3-ND	
Wildlife	3-ND						

Good	Marginal	Likely Good	No Current Data	Likely Bad	Poor	Severe
Meets water quality standards/thresholds by a relatively large margin.	Meets water quality standards/thresholds but only marginally.	Limited data available. The data that is available suggests that the parameter is Potentially Attaining Standards (PAS)	Insufficient information to make an assessment decision.	Limited data available The data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards.	Not meeting water quality standards/thresholds. The impairment is marginal.	Not meeting water quality standards/thresholds The impairment is more severe and causes poor water quality.

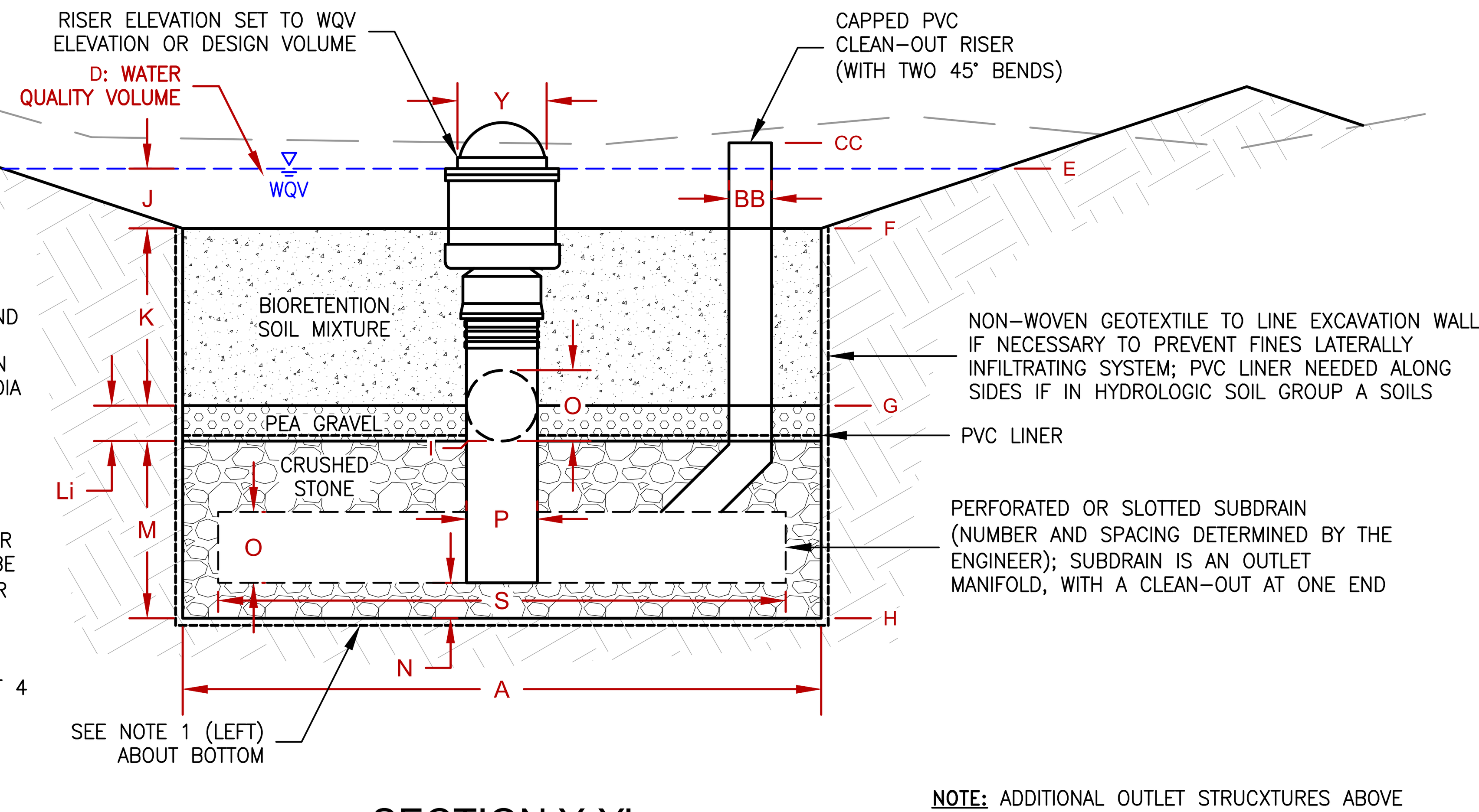


PLAN VIEW

NOTE 1: BOTTOM PERMEABILITY AND LINER
IF A NATIVE, LOW HYDRAULIC CONDUCTIVITY SOIL (k≤0.03ft/day) IS NOT PRESENT BELOW THE PEA GRAVEL ELEVATION, A LOW PERMEABILITY LINER OR SOIL SHOULD BE USED TO MINIMIZE INFILTRATION AND PRESERVE HORIZONTAL FLOW IN THE STONE. THIS LINER EXTENDS FROM THE BASE OF THE EXCAVATION TO ABOVE THE TOP OF THE BIORETENTION SOIL MEDIA LAYER. IF GEOTECHNICAL TESTS CONFIRM THE NEED FOR A LINER, ACCEPTABLE OPTIONS INCLUDE:

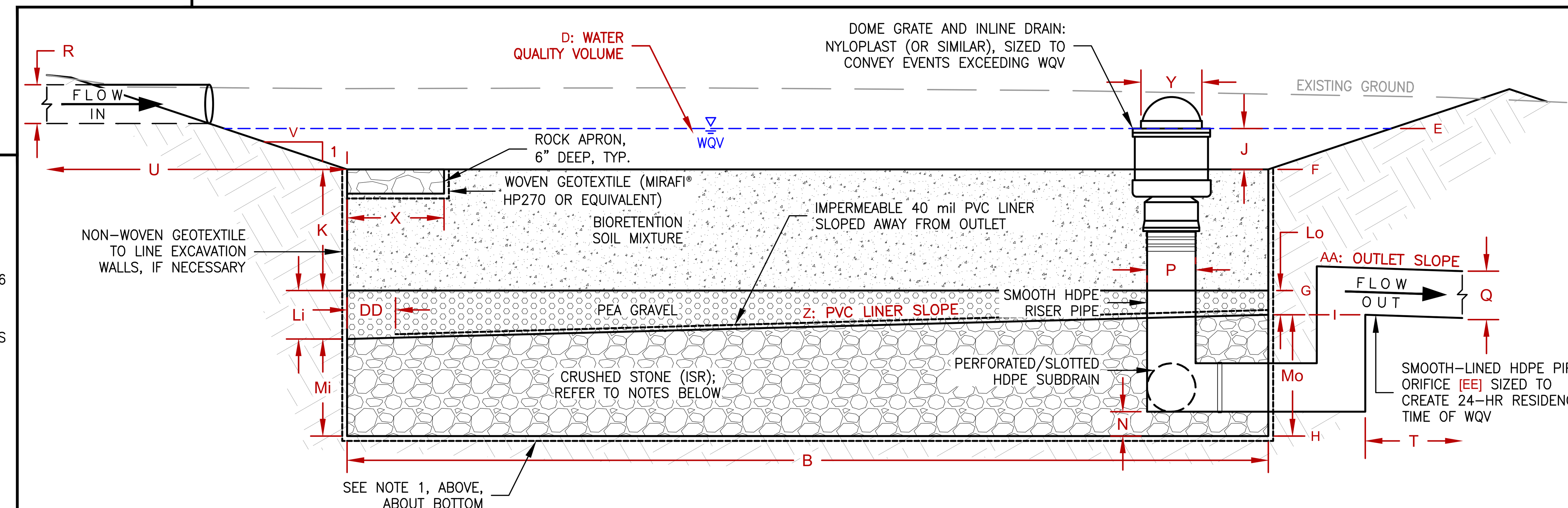
a. SOIL COMPACTION; 6–12 in CLAY SOIL (MINIMUM 15% PASSING THE #200 SIEVE AND A MAXIMUM PERMEABILITY OF 1x10–5 cm/s)
b. A 40 mil PVC LINER WITH SAND BEDDING AND/OR NON-WOVEN GEOTEXTILE. PVC LINERSEAMS MAY BE WELDED, TAPED (WATERPROOF ROOFING TAPE), OR OVERLAPPED (MINIMUM ONE FOOT). THE PERFORMANCE OBJECTIVE IS TO CREATE AND MAINTAIN AN ANAEROBIC ZONE IN THE STONE*
c. A BENTONITE LAYER WITH MINIMUM THICKNESS OF 4 in
d. USE OF CHEMICAL ADDITIVES (SEE NRCS AGRICULTURAL HANDBOOK #386, DATED 1961)
e. OR AN OTHERWISE PREPARED DESIGN BY A PROFESSIONAL ENGINEER

*IF ENGINEER BELIEVES THE PVC LINER IS AT RISK OF PUNCTURE, THE LINER MAY BE SANDWICHED BETWEEN NON-WOVEN GEOTEXTILE OR SAND (3 in THICKNESS)



SECTION Y-Y'

NOTE: ADDITIONAL OUTLET STRUCXTURES ABOVE THE ELEVATION OF THE WQV OR DESIGN VOLUME MAY BE NECESSARY TO CONVEY LARGE FLOWS.



SECTION X-X'

NOTES:

1. FOR FULL BIORETENTION STORMWATER SYSTEM SPECIFICATIONS, PLEASE REFER TO THE UNH STORMWATER CENTER'S BIORETENTION SPECIFICATIONS PUBLICATION, DATED FEBRUARY 2017, FOUND AT: https://www.unh.edu/unhsc/sites/default/files/media/unhsc_bsm_spec_2-28-17_0.pdf
2. SYSTEM FOOTPRINT NEED NOT BE RECTANGULAR. ANY SHAPE IS POSSIBLE. THESE DETAILS USE THE RECTANGULAR SHAPE AS AN EXAMPLE.
3. THESE DETAILS ARE NOT TO SCALE; FOR DIMENSIONS AND SPECIFICATIONS, REFERENCE EACH LETTER TO THE TABLE OF METRICS.
4. BIORETENTION SOIL MIX SHALL NOT BE PLACED UNTIL AFTER ENGINEERING APPROVAL AND INSPECTION OF SUBGRADE.
5. BIORETENTION SYSTEM IS RECOMMENDED TO HAVE PRETREATMENT (FOREBAY, SWALE, OR OTHER APPROVED STRUCTURE). PRETREATMENT IS REQUIRED FOR PROJECTS REQUIRING ALTERATION OF TERRAIN (AOT) PERMITTING.
6. PLANT THE SYSTEM AS SPECIFIED; AT A MINIMUM, SEED THE SYSTEM FLOOR AND SIDE SLOPES WITH RYE GRASS MIXTURE CONTAINING PERENNIAL AND WINTER RYES, AT A RATE SPECIFIED BY THE MANUFACTURER. STABILIZE THE SLOPES WITH STRAW TO A DEPTH OF 1".
7. GENERAL CONSTRUCTION GUIDELINES:
   7.1. VERIFY THAT NO FOREIGN OR DELETERIOUS MATERIAL OR LIQUID SUCH AS PAINT, PAINT WASHOUT, CONCRETE SLURRY, ASPHALT/CONCRETE LAYERS OR CHUNKS, CEMENT, PLASTER, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, SOLID WASTE, OR ACID HAS BEEN DEPOSITED IN PLANTING SOIL (BIORETENTION MEDIA OR LOAM ON SIDE SLOPES).
   7.2. PROCEED WITH PLACEMENT OF ANY SUBSURFACE MATERIALS ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
   7.3. COMPACT EACH BLENDED LIFT OF BIORETENTION SOIL MEDIA TO 75% OF MAXIMUM STANDARD PROCTOR DENSITY ACCORDING TO ASTM D698.
   7.4. GRADE SOIL MEDIA TO A SMOOTH, UNIFORM SURFACE PLANE WITH LOOSE, UNIFORMLY FINE TEXTURE. ROLL AND RAKE, REMOVE RIDGES, AND FILL DEPRESSIONS TO MEET FINISH GRADES.
   7.5. LIGHTLY COMPACT FINISHED FLOOR ELEVATION AND FINISHED SLOPES USING THE BUCKET OF AN EXCAVATOR, NON-MOTORIZED ROLLER, HAND TAMP, OR OTHER MEANS, THEN ROUGHEN SURFACE WITH A RAKE TO LOOSEN SOILS BEFORE SEEDING.
   7.6. DO NOT COMPACT THE SUBGRADE AT THE BOTTOM OF EXCAVATION UNLESS PERMEABILITY EXCEEDS $1x10^{-5}$ cm/s
8. BIORETENTION SOIL MEDIA (BSM) MIXTURE SPECIFICATIONS:
   8.1. STICKS AND ROOTS SHOULD BE MINIMIZED IN THE BSM MIXTURE, AND PREFERABLY LIMITED TO NOTHING LARGER THAN 4.76 mm (0.187 in).
   8.2. DEBRIS AND OTHER FOREIGN MATERIALS SHOULD BE MINIMIZED.
   8.3. ORGANIC MATTER SHOULD MAKE UP A MINIMUM OF 3% BY VOLUME AND A MAXIMUM 8% BY VOLUME OF THE BSM.
   8.4. BSM MIXTURE SHOULD HAVE A SOIL REACTION pH OF 6 TO 7.
   8.5. CATION EXCHANGE CAPACITY (CEC) OF BSM SHOULD BE A MINIMUM OF 10 meq PER 100 mL AT A pH OF 7.0.
9. IF BSM IS PURCHASED FROM A MANUFACTURER, BSM MIXTURE SHALL NOT CONTAIN THE FOLLOWING:
   9.1. UNACCEPTABLE MATERIALS: CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, PLASTER, BUILDING DEBRIS, ASPHALT, BRICKS, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, ACID, SOLID WASTE, OR OTHER EXTRANEOUS MATERIALS THAT ARE HARMFUL TO PLANTS.
   9.2. UNSUITABLE MATERIALS: STONES, ROOTS, PLANTS, SOD, CLAY LUMPS, OR POCKETS OF COARSE SAND THAT EXCEED A COMBINED MAXIMUM OF 5% BY DRY WEIGHT OF THE MANUFACTURED SOIL.
   9.3. LARGE MATERIALS: STONES, CLODS, ROOTS, CLAY LUMPS EXCEEDING 0.187 in (4.76 mm) IN ANY DIMENSION.
10. ORGANIC SOIL AMENDMENTS:
   10.1. NO COMPOST SHOULD BE USED IN THE PLANTING MIX (USED ON THE SIDE SLOPES AND SURROUNDING AREA) UNLESS SPECIFIED BY THE ENGINEER.
   10.1. SPHAGNUM PEAT: PARTIALLY DECOMPOSED SPHAGNUM PEAT MOSS, FINELY DIVIDED OR OF GRANULAR TEXTURE WITH 100% PASSING THROUGH A 1/2-in (13 mm) SIEVE, WITH A pH OF 3.4 TO 4.8.
   10.2. WOOD DERIVATIVES: SHREDDED WOOD, WOOD CHIPS, GROUND BARK, OR WOOD WASTE; OF UNIFORM TEXTURE AND FREE OF STONES, STICKS, SOIL, OR TOXIC MATERIAL.
11. THE CRUSHED STONE LAYER SHOULD CONSIST OF AASHTO #5 STONE (3/4-in).
12. THE VOLUME OF WATER CONTAINED ABOVE THE BSM ELEVATION AND BELOW THE HIGH FLOW SPILLWAY IS STATISTICALLY DESIGNED TO HOLD A SPECIFIC RUNOFF VOLUME.
13. THE DESIGN VOLUME ABOVE THE BSM IS PREFERABLY THE WQV. THIS VOLUME MAY NOT BE ACHIEVABLE FOR RETROFIT INSTALLATIONS

BIORETENTION SYSTEM DESIGN METRICS

ID	DESIGN PARAMETER	MIN	DESIGN	UNITS
A	SYSTEM FLOOR WIDTH			FT
B	SYSTEM FLOOR LENGTH			FT
C	BIORETENTION FOOTPRINT AREA			SF
D	WATER QUALITY VOLUME			CF
E	WQV AND RISER CAP ELEVATION			FT
F	SYSTEM FLOOR ELEVATION			FT
G	BOTTOM BSM ELEVATION			FT
H	BOTTOM STONE ELEVATION			FT
I	TOP STONE/OUTLET INVERT ELEVATION			FT
J	WQV PONDING DEPTH			IN
K	BSM MEDIA DEPTH	18		IN
Li	INLET END PEA GRAVEL DEPTH			IN
Lo	OUTLET END PEA GRAVEL DEPTH	3		IN
Mi	INLET END CRUSHED STONE DEPTH			IN
Mo	OUTLET END CRUSHED STONE DEPTH	14		IN
N	SUBDRAIN DEPTH ABOVE BOTTOM	4		IN
O	PERFORATED SUBDRAIN DIAMETER	6		IN

BIORETENTION SYSTEM DESIGN METRICS

ID	DESIGN PARAMETER	MIN	DESIGN	UNITS
P	RISER PIPE DIAMETER	6		IN
Q	OUTLET PIPE DIAMETER	6		IN
R	INFLOW PIPE DIAMETER			IN
S	PERFORATED SUBDRAIN LENGTH			FT
T	OUTLET PIPE LENGTH			FT
U	INFLOW PIPE LENGTH			FT
V	SLOPE GRADE (RUN PER 1ft RISE)			FT
W	ROCK APRON WIDTH			FT
X	ROCK APRON LENGTH			FT
Y	RISER DOME GRATE DIAMETER			IN
Z	PVC LINER SLOPE			%
AA	OUTLET PIPE SLOPE			%
BB	CLEAN-OUT RISER DIAMETER			IN
CC	CLEAN-OUT RISER ELEVATION			FT
DD	PVC LINER GAP	0.1*B		FT
EE	OUTLET PIPE ORIFICE DIAMETER	1		IN

ACCEPTABLE PARTICLE SIZE DISTRIBUTION OF FINAL BIORETENTION SOIL MIX

MEDIA TYPE	SIEVE #	SIZE (in)	SIZE (mm)	% PASSING
COARSE SAND	4	0.187	4.76	100
MEDIUM SAND	10	0.079	2.00	95
FINE SAND	40	0.017	0.42	40–15
SILTS	200	0.003	0.075	10–20
CLAYS	<200	PAN	PAN	0–5

BIORETENTION SOIL MEDIA COMPONENTS:*

– AMOUNTS MIXED BY TOTAL VOLUME
- 60–85% – SAND (0.5 TO 2.0 mm) (SEE SPECS ABOVE)
- 15–25% – LOAM OR TOPSOIL
- 3–8% – ORGANIC MATTER
- 0–5% – WATER TREATMENT RESIDUALS OR IRON FILINGS**

*ALTERNATELY, USE MEDIA SPECIFIED IN THE ALTERATION OF TERRAIN RULES, Env-Wq 1508.07(k)
**THIS IS AN AMENDMENT USED FOR ENHANCED PHOSPHORUS ADSORPTION

INTERNAL STORAGE RESERVOIR (ISR) NOTES:

- THE HYBRID BIORETENTION SYSTEM HARBORS AN ANAEROBIC INTERNAL STORAGE RESERVOIR FOR NITROGEN REMOVAL.
- THE ISR IS SEPARATED BY AN IMPERMEABLE PVC LINER BETWEEN THE PEA GRAVEL AND CRUSHED STONE LAYERS.
- THE PVC LINER SLOPES FROM THE OUTLET TOWARDS THE INLET TO MAXIMIZE STORAGE RETENTION AND PROVIDE EXTRA TREATMENT/FILTER TIME VIA PLUG FLOW THROUGH CRUSHED STONE.
- DESIGN GUIDELINES FOR THE SUBSURFACE GRAVEL WETLAND SPECIFICATIONS (UNHSC, 2016) IDENTIFIED THAT THE WATER VOLUME IN THE ISR BE AT LEAST 0.26*WQV [WATER QUALITY VOLUME], OR 26% OF THE WQV.
- PVC LINER THICKNESS OF 40 TO 60 mil, PREFERABLY SEAMLESS. IF SEAMS ARE UNAVOIDABLE, THE SEAMS SHOULD BE SEALED.

UNIVERSITY OF NEW HAMPSHIRE
STORMWATER CENTER

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Phone (603) 862-2818
Fax (603) 862-3957
http://www.unh.edu/unhsc

No.	Date	Revision
02	10 Sept 2019	DES Revisions
01	12 Mar 2019	Initial design

Designed:	Checked:	Approved:
JCB	TPB/JJH	TPB/JJH

GRAPHIC SCALE
N/A - DRAWING NOT TO SIZE
Original Drawing Size = 34 x 22 in.

Project:
STANDARD DETAIL BIORETENTION ISR
STORMWATER SYSTEM

Date: 21 FEB 2020

SWPPP Cut Sheet:

Filtrexx® Inlet Protection

Sediment & Perimeter Control Technology

PURPOSE & DESCRIPTION

Filtrexx® Inlet protection is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for storm drain **inlet protection** of sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons) on and around construction activities.

APPLICATION

Drain inlets are located in areas that receive runoff from surrounding lands, often exposed and disturbed soils, and are located at a low point, or in a sump. Inlet protection used around drain inlets (or *Drain* Inlet protection) should completely enclose the circumference of the drain and where possible should not be placed on a grade or slope. Inlet protection used around drain inlets should never be the only form of site sediment control and should be accompanied by erosion control/slope stabilization practices, such as Slope protection or rolled erosion control blankets (RECB). Inlet protection should never be placed where they divert runoff flow from the drain inlet, or on top of the inlet, which can cause flooding. Under high runoff and sediment loading conditions placement of 1-2 in (25-50 mm) diameter rock (AASHTO #2) may be placed around the outer circumference of the Inlet protection up to ½ the height of the Inlet protection. This will slow runoff velocity as it contacts the Inlet protection and will reduce sediment build-up and clogging of the Inlet protection.

Curb inlets are generally located on paved surfaces and are designed to rapidly drain storm runoff from roadways to prevent flooding that poses a hazard to vehicular traffic. Inlet protection devices should be placed in a manner which intercepts runoff prior to entering the inlet, but does not block or divert runoff from the inlet. To prevent diversion of runoff, Inlet protection used around curbs (or *Curb* Inlet protection) should be used in low points, or sumps, and minor slopes or grades. Inlet protection should never be placed in or on the curb inlet drain, or placed in a manner than obstructs vehicular traffic. Inlet protection height should be at least 1 in (25 mm) lower than top of curb inlet to allow for overflow into the drain and not over the curb. Maximum sediment removal efficiency occurs when minor ponding exists behind Inlet protection but should never lead to flooding.

Curb sediment containment systems are used to reduce the sediment and pollutant load flowing to a curb inlet. They are generally placed on paved surfaces perpendicular to runoff flow and should be lower than the height of the curb. Curb sediment containment systems should never cause flooding or placed where they are a hazard to vehicular traffic. Inlet protection used for curb sediment containment (or *Curb Sediment Containment* Inlet protection) can be placed on a grade but should never be placed directly upslope from curb inlet where it may inadvertently divert runoff from entering curb inlet.

INSTALLATION

1. Inlet protection used for inlet protection to reduce sediment and soluble pollutants entering storm drains shall meet Filtrexx® FilterSoxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be a Filtrexx® Certified™ Installer as determined by Filtrexx® International, LLC (440-926-2607 or visit web site at Filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application (current list of installers can be found at www.filtrexx.com). Look for the Filtrexx® Certified™ Installer Seal.

3. Filtrexx® Inlet protection shall be placed at locations indicated on plans as directed by the Engineer. Inlet protection should be installed in a pattern that allows complete protection of the inlet area.
4. Installation of curb Inlet protection will ensure a minimal overlap of at least 1 ft (300mm) on either side of the opening being protected. The Inlet protection will be anchored to the soil behind the curb using staples, stakes or other devices capable of holding the Inlet protection in place.
5. Standard Inlet protection for curb inlet protection and curb sediment containment will use 8 in (200mm) diameter Inlet protection, and drain inlets on soil will use 12 in (300mm) or 18 in (450mm) diameter Inlet protection. In severe flow situations, larger Inlet protection may be specified by the Engineer. During curb installation, Inlet protection shall be compacted to be slightly shorter than curb height.
6. If Inlet protection becomes clogged with debris and sediment, they shall be maintained so as to assure proper drainage and water flow into the storm drain. In severe storm events, overflow of the Inlet protection may be acceptable in order to keep the area from flooding.
7. Curb and drain Inlet protection shall be positioned so as to provide a permeable physical barrier to the drain itself, allowing sediment to collect on the outside of the Inlet protection.
8. For drains and inlets that have only curb cuts, without street grates, a spacer is required in order to keep the Inlet protection away from the drain opening. This spacer should be a hog wire screen bent to overlap the grate opening and keep the sock from falling into the opening. Use at least one spacer for every 4 ft (1.2m) of curb drain opening. The wire grid also prevents other floatable waste from passing over the Inlet protection.
9. Stakes shall be installed through the middle of the drain Inlet protection on 5 ft (1.5m) centers, using 2 in (50mm) x 2 in (50mm) x 3 ft (1m) wood stakes.
10. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.

INSPECTION AND MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Inlet protection should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Inlet protection may be required or sediment removal may be necessary. Inlet protection shall be inspected until contributing drainage area has been permanently stabilized and construction activity has ceased

1. The Contractor shall maintain the Inlet protection in a functional condition at all times and it shall be routinely inspected.
2. If the Inlet protection has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Inlet protection when accumulation has reached 1/2 of the effective height of the Inlet protection, or as directed by the Engineer. Alternatively, for drain Inlet protection a new Soxx™ may be placed on top of the original increasing the sediment storage capacity without soil disturbance.
4. Inlet protection shall be maintained until disturbed area above or around the device has been permanently stabilized and construction activity has ceased.
5. Regular maintenance includes lifting the Inlet protection and cleaning around and under them as sediment collects.
6. The FilterMedia™ will be removed from paved areas or dispersed on site soil or behind curb once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.

Table 2.4 Spacing for Curb Sediment Containment Systems.

Grade (%)	Spacing (ft)	Spacing (mm)
0.5	100	30
1.0	50	15
2.0	25	8
3.0	16	5
4.0	13	4
5.0	10	3

Source: Fifield, 2001.

Figure 2.1. Engineering Design Drawing for Curb and Drain Inlet Protection

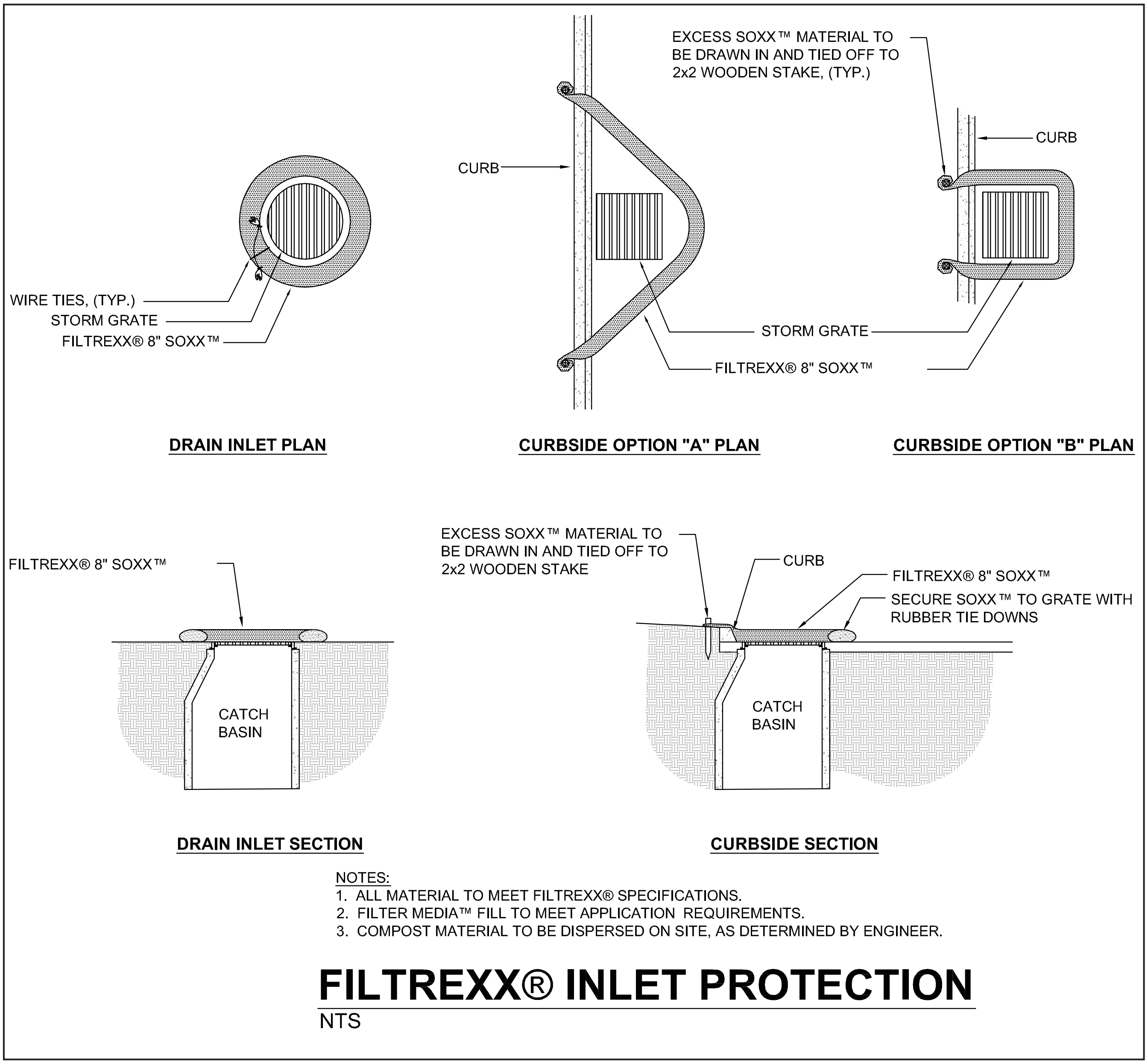
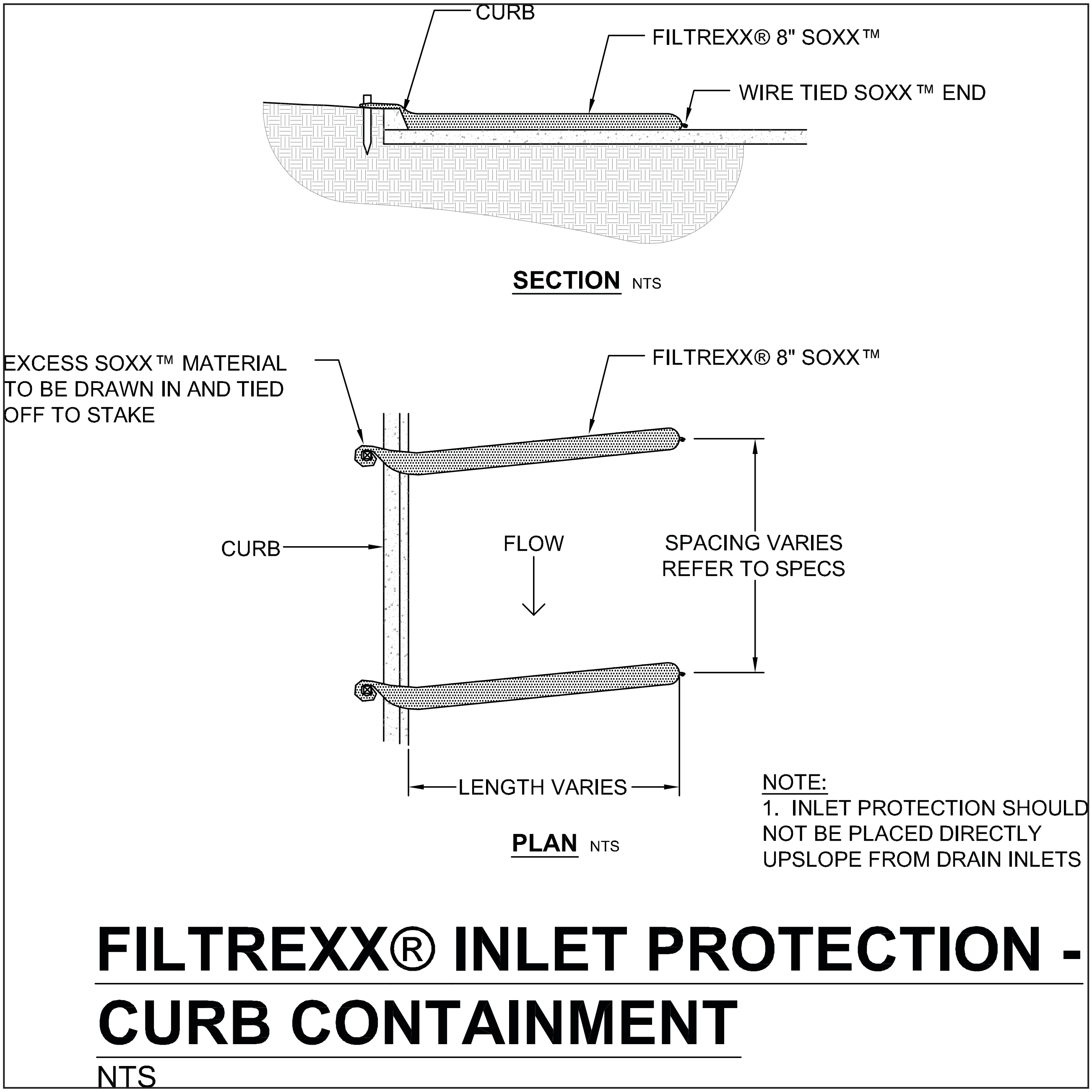


Figure 2.2. Engineering Design Drawing for Curb Sediment Containment Inlet Protection



SWPPP Cut Sheet:

Filtrexx® Sediment Control

Sediment & Perimeter Control Technology

PURPOSE & DESCRIPTION

Filtrexx® Sediment control is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for **perimeter control** of sediment and other soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities.

APPLICATION

Filtrexx® Sediment control is to be installed down slope of any disturbed area requiring erosion and sediment control and filtration of soluble pollutants from runoff. Sediment control is effective when installed perpendicular to sheet or low concentrated flow. Acceptable applications include:

- Site perimeters
- Above and below disturbed areas subject to sheet runoff, interrill and rill erosion
- Above and below exposed and erodable slopes
- Around area drains or inlets located in a 'sump'
- On compacted soils where trenching of silt fence is difficult or impossible
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation.
- On frozen ground where trenching of silt fence is impossible.
- On paved surfaces where trenching of silt fence is impossible.

INSTALLATION

1. Sediment control used for perimeter control of sediment and soluble pollutants in storm runoff shall meet Filtrexx® Soxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
2. Contractor is required to be Filtrexx® Certified™, or use pre-filled Filtrexx® Sediment control products manufactured by a Filtrexx® Certified Manufacturer™ as determined by Filtrexx® International, LLC (440-926-2607 or visit www.filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application. Look for the Filtrexx® Certified™ Seal.
3. Sediment control will be placed at locations indicated on plans as directed by the Engineer.
4. Sediment control should be installed parallel to the base of the slope or other disturbed area. In extreme conditions (i.e., 2:1 slopes), a second Sediment control shall be constructed at the top of the slope.
5. Effective Soxx™ height in the field should be as follows: 8" Diameter Sediment control = 6.5" high, 12" Diameter Sediment control = 9.5" high, 18" Diameter SiltSoxx™ = 14.5" high, 24" Diameter Sediment control = 19" high.
6. Stakes shall be installed through the middle of the Sediment control on 10 ft (3m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) hard wood stakes. In the event staking is not possible, i.e., when Sediment control is used on pavement, heavy concrete blocks shall be used behind the Sediment control to help stabilize during rainfall/runoff events.
7. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
8. Loose compost may be backfilled along the upslope side of the Sediment control, filling the seam between the soil surface and the device, improving filtration and sediment retention.
9. If the Sediment control is to be left as a permanent filter or part of the natural landscape, it may be seeded at time of installation for

establishment of permanent vegetation. The Engineer will specify seed requirements.

10. Filtrexx® Sediment control is not to be used in perennial, ephemeral, or intermittent streams.

See design drawing schematic for correct Filtrexx® Sediment control installation (Figure 1.1).

INSPECTION AND MAINTENANCE

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Sediment control should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Sediment control may be required to reduce effective slope length or sediment removal may be necessary. Sediment control shall be inspected until area above has been permanently stabilized and construction activity has ceased

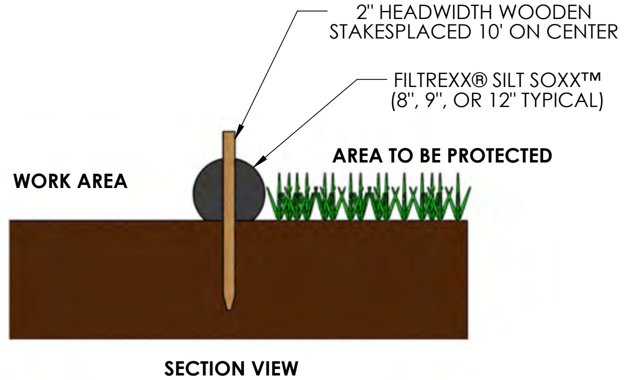
1. The Contractor shall maintain the Sediment control in a functional condition at all times and it shall be routinely inspected.
2. If the Sediment control has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the Sediment control when accumulation has reached 1/2 of the effective height of the Sediment control, or as directed by the Engineer. Alternatively, a new Sediment control can be placed on top of and slightly behind the original one creating more sediment storage capacity without soil disturbance.
4. Sediment control shall be maintained until disturbed area above the device has been permanently stabilized and construction activity has ceased.
5. The FilterMedia™ will be dispersed on site once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
6. For long-term sediment and pollution control applications, Sediment control can be seeded at the time of installation to create a vegetative filtering system for prolonged and increased filtration of sediment and soluble pollutants (contained vegetative filter strip). The appropriate seed mix shall be determined by the Engineer.

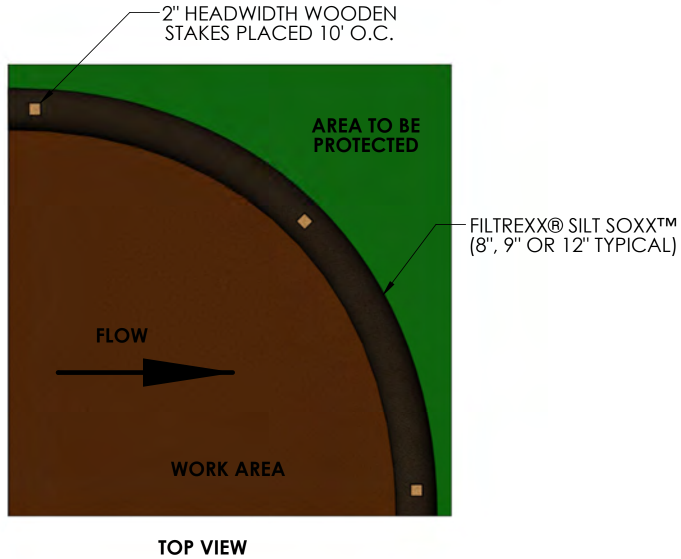
Slope Percent	Maximum Slope Length Above Sediment Control in Feet (meters)*				
	8 in (200 mm) Sediment control	12 in (300 mm) Sediment control	18 in (450 mm) Sediment control	24 in (600mm) Sediment control	32 in (800mm) Sediment control
	6.5 in (160 mm)**	9.5 in (240 mm) **	14.5 in (360 mm) **	19 in (480 mm) **	26 in (650 mm) **
2 (or less)	600 (180)	750 (225)	1000 (300)	1300 (400)	1650 (500)
5	400 (120)	500 (150)	550 (165)	650 (200)	750 (225)
10	200 (60)	250 (75)	300 (90)	400 (120)	500 (150)
15	140 (40)	170 (50)	200 (60)	325 (100)	450 (140)
20	100 (30)	125 (38)	140 (42)	260 (80)	400 (120)
25	80 (24)	100 (30)	110 (33)	200 (60)	275 (85)
30	60 (18)	75 (23)	90 (27)	130 (40)	200 (60)
35	60 (18)	75 (23)	80 (24)	115 (35)	150 (45)
40	60 (18)	75 (23)	80 (24)	100 (30)	125 (38)
45	40 (12)	50 (15)	60 (18)	80 (24)	100 (30)
50	40 (12)	50 (15)	55 (17)	65 (20)	75 (23)

* Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr (25 mm/24 hr) rain event.

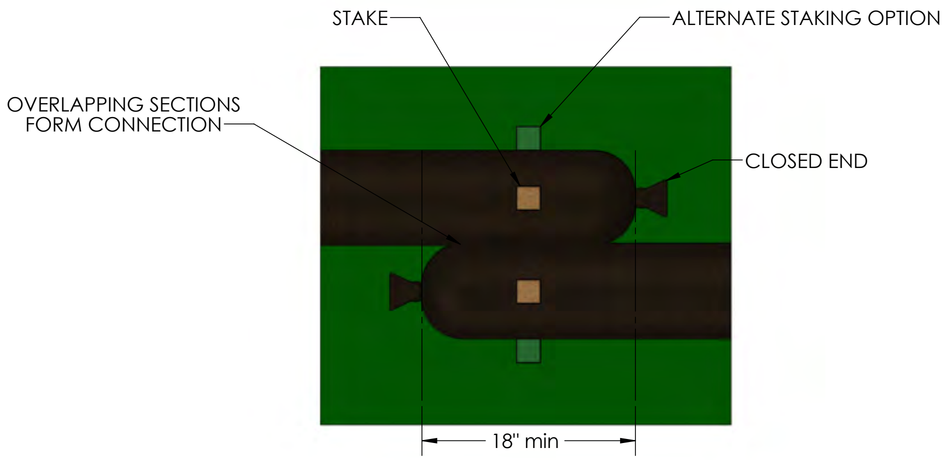
** Effective height of Sediment control after installation and with constant head from runoff as determined by Ohio State University.

FILTREXX® SILT SOXX™

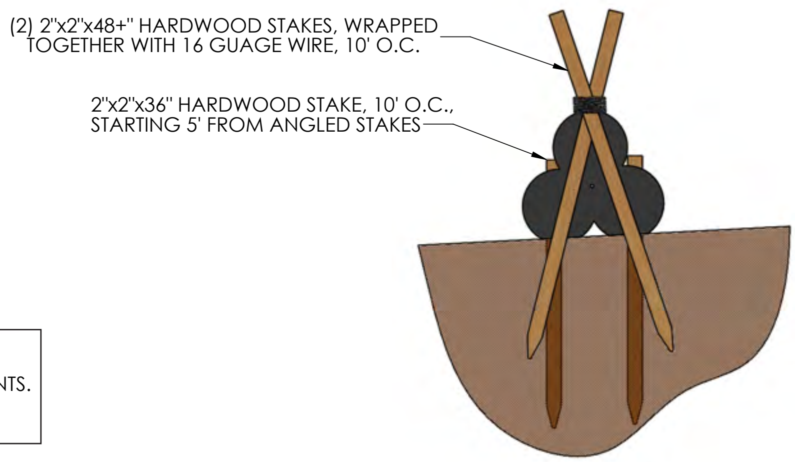




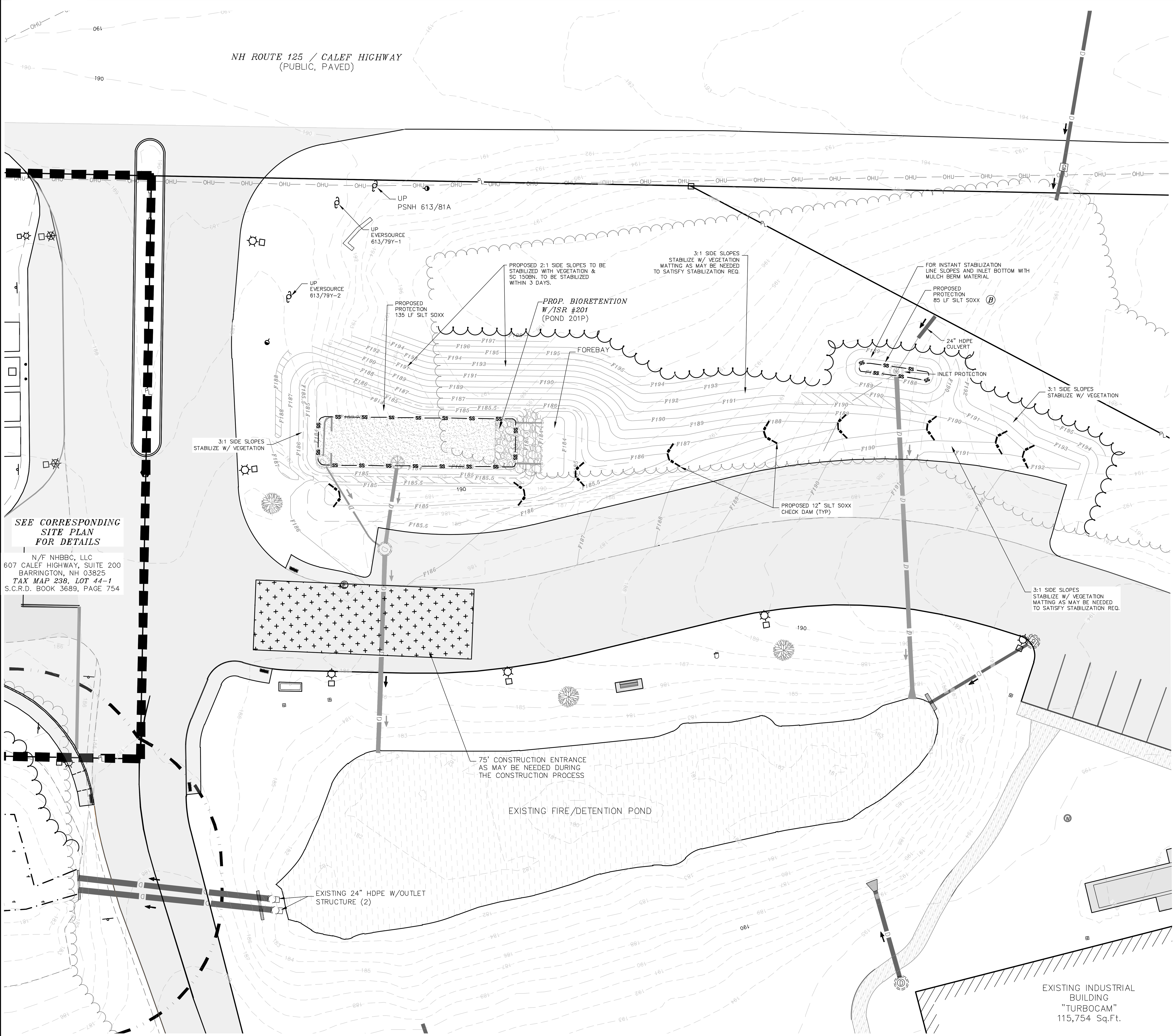
COMPOST SOCK CONNECTION/ATTACHMENT DETAIL



FILTREXX® PYRAMID STAKING DETAIL



NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

STABILIZATION NOTE:
SEE NOTE #6, SHEET E-102, DETAIL E-18
SIDE SLOPES ARE TO BE STABILIZED WITHIN THREE WORKING DAY UPON COMPLETION OF FINAL GRADE.

NOTES:

1.) OWNER: VIRTUOUS REALTY, LLC
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

1A.) APPLICANT: TURBOCAM, INC.
607 CALEF HIGHWAY, SUITE 200
BARRINGTON, NH 03825

2.) TAX MAP 238, LOT 44

3.) LOT AREA: 1,217,250 Sq.Ft., 27.94 Ac.

4.) S.C.R.D. BOOK 2948, PAGE 332

5.) EROSION AND SEDIMENT CONTROL INSPECTIONS TO BE CONDUCTED ONCE PER EVERY SEVEN DAYS AND AT AN INCREASED FREQUENCY INCLUDING WITHIN 24-HOURS OF A 0.25 INCH RAIN EVENT. INSPECTIONS TO BE CONDUCTED BY A "QUALIFIED PERSON" AS DEFINED BY EPA CGP 4.1.1 AND INSPECTION REPORTS SUBMITTED O THE TOWN OF BARRINGTON, LAND USE DEPARTMENT WITHIN 24 HOURS IN ACCORDANCE WITH CGP 4.1.7 AND MAINTAINED BY THE OWNER FOR A PERIOD OF THREE YEARS AFTER THE PROJECT IS COMPLETED.

6.) PER EPA CGP Z.1.2.2 (INSTALL PERIMETER CONTROL), "YOU MUST INSTALL SEDIMENT CONTROLS ALONG THOSE PERIMETER AREAS OF YOUR SITE THAT WILL RECEIVE STORMWATER FROM EARTH DISTURBING ACTIVITIES." AS A RESULT OF SWPPP INSPECTIONS, THE CONTRACTOR MAY HAVE TO EXPAND PERIMETER CONTROLS TO MEET THIS REQUIREMENT. THE E&SC PLAN IS INITIAL GUIDANCE AS TO THE ANTICIPATED REQUIREMENTS AND IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT STORMWATER VIOLATIONS DO NOT OCCUR.

7.) CONTRACTOR IS REQUIRED TO HAVE A CONSTRUCTION ENTRANCE 3" ANGULAR STONE IS REQUIRED.

8.) CONTRACTOR IS RESPONSIBLE FOR SWEEPING THE DRIVEWAY TO ENSURE THAT NO SEDIMENT IS BEING TRACKED ONTO CALEF HIGHWAY OR THE REMAINDER OF THE EXISTING TURBOCAM SITE.

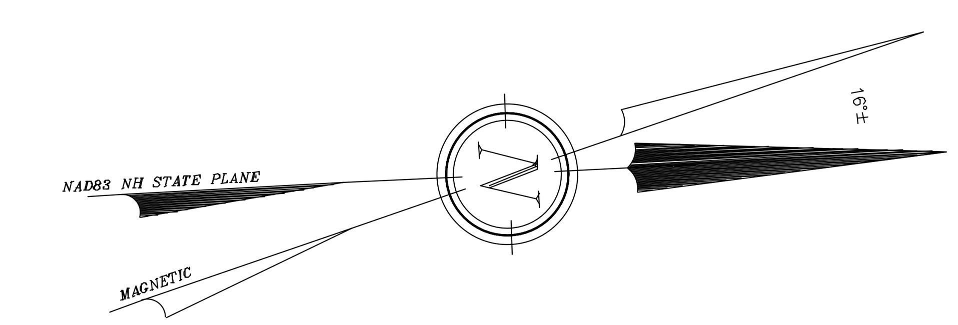
9.) CONTRACTOR IS RESPONSIBLE FOR CLEANING AND MAINTAINING THE INLET PROTECTION ONCE INSTALLED.

10.) FUGITIVE DUST IS TO BE CONTROLLED THROUGHOUT THE CONSTRUCTION PROCESS IN ACCORDANCE WITH ENV-A 1000.

11.) CONTRACTOR IS TO MEET THE REQUIREMENTS SPECIFIED IN RSA 430:51-57 AND AGR 3800, RELATING TO INVASIVE SPECIES.

12.) CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE WATER QUALITY FROM ANY RUNOFF DURING THE CONSTRUCTION PROCESS, IN ACCORDANCE WITH ENV-WQ 1507, IN ORDER TO PREVENT VIOLATIONS OF THE STORMWATER QUALITY STANDARDS.

13.) CONTRACTOR CAN USE SILT FENCE, SILT SOXX OR MULCH BERM FOR PERIMETER CONTROL. SPECIFIC PRACTICES MAY BE SPECIFIED, SEE PLAN. SILT FENCE OR SILT SOXX REQUIRED WHEN UPGRADIENT DISTURBED SOIL IS GREATER THAN 5%. MULCH BERM CAN BE USED WHEN THE UPGRADIENT DISTURBED SOIL IS 5% OR LESS.



SOILS & DEWATERING:

313	DEERFIELD	LOAMY SAND	K= 0.15
12	HINCKLEY	LOAMY SAND	K= 0.17
26	WINDSOR	LOAMY SAND	K= 0.17

SEE SITE SPECIFIC SOILS MAP (SSSM)
SEE WEBSOIL USDA-NRCS
ERODIBILITY FACTOR - K, CPESC MANUAL, ENVIROCERT INTERNATIONAL INC. & ROCKINGHAM COUNTY SOIL SURVEY, ROCKWEB SOIL ATTRIBUTES.

CONTRACTOR TO BE AWARE OF THE SOIL PROFILES AND ENSURE THAT PROPER EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE TAKEN AT ALL TIMES. ANY DEWATERING REQUIREMENTS IN NEW HAMPSHIRE REQUIRE SPECIAL PROVISIONS IN ACCORDANCE WITH THE "CLARIFICATION OF SECTION 9.1.2 (STATE OF NEW HAMPSHIRE CONDITIONS) AND OTHER NH SPECIFIC INFORMATION FOR THE U.S. EPA 2022 NPDES CONSTRUCTION GENERAL PERMIT (CGP)" DATED FEBRUARY 17, 2022 INCLUDED IN THE SWPPP.

COVER MANAGEMENT DURING CONSTRUCTION FOR EXPOSED SOIL WILL INCLUDE HAY / STRAW APPLIED AT A RATE OF 2.0 TONS PER ACRE, TEMPORARY SEEDING OF ANNUAL RYE GRASS, AND PERMANENT SEEDING AT THE EARLIES OPPORTUNITY. SEE ADDITIONAL REQUIREMENT FOR STABILIZATION ON THE EROSION AND SEDIMENT CONTROL DETAIL SHEETS, E-101 AND E-102.

THE CONSTRUCTION SCHEDULE WILL BE MANAGED SO THAT ALL STORMWATER STRUCTURES WILL BE BUILT AND STABILIZED PRIOR TO RECEIVING SURFACE WATER RUNOFF. CONTRACTOR TO BE RESPONSIBLE FOR ALL DIVERSIONS DURING CONSTRUCTION AND FOR INTERIM SEDIMENT AND EROSION CONTROL MEASURES.

LEGEND:

GRANITE/CONCRETE BOUND ~FND~
PROPOSED CATCH BASIN W/ STRUCTURE
PROPOSED STORMWATER BMP OUTLET STRUCTURE
TEMPORARY BENCHMARK (T.B.M.)
E101 E6 DETAIL SHEET / DETAIL
POORLY DRAINED JURISDICTIONAL WETLAND
50' WETLAND BUFFER
176 CONTOUR MINOR, EXISTING
175 CONTOUR MAJOR, EXISTING
F176 CONTOUR MINOR, PROPOSED
F175 CONTOUR MAJOR, PROPOSED
CENTER LINE
EXISTING DRAINAGE LINE
PROPOSED DRAINAGE LINE
RIP RAP
STORMWATER BEST MANAGEMENT PRACTICE (BMP)
BERM
SF SILT FENCE / EROSION MIX BERM
SS FILTREXX 8" - 12" SILT SOXX AS SPECIFIED
C ORANGE CONSTRUCTION PERIMETER FENCE
P/C PERIMETER CONTROL
B STORMWATER BMP PROTECTION
P PERIMETER CONTROL
C RESIDENTIAL/ROADWAY CONSTRUCTION

FOR TOWN APPROVAL PURPOSES :

THE SITE REVIEW REGULATIONS OF THE TOWN OF BARRINGTON ARE A PART OF THIS PLAN, AND APPROVAL OF THIS PLAN IS CONTINGENT UPON COMPLETION OF ALL REQUIREMENTS OF SAID SITE REVIEW REGULATIONS, EXCEPTING ONLY MODIFICATIONS MADE IN WRITING BY THE BOARD AND ATTACHED HERETO.

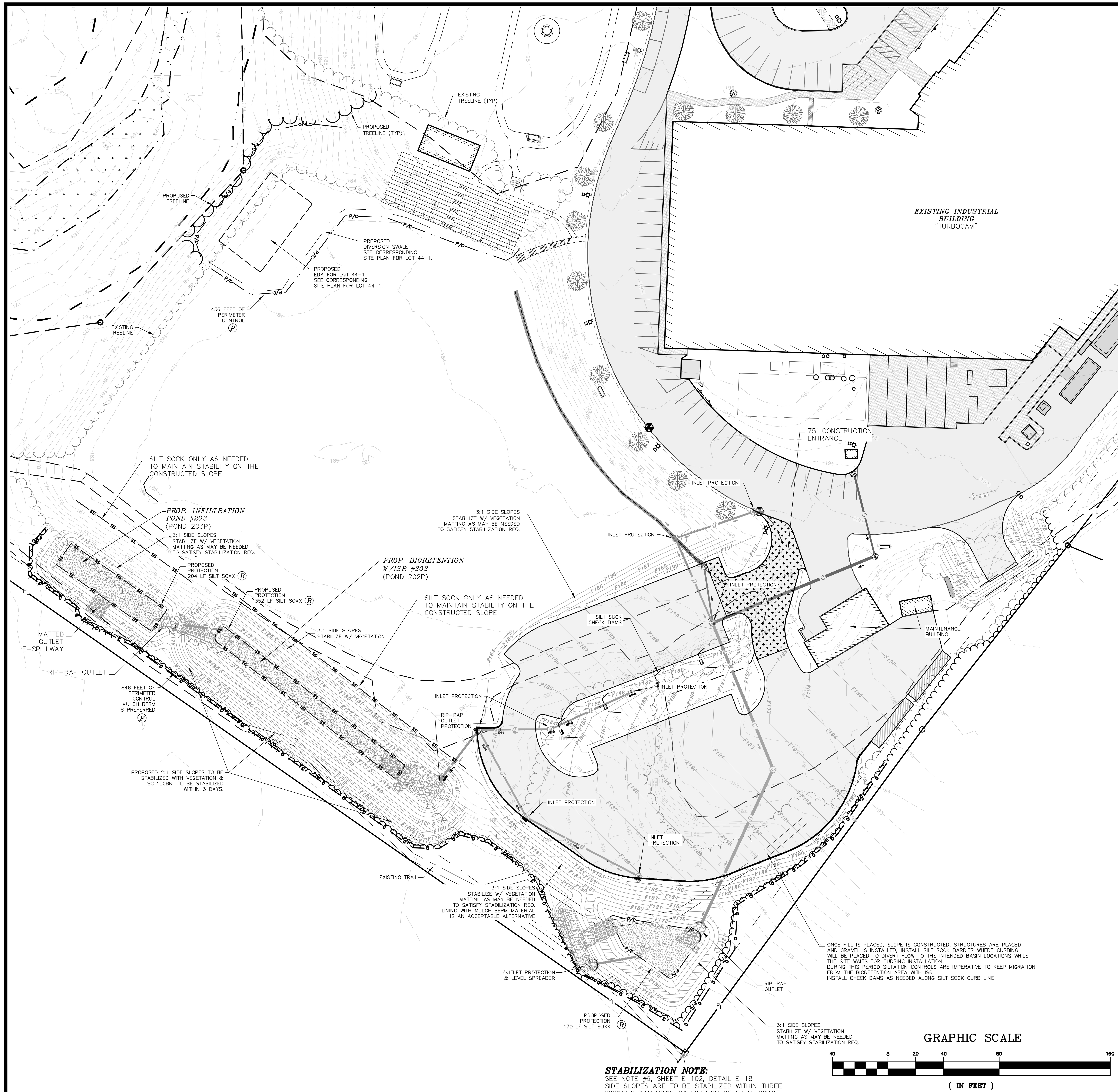
REVISION	DATE	DESCRIPTION

EROSION AND SEDIMENT CONTROL PLAN
FOR
TURBOCAM, INC.
LAND OF
VIRTUOUS REALTY, LLC
NH ROUTE 125/CALEF HIGHWAY
BARRINGTON, N.H.
TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
335 SECOND CROWN POINT ROAD
BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 20 FT.
DATE : APRIL 17, 2024
FILE NO. : DB 2023 - 017

STATE OF NEW HAMPSHIRE
KENNETH A. BERRY No. 14243
LICENSED
PROFESSIONAL ENGINEER



STABILIZATION NOTE:
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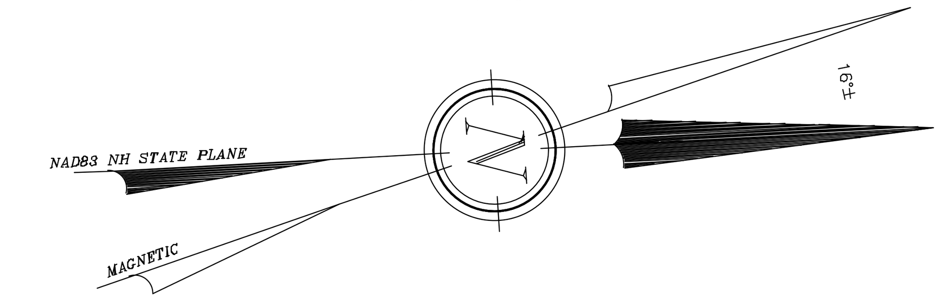

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SEE SITE SPECIFIC SOILS MAP (SSSM)
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NH ROUTE 125/CALEF HIGHWAY
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TAX MAP 238, LOT 44

BERRY SURVEYING & ENGINEERING
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BARRINGTON, NH 03825 (603)332-2863

SCALE : 1 IN. EQUALS 40 FT.
DATE : APRIL 17, 2024
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STATE OF NEW HAMPSHIRE
KENNETH A. BERRY
No. 14243
LICENSED
PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION