FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT (FGEIS)
DOLSONTOWN CORRIDOR
Town of Wawayanda, Orange County, New York

Lead Agency: Planning Board, Town of Wawayanda

Lead Agency Contact: John Razzano, Chairperson
80 Ridgebury Hill Road
Slate Hill, NY 10973
(845) 355-5700

APPENDIX E:
MARANGI SOLID WASTE FACILITY

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DOLSONTOWN CORRIDOR

APPENDIX E: MARANGI SOLID WASTE FACILITY

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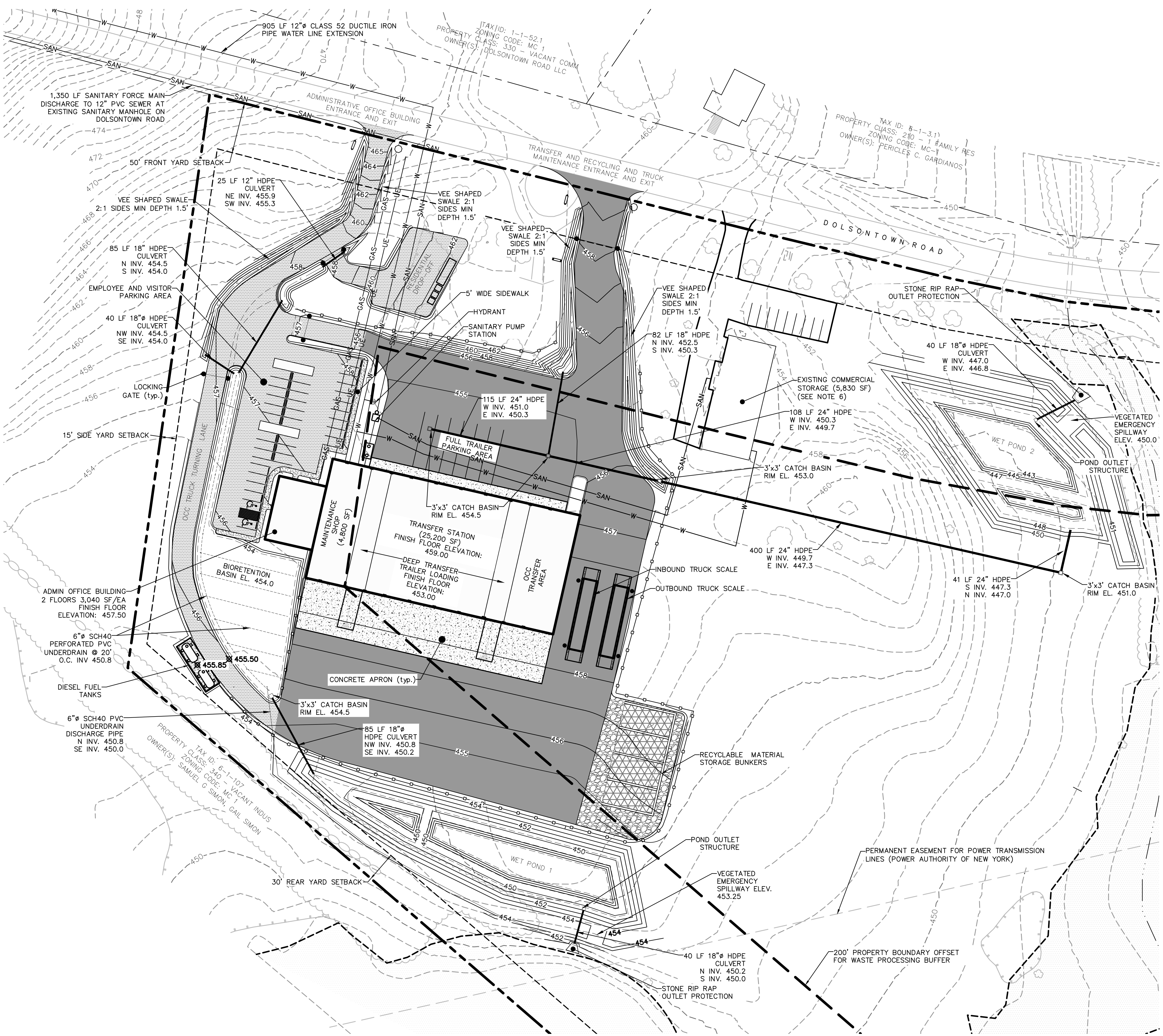
Section 1

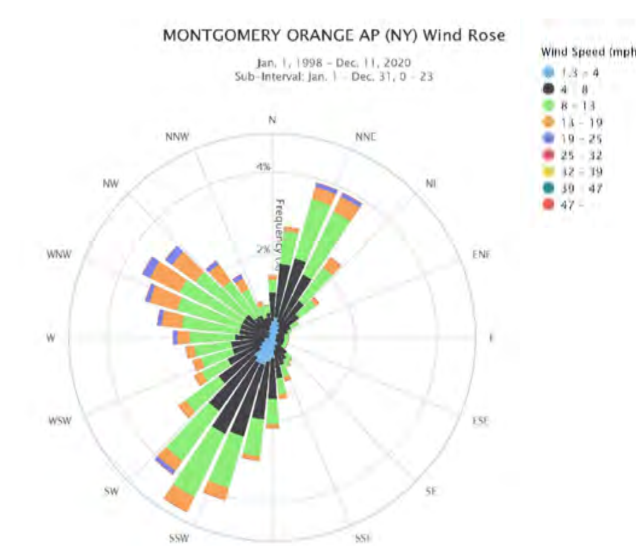


LEGEND:

- EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- PROPOSED GRADING MAJOR CONTOUR
- PROPOSED GRADING MINOR CONTOUR
- PROPERTY BOUNDARY
- PROPERTY BOUNDARY SETBACK
- EXISTING BUILDING
- APPARENT JURISDICTIONAL FEDERAL WETLAND
- OUTDOOR SIGNAGE
- STANDARD DUTY PAVEMENT
- HEAVY DUTY PAVEMENT
- CONCRETE
- GRAVEL
- LITTER FENCE
- SANITARY FORCEMAIN
- WATER LINE
- UNDERGROUND ELECTRIC
- NATURAL GAS LINE
- PROPOSED SWALE
- PROPOSED STORM SEWER
- PROPOSED CATCH BASIN
- LOCKING GATE

NOTES:

1. EXISTING PROPERTY LINE, BUILDINGS AND TOPOGRAPHY FROM A SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
2. ELEVATIONS BASED ON NAVD88 DATUM, HORIZONTAL DATUM IS NEW YORK STATE PLANE EAST.
3. WETLAND BOUNDARY AND APPARENT JURISDICTION FROM DOLSONTOWN ROAD WETLAND DELINEATION REPORT PREPARED BY ENSOL, INC. DATED DECEMBER 2020. WETLAND BOUNDARY SURVEY LOCATIONS ARE FROM THE SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
4. EACH RESIDENTIAL, INDUSTRIAL, COMMERCIAL SUBDIVISION OR SITE PLANS SHALL CONTRIBUTE RECREATIONAL FEES CALCULATED ON THE BASIS OF GROSS FLOOR AREA FOR ALL NEW CONSTRUCTION.
5. THE TRANSFER AND RECYCLING FACILITY IS PROPOSED TO OPERATE FROM 4:00AM TO 7:00PM MONDAY THROUGH FRIDAY, AND FROM 5:00AM TO 4:00PM ON SATURDAY. THE PROPOSED OPERATION HOURS REQUIRE A WAIVER FROM THE TOWN BOARD FROM SECTION 152–17D.(7) OF THE TOWN CODE.
6. THE EXISTING COMMERCIAL STORAGE BUILDING WATER LINE SHALL BE DISCONNECTED FROM THE EXISTING WATER WELL AND CONNECTED TO THE EXTENDED WATER LINE ALONG DOLSONTOWN ROAD. THE SANITARY LINE SHALL BE DISCONNECTED FROM THE EXISTING SEPTIC SYSTEM AND DRAIN TO THE SANITARY PUMP STATION TO BE DISCHARGED TO THE EXISTING SEWER LINE ON DOLSONTOWN ROAD VIA A FORCE MAIN.



NO	REVISION	BY	DATE

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT: DOM KAM LLC

SITE: DOM-MAR TRANSFER AND RECYCLING FACILITY

TOWN OF: WAWAYANDA
COUNTY OF: ORANGE
STATE OF: NEW YORK

PROJECT: SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE: PHASE 1 SITE PLAN

ISSUE: REVIEW

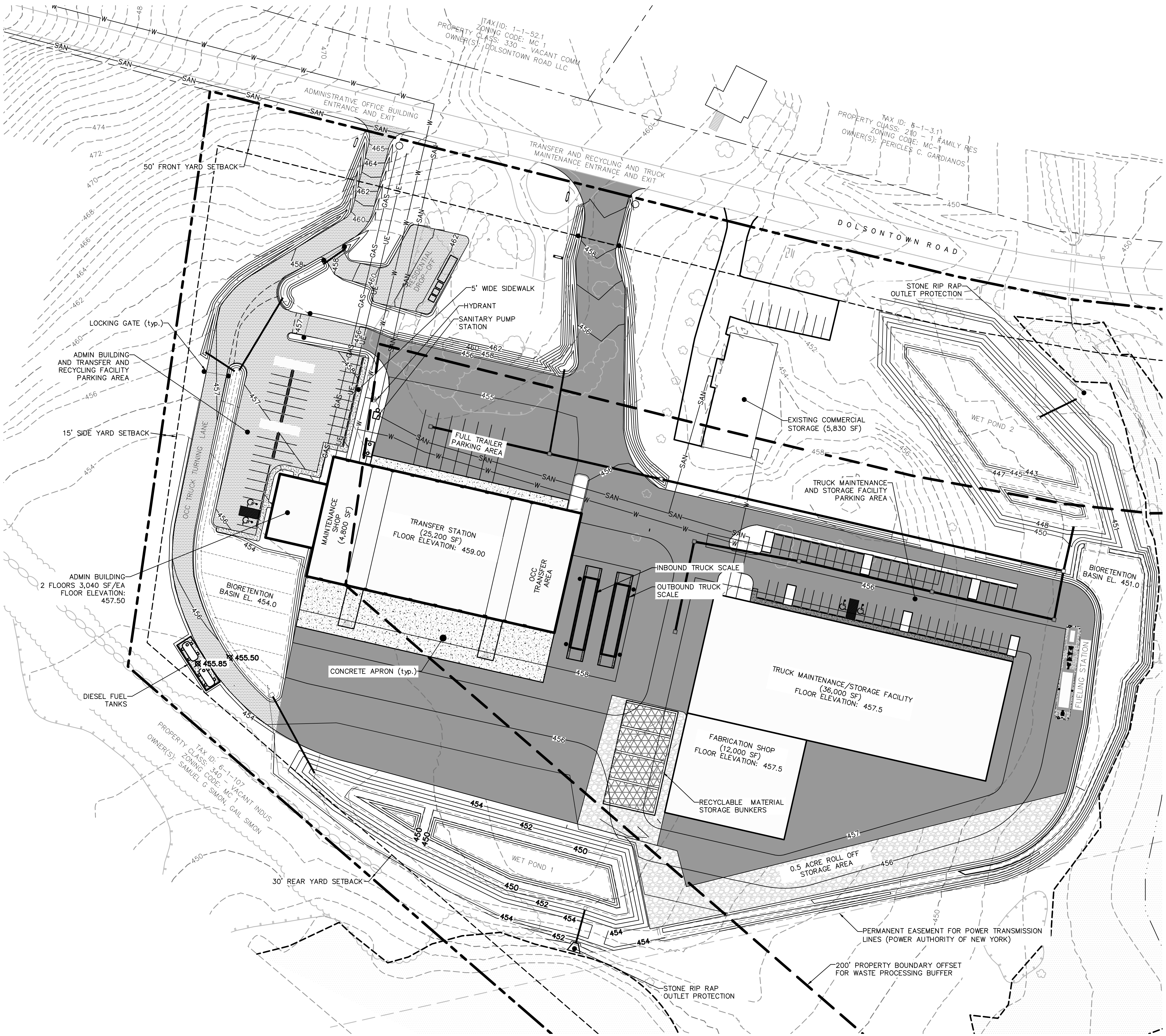
DES:	DRN:	CHK:
DL	SJD	DL

PROJECT NO: 029-A0001
DATE: APRIL 2021

GRAPHIC SCALE: 0' 50' 100'

FILE: Sheet 3 - Phase 1 Site Plan_final.dwg

REV NO: 0
SHEET NO: 3



LEGEND:

- 450 — EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- 450 — PROPOSED GRADING MAJOR CONTOUR
- 448 — PROPOSED GRADING MINOR CONTOUR
- PROPERTY BOUNDARY
- PROPERTY BOUNDARY SETBACK
- EXISTING BUILDING
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- OUTDOOR SIGNAGE
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- HEAVY DUTY PAVEMENT
- CONCRETE
- GRAVEL
- SAN — SANITARY FORCEMAIN
- W — WATER LINE
- UE — UNDERGROUND ELECTRIC
- GAS — NATURAL GAS LINE
- PROPOSED SWALE
- PROPOSED STORM SEWER
- PROPOSED CATCH BASIN

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2. ELEVATIONS BASED ON NAVD88 DATUM, HORIZONTAL DATUM IS NEW YORK STATE PLANE EAST.
3. THE EXISTING COMMERCIAL STORAGE BUILDING SHALL BE CONNECTED TO THE EXTENDED 12-INCH WATER MAIN INSIDE THE NORTH ROW OF DOLSONTOWN ROAD.
4. WETLAND BOUNDARY AND APPARENT JURISDICTION FROM DOLSONTOWN ROAD WETLAND DELINEATION REPORT PREPARED BY ENSOL, INC. DATED DECEMBER 2020. WETLAND BOUNDARY SURVEY LOCATIONS ARE FROM THE SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
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NO.	REVISION	BY	DATE

EnSol
661 Main St.
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DAVID A. LENOX, P.E.
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CLIENT: DOM KAM LLC

SITE: DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT: SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE: CONCEPTUAL FULL BUILD SITE PLAN

ISSUE: REVIEW

DES:	DRN:	CHK:
DL	SJD	DL

PROJECT NO:	DATE:
029-A0001	APRIL 2021

GRAPHIC SCALE: 0' 50' 100'

FILE: Sheet 4 - Conceptual Full Build Site Plan.dwg

REV NO:	SHEET NO:
0	4

Section 2

Construction Stormwater Pollution Prevention Plan (SWPPP)

for the:

Dom-Mar Transfer and Recycling Facility
1118 and 1138 Dolsontown Road
Wawayanda, New York 10940
NYSDEC Permit No. T.B.D.

January 2023

prepared for:

DOM KAM LLC
366 Highland Avenue Ext.
Middletown, New York 10940

prepared by:

EnSol
ENGINEERING + ENVIRONMENTAL

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PN 029-A0001

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1. Introduction

A stormwater management assessment has been conducted for the proposed project to protect the waters of the State of New York from the adverse impacts of stormwater runoff. This report presents an analysis of the project in accordance with the New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-20-001 and the New York State Stormwater Management Design Manual. As required, the Stormwater Pollution Prevention Plan (SWPPP) is designed, where appropriate, to incorporate green infrastructure techniques that preserve natural resources and utilize the existing hydrology of the site, provide runoff reduction practices, water quality treatment practices, apply volume and peak control practices for channel protection, overbank flood control, and extreme flood control.

In accordance with Appendix B, Table 2 of the SPDES General Permit for Construction Activity, GP-0-20-001, new development and redevelopment projects that involve a soil disturbance of one or more acres require the preparation of a full SWPPP that includes post-construction stormwater management practices. In total, approximately 9.6 acres of soil disturbance is expected during the construction of this project. Therefore, this project requires the development of a full SWPPP, including erosion and sediment controls, green infrastructure site planning techniques, runoff reduction volume practices, and post-construction stormwater management practices.

The general contractor and subcontractors performing any activity that involves soil disturbance will be required to comply with the terms and conditions of the SWPPP for the project identified as a condition of authorization to discharge stormwater. The contractors and subcontractors shall identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the trained contractor. The trained contractor(s) shall serve as the representative(s) of the applicant for the duration of construction and shall be responsible for the proper implementation of the SWPPP. The trained contractor(s) shall also be qualified to conduct inspections of stormwater management practices. The owner or operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed. The Contractor shall provide signed certifications (Attachment 3) for itself and all applicable subcontractors at the preconstruction meeting. These signed certifications shall be included as part of the SWPPP. The SWPPP must be maintained on-site and be accessible during normal business hours.

As required by the conditions described in the SPDES general permit, the SWPPP shall be kept current and updated as often as necessary to protect the environment and reflect what is presently occurring at the site. At a minimum, the SWPPP shall be amended:

- Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater discharges from the site,
- Whenever there is a change in design, construction, or operation at the site that has or could have an effect on the discharge of pollutants, and
- To address issues or deficiencies identified during an inspection by the qualified inspector, the New York State Department of Environmental Conservation (NYSDEC), or other regulatory authority (i.e., MS4).

The owner or operator shall notify the MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP. Unless otherwise notified by the MS4, the owner or operator shall have the SWPPP amendments or modifications reviewed and accepted by the MS4 prior to commencing construction of the post-construction stormwater management practice.

A copy of this SWPPP must be maintained at the site at all times and must be made available to regulatory officials at their request in order to comply with the General Permit.

The owner or operator shall retain a copy of the NOI, NOI Acknowledgement Letter, SWPPP, MS4 SWPPP Acceptance Form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete Notice of Termination (NOT) submitted in accordance with Part V of the General Permit

1.1 Scope of the Project

The project will involve the construction of a waste transfer and recycling facility, administrative building and associated utilities, access drive, parking areas, and stormwater appurtenances.

1.2 Location of the Project

The project site is located in the Town of Wayawanda, NY just north of NY State I-84. A General Location Map is included as Figure 1.

This project discharges to tributaries of Monhagen Brook which is listed as a 303(d) waterbody in Appendix E-303(d) Segments Impaired by Construction Related Pollutant(s) of GP-0-20-001. The primary pollutant of concern for Monhagen Brook is phosphorus. Measures taken to reduce the discharge of phosphorus to these waterbodies are described in Section 7 of this document.

For construction sites that directly discharge to one of the 303(d) segments listed in Appendix E, a qualified inspector shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days (See Section 4). The application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days as noted in Section 4.

1.3 Project Type and Size

The project is classified as a new development project with some re-development areas that will disturb approximately 9.6 acres of an approximately 44.3-acre property and will result in an increase in impervious area (pavement, roofs, surface water) of approximately 5.49 acres.

1.4 Project Description

The proposed project includes the construction of a new 42,000 square foot building that will be divided into a waste transfer facility and a recycling area, and a 3,160 square foot administrative office building. Additional site development will include approximately 157,000 square feet of paved entrance, parking, and walkway areas. The proposed parking lot will be sized to provide adequate parking spaces for employees, customers, visitors, and truck/trailer staging and storage.

To evaluate the environmental impacts from the potential full development of the site a Conceptual Full Build Out Plan including a Truck Maintenance Facility was prepared. The full build out of the site is not expected to occur until at least five years after the Transfer and Recycling Facility is constructed. Future site development shall occur under an updated SWPPP and NOI.

1.5 Cultural Resources

The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) Cultural Resource Information System (CRIS) online mapping system was used to determine the potential impacts the project may have on archeologically sensitive and/or historic landmarks. The CRIS Map is included as Figure 5.

A summary of the CRIS survey is provided below:

- The construction activity will occur in an archeologically sensitive area.
- The construction activity will not occur on or adjacent to a property listed or determined to be eligible for listing on the National or State Register of Historic Places.
- The construction activity will not include the construction of a new building in the vicinity of any building or object that is more than 50 years old that has been determined by OPRHP to be historically/archeologically significant.

A Phase 1 archaeological survey was performed by Tracker Archaeology Services, Inc. as part of the SEQR process and no archaeological items of significance were found. The Phase 1 Archaeological Survey Report was submitted to the CRIS database as part of the SEQR Process. In a Letter dated June 15th, 2021, the New York State Historic Preservation Office (SHPO) recommended that the project will not adversely affect historic or archaeological properties listed or eligible for listing on the National Register of Historic Places conditioned on a commitment by the applicant to implement the Human Remains Discovery Protocol should any evidence of human remains, or possible burial goods be encountered during construction. The commitment to implement the Human Remains Discovery Protocol is included on the Site Plan (Drawing 2) as Note 5. The Letter and the Human Remains Discovery Protocol is included in Attachment 8.

1.6 Wetlands

According to the NYSDEC Environmental Resource Map (Figure 3) no New York State jurisdictional wetlands or related 100-ft adjacent area (buffer) exist within the proposed development area. Federal jurisdiction wetlands are shown on Figure 4 within the proposed development area. A wetland delineation was performed by EnSol, and a request for the United States Army Corps of Engineers (USACE) Jurisdictional Determination was prepared by Capital Environmental Consultants, Inc. of Kingston, New York and submitted to the USACE on April 16, 2021. A Jurisdictional Determination Letter dated January 5, 2022, was received from the USACE (Application Number NAN-2021-00721-WOR). The project has been designed to avoid impacting jurisdictional federal wetlands. Jurisdictional wetlands and drainageways shall be delineated with orange construction fencing adjacent to planned areas of disturbance.

1.7 Training

New maintenance personnel and at least one specified individual from hired contractors will receive training on the goals and objectives of this SWPPP. Training sessions will be conducted by a person that meets the definition of a Qualified Inspector as defined in Section 4. Training will occur after maintenance personnel are hired but prior to them undertaking any maintenance responsibilities and shall cover the topics identified in the Maintenance Employee Training Program and sign-in sheet included in Attachment 3. Training and education are intended to help ensure all employees are aware of proper maintenance procedures and the potential for stormwater pollution so that maintenance is performed without error and water quality impacts can be minimized and prevented to the greatest practicable extent. Maintenance procedures will be taken from the appropriate specification in the "New York Standards and Specifications for Erosion and Sediment Control."

A list of those who have attended the training is to be maintained with this SWPPP. The form in Attachment 3 should be used to document the employees/contractors present for each SWPPP training and education meeting. Completed training logs shall be kept for the record in Attachment 3.

2. Project Soils

The NRCS Soil Map is included as Figure 2. The figure shows the soil types within the proposed project area, and their hydrologic soil group (HSG) information.

2.1 Soil Types

The following soil types and hydrologic groups are present within the project area of disturbance:

Table 1 – Soil Type

Soil Symbol, Name, % Slope Range	Hydrologic Group (HSG)[1]	Texture	Character	% Within disturbed area
MdB, Mardin gravelly silt loam, 3 to 8 percent slopes	D	Gravelly silt loam	Moderately well drained	76.6%
MdC, Mardin gravelly silt loam, 8 to 15 percent slopes	D	Gravelly silt loam	Moderately well drained	2.5%
RbA, Rhinebeck silt loam, 0 to 3 percent slopes	C/D	Silty clay loam	Somewhat poorly drained	7.5%
Wd, Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes	B/D	Silt loam	Poorly drained	13.4%

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

2.2 Discussion of Soil Characteristics

There are four hydrologic soil groups within the area of disturbance (AOD). The primary soil series within the project area is the Mardin gravelly silt loam soil, which has a HSG rating D, which indicates poor infiltration potential.

2.3 Subsurface Investigation

Eight exploratory borings designated on the logs as B-1 through B-8 were completed on April 9, 12, and 13, 2021 by SoilTesting Inc. of Oxford, Connecticut. The boreholes were located across the proposed project area, including one borehole located in each of the proposed wet ponds, the bioretention basin, the storm sewer alignment, the Transfer and Recycling Facility building, the area north of the Facility, the parking lot, and the entrance road. The location of the boreholes are shown on the Site Plan and the Erosion and Sediment Control Plan drawings included in Attachment 1.

In general, the subsurface soils consist of a surficial approximately four-to-six-inch-thick layer of topsoil underlain by brown and grey fine, medium, and coarse sand with varying amounts of silt, fine and coarse gravel, cobbles, and trace amounts of clay. The brown and grey sand was predominately classified as SW/SM, and SP/SM per the USCS, which consists of well graded sand, fine to coarse sand/silty sand and poorly graded sand/silty sand. The borehole logs are included in Attachment 7. The subsurface conditions at the proposed post construction stormwater features are described in Section 8.

3. Construction Phasing

3.1 Sequence of Construction Activities

The Contractor's work schedule and methods shall be consistent with the SWPPP or amended SWPPP. Once approved, the progress schedule shall become a part of the SWPPP.

The following list is a suggested sequence of major construction activities for the project to meet the NYSDEC requirements:

1. Install orange construction fencing along wetland boundaries.
2. Install temporary perimeter sediment controls (compost filter sock).
3. Construct stabilized construction entrance for site.
4. Construct temporary sediment basins (future detention pond).
5. Construct drainage swales, culverts, and access roads.
6. Site grading to final proposed grades/pavement subgrades.
7. Construct/install building, utilities, and stormwater management controls (storm sewer, catch basins, rip-rap outlet protection, bioretention basin).
8. Pave all areas where required.
9. Install plantings, seed, and mulch.
10. Convert temporary sediment basins to permanent detention ponds once site stabilization is complete.
11. Remove temporary erosion and sediment controls when site reaches final stabilization.

4. Erosion and Sediment Control Measures

4.1 Erosion and Control Plan

An erosion control plan has been developed in accordance with the "New York Standards and Specifications for Erosion and Sediment Control." The erosion control plan limits the amount of area exposed prior to stabilization, diverts drainage runoff from adjacent areas away from and around the construction site area, and employs various sediment control methods such as silt fence, sediment basin, and inlet/outlet protection. The various erosion and sediment control methods shall be installed in the sequence noted in the previous section.

Silt Fence or Equivalent:
Silt Fence or equivalent such as Compost Filter Sock is proposed along the downslope perimeter of the area to be disturbed to contain and prevent sediment from reaching waters of the State of New York.

Orange Construction Fencing:
Orange construction fencing shall be placed around sensitive areas such as jurisdictional wetlands to deter disturbance from construction personnel and equipment. These areas are shown on the Erosion and Sediment Control Plan in Attachment 1.

Temporary Surface Stabilization: In areas where soil disturbance has temporarily ceased and will not be disturbed again within seven calendar days, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven days from the date the current soil disturbance activity ceased. Areas will be stabilized in accordance with the New York State Standards and Specifications for Erosion and Sediment Control or as directed by the Engineer.

Drainage Pipe Inlet/Outlet Stabilization: As part of the permanent erosion control measure, the inlet and outlet of the culvert pipes will be provided with either stone riprap apron or an apron consisting of erosion control product with vegetation to provide the required erosion control which blends in with the surrounding natural features and topography. The location and type of stabilization to be provided is shown on project plans.

Construction Entrance: A stabilized construction entrance shall be constructed to access the site from Dolsontown Road. This entrance/area shall conform to the New York State Standards and Specifications for Erosion and Sediment Control.

Dust Control: The contractor will be required to minimize dust generation during the construction activities. Provisions such as watering, the use of cover materials, and the application of calcium chloride have proven effective in dust control and can be approved by the Engineer for use in the affected areas.

Storm Drain Inlet Protection: Temporary protection will be provided at all proposed catch basins to prevent clogging of the infiltration system prior to final stabilization of the site.

Temporary Sediment Basin: Temporary sediment basins will be constructed to receive runoff from the majority of the impacted area and allow for settling of sediment before discharging off site. The Sediment Basins shall be converted to the Wet Detention Ponds after site stabilization. The Sediment Basins shall discharge through a Skimmer connected to the Wet Pond outlet structure low flow orifice as shown on the Storm Water Details drawing included in Attachment 1.

Rip-Rap Stone Check Dams: Stone check dams will be installed in temporary drainage swales to reduce velocity and minimize the migration of sediments within the swales. Check dams shall be installed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Permanent Surface Stabilization: In areas where soil disturbance has permanently ceased, the application of soil stabilization methods must be initiated by the end of the next business day and completed within seven days from the date the current soil disturbance activity ceased. Areas will be stabilized in accordance with the New York State Standards and Specifications for Erosion and Sediment Control or as directed by the Engineer. See the seed mixture table below for locations, rates, and applicability.

Table 2 – Site Seed Mixtures

Seed Mixture	Location	Rate	Seeding Season
General Purpose Erosion Control (Permanent)	Non-Paved Areas excluding the Wet Ponds below the maximum pool, Bioretention Basin, and Drainage Swales	• Creeping red fescue (Ensylva, Pennlawn, or Boreal) at 20 lbs/acre • Chewings fescue (Common) at 20 lbs/acre • Perennial ryegrass (Pennfine, Linn) at 20 lbs/acre • Red clover (Common) at 20 lbs/acre	Early spring, late summer/fall
OBL Wetland Mix w/ Aroostook Winter Rye Cover Crop	Wet Pond Shallow Water Area (Aquatic Bench)	0.5 lbs/1,000 sf w/ cover crop at 30 lbs/acre	Early spring, fall
Retention Basin Wildlife Mix w/ Aroostook Winter Rye Cover Crop	Bioretention Basin	0.5 lbs/1,000 sf w/ cover crop at 30 lbs/acre	Early spring, fall
Riparian Buffer Mix w/ Aroostook Winter Rye Cover Crop	Wet Pond Shore Line Fringe (Normal Pool to Maximum Pool)	20 /bs/acre w/ cover crop at 30 lbs/acre	Early spring, fall
Temporary Construction Seeding Mix	Non-paved areas excluding the Wet Ponds below the maximum pool, the Bioretention Basin, and drainage swales	• Perennial ryegrass (Pennfine, Linn) at 30 lbs/acre* • Aroostook winter rye at 100 lbs/acre	Spring, summer, fall
Vegetated Waterway Mix	Drainage swales	• White clover at 8 lbs/acre • Smooth bromegrass at 20 lbs/acre • Creeping red fescue at 20 lbs/acre	Early spring, late August

* If temporary seeding is undertaken in late fall, Aroostook winter rye may be used instead of perennial ryegrass.

The Sediment and Erosion Control Plan is included in Attachment 1. The seeding and planting plan and details are shown on the Landscaping Plan and Landscaping Details Drawings included in Attachment 1.

4.2 SWPPP Implementation and Maintenance Responsibilities

Implementation of all E&SC devices will be by the Contractor as indicated in the contract documents.

The owner or operator shall have a qualified inspector conduct site inspections at least twice every seven (7) calendar days while soil disturbance activities are on-going. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. Per Section 154.8 A. (2) of the Town of Wawayanda Town Code (Town Code) an inspection and associated report shall be completed within 24 hours of any storm event producing more than 0.5 inches of precipitation.

The owner or operator shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the MS4 in accordance with Part II C. 3 of the General Permit.

For construction sites where soil disturbance activities have been temporarily suspended (e.g., winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator shall notify the Department of Water (SPDES) Program contact at the Regional Office or, the traditional land use control MS4 (where applicable), in writing prior to reducing the frequency of inspections.

The qualified inspector shall be a:

- Licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- Someone working under the direct supervision or, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity.

The qualified inspector shall prepare an inspection report after each and every inspection (Attachment 3). Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame. The inspection reports shall be signed by the qualified inspector and shall be maintained on site with the SWPPP. Reports shall also be sent to the Stormwater Management Officer designated by the Town of Wawayanda Town Board (Town Board).

5. Existing Watershed Information

The approximately 44.3-acre property predominately consists of meadow areas with forested and shrub covered areas throughout the remainder of the site. Surface runoff on the parcel drains to two drainageways – Monhagen Brook, which flows west to east across the property and an unnamed tributary to Monhagen Brook, which flows north to south across the property. The topography of the site is generally flat (0 to 3%) with steeper slopes (3 to 8%) in the northern portion of the site. The site drains primarily by sheet flow to a wetland along the southern property boundary. The watershed area considered for this project is approximately 18.8 acres and is primarily open grass field with patches of trees along the southern border. See the Pre-Development Watershed Map in Attachment 4 for additional information.

6. Green Infrastructure

6.1 Reduction of Impervious Cover

The paved area of the project has been limited to the minimum amount of space necessary to provide adequate employee, visitor, and truck parking, as well as adequate drive widths for tractor trailers to traverse the site.

6.2 Runoff Reduction Techniques

Through the application of a combination of green infrastructure techniques and standard stormwater management practices, 18% of the Initial Water Quality volume has been reduced. The following Runoff Reduction volume (RRv) technique was utilized:

Table 3 – Runoff Reduction Techniques

Reduction of Contributing Volume Practices	Description
Bioretention Basin	0.262-acre feet of runoff will be reduced by the basin (total one-year storm runoff volume from contributing drainage area).

7. Pollution Prevention Measures

7.1 Waste Disposal

If needed, all waste materials will be collected and stored in securely lidded metal dumpsters on site. The dumpster will comply with all local and state solid waste management regulations. All litter, trash, and non-contaminated construction debris will be deposited in the dumpsters to prevent them from becoming a pollutant source in the stormwater discharges.

7.2 Sanitary Waste

If needed, portable toilet units or field offices with toilet facilities will be used for sanitary purposes.

7.3 Construction Chemicals and Materials

All chemicals should be stored properly in a closed container, preferably indoors, and should not be allowed to come into contact with stormwater runoff. Any contaminated soils/materials which may result from construction activities will be contained and cleaned up in accordance with applicable state and federal regulations.

Construction materials will be stored in the contractor staging/stockpile area. Any soil stockpiles shall be properly stabilized as shown on the Erosion and Sediment Control Details drawing included in Attachment 1. A compost filter sock will be placed downgradient of the contractor staging/stockpile area to intercept any runoff from this area.

7.4 Phosphorus

Various measures shall be taken to reduce the concentration of phosphorus in waters discharged from the site to the 303(d)-waterbody mentioned in Section I. These include reducing runoff velocity and volume of runoff flowing over disturbed areas, sedimentation, chemical filtration, conformance with the NYS Nutrient Runoff Law (ECL article 17, title 21 and Agriculture and Markets Law § 146-g), and proper equipment maintenance practices. The site will also be inspected by a qualified inspector biweekly (see Section IV) because the site's stormwater infrastructure discharges to 303(d) waterbodies.

Reducing the volume of runoff flowing over disturbed areas will be accomplished through the use of swales designed to convey stormwater to the sediment basins, limiting disturbed areas to the minimum area necessary, and limiting impervious surface cover to the maximum extent practicable. Reducing the velocity of runoff will be achieved through storage of stormwater in sediment basins, properly vegetating swales, scarifying soils prior to stabilization, and through installation of erosion and sediment controls like compost filter socks. Compost filter socks intercept runoff and filter out sediment and provide some chemical filtration of runoff through adsorption of soluble phosphorus ions to organic matter in the filter sock.

Phosphorus concentrations in discharges from the site will also be achieved by implementing provisions and recommendations from the NYS Nutrient Runoff Law. These include the following practices:

- Soil will be sampled and evaluated to determine the need for fertilizer.
- No use of fertilizers with greater than 0.67% phosphorus by weight unless soil test results indicate phosphorus addition is necessary.
- No application of fertilizer within 20 feet of a waterbody unless there is a 10-foot-wide vegetated area between the waterbody and site of fertilizer application or within 3 feet of a waterbody if a spreader guard, deflector shield, or drop spreader are used.
- No application of fertilizers between December 1st and April 1st.

- Sweeping up and properly applying or containerizing fertilizer accidently applied over impervious surfaces.

Other measures intended to reduce phosphorus concentrations in discharges from the site include stabilization of soil stockpiles, proper waste management and chemical storage, proper vehicle maintenance, and no use of phosphorus containing cleaning products on construction equipment.

Water Quality Volume and Runoff Reduction calculations were performed in accordance with the added requirements of Chapter 10 Enhanced Phosphorus Removal Supplement of the New York State Stormwater Design Manual.

7.5 Stormwater Hotspot

In accordance with Table 4.3 of the New York State Stormwater Management Design Manual, the site would be classified as a stormwater hotspot under the categories of vehicle fueling, vehicle service and maintenance, and because the site is considered an industrial site covered under the SPDES General Permit for Stormwater Discharges Associated with Industrial Activity. A stormwater hotspot is a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff.

Sites designated as hotspots have important implications for how stormwater is managed. Infiltration practices are generally avoided for projects that meet the hotspot criteria. As covered in Section 6.2 standard infiltration practices will not be used on the site and runoff reduction for the site will be achieved utilizing a bio-retention basin. It should also be noted that the majority of industrial activities taking place on the site will be indoors, or under cover to prevent stormwater contamination.

8. Post Construction Stormwater Control Practices

8.1 Post Construction Practices

A bioretention basin and two detention ponds will be utilized in conjunction with several dry drainageways to meet water quality and quantity requirements. Stormwater management practice sizing and other calculations related to the wet ponds, bioretention basin, and the drainageways are provided in Attachment 4, including the Post Development Watershed Map. Refer to Attachment 1 for locations and details of the stormwater management practices.

8.1.1 Wet Pond 1

Wet Pond 1 is located south of the Facility and receives stormwater runoff from the southern and southeastern portions of the Site and overflow from the Bioretention Basin. The Pond includes a four-foot deep forebay. The Pond Rim elevation is 454.5, the Pond side slopes consist of a 4:1 slope to the permanent pool elevation of 450.2, an eight-foot-wide aquatic bench to a depth of 1 foot below the pool elevation and then a 2:1 slope to the base of the Pond at elevation 446. A typical detail of the Pond Cross Section is shown on the Stormwater Details drawing included in Attachment 1. Borehole B-6 was drilled in the location of Wet Pond 1. The ground water level was observed at an elevation of approximately 448 in April 2021. This groundwater elevation is compatible with the permanent pool design of the Pond.

The Wet Pond shall be seeded in accordance with the Landscaping Plan and Detail drawings included in Attachment 1. The aquatic bench below the permanent shall be seeded with the OBL Wetland Mix, the area between the permanent pool and the peak 100-year storm elevation shall be seeded with the Riparian Buffer Seed Mix, and the area above the peak elevation shall be seeded with the general seed mix. The Wet Pond 1 outlet structure consists of a square three-foot by three-foot concrete structure with a low flow orifice, a weir, and a grate spillway sized for attenuating 1-year, 10-year and 100-year storm event peak flows respectively. The Pond routing information including peak elevation and flowrate for each storm event are shown on the HydroCAD reports included in Attachment 4. Wet Pond 1 shall discharge to the wetland adjacent to Monhagen Brook via a culvert with stone rip rap outlet protection. An 18-foot wide, 1.25-foot-deep vegetated Emergency Spillway shall direct overflow away from the Pond.

8.1.2 Wet Pond 2

Wet Pond 2 is located to the east of the Facility and receives stormwater runoff from the northern and eastern portions of the Site. The Pond includes a four-foot deep forebay. The Pond Rim elevation is 451.25, the Pond side slopes consist of a 4:1 slope to the permanent pool elevation of 447, an eight-foot-wide aquatic bench to a depth of 1 foot below the pool elevation, and then a 2:1 slope to the base of the Pond at elevation 442.5. Borehole B-8 was drilled in the location of Wet Pond 2. The ground water level was observed at an elevation of approximately 447 in April 2021. This groundwater level is compatible with the permanent pool design of the Pond.

The Wet Pond shall be seeded in accordance with the Landscaping Plan and Detail drawings included in Attachment 1. outlet structure consists of a square three-foot by three-foot concrete structure with a low flow orifice, a weir, and a grate spillway sized for attenuating 1-year, 10-year and 100-year storm event peak flows respectively. The Pond routing information including peak elevation and flowrate for each storm event are shown on the HydroCAD reports included in Attachment 4. Wet Pond 1 shall discharge to the wetland adjacent to the unnamed tributary to Monhagen Brook via a culvert with stone rip rap outlet protection. An 18-foot wide, 1.25-foot-deep vegetated Emergency Spillway shall direct overflow away from the Pond.

8.1.3 Bioretention Basin

The Bioretention Basin is located to the southwest and west of the administration building parking lot. The Bioretention Basin receives runoff from the administration building, and the associated parking lot, and access roads. The Bioretention Basin shall include a stone diaphragm along the edge of the paved parking lot and access road for erosion control. Vegetated slopes above the Basin, and vegetated swales upstream of the Basin shall provide settling of solids. A three-inch mulch layer shall also be included above the planting soil within the basin. Stormwater runoff is filtered through the vegetation and planting soil within the Basin and collected by subsurface collection pipes which discharge the treated stormwater to the Wetland area to the south. The Basin Rim elevation is 455.5, the Basin base elevation is 454, and the elevation of the subsurface collection system is 450.8. Borehole B-4 was drilled within the Basin location. The ground water level was observed at an elevation of approximately 447.4 in April 2021. This groundwater level provides greater than two feet of separation to the base of the Basin's filter soil. Typical details for the Bioretention Basin are shown on the Stormwater Details drawing included in Attachment 1.

The Basin shall be seeded with the Retention Basin Wildlife seed mix as specified on the Landscaping Plan and Detail drawings included in Attachment 1. Discharge from the Bioretention Basin shall be controlled by a square three-foot by three-foot concrete structure with a grate spillway at an elevation of 454.5. The outlet structure will direct overflow from the Basin to Wet Pond 1. The Catch Basin will provide a ponding depth of 0.5 feet. The Bioretention Basin is designed to contain the one-year 24-hour storm event without discharging through the outlet structure to provide enhanced phosphorus treatment and the minimum runoff reduction volume for the site. The Basin routing information including peak elevation and flowrate for each storm event are shown on the HydroCAD reports included in Attachment 4. The Bioretention Basin soil filter is modeled as exfiltration through the outlet structure. The exfiltration rate is based on the water elevation in the Basin and a hydraulic conductivity value of 0.250 in/hr or 0.5 ft/day as specified by the NYSDEC Green Infrastructure spreadsheet. In addition to the routing reports the NYSDEC Green Infrastructure spreadsheet assuming two days of filter time, and an average ponding depth of 0.25 feet is included in Attachment 4.

8.1.4 Vegetated Drainageways

Vegetated drainageways shall intercept stormwater runoff from the Facility roads and access areas, and convey the runoff to culverts, and the stormwater sewer system which eventually discharge to the Bioretention Basin, and the Wet Ponds. The vegetated drainageways shall be seeded with the Vegetated Waterway Mix as specified on the Landscaping Plan and Detail drawings included in Attachment 1. The drainageway Seed Mix consists of the B. Mixture included in the New York State Standard and Specifications for Vegetating Waterways. The drainageways shall have a trapezoid shape, with a minimum depth of one foot, and a minimum base width of two feet with maximum 2:1 side slopes. The typical drainageway detail is shown on the Erosion and Sediment Control Details Drawing included in Attachment 1.

Each drainageway was evaluated for a 24-hour 10 year and 100-year storm events using the Manning equation. The Final Channel Design Summary included in Attachment 4 shows the depth of flow, free board, and velocity for each drainageway. The permissible velocity per Table 4.1 of the New York State Standards and Specifications for Erosion and Sediment Control for Grass Mixtures, slopes of 0-5% and easily eroded soils is 4 feet per second. As the summary shows the velocity is less than 3.5 feet per second for all drainageways for the 10-year 24-hour storm event. The freeboard in each drainageway is greater than 0.5 feet for the 10-year 24-hour storm and the 100-year 24-hour storm is fully contained in each drainageway.

8.1.5 Stormwater Sewer System

The stormwater sewer system is located north of the Transfer and Recycling Building. The System consists of three-by-three-foot concrete catch basins connected to 24-inch diameter corrugated HDPE pipe. Typical details for the stormwater sewer system are shown on the Stormwater Details drawing included in Attachment 1. The catch basins collect stormwater runoff from the paved road and access area north of the Transfer and Recycling Building and the HDPE pipe conveys the runoff east to Wet Pond 2. The Stormwater Sewer system including each catch basin was hydraulically modeled for each storm event in HydroCAD using the dynamic storage indication method. During the 100-year 24-hour storm event the peak elevation is contained within each catch basin. The HydroCAD reports are included in Attachment 4.

8.2 Hydraulic Analysis of Stormwater Control Practices

The following table summarizes the Watershed Physical Parameters for the proposed Stormwater Control Practices. The Cornell Extreme Precipitation database was used for the rainfall depth for each respective storm event.

Table 4 - Stormwater Management Plan Summary

Storm Event	Pre-Development Peak Discharge (cfs)	Post–Development Peak Discharge	Required Volume (acre-ft)	Volume Provided (acre-ft)
1 (Cpv)	11.72	7.32	0.635	1.04
10 (Qp)	31.60	19.59	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge
100 (Qf)	68.98	60.14	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge
Area of disturbance		9.6 ac		
Required Water Quality Volume		1.184af / 51,575cf		
Runoff Reduction Provided		0.262af / 9,996 cf		
Water Quality Provided		Wet Ponds: 1.24 af / 54,014.4cf		

Note: Pre-Development and Post-Development Peak Discharge and the Required Volume and Volume Provided for each storm event were calculated for the entire Site by combining eastern and western drainage areas evaluated in separate HydroCAD models due to the limit on the number of available nodes in HydroCAD.

In the post-development period discharges will be through a pond outlet structure, which allows discharges at the design criteria as demonstrated by the hydraulic analyses included in Attachment 4. Discharges will not contribute to violation of water quality standards established in Section 154-7 B. of the Town Code.

8.2.1 Water Quality Volume

The Water Quality Volume (WQv) represents the volume of runoff generated from the entire 90th percentile rain event. A stormwater management practice sized using the WQv will capture and treat 90% of all 24-hour rain events. The WQv is directly related to the amount of impervious cover constructed at a site. The WQv was calculated in accordance with Chapter 10 Enhanced Phosphorus Removal Supplement of the New York State Stormwater Design Manual dated January 2015. The total required WQv for the site is the estimated runoff volume resulting from the 1 year 24-hour storm event over the post development watershed. The runoff volume from the 1 year 24-hour storm event is included on the HydroCAD report for each post development watershed included in Attachment 4. The WQv for the Wet Pond 1 and Wet Pond 2 watershed is 0.901 acre-ft, and 0.545 acre-ft respectively. The run-off reduction provided by the Bio-Retention Basin (0.262 acre-ft) within the Wet Pond 1 watershed as discussed in Section 8.2.1.1 below is subtracted from the Wet Pond 1 WQv, resulting in a WQv of 0.639 acre-ft. The calculations are shown on the Calculation Sheet included in Attachment 4. The WQv shall be provided within the permanent pool volumes of Wet Pond 1 and Wet Pond 2 which are 0.64 acre-ft, and 0.63 acre-ft respectively. The Permanent Pool cumulative volume calculation is included on the Calculation Sheet and on the HydroCAD pond routing reports included in Attachment 4.

8.2.1.1 Runoff Reduction Volume

The Runoff Reduction Volume RRv is the reduction of the total WQv by application of green infrastructure techniques and standard practices to replicate the pre-development hydrology. The minimum RRv was calculated per Section 4.3 and Chapter 10 of the New York State Stormwater Design Manual and is shown on the Calculation Sheet included in Attachment 4. The minimum RRv is 0.229 acre-ft and shall be provided by the Bioretention Basin. The Bioretention Basin is designed to contain and treat 100% of the one year 24-hour storm runoff volume from the contributing drainage area. The RRv provided by the Bio Retention Basin is 0.262 acre-feet.

8.2.2 Stream Channel Protection Volume

The Stream Channel Protection Volume (Cpv) is designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event. The CPv was determined in accordance with Section 4.4 of the New York State Stormwater Design Manual. The calculation is included in the Calculation Sheet included in Attachment 4. The Wet Pond outlet structure low flow orifice attenuates the post development one-year, 24-hour peak discharge rate to lower than predevelopment rates. The total Cpv volume for the developed drainage area is 0.897 acre-ft, subtracting the RRv provided by the Bio-Retention Basin (0.262 acre-ft) the Cpv is 0.635. The Cpv is included above the permanent pool in each Wet Pond below the outlet structure weir, elevation 450. 20 to 451.75 in Wet Pond 1 and elevation 447 to 448.6 in Wet Pond 2. The Cpv provided in Wet Pond 1 is 0.54 acre-ft, and the Cpv provided in Wet Pond 2 is 0.50 acre-ft, the total Cpv provided is 1.04 acre-ft.

8.2.3 Overbank Flood Protection Volume

The primary purpose of the overbank flood control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development (i.e., flow events that exceed the bank full capacity of the channel, and therefore must spill over into the floodplain). Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp is provided in Wet Ponds 1 and 2 above the permanent pool elevation. The Wet Pond Outlet Structure Wier and the low flow orifice attenuates the post development 10-year 24-hour peak discharge rate to lower than predevelopment rates.

8.2.4 Extreme Flood Protection Volume

The intent of the extreme flood criteria is to prevent the increased risk of flood damage from large storm events, maintain the boundaries of the predevelopment 100-year floodplain, and protect the physical integrity of stormwater management practices. 100-Year storm control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf is provided in Wet Ponds 1 and 2 above the permanent pool elevation. The Wet Pond Outlet Structure low flow orifice, weir, and spillway grate attenuates the post development 100-year 24-hour peak discharge rate to lower than predevelopment rates. Each Wet Pond also shall have an emergency vegetated spillway which shall have a minimum width of 18 feet, a minimum slope of 1%, and provide a minimum free board of 1 foot for the 24 hour 100-year storm event peak elevation. The Emergency Spillway is included in the HydroCAD model for each Wet Pond and was evaluated on the Final Channel Design Summary spreadsheet included in Attachment 4.

8.3 Inspection and Maintenance Schedule of Stormwater Controls

All stormwater management practices will be maintained in good operating condition in order to ensure ongoing effectiveness of the stormwater management system.

Post construction inspections will be performed annually and after major storm events. The following will be inspected:

- Catch basin grates and sumps
- Bioretention Basin
- Vegetated swales
- Stormwater detention pond and outlet structure

Inspections will be in accordance with the Inspection Forms in Attachment 3. The Inspection Forms will be completed during each inspection and signed by the Qualified Inspector.

8.4 Maintenance

Maintenance and/or repair of stormwater management features will be performed as required based on the outcome of inspections. See the Stormwater BMP Specific Maintenance and Inspection Checklists located in Attachment 3.

Prior to the issuance of approval for a land development activity that has a stormwater management facility as one of the requirements the applicant shall execute a maintenance easement agreement pursuant to Sections 154-6 B. (3)(h) and 154-8 B. of the Town of Wawayanda Code. Additionally, the Town Board shall approve a formal maintenance agreement for the stormwater management facilities on the site, in accordance with Sections 154-6 B. (3)(i) and 154-8 E. of the Town Code. Both documents shall be kept with a copy of this SWPPP in Attachment 6.

9. Termination of Permit Coverage

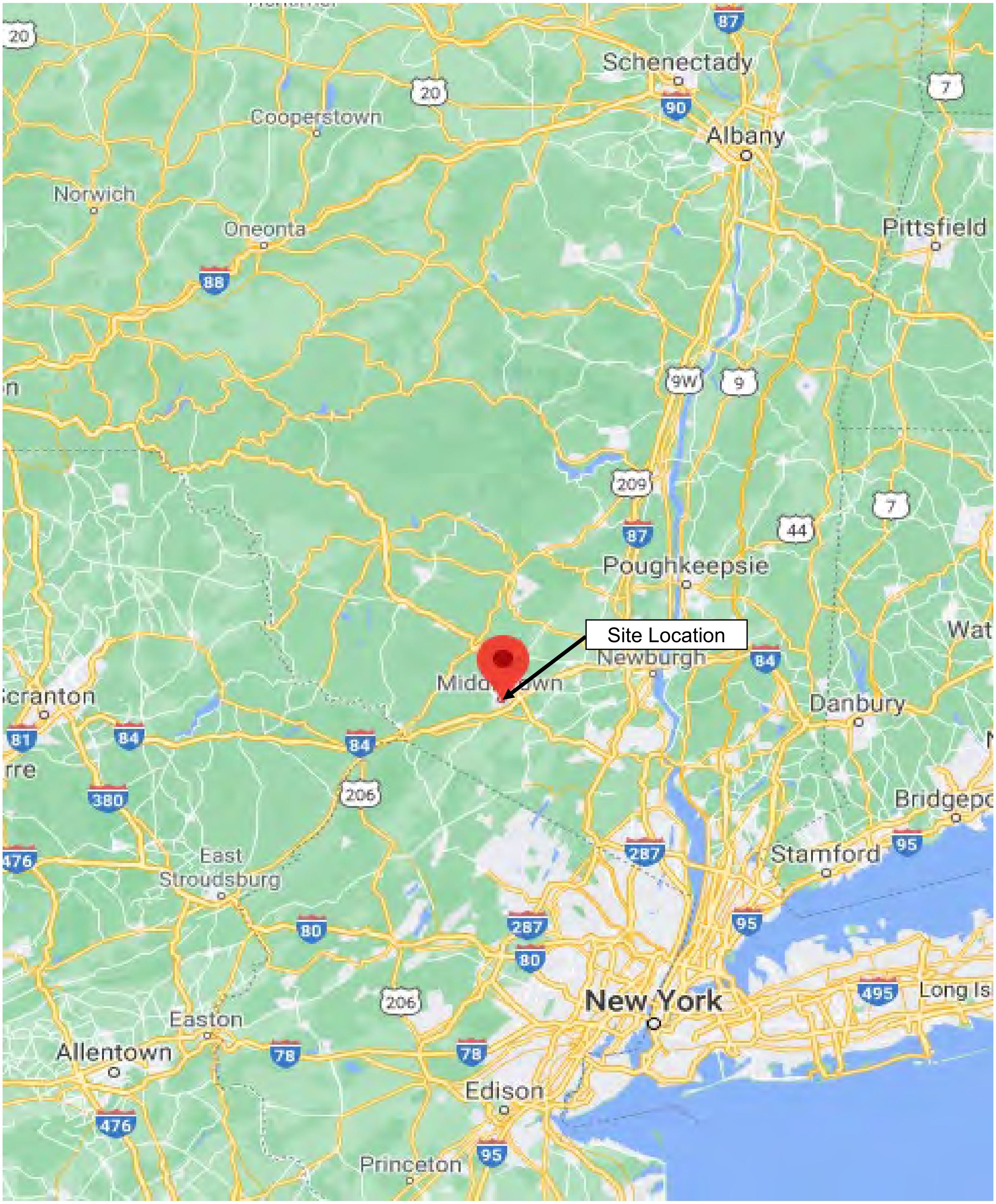
An owner or operator that is eligible to terminate coverage under the General Permit must submit a completed Notice of Termination (NOT) to the NYSDEC. A copy of the NOT is located in Attachment 3. An owner or operator may terminate coverage when one or more of the following conditions have been met:

- Total construction completion.
- Planned shutdown with partial construction completion.
- A new owner or operator has obtained coverage under the General Permit.

Figures

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL



EnSol, Inc.	DOM-MAR Transfer and Recycling Facility	FIGURE 1
Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	Dolsontown Rd. Middletown, Orange County, New York	GENERAL LOCATION MAP
Prepared By: BPB Date Prepared: 3/25/21	Source: google.com	PN: 20-0062

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	13.9	76.6%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	0.5	2.5%
RbA	Rhinebeck silt loam, 0 to 3 percent slopes	1.4	7.5%
Wd	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	2.4	13.4%
Totals for Area of Interest		**18.2**	**100.0%**

EnSol, Inc.
Environmental Solutions
661 Main Street, Niagara Falls, NY 14301
Ph:716-285-3920 Fax: 716-285-3928

DOM-MAR Transfer and Recycling Facility

Dolsontown Rd.
Middletown, Orange County, New York

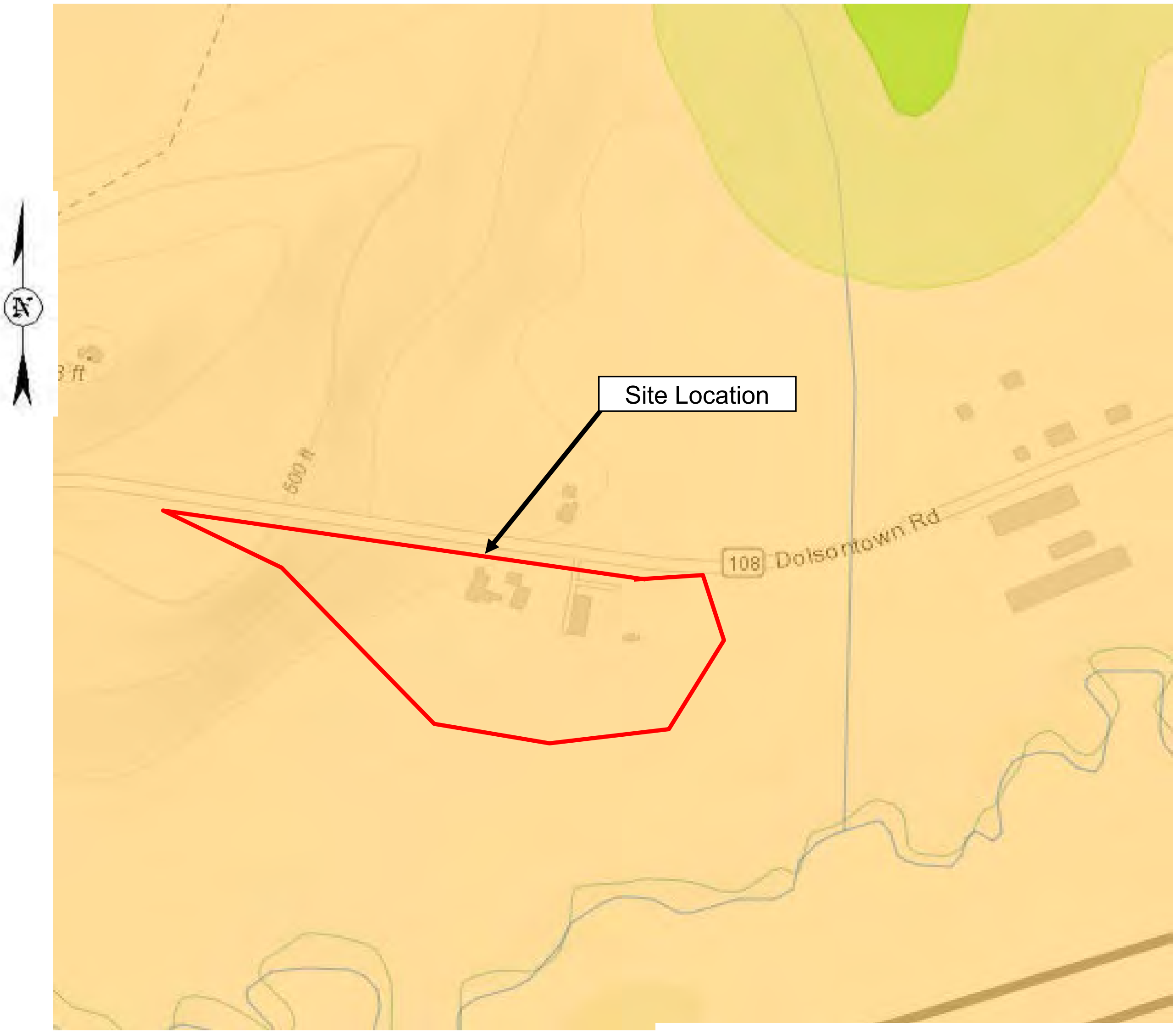
FIGURE 2

NRCS SOILS MAP

Prepared By: BPB
Date Prepared: 3/25/21

Source:
USDA

PN: 20-0062



- Unique Geological Features
- Waterbody Classifications for Rivers/Streams
- Waterbody Classifications for Lakes
- State Regulated Freshwater Wetlands
  - State Regulated Wetland Checkzone
- Significant Natural Communities
  - Natural Communities Near This Location
- Rare Plants or Animals

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DOM-MAR Transfer and Recycling Facility

Dolsontown Rd.
Middletown, Orange County, New York

FIGURE 3

NYSDEC ENVIRONMENTAL RESOURCE MAP

Prepared By: BPB
Date Prepared: 3/25/21

Source:
www.dec.gov/gis/erm

PN:

Attribute:PEM1E (Details)

Type: Freshwater Emergent Wetland

Acres:0.344141811

More about the NWI Wetlands **NWI Wetlands**.

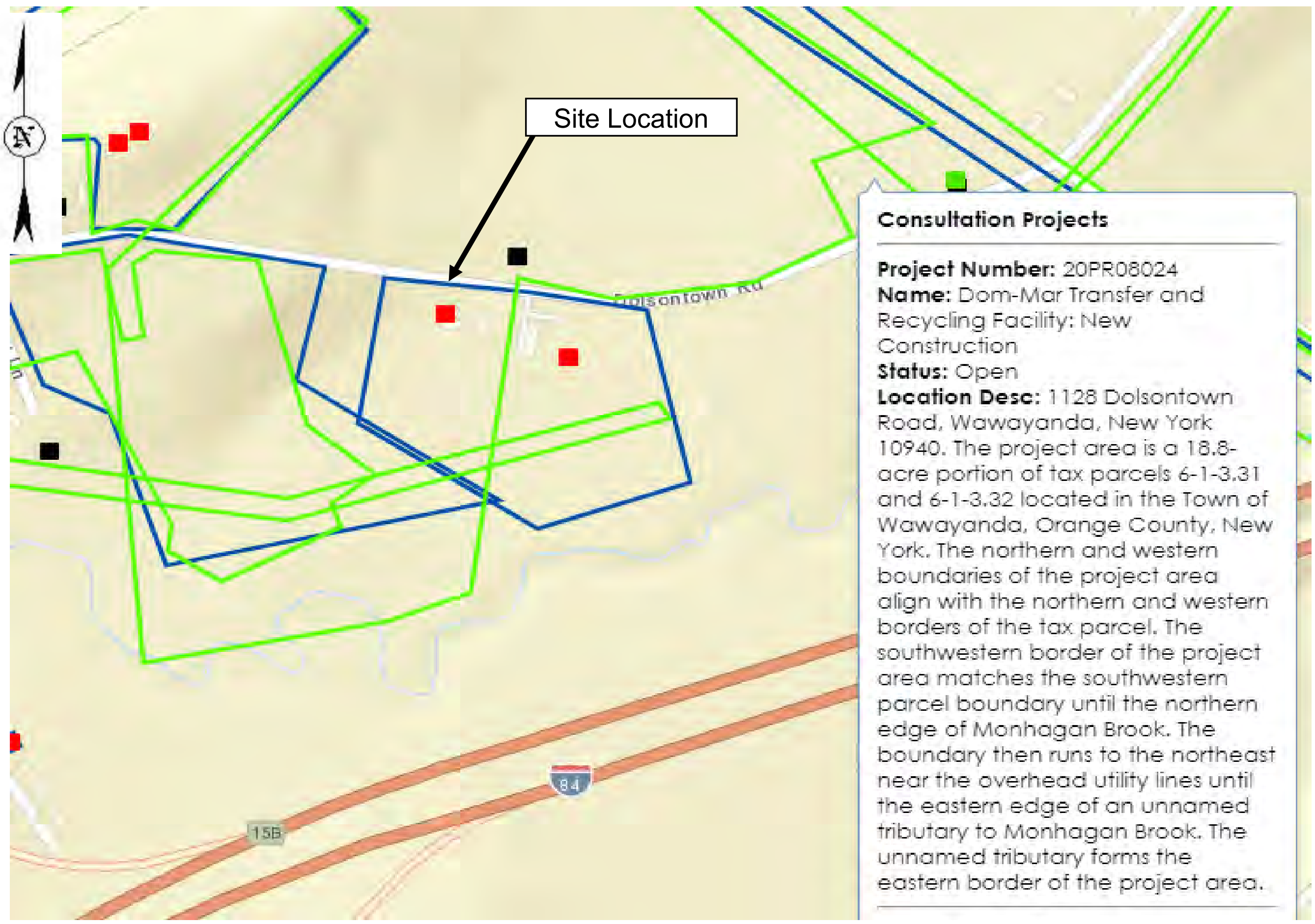
LEGEND

Wetlands

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**DOM-MAR Transfer and Recycling Facility**	**FIGURE 4**
	Dolsontown Rd. **Middletown, Orange County, New York**	**FEDERAL WETLANDS MAP**
Prepared By: BPB Date Prepared: 3/25/21	**Source:** www.fws.gov/wetlands/data/mapper.html	PN:



National Register Building Sites (View)

Survey Archaeology Areas (View)

USN Building Districts (View)

Consultation Projects (View)

Survey Building Areas (View)

Archeologically Sensitive Areas

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DOM-MAR Transfer and Recycling Facility

FIGURE 5

Dolsontown Rd.
Middletown, Orange County, New York

SHPO MAP

Prepared By: BPB
Date Prepared: 3/25/21

Source:
www.cris.parks.ny.gov

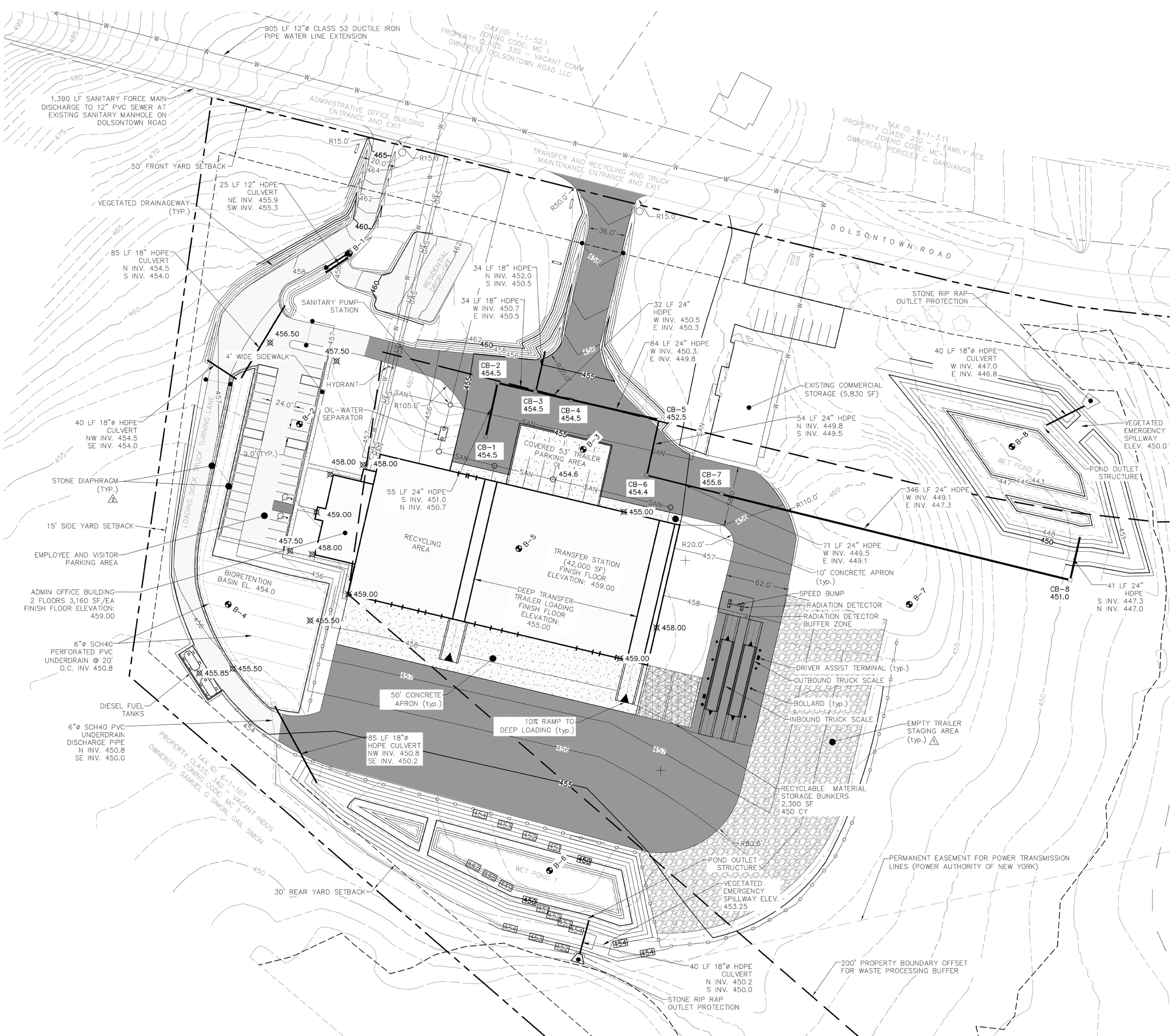
PN:

Attachment 1

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Site Drawings



LEGEND:

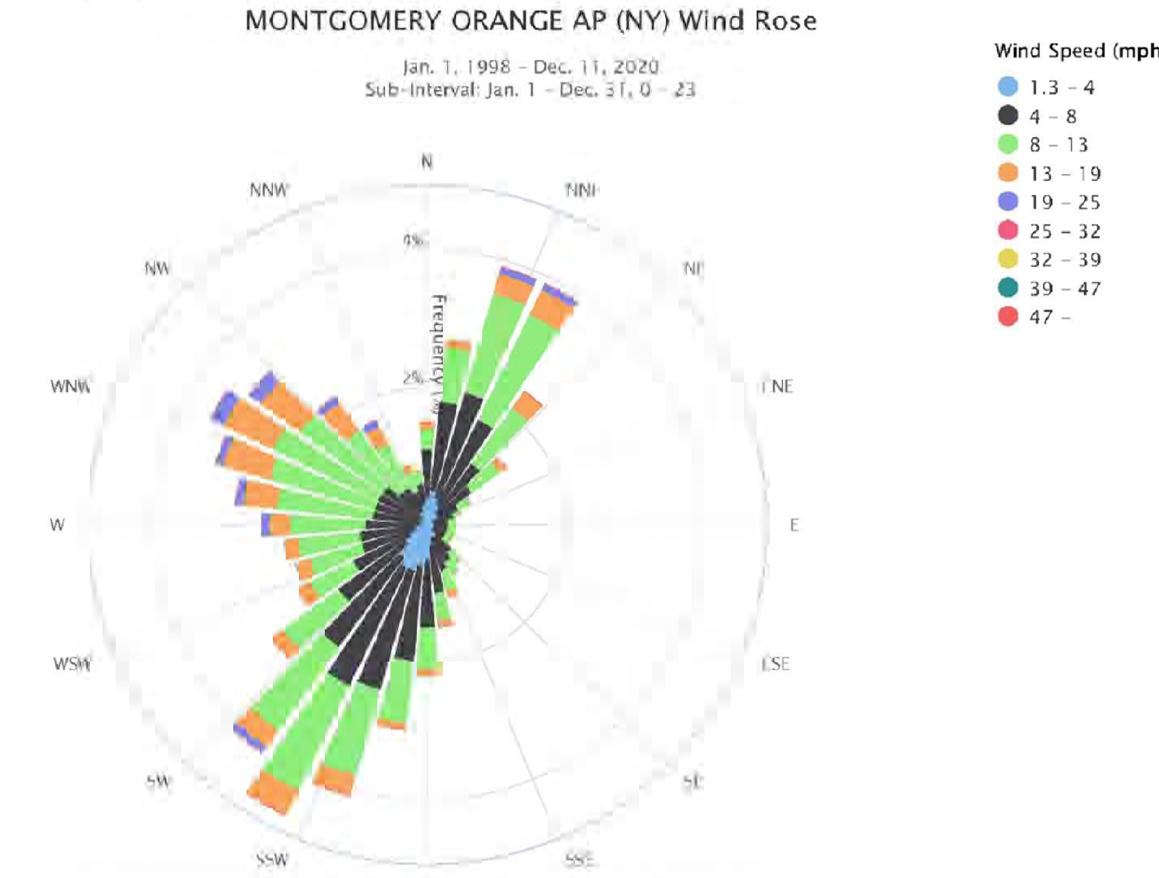
- EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- PROPOSED GRADING MAJOR CONTOUR (450)
- PROPOSED GRADING MINOR CONTOUR (448)
- PROPERTY BOUNDARY
- PROPERTY BOUNDARY SETBACK
- EXISTING BUILDING
- JURISDICTIONAL FEDERAL WETLAND
- OUTDOOR SIGNAGE
- STANDARD DUTY PAVEMENT
- HEAVY DUTY PAVEMENT
- CONCRETE
- GRAVEL
- LITTER FENCE
- SANITARY SEWER (SAN)
- WATER LINE (W)
- UNDERGROUND ELECTRIC (UE)
- NATURAL GAS LINE (GAS)
- PROPOSED SWALE
- PROPOSED STORM SEWER
- CB-1 454.50 — 3'X3' CATCH BASIN ID AND RIM ELEVATION
- LOCKING GATE
- B-3 — BOREHOLE LOCATION

NOTES:

1. EXISTING PROPERTY LINE, BUILDINGS AND TOPOGRAPHY FROM A SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
2. ELEVATIONS BASED ON NAVD88 DATUM, HORIZONTAL DATUM IS NEW YORK STATE PLANE EAST.
2. WETLAND BOUNDARIES AND THE FEDERAL JURISDICTION ARE FROM THE WETLAND DELINEATION REPORT FOR DOLSONTOWN ROAD PREPARED BY ENSOL, INC. DATED DECEMBER 2020. FEDERAL JURISDICTION WAS CONFIRMED THROUGH A JURISDICTIONAL DETERMINATION FROM THE UNITED STATES ARMY CORPS OF ENGINEERS DATED JANUARY 5, 2022 (APPLICATION NUMBER NAN-2021-00721-WOR). WETLAND FLAGS AND BOUNDARY LOCATION ARE FROM THE SURVEY PREPARED FOR MIKE MARANGI DATED NOVEMBER 16, 2020, PREPARED BY LANC & TULLEY ENGINEERING AND SURVEYING, P.C.
3. EACH RESIDENTIAL, INDUSTRIAL, COMMERCIAL SUBDIVISION OR SITE PLANS SHALL CONTRIBUTE RECREATIONAL FEES CALCULATED ON THE BASIS OF GROSS FLOOR AREA FOR ALL NEW CONSTRUCTION.
4. THE EXISTING COMMERCIAL STORAGE BUILDING WATER LINE SHALL BE DISCONNECTED FROM THE EXISTING WATER WELL AND CONNECTED TO THE EXTENDED WATER LINE ALONG DOLSONTOWN ROAD. THE SANITARY LINE SHALL BE DISCONNECTED FROM THE EXISTING SEPTIC SYSTEM AND DRAIN TO THE SANITARY PUMP STATION TO BE DISCHARGED TO THE EXISTING SEWER LINE ON DOLSONTOWN ROAD VIA A FORCE MAIN.
5. BASED ON THE NEW YORK STATE HISTORIC PRESERVATION OFFICE (SHPO) LETTER DATED JUNE 15TH 2021 AND THE PHASE 1 ARCHAEOLOGICAL INVESTIGATION FOR THE DOM-MAR TRANSFER AND RECYCLING CENTER, TOWN OF WAWAYANDA, ORANGE COUNTY, NEW YORK, PERFORMED BY TRACKER ARCHAEOLOGY OF MONROE, NEW YORK, NO EVIDENCE OF ARCHEOLOGICAL SITES WERE FOUND WITHIN THE PROJECT'S AREA OF POTENTIAL EFFECTS. THE APPROXIMATE LOCATION OF A NEW YORK STATE MUSEUM-RECORDED ARCHAEOLOGICAL SITE NYSM 6169 DESCRIBED AS "CEMETERY" IS MAPPED IN THE PROJECT AREA. THE SHPO HUMAN REMAINS DISCOVERY PROTOCOL DATED JANUARY 2021 SHALL BE IMPLEMENTED SHOULD ANY EVIDENCE OF HUMAN REMAINS OR POSSIBLE BURIAL GROUNDS BE ENCOUNTERED DURING CONSTRUCTION.

MONTGOMERY ORANGE AP (NY) Wind Rose

Jan. 1, 1998 - Dec. 11, 2020
Sub-Interval: Jan. 1 - Dec. 31, 0 - 23



NO.	REVISION	BY	DATE
2	ADDED STONE DIAPHRAGM LOCATION		
1	ADDED GRAVEL EMPTY TRAILER STAGING AREA		

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT: DOM KAM LLC

SITE: DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT: NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

TITLE: SITE PLAN

ISSUE: REVIEW

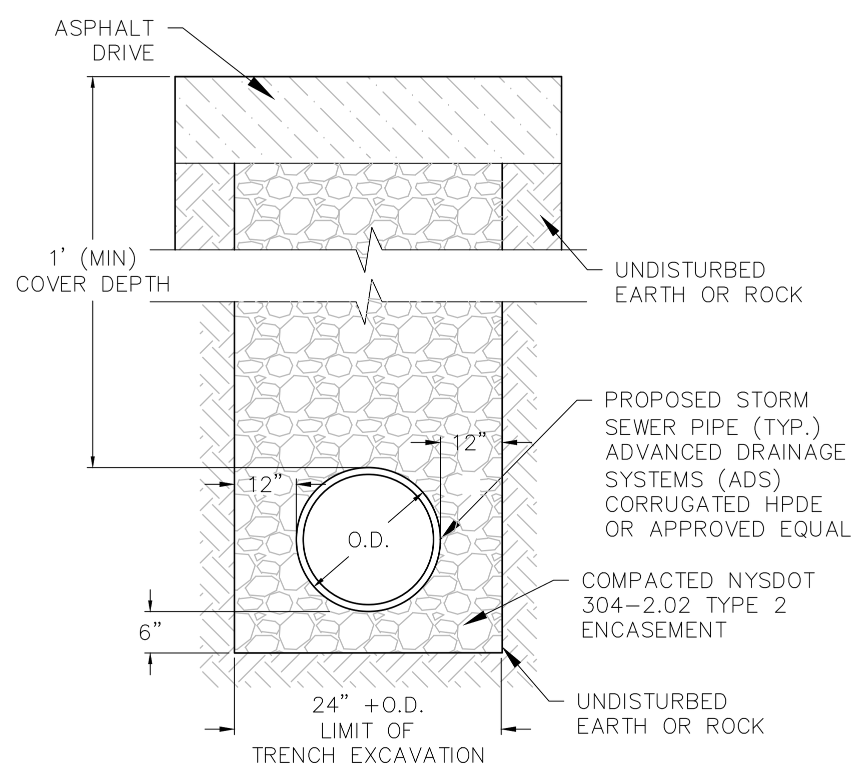
DES:	DRN:	CHK:
DAL	SJD	DAL

PROJECT NO: 029-A0001
DATE: JANUARY 2023

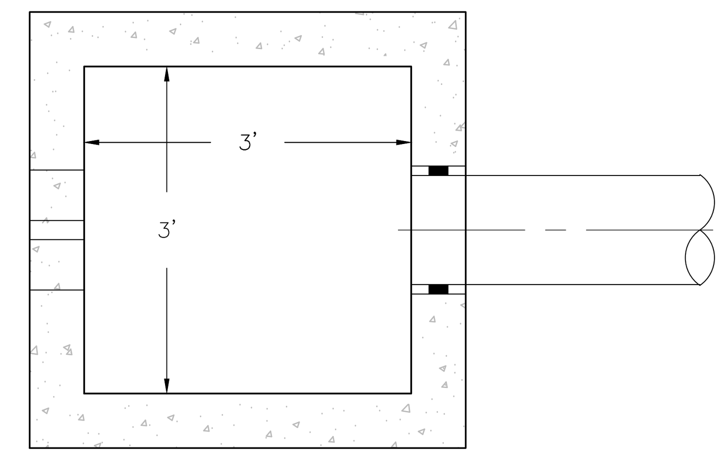
GRAPHIC SCALE: 0' 50' 100'

FILE: Sheet 2 Area Fin Site Plan REV2.dwg

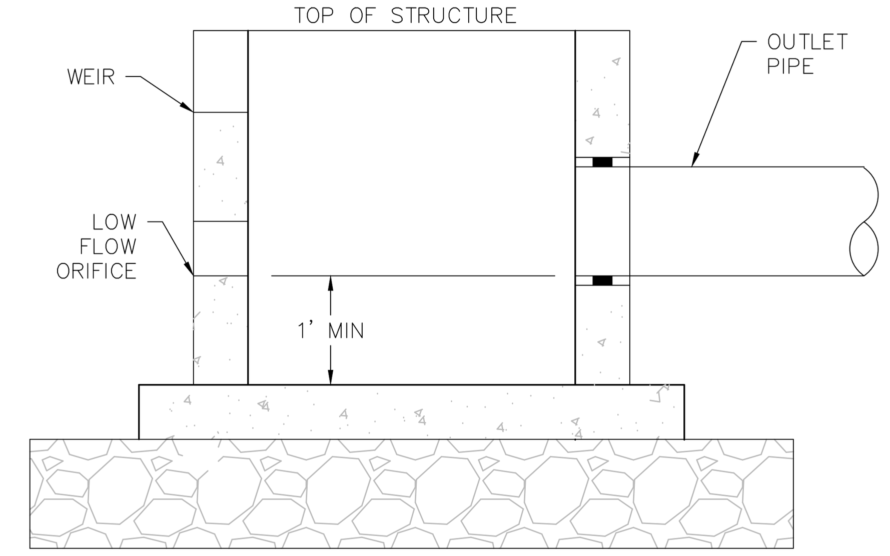
REV NO: 1
SHEET NO: 2



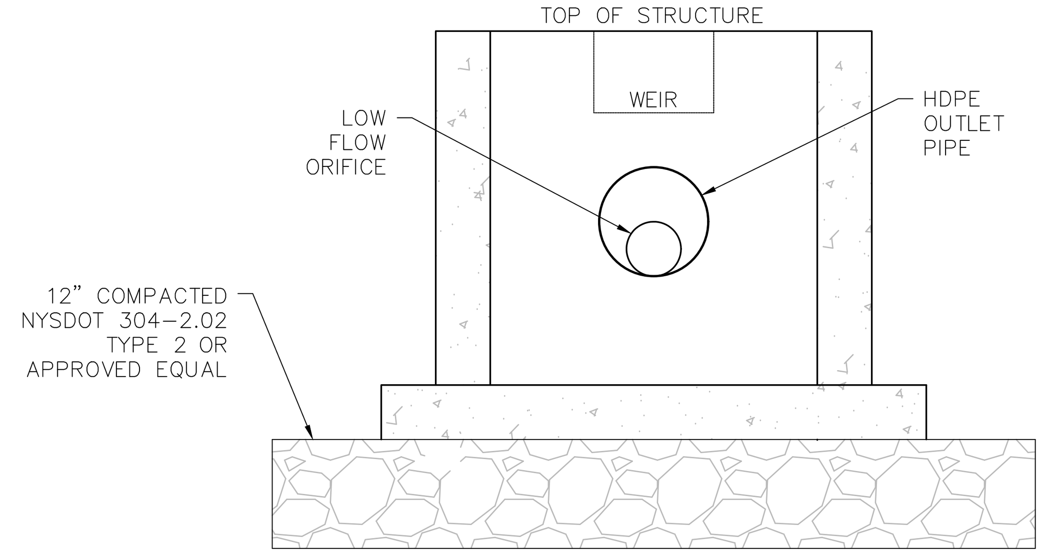
STORM PIPE TRENCH DETAIL
NOT TO SCALE



PLAN VIEW



SECTION VIEW



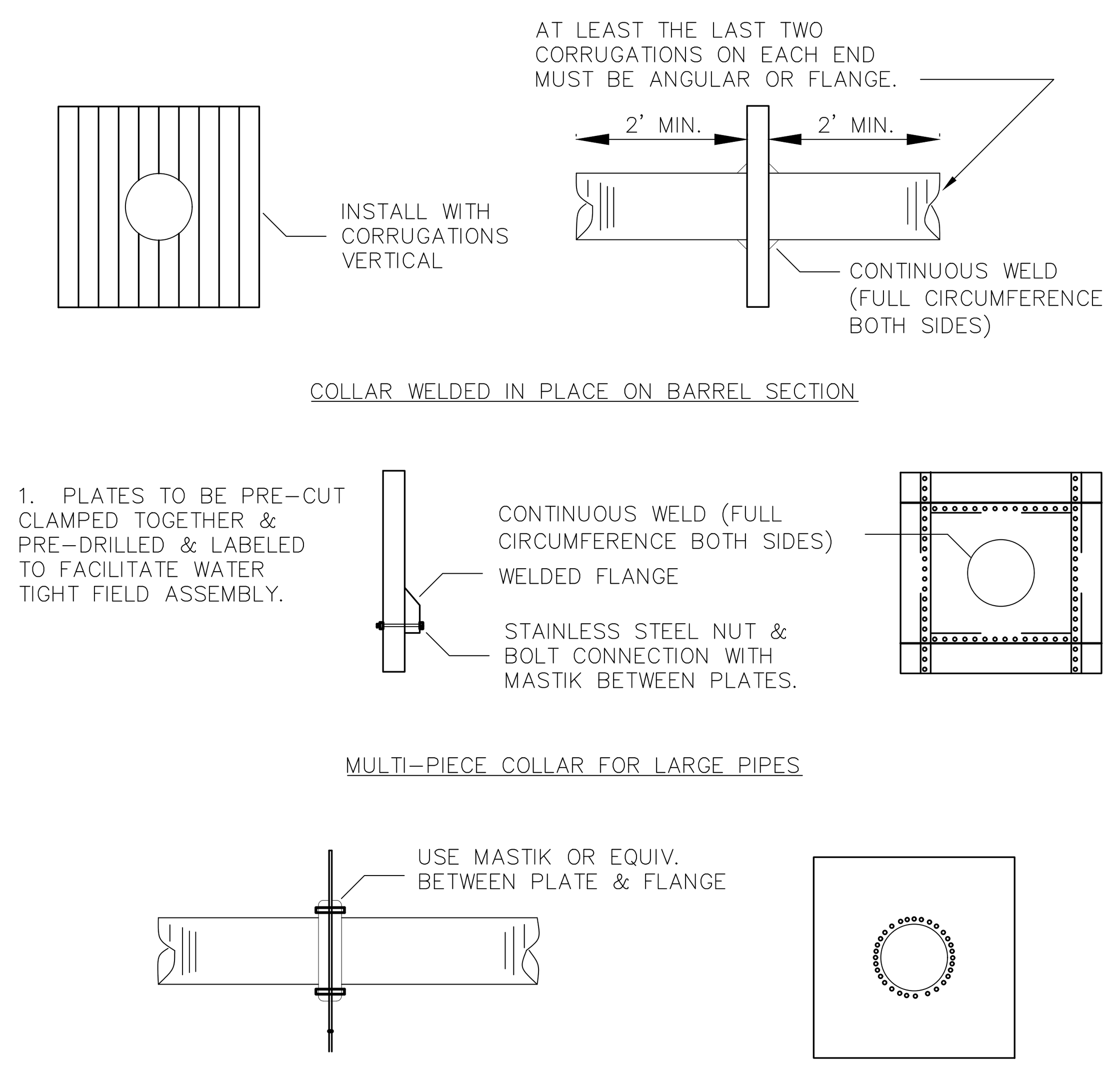
SECTION VIEW

NOTES:
1. ALL OUTLET STRUCTURE INLETS TO BE COVERED BY REMOVABLE TRASH RACKS WITH OPENINGS SMALLER THAN THAT OF THE INLET (ORIFICE, WEIR, ETC.).

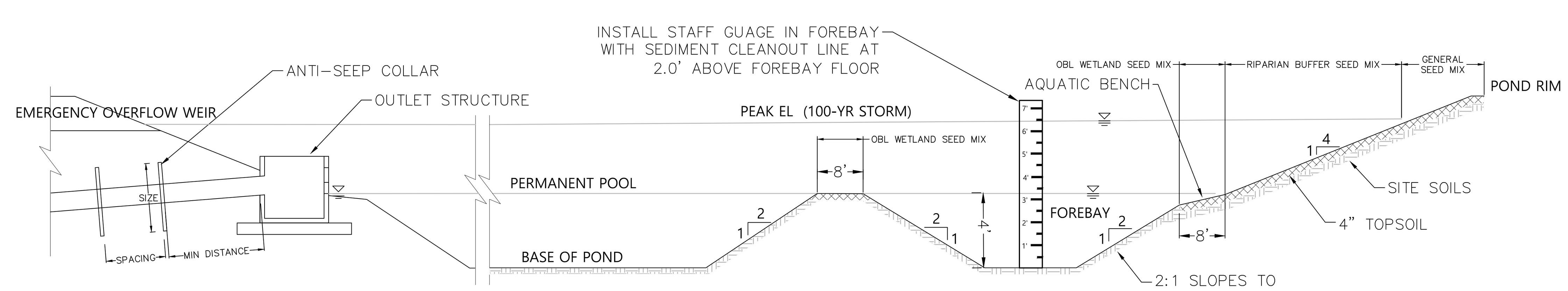
	WET POND 1 OUTLET		WET POND 2 OUTLET	
OUTLET	SIZE	ELEVATION	SIZE	ELEVATION
OUTLET PIPE	18 IN ø	450.2	18 IN ø	447.0
LOW FLOW ORIFICE	3 IN ø	450.2	3 IN ø	447.0
WEIR	12 IN	451.75	12 IN	448.6
TOP OF STRUCTURE	3 FT X 3 FT	452.60	3 FT X 3 FT	450.0

2.

POND OUTLET STRUCTURE
NOT TO SCALE



ANTI-SEEP COLLAR DETAIL
NOT TO SCALE



POND CROSS-SECTION
NOT TO SCALE
1.

ANTI-SEEP COLLARS

	WET POND 1 (WEST POND)			WET POND 2 (EAST POND)		
#	SIZE (MIN)	SPACING	MAX DISTANCE	SIZE (MIN)	SPACING	MAX DISTANCE
1	4.4'	N.A.	19.6'	5.1'	N.A.	24.5'
2	3.1'	4'-11.2'	19.6'	3.3'	4.5'-12.6'	24.5'
3	2.5'	2.5'-7'	19.6'	2.6'	2.8'-7.7'	24.5'

NOTES:
1. FIRST COLLAR TO BE PLACED A MINIMUM DISTANCE WITHIN THE BERM SO THAT THE TOP OF THE COLLAR HAS A MINIMUM 1' OF COVER.

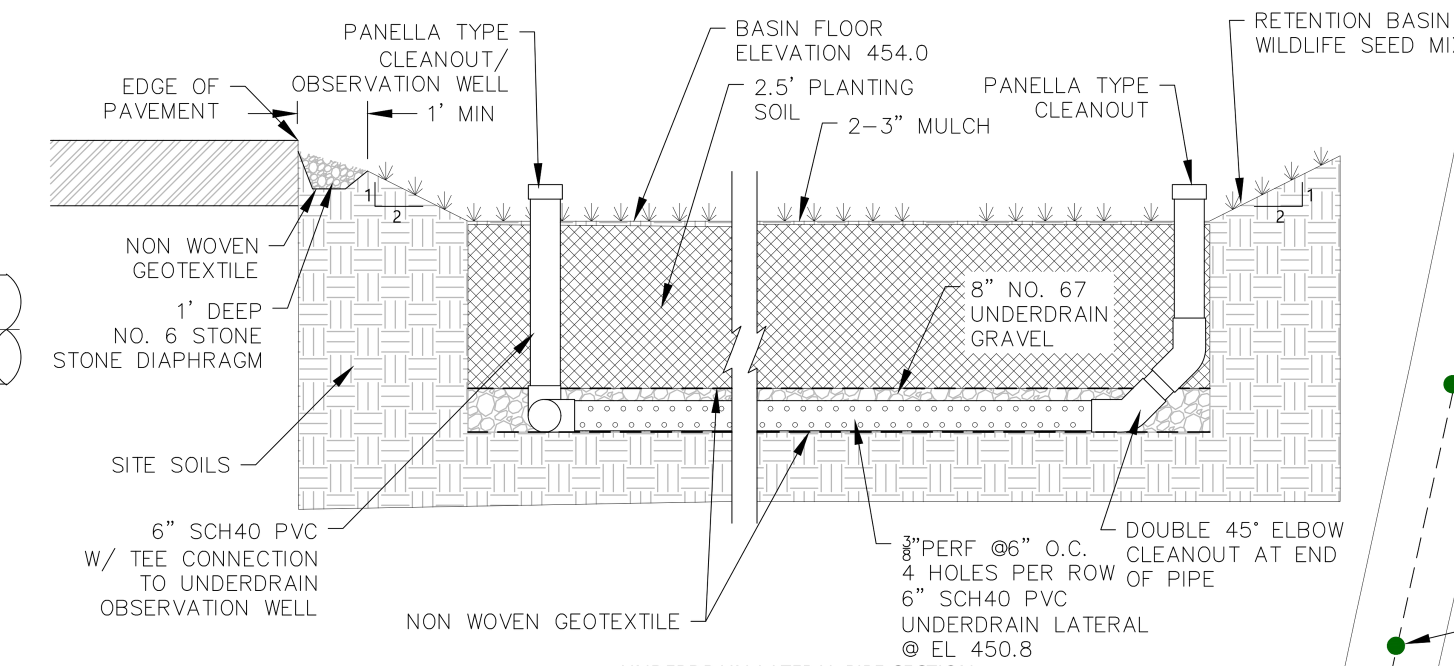
WET POND LANDSCAPING ZONES

ZONE	DEPTH RANGE	ELEVATION	
		WET POND 1	WET POND 2
DEEP WATER AREAS	18"-6'	446.0-448.7	442.5-445.5
SHALLOW WATER AREA	NORMAL POOL-18"	448.7-450.2	445.5-447.0
SHORELINE FRINGE	MAX POOL-NORMAL POOL	450.2-453.46	447.0-450.09

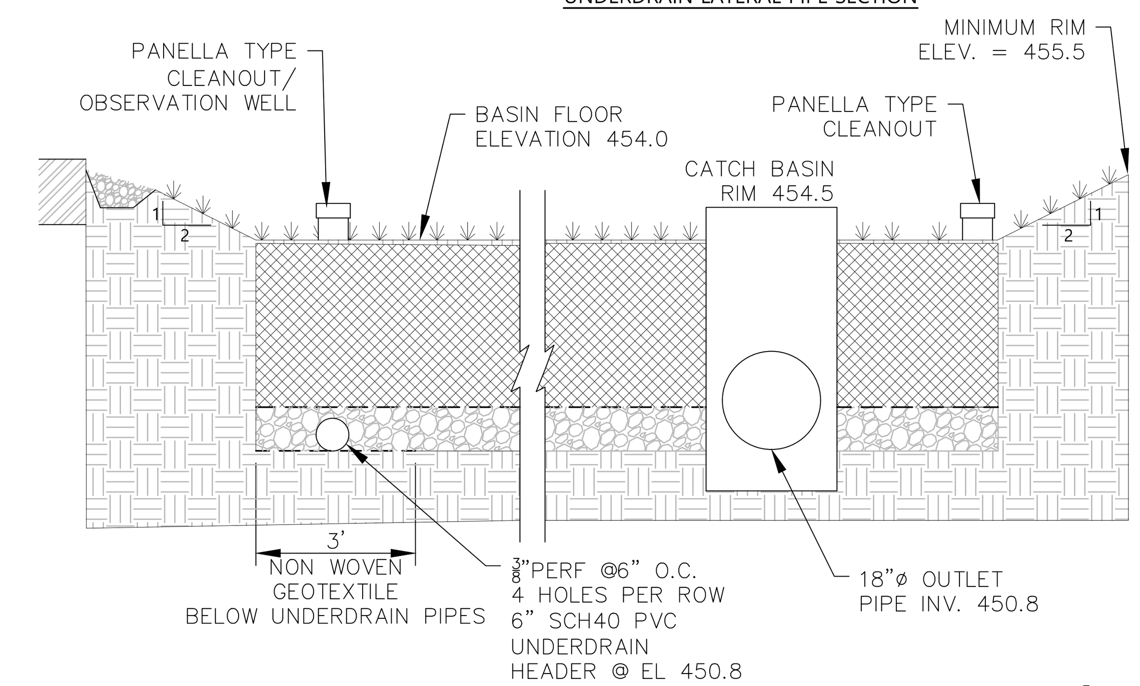
POND ELEVATIONS

ELEVATION	WET POND 1	WET POND 2
POND RIM	454.50	451.25
EMERGENCY OVERFLOW	453.25	450.0
PEAK (100-YR STORM)	453.46	450.09
PERMANENT POOL	450.2	447.0
EDGE OF AQUATIC BENCH	449.2	446.0
BASE OF POND	446.0	442.5

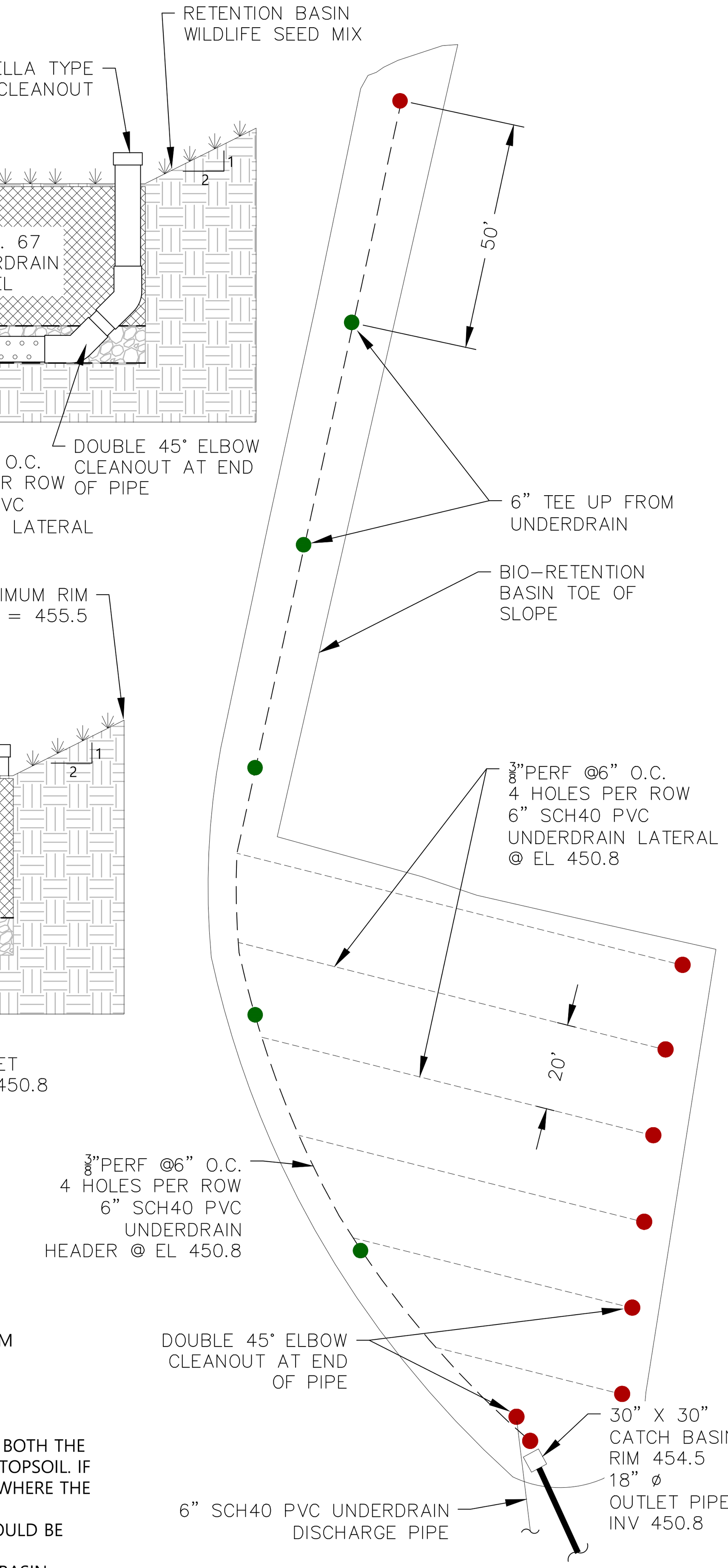
2.



UNDERDRAIN LATERAL PIPE SECTION



UNDERDRAIN HEADER PIPE AND CATCH BASIN SECTION



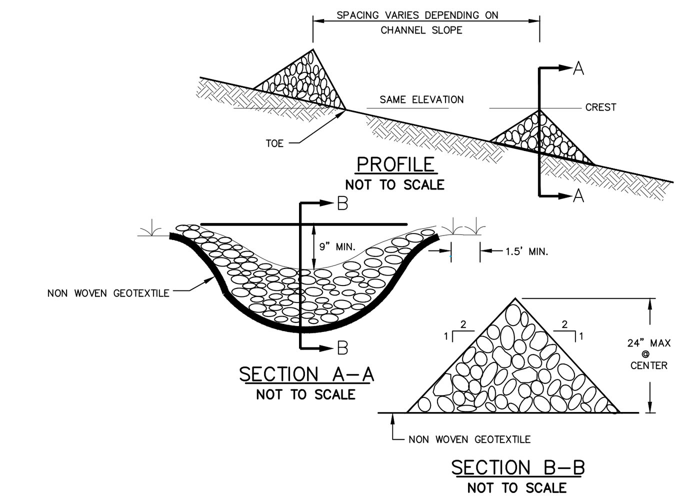
UNDERDRAIN LAYOUT/PLAN VIEW

DETAIL NOTES:
1. PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

PH RANGE	5.2-7.0	SOLUBLE SALTS	NOT TO EXCEED 500PPM
ORGANIC MATTER	1.5 - 4%	CLAY	10 - 25%
MAGNESIUM	35 LB/AC	SILT	30 - 55%
PHOSPHORUS P_2O_5	75 LB/AC	SAND	35 - 60%
POTASSIUM K_2O	85 LB/AC		

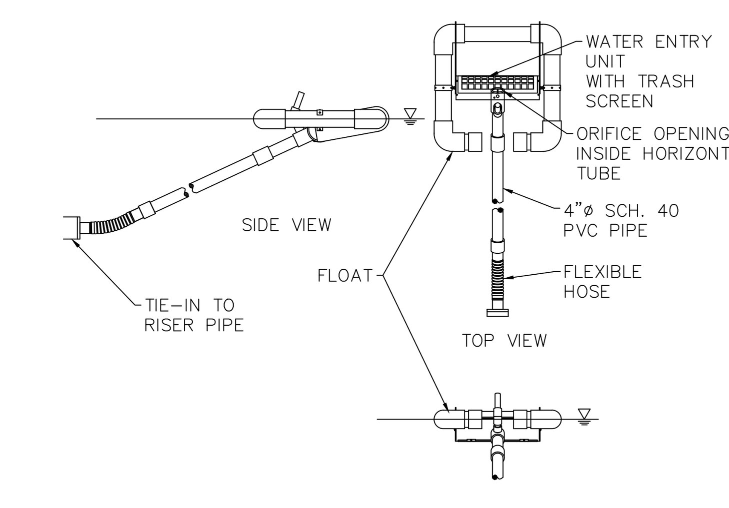
2. ALL BIORETENTION AREAS SHALL HAVE A MINIMUM OF ONE TEST. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TESTS (NOTE 1). A TEXTURAL ANALYSIS IS REQUIRED FOR THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURAL ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.
3. COMPACTION OF BOTH THE BASE OF THE BIORETENTION AREA AND THE REQUIRED BACKFILL SHOULD BE MINIMIZED. USE EXCAVATION HOES WHEN POSSIBLE TO REMOVE ORIGINAL SOIL.
4. SEE APPENDIX C OF THE "NEW YORK STATE STORMWATER DESIGN MANUAL" FOR BIORETENTION BASIN SPECIFICATIONS.
5. ALL UNDERDRAIN PIPES TO HAVE A 3' (MIN) NONWOVEN GEOTEXTILE FABRIC PLACED DIRECTLY BELOW PIPE.

BIORETENTION BASIN DETAIL
NOT TO SCALE



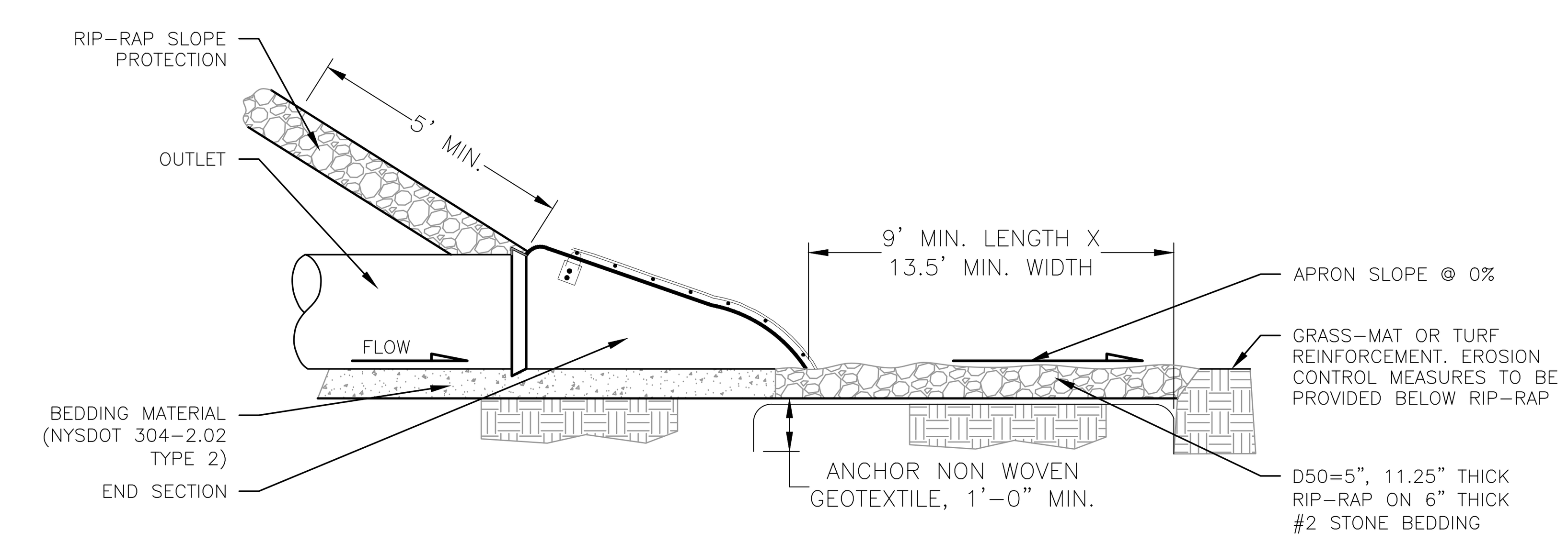
NOTES:
1. CHECK DAMS SHALL BE PLACED AT THE LOCATIONS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOW OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONES.

STONE CHECK DAM DETAIL
NOT TO SCALE

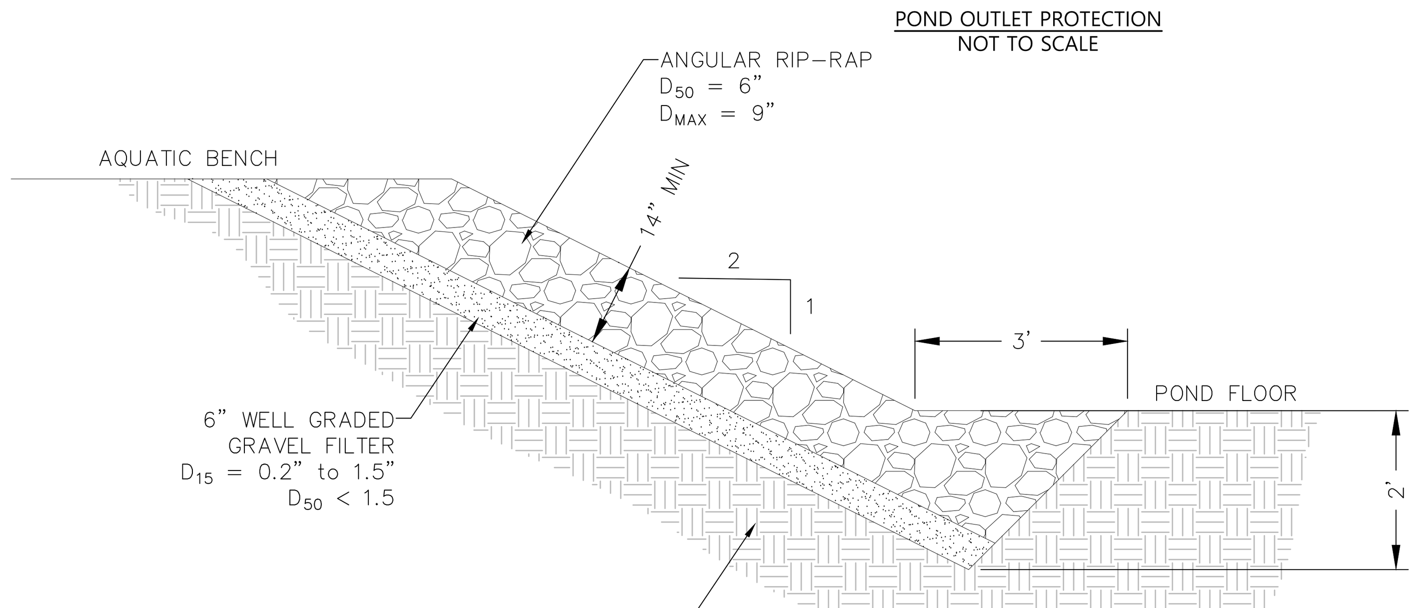


	SEDIMENT BASIN 1	SEDIMENT BASIN 2
RISER TIE-IN	450.2'	447.0'
ORIFICE SIZE	2.3"	2.3"
4" PVC PIPE LENGTH	2.2' MIN	2.3' MIN

SEDIMENT BASIN SKIMMER
NTS

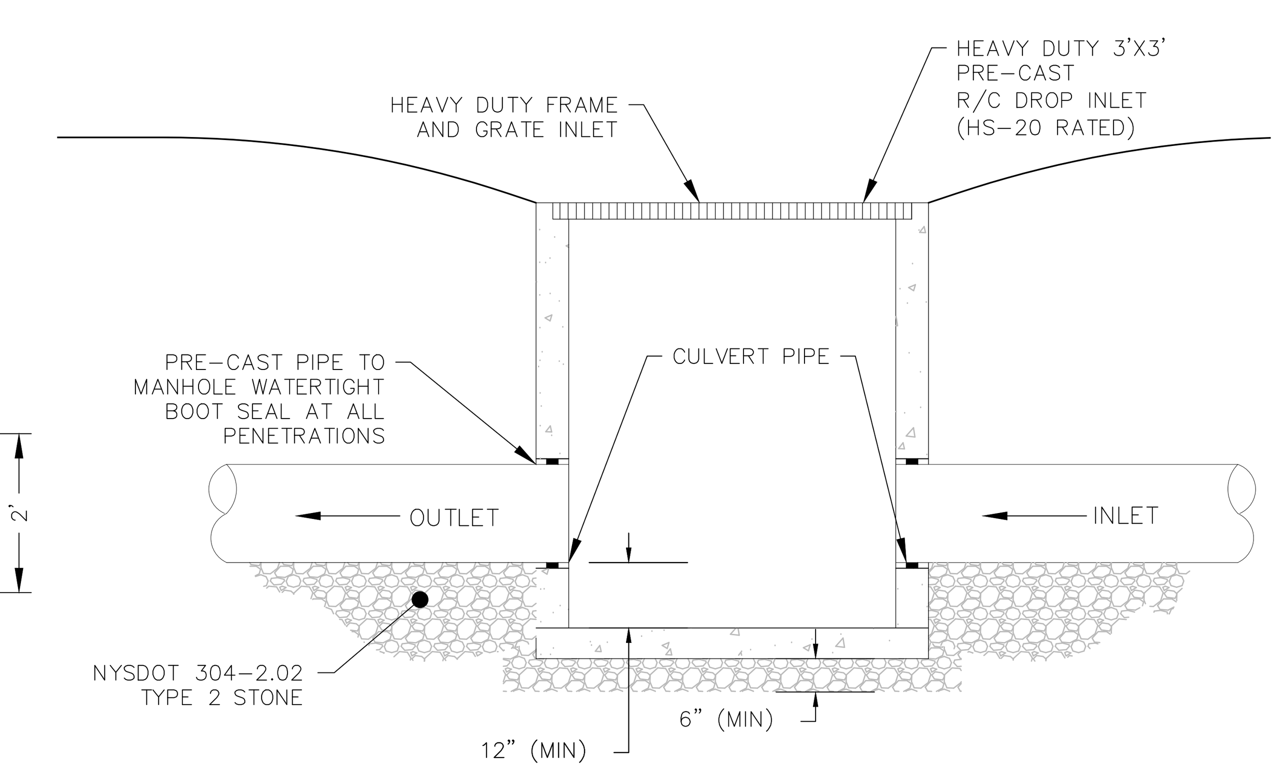


POND OUTLET PROTECTION
NOT TO SCALE



NOTES:
1. ALL 2:1 SLOPES WITHIN WET POND 1 AND WET POND 2 TO BE ARMORED WITH RIP-RAP TO PREVENT EROSION DUE TO SEEPAGE.

RIP-RAP ARMORED SLOPE PROTECTION
NOT TO SCALE



CATCH BASIN DETAIL
NOT TO SCALE

IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, ARTICLE 145 SECTION 7209, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.

NO.	REVISION	BY	DATE
1	ADDED FORE BAY TO POND CROSS SECTION DETAIL		
2	UPDATED POND AND OUTLET ELEVATIONS		

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CLIENT:
DOM KAM LLC

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

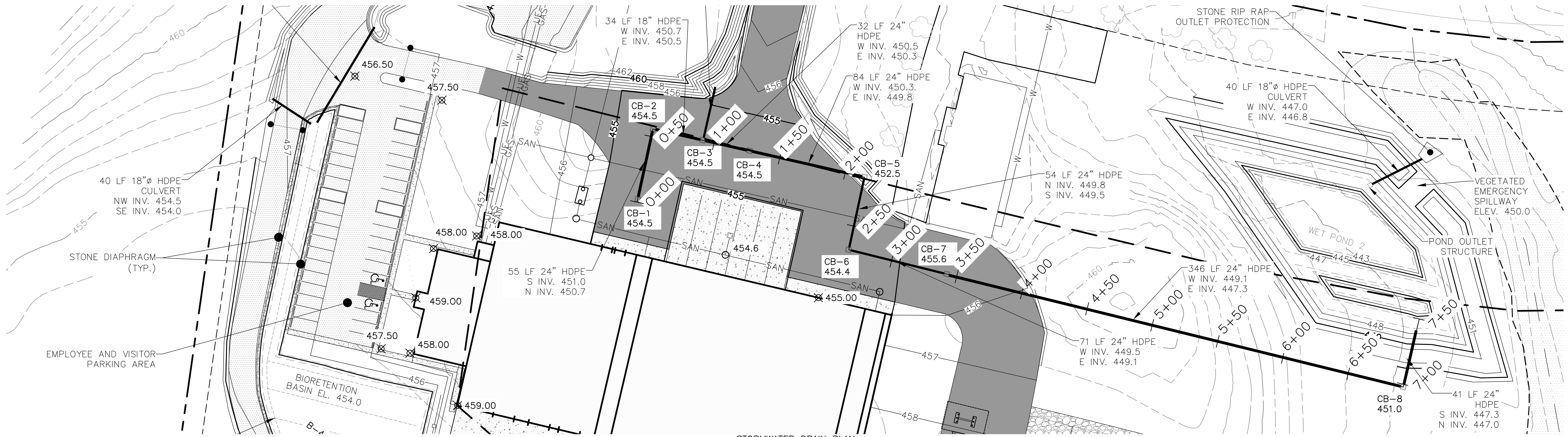
TITLE:
STORMWATER DETAILS

ISSUE:
REVIEW

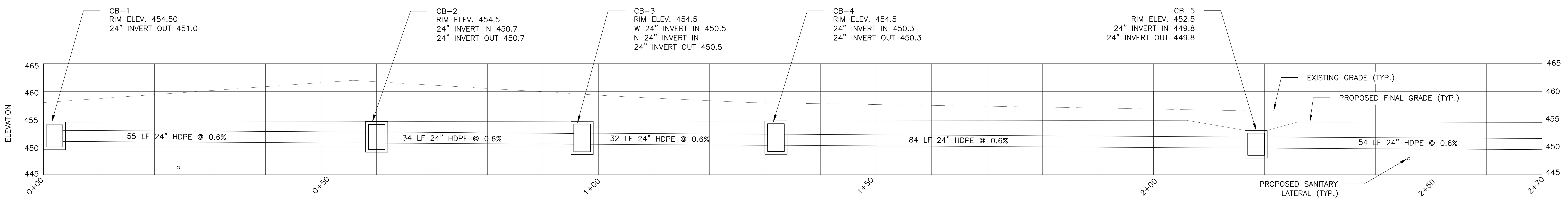
DES: BPB | DRN: BPB | CHK: DL
PROJECT NO: 029-A0001 | DATE: JANUARY 2023
GRAPHIC SCALE: NOTED

FILE: Sheet 7 - Stormwater Details.dwg

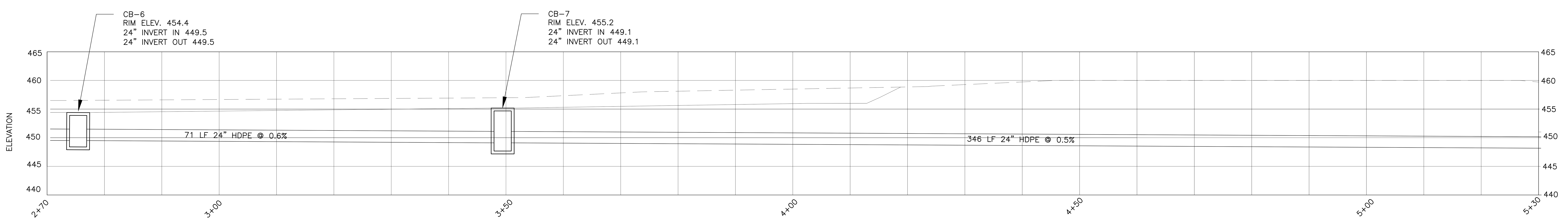
REV NO: 1 | SHEET NO: 7



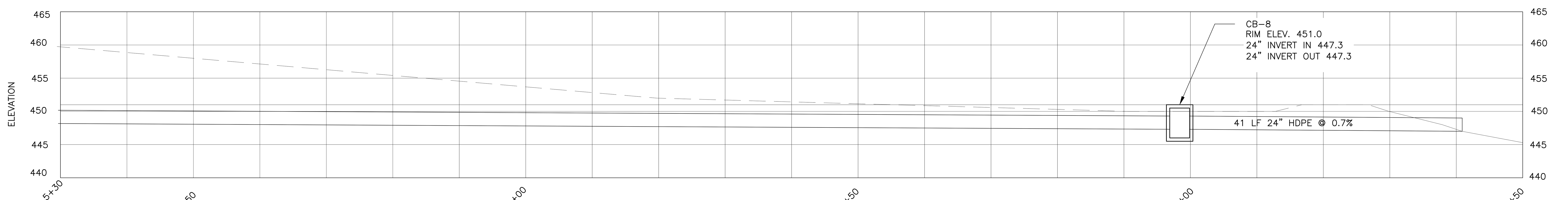
STORMWATER DRAIN PLAN
SCALE: 1"=50'



STORMWATER DRAIN PROFILE
STA 0+00 TO 2+80
SCALE: 1"=10'



STORMWATER DRAIN PROFILE
STA. 2+80 TO 5+30
SCALE: 1"=10'



STORMWATER DRAIN PROFILE
STA. 5+30 TO 7+50
SCALE: 1"=10'

NO.	REVISION	BY	DATE

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TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

TITLE:
STORM WATER DRAIN PROFILE

ISSUE:
REVIEW

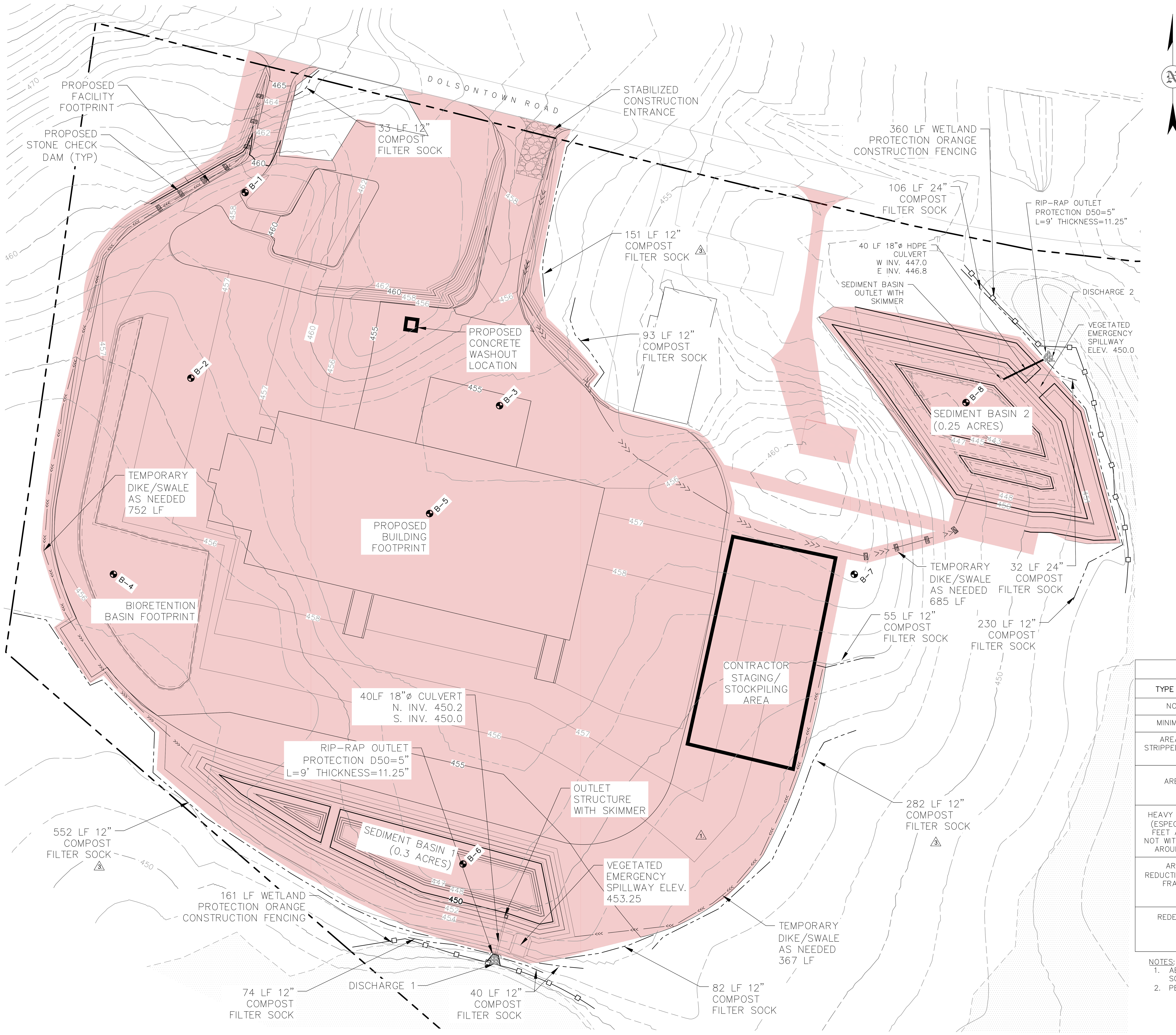
DES: DL | DRN: SJD | CHK: DL

PROJECT NO: 029-A0001 | DATE: MARCH 2022

GRAPHIC SCALE: NOTED

FILE: Sheet 2 And 6 - Site Plan REV3.dwg

REV NO: 0 | SHEET NO: 8



LEGEND:

- EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- PROPOSED GRADING MAJOR CONTOUR
- PROPOSED GRADING MINOR CONTOUR
- PROPERTY BOUNDARY
- EXISTING BUILDING
- BOREHOLE LOCATION
- JURISDICTIONAL FEDERAL WETLAND
- TEMPORARY DIVERSION BERM/SWALE
- SILT FENCE/COMPOST FILTER SOCK
- PROPOSED AREA OF DISTURBANCE TOTAL = 9.6 ACRES
- ORANGE CONSTRUCTION FENCE

GENERAL NOTES:

1. CONTRACTOR TO VERIFY ALL FIELD CONDITIONS AND UTILITY LOCATIONS PRIOR TO START OF CONSTRUCTION.
2. INSTALL STABILIZED CONSTRUCTION ENTRANCE AND PERIMETER EROSION AND SEDIMENT CONTROL FEATURES PRIOR TO COMMENCING SITE WORK.
3. ADDITIONAL COMPOST FILTER SOCK MAY BE REQUIRED TO PREVENT SILT LADEN RUNOFF FROM FLOWING ONTO PAVED AREAS AND/OR ADJACENT PROPERTIES.
4. MAINTAIN EROSION AND SEDIMENT CONTROL FEATURES THROUGHOUT CONSTRUCTION. REMOVE ACCUMULATED SILT AND SEDIMENT AS NEEDED. REPAIR OR REPLACE ALL DAMAGED COMPOST FILTER SOCK IMMEDIATELY.
5. SEDIMENT BASIN PERMANENT POOL DEWATERING TO BE DONE VIA PUMP TO STABILIZED DISCHARGE AREA UTILIZING SILT BAG OR APPROVED EQUAL AS NEEDED.
6. IMMEDIATELY SEED ALL DESIGNATED GRASS AREAS THAT HAVE BEEN COMPLETED THROUGH FINAL GRADE.
7. CONTRACTOR STAGING AREA, STOCKPILE AREAS, AND CONCRETE WASHOUT TO BE LOCATED PER OWNER APPROVAL. PROVIDE SILT CONTROL FEATURES AROUND ALL TEMPORARY STOCKPILES. SEED AND MULCH ALL STOCKPILES THAT WILL REMAIN INACTIVE FOR LONGER THAN 7 DAYS. CONCRETE WASHOUT TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH NYSDEC STANDARD AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
8. MAINTAIN EROSION CONTROL FEATURES UNTIL ADEQUATE FINAL VEGETATION HAS BEEN ESTABLISHED (80% COVERAGE AT 2-INCH STAND OF GRASS). SEDIMENT BASIN OUTLET STRUCTURES TO BE CONVERTED TO FINAL WETPOND OUTLET CONFIGURATION UPON FINAL STABILIZATION.

SOIL RESTORATION REQUIREMENT

TYPE OF SOIL DISTURBANCE	SOIL RESTORATION REQUIREMENT	COMMENTS/EXAMPLES
NO SOIL DISTURBANCE	RESTORATION NOT PERMITTED	PRESERVATION OF NATURAL FEATURES
MINIMAL SOIL DISTURBANCE	RESTORATION NOT REQUIRED	CLEARING AND GRUBBING
AREAS WHERE TOPSOIL IS STRIPPED ONLY – NO CHANGE IN GRADE	HYDROLOGIC SOIL GROUP C&D AERATE[1] AND APPLY 6 INCHES OF TOPSOIL	PROTECT AREA FROM ANY ONGOING CONSTRUCTION ACTIVITIES
AREAS OF CUT OR FILL	HYDROLOGIC SOIL GROUP C&D APPLY FULL SOIL RESTORATION[2]	
HEAVY TRAFFIC AREAS ON SITE (ESPECIALLY IN A ZONE 5–25 FEET AROUND BUILDINGS BUT NOT WITHIN A 5 FOOT PERIMETER AROUND FOUNDATION WALLS	APPLY FULL SOIL RESTORATION (DECOMPACTION AND COMPOST ENHANCEMENT)	
AREAS WHERE RUNOFF REDUCTION AND/OR INFILTRATION FRACTICES ARE APPLIED	RESTORATION NOT REQUIRED, BUT MAY BE APPLIED TO ENHANCE THE REDUCTION SPECIFIED FOR APPROPRIATE PRACTICES	KEEP CONSTRUCTION EQUIPMENT FROM CROSSING THESE AREAS. TO PROTECT NEWLY INSTALLED PRACTICE FROM ANY ONGOING CONSTRUCTION ACTIVITIES CONSTRUCT A SINGLE PHASE OPERATION FENCE AREA
REDEVELOPMENT PROJECTS	SOIL RESTORATION IS REQUIRED ON REDEVELOPMENT PROJECTS IN AREAS WHERE EXISTING IMPERVIOUS AREA WILL BE CONVERTED TO PERVIOUS AREA	

NOTES:
1. AERATION INCLUDE THE USE OF MACHINES SUCH AS TRACTOR-DRAWIN IMPLEMENTS WITH COULTERS MAKING A NARROW SLIT IN THE SOIL, A ROLLER WITH MANY SPIKES MAKING INDENTATIONS IN THE SOIL, OR PRONGS WHICH FUNCTION LIKE A MINI-SUBSOILER.
2. PER "DEEP RIPPING AND DE-COMPACTION, DEC 2008".

TABLE 5.3 FROM NEW YORK STATE STORMWATER DESIGN MANUAL 2015

NO.	REVISION	BY	DATE
1.	ADDED GRAVEL EMPTY TRAILER STAGING AREA.		
2.	ADDED PROPOSED CONTOURS, BUILDING OUTLINES, BOREHOLE LOCATIONS, AND LEGEND		
3.	UPDATED COMPOST FILTER SOCK LOCATION AND LENGTH		

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SITE: DOM-MAR TRANSFER AND RECYCLING FACILITY
CITY OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT: NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

TITLE: EROSION AND SEDIMENT CONTROL PLAN

ISSUE: REVIEW

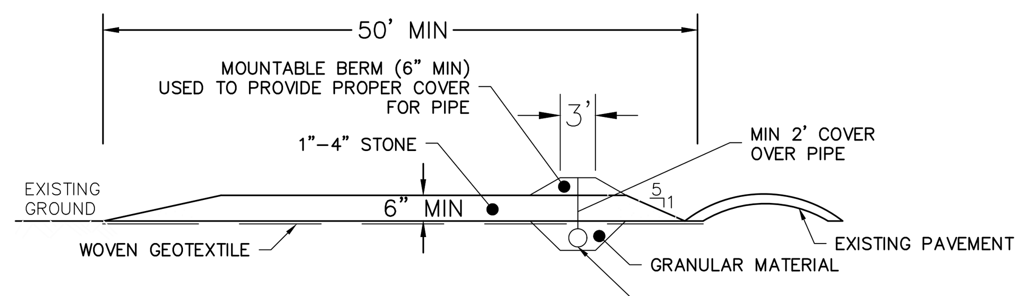
DES: BPB | DRN: BPB | CHK: DAL

PROJECT NO: 20-0062 | DATE: JANUARY 2023

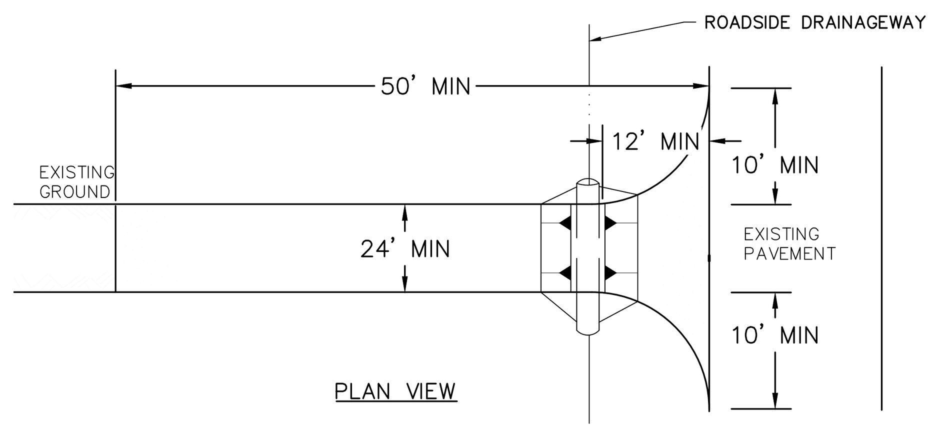
GRAPHIC SCALE: 0' 60' 120'

FILE: Sheet 9 - ESC Plan Rev 1.dwg

REV NO: 1 | SHEET NO: 9



PROFILE VIEW

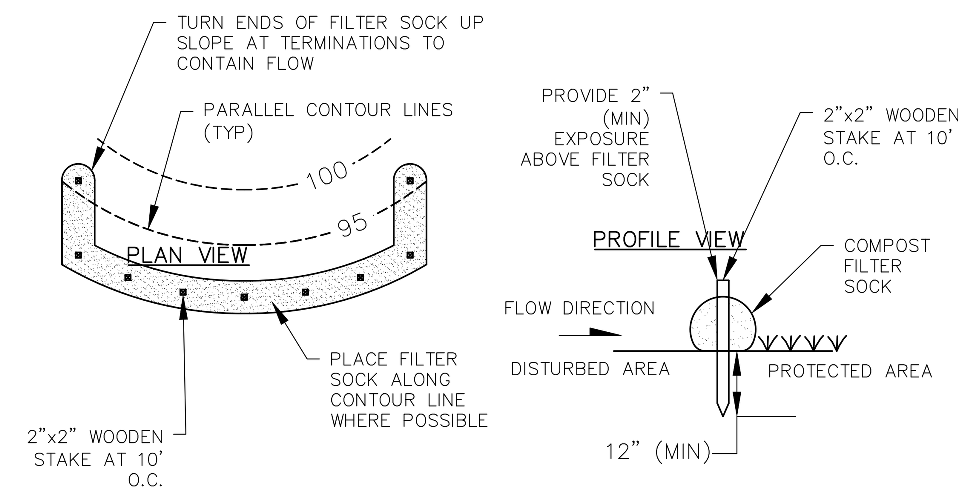


PLAN VIEW

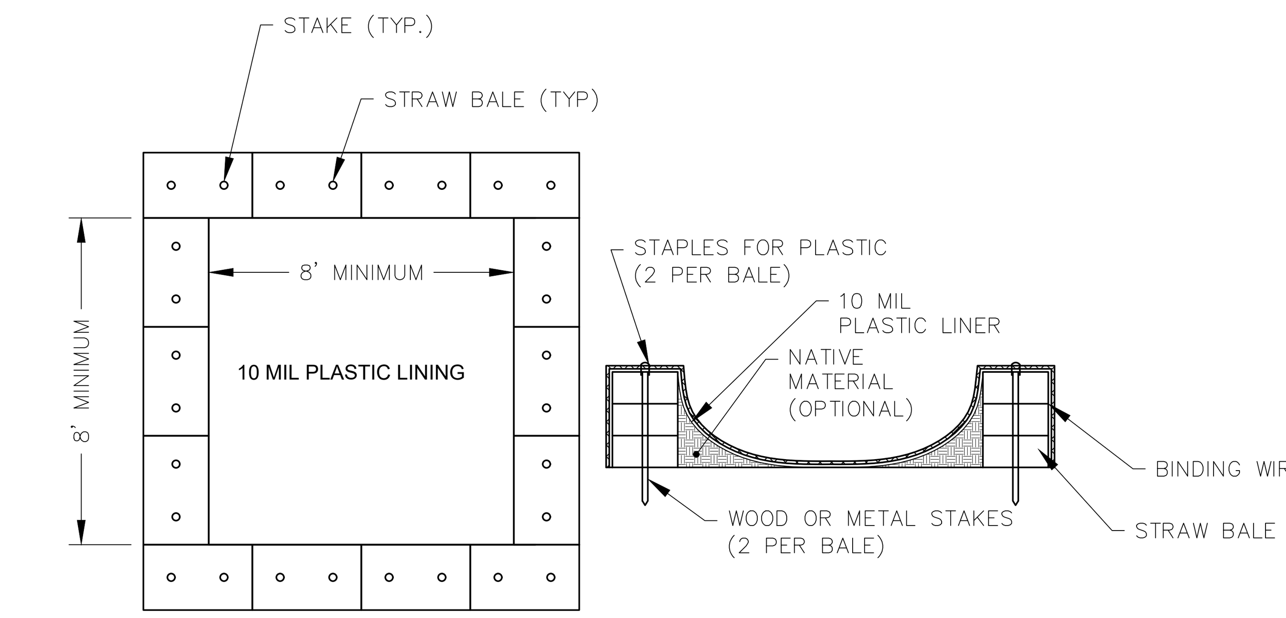
DETAIL NOTES:

1. GRAVEL DRIVE 1-4" CLEAN STONE OR RECLAIMED CONCRETE EQUIVALENT.
2. WOVEN GEOTEXTILE TO BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
3. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE.
4. STABILIZED CONSTRUCTION ENTRANCE SHALL BE MAINTAINED IN GOOD WORKING ORDER THROUGHOUT CONSTRUCTION TO PREVENT TRACKING OF SOILS & SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. REMOVE ALL SOILS & SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY IMMEDIATELY.
5. INSPECT ENTRANCE AFTER EACH RAIN EVENT AND REPAIR AS NECESSARY.
6. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



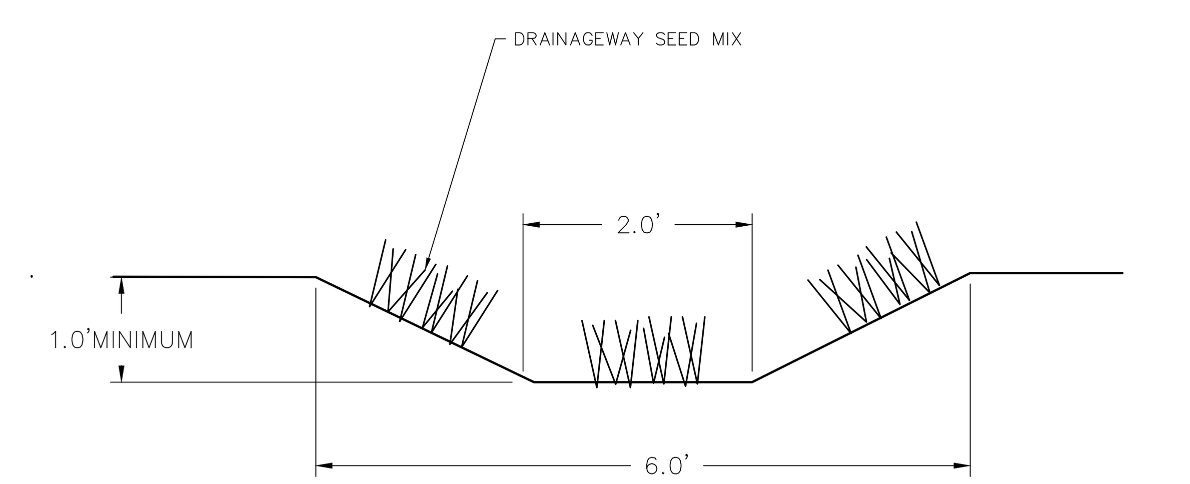
COMPOST FILTER SOCK INSTALLATION DETAILS
NOT TO SCALE



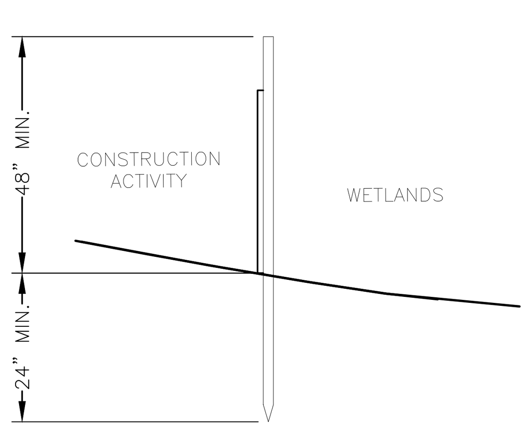
NOTES:

1. WASHOUT FACILITY TO BE SIZED BY CONTRACTOR TO CONTAIN SOLIDS, WASH WATER, AND RAINFALL AND SIZED TO ALLOW THE EVAPORATION OF THE WASH WATER AND RAINFALL.
2. WASH WATER SHALL BE ESTIMATED AT 7 GALLONS PER CHUTE AND 50 GALLONS PER HOPPER OF CONCRETE PUMP TRUCK AND/OR DISCHARGING DRUM.
3. MINIMUM SIZE 8'Wx8'Lx2'H.
4. LOCATE MINIMUM 100' FROM SWALES, STORM INLETS, AND WETLAND.

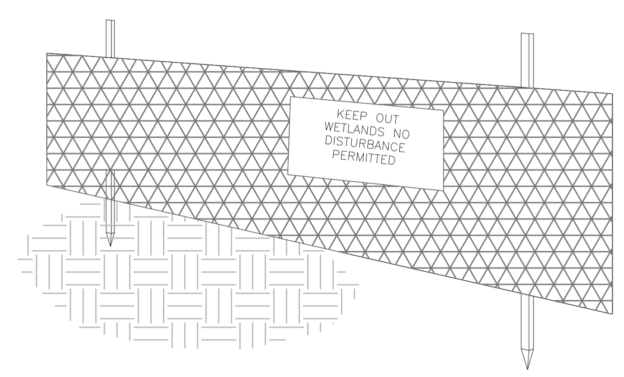
CONCRETE WASHOUT DETAIL
NOT TO SCALE



VEGETATED DRAINAGEWAY DETAIL
NOT TO SCALE



SECTION

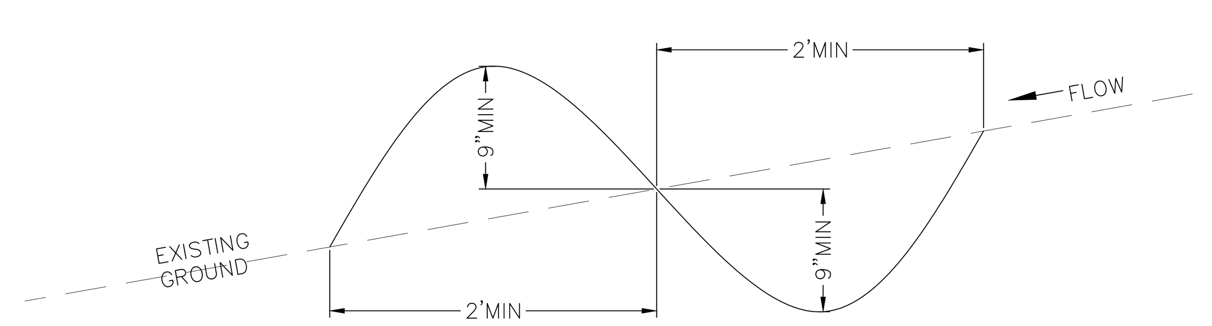


PERSPECTIVE VIEW

GENERAL NOTES
1) WETLAND PROTECTION FENCING TO BE INSTALLED PRIOR TO GRADING AND THE INSTALLATION OF EROSION AND CONTROL SEDIMENT CONTROL MEASURES.

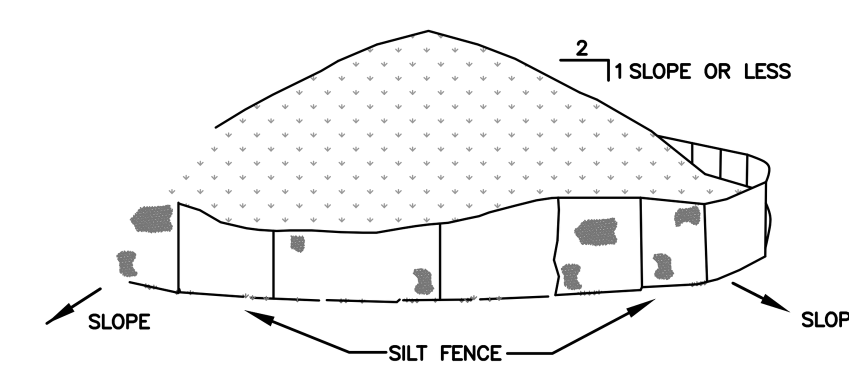
2) ALL PROTECTION FENCING IS TO REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITIES ARE COMPLETE AND SITE STABILIZATION IS ACHIEVED

WETLAND PROTECTION FENCE DETAIL
NOT TO SCALE



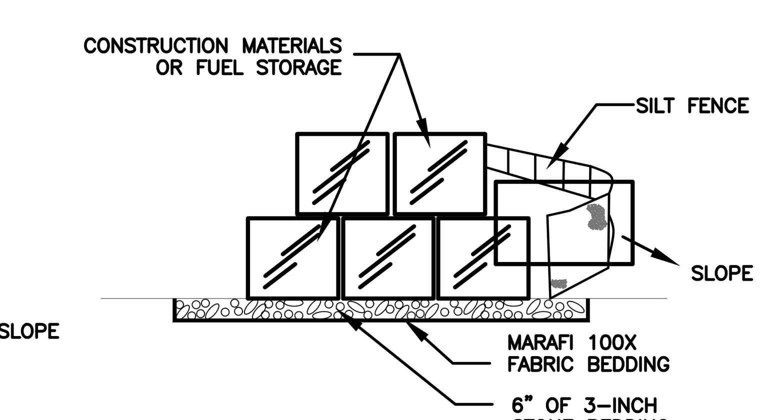
NOTES:
1. PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE.
2. DIVERTED RUNOFF FROM DISTURBED AREA TO BE CONVEYED TO SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM UNDISTURBED AREA SHALL OUTLET TO UNDISTURBED STABILIZED AREA.

TEMPORARY DIKE/SWALE DETAIL
NOT TO SCALE



1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1 : 2.
3. SILT FENCING OR COMPOST FILTER SOCK SHALL BE PLACED 5-FEET DOWNSLOPE OF EACH PILE. UPON COMPLETION OF SOIL STOCKPILING, TOPSOIL SHALL BE STABILIZED WITH SEED AND MULCH IF NOT TO BE DISTURBED/UTILIZED WITHIN 14 DAYS.
4. SEE ADDITIONAL DETAILS FOR INSTALLATION OF SILT FENCE OR COMPOST FILTER SOCK.
5. TEMPORARY PERIMETER DIKES MAY BE REQUIRED TO DIRECT CLEAN RUNOFF FROM STOCKPILE AREAS. REFER TO EROSION AND SEDIMENT CONTROL PLAN.

SOIL STOCKPILE



1. AREA CHOSEN FOR STORAGE OPERATIONS SHALL BE DRY AND STABLE.
2. MINIMUM DISTANCE TO A NATURAL WATER COURSE SHALL BE 50'.
3. THE TOP SIX INCHES OF NATIVE MATERIAL SHALL BE REMOVED FROM MATERIAL/FUEL STORAGE AREA AND REPLACED WITH MARAFI 100X GEOTEXTILE FABRIC AND SIX INCHES OF CRUSHED STONE BEDDING. CRUSHED STONE SHALL MEET NYSDOT ITEM No. 623.11 SPECFICATIONS.
4. SILT FENCING OR COMPOST FILTER SOCK SHALL BE PLACED 5-FEET DOWNSLOPE OF STORAGE AREA.
5. TEMPORARY PERIMETER DIKES MAY BE REQUIRED TO DIRECT CLEAN RUNOFF FROM STORAGE AREAS. REFER TO EROSION AND SEDIMENT CONTROL PLAN.

FUEL OR MATERIAL STORAGE AREA

NO.	REVISION	BY	DATE
9			
8			
7			
6			
5			
4			
3			
2			
1			

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ISSUE:
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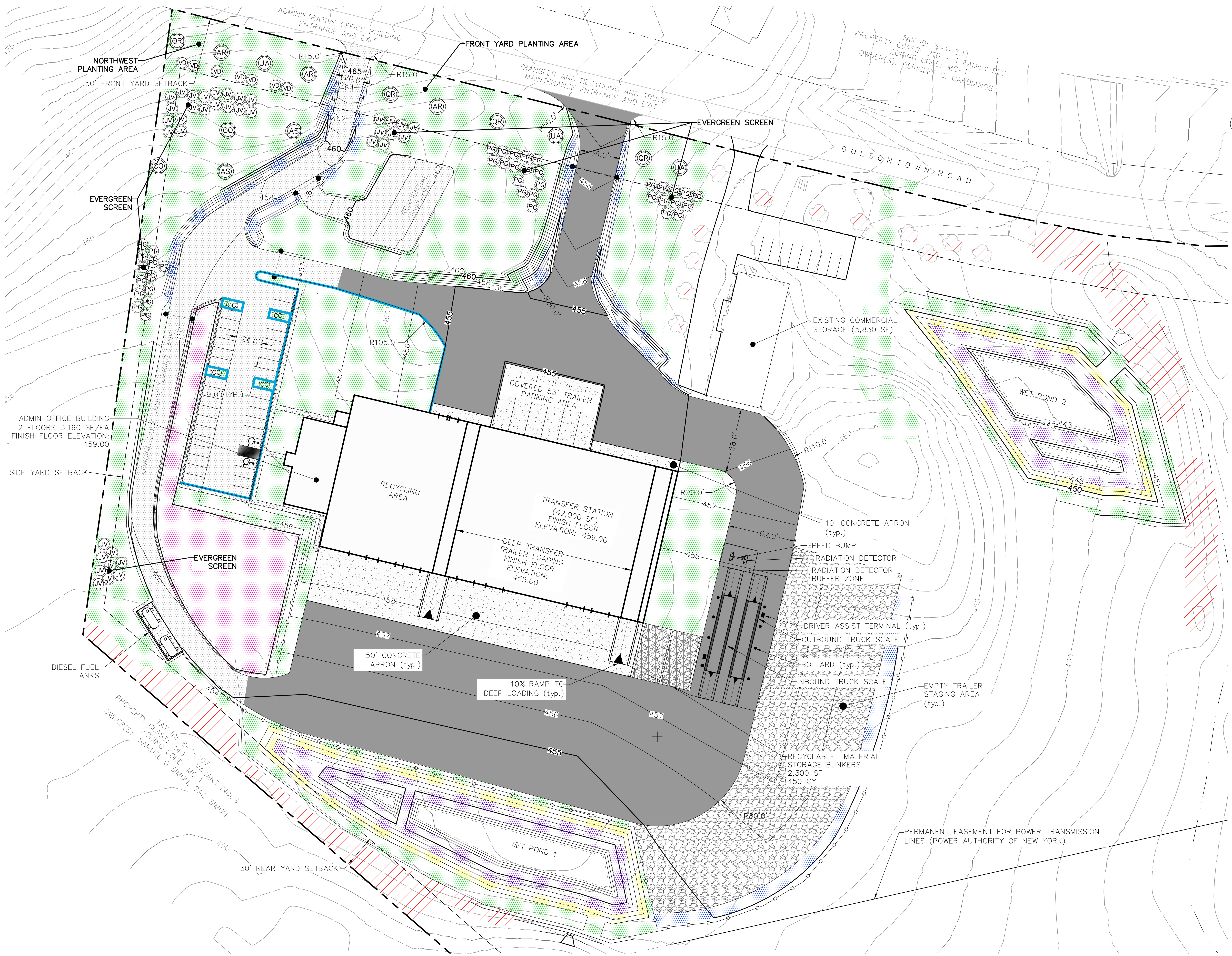
DES:	DRN:	CHK:
BPB	BPB	DAL

PROJECT NO:	DATE:
20-0062	JANUARY 2023

GRAPHIC SCALE:
0' 60' 120'

FILE:
Sheet 9 - ESC Plan Rev 1.dwg

REV NO:	SHEET NO:
0	10



LEGEND:

- PROPERTY BOUNDARY
- PROPERTY BOUNDARY SETBACK
- SEEDING AREA – GENERAL SEED MIX
- SEEDING AREA – RIPARIAN BUFFER SEED MIX
- SEEDING AREA – OBL WETLAND MIX
- SEEDING AREA – RETENTION BASIN WILDLIFE MIX
- SEEDING AREA – DRAINAGEWAY MIX
- AREA TO BE PRESERVED
- CURBED AREA

LANDSCAPE SEED MIXTURES:

Seed Mixture	Rate	Seeding Season
General Purpose Erosion Control (Permanent)	• Creeping red fescue (Ensylva, Pennlawn, or Boreal) at 20 lbs/acre • Chewings fescue (Common) at 20 lbs/acre • Perennial ryegrass (Pennfine, Linn) at 20 lbs/acre • Red clover (Common) at 20 lbs/acre	Early spring, late summer/fall
OBL Wetland Mix w/ Aroostook Winter Rye Cover Crop	0.5 lbs/1,000 sf w/ cover crop at 30 lbs/acre	Early spring, fall
Retention Basin Wildlife Mix w/ Aroostook Winter Rye Cover Crop	0.5 lbs/1,000 sf w/ cover crop at 30 lbs/acre	Early spring, fall
Riparian Buffer Mix w/ Aroostook Winter Rye Cover Crop	20 /bs/acre w/ cover crop at 30 lbs/acre	Early spring, fall
Temporary Construction Seeding Mix	• Perennial ryegrass (Pennfine, Linn) at 30 lbs/acre* • Aroostook winter rye at 100 lbs/acre	Spring, Summer, Fall
Vegetated Waterway Mix	• White clover at 8 lbs/acre • Smooth bromegrass at 20 lbs/acre • Creeping red fescue at 20 lbs/acre	Early spring, late August

* If temporary seeding is undertaken in late fall, Aroostook winter rye may be used instead of perennial ryegrass.

PLANTING SCHEDULE:

Latin Name	Common Name	Symbol	Quantity	Caliper 4 Feet from the Ground (inches)	Tree Height (feet)	Hardy to Zone	Planting Season
Acer rubrum	Red Maple	AR	3	2.5	N/A	3	Early Spring or Fall
Acer saccharum	Sugar Maple	AS	2	2.5	N/A	4	Early Spring or Fall
Carya ovata	Shagbark Hickory	CO	2	2.5	N/A	4	Early Spring or Fall
Cercis canadensis	Eastern Redbud	CC	4	2.5	N/A	4	Early Spring or Fall
Juniperus virginiana	Eastern Red Cedar	JV	37	N/A	6	3	Early Spring or Fall
Picea glauca	White Spruce	PG	39	N/A	6	2	Early Spring or Fall
Quercus rubra	Northern Red Oak	QR	4	2.5	N/A	3	Early Spring or Fall
Ulmus americana	American Elm	UA	3	2.5	N/A	4	Early Spring or Fall
Viburnum dentatum	Arrowwood Viburnum	VD	9	N/A	N/A	3	Early Spring or Fall

DATE
BY
REVISION
NO.

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

TITLE:
LANDSCAPING PLAN

ISSUE:
REVIEW

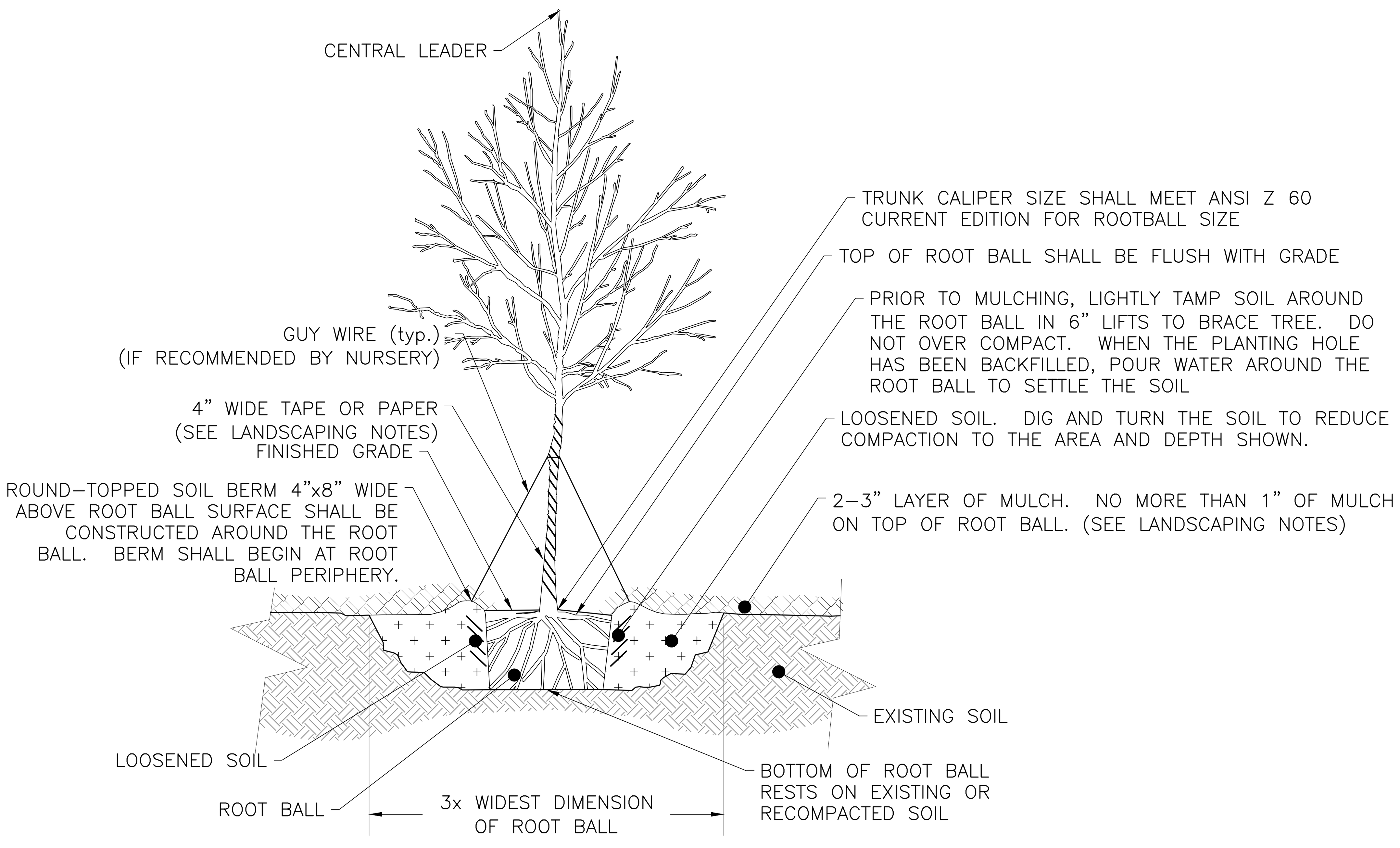
DES: RE | DRN: SJD | CHK: DL

PROJECT NO: 20-0062 | DATE: JANUARY 2023

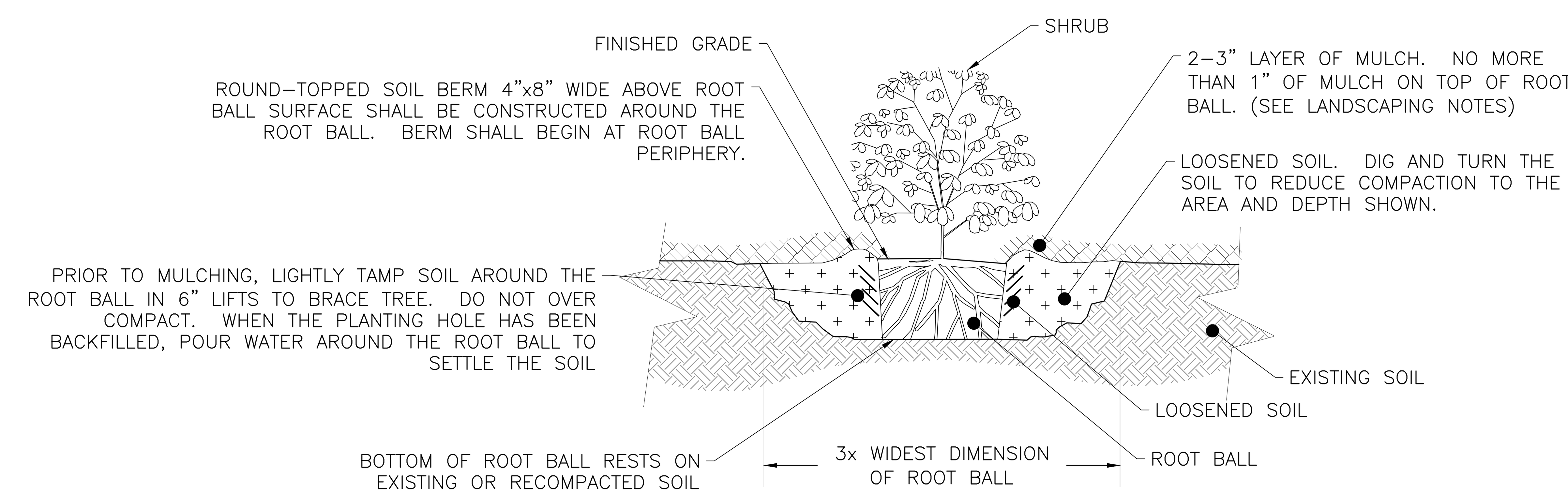
GRAPHIC SCALE: 0' 50' 100'

FILE: Sheet 2 And 8 - Site Plan REV3.dwg

REV NO: 1 | SHEET NO: 5



TREE PLANTING DETAIL
SCALE: NTS



SHRUB PLANTING DETAIL
SCALE: NTS

SEEDING NOTES:

1. TO PREVENT THE UNINTENTIONAL INTRODUCTION OR SPREAD OF INVASIVE SPECIES ALL CONSTRUCTION EQUIPMENT MUST BE CLEANED OF MUD, SEEDS, VEGETATION, AND OTHER DEBRIS PRIOR TO ENTERING THE PROJECT AREA. LOOSE PLANT AND SOIL MATERIAL SALL BE REMOVED FROM CLOTHING AND TOOLS PRIOR TO ENTERING THE PROJECT AREA.

2. TOPSOIL SHALL BE STRIPPED IN AREAS TO BE EXCAVATED AND FOR EMBANKMENT CONSTRUCTION. STRIPPED TOPSOIL SHALL BE STOCKPILED FOR REUSE ONCE DESIGN ELEVATIONS ARE REACHED. STOCKPILES SHALL BE STABILIZED.

3. SCARIFY ALL COMPACT, SLOWLY PERMEABLE, MEDIUM, AND FINE TEXTURED SUBSOIL AREAS. SCARIFY AT APPROXIMATELY RIGHT ANGLES TO THE SLOPE DIRECTION IN SOIL AREAS THAT ARE STEEPER THAN 5%. AREAS THAT HAVE BEEN OVERLY COMPACTED SHALL BE DECOMPACTED IN ACCORDANCE WITH THE SOIL RESTORATION STANDARD.

4. A MINIMUM OF FOUR INCHES OF TOPSOIL SHALL BE USED WHERE SEEDING AND PLANTING IS TO OCCUR, UNLESS OTHERWISE SPECIFIED BY THE PROJECT ENGINEER TOPSOIL SHALL NOT BE PLACED WHEN IT IS PARTIALLY FROZEN, MUDDY, OR ON FROZEN SLOPES, OR OVER ICE, SNOW, OR STANDING WATER PUDDLES. ANY TOPSOIL PLACED ON SLOPES GREATER THAN 5% SHALL BE PROMPTLY FERTILIZED (IF NECESSARY), SEEDED, MULCHED, AND TRACKED WITH SUITABLE EQUIPMENT.

5. TOPSOIL SHALL BE ANALYZED FOR GRAIN SIZE DISTRIBUTION AND MOISTURE CONTENT TO DETERMINE CONFORMANCE WITH NYS STANDARDS. TOPSOIL SHALL ALSO BE TESTED TO DETERMINE ORGANIC MATTER CONTENT, SOLUBLE SALT CONTENT, AND AMENDMENTS NEEDED, IF ANY (SEE NOTES 12 AND 13). SOIL TESTING IS NOT REQUIRED FOR TEMPORARY SEEDING AREAS. ADDITIONALLY, TOPSOIL SHALL NOT CONTAIN NOXIOUS WEEDS SUCH AS NUT SEDGE OR QUACKGRASS.

6. REMOVE ALL STONE AND OTHER OBSTRUCTIONS THAT HINDER MAINTENANCE AND FLOW ABOVE DESIGN GRADES. SEEDBED SHALL BE CLEANED OF MATERIALS LARGER THAN 1.5 INCHES IN DIAMETER.

7. ALL SEEDING SHOULD BE DONE BETWEEN APRIL 1 TO JUNE 15 OR OCTOBER 15 TO DECEMBER 15, UNLESS OTHERWISE SPECIFIED. MULCH AND TEMPORARY SEEDING SHALL BE PLACED BETWEEN JUNE 16 AND OCTOBER 14 ON ALL DISTURBED AREAS AND SEEDED WITH A PERMANENT SEED MIXTURE AT A LATER DATE.

8. TEMPORARY SEEDING AND MULCHING SHALL BE USED ON DISTURBED AREAS THAT WILL BE EXPOSED FOR MORE THAN 14 DAYS.

9. WITHIN 48 HOURS OF COMPLETION OF GRADING OPERATIONS, SEEDING SHALL COMMENCE. ALL SEEDING SHALL BE DONE "IN THE DRY". SEEDING SHALL NOT TAKE PLACE WHEN THE GROUND OR OVERLYING WATER IS FROZEN, OR WHEN CONDITIONS ARE OTHERWISE UNSATISFACTORY FOR PLANTING (SOIL IS "POWDER DRY" OR "STICKY WET". INUNDATED AREAS SHALL NOT BE SEEDED.

10. MULCH IS TO CONSIST OF A MIXTURE OF VIRGIN WOOD FIBER MULCH, PRE-BLENDED TACKIFIER, AND/OR OTHER ADDITIVES WITH WATER TO CREATE A HOMOGENEOUS SLURRY. THE SLURRY SHALL BE SPRAYED UNIFORMLY ONTO THE SOIL SURFACE AT RATES RECOMMENDED BY THE SUPPLIER. MULCH SHALL BE SPRAYED TO ACHEIVE NO LESS THAN 100% COVERAGE. MULCH WITH TACKIFER SHOULD NOT BE APPLIED DURING RAINFALL. MULCH REQUIRES A 24-HOUR CURING PERIOD AND A SOIL TEMPERATURE HIGHER THAN 45°F. WATERWAYS SLOPES GREATER THAN 5% OR WATERWAYS GREATER THAN 300 FT IN LENGTH SHALL HAVE MULCH SECURED WITH ANCHORED NATURAL FIBER MATTING (SEE EROSION AND SEDIMENT CONTROL PLAN FOR DETAIL).

11. ALL SEED MIXTURES PRESENTED AS PURE LIVE SEED VALUES. THE MINIMUM OF PURE LIVE SEED SHALL BE 90%.

12. SEED MIXTURES ARE SUBJECT TO CHANGE ACCORDING TO AVAILABILITY.

13. VEGETATING WATERWAYS
A. LIME SEEDBED TO pH 6.5.
B. SOIL TESTING RESULTS MUST BE OBTAINED PRIOR TO FERTILIZATION.
C. LIME AND FERTILIZER SHALL BE MIXED THOROUGHLY INTO THE SEEDBED DURING PREPARATION.
D. CHANNELS, EXCEPT PAVED SECTIONS, SHALL HAVE 4 INCHES OF TOPSOIL.
E. ALL VEGETATED WATERWAYS SHALL BE MULCHED AND ANY CHANNEL LONGER THAN 300 FEET AND/OR WHERE THE SLOPE IS FIVE PERCENT OR GREATER, MUST HAVE MULCH SECURELY ANCHORED.

14. PERMANENT CONSTRUCTION AREAS
A. LIME SEEDBED TO ATTAIN A pH OF 6.0 IN THE UPPER 2 INCHES OF SOIL
B. SOIL TESTING RESULTS MUST BE OBTAINED PRIOR TO FERTILIZATION.

15. SEE THE DETAIL FOR THE BIORETENTION BASIN ON SHEET 8 FOR PLANTING SOIL AND MULCHING SPECIFICATIONS.

LANDSCAPING NOTES:

1. IF TREES CANNOT BE PLANTED WITHIN 24 HOURS OF DELIVERY THEY SHALL BE STORED INSIDE EXISTING STRUCTURES AND WATERED AT A FREQUENCY RECOMMENDED BY THE NURSERY UNTIL THEY CAN BE PLANTED.

2. PRIOR TO PLANTING REMOVE ANY GALVANIZED WIRE BASKET SECURING THE ROOT BALL. WHEN THE TREE OR SHRUB HAS BEEN PLACED IN THE HOLE AS MUCH OF THE BURLAP COVERING AS POSSIBLE SHOULD BE REMOVED.

3. ALL TREES AND SHRUBS SHALL HAVE A PROTECTIVE COVERING PLACED OVER THEM DURING TRANSPORT AND SHALL HAVE A NON-TOXIC ANTI-DESICCANT APPLIED ACCORDING TO MANUFACTURER RECOMMENDATIONS.

4. PLANTING SHALL ONLY BE PERFORMED WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE FOR PLANTING THE MATERIALS SPECIFIED IN ACCORDANCE WITH LOCALLY ACCEPTED PRACTICE. PLANTING OF ALL TREES AND SHRUBS MAY OCCUR FROM APRIL 1 TO JUNE 1. IF PLANTING IN THE FALL, DECIDUOUS TREES AND SHRUBS MAY BE PLANTED FROM OCTOBER 15 TO DECEMBER 15 AND EVERGREEN TREES MAY BE PLANTED BETWEEN SEPTEMBER 1 AND NOVEMBER 15. IF NECESSARY LOCATIONS OF TREES AND SHRUBS WILL BE STAKED IN THE FIELD.

5. NO PLANTING SHALL TAKE PLACE DURING EXTREMELY HOT, DRY, OR WINDY WEATHER, OR DURING FREEZING TEMPERATURES.

6. WHEN POSSIBLE PLANT TREES BEFORE AREAS ARE SEEDED.

7. INSPECT INCOMING PLANTS FOR SIGNS OF DAMAGE OR DISEASE AND TO ENSURE THE CORRECT SPECIES WERE SENT. ANY DAMAGED, DISEASED, OR MISTAKENLY SENT SPECIMENS SHOULD BE RETURNED TO THE NURSERY.

8. PLANTING HOLES SHALL BE DUG USING HAND TOOLS OR MINI-EXCAVATOR.

9. THE AREA OF SOIL LOOSENING SHALL BE A MINIMUM 3x THE DIAMETER OF THE ROOT BALL AT THE SURFACE SLOPING TO 2x THE DIAMETER OF THE ROOT BALL AT THE BOTTOM OF THE ROOT BALL..

10. LOOSENING OF THE SOIL CONSISTS OF DIGGING AND TURNING THE SOIL TO REDUCE COMPACTION. SOIL DOES NOT NEED TO BE REMOVED FROM THE HOLE. THE SIDES OF THE LOOSENED SOIL SHOULD BE SLOPED TOWARDS THE ROOT BALL AS SHOWN IN THE TREE AND SHRUB PLANTING DETAILS.

11. ROOT BALL DEPTH SHALL BE MEASURED AS THE AVERAGE HEIGHT OF THE OUTER EDGE OF THE ROOT BALL AFTER ANY REQUIRED MODIFICATIONS.

12. IF MOTORIZED EQUIPMENT IS USED TO DELIVER PLANTS OR DIG HOLES AND DRIVES OVER EXPOSED PLANTING AREAS THE AFFECTED SOILS SHALL BE TILLED TO A DEPTH OF 6".

13. TREES SHOULD BE PLACED WITH THE TOP OF THE ROOT BALL AT THE AVERAGE ELEVATION OF THE FINISHED GRADE.

14. MULCH SHALL BE APPLIED IN A CIRCLE AROUND ALL LANDSCAPE TREES. THESE MULCHED AREAS SHALL EXTEND TO THE OUTERMOST EDGES OF THE TREE'S CANOPY (DROP LINE). PULL MULCH 1 INCH AWAY FROM THE BASE OF SHRUBS AND TREES.

15. MULCH APPLIED AROUND TREES AND SHRUBS SHALL BE "WALK ON" GRADE AND CONSIST OF WOOD CHIPS FROM TREE AND WOODY BRUSH SPECIES. THE DIAMETER OF THE MULCH SHALL RANGE FROM 3/8" TO 2" AND SHALL BE NO GREATER THAN 8" IN LENGTH. AS MULCH IS APPLIED, PIECES FAILING TO MEET THIS CRITERIA SHALL BE REMOVED.

16. TREE AND SHRUB SPECIES ARE SUBJECT TO CHANGE ACCORDING TO AVAILABILITY. IF THE NURSERY DOES NOT RECOMMEND TRANSPLANTING CARYA OVATA, THEN AMERICAN SYCAMORE (PLATANUS OCCIDENTALIS) SHALL BE SUBSTITUTED.

17. ALL TREE AND SHRUB SPECIES SHALL BE OF THE COMMON VARIETY, EXCEPT FOR ULMUS AMERICANA, WHICH SHALL BE THE VALLEY FORGE VARIETY. A DURABLE, LEGIBLE LABEL SHALL DISPLAYING THE SCIENTIFIC NAME, COMMON NAME, AND CULTIVAR SHALL BE ATTACHED TO EACH TREE AND SHRUB BY THE NURSERY PRIOR TO DELIVERY.

18. FOLLOWING PLANTING ALL PLANTS SHALL BE THOROUGHLY WATERED AND PRUNED TO REMOVE INJURED TWIGS AND BRANCHES. ANY PLANTS THAT HAVE SETTLED SHALL BE RESET TO GRADE. PRUNING SHOULD NOT CHANGE THE SHAPE OF THE PLANT.

19. IMMEDIATELY AFTER PLANTING ALL DECIDUOUS TREES SHALL BE WRAPPED FROM THE BOTTOM TO THE FIRST LIMB WITH A 4-INCH WIDE BITUMINOUS IMPREGNATED, INSECT RESISTANT TAPE OR PAPER MANUFACTURED FOR THAT PURPOSE. THIS SHOULD BE TIED AT THE TOP AND BOTTOM WITH JUTE (BAG STRINGS). THE WRAP SHOULD BE REMOVED PER NURSERY RECOMMENDATIONS.

20. PLANTS SHALL BE WATERED TWO WEEKS AFTER PLANTING AND, FOR TWO YEARS, PLANTS SHALL BE WATERED EVERY TWO WEEKS DURING DRY PERIODS (THREE OR MORE WEEKS WITHOUT A GOOD SOAKING RAIN), OR AS NEEDED BY LOCAL CONDITIONS. SHRUBS MAY REQUIRE 5 - 10 GALLONS AND TREES 20 - 30 GALLONS FOR EACH WATERING.

NO.	REVISION	BY	DATE
9			
8			
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DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
CITY OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE:
LANDSCAPING DETAILS

ISSUE:
REVIEW

DES:	DRN:	CHK:
RE	SJD	DL

PROJECT NO:	DATE:
029-A0001	MAY 2021

GRAPHIC SCALE:
N/A N/A N/A

FILE:
Sheet 6 & 7 - Details.dwg

REV NO:	SHEET NO:
0	6

Attachment 2

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

SPDES General Permit for Stormwater Discharges from Construction Activity

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature

Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Table of Contents

Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* ("SWPPP") the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;

(ii) Control stormwater *discharges*, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharges* from the site;

(vi) Provide and maintain *natural buffers* around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharges*, unless *infeasible*;

(vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;

(viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

(ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **not** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

    a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

    b. Which are undertaken on land with no existing *impervious cover*; and

    c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

7. *Construction activities* for linear transportation projects and linear utility projects:

    a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

    b. Which are undertaken on land with no existing *impervious cover*; and

    c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4^{th} Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied <u>all</u> of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

   (i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

   (ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land*

use control MS4, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, <u>in writing,</u> of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

   (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

   (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

   (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

   (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

   c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the owner’s or operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC’s

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other *agricultural building*, silo, stock yard or pen.
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Pond construction • Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover • Cross-country ski trails and walking/hiking trails • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development; • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path. • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* <u>or</u> *alter the hydrology from pre to post development* conditions, <u>and</u> are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

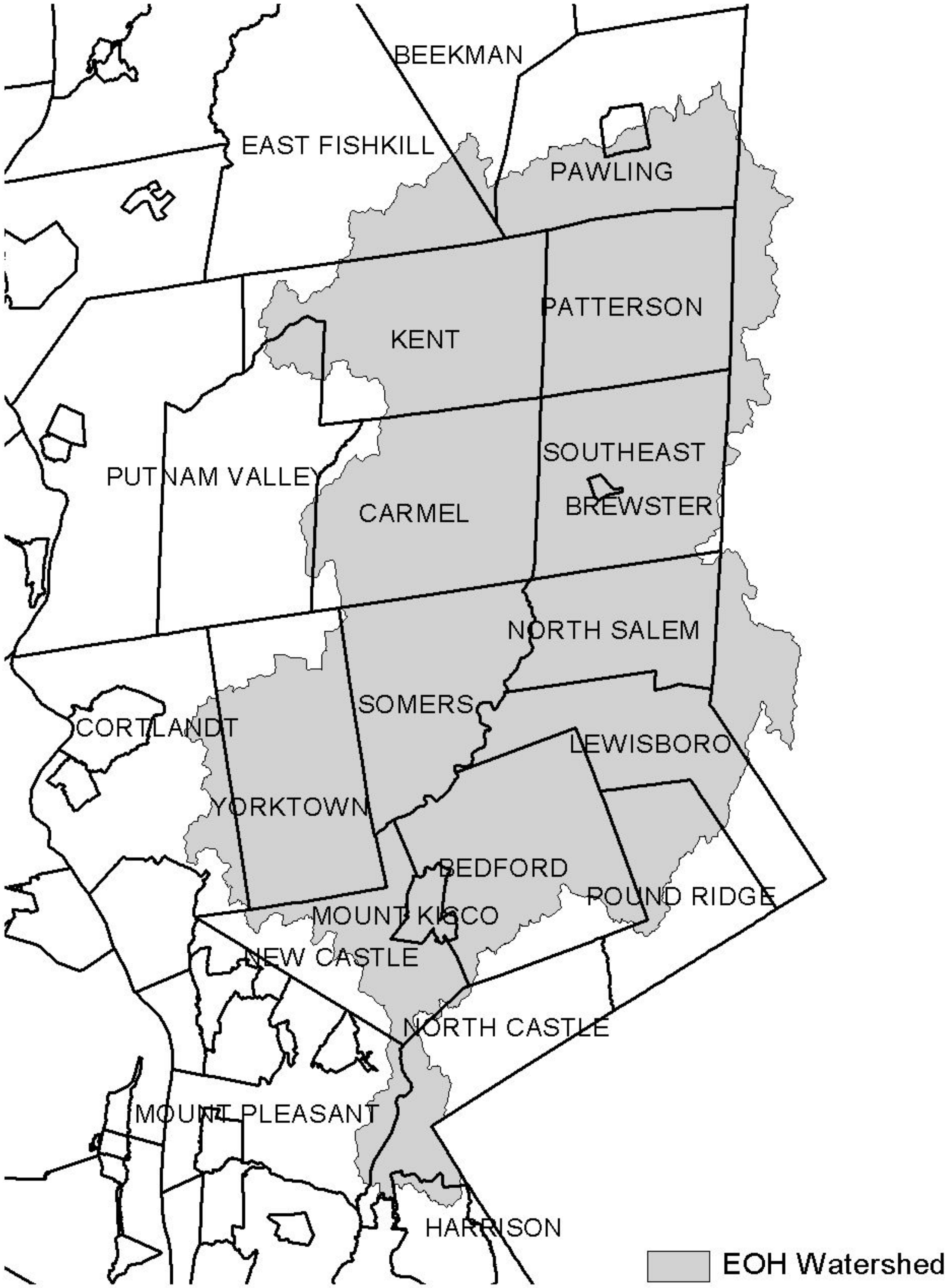


Figure 2 - Onondaga Lake Watershed

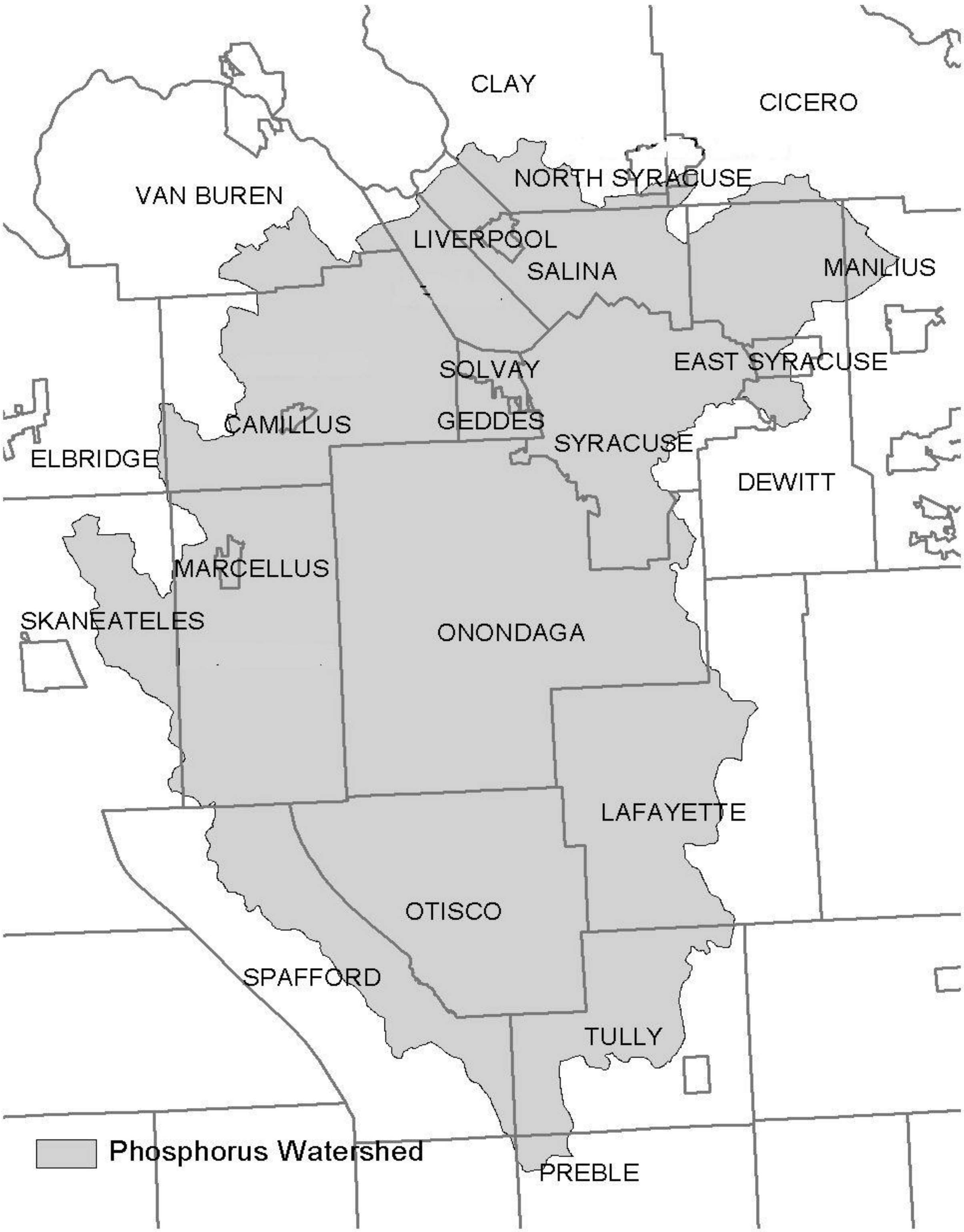


Figure 3 - Greenwood Lake Watershed

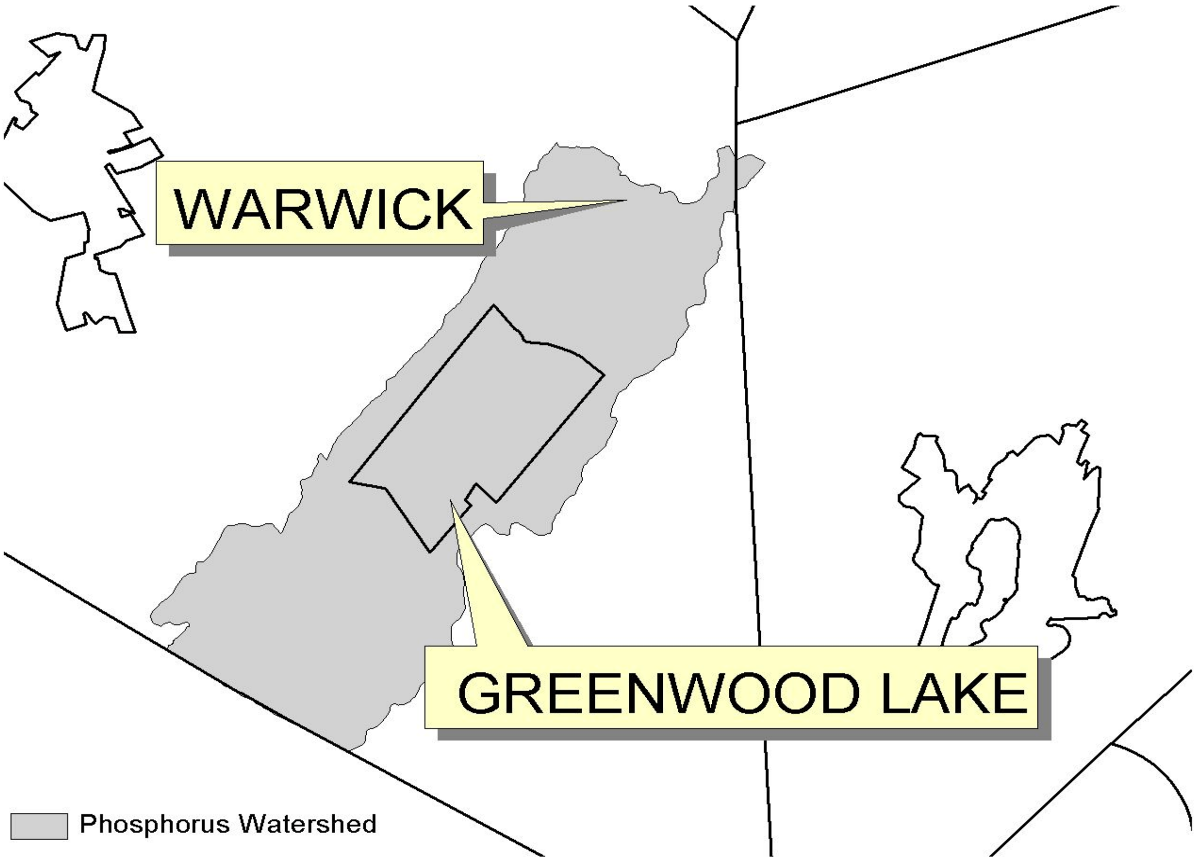


Figure 4 - Oscawana Lake Watershed

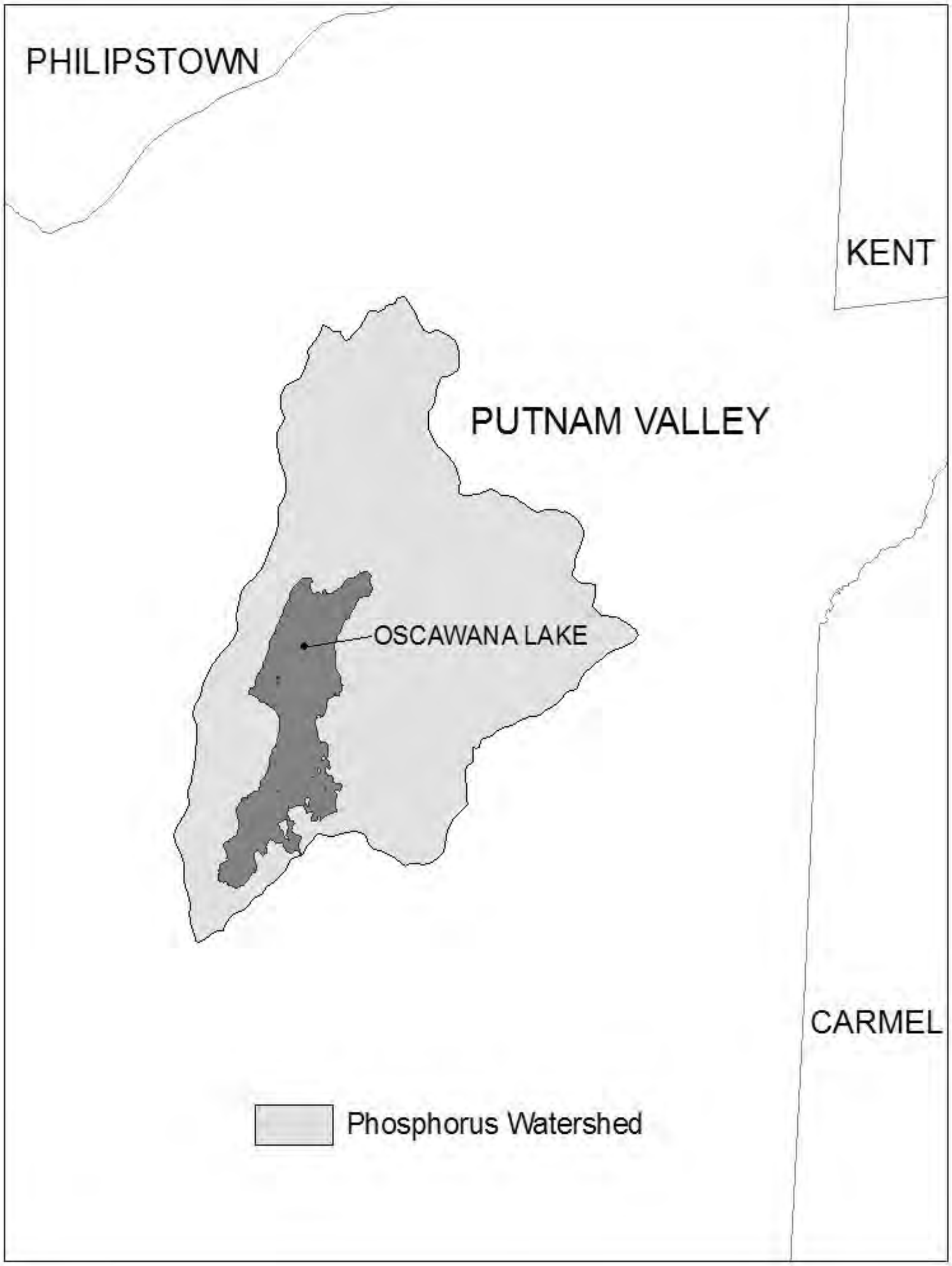
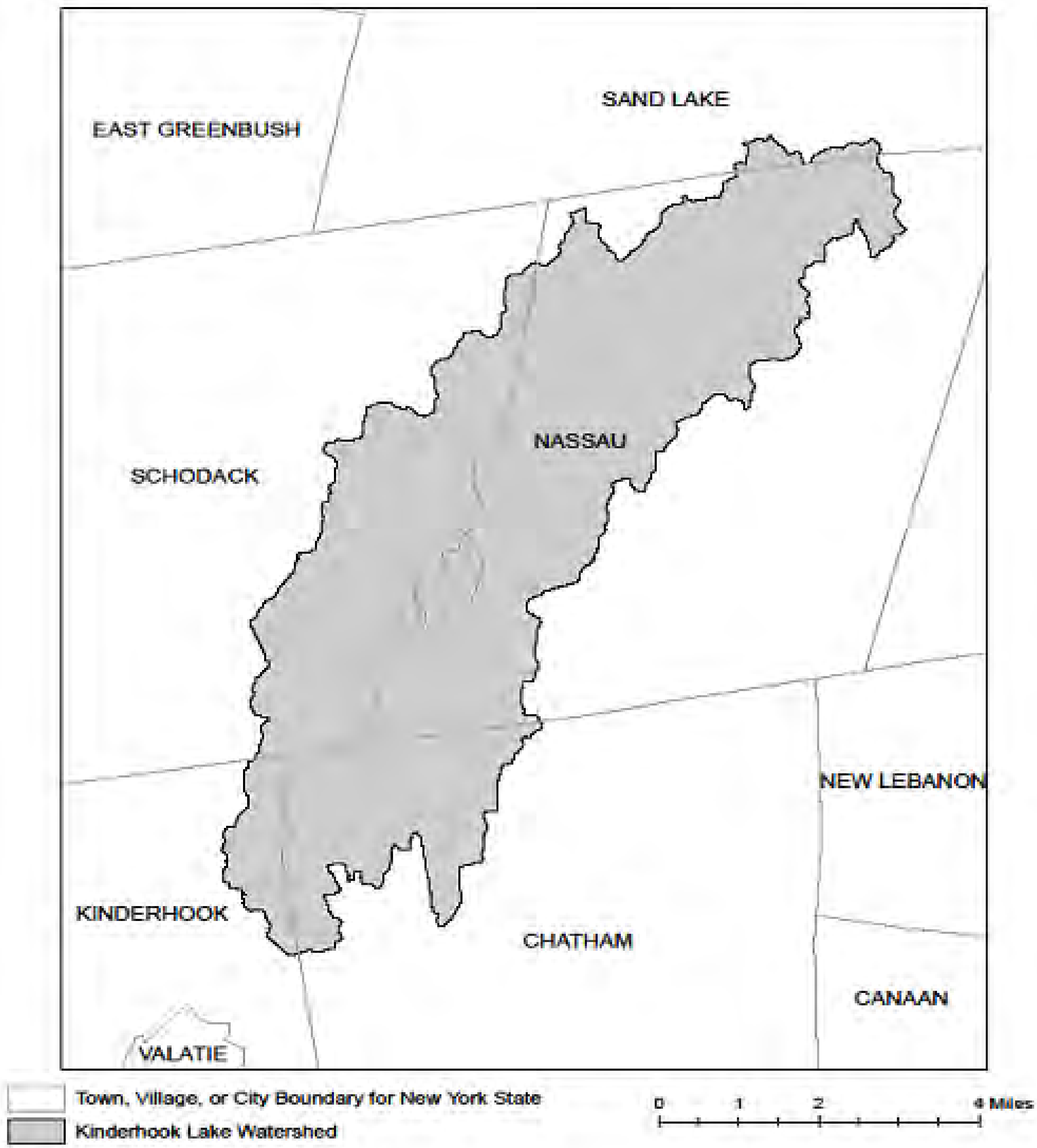


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using ”The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy” dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual (“Design Manual”), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

Attachment 3

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Miscellaneous Forms

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.35

(Submission #: HPR-0JK0-WEDS2, version 1)

Details

Originally Started By	David Lenox
Alternate Identifier	Dom-Mar Recycling and Transfer Facility
Submission ID	HPR-0JK0-WEDS2
Submission Reason	New
Status	Draft

Form Input

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
DOM KAM LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Marangi

Owner/Operator Contact Person First Name
Michael

Owner/Operator Mailing Address
366 Highland Ave. Ext.

City
Middletown

State
New York

Zip
10940

Phone
845-343-5566

Email
mikemarangi@aol.com

Federal Tax ID
86-2134170

Project Location

Project/Site Name
Dom-Mar Recycling and Transfer Facility

Street Address (Not P.O. Box)
1118 Dolsontown Road

Side of Street
South

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Wawayanda

State
NY

Zip
10940

DEC Region
3

County
ORANGE

Name of Nearest Cross Street
MCVEIGH Road

Distance to Nearest Cross Street (Feet)
1970

Project In Relation to Cross Street
West

Tax Map Numbers Section-Block-Parcel
6-1-3.31 and 6-1-3.32

Tax Map Numbers
NONE PROVIDED

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are:
- Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates.
- The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates
41.42257225101493,-74.41673586704768

Project Details

2. What is the nature of this project?
Redevelopment with increase in impervious area

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse
Pasture/Open Land

Post-Development Future Land Use
Industrial

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots.
NONE PROVIDED

---

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area.

*** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres)
44.3

Total Area to be Disturbed (acres)
9.6

Existing Impervious Area to be Disturbed (acres)
.34

Future Impervious Area Within Disturbed Area (acres)
5.49

5. Do you plan to disturb more than 5 acres of soil at any one time?
Yes

---

6. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%)
0

B (%)
0

C (%)
0

D (%)
100

7. Is this a phased project?
No

8. Enter the planned start and end dates of the disturbance activities.

Start Date
04/01/2024

End Date
12/31/2024

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.
Wetlands adjacent to Monhagen Brook and tributary to Monhagen Brook

9a. Type of waterbody identified in question 9?
Wetland/Federal Jurisdiction On Site (Answer 9b)

Other Waterbody Type Off Site Description
NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?
Delineated by Consultant

10. Has the surface waterbody(ies in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001?
Yes

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001?
No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
No

If No, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as D (provided the map unit name is inclusive of slopes greater than 25%), E or F on the USDA Soil Survey?
NONE PROVIDED

If Yes, what is the acreage to be disturbed?
NONE PROVIDED

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?
No

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
No

16. What is the name of the municipality/entity that owns the separate storm sewer system?
NONE PROVIDED

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?
No

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?
No

19. Is this property owned by a state authority, state agency, federal government or local government?
No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.)
No

Required SWPPP Components

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?
Yes

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)?
Yes

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual?
Yes

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

SWPPP Preparer
EnSol Inc.

Contact Name (Last, Space, First)
David Lenox

Mailing Address
661 Main Street

City
Niagara Falls

State
NY

Zip
14301

Phone
7162853920

Email
dlenox@ensolinc.com

Download SWPPP Preparer Certification Form
Please take the following steps to prepare and upload your preparer certification form:

1) Click on the link below to download a blank certification form
2) The certified SWPPP preparer should sign this form

3) Scan the signed form
4) Upload the scanned document
Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification

> SWPPP Preparer Certification Form.pdf - 01/27/2023 02:53 PM
> **Comment**
> NONE PROVIDED

Erosion & Sediment Control Criteria

25. Has a construction sequence schedule for the planned management practices been prepared?
Yes

26. Select all of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural
Stabilized Construction Entrance
Check Dams
Dust Control
Perimeter Dike/Swale
Sediment Basin
Silt Fence
Storm Drain Inlet Protection

Biotechnical
None

Vegetative Measures
Grassed Waterway
Mulching
Protecting Vegetation
Seeding
Topsoiling

Permanent Structural
Land Grading
Rock Outlet Protection
Riprap Slope Protection

Other
NONE PROVIDED

Post-Construction Criteria

*** IMPORTANT: Completion of Questions 27-39 is not required if response to Question 22 is No.**

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
Preservation of Undisturbed Area
Reduction of Clearing and Grading
Roadway Reduction
Sidewalk Reduction
Driveway Reduction
Building Footprint Reduction
Parking Reduction

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).
All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)
1.446

29. Post-construction SMP Identification
Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28).

Identify the SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use the Post-Construction SMP Identification section to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)
0.262

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?
No

If Yes, go to question 36. If No, go to question 32.

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)
0.229

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?
Yes

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. SMPs
Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRv Provided in #30).

Also, provide the total impervious area that contributes runoff to each practice selected.

NOTE: Use the Post-construction SMP Identification section to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question #29. (acre-feet)
1.27

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).
1.532

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?
Yes

If Yes, go to question 36.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv required and provided or select waiver (#36a), if applicable.

CPv Required (acre-feet)
0.635

CPv Provided (acre-feet)
1.04

36a. The need to provide channel protection has been waived because:
NONE PROVIDED

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (#37a), if applicable.

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
31.60

Post-Development (CFS)
19.59

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
68.98

Post-Development (CFS)
60.14

37a. The need to meet the Qp and Qf criteria has been waived because:
NONE PROVIDED

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

If Yes, Identify the entity responsible for the long term Operation and Maintenance
DOM KAM LLC

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.
The total WQv could not be reduced due to poorly draining site soils and high-water table.

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs
Identify the Post-construction SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

Total Contributing Impervious Acres for Vegetated Swale (RR-5)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Garden (RR-6)
NONE PROVIDED

Total Contributing Impervious Acres for Stormwater Planter (RR-7)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)
NONE PROVIDED

Total Contributing Impervious Acres for Porous Pavement (RR-9)
NONE PROVIDED

Total Contributing Impervious Acres for Green Roof (RR-10)
NONE PROVIDED

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)
NONE PROVIDED

Total Contributing Impervious Acres for Infiltration Basin (I-2)
NONE PROVIDED

Total Contributing Impervious Acres for Dry Well (I-3)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Infiltration System (I-4)
NONE PROVIDED

Total Contributing Impervious Acres for Bioretention (F-5)
1.1

Total Contributing Impervious Acres for Dry Swale (O-1)
NONE PROVIDED

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Pond (P-2)
4.39

Total Contributing Impervious Acres for Wet Extended Detention (P-3)
NONE PROVIDED

Total Contributing Impervious Acres for Multiple Pond System (P-4)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Pond (P-5)
NONE PROVIDED

Total Contributing Impervious Acres for Surface Sand Filter (F-1)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Sand Filter (F-2)
NONE PROVIDED

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)
NONE PROVIDED

Total Contributing Impervious Acres for Organic Filter (F-4)
NONE PROVIDED

Total Contributing Impervious Acres for Shallow Wetland (W-1)
NONE PROVIDED

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)
NONE PROVIDED

Total Contributing Impervious Acres for Pond/Wetland System (W-3)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Wetland (W-4)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Swale (O-2)
NONE PROVIDED

Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Total Contributing Impervious Area for Hydrodynamic
NONE PROVIDED

Total Contributing Impervious Area for Wet Vault
NONE PROVIDED

Total Contributing Impervious Area for Media Filter
NONE PROVIDED

"Other" Alternative SMP?
NONE PROVIDED

Total Contributing Impervious Area for "Other"
NONE PROVIDED

Provide the name and manufaturer of the alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

Manufacturer of Alternative SMP
NONE PROVIDED

Name of Alternative SMP
NONE PROVIDED

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility.
Solid Waste
Individual SPDES

If SPDES Multi-Sector GP, then give permit ID
NONE PROVIDED

If Other, then identify
NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit?
No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth
NONE PROVIDED

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.
NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4?
NONE PROVIDED

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?
NONE PROVIDED

MS4 SWPPP Acceptance Form Download
Download form from the link below. Complete, sign, and upload.
MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload

> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.
Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form

NONE PROVIDED

Comment

NONE PROVIDED

Attachments

Date	Attachment Name	Context	User
1/27/2023 2:53 PM	SWPPP Preparer Certification Form.pdf	Attachment	David Lenox

CONR 8
(03/14)

SPDES STORMWATER POLLUTION PREVENTION PLAN (SWPPP) REVISION

JOB STAMP

Date: ______________________

Day of Week: S M T W T F S

Sheet No. ____ of ____

This form is to be used when revisions to the current Stormwater Pollution Prevention Plan (SWPPP) are required by SPDES General Permit for Stormwater Discharges from Construction Activity. The completed form must be filed in the Engineer's Field Office.

Reason for the Revision(s): Revision(s) were requested by NYSDEC: ☐ Yes ☐ No

Describe the Revision(s) to the SWPPP:

Engineer-in-Charge Signature: ______________________

EICs Name & Title: ______________________

Date Completed: ______________

Copy to Contractor: ______________

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The ***owner or operator*** must ensure that all erosion and sediment control practices and all post-construction stormwater management practices identified in the SWPPP are maintained in effective operating condition at all times.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Owner or Operator Maintenance Inspection Requirements

1. The ***owner or operator*** shall inspect, in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, the erosion and sediment controls identified in the SWPPP to ensure that they are being maintained in effective operating condition at all times.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the ***owner or operator*** can stop conducting the maintenance inspections. The ***owner or operator*** shall begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the ***owner or operator*** can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The ***owner or operator*** shall have a ***qualified inspector*** conduct site inspections in conformance with the following requirements:

[Note: The ***trained contractor*** identified in Part III.A.6. **cannot** conduct the ***qualified inspector*** site inspections unless they meet the ***qualified inspector*** qualifications included in Appendix A. In order to perform these inspections, the ***trained contractor*** would have to be a:

• Licensed Professional Engineer,
• Certified Professional in Erosion and Sediment Control (CPESC),
• Registered Landscape Architect, or
• Someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A ***qualified inspector*** shall conduct site inspections for all construction activities identified in Tables 1 and 2 of Appendix B, with the exception of:

a. the construction of a single family residential subdivision with 25% or less impervious cover at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the ***qualified inspector*** shall conduct site inspections in accordance with the following timetable:

a. For construction sites where soil disturbance activities are on-going, the ***qualified inspector*** shall conduct a site inspection at least once every seven (7) calendar days.

b. For construction sites where soil disturbance activities are on-going and the ***owner or operator*** has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the ***qualified inspector*** shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the ***qualified inspector*** shall conduct a site inspection at least once every thirty (30) calendar days. The ***owner or operator*** shall notify the Regional Office stormwater contact person (see contact information in Appendix A) or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the MS4 (provided the MS4 is not the owner or operator of the construction activity) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the ***qualified inspector*** can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The ***owner or operator*** shall notify the Regional Office stormwater contact person (see contact information in Appendix A) or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the MS4 (provided the MS4 is not the owner or operator of the construction activity) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the ***owner or operator*** shall have the ***qualified inspector*** perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed*;* and that all postconstruction stormwater management practices have been constructed in conformance with the SWPPP by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the NOT. The ***owner or operator*** shall then submit the completed NOT form to the address in Part II.A.1.

3. At a minimum, the ***qualified inspector*** shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved final stabilization, all points of discharge to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of discharge from the construction site.

4. The ***qualified inspector*** shall prepare an **inspection report** subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;
b. Name and title of person(s) performing inspection;
c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;
d. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive

runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices that need repair or maintenance;

g. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

k. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The ***qualified inspector*** shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The ***qualified inspector*** shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The ***qualified inspector*** shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the ***qualified inspector*** shall notify the ***owner or operator*** and appropriate contractor or subcontractor identified in Part III.A.6. of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the ***qualified inspector.*** Pursuant to Part II.C.2., the inspection reports shall be maintained on site with the SWPPP.

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project
Location: ______
Site Status: ______

Date: ______
Time: ______

Inspector: ______

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam “As-Built”		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete ______ Corrugated pipe ______ Masonry ______ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

Actions to be Taken:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Contractor Certification

DOM-MAR TRANSFER AND RECYCLING FACILITY
1128 Dolsontown Road
Town of Wawayanda, Orange County, New York

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the Qualified Inspector during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

____

Signature Date

____

Name

____

Title

Contracting Firm Information

____

Name

____

Address

____

Telephone

____

Trained Contractor

The named Contractor is responsible for the ALL SWPPP elements, including inspections by a Qualified Inspector.

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip: WAWAYANDA / NY / 10940
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

EnSol
ENGINEERING+
ENVIRONMENTAL

EnSol, Inc.
661 Main St.
Niagara Falls, NY 14301
716.285.3920

ensolinc.com

Transmitted Via Electronic Mail and/or USPS

March 2, 2022

Mr. Charles White
Stormwater Management Officer
80 Ridgebury Hill Road
Slate Hill, NY 10940

Re: 5-Acre Disturbance Waiver
Dom-Mar Transfer and Recycling Facility
Dolsontown Road
Wawayanda, New York 10940

Dear Mr. White:

On behalf of DOM KAM LLC., EnSol, Inc. (EnSol) has prepared this letter to summarize construction activities for 2022 at the proposed Dom-Mar Transfer and Recycling Facility, located in Wawayanda, New York, and to formally request approval for disturbing more than 5 acres at one time, as required under the SPDES General Permit for Stormwater Discharges Associated with Construction Activities. The project will require the disturbance of areas greater than 5-acres before final stabilization activities can be implemented.

The project will include clearing and regrading of approximately 9.2 acres of predominantly meadow areas with some minor forested and shrub covered areas. Construction will consist of a new 42,000 square foot building, approximately 157,000 square feet of paved entrance, parking, and walkway areas, and stormwater management BMPs. Topsoil within the project limits will be stripped and stockpiled for future use.

Runoff from land that is disturbed as part of development will be managed by both permanent and temporary stormwater management and erosion/sediment (E&S) control features as shown on the attached project specific Erosion and Sediment Control Drawing, and in accordance with the Facilities "Construction Stormwater Pollution Prevention Plan (SWPPP)", prepared by EnSol, dated May 2021 and revised March 2022.

The following measures will be implemented as part of the project:

- SWPPP inspections of the construction areas performed twice a week by a certified Erosion and Sediment Control inspector (once per week when less than 5-acres are disturbed);
- Installation of orange construction fencing.
- Installation of compost filter sock in defined areas, or as required by SWPPP inspections;
- Construct stabilized construction entrance for site.
- Construct temporary sediment basins.
- Installation of temporary dikes/swales to direct stormwater to either permanent or temporary stormwater management features (i.e., sedimentation basins, etc.);
- Periodic sediment removal from existing and proposed drainage swales, ditches, and sediment basin areas;
- Seeding of inactive disturbed surfaces and slopes following construction activities;
- Maintenance of new and existing stormwater management and E&S control features.

- Site grading to final proposed grades/pavement subgrades.
- Construct/install building, utilities, and stormwater management controls (storm sewer, catch basins, rip-rap outlet protection, bioretention basin).
- Pave all areas where required.
- Install plantings, seed and mulch.
- Convert temporary sediment basins to permanent detention ponds once site stabilization is complete.
- Remove temporary erosion and sediment controls when site reaches final stabilization.

Please find attached Sheets 02 Site Plan and 09 Erosion and Sediment Control Plan describing various aspects of the stormwater management and E&S control features to be implemented, and the phasing of construction, as part of the construction project.

Following your review of the aforementioned information, if you have questions or require additional information, please feel free to contact me at (716) 285-3920 ext 222 or (716) 525-0552.

Sincerely,

EnSol Inc.

Brian Boddecker, P.E.
Project Engineer

cc: Mr. David A. Lenox, P.E., EnSol

Attachments

Sheet 02 - Site Plan
Sheet 09 - Erosion and Sediment Control Plan

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): ___________________

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? ______________________________ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:	
Title/Position:	
Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

Stormwater Pollution Prevention Plan
Employee Training List

GENERAL INFORMATION			
Training Topic:	**Implementation of the SWPPP, Maintenance Procedures, Pollution Control Practices**		
Name/Title of Trainer:			
Date of Meeting:		**Time of Meeting:**	

SIGN-IN FORM	
Name	**Signature**

Attachment 4

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Hydrologic Analysis

EnSol, Inc.
Environmental Solutions

PROJECT NO.: 20-0062

CLIENT: DOM KAM LLC PROJECT: Dom-Mar Transfer and Recycling Facility Prepared By: BPB Date: 3/2021
SUBJECT: Stormwater Modeling Calculations Reviewed By: DAL Date: 1/2023

STORMWATER MANAGEMENT DESIGN AND ANALYSIS SUMMARY

PURPOSE:

- Analyze pre-development and post-development stormwater management for the Facility.
- Develop design basis and stormwater modeling input parameters to analyze a bioretention basin and 2 stormwater detention ponds for post-development stormwater management purposes. Stormwater BMPs will provide necessary stormwater detention, Runoff Reduction, and water quality to meet New York State Stormwater Regulations.
- Determine suitability of wet ponds use as temporary sediment basins.
- Size the storm sewer pipe network to convey the 10-yr storm without surcharging.
- Size riprap outlet protection.
- Size anti-seep collars for wet pond outlet pipes.
- Prove adequacy (10-year storm) for the swales located throughout the project site.

EXISTING SITE CONDITIONS

- The ~39.20 acre property consists of predominately grassed areas with wooded and brushed covered areas throughout the remainder of the site. Surface runoff on the parcel drains to two drainageways – Monhagan Brook, which flows west to east across the property and an unnamed tributary to Monhagan Brook, which flows north to south across the property. The topography of the site is generally flat (0 to 3%) with steeper slopes (3 to 8%) in the northern portion of the site.

POST DEVELOPMENT SITE CONDITIONS

- The proposed development of the facility involves constructing approximately 5.49 acres of additional impervious area (parking/driveway, and buildings). This stormwater analysis focuses on an increase in impervious area, and changes in site grading.
- Site will drain to 2 separate wet ponds and 1 bio-retention basin.

DESIGN STORM EVENTS:

- Design for Middletown New York (Extreme Precipitation Tables Northeast Regional Climate Center)
    - 1 Year Event = 2.64 inches
    - 10 Year Event = 4.68 inches
    - 100 Year Event = 8.22 inches

CALCULATIONS:

1. **Water Quality Volume (WQv)**
   Total run-off from one year storm event over developed area for enhanced phosphorus removal:
   Drainage Areas 1-5 for Pond 1 =
   0.074 acre-ft + 0.083 acre-ft + 0.085 acre-ft + 0.020 acre-ft + 0.639 acre-ft = 0.901 acre-ft

   Drainage Areas 7-10A-F for Pond 2 =
   0.037 acre-ft + 0.033 acre-ft + 0.156 acre-ft + 0.070 acre-ft + 0.038acre-ft + 0.033acre-ft + 0.047 acre-ft + 0.064 acre-ft + 0.067 acre-ft = 0.545 acre-ft

   WQv = 0.901 acre-ft + 0.545 acre-ft = **1.446 acre-ft = 62,988 ft^3**

2. Minimum Runoff Reduction Volume (RRv-min)
   Design objectives for runoff reduction are to capture and provide 100% of the WQv through runoff reduction. In

sites such as the site being evaluated with poorly draining soils, high groundwater tables, and other limiting factors it is not feasible to meet this 100% requirement. Therefore, a minimum RRv has been calculated and met.

RRv-min = (P*Rv*A_{ic}*S)/12
P = one year 24-hour storm rainfall (enhanced phosphorus removal) = 2.64"
Rv = 0.05+ 0.009(I)
I= 100% impervious
Aic= New Area of Impervious Cover = 5.49 acres
S = Hydrologic Soil Group (HSG) Specific Reduction Factor = 0.2 (HSG D)
RRv-min = (2.64*0.95*5.49*0.2)/12 = **0.229 acre-ft = 9,996 ft^3**

3. **Runoff Reduction Volume (RRv)**
Runoff Reduction achieved through a Bioretention Basin designed to contain 100% of one year storm runoff from the contributing area for enhanced phosphorus removal (no overflow from Bioretention Basin for one year 24 hour storm event).
One Year 24-hour Storm Runoff from Drainage Areas 1-4:
(0.074 acre-ft + 0.083 acre-ft + 0.085 acre-ft + 0.020 acre-ft) = **0.262 acre-ft** = **11,413 ft^3**

4. **Water Quality Provided:**
Total WQv Required= WQv – RRv = 1.446 ac-ft – 0.262 ac-ft = **1.184 ac-ft**

Wet Pond 1 (Southwest Pond) Sizing
Add 1 year 24-hour storm runoff volume from Drainage Areas 1-5:
(0.074 acre-ft + 0.083 acre-ft + 0.085 acre-ft + 0.020 acre-ft + 0.639 acre-ft) = 0.901 acre-ft = 39,248 ft^3

Remaining WQv = Total WQv (DA 1-5) – RRv Achieved (Bioretention Basin)
= 39,248ft^3 – 11,413 ft^3 = **27,835 ft^3**
WQv Provided by Pond 1:

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
446	3,809					
446.2	4,060	3,934	0.20	787	787	0.02
447	4,996	4,528	0.80	3,622	4,409	0.10
448	6,037	5,516	1.00	5,516	9,925	0.23
449.2	7,447	6,742	1.20	8,090	18,016	0.41
450.2	**12,600**	**10,024**	**1.00**	**10,024**	**28,039**	**0.64**
451	15,292	13,946	0.80	11,157	39,196	0.90
451.75	17,677	16,485	0.75	12,363	51,560	1.18
452	18,334	17,101	0.25	4,275	55,835	1.28
452.6	20,216	18,742	0.60	11,245	67,080	1.54
453	21,494	20,015	0.40	8,006	75,086	1.72
454	25,274	23,384	1.00	23,384	98,470	2.26

Base of Pond = 446, permanent pool elevation = 450.2, Permanent Pool Volume = **28,039 ft^3**
WQv Provided by Pond 1 = **28,039 ft^3 = 0.64 acre-ft**

Pond 1 Forebay Volume (included in total Pond Volume)

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
446.2	55					
447	180	117.35	0.80	93.88	94	0.00
448	377	278.58	1.00	278.58	372	0.01
449.2	722	549.47	1.20	659.36	1,032	0.02
450.2	2,275	1,498.56	1.00	1,498.56	2,530	0.06

Pond 2 (East Pond) Sizing

Add 1 year 24-hour storm runoff volume from

Drainage Areas 7-10A-F:

0.037 acre-ft + 0.033 acre-ft +0.156 acre-ft + 0.070 acre-ft + 0.038acre-ft + 0.033acre-ft + 0.047 acre-ft + 0.064 acre-ft + 0.067 acre-ft = 0.545 acre-ft = 23,741 ft^3

Total WQv (DA 7-10A-F) = **23,741 ft^3**

WQv Provided by Pond 2

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
442.5	3,449					
443	4,086	3,767	0.5	1,884	1,884	0.04
444	5,024	4,555	1.0	4,555	6,439	0.15
445	6,044	5,534	1.0	5,534	11,973	0.27
446	7,144	6,594	1.0	6,594	18,567	0.43
447	**11,029**	**9,086**	**1.0**	**9,086**	**27,653**	**0.63**
448	14,046	12,537	1.0	12,537	40,190	0.92
448.6	15,386	14,716	0.6	8,830	49,020	1.13
449	16,312	15,849	0.4	6,340	55,359	1.27
450	19,045	17,679	1.0	17,679	73,038	1.68
451	21,510	20,278	1.0	20,278	93,316	2.14

Base of Pond is 442.5 ft, Permanent Pool elevation 447, Permanent Pool Volume = **27,653 ft^3**
WQv Provided by Pond 2 = **27,653 ft^3 = 0.63 ac-ft**

Total WQv Provided = Pond 1 + Pond 2 = 0.64 ac-ft + 0.63 ac-ft = 1.27 ac-ft

Pond 2 Forebay Volume (included in total Pond Volume)

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
442.5						
443	345	505	0.5	253	253	0.01
444	665	845	1.0	845	1,098	0.03
445	1,025	1,225	1.0	1,225	2,323	0.05
446	1,424	2,077	1.0	2,077	4,400	0.10
447	2,730	2,730	1.0	2,730	7,130	0.16

5. **Stream Channel Protection Volume**

The Stream Channel Protection Volume (Cpv) is designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event. The CPv was determined in accordance with Section 4.4 of the New York State Stormwater Design Manual. The calculation is included in the attached spreadsheet. The total Cpv volume for the developed drainage area is 0.897 acre-ft, subtracting the RRv provided by the Bio-Retention Basin (0.262 acre-ft) the Cpv is 0.635. The Cpv is included above the permanent pool in each wet pond below the Qp weir, elevation 450. 2 to 451.75 in Wet Pond 1 and elevation 447 to 448.6 in Wet Pond 2. The Cpv provided in Wet Pond 1 is 0.54 acre-ft, and the Cpv provided in Wet Pond 2 is 0.50 acre-ft, the total Cpv provided is 1.04 acre-ft.

6. **Overbank Flood Protection Volume**

The primary purpose of the overbank flood control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development (i.e., flow events that exceed the bank full capacity of the channel, and therefore must spill over into the floodplain). Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp is provided in Wet Pond 1 and 2 above the permanent pool. The Wet Pond Outlet Structure Wier attenuates the post development 10-year 24-hour peak discharge rate to lower than predevelopment rates.

7. **Extreme Flood Protection Volume**

The intent of the extreme flood criteria is to (a) prevent the increased risk of flood damage from large storm events, (b) maintain the boundaries of the predevelopment 100-year floodplain, and (c) protect the physical integrity of stormwater management practices. 100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf is provided in Wet Pond 1 and 2 above the permanent pool. The Wet Pond Outlet Structure attenuates the post development 100-year 24-hour peak discharge rate to lower than predevelopment rates.

8. Post Development Calculations:

Site Runoff was calculated utilizing HydroCAD V10.10 by HydroCAD Software Solutions, LLC.

Design Storm	Pre-Development Peak Runoff West (cfs)	Pre-Development Peak Runoff East (cfs)	Total Pre-Development (cfs)	Post-Development Peak Runoff West (cfs)	Post-Development Peak Runoff East (cfs)	Total Post-Development Peak Runoff (cfs)
1 year	5.36	6.50	11.72	2.83	4.49	7.32
10 year	14.71	17.25	31.60	8.56	11.03	19.59
100 year	32.37	37.27	68.98	31.86	28.28	60.14

Peak Pond Elevation during 100-yr, 24-hr storm
Wet Pond 1 (West Pond) = 453.45. Set Pond top of Berm elevation to 454.50.
Wet Pond 2 (East Pond) = 450.15. Set Pond top of Berm elevation to 451.25.

9. Storm Sewer Pipe Network Sizing

The storm sewer pipe network was hydraulically modeled for each storm event. See attached HydroCAD Reports.

10. Pond Outlet, Storm Sewer, Culvert Riprap Protection Sizing

See attached Calculation sheets.

11. Sediment Basin Sizing

Southwestern Sediment Basin:
Surface Area = 0.015 * Drainage Area = 0.015*6.5 acres = 0.1 acres
Surface Area = 0.01 *Qp = 0.01*17.05 cfs = 0.17 acres
Sediment Basin Area = **0.3 acres** (Permanent Pool Elevation)
Minimum required sediment storage zone volume = 1,000 cubic feet per acre from each disturbed acre with the total drainage area.
Minimum Sediment Storage Volume = 5.9 acres * 1,000 ft^3 = 5,900 ft^3
Permanent Pool Volume = **28,039 ft^3**
Minimum required dewatering zone volume = 3,600 cubic feet per total area drainage to the basin.
Minimum Dewatering Zone Volume = 6.5 acres * 3,600 ft^3 = 23,400 ft^3
Volume Provided between Qp wier (Elevation 451.75) and pool = **23,521 ft^3**
Discharge will occur through skimmer attached to outlet structure designed for attenuating 1-year, 10-year and 100-year post development storm events. Spillway design on attached Channel Design Spreadsheet.

Eastern Sediment Basin:
Surface Area = 0.015 * Drainage Area
Surface Area = 0.015* 4.1 acres = 0.062 acres
Surface Area = 0.01 *Qp = 0.01* 14.98 cfs = 0.15 acres
Sediment Basin Area = **0.25 acres** (Permanent Pool Elevation)
Minimum Sediment Storage Volume = 2.4 acres * 1,000 ft^3 = 2,400 ft^3
Permanent Pool Volume = **27,653 ft^3**
Minimum Dewatering Zone Volume = 4.1 acres * 3,600 ft^3 = 14,760 ft^3
Volume Provided between Qp wier (elevation 448.6) and pool = **21,367 ft^3**
Discharge will occur through skimmer attached to outlet structure designed for attenuating 1-year, 10-year and 100-year post development storm events. Spillway design on attached Channel Design Spreadsheet.

EnSol, Inc.
Environmental Solutions

PROJECT NO.: 20-0062

CLIENT: DOM KAM LLC PROJECT: Dom-Mar Transfer and Recycling Facility Prepared By: BPB Date: 3/2021
SUBJECT: Stormwater Modeling Calculations Reviewed By: DAL Date: 1/2023

12. Swale Adequacy

Per the New York State Stormwater Design Manual:
Peak Velocity for 10-yr storm must be non-erosive (i.e. 3.5-5.0 fps)
Minimum freeboard during 10-yr storm = 6 inches
All swales meet the above requirements.
See attached Channel Design Spreadsheet.

CONCLUSIONS:

- Existing site conditions exhibit poorly draining soils and high groundwater table, which limit available methods to achieve RRv, therefore the site must meet RRv-min requirements.
- Minimum Runoff Reduction Volume is exceeded by the Bioretention Basin.
- The WQv provided by the Stormwater Detention Ponds exceeds the required WQv.
- The Stormwater Detention Ponds provides adequate detention time and stormwater storage volume for reducing the Post Development peak flow from 10- and 100-year storms to below Pre-Development conditions.
- The wet pond designs have been analyzed for use as temporary sediment basins during construction. By installing a skimmer in the wet ponds low flow orifices, the wet ponds will meet the requirements of temporary sediment basins.
- The swales will have maximum velocities less than 4 fps and provide more than 6" of freeboard during the 10-year storm and will fully contain a 100-year storm.

ATTACHMENTS:

- NYSDEC Green Infrastructure Worksheet
- Site Drainage Area Maps
- HydroCAD Model Calculations
- Skimmer Calculations
- Outlet Protection Calculations

Final Channel Design Summary

Using manning equation

INPUT DATA									OUTPUT DATA					ANALYSIS	
Channel	Description	Total ChannelDepth H (ft)	Flow Depth D (ft)	Base Width W (ft)	Slope So (%)	Mannings n	Side Slopes (H:V) Left y:1	Side Slopes (H:V) Right x:1	Free Board (ft)	Velocity V (ft/sec)	Flow Area A (sq ft)	Wetted Perim. Wp (ft)	Hyd. Radius rH	Flow Q_{calc} (cfs)	Required Flow Q_{req} (cfs)
Drainageway 1	100 yr	1.00	0.46	2	3.10%	0.035	2	2	0.5	3.6	1.35	4.07	0.33	4.86	4.86
Drainageway 1	10 yr	1.00	0.31	2	3.10%	0.035	2	2	0.7	2.9	0.81	3.38	0.24	2.34	2.34
Drainageway 2	100 yr	1.00	0.41	2	4.38%	0.035	2	2	0.6	4.0	1.14	3.82	0.30	4.55	4.54
Drainageway 2	10 yr	1.00	0.27	2	4.38%	0.035	2	2	0.7	3.2	0.70	3.23	0.22	2.24	2.24
Drainageway 3	100 yr	1.00	0.33	2	3.90%	0.035	2	2	0.7	3.4	0.88	3.48	0.25	2.96	2.96
Drainageway 3	10 yr	1.00	0.22	2	3.90%	0.035	2	2	0.8	2.7	0.55	3.00	0.18	1.48	1.48
Drainageway 4	100 yr	1.00	0.31	2	2.15%	0.035	2	2	0.7	2.4	0.82	3.39	0.24	1.97	1.97
Drainageway 4	10 yr	1.00	0.22	2	2.15%	0.035	2	2	0.8	2.0	0.54	2.98	0.18	1.07	1.07
Drainageway 5	100 yr	1.00	0.74	2	1.08%	0.035	2	2	0.3	2.7	2.59	5.32	0.49	7.07	7.06
Drainageway 5	10 yr	1.00	0.54	2	1.08%	0.035	2	2	0.5	2.3	1.65	4.40	0.38	3.80	3.79
Wet Pond 1 Emergency Spillway	100 yr	1.25	0.26	18	1.00%	0.035	2	2	1.0	1.7	4.87	19.18	0.25	8.32	8.30
Wet Pond 2 Emergency Spillway	100 yr	1.25	0.13	18	1.00%	0.035	2	2	1.1	1.1	2.37	18.58	0.13	2.56	2.52

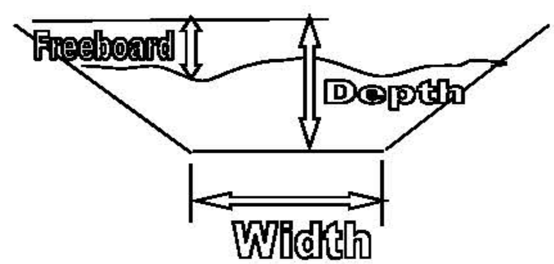
Equations

R_h = A/Wp
A = (W*D)+(1/2*D*(D*y))+(1/2*D*(D*x))
$V = (k/n)*(R_h)^{2/3}*S_o^{1/2}$
Q_{calc} = V*A

Where:
k = 1.486 in US Units
A = Wetted X-Section Area
Wp= Wetted Perimeter

TABLE 3–4 Recommended Design Values of Manning Roughness Coefficients, n^a

	Manning n Range[b]
I. Unlined open channels[c]	
A. Earth, uniform section	
1. Clean, recently completed	0.016–0.018
2. Clean, after weathering	0.018–0.020
3. With short grass, few weeds	0.022–0.027
4. In graveled soil, uniform section, clean	0.022–0.025
B. Earth, fairly uniform section	
1. No vegetation	0.022–0.025
2. Grass, some weeds	0.025–0.030
3. Dense weeds or aquatic plants in deep channels	0.030–0.035
4. Sides, clean gravel bottom	0.025–0.030
5. Sides, clean, cobble bottom	0.030–0.040
C. Dragline excavated or dredged	
1. No vegetation	0.028–0.033
2. Light brush on banks	0.035–0.050
D. Rock	
1. Based on design section	0.035
2. Based on actual mean section	
a. Smooth and uniform	0.035–0.040
b. Jagged and irregular	0.040–0.045
E. Channels not maintained, weeds and brush uncut	
1. Dense weeds, high as flow depth	0.08–0.12
2. Clean bottom, brush on sides	0.05–0.08
3. Clean bottom, brush on sides, highest stage of flow	0.07–0.11
4. Dense brush, high-stage	0.10–0.14
II. Roadside channels and swales with maintained vegetation[d,e] (values shown are for velocities of 2 and 6 ft/sec):	
A. Depth of flow up to 0.7 ft	
1. Bermuda grass, Kentucky bluegrass, buffalo grass	
a. Mowed to 2 in.	0.07–0.045
b. Length 4 to 6 in.	0.09–0.05
2. Good stand, any grass	
a. Length about 12 in.	0.18–0.09
b. Length about 24 in.	0.30–0.15
3. Fair stand, any grass	
a. Length about 12 in.	0.14–0.08
b. Length about 24 in.	0.25–0.13



Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New York
Location	
Longitude	74.417 degrees West
Latitude	41.423 degrees North
Elevation	0 feet
Date/Time	Thu, 05 Jan 2023 12:27:31 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.50	0.62	0.82	1.02	1.26	**1yr**	0.88	1.18	1.45	1.77	2.17	2.64	3.07	**1yr**	2.33	2.95	3.38	4.08	4.71	**1yr**
2yr	0.39	0.60	0.75	0.98	1.24	1.54	**2yr**	1.07	1.43	1.76	2.15	2.62	3.17	3.63	**2yr**	2.80	3.49	4.00	4.71	5.37	**2yr**
5yr	0.46	0.71	0.89	1.19	1.53	1.92	**5yr**	1.32	1.77	2.20	2.70	3.28	3.96	4.57	**5yr**	3.50	4.40	5.01	5.80	6.57	**5yr**
10yr	0.51	0.81	1.02	1.38	1.80	2.27	**10yr**	1.55	2.08	2.62	3.21	3.89	4.68	5.45	**10yr**	4.14	5.24	5.96	6.79	7.66	**10yr**
25yr	0.60	0.95	1.21	1.67	2.23	2.85	**25yr**	1.92	2.57	3.29	4.05	4.90	5.85	6.87	**25yr**	5.18	6.61	7.49	8.38	9.40	**25yr**
50yr	0.68	1.09	1.39	1.95	2.62	3.38	**50yr**	2.26	3.01	3.91	4.81	5.81	6.94	8.20	**50yr**	6.14	7.89	8.90	9.82	10.98	**50yr**
100yr	0.77	1.24	1.60	2.27	3.09	4.01	**100yr**	2.67	3.54	4.66	5.73	6.91	8.22	9.79	**100yr**	7.28	9.42	10.59	11.52	12.82	**100yr**
200yr	0.87	1.42	1.84	2.64	3.65	4.76	**200yr**	3.15	4.17	5.54	6.82	8.22	9.75	11.70	**200yr**	8.63	11.25	12.61	13.52	14.99	**200yr**
500yr	1.04	1.71	2.24	3.25	4.55	5.97	**500yr**	3.93	5.17	6.96	8.57	10.32	12.23	14.81	**500yr**	10.82	14.24	15.90	16.72	18.44	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.73	0.89	1.11	**1yr**	0.77	1.09	1.26	1.61	1.98	2.41	2.61	**1yr**	2.14	2.51	2.86	3.36	3.93	**1yr**
2yr	0.37	0.58	0.71	0.96	1.19	1.43	**2yr**	1.03	1.40	1.62	2.07	2.56	3.09	3.52	**2yr**	2.73	3.39	3.90	4.58	5.23	**2yr**
5yr	0.42	0.65	0.81	1.11	1.41	1.66	**5yr**	1.22	1.62	1.88	2.42	3.01	3.69	4.26	**5yr**	3.27	4.10	4.70	5.40	6.16	**5yr**
10yr	0.46	0.71	0.88	1.24	1.60	1.86	**10yr**	1.38	1.82	2.10	2.66	3.38	4.23	4.92	**10yr**	3.74	4.73	5.39	6.05	6.87	**10yr**
25yr	0.53	0.80	1.00	1.42	1.87	2.13	**25yr**	1.62	2.09	2.47	3.19	3.91	5.06	5.96	**25yr**	4.48	5.73	6.49	6.93	7.93	**25yr**
50yr	0.58	0.88	1.10	1.58	2.12	2.40	**50yr**	1.83	2.35	2.77	3.61	4.38	5.82	6.90	**50yr**	5.15	6.63	7.48	7.68	8.85	**50yr**
100yr	0.64	0.97	1.21	1.75	2.40	2.69	**100yr**	2.07	2.63	3.12	4.09	4.92	6.72	8.02	**100yr**	5.95	7.71	8.62	9.08	9.84	**100yr**
200yr	0.71	1.07	1.36	1.97	2.74	3.01	**200yr**	2.37	2.94	3.51	4.66	5.53	7.77	9.32	**200yr**	6.88	8.96	9.97	10.26	10.93	**200yr**
500yr	0.83	1.23	1.58	2.30	3.27	3.50	**500yr**	2.82	3.42	4.11	5.55	6.50	9.44	11.40	**500yr**	8.36	10.96	12.11	12.05	12.57	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.36	0.55	0.68	0.91	1.12	1.35	**1yr**	0.97	1.32	1.53	1.95	2.40	2.83	3.31	**1yr**	2.50	3.18	3.65	4.37	5.11	**1yr**
2yr	0.41	0.63	0.78	1.05	1.30	1.54	**2yr**	1.12	1.51	1.76	2.23	2.78	3.29	3.75	**2yr**	2.91	3.61	4.17	4.96	5.61	**2yr**
5yr	0.50	0.77	0.95	1.31	1.66	1.98	**5yr**	1.43	1.93	2.25	2.88	3.58	4.27	4.88	**5yr**	3.78	4.69	5.32	6.20	6.95	**5yr**
10yr	0.59	0.91	1.13	1.58	2.04	2.44	**10yr**	1.76	2.39	2.74	3.54	4.38	5.22	5.99	**10yr**	4.62	5.76	6.44	7.45	8.40	**10yr**
25yr	0.75	1.14	1.41	2.02	2.66	3.25	**25yr**	2.29	3.18	3.64	4.64	5.73	6.79	7.82	**25yr**	6.01	7.52	8.31	9.50	10.69	**25yr**
50yr	0.89	1.35	1.68	2.42	3.26	3.73	**50yr**	2.81	3.64	4.46	5.68	7.00	8.27	9.57	**50yr**	7.32	9.20	10.09	11.44	12.85	**50yr**
100yr	1.06	1.60	2.01	2.90	3.98	4.54	**100yr**	3.44	4.43	5.47	6.94	8.57	10.08	11.73	**100yr**	8.92	11.28	12.23	13.99	15.46	**100yr**
200yr	1.27	1.91	2.42	3.50	4.88	5.53	**200yr**	4.21	5.40	6.72	8.50	10.49	12.29	14.38	**200yr**	10.88	13.82	14.84	16.89	18.61	**200yr**
500yr	1.61	2.40	3.08	4.48	6.37	7.16	**500yr**	5.49	7.00	8.83	11.11	13.70	15.94	18.78	**500yr**	14.11	18.06	19.15	21.67	23.82	**500yr**

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Northeast Regional Climate Center

Bioretention Worksheet

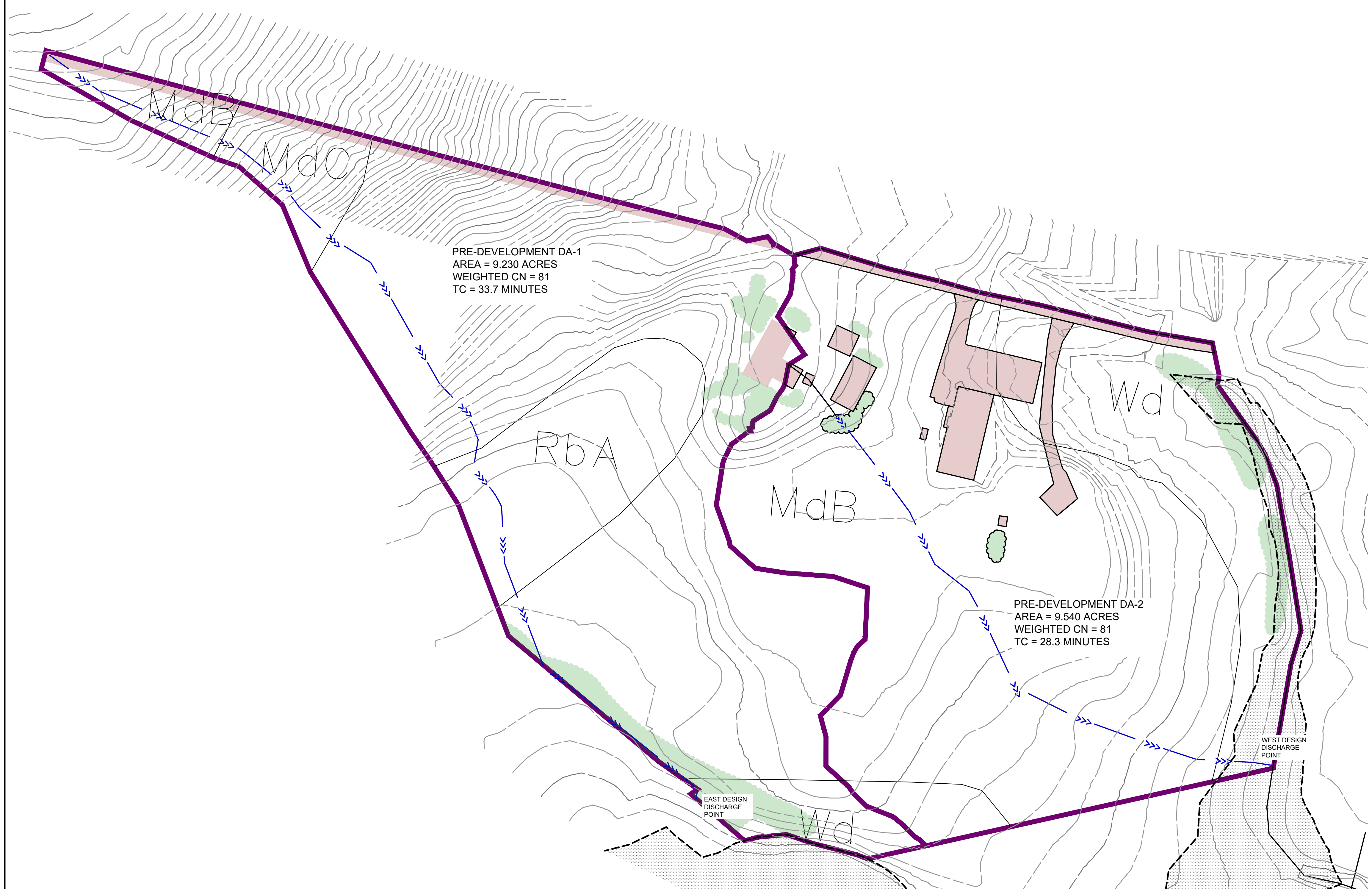
(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k — The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**1**						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
6	2.76	1.07	0.39	0.40	5585.12	1.40	
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	39%	0.40	5,585	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	
Soil Information							
Soil Group		D					
Soil Infiltration Rate		0.10	*in/hour*	*Okay*			
Using Underdrains?		Yes	*Okay*				
Calculate the Minimum Filter Area							
				Value		Units	Notes
WQv				5,585		*ft^3*	
Enter Depth of Soil Media			*df*	2.5		*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity			*k*	0.5		*ft/day*	
Enter Average Height of Ponding			*hf*	0.25		*ft*	*6 inches max.*
Enter Filter Time			*tf*	2		*days*	
Required Filter Area			***Af***	**5077**		***ft^2***	
Determine Actual Bio-Retention Area							
Filter Width		98	*ft*				
Filter Length		142	*ft*				
Filter Area		13916	*ft^2*				
Actual Volume Provided		15308	*ft^3*				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice		N/A	
RRv		6,123					
RRv applied		**5,585**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***			
Volume Treated		0	*ft^3*	*This is the portion of the WQv that is not reduced in*			
Volume Directed		0	*ft^3*	This volume is directed another practice			
Sizing √		OK		*Check to be sure Area provided ≥ Af*			



LEGEND:

- EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- PROPERTY BOUNDARY
- EXISTING BUILDING/PAVEMENT IMPERVIOUS AREA
- WOODED AREA
- JURISDICTIONAL FEDERAL WETLAND
- RUNOFF FLOW PATH
- DRAINAGE AREA BOUNDARY
- SOIL BOUNDARY

IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, ARTICLE 145 SECTION 7209, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.

NO.	REVISION	BY	DATE

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

CLIENT:
DOM KAM, LLC.

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
CITY OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
MARANGI DISPOSAL TS PERMIT

TITLE:
PRE-DEVELOPMENT WATERSHED MAP

ISSUE: REVIEW

DES:	DRN:	CHK:
BPB	BPB	DAL

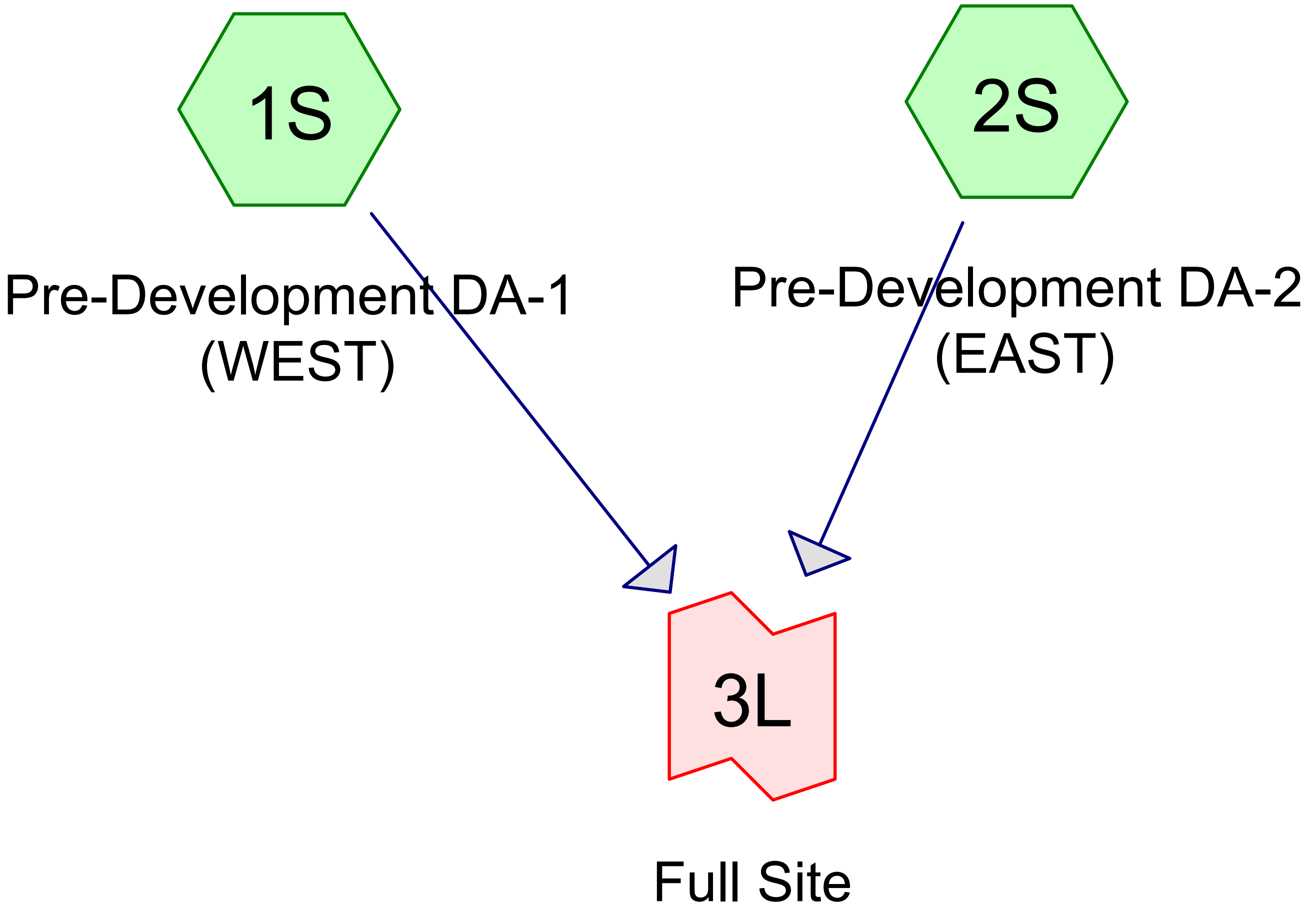
PROJECT NO:	DATE:
20-0062	JANUARY 2023

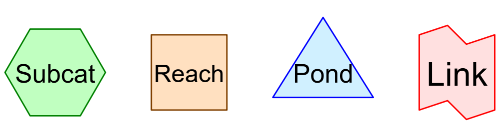
GRAPHIC SCALE: 0' 75' 150'

FILE: Pre-Development Watershed_recover.dwg

REV NO:	SHEET NO:
00	1

Xref .\Survey\200216-SVY-email111720 - C3D-2018\DRIVE T\Civil 3D Projects\200216MAR\SURVEY\DWGS\TEMPORARY SAVE\200216-SVY-email111720.dwg





Routing Diagram for Pre-Development-Jan 2023
Prepared by HP, Printed 2/1/2023

Summary for Subcatchment 1S: Pre-Development DA-1 (WEST)

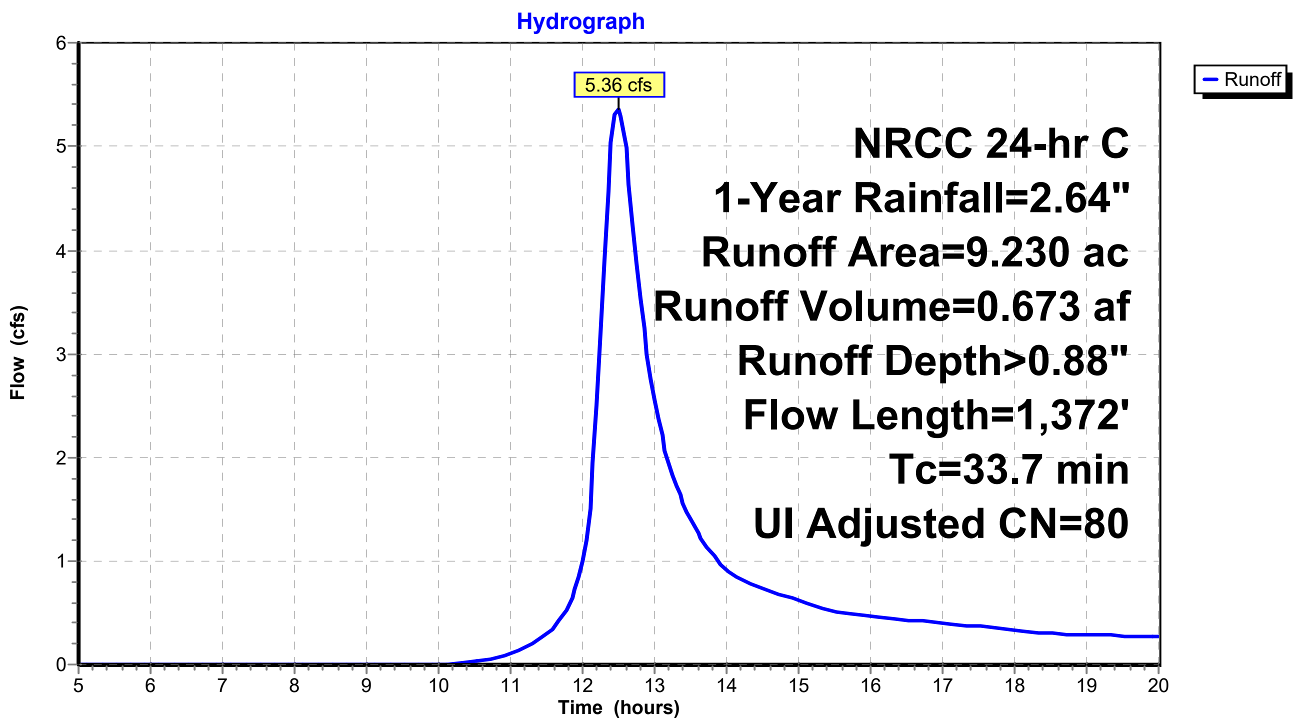
Runoff = 5.36 cfs @ 12.49 hrs, Volume= 0.673 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Adj	Description
8.370	80		Pasture/grassland/range, Good, HSG D
0.510	79		Woods/grass comb., Good, HSG D
0.350	98		Unconnected pavement, HSG D
9.230	81	80	Weighted Average, UI Adjusted
8.880			96.21% Pervious Area
0.350			3.79% Impervious Area
0.350			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 1S: Pre-Development DA-1 (WEST)



Summary for Subcatchment 2S: Pre-Development DA-2 (EAST)

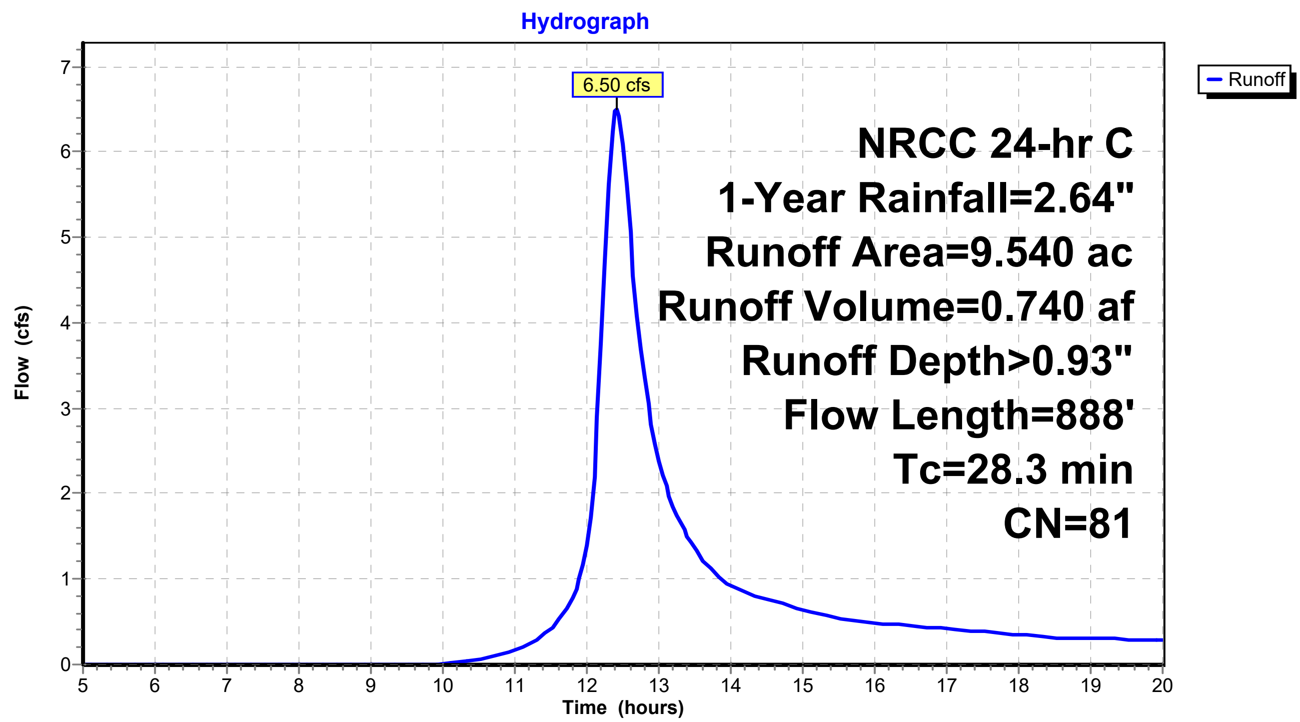
Runoff = 6.50 cfs @ 12.41 hrs, Volume= 0.740 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
8.450	80	Pasture/grassland/range, Good, HSG D
0.370	79	Woods/grass comb., Good, HSG D
0.720	98	Unconnected pavement, HSG D
9.540	81	Weighted Average
8.820		92.45% Pervious Area
0.720		7.55% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
7.6	267	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	521	0.0211	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
28.3	888	Total			

Subcatchment 2S: Pre-Development DA-2 (EAST)

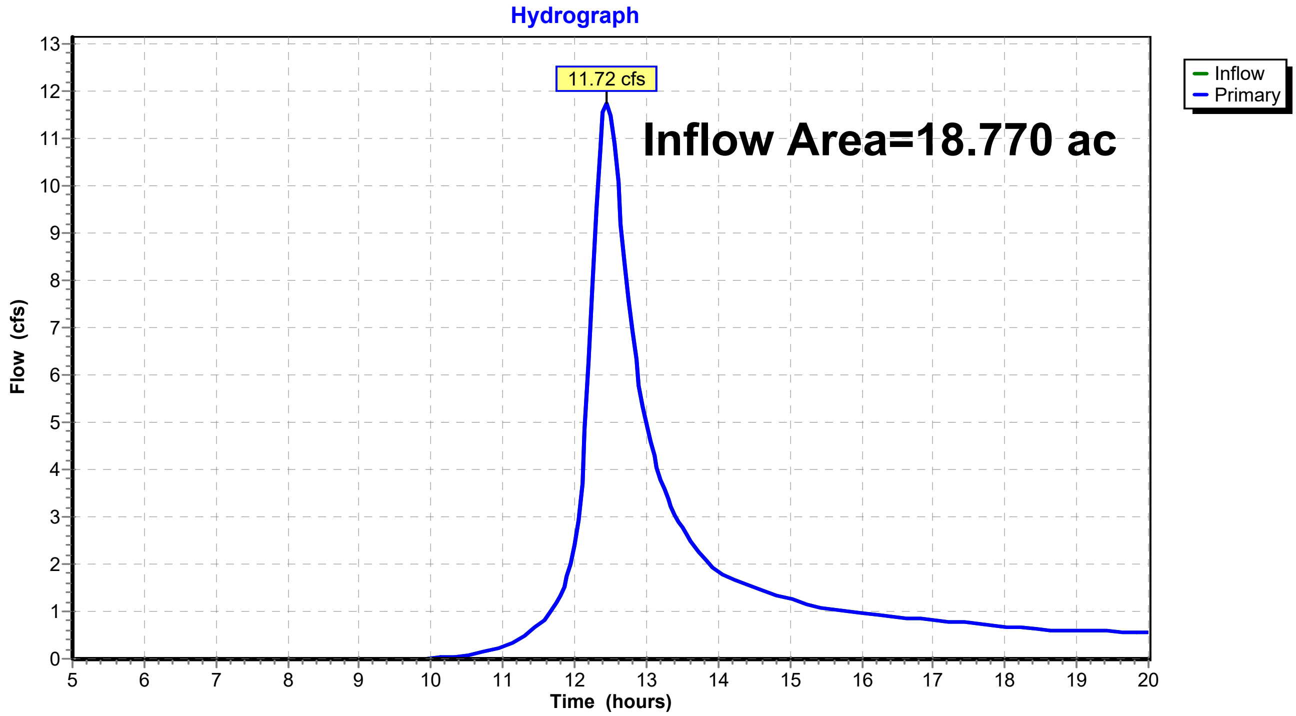


Summary for Link 3L: Full Site

Inflow Area =	18.770 ac,	5.70% Impervious,	Inflow Depth > 0.90"	for 1-Year event
Inflow =	11.72 cfs @	12.45 hrs, Volume=	1.413 af	
Primary =	11.72 cfs @	12.45 hrs, Volume=	1.413 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Full Site



Summary for Subcatchment 1S: Pre-Development DA-1 (WEST)

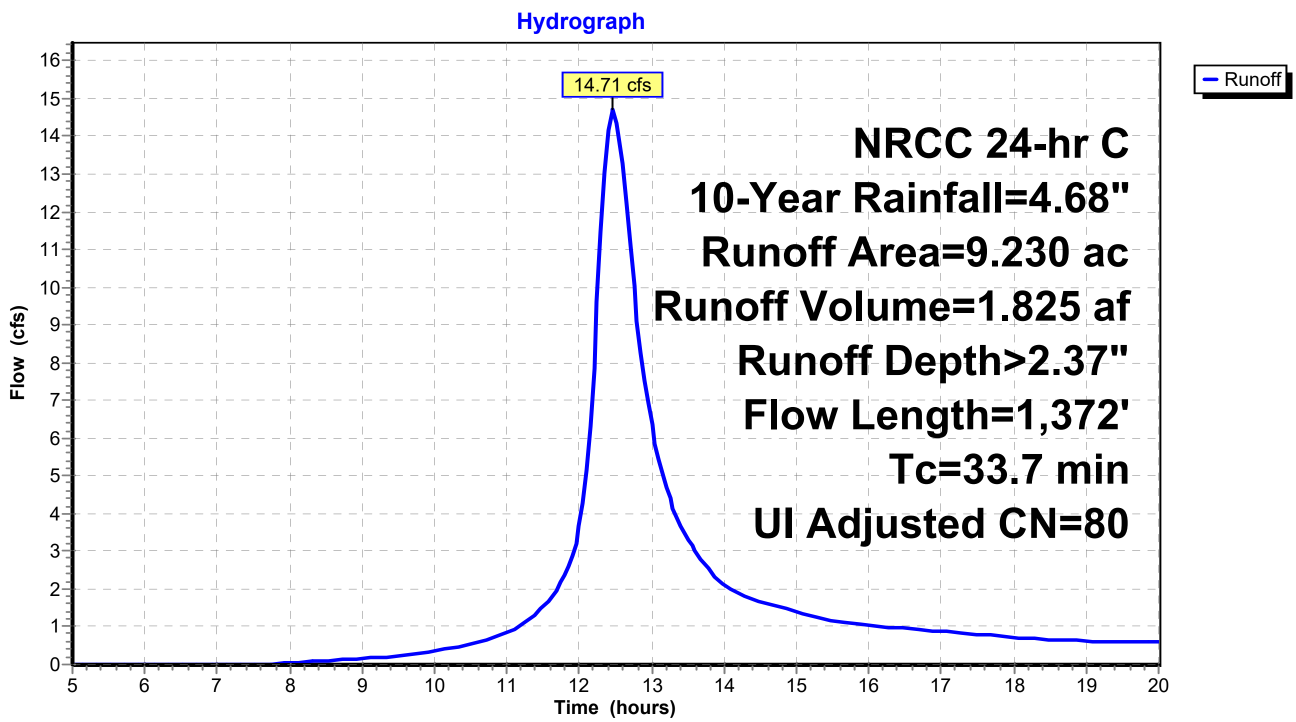
Runoff = 14.71 cfs @ 12.47 hrs, Volume= 1.825 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Adj	Description
8.370	80		Pasture/grassland/range, Good, HSG D
0.510	79		Woods/grass comb., Good, HSG D
0.350	98		Unconnected pavement, HSG D
9.230	81	80	Weighted Average, UI Adjusted
8.880			96.21% Pervious Area
0.350			3.79% Impervious Area
0.350			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 1S: Pre-Development DA-1 (WEST)



Summary for Subcatchment 2S: Pre-Development DA-2 (EAST)

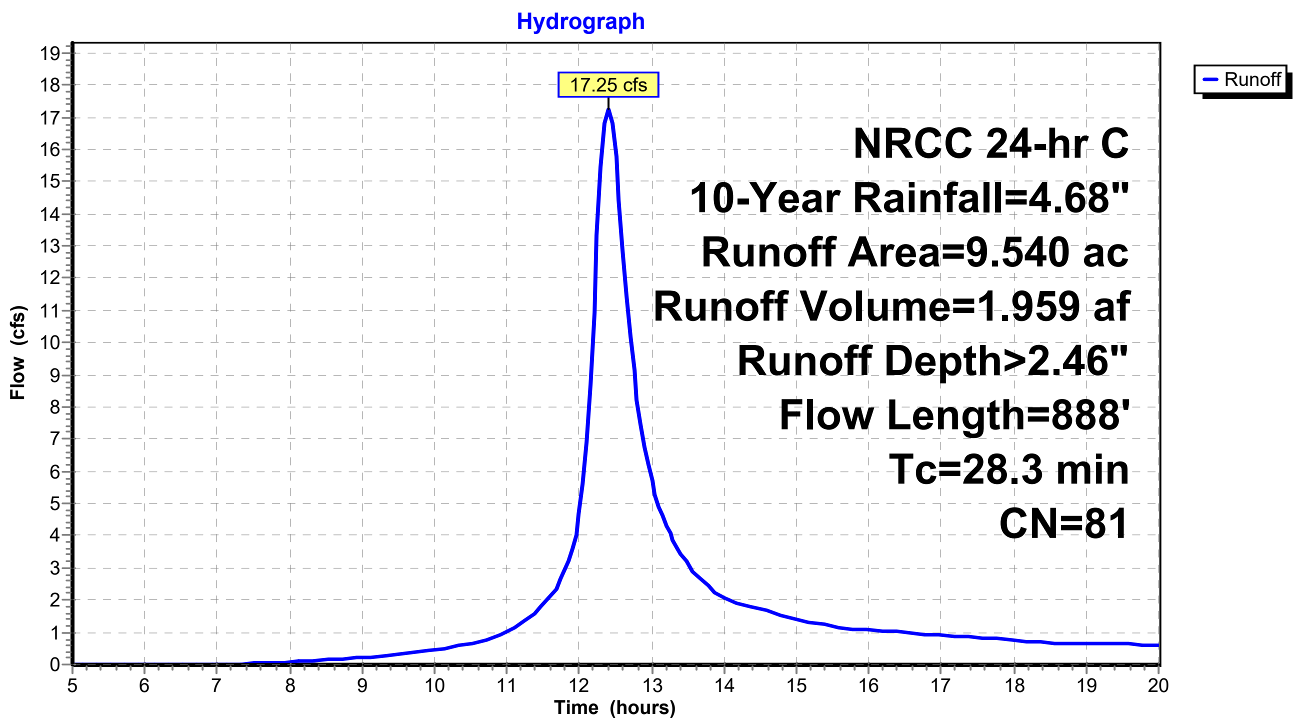
Runoff = 17.25 cfs @ 12.40 hrs, Volume= 1.959 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
8.450	80	Pasture/grassland/range, Good, HSG D
0.370	79	Woods/grass comb., Good, HSG D
0.720	98	Unconnected pavement, HSG D
9.540	81	Weighted Average
8.820		92.45% Pervious Area
0.720		7.55% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
7.6	267	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	521	0.0211	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
28.3	888	Total			

Subcatchment 2S: Pre-Development DA-2 (EAST)

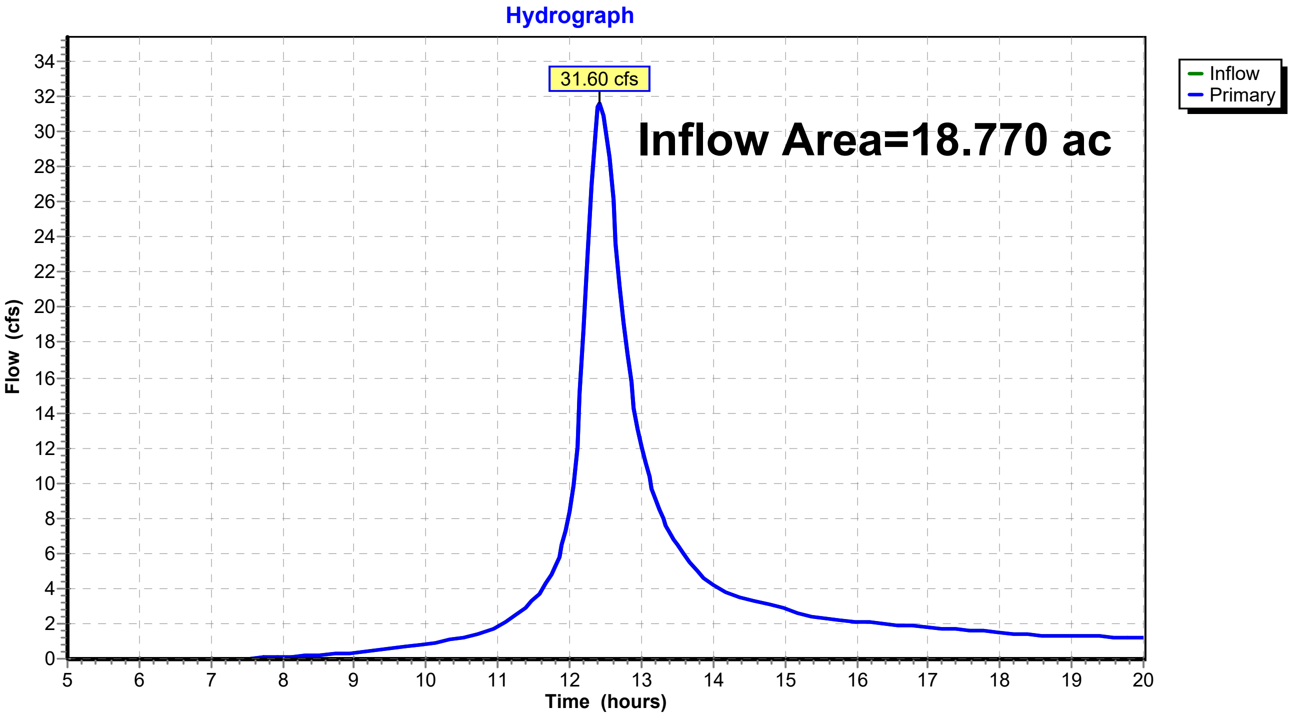


Summary for Link 3L: Full Site

Inflow Area =	18.770 ac,	5.70% Impervious,	Inflow Depth > 2.42"	for 10-Year event	
Inflow =	31.60 cfs @	12.43 hrs,	Volume=	3.784 af	
Primary =	31.60 cfs @	12.43 hrs,	Volume=	3.784 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Full Site



Summary for Subcatchment 1S: Pre-Development DA-1 (WEST)

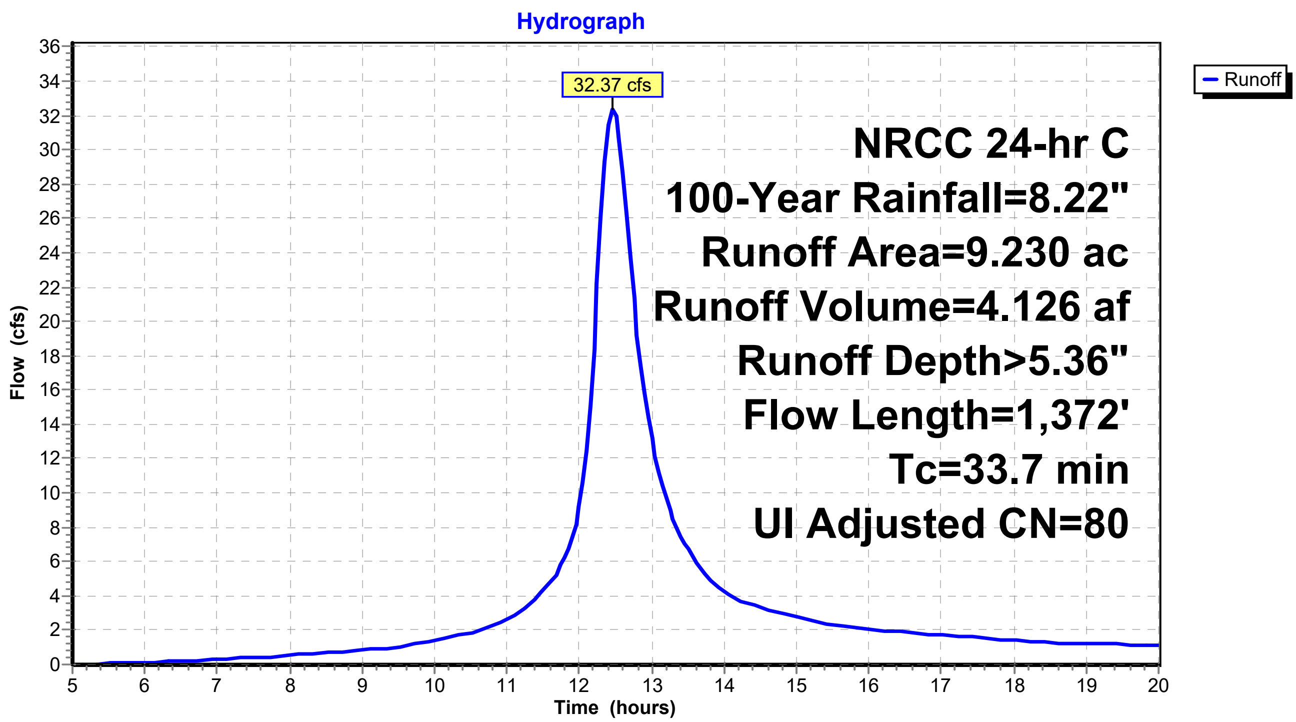
Runoff = 32.37 cfs @ 12.46 hrs, Volume= 4.126 af, Depth> 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Adj	Description
8.370	80		Pasture/grassland/range, Good, HSG D
0.510	79		Woods/grass comb., Good, HSG D
0.350	98		Unconnected pavement, HSG D
9.230	81	80	Weighted Average, UI Adjusted
8.880			96.21% Pervious Area
0.350			3.79% Impervious Area
0.350			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 1S: Pre-Development DA-1 (WEST)



Summary for Subcatchment 2S: Pre-Development DA-2 (EAST)

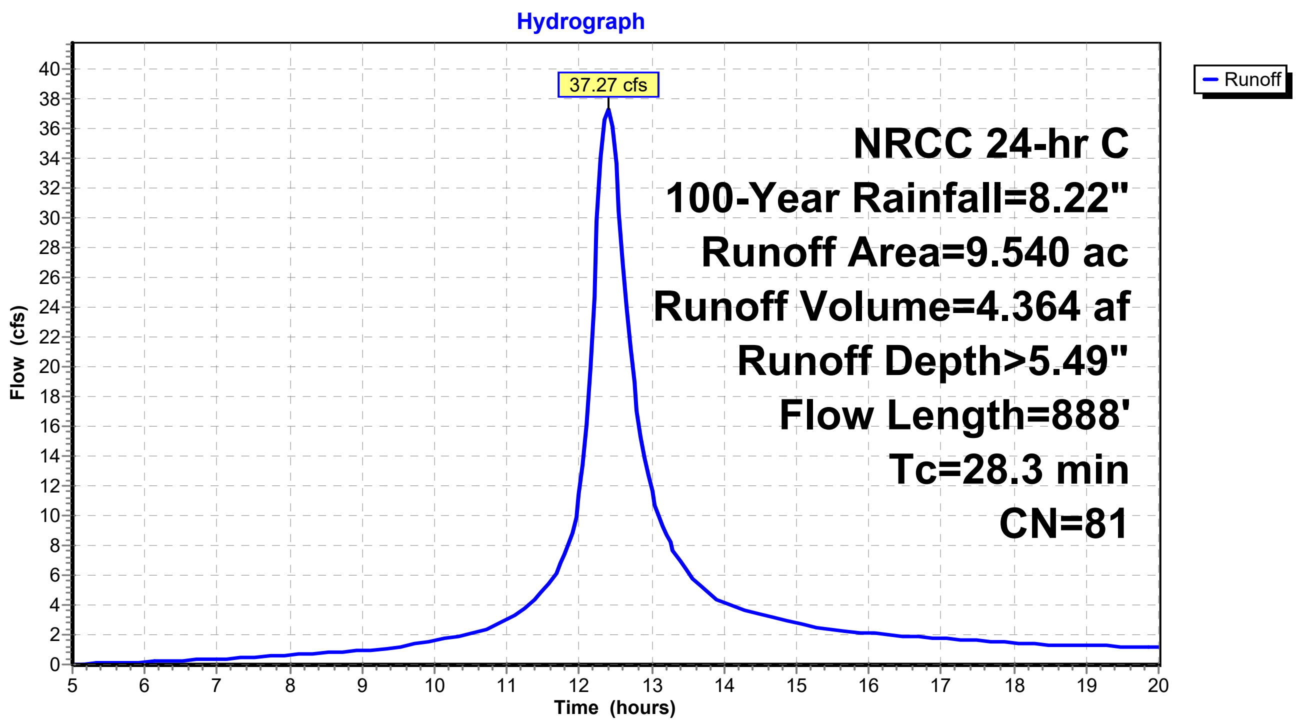
Runoff = 37.27 cfs @ 12.39 hrs, Volume= 4.364 af, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
8.450	80	Pasture/grassland/range, Good, HSG D
0.370	79	Woods/grass comb., Good, HSG D
0.720	98	Unconnected pavement, HSG D
9.540	81	Weighted Average
8.820		92.45% Pervious Area
0.720		7.55% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
7.6	267	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	521	0.0211	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
28.3	888	Total			

Subcatchment 2S: Pre-Development DA-2 (EAST)

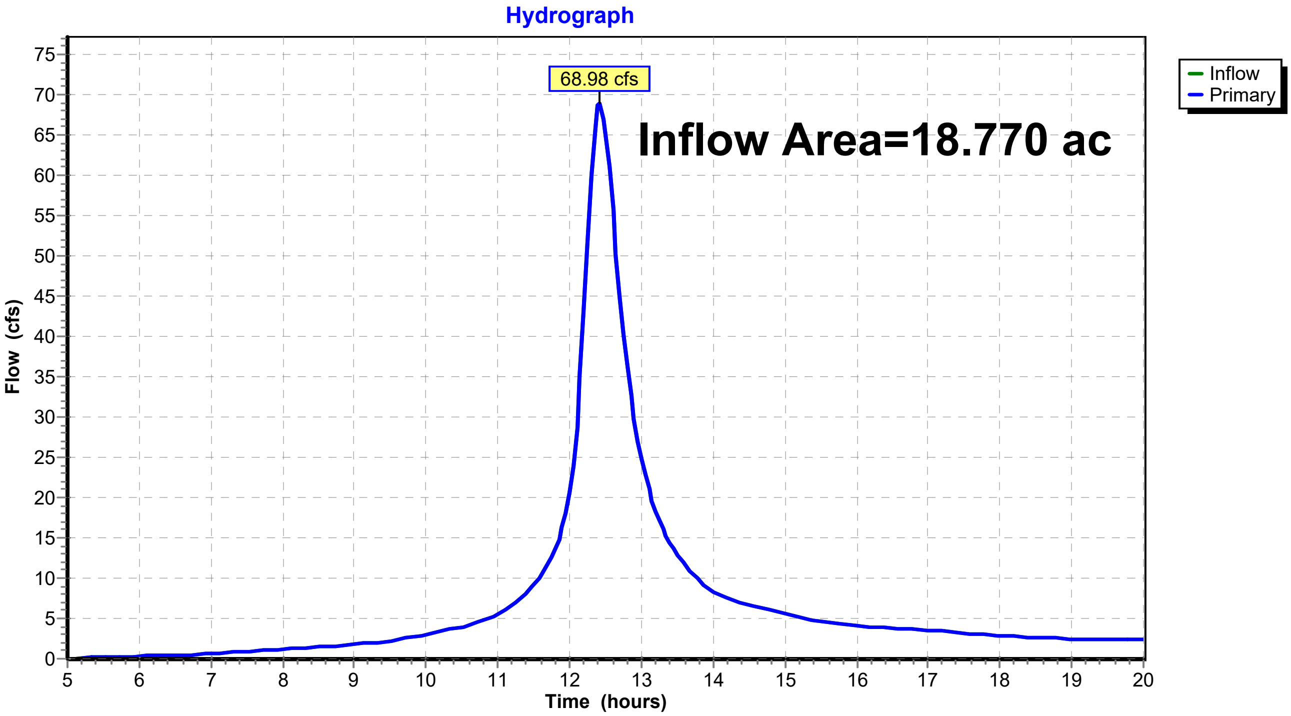


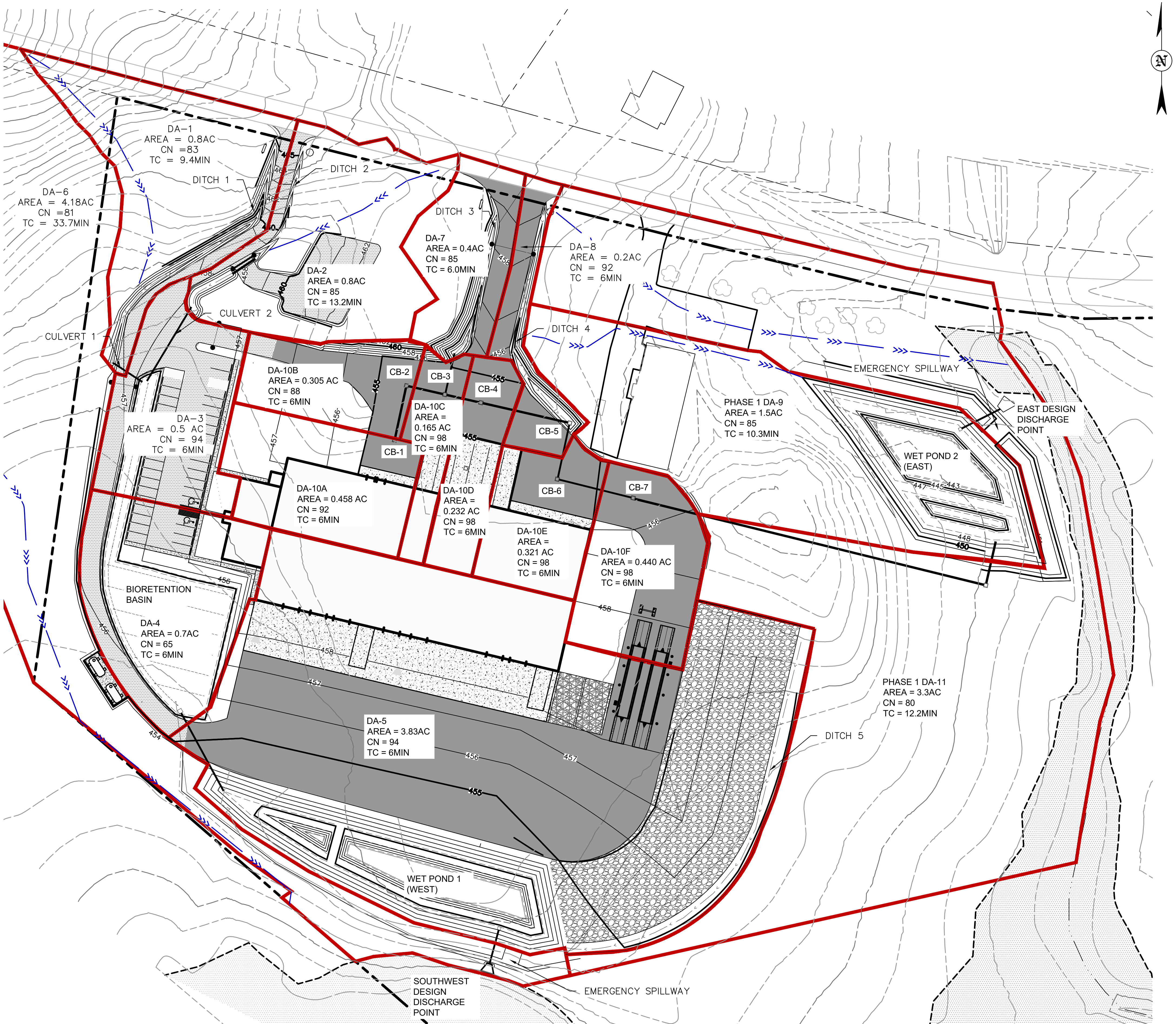
Summary for Link 3L: Full Site

Inflow Area =	18.770 ac,	5.70% Impervious,	Inflow Depth > 5.43"	for 100-Year event	
Inflow =	68.98 cfs @	12.42 hrs,	Volume=	8.490 af	
Primary =	68.98 cfs @	12.42 hrs,	Volume=	8.490 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Full Site





LEGEND:

- EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- PROPOSED GRADING MAJOR CONTOUR
- PROPOSED GRADING MINOR CONTOUR
- PROPERTY BOUNDARY
- PROPERTY BOUNDARY SETBACK
- EXISTING BUILDING
- JURISDICTIONAL FEDERAL WETLAND
- OUTDOOR SIGNAGE
- STANDARD DUTY PAVEMENT
- HEAVY DUTY PAVEMENT
- CONCRETE
- GRAVEL
- LITTER FENCE
- SANITARY SEWER
- WATER LINE
- UNDERGROUND ELECTRIC
- NATURAL GAS LINE
- PROPOSED SWALE
- PROPOSED STORM SEWER
- 3'X3' CATCH BASIN
- LOCKING GATE
- RUNOFF FLOWPATH
- DRAINAGE AREA BOUNDARY

NO.	REVISION	BY	DATE

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

TITLE:
POST DEVELOPMENT WATERSHED MAP

ISSUE: REVIEW

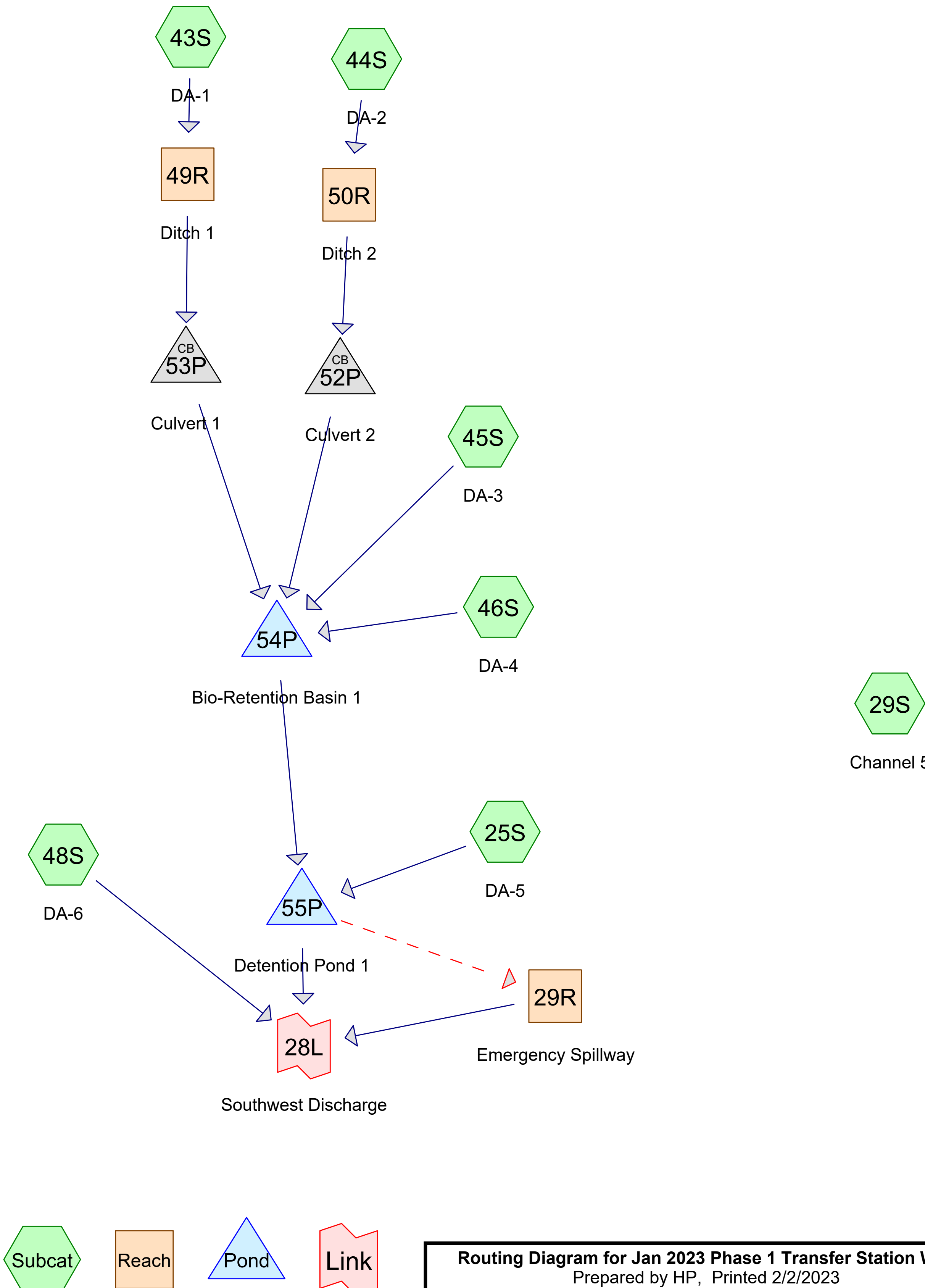
DES: DL | DRN: DL | CHK: DL

PROJECT NO: 029-A0001
DATE: JANUARY 2023

GRAPHIC SCALE: 0' 50' 100'

FILE: Phase 1 Watershed Map Rev 2.dwg

REV NO: 1
SHEET NO: 1



Routing Diagram for Jan 2023 Phase 1 Transfer Station WEST
Prepared by HP, Printed 2/2/2023

Summary for Subcatchment 25S: DA-5

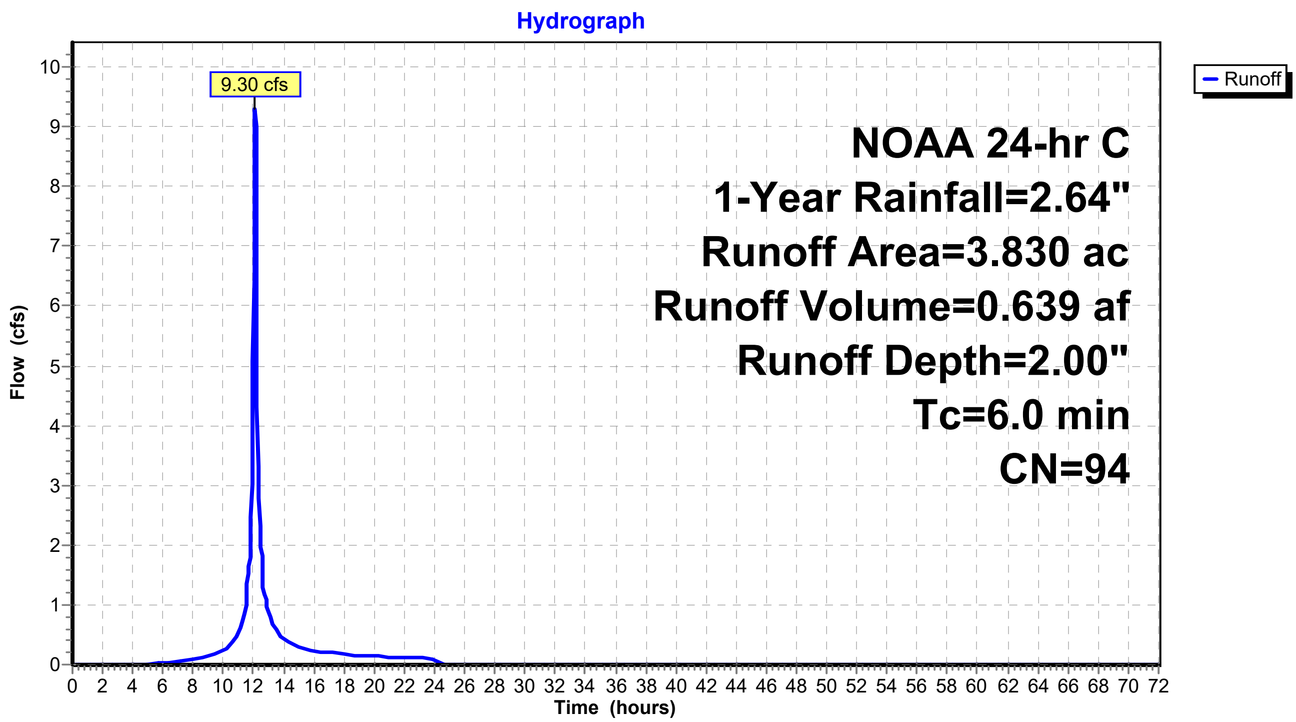
Runoff = 9.30 cfs @ 12.13 hrs, Volume= 0.639 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.502	80	>75% Grass cover, Good, HSG D
2.120	98	Paved parking, HSG D
0.268	98	Water Surface, HSG D
0.799	91	Gravel roads, HSG D
0.141	80	>75% Grass cover, Good, HSG D
3.830	94	Weighted Average
1.442		37.65% Pervious Area
2.388		62.35% Impervious Area

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

Subcatchment 25S: DA-5



Summary for Subcatchment 29S: Channel 5

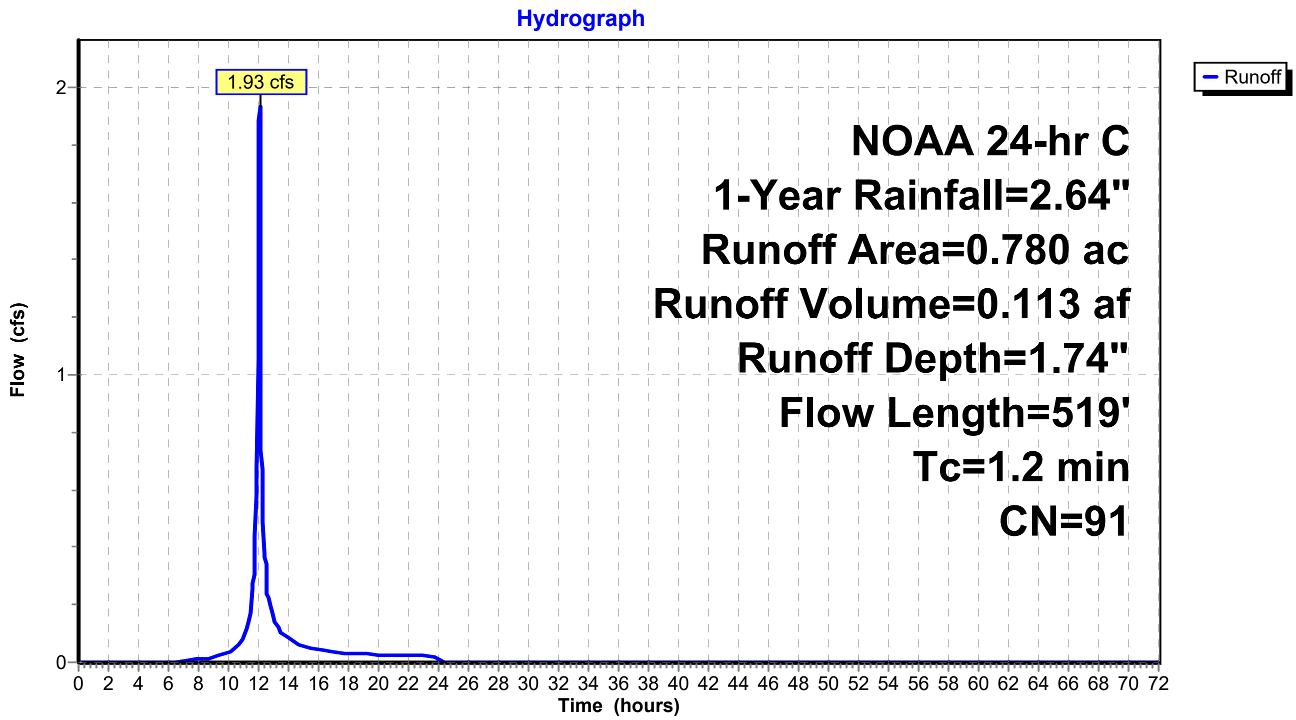
Runoff = 1.93 cfs @ 12.07 hrs, Volume= 0.113 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.780	91	Gravel roads, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.17"
0.2	419	0.7200	36.03	144.10	**Channel Flow,** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.035 Earth, dense weeds
1.2	519	Total			

Subcatchment 29S: Channel 5



Summary for Subcatchment 43S: DA-1

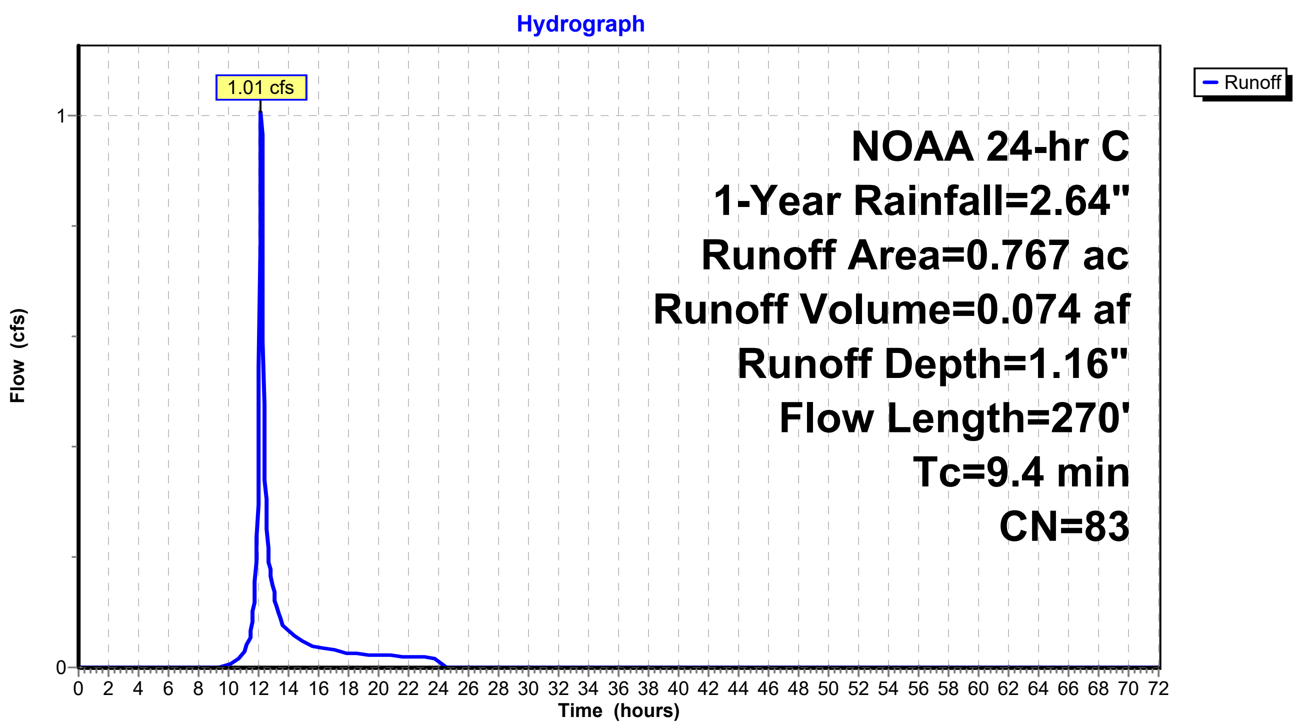
Runoff = 1.01 cfs @ 12.17 hrs, Volume= 0.074 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.622	80	>75% Grass cover, Good, HSG D
0.145	98	Paved parking, HSG D
0.767	83	Weighted Average
0.622		81.10% Pervious Area
0.145		18.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0933	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
1.7	170	0.0588	1.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.4	270	Total			

Subcatchment 43S: DA-1



Summary for Subcatchment 44S: DA-2

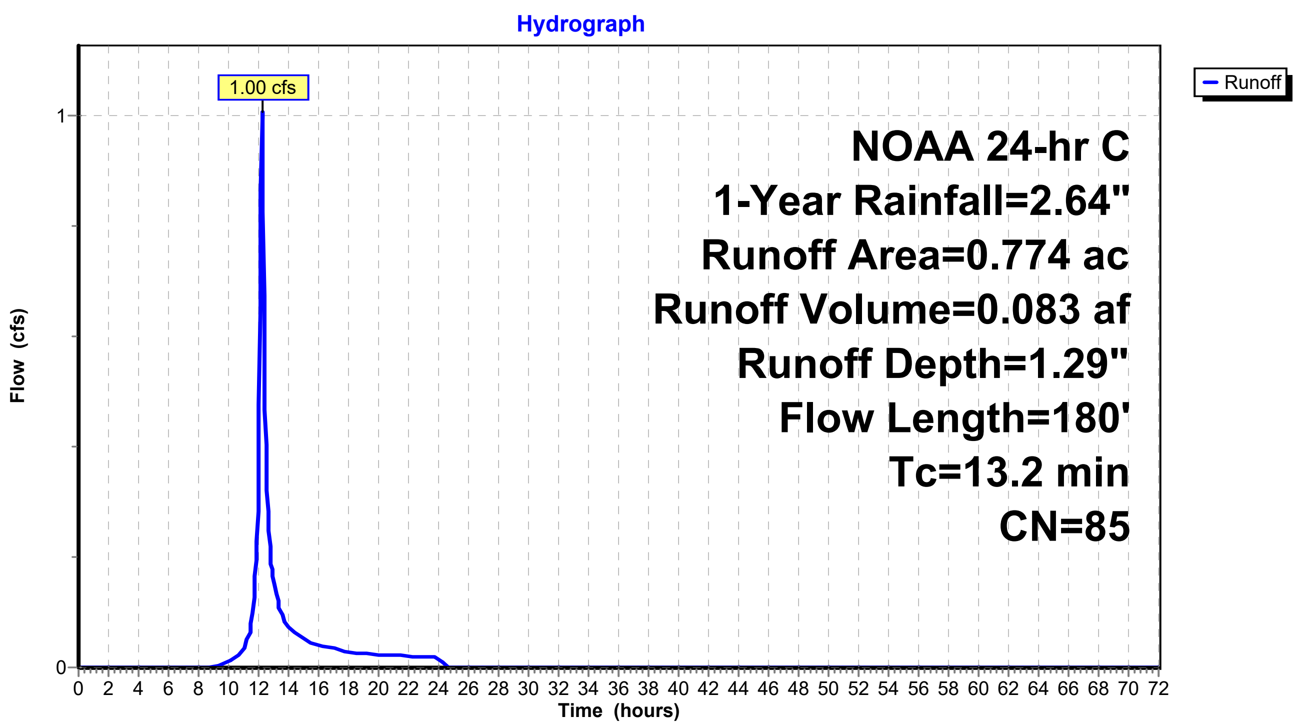
Runoff = 1.00 cfs @ 12.22 hrs, Volume= 0.083 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.564	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.774	85	Weighted Average
0.564		72.87% Pervious Area
0.210		27.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0602	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
4.0	80	0.0023	0.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.2	180	Total			

Subcatchment 44S: DA-2



Summary for Subcatchment 45S: DA-3

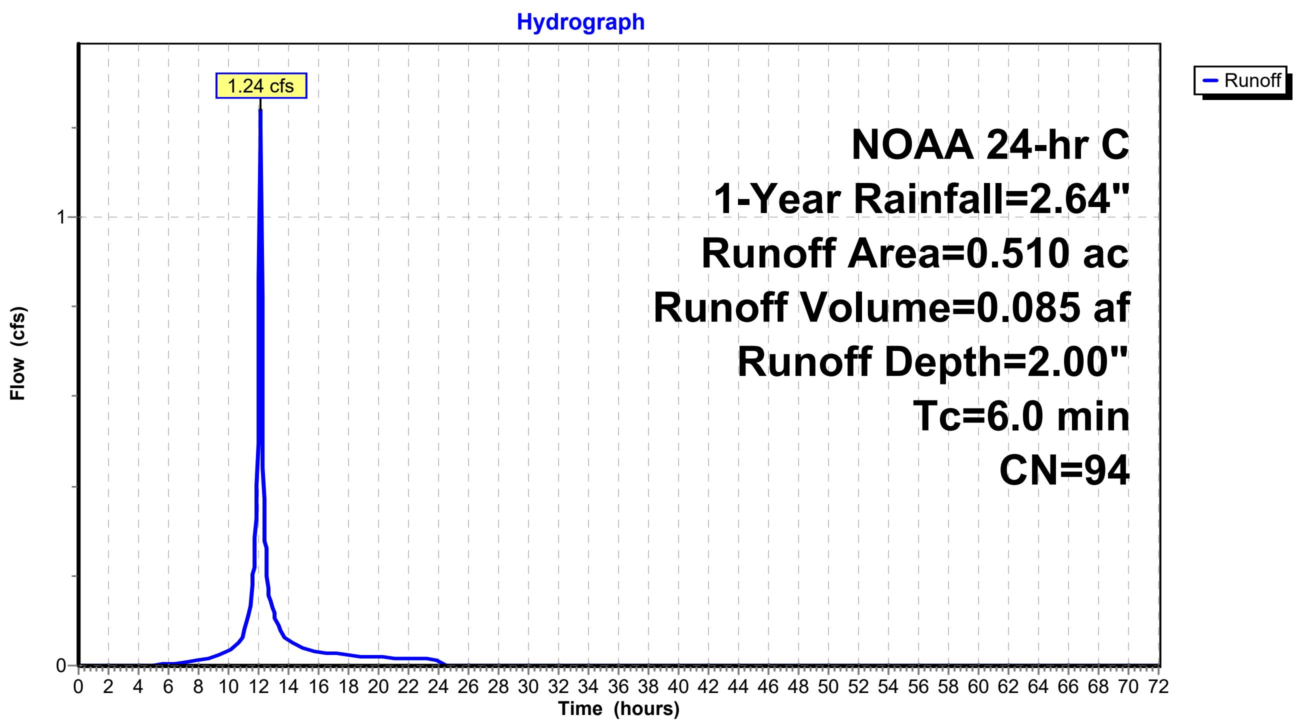
Runoff = 1.24 cfs @ 12.13 hrs, Volume= 0.085 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.110	80	>75% Grass cover, Good, HSG D
0.400	98	Paved parking, HSG D
0.510	94	Weighted Average
0.110		21.57% Pervious Area
0.400		78.43% Impervious Area

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

Subcatchment 45S: DA-3



Summary for Subcatchment 46S: DA-4

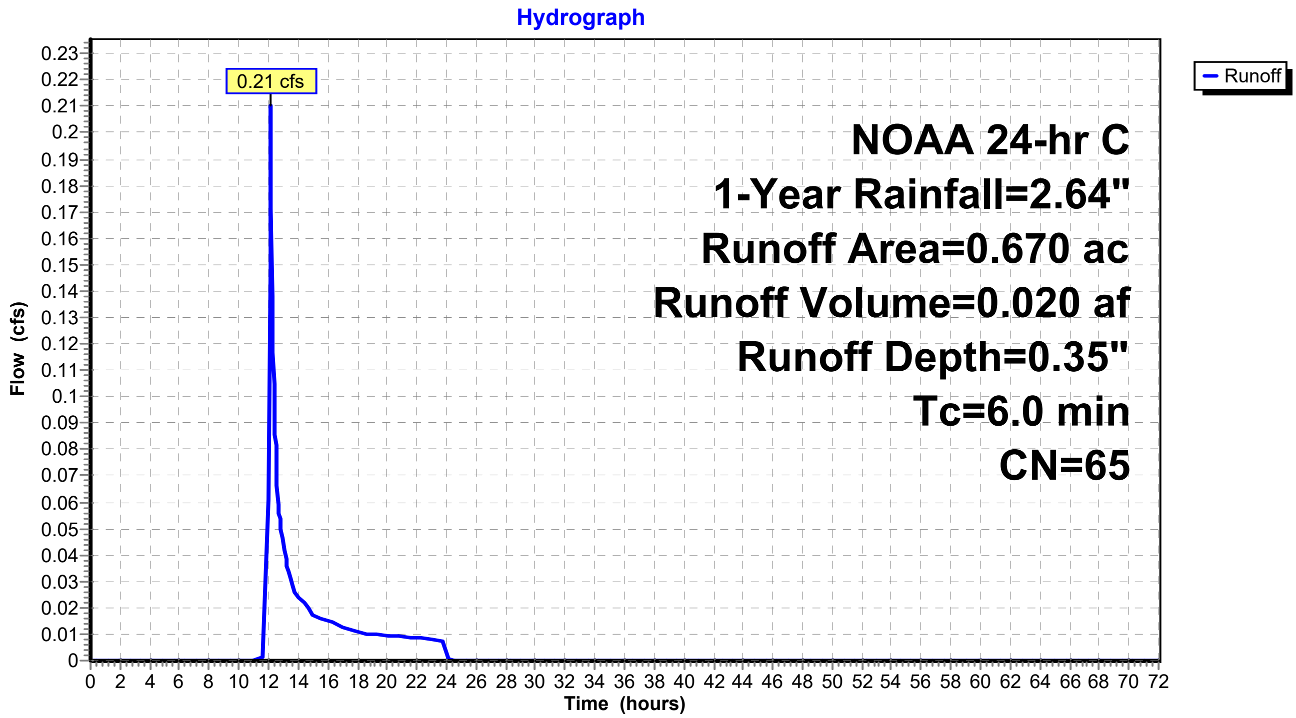
Runoff = 0.21 cfs @ 12.16 hrs, Volume= 0.020 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.380	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG D
0.670	65	Weighted Average
0.380		56.72% Pervious Area
0.290		43.28% Impervious Area

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

Subcatchment 46S: DA-4



Summary for Subcatchment 48S: DA-6

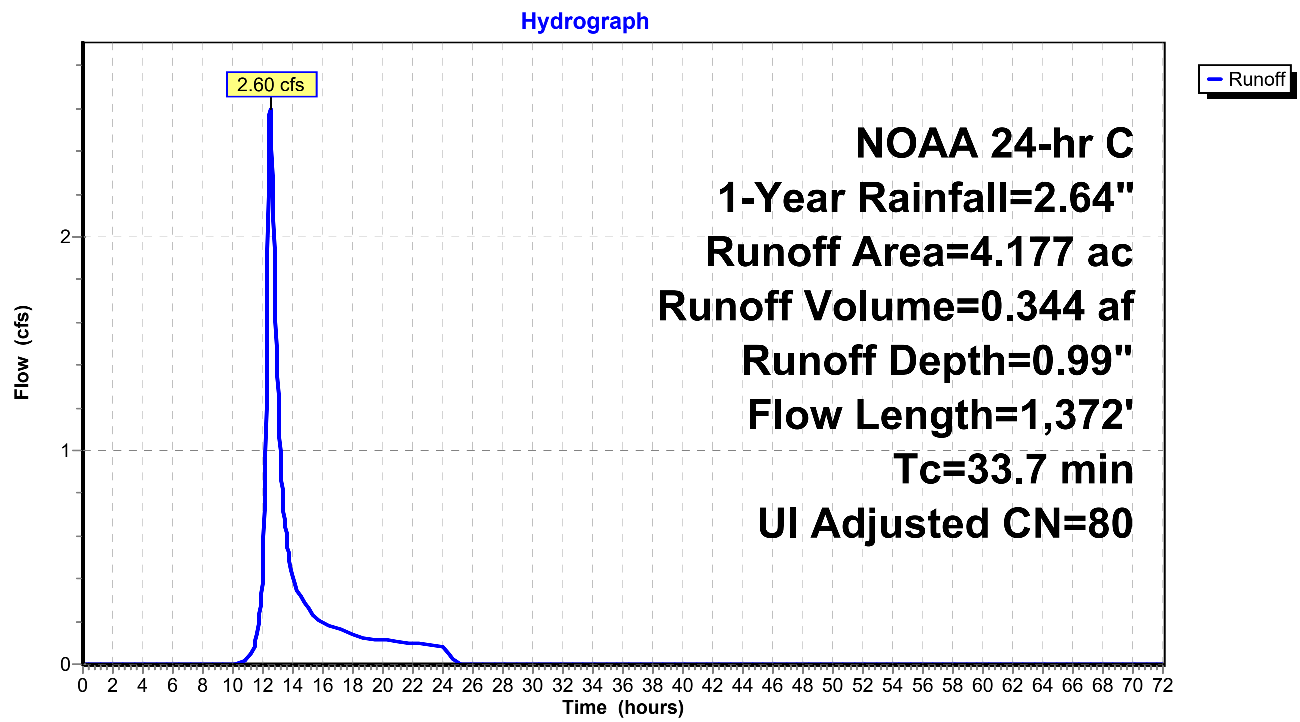
Runoff = 2.60 cfs @ 12.50 hrs, Volume= 0.344 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Adj	Description
3.864	80		Pasture/grassland/range, Good, HSG D
0.127	79		Woods/grass comb., Good, HSG D
0.186	98		Unconnected pavement, HSG D
4.177	81	80	Weighted Average, UI Adjusted
3.991			95.55% Pervious Area
0.186			4.45% Impervious Area
0.186			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 48S: DA-6



Summary for Reach 29R: Emergency Spillway

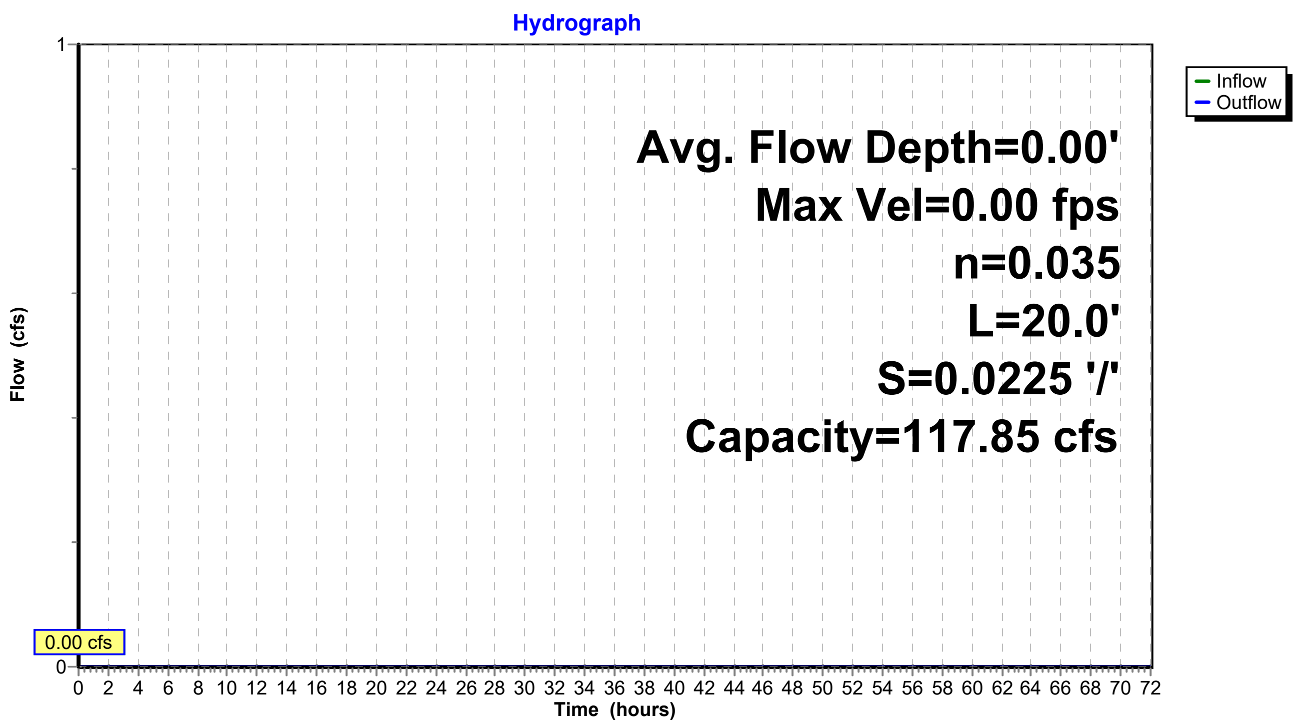
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 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= 1.00' Flow Area= 20.0 sf, Capacity= 117.85 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 20.0' Slope= 0.0225 '/'
Inlet Invert= 453.25', Outlet Invert= 452.80'

Reach 29R: Emergency Spillway



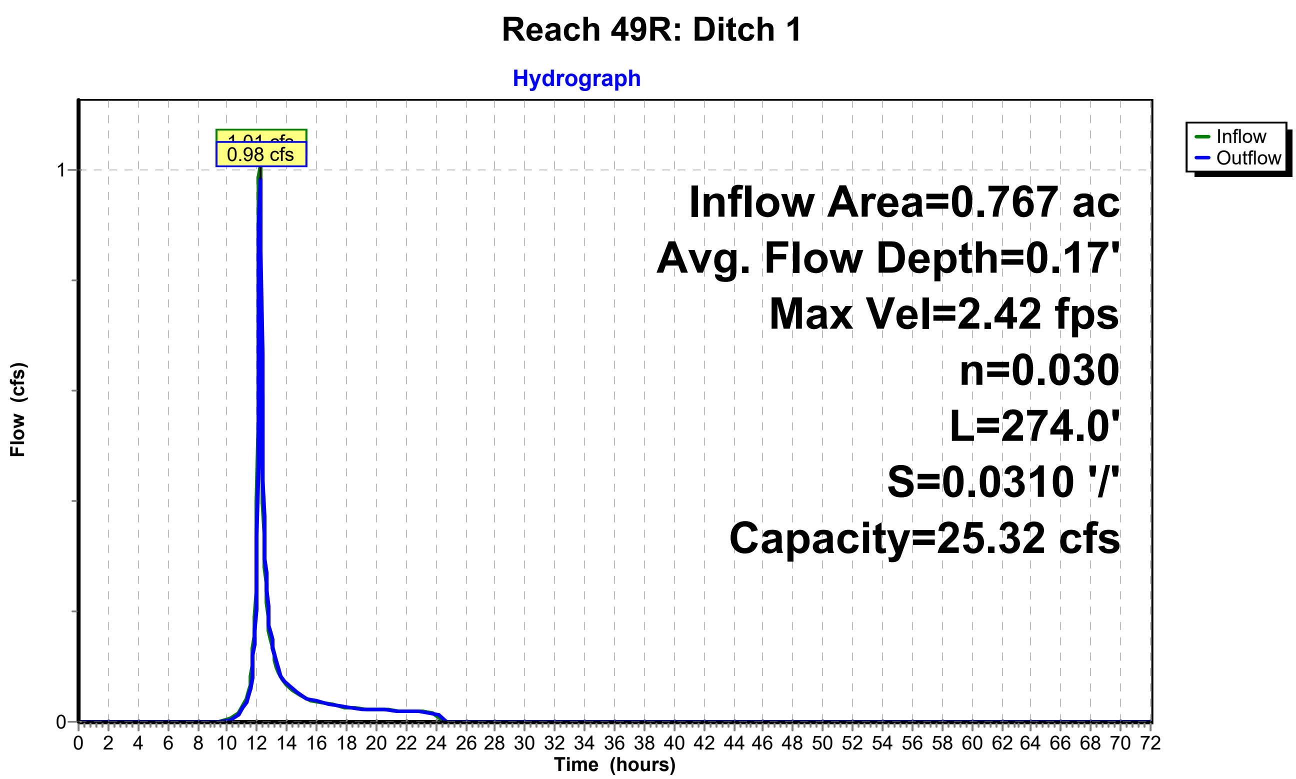
Summary for Reach 49R: Ditch 1

Inflow Area = 0.767 ac, 18.90% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 1.01 cfs @ 12.17 hrs, Volume= 0.074 af
Outflow = 0.98 cfs @ 12.20 hrs, Volume= 0.074 af, Atten= 2%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.42 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 6.3 min

Peak Storage= 111 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 2.69'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 25.32 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 274.0' Slope= 0.0310 '/'
Inlet Invert= 463.00', Outlet Invert= 454.50'



Summary for Reach 50R: Ditch 2

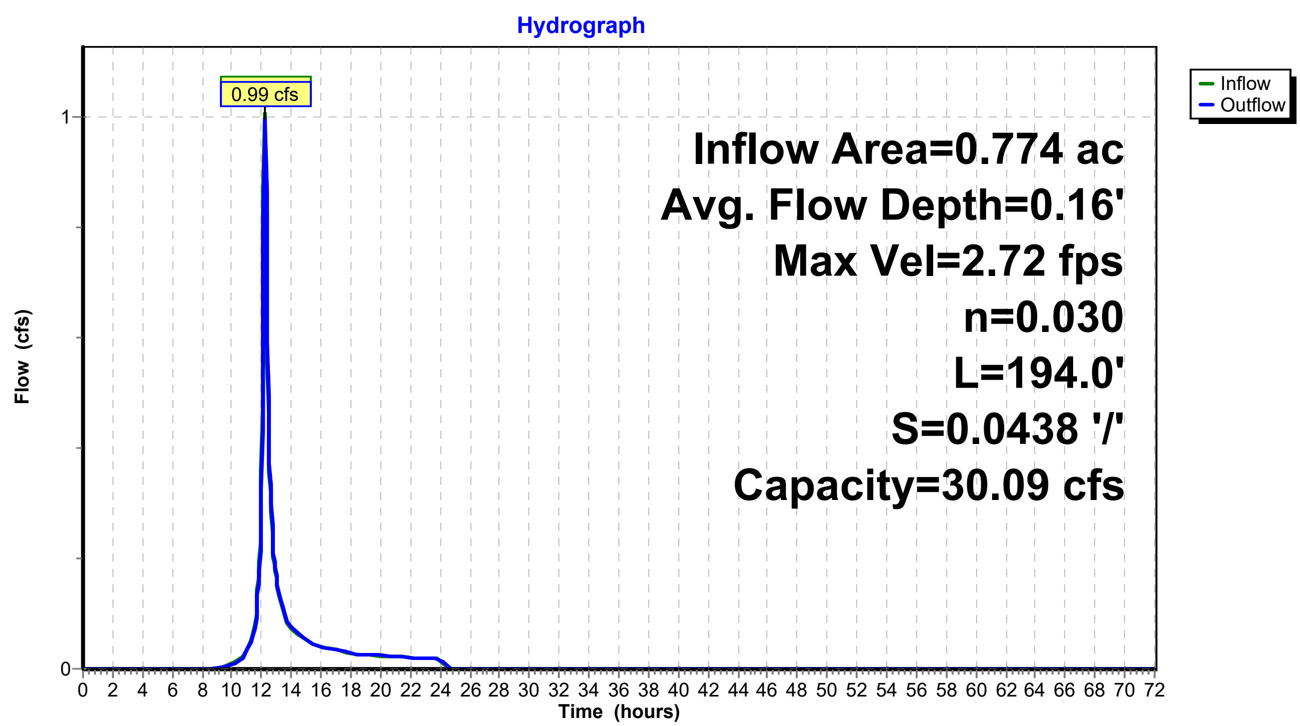
Inflow Area = 0.774 ac, 27.13% Impervious, Inflow Depth = 1.29" for 1-Year event
Inflow = 1.00 cfs @ 12.22 hrs, Volume= 0.083 af
Outflow = 0.99 cfs @ 12.23 hrs, Volume= 0.083 af, Atten= 1%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.72 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 3.9 min

Peak Storage= 71 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 2.63'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 30.09 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 194.0' Slope= 0.0438 '/'
Inlet Invert= 463.00', Outlet Invert= 454.50'

Reach 50R: Ditch 2



Summary for Pond 52P: Culvert 2

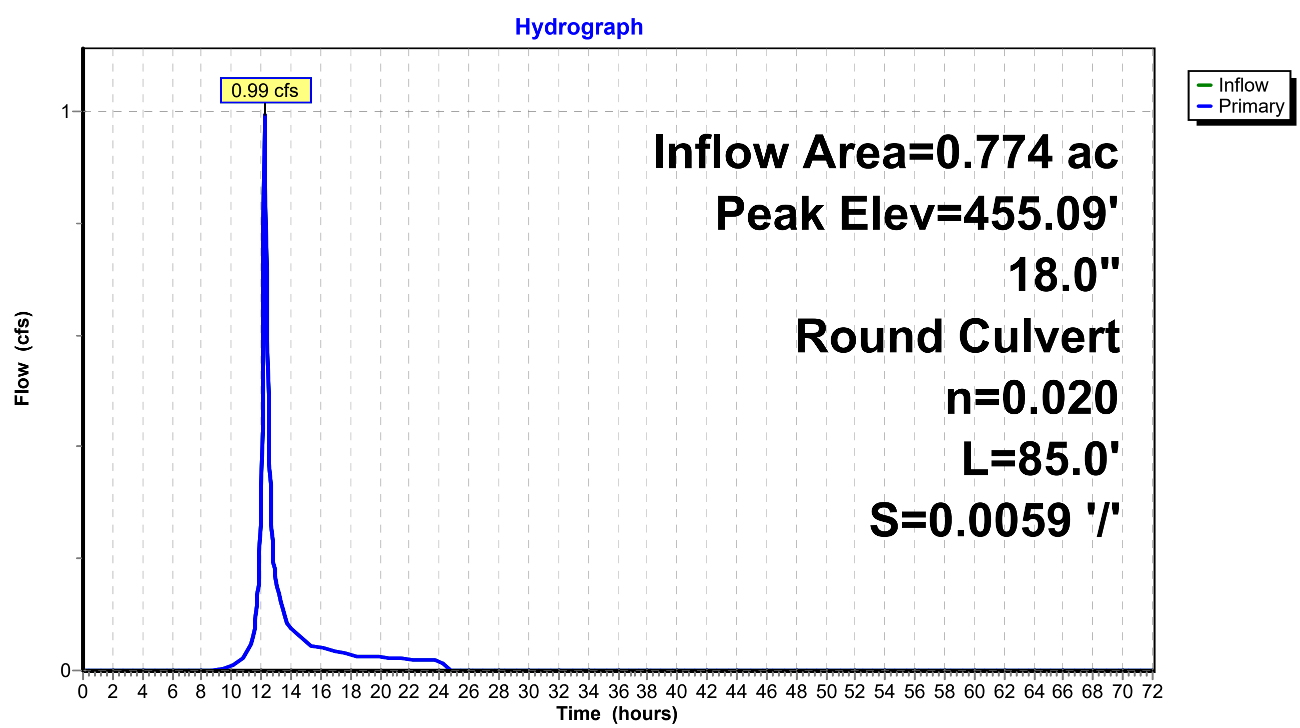
Inflow Area = 0.774 ac, 27.13% Impervious, Inflow Depth = 1.29" for 1-Year event
Inflow = 0.99 cfs @ 12.23 hrs, Volume= 0.083 af
Outflow = 0.99 cfs @ 12.23 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.23 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.09' @ 12.23 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0059 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.98 cfs @ 12.23 hrs HW=455.09' TW=454.22' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.98 cfs @ 2.26 fps)

Pond 52P: Culvert 2



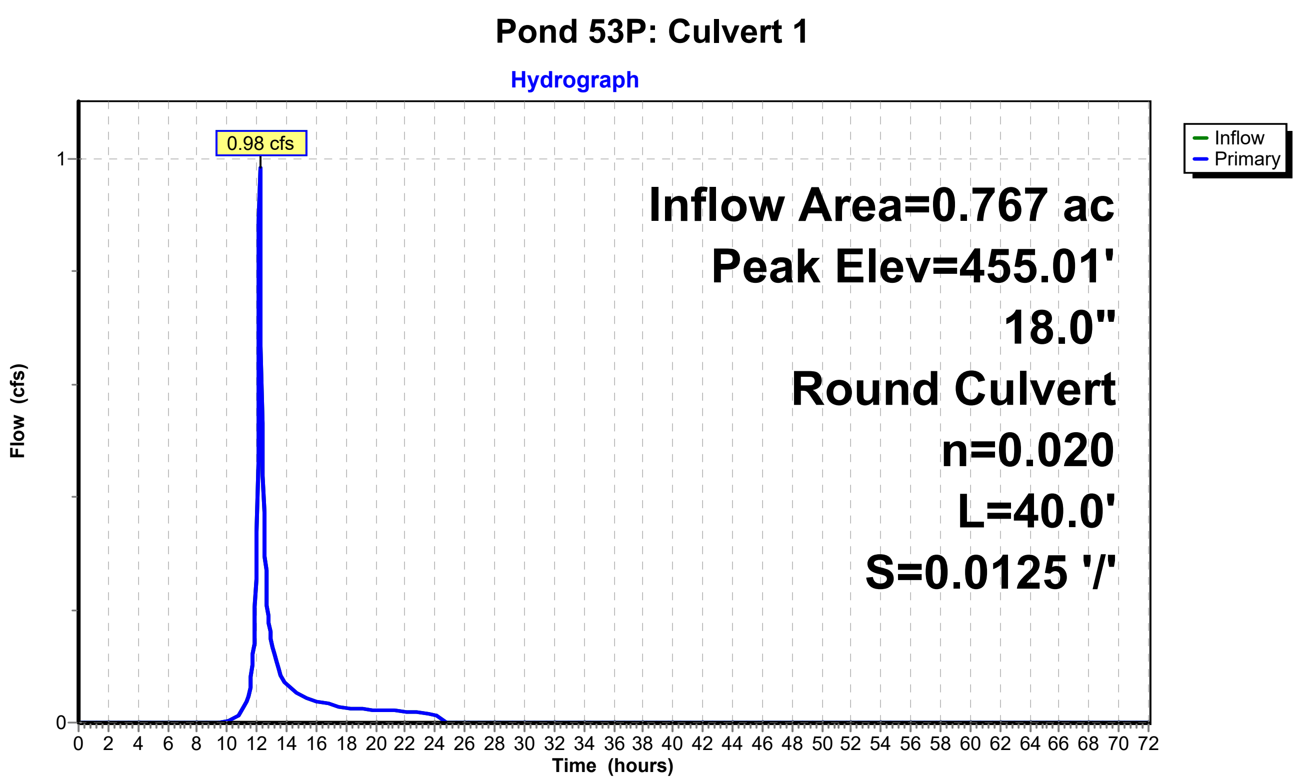
Summary for Pond 53P: Culvert 1

Inflow Area = 0.767 ac, 18.90% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 0.98 cfs @ 12.20 hrs, Volume= 0.074 af
Outflow = 0.98 cfs @ 12.20 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.98 cfs @ 12.20 hrs, Volume= 0.074 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.01' @ 12.20 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0125 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.98 cfs @ 12.20 hrs HW=455.01' TW=454.19' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.98 cfs @ 2.75 fps)



Summary for Pond 54P: Bio-Retention Basin 1

Inflow Area = 2.721 ac, 38.40% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 3.12 cfs @ 12.16 hrs, Volume= 0.262 af
Outflow = 0.09 cfs @ 17.63 hrs, Volume= 0.262 af, Atten= 97%, Lag= 327.9 min
Primary = 0.09 cfs @ 17.63 hrs, Volume= 0.262 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.49' @ 17.63 hrs Surf.Area= 14,824 sf Storage= 7,128 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 783.4 min (1,621.5 - 838.1)

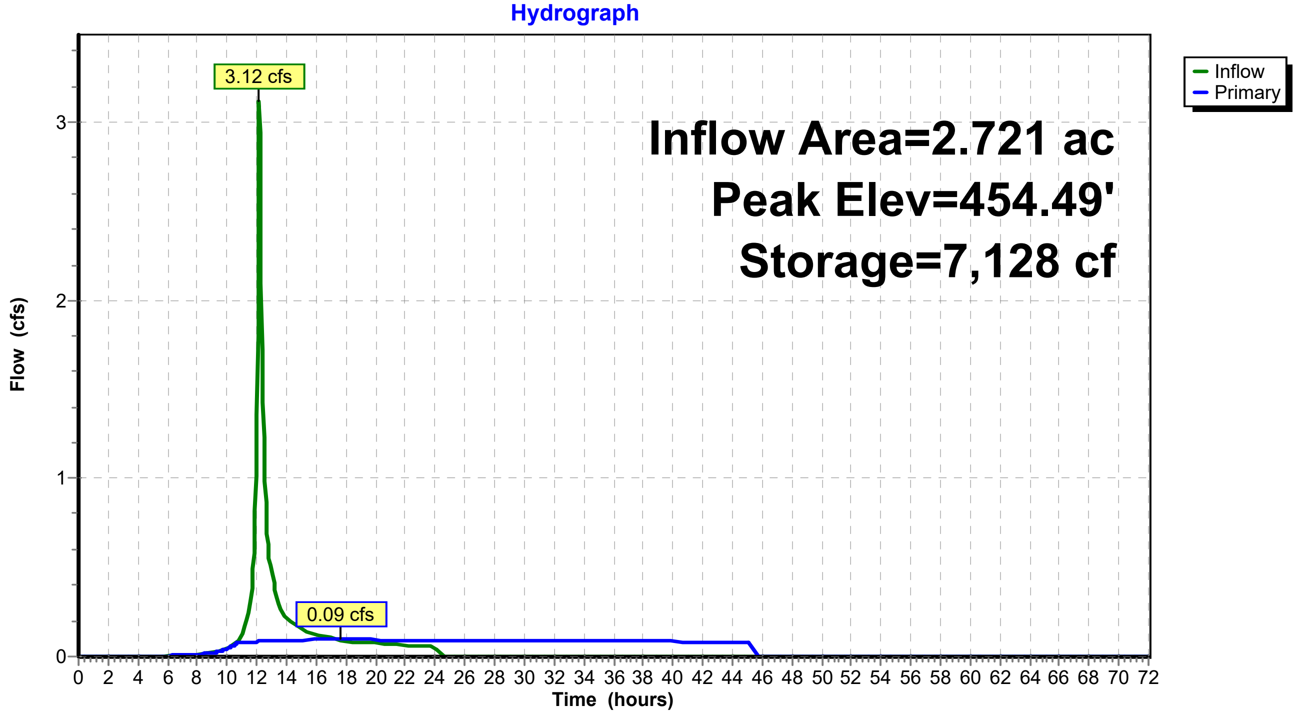
Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	22,875 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
455.50	16,500	22,875	22,875

Device	Routing	Invert	Outlet Devices
#1	Primary	450.80'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.80' / 450.20' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	454.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	454.00'	**0.250 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 448.80'

Primary OutFlow Max=0.09 cfs @ 17.63 hrs HW=454.49' TW=451.62' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.09 cfs of 11.38 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Exfiltration** (Controls 0.09 cfs)

Pond 54P: Bio-Retention Basin 1



Summary for Pond 55P: Detention Pond 1

Inflow Area = 6.551 ac, 52.40% Impervious, Inflow Depth = 1.65" for 1-Year event
Inflow = 9.38 cfs @ 12.13 hrs, Volume= 0.902 af
Outflow = 0.27 cfs @ 17.65 hrs, Volume= 0.869 af, Atten= 97%, Lag= 331.3 min
Primary = 0.27 cfs @ 17.65 hrs, Volume= 0.869 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 450.20' Storage= 28,039 cf
Peak Elev= 451.62' @ 17.65 hrs Storage= 49,550 cf (21,511 cf above start)

Plug-Flow detention time= 2,540.5 min calculated for 0.226 af (25% of inflow)
Center-of-Mass det. time= 973.8 min (2,010.2 - 1,036.4)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	98,470 cf	**Custom Stage Data** Listed below

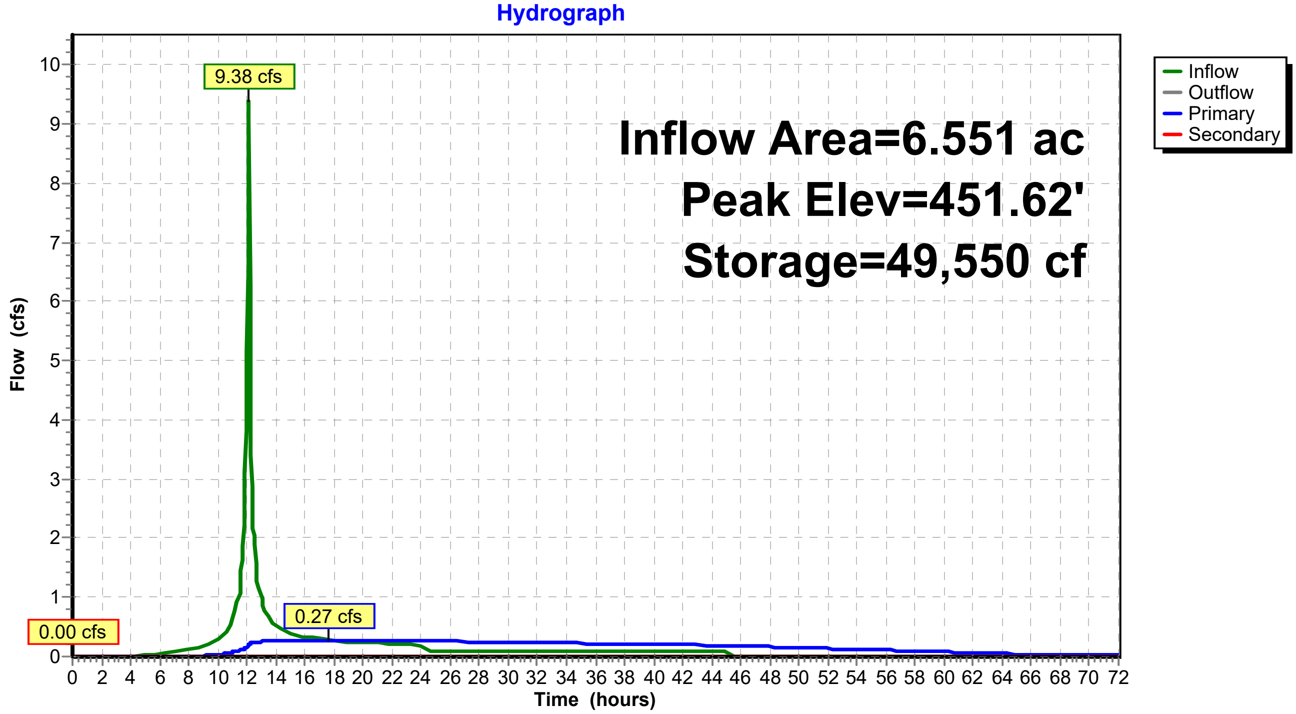
Elevation (feet)	Cum.Store (cubic-feet)
446.00	0
446.20	787
447.00	4,409
448.00	9,925
449.20	18,016
450.20	28,039
451.00	39,196
452.00	55,835
453.00	75,086
454.00	98,470

Device	Routing	Invert	Outlet Devices
#1	Primary	450.20'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.20' / 450.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	450.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	451.75'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	452.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	453.25'	**Channel/Reach** using Reach 29R: Emergency Spillway

Primary OutFlow Max=0.27 cfs @ 17.65 hrs HW=451.62' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.27 cfs of 5.11 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.48 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.20' TW=453.25' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

Pond 55P: Detention Pond 1

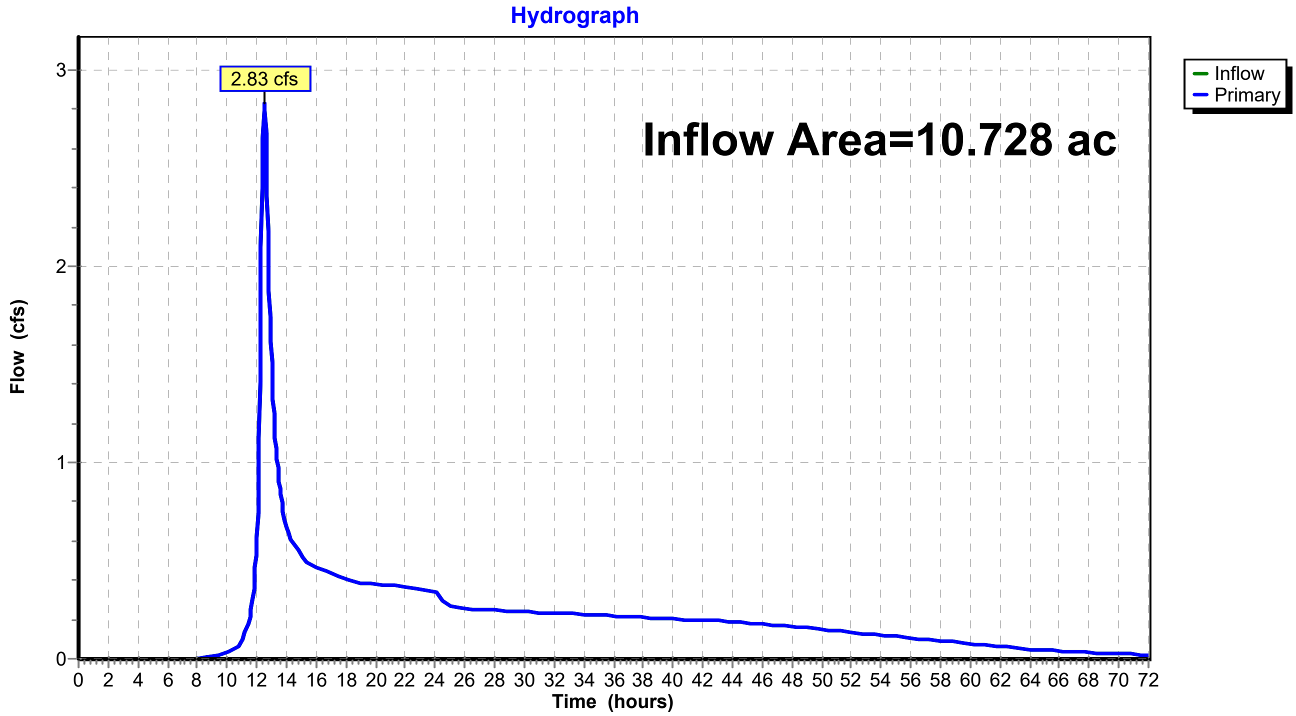


Summary for Link 28L: Southwest Discharge

Inflow Area = 10.728 ac, 33.73% Impervious, Inflow Depth > 1.36" for 1-Year event
Inflow = 2.83 cfs @ 12.50 hrs, Volume= 1.213 af
Primary = 2.83 cfs @ 12.50 hrs, Volume= 1.213 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 28L: Southwest Discharge



Summary for Subcatchment 25S: DA-5

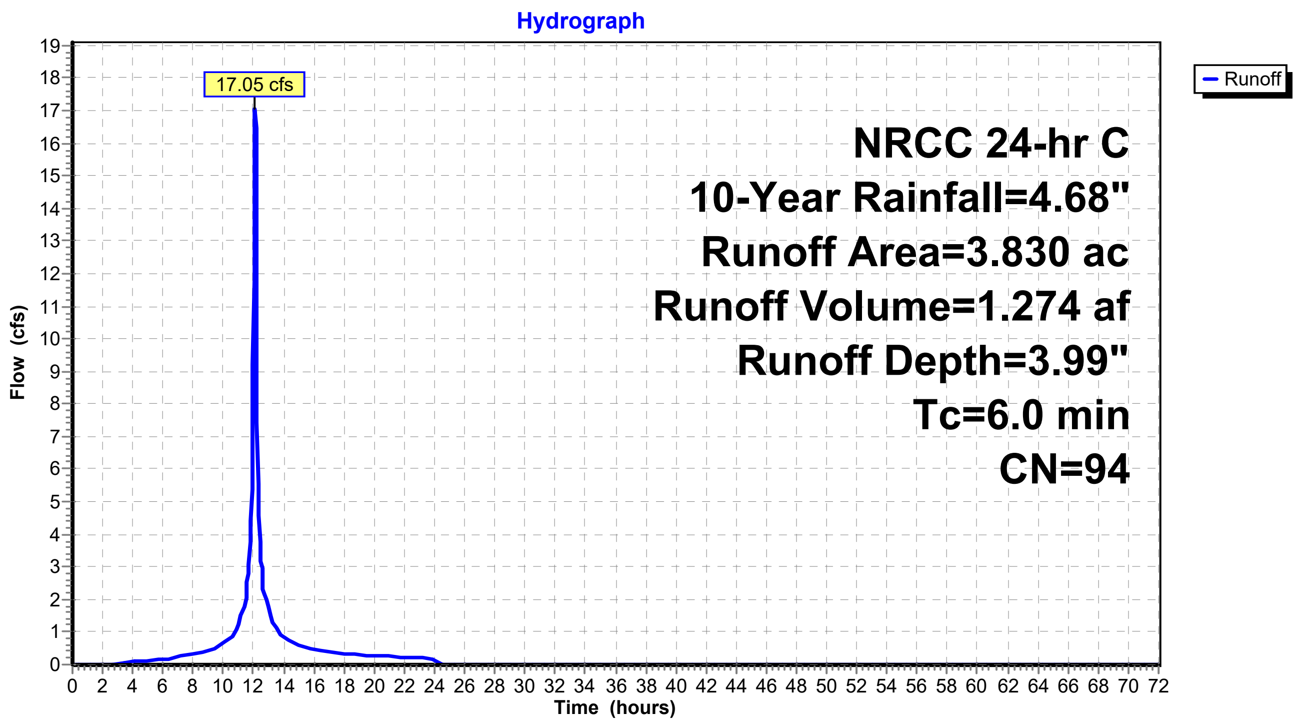
Runoff = 17.05 cfs @ 12.13 hrs, Volume= 1.274 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.502	80	>75% Grass cover, Good, HSG D
2.120	98	Paved parking, HSG D
0.268	98	Water Surface, HSG D
0.799	91	Gravel roads, HSG D
0.141	80	>75% Grass cover, Good, HSG D
3.830	94	Weighted Average
1.442		37.65% Pervious Area
2.388		62.35% Impervious Area

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

Subcatchment 25S: DA-5



Summary for Subcatchment 29S: Channel 5

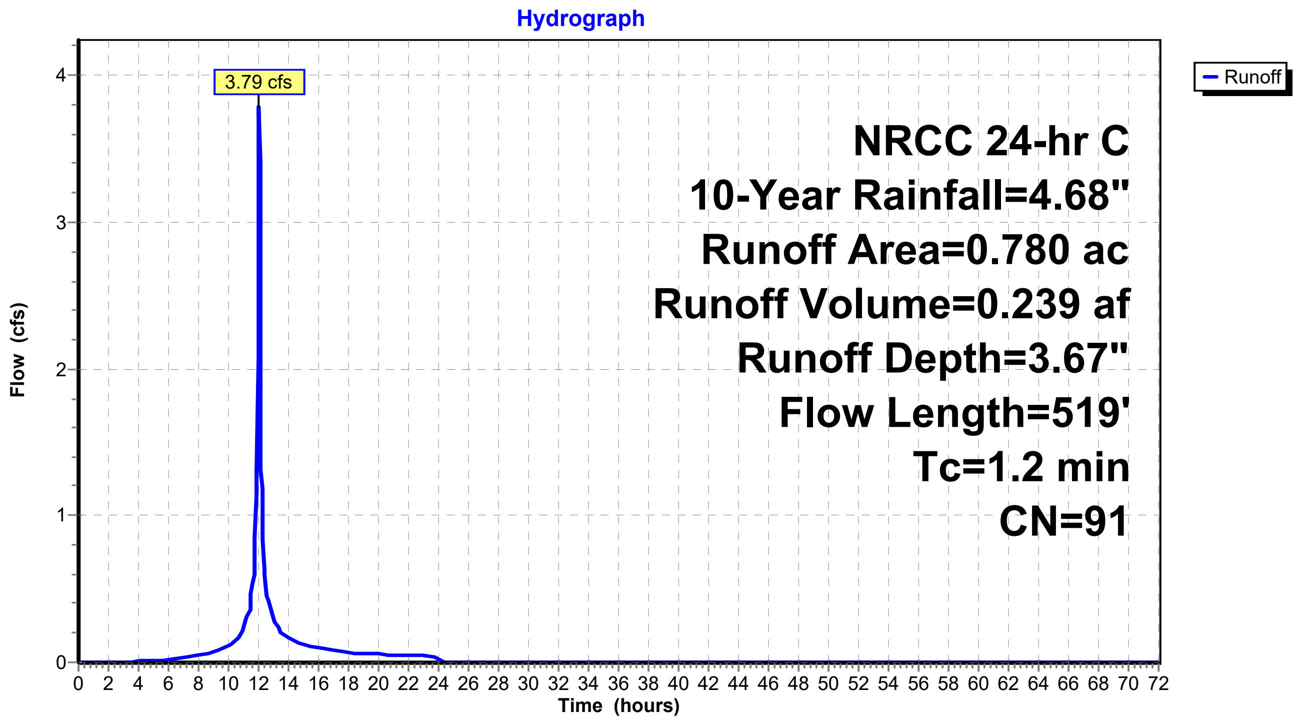
Runoff = 3.79 cfs @ 12.07 hrs, Volume= 0.239 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.780	91	Gravel roads, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.17"
0.2	419	0.7200	36.03	144.10	**Channel Flow,** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.035 Earth, dense weeds
1.2	519	Total			

Subcatchment 29S: Channel 5



Summary for Subcatchment 43S: DA-1

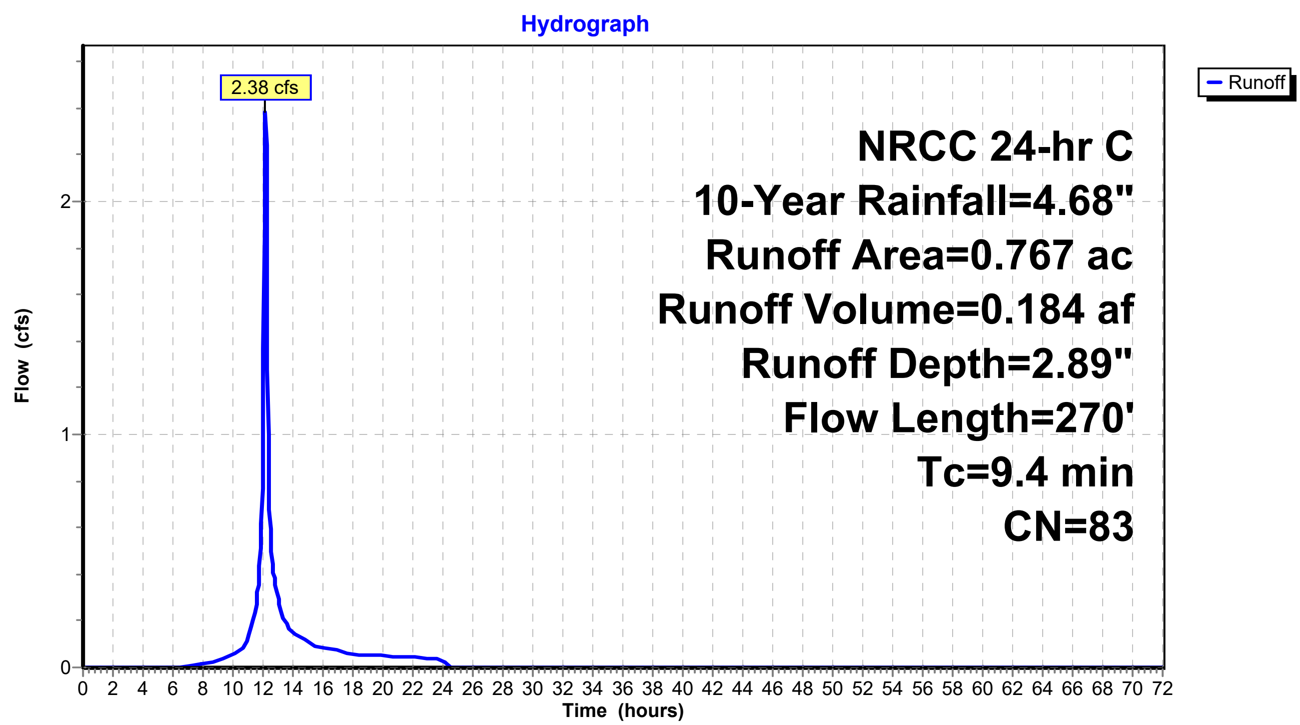
Runoff = 2.38 cfs @ 12.17 hrs, Volume= 0.184 af, Depth= 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.622	80	>75% Grass cover, Good, HSG D
0.145	98	Paved parking, HSG D
0.767	83	Weighted Average
0.622		81.10% Pervious Area
0.145		18.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0933	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
1.7	170	0.0588	1.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.4	270	Total			

Subcatchment 43S: DA-1



Summary for Subcatchment 44S: DA-2

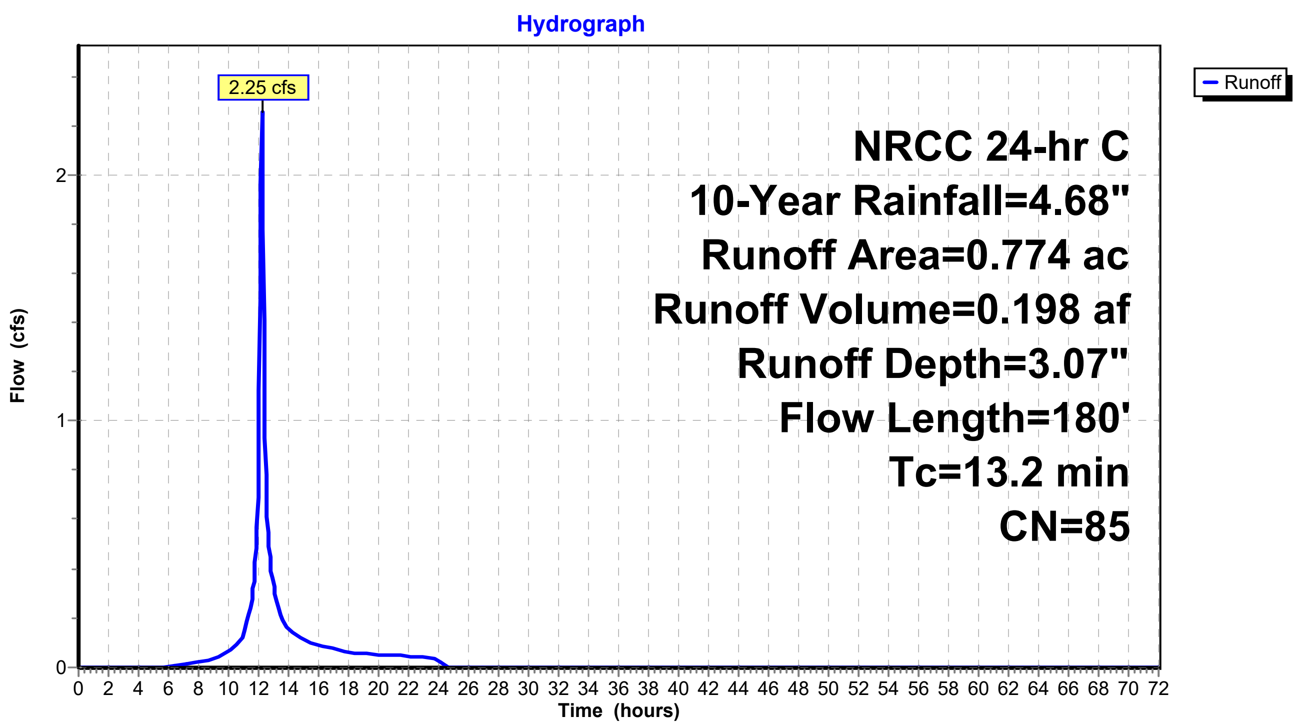
Runoff = 2.25 cfs @ 12.21 hrs, Volume= 0.198 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.564	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.774	85	Weighted Average
0.564		72.87% Pervious Area
0.210		27.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0602	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
4.0	80	0.0023	0.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.2	180	Total			

Subcatchment 44S: DA-2



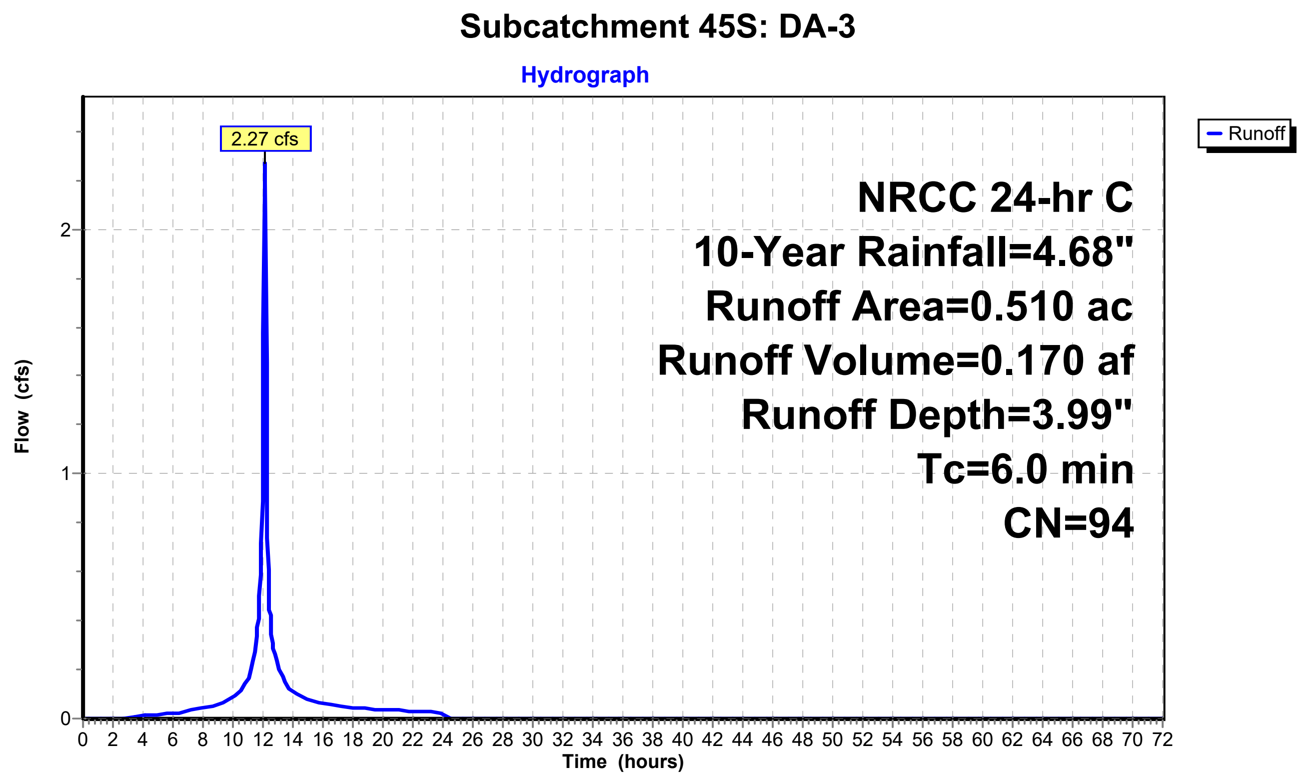
Summary for Subcatchment 45S: DA-3

Runoff = 2.27 cfs @ 12.13 hrs, Volume= 0.170 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.110	80	>75% Grass cover, Good, HSG D
0.400	98	Paved parking, HSG D
0.510	94	Weighted Average
0.110		21.57% Pervious Area
0.400		78.43% Impervious Area

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



Summary for Subcatchment 46S: DA-4

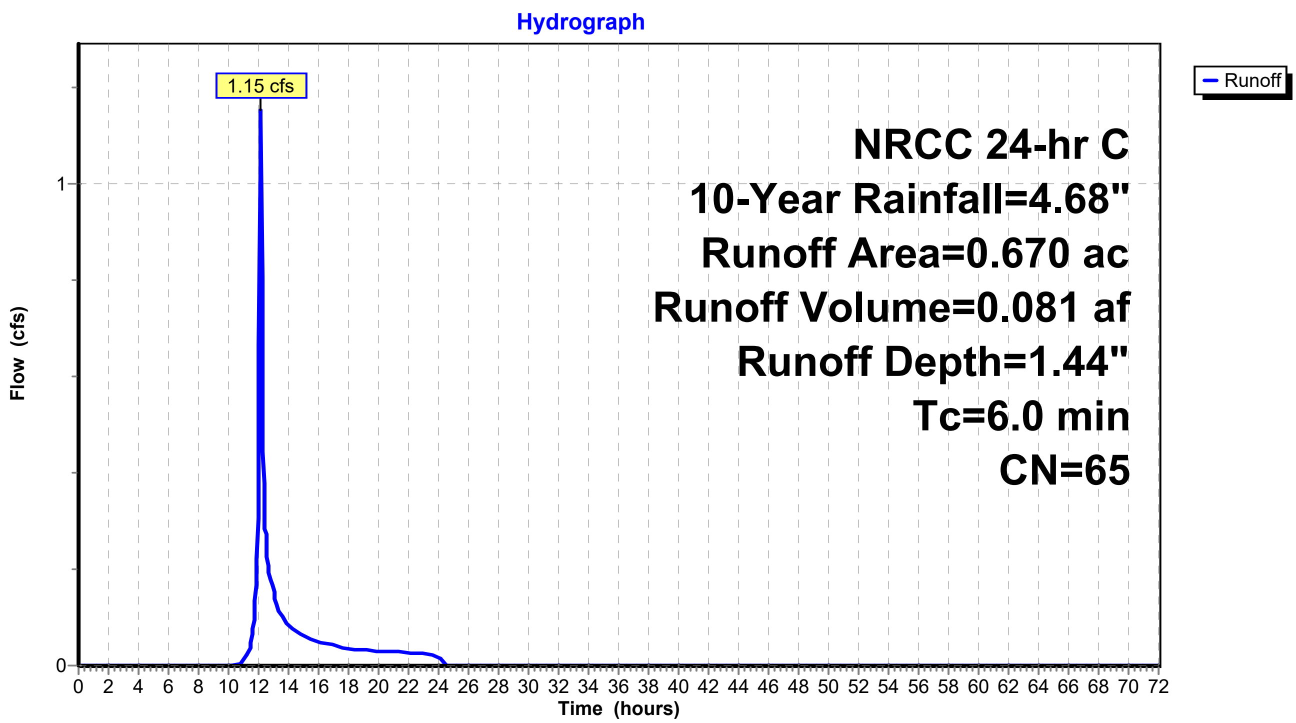
Runoff = 1.15 cfs @ 12.14 hrs, Volume= 0.081 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.380	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG D
0.670	65	Weighted Average
0.380		56.72% Pervious Area
0.290		43.28% Impervious Area

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

Subcatchment 46S: DA-4



Summary for Subcatchment 48S: DA-6

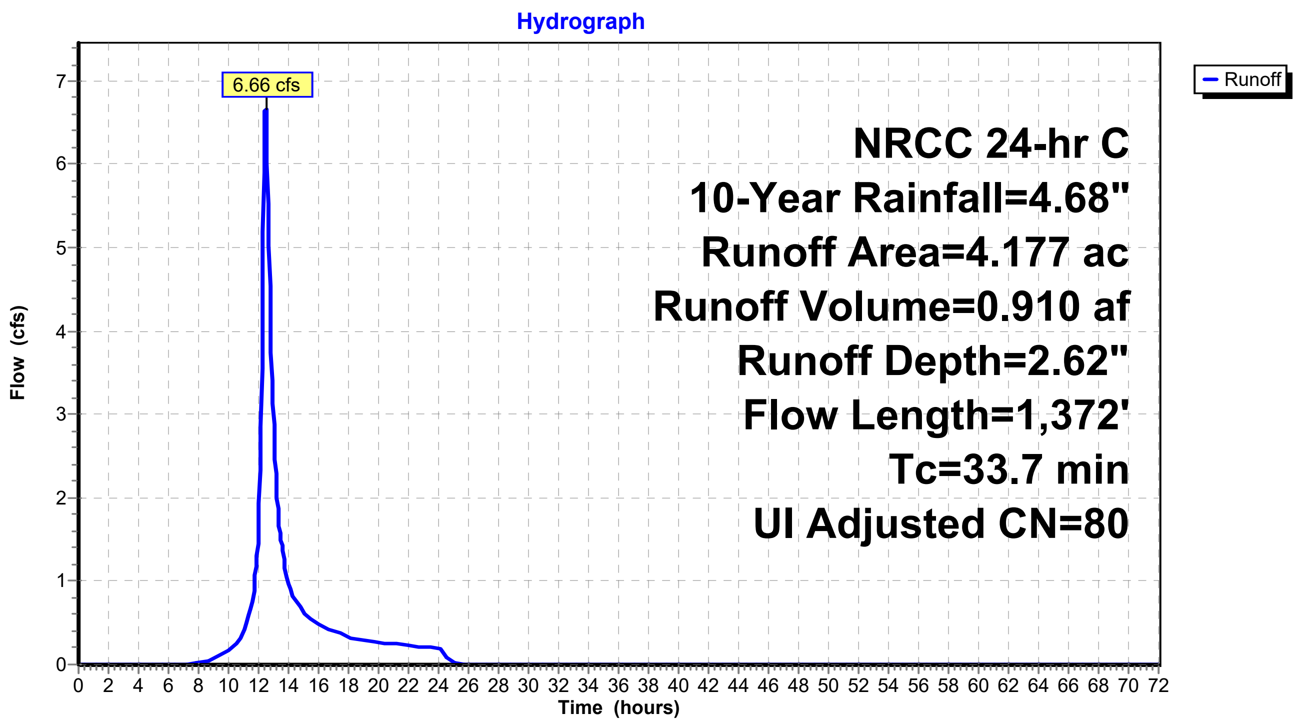
Runoff = 6.66 cfs @ 12.47 hrs, Volume= 0.910 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Adj	Description
3.864	80		Pasture/grassland/range, Good, HSG D
0.127	79		Woods/grass comb., Good, HSG D
0.186	98		Unconnected pavement, HSG D
4.177	81	80	Weighted Average, UI Adjusted
3.991			95.55% Pervious Area
0.186			4.45% Impervious Area
0.186			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 48S: DA-6



Summary for Reach 29R: Emergency Spillway

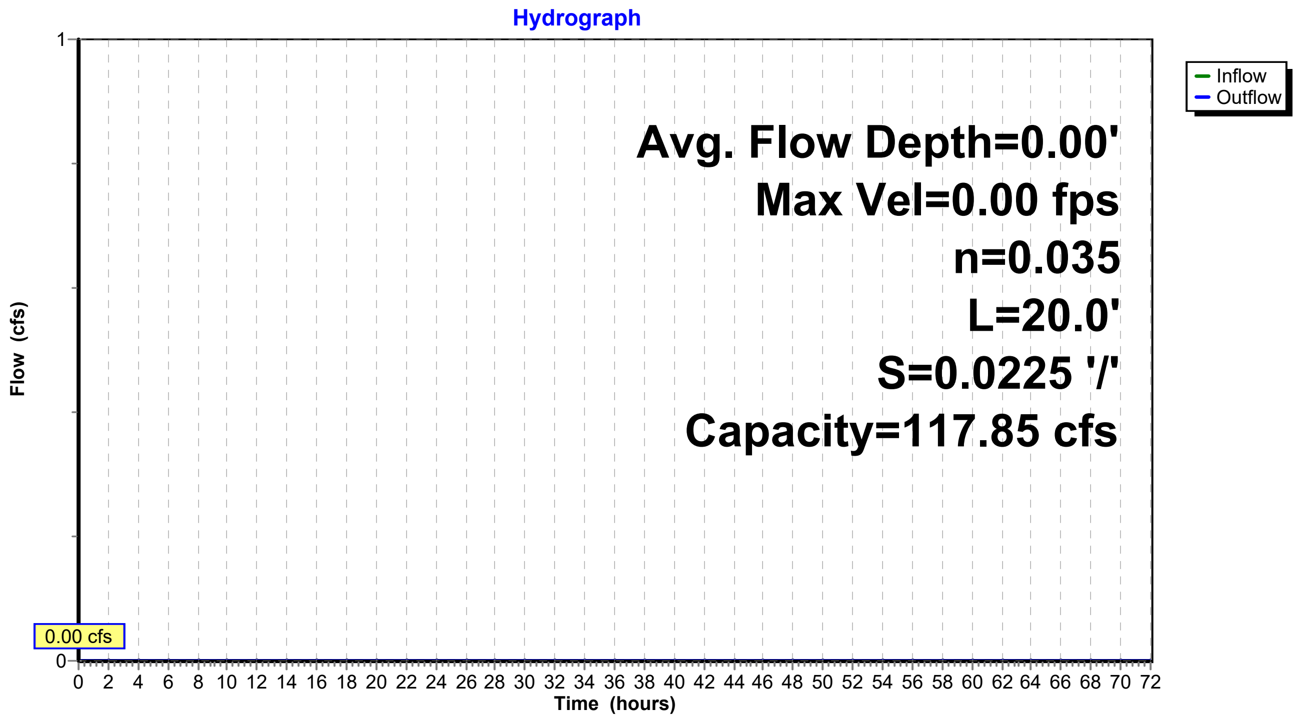
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 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= 1.00' Flow Area= 20.0 sf, Capacity= 117.85 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 20.0' Slope= 0.0225 '/'
Inlet Invert= 453.25', Outlet Invert= 452.80'

Reach 29R: Emergency Spillway



Summary for Reach 49R: Ditch 1

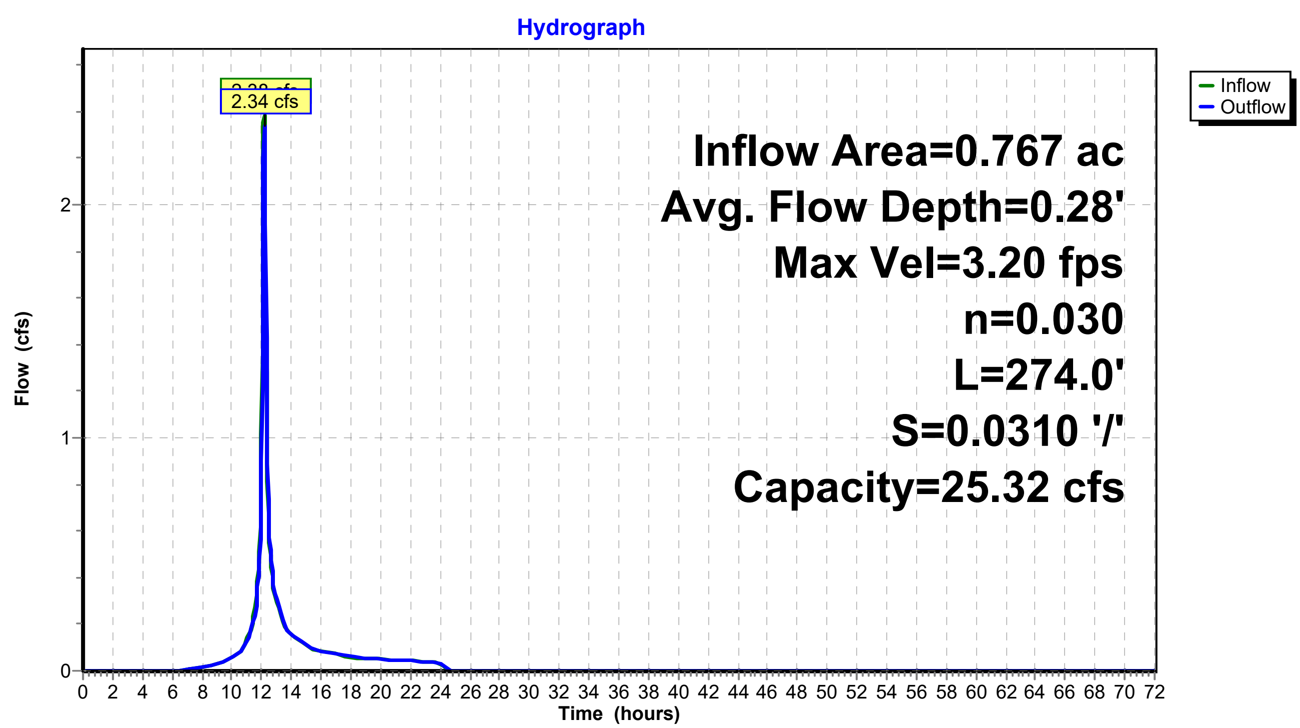
Inflow Area = 0.767 ac, 18.90% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 2.38 cfs @ 12.17 hrs, Volume= 0.184 af
Outflow = 2.34 cfs @ 12.19 hrs, Volume= 0.184 af, Atten= 2%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.20 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 4.9 min

Peak Storage= 200 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.28' , Surface Width= 3.14'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 25.32 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 274.0' Slope= 0.0310 '/'
Inlet Invert= 463.00', Outlet Invert= 454.50'

Reach 49R: Ditch 1



Summary for Reach 50R: Ditch 2

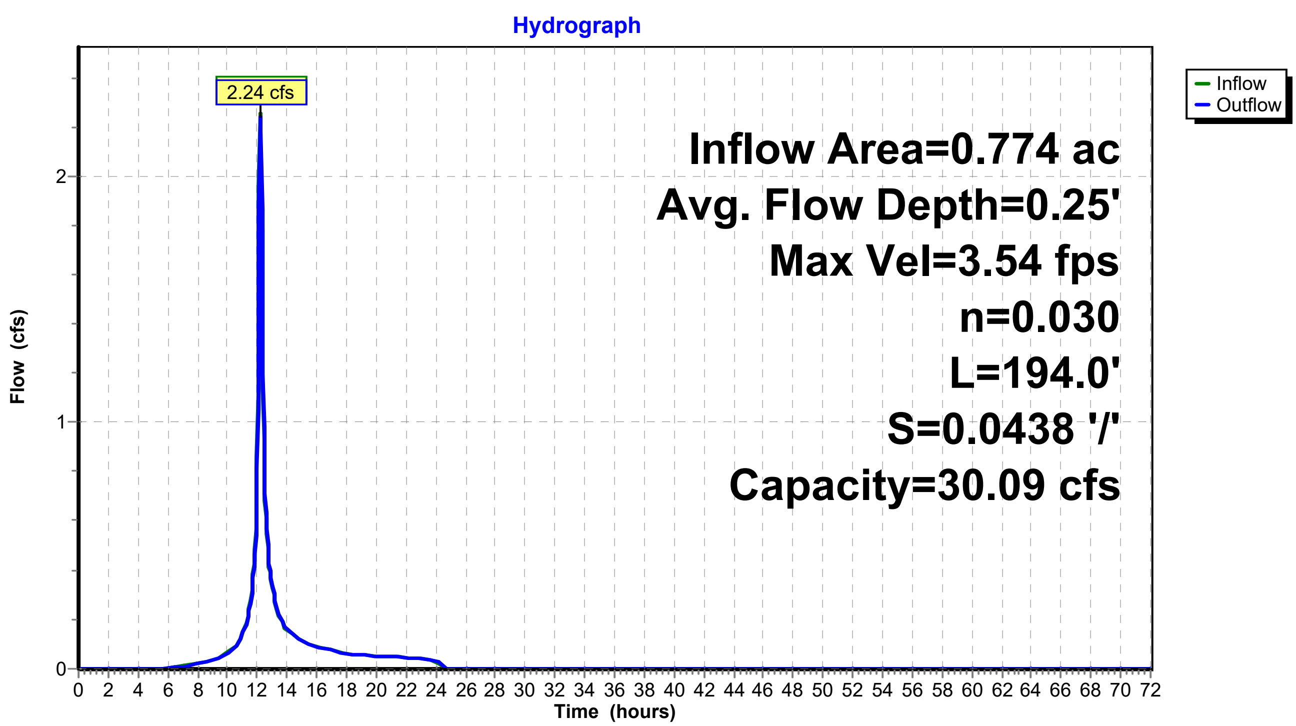
Inflow Area = 0.774 ac, 27.13% Impervious, Inflow Depth = 3.07" for 10-Year event
Inflow = 2.25 cfs @ 12.21 hrs, Volume= 0.198 af
Outflow = 2.24 cfs @ 12.22 hrs, Volume= 0.198 af, Atten= 1%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.54 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 3.0 min

Peak Storage= 122 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 3.01'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 30.09 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 194.0' Slope= 0.0438 '/'
Inlet Invert= 463.00', Outlet Invert= 454.50'

Reach 50R: Ditch 2



Summary for Pond 52P: Culvert 2

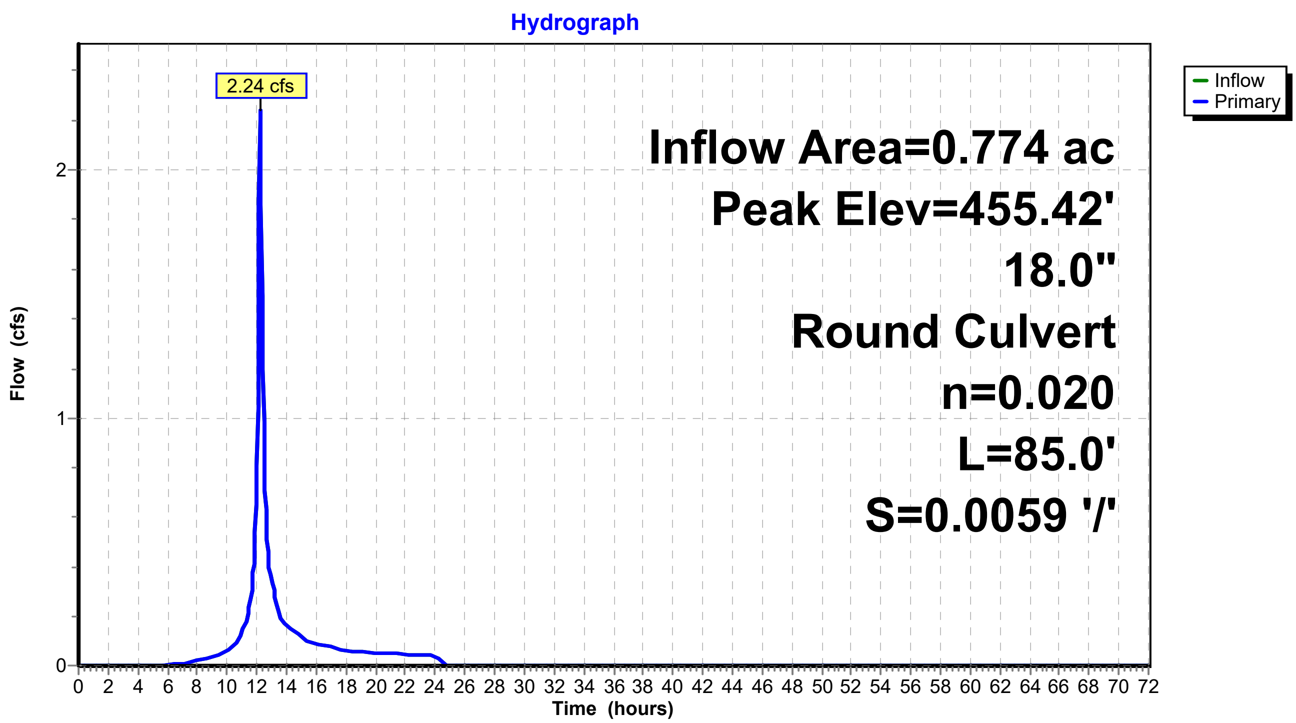
Inflow Area = 0.774 ac, 27.13% Impervious, Inflow Depth = 3.07" for 10-Year event
Inflow = 2.24 cfs @ 12.22 hrs, Volume= 0.198 af
Outflow = 2.24 cfs @ 12.22 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min
Primary = 2.24 cfs @ 12.22 hrs, Volume= 0.198 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.42' @ 12.22 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0059 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.20 cfs @ 12.22 hrs HW=455.41' TW=454.61' (Dynamic Tailwater)
↑—1=Culvert (Barrel Controls 2.20 cfs @ 2.81 fps)

Pond 52P: Culvert 2



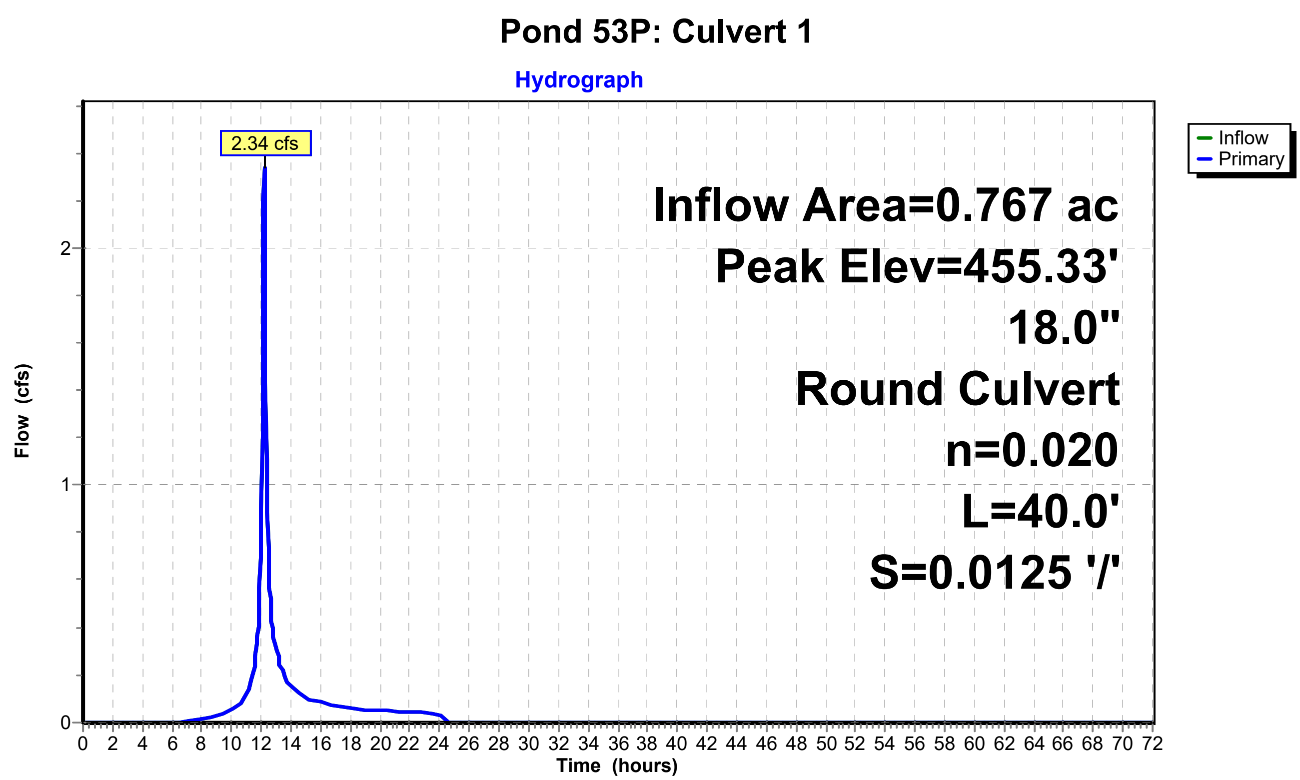
Summary for Pond 53P: Culvert 1

Inflow Area =	0.767 ac,	18.90% Impervious, Inflow Depth = 2.89"	for 10-Year event	
Inflow =	2.34 cfs @	12.19 hrs, Volume=	0.184 af	
Outflow =	2.34 cfs @	12.19 hrs, Volume=	0.184 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.34 cfs @	12.19 hrs, Volume=	0.184 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.33' @ 12.19 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0125 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.28 cfs @ 12.19 hrs HW=455.32' TW=454.57' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.28 cfs @ 3.37 fps)



Summary for Pond 54P: Bio-Retention Basin 1

Inflow Area = 2.721 ac, 38.40% Impervious, Inflow Depth = 2.79" for 10-Year event
Inflow = 7.40 cfs @ 12.16 hrs, Volume= 0.633 af
Outflow = 3.22 cfs @ 12.38 hrs, Volume= 0.633 af, Atten= 57%, Lag= 13.3 min
Primary = 3.22 cfs @ 12.38 hrs, Volume= 0.633 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.68' @ 12.38 hrs Surf.Area= 15,141 sf Storage= 9,979 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 392.4 min (1,214.2 - 821.8)

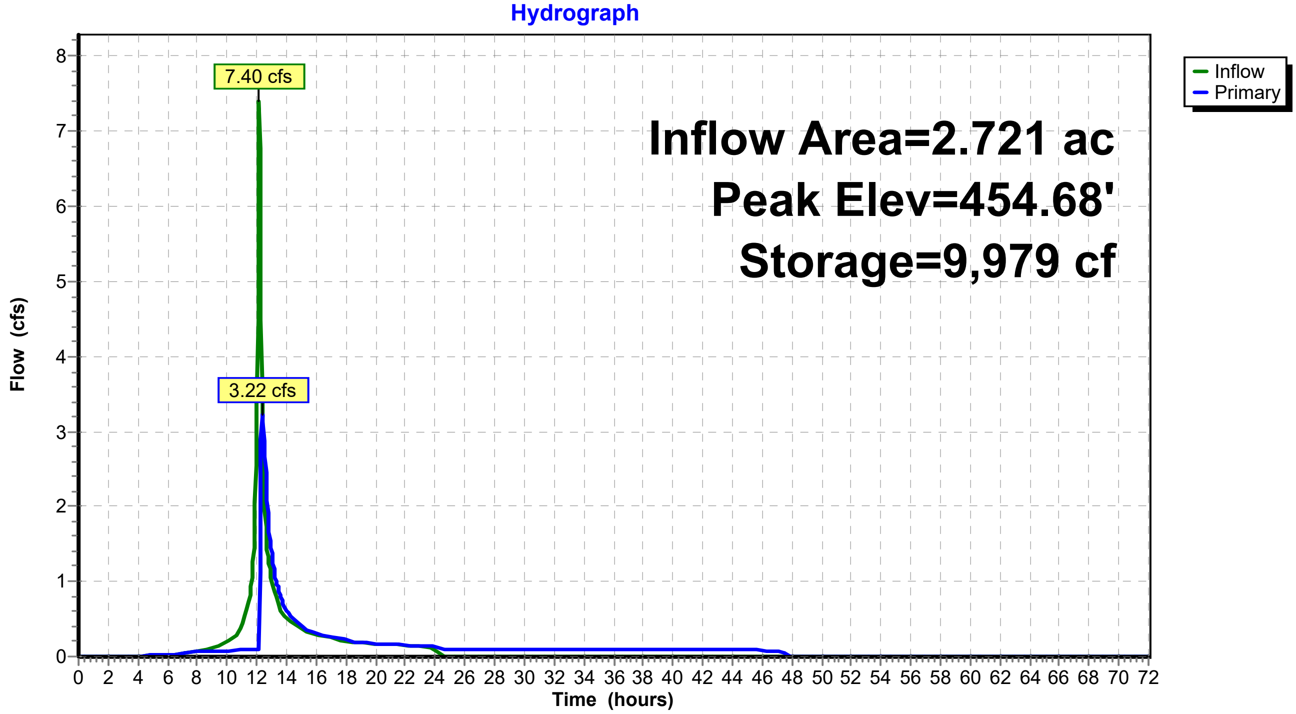
Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	22,875 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
455.50	16,500	22,875	22,875

Device	Routing	Invert	Outlet Devices
#1	Primary	450.80'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.80' / 450.20' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	454.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	454.00'	**0.250 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 448.80'

Primary OutFlow Max=3.20 cfs @ 12.38 hrs HW=454.68' TW=452.28' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.20 cfs of 10.41 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 3.10 cfs @ 1.40 fps)
  └─**3=Exfiltration** (Controls 0.10 cfs)

Pond 54P: Bio-Retention Basin 1



Summary for Pond 55P: Detention Pond 1

Inflow Area = 6.551 ac, 52.40% Impervious, Inflow Depth = 3.49" for 10-Year event
Inflow = 17.05 cfs @ 12.13 hrs, Volume= 1.907 af
Outflow = 2.75 cfs @ 13.10 hrs, Volume= 1.864 af, Atten= 84%, Lag= 58.3 min
Primary = 2.75 cfs @ 13.10 hrs, Volume= 1.864 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 450.20' Storage= 28,039 cf
Peak Elev= 452.56' @ 13.10 hrs Storage= 66,554 cf (38,515 cf above start)

Plug-Flow detention time= 1,253.4 min calculated for 1.221 af (64% of inflow)
Center-of-Mass det. time= 632.6 min (1,556.3 - 923.7)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	98,470 cf	**Custom Stage Data** Listed below

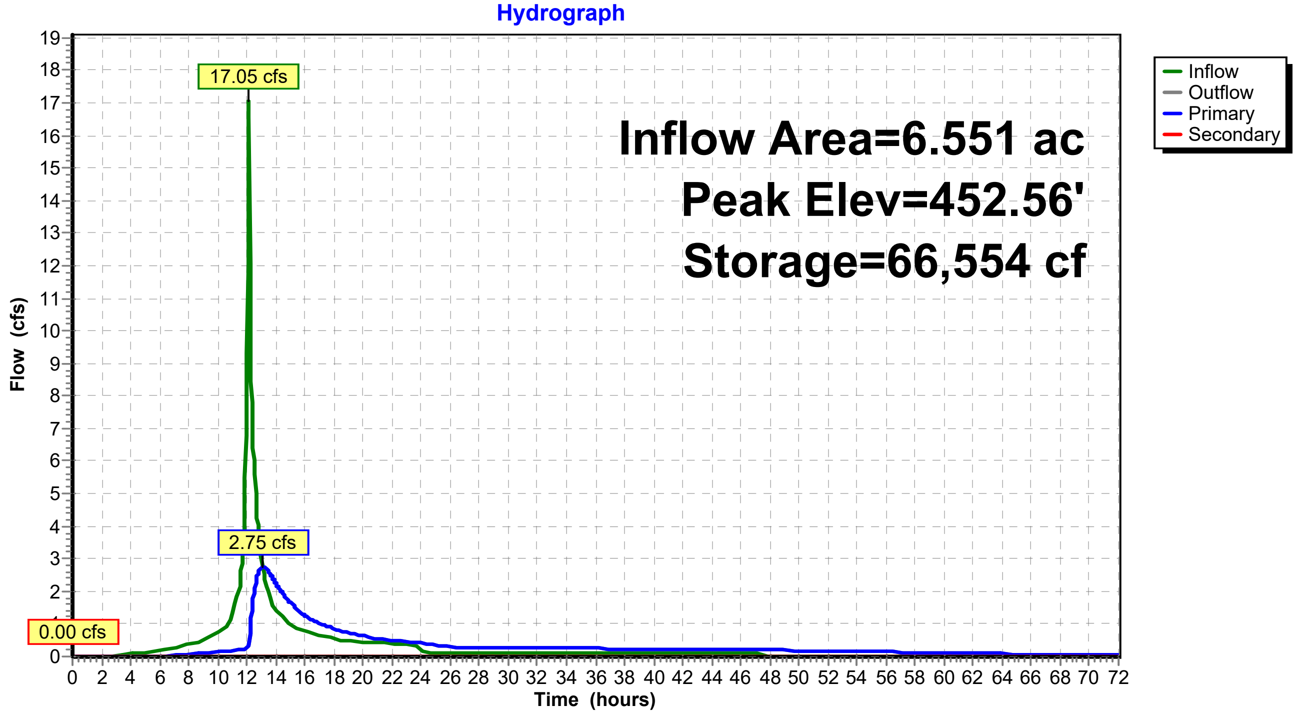
Elevation (feet)	Cum.Store (cubic-feet)
446.00	0
446.20	787
447.00	4,409
448.00	9,925
449.20	18,016
450.20	28,039
451.00	39,196
452.00	55,835
453.00	75,086
454.00	98,470

Device	Routing	Invert	Outlet Devices
#1	Primary	450.20'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.20' / 450.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	450.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	451.75'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	452.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	453.25'	**Channel/Reach** using Reach 29R: Emergency Spillway

Primary OutFlow Max=2.75 cfs @ 13.10 hrs HW=452.56' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.75 cfs of 8.52 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.35 cfs @ 7.19 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 2.39 cfs @ 2.96 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.20' TW=453.25' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

Pond 55P: Detention Pond 1

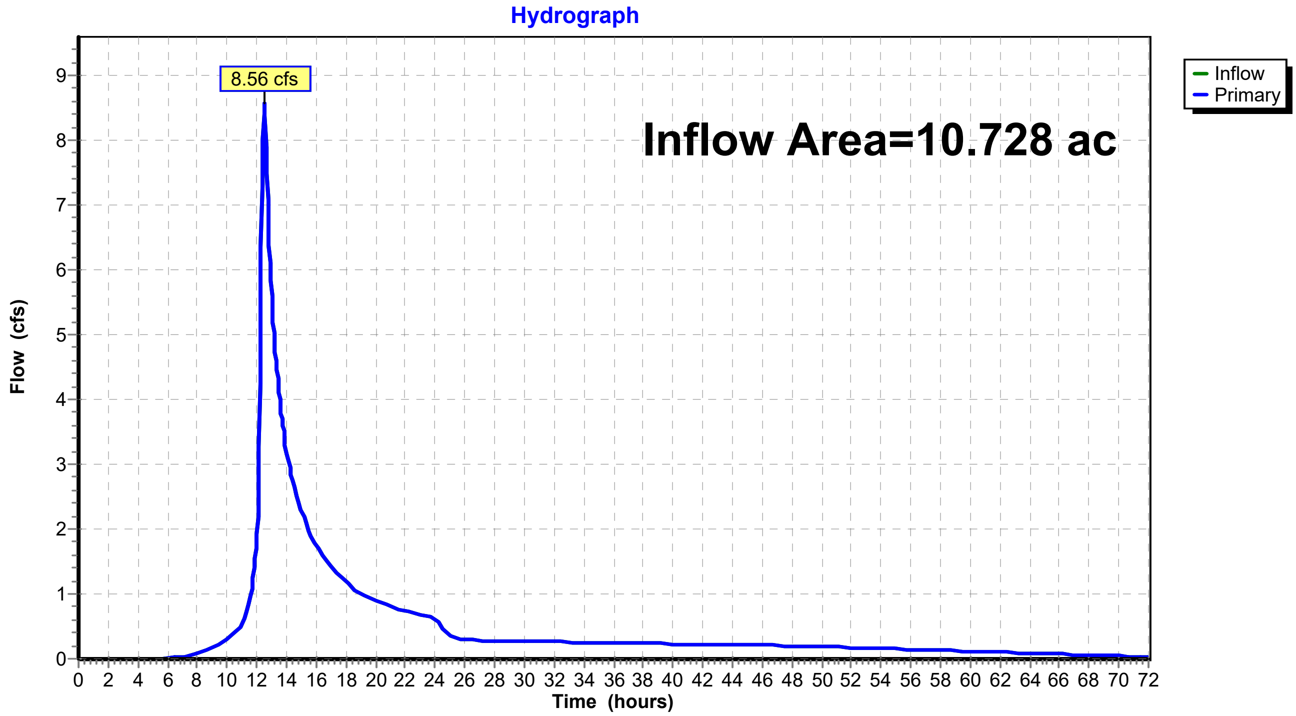


Summary for Link 28L: Southwest Discharge

Inflow Area = 10.728 ac, 33.73% Impervious, Inflow Depth > 3.10" for 10-Year event
Inflow = 8.56 cfs @ 12.51 hrs, Volume= 2.775 af
Primary = 8.56 cfs @ 12.51 hrs, Volume= 2.775 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 28L: Southwest Discharge



Summary for Subcatchment 25S: DA-5

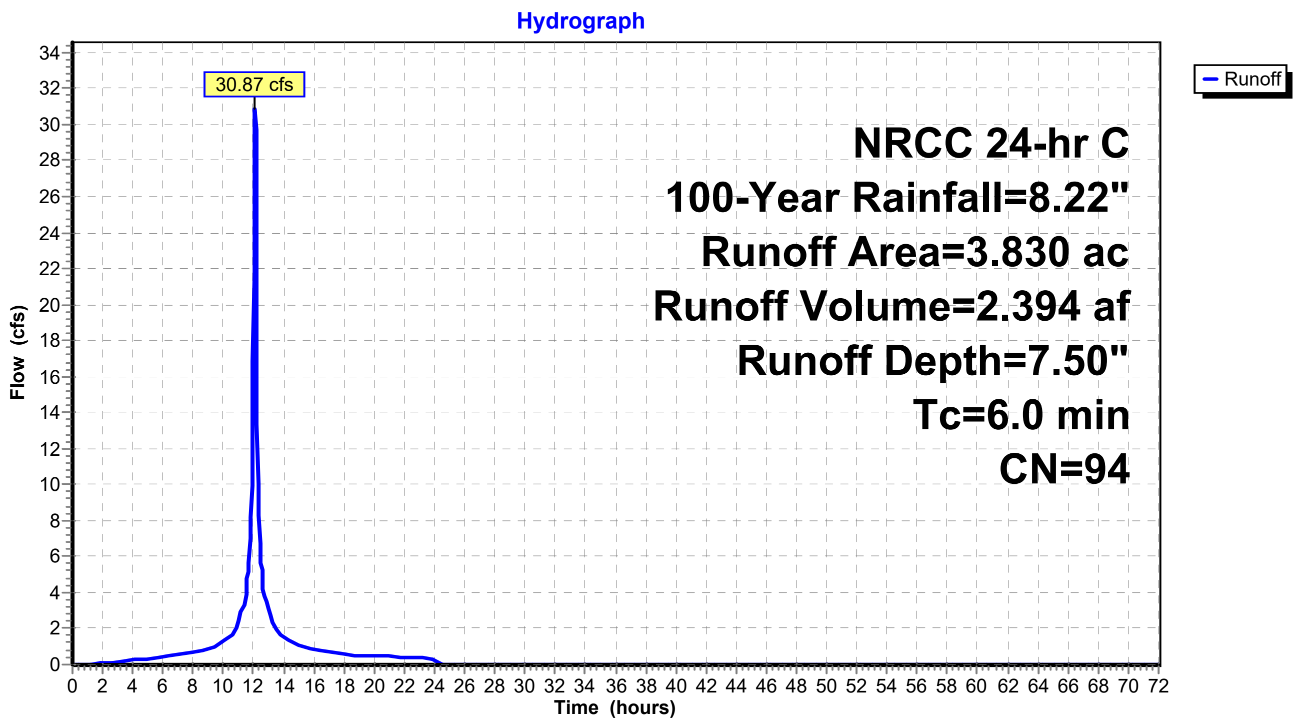
Runoff = 30.87 cfs @ 12.13 hrs, Volume= 2.394 af, Depth= 7.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.502	80	>75% Grass cover, Good, HSG D
2.120	98	Paved parking, HSG D
0.268	98	Water Surface, HSG D
0.799	91	Gravel roads, HSG D
0.141	80	>75% Grass cover, Good, HSG D
3.830	94	Weighted Average
1.442		37.65% Pervious Area
2.388		62.35% Impervious Area

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

Subcatchment 25S: DA-5



Summary for Subcatchment 29S: Channel 5

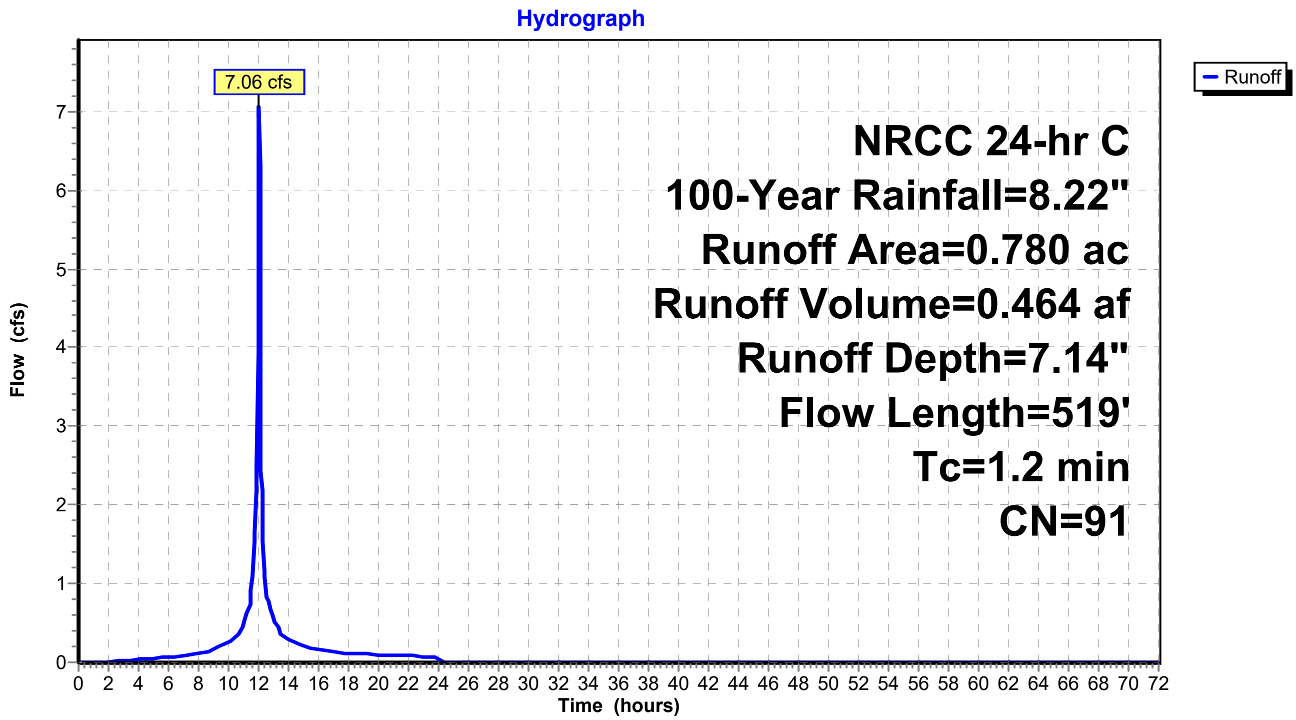
Runoff = 7.06 cfs @ 12.06 hrs, Volume= 0.464 af, Depth= 7.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.780	91	Gravel roads, HSG D
0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0300	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.17"
0.2	419	0.7200	36.03	144.10	**Channel Flow,** Area= 4.0 sf Perim= 4.0' r= 1.00' n= 0.035 Earth, dense weeds
1.2	519	Total			

Subcatchment 29S: Channel 5



Summary for Subcatchment 43S: DA-1

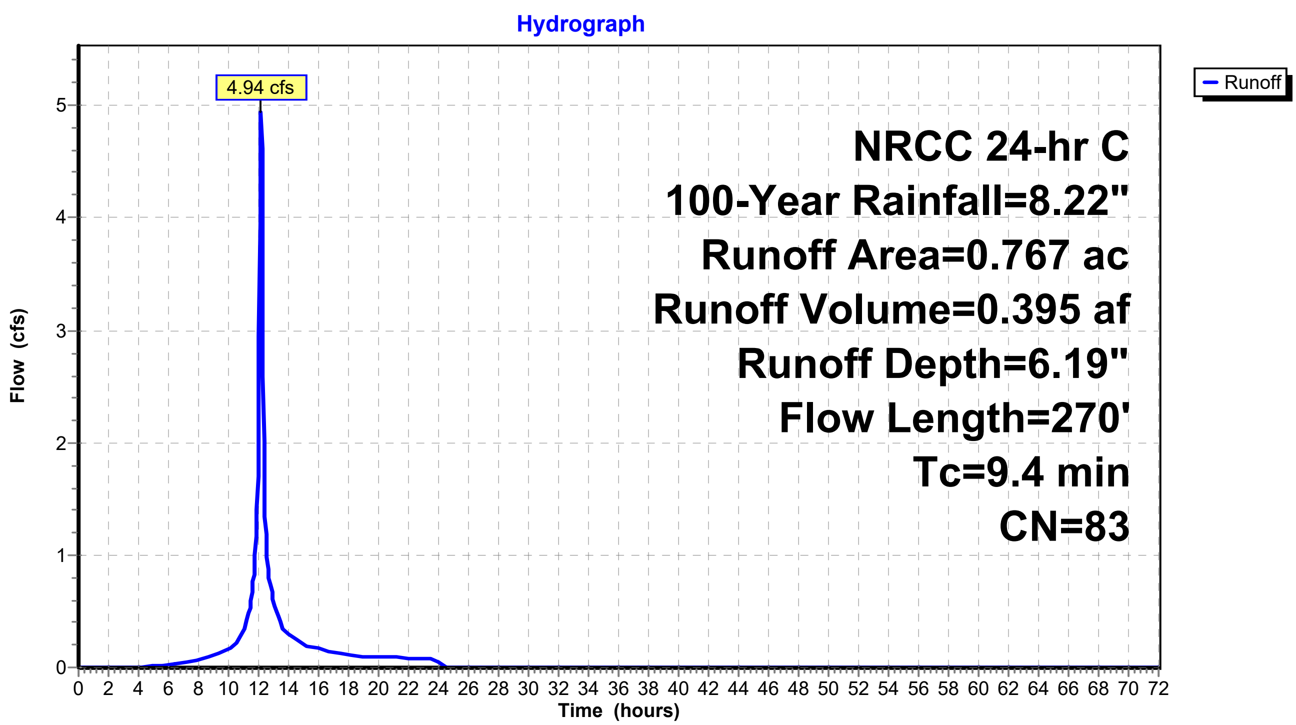
Runoff = 4.94 cfs @ 12.16 hrs, Volume= 0.395 af, Depth= 6.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.622	80	>75% Grass cover, Good, HSG D
0.145	98	Paved parking, HSG D
0.767	83	Weighted Average
0.622		81.10% Pervious Area
0.145		18.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0933	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
1.7	170	0.0588	1.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.4	270	Total			

Subcatchment 43S: DA-1



Summary for Subcatchment 44S: DA-2

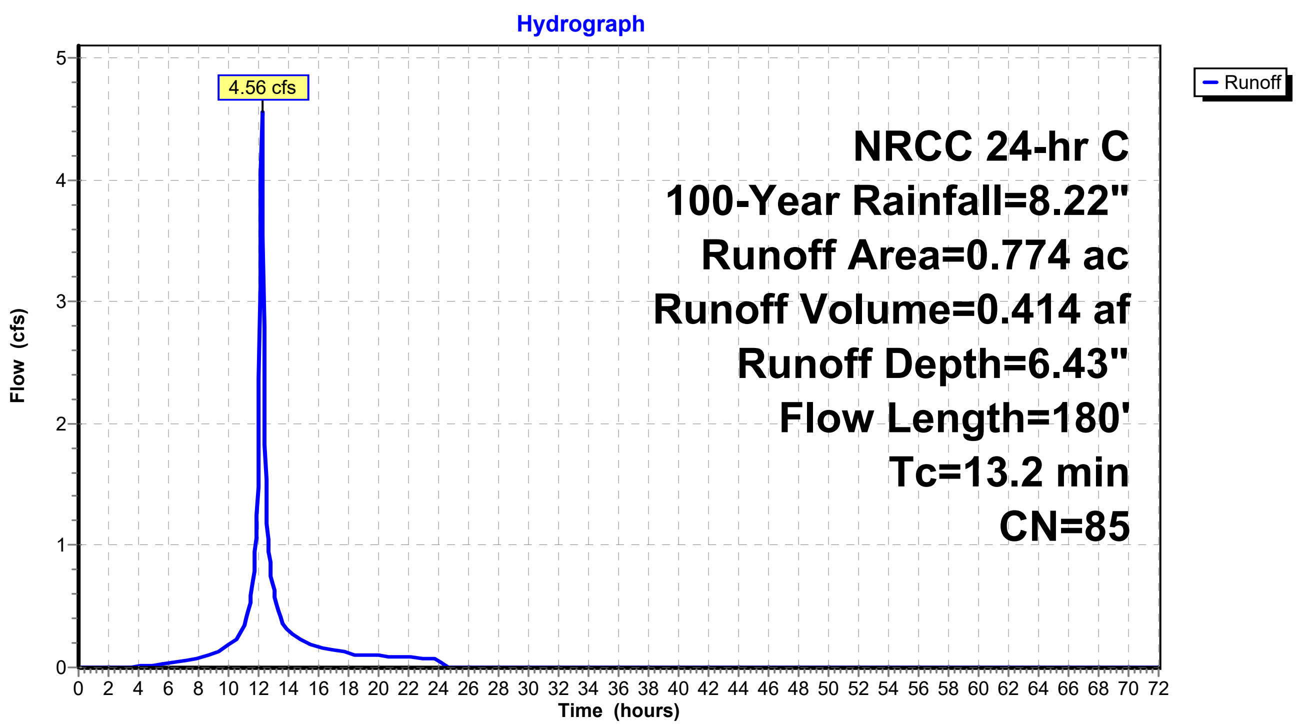
Runoff = 4.56 cfs @ 12.21 hrs, Volume= 0.414 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.564	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.774	85	Weighted Average
0.564		72.87% Pervious Area
0.210		27.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0602	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
4.0	80	0.0023	0.34		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.2	180	Total			

Subcatchment 44S: DA-2



Summary for Subcatchment 45S: DA-3

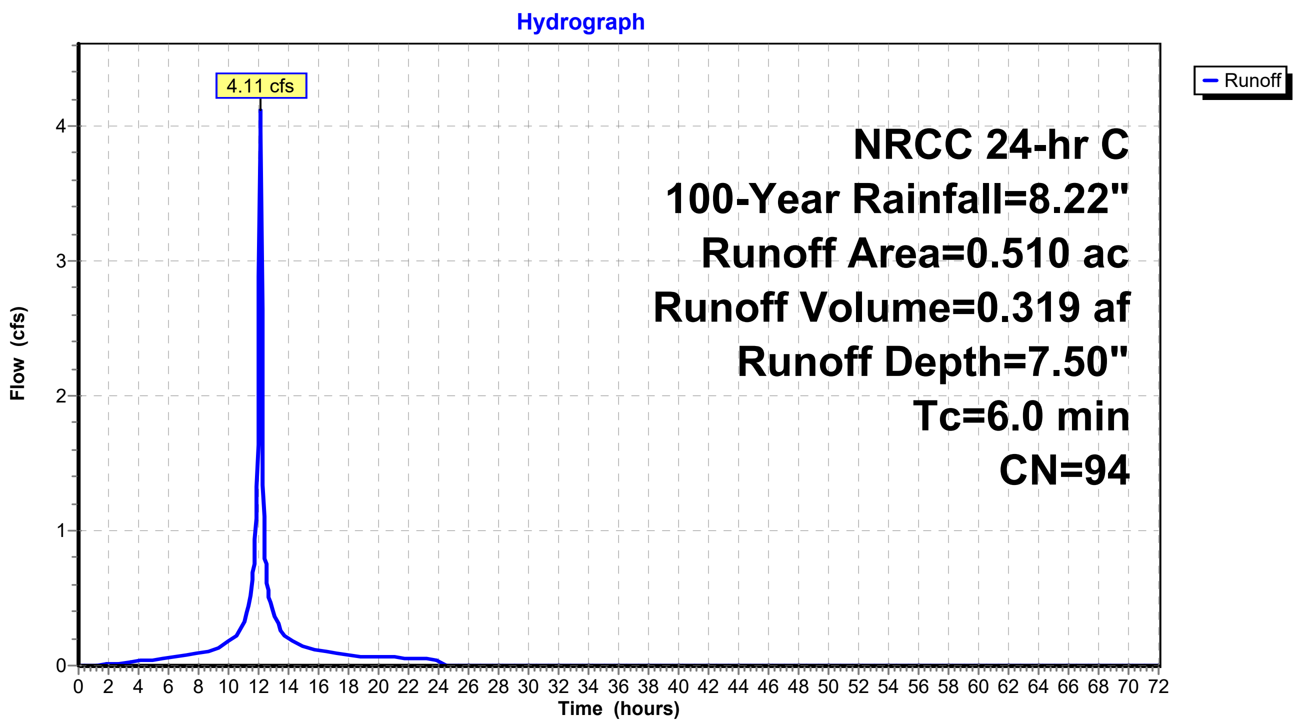
Runoff = 4.11 cfs @ 12.13 hrs, Volume= 0.319 af, Depth= 7.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.110	80	>75% Grass cover, Good, HSG D
0.400	98	Paved parking, HSG D
0.510	94	Weighted Average
0.110		21.57% Pervious Area
0.400		78.43% Impervious Area

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

Subcatchment 45S: DA-3



Summary for Subcatchment 46S: DA-4

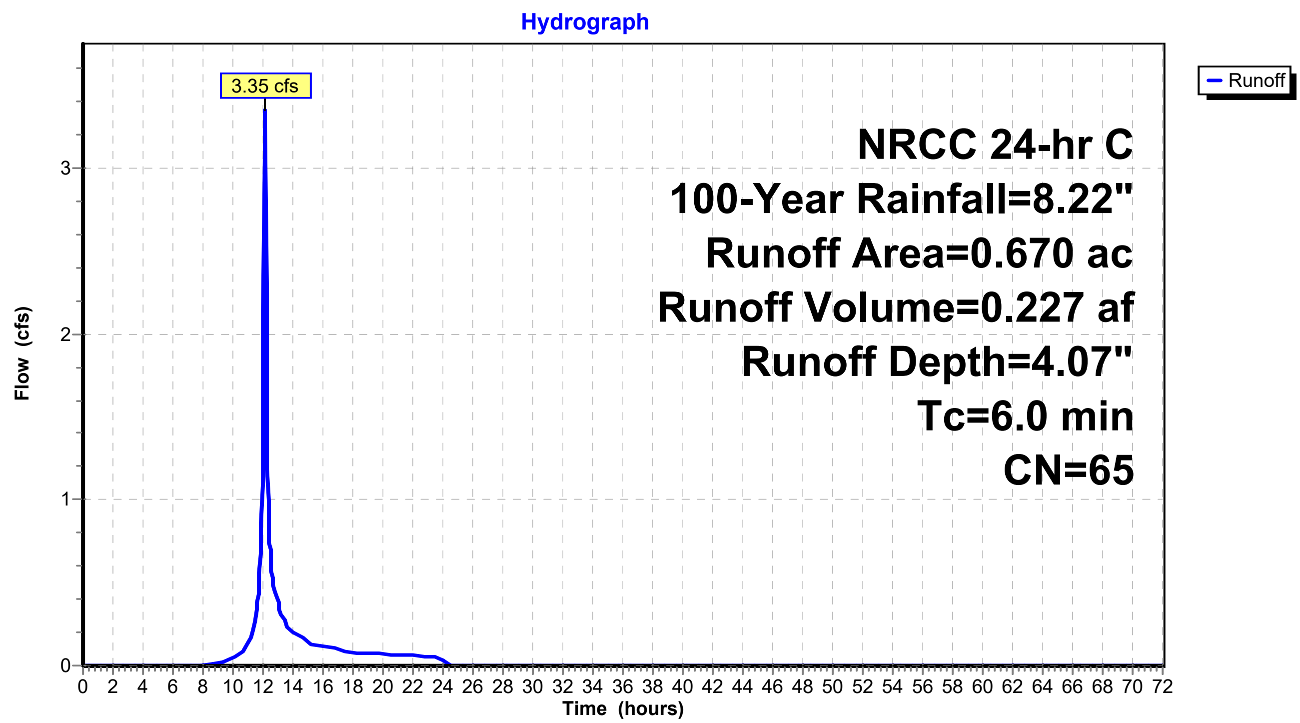
Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.227 af, Depth= 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.380	39	>75% Grass cover, Good, HSG A
0.290	98	Paved parking, HSG D
0.670	65	Weighted Average
0.380		56.72% Pervious Area
0.290		43.28% Impervious Area

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

Subcatchment 46S: DA-4



Summary for Subcatchment 48S: DA-6

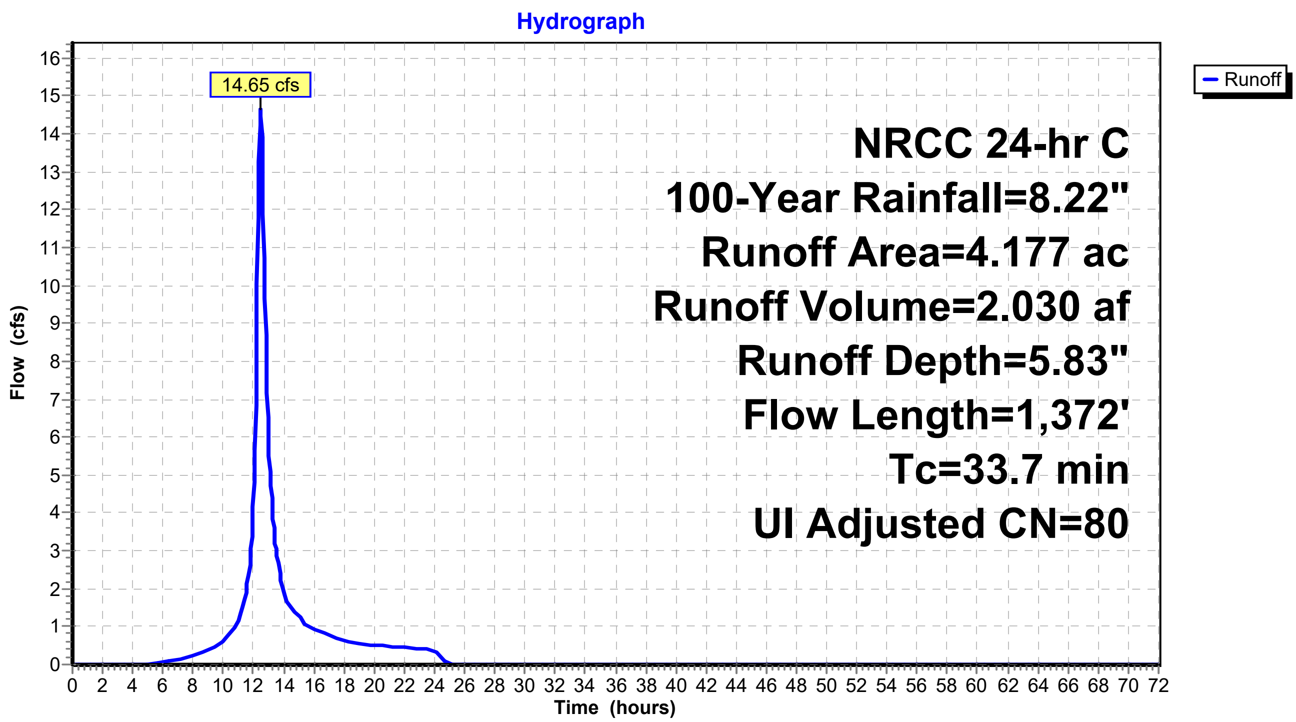
Runoff = 14.65 cfs @ 12.46 hrs, Volume= 2.030 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Adj	Description
3.864	80		Pasture/grassland/range, Good, HSG D
0.127	79		Woods/grass comb., Good, HSG D
0.186	98		Unconnected pavement, HSG D
4.177	81	80	Weighted Average, UI Adjusted
3.991			95.55% Pervious Area
0.186			4.45% Impervious Area
0.186			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 48S: DA-6



Summary for Reach 29R: Emergency Spillway

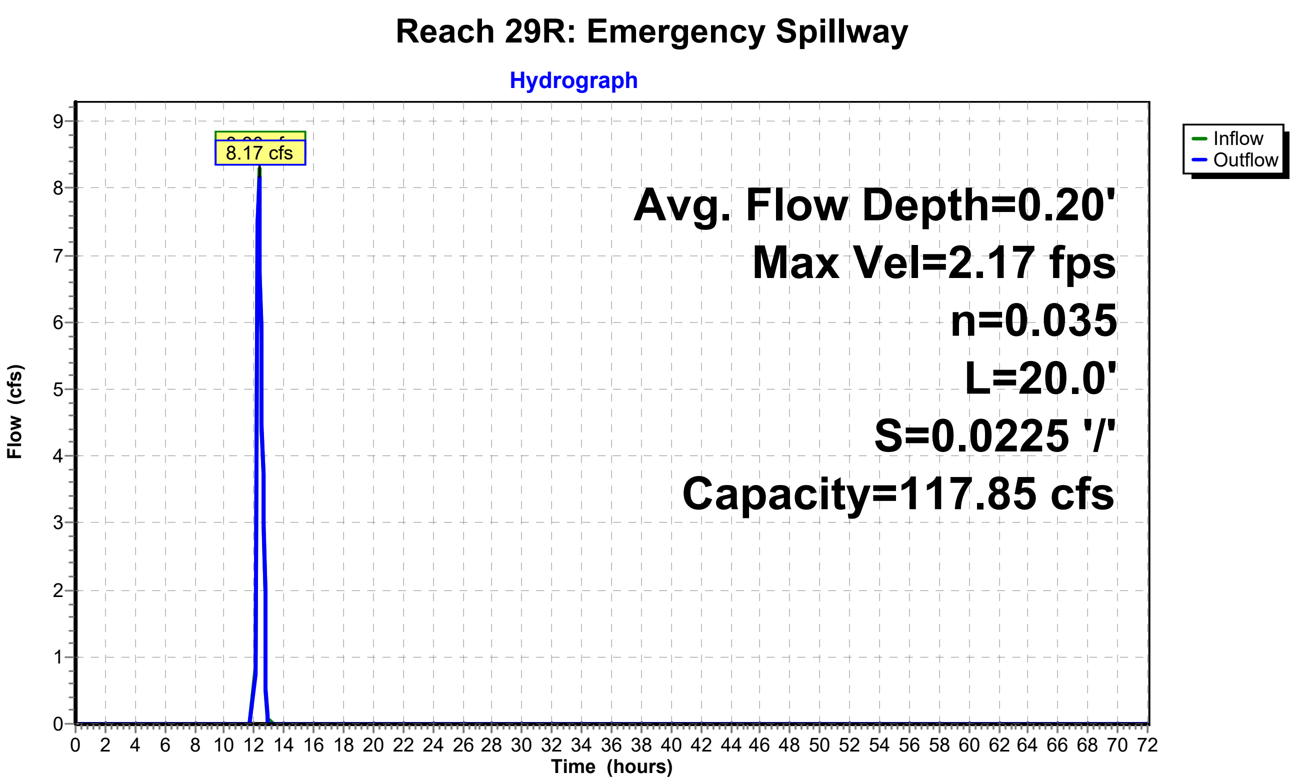
Inflow	=	8.30 cfs @	12.31 hrs, Volume=	0.244 af
Outflow	=	8.17 cfs @	12.31 hrs, Volume=	0.244 af, Atten= 2%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.17 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.47 fps, Avg. Travel Time= 0.2 min

Peak Storage= 75 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 18.82'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 117.85 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 20.0' Slope= 0.0225 '/'
Inlet Invert= 453.25', Outlet Invert= 452.80'

‡



Summary for Reach 49R: Ditch 1

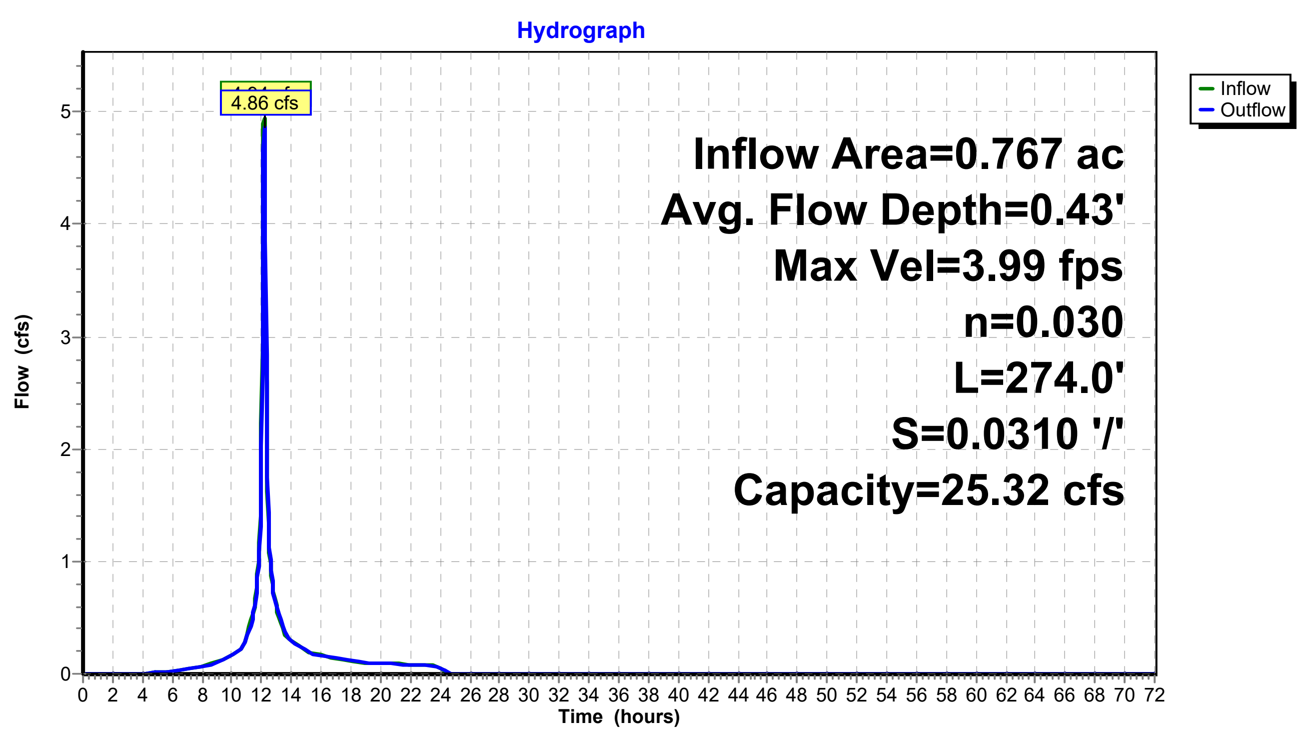
Inflow Area = 0.767 ac, 18.90% Impervious, Inflow Depth = 6.19" for 100-Year event
Inflow = 4.94 cfs @ 12.16 hrs, Volume= 0.395 af
Outflow = 4.86 cfs @ 12.18 hrs, Volume= 0.395 af, Atten= 2%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 4.0 min

Peak Storage= 333 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 3.70'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 25.32 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 274.0' Slope= 0.0310 '/'
Inlet Invert= 463.00', Outlet Invert= 454.50'

Reach 49R: Ditch 1



Summary for Reach 50R: Ditch 2

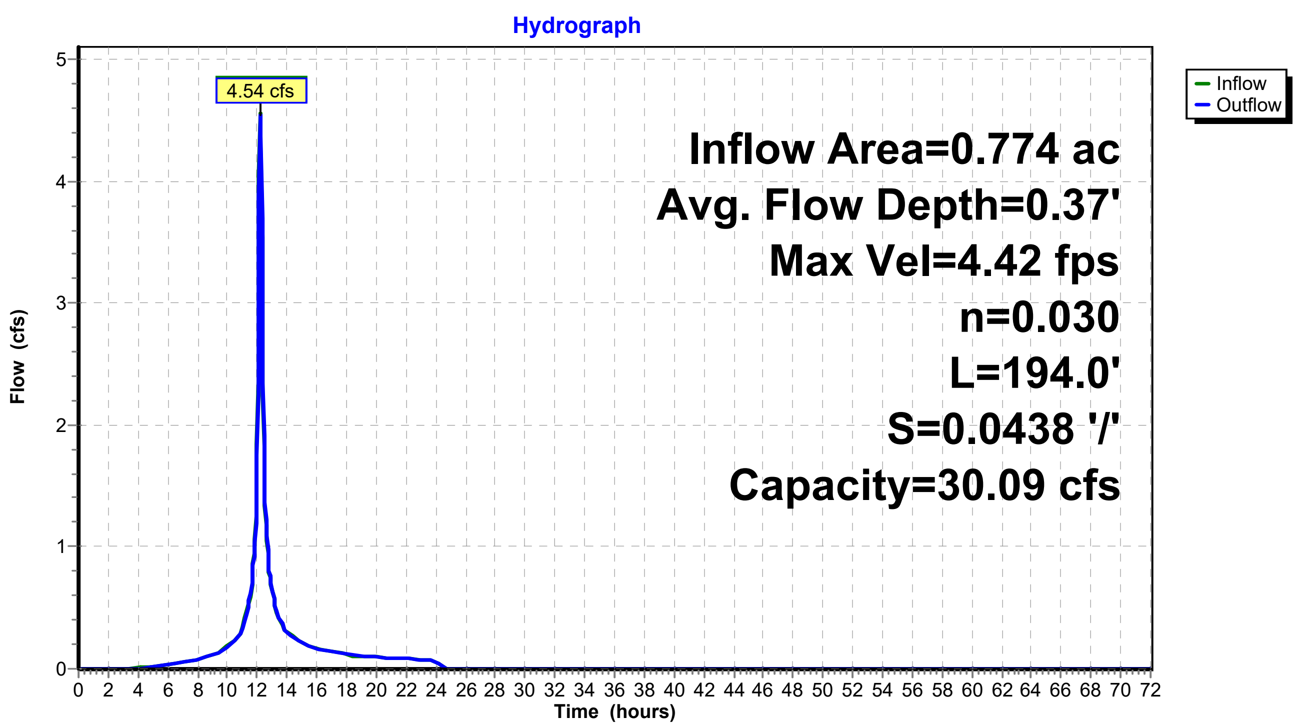
Inflow Area = 0.774 ac, 27.13% Impervious, Inflow Depth = 6.43" for 100-Year event
Inflow = 4.56 cfs @ 12.21 hrs, Volume= 0.414 af
Outflow = 4.54 cfs @ 12.22 hrs, Volume= 0.414 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.42 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 2.4 min

Peak Storage= 199 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 3.49'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 30.09 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 194.0' Slope= 0.0438 '/'
Inlet Invert= 463.00', Outlet Invert= 454.50'

Reach 50R: Ditch 2



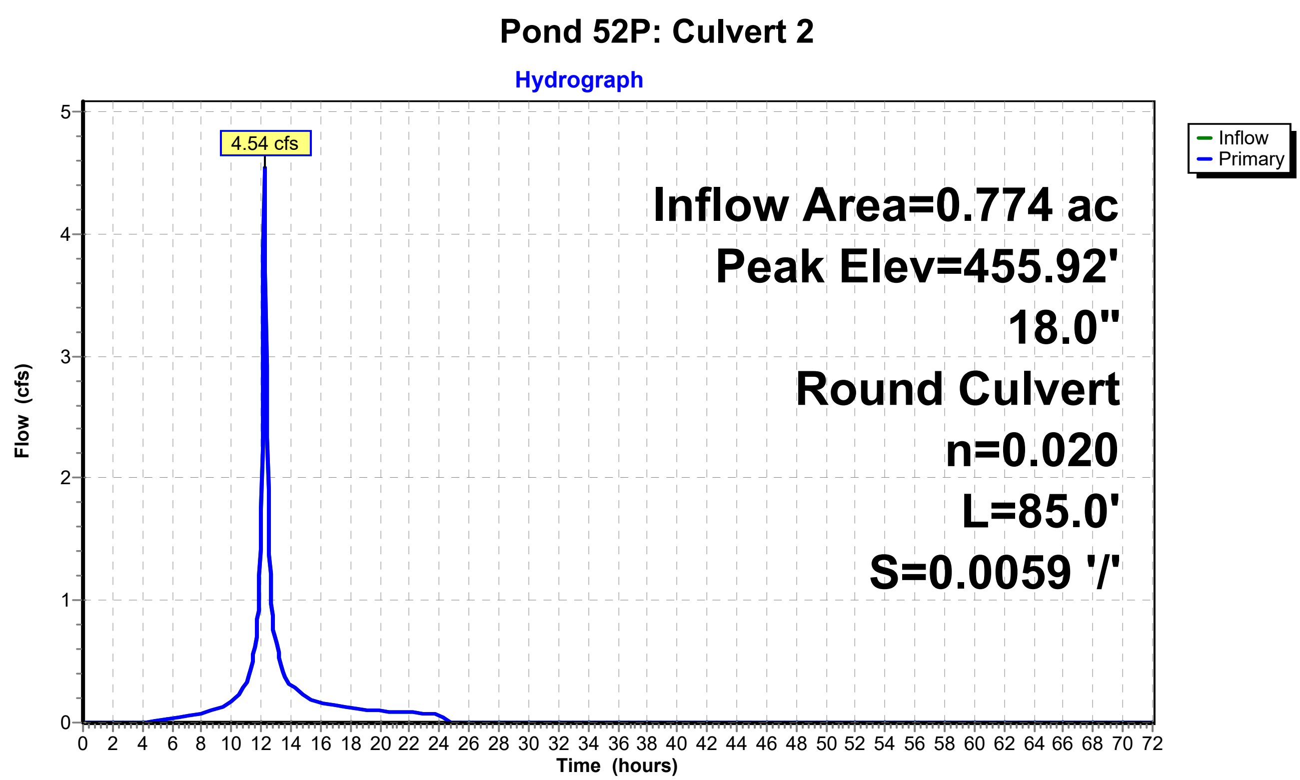
Summary for Pond 52P: Culvert 2

Inflow Area = 0.774 ac, 27.13% Impervious, Inflow Depth = 6.43" for 100-Year event
Inflow = 4.54 cfs @ 12.22 hrs, Volume= 0.414 af
Outflow = 4.54 cfs @ 12.22 hrs, Volume= 0.414 af, Atten= 0%, Lag= 0.0 min
Primary = 4.54 cfs @ 12.22 hrs, Volume= 0.414 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.92' @ 12.22 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0059 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.46 cfs @ 12.22 hrs HW=455.90' TW=454.99' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 4.46 cfs @ 3.37 fps)



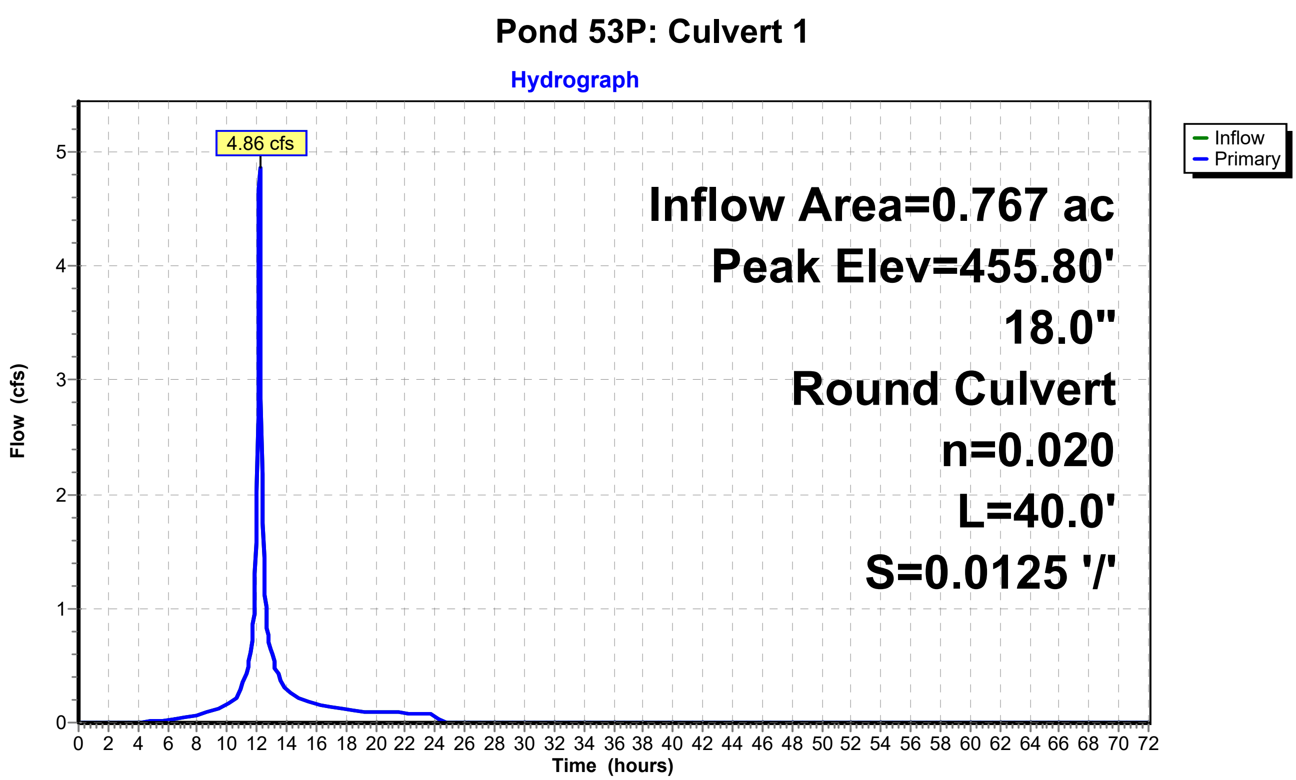
Summary for Pond 53P: Culvert 1

Inflow Area =	0.767 ac,	18.90% Impervious,	Inflow Depth = 6.19"	for 100-Year event
Inflow =	4.86 cfs @	12.18 hrs, Volume=	0.395 af	
Outflow =	4.86 cfs @	12.18 hrs, Volume=	0.395 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.86 cfs @	12.18 hrs, Volume=	0.395 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.80' @ 12.18 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0125 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.74 cfs @ 12.18 hrs HW=455.78' TW=454.95' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 4.74 cfs @ 3.97 fps)



Summary for Pond 54P: Bio-Retention Basin 1

Inflow Area = 2.721 ac, 38.40% Impervious, Inflow Depth = 5.98" for 100-Year event
Inflow = 15.77 cfs @ 12.15 hrs, Volume= 1.356 af
Outflow = 9.42 cfs @ 12.17 hrs, Volume= 1.356 af, Atten= 40%, Lag= 0.7 min
Primary = 9.42 cfs @ 12.17 hrs, Volume= 1.356 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.04' @ 12.32 hrs Surf.Area= 15,733 sf Storage= 15,461 cf

Plug-Flow detention time= 204.2 min calculated for 1.355 af (100% of inflow)
Center-of-Mass det. time= 205.1 min (1,006.8 - 801.7)

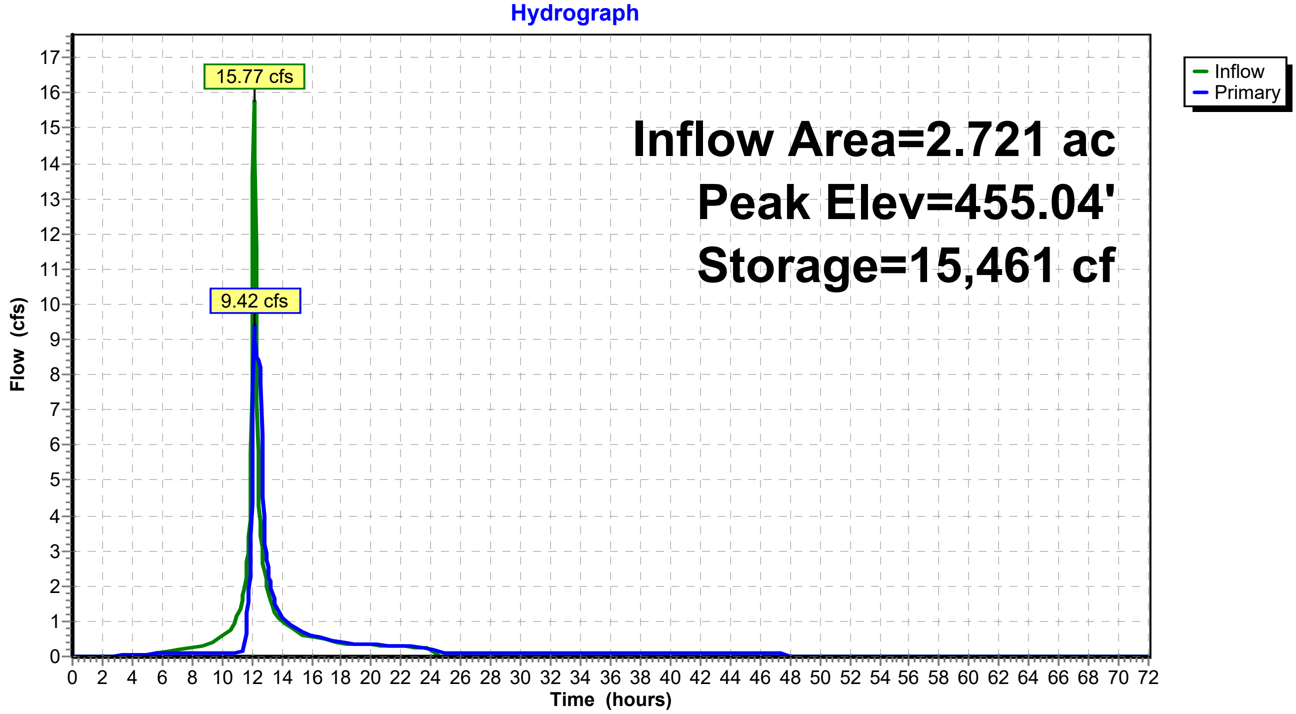
Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	22,875 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
455.50	16,500	22,875	22,875

Device	Routing	Invert	Outlet Devices
#1	Primary	450.80'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.80' / 450.20' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	454.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	454.00'	**0.250 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 448.80'

Primary OutFlow Max=8.68 cfs @ 12.17 hrs HW=454.93' TW=453.25' (Dynamic Tailwater)
1=Culvert (Inlet Controls 8.68 cfs @ 4.91 fps)
2=Orifice/Grate (Passes < 10.91 cfs potential flow)
3=Exfiltration (Passes < 0.11 cfs potential flow)

Pond 54P: Bio-Retention Basin 1



Summary for Pond 55P: Detention Pond 1

Inflow Area = 6.551 ac, 52.40% Impervious, Inflow Depth = 6.87" for 100-Year event
Inflow = 39.75 cfs @ 12.13 hrs, Volume= 3.750 af
Outflow = 18.93 cfs @ 12.31 hrs, Volume= 3.704 af, Atten= 52%, Lag= 10.4 min
Primary = 10.63 cfs @ 12.31 hrs, Volume= 3.460 af
Secondary = 8.30 cfs @ 12.31 hrs, Volume= 0.244 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 450.20' Storage= 28,039 cf
Peak Elev= 453.46' @ 12.31 hrs Storage= 85,757 cf (57,718 cf above start)

Plug-Flow detention time= 604.6 min calculated for 3.060 af (82% of inflow)
Center-of-Mass det. time= 365.8 min (1,217.1 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	98,470 cf	**Custom Stage Data** Listed below

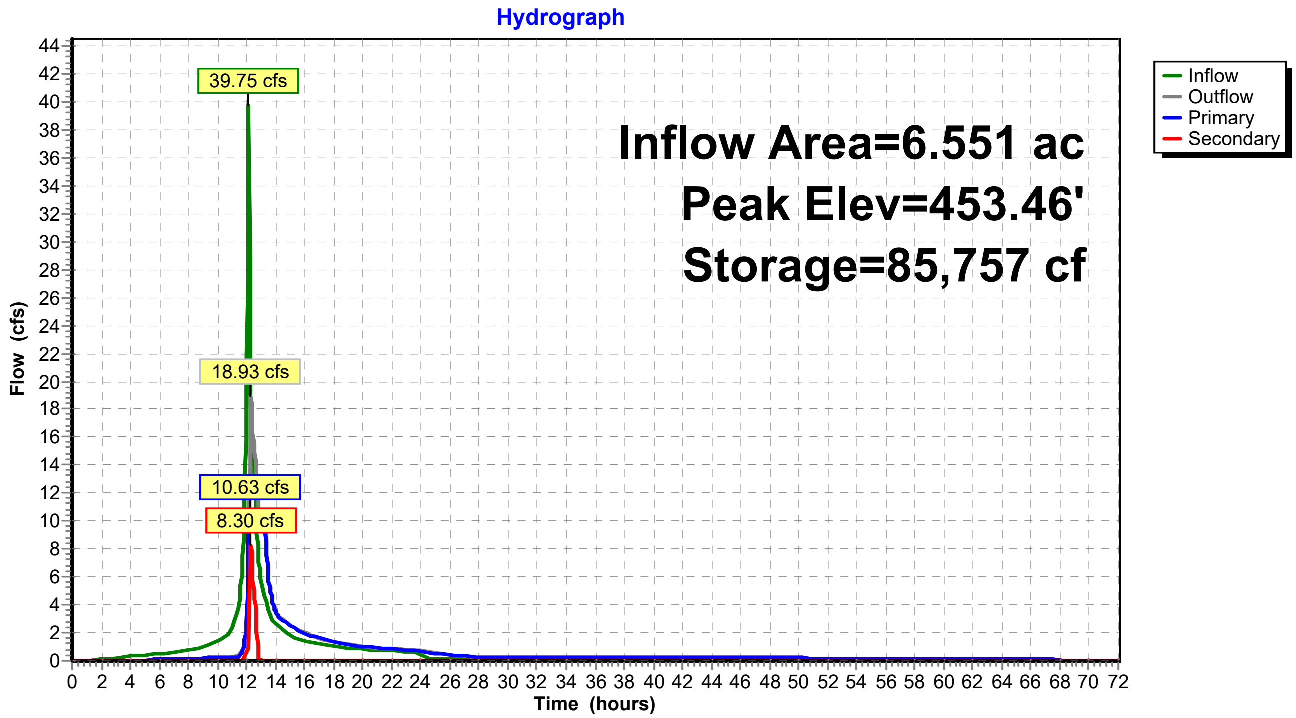
Elevation (feet)	Cum.Store (cubic-feet)
446.00	0
446.20	787
447.00	4,409
448.00	9,925
449.20	18,016
450.20	28,039
451.00	39,196
452.00	55,835
453.00	75,086
454.00	98,470

Device	Routing	Invert	Outlet Devices
#1	Primary	450.20'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.20' / 450.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	450.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	451.75'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	452.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	453.25'	**Channel/Reach** using Reach 29R: Emergency Spillway

Primary OutFlow Max=10.63 cfs @ 12.31 hrs HW=453.46' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.63 cfs @ 6.02 fps)
  ├─**2=Orifice/Grate** (Passes < 0.42 cfs potential flow)
  ├─**3=Broad-Crested Rectangular Weir** (Passes < 7.39 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 17.81 cfs potential flow)

Secondary OutFlow Max=8.22 cfs @ 12.31 hrs HW=453.46' TW=453.45' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 8.22 cfs @ 2.18 fps)

Pond 55P: Detention Pond 1

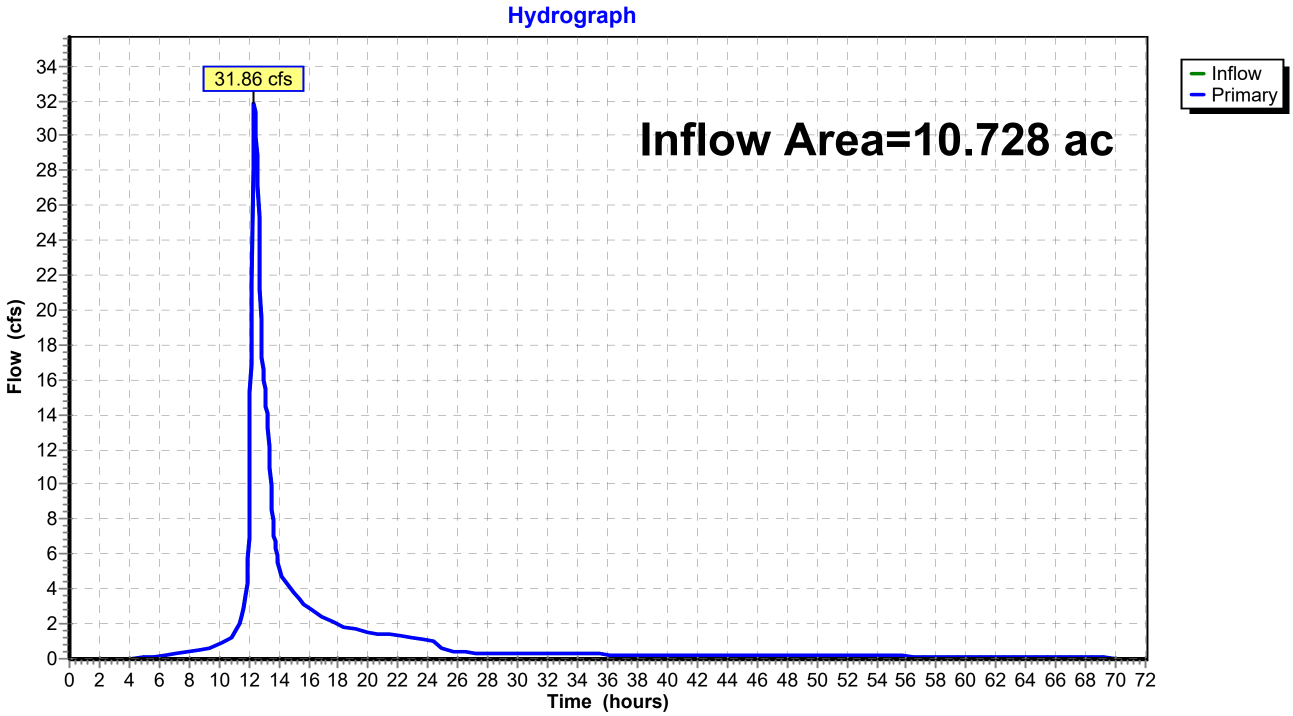


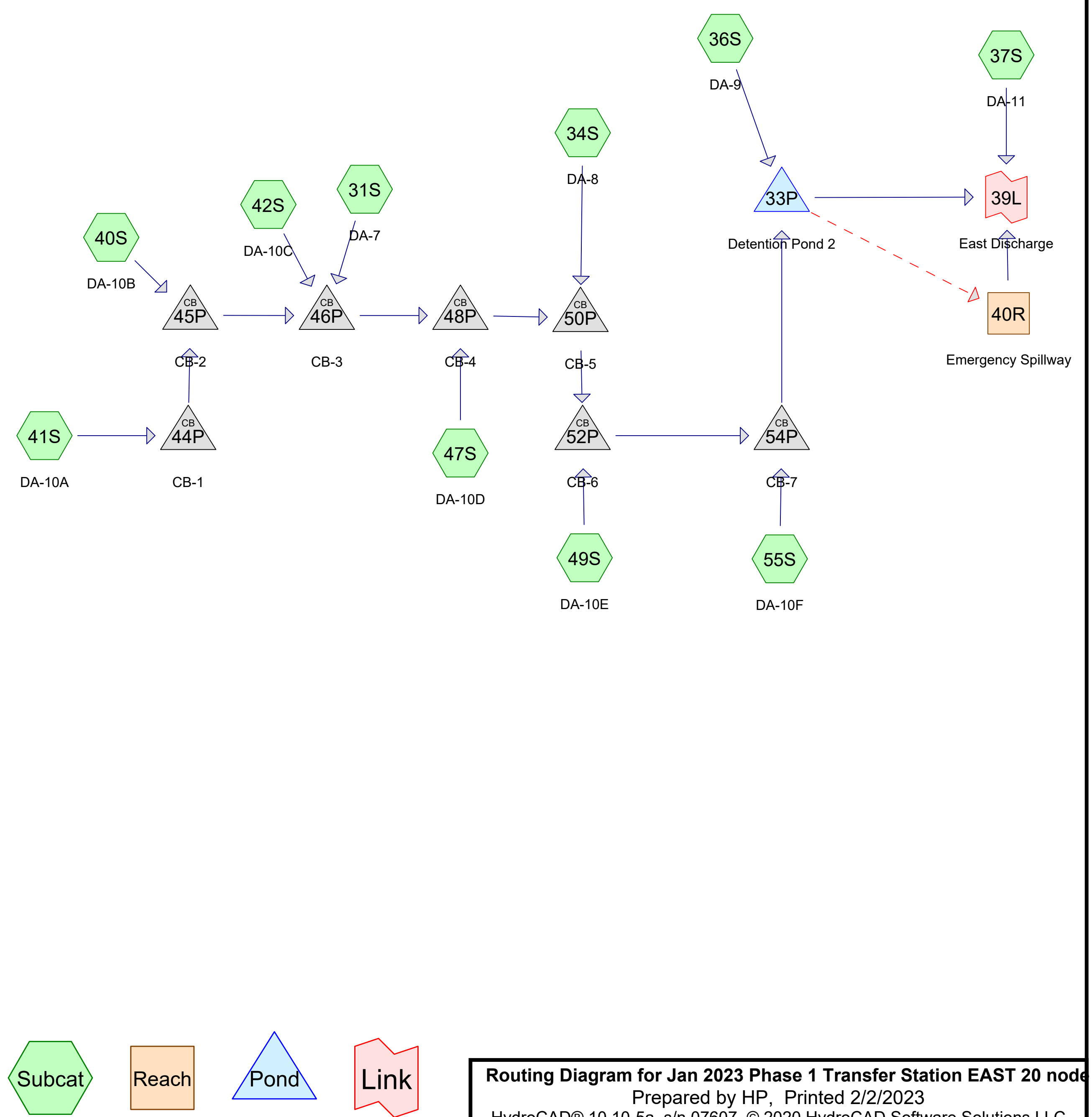
Summary for Link 28L: Southwest Discharge

Inflow Area = 10.728 ac, 33.73% Impervious, Inflow Depth > 6.41" for 100-Year event
Inflow = 31.86 cfs @ 12.37 hrs, Volume= 5.734 af
Primary = 31.86 cfs @ 12.37 hrs, Volume= 5.734 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 28L: Southwest Discharge





Routing Diagram for Jan 2023 Phase 1 Transfer Station EAST 20 node
Prepared by HP, Printed 2/2/2023
HydroCAD® 10.10-5a s/n 07607 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 31S: DA-7

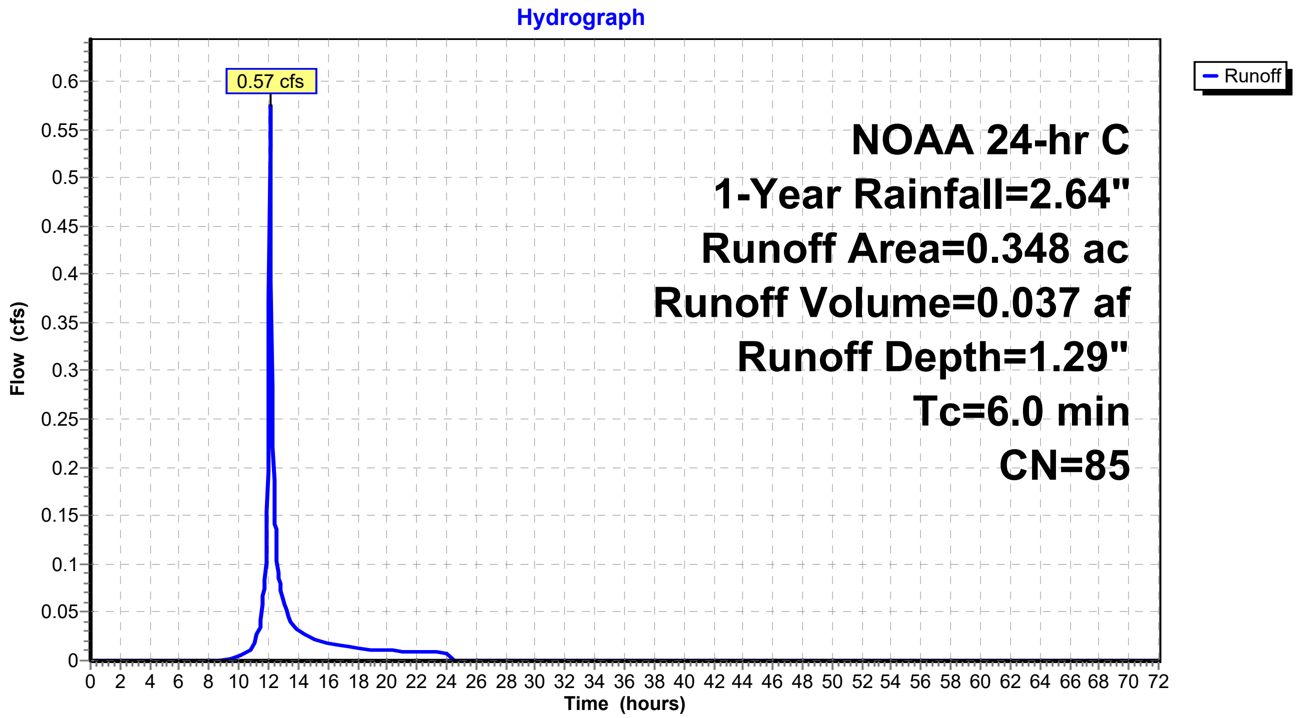
Runoff = 0.57 cfs @ 12.13 hrs, Volume= 0.037 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.248	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.348	85	Weighted Average
0.248		71.26% Pervious Area
0.100		28.74% Impervious Area

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

Subcatchment 31S: DA-7



Summary for Subcatchment 34S: DA-8

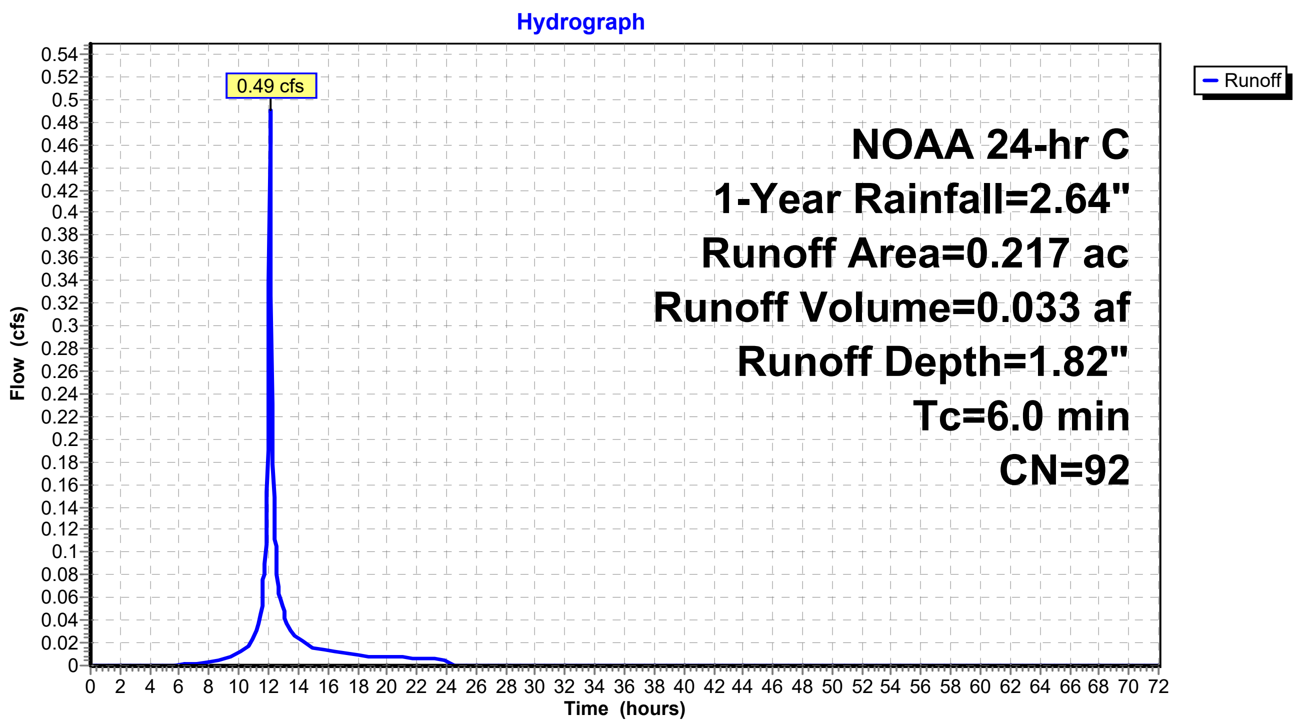
Runoff = 0.49 cfs @ 12.13 hrs, Volume= 0.033 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.074	80	>75% Grass cover, Good, HSG D
0.143	98	Paved parking, HSG D
0.217	92	Weighted Average
0.074		34.10% Pervious Area
0.143		65.90% Impervious Area

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

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-9

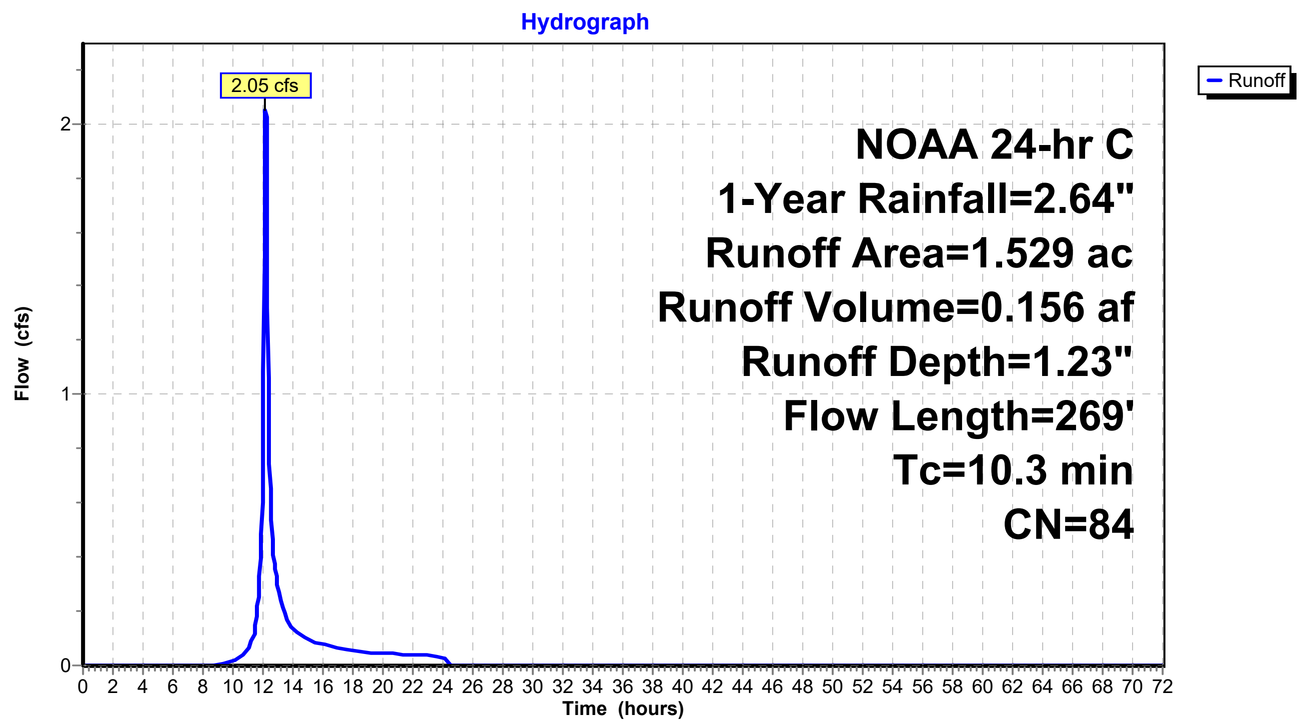
Runoff = 2.05 cfs @ 12.18 hrs, Volume= 0.156 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
1.149	80	>75% Grass cover, Good, HSG D
0.215	98	Paved parking, HSG D
0.165	98	Water Surface, HSG D
1.529	84	Weighted Average
1.149		75.15% Pervious Area
0.380		24.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0364	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
2.6	169	0.0237	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	269	Total			

Subcatchment 36S: DA-9



Summary for Subcatchment 37S: DA-11

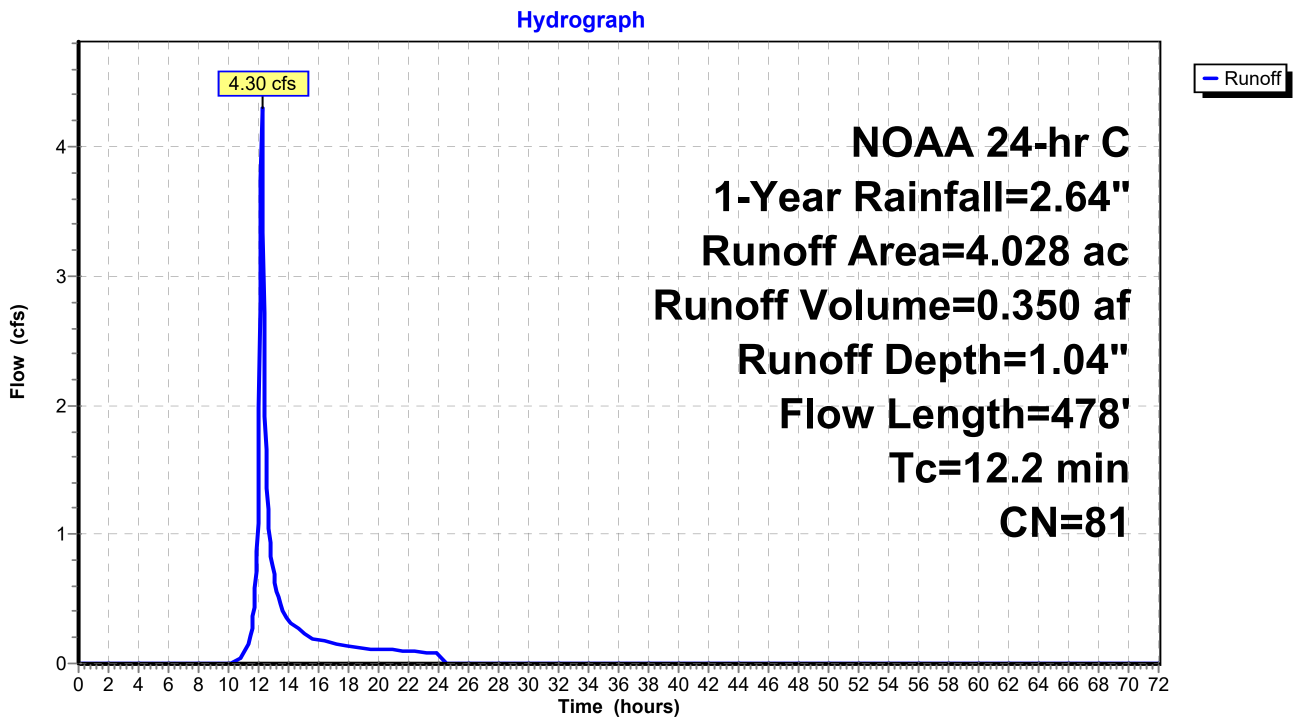
Runoff = 4.30 cfs @ 12.21 hrs, Volume= 0.350 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
3.760	80	>75% Grass cover, Good, HSG D
0.268	98	Paved parking, HSG D
4.028	81	Weighted Average
3.760		93.35% Pervious Area
0.268		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-11



Summary for Subcatchment 40S: DA-10B

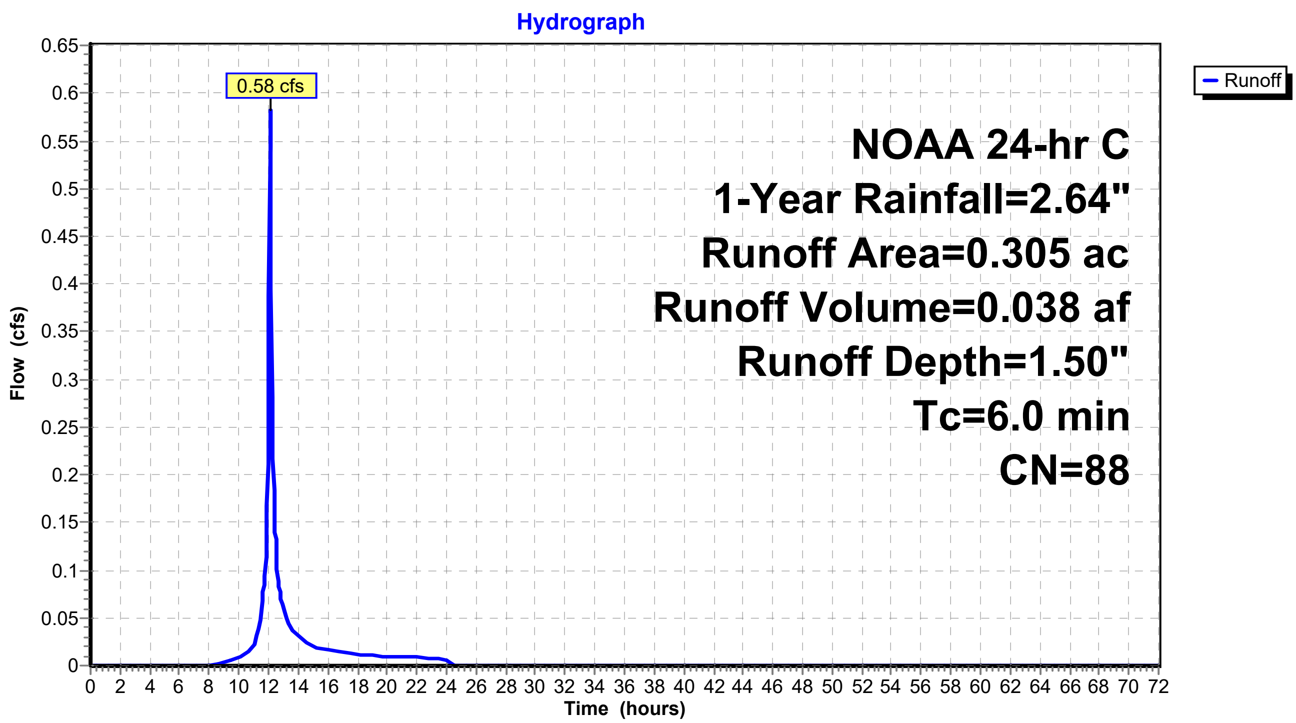
Runoff = 0.58 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.167	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.305	88	Weighted Average
0.167		54.75% Pervious Area
0.138		45.25% Impervious Area

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

Subcatchment 40S: DA-10B



Summary for Subcatchment 41S: DA-10A

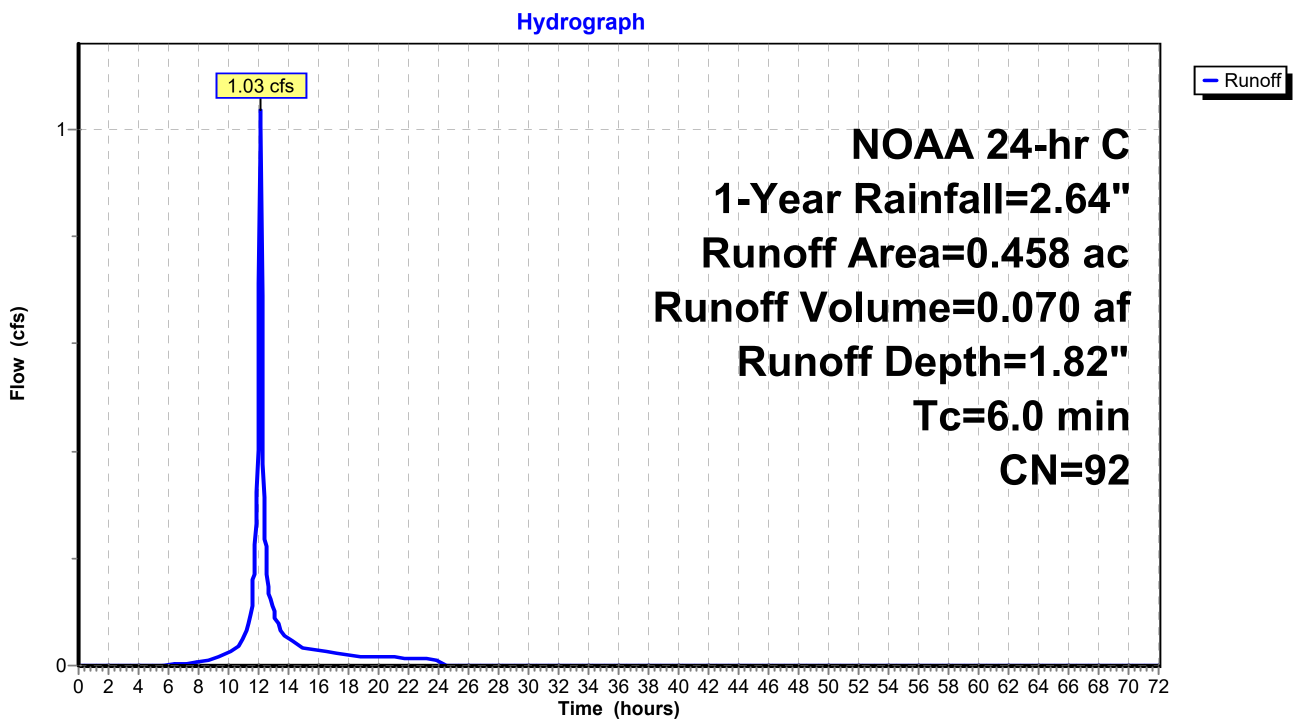
Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.070 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.159	80	>75% Grass cover, Good, HSG D
0.299	98	Paved parking, HSG D
0.458	92	Weighted Average
0.159		34.72% Pervious Area
0.299		65.28% Impervious Area

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

Subcatchment 41S: DA-10A



Summary for Subcatchment 42S: DA-10C

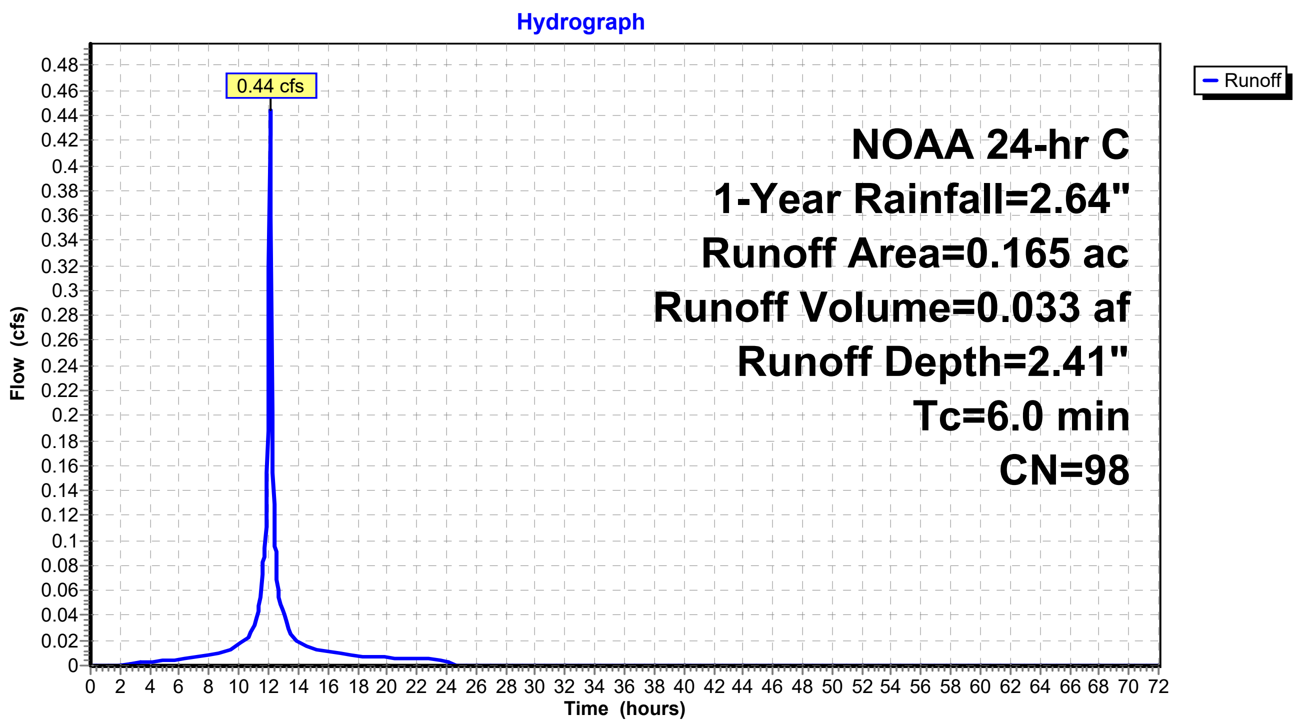
Runoff = 0.44 cfs @ 12.13 hrs, Volume= 0.033 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.004	80	>75% Grass cover, Good, HSG D
0.161	98	Paved parking, HSG D
0.165	98	Weighted Average
0.004		2.42% Pervious Area
0.161		97.58% Impervious Area

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

Subcatchment 42S: DA-10C



Summary for Subcatchment 47S: DA-10D

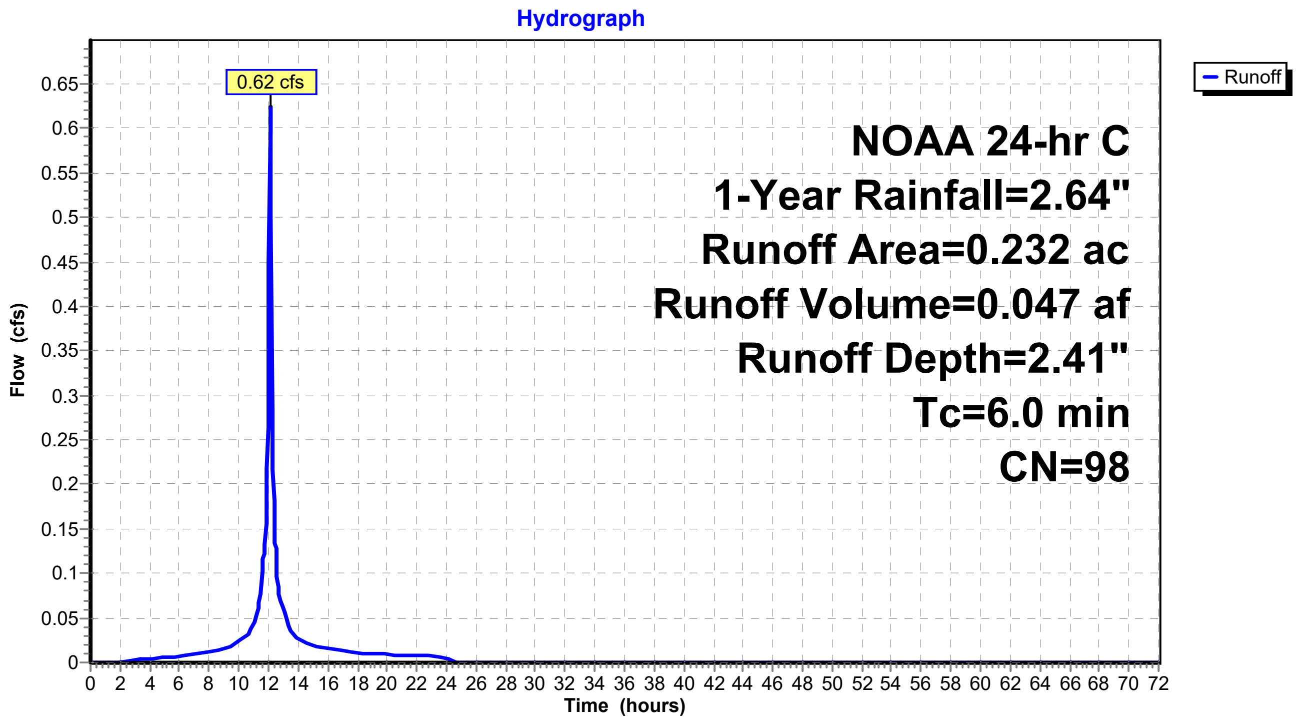
Runoff = 0.62 cfs @ 12.13 hrs, Volume= 0.047 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.232	98	Paved parking, HSG D
0.232		100.00% Impervious Area

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

Subcatchment 47S: DA-10D



Summary for Subcatchment 49S: DA-10E

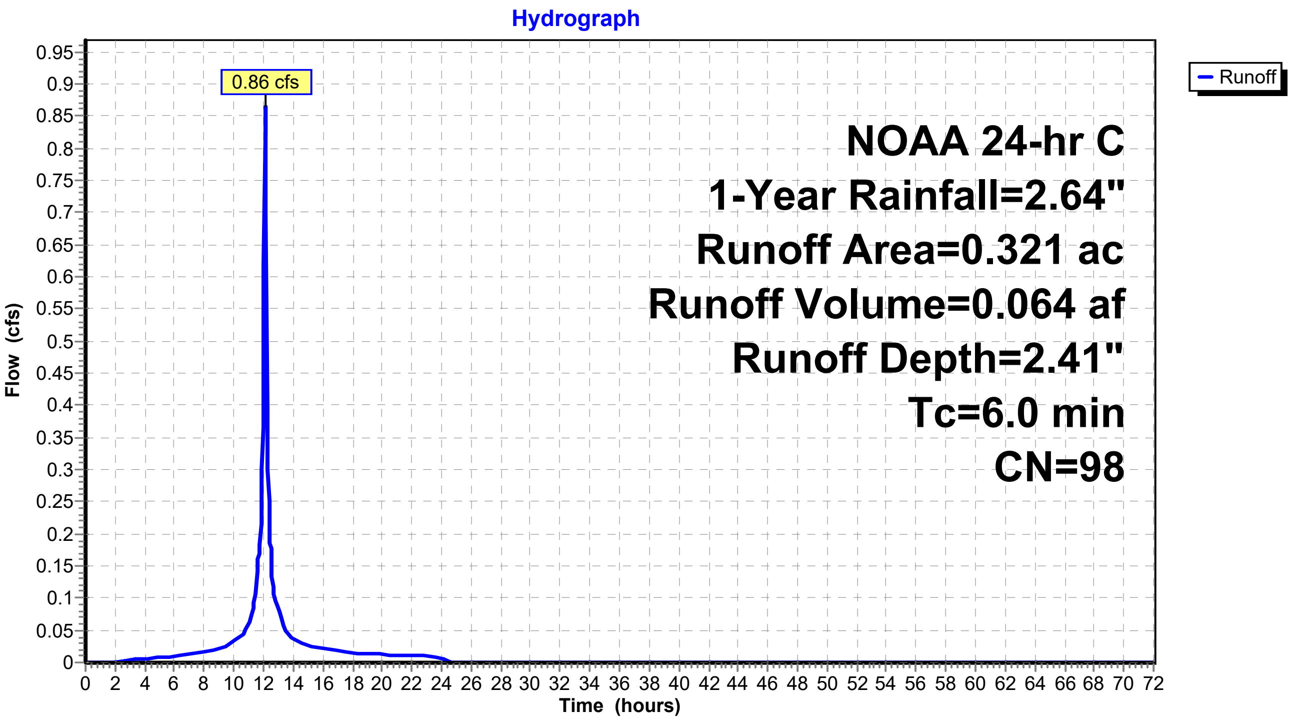
Runoff = 0.86 cfs @ 12.13 hrs, Volume= 0.064 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 49S: DA-10E



Summary for Subcatchment 55S: DA-10F

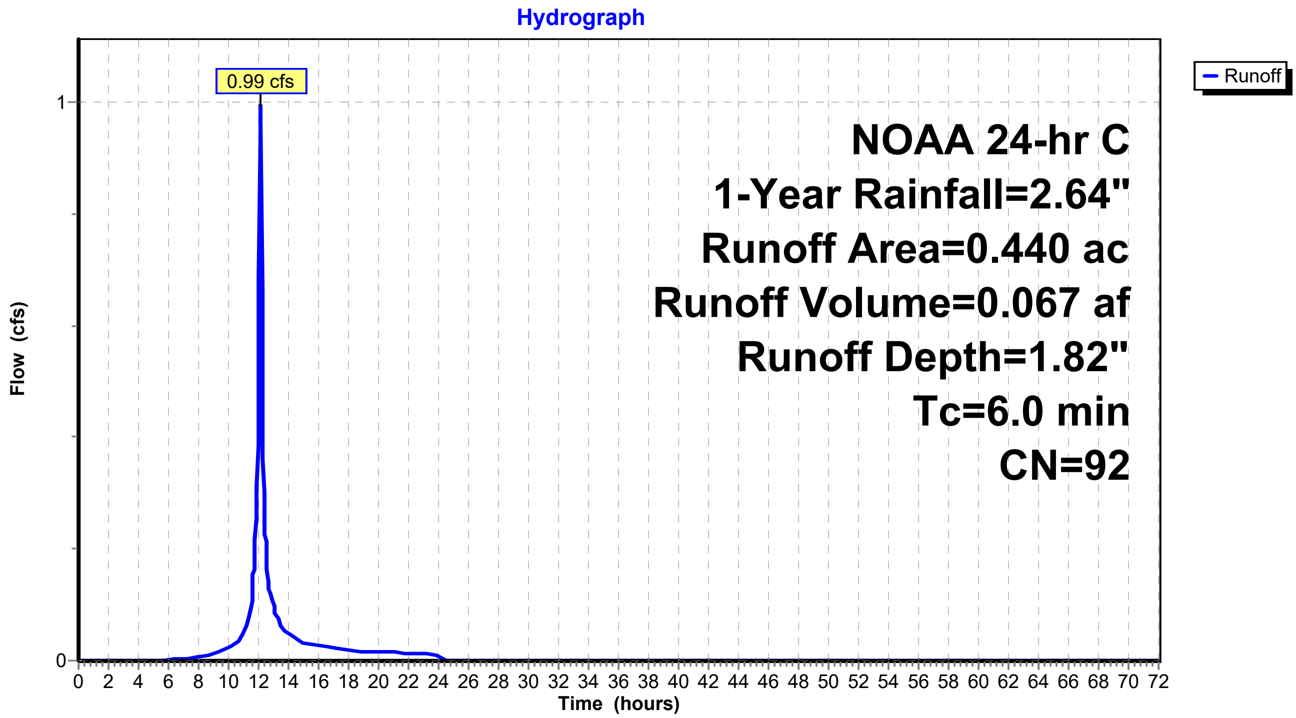
Runoff = 0.99 cfs @ 12.13 hrs, Volume= 0.067 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

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

Subcatchment 55S: DA-10F



Summary for Reach 40R: Emergency Spillway

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

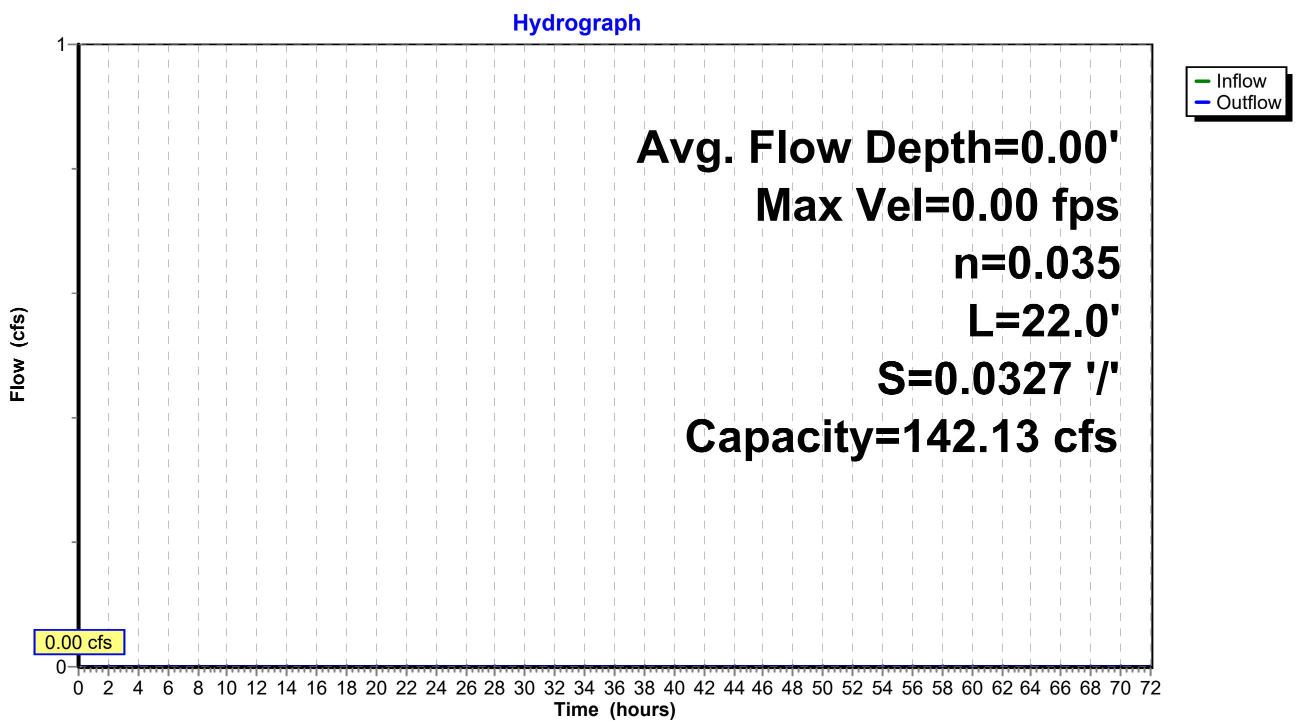
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 142.13 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0327 '/'
Inlet Invert= 450.00', Outlet Invert= 449.28'

‡

Reach 40R: Emergency Spillway



Summary for Pond 33P: Detention Pond 2

Inflow Area = 4.015 ac, 51.33% Impervious, Inflow Depth = 1.63" for 1-Year event
Inflow = 7.46 cfs @ 12.14 hrs, Volume= 0.545 af
Outflow = 0.24 cfs @ 15.53 hrs, Volume= 0.529 af, Atten= 97%, Lag= 203.3 min
Primary = 0.24 cfs @ 15.53 hrs, Volume= 0.529 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 448.16' @ 15.53 hrs Storage= 42,679 cf (16,026 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 851.5 min (1,661.5 - 810.0)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

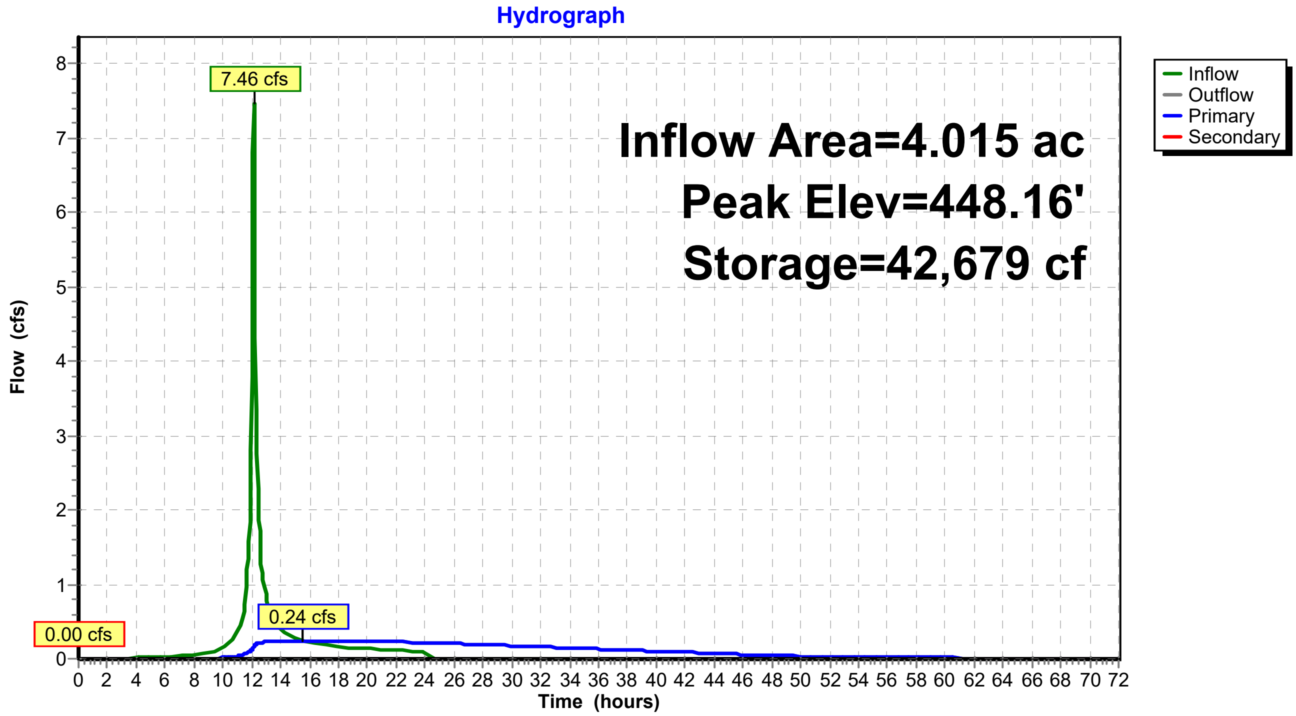
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.00'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=0.24 cfs @ 15.53 hrs HW=448.16' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 0.24 cfs of 3.76 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.24 cfs @ 4.91 fps)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=447.00' TW=450.00' (Dynamic Tailwater)
5=Channel/Reach (Channel Controls 0.00 cfs)

Pond 33P: Detention Pond 2



Summary for Pond 44P: CB-1

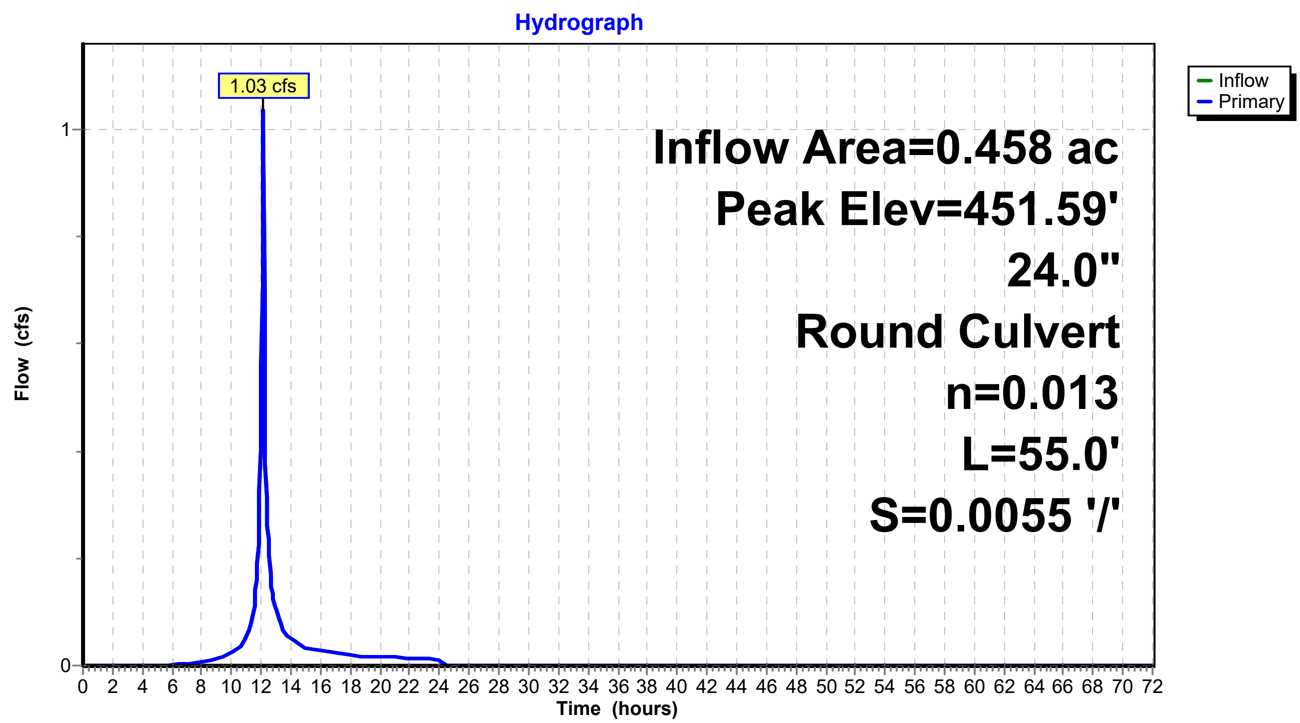
Inflow Area = 0.458 ac, 65.28% Impervious, Inflow Depth = 1.82" for 1-Year event
Inflow = 1.03 cfs @ 12.13 hrs, Volume= 0.070 af
Outflow = 1.03 cfs @ 12.13 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 1.03 cfs @ 12.13 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.59' @ 12.17 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0055 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.74 cfs @ 12.13 hrs HW=451.56' TW=451.44' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.74 cfs @ 1.54 fps)

Pond 44P: CB-1



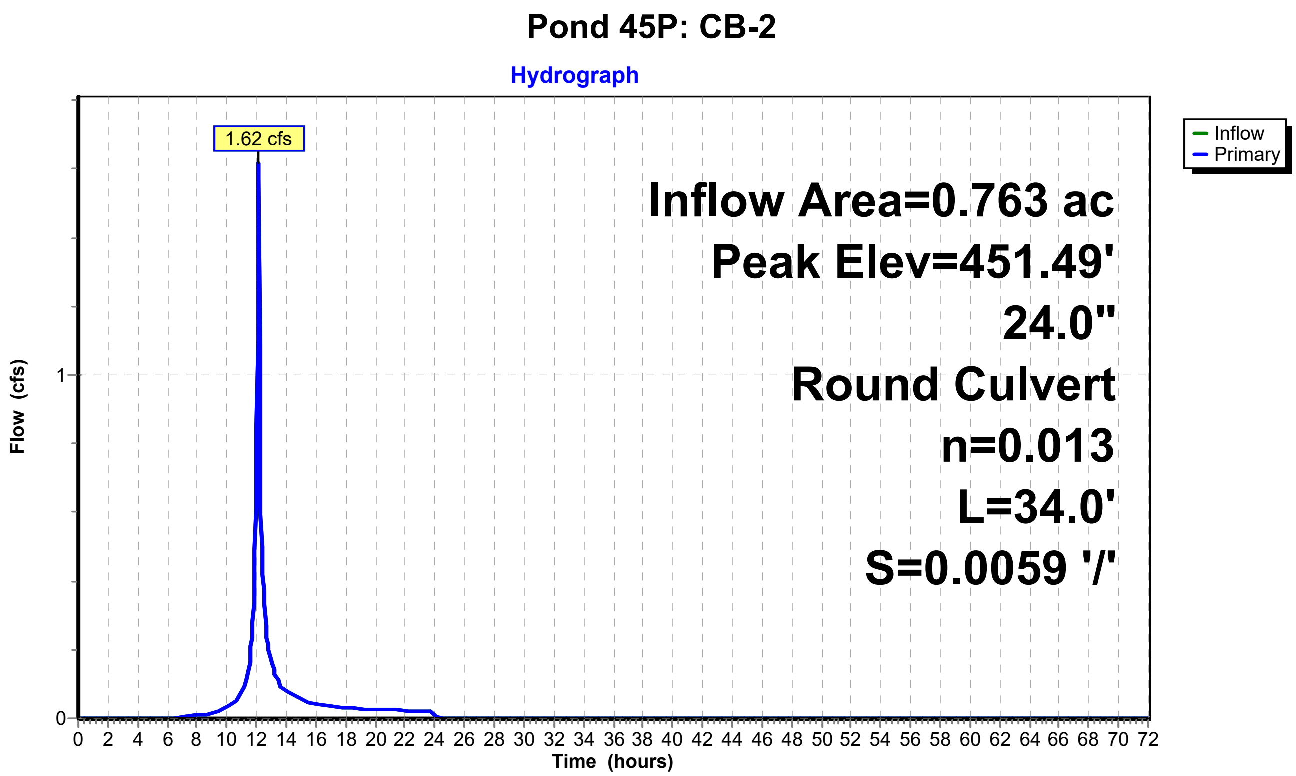
Summary for Pond 45P: CB-2

Inflow Area = 0.763 ac, 57.27% Impervious, Inflow Depth = 1.69" for 1-Year event
Inflow = 1.62 cfs @ 12.13 hrs, Volume= 0.108 af
Outflow = 1.62 cfs @ 12.13 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 12.13 hrs, Volume= 0.108 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.49' @ 12.18 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 34.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.50' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.96 cfs @ 12.13 hrs HW=451.45' TW=451.38' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.96 cfs @ 1.34 fps)



Summary for Pond 46P: CB-3

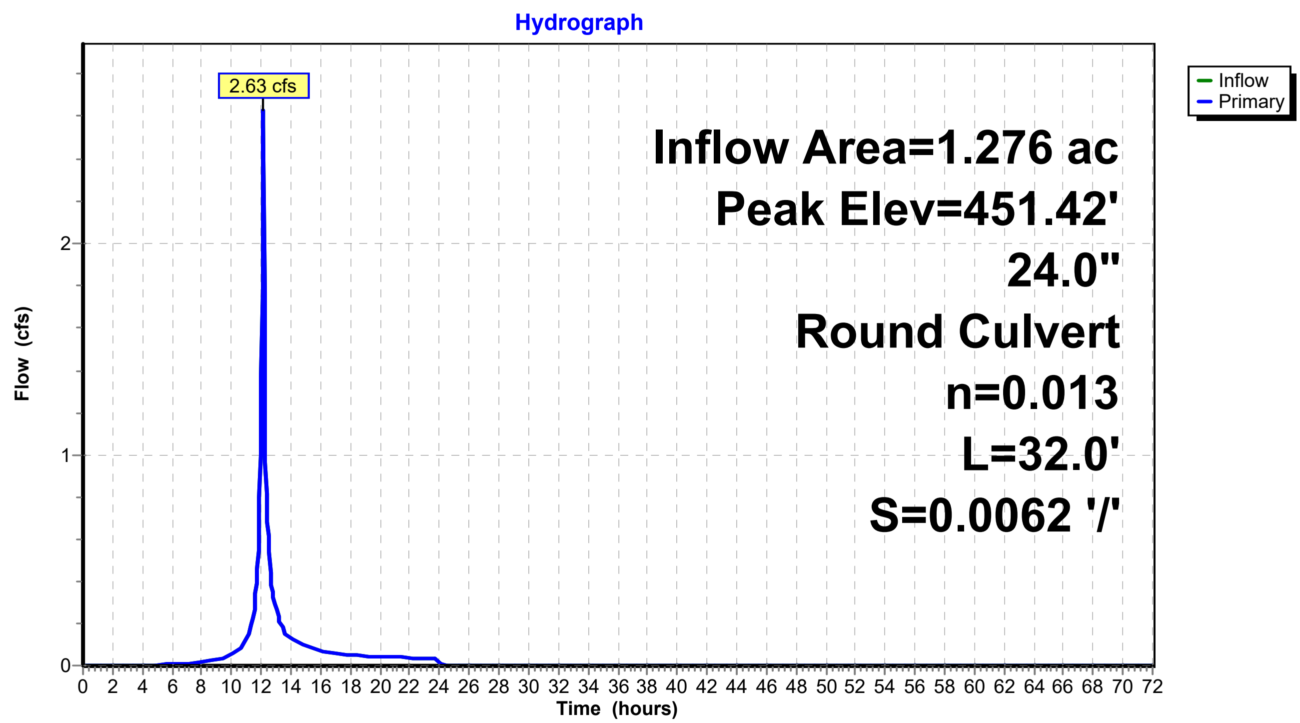
Inflow Area = 1.276 ac, 54.70% Impervious, Inflow Depth = 1.68" for 1-Year event
Inflow = 2.63 cfs @ 12.13 hrs, Volume= 0.178 af
Outflow = 2.63 cfs @ 12.13 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min
Primary = 2.63 cfs @ 12.13 hrs, Volume= 0.178 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.42' @ 12.16 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.50'	**24.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.50' / 450.30' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.99 cfs @ 12.13 hrs HW=451.38' TW=451.23' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.99 cfs @ 2.19 fps)

Pond 46P: CB-3



Summary for Pond 48P: CB-4

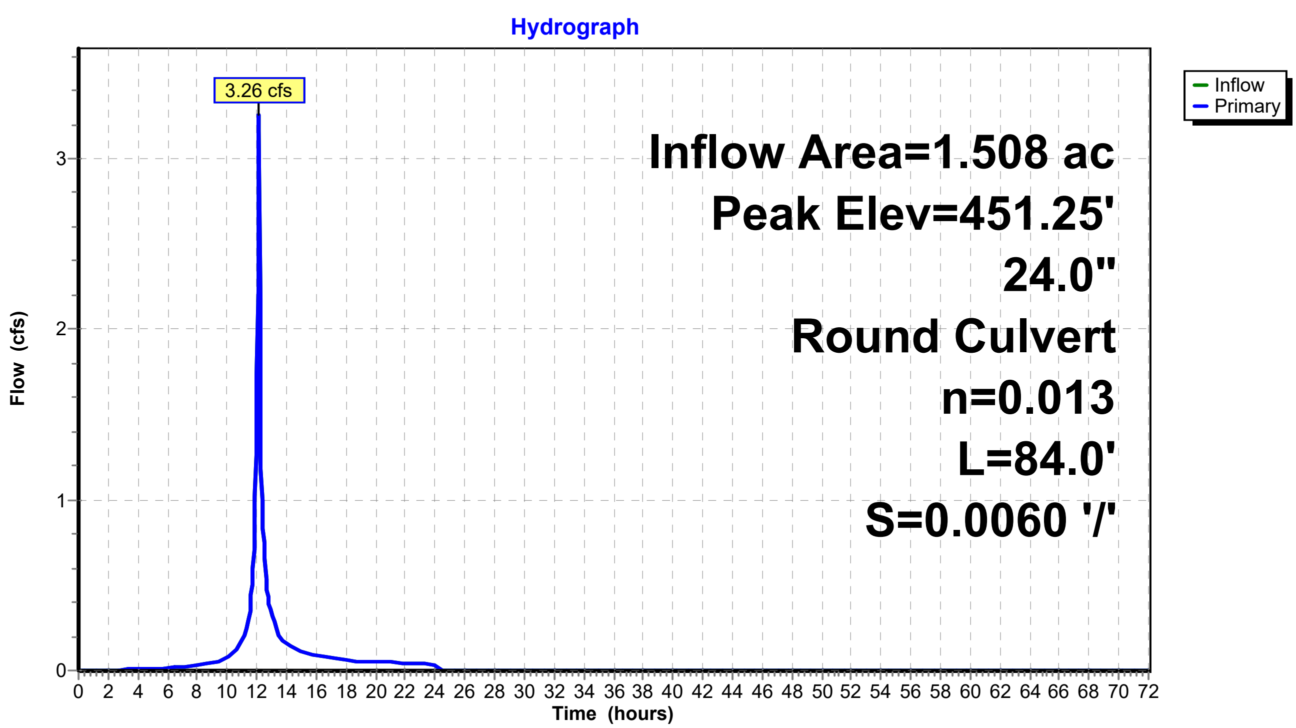
Inflow Area = 1.508 ac, 61.67% Impervious, Inflow Depth = 1.79" for 1-Year event
Inflow = 3.26 cfs @ 12.13 hrs, Volume= 0.225 af
Outflow = 3.26 cfs @ 12.13 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min
Primary = 3.26 cfs @ 12.13 hrs, Volume= 0.225 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.25' @ 12.15 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.72 cfs @ 12.13 hrs HW=451.22' TW=450.86' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 2.72 cfs @ 2.81 fps)

Pond 48P: CB-4



Summary for Pond 50P: CB-5

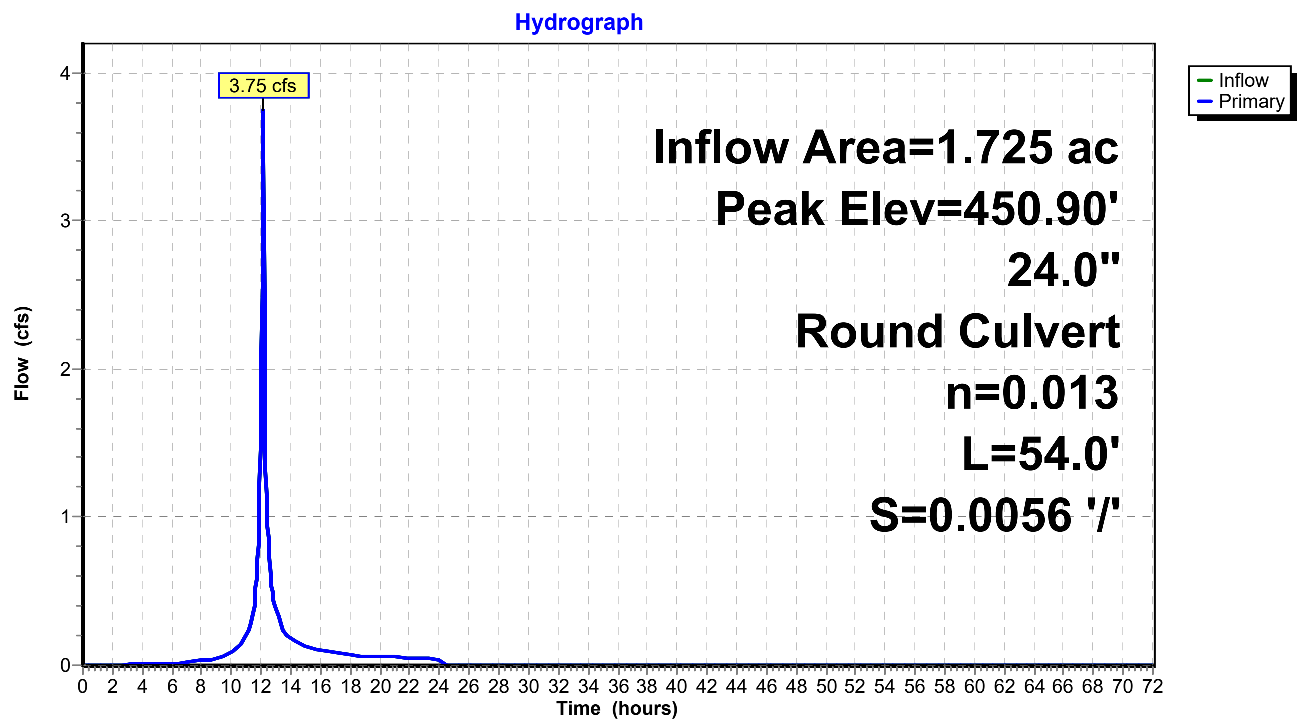
Inflow Area =	1.725 ac,	62.20% Impervious,	Inflow Depth = 1.79"	for 1-Year event
Inflow =	3.75 cfs @	12.13 hrs, Volume=	0.258 af	
Outflow =	3.75 cfs @	12.13 hrs, Volume=	0.258 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.75 cfs @	12.13 hrs, Volume=	0.258 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.90' @ 12.16 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.94 cfs @ 12.13 hrs HW=450.86' TW=450.62' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.94 cfs @ 2.54 fps)

Pond 50P: CB-5



Summary for Pond 52P: CB-6

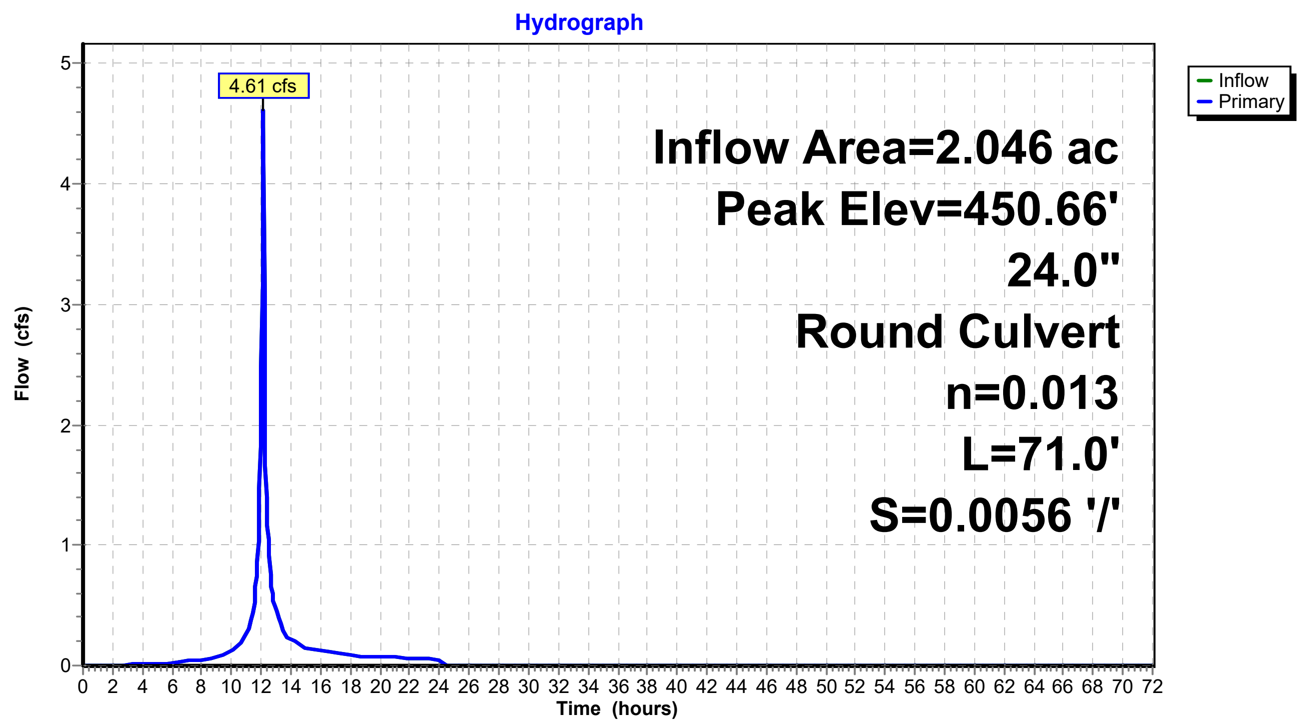
Inflow Area = 2.046 ac, 68.13% Impervious, Inflow Depth = 1.89" for 1-Year event
Inflow = 4.61 cfs @ 12.13 hrs, Volume= 0.322 af
Outflow = 4.61 cfs @ 12.13 hrs, Volume= 0.322 af, Atten= 0%, Lag= 0.0 min
Primary = 4.61 cfs @ 12.13 hrs, Volume= 0.322 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.66' @ 12.14 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.05 cfs @ 12.13 hrs HW=450.62' TW=450.22' (Dynamic Tailwater)
1=Culvert (Outlet Controls 4.05 cfs @ 3.22 fps)

Pond 52P: CB-6



Summary for Pond 54P: CB-7

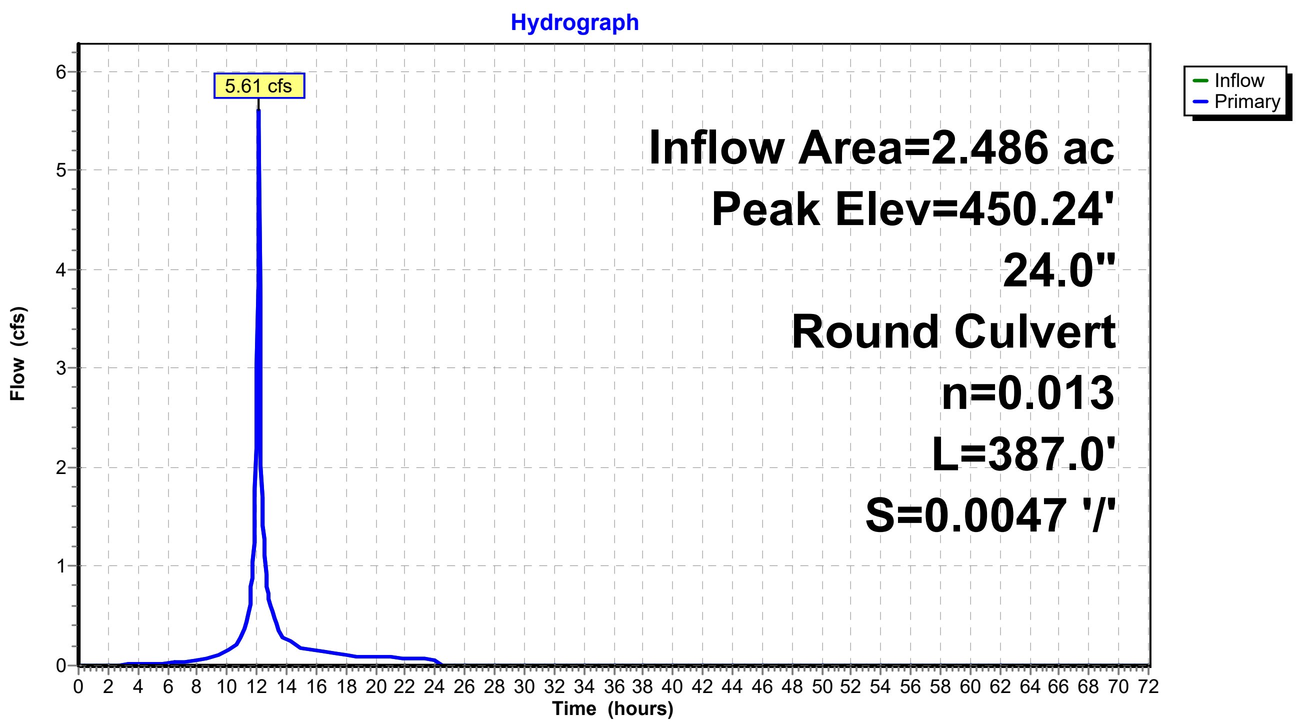
Inflow Area = 2.486 ac, 67.62% Impervious, Inflow Depth = 1.88" for 1-Year event
Inflow = 5.61 cfs @ 12.13 hrs, Volume= 0.389 af
Outflow = 5.61 cfs @ 12.13 hrs, Volume= 0.389 af, Atten= 0%, Lag= 0.0 min
Primary = 5.61 cfs @ 12.13 hrs, Volume= 0.389 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.24' @ 12.13 hrs
Flood Elev= 455.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.30' S= 0.0047 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.38 cfs @ 12.13 hrs HW=450.22' TW=447.59' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 5.38 cfs @ 4.32 fps)

Pond 54P: CB-7

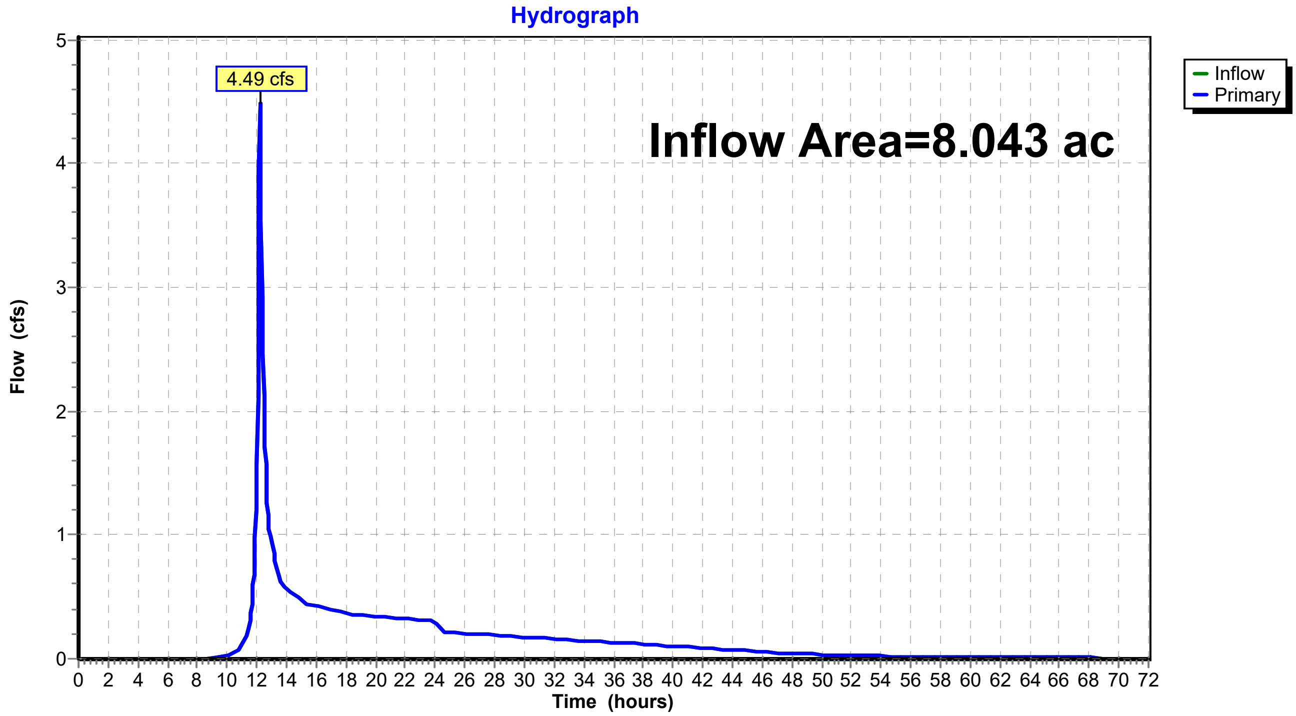


Summary for Link 39L: East Discharge

Inflow Area = 8.043 ac, 28.96% Impervious, Inflow Depth > 1.31" for 1-Year event
Inflow = 4.49 cfs @ 12.21 hrs, Volume= 0.880 af
Primary = 4.49 cfs @ 12.21 hrs, Volume= 0.880 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge



Summary for Subcatchment 31S: DA-7

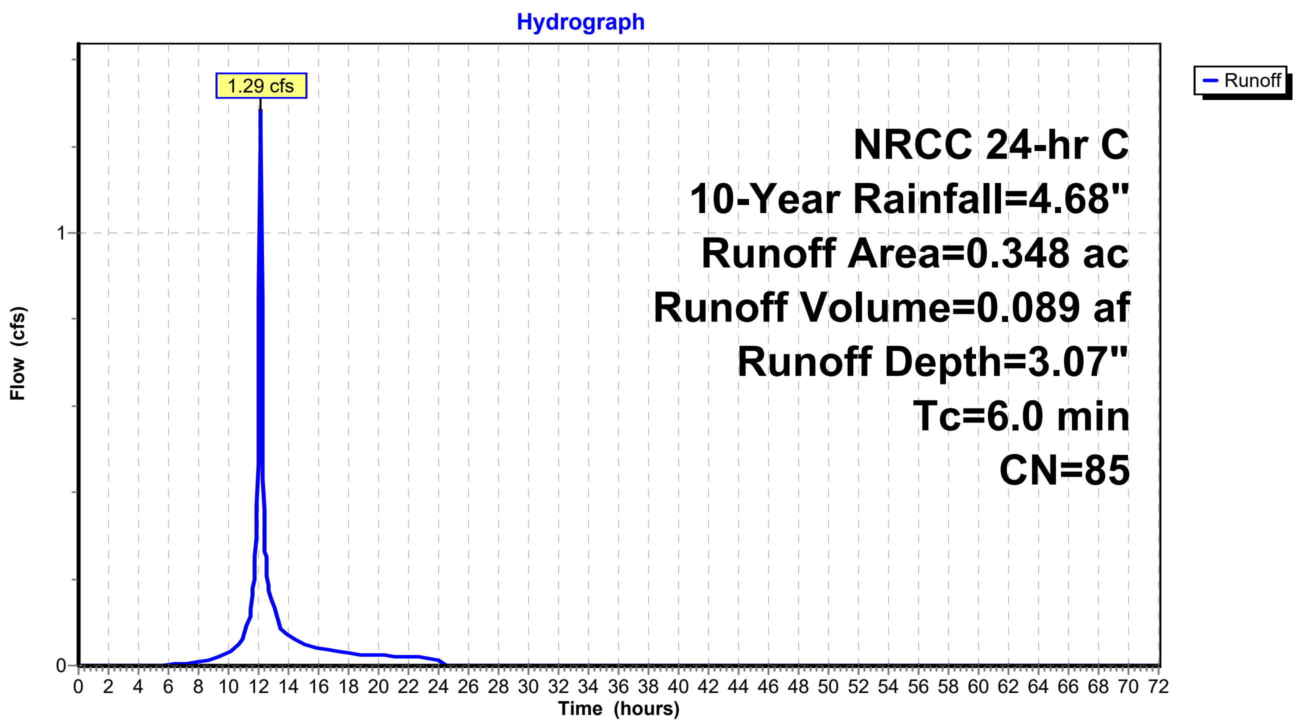
Runoff = 1.29 cfs @ 12.13 hrs, Volume= 0.089 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.248	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.348	85	Weighted Average
0.248		71.26% Pervious Area
0.100		28.74% Impervious Area

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

Subcatchment 31S: DA-7



Summary for Subcatchment 34S: DA-8

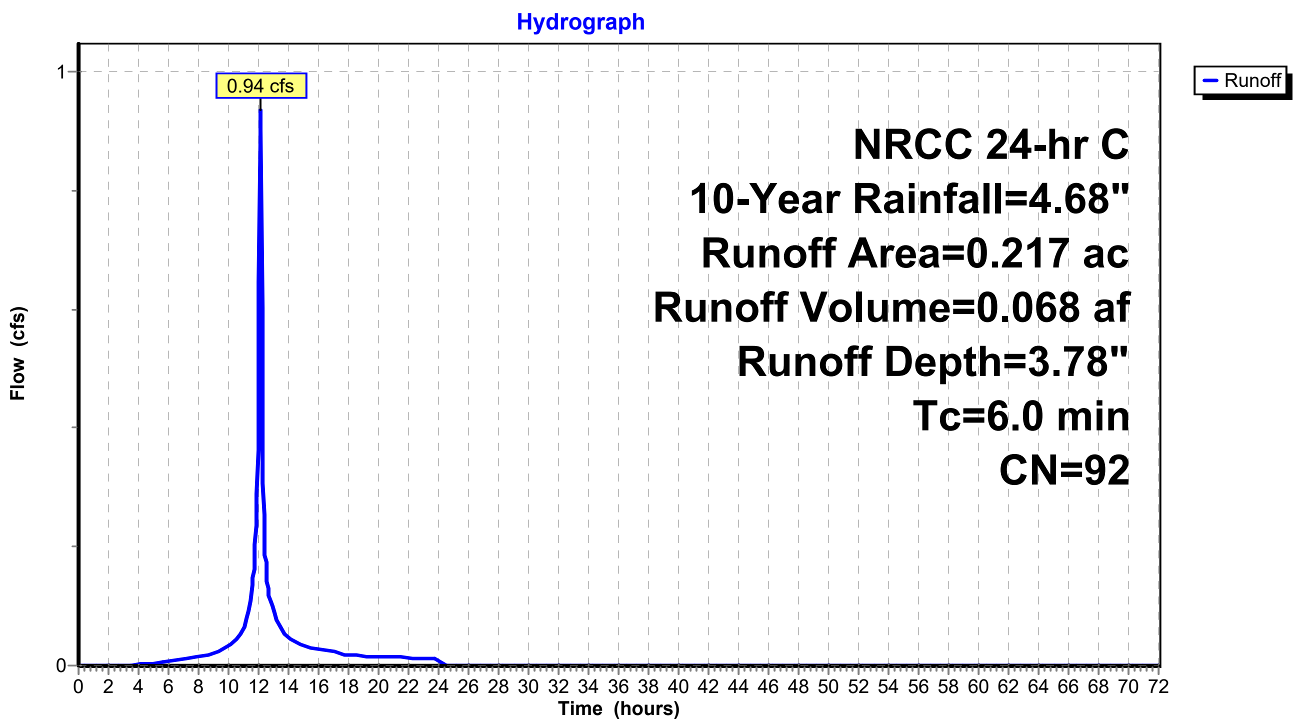
Runoff = 0.94 cfs @ 12.13 hrs, Volume= 0.068 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.074	80	>75% Grass cover, Good, HSG D
0.143	98	Paved parking, HSG D
0.217	92	Weighted Average
0.074		34.10% Pervious Area
0.143		65.90% Impervious Area

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

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-9

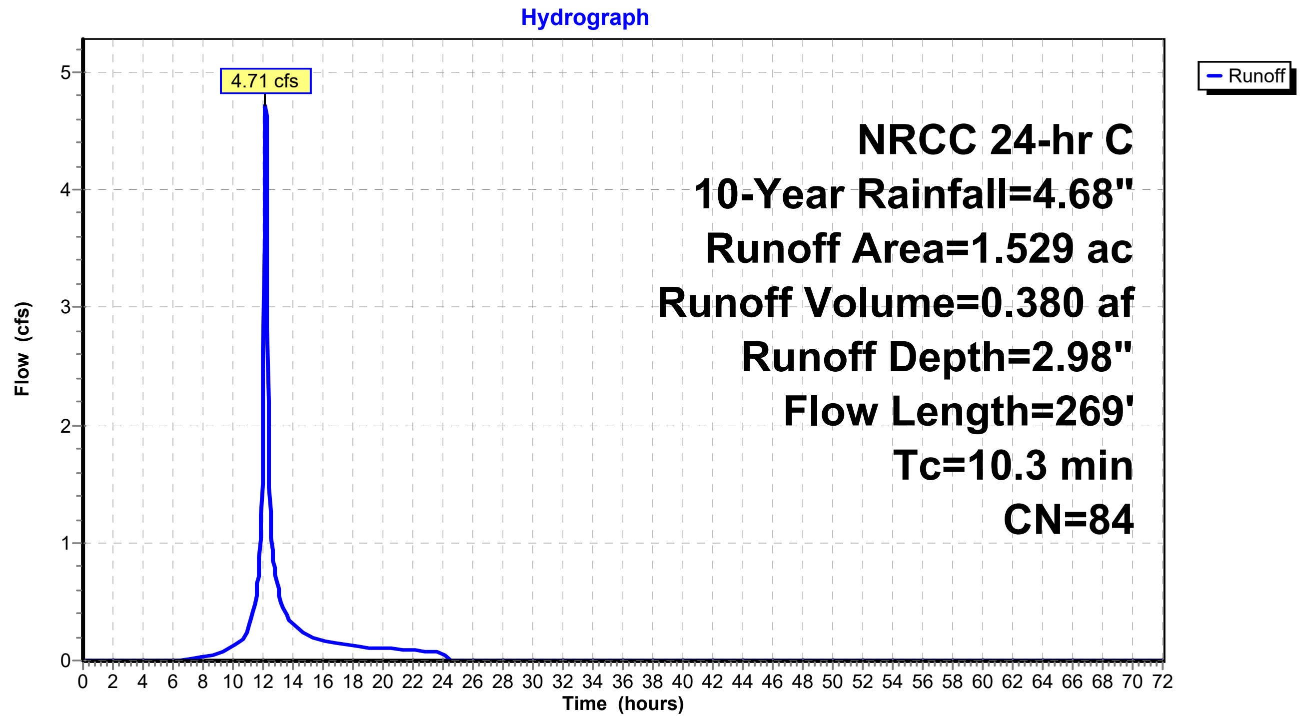
Runoff = 4.71 cfs @ 12.18 hrs, Volume= 0.380 af, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
1.149	80	>75% Grass cover, Good, HSG D
0.215	98	Paved parking, HSG D
0.165	98	Water Surface, HSG D
1.529	84	Weighted Average
1.149		75.15% Pervious Area
0.380		24.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0364	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
2.6	169	0.0237	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	269	Total			

Subcatchment 36S: DA-9



Summary for Subcatchment 37S: DA-11

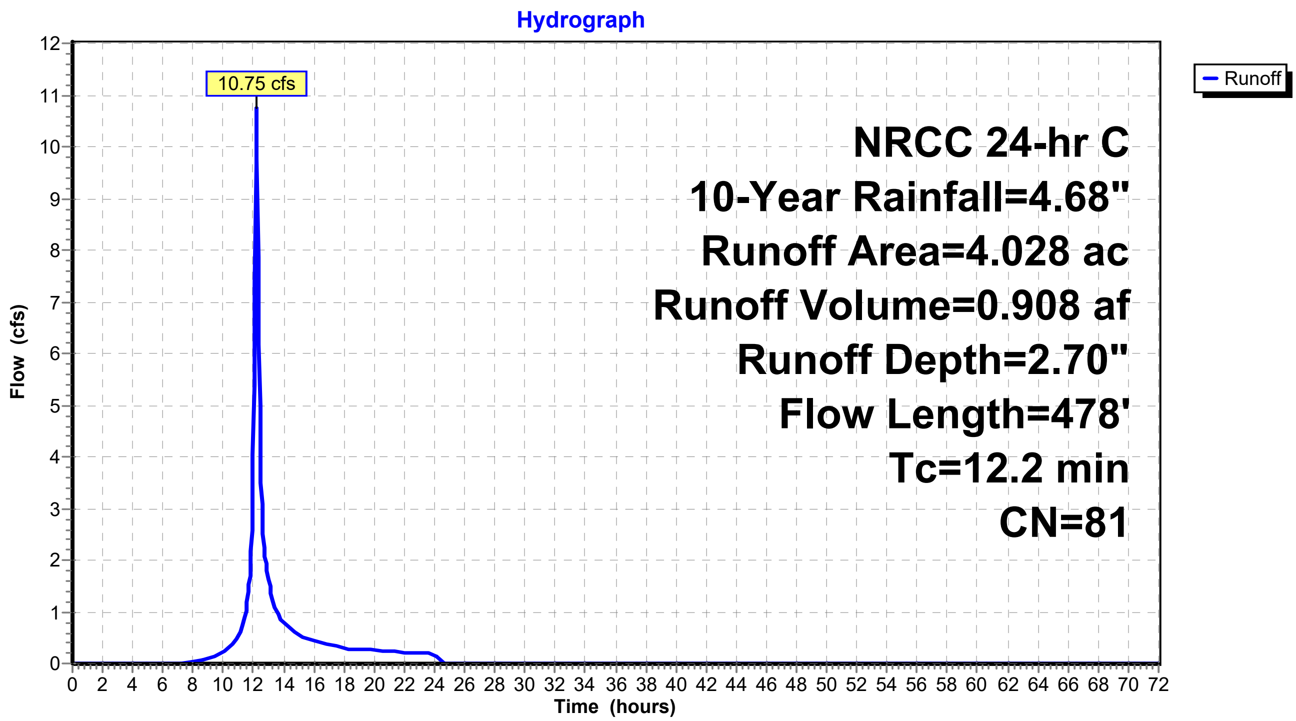
Runoff = 10.75 cfs @ 12.20 hrs, Volume= 0.908 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
3.760	80	>75% Grass cover, Good, HSG D
0.268	98	Paved parking, HSG D
4.028	81	Weighted Average
3.760		93.35% Pervious Area
0.268		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-11



Summary for Subcatchment 40S: DA-10B

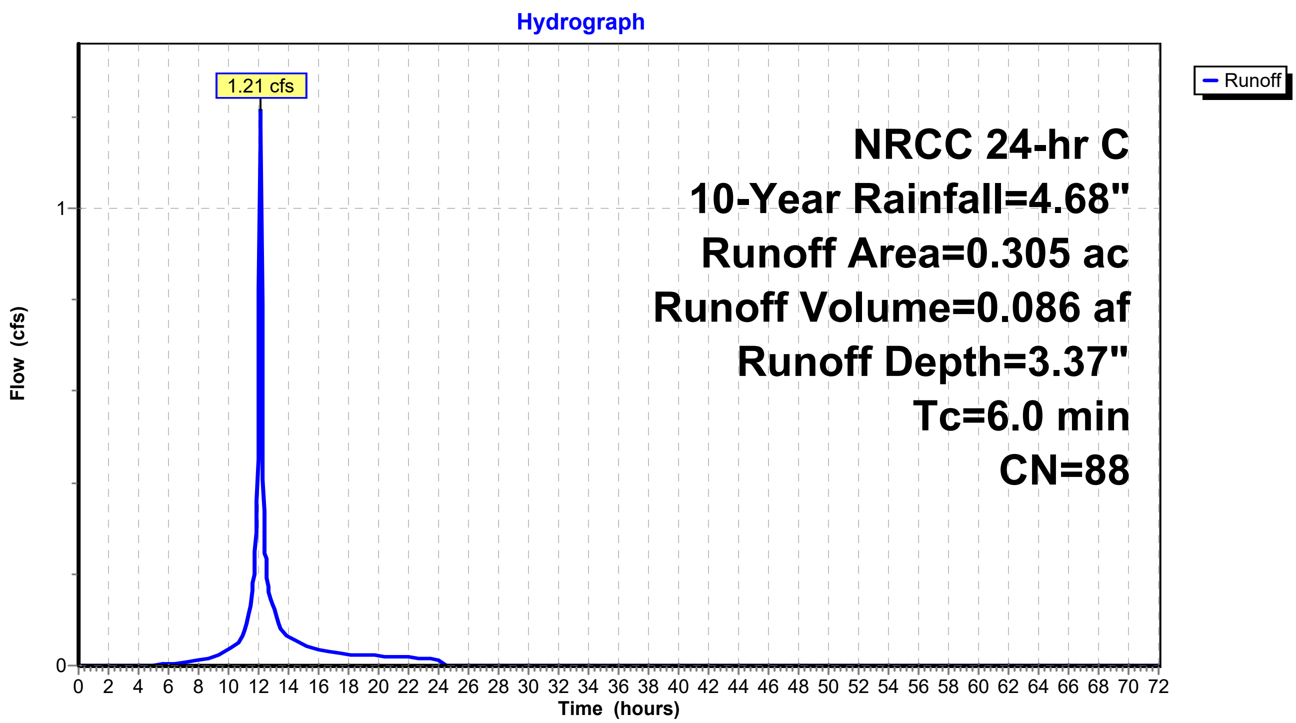
Runoff = 1.21 cfs @ 12.13 hrs, Volume= 0.086 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.167	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.305	88	Weighted Average
0.167		54.75% Pervious Area
0.138		45.25% Impervious Area

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

Subcatchment 40S: DA-10B



Summary for Subcatchment 41S: DA-10A

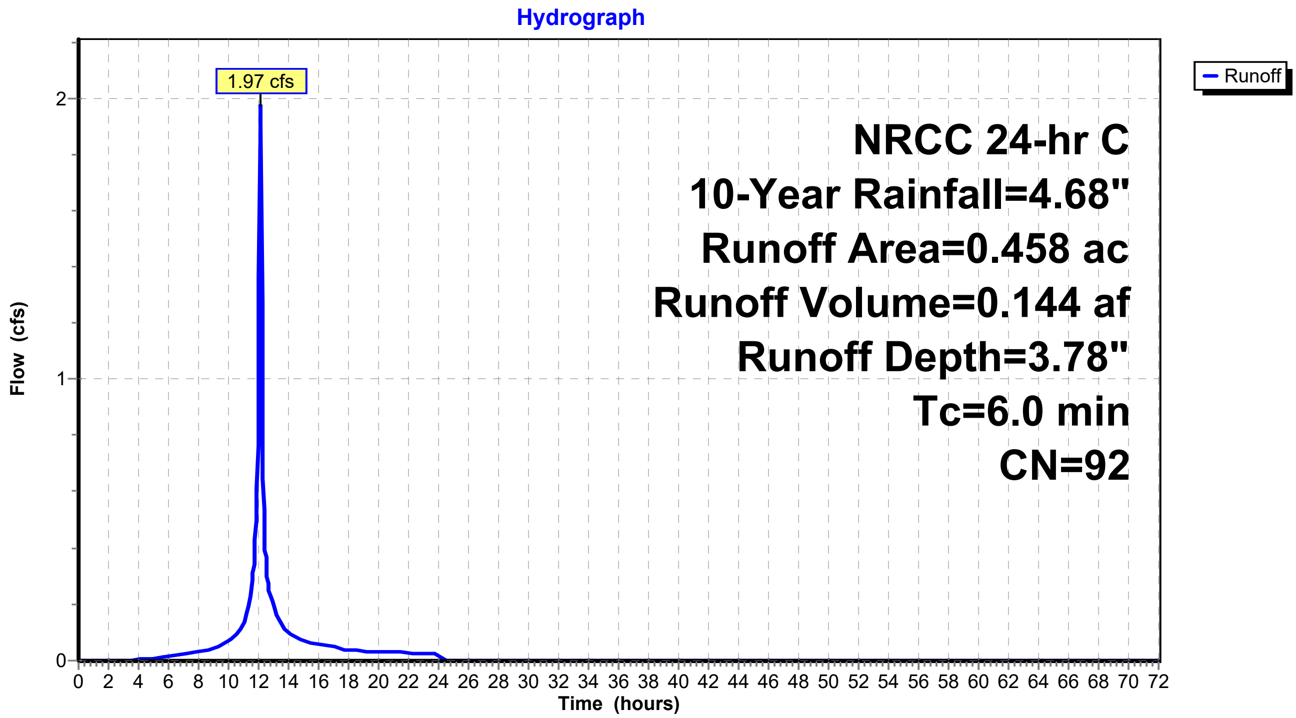
Runoff = 1.97 cfs @ 12.13 hrs, Volume= 0.144 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.159	80	>75% Grass cover, Good, HSG D
0.299	98	Paved parking, HSG D
0.458	92	Weighted Average
0.159		34.72% Pervious Area
0.299		65.28% Impervious Area

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

Subcatchment 41S: DA-10A



Summary for Subcatchment 42S: DA-10C

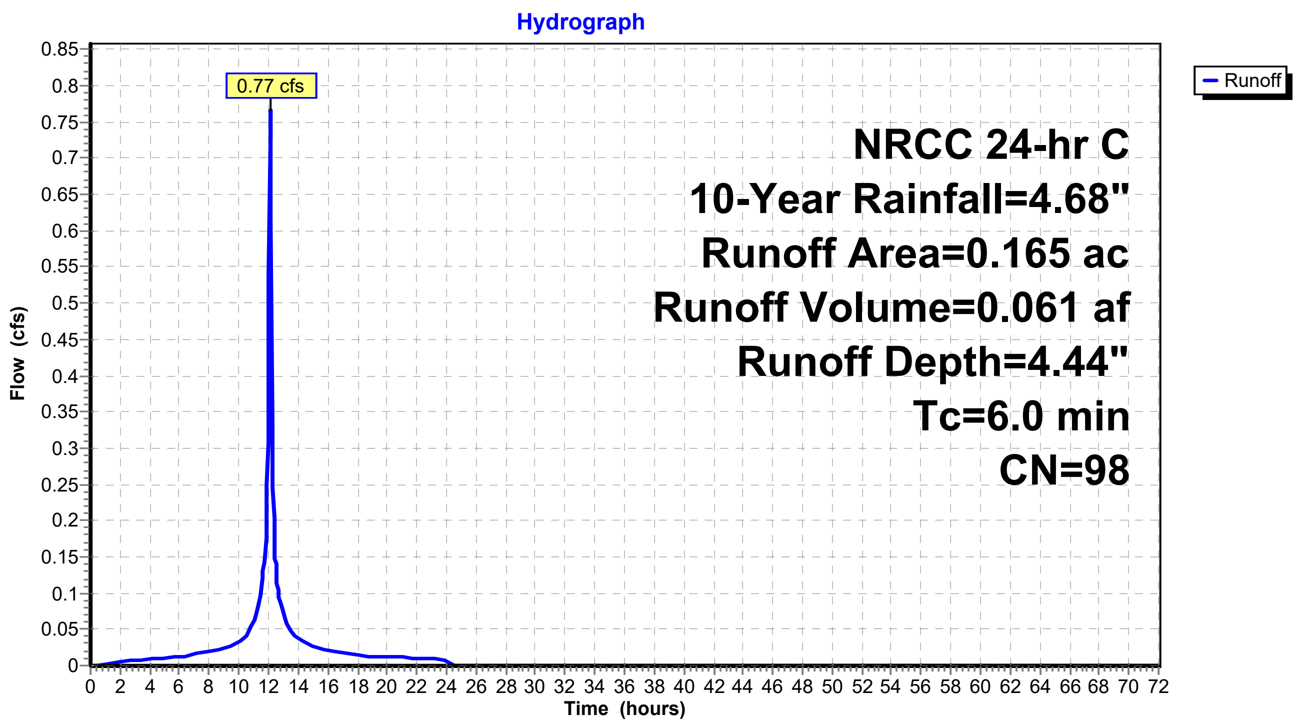
Runoff = 0.77 cfs @ 12.13 hrs, Volume= 0.061 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.004	80	>75% Grass cover, Good, HSG D
0.161	98	Paved parking, HSG D
0.165	98	Weighted Average
0.004		2.42% Pervious Area
0.161		97.58% Impervious Area

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

Subcatchment 42S: DA-10C



Summary for Subcatchment 47S: DA-10D

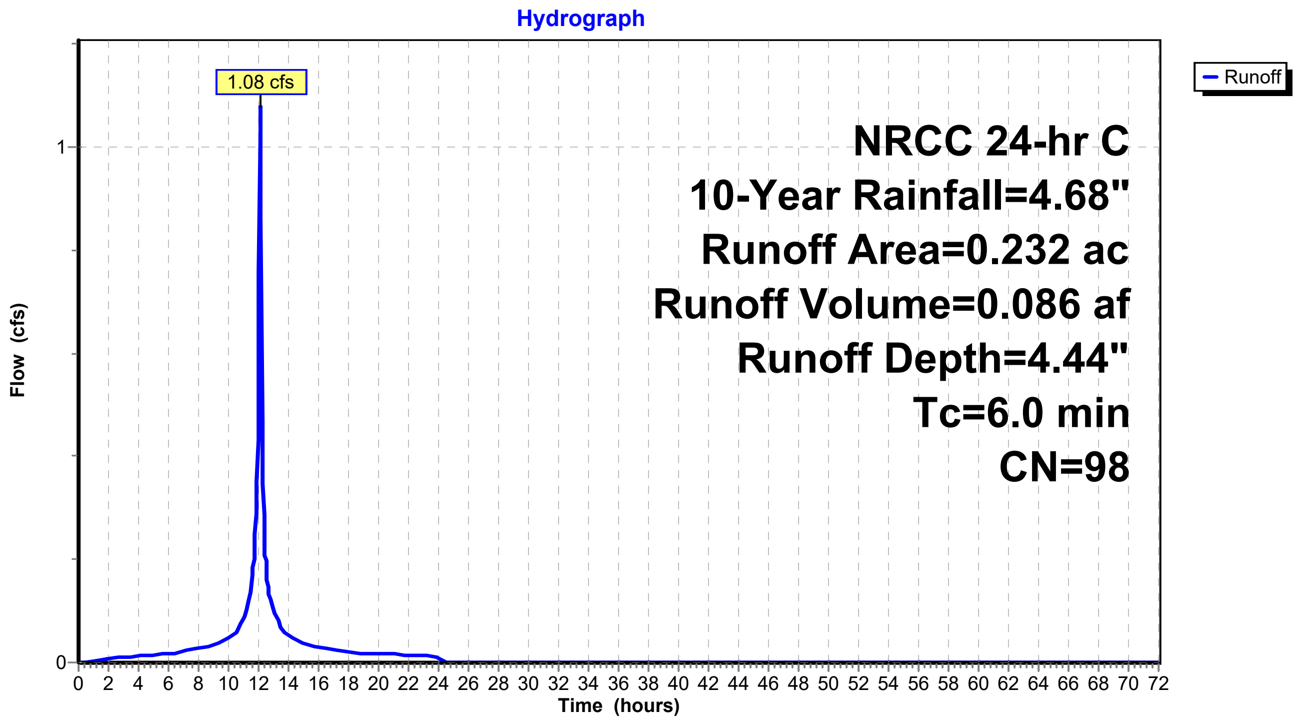
Runoff = 1.08 cfs @ 12.13 hrs, Volume= 0.086 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.232	98	Paved parking, HSG D
0.232		100.00% Impervious Area

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

Subcatchment 47S: DA-10D



Summary for Subcatchment 49S: DA-10E

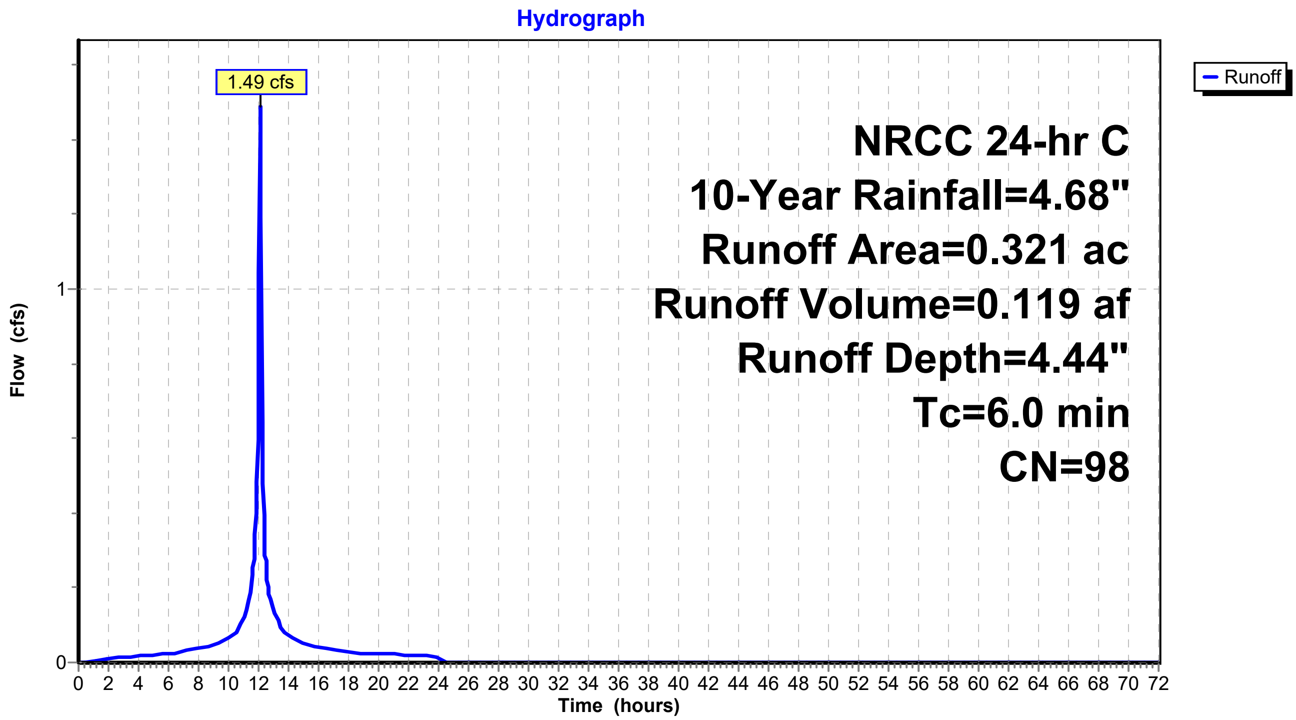
Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.119 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 49S: DA-10E



Summary for Subcatchment 55S: DA-10F

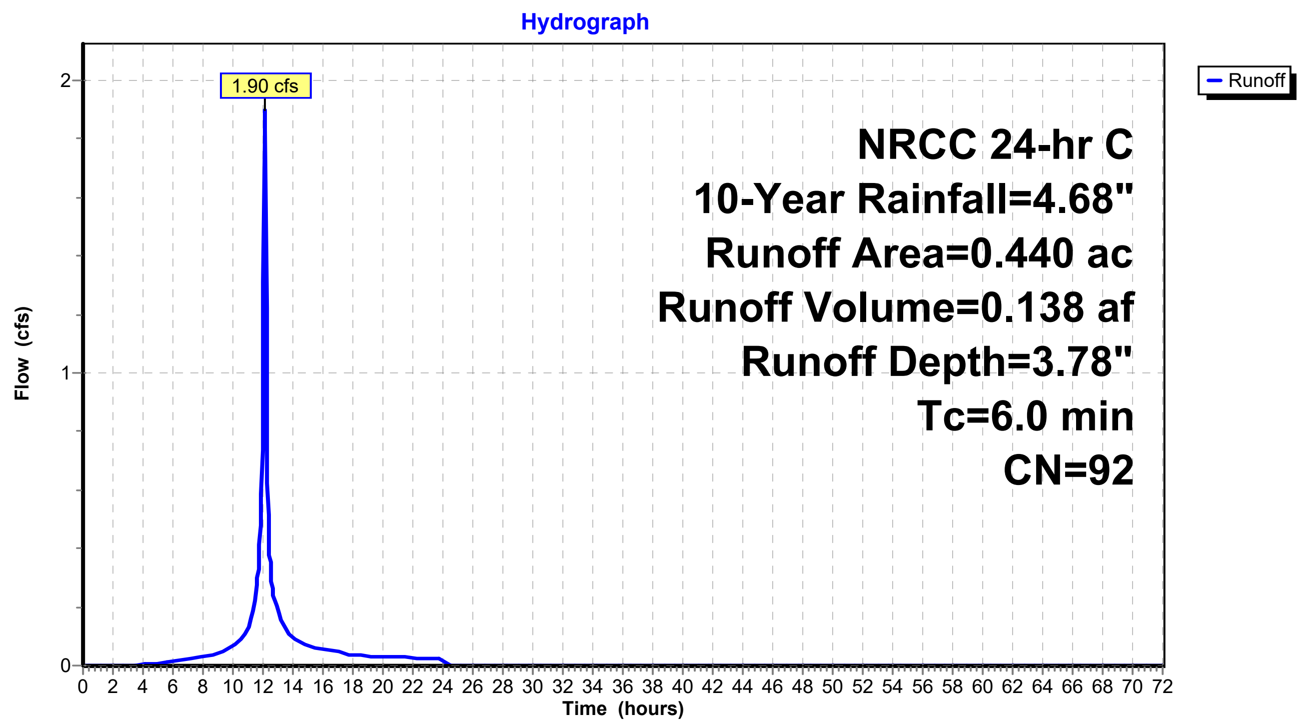
Runoff = 1.90 cfs @ 12.13 hrs, Volume= 0.138 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

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

Subcatchment 55S: DA-10F



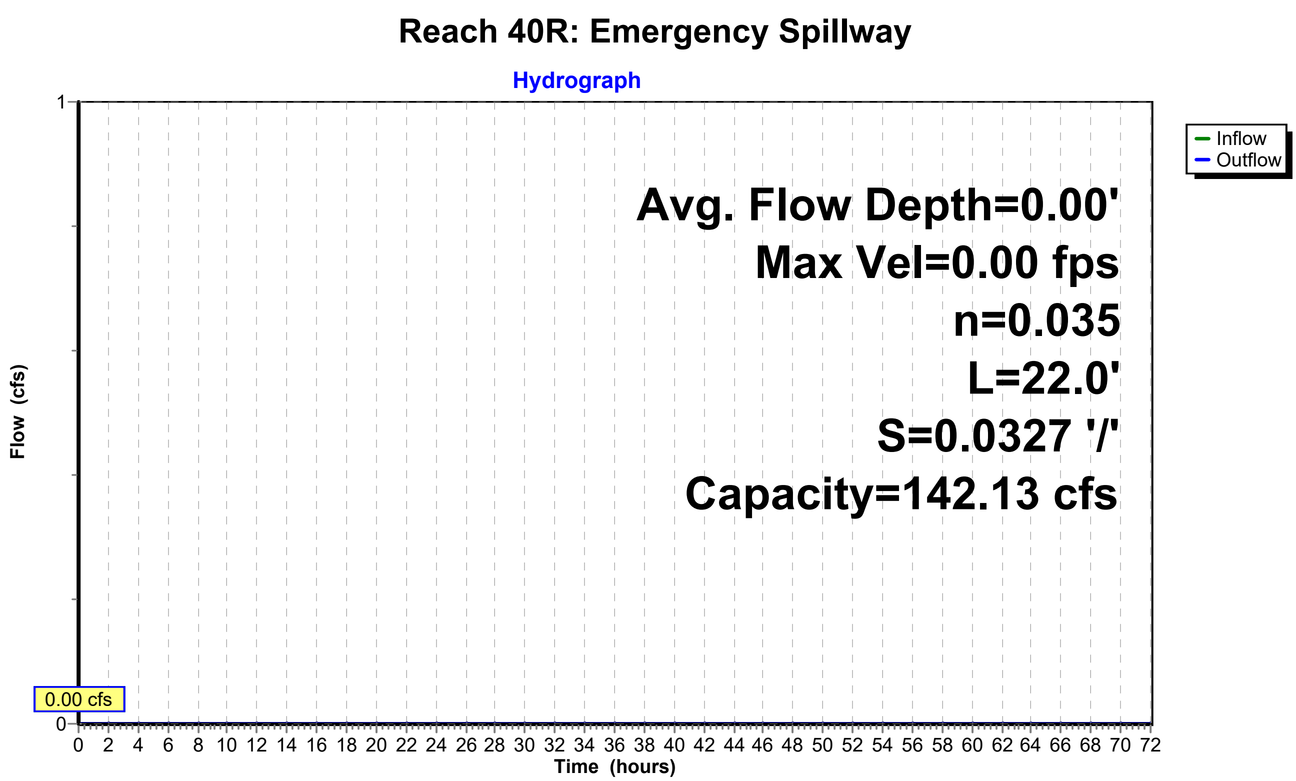
Summary for Reach 40R: Emergency Spillway

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= 0.00-72.00 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= 1.00' Flow Area= 20.0 sf, Capacity= 142.13 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0327 '/'
Inlet Invert= 450.00', Outlet Invert= 449.28'



Summary for Pond 33P: Detention Pond 2

Inflow Area = 4.015 ac, 51.33% Impervious, Inflow Depth = 3.50" for 10-Year event
Inflow = 14.98 cfs @ 12.14 hrs, Volume= 1.171 af
Outflow = 1.28 cfs @ 13.31 hrs, Volume= 1.148 af, Atten= 91%, Lag= 70.3 min
Primary = 1.28 cfs @ 13.31 hrs, Volume= 1.148 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 449.07' @ 13.31 hrs Storage= 56,534 cf (29,881 cf above start)

Plug-Flow detention time= 1,583.0 min calculated for 0.536 af (46% of inflow)
Center-of-Mass det. time= 757.7 min (1,553.5 - 795.8)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

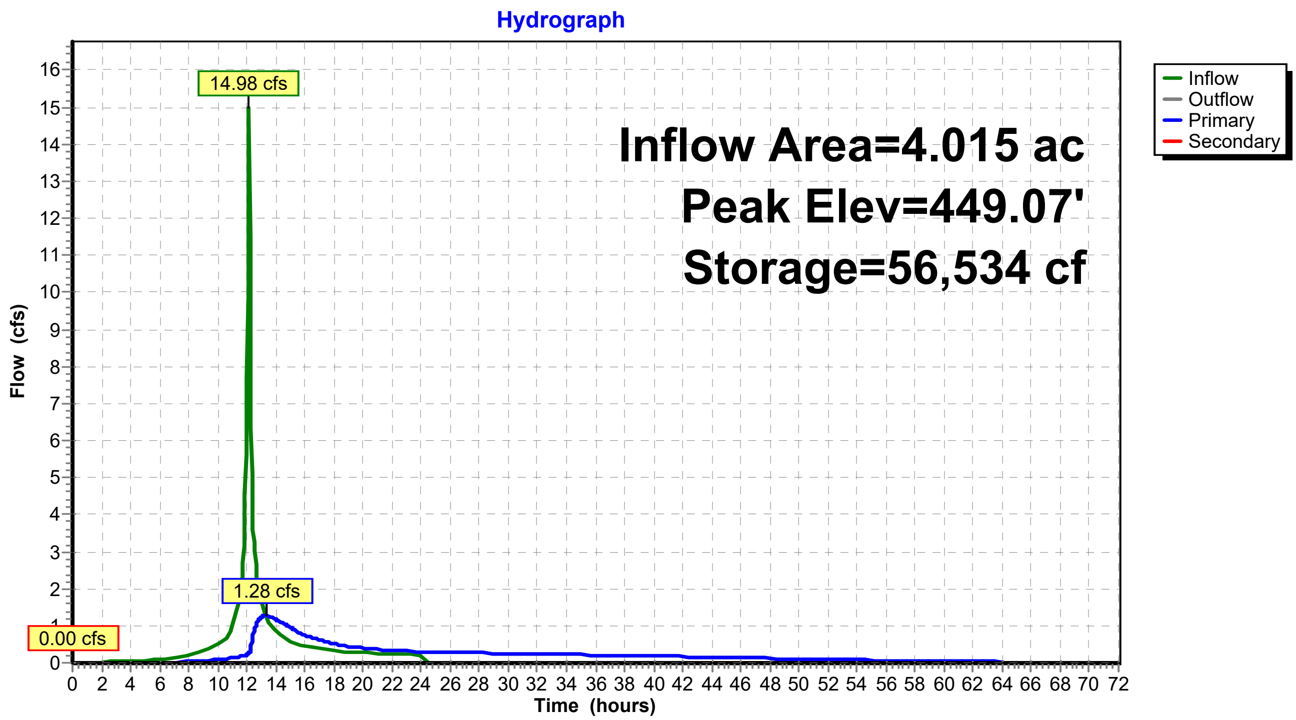
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.00'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=1.28 cfs @ 13.31 hrs HW=449.07' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 1.28 cfs of 7.65 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.33 cfs @ 6.71 fps)
3=Broad-Crested Rectangular Weir (Weir Controls 0.95 cfs @ 2.03 fps)
4=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=447.00' TW=450.00' (Dynamic Tailwater)
5=Channel/Reach (Channel Controls 0.00 cfs)

Pond 33P: Detention Pond 2



Summary for Pond 44P: CB-1

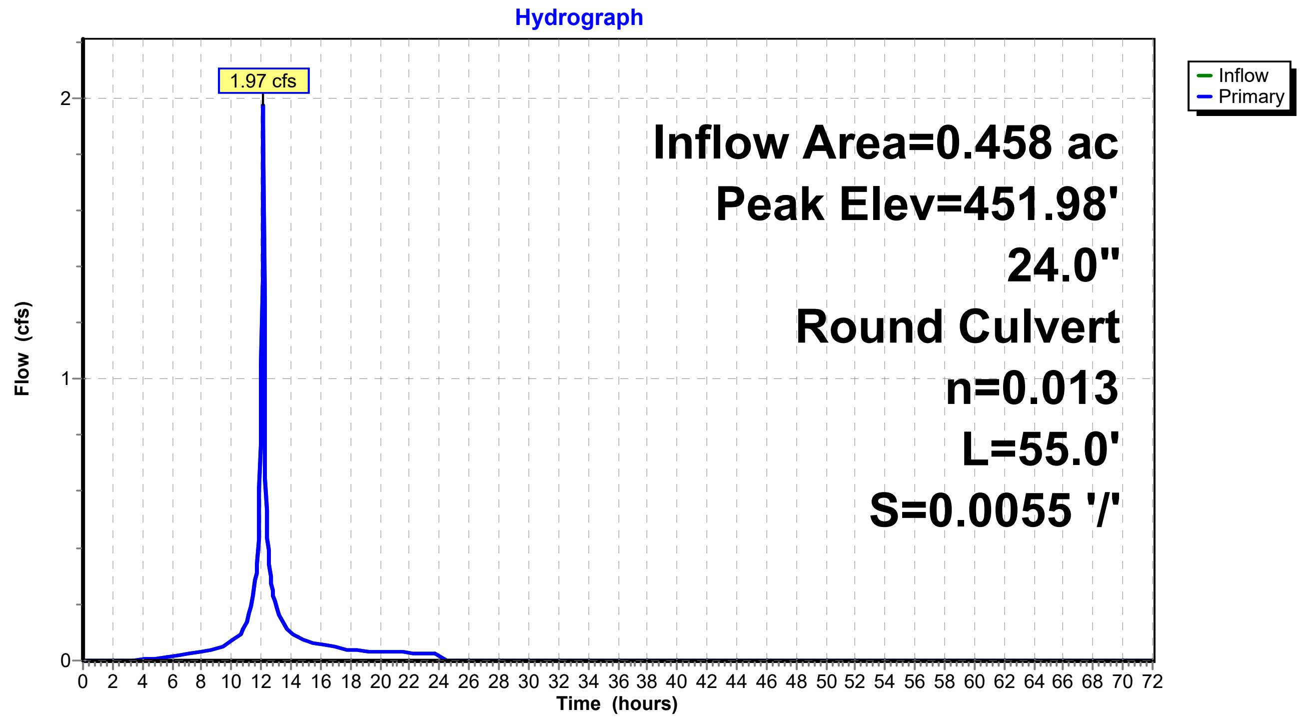
Inflow Area =	0.458 ac,	65.28% Impervious,	Inflow Depth = 3.78"	for 10-Year event	
Inflow =	1.97 cfs @	12.13 hrs,	Volume=	0.144 af	
Outflow =	1.97 cfs @	12.13 hrs,	Volume=	0.144 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.97 cfs @	12.13 hrs,	Volume=	0.144 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.98' @ 12.24 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0055 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.73 cfs @ 12.13 hrs HW=451.86' TW=451.84' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.73 cfs @ 0.83 fps)

Pond 44P: CB-1



Summary for Pond 45P: CB-2

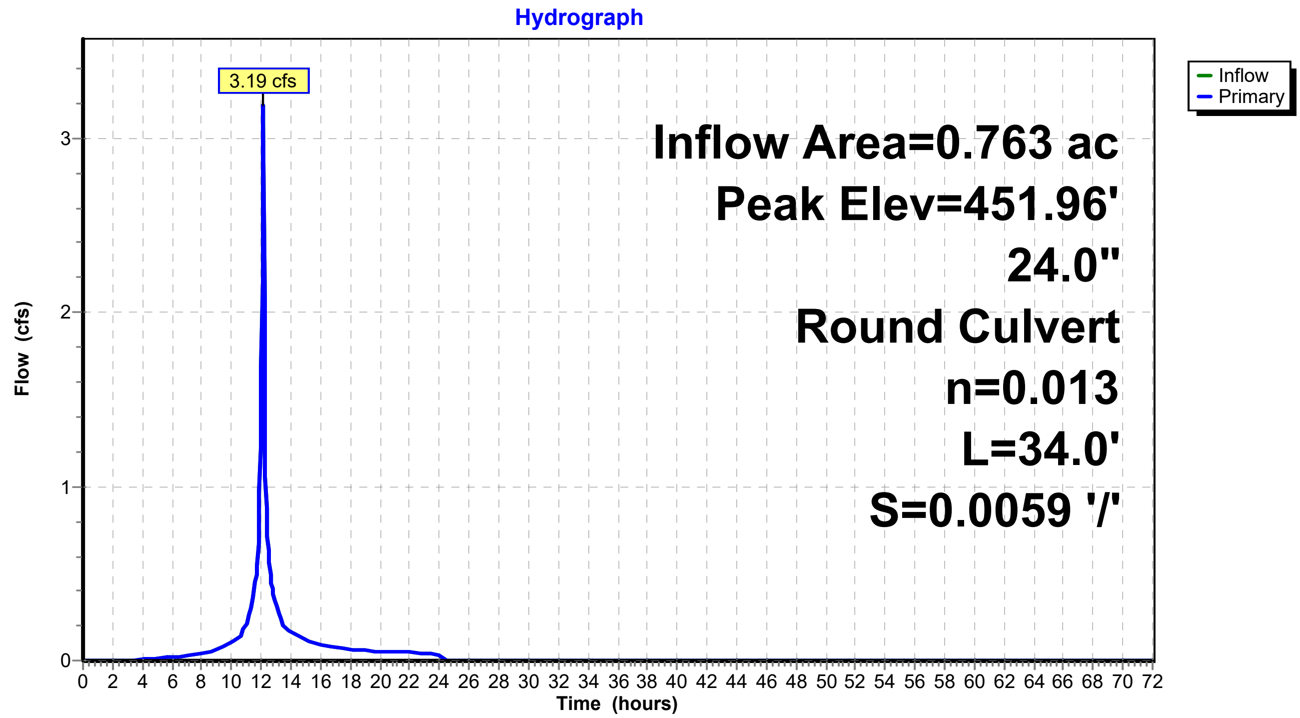
Inflow Area = 0.763 ac, 57.27% Impervious, Inflow Depth = 3.61" for 10-Year event
Inflow = 3.19 cfs @ 12.13 hrs, Volume= 0.230 af
Outflow = 3.19 cfs @ 12.13 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min
Primary = 3.19 cfs @ 12.13 hrs, Volume= 0.230 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.96' @ 12.20 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 34.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.50' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.61 cfs @ 12.13 hrs HW=451.84' TW=451.83' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.61 cfs @ 0.48 fps)

Pond 45P: CB-2



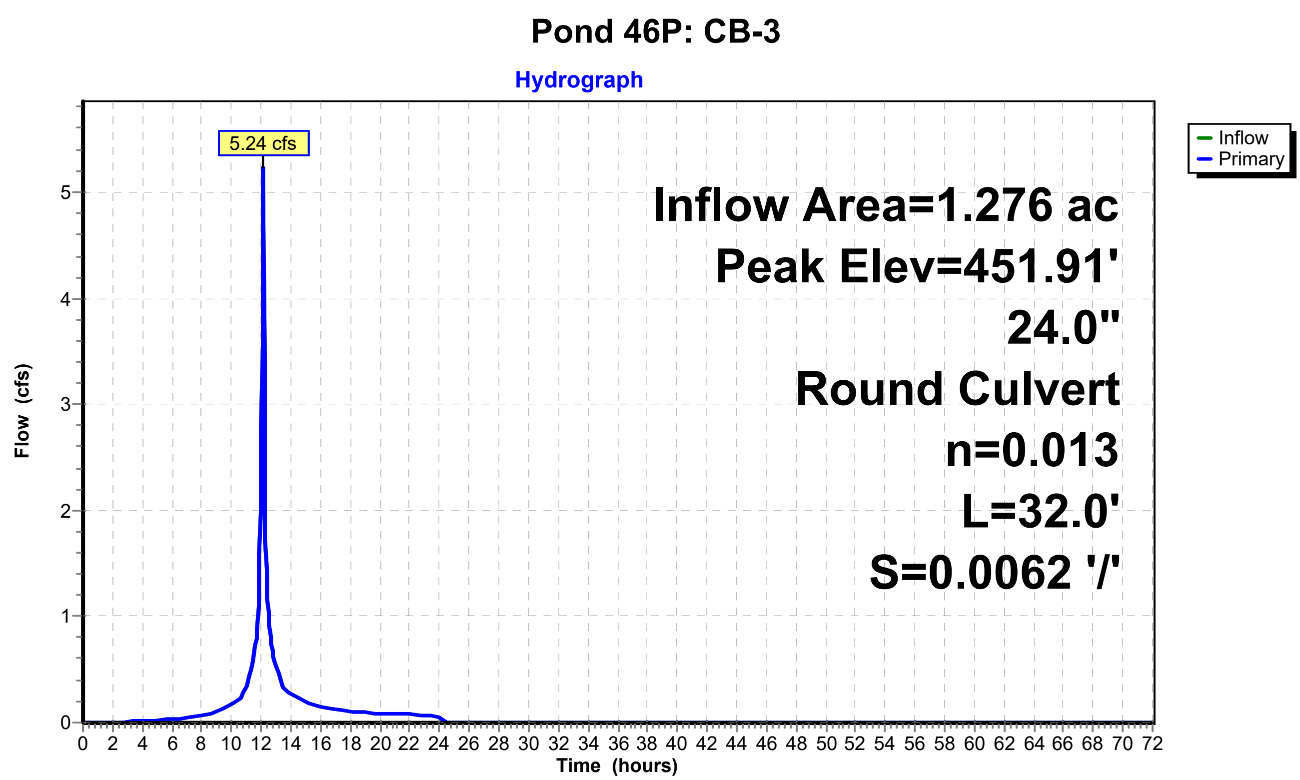
Summary for Pond 46P: CB-3

Inflow Area = 1.276 ac, 54.70% Impervious, Inflow Depth = 3.57" for 10-Year event
Inflow = 5.24 cfs @ 12.13 hrs, Volume= 0.380 af
Outflow = 5.24 cfs @ 12.13 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.0 min
Primary = 5.24 cfs @ 12.13 hrs, Volume= 0.380 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.91' @ 12.17 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.50'	**24.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.50' / 450.30' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.32 cfs @ 12.13 hrs HW=451.83' TW=451.70' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.32 cfs @ 2.12 fps)



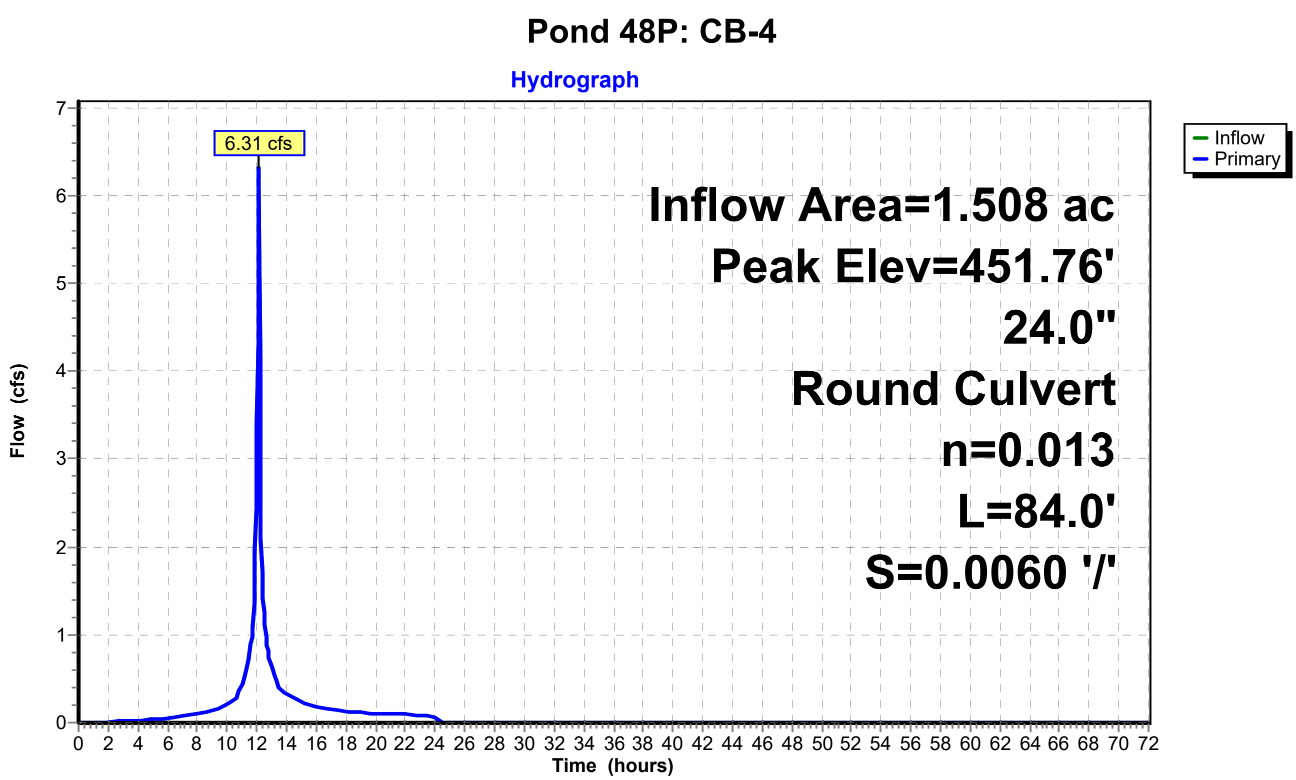
Summary for Pond 48P: CB-4

Inflow Area = 1.508 ac, 61.67% Impervious, Inflow Depth = 3.71" for 10-Year event
Inflow = 6.31 cfs @ 12.13 hrs, Volume= 0.466 af
Outflow = 6.31 cfs @ 12.13 hrs, Volume= 0.466 af, Atten= 0%, Lag= 0.0 min
Primary = 6.31 cfs @ 12.13 hrs, Volume= 0.466 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.76' @ 12.16 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.73 cfs @ 12.13 hrs HW=451.70' TW=451.38' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.73 cfs @ 2.84 fps)



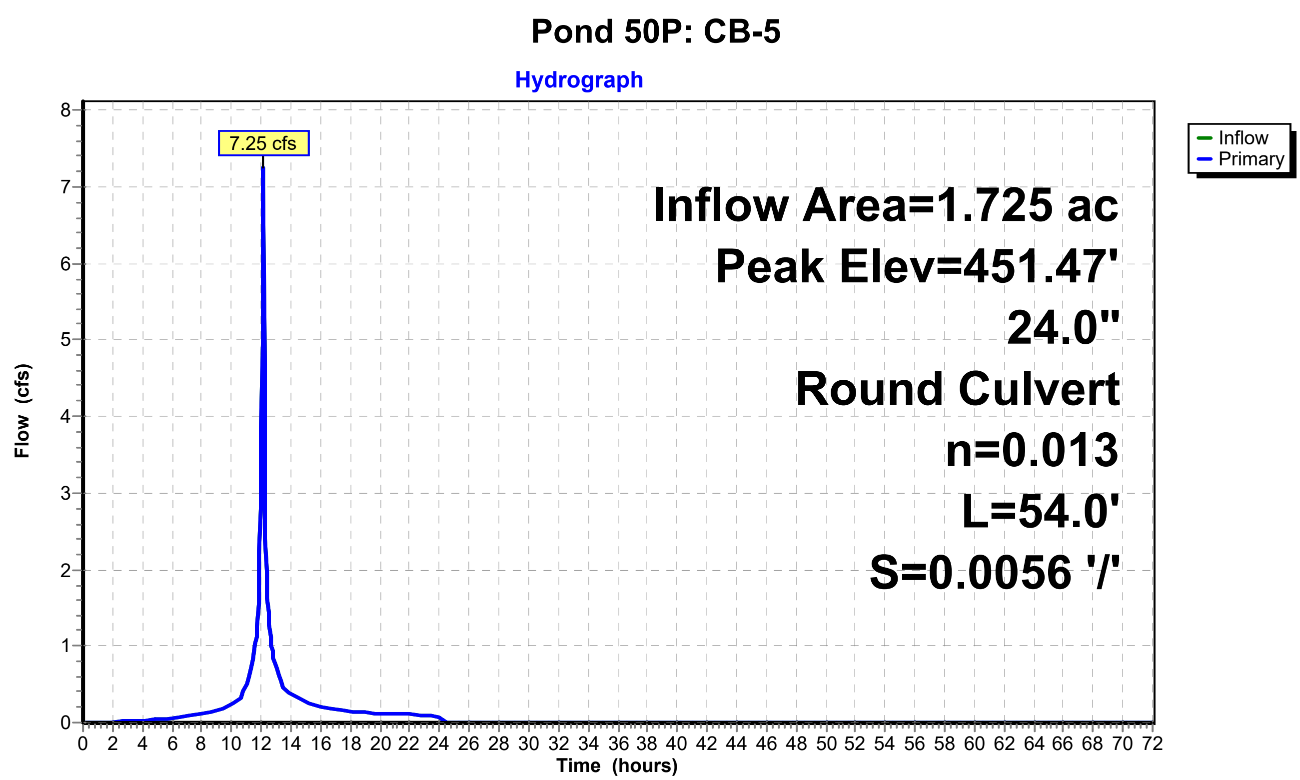
Summary for Pond 50P: CB-5

Inflow Area = 1.725 ac, 62.20% Impervious, Inflow Depth = 3.72" for 10-Year event
Inflow = 7.25 cfs @ 12.13 hrs, Volume= 0.534 af
Outflow = 7.25 cfs @ 12.13 hrs, Volume= 0.534 af, Atten= 0%, Lag= 0.0 min
Primary = 7.25 cfs @ 12.13 hrs, Volume= 0.534 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.47' @ 12.17 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.94 cfs @ 12.13 hrs HW=451.38' TW=451.17' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 4.94 cfs @ 2.54 fps)



Summary for Pond 52P: CB-6

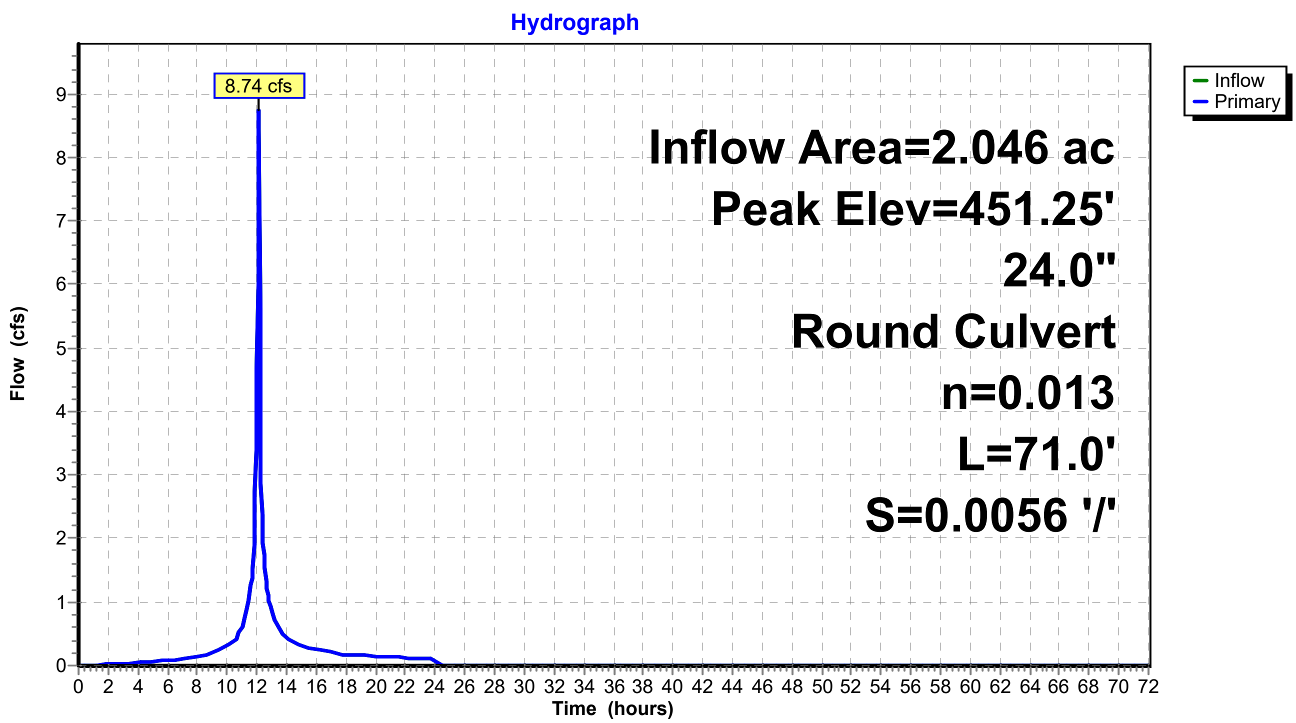
Inflow Area = 2.046 ac, 68.13% Impervious, Inflow Depth = 3.83" for 10-Year event
Inflow = 8.74 cfs @ 12.13 hrs, Volume= 0.653 af
Outflow = 8.74 cfs @ 12.13 hrs, Volume= 0.653 af, Atten= 0%, Lag= 0.0 min
Primary = 8.74 cfs @ 12.13 hrs, Volume= 0.653 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.25' @ 12.15 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.30 cfs @ 12.13 hrs HW=451.17' TW=450.74' (Dynamic Tailwater)
1=Culvert (Outlet Controls 7.30 cfs @ 3.52 fps)

Pond 52P: CB-6



Summary for Pond 54P: CB-7

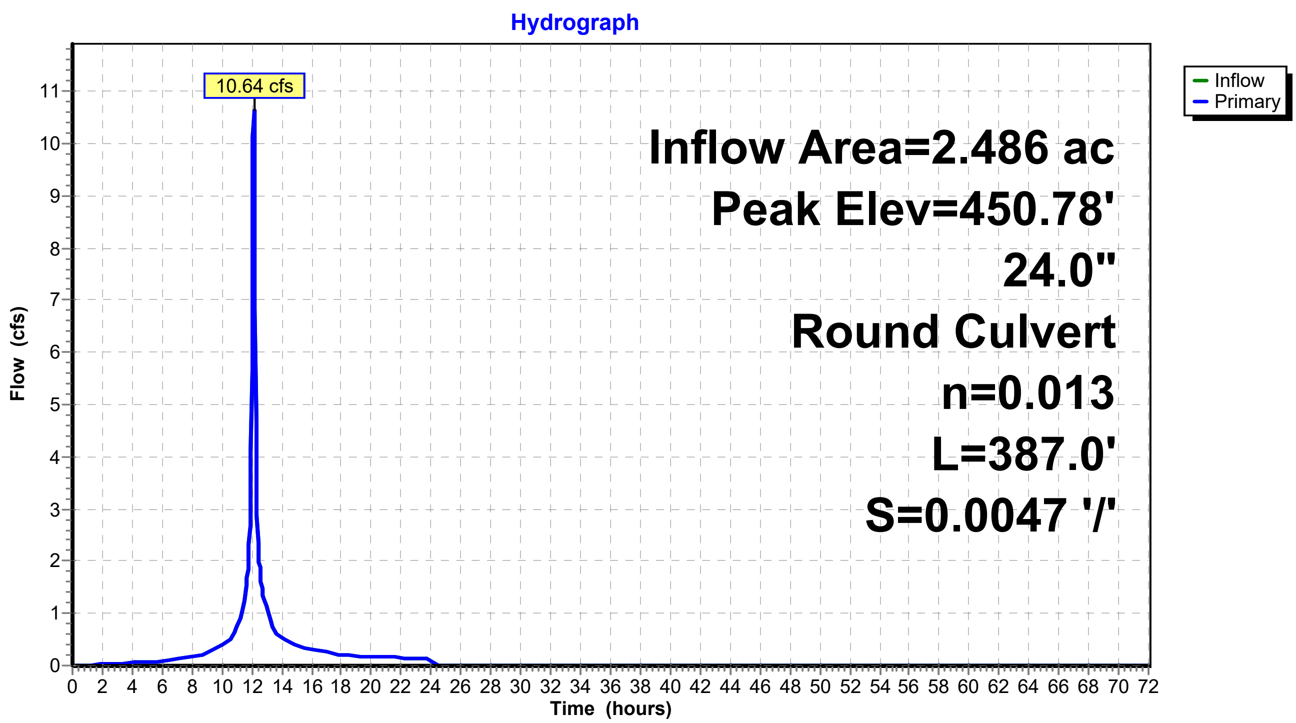
Inflow Area =	2.486 ac,	67.62% Impervious,	Inflow Depth = 3.82"	for 10-Year event
Inflow =	10.64 cfs @	12.13 hrs,	Volume=	0.792 af
Outflow =	10.64 cfs @	12.13 hrs,	Volume=	0.792 af, Atten= 0%, Lag= 0.0 min
Primary =	10.64 cfs @	12.13 hrs,	Volume=	0.792 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.78' @ 12.13 hrs
Flood Elev= 455.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.30' S= 0.0047 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.19 cfs @ 12.13 hrs HW=450.74' TW=448.33' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 10.19 cfs @ 5.03 fps)

Pond 54P: CB-7

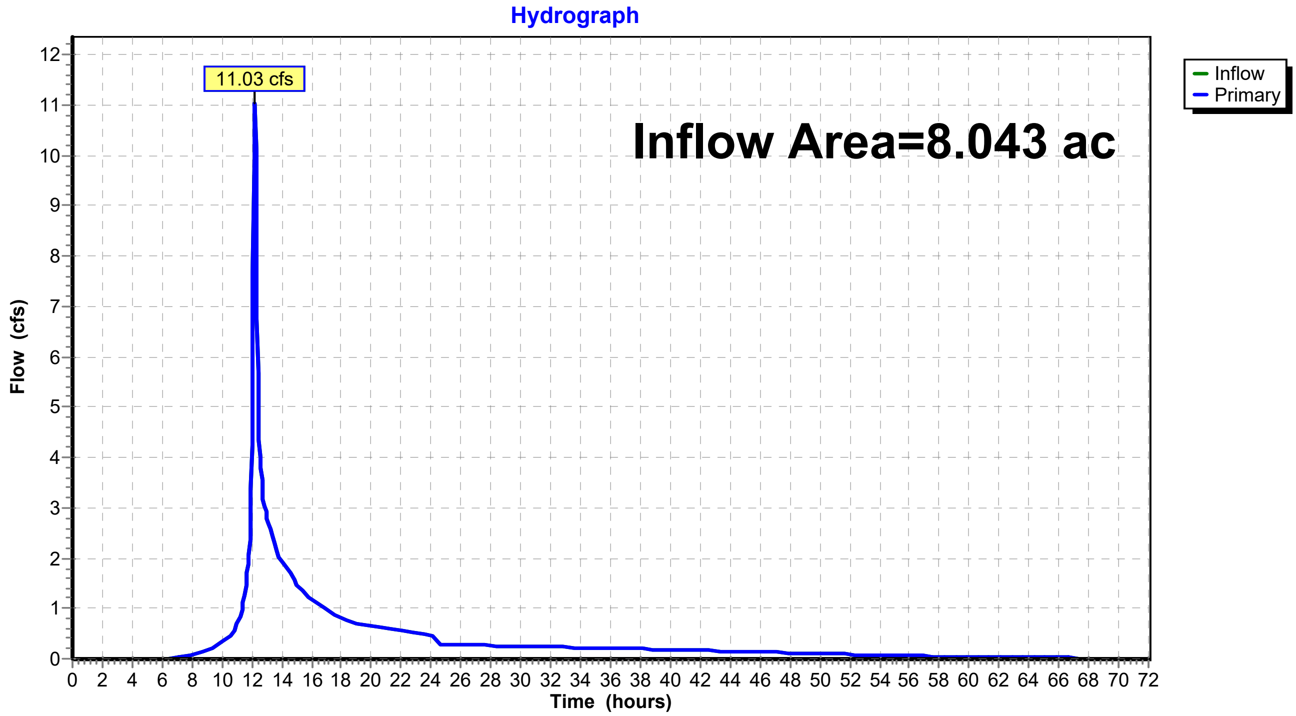


Summary for Link 39L: East Discharge

Inflow Area = 8.043 ac, 28.96% Impervious, Inflow Depth > 3.07" for 10-Year event
Inflow = 11.03 cfs @ 12.20 hrs, Volume= 2.056 af
Primary = 11.03 cfs @ 12.20 hrs, Volume= 2.056 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge



Summary for Subcatchment 31S: DA-7

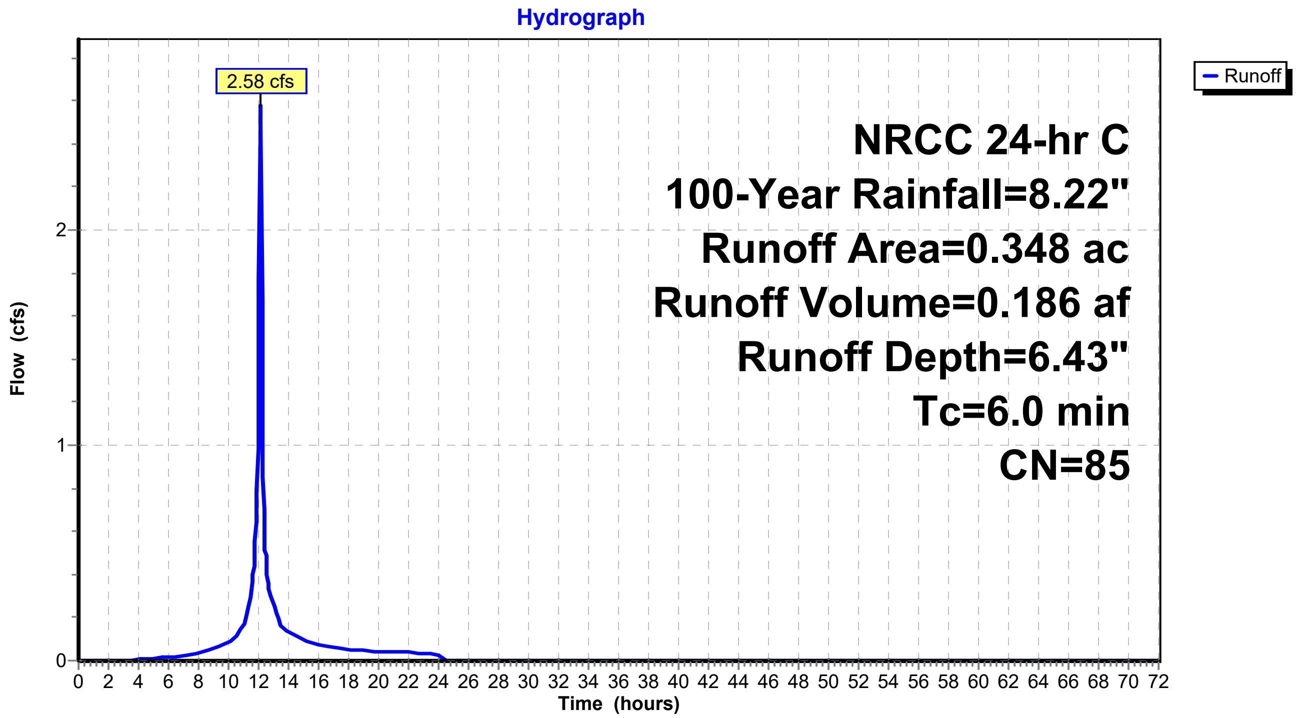
Runoff = 2.58 cfs @ 12.13 hrs, Volume= 0.186 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.248	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.348	85	Weighted Average
0.248		71.26% Pervious Area
0.100		28.74% Impervious Area

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

Subcatchment 31S: DA-7



Summary for Subcatchment 34S: DA-8

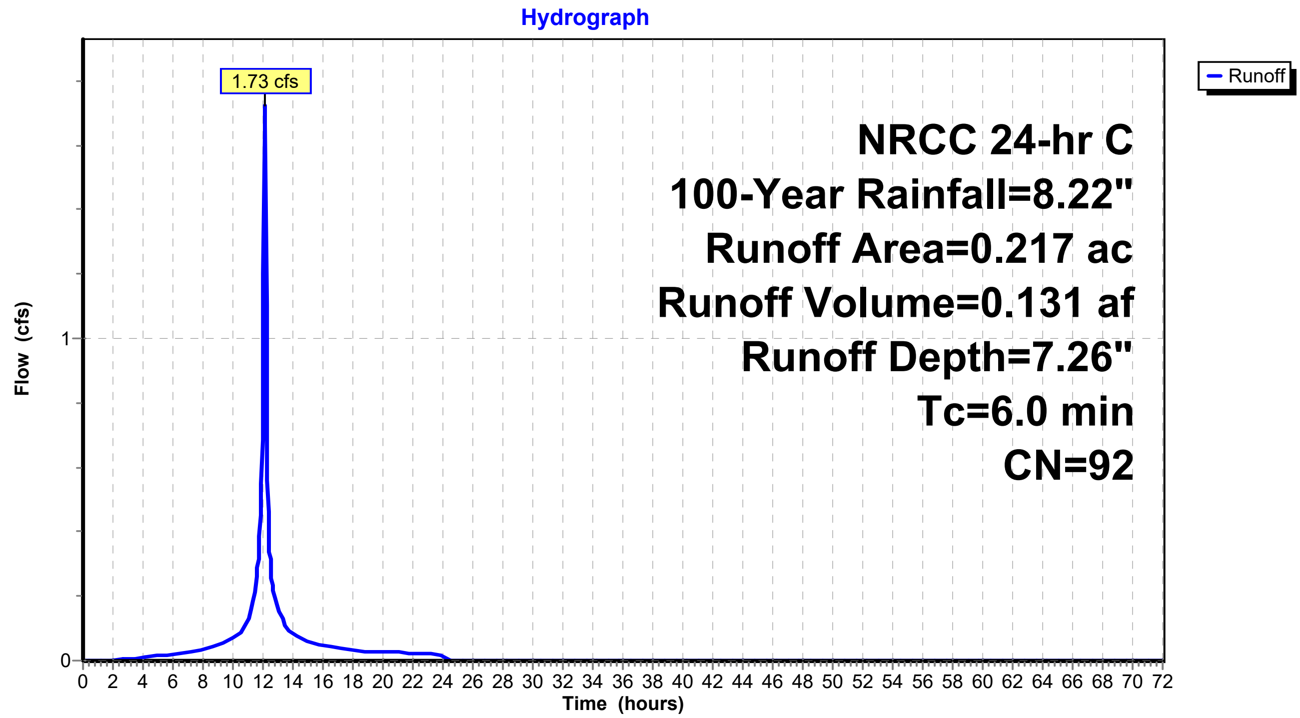
Runoff = 1.73 cfs @ 12.13 hrs, Volume= 0.131 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.074	80	>75% Grass cover, Good, HSG D
0.143	98	Paved parking, HSG D
0.217	92	Weighted Average
0.074		34.10% Pervious Area
0.143		65.90% Impervious Area

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

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-9

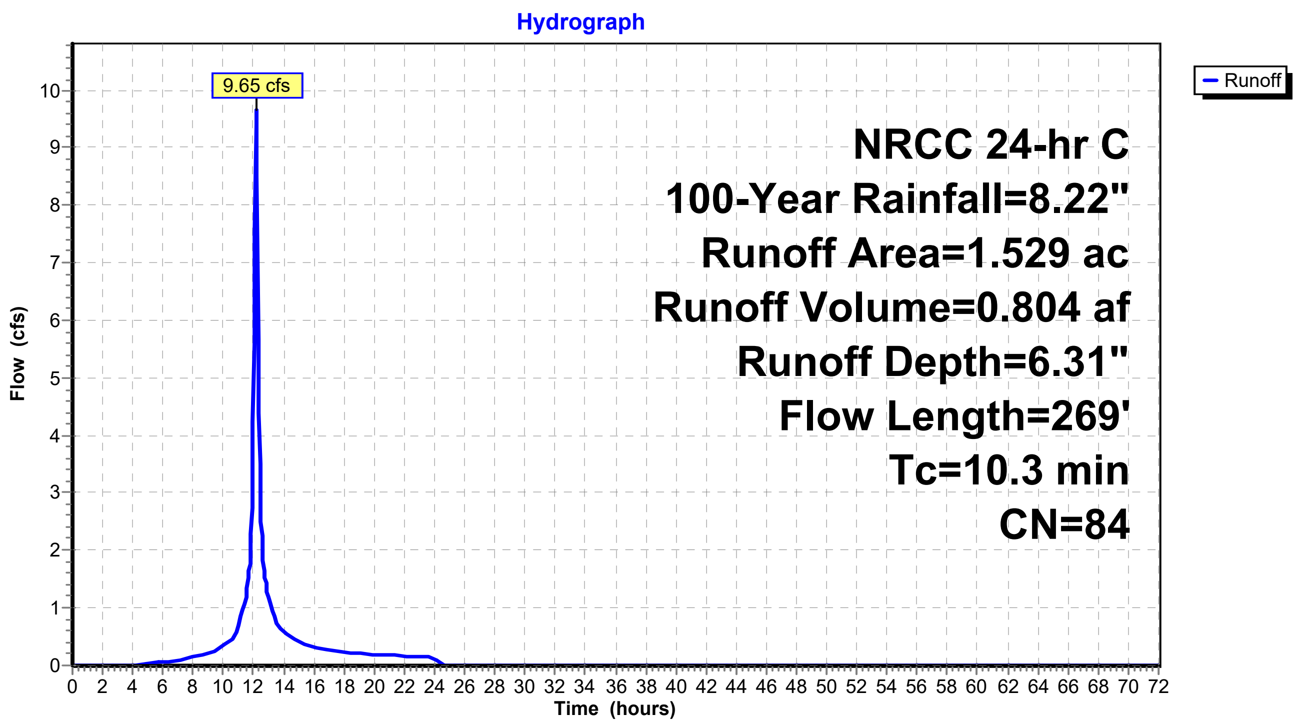
Runoff = 9.65 cfs @ 12.17 hrs, Volume= 0.804 af, Depth= 6.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
1.149	80	>75% Grass cover, Good, HSG D
0.215	98	Paved parking, HSG D
0.165	98	Water Surface, HSG D
1.529	84	Weighted Average
1.149		75.15% Pervious Area
0.380		24.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.0364	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
2.6	169	0.0237	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.3	269	Total			

Subcatchment 36S: DA-9



Summary for Subcatchment 37S: DA-11

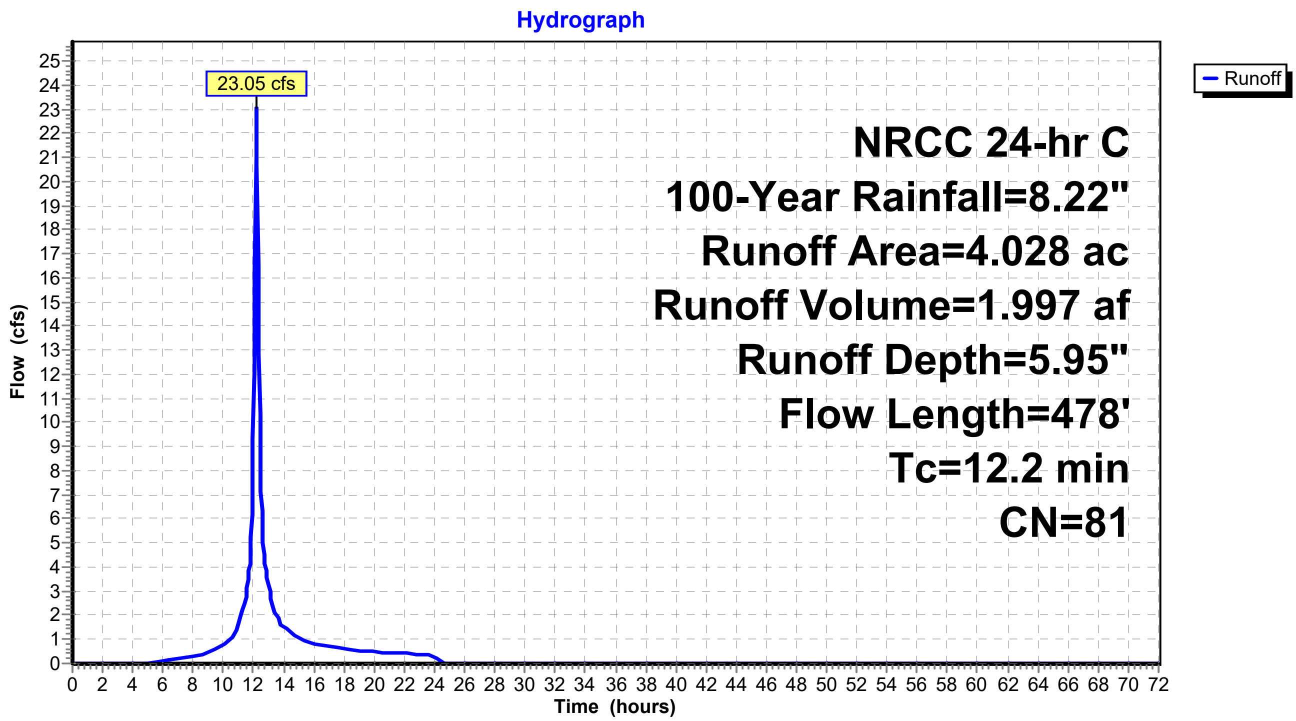
Runoff = 23.05 cfs @ 12.20 hrs, Volume= 1.997 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
3.760	80	>75% Grass cover, Good, HSG D
0.268	98	Paved parking, HSG D
4.028	81	Weighted Average
3.760		93.35% Pervious Area
0.268		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-11



Summary for Subcatchment 40S: DA-10B

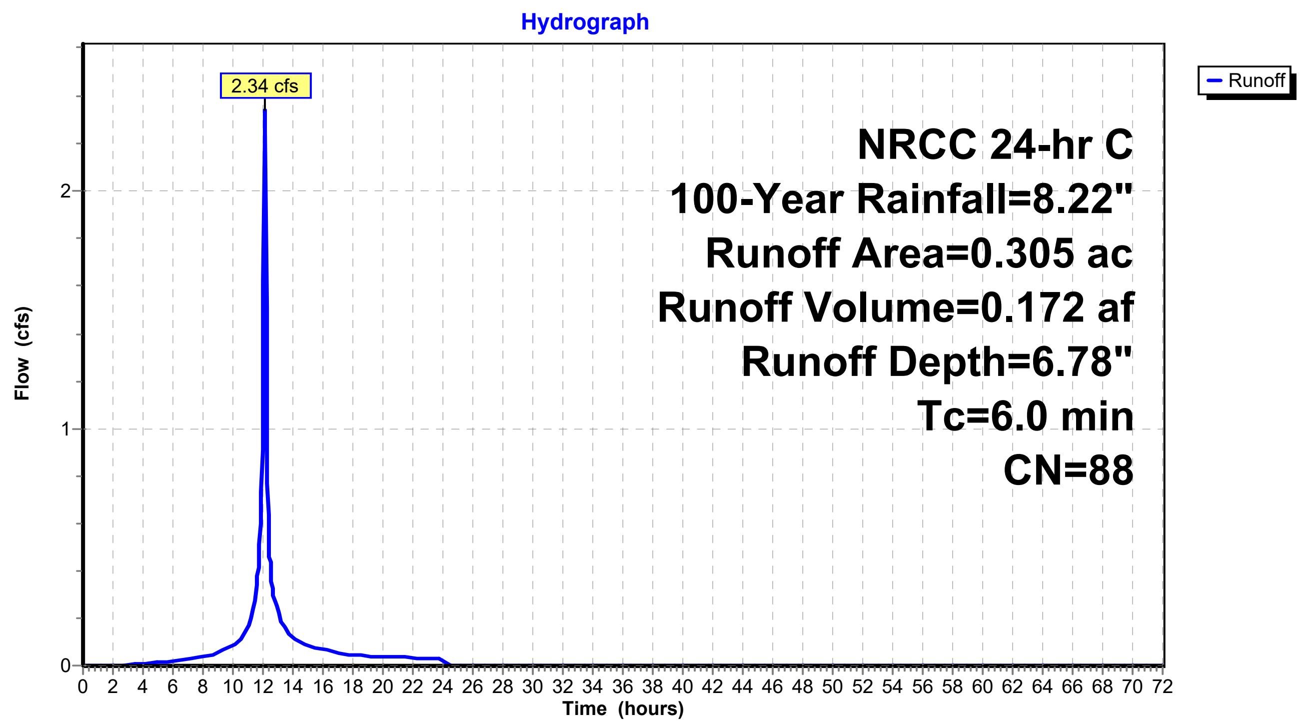
Runoff = 2.34 cfs @ 12.13 hrs, Volume= 0.172 af, Depth= 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.167	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.305	88	Weighted Average
0.167		54.75% Pervious Area
0.138		45.25% Impervious Area

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

Subcatchment 40S: DA-10B



Summary for Subcatchment 41S: DA-10A

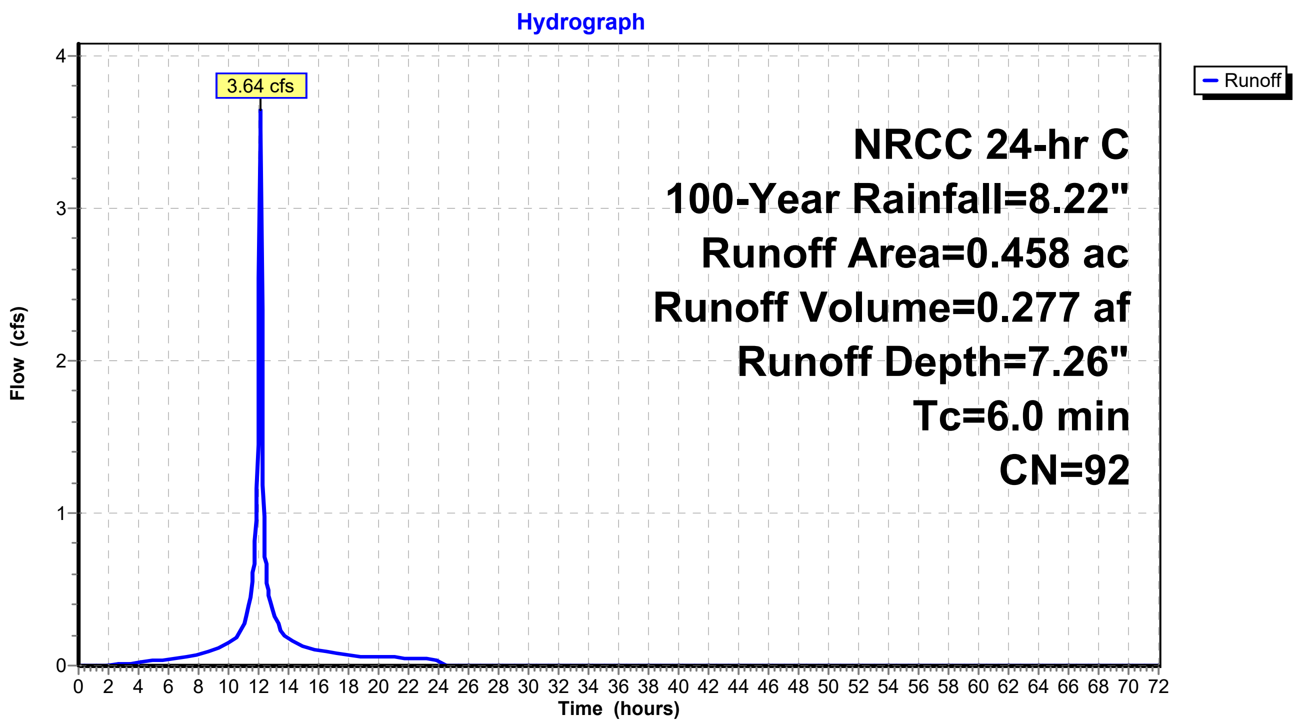
Runoff = 3.64 cfs @ 12.13 hrs, Volume= 0.277 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.159	80	>75% Grass cover, Good, HSG D
0.299	98	Paved parking, HSG D
0.458	92	Weighted Average
0.159		34.72% Pervious Area
0.299		65.28% Impervious Area

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

Subcatchment 41S: DA-10A



Summary for Subcatchment 42S: DA-10C

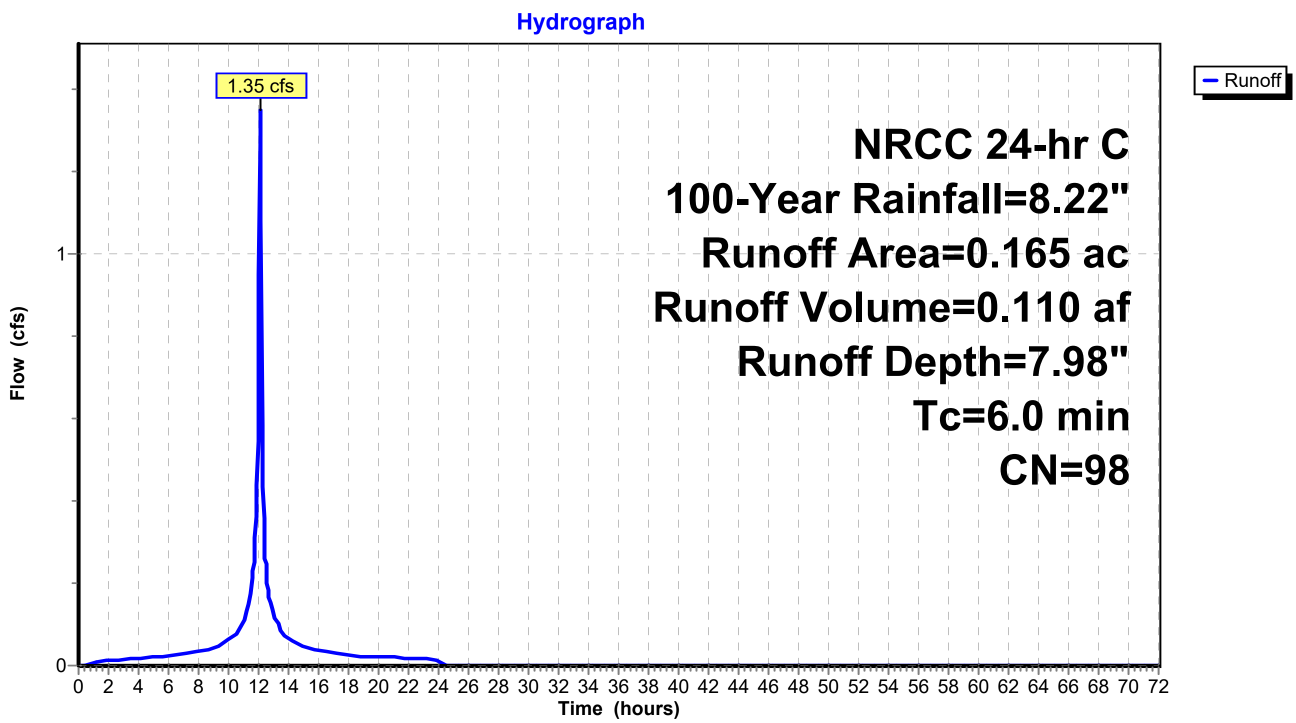
Runoff = 1.35 cfs @ 12.13 hrs, Volume= 0.110 af, Depth= 7.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.004	80	>75% Grass cover, Good, HSG D
0.161	98	Paved parking, HSG D
0.165	98	Weighted Average
0.004		2.42% Pervious Area
0.161		97.58% Impervious Area

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

Subcatchment 42S: DA-10C



Summary for Subcatchment 47S: DA-10D

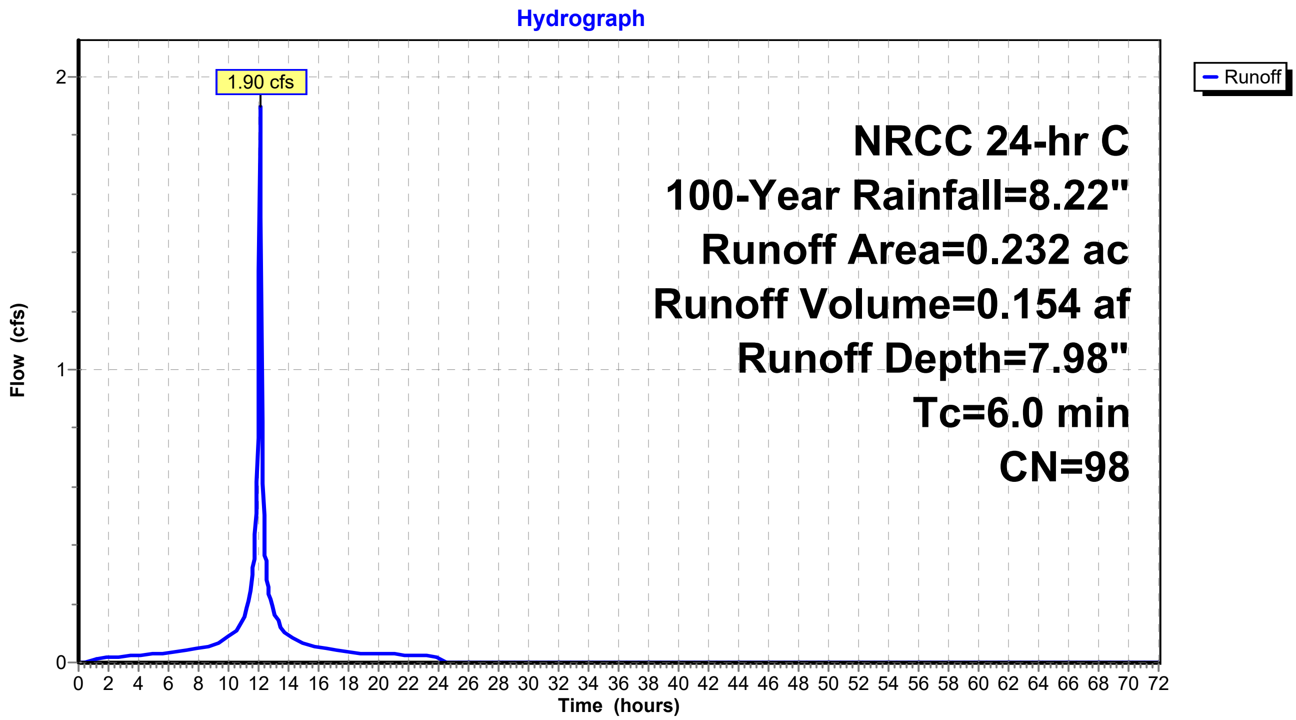
Runoff = 1.90 cfs @ 12.13 hrs, Volume= 0.154 af, Depth= 7.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.232	98	Paved parking, HSG D
0.232		100.00% Impervious Area

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

Subcatchment 47S: DA-10D



Summary for Subcatchment 49S: DA-10E

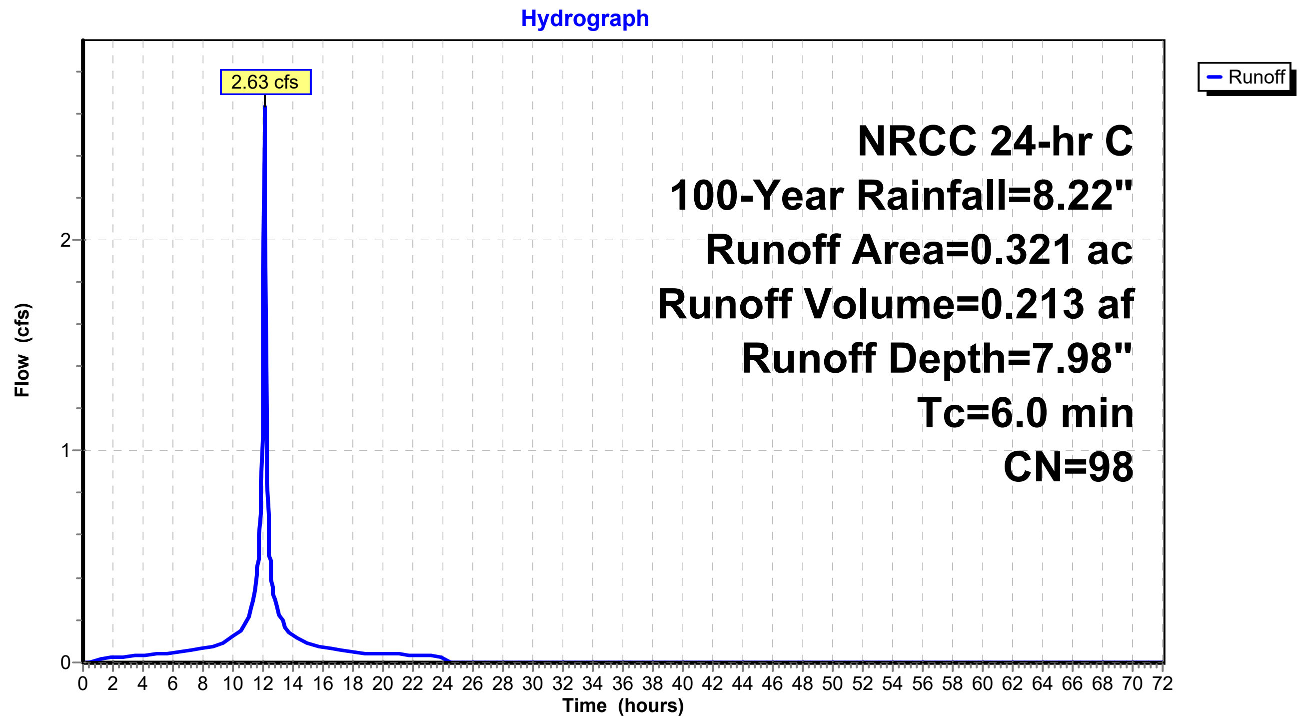
Runoff = 2.63 cfs @ 12.13 hrs, Volume= 0.213 af, Depth= 7.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 49S: DA-10E



Summary for Subcatchment 55S: DA-10F

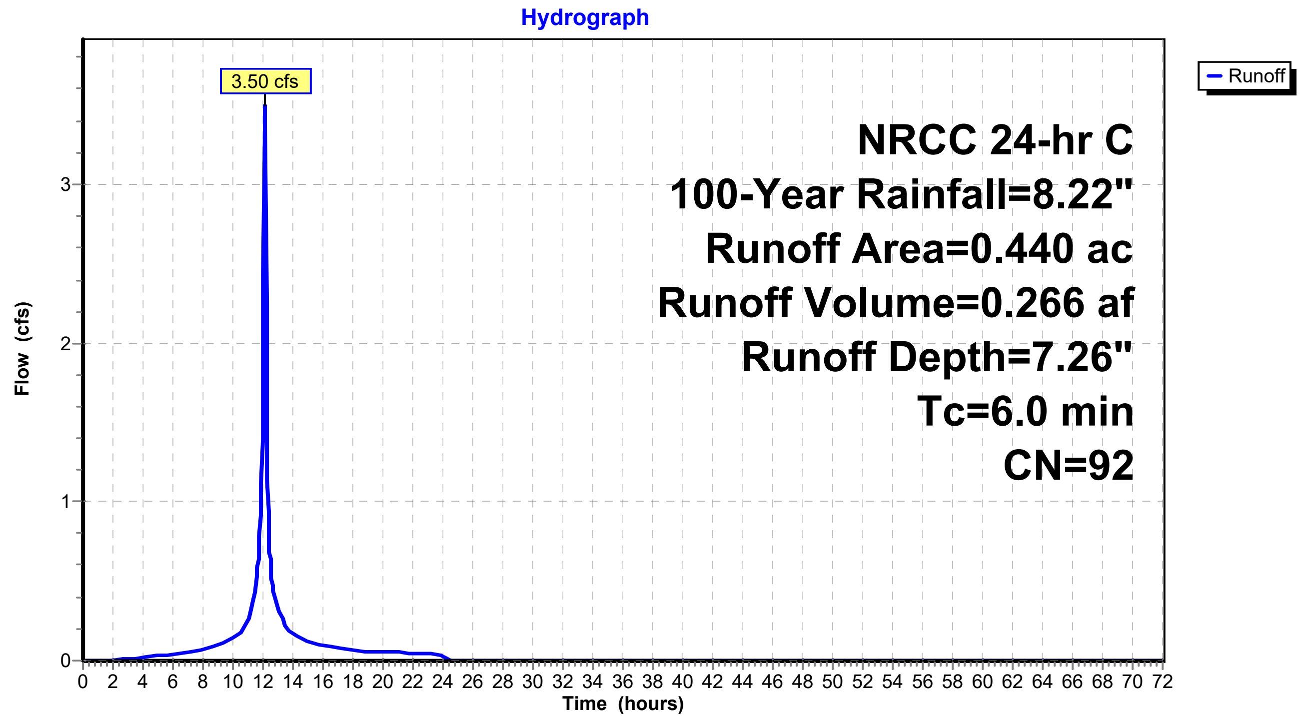
Runoff = 3.50 cfs @ 12.13 hrs, Volume= 0.266 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

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

Subcatchment 55S: DA-10F



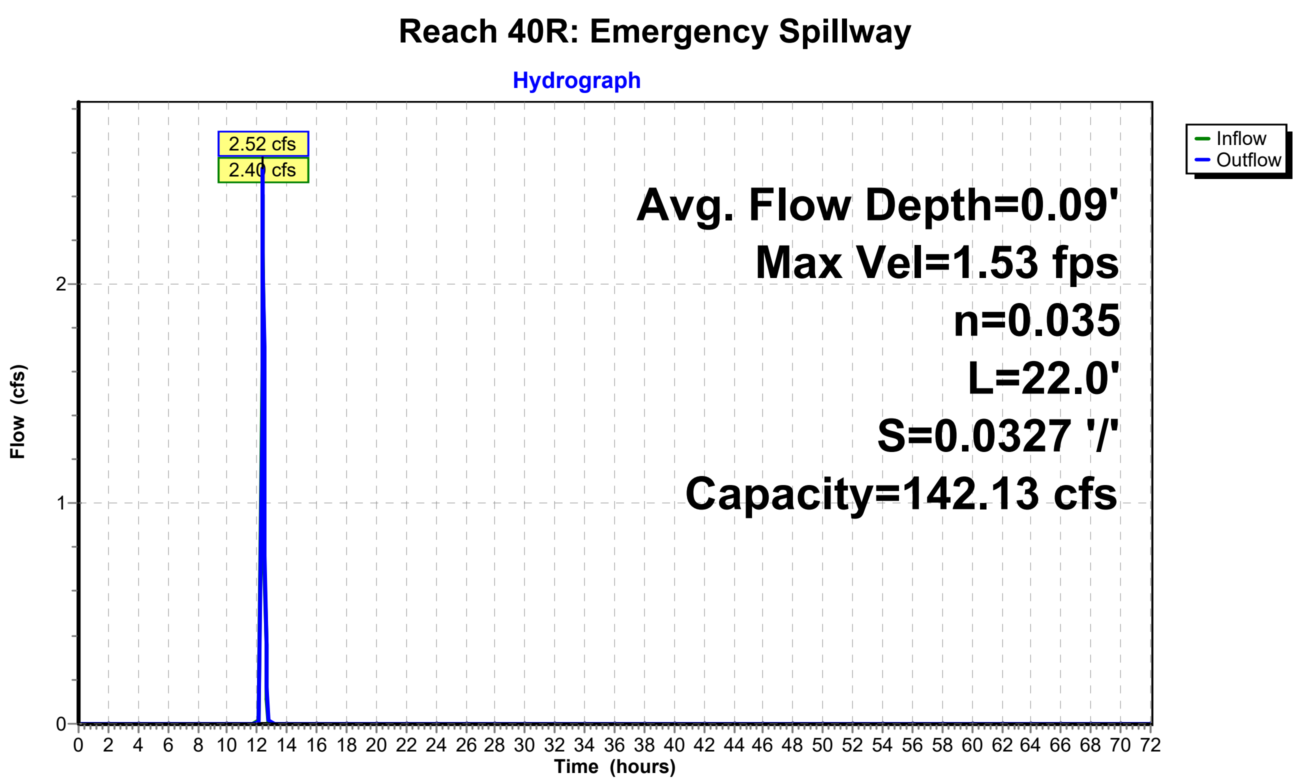
Summary for Reach 40R: Emergency Spillway

Inflow = 2.40 cfs @ 12.36 hrs, Volume= 0.042 af
Outflow = 2.52 cfs @ 12.36 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.53 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 0.4 min

Peak Storage= 36 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 18.36'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 142.13 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0327 '/'
Inlet Invert= 450.00', Outlet Invert= 449.28'



Summary for Pond 33P: Detention Pond 2

Inflow Area = 4.015 ac, 51.33% Impervious, Inflow Depth = 6.92" for 100-Year event
Inflow = 28.64 cfs @ 12.14 hrs, Volume= 2.314 af
Outflow = 9.51 cfs @ 12.36 hrs, Volume= 2.290 af, Atten= 67%, Lag= 13.5 min
Primary = 7.11 cfs @ 12.36 hrs, Volume= 2.248 af
Secondary = 2.40 cfs @ 12.36 hrs, Volume= 0.042 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 450.09' @ 12.36 hrs Storage= 74,819 cf (48,166 cf above start)

Plug-Flow detention time= 733.5 min calculated for 1.677 af (72% of inflow)
Center-of-Mass det. time= 453.5 min (1,232.4 - 778.9)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

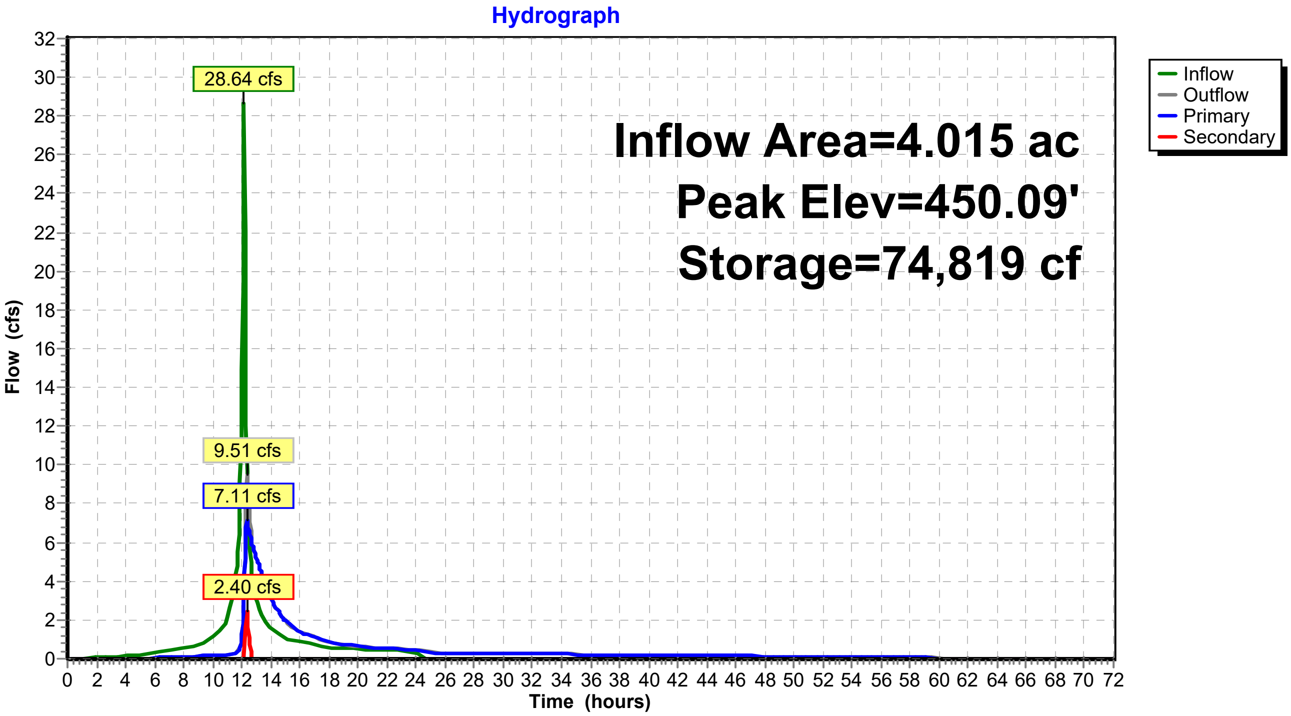
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.00'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=7.08 cfs @ 12.36 hrs HW=450.09' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.08 cfs of 10.27 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.28 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 6.01 cfs @ 4.05 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.66 cfs @ 0.96 fps)

Secondary OutFlow Max=2.31 cfs @ 12.36 hrs HW=450.09' TW=450.09' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 2.31 cfs @ 1.48 fps)

Pond 33P: Detention Pond 2



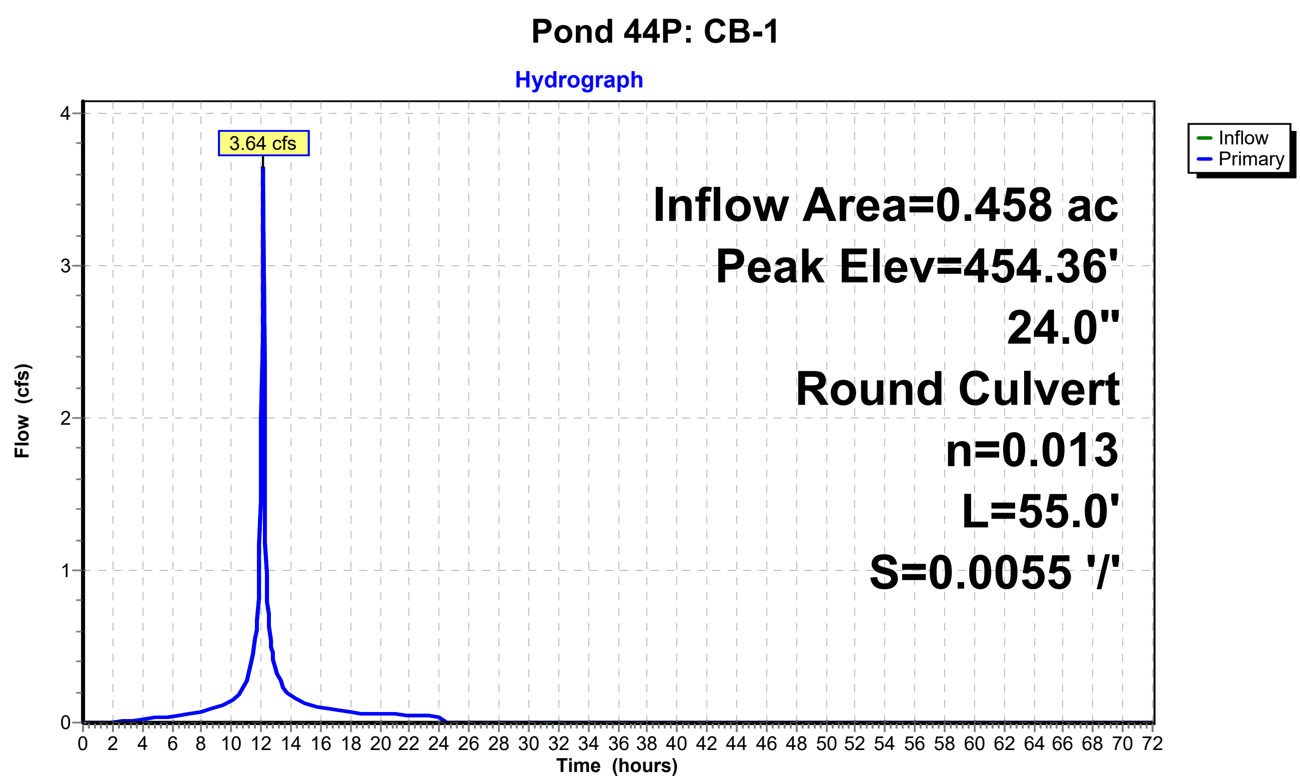
Summary for Pond 44P: CB-1

Inflow Area =	0.458 ac,	65.28% Impervious,	Inflow Depth = 7.26"	for 100-Year event
Inflow =	3.64 cfs @	12.13 hrs, Volume=	0.277 af	
Outflow =	3.64 cfs @	12.13 hrs, Volume=	0.277 af, Atten= 0%, Lag= 0.0 min	
Primary =	3.64 cfs @	12.13 hrs, Volume=	0.277 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.36' @ 12.41 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0055 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=452.35' TW=452.45' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)



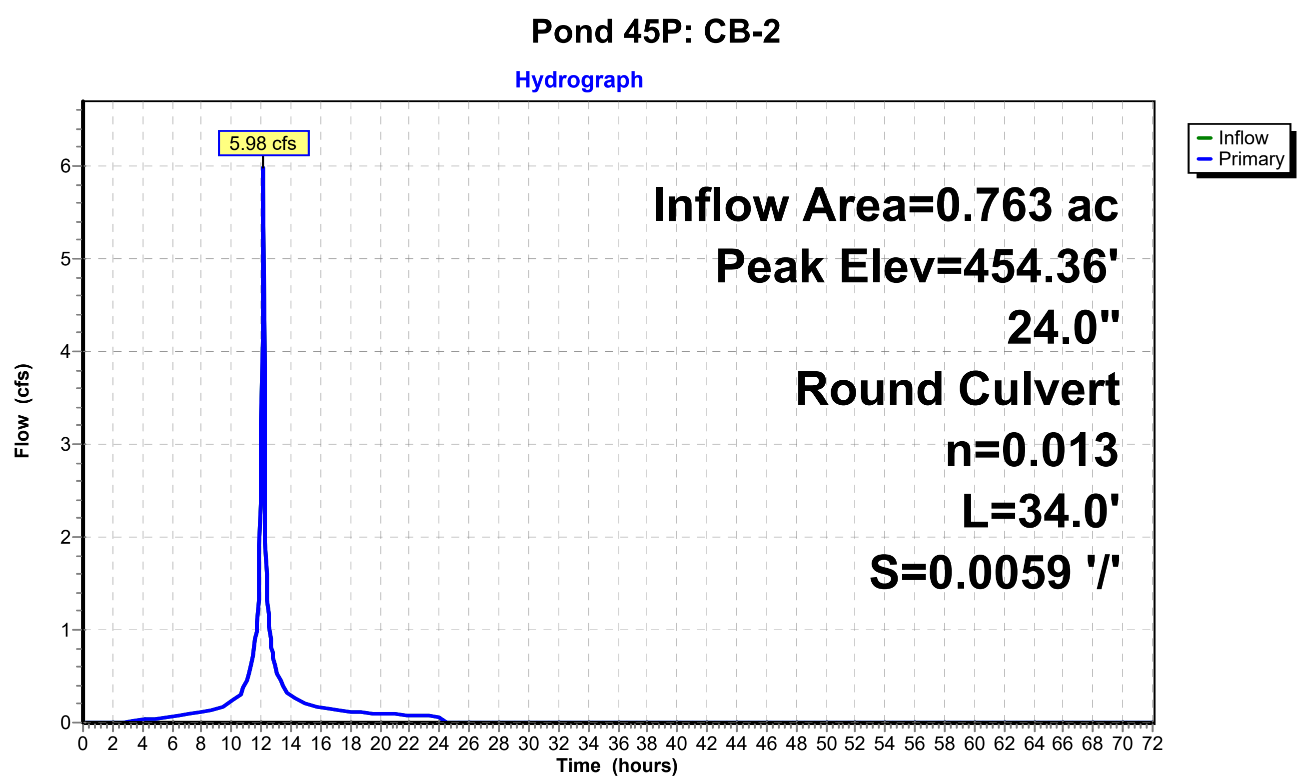
Summary for Pond 45P: CB-2

Inflow Area = 0.763 ac, 57.27% Impervious, Inflow Depth = 7.07" for 100-Year event
Inflow = 5.98 cfs @ 12.13 hrs, Volume= 0.450 af
Outflow = 5.98 cfs @ 12.13 hrs, Volume= 0.450 af, Atten= 0%, Lag= 0.0 min
Primary = 5.98 cfs @ 12.13 hrs, Volume= 0.450 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.36' @ 12.36 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 34.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.50' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=452.45' TW=452.59' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)



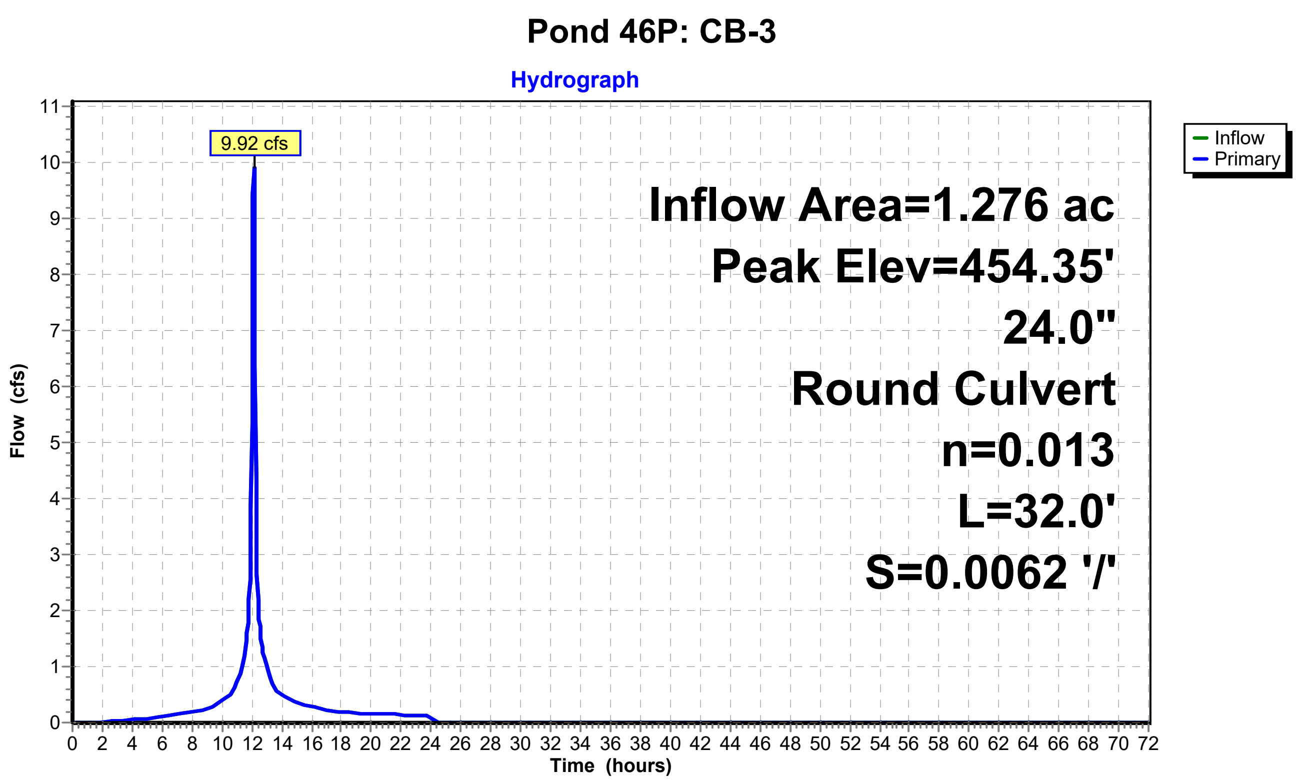
Summary for Pond 46P: CB-3

Inflow Area = 1.276 ac, 54.70% Impervious, Inflow Depth = 7.01" for 100-Year event
Inflow = 9.92 cfs @ 12.13 hrs, Volume= 0.746 af
Outflow = 9.92 cfs @ 12.13 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min
Primary = 9.92 cfs @ 12.13 hrs, Volume= 0.746 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.35' @ 12.31 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.50'	**24.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.50' / 450.30' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=452.59' TW=452.61' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)



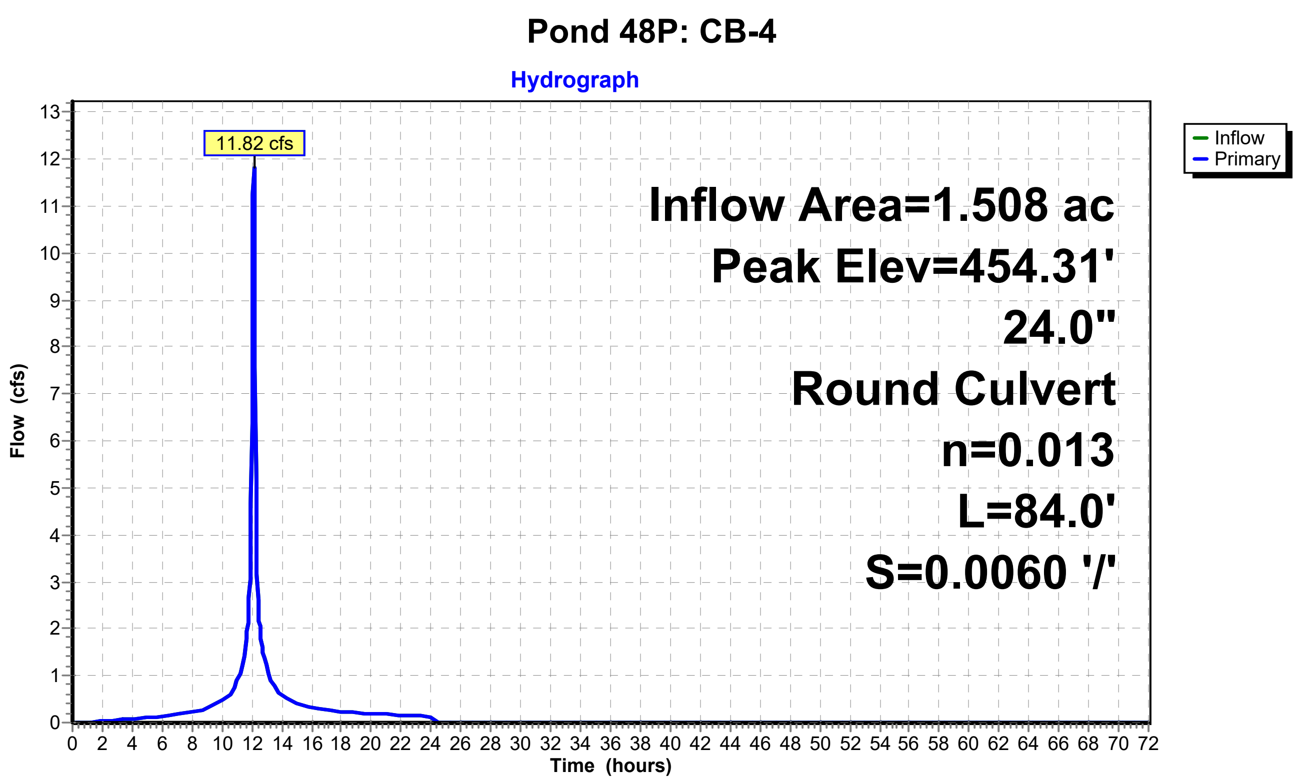
Summary for Pond 48P: CB-4

Inflow Area = 1.508 ac, 61.67% Impervious, Inflow Depth = 7.16" for 100-Year event
Inflow = 11.82 cfs @ 12.13 hrs, Volume= 0.900 af
Outflow = 11.82 cfs @ 12.13 hrs, Volume= 0.900 af, Atten= 0%, Lag= 0.0 min
Primary = 11.82 cfs @ 12.13 hrs, Volume= 0.900 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.31' @ 12.26 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=452.61' TW=452.65' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)



Summary for Pond 50P: CB-5

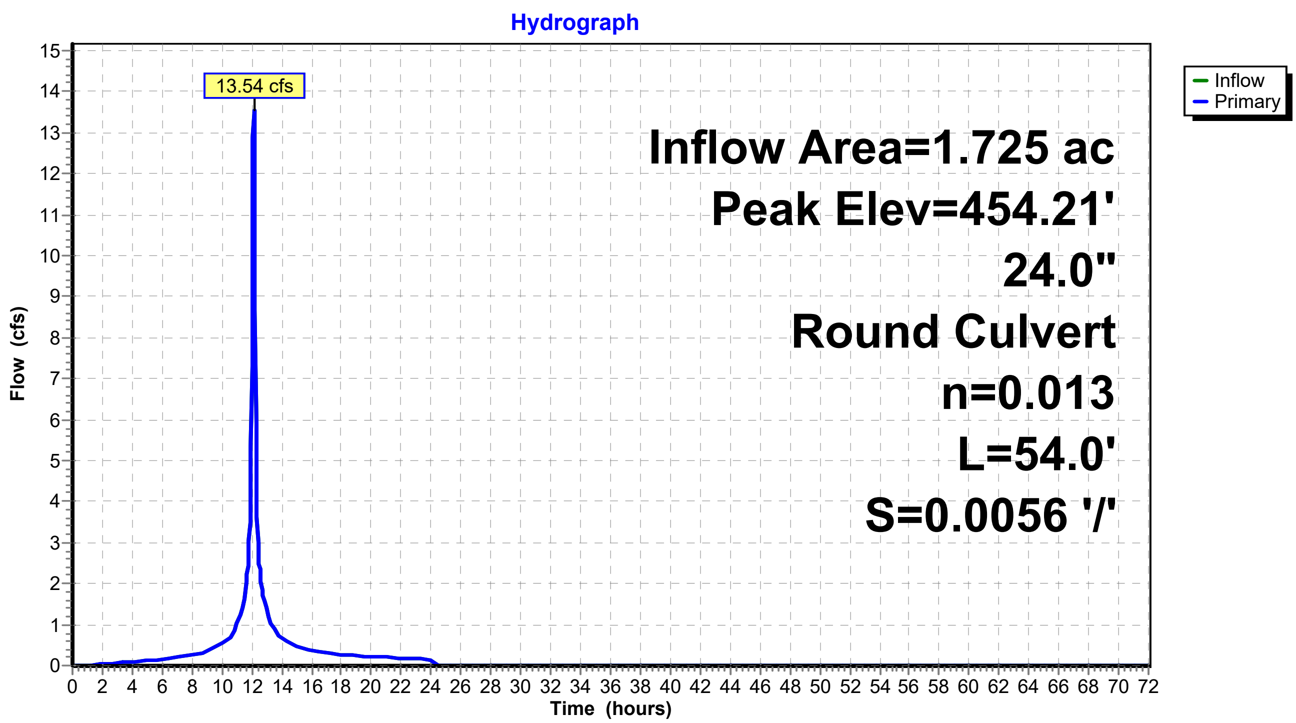
Inflow Area =	1.725 ac, 62.20% Impervious,	Inflow Depth = 7.17"	for 100-Year event
Inflow =	13.54 cfs @ 12.13 hrs,	Volume= 1.031 af	
Outflow =	13.54 cfs @ 12.13 hrs,	Volume= 1.031 af,	Atten= 0%, Lag= 0.0 min
Primary =	13.54 cfs @ 12.13 hrs,	Volume= 1.031 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.21' @ 12.21 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=452.65' TW=453.11' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 50P: CB-5



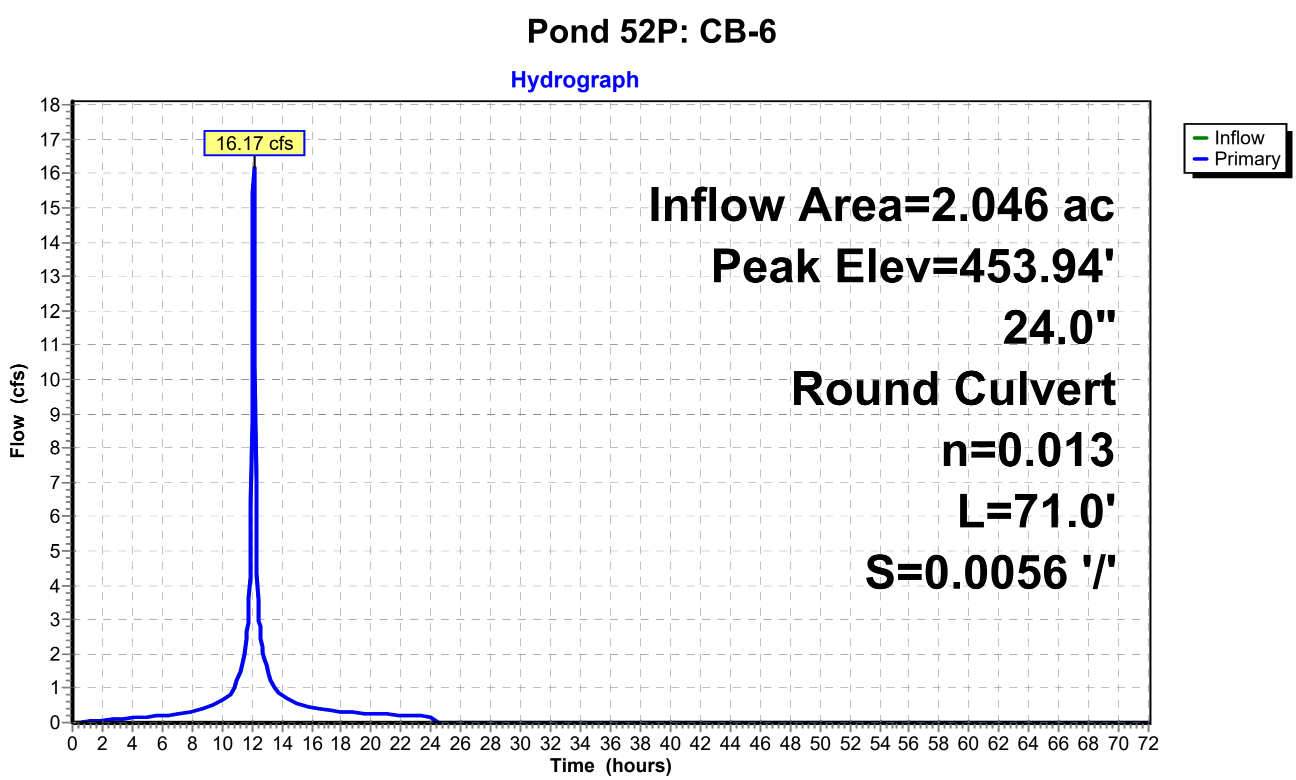
Summary for Pond 52P: CB-6

Inflow Area = 2.046 ac, 68.13% Impervious, Inflow Depth = 7.30" for 100-Year event
Inflow = 16.17 cfs @ 12.13 hrs, Volume= 1.245 af
Outflow = 16.17 cfs @ 12.13 hrs, Volume= 1.245 af, Atten= 0%, Lag= 0.0 min
Primary = 16.17 cfs @ 12.13 hrs, Volume= 1.245 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.94' @ 12.17 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.83 cfs @ 12.13 hrs HW=453.10' TW=452.90' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 6.83 cfs @ 2.17 fps)



Summary for Pond 54P: CB-7

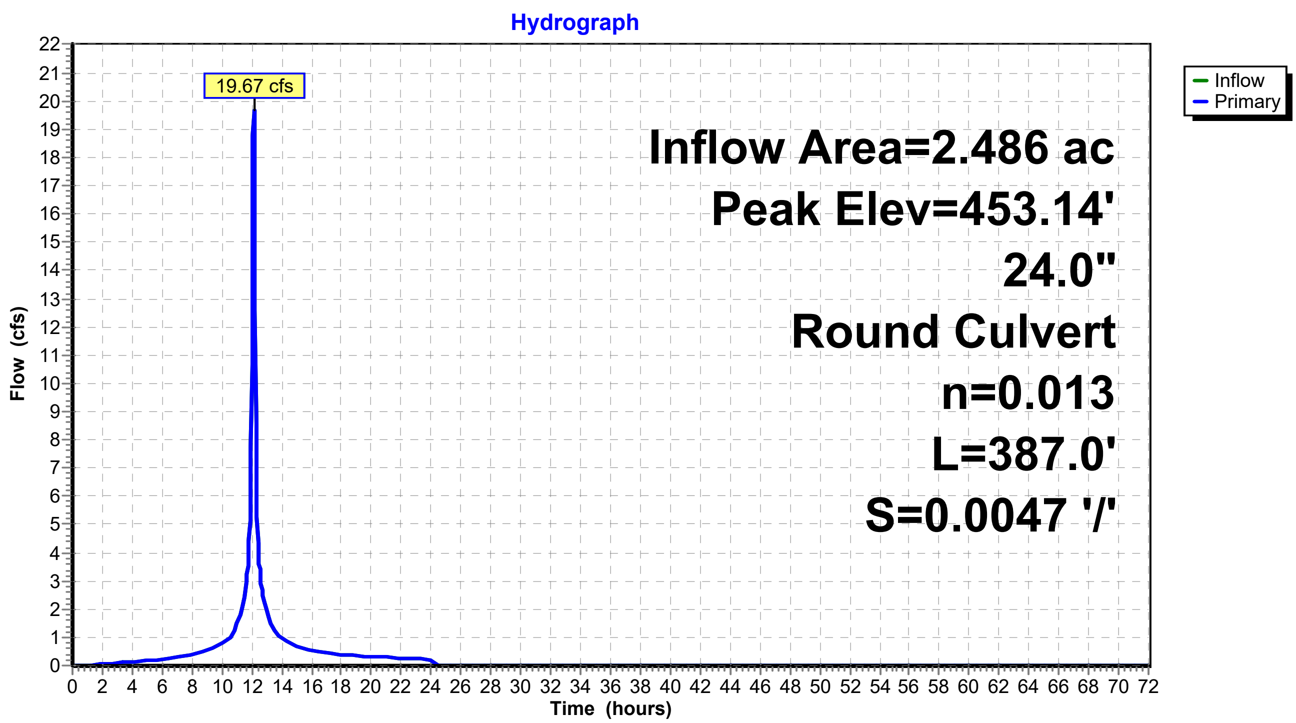
Inflow Area = 2.486 ac, 67.62% Impervious, Inflow Depth = 7.29" for 100-Year event
Inflow = 19.67 cfs @ 12.13 hrs, Volume= 1.511 af
Outflow = 19.67 cfs @ 12.13 hrs, Volume= 1.511 af, Atten= 0%, Lag= 0.0 min
Primary = 19.67 cfs @ 12.13 hrs, Volume= 1.511 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.14' @ 12.13 hrs
Flood Elev= 455.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.30' S= 0.0047 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.35 cfs @ 12.13 hrs HW=452.90' TW=449.55' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 18.35 cfs @ 5.84 fps)

Pond 54P: CB-7

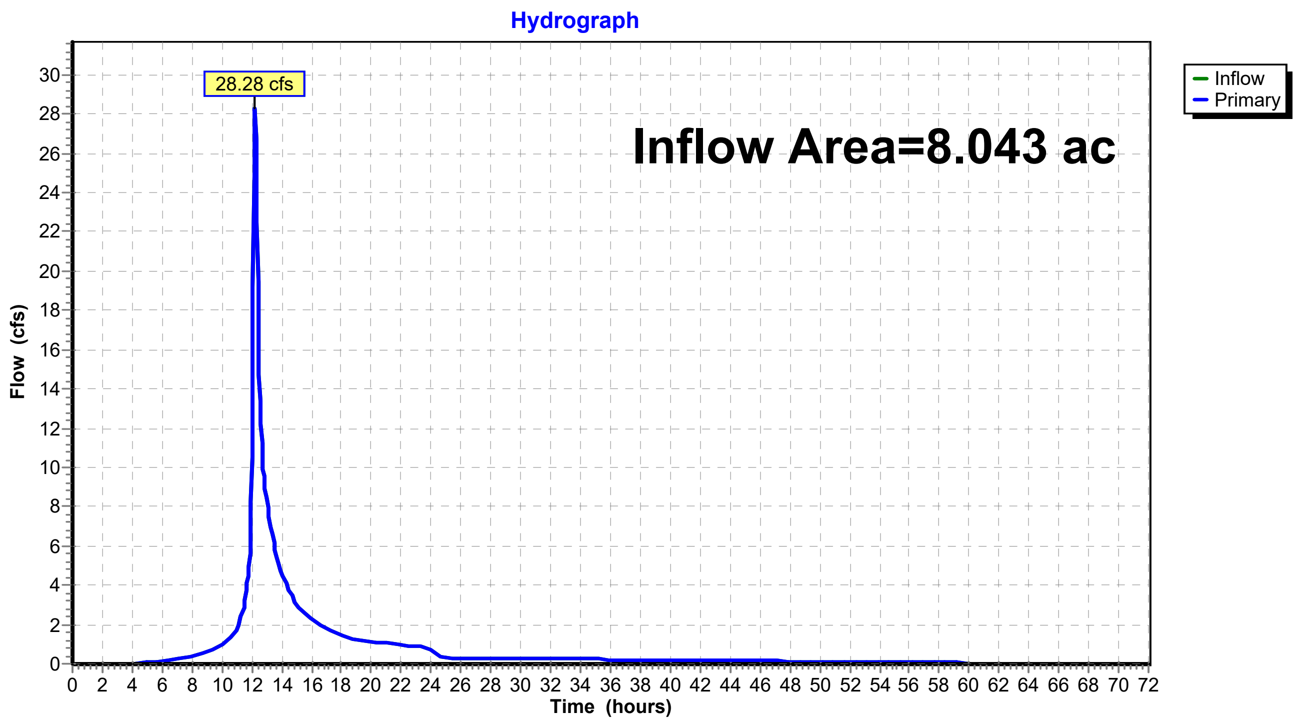


Summary for Link 39L: East Discharge

Inflow Area = 8.043 ac, 28.96% Impervious, Inflow Depth > 6.40" for 100-Year event
Inflow = 28.28 cfs @ 12.21 hrs, Volume= 4.287 af
Primary = 28.28 cfs @ 12.21 hrs, Volume= 4.287 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge



Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non -perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.

2. Filter fabric or media will be replaced as needed.

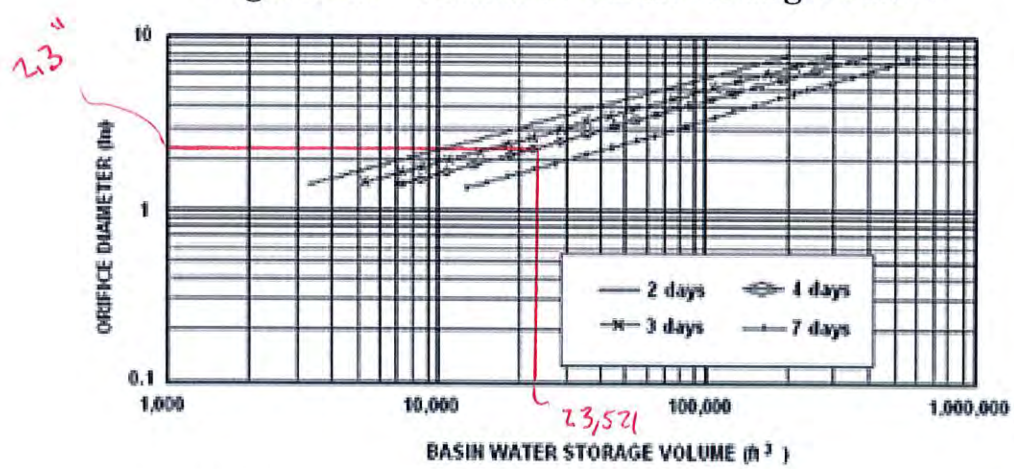
3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

SOUTH WEST
SEDIMENT BASIN 2

Figure 5.3 - Skimmer Orifice Design Chart



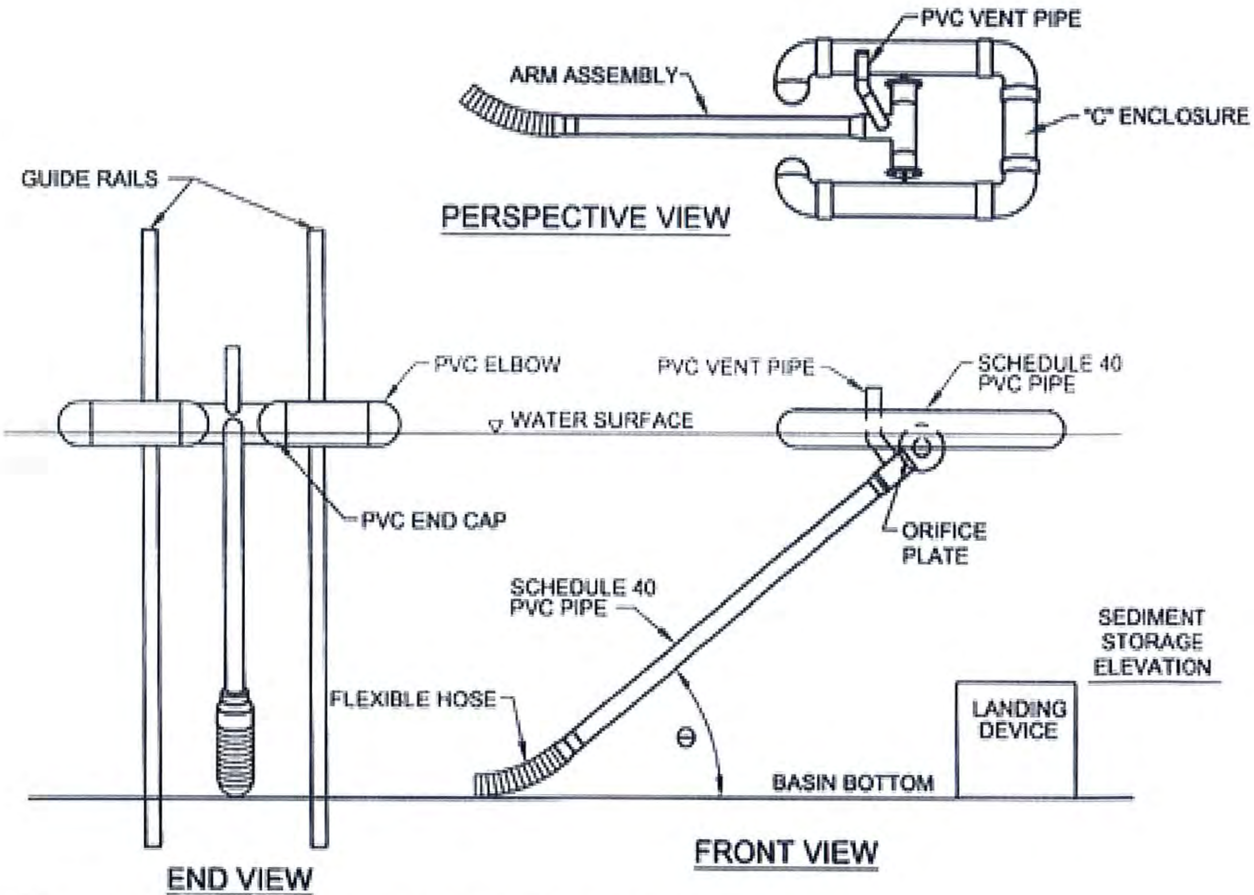
* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3" to 5" head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2" diameter, use a 2" head. For a 3" diameter tube, use a 2.5" head; 4" tube, use 3.3" head, 5" tube use 4" head, and 6" diameter tube use 5" head.

2. Find the vertical line representing the basin's dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)
1	451.75	2.2	2.3	2.3	450.2	48"	450.2

* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle)
** Must be equal to or less than arm diameter

Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non -perforated, corrugated, plastic tubing.
2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

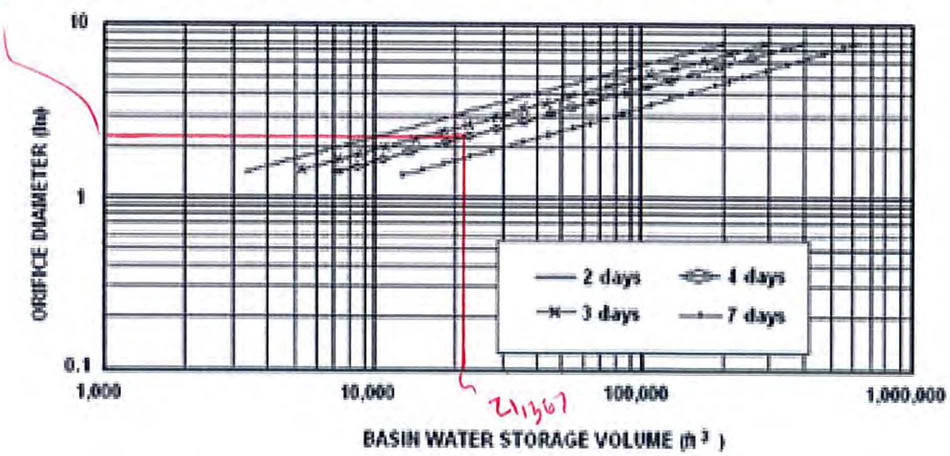
Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.
2. Filter fabric or media will be replaced as needed.
3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.
4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.
5. The structure shall only be removed when the tributary area has been properly stabilized.

EAST SEDIMENT BASIN 2

2.3"

Figure 5.3 - Skimmer Orifice Design Chart

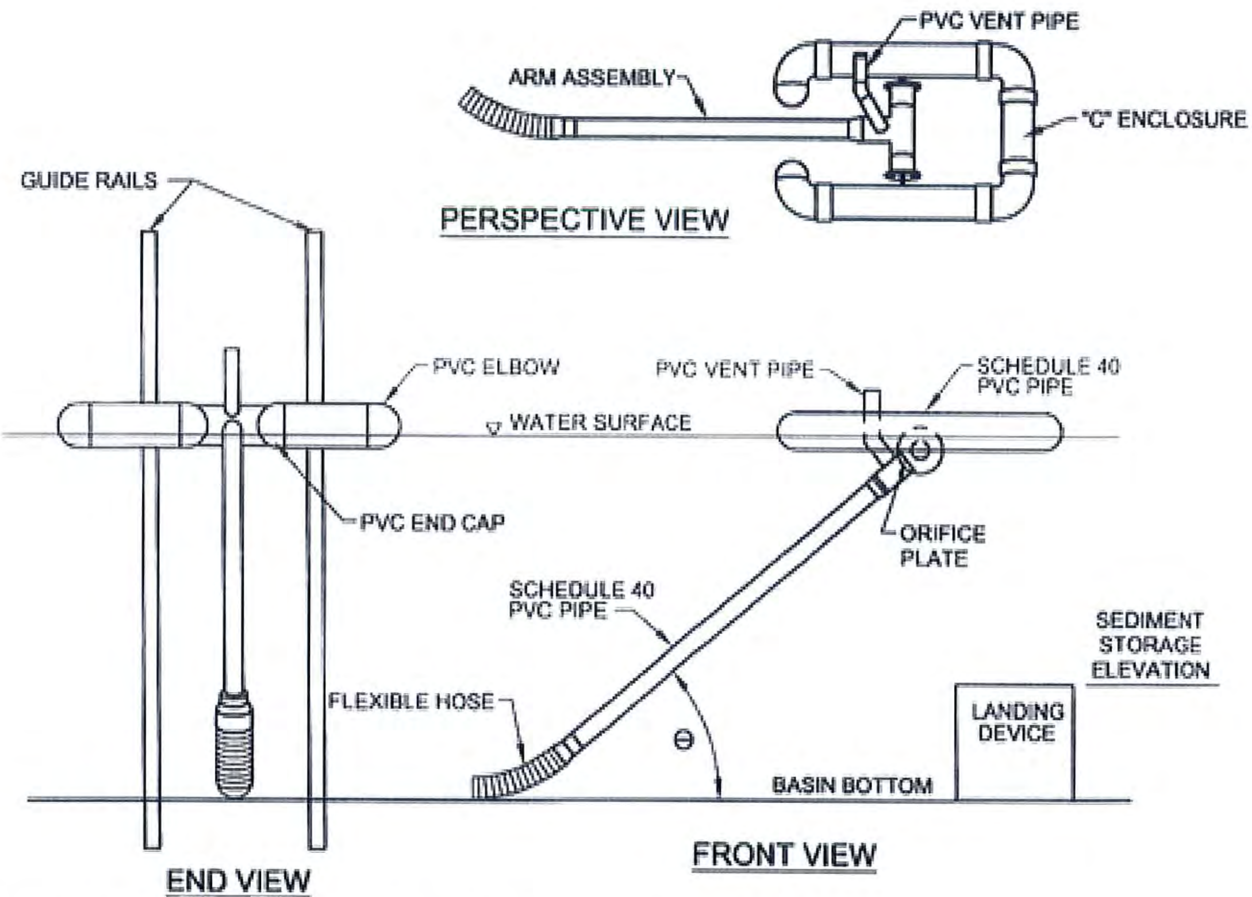


* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3" to 5" head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2" diameter, use a 2" head. For a 3" diameter tube, use a 2.5" head; 4" tube, use 3.3" head, 5" tube use 4" head, and 6" diameter tube use 5" head.
2. Find the vertical line representing the basin's dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)
2	448.6	2.3	2.3	2.3	447	48"	447

* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle)
** Must be equal to or less than arm diameter

SOUTH WEST BASIN
WET POND 1

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

2.4 4 0.005

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25-\text{pipe slope}}\right] = 19.6 \text{ ft}$$

0.005
1.02

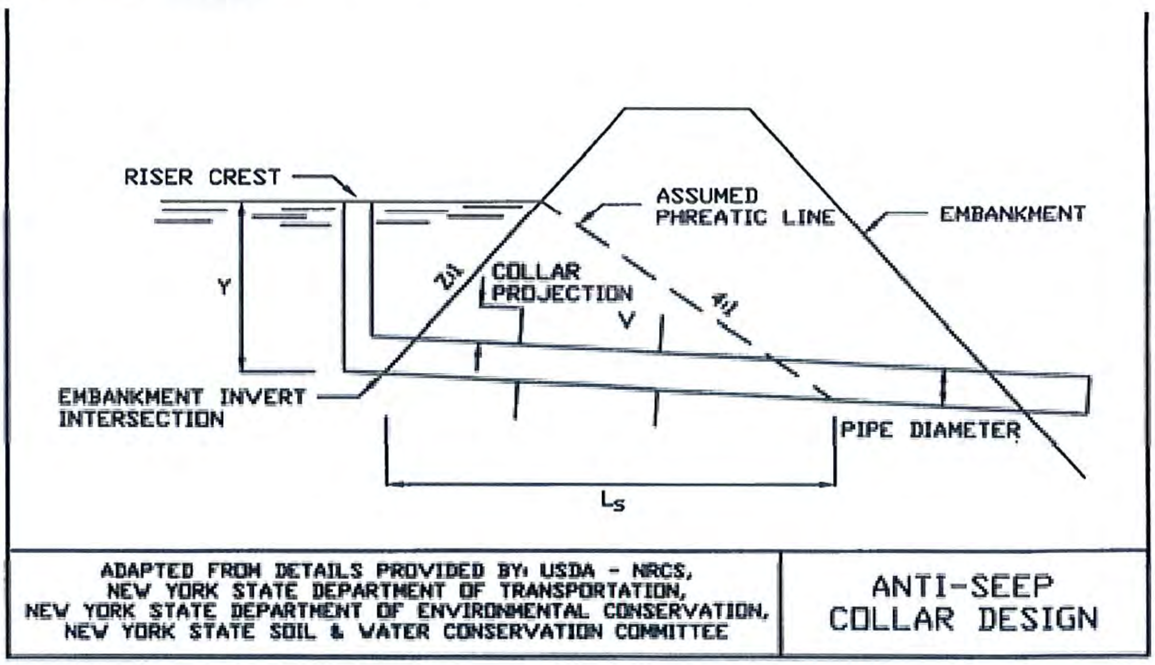
Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

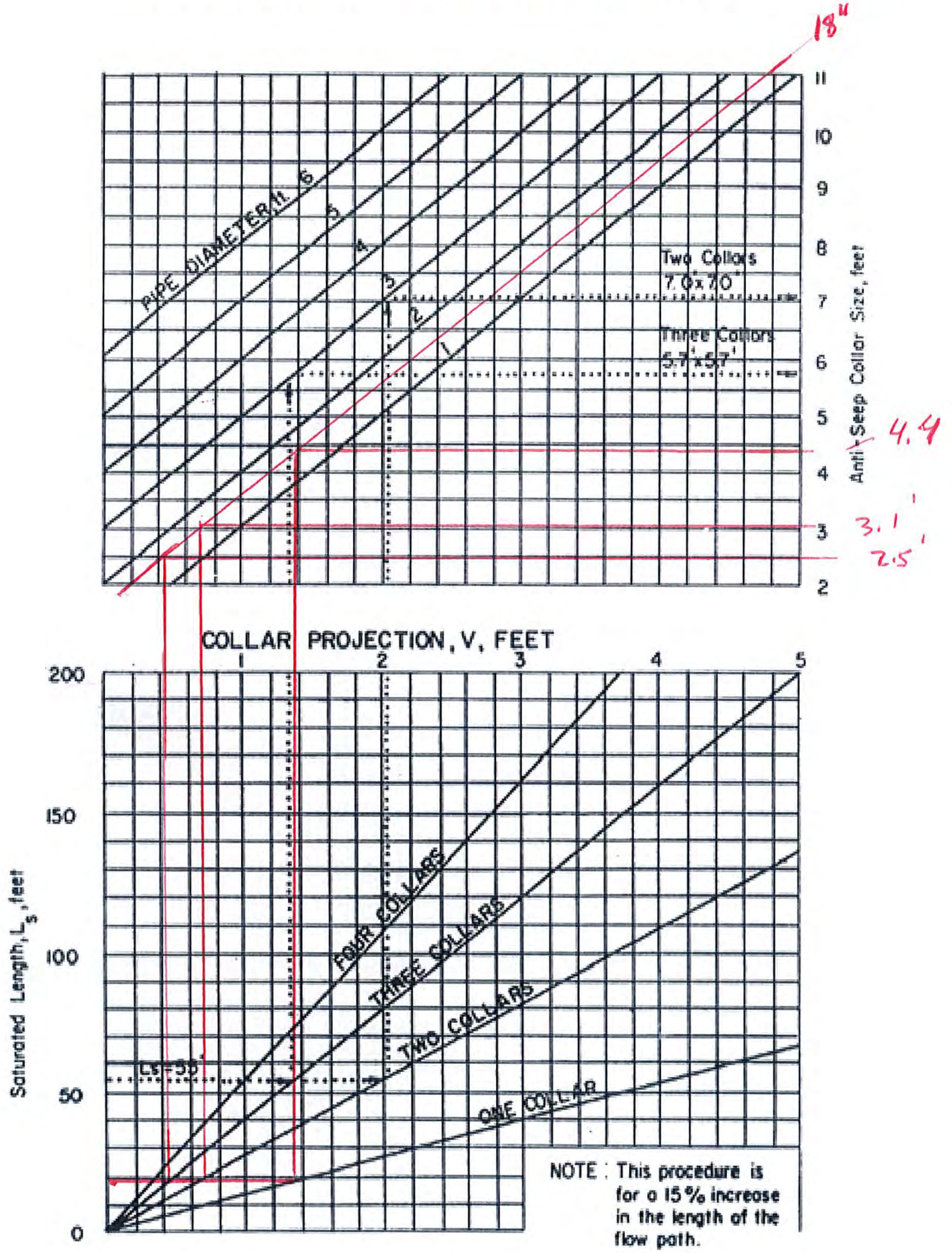
This procedure is based on the approximation of the phreatic line as shown in the drawing below:



SOUTH
WEST BASIN

WET POND 1

Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)



EAST BASIN
WET POND 2

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

3 4 0.005

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25 - \text{pipe slope}}\right] = 24.5 \text{ ft}$$

0.005

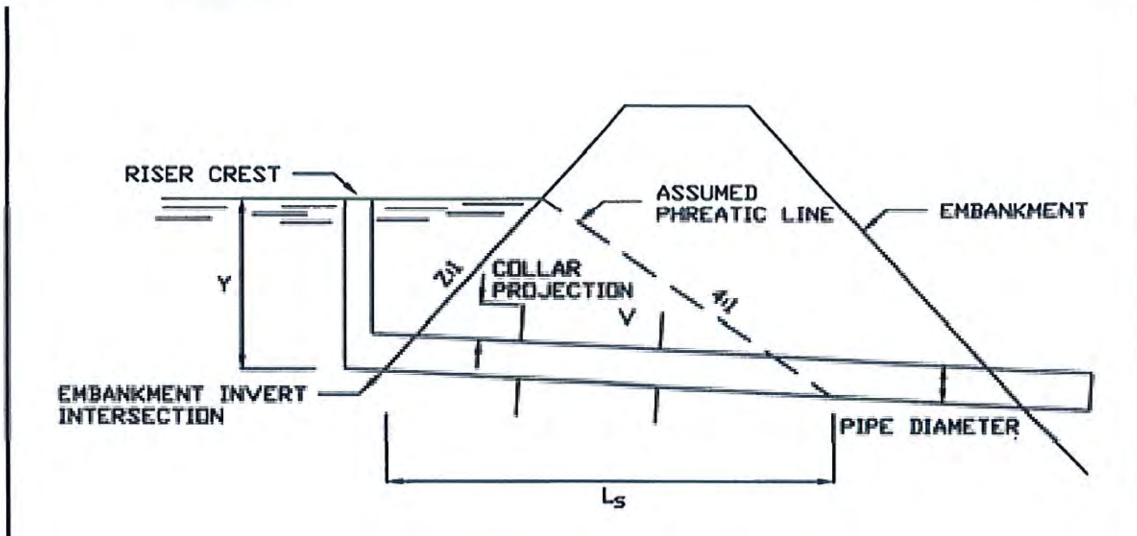
Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:



ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	ANTI-SEEP COLLAR DESIGN

EAST BASIN
WET POND 2

Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)

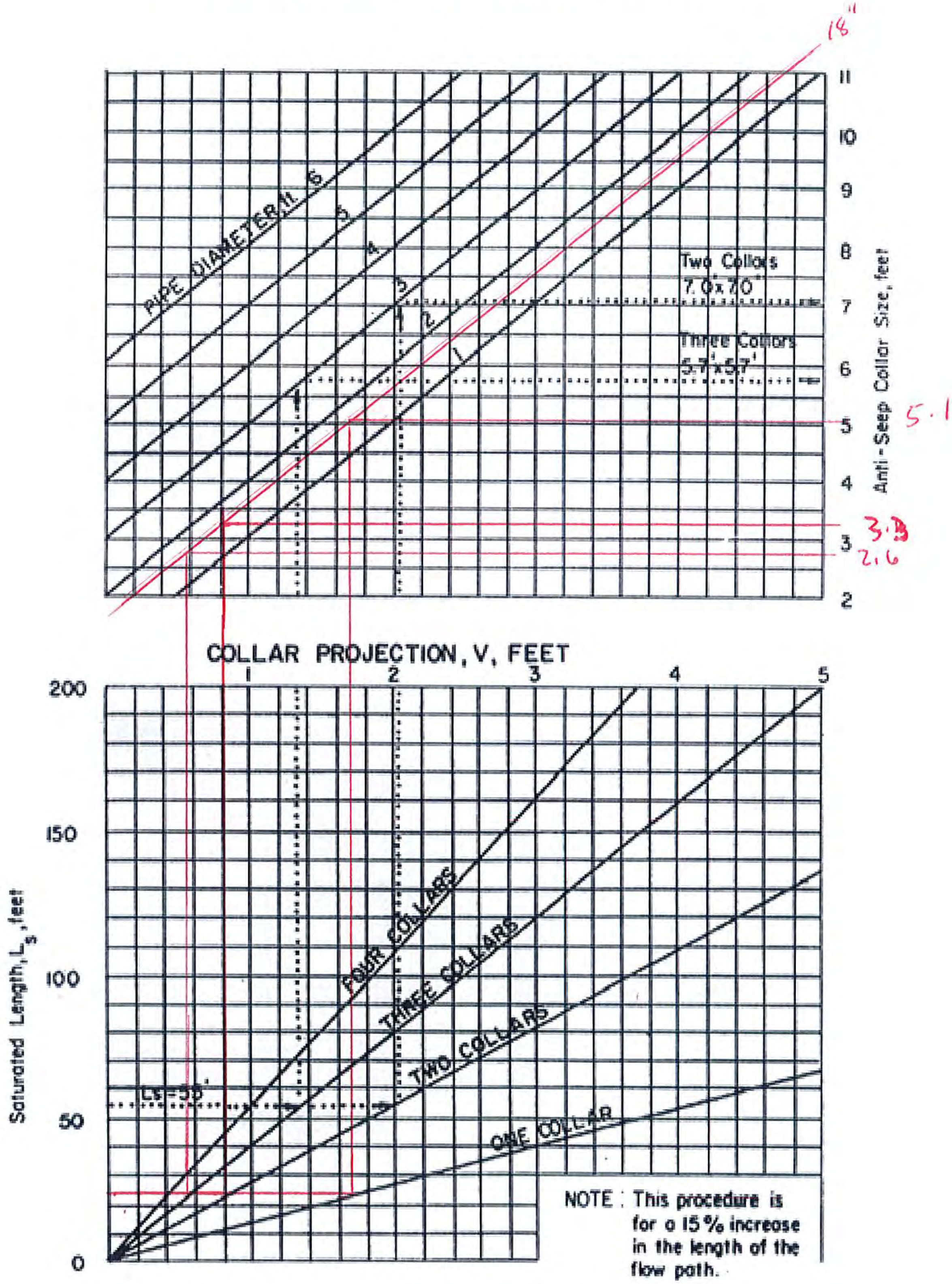
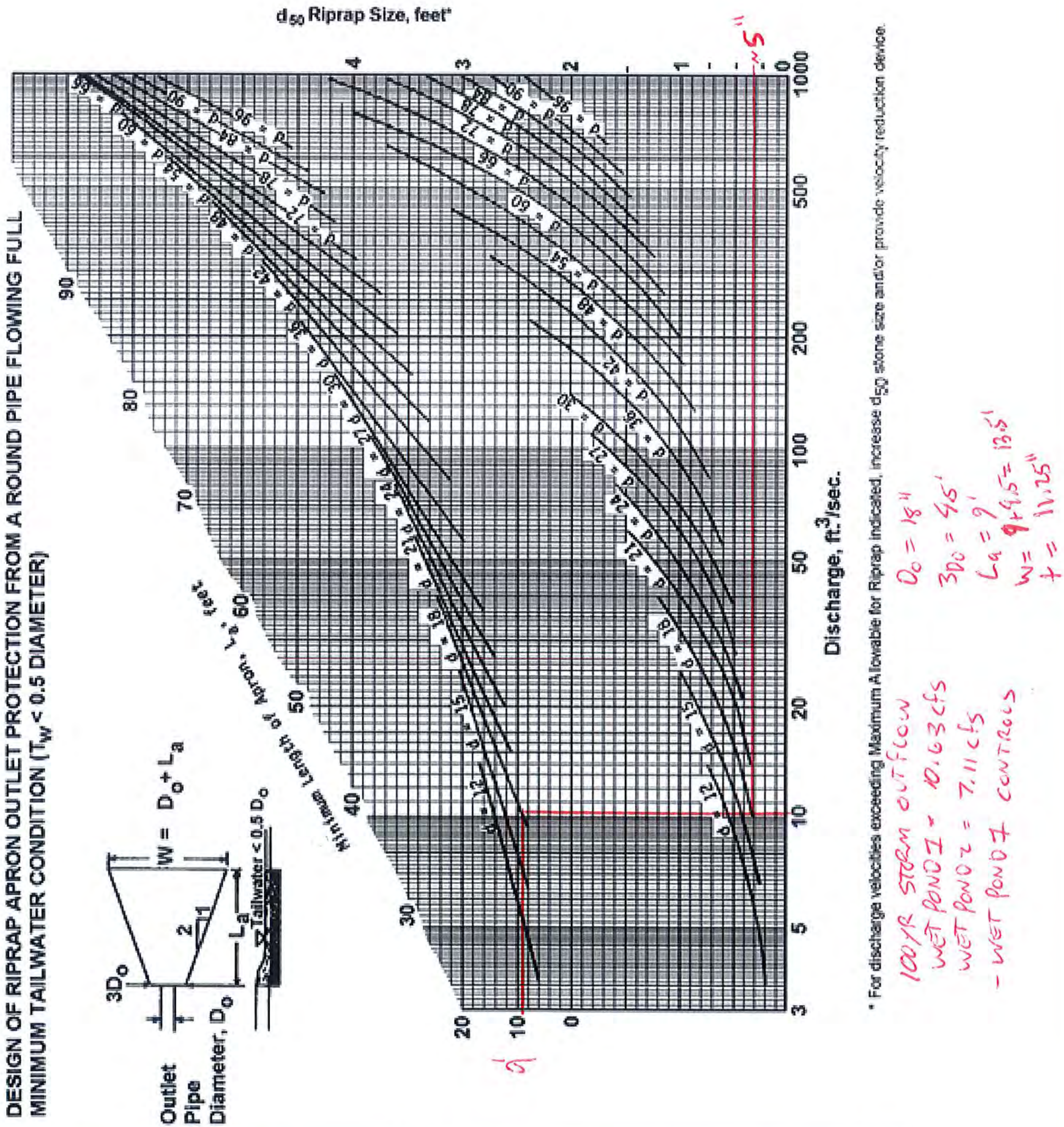


Figure 3.16
Outlet Protection Design—Minimum Tailwater Condition Chart (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Attachment 5

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

NYS Erosion and Sediment Control

STANDARD AND SPECIFICATIONS FOR CHECK DAM

Definition & Scope

Small barriers or dams constructed of stone, bagged sand or gravel, or other durable materials across a drainageway to reduce erosion in a drainage channel by reducing the velocity of flow in the channel.

Conditions Where Practice Applies

This practice is used as a **temporary** and, in some cases, a **permanent** measure to limit erosion by reducing velocities in open channels that are degrading or subject to erosion or where permanent stabilization is impractical due to short period of usefulness and time constraints of construction.

Design Criteria

Drainage Area: Maximum drainage area above the check dam shall not exceed two (2) acres.

Height: Not greater than 2 feet. Center shall be maintained 9 inches lower than abutments at natural ground elevation.

Side Slopes: Shall be 2:1 or flatter.

Spacing: The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

Therefore:

$$S = \frac{h}{s}$$

Where:

S = spacing interval (ft.)
h = height of check dam (ft.)
s = channel slope (ft./ft.)

Example:

For a channel with a 4% slope and 2 ft. high stone check dams, they are spaced as follows:

$$S = \frac{2\ \text{ft}}{0.04\ \frac{\text{ft}}{\text{ft}}} = 50\ \text{ft}$$

For stone check dams: Use a well graded stone matrix 2 to 9 inches in size (NYS – DOT Light Stone Fill meets these requirements).

The overflow of the check dams will be stabilized to resist erosion that might be caused by the check dam. See Figure 3.1 on page 3.3 for details.

Check dams should be anchored in the channel by a cutoff trench 1.5 ft. wide and 0.5 ft. deep and lined with filter fabric to prevent soil migration.

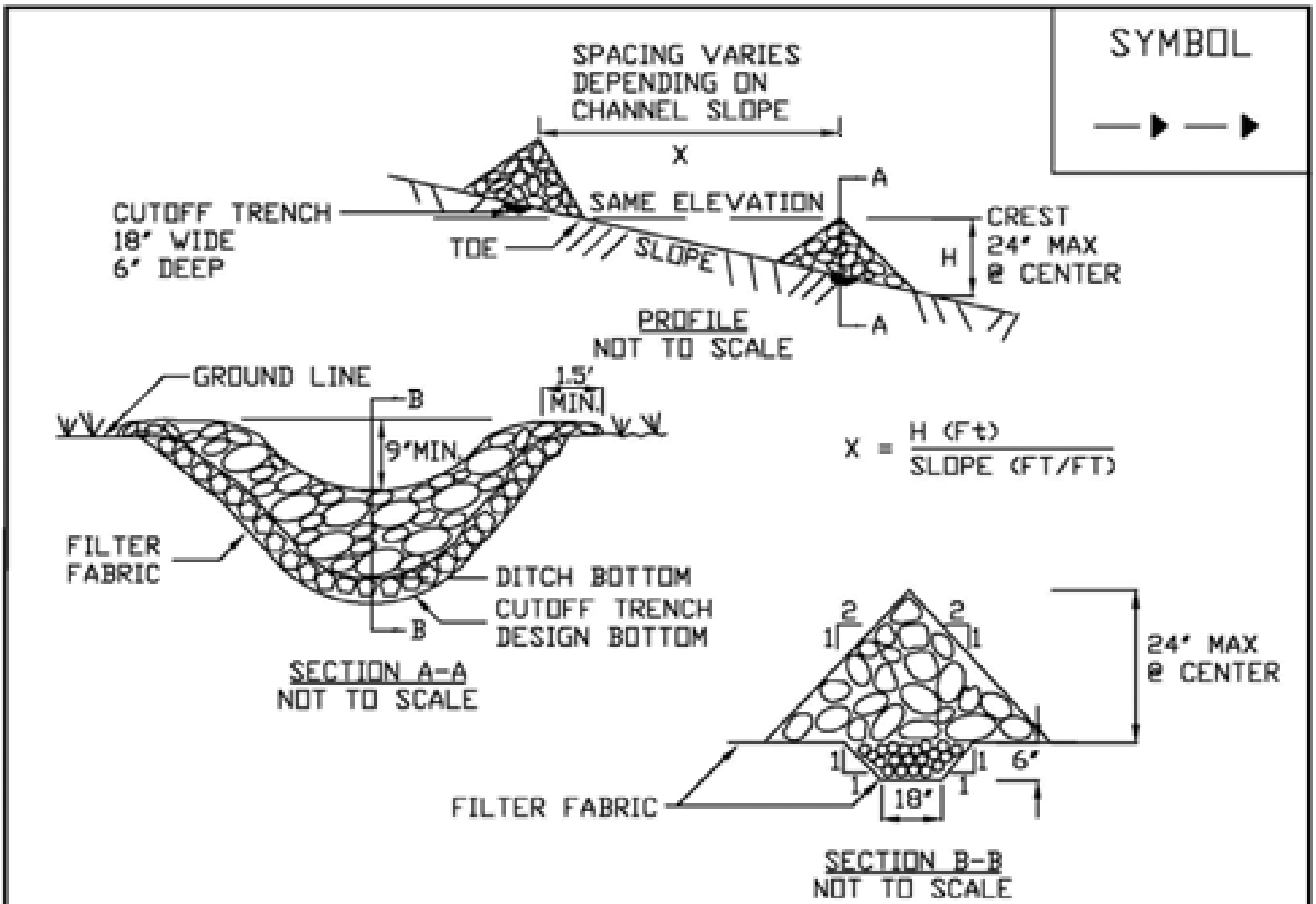
For filter sock or fiber roll check dams: The check dams will be anchored by staking the dam to the earth contact surface. The dam will extend to the top of the bank. The check dam will have a splash apron of NYS DOT #2 crushed stone extending a minimum 3 feet downstream from the dam and 1 foot up the sides of the channel. The compost and materials for a filter sock check dam shall meet the requirements shown in the standard for Compost Filter Sock on page 5.7.

Maintenance

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel or additional check dams added.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam.

Figure 3.1
Stone Check Dam Detail



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

MAXIMUM DRAINAGE AREA 2 ACRES.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE CHECK DAM

STANDARD AND SPECIFICATIONS FOR DIVERSION

Definition & Scope

A drainage way of parabolic or trapezoidal cross-section with a supporting ridge on the lower side that is constructed across the slope to intercept and convey runoff to stable outlets at non-erosive velocities.

Conditions Where Practice Applies

Diversions are used where:

1. Runoff from higher areas has potential for damaging properties, causing erosion, or interfering with, or preventing the establishment of, vegetation on lower areas.

2. Surface and/or shallow subsurface flow is damaging sloping upland.

3. The length of slopes needs to be reduced so that soil loss will be kept to a minimum.

Diversions are only applicable below stabilized or protected areas. Avoid establishment on slopes greater than fifteen percent. Diversions should be used with caution on soils subject to slippage. Construction of diversions shall be in compliance with state and local drainage and water laws.

Design Criteria

Location

Diversion location shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, seep planes (when seepage is a problem), and the development layout.

Capacity

Peak rates of runoff values used in determining the capacity requirements shall be calculated using the most current hydrologic data from the Northeast Regional Climate Center in an appropriate model.

The constructed diversion shall have capacity to carry, as a minimum, the peak discharge from a 10 year frequency rainfall event with freeboard of not less than 0.3 feet.

Diversions designed to protect homes, schools, industrial buildings, roads, parking lots, and comparable high-risk areas, and those designed to function in connection with other structures, shall have sufficient capacity to carry peak runoff expected from a storm frequency consistent with the hazard involved.

Cross Section

The diversion channel shall be parabolic or trapezoidal in shape. Parabolic Diversion design charts are provided in Tables 3.2, 3.3 and 3.4 on pages 3.10, 3.12 and 3.13**.** The diversion shall be designed to have stable side slopes. The side slopes shall not be steeper than 2:1 and shall be flat enough to ensure ease of maintenance of the diversion and its protective vegetative cover.

The ridge shall have a minimum width of four feet at the design water elevation; a minimum of 0.3 feet freeboard and a reasonable settlement factor shall be provided.

Velocity and Grade

The permissible velocity for the specified method of stabilization will determine the maximum grade. Maximum permissible velocities of flow for the stated conditions of stabilization shall be as shown in Table 3.1 on page 3.10 of this standard.

Diversions are not usually applicable below high sediment producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with, or before, the diversions.

Outlets

Each diversion must have an adequate outlet. The outlet may be a grassed waterway, vegetated or paved area, grade stabilization structure, flow spreader, flow diffuser, stable watercourse, or subsurface drain outlet. In all cases, the outlet must convey runoff to a point where outflow will not cause damage. Vegetated outlets shall be installed before diversion construction, if needed, to ensure establishment of vegetative cover in the outlet channel.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

Stabilization

Vegetated diversions shall be stabilized in accordance with the following tables.

Table 3.1
Diversion Maximum Permissible Design Velocities Table

Soil Texture	Retardance and Cover	Permissible Velocity (ft / second) for Selected Channel Vegetation
Sand, Silt, Sandy loam, silty loam, loamy sand (ML, SM, SP, SW)	C-Kentucky 31 tall fescue and Kentucky bluegrass	3.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	2.5
Silty clay loam, Sandy clay loam (ML-CL, SC)	C-Kentucky 31 tall fescue and Kentucky bluegrass	4.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	3.5
Clay (CL)	C-Kentucky 31 tall fescue and Kentucky bluegrass	5.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	4.0

[1] Annuals—Use only as temporary protection until permanent vegetation is established.

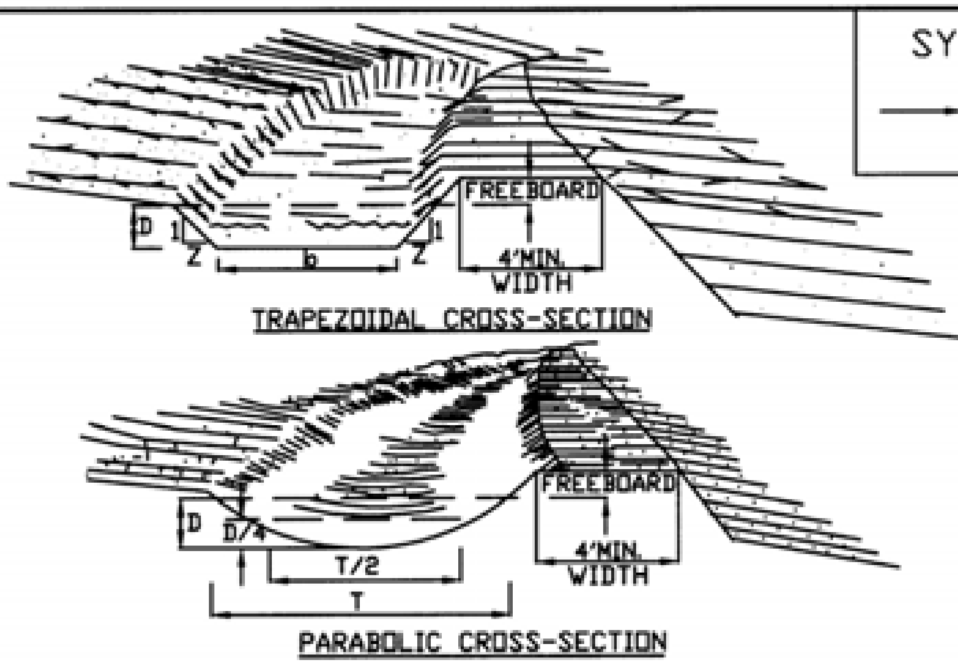
Table 3.2 - Retardance Factors for Various Grasses and Legumes Table

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue	Good stand, unmowed (average 18 inches)
	Grass-legume mixture—Timothy, smooth bromegrass, or Orchard grass with birdsfoot trefoil	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with birdsfoot trefoil or ladino clover	Good stand, uncut (average 18 inches)
C	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture—summer (Orchard grass, redtop, Annual ryegrass, and ladino or white clover)	Good stand, uncut (6 to 8 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Red fescue	Good stand, headed (12 to 18 inches)
	Grass-legume mixture—fall, spring (Orchard grass, redtop, Annual ryegrass, and white or ladino clover)	Good stand, uncut (4 to 5 inches)

Figure 3.4
Diversion Detail

SYMBOL

——→ D ——→



CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE DIVERSION.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY DIVERSIONS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE DIVERSION DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE DIVERSION SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	DIVERSION

Table 3.3
Parabolic Diversion Design, Without Freeboard Tables - 1 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 0.50

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	9	1.6	1.6																								
20	11	1.6	1.7																								
25	14	1.6	1.7	9	1.9	2.1																					
30	17	1.6	1.7	11	1.9	2.2	8	2.2	2.5																		
35	20	1.6	1.7	12	1.9	2.3	9	2.1	2.6																		
40	22	1.6	1.7	14	1.8	2.3	11	2.1	2.7																		
45	25	1.5	1.7	16	1.8	2.3	12	2.0	2.8																		
50	28	1.5	1.7	18	1.8	2.4	13	2.0	2.8	10	2.4	3.2															
55	31	1.5	1.7	19	1.8	2.4	15	2.0	2.8	11	2.4	3.3															
60	33	1.5	1.7	21	1.8	2.4	16	2.0	2.8	11	2.4	3.3															
65	36	1.5	1.8	23	1.8	2.4	17	2.0	2.9	12	2.4	3.3															
70	39	1.5	1.7	24	1.8	2.4	18	2.0	2.9	13	2.3	3.4															
75	42	1.5	1.8	26	1.8	2.4	19	2.0	2.9	14	2.3	3.4	11	2.7	3.7												
80	44	1.5	1.8	28	1.8	2.4	21	2.0	2.9	15	2.3	3.4	12	2.7	3.8												
90	50	1.5	1.8	31	1.8	2.4	24	2.0	2.9	17	2.3	3.4	13	2.7	3.8												
100	55	1.5	1.8	35	1.8	2.4	26	2.0	2.9	19	2.3	3.5	15	2.6	3.9	12	3.0	4.1									

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.0

V_1 based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	13	1.1	1.5	8	1.3	2.0																					
20	18	1.1	1.5	11	1.3	2.1	8	1.5	2.6																		
25	22	1.1	1.5	14	1.3	2.1	9	1.5	2.6	8	1.6	3.0															
30	27	1.1	1.5	17	1.3	2.1	11	1.5	2.7	9	1.6	3.0															
35	31	1.1	1.5	19	1.3	2.2	13	1.5	2.8	11	1.6	3.1	8	1.8	3.6												
40	35	1.1	1.5	22	1.3	2.1	15	1.4	2.8	12	1.5	3.1	9	1.8	3.7												
45	40	1.1	1.5	25	1.3	2.2	17	1.5	2.8	13	1.6	3.2	10	1.8	3.7												
50	44	1.1	1.5	28	1.3	2.2	19	1.4	2.8	15	1.6	3.2	11	1.8	3.7	9	2.0	4.2									
55	46	1.1	1.5	30	1.3	2.2	20	1.4	2.8	16	1.5	3.3	12	1.8	3.8	10	2.0	4.3									
60	53	1.1	1.5	33	1.3	2.2	22	1.4	2.8	18	1.5	3.3	14	1.7	3.8	10	2.0	4.3									
65	57	1.1	1.5	36	1.3	2.2	24	1.4	2.8	19	1.5	3.3	15	1.7	3.8	11	2.0	4.3	9	2.2	4.7						
70	61	1.1	1.5	38	1.3	2.2	26	1.4	2.8	21	1.5	3.3	16	1.7	3.9	12	2.0	4.4	10	2.2	4.7						
75	66	1.1	1.5	41	1.3	2.2	28	1.4	2.9	22	1.5	3.3	17	1.7	3.9	13	2.0	4.5	11	2.2	4.7						
80	70	1.1	1.5	44	1.3	2.2	29	1.4	2.9	24	1.5	3.3	18	1.7	3.9	14	2.0	4.4	11	2.2	4.9						
90	79	1.1	1.5	49	1.3	2.2	33	1.4	2.9	27	1.5	3.3	20	1.7	3.9	15	1.9	4.5	13	2.2	4.9	11	2.4	5.2			
100	87	1.1	1.5	55	1.3	2.2	37	1.4	2.9	29	1.5	3.3	22	1.7	3.9	17	1.9	4.5	14	2.2	4.9	12	2.4	5.3			

Table 3.4
Parabolic Diversion Design, Without Freeboard Tables - 2 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.5

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	17	0.9	1.4	11	1.1	1.9	8	1.2	2.4																		
20	23	0.9	1.4	15	1.0	1.9	10	1.2	2.5	7	1.4	3.0	6	1.5	3.4												
25	28	0.9	1.4	19	1.0	1.9	12	1.2	2.6	8	1.4	3.2	7	1.5	3.6												
30	34	0.9	1.4	22	1.0	1.9	15	1.2	2.6	10	1.3	3.2	8	1.5	3.6	7	1.6	4.0									
35	40	0.9	1.4	26	1.0	2.0	17	1.1	2.6	12	1.3	3.3	10	1.4	3.7	8	1.6	4.1									
40	45	0.9	1.4	30	1.0	1.9	20	1.2	2.6	14	1.3	3.3	11	1.4	3.7	9	1.6	4.2	7	1.8	4.6						
45	51	0.9	1.4	33	1.0	2.0	22	1.1	2.6	15	1.3	3.4	12	1.4	3.8	10	1.5	4.3	8	1.8	4.6						
50	56	0.9	1.4	37	1.0	2.0	25	1.1	2.7	17	1.3	3.4	14	1.4	3.9	11	1.5	4.3	9	1.8	4.8						
55	62	0.9	1.5	41	1.0	2.0	27	1.1	2.6	19	1.3	3.4	15	1.4	3.9	12	1.5	4.3	10	1.7	4.9	8	1.9	5.1			
60	67	0.9	1.5	44	1.0	2.0	30	1.1	2.7	20	1.3	3.4	16	1.4	3.9	14	1.5	4.4	11	1.7	4.9	9	1.9	5.2			
65	73	0.9	1.5	48	1.0	2.0	32	1.1	2.7	22	1.3	3.4	18	1.4	3.9	15	1.5	4.4	11	1.7	5.0	10	1.9	5.3			
70	78	0.9	1.5	51	1.0	2.0	34	1.1	2.7	24	1.3	3.4	19	1.4	3.9	16	1.5	4.4	12	1.7	4.9	10	1.9	5.4	9	2.1	5.6
75	83	0.9	1.5	55	1.0	2.0	37	1.1	2.7	25	1.3	3.4	21	1.4	3.9	17	1.5	4.4	13	1.7	5.0	11	1.9	5.4	9	2.1	5.6
80	89	0.9	1.5	59	1.0	2.0	39	1.1	2.7	27	1.3	3.4	22	1.4	3.9	18	1.5	4.4	14	1.7	5.0	12	1.9	5.5	10	2.1	5.8
90	100	0.9	1.5	66	1.0	2.0	44	1.1	2.7	30	1.3	3.5	25	1.4	3.9	20	1.5	4.4	16	1.7	5.0	13	1.9	5.4	11	2.0	5.9
100				73	1.0	2.0	49	1.1	2.7	33	1.3	3.5	27	1.4	3.9	22	1.5	4.5	17	1.7	5.1	15	1.9	5.5	12	2.0	6.0

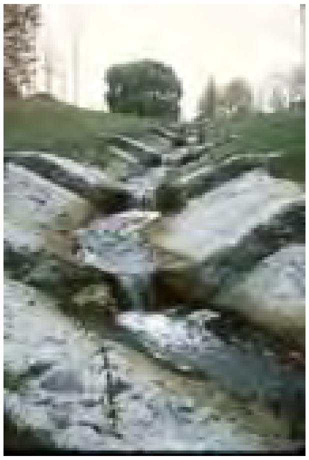
PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 2.0

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	21	0.8	1.3	13	0.9	1.9	9	1.0	2.4	7	1.2	2.9															
20	28	0.8	1.3	17	0.9	1.9	12	1.0	2.4	9	1.1	3.0	7	1.3	3.5	5	1.4	3.8									
25	35	0.8	1.3	21	0.9	1.9	15	1.0	2.4	11	1.1	3.0	8	1.3	3.7	7	1.4	4.0									
30	41	0.8	1.3	26	0.9	1.9	18	1.0	2.5	13	1.1	3.0	10	1.2	3.7	8	1.3	4.2	7	1.5	4.5						
35	48	0.8	1.4	30	0.9	1.9	22	1.0	2.4	15	1.1	3.1	11	1.2	3.8	9	1.3	4.2	8	1.5	4.7						
40	55	0.8	1.3	34	0.9	1.9	25	1.0	2.5	18	1.1	3.1	13	1.2	3.8	11	1.3	4.3	9	1.5	4.7	7	1.7	5.0			
45	62	0.8	1.4	38	0.9	1.9	28	1.0	2.5	20	1.1	3.1	14	1.2	3.8	12	1.3	4.3	10	1.4	4.8	8	1.6	5.2			
50	68	0.8	1.4	42	0.9	1.9	31	1.0	2.5	22	1.1	3.1	16	1.2	3.9	13	1.3	4.3	11	1.4	4.8	9	1.6	5.3	8	1.7	5.6
55	75	0.8	1.4	46	0.9	1.9	34	1.0	2.5	24	1.1	3.1	17	1.2	3.8	14	1.3	4.3	12	1.4	4.9	10	1.6	5.3	8	1.7	5.8
60	82	0.8	1.4	51	0.9	1.9	37	1.0	2.5	26	1.1	3.1	19	1.2	3.9	16	1.3	4.4	13	1.4	4.8	11	1.6	5.3	9	1.7	5.7
65	88	0.8	1.4	55	0.9	1.9	40	1.0	2.5	28	1.1	3.1	21	1.2	3.9	17	1.3	4.4	14	1.4	4.9	11	1.6	5.4	10	1.7	5.7
70	95	0.8	1.4	59	0.9	1.9	43	1.0	2.5	30	1.1	3.1	22	1.2	3.9	18	1.3	4.4	15	1.4	4.9	12	1.6	5.4	10	1.7	5.8
75				63	0.9	1.9	46	1.0	2.5	32	1.1	3.2	24	1.2	3.9	20	1.3	4.4	16	1.4	5.0	13	1.6	5.5	11	1.7	5.9
80				67	0.9	2.0	48	1.0	2.5	35	1.1	3.1	25	1.2	3.9	21	1.3	4.4	17	1.4	4.9	14	1.6	5.4	12	1.7	6.0
90				75	0.9	2.0	54	1.0	2.5	39	1.1	3.2	28	1.2	3.9	23	1.3	4.4	19	1.4	4.9	16	1.6	5.5	13	1.7	5.9
100				83	0.9	2.0	60	1.0	2.5	43	1.1	3.2	31	1.2	3.9	26	1.3	4.4	21	1.4	5.0	17	1.6	5.5	15	1.7	6.0

STANDARD AND SPECIFICATIONS FOR GRADE STABILIZATION STRUCTURE



Definition & Scope

A **permanent** structure to stabilize the grade or to control head cutting in artificial channels by reduction of velocities and grade in the watercourse or by providing channel linings or structures that can withstand the higher velocities.

Conditions Where Practice Applies

This practice applies to sites where the capability of earth and vegetative measures is exceeded in the safe handling of water at permissible velocities, where excessive grades or overfall conditions are encountered, or where water is to be lowered structurally from one elevation to another. These structures should generally be planned and installed along with, or as a part of, other practices in an overall surface water management system.

Design Criteria

Compliance with Laws and Regulations

Design and construction shall be in compliance with state and local laws and regulations. Such compliance is the responsibility of the landowner or developer.

General

Designs and specifications shall be prepared for each structure on an individual job basis depending on its purpose, site conditions, and the basic criteria of the conservation practice with which the structure is planned. Typical structures are as follows:

1. Channel linings of concrete, asphalt, half round metal pipe or other suitable lining materials. These linings should generally be used where channel velocities exceed safe velocities for vegetated channels due to increased grade or a change in channel cross section or where durability of vegetative lining is adversely affected by seasonal changes. Adequate protection will be provided to prevent erosion or scour of both ends of the channel lining.

2. Overfall structures of concrete, metal, rock riprap, or other suitable material is used to lower water from one elevation to another. These structures are applicable where it is desirable to drop the watercourse elevation over a very short horizontal distance. Adequate protection will be provided to prevent erosion or scour upstream, downstream and along sides of overfall structures. Structures should be located on straight sections of channel with a minimum of 100 feet of straight channel each way.

3. Pipe drops of metal pipe with suitable inlet and outlet structures. The inlet structure may consist of a vertical section of pipe or similar material, an embankment, or a combination of both. The outlet structure will provide adequate protection against erosion or scour at the pipe outlet.

Capacity

Structures that are designed to operate in conjunction with other erosion control practices shall have, as a minimum, capacity equal to the bankfull capacity of the channel delivering water to the structures. The minimum design capacity for structures that are not designed to perform in conjunction with other practices shall be that required to handle the peak rate of flow from a 10-year, 24-hour frequency storm or bankfull, whichever is greater. Peak rates of runoff used in determining the capacity requirements shall be determined by appropriate methods.

Set the rest of the structure at an elevation that will stabilize the grade of the upstream channel. The outlet should be set at an elevation to assure stability. Outlet velocities should be kept within the allowable limits for the receiving stream. Structural drop spillways need to include a foundation drainage system to reduce hydrostatic loads.

Permanent structures which involve the retarding of floodwater or the impoundment of water shall be designed using the criteria set forth in the New York State DEC Guidelines for the Design of Dams.

Construction Specifications

Structures shall be installed according to lines and grades shown on the plan. The foundation for structures shall be cleared of all undesirable materials prior to the installation of the structure. Materials used in construction shall be in conformance with the design frequency and life expectancy of the practice. Earth fill, when used as a part of the structure, shall be placed in 4-inch lifts and hand compacted within 2 feet of the structure.

Seeding, fertilizing, and mulching shall conform to the applicable standards and specifications in Section 4.

Construction operations shall be carried out in such a manner that erosion and air and water pollution will be minimized. State and local laws concerning pollution abatement shall be complied with at every site.

Locate emergency bypass areas so that floods in excess of structural capacity enter the channel far enough downstream so as not to cause damage to the structure.

Maintenance

Once properly installed, the maintenance for the grade stabilization structure should be minimal. Inspect the structure periodically and after major storm events. Check fill for piping or extreme settlement. Ensure a good vegetative cover. Check the channel for scour or debris and loss of rock from aprons. Repair or replace failing structures immediately.

STANDARD AND SPECIFICATIONS FOR GRASSED WATERWAY

Definition & Scope

A natural or **permanent** man-made channel of parabolic or trapezoidal cross-section that is below adjacent ground level and is stabilized by suitable vegetation. The flow channel is normally wide and shallow and conveys the runoff down the slope without causing damage by erosion.

Conditions Where Practice Applies

Grass waterways are used where added vegetative protection is needed to control erosion resulting from concentrated runoff.

Design Criteria

Capacity

The minimum capacity shall be that required to confine the peak rate of runoff expected from a 10-year 24 hour frequency rainfall event or a higher frequency corresponding to the hazard involved. This requirement for confinement may be waived on slopes of less than one (1) percent where out-of-bank flow will not cause erosion or property damage.

Peak rates of runoff values used in determining the capacity requirements shall be computed by appropriate methods. Where there is base flow, it shall be handled by a stone center, subsurface drain, or other suitable means since sustained wetness usually prevents adequate vegetative cover. The cross-sectional area of the stone center or subsurface drain size to be provided shall be determined by using a flow rate of 0.1 cfs/acre or by actual measurement of the maximum base flow.

Velocity

Please see Table 3.1, Diversion Maximum Permissible Design Velocities on page 3.10, for seed, soil, and velocity variables.

Cross Section

The design water surface elevation of a grassed waterway receiving water from diversions or other tributary channels shall be equal to or less than the design water surface elevation in the diversion or other tributary channels.

The top width of parabolic waterways shall not exceed 30 feet and the bottom width of trapezoidal waterways shall not exceed 15 feet unless multiple or divided waterways, stone center, or other means are provided to control meandering of low flows.

Structural Measures

In cases where grade or erosion problems exist, special control measures may be needed such as lined waterways (see page 3.27), or grade stabilization measures (see page 3.21). Where needed, these measures will be supported by adequate design computations. For typical cross sections of waterways with riprap sections or stone centers, refer to Figure 3.8 on page 3.24.

The design procedures for parabolic and trapezoidal channels are available in the NRCS Engineering Field Handbook. Figure 3.9 on page 3.25 also provides a design chart for parabolic waterway.

Outlets

Each waterway shall have a stable outlet. The outlet may be another waterway, a stabilized open channel, grade stabilization structure, etc. In all cases, the outlet must discharge in such a manner as not to cause erosion. Outlets shall be constructed and stabilized prior to the operation of the waterway.

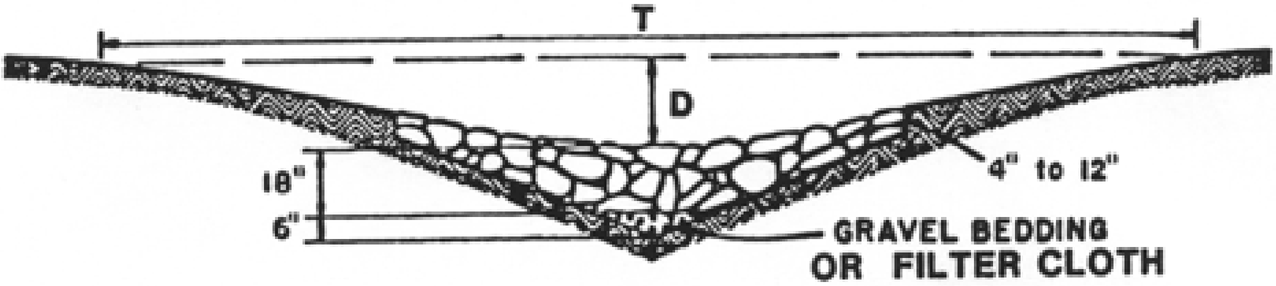
Stabilization

Waterways shall be stabilized in accordance with the appropriate vegetative stabilization standard and specifications, and will be dependent on such factors as slope, soil class, etc. See standard for Vegetating Waterways on Page 4.78.

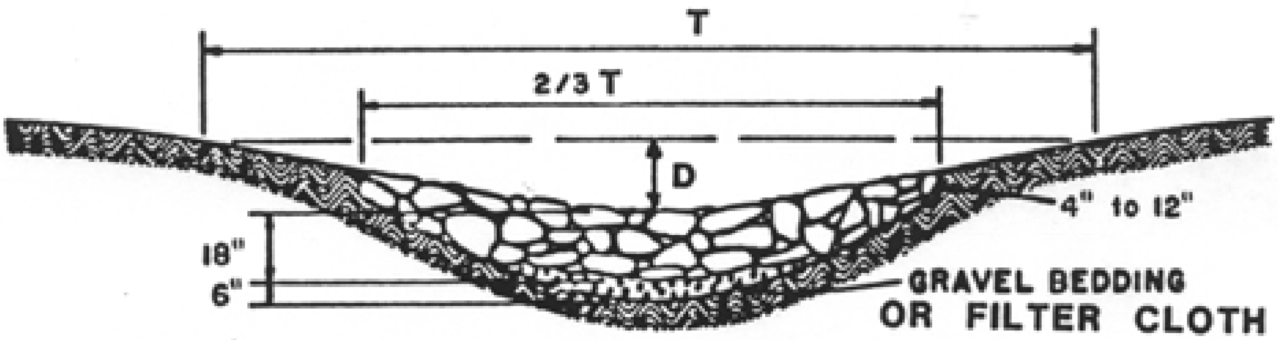
Construction Specifications

See Figure 3.10 on page 3.26 for details.

Figure 3.8
Typical Waterway Cross Sections Details



Waterway with stone center drain. "V"
section shaped by motor grader.



Waterway with stone center drain.
Rounded section shaped by bulldozer.

Figure 3.9
Parabolic Waterway Design Chart (USDA - NRCS)

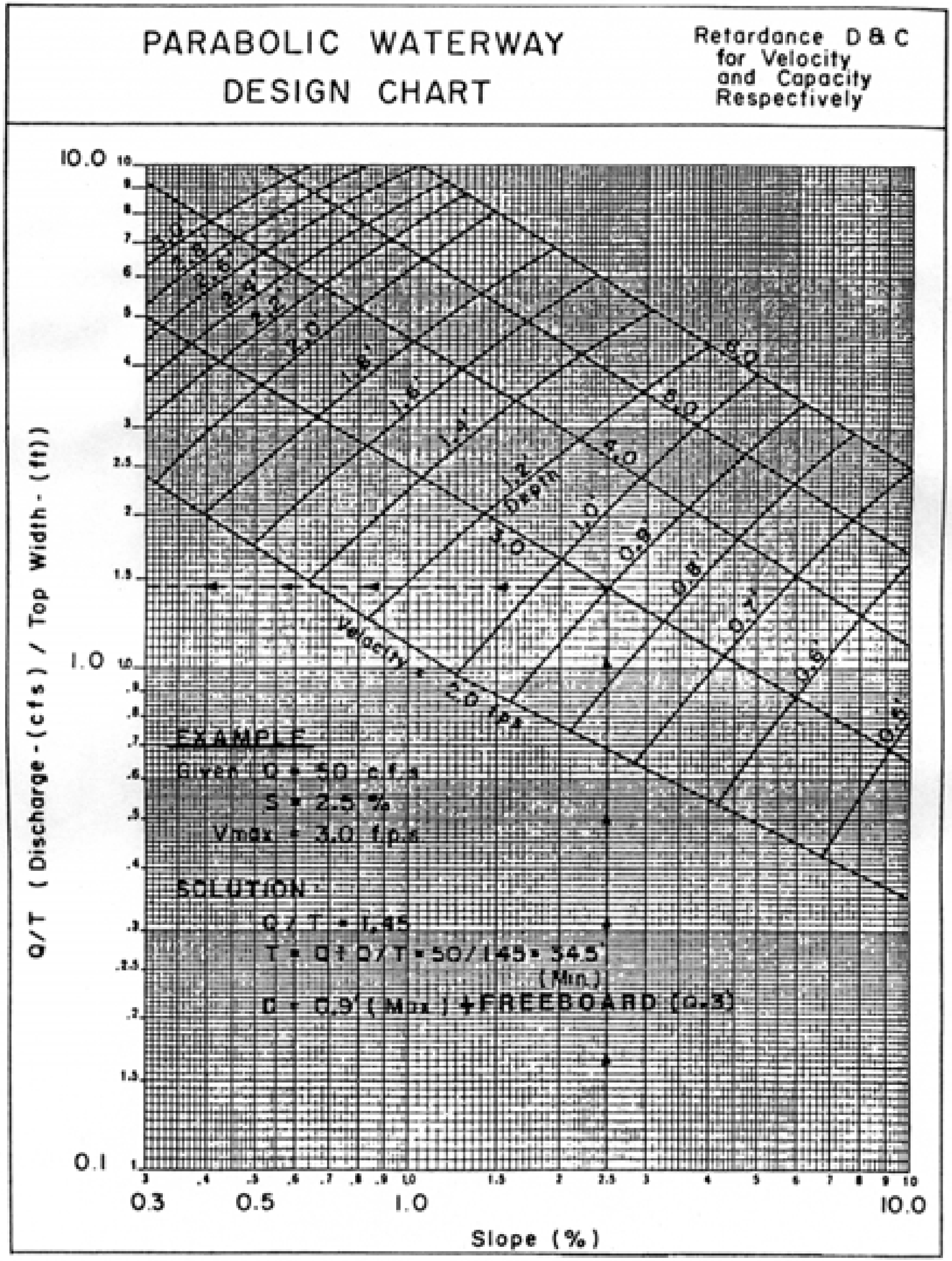
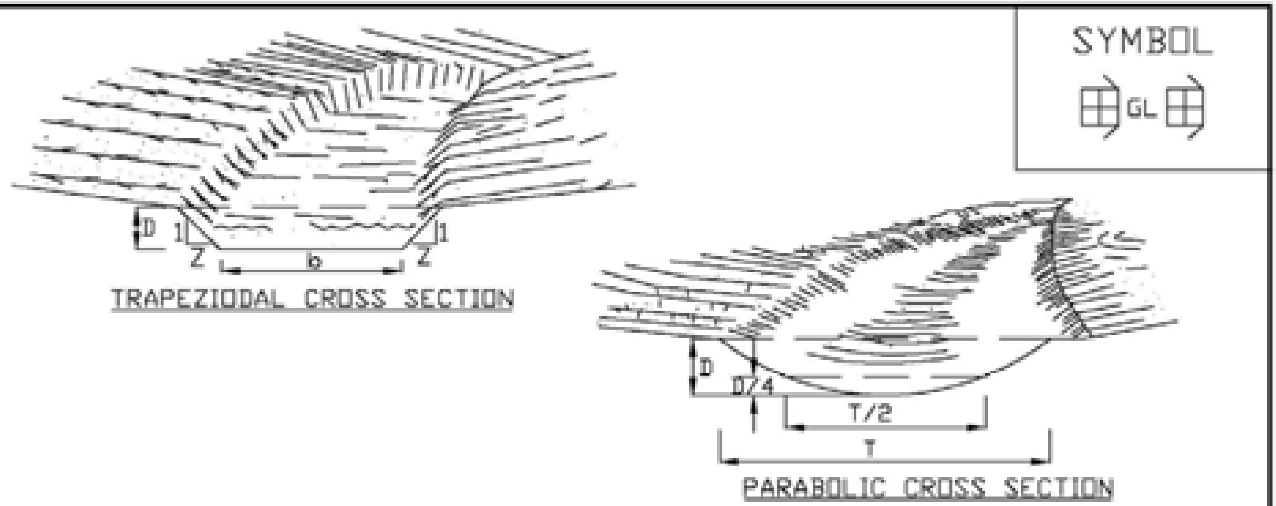


Figure 3.10
Grassed Waterway Detail



CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE WATERWAY.
2. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE WATERWAY.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY WATERWAYS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE WATERWAY DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE WATERWAY SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.
   C. STRUCTURAL - VEGETATIVE PROTECTION
      SUBSURFACE DRAIN FOR BASE FLOW SHALL BE CONSTRUCTED AS SHOWN ON THE STANDARD DRAWING AND AS SPECIFIED IN THE STANDARD AND SPECIFICATIONS FOR SUBSURFACE DRAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASSED WATERWAY

STANDARD AND SPECIFICATIONS FOR SOIL RESTORATION

Definition & Scope

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Conditions Where Practice Applies

Soil restoration is to be applied to areas whose heavy construction traffic is done and final stabilization is to begin. This is generally applied in the cleanup, site restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate ground cover to maintain the soil structure. Soil restoration measures should be applied over and adjacent to any runoff reduction practices to achieve design performance.

Design Criteria

1. Soil restoration areas will be designated on the plan views of areas to be disturbed.
2. Soil restoration will be completed in accordance with Table 4.6 on page 4.53.

Specification for Full Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil. The compost shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table, except for "Particle Size" 100% will pass the 1/2" sieve. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content.**

2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6 inches.
5. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.
6. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. This should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Maintenance

Keep the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Table 4.6
Soil Restoration Requirements

<table>
<tr><th>Type of Soil Disturbance</th><th colspan="2">Soil Restoration Requirement</th><th>Comments/Examples</th></tr>
<tr><td>No soil disturbance</td><td colspan="2">Restoration not permitted</td><td>Preservation of Natural Features</td></tr>
<tr><td>Minimal soil disturbance</td><td colspan="2">Restoration not required</td><td>Clearing and grubbing</td></tr>
<tr><td rowspan="2">Areas where topsoil is stripped only - no change in grade</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Protect area from any ongoing construction activities.</td></tr>
<tr><td>Apply 6 inches of topsoil</td><td>Aerate* and apply 6 inches of topsoil</td></tr>
<tr><td rowspan="2">Areas of cut or fill</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2"></td></tr>
<tr><td>Aerate* and apply 6 inches of topsoil</td><td>Apply full Soil Restoration**</td></tr>
<tr><td>Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)</td><td colspan="2">Apply full Soil Restoration (decompaction and compost enhancement)</td><td></td></tr>
<tr><td>Areas where Runoff Reduction and/or Infiltration practices are applied</td><td colspan="2">Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.</td><td>Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.</td><td></td></tr>
<tr><td colspan="4">* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008".</td></tr>
</table>

STANDARD AND SPECIFICATIONS FOR PERMANENT CONSTRUCTION AREA PLANTING

Definition & Scope

Establishing **permanent** grasses with other forbs and/or shrubs to provide a minimum 80% perennial vegetative cover on areas disturbed by construction and critical areas to reduce erosion and sediment transport. Critical areas may include but are not limited to steep excavated cut or fill slopes as well as eroding or denuded natural slopes and areas subject to erosion.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12", see Soil Restoration Standard. The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-5-10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seeding is preferred. See Table 4.4, "Permanent Construction Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:	Variety	lbs./ acre	lbs/1000 sq. ft.
Red Clover[1] OR	Acclaim, Rally, Red Head II, Renegade	8[2]	0.20
Common white clover[1]	Common	8	0.20
PLUS			
Creeping Red Fescue	Common	20	0.45
PLUS			
Smooth Bromegrass OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[1] add inoculant immediately prior to seeding
[2] Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre. All seeding rates are given for Pure Live Seed (PLS)

Pure Live Seed, or (PLS) refers to the amount of live seed in a lot of bulk seed. Information on the seed bag label includes the type of seed, supplier, test date, source of seed, purity, and germination. Purity is the percentage of pure seed. Germination is the percentage of pure seed that will produce normal plants when planted under favorable conditions.

To compute Pure Live Seed multiply the "germination percent" times the "purity" and divide that by 100 to get Pure Live Seed.

$$\text{Pure Live Seed (PLS)} = \frac{\%\text{ Germination} \times \%\text{ Purity}}{100}$$

For example, the PLS for a lot of Kentucky Blue grass with 75% purity and 96% germination would be calculated as follows:

$$\frac{(96) \times (75)}{100} = 72\%\text{ Pure Live Seed}$$

For 10lbs of PLS from this lot =

$$\frac{10}{0.72} = 13.9\text{ lbs}$$

Therefore, 13.9 lbs of seed is the actual weight needed to meet 10lbs PSL from this specific seed lot.

80% Perennial Vegetative Cover

50% Perennial Vegetative Cover

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the Standard and Specifications for Mulching for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.

Table 4.4
Permanent Construction Area Planting Mixture Recommendations

Seed Mixture	Variety	Rate in lbs./acre (PLS)	Rate in lbs./ 1, 000 ft^2
Mix #1			
Creeping red fescue	Ensylva, Pennlawn, Boreal	10	.25
Perennial ryegrass	Pennfine, Linn	10	.25
*This mix is used extensively for shaded areas.			
Mix #2			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	20	.50
*This rate is in pure live seed, this would be an excellent choice along the upland edge of a wetland to filter runoff and provide wildlife benefits. In areas where erosion may be a problem, a companion seeding of sand lovegrass should be added to provide quick cover at a rate of 2 lbs. per acre (0.05 lbs. per 1000 sq. ft.).			
Mix #3			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	4	.10
Big bluestem	Niagara	4	.10
Little bluestem	Aldous or Camper	2	.05
Indiangrass	Rumsey	4	.10
Coastal panicgrass	Atlantic	2	.05
Sideoats grama	El Reno or Trailway	2	.05
Wildflower mix		.50	.01
*This mix has been successful on sand and gravel plantings. It is very difficult to seed without a warm season grass seeder such as a Truax seed drill. Broadcasting this seed is very difficult due to the fluffy nature of some of the seed, such as bluestems and indiangrass.			
Mix #4			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	10	.25
Coastal panicgrass	Atlantic	10	.25
*This mix is salt tolerant, a good choice along the upland edge of tidal areas and roadsides.			
Mix #5			
Saltmeadow cordgrass (Spartina patens)—This grass is used for tidal shoreline protection and tidal marsh restoration. It is planted by vegetative stem divisions. 'Cape' American beachgrass can be planted for sand dune stabilization above the saltmeadow cordgrass zone.			
Mix #6			
Creeping red fescue	Ensylva, Pennlawn, Boreal	20	.45
Chewings Fescue	Common	20	.45
Perennial ryegrass	Pennfine, Linn	5	.10
Red Clover	Common	10	.45
*General purpose erosion control mix. Not to be used for a turf planting or play grounds.			

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4’ x 112.5’ or 8’ x 112.5’.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR ROCK OUTLET PROTECTION

Definition & Scope

A **permanent** section of rock protection placed at the outlet end of the culverts, conduits, or channels to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach.

Conditions Where Practice Applies

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This applies to:

1. Culvert outlets of all types.

2. Pipe conduits from all sediment basins, dry storm water ponds, and permanent type ponds.

3. New channels constructed as outlets for culverts and conduits.

Design Criteria

The design of rock outlet protection depends entirely on the location. Pipe outlet at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to re-concentration of flows and high velocities encountered after the flow leaves the apron.

Many counties and state agencies have regulations and design procedures already established for dimensions, type and size of materials, and locations where outlet protection is required. Where these requirements exist, they shall be followed.

Tailwater Depth

The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe, and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition; see Figure 3.17 on page 3.43 as an example. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example.

Apron Size

The apron length and width shall be determined from the curves according to the tailwater conditions:

Minimum Tailwater – Use Figure 3.16 on page 3.42
Maximum Tailwater – Use Figure 3.17 on page 3.43

If the pipe discharges directly into a well defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe, shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions. Outlets constructed on the bank of a stream or wetland shall not use grouted rip-rap, gabions or concrete.

Riprap shall be composed of a well-graded mixture of rock size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A well-graded mixture, as used herein, is defined as a mixture composed primarily of larger rock sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the rocks. The diameter of the largest rock size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum rock diameter for d_{50} of 15 inches or less; and 1.2 times the maximum rock size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Rock Quality

Rock for riprap shall consist of field rock or rough unhewn quarry rock. The rock shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual rocks shall be at least 2.5.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Anchored Slope and Channel Stabilization on page 4.7.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturer's recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged rocks. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.

3. Use the appropriate chart with the design discharge to determine the riprap size and apron length required. It is noted that references to pipe diameters in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used to adjust the design discharges.

4. Calculate apron width at the downstream end if a flare section is to be employed.

Design Examples are demonstrated in Appendix B.

Construction Specifications

1. The subgrade for the filter, riprap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grad-

ing limits when installed respectively in the riprap or filter.

3. Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps, whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.

4. Rock for the riprap or gabion outlets may be placed by equipment. Both shall each be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The rock for riprap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller rocks and spalls filling the voids between the larger rocks. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

Figure 3.16
Outlet Protection Design—Minimum Tailwater Condition Chart (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

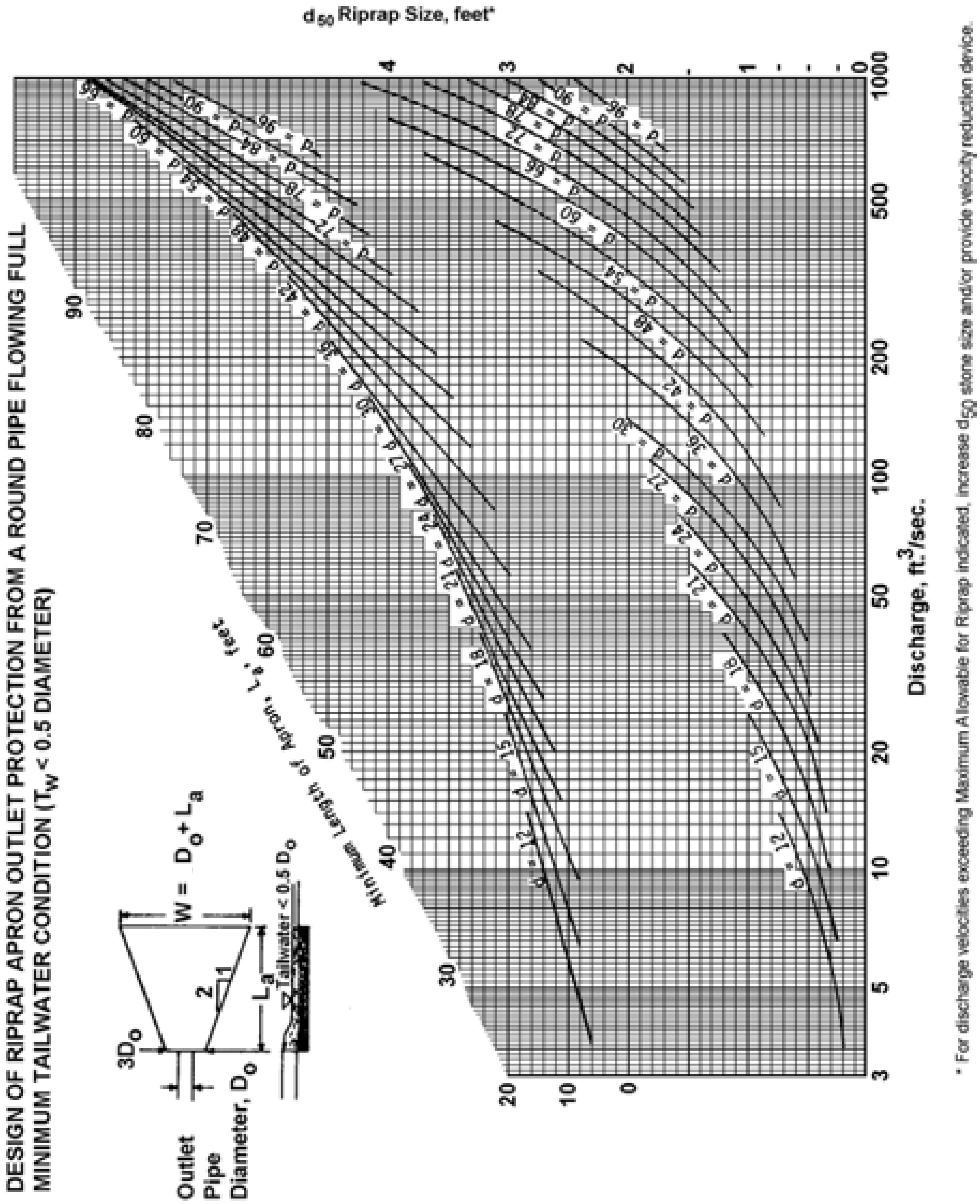


Figure 3.17
Outlet Protection Design—Maximum Tailwater Condition Chart
(Design of Outlet Protection from a Round Pipe Flowing Full, Maximum Tailwater Condition: $T_w \geq 0.5D_o$) (USDA - NRCS)

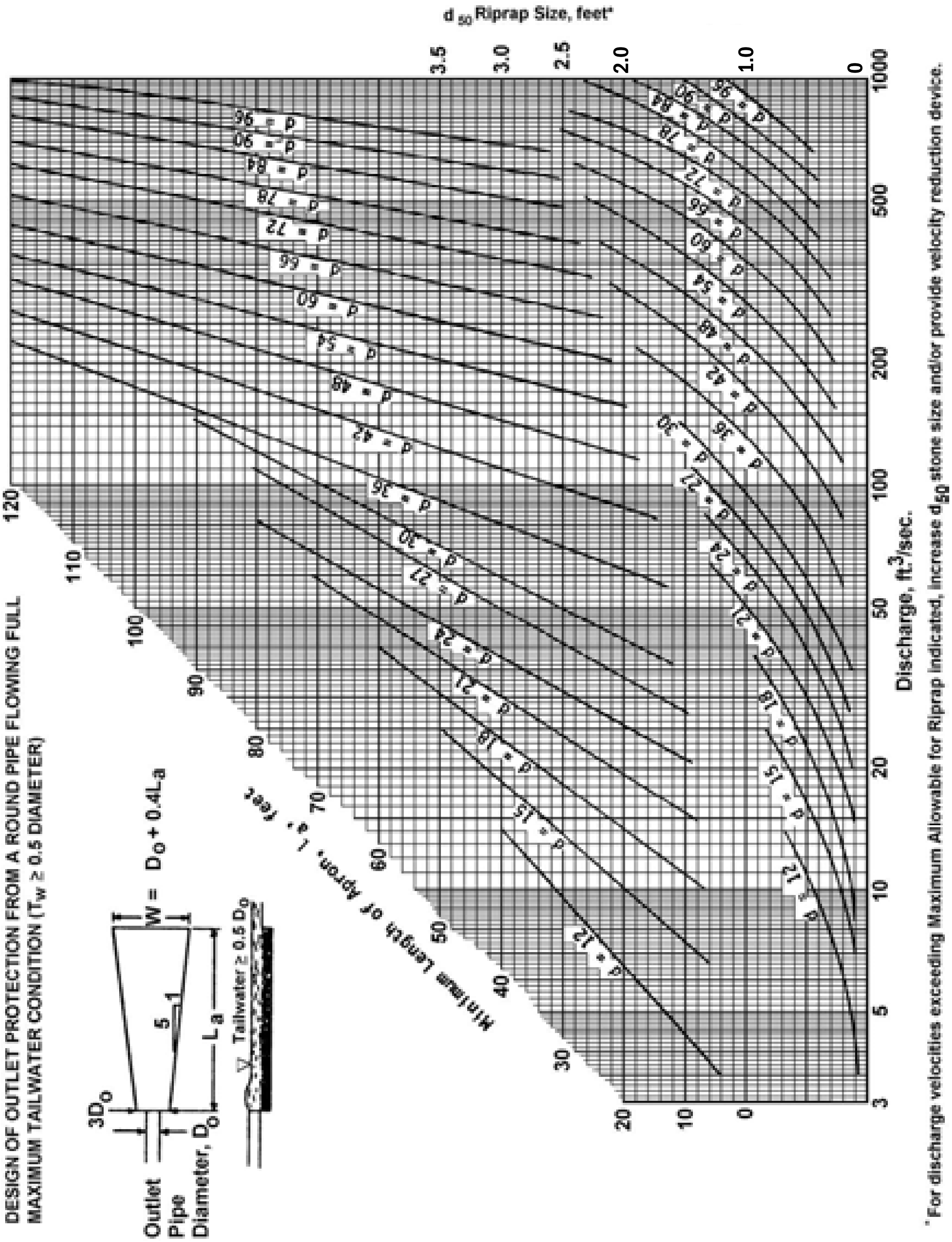


Figure 3.18
Riprap Outlet Protection Detail (1)

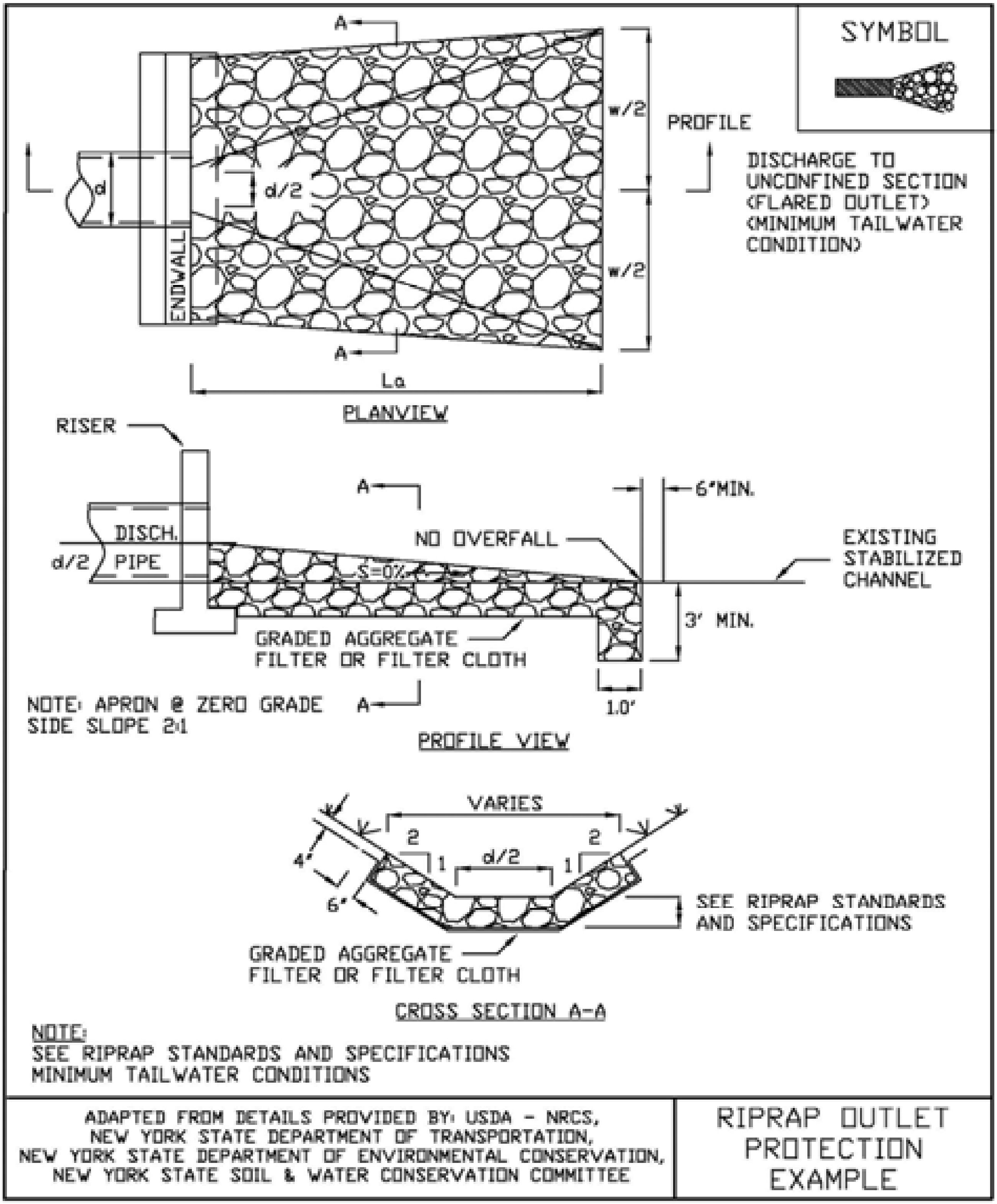


Figure 3.19
Riprap Outlet Protection Detail (2)

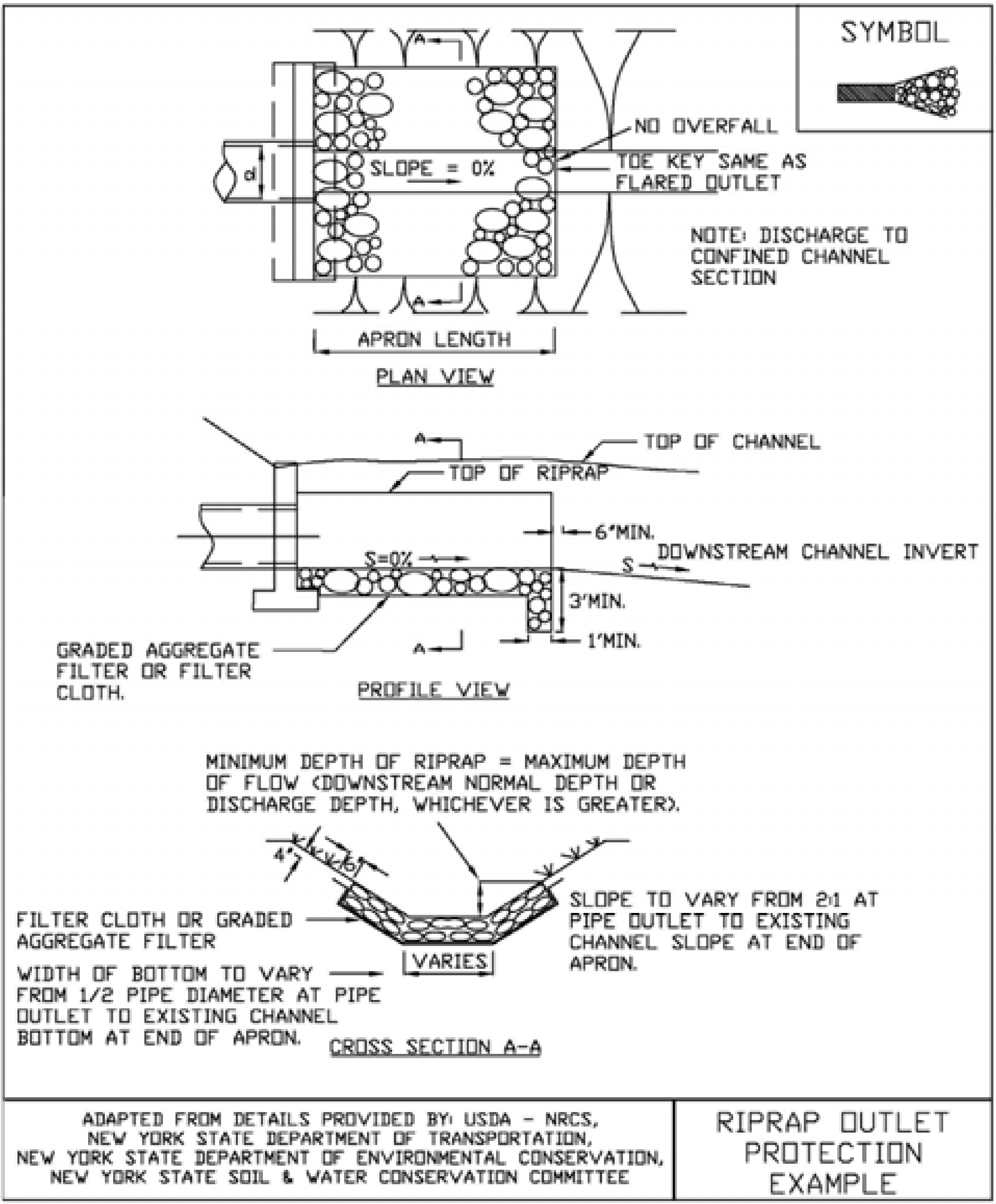
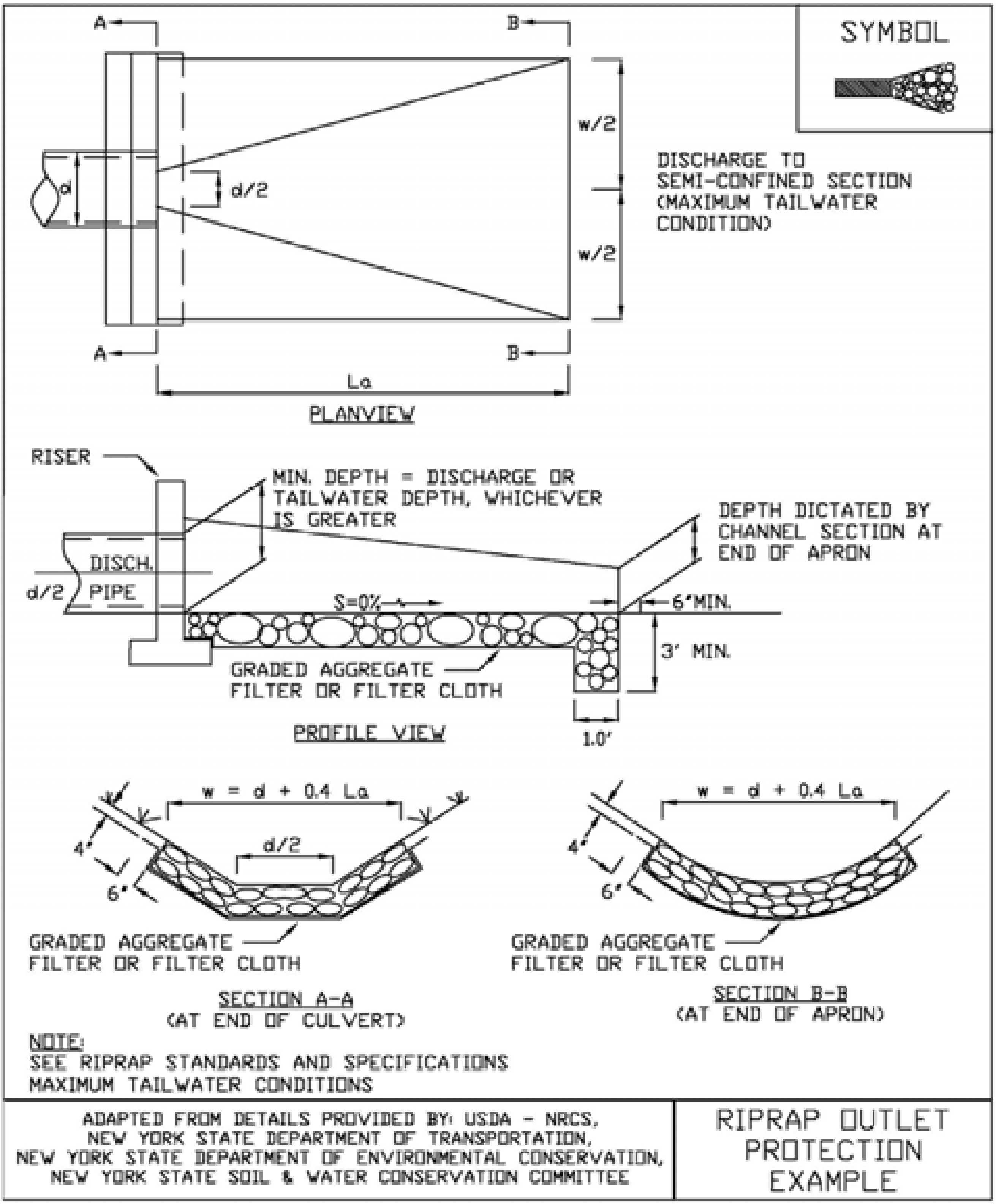


Figure 3.20
Riprap Outlet Protection Detail (3)



STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition & Scope

A **temporary** ridge of soil formed by excavating an adjoining swale located along the perimeter of the site or disturbed area. Its purpose is to prevent off site storm run-on from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 3.14 on page 3.36 for details.

The perimeter dike/swale shall not be constructed outside property lines or setbacks without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

<u>Drainage area</u> – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or construction ditch; for drainage areas larger than 10 acres, see standard and specifications for diversion).

<u>Height</u> – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

<u>Bottom width of dike</u> – 2 feet minimum.

<u>Width of swale</u> – 2 feet minimum.

<u>Grade</u> – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

<u>Stabilization</u> – The disturbed area of the dike and swale shall be stabilized within 2 days of installation, in accordance with the standard and specifications for construction ditch (page 3.4).

Outlet

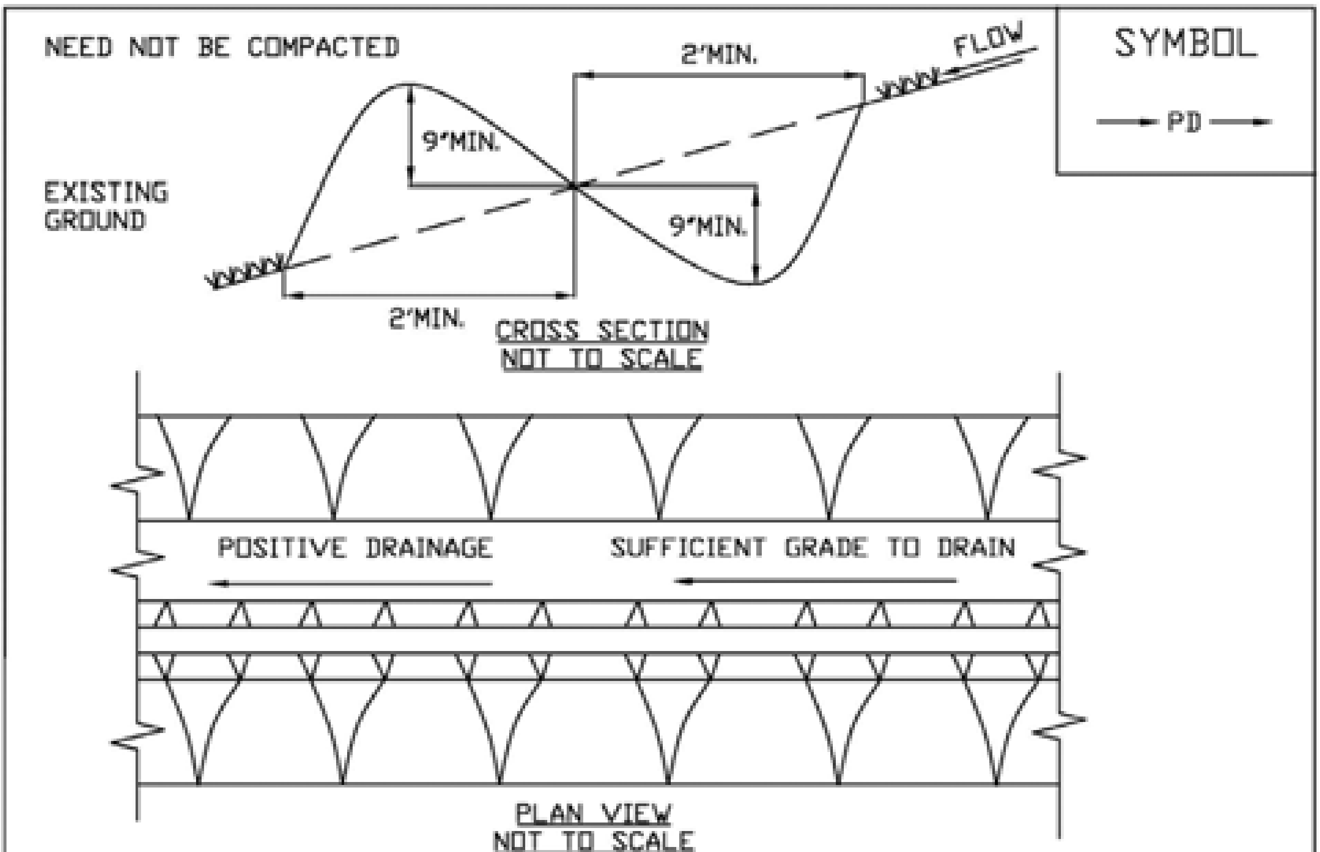
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 3.14
Perimeter Dike/Swale Detail



CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 2 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR TEMPORARY CONSTRUCTION AREA SEEDING

Definition & Scope

Providing temporary erosion control protection to disturbed areas and/or localized critical areas for an interim period by covering all bare ground that exists as a result of construction activities or a natural event. Critical areas may include but are not limited to steep excavated cut or fill slopes and any disturbed, denuded natural slopes subject to erosion.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).

IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding and can be a hazard to young wildlife species.

STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition & Scope

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas to provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.
2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established. Topsoil stockpiles must be stabilized. Stockpile surfaces can be stabilized by vegetation, geotextile or plastic covers. This can be aided by orientating the stockpile lengthwise into prevailing winds.
3. Refer to USDA Natural Resource Conservation Service soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion and sediment control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.
2. Complete rough grading and final grade, allowing for depth of topsoil to be added.
3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted in accordance with the Soil Restoration Standard.
4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.
2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.
3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.
4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.
5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.
6. Topsoil may be manufactured as a mixture of a mineral component and organic material such as compost.

Application and Grading

1. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.
2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by “tracking” with suitable equipment.
3. Apply topsoil in the amounts shown in Table 4.7 below:

Table 4.7 - Topsoil Application Depth		
Site Conditions	**Intended Use**	**Minimum Topsoil Depth**
1. Deep sand or loamy sand	Mowed lawn	6 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	1 in.
2. Deep sandy loam	Mowed lawn	5 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	none
3. Six inches or more: silt loam, clay loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STANDARD AND SPECIFICATIONS FOR TREES, SHRUBS, AND VINES

Definition & Scope

Establishing trees, shrubs, and vines or selectively reducing stand density and trimming woody plants to protect the soil and plant resources, improve an area for recreation and increase the attractiveness and usefulness of areas.

Conditions Where Practice Applies

On any area planned for recreation or landscape use such as yard areas, leisure areas, picnic areas, and park lands providing outdoor recreational opportunities.

Criteria and Specifications

1. Planting nursery stock

   A. Select species to serve the intended purpose. See Appendix G, Table G.1**,** "Trees Suitable for Landscape and Conservation Plantings in New York." Where planting of trees is to be done in recreation areas, use those species resistant to compaction listed in Table G.2, "Susceptibility of Tree Species to Compaction" whenever possible.

   B. Plant Materials

   1) Plants shall conform to the species, variety, size, number, and conditions as stated in a conservation plan or on a plant list shown on landscape drawings. "American Standard for Nursery Stock," by American Association of Nurserymen, shall be used to develop the plant list for landscape drawings and to check quality of plant materials.

   2) Durable, legible labels with the scientific and common name and cultivar shall be securely attached to plants, bundles of seedlings, containers, and/or flats.

   C. Plant Protection

   Prior to delivery, the trunk, branches, and foliage of the plants shall be sprayed with non-toxic antidesiccant, applied according to the manufacturer's recommendations. This does not apply to state nursery seedlings.

   D. Planting Time

   Deciduous trees and shrubs: April 1 to June 1 and October 15 to December 15. Evergreen trees and shrubs: April 1 to June 1 and September 1 to November 15.

   E. Spacing

   Plant all trees and shrubs well back from buildings to allow for mature crown size. The following are guides for planning:

Large Trees	50-60 feet apart
Small Trees	20-30 feet apart
Columnar Species	6-8 feet apart
Hedges	1-4 feet apart
Shrubs	For clumps, plan spacing so mature shrubs will be touching or overlapping by only 1 or 2 feet

   F. Site Preparation

   1) Individual sites for planting seedlings can be prepared by scalping the sod away from a four foot square area where the seedling is to be planted.

   2) All planting beds shall be cultivated to a depth of 8 inches, or chemically treated for weed control. Remove objectionable objects that will interfere with maintenance of site.

   G. Planting

   1) Plants shall be located as shown on plans and/or drawings and, where necessary, located on the site by stakes, flags or other means.

   2) Prior to planting, remove galvanized wire basket securing root ball, untie and roll down burlap covering from around the stem.

3) The plants shall be set upright in holes as illustrated in Figure G.1 in Appendix G.

4) All plants shall be thoroughly watered on the same day of planting. Plants that have settled shall be reset to grade.

H. Wrapping

Immediately after planting, wrap deciduous tree trunks from the bottom to the first limb with a 4 inch wide bituminous impregnated, insect resistant tape or paper manufactured for that purpose. Tie with jute (bag strings) at top and bottom. The wrap should be removed per nursery recommendations.

I. Mulching

Mulch the disturbed area around individual trees and shrubs with a 2-3" layer of wood chips. Pull wood chips 1 inch away from the base of shrubs to avoid fungus development.

J. Pruning

After planting, prune to remove injured twigs and branches. The natural shape of the plant should not be changed.

K. Cleanup and Maintenance

1) After all work is complete, all excess soil, peat moss, debris, etc., shall be removed from the site.

2) Water plants two weeks after planting. For two years, water plants every two weeks during dry periods, which exceed three weeks without a good soaking rain, or water as needed in accordance with local conditions. Shrubs may require 5 to 10 gallons and trees, 20 to 30 gallons for each watering.

3) Remove trunk wrap per nursery recommendation.

2. Transplanting "Wild" Stock

Successful transplanting of wild stock will require heavy equipment and considerable labor as a large weight of soil must be moved with the roots.

A. Select trees and shrubs with good form and full crowns.

B. Transplant only when plants are dormant and soil is moist. Wrap soil ball with burlap to prevent soil from separating from roots.

C. Table 4.8 shows minimum diameter and approximate weight of soil ball that must be moved with each size plant.

D. Plant and maintain as described above for nursery stock.

PRUNING AND THINNING

Use	Cleared Width Each Side of Trail Tread (ft.)	Cleared Height (ft.)
TRAILS		
Hiking	1	8
Bicycle	2	10
Motorbike	2	10
Horse	2	12
X-Country Ski	Total: 3-12	12[1]
Snowmobile	Total: 6-12	12[1]
PICNIC & CAMPING AREAS		
Campfire/Grill	10 ft. diam.	15
[1] Includes allowance for snow depth and snow load on branches		

1. Pruning

A. Remove trees, limbs, and limb stubs to the above widths and heights specified for the intended use.

B. Remove dead, diseased, or dying limbs that may fall.

C. Do not remove more than one-third of the live crown of a tree in a year.

D. Cut limbs flush to the branch bark ridge.

E. Use the 3 or 4 cut pruning method on all branches over 2 inches in diameter: First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

2. Thinning

   A. Remove dead, diseased, dying, poorly anchored, or ice damaged trees that pose a hazard to recreationists or that interfere with intended use.

   B. To maintain grass cover in a wooded area, thin according to formula Dx3 (average diameter of the trunk of overstory trees, in inches, times three—the answer is the spacing between trees to be left, in feet). For example, for trees with average diameter of 6 inches, spacing after thinning should leave trees 18 feet apart on average. Crown cover after thinning should be about 50 percent.

   C. Selectively thin as needed to favor those trees that are most "resistant" to compaction around their roots. See Table G.2**,** "Susceptibility of Tree Species to Compaction" in Appendix G. If the soil on the site is naturally well drained, those species in the "intermediate" group may also be favored.

Table 4.8
Size and Weight of Earth Ball Required to Transplant Wild Stock

	Shade Trees (Maple, Ash, Oak, Birch, etc.)		Small Trees & Shrubs (Crabapple, Thornapple, Viburnum, Dogwood, etc.)		
Caliper[1] (Inches)	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)	Up to 6 ft. Height — 6 ft. and Caliper[1]	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)
1/2	14	88	2	12	55
3/4	16	130	3	14	88
1	18	186	4	16	130
1-1/4	20	227	5	18	186
1-1/2	22	302	3/4	18	186
1-3/4	24	390	1	20	227
2	28	621	1-1/2	22	302
3	32	836	1-3/4	24	390
3-1/2	38	1,400	2	28	621
4	42	1,887	2-1/2	32	836
			3	38	1,400

[1]Caliper is a diameter measurement of trees at a height of 6 inches above the ground.

STANDARD AND SPECIFICATIONS FOR VEGETATING WATERWAYS

Definition & Scope

Waterways are a **permanently** constructed conveyance channel, shaped or graded. They are vegetated for the safe transport of excess surface water from construction sites and urban areas without damage from erosion.

Conditions Where Practice Applies

This standard applies to vegetating waterways and similar water carrying structures.

Supplemental measures may be required with this practice. These may include: subsurface drainage to permit the growth of suitable vegetation and to eliminate wet spots; a section stabilized with asphalt, stone, or other suitable means; or additional storm drains to handle snowmelt or storm runoff.

Retardance factors for determining waterway dimensions are shown in Table 3.1 on page 3.10 and "Maximum Permissible Velocities for Selected Grass and Legume Mixtures" (See Table 4.10 on page 4.79).

Design Criteria

Waterways or outlets shall be protected against erosion by vegetative means as soon after construction as practical. Vegetation must be well established before diversions or other channels are outletted into them. Consideration should be given to the use of turf reinforcement mats, excelsior matting, other rolled erosion control products, or sodding of channels to provide erosion protection as soon after construction as possible. It is strongly recommended that the center line of the waterway be protected with one of the above materials to avoid center gullies and to protect seedlings from erosion before establishment.

1. Liming, fertilizing, and seedbed preparation.
   A. Lime to pH 6.5.
   B. **The soil should be tested to determine the amounts of amendments needed.** If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 1.0 lbs/1,000 sq. ft. of N, P_2O_5, and K_2O.
   C. Lime and fertilizer shall be mixed thoroughly into the seedbed during preparation.
   D. Channels, except for paved section, shall have at least 4 inches of topsoil.
   E. Remove stones and other obstructions that will hinder maintenance.
2. Timing of Seeding.
   A. Early spring and late August are best.
   B. Temporary cover to protect from erosion is recommended during periods when seedings may fail.
3. Seed Mixtures:

Mixtures	Rate per Acre (lbs)	Rate per 1,000 sq. ft. (lbs)
A. White clover or ladino clover[1]	8	0.20
Smooth bromegrass	20	0.45
Creeping red fescue[2]	2	0.05
Total	30	0.70
OR		
B. Smooth bromegass[3]	25	0.60
Creeping red fescue	20	0.50
Perennial ryegrass	10	0.20
Total	55	1.30

[1] Inoculate with appropriate inoculum immediately prior to seeding. Ladino or birdsfoot trefoil may be substituted for common white clover and seeded at the same rate.

[2] Perennial ryegrass may be substituted for the creeping red fescue but increase seeding rate to 5 lbs/acre (0.1 lb/1,000 sq. ft).

[3] Use this mixture in areas which are mowed frequently. Common white clover may be added if desired and seeded at 8 lbs/acre (0.2 lb/1,000 sq. ft.)

4. Seeding

Select the appropriate seed mixture and apply uniformly over the area. Rolling or cultipacking across the waterway is desirable.

Waterway centers or crucial areas may be sodded. Refer to the standard and specification for Stabilization with Sod. Be sure sod is securely anchored using staples or stakes.

5. Mulching

All seeded areas will be mulched. Channels more than 300 feet long, and/or where the slope is 5 percent or more, must have the mulch securely anchored. Refer to the standard and specifications for Mulching for details.

6. Maintenance

Fertilize, lime, and mow as needed to maintain dense protective vegetative cover.

Waterways shall not be used for roadways.

If rills develop in the centerline of a waterway, prompt attention is required to avoid the formation of gullies. Either stone and/or compacted soil fill with excelsior or filter fabric as necessary may be used during the establishment phase. See Figure 4.25, Rill Maintenance Measures. Spacing between rill maintenance barriers shall not exceed 100 feet.

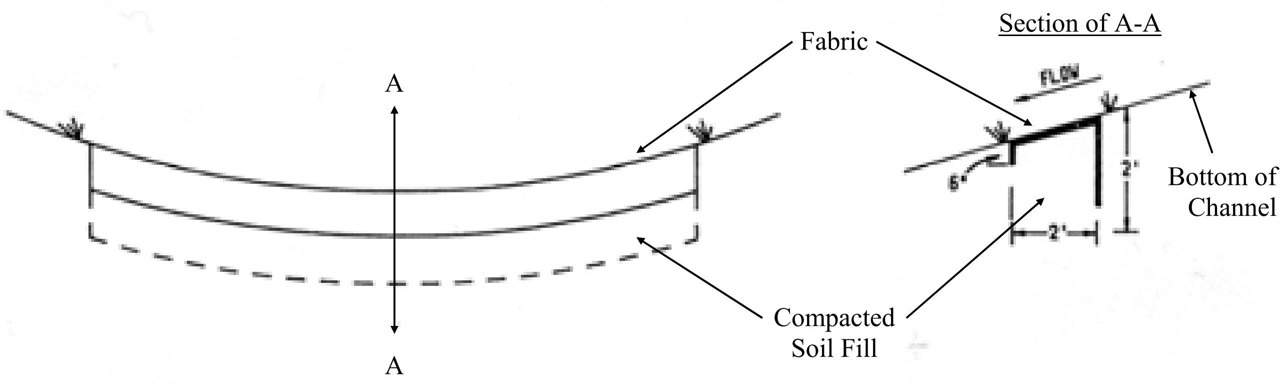
Table 4.10
Maximum Permissible Velocities for Selected Seed Mixtures

Cover	Slope Range [2] (%)	Permissible Velocity [1]	
		Erosion-resistant Soils (ft. per sec.) K=0.10 - 0.35 [3]	Easily Eroded Soils (ft. per sec.) K=0.36 - 0.80
Smooth Bromegrass Hard Fescue	0-5 5-10 Over 10	7 6 5	5 4 3
Grass Mixtures	[2] 0-5 5-10	5 4	4 3
White/Red Clover Alfalfa Red Fescue	[4] 0-5	3.5	2.5

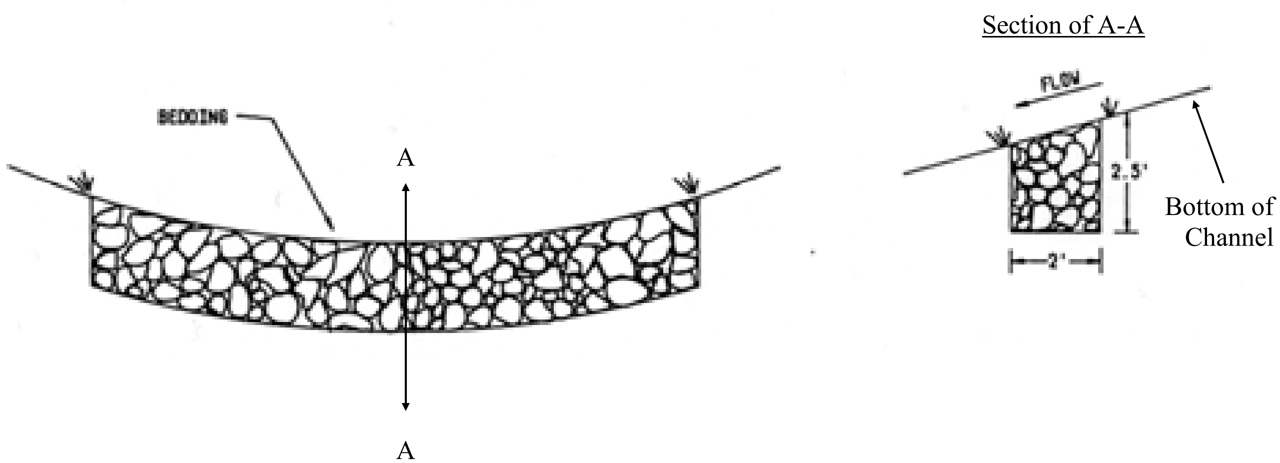
[1] Use velocities exceeding 5 feet per second only where good covers and proper maintenance can be obtained.
[2] Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
[3] K is the soil erodibility factor used in the Revised Universal Soil Loss Equation. Visit Appendix A or consult the appropriate USDA-NRCS technical guide for K values for New York State soils.
[4] Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
[5] Annuals - use on mild slopes or as temporary protection until permanent covers are established.
[6] Use on slopes steeper than 5 percent is not recommended.

Figure 4.25
Rill Maintenance Measures

Filter Fabric



Stone



STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK

Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12” – 32” except that 8” diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	5	10	20	25	33	50
8	225*	200	100	50	20	—	—
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50
* Length in feet							

5. The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC’s 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**

6. The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2" x 2" wooden stakes driven 12" into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.

4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.

5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

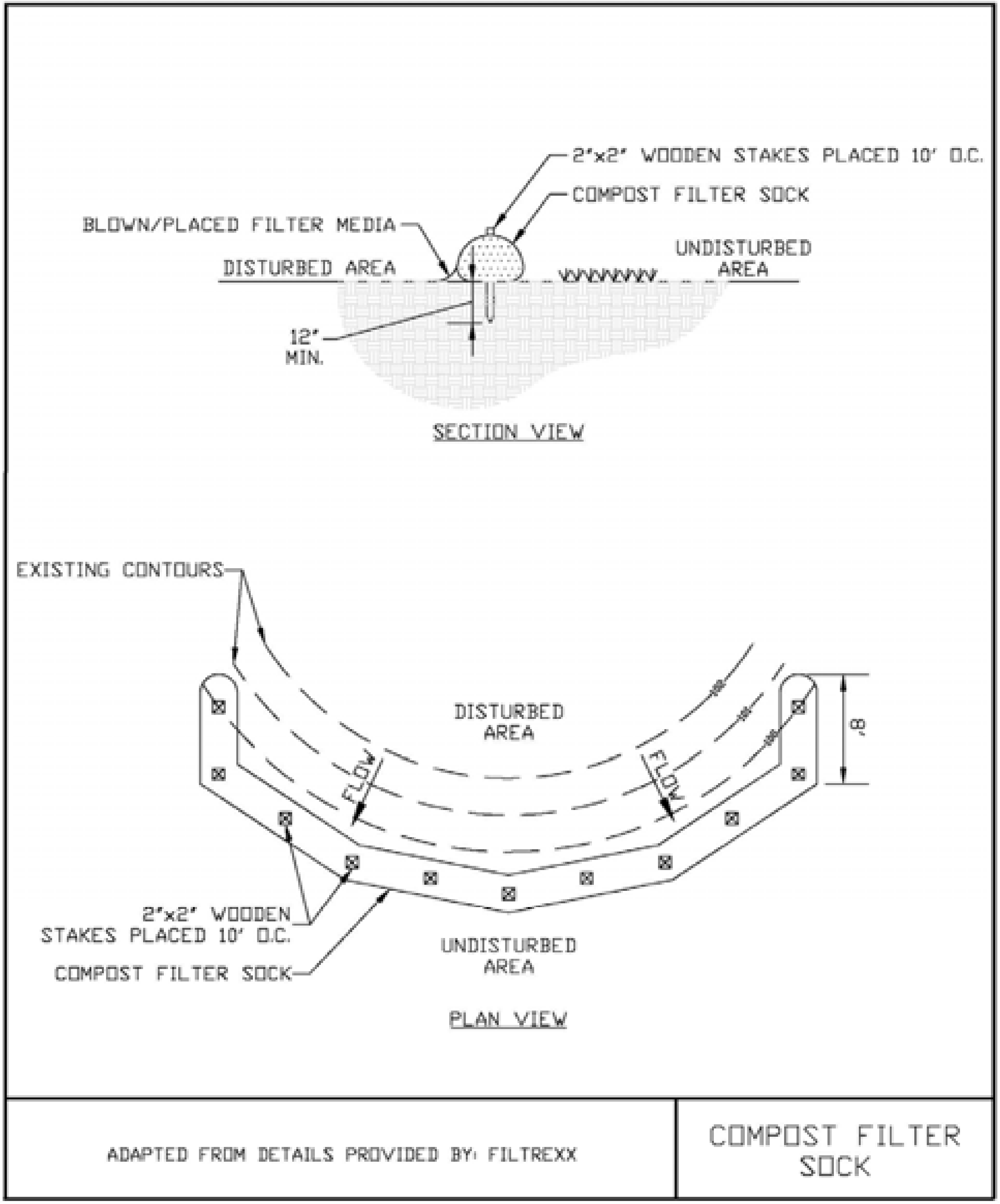
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Table 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1" screen and 10 - 50% passing a 3/8" screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR DEWATERING DEVICE

Definition & Scope

An appurtenance to a sediment trapping structure such as a basin or trap that allows sediment laden water to pond allowing sediment to settle out while removing relatively clean water to a suitable, stable outlet.

Condition Where Practice Applies

Dewatering devices are appropriate where the discharge from a trap or basin will be by gravity flow through a riser and pipe outlet system. The skimmer dewatering device is the preferred option. A fixed pipe dewatering device, configured as a perforated vertical riser surrounded by filter fabric and stone material is an alternate option for small structures.

Design Criteria

Skimmer Device

1. Skimmers must be designed so as to float just beneath the water surface to remove the least sediment laden water effectively.

2. Skimmer shall be constructed with a 4 foot long flexible pipe elbow to allow for vertical movement of the skimmer for its designated range of operation.

3. The designer will provide a table that shows all required dimensions for the skimmer. An example of this table is shown in Figure 5.4 on page 5.12. See design example in Appendix B.

4. The skimmer will be provided with vertical travel guides and a resting stone pad set at the appropriate design elevation.

5. The orifice plate will be at the "T" intersection of the perforated skimmer section with the non-perforated extension arm.

Riser-Pipe Device

1. The riser-pipe device is constructed as a fixed rigid structure with a larger diameter pipe as the vertical riser connected to a smaller diameter horizontal pipe barrel.

2. The joint of these two conduits will be anchored by means of a concrete block or welded steel plate to prevent flotation.

3. The riser will be perforated above the bottom of the dewatering zone elevation and wrapped with a geotextile filter fabric to filter out sediment.

4. The filter fabric shall be covered with stone graded as NYSDOT #1, #2, or a blend of both, to protect the fabric from deterioration.

5. An orifice plate shall be placed in the riser at the bottom of the dewatering zone elevation to control the dewatering rate.

Dewatering Drawdown

As a minimum, sediment traps and basins should have their temporary storage dewatered over a 48 hour period to maximize sediment retention. If the soils disturbed within the drainage area will have 60% - 80% fines the settling time should be increased to 4 days. Soils containing greater than 80% fines will need longer settling times but in no case longer than 7 days to maintain the hydraulic performance of the basin for recurring runoff events.

1. Skimmer orifices may be sized by using the design chart shown in Figure 5.3 on page 5.11.

2. Riser-pipe orifice sizes may be approximated by the following formula:

$$A_0 = \frac{A_s \times 2h^{0.5}}{T \times C_d \times 20{,}428}$$

Where:

A_0 = Areas of the dewatering orifice (ft^2)

As = Surface area of the basin/trap (ft^2)

h = head of water above the orifice (ft)

C_d = 0.6 (contraction coefficient of an orifice)

T = Detention time needed to dewater basin (48 hours minimum)

Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non-perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.

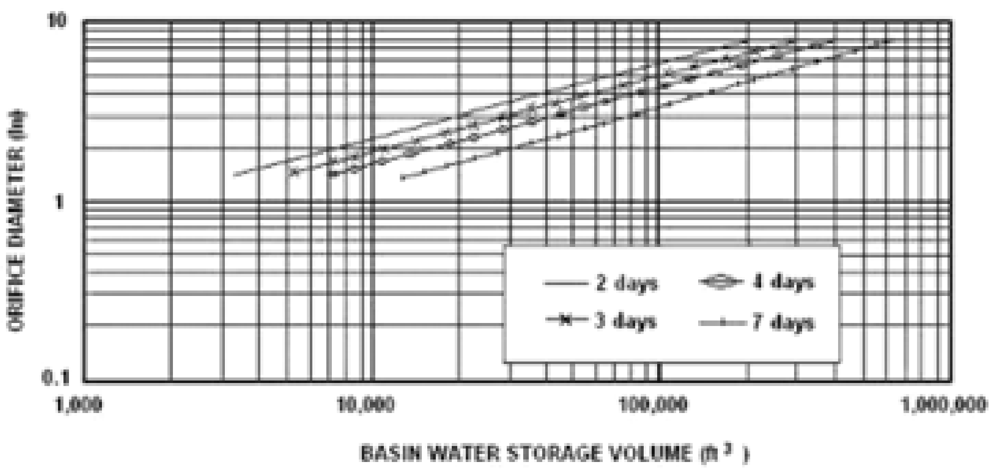
2. Filter fabric or media will be replaced as needed.

3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

Figure 5.3 - Skimmer Orifice Design Chart



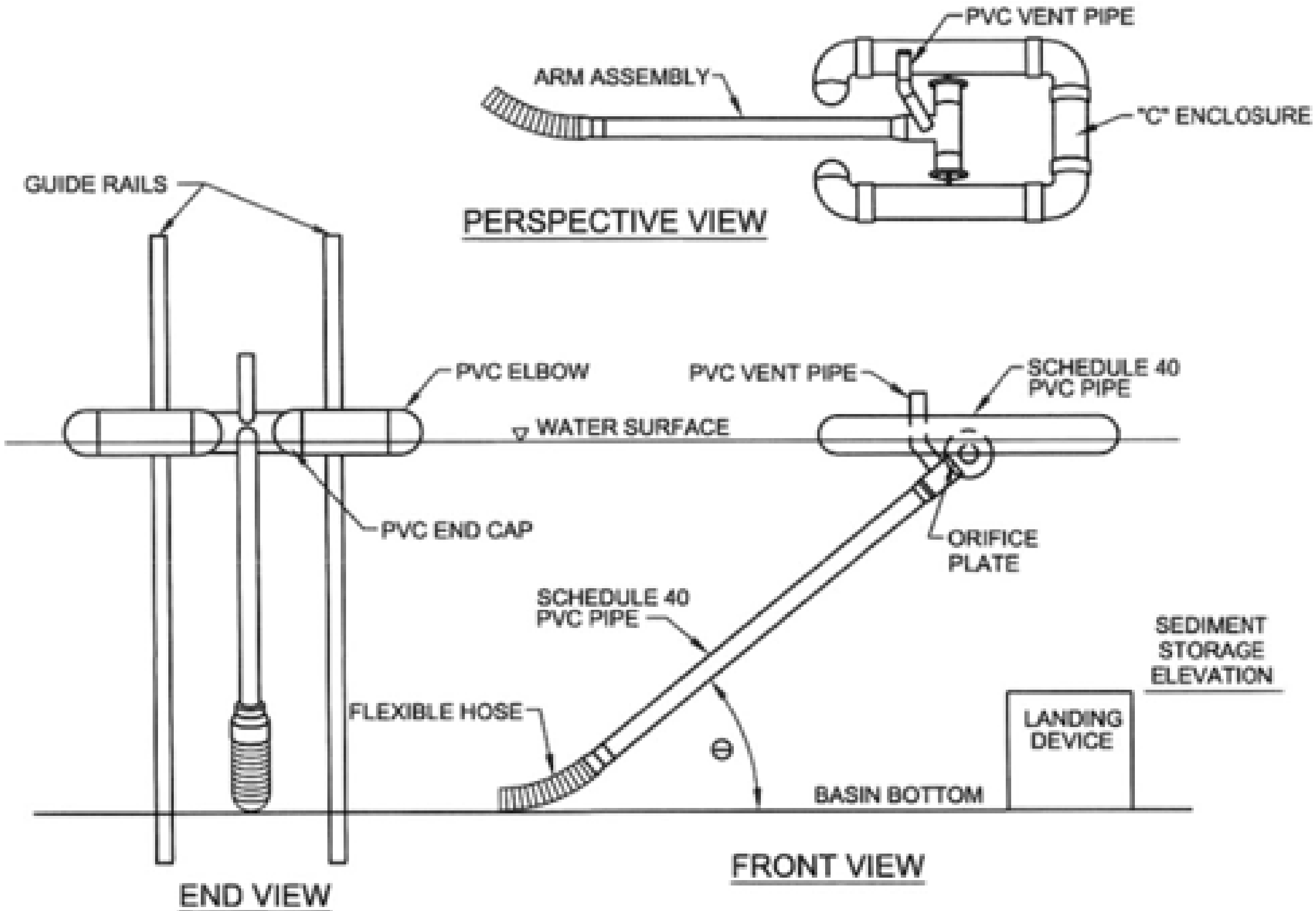
* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3” to 5” head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2” diameter, use a 2” head. For a 3” diameter tube, use a 2.5” head; 4” tube, use 3.3” head, 5” tube use 4” head, and 6” diameter tube use 5” head.

2. Find the vertical line representing the basin’s dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)
* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle) ** Must be equal to or less than arm diameter							

Skimmer Construction Notes

1. Pipe flotation section shall be solvent welded to ensure an airtight assembly. The contractor is required to conduct a test to check for leaks prior to installation.

2. Skimmer section shall have 12 rows of 1/2” diameter holes, 1 1/4” on center. If additional filtration is necessary, the filtering media shall consist of a Type GD-II geotextile fabric wrapped around the perforated portion of the skimmer and attached with plastic snap ties, bands, etc.

3. Flexible pipe shall be inserted into solid pipe and fastened with 2 #8 wood screws.

4. At a minimum, the structure shall be inspected after each rain and repairs made as needed. If vandalism is a problem, more frequent inspection may be necessary.

5. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

6. The structure shall only be removed when the contributing drainage area has been properly stabilized.

Materials

(Note: materials for a 4” diameter arm assembly)

1. Solid Pipe - 4” Schedule 40 PVC

2. Perforated Pipe - 4” Schedule 40 PVC

3. 90º Tee (1 each) - 4” Schedule 40 PVC

4. 90º Elbow (4 each) - 4” Schedule 40 PVC

5. Cap (2 each) - 4” Schedule 40 PVC, solid

6. Flexible pipe - 4” Corrugated Plastic Tubing (non-perforated)

Figure 5.5
Riser Pipe Dewatering Device

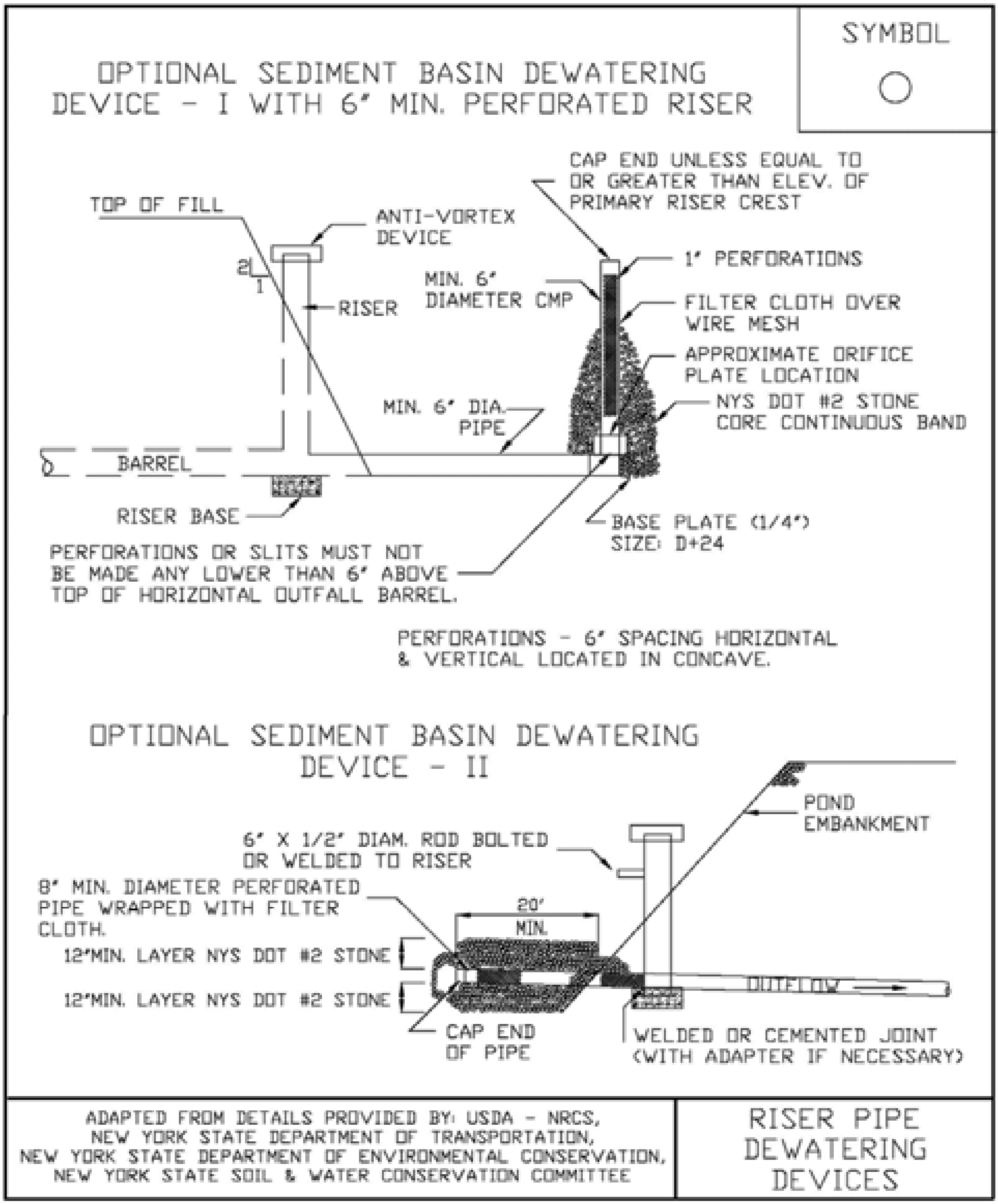


Figure 5.6
Riser Pipe Dewatering Device Construction Notes

Riser Pipe Construction Notes

1. Standpipe and connector pipe shall be a minimum of 6 inches diameter.

2. Metal pipe may be galvanized steel or aluminum; plastic pipe may be Schedule 40 PVC or HDPP.

3. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

4. The structure shall only be removed when the contributing drainage area has been properly stabilized.

5. All pipe connections shall be watertight. The lower portion of the standpipe, at a point above the barrel connection, shall be fitted with an internal orifice plate sized to release the volume of the basin no sooner than 48 hours.

6. The top 2/3 of the standpipe shall be perforated with 1 inch diameter hole or slit spaced 6 inches vertically and horizontally and placed in the concave portion of the pipe. No holes will be allowed within 6 inches inches of the horizontal connector pipe.

7. The riser shall be wrapped with a Type GD-II geotextile fabric. The fabric shall extend 6inches above the highest hole and 6" below the lowest hole. Where ends of fabric come together, they shall be overlapped, folded and stapled to prevent bypass.

8. Straps or connecting bands shall be used to hold the fabric and wire mesh (as needed) in place. They shall be placed at the top and bottom of the cloth.

9. The standpipe shall be anchored with either concrete base or steel plate base to prevent flotation. Concrete bases shall be 12 inches thick with the standpipe embedded nine inches. Steel plate bases will be 1/4 inch minimum thickness attached to the standpipe by a continuous weld around the bottom to form a watertight connection. The plate shall have 2.5 feet of stone, gravel or tampered earth placed on it.

10. The perforated standpipe shall be surrounded by NYSDOT #1 or #2 stone or a blend of both to protect the filter fabric.

STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN

Definition & Scope

A **temporary** basin with a barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainageways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other control measures to adequately control runoff, erosion, and sedimentation. However, it is required that other erosion control measures be used with the sediment basin. The basin may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 50 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as **permanent** structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams."

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location - Maximum Drainage Area = 50 acres

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The sediment basin will contain two separate zones. The lowest zone is the sediment storage zone. This zone is sized for a volume equal to 1,000 cubic feet per disturbed acre over the course of the life of the project, contributing to the basin as measured from the bottom of the basin to the bottom of the dewatering zone. It shall have a minimum depth of 1 foot. Layered above this zone is the dewatering zone. This zone is sized for a minimum volume equal to 3,600 cubic feet per each acre draining to the basin. This volume is temporarily stored between the sediment storage zone and the crest of the principal spillway. This zone should be a minimum of 3 feet deep. See Figures 5.8 and 5.9 on pages 5.26 and 5.27. This 3,600 cubic feet per acre is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be 2:1 or greater, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end. See Figure 5.22 on page 5.41.

Surface Area

Research studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x\ D.A.$ (whichever is greater)

where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm. (The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

Sediment basins shall be cleaned out when the sediment storage zone volume described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the bottom of the dewatering zone. At this elevation, cleanout shall be performed to restore the original design volume to the sediment storage zone.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by standard accepted hydrologic methods noted previously in this book of standards. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten (10) year frequency, 24 hour duration storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5.10, 5.11 and 5.12 on pages 5.28, 5.29, and 5.30 for principal spillway sizes and capacities.

   A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

   B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not be other holes, leaks, rips, or perforations in the structure.

   C. Dewatering the basin:

   1) Preferred Method- The preferred method for dewatering sediment basins is by using surface skimmers to decant the cleaner top surface water from the basin as the sediment settles out. See Dewatering Device Standard, page 5.10.

   2) Alternative Method– A fixed vertical riser pipe configured with perforations and filter fabric with a cone of pea gravel or small crushed stone is an alternative option for use. See Figure 5.5 on page 5.14.

   The sediment basin dewatering system shall be designed to release the dewatering zone volume between 2 to 7 days in watersheds not impaired by sediment, and 4-7 days in sediment impaired watersheds (check the NYSDEC Waterbody Inventory/Priority Waterbody List - **http://www.dec.ny.gov/chemical/36730.html**, to see if your site is in an impaired watershed). The design performance range will depend on the percent of silt and clay in the soils tributary to the basin. If the performance of the basin does not meet water quality objectives after 7 days, chemical treatment may be necessary.

   D. Anti-vortex device and trash rack:

   An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5.13 and 5.14 on pages 5.31 and 5.32.

   E. Base:

   The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼” minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

   For risers greater than ten feet high, computations shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5.15 on page 5.33 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

$$2(N)(P) = 1.15(L_s) \qquad N = (0.075)(L_s)/P$$

When anti-seep collars are used, the equation for revised seepage length becomes:

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight. See Figures 5.16 and 5.17 on pages 5.34 and 5.35 for anti-seep collar design and Figure 5.18 on page 5.36 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, Section 3, page 3.39.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5.19 on page 5.37 and the Design Tables in Figures 5.20 and 5.21 on pages 5.38 and 5.39.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

1. The maximum height of dam = 15 feet (measured from the low point of original ground at the downstream toe to the top of the dam).

2. Minimum top width of dam = 10 feet.

3. Side slopes shall be 2.5 to 1 or flatter.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for severe gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method (s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basins plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. **Sediment shall not be allowed to flush into a stream or drainageway.**

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include anionic polyelectrolytes such as polyacrylimides, aluminum sulfate (alum), polyaluminum chloride and chitosan. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. **Chemical applications shall not be applied without written approval from the NYSDEC.**

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than three (3) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified depth for cleanout noted on the plans which will not exceed 50% of the capacity of the sediment storage zone. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and backfilled.

<u>Information to be Submitted</u>

Sediment basin designs and construction plans submitted for review to a local municipality, New York State DEC, New York City DEP, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computations

    A. Zones total required

    B. Zones total Available

    C. Elevation of sediment at which cleanout shall be required; also stated as a distance from the riser

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by __________________________ Date _____________Checked by ________________Date _________
Project____Basin #__________________________
Location __________________________ Total Area draining to basin (≤50 Ac.) _____________________Acres

BASIN SIZE DESIGN

1. Sediment storage zone volume = 1,000 cu. ft. x number of disturbed acres = _______ cu. ft., Top of Zone Elev. _____
2. Dewatering zone volume = 3,600 cu. ft. x number of drainage area acres = _______cu. ft., Top of Zone Elev. _______
3. Length to width ratio = _____________
4. A. Cleanout at 50% of sediment storage zone volume, Elev. _____________
   B. Distance below top of riser ___________ feet
5. Minimum surface area is larger of 0.01 $Q_{(10)}$ _________or, 0.015 DA = ___________ use ___________acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

6. $Q_{p(10)}$ = ____________________________cfs (Attach runoff computation sheets)

Pipe Spillway (Q_{ps})

7. Min. pipe spillway cap., Q_{ps} = 0.2 x _______Drainage Area, acres = ________cfs
   Note: If there is no emergency spillway, then required $Q_{ps} = Q_{p(10)}$ = ________cfs.
8. H, head = ________ft. Barrel length = ________ft
9. Barrel: Diam. _______inches; Q_{ps} = (Q) ___________x (cor.fac.)________=_________cfs.
10. Riser: Diam. _______inches; Length ________ft.; h = _________ft. Crest Elev. _____________
11. Trash Rack: Diameter = ________inches; H, height = __________inches

Emergency Spillway Design

12. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = ___________ - ____________ = ___________cfs.
13. Width _______ft.; H_p _________ft Crest elevation ___________; Design High Water Elev. ___________
    Entrance channel slope___________________________% ; Top of Dam Elev. ________________
    Exit channel slope ______________________________%

ANTI-SEEP COLLAR/SEEPAGE DIAPHRAGM DESIGN

Collars:

14. y = ________ft.; z = _______:1; pipe slope = ________%, L_s = _______ft.
    Use _______ collars, ______ - ______inches square; projection = ________ft.

Diaphragms:

#_________ width_________ ft. height _________ft.

DEWATERING ORIFICE SIZING

(Determined from the Dewatering Device Standard)

15. Dewatering orifice diameter = ________ inches. Skimmer ___ or Riser ____ (check one)
16. Design dewatering time ________ days (Min. 2 days required)

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage zone volume is 1,000 cubic feet per acre from each disturbed acre within the total drainage area. Minimum required dewatering zone volume is 3,600 cubic feet per total area draining to the basin.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required zone volumes.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5. Use of the NRCC hydrologic data at www.precip.net with an appropriate hydrologic model, is the preferred process for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of “H” from field conditions; “H” is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Flow Charts, Figures 5.11 and 5.12 on pages 5.29 and 5.30.

9. See Riser Inflow Curves, Figure 5.10 on page 5.28.

10. Compute the orifice size required to dewater the basin over a minimum 48 hour period. See the Dewatering Device Standard on page 5.10.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5.13 and 5.14 on pages 5.31 and 5.32.

12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason (s).

14. See Anti-Seep Collar / Seepage Diaphragm Design (see figures 5.16, 5.17 and 5.18 on pages 5.34, 5.35 and 5.36).

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

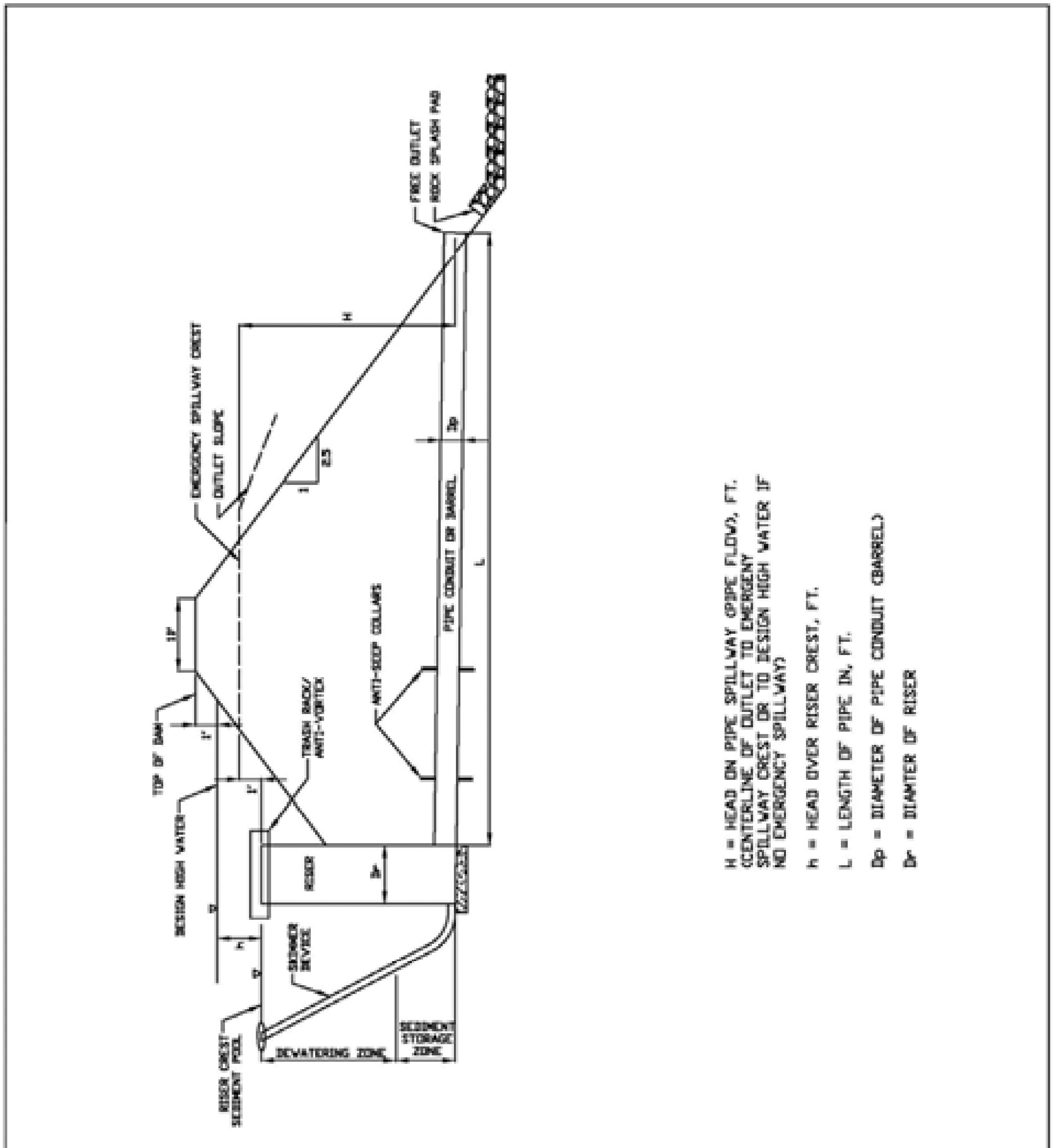
To use charts for pipe spillway design:

1. Enter chart, Figures 5.11 or 5.12 on pages 5.29 and 5.30 with H and required discharge.

2. Find diameter of pipe conduit that provides equal or greater discharge

3. Enter chart, Figure 5.10 on page 5.28 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Figure 5.8
Pipe Spillway Design



ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PIPE SPILLWAY DESIGN

Figure 5.9
Sediment Basin

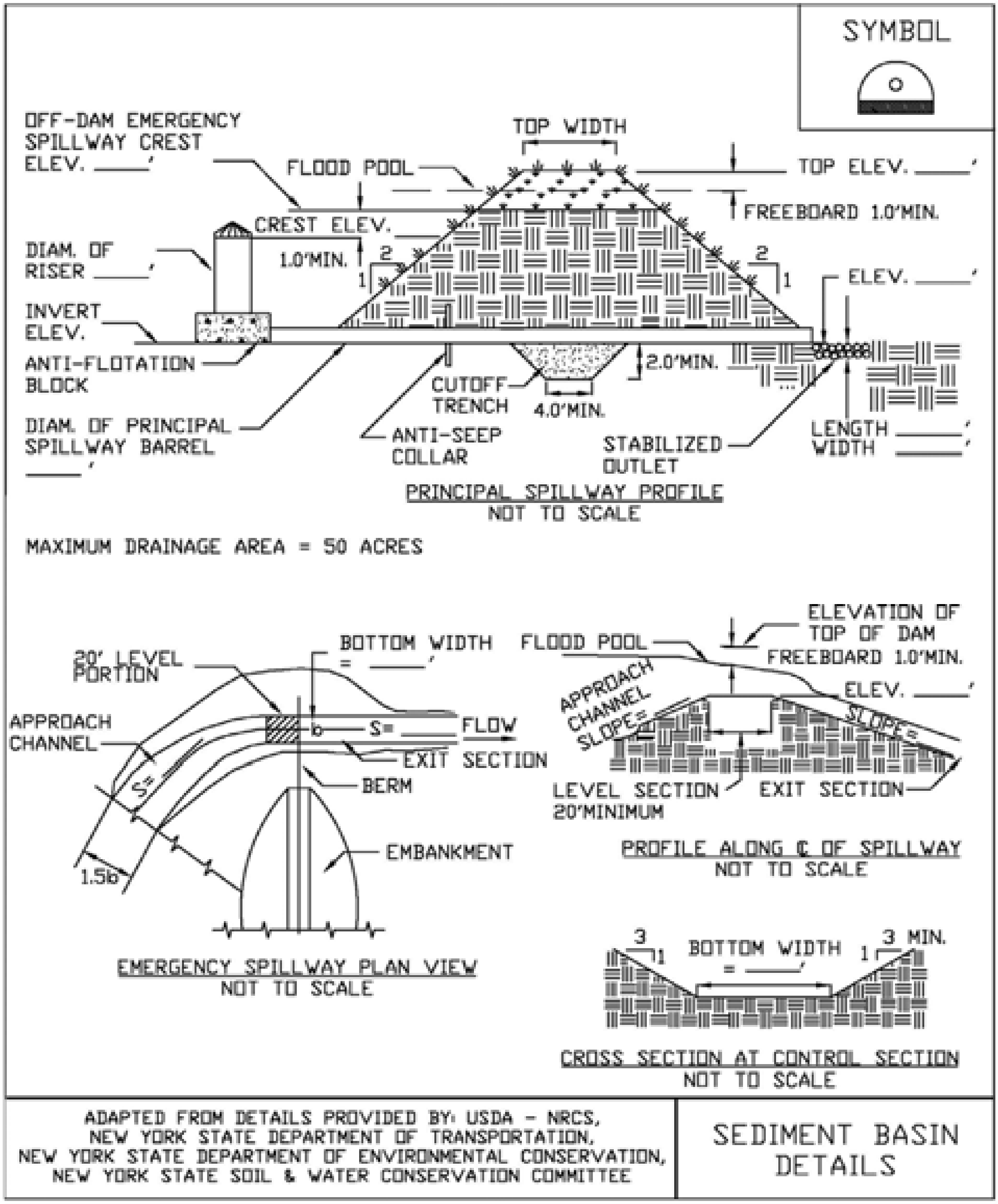


Figure 5.10
Riser Inflow Chart (USDA - NRCS)

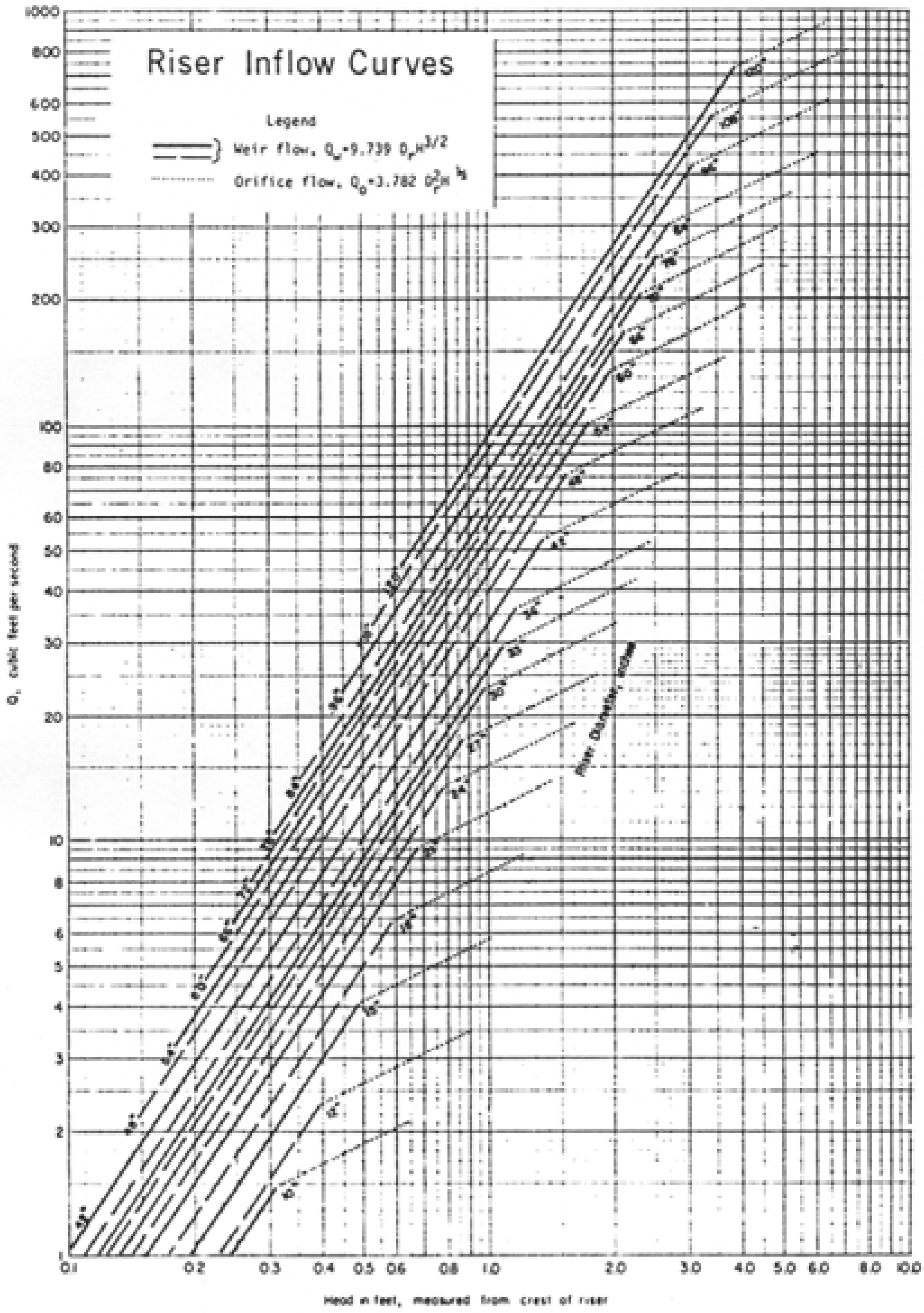


Figure 5.11
Pipe Flow Chart; “n” = 0.025 (USDA - NRCS)

PIPE FLOW CHART n = 0.025
FOR CORRUGATED METAL PIPE INLET $K_m = K_e + K_b = 1.0$ AND 70 FEET OF CORRUGATED METAL PIPE CONDUIT (full flow assumed)
Note correction factors for pipe lengths other than 70 feet
diameter of pipe in inches

H, in feet	6"	8"	10"	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	0.33	0.70	1.25	1.98	3.48	5.47	7.99	11.0	18.8	28.8	41.1	55.7	72.6	91.8	113	137	163	191	222	255	290
2	0.47	0.99	1.76	2.80	4.92	7.74	11.3	15.6	26.6	40.8	58.2	78.8	103	130	160	194	231	271	314	360	410
3	0.58	1.22	2.16	3.43	6.02	9.48	13.8	19.1	32.6	49.9	71.2	96.5	126	159	196	237	282	331	384	441	502
4	0.67	1.40	2.49	3.97	6.96	10.9	16.0	22.1	37.6	57.7	82.3	111	145	184	226	274	326	383	444	510	580
5	0.74	1.57	2.79	4.43	7.78	12.2	17.9	24.7	42.1	64.5	92.0	125	162	205	253	306	365	428	496	570	648
6	0.82	1.72	3.05	4.86	8.52	13.4	19.6	27.0	46.1	70.6	101	136	178	225	277	336	399	469	544	624	710
7	0.88	1.86	3.30	5.25	9.20	14.5	21.1	29.2	49.8	76.3	109	147	192	243	300	362	431	506	587	674	767
8	0.94	1.99	3.53	5.61	9.84	15.5	22.6	31.2	53.2	81.5	116	158	205	260	320	388	461	541	628	721	820
9	1.00	2.11	3.74	5.95	10.4	16.4	24.0	33.1	56.4	86.5	123	167	218	275	340	411	489	574	666	764	870
10	1.05	2.22	3.94	6.27	11.0	17.3	25.3	34.9	59.5	91.2	130	176	230	290	358	433	516	605	702	806	917
11	1.10	2.33	4.13	6.58	11.5	18.2	26.5	36.6	62.4	95.6	136	185	241	304	376	454	541	635	736	845	962
12	1.15	2.43	4.32	6.87	12.1	19.0	27.7	38.2	65.2	99.9	142	193	252	318	392	475	565	663	769	883	1004
13	1.20	2.53	4.49	7.15	12.6	19.7	28.8	39.8	67.8	104	148	201	262	331	408	494	588	690	800	919	1045
14	1.25	2.63	4.66	7.42	13.0	20.5	29.9	41.3	70.4	108	154	208	272	343	424	513	610	716	830	953	1085
15	1.29	2.72	4.83	7.68	13.5	21.2	30.9	42.8	72.8	112	159	216	281	355	439	531	631	741	860	987	1123
16	1.33	2.81	4.99	7.93	13.9	21.9	32.0	44.2	75.2	115	165	223	290	367	453	548	652	765	888	1019	1160
17	1.37	2.90	5.14	8.18	14.3	22.6	32.9	45.5	77.5	119	170	230	229	378	467	565	672	789	915	1051	1195
18	1.41	2.98	5.29	8.41	14.8	23.2	33.9	46.8	79.8	120	174	236	308	389	480	581	692	812	942	1081	1230
19	1.45	3.06	5.43	8.64	15.2	23.9	34.8	48.1	82.0	126	179	243	316	400	494	597	711	834	967	1111	1264
20	1.49	3.14	5.57	8.87	15.6	24.5	35.7	49.4	84.1	129	184	249	325	410	506	613	729	856	993	1139	1297
21	1.53	3.22	5.71	9.09	15.9	25.1	36.6	50.6	86.2	132	188	255	333	421	519	628	747	877	1017	1168	1329
22	1.56	3.29	5.85	9.30	16.3	25.7	37.5	51.8	88.2	135	193	261	341	430	531	643	765	898	1041	1195	1360
23	1.60	3.37	5.98	9.51	16.7	26.2	38.3	53.0	90.2	138	197	267	348	440	543	657	782	918	1064	1222	1390
24	1.63	3.44	6.11	9.72	17.0	26.8	39.1	54.1	92.1	141	201	273	356	450	555	671	799	937	1087	1248	1420
25	1.66	3.51	6.23	9.92	17.4	27.4	39.9	55.2	94.0	144	206	279	363	459	566	685	815	957	1110	1274	1450
26	1.70	3.58	6.36	10.1	17.7	27.9	40.7	56.3	95.9	147	210	284	370	468	577	699	831	976	1132	1299	1478
27	1.73	3.65	6.48	10.3	18.1	28.4	41.5	57.4	97.7	150	214	290	377	477	588	712	847	994	1153	1324	1507
28	1.76	3.72	6.60	10.5	18.4	29.0	42.3	58.4	99.5	153	218	295	384	486	599	725	863	1013	1174	1348	1534
29	1.79	3.78	6.71	10.7	18.7	29.5	43.0	59.5	101	155	221	300	391	494	610	738	878	1030	1195	1372	1561
30	1.82	3.85	6.83	10.9	19.1	30.0	43.7	60.5	103	158	225	305	398	503	620	750	893	1048	1216	1396	1588
L, in feet	Correction Factors For Other Pipe Lengths																				
20	1.49	1.63	1.58	1.53	1.47	1.42	1.37	1.34	1.28	1.24	1.20	1.18	1.16	1.14	1.13	1.11	1.10	1.10	1.09	1.08	1.08
30	1.44	1.41	1.39	1.36	1.32	1.29	1,27	1.24	1.21	1.18	1.15	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.07	1.06	1.06
40	1.26	1.27	1.25	1.23	1.21	1.20	1.18	1.17	1.14	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.05	1.04
50	1.16	1.16	1.15	1.14	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.04	1.03	1.03	1.03
60	1.07	1.07	1.07	1.06	1.06	1.05	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.94	.94	.95	.95	.95	.95	.96	.96	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99	.99	.99
90	.89	.89	.90	.90	.91	.91	.92	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97	.97	.97	.97	.94
100	.85	.85	.86	.86	.87	.88	.89	.89	.90	.91	.92	.93	.93	.94	.94	.95	.95	.95	.96	.96	.94
120	.78	.79	.79	.80	.81	.82	.83	.83	.85	.86	.87	.89	.89	.90	.91	.89	.92	.93	.93	.94	.92
140	.72	.73	.74	.75	.76	.77	.78	.79	.81	.82	.84	.85	.86	.87	.88	.86	.89	.90	.91	.91	.90
160	.68	.69	.69	.70	.71	.73	.74	.75	.77	.79	.80	.82	.83	.84	.85	.92	.87	.88	.89	.89	

Figure 5.12
Pipe Flow Chart; “n” = 0.013 (USDA - NRCS)

PIPE FLOW CHART n = 0.013

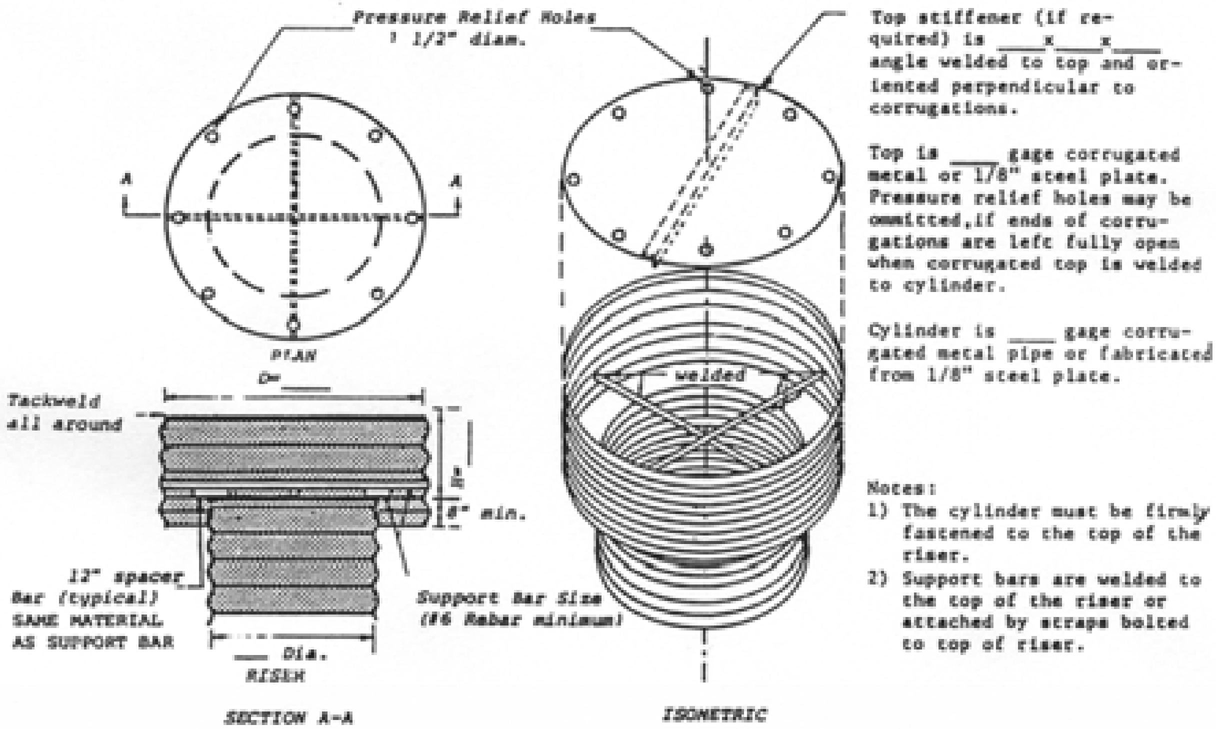
FOR REINFORCED CONCRETE PIPE INLET $K_m = K_e + K_b = 1.00$ AND 70 FEET OF REINFORCED CONCRETE PIPE CONDUIT (full flow assumed)

Note correction factors for pipe lengths other than 70 feet

diameter of pipe in inches

H, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	3.22	5.44	8.29	11.8	15.9	26.0	38.6	53.8	71.4	91.5	114	139	167	197	229	264	302	342
2	4.55	7.69	11.7	16.7	22.5	36.8	54.6	76.0	101	129	161	197	236	278	324	374	427	483
3	5.57	9.42	14.4	20.4	27.5	45.0	66.9	93.1	124	159	198	241	289	341	397	458	523	592
4	6.43	10.9	16.6	23.5	31.8	52.0	77.3	108	143	183	228	278	334	394	459	529	604	683
5	7.19	12.2	18.5	26.3	35.5	58.1	86.4	120	160	205	255	311	373	440	513	591	675	764
6	7.88	13.3	20.3	28.8	38.9	63.7	94.6	132	175	224	280	341	409	482	542	647	739	837
7	8.51	14.4	21.9	31.1	42.0	68.8	102	142	189	242	302	368	441	521	607	699	798	904
8	9.10	15.4	23.5	33.3	44.9	73.5	109	152	202	259	323	394	472	557	685	748	854	966
9	9.65	16.3	24.9	35.3	47.7	78.0	116	161	214	275	342	418	500	590	688	793	905	1025
10	10.2	17.2	26.2	37.2	50.2	82.2	122	170	226	289	361	440	527	622	725	836	954	1080
11	10.7	18.0	27.5	39.0	52.7	86.2	128	178	237	304	379	462	553	653	761	877	1001	1133
12	11.1	18.9	28.7	40.8	55.0	90.1	134	186	247	317	395	482	578	682	794	916	1045	1184
13	11.6	19.6	29.9	42.4	57.3	93.7	139	194	257	330	411	502	601	710	827	953	1088	1232
14	12.0	20.4	31.0	44.1	59.4	97.3	145	201	267	342	427	521	624	736	858	989	1129	1278
15	12.5	21.1	32.1	45.6	61.5	101	150	208	277	354	442	539	646	762	888	1024	1169	1323
16	12.9	21.8	33.2	47.1	63.5	104	155	215	286	366	457	557	667	787	917	1057	1207	1367
17	13.3	22.4	34.2	48.5	65.5	107	159	222	294	377	471	574	688	812	946	1090	1244	1409
18	13.7	23.1	35.2	49.9	67.4	110	164	228	303	388	484	591	708	835	973	1121	1280	1450
19	14.0	23.7	36.1	51.3	69.2	113	168	234	311	399	497	607	727	858	1000	1152	1315	1489
20	14.4	24.3	37.1	52.6	71.0	116	173	240	319	409	510	623	746	880	1026	1182	1350	1528
21	14.7	24.9	38.0	53.9	72.8	119	177	246	327	419	523	638	764	902	1051	1211	1383	1566
22	15.1	25.5	38.9	55.2	74.5	122	181	252	335	429	535	653	782	923	1076	1240	1415	1603
23	15.4	26.1	39.8	56.5	76.2	125	186	258	342	439	547	668	800	944	1100	1268	1447	1639
24	15.8	26.7	40.6	57.7	77.8	127	189	263	350	448	559	682	817	964	1123	1295	1478	1674
25	16.1	27.2	41.5	58.9	79.4	130	193	269	357	458	571	696	834	984	1147	1322	1509	1708
26	16.4	27.7	42.3	60.0	81.0	133	197	274	364	467	582	710	850	1004	1169	1348	1539	1742
27	16.7	28.3	43.1	61.2	82.5	135	201	279	371	476	593	723	867	1023	1192	1373	1568	1775
28	17.0	28.8	43.9	62.3	84.1	138	204	285	378	484	604	737	883	1041	1214	1399	1597	1808
29	17.3	29.3	44.7	63.4	85.5	140	208	290	384	493	615	750	898	1060	1235	1423	1625	1840
30	17.6	29.8	45.4	64.5	87.0	142	212	294	391	501	625	763	913	1078	1256	1448	1653	1871
L, in feet	Correction Factors For Other Pipe Lengths																	
20	1.30	1.24	1.21	1.18	1.15	1.12	1.10	1.08	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
30	1.22	1.18	1.15	1.13	1.12	1.09	1.08	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02
40	1.15	1.13	1.11	1.10	1.08	1.07	1.05	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
50	1.09	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
60	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.96	.97	.97	.97	.98	.98	.98	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99
90	.93	.94	.94	.95	.95	.96	.97	.97	.98	.98	.98	.98	.98	.99	.99	.99	.99	.99
100	.90	.91	.92	.93	.93	.95	.95	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99
120	.84	.86	.87	.89	.90	.91	.93	.94	.94	.95	.96	.96	.96	.97	.97	.97	.97	.98
140	.80	.82	.83	.85	.86	.88	.90	.91	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97
160	.76	.78	.80	.82	.83	.86	.88	.89	.90	.91	.92	.93	.94	.94	.95	.95	.95	.96

Figure 5.13
Concentric Trash Rack and Anti-Vortex Device (USDA - NRCS)



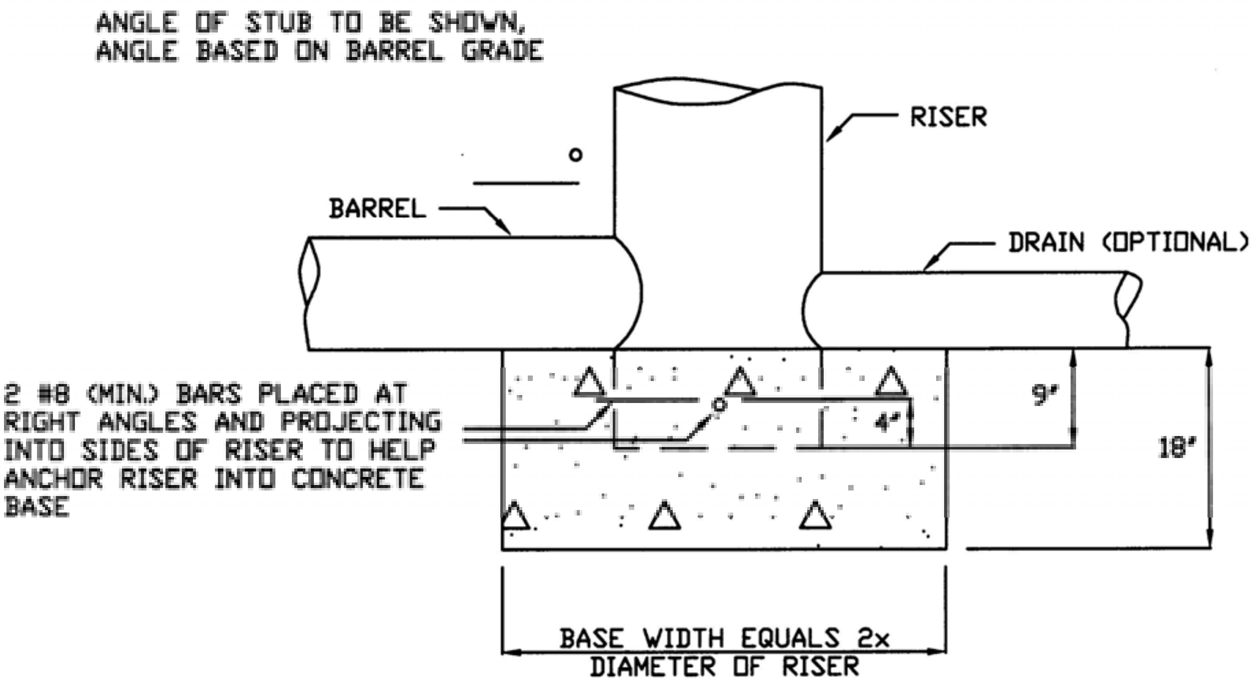
CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE
(not to scale)

Figure 5.14
Concentric Trash Rack and Anti-Vortex Device Design Table
(USDA - NRCS)

Riser Diam.(in)	Cylinder Diam (in.)	Thick. Gage	H (in.)	Minimum Size Support Bar	Minimun Top Thickness	Stiffener
12	18	16	6	#6 Rebar	16 ga.	—
15	21	16	7	#6 Rebar	16 ga.	—
18	27	16	8	#6 Rebar	16 ga.	—
21	30	16	11	#6 Rebar	16 ga.	—
24	36	16	13	#6 Rebar	14 ga.	—
27	42	16	15	#6 Rebar	14 ga.	—
36	54	14	17	#8 Rebar	12 ga.	—
42	60	14	19	#8 Rebar	12 ga.	—
48	72	12	21	1 1/4" pipe or 1 1/4x1 1/4x1/4 angle	10 ga.	—
54	78	12	25	See 48" Riser	10 ga.	—
60	90	12	29	1 1/2" pipe or 1 1/2x1 1/2x1/2 angle	8 ga.	—
66	96	10	33	2" pipe or 2x2x3/16 angle	8 ga. w/stiffener	2x2x1/4 angle
72	102	10	36	———See 66" Riser———		2 1/2x2 1/2x1/4 angle
78	114	10	39	2 1/2" pipe or 2x2x1/4 angle	See 72" Riser	See 72" Riser
84	120	10	42	2 1/2" pipe or 2 1/2x2 1/2x1/4 angle	See 72" Riser	2 1/2x 2 1/2x 5/16 angle

Note: The criteria for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.

Figure 5.15
Riser Base Details



CONSTRUCTION SPECIFICATIONS

1. THE CONCRETE BASE SHALL BE POURED IN SUCH A MANNER TO INSURE THAT THE CONCRETE FILLS THE BOTTOM OF THE RISER TO THE INVERT OF THE OUTLET PIPE TO PREVENT THE RISER FROM BREAKING AWAY FROM THE BASE.
2. WITH ALUMINUM OR ALUMINIZED PIPE, THE EMBEDDED SECTION MUST BE PAINTED WITH CHROMATE OR EQUIVALENT.
3. RISER BASE MAY BE SIZED AS COMPUTED USING FLOATATION WITH A FACTOR OF SAFETY OF 1.2.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RISER BASE DETAIL SEDIMENT BASIN

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25 - \text{pipe slope}}\right]$$

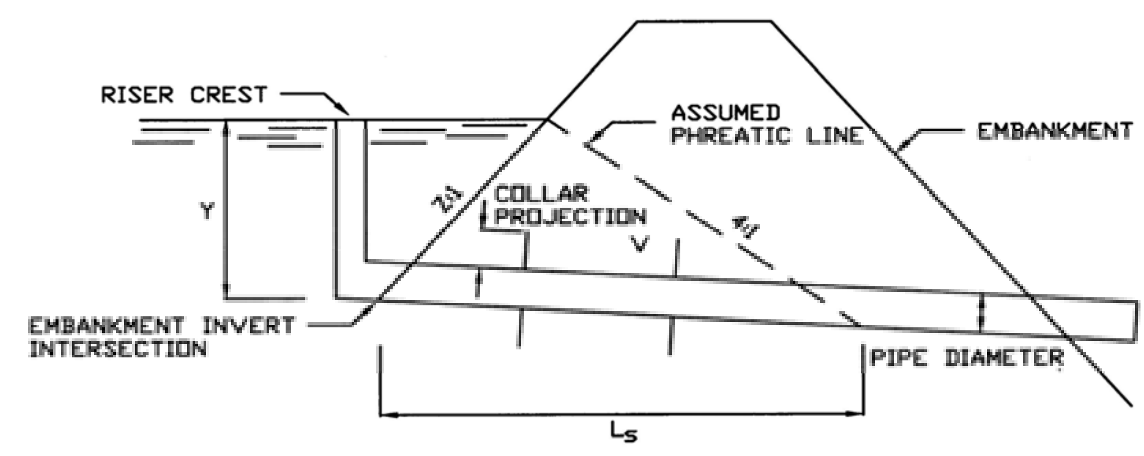
Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:



ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	ANTI-SEEP COLLAR DESIGN

Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)

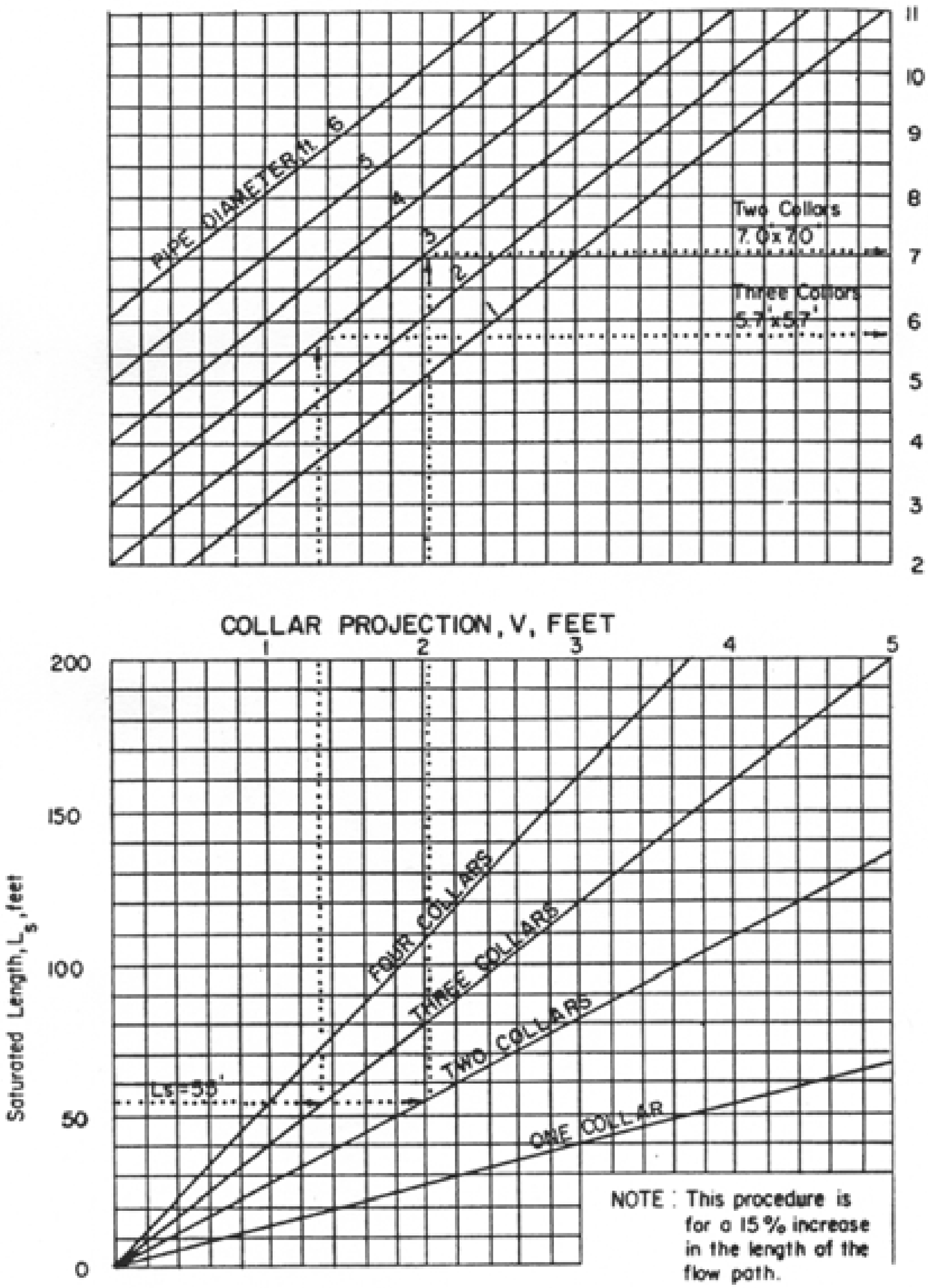


Figure 5.18
Anti-Seep Collar

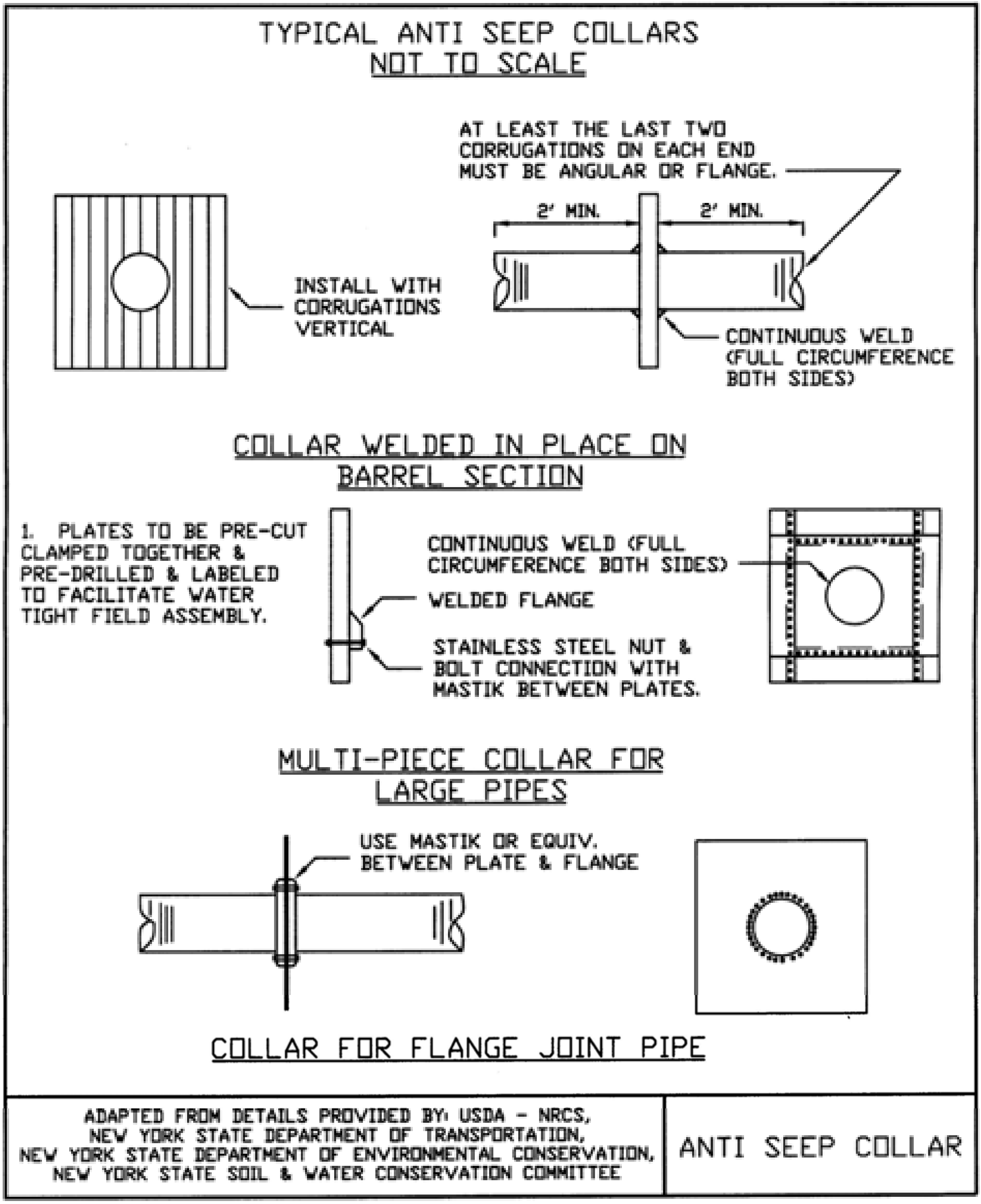
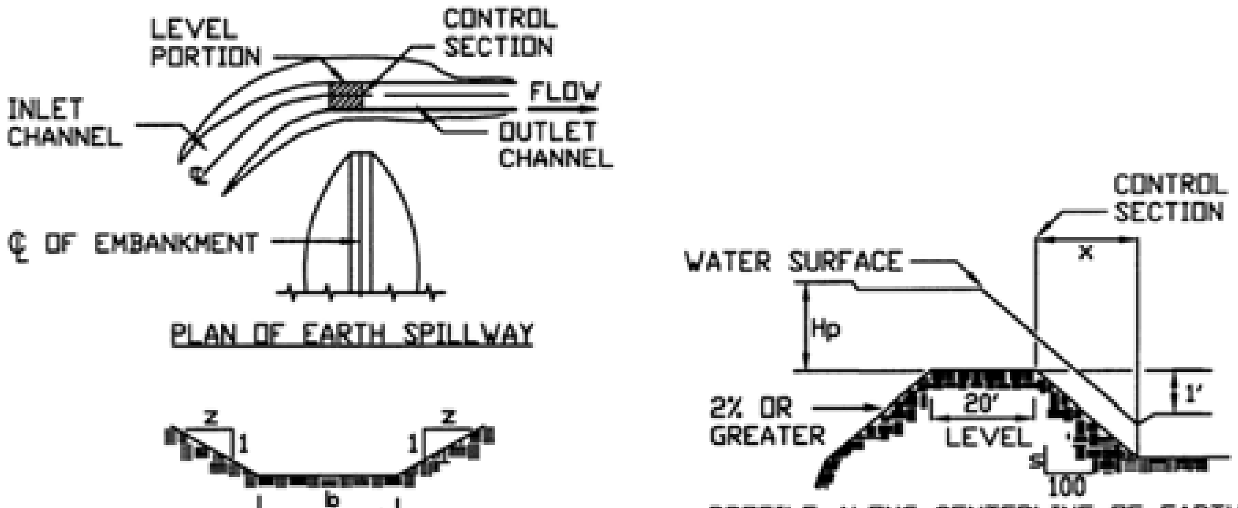


Figure 5.19
Design Data for Earth Spillways



PLAN OF EARTH SPILLWAY

CROSS SECTION OF EARTH SPILLWAY AT CONTROL SECTION

PROFILE ALONG CENTERLINE OF EARTH SPILLWAY

LEGEND

n = MANNING'S COEFFICIENT OF ROUGHNESS.

Hp = DIFFERENCE IN ELEVATION BETWEEN CREST OF EARTH SPILLWAY AT THE CONTROL SECTION AND WATER SURFACE IN RESERVOIR, IN FEET.

b = BOTTOM WIDTH OF EARTH SPILLWAY AT THE CONTROL SECTION, IN FEET.

Q = TOTAL DISCHARGE, IN cfs.

V = VELOCITY, IN FEET PER SECOND, THAT WILL EXIST IN CHANNEL BELOW CONTROL SECTION, AT DESIGN Q, IF CONSTRUCTED TO SLOPE (S) THAT IS SHOWN.

S = FLATTEST SLOPE (S), IN %, ALLOWABLE FOR CHANNEL BELOW CONTROL SECTION.

X = MINIMUM LENGTH OF CHANNEL BELOW CONTROL SECTION, IN FEET.

z = SIDE SLOPE RATIO.

NOTES:

1) FOR A GIVEN Hp A DECREASE IN THE EXIT SLOPE FROM S AS GIVEN IN THE TABLE DECREASES SPILLWAY DISCHARGE BUT INCREASING THE EXIT SLOPE FROM S DOES NOT INCREASE DISCHARGE. IF AN EXIT SLOPE (Se) STEEPER THAN S IS USED, THEN VELOCITY (Ve) IN THE EXIT CHANNEL WILL INCREASE ACCORDING TO THE FOLLOWING RELATIONSHIP:

$$Ve = V\left(\frac{Se}{S}\right) 0.3$$

2) DATA TO RIGHT OF HEAVY VERTICAL LINES ON DRAWINGS SHOULD BE USED WITH CAUTION, AS THE RESULTING SECTIONS WILL BE EITHER POORLY PROPORTIONED OR HAVE VELOCITIES IN EXCESS OF 6 FT/SEC.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	DESIGN DATA FOR EARTH SPILLWAYS

Figure 5.20
Design Table for Vegetated Earth Spillways in Erosion Resistant Soils, K=0.1 - 0.35, Side Slopes = 3:1

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
15	3.3	12.2	8	.83
	3.5	16.2	12	.69
20	3.1	8.9	8	.97
	3.2	13.0	12	.81
	3.3	17.3	16	.70
25	2.9	7.1	8	1.09
	3.2	9.9	12	.91
	3.3	13.2	16	.79
	3.3	17.2	20	.70
30	2.9	6.0	8	1.20
	3.0	8.2	12	1.01
	3.0	10.7	16	.88
	3.3	13.8	20	.78
35	2.8	5.1	8	1.30
	2.9	6.9	12	1.10
	3.1	9.0	16	.94
	3.1	11.3	20	.85
	3.2	14.1	24	.77
40	2.7	4.5	8	1.40
	2.9	6.0	12	1.18
	2.9	7.6	16	1.03
	3.1	9.7	20	.91
	3.1	11.9	24	.83
45	2.6	4.1	8	1.49
	2.8	5.3	12	1.25
	2.9	6.7	16	1.09
	3.0	8.4	20	.98
	3.0	10.4	24	.89
50	2.7	3.7	8	1.57
	2.8	4.7	12	1.33
	2.8	6.0	16	1.16
	2.9	7.3	20	1.03
	3.1	9.0	24	.94
60	2.6	3.1	8	1.73
	2.7	3.9	12	1.47
	2.7	4.8	16	1.28
	2.9	5.9	20	1.15
	2.9	7.3	24	1.05
	3.0	8.6	28	.97
70	2.5	2.8	8	1.88
	2.6	3.3	12	1.60
	2.6	4.1	16	1.40
	2.7	5.0	20	1.26
	2.8	6.1	24	1.15
	2.9	7.0	28	1.05
80	2.5	2.9	12	1.72
	2.6	3.6	16	1.51
	2.7	4.3	20	1.35

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
80	2.8	5.2	24	1.24
	2.8	5.9	28	1.14
	2.9	7.0	32	1.06
90	2.5	2.6	12	1.84
	2.5	3.1	16	1.61
	2.6	3.8	20	1.45
	2.7	4.5	24	1.32
	2.8	5.3	28	1.22
	2.8	6.1	32	1.14
100	2.5	2.8	16	1.71
	2.6	3.3	20	1.54
	2.6	4.0	24	1.41
	2.7	4.8	28	1.30
	2.7	5.3	32	1.21
	2.8	6.1	36	1.13
120	2.5	2.8	20	1.71
	2.6	3.2	24	1.56
	2.7	3.8	28	1.44
	2.7	4.2	32	1.34
	2.7	4.8	36	1.26
140	2.5	2.7	24	1.71
	2.5	3.2	28	1.58
	2.6	3.6	32	1.47
	2.6	4.0	36	1.38
	2.7	4.5	40	1.30
160	2.5	2.7	28	1.70
	2.5	3.1	32	1.58
	2.6	3.4	36	1.49
	2.6	3.8	40	1.40
	2.7	4.3	44	1.33
180	2.4	2.7	32	1.72
	2.4	3.0	36	1.60
	2.5	3.4	40	1.51
	2.6	3.7	44	1.43
200	2.5	2.7	36	1.70
	2.5	2.9	40	1.60
	2.5	3.3	44	1.52
	2.6	3.6	48	1.45
220	2.4	2.6	40	1.70
	2.5	2.9	44	1.61
	2.5	3.2	48	1.53
240	2.5	2.6	44	1.70
	2.5	2.9	48	1.62
	2.6	3.2	52	1.54
260	2.4	2.6	48	1.70
	2.5	2.9	52	1.62
280	2.4	2.6	52	1.70
300	2.5	2.6	56	1.69

Figure 5.21
Design Table for Vegetated Earth Spillways in
Very Erodible Soils, K = 0.36 - 0.80, Side Slopes = 3:1
(USDA - NRCS)

Disoharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
10	3.5	4.7	8	.68
15	3.4	4.4	12	.69
	3.4	5.9	16	.60
20	3.3	3.3	12	.80
	3.3	4.1	16	.70
	3.5	5.3	20	.62
25	3.3	3.3	16	.79
	3.3	4.0	20	.70
	3.5	4.9	24	.64
30	3.3	3.3	20	.78
	3.3	4.0	24	.71
	3.4	4.7	28	.65
	3.4	5.5	32	.61
35	3.2	3.2	24	.77
	3.3	3.9	28	.71
	3.5	4.6	32	.66
	3.5	5.2	36	.62
40	3.3	3.3	28	.76
	3.4	3.8	32	.71
	3.4	4.4	36	.67
	3.4	5.0	40	.64
45	3.3	3.3	32	.76
	3.4	3.8	36	.71
	3.4	4.3	40	.67
	3.4	4.8	44	.64
50	3.3	3.3	36	.75
	3.3	3.8	40	.71
	3.3	4.3	44	.68
60	3.2	3.2	44	.75
	3.2	3.7	48	.72
70	3.3	3.3	52	.75
80	3.1	3.1	56	.78

Procedure for Determining or Altering Sediment Basin Shape

As specified in the Standard and Specification, the pool area at the elevation of the crest of the principal spillway shall have a length to width ratio of at least 2.0 to 1. The purpose of this requirement is to minimize the "short circuiting" effect of the sediment laden inflow to the riser and thereby increase the effectiveness of the sediment basin. The purpose of this procedure is to prescribe the parameters, procedures, and methods of determining and modifying the shape of the basin.

The length of the flow path (L) is the distance from the point of inflow to the riser (outflow point). The point of inflow is the point that the stream enters the normal pool (pool level at the riser crest elevation). The pool area (A) is the area of the normal pool. The effective width (W_e) is found by the equation:

$$W_e = A/L \text{ and L:W ratio} = L/W_e$$

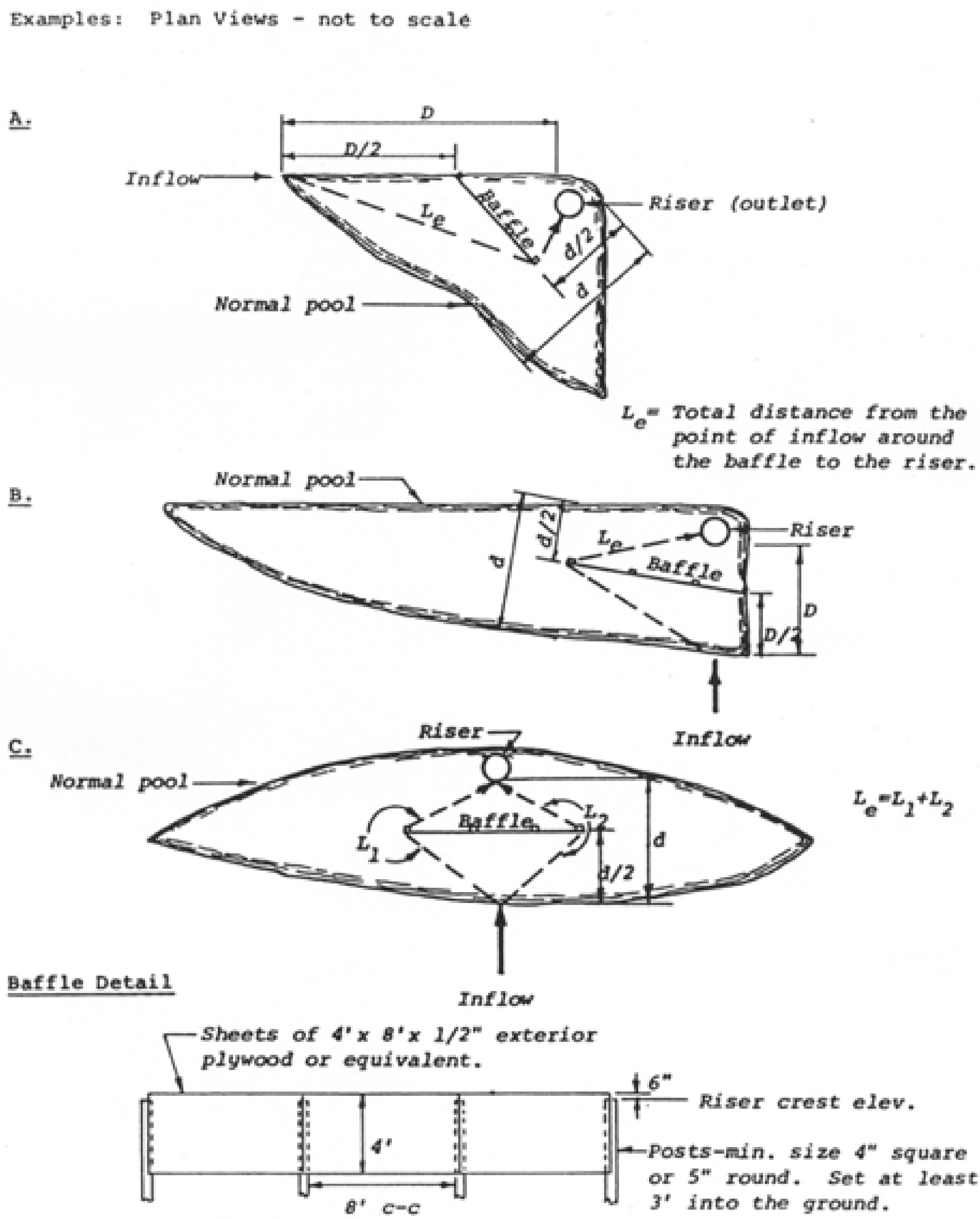
In the event there is more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate shall meet the length to width ratio criteria.

The required basin shape may be obtained by proper site selection, by excavation, or by constructing a baffle in the basin. The purpose of the baffle is to increase the effective flow length from the inflow point to the riser. Baffles (see Figure 5.22 on following page) shall be placed midway between the inflow point around the end of the baffle to the outflow point. Then:

$$W_e = A/L_e \text{ and L:W ratio} = L_e/W_e$$

Three examples are shown on the following page. Note that for the special case in example C the water is allowed to go around both ends of the baffle and the effective length, $L_e = L_1 + L_2$. Otherwise, the length to width ratio computations are the same as shown above. This special case procedure for computing L_e is allowable only when the two flow paths are equal, i.e., when $L_1 = L_2$. A baffle detail is also shown in Figure 5.22 on page 5.41.

Figure 5.22
Sediment Basin Baffle Details (USDA - NRCS)



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

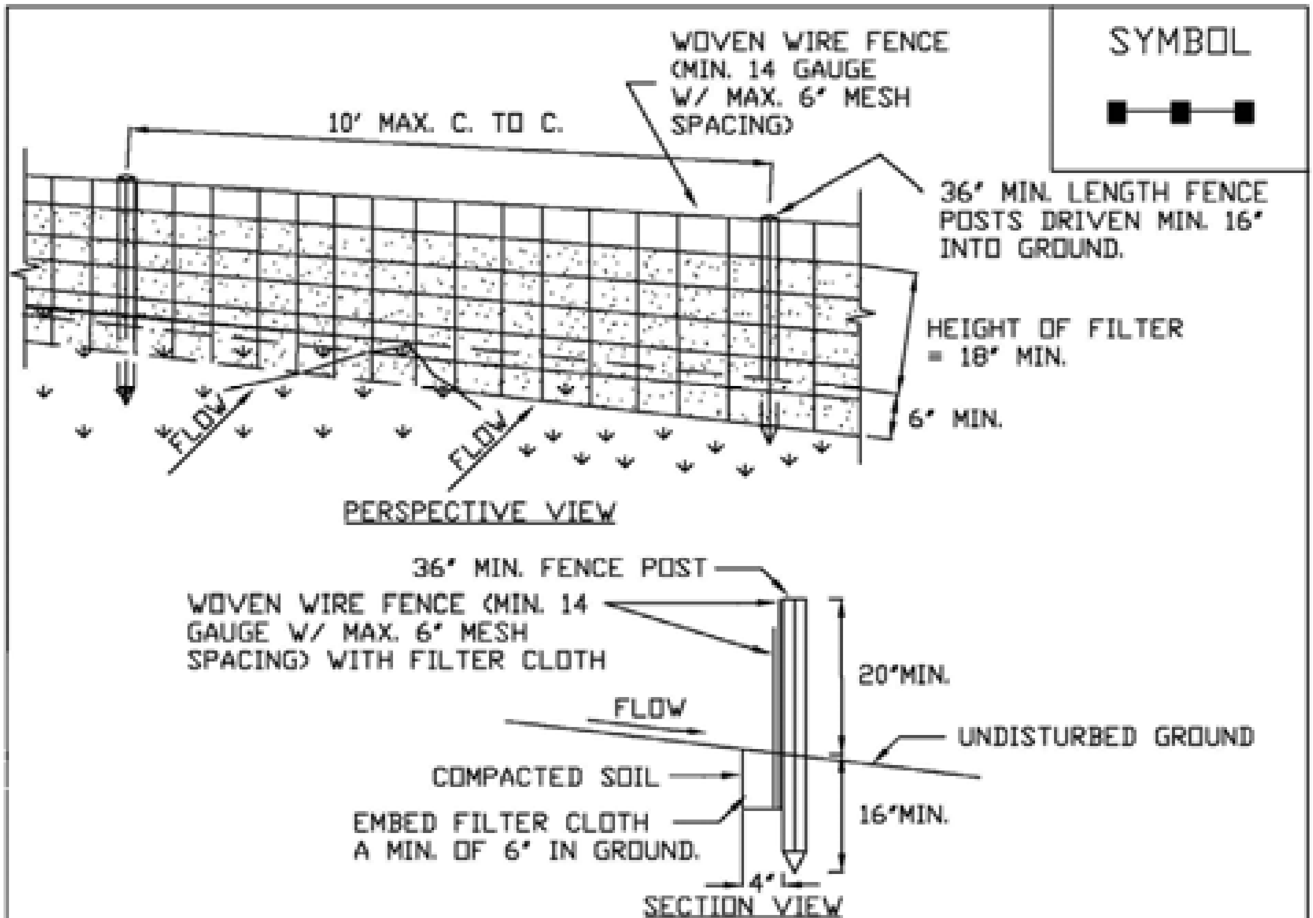
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

Reinforced Silt Fence

Super Silt Fence

Figure 5.30
Reinforced Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER 'T' OR 'U' TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN 'BULGES' DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	REINFORCED SILT FENCE

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.

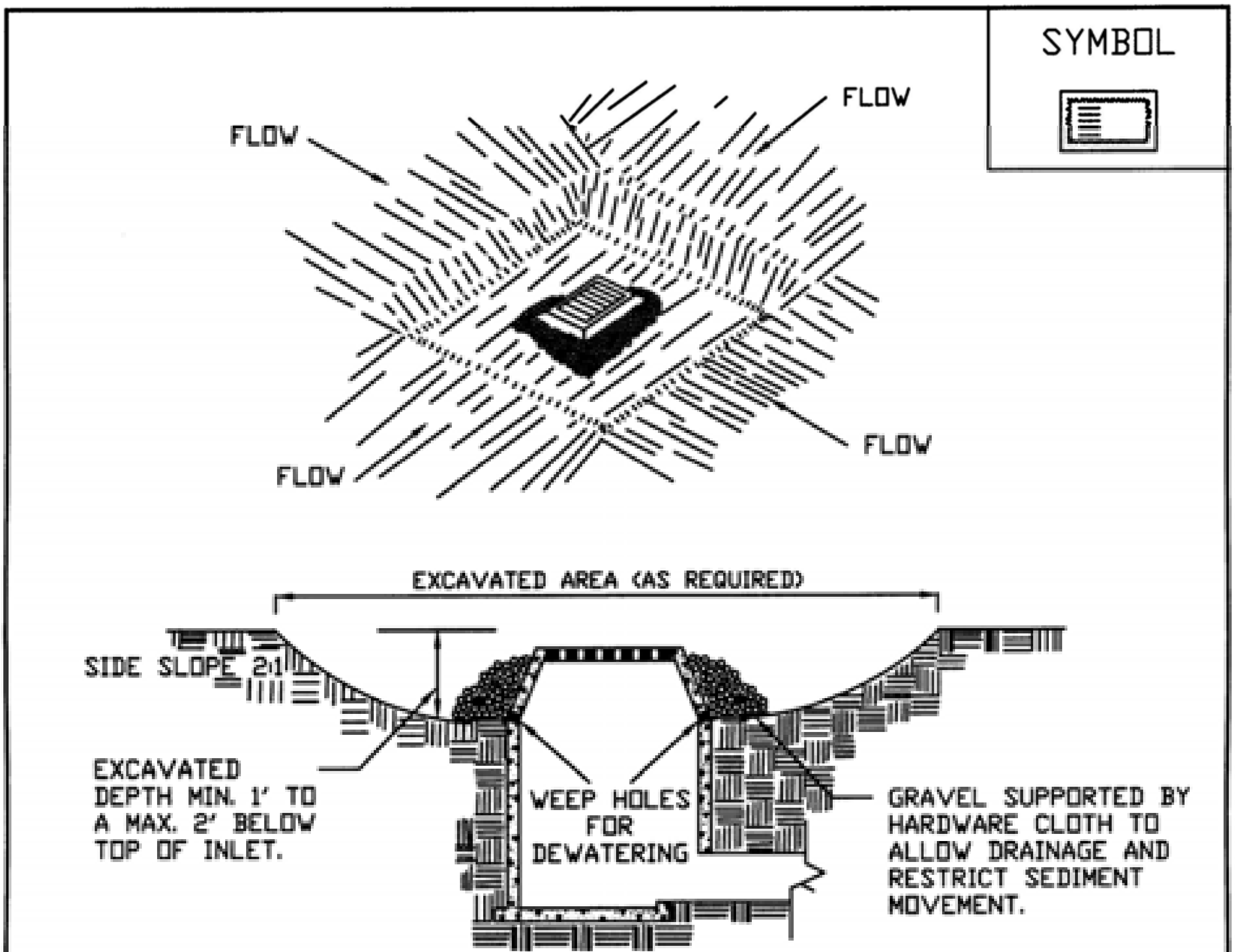
The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection



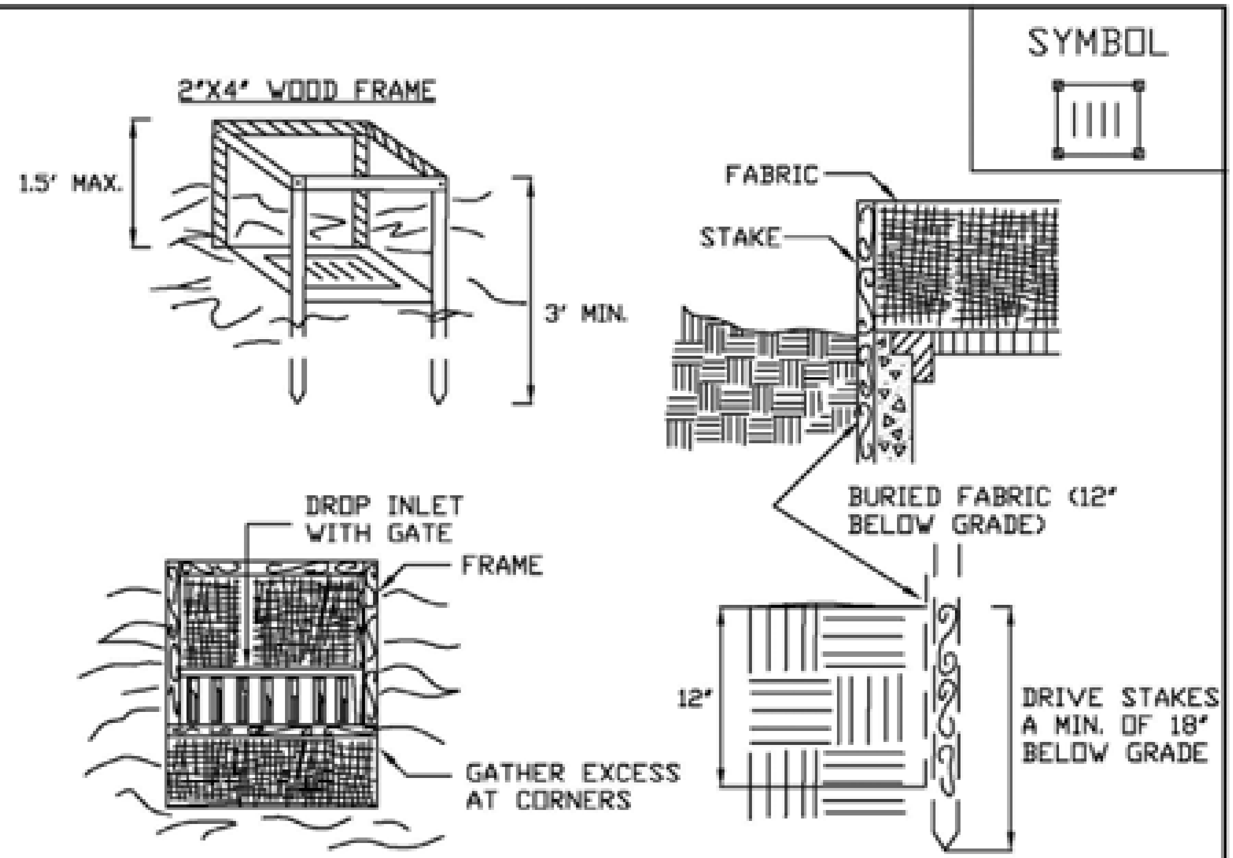
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5.32
Fabric Drop Inlet Protection



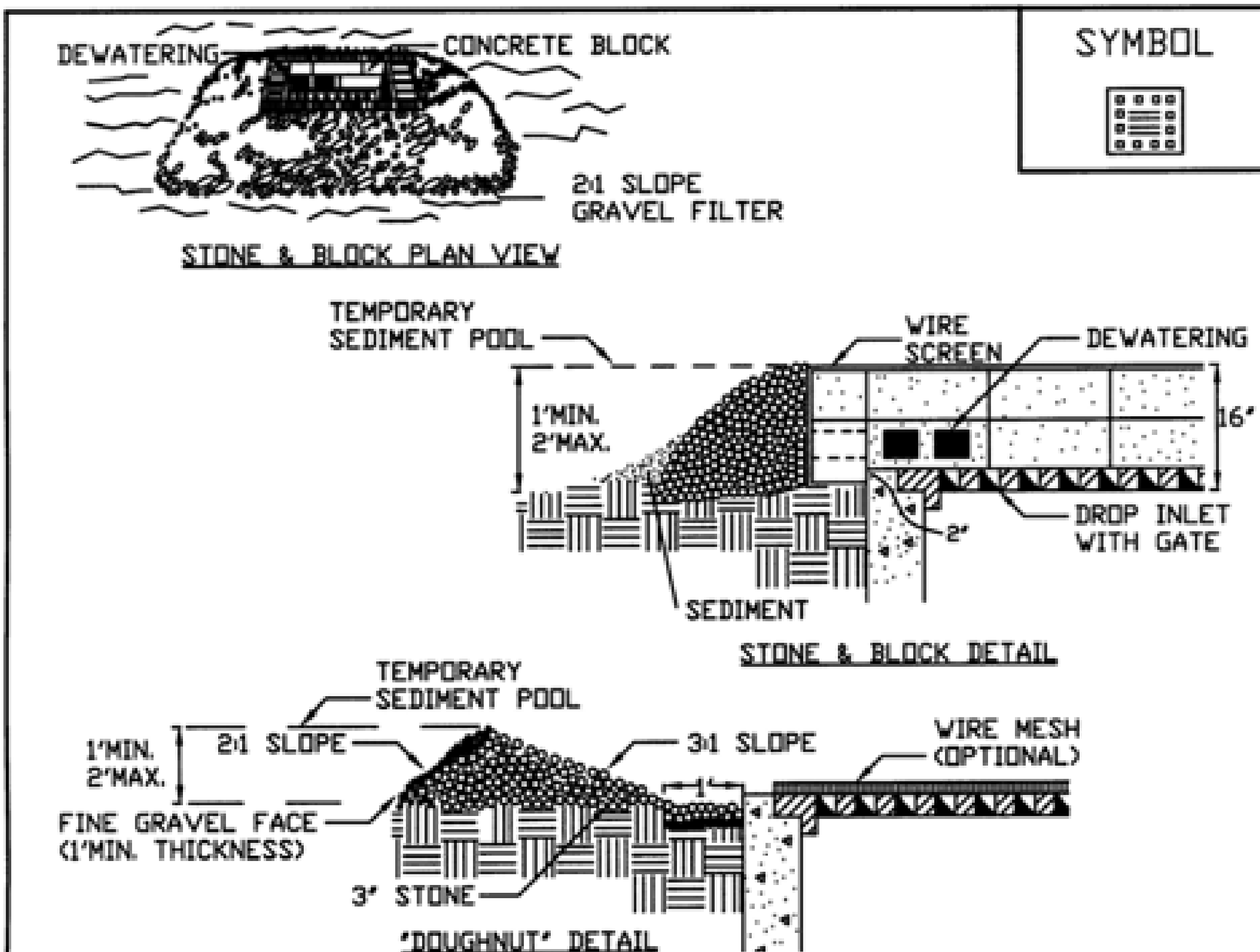
CONSTRUCTION SPECIFICATIONS

1. FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	FABRIC DROP INLET PROTECTION

Figure 5.33
Stone & Block Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS FOR ARMORED SLOPE AND CHANNEL STABILIZATION

Definition & Scope

A **permanent** layer of stone designed to protect and stabilize areas subject to erosion by protecting the soil surface from rain splash, sheet flow, rill and gully erosion and channel erosion. It can also be used to improve the stability of soil slopes that are subject to seepage or have poor soil structure.

Conditions Where Practice Applies

Riprap is used for cut and fill slopes subject to seepage, erosion, or weathering, particularly where conditions prohibit the establishment of vegetation. Riprap is also used for channel side slopes and bottoms, temporary dewatering diversion channels where the flow velocities exceed 6 feet/second, grade sills, on shorelines subject to erosion, and at inlets and outlets to culverts, bridges, slope drains, grade stabilization structures, and storm drains.

Slope Stabilization Design Criteria

Gradation – Riprap shall be a well-graded mixture with 50% by weight larger than the specified design size. The diameter of the largest stone size in such a mixture should be 1.5 times the d_{50} size with smaller sizes grading down to 1 inch. The designer should select the size or sizes that equal or exceed that minimum size based on riprap gradations commercially available in the area.

Thickness – The minimum layer thickness shall be 1.5 times the maximum stone diameter, but in no case less than 6 inches.

Quality – Stone for riprap shall be hard, durable field or quarry materials. They shall be angular and not subject to breaking down when exposed to water or weathering. The specific gravity shall be at least 2.5.

Size – The sizes of stones used for riprap protection are determined by purpose and specific site conditions:

1. Slope Stabilization – Riprap stone for slope stabilization not subject to flowing water or wave action shall be sized for the proposed grade. The gradient of the slope to be stabilized shall be less than the natural angle of repose of the stone selected. Angles of repose of riprap stones may be estimated from Figure 4.1.

   Riprap used for surface stabilization of slopes does not add significant resistance to sliding or slope failure and should not be considered a retaining wall. Slopes approaching 1.5:1 may require special stability analysis. The inherent stability of the soil must be satisfactory before riprap is used for surface stabilization.

2. Channel Stabilization - Design criteria for sizing stone for stability of channel side slopes are presented under Channel Stabilization Design Criteria on page 4.10.

2. Outlet Protection – Design criteria for sizing stone and determining dimensions of riprap aprons are presented in Standards and Specifications for Rock Outlet Protection on page 3.39.

Filter Blanket – A filter blanket is a layer of material placed between the riprap and the underlying soil to prevent soil movement into or through the riprap. A suitable filter may consist of a well-graded gravel or sand-gravel layer or a synthetic filter fabric manufactured for this purpose. The design of a gravel filter blanket is based on the ratio of particle size in the overlying filter material to that of the base material in accordance with the criteria below. Multiple layers may be designed to affect a proper filter if necessary.

A gravel filter blanket should have the following relationship for a stable design:

$$\frac{d_{15}\text{ filter}}{d_{85}\text{ base}} \le 5$$

$$5 < \frac{d_{15}\text{ filter}}{d_{50}\text{ base}} \le 40$$

and

$$\frac{d_{50}\text{ filter}}{d_{50}\text{ base}} \le 40$$

Filter refers to the overlying material while base refers to the underlying material. These relationships must hold between the base and filter and the filter and riprap to prevent migration of material. In some cases, more than one filter may be needed. Each filter layer should be a minimum of 6 inches thick, unless an acceptable filter fabric is used.

A synthetic filter fabric may be used with or in place of gravel filters. The following particle size relationships should exist:

1. Filter fabric covering a base containing 50% or less by weight of fine particles (#200 sieve size):

   A. $$\frac{d_{85} \text{ base (mm)}}{\text{EOS} \times \text{filter fabric (mm)}} > 1$$

   B. total open area of filter fabric should not exceed 36%

2. Filter fabric covering other soils:

   A. EOS is no larger than 0.21 mm (#70 sieve size)

   B. total open area of filter fabric should not exceed 10%

*EOS – Equivalent opening size compared to a U.S. standard sieve size.

No filter fabric should have less than 4% open area or an EOS less than U.S. Standard Sieve #100 (0.15 mm). The permeability of the fabric must be greater than that of the soil. The fabric may be made of woven or nonwoven monofilament yarns and should meet the following minimum requirements:

Thickness 20-60 mils

grab strength 90-120 lbs.

conform to ASTM D-1682 or ASTM D-177

Filter blankets should always be provided where seepage is significant or where flow velocity and duration of flow or turbulence may cause underlying soil particles to move though the riprap.

Construction Specifications

Subgrade Preparation – Prepare the subgrade for riprap and filter to the required lines and grades shown on the plans. Compact any fill required in the subgrade to a density approximating that of the undisturbed material or overfill depressions with riprap. Remove brush, trees, stumps, and other objectionable material. Cut the subgrade sufficiently deep so that the finished grade of the riprap will be at the elevation of the surrounding area. Channels shall be excavated sufficiently to allow placement of the riprap in a manner such that the finished inside dimensions and grade of the riprap meet design specifications.

Sand and gravel filter blanket – Place the filter blanket immediately after the ground foundation is prepared. For gravel, spread filter stone in a uniform layer to the specified depth. Where more than one layer of filter material is used, spread the layers with minimal mixing.

Synthetic filter fabric – Place the cloth directly on the prepared foundation. Overlap the edges by at least 2 feet, and space the anchor pins every 3 feet along the overlap. Bury the upper and lower ends of the cloth a minimum of 12 inches below ground. Take precautions not to damage the cloth by dropping the riprap. If damage occurs, remove the riprap and repair the sheet by adding another layer of filter fabric with a minimum overlap of 12 inches around the damaged area. Where large stones are to be placed, a 4-inch layer of fine sand or gravel is recommended to protect the filter cloth. Filter fabric is not recommended as a filter on slopes steeper than 2 horizontal to 1 vertical.

Stone placement – Placement of the riprap shall follow immediately after placement of the filter. Place riprap so that it forms dense, well-graded mass of stone with a minimum of voids. The desired distribution of stones throughout the mass may be obtained by selective loading at the quarry and controlled dumping during final placement. Place riprap to its full thickness in one operation. Do not place riprap by dumping through chutes or other methods that cause segregation of stone sizes. Be careful not to dislodge the underlying base or filter when placing the stones.

The toe of the riprap shall be keyed into a stable foundation at its base as shown in Figure 4.2 - Typical Riprap Slope Protection Detail. The toe should be excavated to a depth of 2.0 feet. The design thickness of the riprap shall extend a minimum of 3 feet horizontally from the slope. The finished slope should be free of pockets of small stone or clusters of large stones. Hand placing may be necessary to achieve proper distribution of stone sizes to produce a relatively smooth, uniform surface. The finished grade of the riprap should blend with the surrounding area.

Maintenance

Riprap shall be inspected periodically for scour or dislodged stones. Control weed and brush growth as needed.

Figure 4.1
Angles of Repose of Riprap Stones (FHWA)

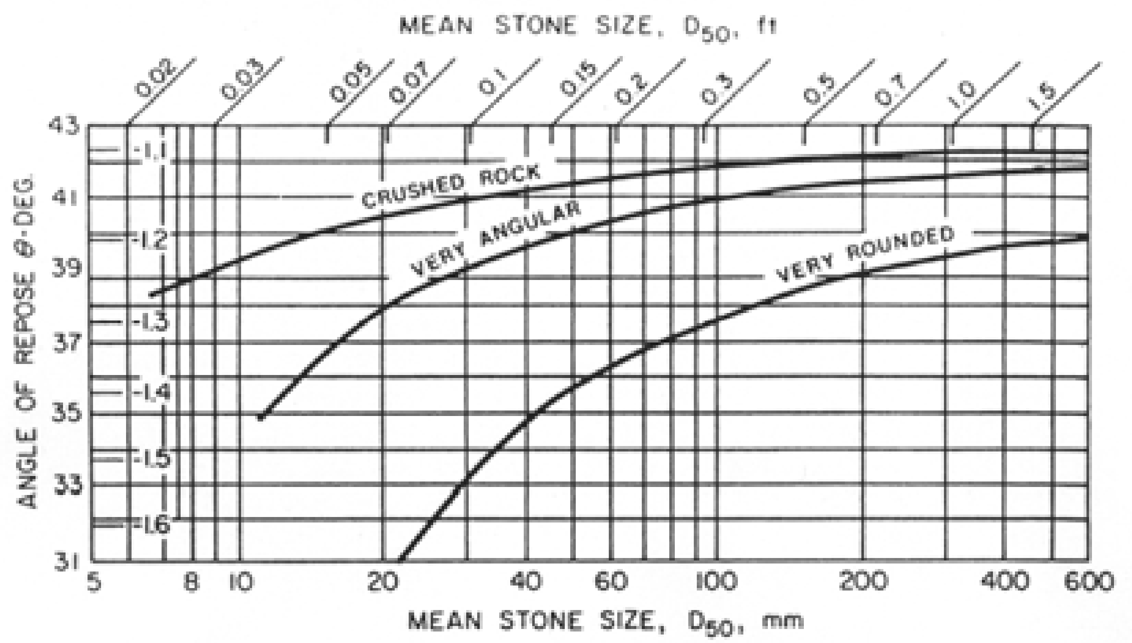
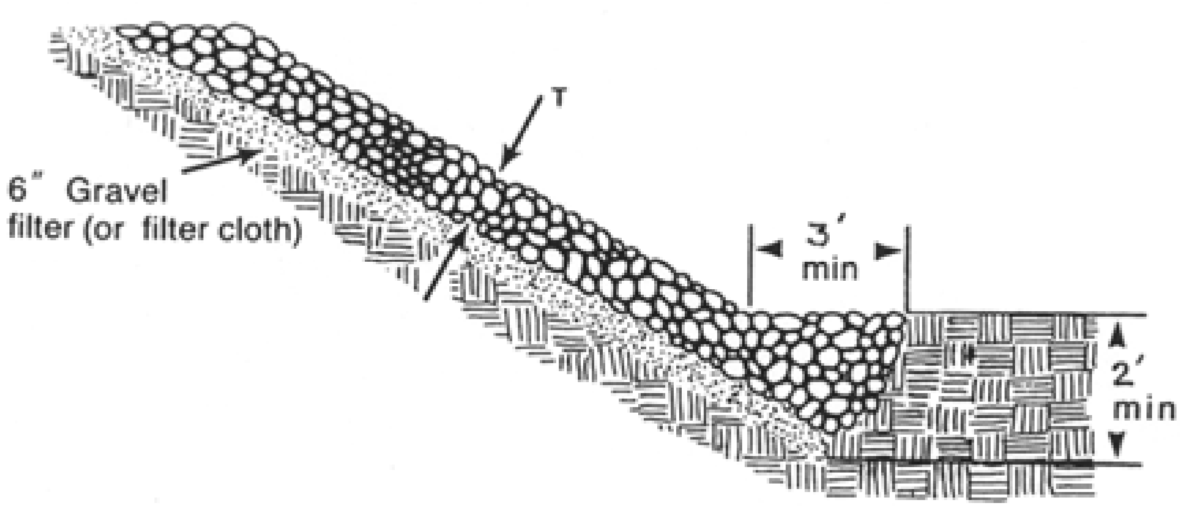


Figure 4.2
Typical Riprap Slope Protection Detail



Channel Stabilization Design Criteria

1. Since each channel is unique, measures for structural channel stabilization should be installed according to a design based on specific site conditions.

2. The plan and profile of the design reach should approximate a naturally stable channel from the project area, based on a stable "reference reach" for the subject channel type.

3. Develop designs according to the following principles:

   - Make protective measures compatible with other channel modifications planned or being carried out in the channel reaches.
   - Whenever excavation and re-shaping work is proposed within channels, the design should provide functional channel dimensions and geometry at each section. Work proposed within a stream channel may require permits from the NYS DEC and US Army Corps of Engineers.
   - Use the design velocity of the peak discharge of the 10-year storm or bankfull discharge, whichever is less. Structural measures should be capable of withstanding greater flows without serious damage.
   - Ensure that the channel bottom is stable or stabilized by structural means before installing any permanent slope protection.
   - Channel stabilization should begin at a stable location and end at a stable point along the bank.
   - Changes in alignment should not be done without a complete analysis of the environmental and stability effects on the entire system.
   - Provisions should be made to maintain and improve fish and wildlife habitat. For example, restoring lost vegetation will provide valuable shade, food, and/or cover.
   - Ensure that all requirements of state law and all permit requirements of local, state, and federal agencies are met.

Construction Specifications

Riprap – Riprap is the most commonly used material to structurally stabilize a channel. While riprap will provide the structural stabilization necessary, the side slope can be enhanced with vegetative material to slow the velocity of water, filter debris, and enhance habitat. See Principles of Biotechnical Practices on page 4.1, for more information.

1. Side slope – slopes shall be graded to 2:1 or flatter prior to placing bedding, filter fabric, or riprap.

2. Filter – filters should be placed between the base material and the riprap and meet the requirements of criteria listed pages 4.7 and 4.8.

3. Gradation – The gradation of the riprap is dependent on the velocity expected against the bank for the design conditions. See Table 4.1 on page 4.12. Once the velocity is known, gradation can be selected from the table for the appropriate class of rock. Note, this table was developed for a 2:1 slope; if the slope steepens to 1.5:1 the gradations should be increased 20%. The riprap should extend 2 feet below the channel bottom and be keyed into the side slope both at the upstream end and downstream end of the proposed work or reach.

See Figure 4.3 on page 4.13 for details.

Reinforced Concrete - Is often used to armor eroding sections of flow channel by constructing walls, bulk heads, or stabilize bank linings in urban areas for redevelopment work. Provide positive drainage behind these structures to relieve uplift pressures.

Grid Pavers – Modular concrete units with or without void areas can be used to stabilize flow channel. Units with void areas can allow the establishment of vegetation. These structures may be obtained in a variety of shapes (Figure 4.4) or they may be formed and poured in place. Maintain design and installation in accordance with manufacturer's instructions.

Revetment – Structural support or armoring to protect an embankment from erosion. Riprap and gabions are commonly used. Also used is a hollow fabric mattress with cells that receive a concrete mixture. Any revetment should be installed to a depth below the anticipated channel degradation and into the channel bed as necessary to provide stability.

Modular Pre-Cast Units – Interlocking modular precast units of different sizes, shapes, heights, and depths, have been developed for a wide variety of applications. They provide vertical support in tight areas as well as durability. Many types are available with textured surfaces. They also act as gravity retaining walls. They should be designed and installed in accordance with the manufacturer's recommendations (Figure 4.4). All areas disturbed by construction should be stabilized as soon as the structural measures are complete.

Maintenance

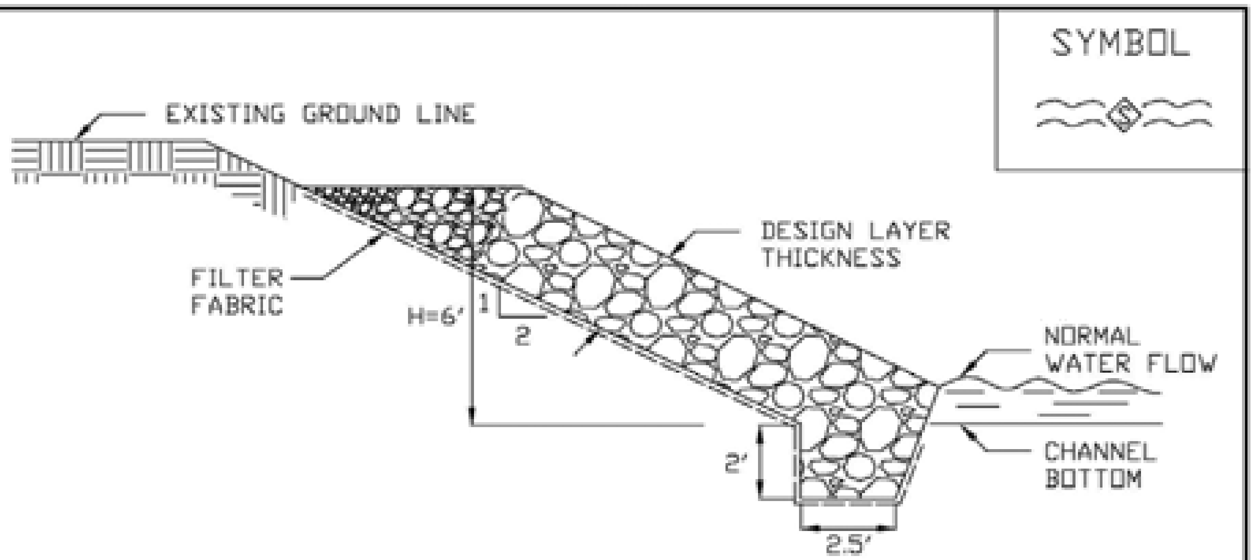
Check stabilized flow channel sections after every high-water event, and make any needed repairs immediately to prevent any further damage or unraveling of the existing work.

Table 4.1 - Riprap Gradations for Channel Stabilization

Class	Layer Thickness (in.)	Max. Velocity (ft/s)	Wave Height (ft.)		PERCENT FINER BY WEIGHT											
					D_{10}			D_{50}			D_{85}			D_{100}		
					Wt. (lbs.)	d_o (in.)	d□ (in.)	Wt. (lbs.)	d_o (in.)	d□ (in.)	Wt. (lbs.)	d_o (in.)	d□ (in.)	Wt. (lbs.)	d_o (in.)	d□ (in.)
I	18	8.5	-		5	5	4	50	10	8	100	13	10	150	15	12
II	18	10	-		17	7	6	170	15	12	340	19	15	500	22	18
III	24	12	2		46	10	8	460	21	17	920	26	21	1400	30	24
IV	36	14	3		150	15	12	1500	30	25	3000	39	32	4500	47	36
V	48	17	4.8		370	20	16	3700	42	34	7400	53	43	11,000	60	49

d_o = gravel material d□ = angular rock riprap
Wt = weight in pounds

Figure 4.3
Riprap Channel Stabilization



RIPRAP DESIGN TABLE

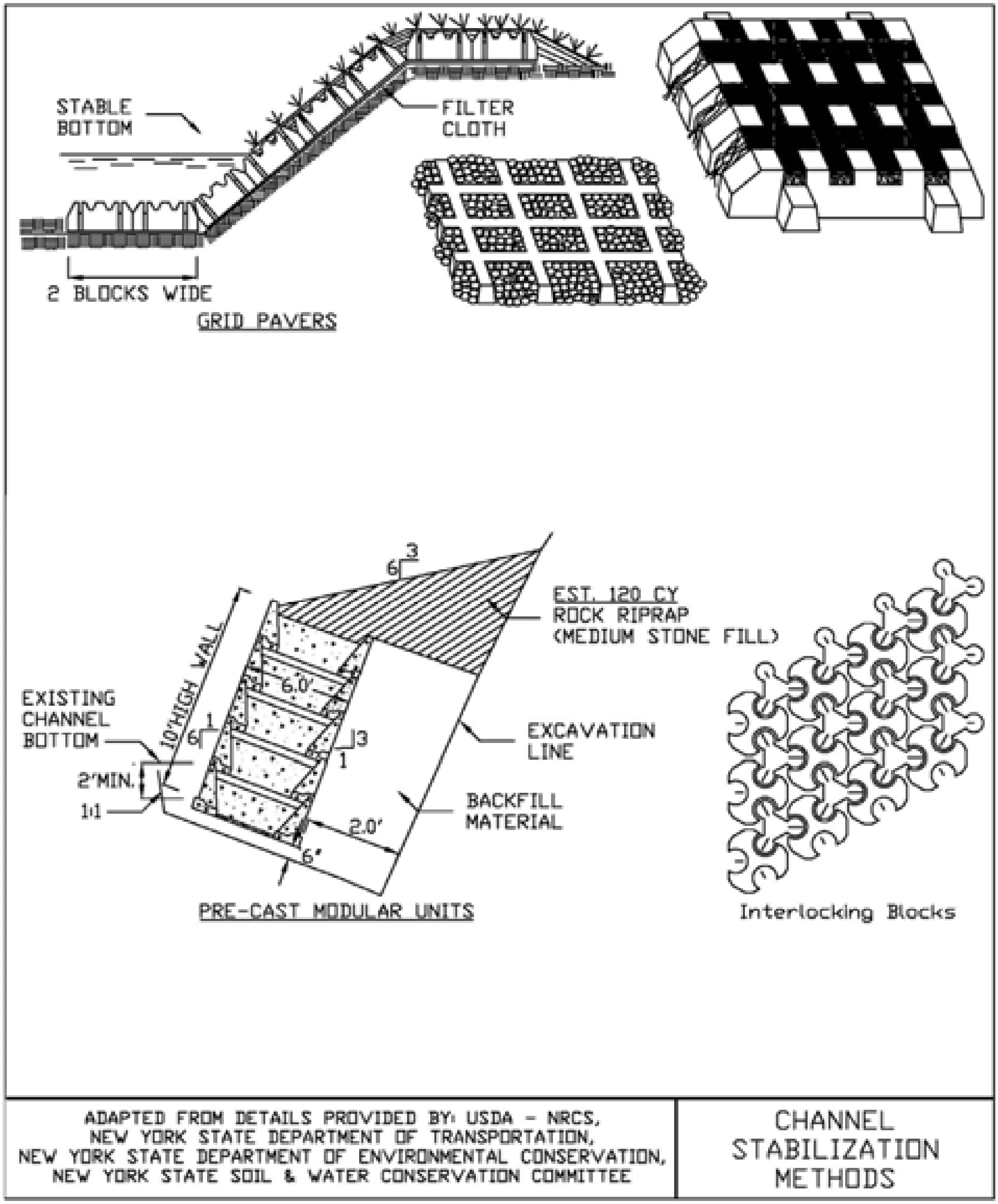
REACH	CLASS	THICKNESS	LAYER	HEIGHT	D10	D50	D85	D100	FILTER

CONSTRUCTION SPECIFICATIONS

1. SLOPE SHALL BE GRADED TO 2:1 OR FLATTER PRIOR TO PLACING FILTER, FILTER FABRIC, OR RIPRAP.
2. RIPRAP SHALL BE PLACED TO MAINTAIN A UNIFORM GRADATION. LARGER STONE SHALL BE PLACED AT THE TOE.
3. ENDS OF THE RIPRAP SHALL BE KEYED INTO A STABLE BANK. WHEN TYING INTO OTHER STRUCTURES, LARGER RIPRAP CAN BE LAID IN STEPS OR STACKED AS NEEDED TO FIT. STONES LARGER THAN THOSE DESIGNED FOR FLOW SHALL BE USED FOR THIS PURPOSE.
4. REMAINING DISTURBED AREAS SHALL BE GRADED AND PERMANENTLY SEEDED AND MULCHED.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RIPRAP CHANNEL STABILIZATION

Figure 4.4
Channel Stabilization Methods



Attachment 6

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Maintenance Agreement and Easement

Town of Wawayanda

Schedule A
Sample Stormwater Control Facility Maintenance Agreement
[Amended 2-4-2021 by L.L. No. 1-2021]

WHEREAS the Town of Wawayanda, Orange County, New York, ("the Town"), a municipal corporation with an office located at 80 Ridgebury Hill Road, Slate Hill, New York 10973 and ________________________________ ("the facility owner"), with an office located at ____ want to enter into an agreement to provide for the long-term construction, maintenance and continuation of stormwater control measures approved by the Town for the project described in the project plans for referred to below for property known on the tax map of the Town as Section ____ Block ___ Lot ___ being and intended to be the property described in a deed from ______________________, the facility owner, dated__________ and recorded in the Orange County Clerk's Office in Liber _____ at Page ____, and being more particularly describe in Schedule A annexed hereto (the "Property") and

WHEREAS the Town and the facility owner desire that the stormwater control measures be built in accordance with the approved project plans and thereafter be maintained, cleaned, repaired, replaced and continued for the period of time set forth in this Agreement by the facility owner, its heirs, successors and assigns in order to ensure optimum performance of the components.

THEREFORE, the Town and the facility owner agree as follows:

1. This Agreement binds the Town and the facility owner, its heirs, successors and assigns to the construction, maintenance and continuation of stormwater control measures depicted in the approved project plans entitled "Site Plan for _______________________________________" by__________________________, P.E., P.C. dated ____________________ for final approval (the Site Plan) on file with the Town and intended to be made a part of this Agreement as if more fully set forth herein.

2. The facility owner, its heirs, successors and assigns shall construct, maintain, clean, repair, replace and continue the stormwater control measures depicted in the Site Plan as necessary to ensure optimum performance of the measures to design specifications. The stormwater control measures may include, but shall not be limited to, the following drainage ditches, swales, dry wells, infiltrators, drop inlets, pipes, culverts, soil absorption devices, catch basins, manholes and stormwater treatment and management ponds.

3. The facility owner, its heirs, successors and assigns shall be responsible for all expenses related to the construction, maintenance and continuation of the stormwater control measures and shall establish a means for the collection and distribution of expenses among parties for any commonly owned facilities.

4. The facility owner, its heirs, successors and assigns shall provide for the periodic inspection of the stormwater control measures, not less than once in every one-year period, to determine the condition and integrity of the measures. Such inspection shall be performed by a professional engineer licensed by the State of New York. The inspecting engineer shall prepare and submit to the Town, within 30 days of the inspection, a written report of the findings, including recommendations for those actions necessary for the repair and/or continuation of the stormwater control measures.

5. The facility owner, its heirs, successors and assigns shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the stormwater control measures except in accordance with written approval of the Town, which approval the Town can withhold in its sole discretion.

6. The facility owner, its heirs, successors and assigns shall undertake necessary repairs and replacement of the stormwater control measures at the direction of the Town or in accordance with the recommendations of the inspecting engineer.

7. This Agreement shall be recorded in the Office of the County Clerk, County of Orange. This Agreement and the requirements contained herein, shall run with the land and shall bind the facility owner, its heirs, successors and assigns for a term of ninety-nine (99) years, unless discontinued with the written approval of the Town in accordance with Par. 5 of this Agreement. The facility owner, its heirs, successors and assigns agree to execute any documents required by the Town in connection with this Agreement and the implementation of this Agreement and failure to so execute any such documents shall constitute a violation of this Agreement.

8. If ever the Town determines that the facility owner, its heirs, successors and assigns has failed to construct or maintain the stormwater control measures in accordance with the project plans or has failed to undertake corrective action specified by the Town or by the inspecting engineer, or if the facility owner, its heirs, successors and assigns has failed to execute any documents required by the town in connection with this Agreement and the implementation of this Agreement, the Town is authorized to undertake such steps as may be reasonably necessary for the preservation, continuation or maintenance of the stormwater control measures including entry onto the Property to perform and performance of work and to levy and assess the expenses thereof as a lien against the Property and to collect such amounts in the same manner as real property taxes, and to take any and all other actions against the facility owner, its heirs, successors and assigns as may be allowed by local, county, state or federal law.

9. Whenever reference is made in this Agreement to the “the Town”, the same shall also be deemed to mean agents, officers, employees, contractors, and subcontractors of the consultants to the Town.

10. This Agreement is effective as of the ______ day of _____, 20 .

BY: ____
Title

TOWN OF WAWAYANDA
BY: ____
Title

STATE OF NEW YORK)
)SS:
COUNTY OF ORANGE)

On this day of 20 , before me, the undersigned, a Notary Public in and for said state, personal appeared ____________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted executed the instrument.

____

Notary Public

STATE OF NEW YORK)
)SS:
COUNTY OF ORANGE)

On this day of 20 , before me, the undersigned, a Notary Public in and for said state, personal appeared ____________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted executed the instrument.

____

Notary Public

TP-584 (3/19)

Department of Taxation and Finance

NEW YORK STATE

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

Recording office time stamp

See Form TP-584-I, Instructions for Form TP-584, before completing this form. Print or type.

Schedule A – Information relating to conveyance

Grantor/Transferor

☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Multi-member LLC
☐ Other

Name *(if individual, last, first, middle initial)* (☐ *mark an X if more than one grantor*)	Social Security number (SSN)
Mailing address	SSN
City / State / ZIP code	Employer Identification Number (EIN)
Single member's name if grantor is a single member LLC *(see instructions)*	Single member EIN or SSN

Grantee/Transferee

☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Multi-member LLC
☐ Other

Name *(if individual, last, first, middle initial)* (☐ *mark an X if more than one grantee*)	SSN
Mailing address	SSN
City / State / ZIP code	EIN
Single member's name if grantee is a single member LLC *(see instructions)*	Single member EIN or SSN

Location and description of property conveyed

Tax map designation – Section, block & lot *(include dots and dashes)*	SWIS code (six digits)	Street address	City, town, or village	County

Type of property conveyed *(mark an X in applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☐ Vacant land
5 ☐ Commercial/Industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☐ Four-family dwelling
9 ☐ Other ____________

Date of conveyance ____ ____ ____ (month / day / year)

Percentage of real property conveyed which is residential real property ________% *(see instructions)*

Condition of conveyance *(mark an X in all that apply)*

a. ☐ Conveyance of fee interest

b. ☐ Acquisition of a controlling interest (state percentage acquired ________%)

c. ☐ Transfer of a controlling interest (state percentage transferred ________%)

d. ☐ Conveyance to cooperative housing corporation

e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*

f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*

g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*

h. ☐ Conveyance of cooperative apartment(s)

i. ☐ Syndication

j. ☐ Conveyance of air rights or development rights

k. ☐ Contract assignment

l. ☐ Option assignment or surrender

m. ☐ Leasehold assignment or surrender

n. ☐ Leasehold grant

o. ☐ Conveyance of an easement

p. ☐ Conveyance for which exemption from transfer tax claimed *(complete Schedule B, Part 3)*

q. ☐ Conveyance of property partly within and partly outside the state

r. ☐ Conveyance pursuant to divorce or separation

s. ☐ Other *(describe)* ____________

For recording officer's use	Amount received	Date received	Transaction number
	Schedule B, Part 1 $ Schedule B, Part 2 $		

Page 2 of 4 **TP-584** (9/13)

Schedule B – Real estate transfer tax return (Tax Law Article 31)

Part 1 – Computation of tax due

1	Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, mark an X in the Exemption claimed box, enter consideration and proceed to Part 3)* ☐ **Exemption claimed**	1.	
2	Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)*	2.	
3	Taxable consideration *(subtract line 2 from line 1)*	3.	
4	Tax: $2 for each $500, or fractional part thereof, of consideration on line 3	4.	
5	Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1, Schedule G)*	5.	
6	Total tax due* *(subtract line 5 from line 4)*	6.	

Part 2 – Computation of additional tax due on the conveyance of residential real property for $1 million or more

1	Enter amount of consideration for conveyance *(from Part 1, line 1)*	1.	
2	Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in Schedule A)*	2.	
3	Total additional transfer tax due* *(multiply line 2 by 1% (.01))*	3.	

Part 3 – Explanation of exemption claimed on Part 1, line 1 *(mark an X in all boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, New York State, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) .... a ☐

b. Conveyance is to secure a debt or other obligation .... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance .... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts .... d ☐

e. Conveyance is given in connection with a tax sale .... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F .... f ☐

g. Conveyance consists of deed of partition .... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act .... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property .... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment .... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, § 1401(e) *(attach documents supporting such claim)* .... k ☐

* The total tax (from Part 1, line 6 and Part 2, line 3 above) is due within 15 days from the date of conveyance. Make check(s) payable to the county clerk where the recording is to take place. For conveyances of real property within New York City, use Form TP-584-NYC. If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045. If not using U.S. Mail, see Publication 55, *Designated Private Delivery Services.*

Schedule C – Credit Line Mortgage Certificate (Tax Law Article 11)

Complete the following only if the interest being transferred is a fee simple interest.
This is to certify that: *(mark an X in the appropriate box)*

1. ☐ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:

   a ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.

   b ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).

   c ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.

   d ☐ The maximum principal amount secured by the credit line mortgage is $3 million or more, and the real property being sold or transferred is **not** principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

   Note: for purposes of determining whether the maximum principal amount secured is $3 million or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.

   e ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:

   a ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.

   b ☐ A check has been drawn payable for transmission to the credit line mortgagee or mortgagee's agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in ______________ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is ______________. No exemption from tax is claimed and the tax of ______________ is being paid herewith. *(Make check payable to county clerk where deed will be recorded.)*

Signature (both the grantors and grantees must sign)

The undersigned certify that the above information contained in Schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of their knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

Grantor signature	Title	Grantee signature	Title
Grantor signature	Title	Grantee signature	Title

Reminder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you marked *e*, *f*, or *g* in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place? If no recording is required, send this return and your check(s), made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-0045. If not using U.S. Mail, see Publication 55, *Designated Private Delivery Services*.

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Schedule D – Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, § 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part 2, mark an *X* in the second box under *Exemption for nonresident transferors/sellers*, and sign at bottom.

Part 1 – New York State residents

If you are a New York State resident transferor/seller listed in Form TP-584, Schedule A (or an attachment to Form TP-584), you must sign the certification below. If one or more transferor/seller of the real property or cooperative unit is a resident of New York State, **each** resident transferor/seller must sign in the space provided. If more space is needed, photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

Certification of resident transferors/sellers

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor/seller as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law § 663(a) upon the sale or transfer of this real property or cooperative unit.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Note: A resident of New York State may still be required to pay estimated tax under Tax Law § 685(c), but not as a condition of recording a deed.

Part 2 – Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Form TP-584, Schedule A (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law § 663(c), mark an *X* in the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor/seller, that transferor/seller is not required to pay estimated personal income tax to New York State under Tax Law § 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form*. For more information, see *Payment of estimated personal income tax*, on Form TP-584-I, page 1.

Exemption for nonresident transferors/sellers

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor/seller (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law § 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from ________ (Date) to ________ (Date) (see instructions).

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of New York State, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Attachment 7

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Geotechnical Borehole Logs

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: **Ensol, Inc.** PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-1 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 5' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV. 457.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	6"	2'0"	1	2		5	moist		6" Topsoil; Brn F SAND, lit silt [SP]
							3	3			loose	2'0"	
		2	ss	24"	12"	4'0"	8	12		30	moist		Brn F SAND, lit silt, lit FC gravel [SP]
							18	14			compact		
5		3	ss	24"	20"	6'0"	3	4		11	wet		Brn F SAND & SILT, tr clay [SP/SM]
							7	8			compact		
		4	ss	24"	20"	8'0"	10	15		25	moist		SAME
							10	12			compact		
		5	ss	24"	10"	10'0"	14	17		33	moist		SAME
10							16	12			dense		
		6	ss	24"	18"	12'0"	7	8		20	wet		Grey FMC SAND & SILT, tr clay, lit FC gravel [SW/SM]
							12	10			compact		
		7	ss	24"	20"	14'0"	12	28		68	wet		SAME, tr cobbles
							40	26			v dense		
15		8	ss	24"	16"	16'0"	19	17		32	wet		Grey FMC SAND, sm silt, sm FC gravel, tr clay [SW/SM]
							15	17			dense		
20													
		9	ss	10"	6"	20'9"	41	100/4"		100	wet		SAME
											v dense		
		10	ss	24"	20"	25'0"	29	41		93	wet		SAME
25							52	60			v dense	25'0"	
													E.O.B 25'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________ FT. USED ______________ CASING THEN _______ CASING TO _______ FT. **HOLE NO. B-1**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-2
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV. 455.7
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE Type	SAMPLE PEN	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	20"	2'0"	1	2		5	moist		4" Topsoil; GreyBrn F SAND & SILT, tr clay, tr F grave
							3	5			loose		
		2	ss	24"	20"	4'0"	7	11		21	moist	2'3"	
							10	12			compact		
5		3	ss	24"	18"	6'0"	6	10		24	moist		GreyBrn F SAND & SILT, tr clay [SP/SM]
							14	13			compact		
		4	ss	24"	20"	8'0"	11	15		49	wet		Brn FMC SAND & SILT, tr FC gravel [SP/SM]
							34	21			dense		
		5	ss	24"	12"	10'0'	10	14		27	wet/moist		Grey F SAND & SILT, tr clay, lit FC gravel [SW/SM]
10							13	14			compact		
		6	ss	24"	18"	12'0'	6	8		19	wet		Grey FMC SAND & SILT, tr clay, lit FC GRAVEL [SP/SM]
							11				compact		
		7	ss	24"	20"	14'0'	15	25		57	wet		SAME
							32	27			v dense		
15		8	ss	24"	18"	16'0"	17	17		33	wet		
							16	17			dense		Grey FMC SAND, sm siltm sm FC gravel, tr clay [SW/SM]
20													
		9	ss	24"	20"	22'0"	27	39		80	wet		SAME
							41	60			v dense		
		10	ss	24"	18"	23'8"	24	37		86	wet		
							49	50/4"			v dense	23'8"	SAME
25													E. O B 23'8"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-2**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-3 BORING LOCATIONS per Plan
FOREMAN - DRILLER PD/ak	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 4' FT AFTER 0 HOURS
AT 2' FT AFTER 4 HOURS

DATE START 4/9/21
DATE FINISH 4/9/21
SURFACE ELEV. 456.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	18"	2'0"	2	2		5	moist	0'6"	Topsoil; DkBrnBrn SILT [ML]
							3	6			stiff		
		2	ss	24"	14"	4'0"	17	12		32	moist	2'0"	BrnLtBrn SILT [ML]
							20	25			hard		
5		3	ss	24"	18"	6'0"	28	21		35	wet	4'0"	Brn SILT & FM SAND, FC gravel [ML]
							14	11			hard		
		4	ss	24"	19"	8'0"	11	11		24	wet	7'0"	Brn FMC SAND & FC GRAVEL, lit silt [SW]
							13	15			compact		LtBrnBrn VFFMC SAND & FC GRAVEL, lit silt
		5	ss	11"	10"	8'11"	43	100/5"		100	vmoist		[SW]
10											v dense		
		6	ss	24"	20"	12'0"	33	70		143	moist	10'6"	LtBrn VFFMC SAND & FC GRAVEL, silt
							73	84			v dense		LtGrey VFFMC SAND & FC GRAVEL, silt, lit cobbles
		7	ss	11"	6"	12'11"	87	100/5"		100	moist/dry		[SW/SM]
15		8	ss	24"	18"	16'0"	14	17		42	moist		Grey VFFM SAND, F gravel, silt, sm cobbles, tr boulders
							25	20			dense		[SP/SM]
20													
		9	ss	24"	18"	22'0"	18	22		42	moist		Grey VFF SAND, FC gravel, sm silt [SW]
							20	22			dense		
25													
		10	ss	4"	3"	25'4"	100/4"			100	v dense	25'4"	Grey VFFM SAND, FC gravel, cobbles, lit silt, boulders
													E.O.B 25'4"
30													
													* POCKET PENETROMETER READING Tons/sqft
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. HOLE NO. B-3

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-4 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR		
TYPE	HSA	SS		DATE START	4/12/21
SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH	4/12/21
HAMMER WT.		140#	BIT	SURFACE ELEV.	453.4
HAMMER FALL		30"		GROUND WATER ELEV.	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	1	1		4	moist		4" Topsoil, GreyBrn F SAND & SILT [SM]
							3	5			v loose		
		2	ss	24"	16"	4'0"	6	10		20	moist		SAME
							10	11			compact		
5		3	ss	24"	14"	6'0"	6	8		18	moist		GreyBrn F SAND & SILT [SP/SM]
							10	10			compact		
		4	ss	24"	6"	8'0"	4	5		10	wet		Brn F SAND, tr silt [SP]
							5	5			loose		
		5	ss	24"	12"	10'0"	5	5		13	wet		Brn FMC SAND, sm silt, sm FC gravel [SW/SM]
10							8	8			compact	9'6"	
		6	ss	24"	18"	12'0"	7	9		21	wet		Grey FMC SAND, sm silt, some FC gravel [SW/SM]
							12	13			compact		
		7	ss	24"	26"	14'0"	14	27		56	wet		Grey FMC SAND, sm silt, lit FC gravel tr clay
							29	30			v dense		
15		8	ss	24"	14"	16'0"	18	17		33	wet		SAME
							16	17			dense		
20													
		9	ss	15	10"	21'3"	31	40		90	wet		Gray FMC SAND, sm silt, sm FC gravel , tr clay [SW/SM]
							50/3"				v dense		
		10	ss	24"	20"	25'0"	24	37		87	wet		same
25							50	71			v dense	25'0"	
													E.O.B 25'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ____________ CASING THEN ______ CASING TO ______ FT. HOLE NO. B-4
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.1	4.1	6.6	33.9	48.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	94.1		
#4	92.9		
#10	88.8		
#20	85.4		
#40	82.2		
#60	75.9		
#140	60.6		
#200	48.3		

* (no specification provided)

Material Description

Brown and gray silty, clayey sand

Atterberg Limits

PL= 19 LL= 26 PI= 7

Coefficients

D_{90}= 2.4908 D_{85}= 0.7347 D_{60}= 0.1039
D_{50}= 0.0785 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO=

Remarks

Moisture content=24.3%

Source of Sample: B-4 **Depth:** 4-10 ft.
Sample Number: S-3,S-4,S-5 Comp.

Date: 6-22-2021

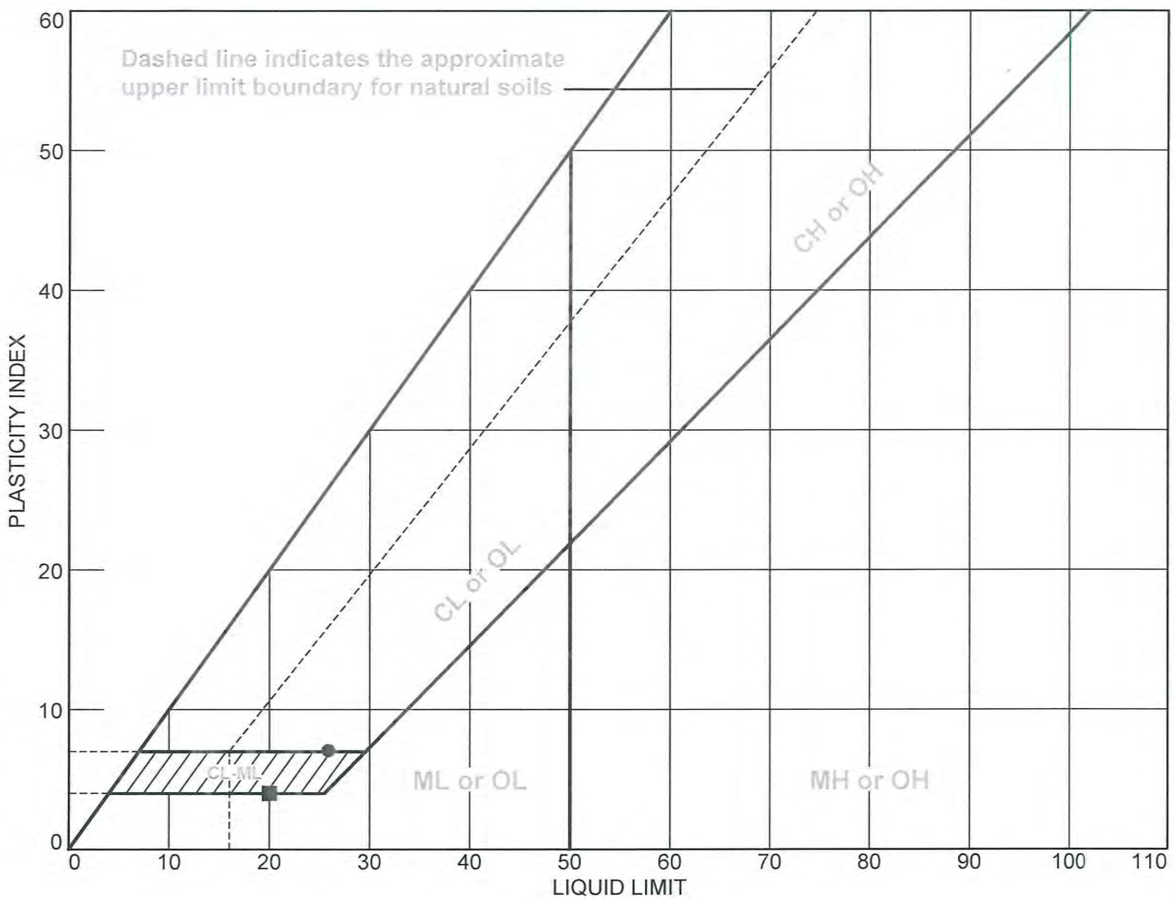
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-3,S-4,S-5 Comp.	4-10 ft.	24.3	19	26	7	SC-SM
■	B-5	S-5,S-6 Comp.	8-12 ft.	18.9	16	20	4	GP-GC

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No.: 21-065 **Figure**

Tested By: EH **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: **Ensol, Inc.**	SHEET 1 OF 2 HOLE NO. B-5
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER PD AK	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/9/21
DATE FINISH 4/9/21
SURFACE ELEV. _____457.7
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST ________M OIST	STRATA CHANGE DEPTH ______ ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	3	3		6	moist	1'0"	Topsoil
							3	5			loose	2'0"	Brn SILT & FC GRAVEL, sm FM sand [ML]
		2	ss	24"	18"	4'0"	13	17		37	moist		Brn FMC SAND & FC GRAVEL, lit cobbles, silt [SW]
							20	22			dense		
5		3	ss	24"	20"	6'0"	18	19		33	moist/v moist		Brn FMC SAND & FC GRAVEL, lit cobbles, silt
							14	14			dense		
		4	ss	24"	18"	8'0"	14	15		29	wet		BrnGrey FMC SAND & FC GRAVEL, lit cobbles, silt
							14	15			compact		
		5	ss	24"	18"	10'0"	14	15		27	wet		Lt BmBrn VFFMC & SAND, silt, FC gravel [SW/SM]
10							12	11			compact		
		6	ss	24"	20"	12'0"	5	15		34	wet/v moist	11'0"	SAME
							19	20			dense		BrnGray FMC SAND & FC GRAVEL, lit silt, cobbles [SW]
		7	ss	24"	18"	14'0"	20	23		50	wet	12'6"	
							27	25			dense	13'6"	Brn FMC SAND, FC gravel [SW]
15		8	ss	17"	15"	15'5"	29	32		132	wet		Brn VFF SAND, silt, FC gravel, cobbles, tr boulders [SP/SM]
							100/5"				v dense		
20													
		9	ss	18"	18"	21'6"	14	16		35	wet		Brn VFF SAND, silt, FC gravel, cobbles, tr boulders [SP/SM]
							19				dense		Bolders
25													
		10	ss	18"	18"	26'6"	51	25		52	wet		Grey VFFMC SAND, FC gravel, sm silt, cobbles, lit bolders
							27				v dense		[SW/SM]
30													Cobbles @ 29'
		11	ss	18"	18"	31'6"	8	10		30	wet	31'0"	GreyDkGrey FM SAND, sm silt, Tr C Sand [SW/SM]
							20				compact		Grey FMC SAND & F GRAVEL, sm silt
35													
		12	ss	18"	18"	36'6"	33	50		113	v moist		LtGrey VF SAND, silt, sm F gravel, cobbles [SP/SM]
							63				v dense		
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-5**
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. CLIENT: **Ensol, Inc.** SHEET 2 OF 2

90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	HOLE NO. B-5 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT 6' FT AFTER 0 HOURS AT __ FT AFTER __ HOURS		DATE START 4/12/21 DATE FINISH 4/12/21 SURFACE ELEV. GROUND WATER ELEV.

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST ___M OIST	STRATA CHANGE DEPTH ___ ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		13	ss	19"	9"	40'9"	81	100/3"		100	wet		SAME
											v dense		
45													
		14	ss	18"	18"	46'6"	37	42		132	wet		LtGreyGrey SILT, sm VFFMC SAND, FC gravel, cobbles,
							90				v dense		tr boulders [ML]
50													
		15	ss	18"	18"	51'6"	35	41		99	wet		SAME
							58				v dense		
55													
		16	ss	18"	18"	56'6"	19	22		48	wet		GreyBrn VFF SAND, sm silt [SP/SM]
							26				dense		
60													
		17	ss	18"	18"	61'6"	20	28		73	wet		GreyBrn VFF SAND, lit silt [SP]
							45				v dense		Grey FMC SAND & FC GRAVEL, lit silt, cobbles [SW]
65													
		18	ss	18"	17"	66'6"	41	63		140	wet		Grey VFFMC SAND, silt, FC gravel, cobbles [SW/SM]
							77				v dense	67'0"	Auger refusal
													E.O.B 67'0"
70													*PP: Pocket Petrometer
75													
80													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-5**

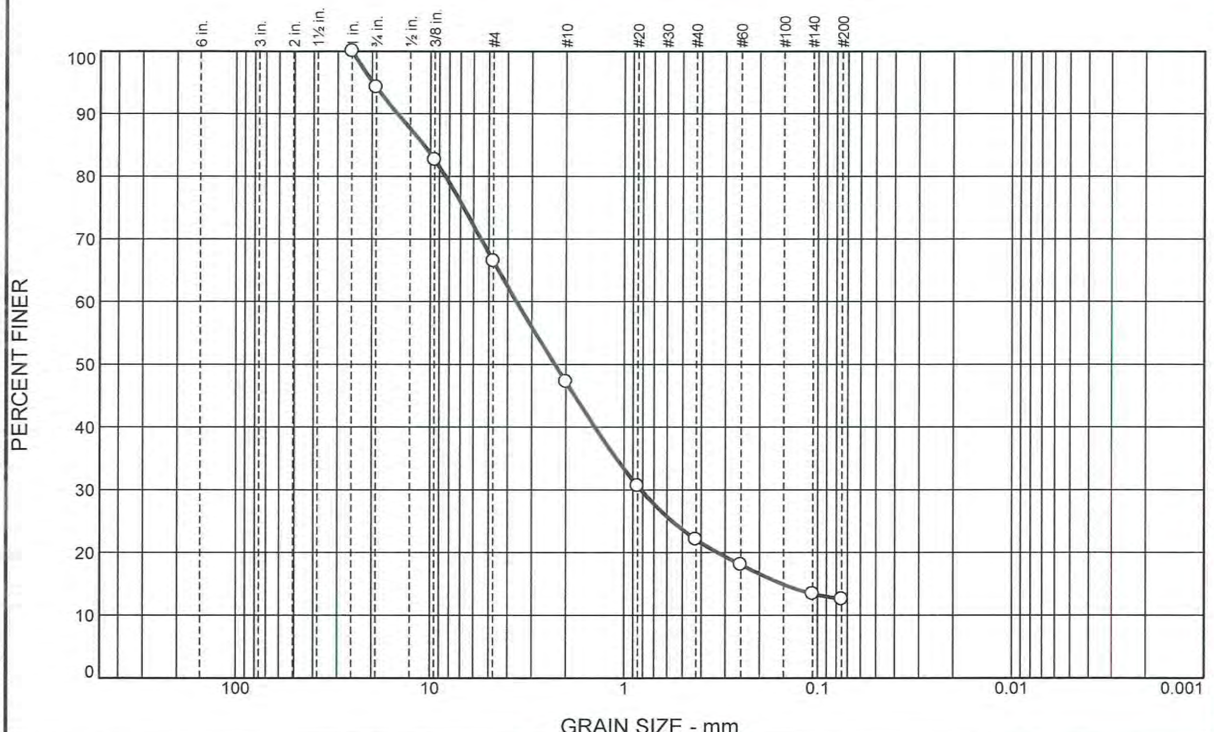
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE

SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM

PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.8	27.7	19.3	25.1	9.5	12.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	94.2		
.375	82.6		
#4	66.5		
#10	47.2		
#20	30.6		
#40	22.1		
#60	18.1		
#140	13.4		
#200	12.6		

* (no specification provided)

Material Description

Brown and gray silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.8075 D_{85}= 10.8418 D_{60}= 3.6024
D_{50}= 2.2795 D_{30}= 0.8161 D_{15}= 0.1522
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-5 **Depth:** 2-8 ft.
Sample Number: S-2,S-3,S-4 Comp. **Date:** 6-22-2021

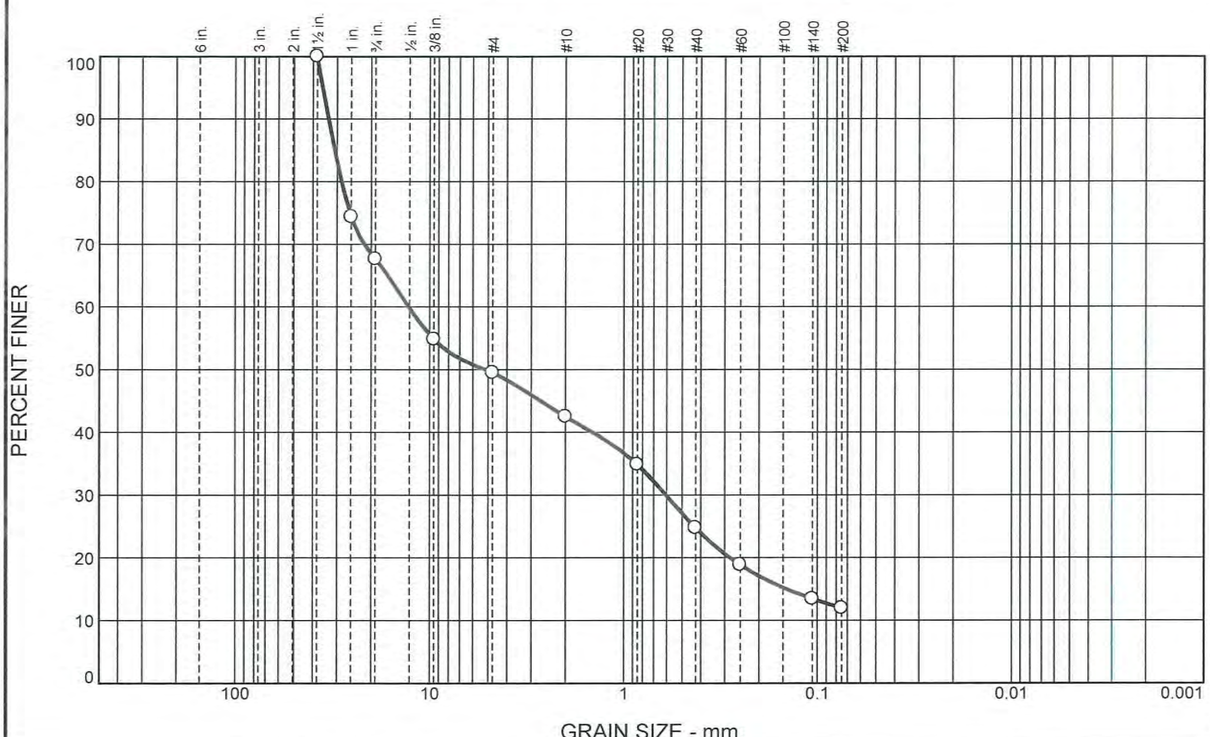
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	32.4	18.1	7.0	17.7	12.8	12.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	74.4		
.75	67.6		
.375	54.8		
#4	49.5		
#10	42.5		
#20	34.9		
#40	24.8		
#60	18.9		
#140	13.5		
#200	12.0		

* (no specification provided)

Material Description

Brown and gray poorly graded gravel with silty clay and sand

Atterberg Limits

PL= 16 LL= 20 PI= 4

Coefficients

D_{90}= 33.2740 D_{85}= 30.9360 D_{60}= 12.8380
D_{50}= 5.1868 D_{30}= 0.6038 D_{15}= 0.1441
D_{10}= C_u= C_c=

Classification

USCS= GP-GC AASHTO=

Remarks

Moisture content=18.9%

Source of Sample: B-5 **Depth:** 8-12 ft.
Sample Number: S-5,S-6 Comp.

Date: 6-22-2021

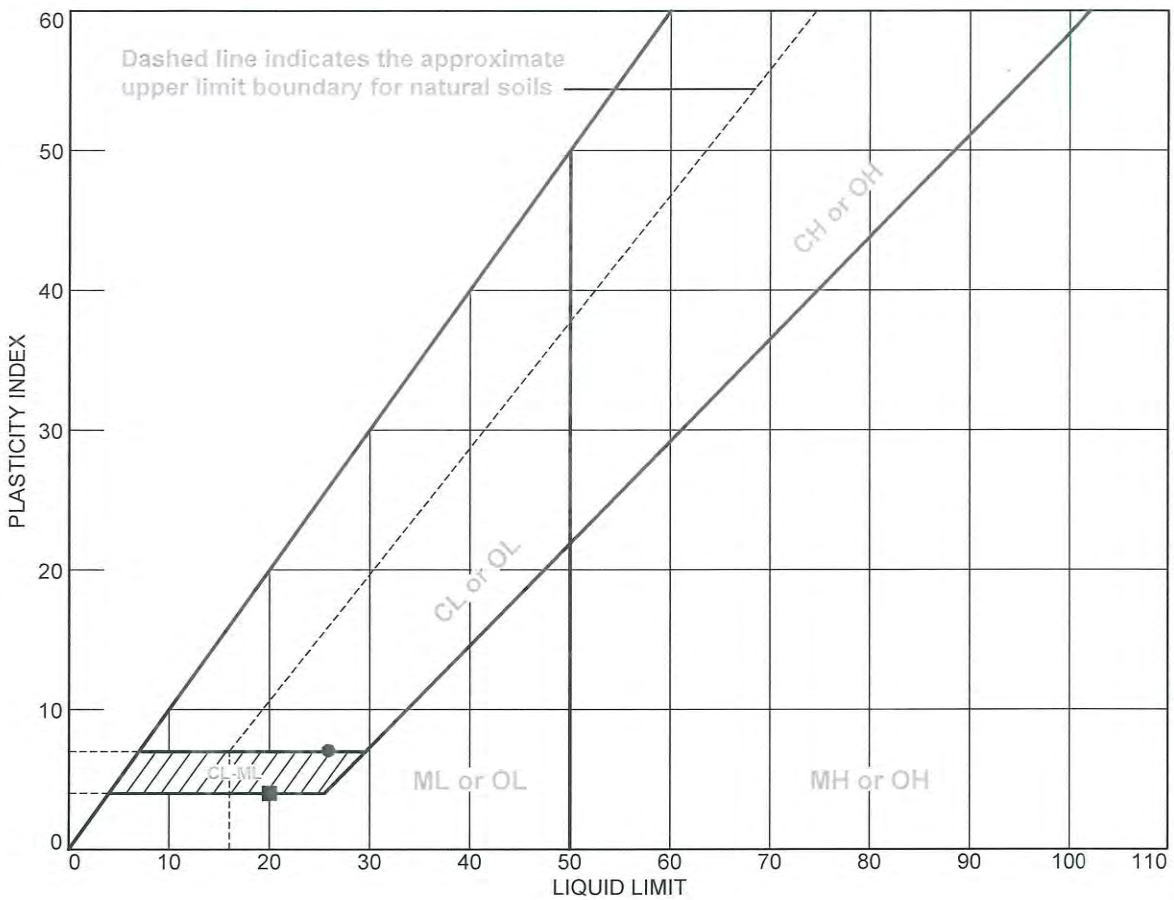
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-3,S-4,S-5 Comp.	4-10 ft.	24.3	19	26	7	SC-SM
■	B-5	S-5,S-6 Comp.	8-12 ft.	18.9	16	20	4	GP-GC

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No.: 21-065 **Figure**

Tested By: EH **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-6 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR		
AT 8 FT AFTER 0 HOURS	TYPE	HSA	SS		DATE START	4/13/21
AT __ FT AFTER __ HOURS	SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH	4/13/21
	HAMMER WT.		140#	BIT	SURFACE ELEV.	456.0
	HAMMER FALL		30"		GROUND WATER ELEV.	

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	12"	2'0"	8	10		18	moist		Topsoil
							8	9			compact		Brn FMC SAND, sm clay, silt [SW/SC]
		2	ss	24"	8"	4'0"	16	8		18	moist		SAME
							10	11			compact		
5		3	ss	24"	18"	6'0"	12	14		26	moist		GrayBrn FMC SAND, sm FC gravel, lit silt [SW]
							12	11			compact		
		4	ss	24"	6"	8'0"	13	13		28	moist		SAME
							15	15			compact		
		5	ss	24"	0"	10'0"	14	12		24	wet		NO RECOVERY
10							12	11			compact		
		6	ss	24"	4"	12'0"	11	9		17	wet		Brn FMC SAND & FC gravel [SW]
							8	9			compact		
		7	ss	24"	12"	14'0"	7	9		18	wet		SAME
							9	9			compact		
15		8	ss	20"	18"	15'8"	23	32		84	wet		Brn FMC SAND & FC GRAVEL, tr cobbles [SW]
							52	50/2"			v dense		
20													
		9	ss	24"	18"	22'0"	21	21		43	wet		Brn FMC SAND, lit FC gravel [SW]
							22	26			dense		
		10	ss	24"	16"	24'0"	18	22		54	wet		Grey FMC SAND & FC GRAVEL, tr cobbles [SW]
25							32	29			v dense	24'0"	
													E.O.B. 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________ FT. USED ______________ CASING THEN _______ CASING TO _______ FT. **HOLE NO. B-6**

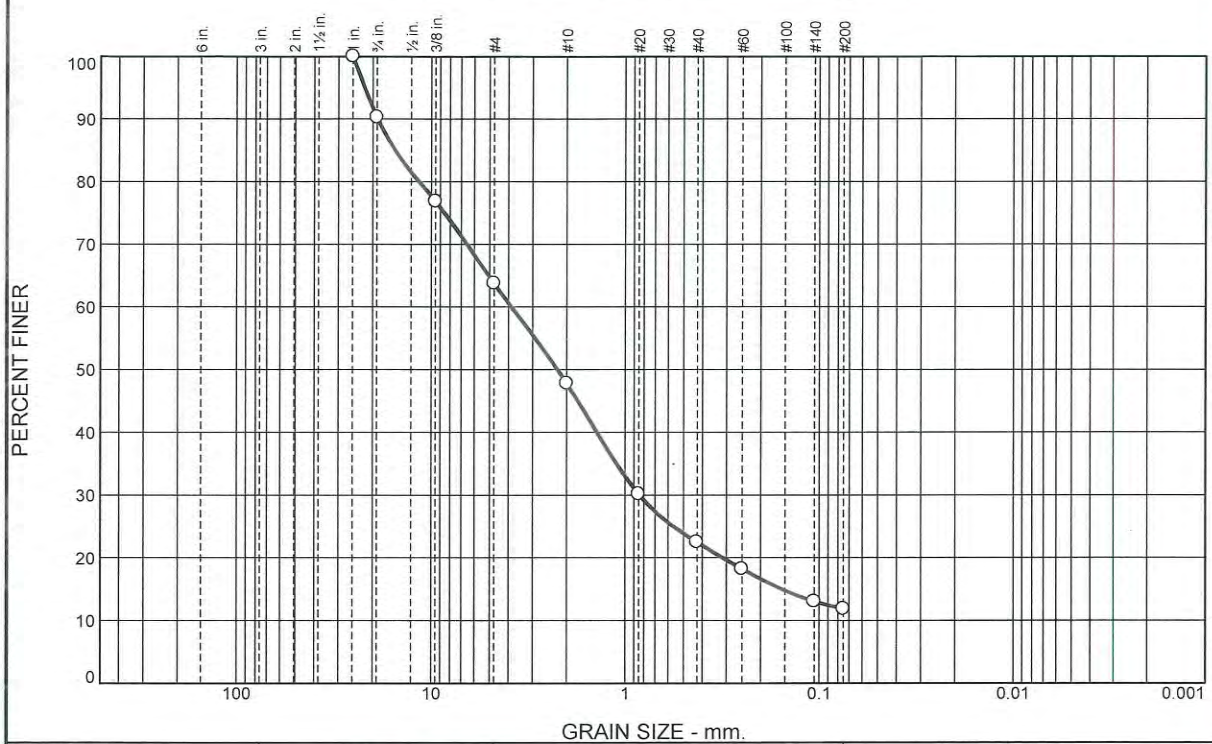
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE

SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM

PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.7	26.5	16.0	25.3	10.7	11.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	90.3		
.375	76.9		
#4	63.8		
#10	47.8		
#20	30.2		
#40	22.5		
#60	18.2		
#140	13.0		
#200	11.8		

* (no specification provided)

Material Description

Brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.8609 D_{85}= 15.3652 D_{60}= 3.8647
D_{50}= 2.2312 D_{30}= 0.8409 D_{15}= 0.1554
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-6 **Depth:** 4-8 & 10-14 ft.
Sample Number: S-3,S-4,S-6,S-7 Comp **Date:** 6-22-2021

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-7
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 13' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/13/21
DATE FINISH 4/13/21
SURFACE ELEV. 458.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		ss	ss	24"	10"	2'0"	3	6		10	moist		4" Topsoil; Brn F SAND, sm silt, lit FC gravel [SP/SM]
							4	18			loose		
		2	ss	24"	10"	4'0"	16	11		21	moist		SAME
							10	10			compact		
5		3	ss	24"	14"	6'0"	17	18		41	dry		Brn FMC SAND, sm FC gravel, tr silt, tr cobbles [SW]
							23	36			dense		
		4	ss	24"	16"	8'0"	41	25		43	dry		SAME
							18	19			dense		
		5	ss	24"	14"	10'0"	10	11		23	moist/wet		DkBrn FMC SAND, sm FC gravel, tr silt [SW]
10							12	12			compact		
		6	ss	24"	12"	12'0"	15	24		45	wet		Brn FMC SAND & FC GRAVEl, tr silt [SW]
							21	16			dense		
		7	ss	24"	16"	14'0"	20	14		26	wet		SAME
							12	10			compact		
15		8	ss	24"	16"	16'0"	14	20		43	wet		Brn FMC SAND, sm FC gravel, tr silt [SW]
							23	25			dense		
20													
		9	ss	24"	8"	22'0"	28	22		42	wet		Brn FMC SAND, sm silt, tr clay, lit FC gravel [SW/SM]
							20	23			dense		
		10	ss	24"	12"	24'0"	29	19		31	wet		GreyBrn FMC SAND & FC GRAVEL, tr silt [SW]
							12	14			dense	24'0"	
25													E.O.B 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-7**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-8 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	
	TYPE	HSA	SS		DATE START 4/13/21
AT 2'6" FT AFTER 0 HOURS	SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH 4/13/21
AT __ FT AFTER __ HOURS	HAMMER WT.		140#	BIT	SURFACE ELEV. 449.7
	HAMMER FALL		30"		GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	8"	2'0"	1	2		4	moist		4" Topsoil; Brn F SAND, sm silt, lit FC gravel
							2	2			v loose		
		2	ss	24"	14"	4'0"	5	11		31	wet		Grey FMC SAND, lit FC gravel, lit silt [SW]
							20	12			dense		
5		3	ss	24"	12"	6'0"	9	17		32	wet		Grey FMC SAND & FC gravel, tr silt
							15	15			dense		
		4	ss	24"	16"	8'0"	10	11		22	wet		Brn FMC SAND & FC GRAVEL, tr silt [SW]
							11	11			compact		
		5	ss	2"	0"	8'2"	100/2"			100	wet		No recovery
10											v dense		
		6	ss	24"	14"	12'0"	10	11		45	wet		Brn FMC SAND & FC GRAVEL, tr cobbles [SW]
							34	24			dense		
		7	ss	14"	10"	13'2"	26	49		149	wet		SAME
							100/2"				v dense	14'0"	
15		8	ss	24"	20"	16'0"	14	16		31	wet		Grey F SAND & SILT [SP/SM]
							15	17			dense		
20													
		9	ss	24"	20"	22'0"	11	10		29	wet		SAME
							19	15			compact		
		10	ss	24"	20"	24'0"	12	11		29	wet		
							18	15			compact	24'0"	SAME
25													
													E.O.B 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ____________ CASING THEN ______ CASING TO ______ FT. HOLE NO. B-8

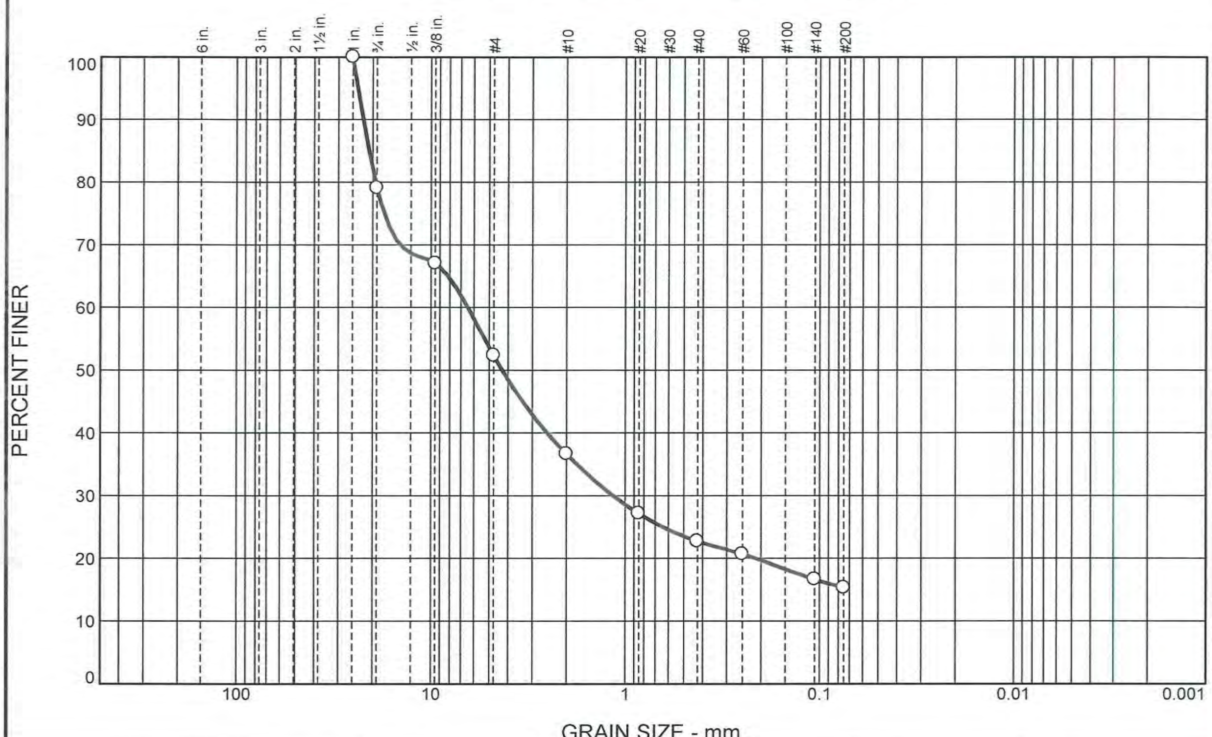
A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE

SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM

PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.9	26.8	15.6	13.9	7.5	15.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	79.1		
.375	67.0		
#4	52.3		
#10	36.7		
#20	27.2		
#40	22.8		
#60	20.7		
#140	16.7		
#200	15.3		

* (no specification provided)

Material Description

Gray-brown silty gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 22.4203 D_{85}= 20.9434 D_{60}= 6.4557
D_{50}= 4.2926 D_{30}= 1.1507 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-8 **Depth:** 2-8 ft.
Sample Number: S-2,S-3,S-4 Comp.

Date: 6-22-2021

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

Attachment 8

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

SHPO Correspondence

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

June 15, 2021

David Lenox
Project Manager
EnSol, Inc.
661 Main Street
Niagara Falls, NY 14301

Re: USACE
Dom-Mar Transfer and Recycling Facility: New Construction
1128 Dolsontown Rd, Middletown, NY 10940
20PR08024

Dear David Lenox:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed *Phase I Archaeological Investigation for the Dom-Mar Transfer & Recycling Center Town of Wawayanda, Orange County, New York* (Tracker Archaeology, April 2021). The investigation found no evidence of archaeological sites within the project's Area of Potential Effects (APE). However, as noted in the report, a New York State Museum-recorded archaeological site, NYSM 6169, is mapped within the project area. The site is described as "Cemetery." No other information is available. The mapped location must be considered approximate and, based on a review of historic USGS topographic maps, there may have been significant landscape modification in the recorded site's vicinity. Therefore, based on these factors, we recommend that the project will not adversely affect historic or archaeological properties listed or eligible for listing on the National Register of Historic Places conditioned on a commitment by the applicant to implement our Human Remains Discovery Protocol (attached) should any evidence of human remains or possible burial goods be encountered during construction.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

Attachment

cc: Ryan Elliott, EnSol; Brian Orzel, USACE; Charles Vandrei and David Witt, DEC

State Historic Preservation Office/
New York State Office of Parks, Recreation and Historic Preservation
Human Remains Discovery Protocol
(January 2021)

If human remains are encountered during construction or archaeological investigations, the New York State Historic Preservation Office (SHPO) recommends that the following protocol is implemented.

- Human remains shall be treated with dignity and respect. Should human remains or suspected human remains be encountered, work in the general area of the discovery shall stop immediately and the location shall be secured and protected from damage and disturbance.

- If skeletal remains are identified and the archaeologist is not able to conclusively determine if they are human, the remains and any associated materials shall be left in place. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist shall assess the remains in situ to help determine if they are human.

- If the remains are determined to be human, law enforcement, the SHPO, the appropriate Indian Nations, and the involved state and federal agencies shall be notified immediately. If law enforcement determines that the burial site is not a criminal matter, no skeletal remains or associated materials shall be removed until appropriate consultation takes place.

- If human remains are determined to be Native American, they shall be left in place and protected from further disturbance until a plan for their avoidance or removal is developed. Please note that avoidance is the preferred option of the SHPO and the Indian Nations. The involved agency shall consult SHPO and the appropriate Indian Nations to develop a plan of action. Photographs of Native American human remains and associated materials should not be taken without consulting with the involved Indian Nations.

- If human remains are determined to be non-Native American, the remains shall be left in place and protected from further disturbance until a plan for their avoidance or removal is developed. Please note that avoidance is the preferred option of the SHPO. The involved agency shall consult SHPO and other appropriate parties to develop a plan of action.

- The SHPO recommends that burial information is not released to the public to protect burial sites from possible looting.

Section 3

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

January 7, 2021

Ryan Elliott
EnSol, Inc.
661 Main Street
Niagara Falls, NY 14301

Re: Dolsontown Road Transfer Station
County: Orange   Town/City: Wawayanda

Dear Mr. Elliott:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

We have no records of rare or state-listed animals or plants, or significant natural communities at the project site.

Within 1.75 miles of the project site is a documented summer location of **Indiana bat** (*Myotis sodalis*, state and federally listed as Endangered). The bats may travel 2.5 miles or more from documented locations. The main impact of concern for bats is the removal of potential roost trees. For information about any permit considerations for your project, please contact the Permits staff at the NYSDEC Region 3 Office, Division of Environmental Permits, at dep.r3@dec.ny.gov.

For most sites, comprehensive field surveys have not been conducted. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other resources may be required to fully assess impacts on biological resources.

For information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the Permits staff at the NYSDEC Region 3 Office as described above.

Sincerely,

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

1378

Section 4

Phase I Archaeological Investigation for the Dom-Mar Transfer & Recycling Center
Town of Wawayanda, Orange County, New York

April 2021

Prepared for:
EnSol, Inc., Niagara Falls, New York

Alfred G. Cammisa, M.A.
with Alexander Padilla, B.A. (CAD)

1053

MANAGEMENT SUMMARY

PR#:
20PR08024

Involved agencies:
Town of Wawayanda

Phase:
Phase IA & IB

Location:
Town of Wawayanda
Orange County

Survey Area:
Length: up to 1120 feet (341 meters) north-south
Width: up to 1300 feet (396 m) east-west
Acres Surveyed: about 18 acres (7h)

USGS:
Middeltown, NY

Survey overview:
ST no. & interval: 297 ST's at 50 ft (15m) intervals

Results:
No prehistoric or historic sites

Structures:
No. Of buildings/structures/cemeteries in project area: 20th century dwelling, store, & barn complex
No. Of buildings/structures/cemeteries adjacent to project area: na
No. Of previously determined NR listed or eligible buildings/structures/cemeteries/districts: none
No. Of identified eligible buildings/structures/cemeteries/districts: none

Authors:
Alfred G. Cammisa, M.A.
Alexander Padilla, B.A. (CAD)

Date of Report:
Report completed April, 2021

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INTRODUCTION

Between February 18 and April 7, 2021 and TRACKER Archaeology, Inc. conducted a Phase IA documentary study and a Phase IB field testing for the Dom-Mar Transfer & Recycling Center, Town of Wawayanda, Orange County, New York.

The purpose of the Phase IA documentary study was to determine the prehistoric and historic potential of the project area for the recovery of archaeological remains. This was implemented by a review of the original and current environmental data, archaeological site files, other archival literature, maps, and documents.

The prehistoric and historic site file search was conducted utilizing the CRIS resources of the New York State Historic Preservation Office in Waterford, New York. Various historic and/or archaeological web sites may have been visited to review any pertinent site information.

The purpose of the Phase IB survey was to recover physical evidence for the presence or absence of archaeological sites on the property. This was accomplished through subsurface testing and ground surface reconnaissance.

These investigations have been conducted in accordance with the standards set forth by the New York Archaeological Council and the New York State Historic Preservation Office.

The project area is located at 1138 Dolsontown Road between McVeigh Road and Caskey Lane. It is bound by Dolsontown Road to the north, a stream to the east, and other properties on the other sides.

The investigation was completed by TRACKER-Archaeology, Inc. of Monroe, New York. Historic & prehistoric research by P.I., Alfred G. Cammisa, M.A. Field work was conducted by Alfred G. Cammisa, crew chief, Alfred T. Cammisa and field technicians Erin Murphy, B.A. and Alec Denniger, B.A. Report preparation was by Alfred G. Cammisa with Alexander Padilla, B.A. (CAD).

The work was performed for EnSol, Inc., Niagara Falls,, New York.

ENVIRONMENT

Geology
The study area is located in the southeast portion of New York State in the center part of Orange County. This region of New York lies within the Ridge and Valley Physiographic Province. This province, also known as the Newer Appalachians, extends from Lake Champlain to Alabama. It passes as a narrow lowland belt between the New England Uplands (Taconic Mountains and Hudson Highlands) to the east and the Appalachian Plateau (Catskill and Shawangunk Mountains) and Adirondack Mountains to the west. The characteristic topography is a succession of parallel valleys and ridges trending roughly in a northeasterly direction. This is a region of sedimentary rocks which were easily eroded and subjected to folding or bedding of the rock layers (Schuberth 1968: cover map, 16-18; Isachsen et al 2000: 4, 53-54; New York-New Jersey Trail Conference 1998: cover map).

Soils and Topography
Soils on the project area consist of:

Name	Soil Horizon Depth in(cm)	Color	Texture Inclusion	Slope %	Drainage	Landform
Hoosic	O=3-0 (8-0) A=0-4(-10) B=4-14(-36)	Roots, leaves 10YR4/3 7.5YR5/6	GrSaLo	3-8	well	glacial lake deposits
Mardin	Ap=0-8(-20) B=8-15(-38)	10YR4/2 10YR5/6	GrSiLo	3-8	well	glacial lake deposits
Riverhead	Ap 0-7in (0-18cm) B 7-11 (-28)	10YR3/2 10YR5/4	SiLo	0-3	Poor	glacial lake deposits
Wayland	Ap=0-9(-22) B=9-17(-43)	10YR3/2 10YR5/2	GrLo	3-8	well	glacial till

(Olsson 1981: Map 48 pgs., 34, 37-38, 49, 768, 95, 99).

KEY:

Shade: Lt=Light, Dk=Dark, V=Very
Color: Br=Brown, Blk=Black, Gry=Gray, Gbr=Gray Brown, StBr=Strong Brown, Rbr=Red Brown, Ybr= Yellow Brown
Soils: Si=Silt, Lo=Loam, Sa=Sand, Cl=Clay
Other: Sh=shale, M=Mottle, Gr=Gravelly, Cb=cobbles, /=or

The elevation on the project area is approximately 450 to 460 feet above mean sea level.

Hydrology
The project area is adjacent to a tributary of Monhagen Brook. The Monhagan drains into the Wallkill River. The Wallkill drains north into the Hudson River.

Vegetation
The predominant forest community in this area was probably the Oak Hickory Forest. This forest is a nut producing forest with acorns and hickory nuts usually an obvious part of the leaf litter on the forest floor. The Oak Hickory Forest intermingles with virtually all other forest types. The northern extension of this forest community was also originally called the Oak-Chestnut forest, before the historic Chestnut blight (Kricher 1988:38, 57-60).

At the time of the Phase IB survey, the property consisted of an open grass field with a 20th century store, dwelling, and barn complex.

PREHISTORIC POTENTIAL

A prehistoric site file search was conducted at the New York State Historic Preservation Office. The search included a 1 mile radius around the study area. The following sites were recorded:

NYSM Sites	NYSHPO Sites	Distance from APE ft(m)	Site Description
6169		Within project area	Cemetery: no info.
	7119.000083	565(172)	Simon:Late Archaic/Early Woodland point, bifaces, cores, flakes, scraper
	7119.000017	2363(720)	Unknown
	7119.000021	1203(366)	Unknown
	7119.000016	2562(781)	Unknown
	7119.000008	3333(1016)	Unknown
	7119.000205	2946(898)	4 lithic scatters, 1 with Late Archaic Brewerton Eared
	7119.000206	4574(1394)	Isolated find: Brewerton Eared
	7119.000186	3367(1026)	Late Archaic.2 Lamoka point, 2 biface, 2 utilized flakes, 1 retouched flake, 1 core, 107 flakes, shatter 2 FCRs
	7119.000187	3541(1079)	Lake Archaic with 1 Lamoka point, 1 Normanskill point, 2 utilized flakes, 32 flakes, 3 shatter 1 FCR
	7119.000018	4656(1389)	Cemetery expansion
	7119.000015	2285(6966)	Unknown

-The project area is adjacent to a tributary of Monhagen Brook.

-The study parcel consists of level to moderately sloped, well drained terrain with some poorly drained soils also.

-Numerous prehistoric sites are in the vicinity.

In our opinion, the study area has a higher than average potential for the recovery of prehistoric sites on the well drained terrain. The type of site encountered could be from either Woodland or Archaic Periods and likely encountered in the A or upper B soil horizons.

HISTORIC POTENTIAL

Seventeenth Century

At the time of European contact and settlement, the study area was probably occupied by the Waoranecks who lived between Stony Point and Danns Kammer (near Newburgh Bay). Their western boundary was unknown. These peoples were likely a sub-branch and/or clan related to the large Munsee (Minsi) tribe belonging to the Delawarean linguistic family. The term "Minsi" (or "Munsee") means people of the stony country" or abbreviated as "mountaineers" (Ruttenber 1992A:35, 44-45, 49-50, 93; Ruttenber 1992B:221; Becker 1993:16-22; Hearne Brothers nd:wall map; Weslager 1991:45; Synder 1969:2).

Population estimates for the Munsee are 600 to 800 individuals. The Munsee are described by Becker (1993:18) as possibly horticultural. Hull (1996:10) mentions that they were hunters, gatherers, and horticulturalists. They fished in the fast running waters of the Wawayanda and Pochuck creeks.

An Indian trail known as the Wawayanda Trail started at the tribal meeting grounds at Danns Kammer, then passed through Washingtonville, Warwick and Vernon villages, and eventually on to Philadelphia. This road, or the close approximation, is currently known as Kings Highway (Hull 1996:127; Figure 5).

Eighteenth Century

New York State Military Museum mentions Fort Gardner as being constructed in 1756 in Gardnerville by Captain Richard Gardner of the Frontier Guard. The fort had a 100 foot square palisade and contained multiple dwellings (www.dmna.state.ny.us.forts).

The 1779 Sauthier map shows the study property just west of the Wallkill River on lands possibly within or near the Minisink Angle (Figure 3).

Early business in town included farming, potash, and milling (Ruttenber 1881:676-684).

Nineteenth Century

The 1840 Burr map shows the study property possibly near Route 17A. Land here appears to have been on land in the Minisink Angle or belonging to Ten Eyck or L. Clowes (Figure 4).

In 1849 the Town of Wawayanda was formed when it separated from the Town of Minisink. The population in 1850 in Wawayanda was 2,069 inhabitants (Stickney 1903:454).

The 1850 Sydney map depicts a structures nearby or adjacent to the project area belonging to G. Hulse. The Dolsen family has many structures in the surrounding vicinity. A sawmill is nearby (Figure 5).

The 1859 map of Orange County depicts no structures on or adjacent to the project area(Figure 6).

By 1860 the town's population *decreased* by 163 people (Stickney 1903:454).

The 1875 Beers atlas a stream on the project area. There is a milk station either on, adjacent, or close to the property which may be owned by Caskey on his 160 acre farm (Figure 7).

Twentieth Century

The 1908 U.S.G.S. shows no structures on or adjacent to the project area (Figure 8).

An historic site file search was conducted at the New York State Historic Preservation Office. The search included a 1 mile radius around the study area. The following sites were recorded:

-No reported historic sites.

Assessing the known environmental and historic data, we can summarize the following points:

-The project area is adjacent to a tributary of Monhagen Brook.

-The study parcel consists of level to moderately sloped, well drained terrain with some poorly drained soils also.

-An historic map documented structure (MDS) was noted on or adjacent to the project area in 1950 as was the Caskey milk station in 1875.

-No historic sites were recorded in the area.

In our opinion, the study area has a higher than average potential for encountering nineteenth to early twentieth century European-American sites relating to Hulse/Caskey.

FIELD METHODS

<u>Walkover</u>
Exposed ground surfaces were subjected to a close quarters walk-over, when possible, at 3 to 5 meter intervals to observe for artifacts. Covered ground terrain was reconnoitered at about 15 meter intervals, or less, to observe for any above ground features, such as berms, depression, or rock configurations, which could be evidence for a prehistoric or historic site. Photographs were taken of the project area.

<u>Shovel Testing</u>
Shovel tests (ST's) were excavated at about 15 meter intervals across the project area. Each ST measured about 30 to 40 cm. in diameter and was dug into the underlying subsoil (B horizon) 10 to 20 cm. when possible. All soils were screened through 1/4 inch wire mesh and observed for artifacts. Shovel tests were flagged in the field. All ST's were mapped on the project area map at this time.

Soil stratigraphy was recorded according to texture and color. Soil color was matched against the Munsell color chart for soils. Notes were transcribed in a notebook and on pre-printed field forms.

FIELD RESULTS

Field testing of the project area included the excavation of 297 shovel tests (ST's) across the project area. No prehistoric artifacts were encountered. No historic artifacts or features were encountered. The soils were impacted to some small degree likely by construction of the overhead utility line.

<u>Stratigraphy</u>
Stratigraphy across the project area was generally:

-O horizon - 1 to 5 cm. thick of root mat, leaf litter, and humus.

-A horizon - 20 to 31 cm. thick of 10YR4/3 brown or 10YR4/4 dark yellow brown gravelly loam or 10YR4/2 dark grey brown gravely loam in the wetter areas.

-B horizon - about 10. dug into where possible of 10YR5/4, yellow brown gravelly loam.

CONCLUSIONS AND RECOMMENDATIONS

Based on distance to prehistoric sites in the vicinity, well drained soils, level terrain, and distance to a water sources, the property was seen as having an above average potential for encountering prehistoric native American sites.

Based upon similar soils, terrain, and water sources as well as proximity to historic MDS's and/or historic sites, Indian foot trails, or roads, the property was assessed as having a higher than average potential for historic sites.

During the course of the field testing, 297 ST's were excavated. No prehistoric or historic artifacts or features were encountered. No further archaeological work is recommended.

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1859 *Towns of Deer Park-Greenville-Minisink-Mount Hope-Wawayanda, taken from the 1859 Map of Orange County. Deer Park Historians Office.*

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United States Geologic Survey
1969 *Middletown, New York* quadrangle map, 7.5 minute series. Revised 1976.

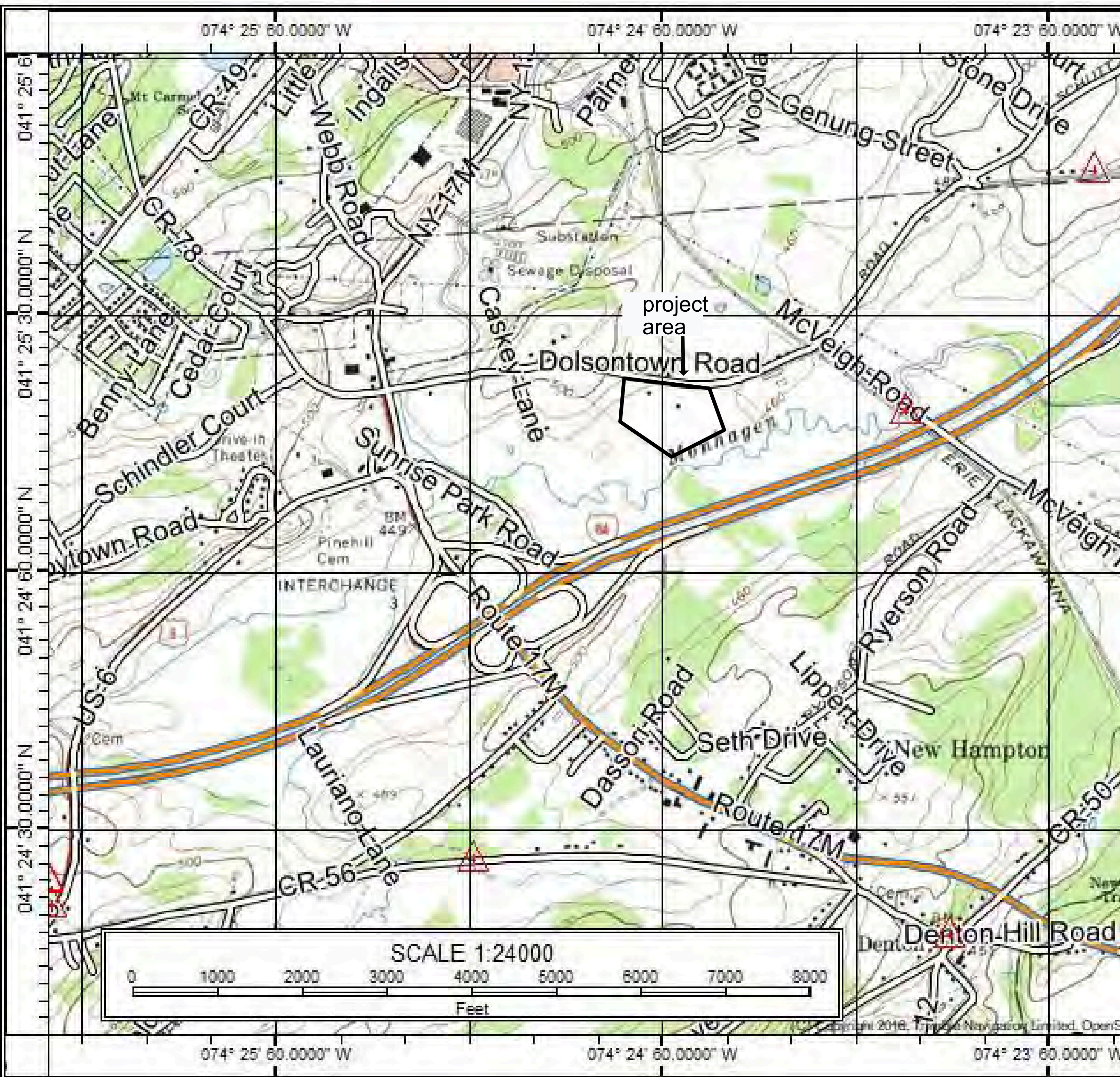
1908 *Port Jervis, New York* quadrangle map, 15 minute series.

<u>Web Sites</u>
2004 *www.dmna.state.ny/forts/fortsE_L/gardner.htm.* New York State Military Museum and Veterans Research Center. NYS Division of Military and Naval Affairs

APPENDIX 1

Figure 1

Middletown, NY USGS



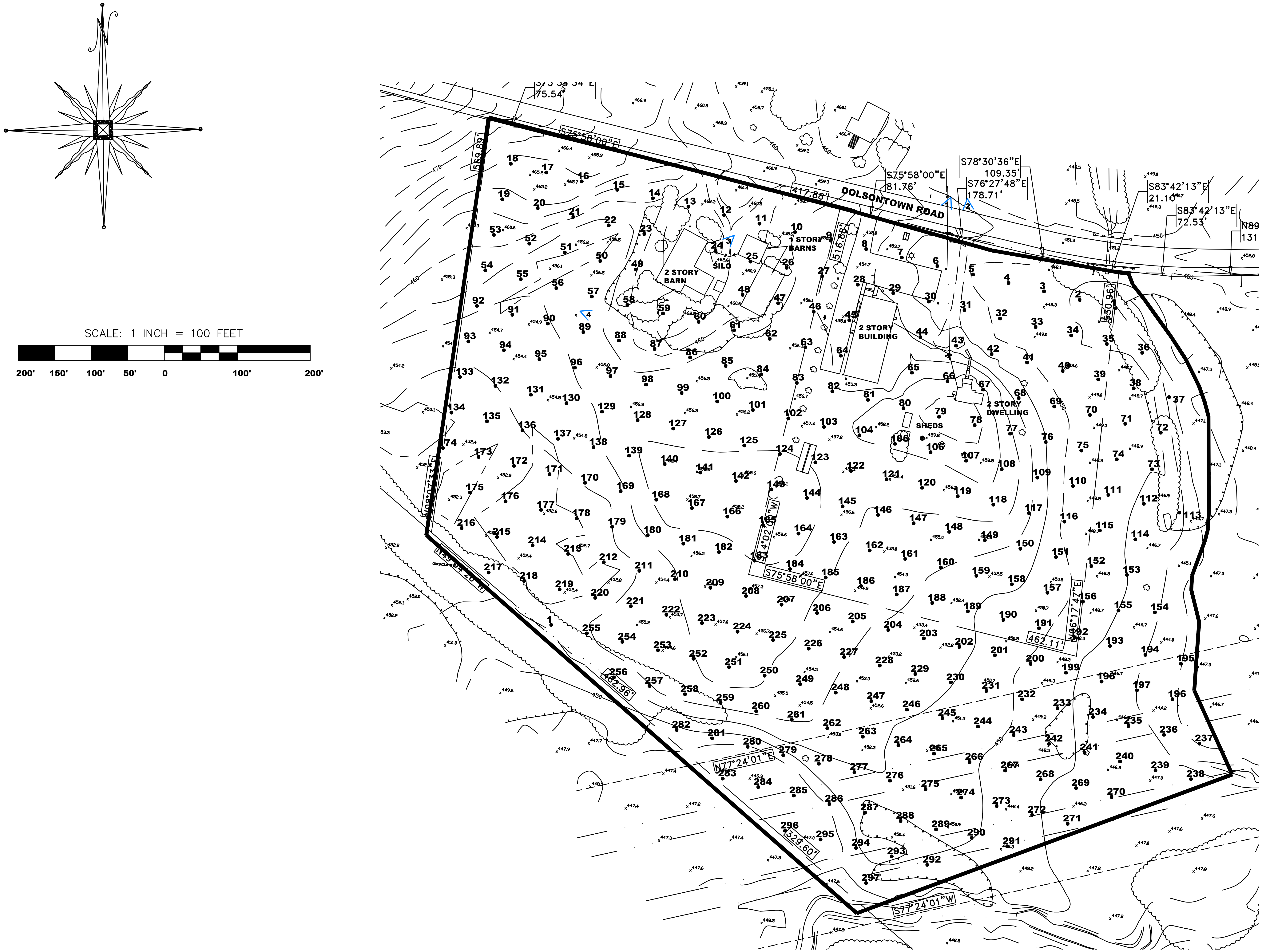


FIGURE 2: LOCATION OF SHOVEL TESTS

PHOTO ANGLE

NEGATIVE SHOVEL TEST

POSITIVE SHOVEL TEST w/ARTIFACTS

PROJECT BOUNDARY(A.P.E.)

PROJECT NAME: DOM MAR

Figure 3
1779 Sauthier map

Figure 4

1840 Burr map

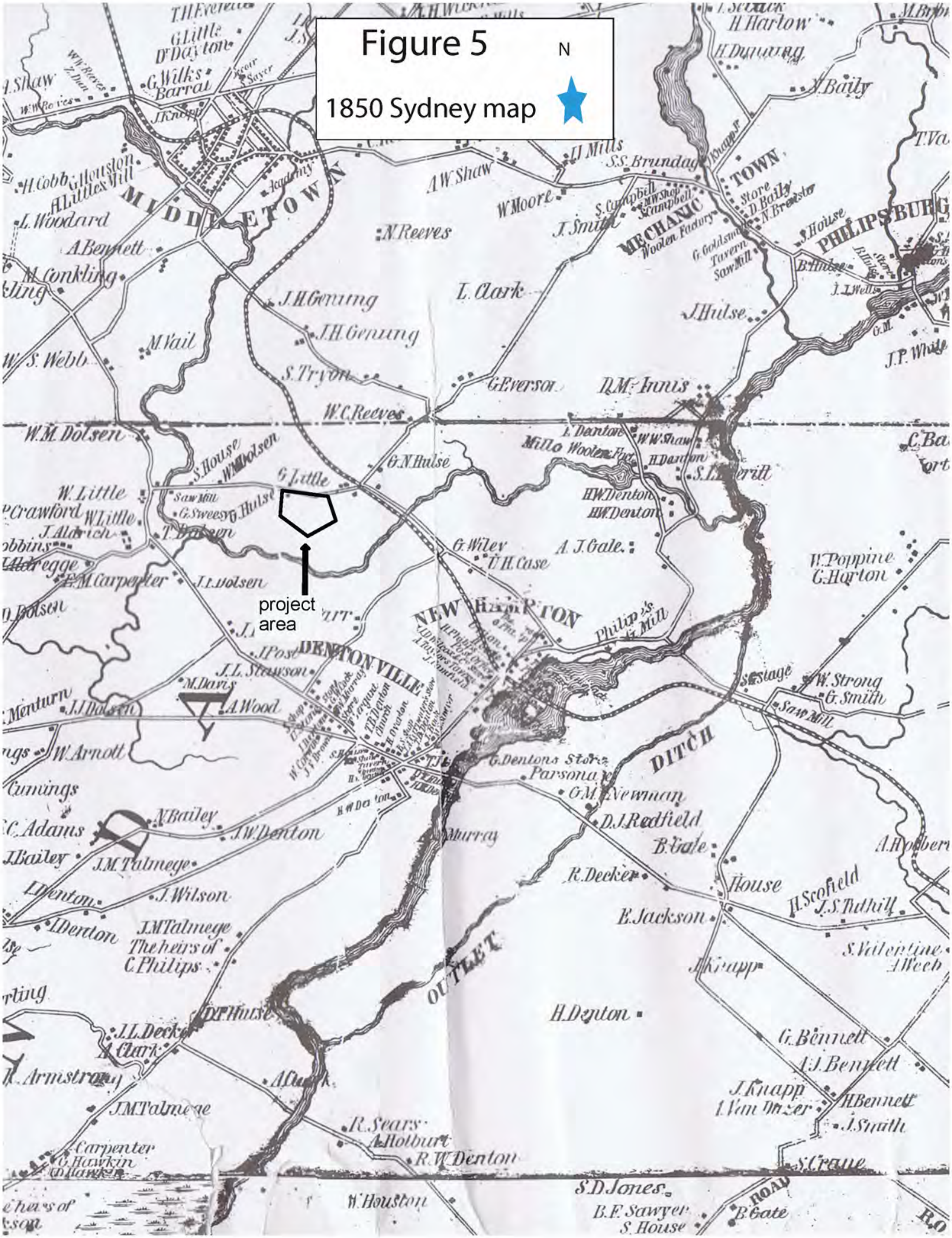
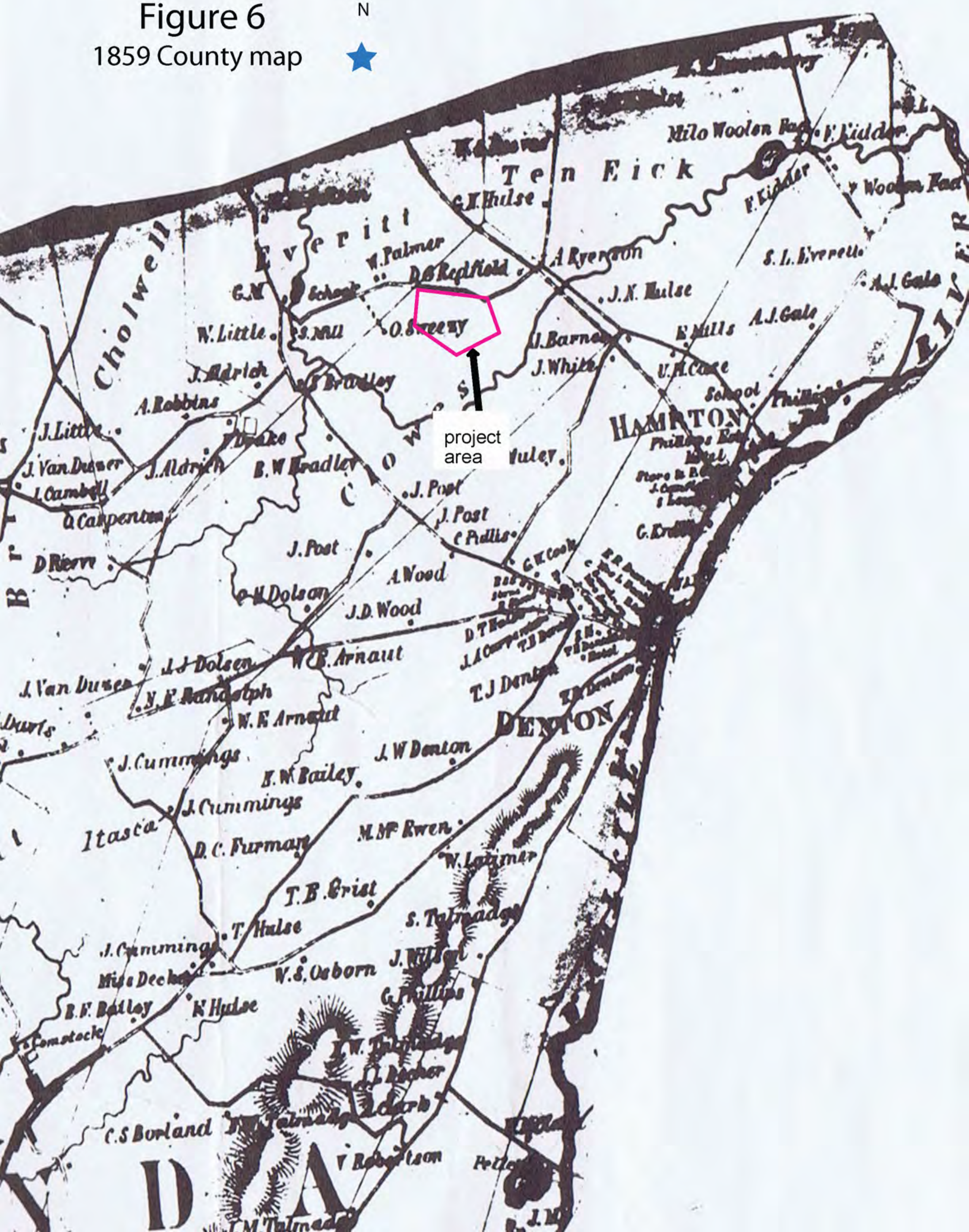


Figure 5
1850 Sydney map

Figure 6

1859 County map



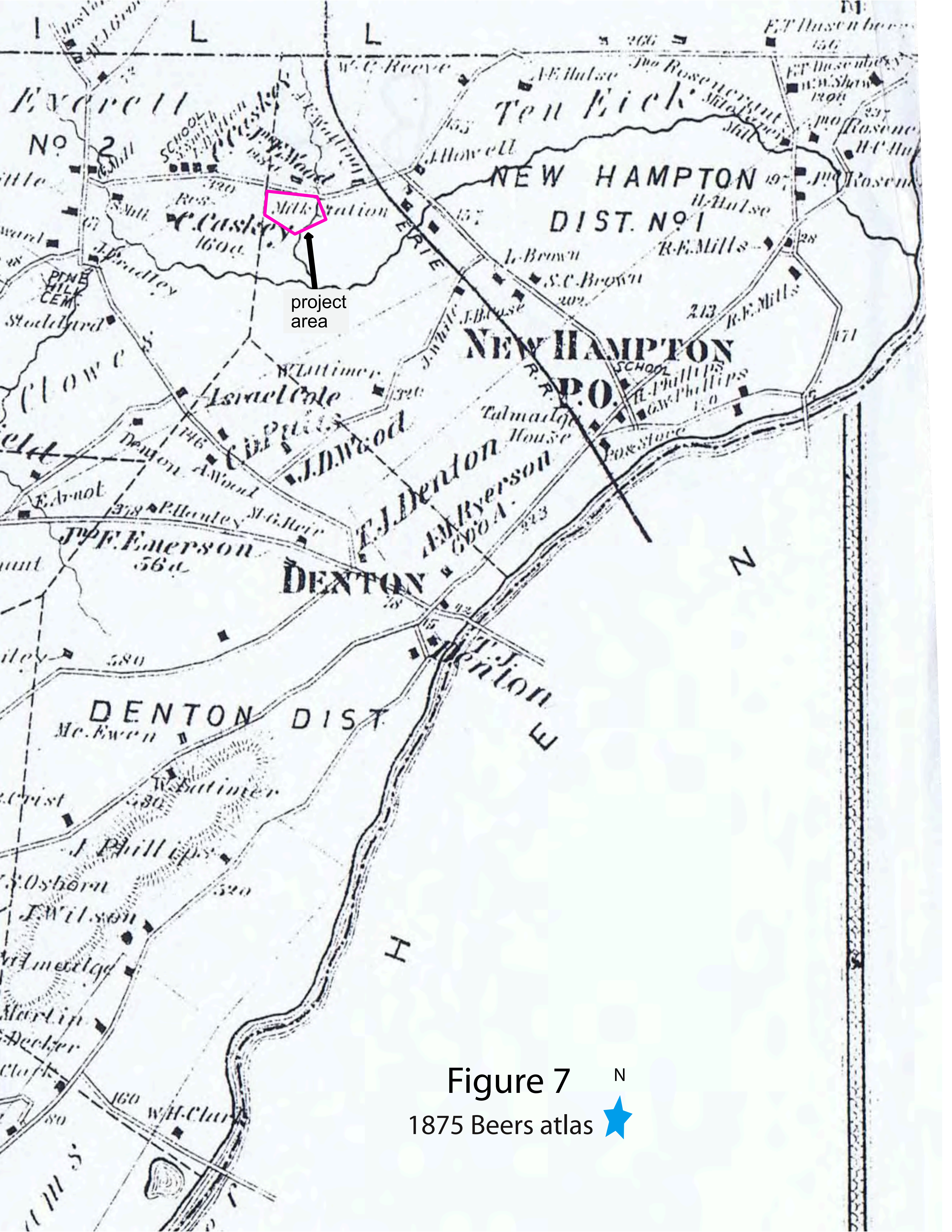


Figure 7

1875 Beers atlas

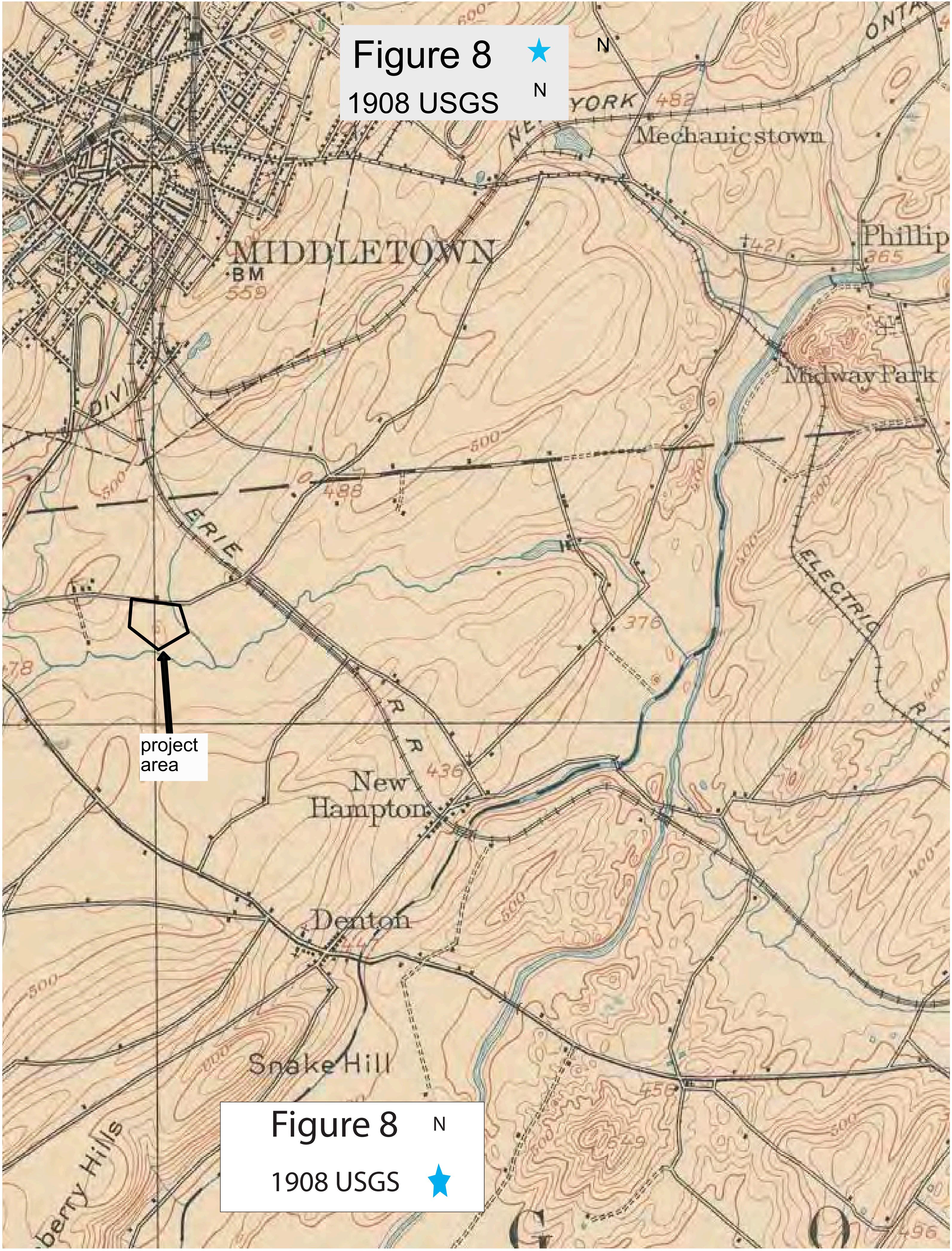


Figure 8
1908 USGS
N

Figure 8
N
1908 USGS

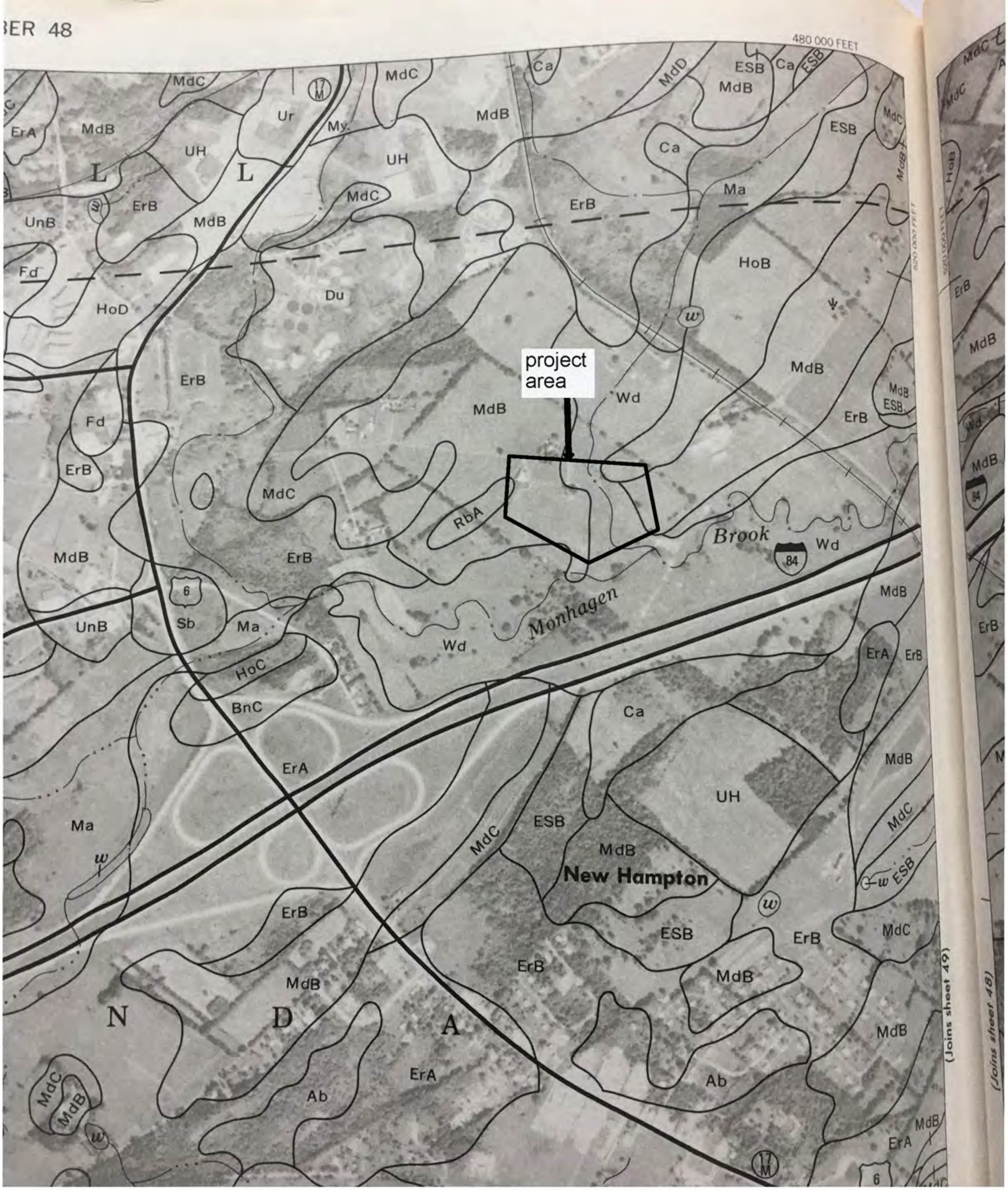


Figure 9

N

County Soil Survey

Photo 1
Looking SW from road


Photo 2
Looking SE from road

Photo 3
Barn complex

Photo 4
Looking east from near barn

APPENDIX 2

Shovel Tests

STP	LV	DEPTH(CM)	TEXTURE	COLOR	HOR	COMMENT
1	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo mottled	10YR4/3-5/6	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
2	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
3	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
4	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
5	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
6	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	27-39	GrLo	10YR5/4	B	NCM
7	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
8	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
9	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-36	GrLo	10YR5/4	B	NCM
10	1	gravel driveway				
11	1	gravel				
12	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo mottled	10YR4/3-5/4	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
13	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM

14	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
15	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
16	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
17	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-33	GrLo	10YR4/3	A	NCM
	3	33-43	GrLo	10YR5/4	B	NCM
18	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
19	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
20	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
21	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
22	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-28	GrLo wet	10YR4/3	A	NCM
	3	28-40	GrLo wet	10YR5/4	B	NCM
23	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
24	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-28	GrLo wet mottled	10YR4/3	A	NCM
	3	28-40	GrLo wet	10YR5/4	B	NCM
25	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo mud	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
26	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-35	SaGr	10YR4/3	A	NCM

27	1	gravel				
28	1	gravel				
29	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
30	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
31	1	pavement				
32	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-28	GrLo	10YR4/3	A	plastic toy tool
	3	28-38	GrLo	10YR5/4	B	NCM
33	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-27	VSiLo	10YR3/2	A	NCM
	3	27-38	GrLo	10YR5/4	B	NCM
34	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-27	GrLo	10YR4/3	A	NCM
	3	27-38	GrLo	10YR5/4	B	NCM
35	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/4	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
36	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/4	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
37	1	water				
38	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-28	GrLo wet	10YR4/2	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
39	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	plastic
	3	26-37	GrLo	10YR5/4	B	NCM
40	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
41	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-25	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM

42	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
43	1	gravel				
44	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
45	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
46	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
47	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
48	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/2	A	NCM
	3	26-35	GrLo	10YR5/4	B	NCM
49	1	0-1	rootmat,leaves,humus		A/O	NCM
	2	1-10	GrLo	10YR4/3	A	NCM
	3	10-27	GrLo	10YR5/4	B	NCM
50	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
51	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
52	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	26-37	GrLo	10YR5/4	B	NCM
53	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-24	GrLo	10YR4/3	A	NCM
	3	24-root				
54	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
55	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM

56	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/4	A	NCM
	3	26-36	GrLo		10YR54/4	B	NCM
57	1	wetlands (flagging) standing water					
58	1	0-53	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/4	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
59	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-27	GrLo	wet	10YR3/2	A	NCM
	3	26-37	GrLo	wet	10YR5/4	B	NCM
60	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-27	GrLo		10YR4/3	A	NCM
	3	27-38	GrLo		10YR5/4	B	NCM
61	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-27	GrLo		10YR4/3	A	wg
	3	27-37	GrLo		10YR5/4	B	NCM
62	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-27	GrLo		10YR4/3	A	NCM
	3	27-40	GrLo		10YR5/4	B	NCM
63	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
64	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-22	GrLo		10YR4/3	A	NCM
	3	22-35	GrLo		10YR5/4	B	NCM
65	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
66	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
67	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/3	A	NCM
	3	26-40	GrLo		10YR5/4	B	NCM
68	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo		10YR4/3	A	NCM
	3	26-root					
69	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-28	GrLo		10YR4/3	A	NCM
	3	28-38	GrLo		10YR5/4	B	NCM

70	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
71	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	brick frag
	3	28-38	GrLo	10YR5/4	B	NCM
72	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	brick frag
	3	28-40	GrLo	10YR5/4	B	NCM
73	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-29	GrLo	10YR4/3	A	brick frag
	3	29-39	GrLo	10YR5/4	B	NCM
74	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-25	GrLo	10YR4/4	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
75	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-25	GrLo	10YR4/4	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
76	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/4	A	NCM
	3	25-36	GrLo	10YR5/4	B	NCM
77	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-35	GrLo	10YR5/4	B	NCM
78	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-26	GrLo	10YR4/4	Ap	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
79	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
80	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
81	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
82	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM

83	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
84	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
85	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
86	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
87	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
88	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
89	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
90	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
91	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
92	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo wet	10YR4/3	A	NCM
	3	25-35	GrLo wet	10YR5/4	B	NCM
93	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo wet	10YR4/3	A	NCM
	3	25-35	GrLo wet	10YR5/4	B	NCM
94	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo wet	10YR4/3	A	NCM
	3	25-35	GrLo wet	10YR5/4	B	NCM
95	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM

96	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
97	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
98	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
99	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
100	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
101	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	27-40	GrLo	10YR5/4	B	NCM
102	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-40	GrLo	10YR5/4	B	NCM
103	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
104	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-41	GrLo	10YR5/4	B	NCM
105	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
106	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	NCM
	3	27-37	GrLo	10YR5/4	B	NCM
107	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-23	GrLo	10YR4/3	A	wg
	3	23-33	GrLo	10YR5/4	B	NCM
108	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-27	GrLo	10YR4/3	A	coal
	3	27-37	GrLo	10YR5/4	B	NCM

109	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-30	GrLo	10YR4/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
110	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
111	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
112	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
113	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
114	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
115	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
116	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-24	GrLo	10YR4/3	A	NCM
	3	24-35	GrLo	10YR5/4	B	NCM
117	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
118	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
119	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
120	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-20,rock	GrLo	10YR4/3	A	NCM
121	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
122	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM

123	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-25	GrLo		10YR4/3	A	NCM
	3	25-26,rock	GrLo		10YR5/4	B	NCM
124	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
125	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
126	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-24	GrLo		10YR4/3	A	NCM
	3	24-34	GrLo		10YR5/4	B	NCM
127	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	3-28	GrLo		10YR4/3	A	NCM
	3	28-38	GrLo		10YR5/4	B	NCM
128	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
129	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
130	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-26	GrLo		10YR4/3	A	clay pot
	3	26-36	GrLo		10YR5/4	B	NCM
131	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
132	1	0-5	rootmat,leaves,humus			A/O	NCM
	2	5-24	GrLo		10YR4/3	A	NCM
	3	24-36	GrLo		10YR5/4	B	NCM
133	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-28	GrLo	wet	10YR3/2	A	NCM
	3	28-38	GrLo	wet	10YR5/4	B	NCM
134	1	0-5	rootmat,leaves,humus			A/O	NCM
	2	5-21	GrLo		10YR4/3	A	NCM
	3	21-35	GrLo		10YR5/4	B	NCM
135	1	0-4	rootmat,leaves,humus			A/O	NCM
	3	4-26	GrLo		10YR5/4	B	NCM

136	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-30	GrLo	10YR5/4	B	NCM
137	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-30	GrLo	10YR5/4	B	NCM
138	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-30	GrLo	10YR5/4	B	NCM
139	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-22	GrLo	10YR4/3	A	NCM
	3	22-32	GrLo	10YR5/4	B	NCM
140	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-30	GrLo	10YR5/4	B	NCM
141	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-22	GrLo	10YR4/3	A	NCM
	3	22-32	GrLo	10YR5/4	B	NCM
142	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-30	GrLo	10YR5/4	B	NCM
143	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
144	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
145	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
146	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
147	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-20	GrLo	10YR4/3	A	NCM
	3	20-rocks				
148	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM

149	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
150	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
151	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
152	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
153	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
154	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-28	SiLo	10YR3/2	A	NCM
	3	28-38	SiLo	10YR5/4	B	NCM
155	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
156	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-40	GrLo	10YR5/4	B	NCM
157	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
158	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
159	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
160	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
161	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM

162	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
163	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
164	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
165	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
166	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
167	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
168	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
169	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
170	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
171	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-25	GrLo	10YR4/4	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
172	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-30	GrLo	10YR3/3	A	NCM
	3	30-40	GrLo	10YR5/4	B	NCM
173	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM
174	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-25	GrLo	10YR4/3	A	NCM
	3	25-37	GrLo	10YR5/4	B	NCM

175	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-30	GrLo	wet	mottled	10YR3/2-5/4	A	NCM

Note: wetland flagged

176	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-30	GrLo	wet	mottled	10YR3/2-5/4	A	NCM
177	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-30	GrLo	wet	mottled	10YR3/2-5/4	A	NCM
178	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-30	GrLo	wet	mottled	10YR3/2-5/4	A	NCM
179	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-30	GrLo	wet	mottled	10YR3/2-5/4	A	NCM
180	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-30	GrLo	wet	mottled	10YR3/2-5/4	A	NCM
181	1	0-5	rootmat,leaves,humus				A/O	NCM
	2	5-26	GrLo			10YR4/3	A	NCM
	3	26-37	GrLo			10YR5/4	B	NCM
182	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-26	GrLo			10YR4/3	A	NCM
	3	26-36	GrLo			10YR5/4	B	NCM
183	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-26	GrLo			10YR4/3	A	NCM
	3	26-37	GrLo			10YR5/4	B	NCM
184	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-25	GrLo			10YR4/3	A	NCM
	3	25-36	GrLo			10YR5/4	B	NCM
185	1	0-5	rootmat,leaves,humus				A/O	NCM
	2	5-24	GrLo			10YR4/3	A	NCM
	3	24-35	GrLo			10YR5/4	B	NCM
186	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-22	GrLo			10YR4/4	Ap	NCM
	3	22-35	GrLo			10YR5/4	B	NCM
187	1	0-3	rootmat,leaves,humus				A/O	NCM
	3	3-27	GrLo			10YR5/4	B	NCM
188	1	0-3	rootmat,leaves,humus				A/O	NCM
	2	3-26	GrLo			10YR4/3	A	NCM
	3	26-36	GrLo			10YR5/4	B	NCM
189	1	0-5	rootmat,leaves,humus				A/O	NCM
	2	5-28	GrLo			10YR4/3	A	NCM
	3	28-38	GrLo			10YR5/4	B	NCM

190	1	0-5	rootmat,leaves,humus			A/O	NCM
	2	5-22	GrLo		10YR4/3	A	NCM
	3	22-32	GrLo		10YR5/4	B	NCM
191	1	0-5	rootmat,leaves,humus			A/O	NCM
	2	5-23	GrLo		10YR4/3	A	NCM
	3	23-33	GrLo		10YR5/4	B	NCM
192	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
193	1	0-2	rootmat,leaves,humus			A/O	NCM
	2	2-26	GrLo		10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
194	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-27	GrLo		10YR4/3	A	NCM
	3	27-37	GrLo		10YR5/4	B	NCM
195	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-23	GrLo		10YR4/3	A	NCM
	3	23-33	GrLo		10YR5/4	B	NCM
196	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
197	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
198	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
199	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
200	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
201	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
202	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM

203	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
204	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
205	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
206	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
207	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-26	GrLo	densely packed	10YR4/3	A	NCM
	3	26-36	GrLo		10YR5/4	B	NCM
208	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-20	GrLo		10YR4/2	A	NCM
	3	20-30	GrLo		10YR5/4	B	NCM
209	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-20	GrLo	mottled wet	10YR4/2-5/4	A	NCM
	3	20-30	GrLo		10YR5/4	B	NCM
210	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-23	GrLo		10YR4/3	A	NCM
	3	23-33	GrLo		10YR5/4	B	NCM
211	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-20	GrLo		10YR4/3	A	NCM
	3	20-30	GrLo		10YR5/4	B	NCM
212	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-22	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
213	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-22	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
214	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-22	GrLo		10YR4/2	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
215	standing water						
216	standing water						
217	standing water						

218	standing water					
219	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-12	GrLo	10YR4/3	A	NCM
	3	12-23	GrLo	10YR5/4	B	NCM
221	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-35	GrLo	10YR5/4	B	NCM
222	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-35	GrLo	10YR5/4	B	NCM
223	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-40	GrLo	10YR4/3	A?	NCM
224	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
225	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-20	GrLo	10YR4/3	A	NCM
	3	20-35	GrLo	10YR5/4	B	NCM
226	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
227	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
228	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-28	GrLo	10YR4/3	A	NCM
	3	28-30,root	GrLo	10YR5/4	B	NCM
229	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
230	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
231	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
232	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM

233	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
234	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
235	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
236	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
237	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
238	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
239	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
240	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-28	GrLo	10YR4/3	A	NCM
	3	28-38	GrLo	10YR5/4	B	NCM
241	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-22	GrLo	10YR4/4	A	NCM
	3	22-32	GrLo	10YR5/4	B	NCM
242	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/4	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
243	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
244	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR54/4	B	NCM
245	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM

246	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
247	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
248	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
249	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-25	GrLo	10YR4/4	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
250	1	0-2	rootmat,leaves,humus		A/O	NCM
	2	2-23	GrLo	10YR4/4	A	NCM
	3	23-gravel				
251	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
252	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
253	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
254	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
255	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
256	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
257	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-24	GrLo	10YR4/3	A	NCM
	3	24-34	GrLo	10YR5/4	B	NCM
258	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM

259	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-24	GrLo		10YR4/3	A	NCM
	3	24-34	GrLo		10YR5/4	B	NCM
260	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo	very gravelly	10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
261	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo	v gravelly	10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
262	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo	v gravelly	10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
263	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
264	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
265	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
266	1	0-6	rootmat,leaves,humus			A/O	NCM
	2	6-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
267	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo		10YR4/3	A	NCM
	3	25-37	GrLo		10YR5/4	B	NCM
268	1	0-4	rootmat,leaves,humus			A/O	NCM
	2	4-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
269	1	0-5	rootmat,leaves,humus			A/O	NCM
	2	5-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
270	1	0-3	rootmat,leaves,humus			A/O	NCM
	2	3-24	GrLo	wet	10YR4/2	A	NCM
	3	24-38	GrLo	wet	10YR5/4	B	NCM
271	1	0-1	rootmat,leaves,humus			A/O	NCM
	2	1-25	GrLo		10YR4/3	A	NCM
	3	25-35	GrLo		10YR5/4	B	NCM
272	1	gravel					

273	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
274	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
275	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
276	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
277	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
278	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-25	GrLo	10YR4/3	A	NCM
	3	25-35	GrLo	10YR5/4	B	NCM
279	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
280	1	0-5	rootmat,leaves,humus		A/O	NCM
	2	5-26	Sa	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
281	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-26	SaLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
282	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
283	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
284	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
285	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM

286	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
287	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
288	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-23	GrLo	10YR4/3	A	NCM
	3	23-37	GrLo	10YR5/4	B	NCM
289	1	0-6	rootmat,leaves,humus		A/O	NCM
	2	6-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
290	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
291	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
292	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
293	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
294	1	0-3	rootmat,leaves,humus		A/O	NCM
	2	3-23	GrLo	10YR4/3	A	NCM
	3	23-33	GrLo	10YR5/4	B	NCM
295	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
296	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM
297	1	0-4	rootmat,leaves,humus		A/O	NCM
	2	4-26	GrLo	10YR4/3	A	NCM
	3	26-36	GrLo	10YR5/4	B	NCM

Section 5

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

June 15, 2021

David Lenox
Project Manager
EnSol, Inc.
661 Main Street
Niagara Falls, NY 14301

Re: USACE
Dom-Mar Transfer and Recycling Facility: New Construction
1128 Dolsontown Rd, Middletown, NY 10940
20PR08024

Dear David Lenox:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed *Phase I Archaeological Investigation for the Dom-Mar Transfer & Recycling Center Town of Wawayanda, Orange County, New York* (Tracker Archaeology, April 2021). The investigation found no evidence of archaeological sites within the project's Area of Potential Effects (APE). However, as noted in the report, a New York State Museum-recorded archaeological site, NYSM 6169, is mapped within the project area. The site is described as "Cemetery." No other information is available. The mapped location must be considered approximate and, based on a review of historic USGS topographic maps, there may have been significant landscape modification in the recorded site's vicinity. Therefore, based on these factors, we recommend that the project will not adversely affect historic or archaeological properties listed or eligible for listing on the National Register of Historic Places conditioned on a commitment by the applicant to implement our Human Remains Discovery Protocol (attached) should any evidence of human remains or possible burial goods be encountered during construction.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

Attachment

cc: Ryan Elliott, EnSol; Brian Orzel, USACE; Charles Vandrei and David Witt, DEC

State Historic Preservation Office/
New York State Office of Parks, Recreation and Historic Preservation
Human Remains Discovery Protocol
(January 2021)

If human remains are encountered during construction or archaeological investigations, the New York State Historic Preservation Office (SHPO) recommends that the following protocol is implemented.

- Human remains shall be treated with dignity and respect. Should human remains or suspected human remains be encountered, work in the general area of the discovery shall stop immediately and the location shall be secured and protected from damage and disturbance.

- If skeletal remains are identified and the archaeologist is not able to conclusively determine if they are human, the remains and any associated materials shall be left in place. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist shall assess the remains in situ to help determine if they are human.

- If the remains are determined to be human, law enforcement, the SHPO, the appropriate Indian Nations, and the involved state and federal agencies shall be notified immediately. If law enforcement determines that the burial site is not a criminal matter, no skeletal remains or associated materials shall be removed until appropriate consultation takes place.

- If human remains are determined to be Native American, they shall be left in place and protected from further disturbance until a plan for their avoidance or removal is developed. Please note that avoidance is the preferred option of the SHPO and the Indian Nations. The involved agency shall consult SHPO and the appropriate Indian Nations to develop a plan of action. Photographs of Native American human remains and associated materials should not be taken without consulting with the involved Indian Nations.

- If human remains are determined to be non-Native American, the remains shall be left in place and protected from further disturbance until a plan for their avoidance or removal is developed. Please note that avoidance is the preferred option of the SHPO. The involved agency shall consult SHPO and other appropriate parties to develop a plan of action.

- The SHPO recommends that burial information is not released to the public to protect burial sites from possible looting.

Division for Historic Preservation
P.O. Box 189, Waterford, New York 12188-0189 • (518) 237-8643 • parks.ny.gov

Section 6

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April 7, 2021

Mr. Michael Marangi
Marangi Disposal
175 NY-303
Valley Cottage, NY 10989

Re: Marangi Disposal- Solid Waste Management Facility
Town of Wawayanda, Orange County, New York
Chazen Project #32034.00

Dear Mr. Marangi:

The Chazen Companies (Chazen) has completed a Traffic Impact Analysis for a proposed solid waste handling facility on Dolsontown Road in Wawayanda, NY. This report presents the traffic conditions at the intersection of NY Route 17M and Dolsontown Road, as well as at the site access intersection with Dolsontown Road, and determines the potential traffic impact of the project on these intersections. The following sections present the analyses and results.

I. Existing Conditions

A. Introduction

It is proposed to construct a solid waste transfer facility and a truck maintenance & repair facility. The development will be constructed in two phases: Phase 1 includes the construction of a solid waste facility and is expected to be completed by end of 2021; Phase 2 (project full build-out) includes the addition of a truck maintenance and repair facility and is expected to be completed by 2026. The project site is on the south side of Dolsontown Road. The site will have one full movement driveway on Dolsontown Road. The site contains multiple vacant farm buildings. An adjacent property consists of a single family home and a warehouse/showroom. Figure 1 shows the site location. A concept plan is provided as Attachment A.

B. Study Intersection and Traffic Volumes

At the project site Dolsontown Road is a two-lane roadway about 22’ in width with 2-3’ wide shoulders. The speed limit on Dolsontown Road is 45 mph.

The intersection of Route 17M and Dolsontown Road is a signalized four- leg intersection. The northbound and southbound approaches of Route 17M consist of a left-turn lane, a through lane, and a shared through/right-turn lane. The eastbound approach (James P Kelly Way) consists a left-turn lane, a through lane, and a right-turn lane. The westbound approach of Dolsontown Road consists of a left-turn lane and a shared through/right-turn lane.

Intersection turning movement counts were collected on Tuesday, October 13, 2020 during the morning peak period of 6:00 – 9:00 a.m. and during the afternoon peak period of 3:00 – 6:00 p.m. Schools were in session during the count periods. The review of the traffic counts revealed that the peak AM and PM peak hours occurred at 7:30 – 8:30 a.m. and 3:45 – 4:45 p.m., respectively. The traffic data is contained in Attachment B.

Circumstances created by the COVID-19 pandemic have influenced travel patterns such that the current traffic volumes collected in October may not be representative of typical volumes during pre-COVID conditions. Therefore, the current traffic volumes were compared to historic volume data from NYSDOT's *Traffic Data Viewer*. The comparison showed that the AM and PM counted volumes are 34% and 16% lower, respectively, than historic volumes which may be related to the circumstances created by the COVID-19 pandemic. Therefore, the counted traffic volumes were increased by 34% and 16% to represent a typical condition. The adjusted existing traffic volumes are shown on Figure 2.

II. Phase 1 Project

A. 2021 No-Build Traffic Volumes

No-Build traffic volumes consist of normal background growth plus future traffic from other development projects in the area. A background growth rate was estimated using historical traffic volume data published by NYSDOT. Based on the historical data, traffic volumes at the study intersection were increased by 2% to represent growth that may occur in the area during 2021.

Discussions with town staff indicated that there are several other development projects in the area in the vicinity of the site that would generate traffic through the study area. However, those developments are expected to be completed after the completion of the Phase 1. Thus, the phase 1 No-Build traffic volumes include only the background growth rate factor. The 2021 No-Build traffic volumes are shown on Figure 3.

B. Trip Generation

Trip generation determines the quantity of traffic expected to travel to and from a given site. The Institute of Transportation Engineers (ITE) *Trip Generation* is the industry standard for determining trip generation for proposed land uses based on studies of similar existing developments located across the country. However, there is no data for a solid waste handling facility; therefore, the number of trips was estimated from details supplied by the applicant for the anticipated truck activity and the administrative activities.

The transfer station is proposed to accept and process 950 tons per day (tpd) of MSW and C&D. The project will also include a 4,000 square foot (SF) office building. The facility will operate between 7:00 a.m. to 5:00 p.m. on weekdays and from 7:00 a.m. to 2:00 p.m. on Saturdays. In general, truck arrivals start at 7:00 a.m. and will be evenly distributed over the day, tapering off after 4:00 p.m. The administrative personnel arrive around 8:00 a.m. and leave around 5:00 p.m. Based on the data provided, the AM peak activity at the Site is between 8:00 a.m. and 9:00 a.m. with a total of 62 vehicles and the PM Peak activity is between 4:00 p.m. and 5:00 p.m. with a total of 32 vehicles.

The peak hour trips for the adjacent property are also generated based on the use. The total peak hour trips are summarized in Table 1 and show about1 trip per minute in the AM peak and 1 trip every 3 minutes in the PM peak.

Table 1
Peak Hour Generated Trips – Phase 1

Facility		AM Peak Hour			PM Peak Hour		
		Enter	**Exit**	**Total**	**Enter**	**Exit**	**Total**
Adjacent Property	Single family	1	0	**1**	0	1	**1**
	6ksf Warehouse	0	1	**1**	1	0	**1**
Solid Waste Facility	Trucks	10	10	**20**	7	8	**15**
	Cars	22	0	**22**	0	2	**2**
	Total	33	11	**44**	8	11	**19**

C. Trip Distribution and Assignment

Trip distribution patterns were estimated from existing peak hour traffic patterns and the probable truck routes of the solid waste facility given the proximity of I-84. The trip distribution percentages for entering and exiting the site for passenger vehicles and for trucks are shown in Figure 4 and the site generated trips are shown on Figure 5. It is noted that to do a conservative analysis, a single driveway was assumed for access to the project site and adjacent property.

D. 2021 Build Traffic Volumes

The site generated trips were added to the No-Build traffic volumes to develop Build traffic volumes. The 2021 Build traffic volumes are shown on Figure 6.

E. Capacity Analysis

Intersection level of service and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Evaluations were made using the procedures contained in the *Highway Capacity Manual, 6th Edition*. The relative impact of the project can be determined by comparing the levels of service of the No-Build and Build conditions. Levels of service calculations for the weekday AM and PM peak hours are shown in Table 2. Level of service descriptions and capacity analysis worksheets are contained in Attachment C.

Table 2
Levels of Service – Phase 1

Intersection	AM Peak Hour			PM Peak Hour		
	2020 Existing	2021 No-Build	2021 Build	2020 Existing	2021 No-Build	2021 Build
NY Route 17M at Dolsontown Road						
James P Kelly Way Eastbound L	C (20.4)	C (20.5)	C (20.6)	C (22.0)	C (22.1)	C (22.1)
James P Kelly Way Eastbound T	C (25.2)	C (25.5)	C (26.2)	C (25.4)	C (25.5)	C (25.5)
James P Kelly Way Eastbound R	F (237.5)	F (250.2)	F (253.6)	D (47.3)	D (50.7)	D (50.7)
Dolsontown Road Westbound L	C (20.7)	C (20.8)	C (20.9)	C (30.6)	C (31.8)	C (33.1)
Dolsontown Road Westbound TR	C (23.5)	C (23.6)	C (23.5)	D (43.4)	D (46.2)	D (47.5)
RT 17M Northbound L	F (117.4)	F (132.1)	F (135.6)	F (236.7)	F (259.3)	F (259.3)
RT 17M Northbound TR	C (25.0)	C (25.6)	C (27.1)	C (30.6)	C (31.5)	C (31.9)
RT 17M Southbound L	B (15.3)	B (15.4)	B (15.8)	B (17.0)	B (17.3)	B (17.4)
RT 17M Southbound TR	B (18.9)	B (19.0)	B (19.2)	C (22.9)	C (23.2)	C (23.2)
Overall	**F (81.7)**	**F (86.8)**	**F (87.7)**	**E (60.0)**	**E (64.3)**	**E (64.4)**
Dolsontown Road at Site Driveway						
Dolsontown Road Westbound L	-	-	A (8.4)	-	-	A (0.0)
Site Driveway Northbound	-	-	C (15.0)	-	-	C (21.8)

B (15.7): Level of Service (Avg. Delay in seconds per vehicle)
L: Left; T: Through; R: Right

The Phase 1 results show that the eastbound right-turn movement and northbound left-turn movement experience level of service F conditions and very long delays for Existing, No-Build, and Build conditions at the intersection of Route 17M and Dolsontown Road. With the additional traffic from the proposed project the levels of service remain the same in the Build condition as compared to the No-Build condition with minimal increases in delay. The site driveway operates at good levels of service and will be controlled by a stop sign. No improvements are needed as part of Phase 1 of the proposed project.

F. Sight Distance Analysis

A sight distance evaluation was completed at the proposed site driveway on Dolsontown Road. The available intersection sight distances were measured from the perspective of a driver turning left to enter the site from Dolsontown Road, and looking left and right exiting the site. The available sight distances measured in the field were compared to the guidelines presented by AASHTO in *A Policy on Geometric Design of Highways and Street*s, 2018, 7th Edition, for the posted speed limit of 45 mph. The sight distance evaluation is summarized in Table 3.

Table 3
Intersection Sight Distance Summary

Site Driveway at Dolsontown Road	Intersection Sight Distance (feet)		
	Right-Turn from Site (Looking Left)	Left-Turn from Site	
		Looking Left	Looking Right
Available	720	720	990
Recommended	430	430	500

The table shows that the measured available intersection sight distances at the site driveways exceed the AASHTO recommended sight distances.

III. Phase 2 Project

A. 2026 No-Build Traffic Volumes

The 2026 No-Build traffic volumes consist of normal background growth plus future traffic from other development projects in the area. Five other development projects are proposed in the area that will contribute to the overall traffic growth; therefore, the Phase 1 background growth rate of 2% per year was reduced to 1% per year for the 5-year period to 2026.

The five other development projects in the area include:

- A gas station with convenience store and approximately 15,000 SF of commercial space to be located at the intersection of Dolsontown Road and Airport Road.
- Approximately 200,000 SF of light industrial use with 75,000 SF of office space to be located on the north side of Dolsontown Road, east side of Caskey Lane.
- Approximately 390,000 SF of warehouse space west of the project site on the south side of Dolsontown Road.
- Phase II development to the existing Carwash to include two touchless carwash tunnels. The property is located at 1020 Dolsontown Road.
- Arden Slate Hill Warehouse development consisting of approximately 1,000,000 SF of space to be located at the intersection of Route 6 and McBride Road.

The traffic volumes for the above developments were obtained from the available traffic studies or were generated using the ITE's *Trip Generation Manual*. The volumes for the vicinity developments are shown on Figure 7 and the combined 2026 No-Build volumes are shown on Figure 8.

B. Trip Generation

Phase 2 consists of the construction of a truck maintenance facility. The level of activity for the facility was provided by the applicant and is shown in Table 4 with 4 trips in the AM Peak and 28 trips in the PM Peak.

Table 4
Peak Hour Generated Trips – Phase 2

Facility		**AM Peak Hour**			**PM Peak Hour**		
		Enter	**Exit**	**Total**	**Enter**	**Exit**	**Total**
Truck Maintenance Facility	Trucks	4	0	**4**	0	4	**4**
	Cars	0	0	**0**	0	24	**24**
	Total	4	0	**4**	0	28	**28**

Table 5 presents the total number of trips at project build-out, Phase 1 plus Phase 2. Both the Am and PM Peaks will average about 1 trip per minute.

Table 5
Peak Hour Generated Trips – Phase 1 + Phase 2

Facility		AM Peak Hour			PM Peak Hour		
		Enter	**Exit**	**Total**	**Enter**	**Exit**	**Total**
Adjacent Property	Single family	1	0	**1**	0	1	**1**
	6ksf Warehouse	0	1	**1**	1	0	**1**
Solid Waste Facility and Truck Maintenance Facility	Trucks	14	10	**24**	7	12	**19**
	Cars	22	0	**22**	0	26	**26**
	Total	37	11	**48**	8	39	**47**

C. Trip Distribution and Assignment
Phase 1 trip distribution patterns were also used for Phase 2 trips and the trip assignments are shown on Figure 9. It is noted that additional driveways will be provided at Phase 2; however, to conduct a conservative traffic only one driveway was assumed.

D. 2026 Build Traffic Volumes
The Phase 1 and Phase 2 site generated trips were added to the 2026 No-Build traffic volumes to develop Build traffic volumes. The 2026 Build traffic volumes are shown on Figure 10.

E. Capacity Analysis
Table 6 presents the analysis results for the 2026 No-Build and Build conditions. The additional volumes generated by other developments increase the overall delays for the 2026 No-Build condition at Route 17M and Dolsontown Road by 20 – 30 seconds with movements dropping to levels of service E and F. Traffic generated by the proposed project will noticeably increase delays on the westbound in the PM peak hour as compared to the No-Build condition. Minor signal timing changes of 1 -2 seconds will mitigate the impacts of the project's traffic. The site driveway continues to operate at good levels of service and will be controlled by a stop sign. No improvements are needed as part of the Build-out of the proposed project.

A left-turn lane on Dolsontown road is not warranted as all the trucks are expected to enter the site from west and will be making a right-turn into the site. A right-turn lane is not needed as number of trucks expected is minimal, 14 trucks per hour in the peak hour which is equivalent to one truck every four minutes.

Table 6
Levels of Service – Phase 1 + Phase 2

Intersection Approach	AM Peak Hour			PM Peak Hour			
	2020 Existing	2026 No-Build	2026 Build	2020 Existing	2026 No-Build	2026 Build	2026 Build w/Mit.
NY Route 17M at Dolsontown Road							
James P Kelly Way Eastbound L	C (20.4)	C (21.0)	C (21.0)	C (22.0)	C (22.7)	C (22.7)	C (22.7)
James P Kelly Way Eastbound T	C (25.2)	C (28.1)	C (28.6)	C (25.4)	C (25.8)	C (25.8)	C (25.8)
James P Kelly Way Eastbound R	F (237.5)	F (288.3)	F (288.3)	D (47.3)	E (58.1)	E (58.1)	D (46.4)
Dolsontown Road Westbound L	C (20.7)	C (21.1)	C (21.4)	C (30.6)	F (165.5)	F (188.8)	F (146.9)
Dolsontown Road Westbound TR	C (23.5)	C (23.7)	C (23.8)	D (43.4)	F (109.5)	F (121.5)	F (95.9)
RT 17M Northbound L	F (117.4)	F (199.3)	F (199.3)	F (236.7)	F (313.2)	F (313.2)	F (312.3)
RT 17M Northbound TR	C (25.0)	D (42.8)	D (45.8)	C (30.3)	D (39.4)	D (39.9)	D (46.5)
RT 17M Southbound L	B (15.3)	C (20.9)	C (22.8)	B (17.0)	C (20.1)	C (20.5)	C (22.5)
RT 17M Southbound TR	B (18.9)	C (20.6)	C (20.6)	C (22.9)	C (24.1)	C (24.1)	C (27.7)
Overall	**F (81.7)**	**F (103.8)**	**F (103.8)**	**E (60.0)**	**F (91.2)**	**F (95.6)**	**F (89.6)**
Dolsontown Road at Site Driveway							
Dolsontown Road Westbound L	-	-	A (8.5)	-	-	A (0.0)	-
Site Driveway Northbound	-	-	C (16.2)	-	-	D (26.7)	-

C (20.4): Level of Service (Avg. Delay in seconds per vehicle)
L: Left; T: Through; R: Right

IV. Conclusions

Based on the results of the traffic impact analysis completed for the proposed solid waste facility with a truck maintenance & repair facility, the following conclusions are presented:

- The project will generate one peak hour trip every 1 to 3 minutes for Phase 1, and one trip every 1 minute at build-out.
- Movements at the intersection of Route 17M and Dolsontown Road currently operate at level of service F with long delays.
- Additional volumes from the project for Phase 1 will increase delays at the intersection minimally and no improvements are needed. Minor signal timing changes will mitigate the impacts of the project at full build (Phase1 plus Phase 2.)
- A left-turn lane or right-turn lane is not needed on Dolsontown Road at the Site Driveway.
- Sight distances provided at the proposed location of the site driveway exceed the recommended distances and no sight distance enhancements are needed.

As such, the proposed project will not have a significant impact on the adjacent roadway network.

Please contact me at tjohnson@chazencompanies.com, or at (518) 266-7369 if you have any questions on this traffic analysis.

Sincerely,

Thomas R. Johnson, P.E., PTOE
Director, Transportation Services

Attachments

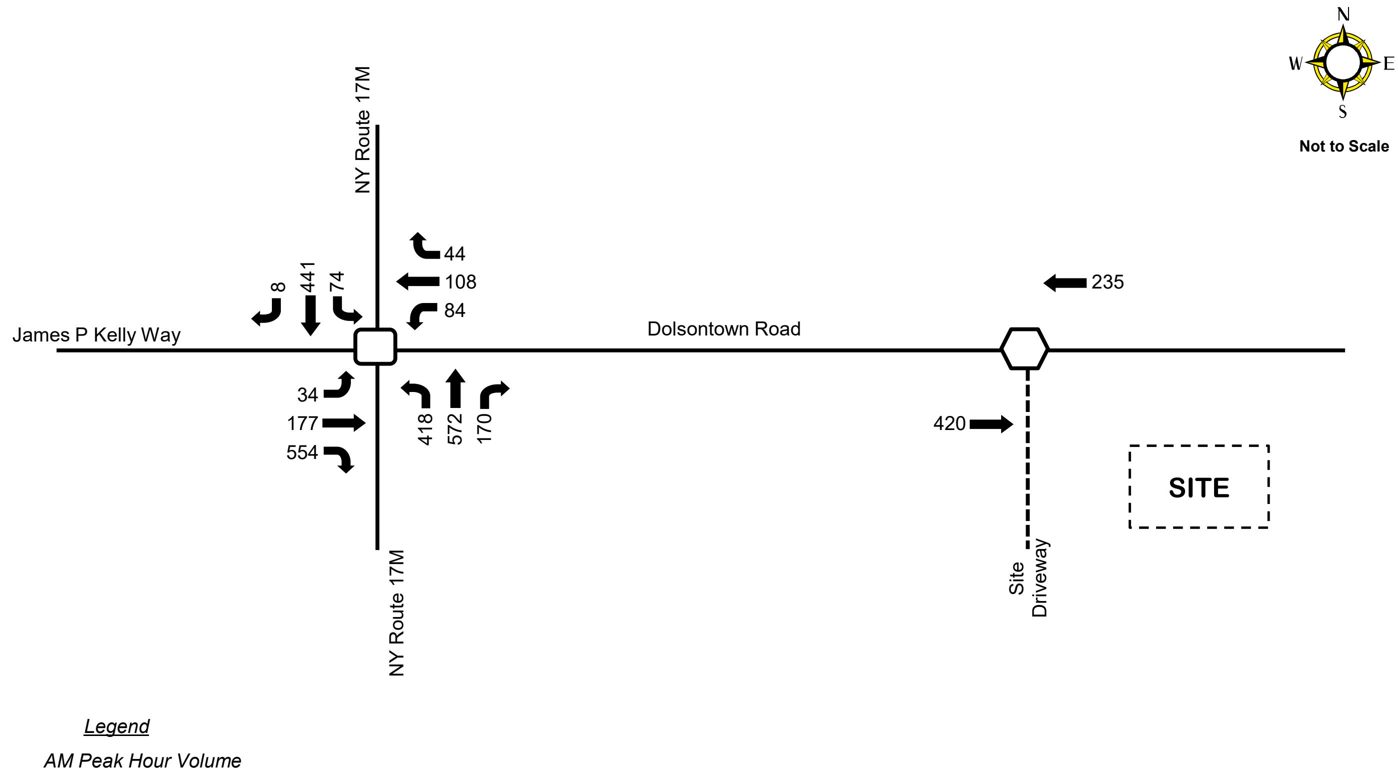
THE Chazen COMPANIES®
Proud to be Employee Owned

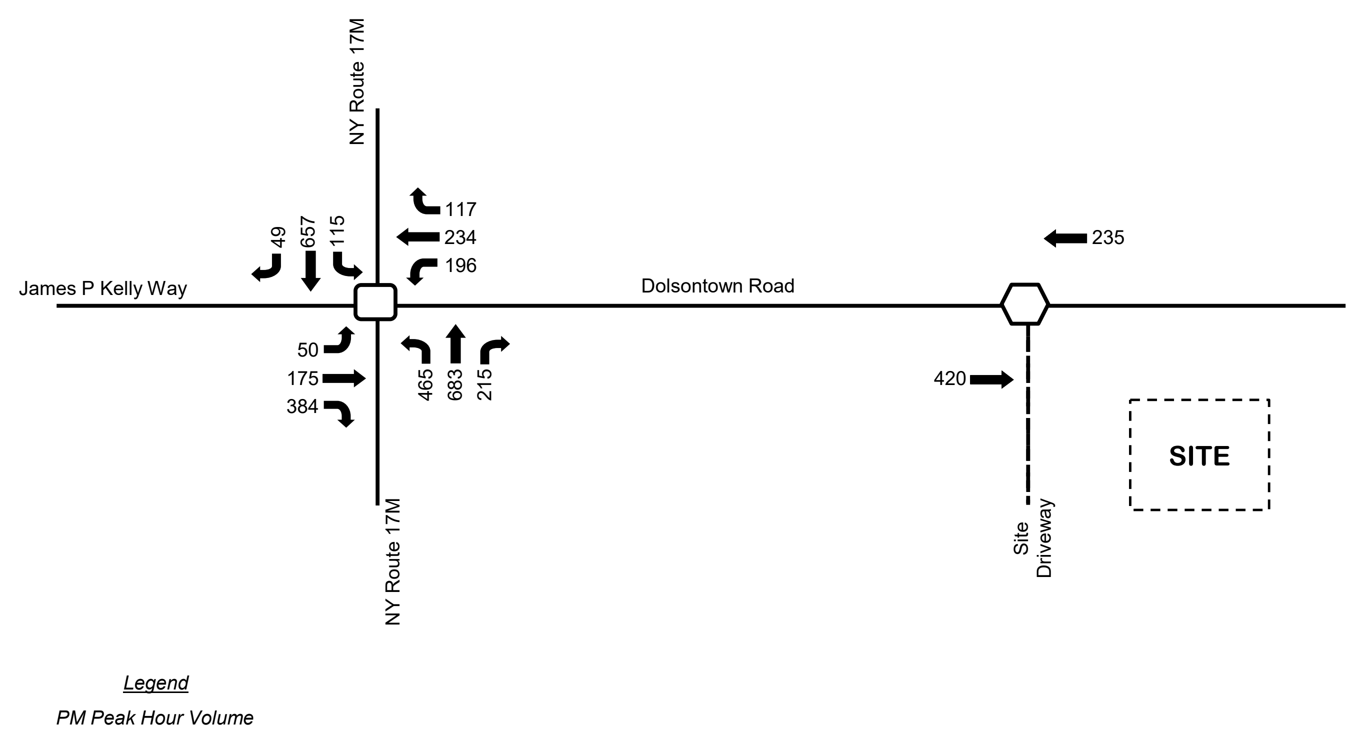
Marangi Disposal Facility

Town of Wawayanda, Orange County, New York

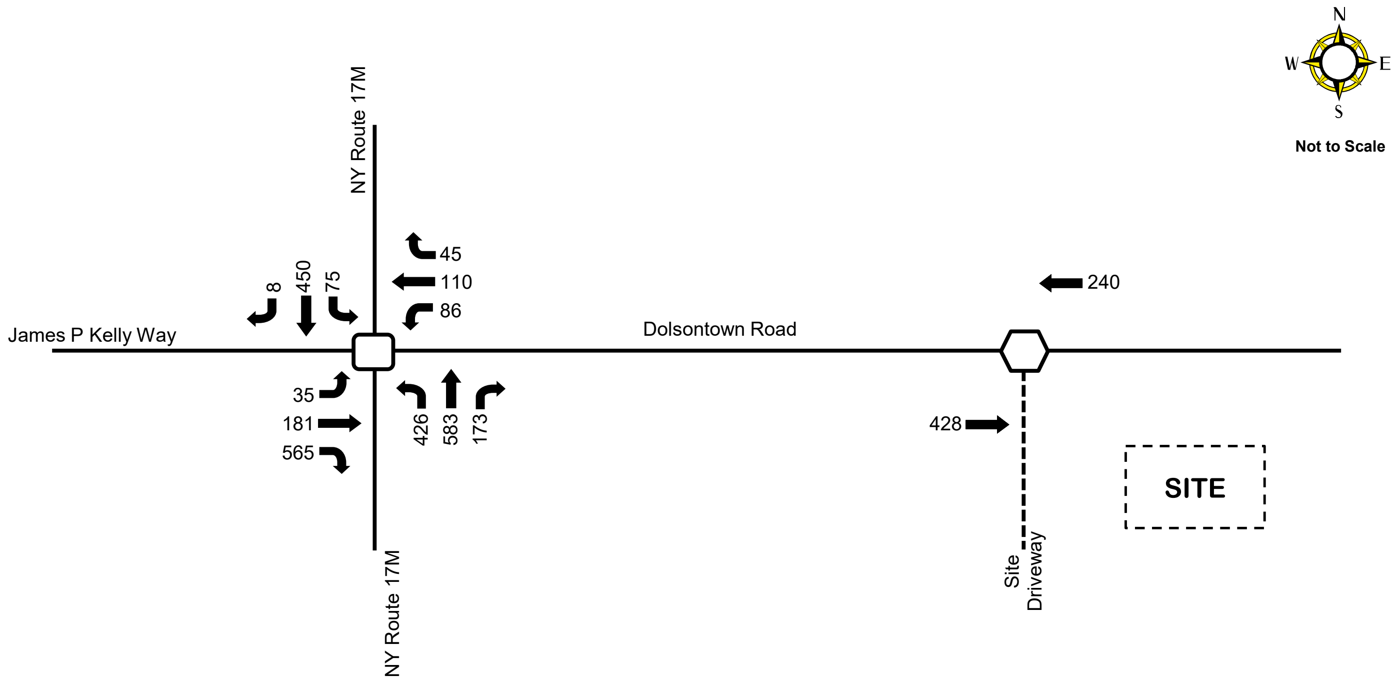
Site Location Map

Project # 32034.00	Date: March 2021	Figure: # 1



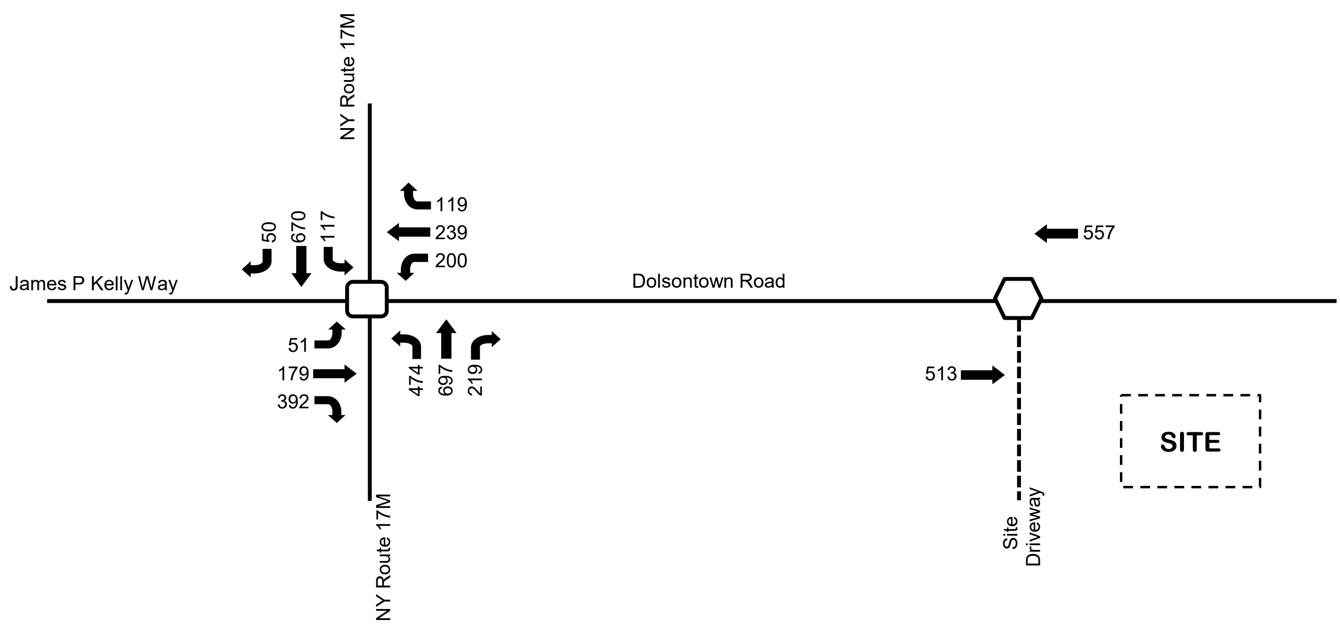


THE Chazen COMPANIES® Proud to be Employee Owned	**Marangi Disposal Facility** Town of Wawayanda, Orange County, New York	2020 Existing Peak Highway Hour Traffic Volumes
	Project # 32034.00 / Date: March 2021	Figure: # 2



Legend

AM Peak Hour Volume



Legend

PM Peak Hour Volume

THE Chazen COMPANIES®
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Marangi Disposal Facility

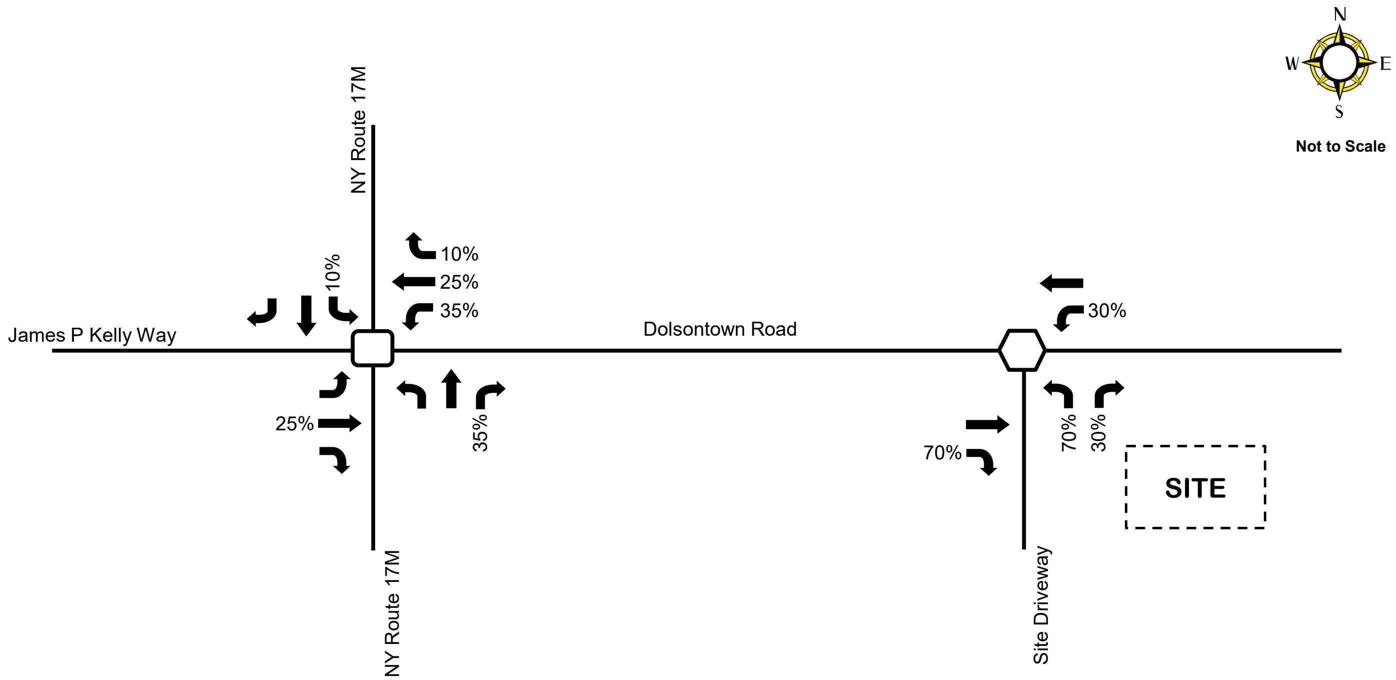
Town of Wawayanda, Orange County, New York

Phase 1
2021 No-Build Peak Highway Hour Traffic Volumes

Project # 32034.00

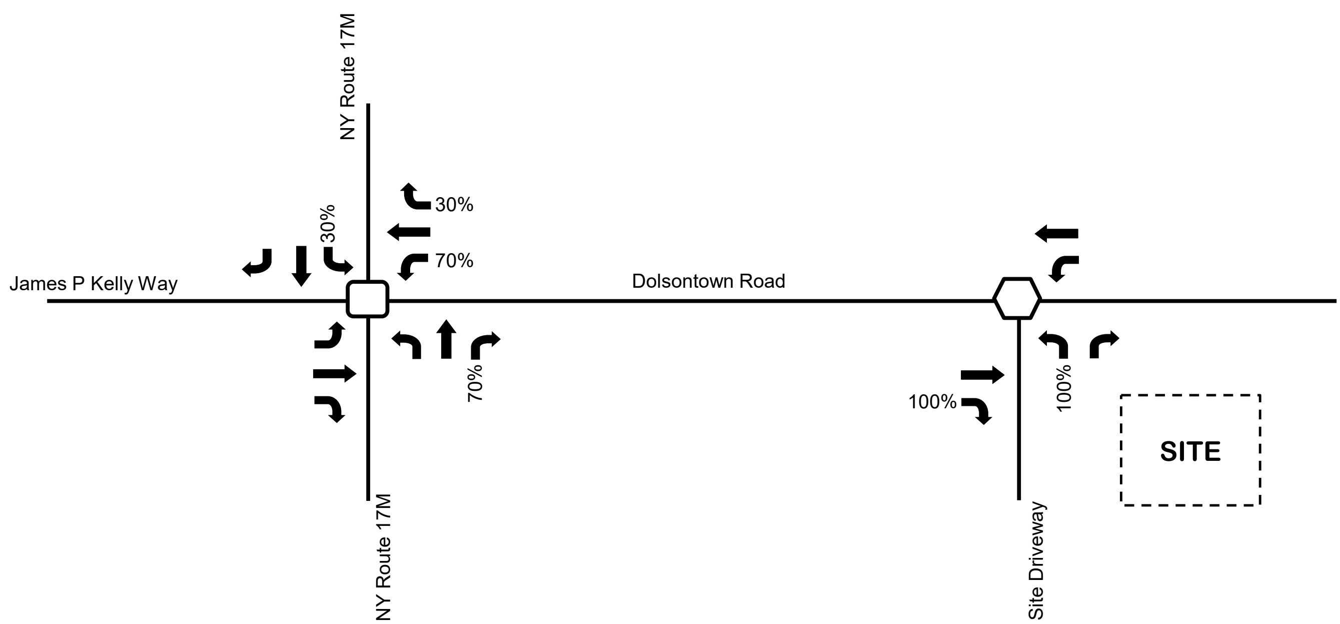
Date: March 2021

Figure: # 3



Legend

Passenger Vehicles A-D Pattern



Legend

Truck A-D Pattern

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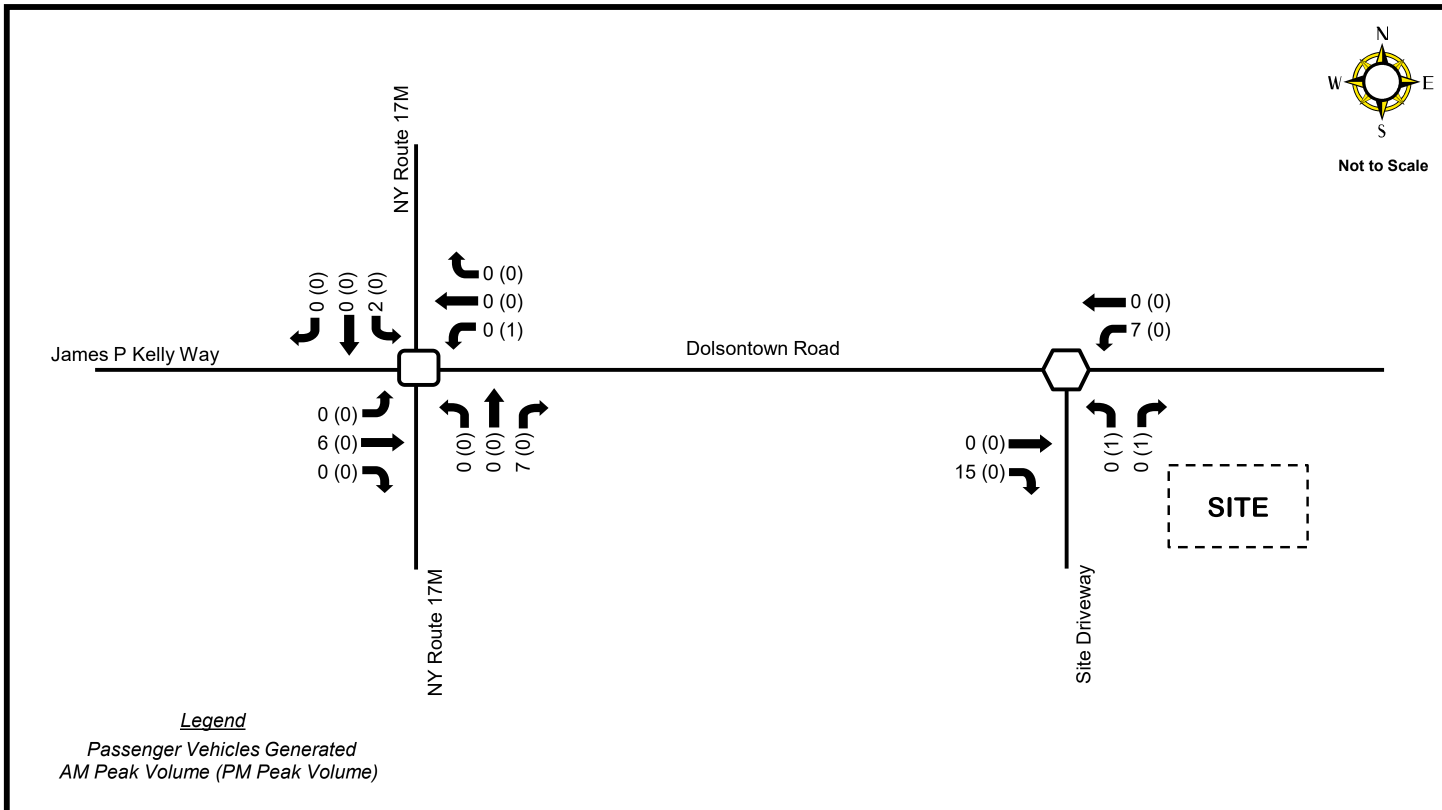
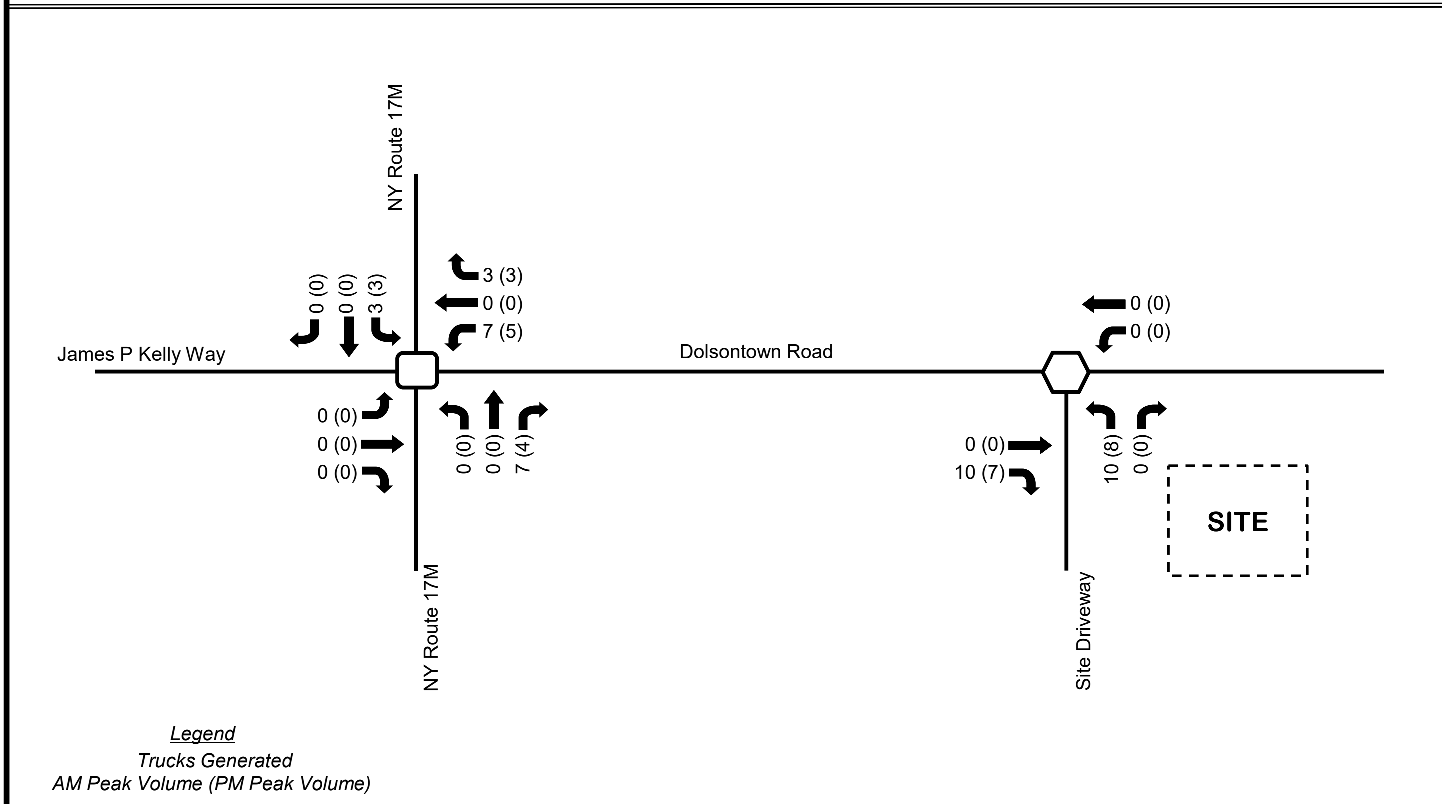
Marangi Disposal Facility

Town of Wawayanda, Orange County, New York

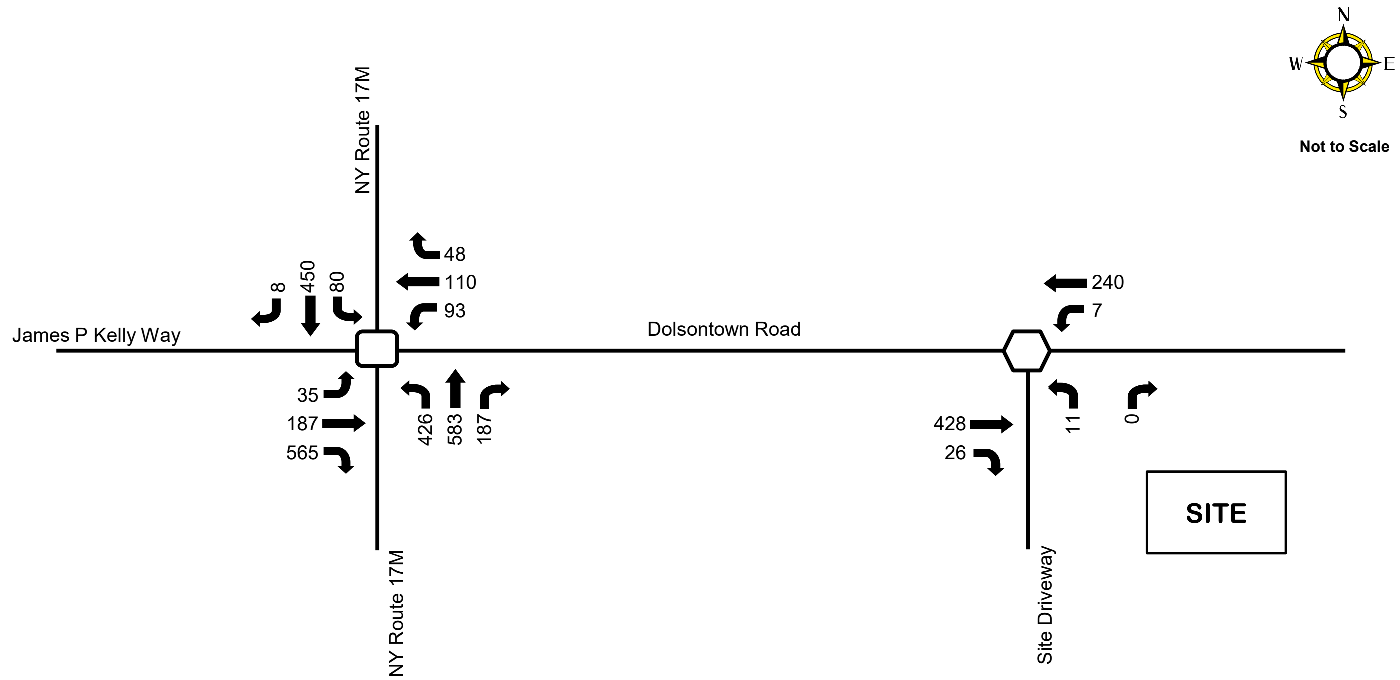
Arrival & Departure Patterns for Passenger Vehicles and Trucks

Project # 32034.00	Date: March 2021	Figure: # 4





THE Chazen COMPANIES® Proud to be Employee Owned	**Marangi Disposal Facility** Town of Wawayanda, Orange County, New York	Phase 1 2021 Project-Generated Peak Highway Hour Traffic
Project # 32034.00	Date: March 2021	Figure: # 5



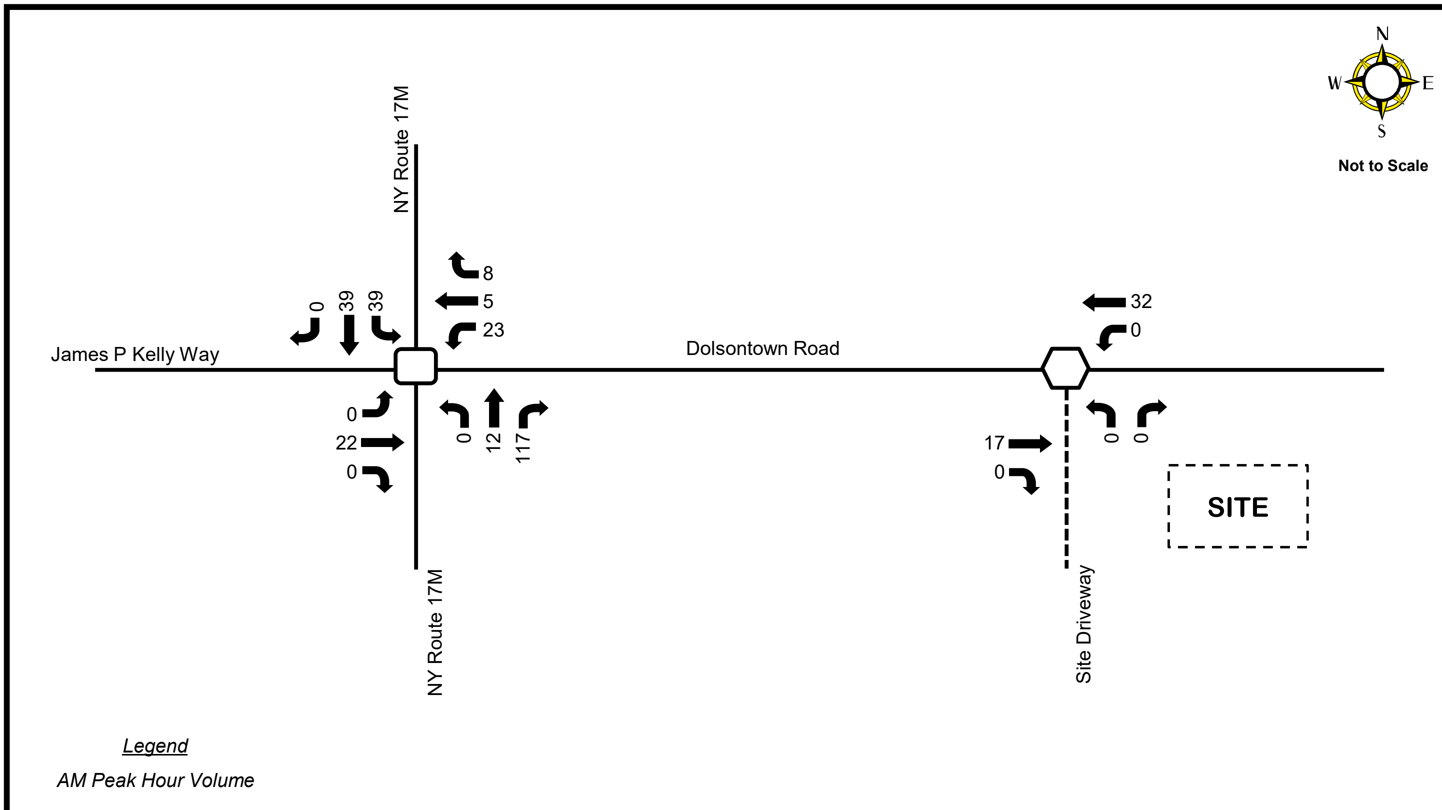
Legend

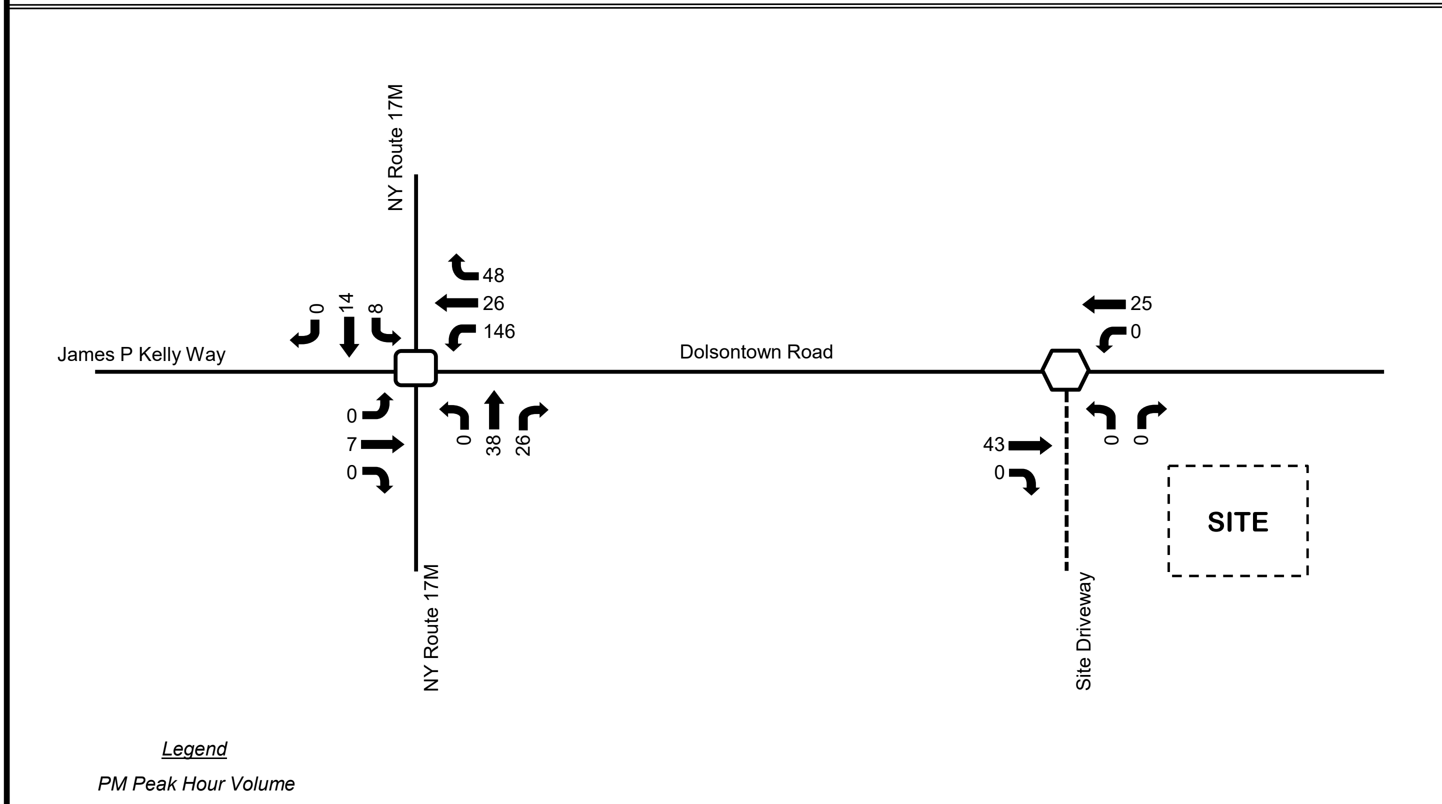
AM Peak Hour Volume

Legend

PM Peak Hour Volume

THE Chazen COMPANIES® Proud to be Employee Owned	**Marangi Disposal Facility** Town of Wawayanda, Orange County, New York	Phase 1 2021 Build Peak Highway Hour Traffic Volumes
	Project # 32034.00 / Date: March 2021	Figure: # 6





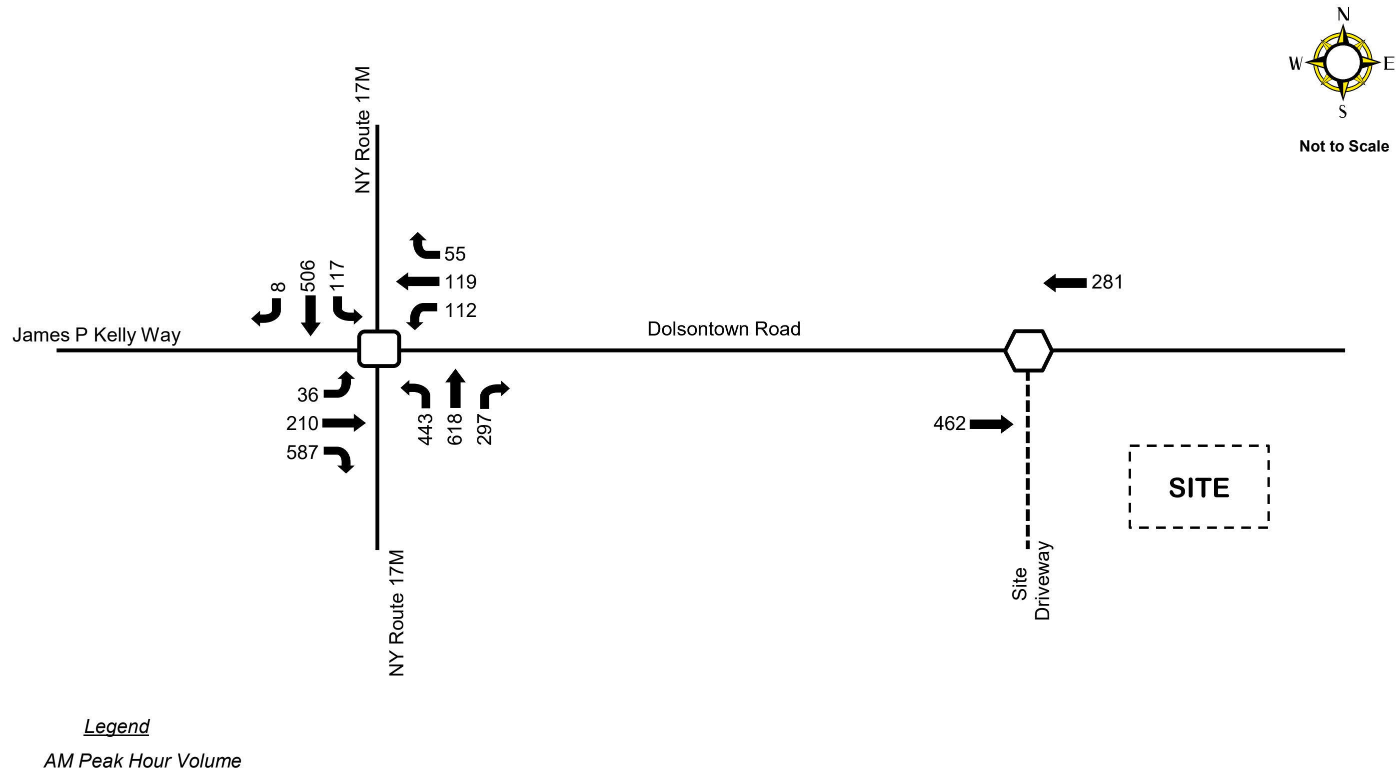
THE Chazen COMPANIES® Proud to be Employee Owned

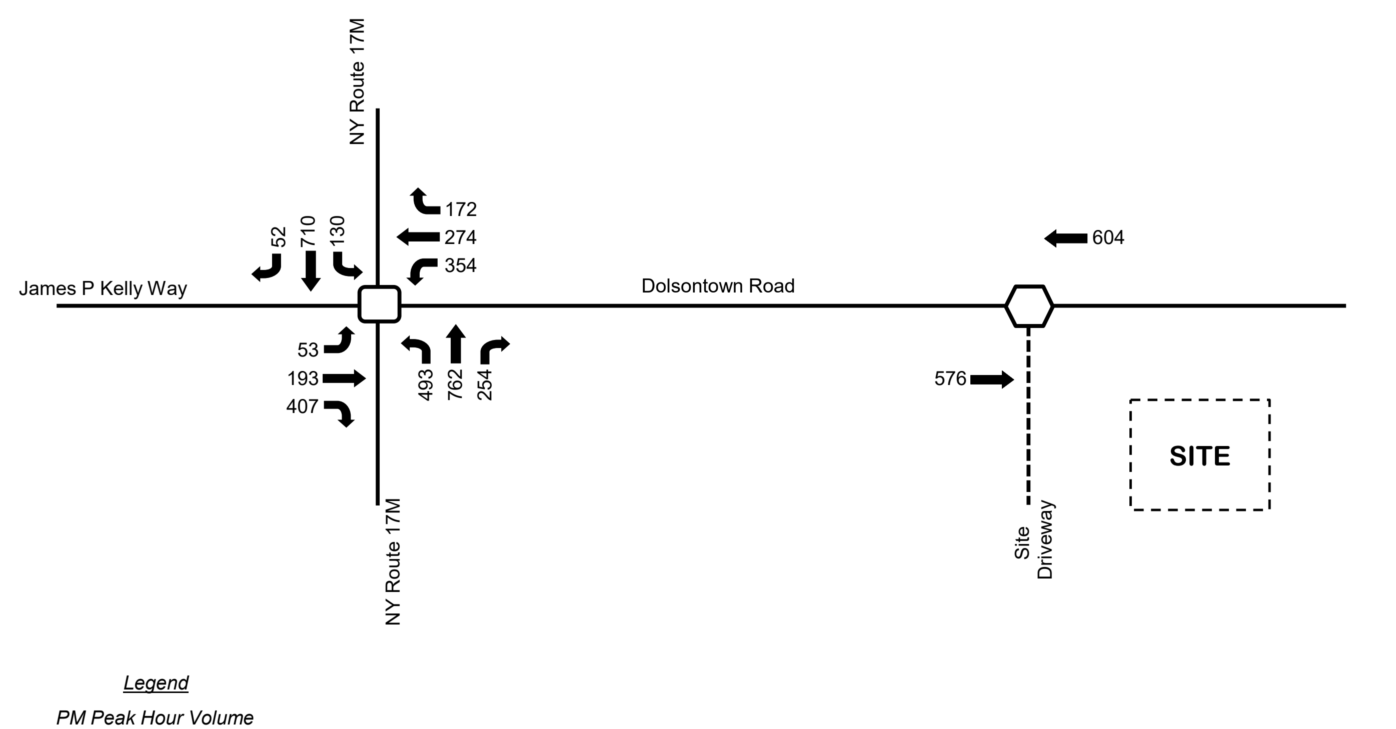
Marangi Disposal Facility

Town of Wawayanda, Orange County, New York

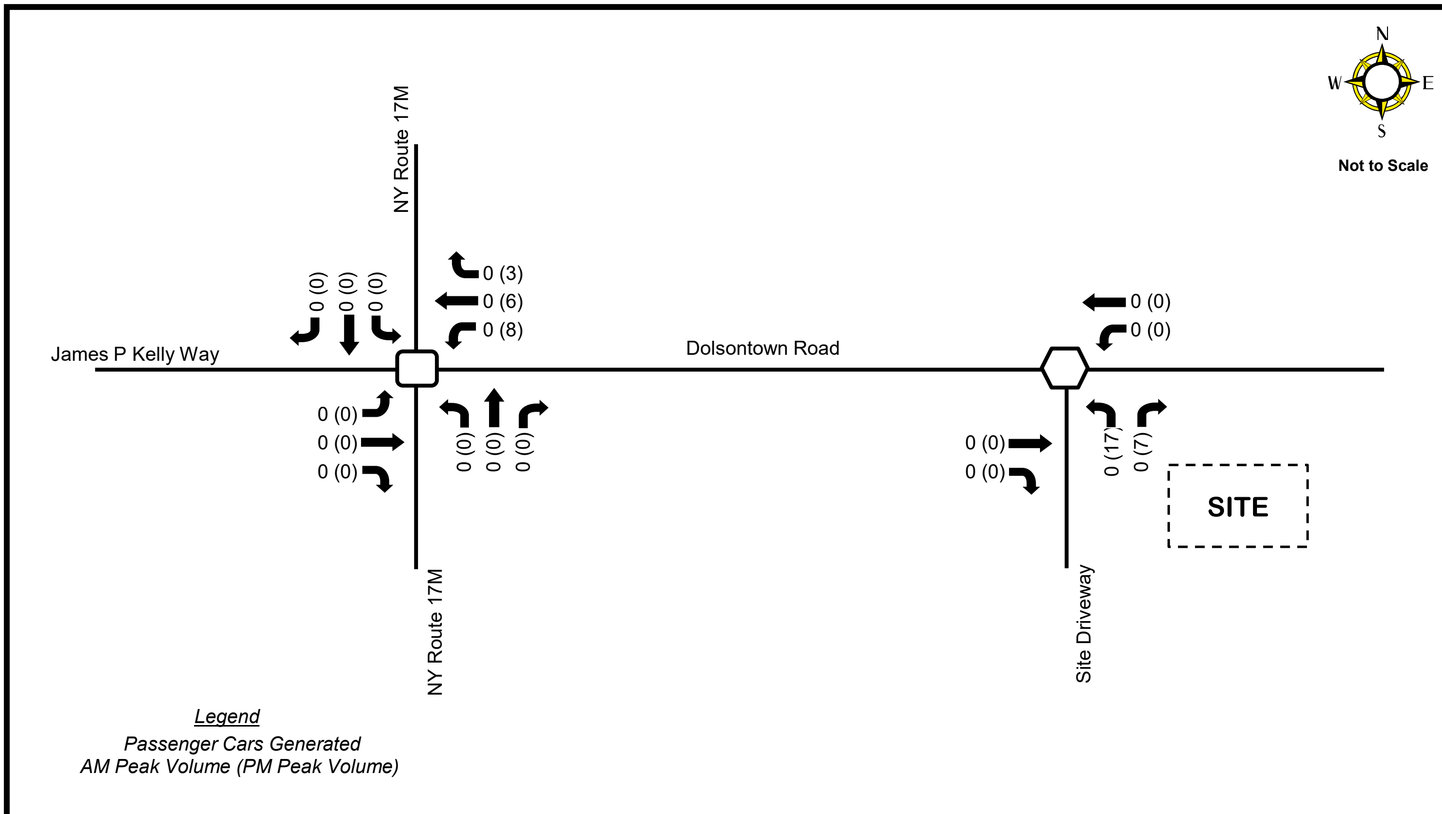
Vicinity Developments Peak Highway Hour Traffic Volumes

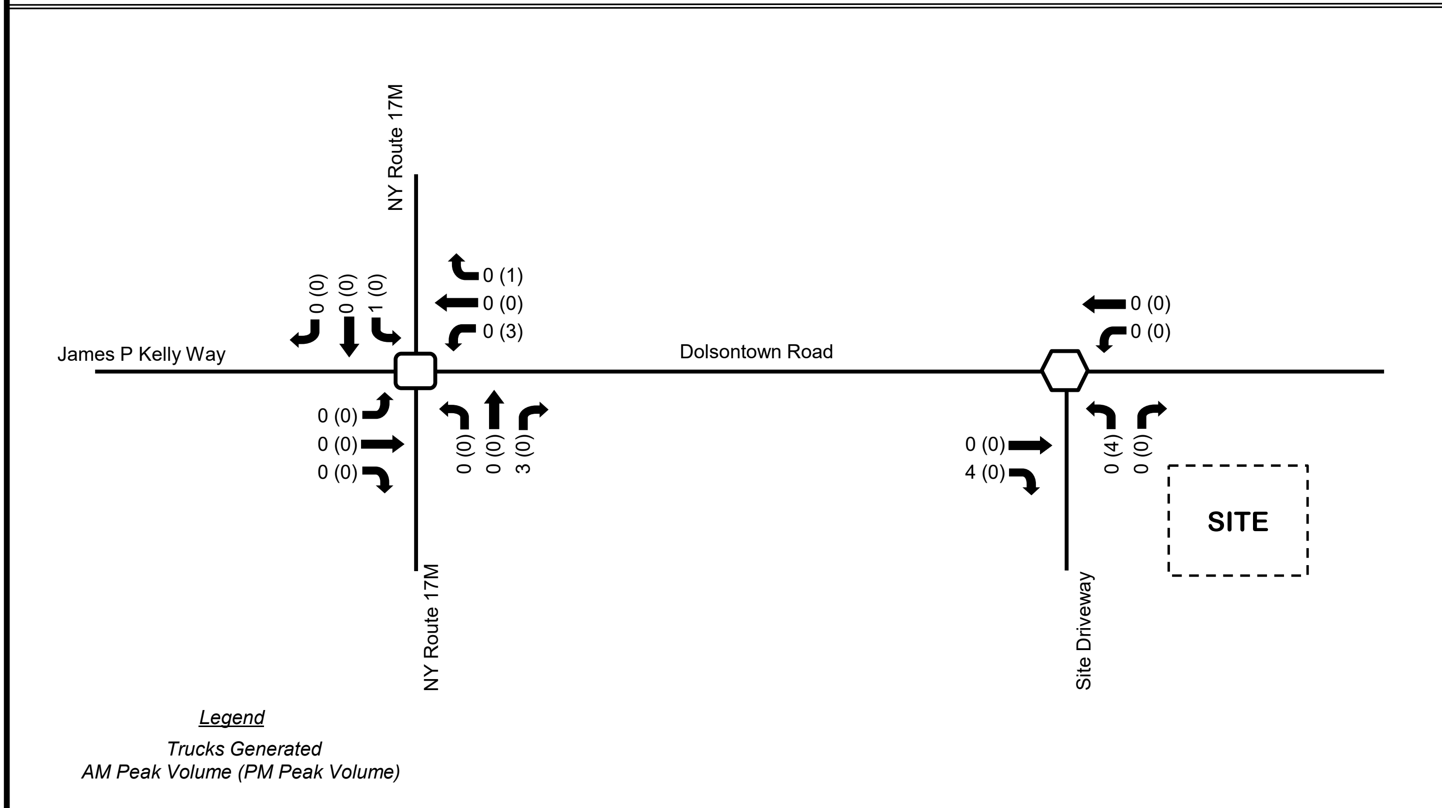
Project # 32034.00	Date: March 2021	Figure: # 7





THE Chazen COMPANIES Proud to be Employee Owned	**Marangi Disposal Facility** Town of Wawayanda, Orange County, New York		Phase 2 2026 No-Build Peak Highway Hour Traffic Volumes
	Project # 32034.00	Date: March 2021	Figure: # 8





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Marangi Disposal Facility

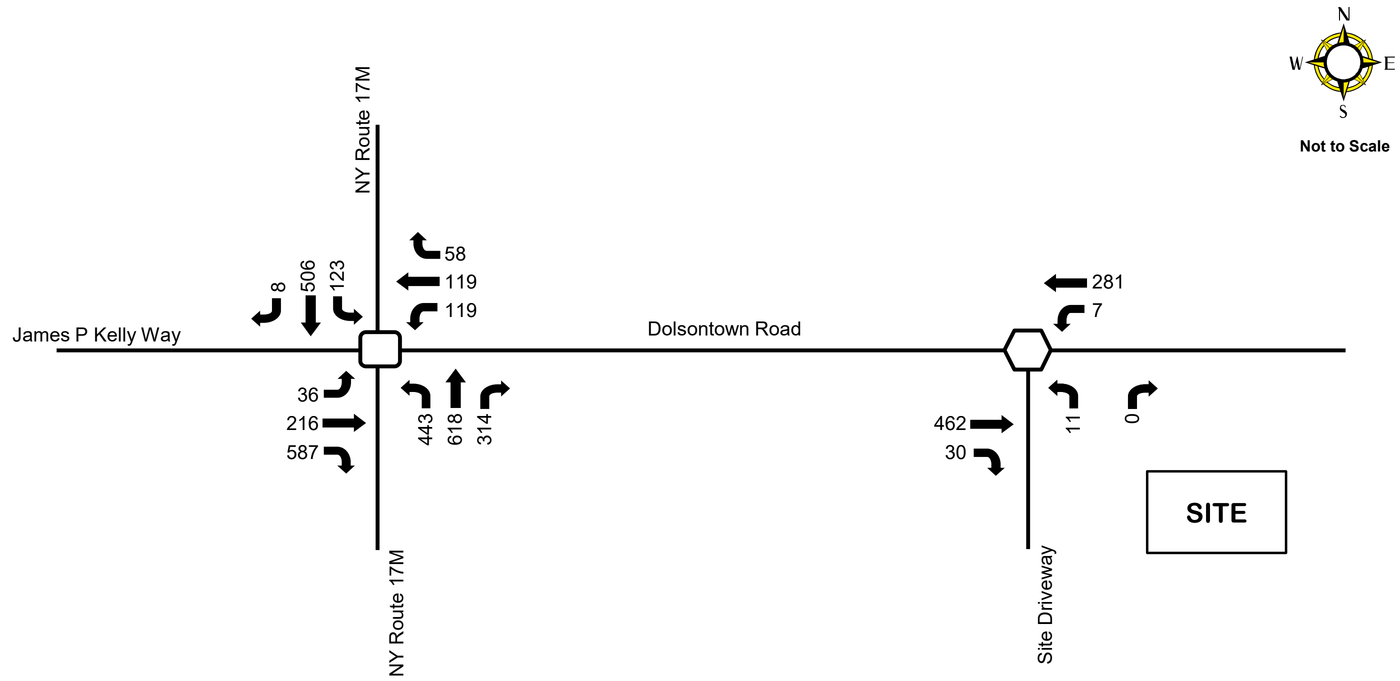
Town of Wawayanda, Orange County, New York

Phase 2
2026 Project-Generated Peak Highway Hour Traffic

Project # 32034.00

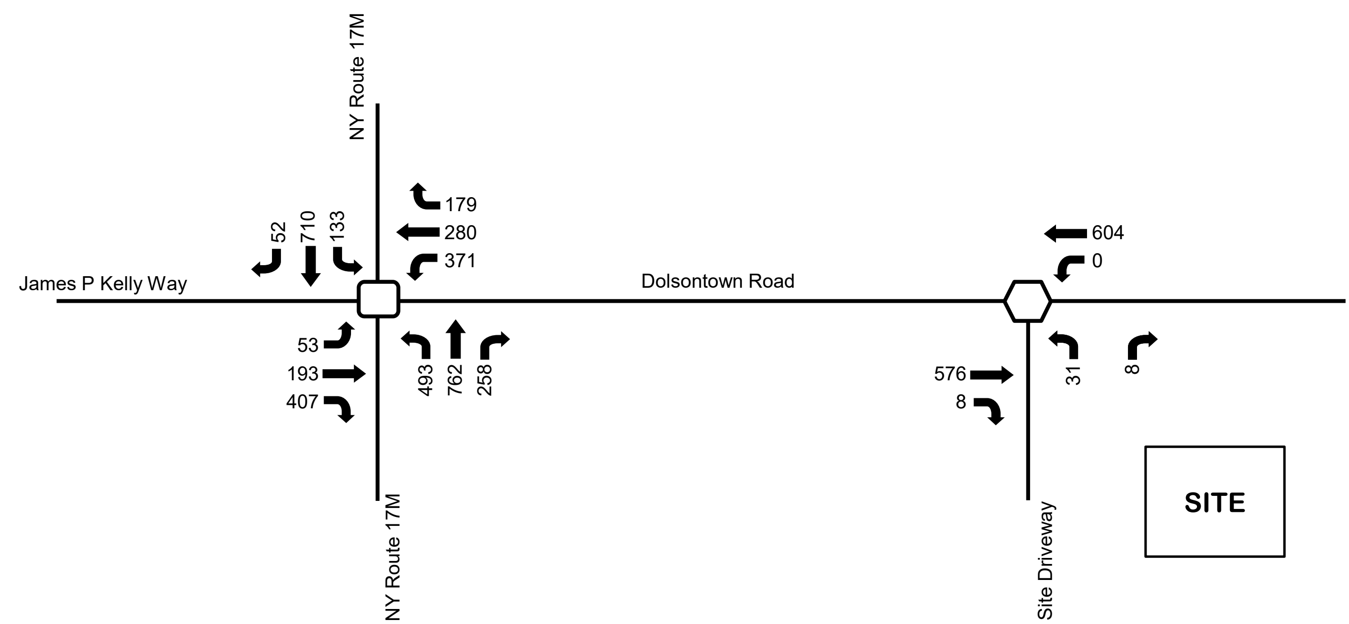
Date: March 2021

Figure: # 9



Legend

AM Peak Hour Volume



Legend

PM Peak Hour Volume

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Marangi Disposal Facility

Town of Wawayanda, Orange County, New York

Phase 1 + Phase 2
2026 Build Peak Highway Hour Traffic Volumes

Project # 32034.00

Date: March 2021

Figure: # 10

Attachment B: Traffic Counts

TRI-STATE TRAFFIC DATA

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

WaWayanda, NY
Rte 17M & Dolsontown Road
Tuesday, October 13, 2020
Location: 41.422677, -74.42823

Count Name: Rte 17M & Dolsontown Rd
Site Code:
Start Date: 10/13/2020
Page No: 1

Turning Movement Data

Start Time	James P Kelly Way Eastbound							Dolsontown Rd Westbound							Rte 17M Northbound							Rte 17M Southbound							
	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
6:00 AM	3	14	42	43	0	0	102	6	3	0	0	0	0	9	21	34	6	0	0	0	61	2	44	1	0	0	0	47	219
6:15 AM	3	16	48	45	0	0	112	13	6	4	1	0	0	24	26	30	4	1	0	0	61	1	48	0	0	1	0	50	247
6:30 AM	4	23	68	37	0	0	132	12	7	1	4	0	0	24	23	40	14	2	0	0	79	5	86	0	1	0	0	92	327
6:45 AM	8	28	58	38	0	1	132	16	8	7	2	0	0	33	37	43	19	6	0	1	105	8	76	1	0	0	1	85	355
Hourly Total	18	81	216	163	0	1	478	47	24	12	7	0	0	90	107	147	43	9	0	1	306	16	254	2	1	1	1	274	1148
7:00 AM	5	23	46	42	0	0	116	12	3	2	3	0	0	20	37	87	19	2	0	0	145	9	70	4	0	0	0	83	364
7:15 AM	7	41	36	55	0	0	139	13	9	4	4	0	0	30	74	61	20	2	0	0	157	6	83	1	0	0	0	90	416
7:30 AM	6	38	47	79	0	0	170	14	15	1	3	0	0	33	92	110	37	0	0	0	239	11	84	0	0	0	0	95	537
7:45 AM	7	41	55	48	0	0	151	15	32	7	4	0	0	58	88	129	43	3	0	0	263	15	99	0	0	0	0	114	586
Hourly Total	25	143	184	224	0	0	576	54	59	14	14	0	0	141	291	387	119	7	0	0	804	41	336	5	0	0	0	382	1903
8:00 AM	7	24	31	71	0	0	133	18	18	5	2	0	0	43	74	97	21	4	0	0	196	12	70	2	2	0	0	86	458
8:15 AM	6	30	39	50	0	0	125	17	16	7	4	0	0	44	63	97	15	6	0	0	181	18	81	2	0	0	0	101	451
8:30 AM	6	37	38	62	0	0	143	24	17	6	1	0	0	48	72	101	31	1	0	0	205	12	97	4	1	0	0	114	510
8:45 AM	9	37	32	48	0	0	126	24	15	9	7	0	0	55	71	110	23	4	0	0	208	13	67	3	2	0	0	85	474
Hourly Total	28	128	140	231	0	0	527	83	66	27	14	0	0	190	280	405	90	15	0	0	790	55	315	11	5	0	0	386	1893
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	8	37	13	62	0	0	120	42	46	12	5	0	0	105	98	140	29	22	0	0	289	30	123	3	0	0	0	156	670
3:15 PM	11	32	10	69	0	0	122	31	43	20	10	0	0	104	104	140	25	9	0	0	278	26	124	2	1	0	0	153	657
3:30 PM	10	42	18	48	0	0	118	33	28	23	5	0	0	89	103	153	29	7	0	0	292	27	140	9	1	0	0	177	676
3:45 PM	9	45	25	60	0	0	139	39	56	26	3	0	0	124	92	153	32	6	0	0	283	38	147	6	0	0	0	191	737
Hourly Total	38	156	66	239	0	0	499	145	173	81	23	0	0	422	397	586	115	44	0	0	1142	121	534	20	2	0	0	677	2740
4:00 PM	14	34	44	55	0	1	147	43	45	22	4	0	0	114	90	155	42	12	0	0	299	21	138	14	0	0	0	173	733
4:15 PM	7	30	19	50	0	0	106	48	52	20	4	0	0	124	106	136	42	6	0	0	290	19	139	5	1	0	0	164	684
4:30 PM	13	41	30	48	0	0	132	39	48	17	5	0	0	109	113	145	34	11	0	0	303	21	142	13	3	0	0	179	723
4:45 PM	10	42	23	39	0	0	114	37	52	26	7	0	0	122	89	145	32	3	0	0	269	19	105	10	2	0	0	136	641
Hourly Total	44	147	116	192	0	1	499	167	197	85	20	0	0	469	398	581	150	32	0	0	1161	80	524	42	6	0	0	652	2781
5:00 PM	4	41	23	46	0	0	114	52	42	26	3	0	0	123	115	106	44	6	0	0	271	26	141	7	3	0	0	177	685
5:15 PM	11	34	9	47	0	0	101	39	53	16	0	0	0	108	121	144	49	7	0	0	321	24	136	7	1	0	0	168	698
5:30 PM	8	39	11	40	0	1	98	51	53	25	3	0	0	132	102	122	23	8	0	0	255	24	124	2	0	0	0	150	635
5:45 PM	9	39	18	33	0	0	99	38	45	21	6	0	0	110	108	97	21	3	0	0	229	17	77	1	1	0	0	96	534
Hourly Total	32	153	61	166	0	1	412	180	193	88	12	0	0	473	446	469	137	24	0	0	1076	91	478	17	5	0	0	591	2552
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	185	808	783	1215	0	3	2991	676	712	307	90	0	0	1785	1919	2575	654	131	0	1	5279	404	2441	97	19	1	1	2962	13017
Approach %	6.2	27.0	26.2	40.6	0.0	-	-	37.9	39.9	17.2	5.0	0.0	-	-	36.4	48.8	12.4	2.5	0.0	-	-	13.6	82.4	3.3	0.6	0.0	-	-	-
Total %	1.4	6.2	6.0	9.3	0.0	-	23.0	5.2	5.5	2.4	0.7	0.0	-	13.7	14.7	19.8	5.0	1.0	0.0	-	40.6	3.1	18.8	0.7	0.1	0.0	-	22.8	-
Lights	182	799	761	1197	0	-	2939	656	704	303	89	0	-	1752	1860	2506	634	130	0	-	5130	399	2373	93	18	1	-	2884	12705
% Lights	98.4	98.9	97.2	98.5	-	-	98.3	97.0	98.9	98.7	98.9	-	-	98.2	96.9	97.3	96.9	99.2	-	-	97.2	98.8	97.2	95.9	94.7	100.0	-	97.4	97.6
Buses	1	6	7	11	0	-	25	3	5	0	0	0	-	8	17	9	3	0	0	-	29	3	13	1	0	0	-	17	79
% Buses	0.5	0.7	0.9	0.9	-	-	0.8	0.4	0.7	0.0	0.0	-	-	0.4	0.9	0.3	0.5	0.0	-	-	0.5	0.7	0.5	1.0	0.0	0.0	-	0.6	0.6
Trucks	2	3	15	7	0	-	27	17	3	4	1	0	-	25	42	60	17	1	0	-	120	2	55	3	1	0	-	61	233
% Trucks	1.1	0.4	1.9	0.6	-	-	0.9	2.5	0.4	1.3	1.1	-	-	1.4	2.2	2.3	2.6	0.8	-	-	2.3	0.5	2.3	3.1	5.3	0.0	-	2.1	1.8
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-

TRI-STATE TRAFFIC DATA

www.TSTData.com
184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

WaWayanda, NY
Rte 17M & Dolsontown Road
Tuesday, October 13, 2020
Location: 41.422677, -74.42823

Count Name: Rte 17M & Dolsontown Rd
Site Code:
Start Date: 10/13/2020

10/13/2020 6:00 AM
Ending At
10/13/2020 6:15 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Rte 17M [SB]

Out	In	Total
3081	2884	5965
10	17	27
67	61	128
0	0	0
0	0	0
3158	**2962**	**6120**

R	T	L	U	P
111	2373	399	1	0
1	13	3	0	0
4	55	2	0	0
0	0	0	0	0
0	0	0	0	1
116	**2441**	**404**	**1**	**1**

James P Kelly Way [EB]

Out	In	Total
2675	2939	5614
23	25	48
49	27	76
0	0	0
0	0	0
2747	**2991**	**5738**

U	L	T	R	P
0	182	799	1958	0
0	1	6	18	0
0	2	3	22	0
0	0	0	0	0
0	0	0	0	3
0	**185**	**808**	**1998**	**3**

Dolsontown Rd [WB]

Out	In	Total
1962	1752	3714
12	8	20
23	25	48
0	0	0
0	0	0
1997	**1785**	**3782**

R	T	L	U	P
392	704	656	0	0
0	5	3	0	0
5	3	17	0	0
0	0	0	0	0
0	0	0	0	0
397	**712**	**676**	**0**	**0**

Rte 17M [NB]

U	L	T	R	P
0	1860	2506	764	0
0	17	9	3	0
0	42	60	18	0
0	0	0	0	0
0	0	0	0	1
0	**1919**	**2575**	**785**	**1**

Out	In	Total
4987	5130	10117
34	29	63
94	120	214
0	0	0
0	0	0
5115	**5279**	**10394**

Turning Movement Data Plot

![TRI-STATE TRAFFIC DATA]

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184 Baker Rd

Coatesville, Pennsylvania, United States 19320
610-466-1469
Serving Transportation Professionals Since 1995

WaWayanda, NY
Rte 17M & Dolsontown Road
Tuesday, October 13, 2020
Location: 41.422677, -74.42823

Turning Movement Peak Hour Data (7:30 AM)

	James P Kelly Way							Dolsontown Rd							Rte 17M							Rte 17M							
	Eastbound							Westbound							Northbound							Southbound							
Start Time	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
7:30 AM	6	38	47	79	0	0	170	14	15	1	3	0	0	33	92	110	37	0	0	0	239	11	84	0	0	0	0	95	537
7:45 AM	7	41	55	48	0	0	151	15	32	7	4	0	0	58	88	129	43	3	0	0	263	15	99	0	0	0	0	114	586
8:00 AM	7	24	31	71	0	0	133	18	18	5	2	0	0	43	74	97	21	4	0	0	196	12	70	2	2	0	0	86	458
8:15 AM	6	30	39	50	0	0	125	17	16	7	4	0	0	44	63	97	15	6	0	0	181	18	81	2	0	0	0	101	451
Total	26	133	172	248	0	0	579	64	81	20	13	0	0	178	317	433	116	13	0	0	879	56	334	4	2	0	0	396	2032
Approach %	4.5	23.0	29.7	42.8	0.0	-	-	36.0	45.5	11.2	7.3	0.0	-	-	36.1	49.3	13.2	1.5	0.0	-	-	14.1	84.3	1.0	0.5	0.0	-	-	-
Total %	1.3	6.5	8.5	12.2	0.0	-	28.5	3.1	4.0	1.0	0.6	0.0	-	8.8	15.6	21.3	5.7	0.6	0.0	-	43.3	2.8	16.4	0.2	0.1	0.0	-	19.5	-
PHF	0.929	0.811	0.782	0.785	0.000	-	0.851	0.889	0.633	0.714	0.813	0.000	-	0.767	0.861	0.839	0.674	0.542	0.000	-	0.836	0.778	0.843	0.500	0.250	0.000	-	0.868	0.867
Lights	24	132	169	240	0	-	565	58	79	20	12	0	-	169	301	415	110	13	0	-	839	53	313	4	2	0	-	372	1945
% Lights	92.3	99.2	98.3	96.8	-	-	97.6	90.6	97.5	100.0	92.3	-	-	94.9	95.0	95.8	94.8	100.0	-	-	95.4	94.6	93.7	100.0	100.0	-	-	93.9	95.7
Buses	1	1	1	6	0	-	9	2	1	0	0	0	-	3	4	2	2	0	0	-	8	3	6	0	0	0	-	9	29
% Buses	3.8	0.8	0.6	2.4	-	-	1.6	3.1	1.2	0.0	0.0	-	-	1.7	1.3	0.5	1.7	0.0	-	-	0.9	5.4	1.8	0.0	0.0	-	-	2.3	1.4
Trucks	1	0	2	2	0	-	5	4	1	0	1	0	-	6	12	16	4	0	0	-	32	0	15	0	0	0	-	15	58
% Trucks	3.8	0.0	1.2	0.8	-	-	0.9	6.3	1.2	0.0	7.7	-	-	3.4	3.8	3.7	3.4	0.0	-	-	3.6	0.0	4.5	0.0	0.0	-	-	3.8	2.9
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Peak Hour Data

10/13/2020 7:30 AM
Ending At
10/13/2020 8:30 AM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Rte 17M [SB]

Out	In	Total
471	372	843
3	9	12
18	15	33
0	0	0
0	0	0
492	**396**	**888**

R	T	L	U	P
6	313	53	0	0
0	6	3	0	0
0	15	0	0	0
0	0	0	0	0
0	0	0	0	0
6	**334**	**56**	**0**	**0**

James P Kelly Way [EB]

Out	In	Total
386	565	951
5	9	14
13	5	18
0	0	0
0	0	0
404	**579**	**983**

U	L	T	R	P
0	24	132	409	0
0	1	1	7	0
0	1	0	4	0
0	0	0	0	0
0	0	0	0	0
0	**26**	**133**	**420**	**0**

Dolsontown Rd [WB]

Out	In	Total
308	169	477
6	3	9
4	6	10
0	0	0
0	0	0
318	**178**	**496**

R	T	L	U	P
32	79	58	0	0
0	1	2	0	0
1	1	4	0	0
0	0	0	0	0
0	0	0	0	0
33	**81**	**64**	**0**	**0**

Rte 17M [NB]

U	L	T	R	P
0	301	415	123	0
0	4	2	2	0
0	12	16	4	0
0	0	0	0	0
0	0	0	0	0
0	**317**	**433**	**129**	**0**

Out	In	Total
780	839	1619
15	8	23
23	32	55
0	0	0
0	0	0
818	**879**	**1697**

Turning Movement Peak Hour Data Plot (7:30 AM)

TRI-STATE TRAFFIC DATA

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WaWayanda, NY
Rte 17M & Dolsontown Road
Tuesday, October 13, 2020
Location: 41.422677, -74.42823

Count Name: Rte 17M & Dolsontown Rd
Site Code:
Start Date: 10/13/2020

Turning Movement Peak Hour Data (3:45 PM)

	James P Kelly Way							Dolsontown Rd							Rte 17M							Rte 17M							
	Eastbound							Westbound							Northbound							Southbound							
Start Time	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Left	Thru	Right	Right on Red	U-Turn	Peds	App. Total	Int. Total
3:45 PM	9	45	25	60	0	0	139	39	56	26	3	0	0	124	92	153	32	6	0	0	283	38	147	6	0	0	0	191	737
4:00 PM	14	34	44	55	0	1	147	43	45	22	4	0	0	114	90	155	42	12	0	0	299	21	138	14	0	0	0	173	733
4:15 PM	7	30	19	50	0	0	106	48	52	20	4	0	0	124	106	136	42	6	0	0	290	19	139	5	1	0	0	164	684
4:30 PM	13	41	30	48	0	0	132	39	48	17	5	0	0	109	113	145	34	11	0	0	303	21	142	13	3	0	0	179	723
Total	43	150	118	213	0	1	524	169	201	85	16	0	0	471	401	589	150	35	0	0	1175	99	566	38	4	0	0	707	2877
Approach %	8.2	28.6	22.5	40.6	0.0	-	-	35.9	42.7	18.0	3.4	0.0	-	-	34.1	50.1	12.8	3.0	0.0	-	-	14.0	80.1	5.4	0.6	0.0	-	-	-
Total %	1.5	5.2	4.1	7.4	0.0	-	18.2	5.9	7.0	3.0	0.6	0.0	-	16.4	13.9	20.5	5.2	1.2	0.0	-	40.8	3.4	19.7	1.3	0.1	0.0	-	24.6	-
PHF	0.768	0.833	0.670	0.888	0.000	-	0.891	0.880	0.897	0.817	0.800	0.000	-	0.950	0.887	0.950	0.893	0.729	0.000	-	0.969	0.651	0.963	0.679	0.333	0.000	-	0.925	0.976
Lights	43	149	116	212	0	-	520	169	199	84	16	0	-	468	391	579	148	34	0	-	1152	99	556	38	4	0	-	697	2837
% Lights	100.0	99.3	98.3	99.5	-	-	99.2	100.0	99.0	98.8	100.0	-	-	99.4	97.5	98.3	98.7	97.1	-	-	98.0	100.0	98.2	100.0	100.0	-	-	98.6	98.6
Buses	0	0	0	0	0	-	0	0	1	0	0	0	-	1	2	0	0	0	0	-	2	0	2	0	0	0	-	2	5
% Buses	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	0.0	-	-	0.2	0.5	0.0	0.0	0.0	-	-	0.2	0.0	0.4	0.0	0.0	-	-	0.3	0.2
Trucks	0	1	2	1	0	-	4	0	1	1	0	0	-	2	8	10	2	1	0	-	21	0	8	0	0	0	-	8	35
% Trucks	0.0	0.7	1.7	0.5	-	-	0.8	0.0	0.5	1.2	0.0	-	-	0.4	2.0	1.7	1.3	2.9	-	-	1.8	0.0	1.4	0.0	0.0	-	-	1.1	1.2
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WaWayanda, NY
Rte 17M & Dolsontown Road
Tuesday, October 13, 2020
Location: 41.422677, -74.42823

Count Name: Rte 17M & Dolsontown Rd
Site Code:
Start Date: 10/13/2020

Peak Hour Data

10/13/2020 3:45 PM
Ending At
10/13/2020 4:45 PM

Lights
Buses
Trucks
Bicycles on Crosswalk
Pedestrians

Rte 17M [SB]

Out	In	Total
722	697	1419
0	2	2
11	8	19
0	0	0
0	0	0
733	**707**	**1440**

R	T	L	U	P
42	556	99	0	0
0	2	0	0	0
0	8	0	0	0
0	0	0	0	0
0	0	0	0	0
42	**566**	**99**	**0**	**0**

James P Kelly Way [EB]

Out	In	Total
632	520	1152
3	0	3
9	4	13
0	0	0
0	0	0
644	**524**	**1168**

U	L	T	R	P
0	43	149	328	0
0	0	0	0	0
0	0	1	3	0
0	0	0	0	0
0	0	0	0	1
0	**43**	**150**	**331**	**1**

Dolsontown Rd [WB]

Out	In	Total
430	468	898
0	1	1
4	2	6
0	0	0
0	0	0
434	**471**	**905**

R	T	L	U	P
100	199	169	0	0
0	1	0	0	0
1	1	0	0	0
0	0	0	0	0
0	0	0	0	0
101	**201**	**169**	**0**	**0**

U	L	T	R	P
0	391	579	182	0
0	2	0	0	0
0	8	10	3	0
0	0	0	0	0
0	0	0	0	0
0	**401**	**589**	**185**	**0**

Out	In	Total
1053	1152	2205
2	2	4
11	21	32
0	0	0
0	0	0
1066	**1175**	**2241**

Rte 17M [NB]

Turning Movement Peak Hour Data Plot (3:45 PM)

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Attachment C:
Capacity Analysis Worksheets

INTERSECTION CAPACITY ANALYSIS PROCEDURES

Traffic impacts are measured by intersection capacity analyses, computed in accordance with procedures outlined in the Highway Capacity Manual (HCM) 6 Edition, published by the Transportation Research Board. In general, the intersection capacity analyses results are a measure of the ability of a roadway network's individual intersections to process vehicles. This is evaluated for each approach to the intersection as well as for the entire intersection. The performance of the individual intersection approaches as well as the intersection overall is quantified based on the average delay per vehicle. The calculated delay is assigned a performance grade called a Level-of-Service (LOS) which ranges from "A" through "F," with LOS "A" representing the least delays and LOS "F" representing longer delays or capacity-deficient operations.

According to generally accepted practice, LOS "A", "B" and "C" reflect clearly acceptable conditions, LOS "D" reflects the existence of delays within a generally tolerable range, LOS "E" is generally only tolerated on minor movements and LOS "F" indicates typically undesirable delays often associated with breakdown conditions.

The parameters considered in the calculations of intersection capacity include: the type of control, the volumes on each approach, the distribution of vehicles by direction (left, through and right) and other factors. Roadway parameters relate to the geometry of the intersection, specifically, the number of lanes, the widths of lanes and lane-use considerations. Other network parameters include the number of lanes of travel per direction and the ideal operating speed.

The computed LOS is defined in terms of the average control delay per vehicle for the peak 15-minute period within the peak one-hour period. Control delay includes initial deceleration delay, queue move-up-time, stopped delay, and final acceleration delay. For signalized intersections, capital letters are used to indicate the Levels-of-Service. The range of delay within each signalized Level-of-Service category are:

LEVEL-OF-SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	Less than or equal to 10.00
B	Between 10.01 and 20.00
C	Between 20.01 and 35.00
D	Between 35.01 and 55.00
E	Between 55.01 and 80.00
F	Greater than 80.00

For unsignalized intersections, Levels-of-Service and delay are reported for the individual lane groups in that they provide a more meaningful representation of operating conditions than the overall intersection LOS and delay. Lower-case letters are used to show that the Level-of-Service refers to unsignalized intersections. The range of delay within each unsignalized Level-of-Service category are as follows:

LEVEL-OF-SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
a	Less than or equal to 10.00
b	Between 10.01 and 15.00
c	Between 15.01 and 25.00
d	Between 25.01 and 35.00
e	Between 35.01 and 50.00
f	Greater than 50.00

These delay ranges for the unsignalized Level-of-Service categories are less than those at signalized intersections because it is assumed that motorists will tolerate longer delays at a signalized intersection in exchange for guaranteed entry into the intersection in a definite period of time.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	177	554	84	108	44	418	572	170	74	441	8
Future Volume (veh/h)	34	177	554	84	108	44	418	572	170	74	441	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	39	203	637	97	124	51	480	657	195	85	507	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	357	405	441	283	286	118	416	955	283	289	1243	22
Arrive On Green	0.04	0.20	0.20	0.06	0.23	0.23	0.06	0.36	0.36	0.05	0.35	0.35
Sat Flow, veh/h	1865	1988	1685	1725	1259	518	1747	2650	786	1818	3561	63
Grp Volume(v), veh/h	39	203	637	97	0	175	480	432	420	85	252	264
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1777	1747	1743	1693	1818	1771	1853
Q Serve(g_s), s	1.1	6.2	14.0	3.0	0.0	5.8	4.0	14.5	14.5	2.0	7.4	7.4
Cycle Q Clear(g_c), s	1.1	6.2	14.0	3.0	0.0	5.8	4.0	14.5	14.5	2.0	7.4	7.4
Prop In Lane	1.00		1.00	1.00		0.29	1.00		0.46	1.00		0.03
Lane Grp Cap(c), veh/h	357	405	441	283	0	403	416	628	610	289	618	647
V/C Ratio(X)	0.11	0.50	1.44	0.34	0.00	0.43	1.15	0.69	0.69	0.29	0.41	0.41
Avail Cap(c_a), veh/h	435	405	441	315	0	403	416	628	610	309	618	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	24.3	25.4	20.0	0.0	22.8	23.8	18.7	18.7	14.7	17.0	17.0
Incr Delay (d2), s/veh	0.1	1.0	212.2	0.7	0.0	0.7	93.6	6.1	6.2	0.6	2.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.7	32.3	1.1	0.0	2.3	15.6	6.4	6.3	0.8	3.1	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	25.2	237.5	20.7	0.0	23.5	117.4	24.8	25.0	15.3	19.0	18.9
LnGrp LOS	C	C	F	C	A	C	F	C	C	B	B	B
Approach Vol, veh/h		879			272			1332			601	
Approach Delay, s/veh		178.9			22.5			58.2			18.4	
Approach LOS		F			C			E			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	30.8	7.1	21.6	10.0	30.0	8.7	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	5.5	14.0
Max Q Clear Time (g_c+I1), s	4.0	16.5	3.1	7.8	6.0	9.4	5.0	16.0
Green Ext Time (p_c), s	0.0	3.2	0.0	0.4	0.0	2.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	81.7
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	175	384	196	234	117	465	683	215	115	657	49
Future Volume (veh/h)	50	175	384	196	234	117	465	683	215	115	657	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	51	179	392	200	239	119	474	697	219	117	670	50
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	228	398	433	300	275	137	330	895	281	271	1146	85
Arrive On Green	0.04	0.20	0.20	0.06	0.23	0.23	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1178	587	1747	2610	820	1818	3341	249
Grp Volume(v), veh/h	51	179	392	200	0	358	474	465	451	117	355	365
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1765	1747	1743	1687	1818	1771	1819
Q Serve(g_s), s	1.5	5.5	14.0	4.0	0.0	13.7	4.0	16.8	16.8	2.9	11.5	11.5
Cycle Q Clear(g_c), s	1.5	5.5	14.0	4.0	0.0	13.7	4.0	16.8	16.8	2.9	11.5	11.5
Prop In Lane	1.00		1.00	1.00		0.33	1.00		0.49	1.00		0.14
Lane Grp Cap(c), veh/h	228	398	433	300	0	412	330	598	578	271	607	624
V/C Ratio(X)	0.22	0.45	0.90	0.67	0.00	0.87	1.43	0.78	0.78	0.43	0.58	0.59
Avail Cap(c_a), veh/h	291	398	433	300	0	412	330	598	578	271	607	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	24.6	25.2	25.0	0.0	25.8	24.7	20.6	20.6	15.9	18.9	18.9
Incr Delay (d2), s/veh	0.5	0.8	22.2	5.5	0.0	17.6	212.0	9.7	10.0	1.1	4.1	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.4	8.2	1.5	0.0	7.1	23.0	7.9	7.7	1.2	5.1	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	25.4	47.3	30.6	0.0	43.4	236.7	30.3	30.6	17.0	23.0	22.9
LnGrp LOS	C	C	D	C	A	D	F	C	C	B	C	C
Approach Vol, veh/h		622			558			1390			837	
Approach Delay, s/veh		38.9			38.8			100.8			22.1	
Approach LOS		D			D			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	30.0	7.6	22.4	10.0	30.0	10.0	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	4.0	14.0
Max Q Clear Time (g_c+I1), s	4.9	18.8	3.5	15.7	6.0	13.5	6.0	16.0
Green Ext Time (p_c), s	0.0	2.6	0.0	0.0	0.0	3.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	60.0
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	180	565	86	110	45	426	583	173	75	450	8
Future Volume (veh/h)	35	180	565	86	110	45	426	583	173	75	450	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	40	207	649	99	126	52	490	670	199	86	517	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	356	404	441	282	286	118	411	952	283	284	1242	22
Arrive On Green	0.04	0.20	0.20	0.06	0.23	0.23	0.06	0.36	0.36	0.05	0.35	0.35
Sat Flow, veh/h	1865	1988	1685	1725	1258	519	1747	2650	787	1818	3562	62
Grp Volume(v), veh/h	40	207	649	99	0	178	490	441	428	86	257	269
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1777	1747	1743	1693	1818	1771	1853
Q Serve(g_s), s	1.1	6.4	14.0	3.1	0.0	5.9	4.0	14.9	14.9	2.1	7.6	7.6
Cycle Q Clear(g_c), s	1.1	6.4	14.0	3.1	0.0	5.9	4.0	14.9	14.9	2.1	7.6	7.6
Prop In Lane	1.00		1.00	1.00		0.29	1.00		0.46	1.00		0.03
Lane Grp Cap(c), veh/h	356	404	441	282	0	404	411	626	608	284	618	646
V/C Ratio(X)	0.11	0.51	1.47	0.35	0.00	0.44	1.19	0.70	0.70	0.30	0.42	0.42
Avail Cap(c_a), veh/h	432	404	441	312	0	404	411	626	608	303	618	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	24.4	25.4	20.0	0.0	22.8	23.9	18.9	18.9	14.9	17.1	17.1
Incr Delay (d2), s/veh	0.1	1.1	224.8	0.7	0.0	0.8	108.2	6.5	6.7	0.6	2.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.8	33.8	1.2	0.0	2.3	17.1	6.7	6.5	0.8	3.2	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	25.5	250.2	20.8	0.0	23.6	132.1	25.4	25.6	15.4	19.1	19.0
LnGrp LOS	C	C	F	C	A	C	F	C	C	B	B	B
Approach Vol, veh/h		896			277			1359			612	
Approach Delay, s/veh		188.0			22.6			63.9			18.6	
Approach LOS		F			C			E			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.3	30.7	7.2	21.6	10.0	30.0	8.8	20.0				
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	4.5	6.0				
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	5.5	14.0				
Max Q Clear Time (g_c+I1), s	4.1	16.9	3.1	7.9	6.0	9.6	5.1	16.0				
Green Ext Time (p_c), s	0.0	3.2	0.0	0.4	0.0	2.7	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			86.8									
HCM 6th LOS			F									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	179	392	200	239	119	474	697	219	117	670	50
Future Volume (veh/h)	51	179	392	200	239	119	474	697	219	117	670	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	52	183	400	204	244	121	484	711	223	119	684	51
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	223	398	433	297	275	136	326	895	281	266	1146	85
Arrive On Green	0.05	0.20	0.20	0.06	0.23	0.23	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1180	585	1747	2611	819	1818	3342	249
Grp Volume(v), veh/h	52	183	400	204	0	365	484	475	459	119	362	373
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1765	1747	1743	1687	1818	1771	1819
Q Serve(g_s), s	1.5	5.7	14.0	4.0	0.0	14.0	4.0	17.2	17.2	2.9	11.8	11.9
Cycle Q Clear(g_c), s	1.5	5.7	14.0	4.0	0.0	14.0	4.0	17.2	17.2	2.9	11.8	11.9
Prop In Lane	1.00		1.00	1.00		0.33	1.00		0.49	1.00		0.14
Lane Grp Cap(c), veh/h	223	398	433	297	0	411	326	598	579	266	607	624
V/C Ratio(X)	0.23	0.46	0.92	0.69	0.00	0.89	1.49	0.79	0.79	0.45	0.60	0.60
Avail Cap(c_a), veh/h	285	398	433	297	0	411	326	598	579	266	607	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	24.7	25.3	25.3	0.0	25.9	24.7	20.8	20.8	16.1	19.0	19.0
Incr Delay (d2), s/veh	0.5	0.8	25.4	6.4	0.0	20.2	234.5	10.4	10.8	1.2	4.3	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.5	8.8	1.7	0.0	7.5	24.7	8.2	8.0	1.2	5.2	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	25.5	50.7	31.8	0.0	46.2	259.3	31.2	31.5	17.3	23.3	23.2
LnGrp LOS	C	C	D	C	A	D	F	C	C	B	C	C
Approach Vol, veh/h		635			569			1418			854	
Approach Delay, s/veh		41.1			41.0			109.1			22.4	
Approach LOS		D			D			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	30.0	7.7	22.3	10.0	30.0	10.0	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	4.0	14.0
Max Q Clear Time (g_c+I1), s	4.9	19.2	3.5	16.0	6.0	13.9	6.0	16.0
Green Ext Time (p_c), s	0.0	2.5	0.0	0.0	0.0	3.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	64.3
HCM 6th LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	187	565	93	110	48	426	583	187	80	450	8
Future Volume (veh/h)	35	187	565	93	110	48	426	583	187	80	450	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	40	215	649	107	126	55	490	670	215	92	517	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	357	402	438	286	285	124	408	920	295	279	1236	22
Arrive On Green	0.04	0.20	0.20	0.07	0.23	0.23	0.06	0.35	0.35	0.05	0.35	0.35
Sat Flow, veh/h	1865	1988	1685	1725	1234	539	1747	2596	833	1818	3562	62
Grp Volume(v), veh/h	40	215	649	107	0	181	490	450	435	92	257	269
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1773	1747	1743	1685	1818	1771	1853
Q Serve(g_s), s	1.2	6.7	14.0	3.3	0.0	6.0	4.0	15.5	15.5	2.2	7.7	7.7
Cycle Q Clear(g_c), s	1.2	6.7	14.0	3.3	0.0	6.0	4.0	15.5	15.5	2.2	7.7	7.7
Prop In Lane	1.00		1.00	1.00		0.30	1.00		0.49	1.00		0.03
Lane Grp Cap(c), veh/h	357	402	438	286	0	410	408	618	597	279	615	643
V/C Ratio(X)	0.11	0.53	1.48	0.37	0.00	0.44	1.20	0.73	0.73	0.33	0.42	0.42
Avail Cap(c_a), veh/h	433	402	438	307	0	410	408	618	597	292	615	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	24.7	25.6	20.0	0.0	22.8	24.1	19.4	19.4	15.1	17.2	17.2
Incr Delay (d2), s/veh	0.1	1.4	228.0	0.8	0.0	0.7	111.5	7.4	7.6	0.7	2.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.0	34.1	1.3	0.0	2.3	17.4	7.0	6.9	0.9	3.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	26.0	253.6	20.9	0.0	23.5	135.6	26.8	27.1	15.8	19.3	19.2
LnGrp LOS	C	C	F	C	A	C	F	C	C	B	B	B
Approach Vol, veh/h		904			288			1375			618	
Approach Delay, s/veh		189.2			22.5			65.7			18.8	
Approach LOS		F			C			E			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	30.5	7.2	22.0	10.0	30.0	9.2	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	5.5	14.0
Max Q Clear Time (g_c+I1), s	4.2	17.5	3.2	8.0	6.0	9.7	5.3	16.0
Green Ext Time (p_c), s	0.0	3.0	0.0	0.4	0.0	2.7	0.0	0.0

Intersection Summary		
HCM 6th Ctrl Delay		87.7
HCM 6th LOS		F

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	428	26	7	240	11	0
Future Vol, veh/h	428	26	7	240	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	465	28	8	261	12	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	493	0	756	479
Stage 1	-	-	-	-	479	-
Stage 2	-	-	-	-	277	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1071	-	376	587
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1071	-	373	587
Mov Cap-2 Maneuver	-	-	-	-	373	-
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	770	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	373	-	-	1071	-
HCM Lane V/C Ratio	0.032	-	-	0.007	-
HCM Control Delay (s)	15	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	179	392	206	239	122	474	697	223	120	670	50
Future Volume (veh/h)	51	179	392	206	239	122	474	697	223	120	670	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	52	183	400	210	244	124	484	711	228	122	684	51
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	220	398	433	297	273	139	326	890	285	265	1146	85
Arrive On Green	0.05	0.20	0.20	0.06	0.23	0.23	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1169	594	1747	2596	832	1818	3342	249
Grp Volume(v), veh/h	52	183	400	210	0	368	484	477	462	122	362	373
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1763	1747	1743	1685	1818	1771	1819
Q Serve(g_s), s	1.5	5.7	14.0	4.0	0.0	14.2	4.0	17.4	17.4	3.0	11.8	11.9
Cycle Q Clear(g_c), s	1.5	5.7	14.0	4.0	0.0	14.2	4.0	17.4	17.4	3.0	11.8	11.9
Prop In Lane	1.00		1.00	1.00		0.34	1.00		0.49	1.00		0.14
Lane Grp Cap(c), veh/h	220	398	433	297	0	411	326	598	578	265	607	624
V/C Ratio(X)	0.24	0.46	0.92	0.71	0.00	0.90	1.49	0.80	0.80	0.46	0.60	0.60
Avail Cap(c_a), veh/h	282	398	433	297	0	411	326	598	578	265	607	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.6	24.7	25.3	25.6	0.0	26.0	24.7	20.8	20.8	16.2	19.0	19.0
Incr Delay (d2), s/veh	0.5	0.8	25.4	7.5	0.0	21.5	234.5	10.7	11.0	1.3	4.3	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.5	8.8	1.9	0.0	7.7	24.7	8.3	8.1	1.2	5.2	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	25.5	50.7	33.1	0.0	47.5	259.3	31.5	31.9	17.4	23.3	23.2
LnGrp LOS	C	C	D	C	A	D	F	C	C	B	C	C
Approach Vol, veh/h		635			578			1423			857	
Approach Delay, s/veh		41.1			42.2			109.1			22.4	
Approach LOS		D			D			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	30.0	7.7	22.3	10.0	30.0	10.0	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	4.0	14.0
Max Q Clear Time (g_c+I1), s	5.0	19.4	3.5	16.2	6.0	13.9	6.0	16.0
Green Ext Time (p_c), s	0.0	2.5	0.0	0.0	0.0	3.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	64.4
HCM 6th LOS	E

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	513	8	0	557	10	1
Future Vol, veh/h	513	8	0	557	10	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	558	9	0	605	11	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	567	0	1168	563
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1005	-	214	526
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1005	-	214	526
Mov Cap-2 Maneuver	-	-	-	-	214	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	226	-	-	1005	-
HCM Lane V/C Ratio	0.053	-	-	-	-
HCM Control Delay (s)	21.8	-	-	0	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	210	587	112	119	55	443	618	297	117	506	8
Future Volume (veh/h)	36	210	587	112	119	55	443	618	297	117	506	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	41	241	675	129	137	63	509	710	341	134	582	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	352	398	433	291	290	133	377	783	376	232	1224	19
Arrive On Green	0.04	0.20	0.20	0.08	0.24	0.24	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1212	558	1747	2284	1096	1818	3570	55
Grp Volume(v), veh/h	41	241	675	129	0	200	509	542	509	134	289	302
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1770	1747	1743	1637	1818	1771	1854
Q Serve(g_s), s	1.2	7.7	14.0	4.1	0.0	6.8	4.0	20.7	20.8	3.3	9.0	9.0
Cycle Q Clear(g_c), s	1.2	7.7	14.0	4.1	0.0	6.8	4.0	20.7	20.8	3.3	9.0	9.0
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.67	1.00		0.03
Lane Grp Cap(c), veh/h	352	398	433	291	0	424	377	598	561	232	607	636
V/C Ratio(X)	0.12	0.61	1.56	0.44	0.00	0.47	1.35	0.91	0.91	0.58	0.48	0.48
Avail Cap(c_a), veh/h	426	398	433	291	0	424	377	598	561	232	607	636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	25.5	26.0	20.1	0.0	22.8	24.6	21.9	21.9	17.4	18.1	18.1
Incr Delay (d2), s/veh	0.1	2.6	262.3	1.1	0.0	0.8	174.7	19.8	20.9	3.5	2.7	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.6	37.9	1.5	0.0	2.6	22.6	11.1	10.6	1.5	3.9	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	28.1	288.3	21.1	0.0	23.7	199.3	41.8	42.8	20.9	20.7	20.6
LnGrp LOS	C	C	F	C	A	C	F	D	D	C	C	C
Approach Vol, veh/h		957			329			1560			725	
Approach Delay, s/veh		211.3			22.7			93.5			20.7	
Approach LOS		F			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	30.0	7.2	22.8	10.0	30.0	10.0	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	4.5	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	5.5	14.0
Max Q Clear Time (g_c+I1), s	5.3	22.8	3.2	8.8	6.0	11.0	6.1	16.0
Green Ext Time (p_c), s	0.0	0.8	0.0	0.4	0.0	3.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	103.8
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	193	407	354	274	172	493	762	254	130	710	52
Future Volume (veh/h)	53	193	407	354	274	172	493	762	254	130	710	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	54	197	415	361	280	176	503	778	259	133	724	53
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	189	398	433	289	249	157	313	881	293	239	1147	84
Arrive On Green	0.05	0.20	0.20	0.06	0.23	0.23	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1074	675	1747	2569	855	1818	3346	245
Grp Volume(v), veh/h	54	197	415	361	0	456	503	528	509	133	383	394
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1749	1747	1743	1681	1818	1771	1820
Q Serve(g_s), s	1.6	6.2	14.0	4.0	0.0	16.2	4.0	20.0	20.0	3.3	12.7	12.7
Cycle Q Clear(g_c), s	1.6	6.2	14.0	4.0	0.0	16.2	4.0	20.0	20.0	3.3	12.7	12.7
Prop In Lane	1.00		1.00	1.00		0.39	1.00		0.51	1.00		0.13
Lane Grp Cap(c), veh/h	189	398	433	289	0	406	313	598	576	239	607	624
V/C Ratio(X)	0.29	0.50	0.96	1.25	0.00	1.12	1.61	0.88	0.88	0.56	0.63	0.63
Avail Cap(c_a), veh/h	249	398	433	289	0	406	313	598	576	239	607	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	24.9	25.6	28.4	0.0	26.9	24.7	21.7	21.7	17.2	19.3	19.3
Incr Delay (d2), s/veh	0.8	1.0	32.5	137.1	0.0	82.6	288.5	17.2	17.7	2.9	4.9	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.7	9.9	13.7	0.0	15.3	28.3	10.3	10.0	1.4	5.7	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	25.8	58.1	165.5	0.0	109.5	313.2	38.8	39.4	20.1	24.2	24.1
LnGrp LOS	C	C	E	F	A	F	F	D	D	C	C	C
Approach Vol, veh/h		666			817			1540			910	
Approach Delay, s/veh		45.7			134.2			128.6			23.6	
Approach LOS		D			F			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	30.0	7.8	22.2	10.0	30.0	10.0	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	4.0	14.0
Max Q Clear Time (g_c+I1), s	5.3	22.0	3.6	18.2	6.0	14.7	6.0	16.0
Green Ext Time (p_c), s	0.0	1.3	0.0	0.0	0.0	3.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	91.4
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	216	587	119	119	58	443	618	314	123	506	8
Future Volume (veh/h)	36	216	587	119	119	58	443	618	314	123	506	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	41	248	675	137	137	67	509	710	361	141	582	9
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	349	398	433	289	284	139	377	767	390	227	1224	19
Arrive On Green	0.04	0.20	0.20	0.08	0.24	0.24	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1186	580	1747	2237	1136	1818	3570	55
Grp Volume(v), veh/h	41	248	675	137	0	204	509	553	518	141	289	302
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1766	1747	1743	1630	1818	1771	1854
Q Serve(g_s), s	1.2	8.0	14.0	4.3	0.0	7.0	4.0	21.4	21.4	3.5	9.0	9.0
Cycle Q Clear(g_c), s	1.2	8.0	14.0	4.3	0.0	7.0	4.0	21.4	21.4	3.5	9.0	9.0
Prop In Lane	1.00		1.00	1.00		0.33	1.00		0.70	1.00		0.03
Lane Grp Cap(c), veh/h	349	398	433	289	0	423	377	598	559	227	607	636
V/C Ratio(X)	0.12	0.62	1.56	0.47	0.00	0.48	1.35	0.93	0.93	0.62	0.48	0.48
Avail Cap(c_a), veh/h	422	398	433	289	0	423	377	598	559	227	607	636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	25.6	26.0	20.2	0.0	22.9	24.6	22.1	22.2	17.6	18.1	18.1
Incr Delay (d2), s/veh	0.1	3.0	262.3	1.2	0.0	0.9	174.7	22.4	23.7	5.2	2.7	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.7	37.9	1.6	0.0	2.7	22.6	11.7	11.2	1.7	3.9	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	28.6	288.3	21.4	0.0	23.8	199.3	44.6	45.8	22.8	20.7	20.6
LnGrp LOS	C	C	F	C	A	C	F	D	D	C	C	C
Approach Vol, veh/h		964			341			1580			732	
Approach Delay, s/veh		210.1			22.8			94.8			21.1	
Approach LOS		F			C			F			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	30.0	7.2	22.8	10.0	30.0	10.0	20.0				
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	4.5	6.0				
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	5.5	14.0				
Max Q Clear Time (g_c+I1), s	5.5	23.4	3.2	9.0	6.0	11.0	6.3	16.0				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.4	0.0	3.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			103.8									
HCM 6th LOS			F									

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	462	30	7	281	11	0
Future Vol, veh/h	462	30	7	281	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	502	33	8	305	12	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	535	0	840	519
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	321	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1033	-	335	557
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1033	-	332	557
Mov Cap-2 Maneuver	-	-	-	-	332	-
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	735	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	332	-	-	1033	-
HCM Lane V/C Ratio	0.036	-	-	0.007	-
HCM Control Delay (s)	16.2	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	191	407	371	280	179	493	762	258	132	710	52
Future Volume (veh/h)	53	191	407	371	280	179	493	762	258	132	710	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	54	195	415	379	286	183	503	778	263	135	724	53
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	189	398	433	290	247	158	313	877	296	237	1147	84
Arrive On Green	0.05	0.20	0.20	0.06	0.23	0.23	0.06	0.34	0.34	0.06	0.34	0.34
Sat Flow, veh/h	1865	1988	1685	1725	1066	682	1747	2558	864	1818	3346	245
Grp Volume(v), veh/h	54	195	415	379	0	469	503	530	511	135	383	394
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1748	1747	1743	1679	1818	1771	1820
Q Serve(g_s), s	1.6	6.1	14.0	4.0	0.0	16.2	4.0	20.1	20.1	3.4	12.7	12.7
Cycle Q Clear(g_c), s	1.6	6.1	14.0	4.0	0.0	16.2	4.0	20.1	20.1	3.4	12.7	12.7
Prop In Lane	1.00		1.00	1.00		0.39	1.00		0.51	1.00		0.13
Lane Grp Cap(c), veh/h	189	398	433	290	0	406	313	598	576	237	607	624
V/C Ratio(X)	0.29	0.49	0.96	1.31	0.00	1.16	1.61	0.89	0.89	0.57	0.63	0.63
Avail Cap(c_a), veh/h	249	398	433	290	0	406	313	598	576	237	607	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	24.8	25.6	28.4	0.0	26.9	24.7	21.7	21.7	17.3	19.3	19.3
Incr Delay (d2), s/veh	0.8	0.9	32.5	160.5	0.0	94.6	288.5	17.6	18.1	3.2	4.9	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.7	9.9	15.6	0.0	16.7	28.3	10.4	10.2	1.5	5.7	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	25.8	58.1	188.8	0.0	121.5	313.2	39.3	39.9	20.5	24.2	24.1
LnGrp LOS	C	C	E	F	A	F	F	D	D	C	C	C
Approach Vol, veh/h		664			848			1544			912	
Approach Delay, s/veh		45.8			151.6			128.7			23.6	
Approach LOS		D			F			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	30.0	7.8	22.2	10.0	30.0	10.0	20.0
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	4.0	24.0	5.5	14.0	4.0	24.0	4.0	14.0
Max Q Clear Time (g_c+I1), s	5.4	22.1	3.6	18.2	6.0	14.7	6.0	16.0
Green Ext Time (p_c), s	0.0	1.2	0.0	0.0	0.0	3.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	95.6
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	576	8	0	604	31	8
Future Vol, veh/h	576	8	0	604	31	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	626	9	0	657	34	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	635	0	1288	631
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	657	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	948	-	181	481
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	948	-	181	481
Mov Cap-2 Maneuver	-	-	-	-	181	-
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	516	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	26.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	208	-	-	948	-
HCM Lane V/C Ratio	0.204	-	-	-	-
HCM Control Delay (s)	26.7	-	-	0	-
HCM Lane LOS	D	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	193	407	371	280	179	493	762	258	132	710	52
Future Volume (veh/h)	53	193	407	371	280	179	493	762	258	132	710	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1958	1988	1988	1811	1870	1870	1835	1835	1835	1909	1864	1864
Adj Flow Rate, veh/h	54	197	415	379	286	183	503	778	263	135	724	53
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	4	2	2	6	2	2	4	4	4	2	5	5
Cap, veh/h	189	398	457	314	263	168	313	840	284	226	1052	77
Arrive On Green	0.05	0.20	0.20	0.07	0.25	0.25	0.07	0.33	0.33	0.06	0.31	0.31
Sat Flow, veh/h	1865	1988	1685	1725	1066	682	1747	2558	864	1818	3346	245
Grp Volume(v), veh/h	54	197	415	379	0	469	503	530	511	135	383	394
Grp Sat Flow(s),veh/h/ln	1865	1988	1685	1725	0	1748	1747	1743	1679	1818	1771	1820
Q Serve(g_s), s	1.6	6.2	14.0	5.0	0.0	17.2	5.0	20.5	20.6	3.5	13.2	13.3
Cycle Q Clear(g_c), s	1.6	6.2	14.0	5.0	0.0	17.2	5.0	20.5	20.6	3.5	13.2	13.3
Prop In Lane	1.00		1.00	1.00		0.39	1.00		0.51	1.00		0.13
Lane Grp Cap(c), veh/h	189	398	457	314	0	431	313	573	552	226	557	572
V/C Ratio(X)	0.29	0.50	0.91	1.21	0.00	1.09	1.61	0.93	0.93	0.60	0.69	0.69
Avail Cap(c_a), veh/h	276	398	457	314	0	431	313	573	552	226	557	572
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	24.9	24.7	27.4	0.0	26.4	24.0	22.7	22.7	18.2	21.0	21.0
Incr Delay (d2), s/veh	0.8	1.0	21.7	119.5	0.0	69.5	288.2	23.1	23.8	4.2	6.8	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.7	8.6	13.0	0.0	14.6	27.8	11.4	11.1	1.6	6.1	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	25.8	46.4	146.9	0.0	95.9	312.3	45.8	46.5	22.5	27.8	27.7
LnGrp LOS	C	C	D	F	A	F	F	D	D	C	C	C
Approach Vol, veh/h		666			848			1544			912	
Approach Delay, s/veh		38.4			118.7			132.8			26.9	
Approach LOS		D			F			F			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	29.0	7.8	23.2	11.0	28.0	11.0	20.0				
Change Period (Y+Rc), s	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	4.0	23.0	6.5	14.0	5.0	22.0	5.0	14.0				
Max Q Clear Time (g_c+I1), s	5.5	22.6	3.6	19.2	7.0	15.3	7.0	16.0				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	2.7	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			89.6									
HCM 6th LOS			F									

Section 7

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May 21, 2021

Mr. Michael Marangi
Dom-Kam, LLC
366 Highland Avenue Ext.
Middletown, NY 10940

Re: Proposed Dom-Mar Transfer Facility – Principal or Primary Aquifer
1128 Dolsontown Road, Town of Wawayanda, NY
Chazen Project No. 32034.00

Dear Michael,

This letter is prepared in response to discussion of whether the proposed Dom-Kam Transfer Facility site is situated over or near a location meeting qualifications of a Principal or Primary Aquifer as typically defined by the State of New York.

I am a professional geologist and hydrogeologist with landfill siting experience, water resource planning experience, and a long history identifying suitable sites for high-capacity private or municipal wells. I am a professional geologist in the State of New York, PG No. 412 and nationally-acknowledged Certified Professional Geologist No. 112286.

Technical and Operational Guidance Series document 2.1.3
Primary and Principal Aquifer Determinations

An aquifer is defined as a geologic formation offering economically-productive volumes of groundwater. Bedrock aquifers and overburden aquifers (typically sand and gravel) exist everywhere that existing wells are currently satisfying economically-critical water supply functions, whether low-capacity aquifers providing just 5 critical gallons per minute for homeowners or higher-capacity aquifers with public water system wells supporting flows over 100 gallons per minute.

Certain geologic formations have been recognized as Principal and Primary aquifers by the State of New York. The NYS Division of Water Technical and Operational Guidance Series (TOGS) guidance document relied upon to inform these designations is TOGS 2.1.3. The distinction between Primary and Principal aquifers is immaterial to this discussion since the Town of Wawayanda references them interchangeably relative to the matter at hand. Briefly, Primary aquifers are in active use, while Principal aquifers are reserve resources potentially supporting future water supply capacity.

By NYSDEC definition, the Principal and Primary aquifer designation is restricted to unconsolidated aquifers (e.g. sand and gravel). There are many highly-productive bedrock aquifers in New York State but TOGS 2.1.3 does not address them and they are not recognized as Principal or Primary aquifers. TOGS 2.1.3 lists three primary criteria for considering Principal or Primary aquifer designations:

1. Area: the area of the aquifer should cover five to ten square miles at a minimum.

2. Saturated Thickness: The saturated sediments of highly permeable material should be at least 20 feet thick and include some areas in excess of 50 feet of saturated thickness.

3. Obtainable Well Yields: Wells yielding 50 gallons per minute or more should be found distributed over two or more square miles of the Area defined above.

Principal Aquifers and the Proposed Dom-Kam Transfer Facility Site

The Town of Wawayanda local law section 152-17.B.(1) states that solid waste management facilities shall not be placed on primary or principal aquifers. The applicant prepared a SEQRA Full Environmental Assessment Form for submission to the Planning Board using the EAF Mapper Application to generate partially filled-in answers. The EAF Mapper Application suggests that the site is located over, or immediately adjoining, a principal aquifer.

A NYSDEC website page addressing principal aquifers directs views to review a 1:250,000 scale USGS map entitled "Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York - Lower Hudson Sheet." On this map there appears a small oblong area near the project site labeled "G". The legend defines "G" areas as having sand and gravel of unknown thickness or saturation. Attached please find a figure showing the project site. On this we have shown the approximate location of the oblong area labeled "G" with blue cross hatching. I am in agreement with comments already submitted by the project team suggesting that New York State regulators did not intend areas labeled "G" without color-defined yield estimates to be considered Principal aquifers, so the default EAF Mapper Application appears incorrect to me. The same map does show aquifer areas, colored in green and blue, with presumably verified yields, but none is near the project site.

From a hydrogeologic perspective I have also reviewed available geologic and spatial elements and believe the oval "G" area near the proposed Dom-Kam transfer facility fails the Principal aquifer TOGS 2.1.3 criteria, as follows:

1. Area: The area of the oval near the site is 73.2 acres (0.11 sq-mile). This is far below five to ten square miles.

2. Saturated Thickness:

    a. I examined the NYS well log database which identifies 10 wells within 2 miles of the site. Eight of the ten records include data describing both depths to bedrock, ranging from 43 to 120 feet, and the depth at which the driller encountered groundwater, all between 20 to 70 feet below grade and one with water reported at 2 feet. For these eight wells with both bedrock and water depth data, two wells have groundwater essentially at the bedrock surface (meaning saturated sediment thickness is zero); three have between 20 and 30 feet of saturated sediment, and; three wells have saturated thicknesses between 41 and 43 feet.

    b. At the site itself, geotechnical borings were advanced variably between 24 and 67 feet; none encountered bedrock, sediments appear predominantly to be Sand with frequent references to silt and some reference to gravel and boulders, and some are reported to be wet although without clarifying whether the wetness was saturated.

    c. Another resource I reviewed is the Orange County Water Authority aquifer map. Its mapping units have been added to the attached figure in green and red . South and east of the

NYSDEC "G" oval, the County's map suggests sand and gravel extending below the watertable along the Monhagen Brook (e.g. offering saturated thickness), extending under and thinning out at the southwest margin of the site. Sand and gravel above the water table (unsaturated) is shown west of the site. No sand and gravel, either above or below the water table, is reported in the NYSDEC "G" oval. The intermittent nature of saturated sediments suggested by the OCWa map this vicinity is consistent with our evaluation of saturated thicknesses from well log data.

From these various observations, saturated sediment thickness within 2 miles of the site appears to vary between 0 and approximately 20 feet of thickness and no areas exhibit 50 or more feet of saturated thickness.

3. Well Yields: The ten wells within two miles of the site noted in the NYS well log database are all bedrock wells. None provide direct perspective on potential sand and gravel well yields since all were advanced through the overburden into the underlying bedrock. The wells, however, were all advanced to variable final depths of 240 to 500 feet below grade, which is a costly exercise. So while not conclusively diagnostic, an absence of wells finished in sand and gravel suggests that sediments drilled through over the bedrock deemed insufficiently productive for drillers and property owners to choose to install overburden wells rather than bedrock wells.

Collectively, this review of the three TOGS 2.1.3 defining criteria for Principal or Primary aquifers suggest the "G" oval area identified on the map does not qualify as a Principal or Primary Aquifer. The "G" oval is not large enough, does not offer any confirmed saturated thickness, on the basis of likely inadequate saturated thickness and any evidence of a multitude of nearby 50 gpm gravel wells the "G" area also fails the yield criteria.

I suspect the oval area was drawn on the Unconsolidated Aquifers map because many primary and principal aquifers in eastern New York State coincide with Hoosick soils. There is a small area on the site and extending east of the site with this soil type (Figure 1). Hoosick soils are recognized by the Natural Resource Conservation Service (NRCS) as being derived from glacial outwash sediments and therefore frequently offering well-washed and high permeability geologic media which can be an excellent aquifer if the sediments extend below the water table. Hydrogeologists often seek out Hoosick soils as potential locations for groundwater supply exploration. But Hoosick soils should only be recognized as Principal or Primary aquifers if also satisfying the TOGS 2.1.3 criteria, which in this case it does not. The oval shapes of the Hoosick mapping unit and the suggested "G" mapping unit are very similar, suggesting the map analyst simply circled the Hoosick mapping unit to call attention to a feature perhaps worthy of future exploration. The analyst correctly recognized they had no substantiating data so only gave it a "G" designation, acknowledging its unknown thickness or degree of saturation. The review completed here, again, indicates the zone fails the Principal aquifer criteria.

____

Thank you for consideration of this matter. Stated plainly, I see no hydrogeologic evidence on the basis of well logs, soil maps, lateral size, existing aquifer maps, or site geotechnical logs to suggest the presence of a productive overburden aquifer warranting Principal aquifer status either under the site, or east of the site in the direction identified by the "G" mapped oval on the Potential Yields of Wells in Unconsolidated Aquifers in Upstate New York - Lower Hudson Sheet map.

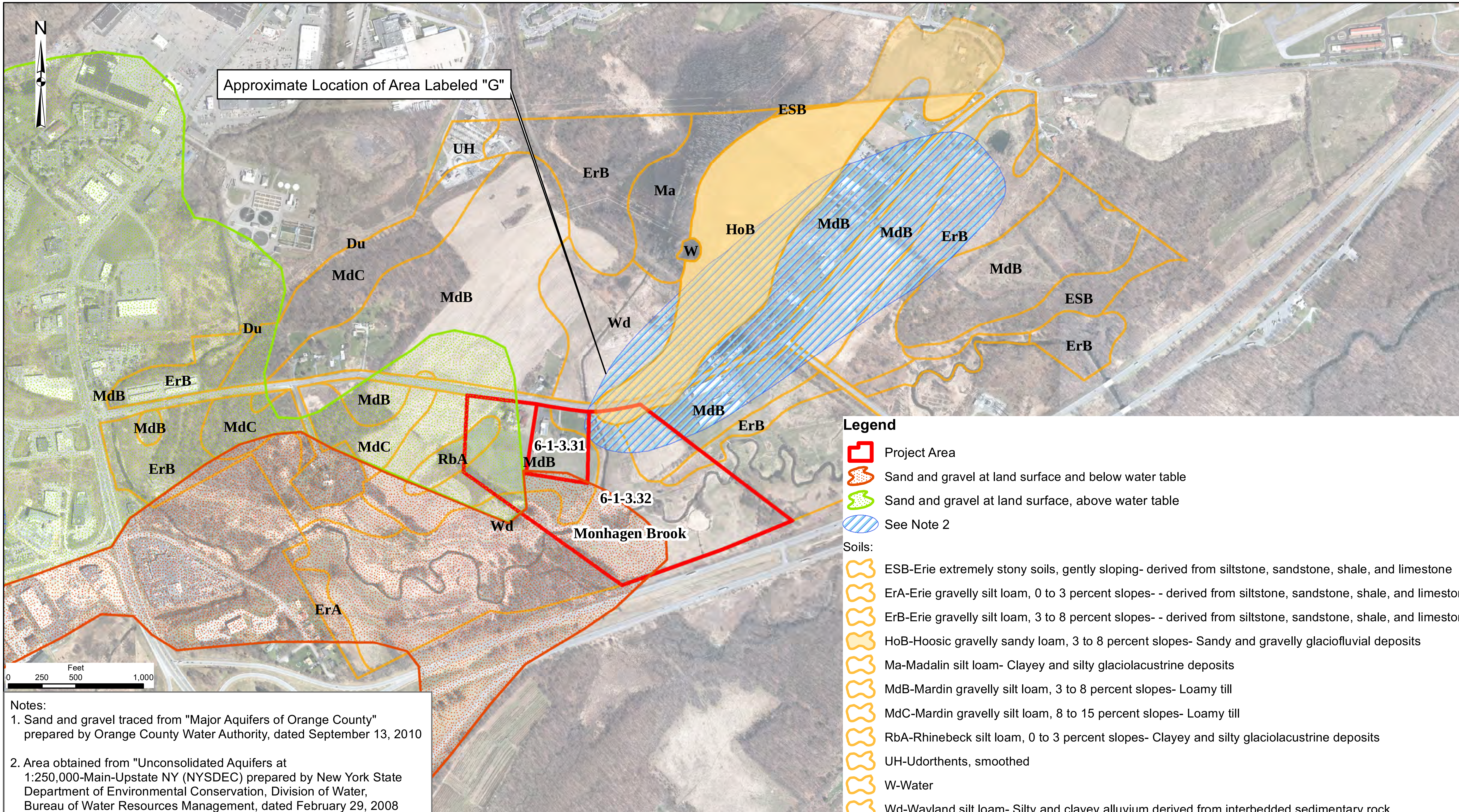
I would be happy to discuss this further as necessary. Please feel free to contact me at 914 456-1095 (cell) or rum@chazencompanies.com.

Sincerely,

Russell Urban-Mead, PG
Senior Hydrogeologist / VP Environmental Services

Attachment: Figure 1

cc: File



Legend

- Project Area
- Sand and gravel at land surface and below water table
- Sand and gravel at land surface, above water table
- See Note 2

Soils:

- ESB-Erie extremely stony soils, gently sloping- derived from siltstone, sandstone, shale, and limestone
- ErA-Erie gravelly silt loam, 0 to 3 percent slopes- - derived from siltstone, sandstone, shale, and limestone
- ErB-Erie gravelly silt loam, 3 to 8 percent slopes- - derived from siltstone, sandstone, shale, and limestone
- HoB-Hoosic gravelly sandy loam, 3 to 8 percent slopes- Sandy and gravelly glaciofluvial deposits
- Ma-Madalin silt loam- Clayey and silty glaciolacustrine deposits
- MdB-Mardin gravelly silt loam, 3 to 8 percent slopes- Loamy till
- MdC-Mardin gravelly silt loam, 8 to 15 percent slopes- Loamy till
- RbA-Rhinebeck silt loam, 0 to 3 percent slopes- Clayey and silty glaciolacustrine deposits
- UH-Udorthents, smoothed
- W-Water
- Wd-Wayland silt loam- Silty and clayey alluvium derived from interbedded sedimentary rock

Notes:

1. Sand and gravel traced from "Major Aquifers of Orange County" prepared by Orange County Water Authority, dated September 13, 2010
2. Area obtained from "Unconsolidated Aquifers at 1:250,000-Main-Upstate NY (NYSDEC) prepared by New York State Department of Environmental Conservation, Division of Water, Bureau of Water Resources Management, dated February 29, 2008

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DOM-MAR TRANSFER AND RECYCLING FACILITY

AQUIFER AND SOILS MAP

TOWN OF WAYWAYANDA, ORANGE COUNTY, NEW YORK

Drawn:	HEB
Date:	05/20/21
Scale:	1:8,000
Project:	32034.00
Figure:	FIG 1

Section 8

Geotechnical Subsurface Investigation Report for

Dom-Mar Transfer and Recycling Facility

DOM KAM LLC
366 Highland Ave. Ext.
Middletown, New York 10940

October 2021

Prepared by

EnSol

Geotechnical Subsurface Investigation Report

Dom-Mar Transfer and Recycling Facility

DOM KAM LLC
366 Highland Avenue Ext.
Middletown, New York 10940

October 2021

Prepared by

ENGINEERING +
ENVIRONMENTAL
661 Main Street
Niagara Falls, New York 14301

Table of Contents

1. Introduction

This Geotechnical Subsurface Investigation Report has been prepared for the proposed Dom-Mar Transfer and Recycling Facility located at 1128 Dolsontown Road in the Town of Wawayanda, New York. DOM KAM LLC (DM) retained EnSol, Inc. (EnSol) to perform a subsurface investigation for an approximately 18.39-acre area located on a portion of parcel 6-1-3.32 and parcel 6-1-3.31.

The field portion of the subsurface investigation, including exploratory borings was completed by Soil Testing, Inc. (ST) of Oxford, CT on April 9, 12 and 13, 2021. Borehole logs prepared by ST were provided to EnSol for the purpose of preparing this report. The borehole locations are shown on the Site Plan included in Attachment 1; copies of the borehole logs are included in Attachment 2.

This report summarizes our understanding of the proposed project as it relates to geotechnical matters and the associated construction activities. The report describes the investigation procedures, presents the findings, and discusses the associated evaluations, including foundation design and construction recommendations. The recommendations provided have been developed in accordance with generally accepted geotechnical engineering practice. No guarantees or warranties of any kind are expressed or implied.

2. Project Description

DOM KAM LLC (DM) of Middletown, New York is proposing to construct a solid waste transfer and recycling facility (Dom-Mar Transfer and Recycling Facility or Facility) in the Town of Wawayanda, Orange County, New York. The Transfer and Recycling Facility will process and transfer municipal solid waste (MSW), Construction and Demolition debris (C&D), and Industrial Waste (IW) for disposal, and package and transfer source separated Old Corrugated Containers (OCC) for further processing. Hardfill, brush, unadulterated wood, and metal from the C&D will be separated through simple floor sorting and transferred for further processing. The Transfer and Recycling Facility is Phase 1 of the planned site development. The planned full development of the site includes the construction of a Truck Maintenance and Storage Facility at least five years after construction of the Transfer and Recycling Facility. Stormwater runoff from developed areas will be conveyed to a bioretention basin, and two Wet Ponds. Stormwater north of the Transfer Station Building shall be collected by catch basins and directed to Wet Pond 2 by a storm sewer. Wet Pond 2 will discharge to the unnamed tributary which flows south to Monhagen Brook. Stormwater runoff south and west of the Transfer Station Building will be collected by stormwater channels and directed to a bioretention basin and Wet Pond 1. A Site Plan of the proposed development is included in Attachment 1.

3. Subsurface Investigation Procedure

Eight exploratory borings; designated on the logs as B-1 through B-8 were completed on April 9, 12, and 13, 2021 by ST. The boreholes were located across the proposed project area, including one borehole located in each of the wet ponds, the bioretention basin, the storm sewer, the Transfer and Recycling Facility deep loading bay, the area north of the Facility, the parking lot, and the entrance road. The information provided by the borehole logs has been utilized to evaluate the geotechnical parameters of the subsurface materials at the site. The horizontal location at each borehole was staked out on the project site by Lanc and Tulley Engineering and Surveying, PC of Goshen, NY. The location of the boreholes is shown on the Site Plan included in Attachment 1.

The test borings were completed in general accordance with accepted geotechnical investigative procedures outlined in ASTM D1586, the Standard Test Method for Standard Penetration Test (STP) and Split Barrel Sampling of Soils. The test borings performed during this investigation were drilled, utilizing 4¼-inch inner diameter hollow-stem augers. Soil samples were recovered by driving a standard 2-inch diameter split spoon sampler (1 3/8" inner diameter) into the soil with a 140-pound weight falling freely over 30 inches. The sampler was driven in four successive six-inch increments, and the number of blows per increment were recorded. The sum of the number of blows required to advance the sampler the second and third six-inch increments is termed the Standard Penetration Resistance (N-value) and is presented on the final borehole logs. The split spoon sampler recovered 1 3/8-inch diameter samples.

The drilling crew consisted of the driller, and a foreman responsible for classifying the soil samples in the field. The field logs and jar samples were reviewed by a senior engineering geologist, who supervised and approved the preparation of the final logs. Final borehole logs are included in Attachment 2.

Borehole B-5 was advanced to refusal at a depth of 67 feet below ground surface (bgs), the other boreholes were advanced to a depth of approximately 24 feet bgs. During drilling operations, the augers were advanced such that soil samples were collected continuously throughout the upper 16-feet of each borehole, and then at a five-foot interval to the bottom of the boreholes. The soil samples were sealed in jars for confirmatory classification and subsequent laboratory testing.

Soil and groundwater conditions encountered in the test borings are presented in the logs. The boring logs also present detailed descriptions and classifications for the soils, information related to sampling equipment, sample data, SPT results and any water or moisture conditions observed in the borehole on completion. Unified Soil Classification System (USCS) classifications are included in the logs (ASTM D 2487 and D 2488) and help form the basis for some of the statements made in this report.

Experience indicates that the actual subsoil conditions at a site could vary from those generalized based on test borings made at specific locations. Therefore, it is recommended that a qualified individual be retained to provide soil engineering services during the site preparation, excavation, and other construction phases of the proposed project. This is to observe compliance with the design and construction recommendations and to allow design changes in the event subsurface conditions differ from those now anticipated.

4. General Site and Subsurface Conditions

4.1 Site Conditions

The site has historically been used for agricultural purposes, Parcel 6-1-3.32 contains multiple vacant farm buildings and a silo, the property is classified as a dairy farm. Parcel 6-1-3.31 contains a residential house, and a commercial storage building, the property is classified as a one-use small building. The ground surface generally slopes down from Dolsontown Road to the south on Parcel 6-1-3.32 to Monhagen Brook which flows west to east across the property. On Parcel 6-1-3.31 the ground surface generally slopes to the west to an unnamed tributary to Monhagen Brook which flows north to south across the property. The topography of the site is steeper in the northern portion with approximately 3 to 8% slopes and flatter in the southern portion with 0 to 3% slopes. The existing ground cover consists of predominately grassed areas with wooded and brush covered areas throughout the remainder of the site.

4.2 Subsurface Soil Conditions

In general, the subsurface soils consist of a surficial approximately four-to-six-inch layer of topsoil underlain by brown and grey fine, medium, and coarse sand with varying amounts of silt, fine and coarse gravel, cobbles, and trace amounts of clay. The brown and grey sand was predominately classified as SW/SM, and SP/SM per the USCS, which consists of well graded sand, fine to coarse sand/silty sand and poorly graded sand/silty sand. Borehole B-3 included dark brown to light brown silt beginning two feet bgs to a depth of four feet underlain by the brown and grey fine, medium, and coarse sand, and fine and coarse gravel, with little silt. Borehole B-5 included brown silt and fine and coarse gravel with some sand beginning at a depth of one-foot bgs to a depth of two feet bgs, underlain by brown fine, medium, and coarse sand, and fine and coarse gravel, with little cobbles and silt. The silty sand and gravel extended to a depth of 45 feet bgs in Borehole B-5 and is underlain by light gray silt, some very fine, fine, medium, and coarse sand, fine and coarse gravel, cobbles, and trace boulders. This layer is classified as ML per the USCS, which consists of silt. The light brown silt extends to a depth of 55 feet bgs in Borehole B-5 and is underlain by grey and brown very fine to coarse sand, some silt, gravel, and cobbles until auger refusal at a depth 67 feet. The grey brown very fine to coarse sand layer was classified as poorly graded sand/silty sand to well graded sand, fine to coarse sand/silty sand.

Based on the SPT N values the upper one to two feet of the silty sand was loose. The silty sand and gravel mixture then ranged from firm to very compact to the end of the borehole. The light grey silt layer in Borehole B-5 was classified as compact to very compact.

4.2.1 Laboratory Testing

Representative samples of the silty sand from Boreholes B-4, B-5, B-6 and B-8 were tested by ST for grain size (ASTM D-112), and Atterberg limits (ASTM D-4318). The selected samples are taken below the proposed Bioretention Basin (Borehole B-4), the expected footer elevation of the Transfer and Recycling Facility building (Borehole B-5), the proposed base of Wet Pond 1 (Borehole B-6), and the proposed base of Wet Pond 2. The sample results are shown in Table 1 below:

Table 1 Atterberg Limits and Grain Size Results

Borehole	Sample No.	Depth (ft)	Atterberg Limits			Gravel (%)		Sand (%)			Silt and Clay (%)	Moisture Content (%)
			LL	PL	PI	Coarse	Fine	Coarse	Medium	Fine		
B-4	S3, S4, S5	4-10	26	19	7	0.0	7.1	4.1	6.6	33.9	48.3	24.3
B-5	S2, S3, S4	2-8				5.8	27.7	19.3	25.1	9.5	12.6	
B-5	S5, S6	8-12	20	16	4	32.4	18.1	7.0	17.7	12.8	12.0	18.9
B-6	S3, S4, S6, S7	4-8 10-14				9.7	26.5	16.0	25.3	10.7	11.8	
B-8	S2, S3, S4	2-8				20.9	26.8	15.6	13.9	7.5	15.3	

The test laboratory reports are included in Attachment 2. Based on the laboratory test results the soil below the Bioretention Basin in Borehole B-4 was classified as brown and grey silty, clayey sand. The soil near the expected footer elevation of the Transfer and Recycling Facility building in Borehole B-5 was classified as brown and grey silty sand with gravel at a depth of two to eight feet, and brown and grey poorly graded gravel with silty clay and sand at a depth of eight to 12 feet. The soil at the proposed base of Wet Pond 1 in Borehole B-6 was classified as brown poorly graded sand with silt and gravel. The soil at the proposed base of Wet Pond 2 in Borehole B-8 was classified as grey-brown silty gravel with sand.

4.2.2 Expansive Soils

For the purposes of this report, expansive soils are those that experience volume changes with variations in moisture content from a wet to a dry state, such as swelling with increasing moisture content and shrinkage with decreasing moisture content. The magnitude of the volume change in any given soil is primarily related to the type and amount of clay sized particles in the matrix. Holtz and Gibbs (1956) developed a system to classify soils as having either a low, medium, high, or very high expansion potential given the clay content and plasticity index of the soil, as follows:

Expansion Potential	**Very Low**	**Low**	**Medium**	**High**	**Very High**
Expansion Index	0-20	21-50	51-90	91-130	130 +
Clay Content	0 – 10%	10 – 15%	15 – 25%	25 – 30%	35 – 100%
Plastic Index	0 - 10	10 - 15	15 - 25	25 - 35	35 +

Based on the laboratory testing of the silty sand and gravel mixture, the soil exhibits a very low expansion potential.

According to Section 1803.5.3 Expansive Soil of the New York State Building Code soils meeting all four of the following provisions shall be considered to be expansive, except that tests to show compliance with Items 1, 2, and 3 shall not be required if the test in Item 4 is conducted:

1. Plasticity Index of 15 or greater, determined in accordance with ASTM D4318
2. More than 10 percent of the soil particles pass a No. 200 sieve, determined in accordance with ASTM D422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D422.
4. Expansion index greater than 20, determined in accordance with ASTM D4829.

Based on the New York State Building Code criteria the silty sand and gravel mixture is not considered to be expansive.

4.2.3 Compressibility

The compressibility of the shallow soils is also an important consideration in the design and construction of foundations. Compressibility is defined as a decrease in volume that occurs in a soil mass when it is subject to an increase in loading. Some examples of more compressible soils include loose sands, organic clays, sensitive clays, highly plastic or soft clays and uncompacted fills.

The silty sand and gravel mixtures are classified as firm to very compact, with low plasticity and has a low potential for compressibility.

4.3 Groundwater

Free-standing water was recorded at time 0 at a depth of four to six feet bgs in Boreholes B-1, B-2, B-3, B-4 and B-5. The ground water was noted to rise to a depth of two feet bgs in Borehole B-3 after four hours. Groundwater was deeper in Boreholes B-6 and B-7 at eight and 13 feet bgs respectively at 0 hours. Boreholes B-6 and B-7 are located in relatively higher elevations on the site. Groundwater at Borehole B-1 was shallower at 2.5 feet bgs at Borehole B-8, which is located in the lowest elevation of the project area. The excavation and construction of the Transfer and Recycling Facility building will involve excavation in both unsaturated and saturated sand & silt and sand & gravel mixtures. Wet Pond 1 and Wet Pond 2 will also be located below the water table and will have normal pool elevations lower than the existing water table based on the subsurface investigation results.

5. Geotechnical Considerations and Design Parameters

5.1 Seismic Site Classification

The intensity of ground shaking during an earthquake and the amount of force transferred to any structure is related in a general way to the local soil conditions. Section 1613.2 of the Building Code of New York State requires that building sites be categorized into one of the seismic site classes in accordance with Chapter 20 of ASCE 7. The seismic site class is based on the average soil properties to a depth of 100 feet. The average N value was determined for Borehole B-5 using the procedures Chapter 20 of ASCE 7. The average N value was calculated as 53.5, therefore the site is classified as Seismic Site Class C, very dense soil and soft rock per Table 20.3-1 Site Classification included in Chapter 20 of ASCE 7.

According to Figure 1613.2.1(1) of the Building Code of New York State, the mapped short period (0.2 sec.) spectral response acceleration (SS) for the Town of Wawayanda is approximately 0.225g. The adjusted short period response (SMS) acceleration for Site Class C is 0.29g, and the corresponding five-percent damped design spectral response acceleration (SDS) is 0.19g. According to Figure 1613.2.1(2) of the Building Code of New York State, the mapped 1-second spectral response acceleration (S1) for the Town of Wawayanda is approximately 0.06g. The adjusted 1-second response (SM1) acceleration for Site Class C is 0.09g, and the corresponding five-percent damped design spectral response acceleration (SDS) is 0.06g.

Based on Table 1604.5 of the Building Code of New York State, the proposed building is classified as Risk Category II. Based on Table 1613.2.5(1) of the Building Code of New York State, the Seismic Design Category based on a short period response acceleration for this site is B for buildings classified as Risk Category II. Based on Table 1613.2.5(2) of the Building Code of New York State, the Seismic Design Category based on a 1-second period response acceleration for this site is A for buildings classified as Risk Category II.

5.2 Frost Effects

Frost action is defined as an increase in soil volume that occurs when water is drawn from unfrozen soil to the freezing zone where it attaches to form ice lenses, forcing soil particles apart and causing the soil surface to heave. In general, coarse-grained soils such as clean sands and gravels do not heave, whereas clays, silts and very fine sands and silty sands may support the growth of ice lenses even when present in small proportions in coarse soils. The soils within the frost zone at the site, or about four feet bgs are typically classified as SP/SM poorly graded sand/silty sand which exhibit medium potential for frost heave.

The potential for frost heave adjacent to or under foundations, utilities and other structures can best eliminated in at least three ways. The most common method for building foundations and utilities is to place the base of the foundation below the maximum expected frost depth. Another approach for buildings or other structures is to provide for a floating foundation that can tolerate movement without damage.

Given the potential for frost susceptible soils and the climatic conditions in Wawayanda, New York the practical approach to preventing frost damage for structures at the Transfer and Recycling Facility is to provide a minimum burial depth of 48 inches, and/or adequate drainage of subgrade materials. For instance, frost protection for concrete slabs should include a well-drained, crushed stone base beneath a very stiff and well reinforced concrete slab. Any excavation for the stone base course should extend six inches wider than the planned concrete slab width.

5.3 Bearing Capacity

The ultimate bearing capacity is defined as that bearing stress that will result in shear failure of the soil. The allowable bearing capacity is the ultimate bearing capacity reduced by an appropriate factor of safety (typically = 3). The bearing capacity was computed for the portion of the silty sand and gravel mixture 48 inches below the lowest proposed ground elevation north of the building at a depth of approximately 6.7 feet.

Bearing capacity values were determined using the Meyerhof Allowable Bearing Capacity Equation based on SPT N Values in the area of interest and one inch of foundation settlement. This method assumes a depth of foundation of 48 inches and a footer width of 18 inches. The allowable bearing capacity of 4,000 pounds per square foot (psf) was conservatively computed for a foundation that rests on the silty sand and gravel.

5.4 Settlement

Based on the adherence to the site preparation recommendations and good construction practices included in Section 6 of this report, normal consolidation settlement should not result in total building settlements greater than one-inch or differential settlement in excess of ¾-inch, indicative of all good foundation soils.

5.5 Foundation Design

5.5.1 Building Foundation

Following the satisfactory completion of the site preparation and foundation inspections outlined in Section 6 of this report, the proposed Transfer and Recycling Facility building may be supported on a conventional shallow foundation system consisting of a reinforced concrete strip footing supporting a reinforced concrete foundation wall. The base of the strip footing shall be placed at a minimum depth of 48 inches below finish grade. The continuous wall footings should be 18 to 24-inches in width, and individual column footings should be at least 36-inches wide.

5.5.2 Concrete Floor Slabs

It is recommended that all floor slabs be "floating," that is, fully ground supported and not structurally connected to walls or foundations. This is to reduce the possibility of cracking and displacement of the floor slabs because of differential movements between the slab and the foundation. Such movements could be detrimental to the slabs if they were rigidly connected to the foundations.

Subgrades below the floor slab subbase material are expected to consist of silty sand. For subgrades that have been verified as stable by proof rolling/compaction in accordance with the recommendations provided in Section 6 of this report, a modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci) may be used for floor slab design. It is also recommended that the floor slab be supported on a minimum six-inch layer of relatively clean granular material such as sand and gravel or crushed stone. This is to help distribute concentrated loads and to provide more uniform subgrade support beneath the slab. Also, the upper 12 inches of the existing subgrade materials should be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D 1557 (Modified Proctor) or confirmed as stable by proof rolling/compaction.

5.5.3 Drainage and Waterproofing

To address the potential for a high-water table, a foundation drainage system must be installed such that the adjacent backfill or subbase material remains in a drained state. Non-expansive free draining foundation backfill material such as sands and gravels shall be used. The drainage system should include a properly designed and selected graded soil or geotextile filter to prevent piping of the erodible fine-grained soil from below the foundation. The filter should be designed to operate without clogging the filter, or any drain stone and pipe system that may be employed. The design of the drainage system must be based on accepted principles of engineering in consideration of the permeability of the soil, the grain size distribution of the soil and drainage stone, and the anticipated rate of flow.

5.5.4 General Recommendations

The following additional foundation design recommendations are commonly required by the building codes, or are considered standard operating procedure in quality construction projects:

- The foundation design must be completed by a qualified design professional in accordance with standard engineering practice, the soil information presented above and the requirements of all applicable codes.
- Reinforcing steel should be incorporated in the footing and wall design by a structural engineer licensed to practice engineering in New York state as required to aid in stress distribution and minimize cracking and differential motion.
- An experienced geotechnical engineer licensed to practice engineering in New York state shall review the foundation design details and foundation elevations and loadings as indicated on the drawings submitted with the building permit application to determine compliance with the recommendations of this Report.
- Unbalanced soil bearing pressures should be avoided.
- Concrete for the footing should be placed as soon after foundation excavation as is possible, and water must not be allowed to pond in any excavation. If it is necessary to leave the bearing surface open for any extended period of time, it is highly recommended that a thin mat of lean concrete be placed over the bottom of the excavation to minimize damage to the surface from weather or construction. Foundation concrete should not be placed on a frozen or saturated subgrade.
- Positive final site grading should be such that surface water drainage is conducted away from the structure. Roof drainage systems including gutters and downspouts should be unobstructed by leaves and tree limbs and should be connected to drainpipe extensions so that the roof water is drained at least 15-feet away from the foundation.

6. Construction Recommendations

6.1 Subgrade Preparation

We recommend that a geotechnical engineer or a trained and experienced observer complete a detailed footing subgrade soil inspection prior to the concrete placement. The purpose is to verify that conditions are suitable, that site specific bearing grade preparation as required by this Report have been followed, that any unsatisfactory soils have been removed and the exposed soil conditions are consistent with the subsurface conditions encountered in the test borings and are capable of supporting the design foundation loads.

Proof rolling the stripped surface should be used in detecting excessively soft or otherwise unacceptable conditions or subgrade materials. Proof rolling is performed by driving a select heavy vehicle over the soil surface and observing the soil surface for deflection such as ruts or indentations. Typically, soft or loose soil is detected by permanent ruts or indentations of one inch or more. Should loose or soft soils be identified during the proof rolling effort, the soils should be densified using a smooth drum vibratory compactor providing a static weight on the drum of no less than 7,000 pounds, or a “hoe-pac”, or other similar type of pneumatic compactor. The roller should make a minimum of two passes covering the proposed construction area, with additional passes as necessary to achieve required compaction and/or subgrade stabilization. Prior to proceeding with the placement of any compacted soil operations, all topsoil and other deleterious non-soil materials should be stripped from the proposed fill areas. Any on-site stockpiling should be completed in accordance with Best Management Practices, (BMP’s) to minimize erosion and sedimentation.

If the subgrade soils cannot be readily compacted, they should be over excavated and removed. Over-excavation should extend to suitable bearing soils, or a depth of three feet below the design subgrade elevation. Should unsatisfactory bearing soils remain at an over excavation depth of three feet, the subsurface conditions should be reviewed by the geotechnical engineer considering the encountered bearing strength to determine if a reduced bearing pressure is appropriate. Loose, dry granular fill over excavated from foundation excavations may be recompacted as engineered backfill, provided is it free of deleterious materials.

6.2 Building Foundation and Wet Pond Excavation

The sides of temporary excavations for building foundations, utility installations, and other construction should be adequately sloped to provide stable sides and safe working conditions. Otherwise, the excavation must be properly braced against lateral movements. In any case, applicable Occupational Safety and Health Administration (OSHA) safety standards must be followed.

Based on the field and laboratory test results, the overburden soils may generally be classified as OSHA Type C soils (granular soils including gravel, sand, and loamy sand). Slopes in areas of Type C soils must be constructed no steeper than 1.5 horizontal to 1 vertical (3/4H:1V) for excavation depths of 20 feet or less. Flatter slopes will be required if lower-strength soils or adverse seepage conditions are encountered.

The Wet Pond slopes shall be excavated at a maximum slope of 4:1 to the permanent pool elevation of 450.2 for Wet Pond 1 and 447 for Wet Pond 2. At the permanent pool elevation, the maximum slope shall be 8:1 to an elevation of 449.2 for Wet Pond 1, and 446 for Wet Pond 2 to create the aquatic bench. Below the aquatic bench a maximum slope of 2:1 shall be excavated to the base of the pond.

7. Conclusion

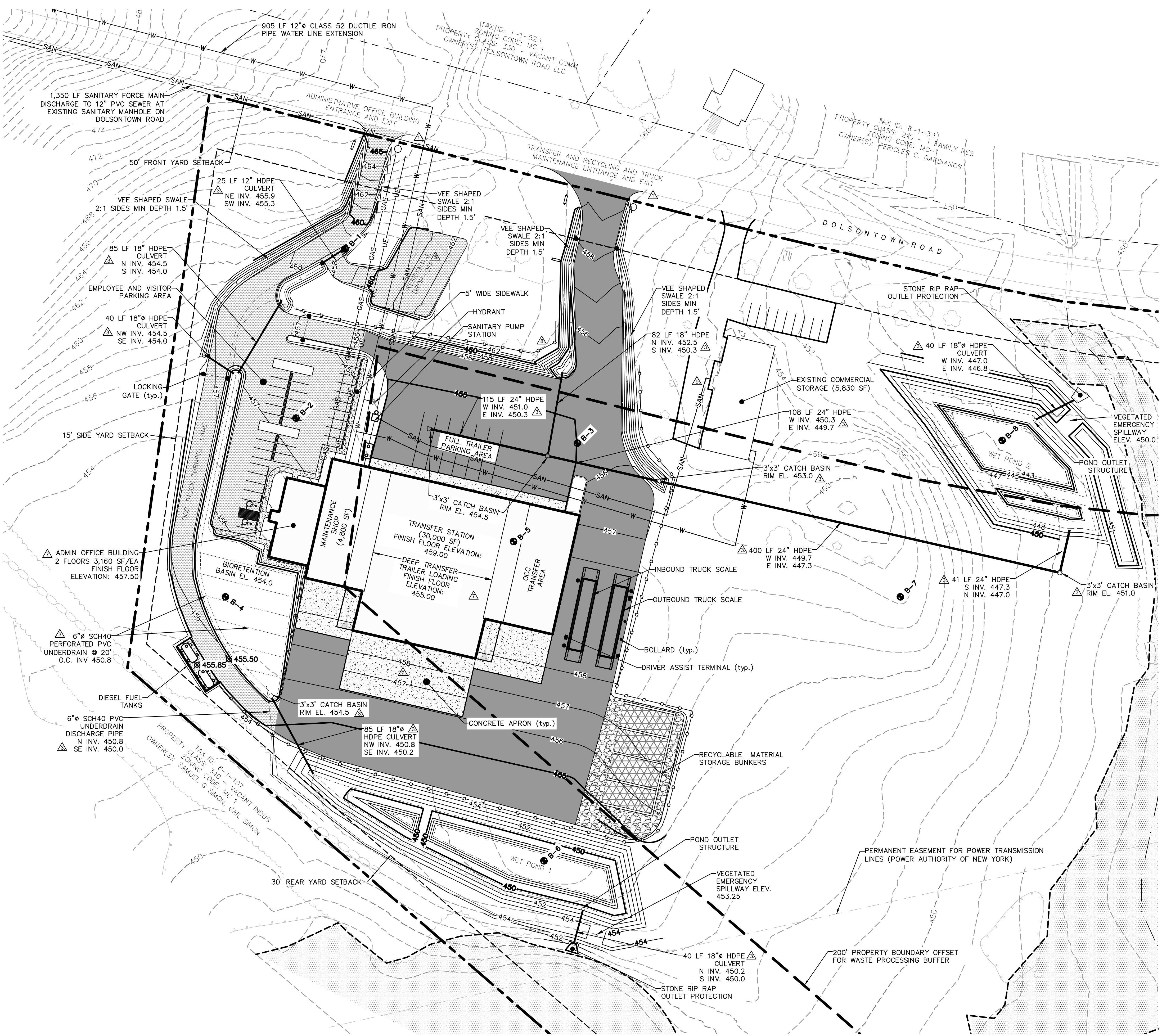
The borehole investigation, laboratory testing and geotechnical engineering analysis of the subsurface conditions for the proposed Dom-Mar Transfer and Recycling Facility demonstrate that the subsurface conditions are suitable for the Transfer and Recycling Facility building if the foundation design recommendations and the site and subgrade preparation techniques are adhered to.

ATTACHMENT 1

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Project Site Plan and Borehole Locations

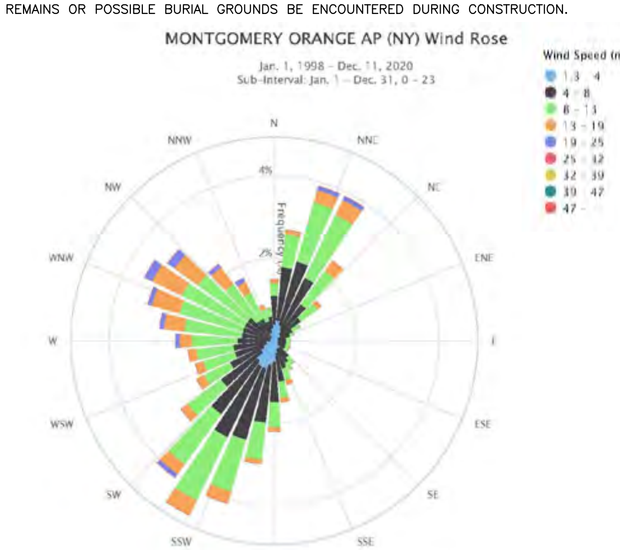


LEGEND:

450	EXISTING GROUND MAJOR CONTOUR
	EXISTING GROUND MINOR CONTOUR
450	PROPOSED GRADING MAJOR CONTOUR
448	PROPOSED GRADING MINOR CONTOUR
	PROPERTY BOUNDARY
	PROPERTY BOUNDARY SETBACK
	EXISTING BUILDING
	APPARENT JURISDICTIONAL FEDERAL WETLAND
	OUTDOOR SIGNAGE
	STANDARD DUTY PAVEMENT
	HEAVY DUTY PAVEMENT
	CONCRETE
	GRAVEL
	LITTER FENCE
SAN	SANITARY FORCEMAIN
W	WATER LINE
UE	UNDERGROUND ELECTRIC
GAS	NATURAL GAS LINE
	PROPOSED SWALE
	PROPOSED STORM SEWER
	PROPOSED CATCH BASIN
	LOCKING GATE
B-3	BOREHOLE LOCATION

NOTES:

1. EXISTING PROPERTY LINE, BUILDINGS AND TOPOGRAPHY FROM A SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
2. ELEVATIONS BASED ON NAVD88 DATUM, HORIZONTAL DATUM IS NEW YORK STATE PLANE EAST.
3. WETLAND BOUNDARY AND APPARENT JURISDICTION FROM DOLSONTOWN ROAD WETLAND DELINEATION REPORT PREPARED BY ENSOL, INC. DATED DECEMBER 2020. WETLAND BOUNDARY SURVEY LOCATIONS ARE FROM THE SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
4. EACH RESIDENTIAL, INDUSTRIAL, COMMERCIAL SUBDIVISION OR SITE PLANS SHALL CONTRIBUTE RECREATIONAL FEES CALCULATED ON THE BASIS OF GROSS FLOOR AREA FOR ALL NEW CONSTRUCTION.
5. THE EXISTING COMMERCIAL STORAGE BUILDING WATER LINE SHALL BE DISCONNECTED FROM THE EXISTING WATER WELL AND CONNECTED TO THE EXTENDED WATER LINE ALONG DOLSONTOWN ROAD. THE SANITARY LINE SHALL BE DISCONNECTED FROM THE EXISTING SEPTIC SYSTEM AND DRAIN TO THE SANITARY PUMP STATION TO BE DISCHARGED TO THE EXISTING SEWER LINE ON DOLSONTOWN ROAD VIA A FORCE MAIN.
6. BASED ON THE NEW YORK STATE HISTORIC PRESERVATION OFFICE (SHPO) LETTER DATED JUNE 15TH 2021 AND THE PHASE 1 ARCHAEOLOGICAL INVESTIGATION FOR THE DOM-MAR TRANSFER AND RECYCLING CENTER, TOWN OF WAWAYANDA, ORANGE COUNTY, NEW YORK, PERFORMED BY TRACKER ARCHAEOLOGY OF MONROE, NEW YORK, NO EVIDENCE OF ARCHEOLOGICAL SITES WERE FOUND WITHIN THE PROJECT'S AREA OF POTENTIAL EFFECTS. THE APPROXIMATE LOCATION OF A NEW YORK STATE MUSEUM-RECORDED ARCHAEOLOGICAL SITE NYSM 6169 DESCRIBED AS "CEMETERY" IS MAPPED IN THE PROJECT AREA. THE SHPO HUMAN REMAINS DISCOVERY PROTOCOL DATED JANUARY 2021 SHALL BE IMPLEMENTED SHOULD ANY EVIDENCE OF HUMAN REMAINS OR POSSIBLE BURIAL GROUNDS BE ENCOUNTERED DURING CONSTRUCTION.



IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, ARTICLE 145 SECTION 7209, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.

NO.	REVISION	BY	DATE
1	ADDED WATER LINE AND SANITARY SEWER CONNECTION TO EXISTING COMMERCIAL STORAGE BUILDING	SJD	7/6/21
1	REVISED LITTER FENCE LOCATION	SJD	7/6/21
1	ADDED CONCRETE APRON, STANDARD AND HEAVY DUTY PAVEMENT, AND GRAVEL AREAS, INCREASED SIZE OF ADMINISTRATIVE BUILDING AND TRANSFER STATION	SJD	7/6/21
1	REMOVED LANDSCAPING FOR PRESENTATION AND CLARITY	SJD	7/6/21
1	REVISED RESIDENTIAL DROP-OFF AREA LOCATION	SJD	7/6/21
1	REVISED NOTES, ADDED NOTE 5 FOR EXISTING COMMERCIAL STORAGE BUILDING WATER AND SEWER CONNECTION, ADDED NOTE 6 FOR ARCHAEOLOGY INVESTIGATION	SJD	7/6/21
1	ADDED STORMWATER COLLECTION SYSTEM PIPE SIZES AND INVERTS	SJD	7/6/21
1	REVISED GRADING, ADDED 1FT CONTOURS FOR PROPOSED AND EXISTING	SJD	7/6/21
1	REVISED ENTRANCE AND EXIT LOCATIONS	SJD	7/6/21

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
NYSDEC SOLID WASTE MANAGEMENT FACILITY PERMIT APPLICATION

TITLE:
SITE PLAN

ISSUE:
REVIEW

DES:	DRN:	CHK:
DL	SJD	DL

PROJECT NO: 029-A0001
DATE: JULY 2021

GRAPHIC SCALE: 0' 50' 100'

FILE: Sheet 3 - Site Plan REV1.dwg

REV NO: 1
SHEET NO: 3

ATTACHMENT 2

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

ST Boring Logs and Laboratory Results

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-1 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 5' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV. 457.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	6"	2'0"	1	2		5	moist		6" Topsoil; Brn F SAND, lit silt [SP]
							3	3			loose	2'0"	
		2	ss	24"	12"	4'0"	8	12		30	moist		Brn F SAND, lit silt, lit FC gravel [SP]
							18	14			compact		
5		3	ss	24"	20"	6'0"	3	4		11	wet		Brn F SAND & SILT, tr clay [SP/SM]
							7	8			compact		
		4	ss	24"	20"	8'0"	10	15		25	moist		SAME
							10	12			compact		
		5	ss	24"	10"	10'0"	14	17		33	moist		SAME
10							16	12			dense		
		6	ss	24"	18"	12'0"	7	8		20	wet		Grey FMC SAND & SILT, tr clay, lit FC gravel [SW/SM]
							12	10			compact		
		7	ss	24"	20"	14'0"	12	28		68	wet		SAME, tr cobbles
							40	26			v dense		
15		8	ss	24"	16"	16'0"	19	17		32	wet		Grey FMC SAND, sm silt, sm FC gravel, tr clay [SW/SM]
							15	17			dense		
20													
		9	ss	10"	6"	20'9"	41	100/4"		100	wet		SAME
											v dense		
		10	ss	24"	20"	25'0"	29	41		93	wet		SAME
25							52	60			v dense	25'0"	
													E.O.B 25'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________ FT. USED ____________ CASING THEN ______ CASING TO ______ FT. HOLE NO. B-1

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-2
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __FT AFTER __HOURS

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV. 455.7
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	20"	2'0"	1	2		5	moist		4" Topsoil; GreyBrn F SAND & SILT, tr clay, tr F grave
							3	5			loose		
		2	ss	24"	20"	4'0"	7	11		21	moist	2'3"	
							10	12			compact		
5		3	ss	24"	18"	6'0"	6	10		24	moist		GreyBrn F SAND & SILT, tr clay [SP/SM]
							14	13			compact		
		4	ss	24"	20"	8'0"	11	15		49	wet		Brn FMC SAND & SILT, tr FC gravel [SP/SM]
							34	21			dense		
		5	ss	24"	12"	10'0'	10	14		27	wet/moist		Grey F SAND & SILT, tr clay, lit FC gravel [SW/SM]
10							13	14			compact		
		6	ss	24"	18"	12'0'	6	8		19	wet		Grey FMC SAND & SILT, tr clay, lit FC GRAVEL [SP/SM]
							11				compact		
		7	ss	24"	20"	14'0'	15	25		57	wet		SAME
							32	27			v dense		
15		8	ss	24"	18"	16'0"	17	17		33	wet		
							16	17			dense		Grey FMC SAND, sm siltm sm FC gravel, tr clay [SW/SM]
20													
		9	ss	24"	20"	22'0"	27	39		80	wet		SAME
							41	60			v dense		
		10	ss	24"	18"	23'8"	24	37		86	wet		
							49	50/4"			v dense	23'8"	SAME
25													E. O B 23'8"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. HOLE NO. B-2

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-3
FOREMAN - DRILLER PD/ak	PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
INSPECTOR	LOCATION Wawayanda NY	OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	
	TYPE	HSA	SS		DATE START 4/9/21
AT 4' FT AFTER 0 HOURS	SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH 4/9/21
AT 2' FT AFTER 4 HOURS	HAMMER WT.		140#	BIT	SURFACE ELEV. 456.0
	HAMMER FALL		30"		GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	18"	2'0"	2	2		5	moist	0'6"	Topsoil; DkBrnBrn SILT [ML]
							3	6			stiff		
		2	ss	24"	14"	4'0"	17	12		32	moist	2'0"	BrnLtBrn SILT [ML]
							20	25			hard		
5		3	ss	24"	18"	6'0"	28	21		35	wet	4'0"	Brn SILT & FM SAND, FC gravel [ML]
							14	11			hard		
		4	ss	24"	19"	8'0"	11	11		24	wet	7'0"	Brn FMC SAND & FC GRAVEL, lit silt [SW]
							13	15			compact		LtBrnBrn VFFMC SAND & FC GRAVEL, lit silt
		5	ss	11"	10"	8'11"	43	100/5"		100	vmoist		[SW]
10											v dense		
		6	ss	24"	20"	12'0"	33	70		143	moist	10'6"	LtBrn VFFMC SAND & FC GRAVEL, silt
							73	84			v dense		LtGrey VFFMC SAND & FC GRAVEL, silt, lit cobbles
		7	ss	11"	6"	12'11"	87	100/5"		100	moist/dry		[SW/SM]
15		8	ss	24"	18"	16'0"	14	17		42	moist		Grey VFFM SAND, F gravel, silt, sm cobbles, tr boulders
							25	20			dense		[SP/SM]
20													
		9	ss	24"	18"	22'0"	18	22		42	moist		Grey VFF SAND, FC gravel, sm silt [SW]
							20	22			dense		
25													
		10	ss	4"	3"	25'4"	100/4"			100	v dense	25'4"	Grey VFFM SAND, FC gravel, cobbles, lit silt, boulders
													E.O.B 25'4"
30													
													* POCKET PENETROMETER READING Tons/sqft
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-3**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: **Ensol, Inc.** PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-4 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT 6' FT AFTER 0 HOURS AT __FT AFTER__HOURS	TYPE: CASING HSA, SAMPLER SS, CORE BAR SIZE I.D.: 4 ¼", 1 3/8" HAMMER WT.: 140#, BIT HAMMER FALL: 30"	DATE START 4/12/21 DATE FINISH 4/12/21 SURFACE ELEV. 453.4 GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	1	1		4	moist		4" Topsoil, GreyBrn F SAND & SILT [SM]
							3	5			v loose		
		2	ss	24"	16"	4'0"	6	10		20	moist		SAME
							10	11			compact		
5		3	ss	24"	14"	6'0"	6	8		18	moist		GreyBrn F SAND & SILT [SP/SM]
							10	10			compact		
		4	ss	24"	6"	8'0"	4	5		10	wet		Brn F SAND, tr silt [SP]
							5	5			loose		
		5	ss	24"	12"	10'0"	5	5		13	wet		Brn FMC SAND, sm silt, sm FC gravel [SW/SM]
10							8	8			compact	9'6"	
		6	ss	24"	18"	12'0"	7	9		21	wet		Grey FMC SAND, sm silt, some FC gravel [SW/SM]
							12	13			compact		
		7	ss	24"	26"	14'0"	14	27		56	wet		Grey FMC SAND, sm silt, lit FC gravel tr clay
							29	30			v dense		
15		8	ss	24"	14"	16'0"	18	17		33	wet		SAME
							16	17			dense		
20													
		9	ss	15	10"	21'3"	31	40		90	wet		Gray FMC SAND, sm silt, sm FC gravel , tr clay [SW/SM]
							50/3"				v dense		
		10	ss	24"	20"	25'0"	24	37		87	wet		same
25							50	71			v dense	25'0"	
													E.O.B 25'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______FT. USED ____________CASING THEN ______ CASING TO ______FT. **HOLE NO. B-4**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE

SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM

PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.1	4.1	6.6	33.9	48.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	94.1		
#4	92.9		
#10	88.8		
#20	85.4		
#40	82.2		
#60	75.9		
#140	60.6		
#200	48.3		

* (no specification provided)

Material Description

Brown and gray silty, clayey sand

Atterberg Limits

PL= 19 LL= 26 PI= 7

Coefficients

D_{90}= 2.4908 D_{85}= 0.7347 D_{60}= 0.1039
D_{50}= 0.0785 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO=

Remarks

Moisture content=24.3%

Source of Sample: B-4 **Depth:** 4-10 ft.
Sample Number: S-3,S-4,S-5 Comp.

Date: 6-22-2021

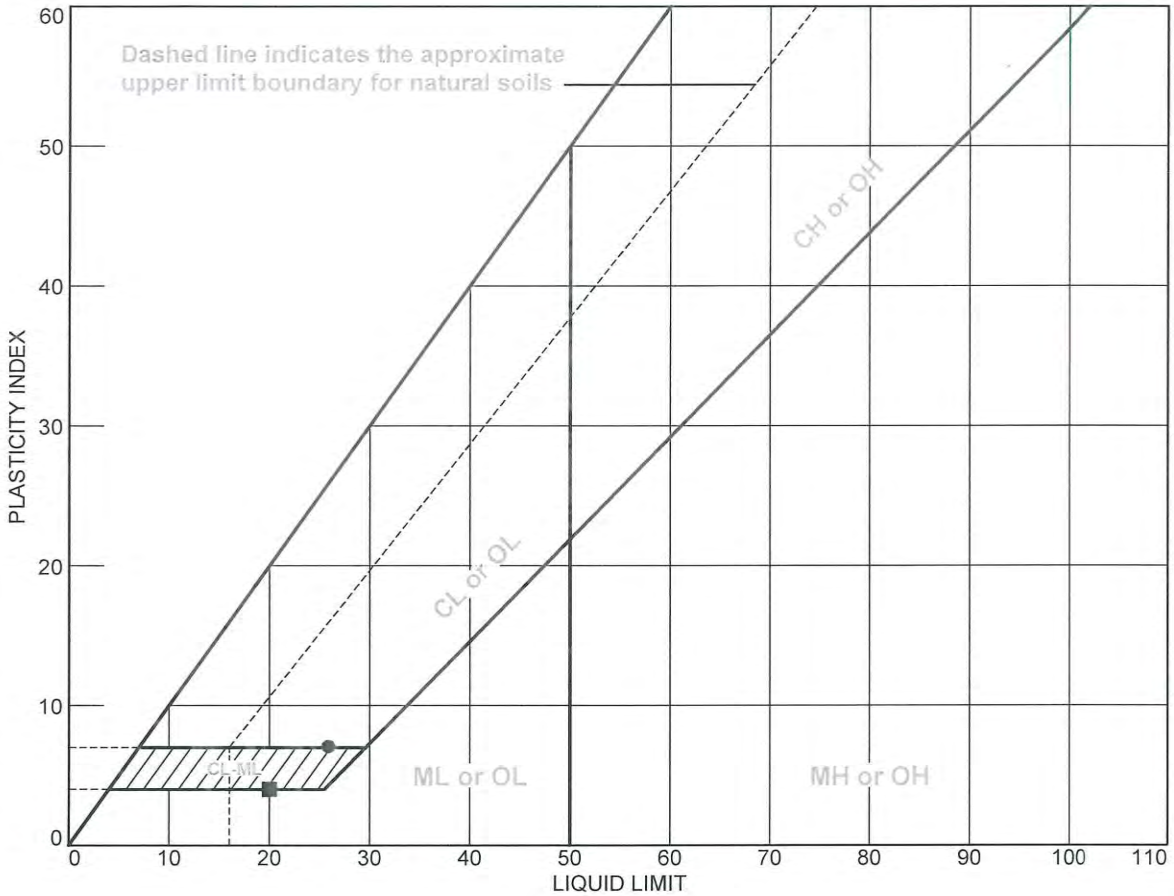
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-3,S-4,S-5 Comp.	4-10 ft.	24.3	19	26	7	SC-SM
■	B-5	S-5,S-6 Comp.	8-12 ft.	18.9	16	20	4	GP-GC

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No.: 21-065 **Figure**

Tested By: EH **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: **Ensol, Inc.**	SHEET 1 OF 2 HOLE NO. B-5
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER PD AK	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/9/21
DATE FINISH 4/9/21
SURFACE ELEV. 457.7
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST M OIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	3	3		6	moist	1'0"	Topsoil
							3	5			loose	2'0"	Brn SILT & FC GRAVEL, sm FM sand [ML]
		2	ss	24"	18"	4'0"	13	17		37	moist		Brn FMC SAND & FC GRAVEL, lit cobbles, silt [SW]
							20	22			dense		
5		3	ss	24"	20"	6'0"	18	19		33	moist/v moist		Brn FMC SAND & FC GRAVEL, lit cobbles, silt
							14	14			dense		
		4	ss	24"	18"	8'0"	14	15		29	wet		BrnGrey FMC SAND & FC GRAVEL, lit cobbles, silt
							14	15			compact		
		5	ss	24"	18"	10'0"	14	15		27	wet		Lt BmBrn VFFMC & SAND, silt, FC gravel [SW/SM]
10							12	11			compact		
		6	ss	24"	20"	12'0"	5	15		34	wet/v moist	11'0"	SAME
							19	20			dense		BrnGray FMC SAND & FC GRAVEL, lit silt, cobbles [SW]
		7	ss	24"	18"	14'0"	20	23		50	wet	12'6"	
							27	25			dense	13'6"	Brn FMC SAND, FC gravel [SW]
15		8	ss	17"	15"	15'5"	29	32		132	wet		Brn VFF SAND, silt, FC gravel, cobbles, tr boulders [SP/SM]
							100/5"				v dense		
20													
		9	ss	18"	18"	21'6"	14	16		35	wet		Brn VFF SAND, silt, FC gravel, cobbles, tr boulders [SP/SM]
							19				dense		Bolders
25													
		10	ss	18"	18"	26'6"	51	25		52	wet		Grey VFFMC SAND, FC gravel, sm silt, cobbles, lit bolders
							27				v dense		[SW/SM]
30													Cobbles @ 29'
		11	ss	18"	18"	31'6"	8	10		30	wet	31'0"	GreyDkGrey FM SAND, sm silt, Tr C Sand [SW/SM]
							20				compact		Grey FMC SAND & F GRAVEL, sm silt
35													
		12	ss	18"	18"	36'6"	33	50		113	v moist		LtGrey VF SAND, silt, sm F gravel, cobbles [SP/SM]
							63				v dense		
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ______ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-5**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. CLIENT: Ensol, Inc. SHEET 2 OF 2

90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	HOLE NO. B-5 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR	
TYPE	HSA	SS		DATE START 4/12/21
SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH 4/12/21
HAMMER WT.		140#	BIT	SURFACE ELEV.
HAMMER FALL		30"		GROUND WATER ELEV.

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

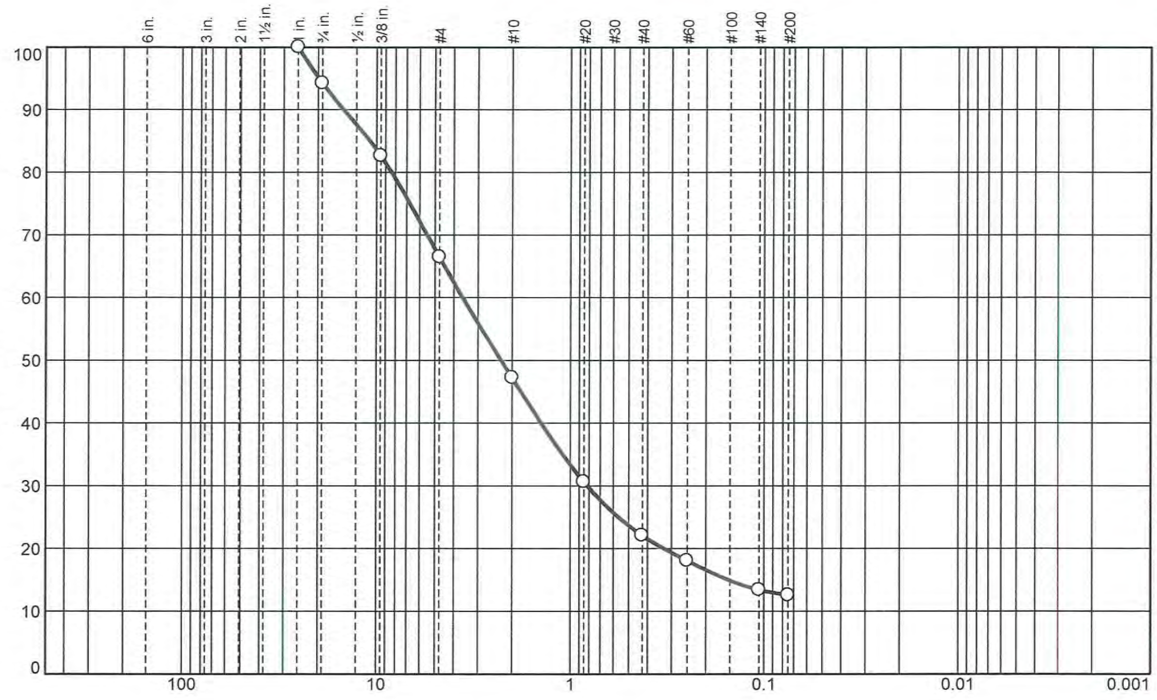
DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		13	ss	19"	9"	40'9"	81	100/3"		100	wet		SAME
											v dense		
45													
		14	ss	18"	18"	46'6"	37	42		132	wet		LtGreyGrey SILT, sm VFFMC SAND, FC gravel, cobbles,
							90				v dense		tr boulders [ML]
50													
		15	ss	18"	18"	51'6"	35	41		99	wet		SAME
							58				v dense		
55													
		16	ss	18"	18"	56'6"	19	22		48	wet		GreyBrn VFF SAND, sm silt [SP/SM]
							26				dense		
60													
		17	ss	18"	18"	61'6"	20	28		73	wet		GreyBrn VFF SAND, lit silt [SP]
							45				v dense		Grey FMC SAND & FC GRAVEL, lit silt, cobbles [SW]
65													
		18	ss	18"	17"	66'6"	41	63		140	wet		Grey VFFMC SAND, silt, FC gravel, cobbles [SW/SM]
							77				v dense	67'0"	Auger refusal
													E.O.B 67'0"
70													*PP: Pocket Petrometer
75													
80													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ______ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-5**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.8	27.7	19.3	25.1	9.5	12.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	94.2		
.375	82.6		
#4	66.5		
#10	47.2		
#20	30.6		
#40	22.1		
#60	18.1		
#140	13.4		
#200	12.6		

* (no specification provided)

Material Description

Brown and gray silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.8075 D_{85}= 10.8418 D_{60}= 3.6024
D_{50}= 2.2795 D_{30}= 0.8161 D_{15}= 0.1522
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-5 **Depth:** 2-8 ft.
Sample Number: S-2,S-3,S-4 Comp.

Date: 6-22-2021

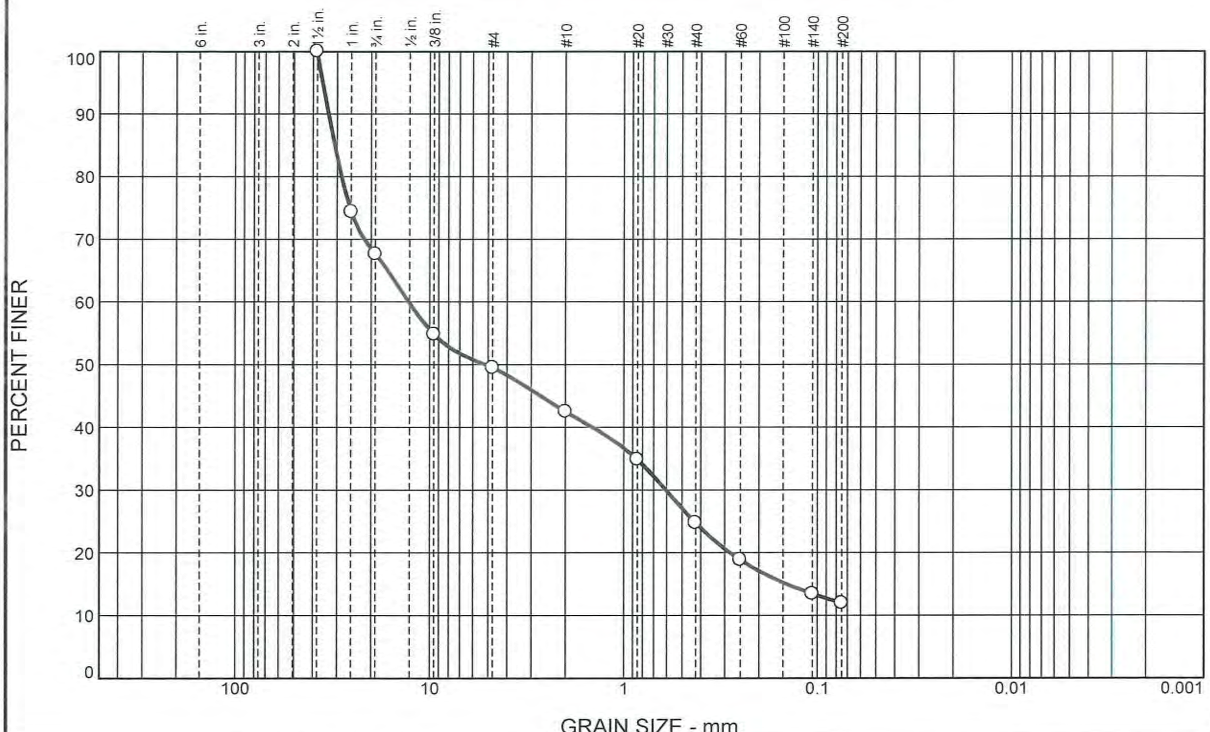
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	32.4	18.1	7.0	17.7	12.8	12.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	74.4		
.75	67.6		
.375	54.8		
#4	49.5		
#10	42.5		
#20	34.9		
#40	24.8		
#60	18.9		
#140	13.5		
#200	12.0		

* (no specification provided)

Material Description

Brown and gray poorly graded gravel with silty clay and sand

Atterberg Limits

PL= 16 LL= 20 PI= 4

Coefficients

D_{90}= 33.2740 D_{85}= 30.9360 D_{60}= 12.8380
D_{50}= 5.1868 D_{30}= 0.6038 D_{15}= 0.1441
D_{10}= C_u= C_c=

Classification

USCS= GP-GC AASHTO=

Remarks

Moisture content=18.9%

Source of Sample: B-5 **Depth:** 8-12 ft.
Sample Number: S-5,S-6 Comp.

Date: 6-22-2021

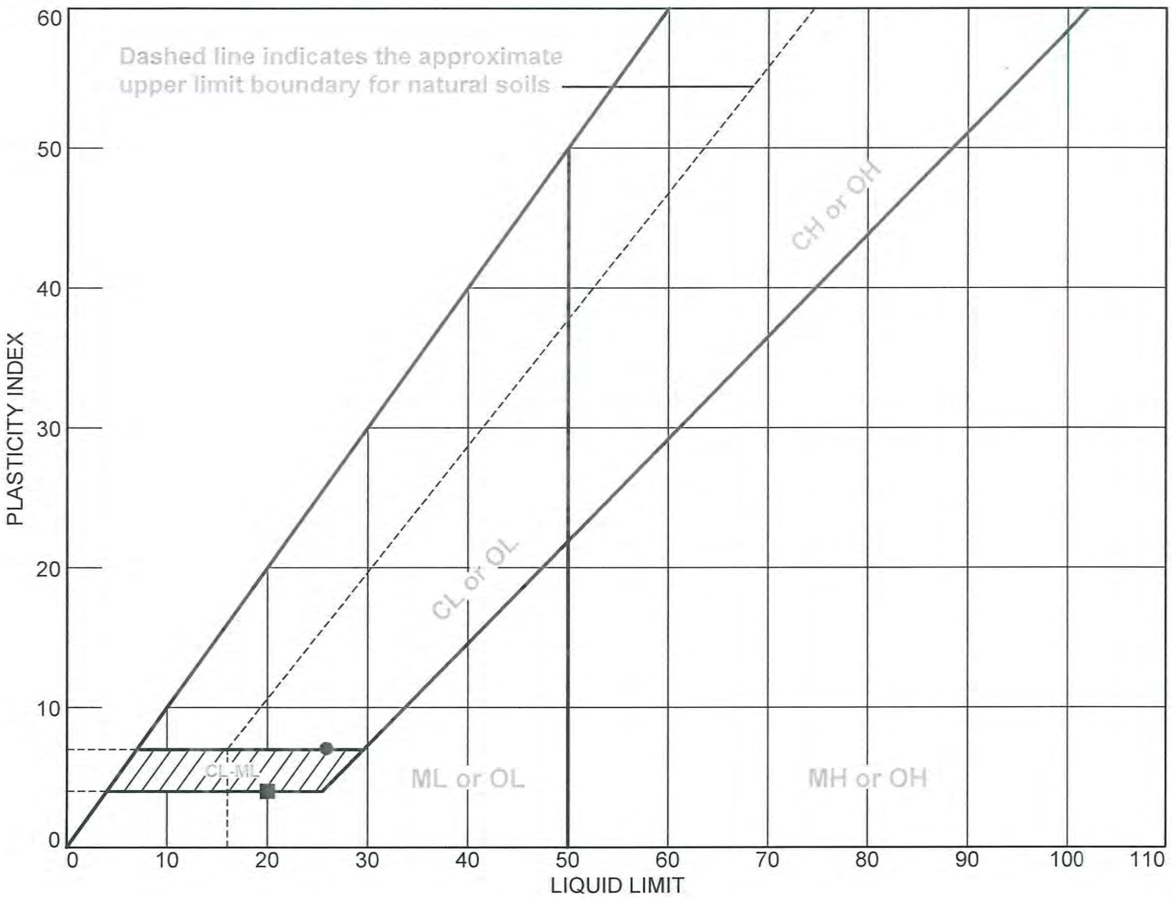
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-3,S-4,S-5 Comp.	4-10 ft.	24.3	19	26	7	SC-SM
■	B-5	S-5,S-6 Comp.	8-12 ft.	18.9	16	20	4	GP-GC

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No.: 21-065 **Figure**

Tested By: EH **Checked By:** VRS

SOILTESTING, INC.
90 DONOVAN RD.
OXFORD, CT 06478
CT (203) 262-9328
NY (914) 946-4850

CLIENT: **Ensol, Inc.**

PROJECT NO. **G70-1762-21**

PROJECT NAME **1128 Dolsontown Rd**

LOCATION **Wawayanda NY**

SHEET 1 OF 1
HOLE NO. B-6

BORING LOCATIONS per Plan

OFFSET

FOREMAN - DRILLER **MK/ao**

INSPECTOR

GROUND WATER OBSERVATIONS
AT 8 FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

DATE START 4/13/21
DATE FINISH 4/13/21
SURFACE ELEV. 456.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	12"	2'0"	8	10		18	moist		Topsoil
							8	9			compact		Brn FMC SAND, sm clay, silt [SW/SC]
		2	ss	24"	8"	4'0"	16	8		18	moist		SAME
							10	11			compact		
5		3	ss	24"	18"	6'0"	12	14		26	moist		GrayBrn FMC SAND, sm FC gravel, lit silt [SW]
							12	11			compact		
		4	ss	24"	6"	8'0"	13	13		28	moist		SAME
							15	15			compact		
		5	ss	24"	0"	10'0"	14	12		24	wet		NO RECOVERY
10							12	11			compact		
		6	ss	24"	4"	12'0"	11	9		17	wet		Brn FMC SAND & FC gravel [SW]
							8	9			compact		
		7	ss	24"	12"	14'0"	7	9		18	wet		SAME
							9	9			compact		
15		8	ss	20"	18"	15'8"	23	32		84	wet		Brn FMC SAND & FC GRAVEL, tr cobbles [SW]
							52	50/2"			v dense		
20													
		9	ss	24"	18"	22'0"	21	21		43	wet		Brn FMC SAND, lit FC gravel [SW]
							22	26			dense		
		10	ss	24"	16"	24'0"	18	22		54	wet		Grey FMC SAND & FC GRAVEL, tr cobbles [SW]
25							32	29			v dense	24'0"	
													E.O.B. 24'0"
30													
35													
40													

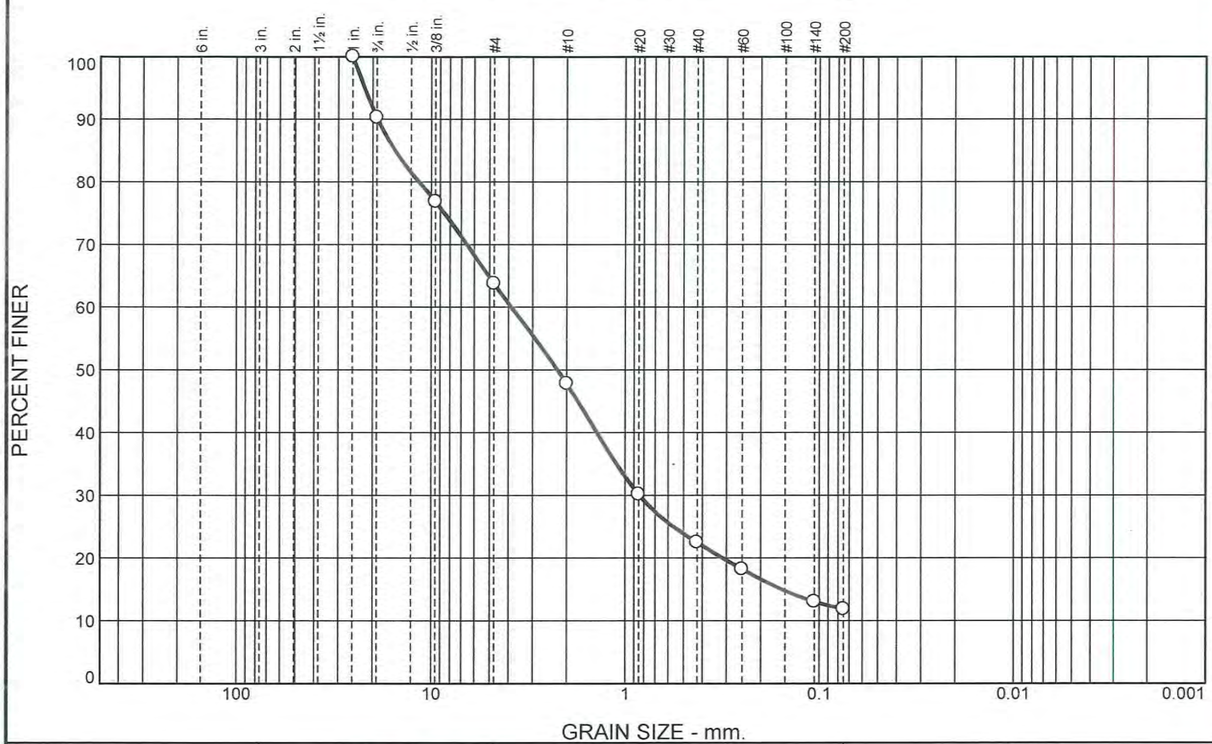
NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________ FT. USED ______________ CASING THEN _______ CASING TO _______ FT. **HOLE NO. B-6**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50%

C = COARSE
M = MEDIUM
F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.7	26.5	16.0	25.3	10.7	11.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	90.3		
.375	76.9		
#4	63.8		
#10	47.8		
#20	30.2		
#40	22.5		
#60	18.2		
#140	13.0		
#200	11.8		

* (no specification provided)

Material Description

Brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.8609 D_{85}= 15.3652 D_{60}= 3.8647
D_{50}= 2.2312 D_{30}= 0.8409 D_{15}= 0.1554
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-6 **Depth:** 4-8 & 10-14 ft.
Sample Number: S-3,S-4,S-6,S-7 Comp **Date:** 6-22-2021

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-7 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT 13' FT AFTER 0 HOURS AT __ FT AFTER __ HOURS		DATE START 4/13/21 DATE FINISH 4/13/21 SURFACE ELEV. 458.0 GROUND WATER ELEV.

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC.	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		ss	ss	24"	10"	2'0"	3	6		10	moist		4" Topsoil; Brn F SAND, sm silt, lit FC gravel [SP/SM]
							4	18			loose		
		2	ss	24"	10"	4'0"	16	11		21	moist		SAME
							10	10			compact		
5		3	ss	24"	14"	6'0"	17	18		41	dry		Brn FMC SAND, sm FC gravel, tr silt, tr cobbles [SW]
							23	36			dense		
		4	ss	24"	16"	8'0"	41	25		43	dry		SAME
							18	19			dense		
		5	ss	24"	14"	10'0"	10	11		23	moist/wet		DkBrn FMC SAND, sm FC gravel, tr silt [SW]
10							12	12			compact		
		6	ss	24"	12"	12'0"	15	24		45	wet		Brn FMC SAND & FC GRAVEl, tr silt [SW]
							21	16			dense		
		7	ss	24"	16"	14'0"	20	14		26	wet		SAME
							12	10			compact		
15		8	ss	24"	16"	16'0"	14	20		43	wet		Brn FMC SAND, sm FC gravel, tr silt [SW]
							23	25			dense		
20													
		9	ss	24"	8"	22'0"	28	22		42	wet		Brn FMC SAND, sm silt, tr clay, lit FC gravel [SW/SM]
							20	23			dense		
		10	ss	24"	12"	24'0"	29	19		31	wet		GreyBrn FMC SAND & FC GRAVEL, tr silt [SW]
							12	14			dense	24'0"	
25													E.O.B 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-7**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-8
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR	
TYPE	HSA	SS		DATE START 4/13/21
SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH 4/13/21
HAMMER WT.		140#	BIT	SURFACE ELEV. 449.7
HAMMER FALL		30"		GROUND WATER ELEV.

GROUND WATER OBSERVATIONS
AT 2'6" FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

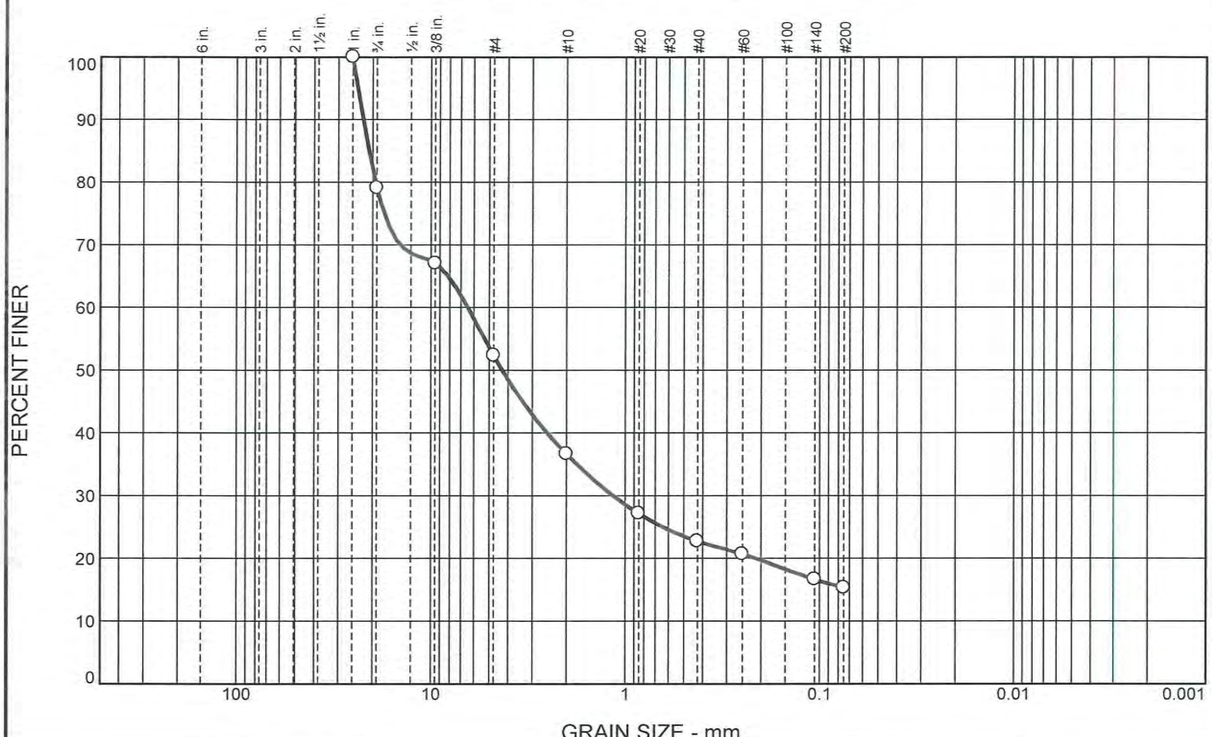
DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	8"	2'0"	1	2		4	moist		4" Topsoil; Brn F SAND, sm silt, lit FC gravel
							2	2			v loose		
		2	ss	24"	14"	4'0"	5	11		31	wet		Grey FMC SAND, lit FC gravel, lit silt [SW]
							20	12			dense		
5		3	ss	24"	12"	6'0"	9	17		32	wet		Grey FMC SAND & FC gravel, tr silt
							15	15			dense		
		4	ss	24"	16"	8'0"	10	11		22	wet		Brn FMC SAND & FC GRAVEL, tr silt [SW]
							11	11			compact		
		5	ss	2"	0"	8'2"	100/2"			100	wet		No recovery
10											v dense		
		6	ss	24"	14"	12'0"	10	11		45	wet		Brn FMC SAND & FC GRAVEL, tr cobbles [SW]
							34	24			dense		
		7	ss	14"	10"	13'2"	26	49		149	wet		SAME
							100/2"				v dense	14'0"	
15		8	ss	24"	20"	16'0"	14	16		31	wet		Grey F SAND & SILT [SP/SM]
							15	17			dense		
20													
		9	ss	24"	20"	22'0"	11	10		29	wet		SAME
							19	15			compact		
		10	ss	24"	20"	24'0"	12	11		29	wet		
							18	15			compact	24'0"	SAME
25													
													E.O.B 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO _______FT. **HOLE NO. B-8**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.9	26.8	15.6	13.9	7.5	15.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	79.1		
.375	67.0		
#4	52.3		
#10	36.7		
#20	27.2		
#40	22.8		
#60	20.7		
#140	16.7		
#200	15.3		

* (no specification provided)

Material Description

Gray-brown silty gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 22.4203 D_{85}= 20.9434 D_{60}= 6.4557
D_{50}= 4.2926 D_{30}= 1.1507 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-8 **Depth:** 2-8 ft.
Sample Number: S-2,S-3,S-4 Comp.

Date: 6-22-2021

SKYLANDS TESTING, LLC **Sparta, NJ**	**Client:** Soiltesting, Inc. **Project:** 1128 Dolsontown Road Wawayanda, NY **Project No:** 21-065 **Figure**

Tested By: RS **Checked By:** VRS

Section 9

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278-0090

January 5, 2022

Regulatory Branch

SUBJECT: Permit Application Number NAN-2021-00721-WOR
by Marangi Disposal

Greg Fleischer
Capital Environmental Consultants, Inc.
243 Fair Street, Suite 4
Kingston, New York 14301

Dear Mr. Fleischer:

On April 21, 2021, the New York District of the U.S. Army Corps of Engineers received a request for a Department of the Army jurisdictional determination for the above referenced project. The area within the project boundary consists of approximately 18.8 acres, in the Rondout Creek watershed, located on Dolsontown Road in the Town of Wawayanda, Orange County, New York.

In the letter received on April 21, 2021, your office submitted a proposed delineation of the extent of waters of the United States within the project boundary. On October 1, 2021, this office received a complete delineation.

Based on the material submitted, this site has been determined to contain jurisdictional waters of the United States based on: the presence of wetlands determined by the occurrence of hydrophytic vegetation, hydric soils and wetland hydrology according to criteria established in the 1987 "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1 that are either adjacent to or part of a tributary system; and the presence of a defined water body (e.g. stream channel, lake, pond, river, etc.) which is part of a tributary system.

These jurisdictional waters of the United States are shown on the drawing entitled “Wetland Delineation Map Dolsontown Road Wetland Delineation Report Marangi Disposal Town of Wawayanda, Orange County, State of New York”, Figure 5-1, prepared by EnSol, Inc, dated September, 2021. This drawing indicates that there are two (2) principal wetland areas within the project boundary which are part of a tributary system, and are considered to be waters of the United States. The area within the project boundary consists of the area encompassed by the “Delineation Area/Project Boundary: 18.80ac” line, as shown on the above referenced drawing. **It should be noted that jurisdictional waters of the United States exist outside of the project boundary and have not been formally reviewed by this office.**

The first wetland (Wetland D) is located on the southwestern portion of the project boundary and is approximately 0.52 acres within the project boundary. The second wetland (Wetland E) is located along the eastern and southeastern portions of the project boundary and is approximately 1.57 acres within the project boundary.

It should be noted that, in light of the U.S. Supreme Court decision (Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178, January 9, 2001), the remainder of the wetlands shown on the above referenced drawing (Wetlands A, B, C and F) do not meet the current criteria of waters of the United States under Section 404 of the Clean Water Act. The Court ruled that isolated, intrastate waters can no longer be considered waters of the United States, based solely upon their use by migratory birds.

This determination regarding the delineation shall be considered valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

This determination was documented using the Approved Jurisdictional Determination Form, promulgated by the Corps of Engineers in June 2007. A copy of that document is enclosed with this letter, and will be posted on the New York District website at:
http://www.nan.usace.army.mil/Missions/Regulatory/JurisdictionalDeterminations/RecentJurisdictionalDeterminations.aspx

This delineation/determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in this request. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed is a combined Notification of Appeal Process (NAP) and Request For Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the North Atlantic Division Office at the following address:

Naomi Handell, Regulatory Program Manager, CENAD-PD-OR
North Atlantic Division, U.S. Army Engineer Division
Fort Hamilton Military Community
General Lee Avenue, Building 301
Brooklyn, New York 11252-6700

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Park 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by March 6, 2022. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

It is strongly recommended that the development of the site be carried out in such a manner as to avoid as much as possible the discharge of dredged or fill material into the delineated waters of the United States. If the activities proposed for the site involve such discharges, authorization from this office may be necessary prior to the initiation of the proposed work. The extent of such discharge of fill will determine the level of authorization that would be required.

In order for us to better serve you, please complete our Customer Service Survey located at http://www.nan.usace.army.mil/Missions/Regulatory/CustomerSurvey.aspx.

If any questions should arise concerning this matter, please contact Brian A. Orzel, of my staff, at Brian.A.Orzel@usace.army.mil.

Sincerely,

Rosita Miranda
Date: 2022.01.05 16:38:29 -05'00'

Rosita Miranda
Chief, Western Section

Enclosures

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Marangi Disposal		File Number: NAN-2021-00721-WOR	Date: 5 JAN 2022
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of permission)		B
	PERMIT DENIAL		C
X	APPROVED JURISDICTIONAL DETERMINATION		D
	PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
Mr. Stephan A. Ryba Chief, Regulatory Branch (CENAN-OP-R) NY District, U.S. Army Corps of Engineers 26 Federal Plaza, Room 16-406 New York, NY 10278-0090 Telephone number: 917-790-8512	Ms. Naomi Handell Regulatory Program Manager (CENAD-PD-OR) U.S. Army Corps of Engineers Fort Hamilton Military Community General Lee Avenue, Building 301 Brooklyn, New York 11252-6700 Telephone number: 917-789-4841

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_______________________________ Signature of appellant or agent.	Date:	Telephone number:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): January 5, 2022

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: NY District, Marangi Disposal, NAN-2021-00721-WOR-JD1

C. PROJECT LOCATION AND BACKGROUND INFORMATION: ,

State: New York County/parish/borough: Orange City: Wawayanda
Center coordinates of site (lat/long in degree decimal format): Lat. 41.4218° N, Long. 74.4160° W.
Universal Transverse Mercator:
Name of nearest waterbody: Monhagen Brook
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Wallkill River
Name of watershed or Hydrologic Unit Code (HUC): 02020007

- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- ☒ Office (Desk) Determination. Date: December 13, 2021
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☐ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Wetland A is isolated, located approximately 500 feet from and 4 feet higher in elevation than Wetland D, the nearest waters of the United States, with no apparent hydrologic connection. Wetland B is isolated, located**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

approximately 405 feet from and 4 feet higher in elevation than Wetland D, the nearest waters of the United States, with no apparent hydrologic connection. Wetland C is isolated, located approximately 215 feet from and 4 feet higher in elevation than Wetland D, the nearest waters of the United States, with no apparent hydrologic connection. Wetland F is isolated, located approximately 615 feet from and 8 feet higher in elevation than Wetland D, the nearest waters of the United States, with no apparent hydrologic connection.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☐ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☐ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☐ sediment deposition ☐ multiple observed or predicted flow events
☐ water staining ☐ abrupt change in plant community
☐ other (list):
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by: ☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects ☐ survey to available datum;
☐ fine shell or debris deposits (foreshore) ☐ physical markings;
☐ physical markings/characteristics ☐ vegetation lines/changes in vegetation types.
☐ tidal gauges
☐ other (list):

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs[8] that flow directly or indirectly into TNWs.
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Provide estimates for jurisdictional waters in the review area (check all that apply):

☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☒ Other: (explain, if not covered above): **There are no features within Wetlands A, B, C or F which are or could be used by interstate or foreign travelers for recreational or other purposes. There are no areas from which fish or shellfish can be or are taken and sold in interstate or foreign commerce. There are no areas which are or could be used for industrial purpose by industries in interstate commerce. Consequently, there does not appear to be a reasonable nexus with interstate commerce. Also, the use, degradation or loss of Wetlands A, B, C or F will not affect other waters of the U.S. or affect interstate or foreign commerce.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☒ Wetlands: 0.613 acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: Middletown, NY.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Orange County, NY.
☒ National wetlands inventory map(s). Cite name: Middletown, NY.
☒ State/Local wetland inventory map(s): Middletown, NY.
☒ FEMA/FIRM maps:36071C0266E.
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): .
or ☒ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): January 5, 2022

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: NY District, Marangi Disposal, NAN-2021-00721-WOR-JD2

C. PROJECT LOCATION AND BACKGROUND INFORMATION: ,

State: New York County/parish/borough: Orange City: Wawayanda
Center coordinates of site (lat/long in degree decimal format): Lat. 41.4218° N, Long. 74.4160° W.
Universal Transverse Mercator:
Name of nearest waterbody: Monhagen Brook
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Wallkill River
Name of watershed or Hydrologic Unit Code (HUC): 02020007

- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- ☒ Office (Desk) Determination. Date: December 13, 2021
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☐ Non-RPWs that flow directly or indirectly into TNWs
   - ☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: 2.09 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: .

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: **Pick List**
   Drainage area: **Pick List**
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through **Pick List** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

---

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☐ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):

Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☒ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **Water within Wetlands D and E flows within the channel of Monhagen Brook, an off-site, perennial tributary to the Wallkill River, which is a TNW. Aerial photography, the Middletown, NY USGS quadrangle map, and annual rainfall of 40 inches, indicate that the off-site stream flows all year.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: **2.09** acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

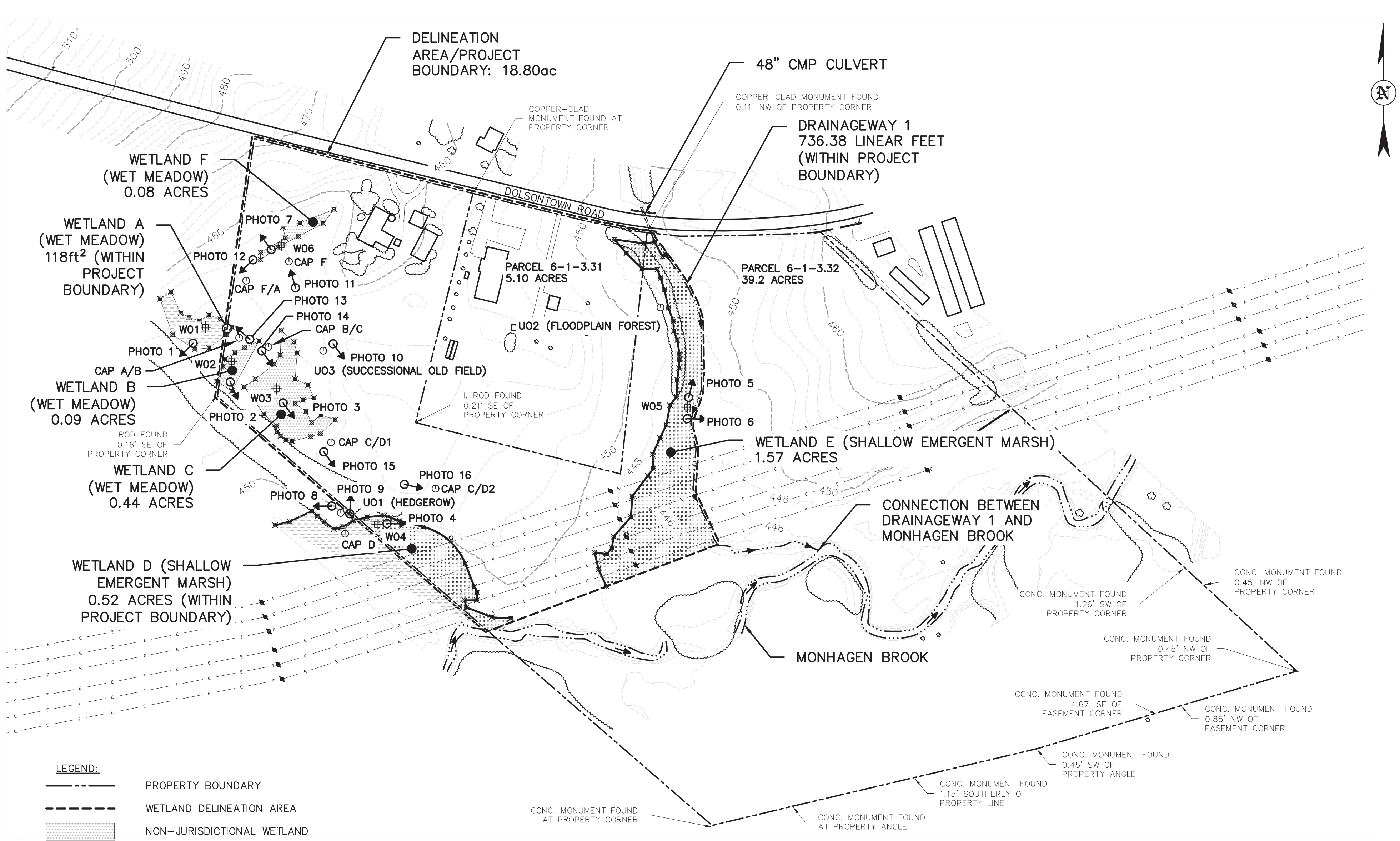
Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: Middletown, NY.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Orange County, NY.
☒ National wetlands inventory map(s). Cite name: Middletown, NY.
☒ State/Local wetland inventory map(s): Middletown, NY.
☒ FEMA/FIRM maps:36071C0266E.
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): .
or ☒ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .



NOTES:

1. TOPOGRAPHY, PROPERTY BOUNDARIES, AND WETLAND FLAG LOCATIONS WERE OBTAINED FROM A SURVEY CONDUCTED BY LANE&TULLEY ENGINEERING AND SURVEYING, P.C.
2. SAMPLE POINT LOCATIONS WERE RECORDED USING A GARMIN GPSMAP 64st HANDHELD GPS.
3. TABLES 5-1 AND 5-2 OUTLINE ACREAGE AND LINEAR FEET OF JURISDICTIONAL AND NON-JURISDICTIONAL FEATURES WITHIN THE WETLAND DELINEATION AREA.
4. THE WETLAND DELINEATION AREA CONSISTS OF THE PROPOSED PROJECT BOUNDARY. THE 18.8 ACRE AREA INCLUDES ALL OF PARCEL 6-1-3.31 AND A PORTION OF 6-1-3.32. THE COMBINED TOTAL PROPERTY AREA IS 44.3 ACRES.

WETLAND DELINEATION MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

MARANGI DISPOSAL

TOWN OF WAWAYANDA, ORANGE COUNTY, STATE OF NEW YORK

EnSol, Inc.
Environmental Solutions
661 MAIN STREET
NIAGARA FALLS, NY 14301
PHONE (716) 285-3920
FAX (716) 285-3928

FIGURE 5-1

SEPTEMBER 2021 | PN: 20-0062

X:\AAApj\Marangi Disposal\029-A0001 TS Permit Application\Application Documents\Drawings\5-1 Wetland Delineation Map.dwg 9/8/2021 3:45 PM

Section 10

CAPITAL
ENVIRONMENTAL CONSULTANTS, INC.

243 Fair Street, Suite #4
Kingston, NY 12401
O: (845) 383-1114
gfleischer@capitalenviro.com
www.capitalenviro.com

April 13, 2021

NY District US Army Corps of Engineers
Regulatory Branch
26 Federal Plaza, Room 16-406
New York, New York 10278-0090

Re: Wetland Delineation Report
Dolsontown Road – SBL: 6-1-3.31 & 6-1-3.32
Middletown, NY 10940

To Whom It May Concern,

Capital Environmental Consultants, Inc., in conjunction with EnSol, Inc., submit the following Wetland Delineation Report and associated attachments, for the jurisdictional determination at Dolsontown Road, SBL: 6-1-3.31 & 6-1-3.32, Middletown, New York:

- Attachment A: Wetland Delineation Report for Dolsontown Road, prepared by EnSol, Inc., Dated December 2020.
- Attachment B: Site Survey, prepared by Lanc & Tully Engineering and Surveying, P.C., Dated November 16, 2020.
- Attachment C: United States Army Corps of Engineers Jurisdictional Determinations Checklist.
- Attachment D: Aquatic Resources Spreadsheet.

If you have any questions or comments, I will be available at any time via phone (845) 383-1114 via email gfleischer@capitalenviro.com.

Sincerely,

Capital Environmental Consultants, Inc.

Greg M. Fleischer,
PWS

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gfleischer@capitalenviro.com
www.capitalenviro.com

Attachment A

Wetland Delineation Report for Dolsontown Road Tax IDs 6-1-3.31 & 6-1-3.32

DOM KAM LLC
Middletown, New York

December 2020

Prepared by

EnSol

661 Main Street
Niagara Falls, New York 14301

Wetland Delineation Report for Dolsontown Road Tax IDs 6-1-3.31 & 6-1-3.32

DOM KAM, LLC
Middletown, New York

December 2020

Prepared by

EnSol, Inc.
661 Main Street
Niagara Falls, New York 14301

Table of Contents

C Representative Photos

D References

1. Introduction

366 Highland DMI, LLC owns two parcels, Parcel 6-1-3.32 (39.2acres) and Parcel 6-1-3.31 (5.10 acres) in the Town of Wawayanda, Orange County, New York. The properties are bounded by Dolsontown Road to the north, Interstate 84 to the south, and undeveloped land parcels to the east and west. Figure 1-1 shows the parcel locations on an aerial regional map. Figure 1-2 displays the parcel locations on a USGS 7.5-minute quadrangle map, and Figure 1-3 depicts an aerial map of the parcels.

Marangi Disposal retained EnSol, Inc. (EnSol) to conduct a wetland delineation within an 18.8-acre area (delineation area) in the northwest portion of the site, which contained part of Parcel 6-1-3.32 and all of Parcel 6-1-3.31. The wetland delineation was conducted to determine the extent of any United States Army Corps of Engineers (USACE) or New York State Department of Environmental Conservation (NYSDEC) jurisdictional wetlands in accordance with Section 404 of the Clean Water Act and Article 15 and Article 24 of the New York State Environmental Conservation Law, respectively.

The wetland delineation was conducted on November 3, 2020 by David Lenox, PE, and Ryan Elliott, MS. The delineation was conducted in accordance with the January 1987 Corps of Engineers Wetland Delineation Manual, and the January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2). The purpose of this report is to describe the site conditions, the wetland delineation procedure, the results, and provide recommendations.

NOTES:

1. SOURCE: GOOGLE EARTH IMAGERY ACCESSED ON 10/19/20.

REGIONAL MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

DOM KAM LLC

TOWN OF WAWAYANDA, ORANGE COUNTY, STATE OF NEW YORK

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FIGURE 1-1

NOVEMBER 2020

PN: 20-0062

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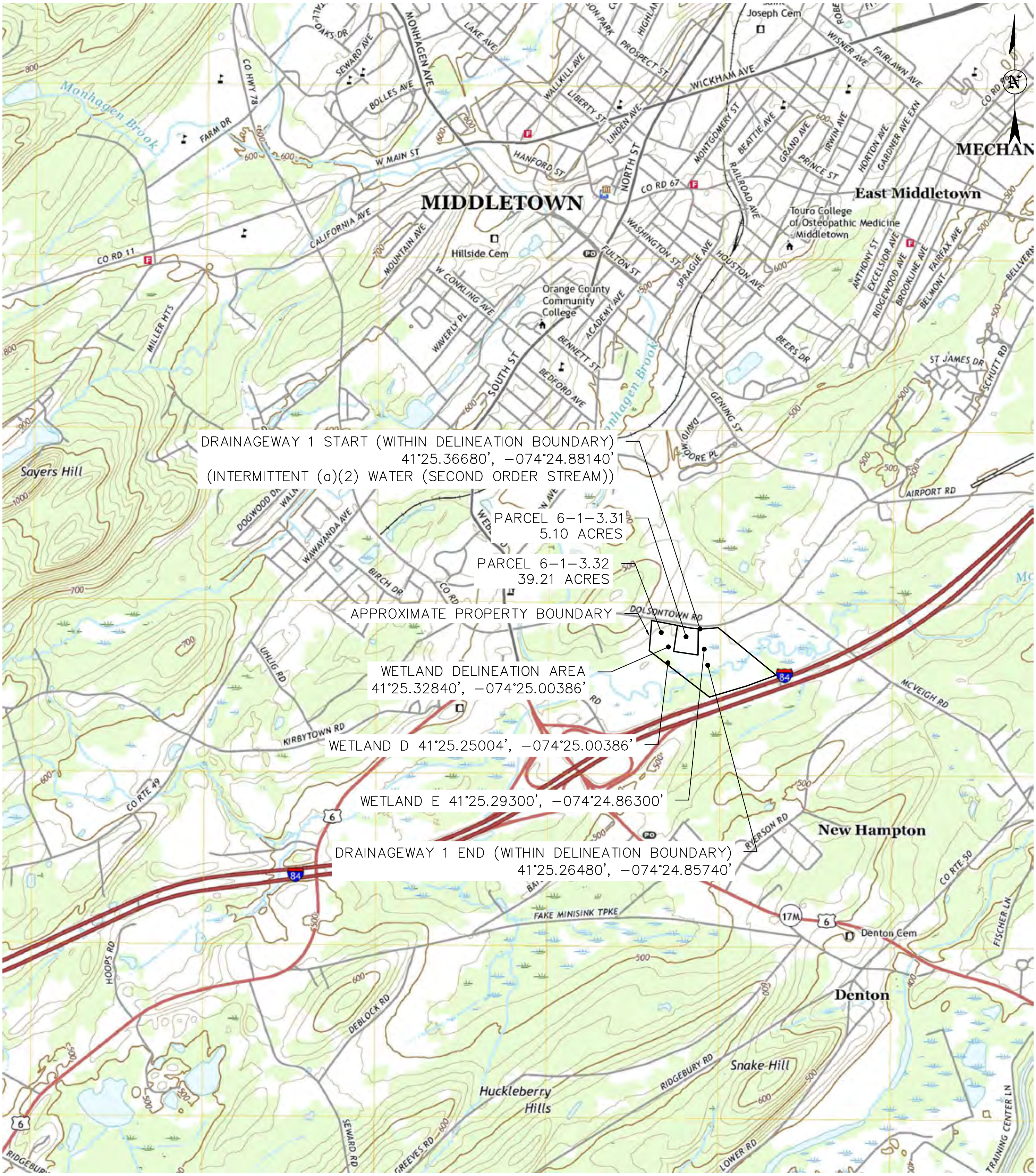

NOTES:

1. SOURCE: USGS MIDDLETOWN QUADRANGLE 7.5 MINUTE SERIES
2. DRAINAGEWAY 1 NOT SHOWN, BUT COORDINATES OF START AND END POINTS ARE PROVIDED. SEE FIGURE 5-1 FOR A DEPICTION OF THIS REACH.

VICINITY MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

DOM KAM LLC

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FIGURE 1-2

DECEMBER 2020 | PN: 20-0062

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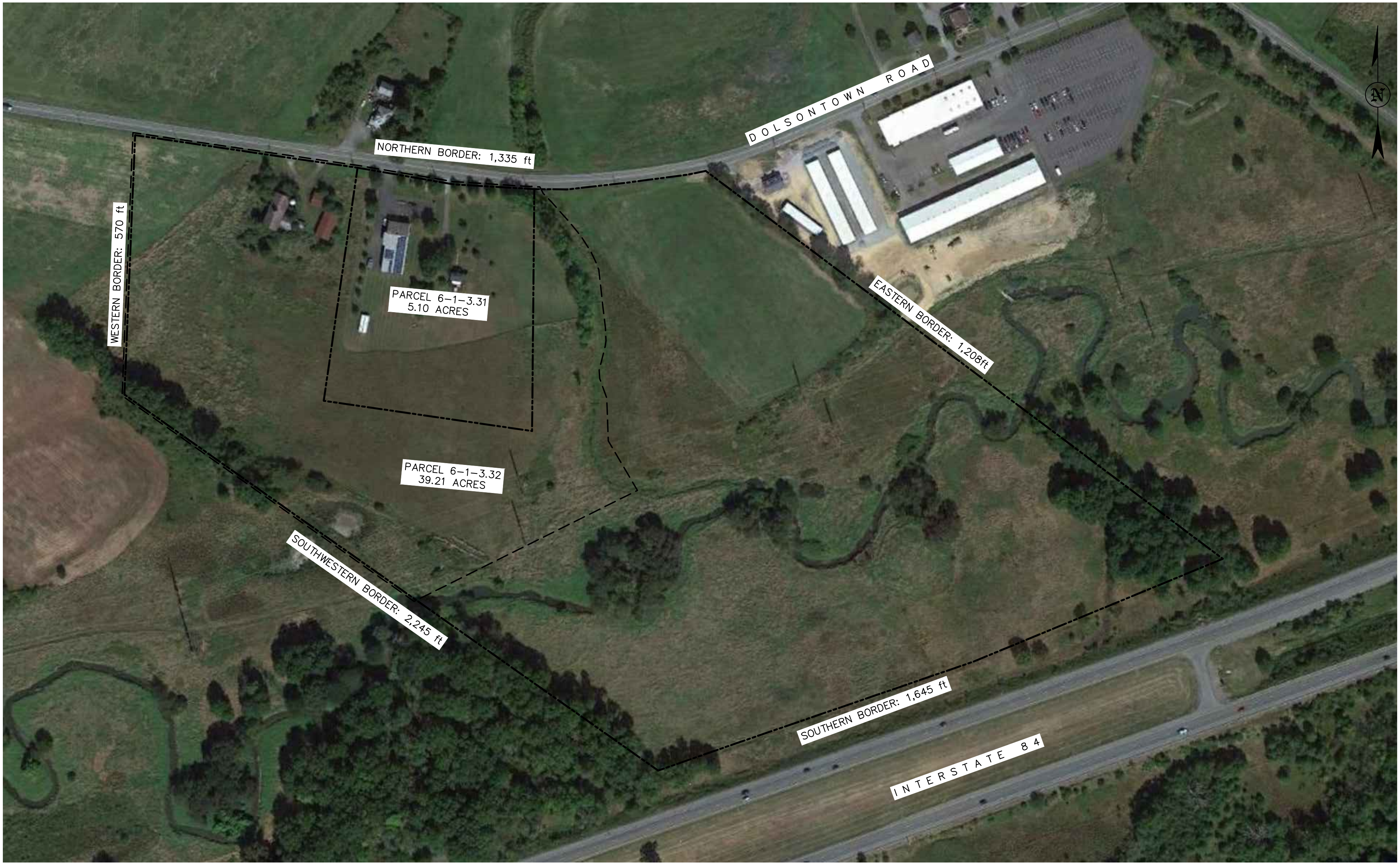

NOTES:

1. SOURCE: GOOGLE EARTH IMAGERY ACCESSED ON 10/19/20.

LEGEND:

PROPERTY BOUNDARY

WETLAND DELINEATION AREA

AERIAL MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

DOM KAM LLC

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FIGURE 1-3

DECEMBER 2020

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2. Site Description

The site has an approximate area of 44.3 acres, with a width of 1,335 feet at the northern boundary, 1,208 feet at the eastern boundary, 1,645 feet along the southern boundary, 2,245 feet along the southwestern border, and 570 feet along the western boundary as shown on Figure 1-3. The parcels are within the Masonic Creek-Wallkill River Watershed (HUC-12: 020200070401), the area of which is approximately 30,150 acres. Surface runoff on the parcels drains to two drainageways - Monhagan Brook, which flows west to east across the site and an unnamed tributary to Monhagan Brook (Drainageway 1), which flows north to south across the site. Drainageway 1 discharges to Monhagan Brook near the center of Parcel 6-1-3.32, after which the brook flows to the east before leaving the site. The connection between Drainageway 1 and Monhagan Brook is shown on Figure 1-3. The drainage area of the Drainageway 1 is 659-acres (U.S. Geological Survey, 2016). The path of this tributary shown in StreamStats is different from actual site conditions, so this acreage is approximate. The drainage area of Monhagan Brook where it exits the site is approximately 9,856 acres (U.S. Geological Survey, 2016). Average annual precipitation in these drainage areas is approximately 40 inches per year (U.S. Geological Survey, 2016). Monhagan Brook continues to flow east until the brook discharges to the Wallkill River. The Wallkill River flows to the northeast before joining Rondout Creek. Water continues to flow northeast in the creek until the water is discharged to the Hudson River. The distance between Monhagan Brook where it exits Parcel 6-1-3.32, and the Hudson River is approximately 55.6 river miles or 41.5 aerial miles. The topography of the site is generally flat (0 to 3%) with steeper slopes (3 to 8%) in the northern portion of the site.

Parcel 6-1-3.32 was historically used as a dairy farm and more recently has been managed by mowing. Areas near the small pond near Wetland D and adjacent to the tributary to Monhagan Brook are excluded from mowing efforts, likely due to wetter conditions at these locations. Parcel 6-1-3.31 was most recently used for a commercial business, Bianchi Floors Inc., and a residence. Solar panels were installed on this parcel in 2014. Open areas of Parcel 6-1-3.31 are managed by mowing. Due to the current low impact uses of the site there is limited potential for pollution to be generated within the wetland delineation area.

3. Environmental Resource Analysis

In preparation for the wetland delineation several sources of information were analyzed to identify potential wetland and waterbody features within the proposed project area and to become more familiar with the site conditions. The sources analyzed include:

- United States Department of Agriculture (USDA) National Resources Conservation Service Soil Survey;
- NYSDEC Environmental Mapper; and,
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Mapper.

3.1 Soil Survey

Figure 3-1 shows the USDA National Resources Conservation Service soil survey results for the wetland delineation area. As Figure 3-1 shows, there are three mapped soil types within the delineation area which are listed in Table 3-1:

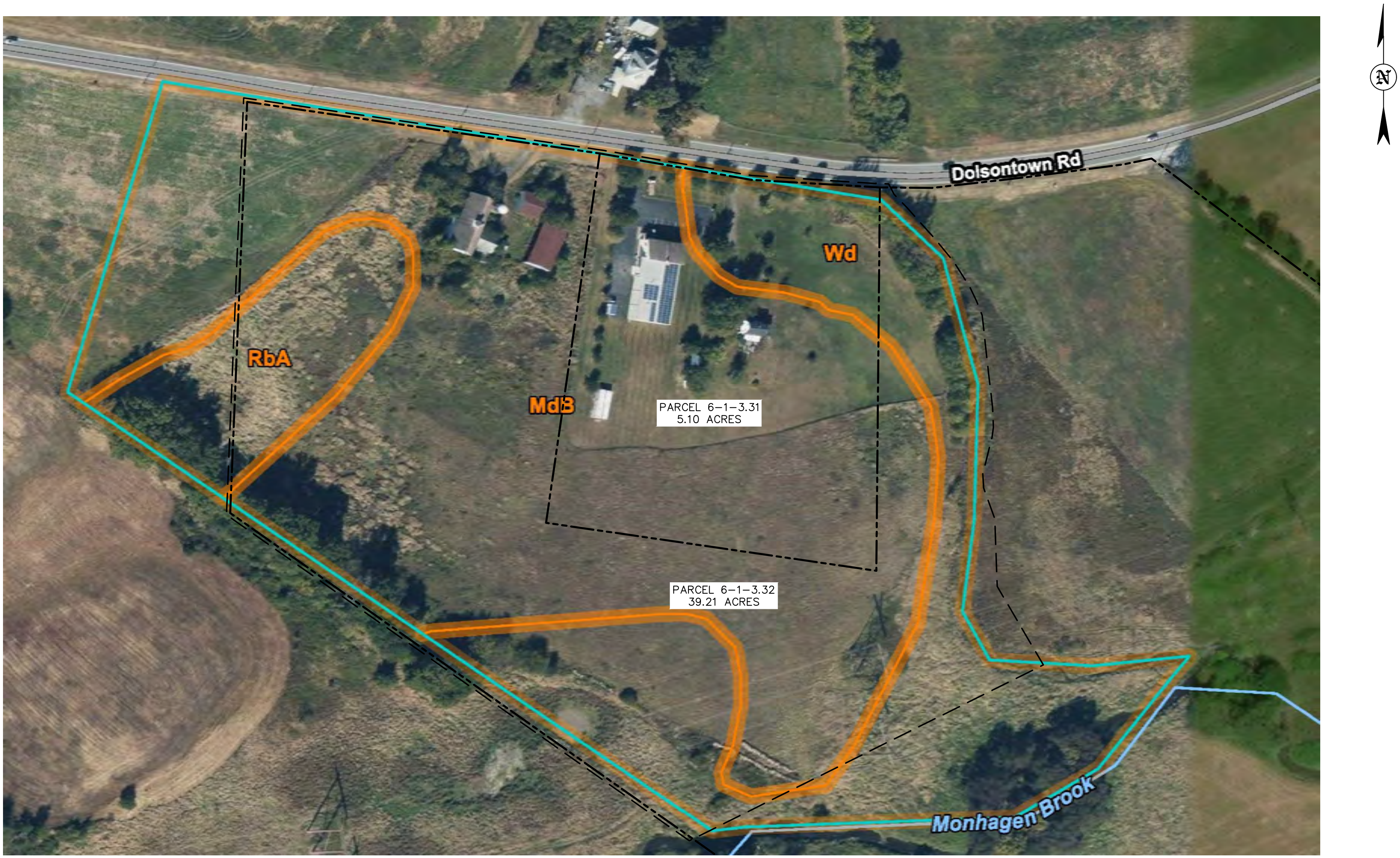
Table 3-1. Soil Survey Results

Map Unit Symbol	Map Unit Name	Hydric Soil Rating	Hydrologic Soil Group
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	0	D
RbA	Rhinebeck silt loam, 0 to 3 percent slopes	5	C/D
Wd	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	90	B/D

The soil map was analyzed for the presence of hydric soil inclusions, which are defined by the National Technical Committee for Hydric Soils as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Mardin gravelly silt loam consists of gravelly silt loam derived from loamy till and is found on hills and mountains near the summit or shoulder. Mardin gravelly silt loam is classified as moderately well drained. The Mardin gravelly silt loam is in hydrologic soil group D and none of the map units are rated hydric.

The Rhinebeck silt loam and silty clay loam derived from clayey and silty glaciolacustrine deposits and is typically found on the footslope of lake plains. Rhinebeck silt loam is somewhat poorly drained. The Rhinebeck silt loam is in hydrologic soil group C/D and five percent of the Rhinebeck silt loam map units are rated hydric.

The Wayland soils complex is comprised Wayland and Wayland, Very Poorly Drained soils. Both are principally comprised of silt loam with parent material consisting of silty and clayey alluvium derived from interbedded sedimentary rock and are typically found on treads of floodplains. Wayland soils are poorly drained and Wayland, Very Poorly Drained soils are very poorly drained. Both soils are in hydrologic soil group B/D and 90 percent of the Wayland soils complex map units are rated as hydric.



LEGEND:

RbA	RHINEBACK SILT LOAM
Wd	WAYLAND SOILS COMPLEX
MdB	MARDIN GRAVELLY SILT LOAM
— · · —	PROPERTY BOUNDARY
— — —	WETLAND DELINEATION AREA

NOTES:

1. SOURCE: SOIL MAP GENERATED FROM THE USDA NATURAL RESOURCE CONSERVATION SERVICE.

SCALE: 100' 0' 100' 200'

SOIL SURVEY MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

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FIGURE 3-1

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3.2 Environmental Resource Mapper

The results of the NYSDEC Environmental Resource Mapper review are shown in Figure 3-2. The parcels contain two mapped Class C waterbodies – Monhagan Brook and an unnamed tributary to Monhagan Brook. Based on examination of the underlying imagery, it appears that this unnamed tributary is located incorrectly because there is no evidence of a drainageway in that location on aerial imagery. EnSol is of the belief that this tributary should follow the path of Drainageway 1, which appears in Figure 3-2 to the west of the unnamed tributary. There are no mapped NYSDEC regulated wetlands within the parcels, but two Class 2 wetlands (IDs: MD-23 and MD-19) can be seen in Figure 3-2. The site is also located within the vicinity of bats listed as endangered or threatened.

3.3 National Wetlands Inventory Mapper

The results of the USFWS NWI mapper are shown in Figure 3-3. Freshwater emergent wetlands (PEM1E) shown on the NWI mapper are associated with Monhagan Brook, the tributary to Monhagan Brook, the pond located north of Monhagan Brook, and a wooded area along the southwest border of Parcel 6-1-3.32. Monhagan Brook itself is also mapped as an upper perennial, permanently flooded riverine system with unconsolidated bottom (R3UBH). The tributary to Monhagan Brook is listed as a freshwater emergent wetland although water flows through a swale towards Monhagan Brook. Part of the freshwater emergent wetland along the southwestern border of Parcel 6-1-3.32 was included as part of Wetland C, but the dimensions of this wetland are different than those shown by the NWI mapper.

3.4 Information for Planning and Consultation

Using the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) tool a species list was generated containing species that may potentially be affected by activities in this location. The species list contains one endangered species, the Indiana Bat (*Myotis sodalis*), and two threatened species, the Northern Long-eared Bat (*Myotis septentrionalis*), and the Small Whorled Pogonia (*Isotria medeoloides*). The species list also contains five migratory birds. When planning work for the site it is important that care is taken not to disrupt these species when they are likely to occur at the site. These species include bald eagle (*Haliaeetus leucocephalus*), black-capped chickadee (*Poecile atricapillus practicus*), bobolink (*Dolichonyx oryzivorus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*). Potential habitat for *H. leucocephalus*, *P. atricapillus practicus*, *E. carolinus*, and *H. mustelina* exists in hedgerow and floodplain forest type vegetation communities. Potential breeding habitat for *D. oryzivorus* and foraging habitat for *E. carolinus* exists in the meadow and successional old field areas of the site. *E. carolinus* is reported not to breed in the project area.

3.4.1 Indiana Bat (*Myotis sodalis*) – Endangered

M. sodalis uses trees with characteristics like loose or shaggy bark, crevices, and hollows as summer roosting habitat, with these characteristics typically being more important than the tree species. Females have been noted to roost in trees with a diameter at breast height (dbh) as small as 5 inches, while males have been seen roosting in trees as small as 3 inches dbh (U.S. Fish and Wildlife Service, 2008). Trees with suitable characteristics for summer roosting habitat were seen on the site, particularly in the hedgerow along the southwest border of Parcel

6-1-3.32. However, IPaC results indicate that the project site is outside of the area designated as critical habitat for this species.

3.4.2 Northern Long-eared Bat (*Myotis septentrionalis*) - Threatened

Like *M. sodalis*, *M. septentrionalis* uses live or dead trees greater than or equal to three inches dbh with loose or shaggy bark, crevices, and hollows as summer roosting habitat (U.S. Fish and Wildlife Service, 2014). As noted above, the hedgerow along the southwest border of Parcel 6-1-3.32 contains trees that have these characteristics. The project site is not within 1.5 miles of a known summer occurrence. The project site is within five miles of Goshen, New York, which has NYSDEC documented winter occurrences of *M. septentrionalis*, however none of the coordinates provided by the USWFS are within five miles of the site.

3.4.3 Small Whorled Pogonia (*Isotria medeoloides*) – Threatened

I. medeoloides is a perennial member of the orchid family that is typically found in mixed-deciduous or mixed-deciduous/coniferous forests in second or third-growth successional stages. This species is commonly found in areas where there are breaks in the forest canopy and may be limited by light availability (U.S. Fish and Wildlife Service, 2019). The hedgerow on the southwest corner of Parcel 6-1-3.32 may provide suitable habitat for this species, however, the canopy cover has few breaks, which may impact this species' ability to survive in this area. *I. medeoloides* was not observed during the wetland delineation.

LEGEND:

PROPERTY BOUNDARY

WETLAND DELINEATION AREA

NOTES:

1. SOURCE: SOIL MAP GENERATED FROM THE USDA NATURAL RESOURCE CONSERVATION SERVICE.

SCALE: 400' 0' 400' 800'

ENVIRONMENTAL RESOURCE MAPPER

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

DOM KAM LLC

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Environmental Solutions

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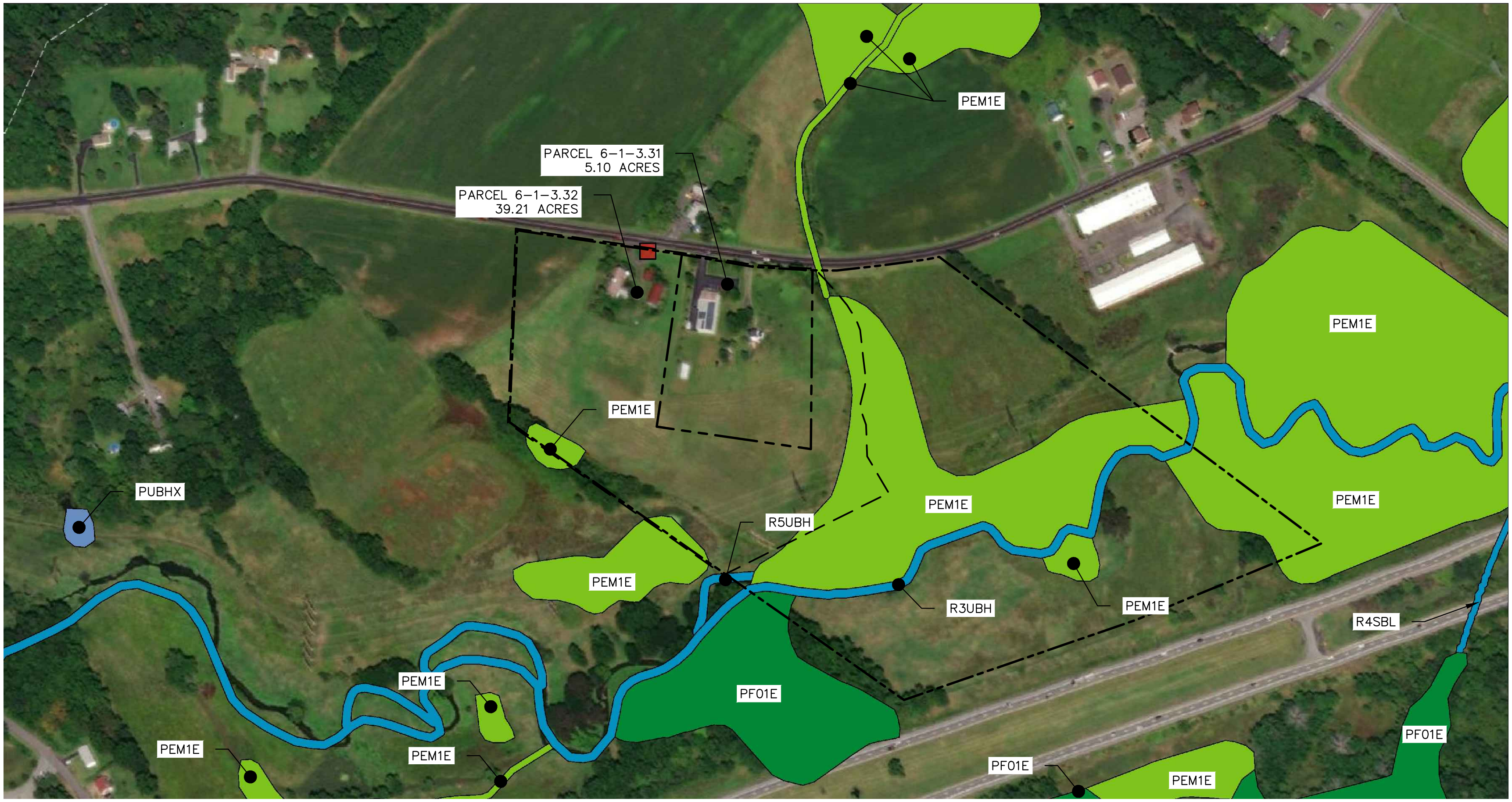
FIGURE 3-2

DECEMBER 2020

PN: 20-0062



LEGEND:

PROPERTY BOUNDARY

WETLAND DELINEATION AREA

NOTES:

1. SOURCE: INFORMATION OBTAINED FROM THE NYSDEC ENVRIONMENTAL RESOURCE MAPPER.

SCALE: 250' 0' 250' 500'

NATIONAL WETLANDS INVENTORY MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

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FIGURE 3-3

DECEMBER 2020

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4. Wetland Delineation Method

The wetland delineation was completed in accordance with the January 1987 Corps of Engineers Wetlands Delineation Manual and the January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2). The Level 2 Routine Determination Method described in Part IV Section D of the January 1987 Corps of Engineers Wetlands Delineation Manual was used. The Level 2 Routine Determination method requires onsite inspection, as insufficient information was available for making a desktop wetland determination across the entire site.

The site was evaluated to determine if any atypical conditions existed, such as sufficient natural or human-induced alteration to significantly alter the area vegetation, soils and/or hydrology. Much of the wetland delineation area vegetation had been recently mowed, including at Observation Points W01, W02, W03, U03, and W06.

The Antecedent Precipitation Tool (APT) was used to determine if normal circumstances were present during the site investigation. The APT was run for the site using November 2, 2020 as the input date. The APT indicated that normal circumstances were present (Attachment B). The only 30-day period determined to be drier than normal was from September 4 to October 3, 2020, corresponding to a mild drought during the month of September, indicated by the Palmer Drought Severity Index (PDSI). The WebWIMP H_2O balance indicated that the wetland delineation was conducted during the wet season.

In total nine sample points were used to characterize the proposed project area. Wetland Determination Data Forms were completed for each sample point and are included in Attachment A. For each sample point, determinations are made regarding the presence of the following wetland indicators:

- Wetland Hydrology Indicators;
- Hydric Soil Indicators; and,
- Hydrophytic Vegetation.

4.1 Wetland Hydrology Indicators

The January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2) provides guidelines for determining the presence of wetland hydrology indictors. The criteria for the presence of wetland hydrology are met if one primary indicator is observed or a minimum of two secondary indicators are observed. The primary and secondary hydrologic indicators are listed on the Wetland Determination Data Forms. Primary indicators include surface water, high water table, soil saturation, oxidized rhizospheres on living roots. Secondary indicators of wetland hydrology include geomorphic position and a positive FAC-neutral test.

4.2 Hydric Soil Indicators

The January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2) provides guidelines for determining the presence of hydric soil indicators. The Field Indicators of Hydric Soils in the Unites States: A Guide for Identifying and Delineating Hydric Soil Version 8.2 was also used. Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment. Hydric soil indicators are organized into three groups including All Soils, Sandy Soils, and Loamy and Clayey Soils. Hydric soil indicators are based on the soil color and presence of redox features formed by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment.

Soils were examined in the field utilizing a sharpshooter shovel. The soils were excavated to the depth needed to document a hydric soil indicator or to confirm the absence of indicators. The soil colors were identified using a 2009 Munsell Soil Color Book and recorded on the Wetland Determination Data Forms. The presence of redox concentrations and depletions, and soil texture were also recorded on the Wetland Determination Data Forms. Soils were evaluated both within and outside the wetland boundaries.

4.3 Hydrophytic Vegetation Determination

The January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2) provides guidelines for determining the predominance of hydrophytic vegetation. Species present in the following plot sizes and vegetation strata were recorded on the Wetland Determination Data Forms:

- Tree Stratum (woody plants three inches or more in diameter at breast height): 30-foot radius;
- Sapling/Shrub Stratum (woody plants less than three inches in diameter at breast height and greater than or equal to one meter tall): 15-foot radius;
- Herb Stratum (all herbaceous plants and woody plants less than one meter tall): five-foot radius; and,
- Woody Vines (all woody vines greater than one meter in height): 30-foot radius.

The abundance of each species was determined by using areal coverage estimates and was recorded on the Wetland Determination Data Forms. Dominant plant species were determined using the 50/20 rule, in which plant species that individually or collectively account for more than 50 percent of the total coverage of vegetation in the stratum, plus any other species that, by itself accounts for at least 20 percent of the total aerial coverage of a stratum are identified as dominant species. The wetland indicator status is also listed for each plant species, using the USACE Northcentral and Northeast 2018 Regional Wetland Plant List. The wetland indicator status categories include the following:

- OBL: Plants that have a greater than 99 percent chance of occurring in wetlands under natural conditions, and a less than one percent chance of occurring in non-wetlands;
- FACW: Plants that have a 67 to 99 percent chance of occurring in wetlands under natural conditions, and a one to 33 percent chance of occurring in non-wetlands;
- FAC: Plants that have a 33 to 67 percent chance of occurring in both wetlands and non-wetlands;
- FACU: Plants that have a one to 33 percent chance of occurring in wetlands, and a 67 to 99 percent chance of occurring in non-wetlands; and,
- UPL: Plants that have a less than one percent chance of occurring in wetlands, and a greater than 99 percent chance of occurring in non-wetlands.

To determine the predominance of hydrophytic vegetation a four-tiered approach of indicators is used, including:

- Rapid Test for Hydrophytic Vegetation: All dominant species across all strata are rated OBL or FACW, or a combination of these two categories;

- Dominance Test: More than 50 percent of the dominant plant species across all strata are rated OBL, FACW, or FAC;
- Prevalence Index: The prevalence index is calculated per the Wetland Determination Data Form, an index of three or less indicates that hydrophytic vegetation is present; and,
- Morphological adaptations: The plant community passes either the dominance test or the prevalence index after reconsideration of the wetland indicator status of a certain plant species that exhibit morphological adaptations for life in wetlands.

If the hydrology, soils, and vegetation at a sample point all met the required wetland indicators the boundary of the wetland was determined and marked with pink nylon flagging. Wetlands and their associated flag numbers were labeled in numerical order. The location of each flag and the sample points were recorded with the Garmin GPSMap 64st handheld Global Positioning System (GPS). Identified wetlands were classified according to the March 2014 Ecological Communities of New York State Second Edition (Edinger et al.). The results of the wetland delineation are discussed in Section 5 of this report.

5. Wetland Delineation Results

The wetland delineation was conducted within the delineation area on November 3, 2020. The delineation identified 6 wetland areas within the 18.8-acre delineation area. Table 5-1 lists the delineated wetlands, their area, community type, and the apparent jurisdictional determination. Table 5-2 lists the drainage features identified on the site. Figure 5-1 shows the wetland vegetation communities within the project area. Representative photos of the sample points are shown in Attachment C. References used for the wetland delineation are included in Attachment 4. The vegetation communities are described based on the March 2014 Ecological Communities of New York State Second Edition (Edinger et al.).

Table 5-1. Wetland Delineation Results Summary

Wetland Identification	Wetland Boundary Flags	Area (Acres)*	Vegetation Community (Edinger et al. 2014)	Apparent Jurisdictional Determination
Wetland A	WA-1 through WA-12	0.003	Wet Meadow	Non-jurisdictional
Wetland B	WB-1 through WB-7	0.09	Wet Meadow	Non-jurisdictional
Wetland C	WC-1 through WC-25	0.44	Wet meadow	Non-jurisdictional
Wetland D**	WD-1 through WD-21	0.52	Shallow Emergent Marsh	Jurisdictional
Wetland E***	WE-1 through WE-31	1.57	Shallow Emergent Marsh	Jurisdictional
Wetland F	WF-1 through WF-9	0.08	Wet Meadow	Non-jurisdictional
Shallow Emergent Marsh, Total	N/A	2.09	Shallow Emergent Marsh	N/A
Wet Meadow, Total	N/A	0.61	Wet meadow	N/A

*Acreages listed in this table are the acreages of delineated wetland within the property boundaries.
** Wetland D is believed to continue to the south-southwest outside of the property boundaries.
*** Wetland E is believed to continue on the eastern side of Drainageway 1 and south to Monhagan Brook.

Table 5-2. Drainage Features

Drainage Identification Number	Approximate Length within Delineation Limit (feet)	Description	Apparent Jurisdictional Determination
Drainageway 1	736	Intermittent channel	Jurisdictional

One drainage feature was observed during the delineation. As shown on Figure 5-1, Drainageway 1 flows onto the site after crossing under Dolsontown Road to the north of the site. This drainageway then flows north to south through the site, eventually discharging to Monhagan Brook. Monhagan Brook was outside the limits of the delineation area. Drainageway 1 is mapped and is classified as a Class C waterbody in the NYSDEC Environmental Resource Mapper and as a freshwater emergent wetland (PEM1E) in the National Wetlands Inventory Mapper, though the location of the Drainageway appears to be misrepresented on the Environmental Resource Mapper, as discussed in Section 3.2. The bed of this drainageway was composed of silt and gravel and was uniformly covered with emergent vegetation. During the delineation flowing water was measured to be 1 foot 9 inches deep in the center of the channel with an ordinary high-water mark at approximately 30 feet wide. Using StreamStats (U.S. Geological Survey, 2016) with bankfull statistics (Mulvihill et al., 2009) the bankfull streamflow in Drainageway 1 is estimated to be 85.5 cubic feet per second. These observations were made with normal conditions present, following a mild drought in September 2020. Evaluation of aerial imagery suggests that this stream commonly flows during spring following snow melt and occasionally in autumn (Google Earth Pro, 2020). These observations suggest that flow in Drainageway 1 is likely intermittent.

The vegetation community in Wetlands A, B, C, and F is a wet meadow. Wetland B was dominated by lamp rush (*Juncus effusus*). In Wetlands A, C, and F *J. effusus* was also dominant, but other species were co-dominant – in Wetland A foxtail sedge (*Carex vulpinoidea*) was co-dominant; in Wetland C blunt broom sedge (*Carex tribuloides*) was co-dominant; and in Wetland F reed canary grass (*Phalaris arundinacea*) and *C. vulpinoidea* were co-dominant. Other species seen in these wetlands include purple loosestrife (*L. salicaria*), willow herb (*Epilobium* sp.), Canada thistle (*Cirsium arvense*), and one unidentified species in the Asteraceae family. Primary hydrology indicators at Sample Point W03(Wetland C) included surface water (A1), high water table (A2), saturation (A3), and oxidized rhizospheres on living roots (C3). No primary hydrology indicators were observed at Sample Points W01 (Wetland A), W02 (Wetland B), and W06 (Wetland F). Secondary hydrology indicators at Sample Points W01, W02, W03, and W06 included geomorphic position (D2) and a positive FAC-neutral test (D5).

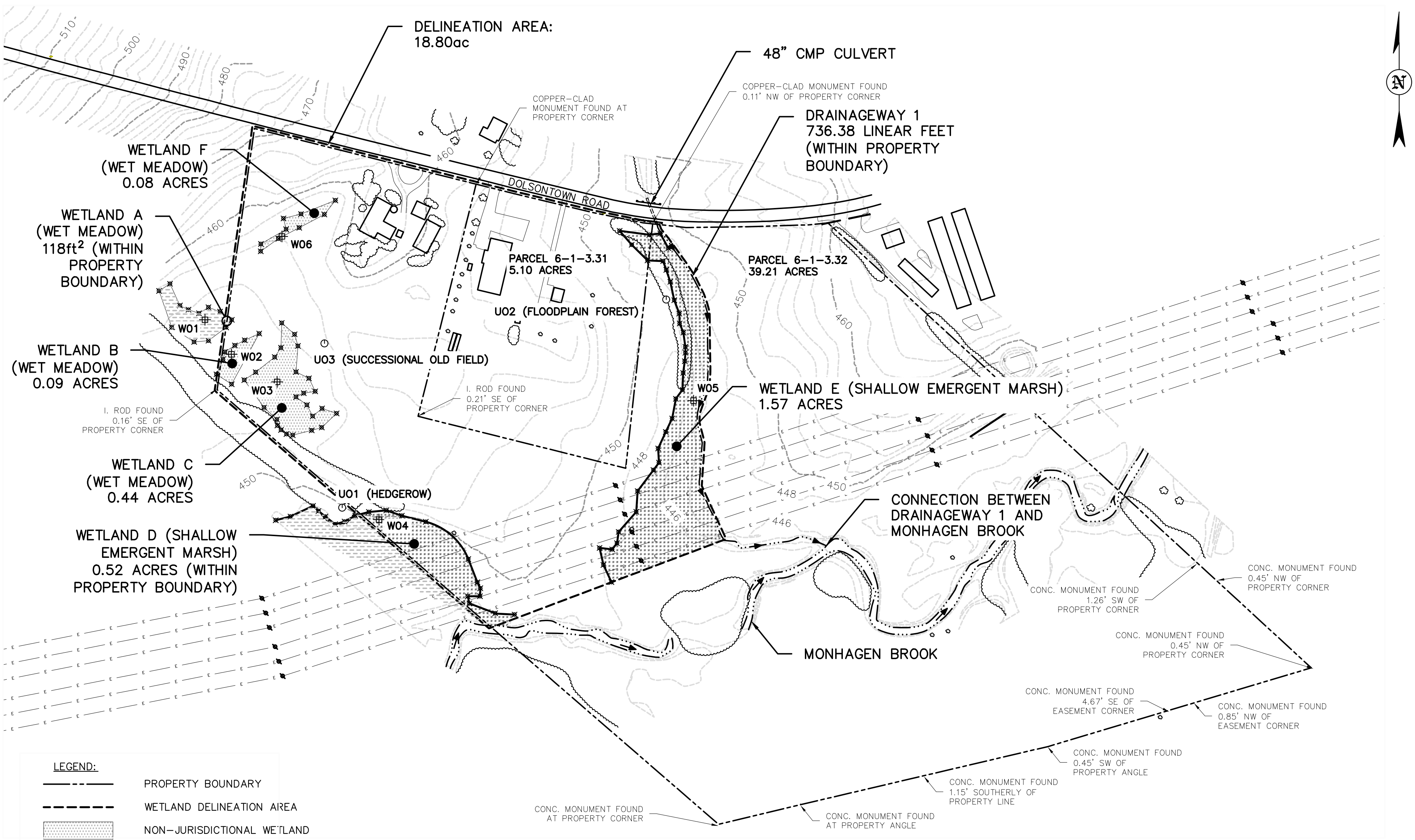
The vegetation community in Wetlands D and E are best classified as shallow emergent marsh. Dominant species in Wetland D include cattail hybrid (*Typha x glauca)*, *P. arundinacea*, and arrow-leaved tearthumb (*Persicaria sagittata*). Wool grass (*Scirpus cypernius*) was also present in Wetland D. Wetland E was dominated by *P. arundinacea* but also included other species characteristic of emergent wetlands such as *L. salicaria*, green bulrush (*Scirpus atrovirens*), and blue vervain (*Verbena hastata*). The vegetation community becomes more diverse near Drainageway 1 and more dominated by *P. arundinacea* farther from the drainageway. One unidentified species in the *Carex* genus was found in Wetland E. This sedge is thought to be lurid sedge (*Carex lurida*) because the inflorescence of *C. lurida* was found within the borders of the wetland, though it was not found near a growing sedge. Primary hydrology indicators at Sample Points W04 (Wetland D) and W05 (Wetland E) included high water table (A2), saturation (A3), and oxidized rhizospheres on living roots (C3). Secondary hydrology indicators at W04 and W05 included geomorphic position (D2) and a positive FAC-neutral test (D5).

Sample Point U01 was located at the edge of a hedgerow that runs along the southwestern edge of Parcel 6-1-3.32. The vegetation community at this sample point was dominated by pin oak (*Quercus palustris*), *P. arundinacea*, and *C. tribuloides*. The vegetation community at Sample Point U02 is similar to that of a floodplain forest community, dominated by silver maple (*Acer saccharinum*), though hydric soil and hydrology indicators were lacking at this site. The vegetation community at Sample Point U03 is a successional old field dominated by timothy (*Phleum pratense*) with some herbaceous species typically found in successional old fields, though no shrubs were present. Both parcels appear to be mowed at least yearly, which prohibits the establishment of more successional species from establishing. Mowing appears to occur more frequently on part of Parcel 6-1-3.31 near the onsite residence. No primary hydrology indicators were observed at any of the upland sample points. A positive FAC-neutral test (D5) was observed at Sample Points U01 and U02. No secondary hydrology indicators were observed at Sample Point U03.

Table 5-3 summarizes the hydric soil indicators observed at each sample point location. No hydric soil indicators were observed at any of the three upland sample points, so these points are excluded from Table 5-3.

Table 5-3 Hydric Soil Indicators Summary

Wetland Sample Point	Wetland	Hydric Soil Indicator
W-1	Wetland A	Depleted below dark surface (A11) Depleted matrix (F3)
W-2	Wetland B	Redox dark surface (F6)
W-3	Wetland C	Depleted matrix (F3)
W-4	Wetland D	Depleted matrix (F3)
W-5	Wetland E	Redox dark surface (F6)
W-6	Wetland F	Depleted matrix (F3)



LEGEND:

—·—·—	PROPERTY BOUNDARY
— — —	WETLAND DELINEATION AREA
	NON-JURISDICTIONAL WETLAND
	JURISDICTIONAL WETLAND
	FIELD DELINEATED WETLAND (OUTSIDE OF PROPERTY BOUNDARY)
	WETLAND DELINEATION FLAG
	WETLAND SAMPLE POINT
	UPLAND SAMPLE POINT
	STREAM
	TREE LINE
	TREE
—— E ——	OVERHEAD POWER LINES AND POLES
	EXISTING BUILDING

NOTES:

1. TOPOGRAPHY, PROPERTY BOUNDARIES, AND WETLAND FLAG LOCATIONS WERE OBTAINED FROM A SURVEY CONDUCTED BY LANE&TULLEY ENGINEERING AND SURVEYING, P.C.
2. SAMPLE POINT LOCATIONS WERE RECORDED USING A GARMIN GPSMAP 64st HANDHELD GPS.
3. TABLES 5-1 AND 5-2 OUTLINE ACREAGE AND LINEAR FEET OF JURISDICTIONAL AND NON-JURISDICTIONAL FEATURES WITHIN THE WETLAND DELINEATION AREA.

SCALE: 150' 0' 150' 300'

WETLAND DELINEATION MAP

DOLSONTOWN ROAD WETLAND DELINEATION REPORT

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FIGURE 5-1

FEBRUARY 2021

PN: 20-0062

6. Recommendations

During the wetland delineation six wetland areas and one drainage feature were identified through the methods described in the January 1987 Corps of Engineers Wetlands Delineation Manual and the January 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2). The Environmental Protection Agency (EPA) and the USACE's Navigable Waters Protection Rule: Definition of "Waters of the United States" became effective in 49 states (except Colorado) and in all US territories on June 22, 2020.

It is EnSol's professional opinion that Drainageway 1 is jurisdictional under the new "Waters of the United States" rule. Drainageway 1 is mapped on the National Wetlands Inventory as a freshwater emergent wetland and as a Class C waterbody by the NYSDEC Environmental Resource Mapper. The location of Drainageway 1 appears to match the natural topography of the site indicating that the drainageway is a natural tributary.

It is also EnSol's professional opinion that Wetlands D and E are jurisdictional adjacent wetlands under the new rule. Wetland D is adjacent to Monhagan Brook, an (a)(2) water (a natural tributary to a water which is currently used, or was used in the past, or may be susceptible to use in interstate or foreign commerce) and is separated only by a natural bank, as shown in Figure 5-1. Wetland E is adjacent to and abuts Drainageway 1 which is also an (a)(2) water.

EnSol does not believe that Wetlands A, B, C, or F are jurisdictional under the new "Waters of the United States" rule as they do not abut, nor do they appear to be inundated by flooding in a typical year by either Drainageway 1 or Monhagan Brook.

Attachment A

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsentown Road City/County: Wawayanda/Orange Sampling Date: 11-3-2020
Applicant/Owner: Mavangi Disposal State: NY Sampling Point: WC1
Investigator(s): RJE, DAL Section, Township, Range: ______
Landform (hillslope, terrace, etc.): Toe slope Local relief (concave, convex, none): Concave Slope (%): 0-3%
Subregion (LRR or MLRA): LRR R Lat: 41° 25.3181 Long: -74° 25.090' Datum: WGS 84
Soil Map Unit Name: Rhinebeck silt loam, 0-3% slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☒, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	If yes, optional Wetland Site ID: Wetland A
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: (Explain alternative procedures here or in a separate report.)
Community type: Select from list
- Mild drought indicated by PDSI in September
- Area is mowed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐ No ☒	Depth (inches): ______
Water Table Present?	Yes ☐ No ☒	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ☐ No ☒	Depth (inches): ______

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
2 soil photos @ 8:15

VEGETATION – Use scientific names of plants.

Sampling Point: WC1

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juncus effusus	40	X	OBL
2. Carex Vulpinoidea	40	X	OBL
3. Phalaris arundinacea	20		FACW
4. Epilobium sp.	2		
5. Cirsium arvense	1		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	103 = Total Cover		

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- [ ] Rapid Test for Hydrophytic Vegetation
- [x] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes [X] No [ ]

Remarks: (Include photo numbers here or on a separate sheet.)

Photo @ 9:19 looking SW

SOIL

Sampling Point: W-I

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	100						
7-13	10YR 8/2	80	5YR 4/6	20	C	M	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [X] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (**LRR R, MLRA 149B**)
- [ ] Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- [ ] Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- [ ] Loamy Mucky Mineral (F1) (**LRR K, L**)
- [ ] Loamy Gleyed Matrix (F2)
- [X] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- [ ] Coast Prairie Redox (A16) (**LRR K, L, R**)
- [ ] 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- [ ] Dark Surface (S7) (**LRR K, L**)
- [ ] Polyvalue Below Surface (S8) (**LRR K, L**)
- [ ] Thin Dark Surface (S9) (**LRR K, L**)
- [ ] Iron-Manganese Masses (F12) (**LRR K, L, R**)
- [ ] Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- [ ] Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): ____

Hydric Soil Present? Yes [X] No [ ]

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda/Orange Sampling Date: 11-3-2020

Applicant/Owner: Marangi Disposal State: NY Sampling Point: WO2

Investigator(s): RJE, DAL Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Toe slope Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat: 41°25.305' Long: -74°25.077' Datum: WGS84

Soil Map Unit Name: Rhinebeck Silt loam, 0-3% slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ☒, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Hydric Soil Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐

Is the Sampled Area within a Wetland? Yes ☒ No ☐

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Community type: Select from list

- Mild drought indicated by PDSI in September
- Area is mowed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): ______
Water Table Present?	Yes ☐	No ☒	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches): ______

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil photo @ 9:21

VEGETATION – Use scientific names of plants. Sampling Point: WD2

Tree Stratum (Plot size: ________)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ________)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft)			
1. J. effusus	60	X	OBL
2. C. vulpinoidea	15		OBL
3. P. arundinacea	10		FACW
4. Lythrum salicaria	5		OBL
5. Asteraceae sp.	5		
6. Epilobium sp.	3		
7.			
8.			
9.			
10.			
11.			
12.			
	98 = Total Cover		

Woody Vine Stratum (Plot size: ________)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

Photo looking SE @ 9:28

SOIL

Sampling Point: W-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/1	98	5YR 4/6	2	C	M	Loam	moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): ____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda/Orange Sampling Date: 11-3-2020

Applicant/Owner: Marangi Disposal State: NY Sampling Point: W03

Investigator(s): RJE, DAL Section, Township, Range: ____

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 41°25.298' Long: -74°25.053' Datum: WGS84

Soil Map Unit Name: Mardin Gravelly Silt loam, 3-8% slopes NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ☒, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	If yes, optional Wetland Site ID: Wetland C

Remarks: (Explain alternative procedures here or in a separate report.)

Community type: Select from list

- Mild drought indicated by PDSI in September
- Area is mowed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒ No ☐	Depth (inches): 0	
Water Table Present?	Yes ☒ No ☐	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes ☒ No ☐	Depth (inches): 0	**Wetland Hydrology Present?** Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil photo @ 9:55

VEGETATION – Use scientific names of plants.

Sampling Point: W03

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5ft)			
1. J. effusus	65	X	OBL
2. Carex tribuloides	20	X	FACW
3. Carex vulpinoidea	10		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

Photo @ 9:45 looking SE

SOIL

Sampling Point: W-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 5/1	100					LOAM	MOIST
5-12"	10YR 5/1	95	7.5YR 3/4	5%	C	M	LOAM	MOIST

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ☐ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ☐ Dark Surface (S7) **(LRR K, L)**
- ☐ Polyvalue Below Surface (S8) **(LRR K, L)**
- ☐ Thin Dark Surface (S9) **(LRR K, L)**
- ☐ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ☐ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches):

Hydric Soil Present? Yes [X] No [ ]

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda / Orange Sampling Date: 11-3-2020
Applicant/Owner: Marangi Disposal State: NY Sampling Point: W04
Investigator(s): RJE, DAL Section, Township, Range: ______
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0-3%
Subregion (LRR or MLRA): LRR R Lat: 41° 25.250' Long: -74° 25.004' Datum: WGS 84
Soil Map Unit Name: Wayland Soils Complex, non-calcareous substratum, 0 to 3% Slopes, freq. flooded NWI classification: PEM1E
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	If yes, optional Wetland Site ID: Wetland D

Remarks: (Explain alternative procedures here or in a separate report.)
Community type: Select from list
- Mild drought indicated by PDSI for September

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐ No ☒	Depth (inches):
Water Table Present?	Yes ☒ No ☐	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes ☒ No ☐	Depth (inches): 5

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
2 Soil photos @ 11:30

VEGETATION – Use scientific names of plants.

Sampling Point: W04

Tree Stratum (Plot size: ________)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ________)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	____ = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. P. arundinacea	90%	X	FACW
2. Typha x glauca	40%	X	OBL
3. Persicaria sagittata	40%	X	OBL
4. Scirpus cyperinus	5%		OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	175% = Total Cover		
Woody Vine Stratum (Plot size: ________)			
1.			
2.			
3.			
4.			
	____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ________ (A)

Total Number of Dominant Species Across All Strata: ________ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ________ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = 1
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- [x] Rapid Test for Hydrophytic Vegetation
- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes [X] No [ ]

Remarks: (Include photo numbers here or on a separate sheet.)

Photo facing ~~W~~E @ 11:22

SOIL

Sampling Point: W-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14"	10YR4/1	98	5YR4/6	2	C	PL	LOAM	MOIST

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (**LRR R, MLRA 149B**)
- [ ] Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- [ ] Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- [ ] Loamy Mucky Mineral (F1) (**LRR K, L**)
- [ ] Loamy Gleyed Matrix (F2)
- [x] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- [ ] Coast Prairie Redox (A16) (**LRR K, L, R**)
- [ ] 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- [ ] Dark Surface (S7) (**LRR K, L**)
- [ ] Polyvalue Below Surface (S8) (**LRR K, L**)
- [ ] Thin Dark Surface (S9) (**LRR K, L**)
- [ ] Iron-Manganese Masses (F12) (**LRR K, L, R**)
- [ ] Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- [ ] Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): ______

Hydric Soil Present? Yes [X] No [ ]

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda/Orange Sampling Date: 11-3-2020

Applicant/Owner: Marangi Disposal State: NY Sampling Point: W05

Investigator(s): RJE, DAL Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat: 41° 25.293' Long: -74° 24.863' Datum: WGS 84

Soil Map Unit Name: Wayland Soils Complex, noncalcareous Substratum, 0-3% slopes, frequently flooded NWI classification: PEM1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Hydric Soil Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐

Is the Sampled Area within a Wetland? Yes ☒ No ☐

If yes, optional Wetland Site ID: Wetland E

Remarks: (Explain alternative procedures here or in a separate report.)

Community type: Select from list

- Mild drought indicated by PDSI in September

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 9

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

- Soil photo @ 1:26
- Photo of ~~creek~~ drainageway @ 2:41 near northern end of flagged area

VEGETATION – Use scientific names of plants.

Sampling Point: W05

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. P. arundinacea	90	X	FACW
2. Scirpus cyperinus	15		OBL
3. Cyperaceae sp.	15		
4. L. salicaria	10		OBL
5. Scirpus atrovirens	3		OBL
6. Verbena hastata	3		FACW
7. Cyperus esculentis	1		FACW
8.			
9.			
10.			
11.			
12.			
	= Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- [X] Rapid Test for Hydrophytic Vegetation
- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes [X] No [ ]

Remarks: (Include photo numbers here or on a separate sheet.)

- Cyperaceae sp. growing (tussock forming) on banks & in creek likely C. lurida.
- Photo @ 1:07 facing N.

SOIL

Sampling Point: W-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 2.5/1	80	5YR 4/6	20	C	PL/M	LOAM	PLASTIC CLAY - MOIST

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda/Orange Sampling Date: ~~W06~~ 11-3-20

Applicant/Owner: Marangi Disposal State: NY Sampling Point: W06

Investigator(s): RJE, DAL Section, Township, Range: ____

Landform (hillslope, terrace, etc.): Hillslope/Depression Local relief (concave, convex, none): Concave Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat: 41°25.353' Long: -74°25.060' Datum: WGS 84

Soil Map Unit Name: Rhinebeck silt loam, 0-3% slopes NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes [ ] No [X] (If no, explain in Remarks.)

Are Vegetation [X], Soil [ ], or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes [X] No [ ]

Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes [X]	No [ ]
Hydric Soil Present?	Yes [X]	No [ ]
Wetland Hydrology Present?	Yes [X]	No [ ]

Is the Sampled Area within a Wetland? Yes [X] No [ ]

If yes, optional Wetland Site ID: Wetland F

Remarks: (Explain alternative procedures here or in a separate report.)

Community type: Select from list

- Mild drought indicated by ATP PDSI in September
- Area is mowed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [X] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [X] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes [ ]	No [X]	Depth (inches): ____
Water Table Present?	Yes [ ]	No [X]	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes [ ]	No [X]	Depth (inches): ____

Wetland Hydrology Present? Yes [X] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil photo @ 3:47

- Wetter in invert of a swale running down the hill

VEGETATION – Use scientific names of plants.

Sampling Point: W06

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. P. arundinacea	50	X	FACW
2. J. effusus	30	X	OBL
3. C. vulpinoidea	20	X	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ________ (A)

Total Number of Dominant Species Across All Strata: ________ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ________ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ________

Hydrophytic Vegetation Indicators:

- [x] Rapid Test for Hydrophytic Vegetation
- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes [X] No [ ]

Remarks: (Include photo numbers here or on a separate sheet.)

Photo @ 3:47 looking NW

SOIL

Sampling Point: W-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 4/1	98	5YR 4/6	2	C	M	Silt Loam	Moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) **(LRR R, MLRA 149B)**
- [ ] Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- [ ] Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- [ ] Loamy Mucky Mineral (F1) **(LRR K, L)**
- [ ] Loamy Gleyed Matrix (F2)
- [X] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- [ ] Coast Prairie Redox (A16) **(LRR K, L, R)**
- [ ] 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- [ ] Dark Surface (S7) **(LRR K, L)**
- [ ] Polyvalue Below Surface (S8) **(LRR K, L)**
- [ ] Thin Dark Surface (S9) **(LRR K, L)**
- [ ] Iron-Manganese Masses (F12) **(LRR K, L, R)**
- [ ] Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- [ ] Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): ______

Hydric Soil Present? Yes [X] No [ ]

Remarks:

Photo @ 3:47 PM

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda/Orange Sampling Date: 11-3-20

Applicant/Owner: Marangi Disposal State: NY Sampling Point: U01

Investigator(s): RJE, DAL Section, Township, Range:

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): None Slope (%): 0-3%

Subregion (LRR or MLRA): LRR R Lat: 41° 25.255' Long: -74° 25.017' Datum: WGS84

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

Community type: Select from list - Mild drought indicated by PDSI in September

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil photo @ 11:55

VEGETATION – Use scientific names of plants. Sampling Point: WU02

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus palustris	100	✓	FACW
2. Q. bicolor	5		FACW
3.			
4.			
5.			
6.			
7.			
	105 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ligustrum obtusifolium	3		FACU
2.			
3.			
4.			
5.			
6.			
7.			
	3 = Total Cover		

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. P. arundinacea	25	✓	FACW
2. C. tribuloides	15	✓	FACW
3. Rosa multiflora	5		FACU
4. Rhamnus carthartica	2		FAC
5. Solidago rugosa	1		FAC
6. Lonicera sp.	1		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	~~200~~ 49 = Total Cover		

Woody Vine Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Include photo numbers here or on a separate sheet.)

- Photo @ 11:55 looking west
- Cyperaceae sp. similar to species found @ W03 in saturated soils
- L. obtusifolium is not assigned an indicator status in the NWPL but is typically found in similar areas to L. vulgare, which is FACU
- Lonicera sp. is a bush honeysuckle, not a vine, so indicator status of FACU assigned

SOIL

Sampling Point: U-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 5/2	100					Loam	~~Moist~~ Dry
6-12"	10YR 7/4	98	7.5YR 6/6	2	C	M	Loam	Dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches): ____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Dolsontown Road City/County: Wawayanda/Orange Sampling Date: 11-3-20
Applicant/Owner: Marangi Disposal State: NY Sampling Point: V02
Investigator(s): RJE, DAL Section, Township, Range: ______
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 0-3%
Subregion (LRR or MLRA): LRR R Lat: 41° 25.328' Long: -74° 24.865' Datum: WGS 84
Soil Map Unit Name: Wayland Soils complex, non-calcareous substratum, 0-3% slopes, frequently flooded NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Hydric Soil Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒
If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Community type: Select from list

- Mild drought indicated by APTPDSI in September

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): ______
Water Table Present?	Yes ☐	No ☒	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches): ______

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil photo @ 2:49

VEGETATION – Use scientific names of plants. Sampling Point: VC2

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	85	X	FACW
2. Ulmus americana	20		FACW
3. Rhamnus cathartica	10		FAC
4.			
5.			
6.			
7.			
	115	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Solidago gigantea	15	X	FACW
2. Cyperaceae sp.	5		
3. P. arundinacea	3		
4. Asteraceae sp.	3		
5. Aliaria petiolata	2		
6. R. cathartica	2		
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	
Woody Vine Stratum (Plot size:)			
1. T. radicans	2		FAC
2. Vitis sp.	2		
3.			
4.			
	4	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 1
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- [ ] Rapid Test for Hydrophytic Vegetation
- [x] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes [X] No [ ]

Remarks: (Include photo numbers here or on a separate sheet.)

Photo @ 2:41 looking South

SOIL

Sampling Point: U-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	100					LOAM	LITTLE BRICK - OLY

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NA

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Delsantown Rd. City/County: Wawayanda/Orange Sampling Date: 11-3-20
Applicant/Owner: Marangi Disposal State: NY Sampling Point: W03
Investigator(s): RJE, DAC Section, Township, Range:
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3 to 8%
Subregion (LRR or MLRA): LRR R Lat: 41° 25.314' Long: -74° 25.026' Datum: WGS84
Soil Map Unit Name: Mardin gravelly silt loam, 3-8% slopes NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes [ ] No [X] (If no, explain in Remarks.)
Are Vegetation [X], Soil [ ], or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes [X] No [ ]
Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes [ ] No [X]		Is the Sampled Area within a Wetland? Yes [ ] No [X]
Hydric Soil Present? Yes [ ] No [X]		
Wetland Hydrology Present? Yes [ ] No [X]		If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Community type: Select from list
- Mild drought indicated by APTPOSI in September
- Vegetation is mowed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes [ ] No [X] Depth (inches):
Water Table Present? Yes [ ] No [X] Depth (inches):
Saturation Present? (includes capillary fringe) Yes [ ] No [X] Depth (inches):

Wetland Hydrology Present? Yes [ ] No [X]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soil photo @ 3:26

VEGETATION – Use scientific names of plants.

Sampling Point: V03

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Phleum pratense	100	✓	FACU
2. Glechoma hederacea	25		FACU
3. Galium sp.	5		
4. Ranunculus sp.	1		
5. Daucus carota	1		UPL
6. Taraxacum officinale	1		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	133 = Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 1
FACW species	0	x 2 =
FAC species	0	x 3 =
FACU species	126	x 4 = 504
UPL species	1	x 5 = 5
Column Totals:	127 (A)	509 (B)

Prevalence Index = B/A = 4.01

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.)

- Galium sp. is likely
- Photo looking SE @ 3:19

SOIL

Sampling Point: U-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 4/3	100					LOAM	SOME STONE - DRY

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (**LRR R, MLRA 149B**)
- [ ] Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- [ ] Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- [ ] Loamy Mucky Mineral (F1) (**LRR K, L**)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- [ ] Coast Prairie Redox (A16) (**LRR K, L, R**)
- [ ] 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- [ ] Dark Surface (S7) (**LRR K, L**)
- [ ] Polyvalue Below Surface (S8) (**LRR K, L**)
- [ ] Thin Dark Surface (S9) (**LRR K, L**)
- [ ] Iron-Manganese Masses (F12) (**LRR K, L, R**)
- [ ] Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- [ ] Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

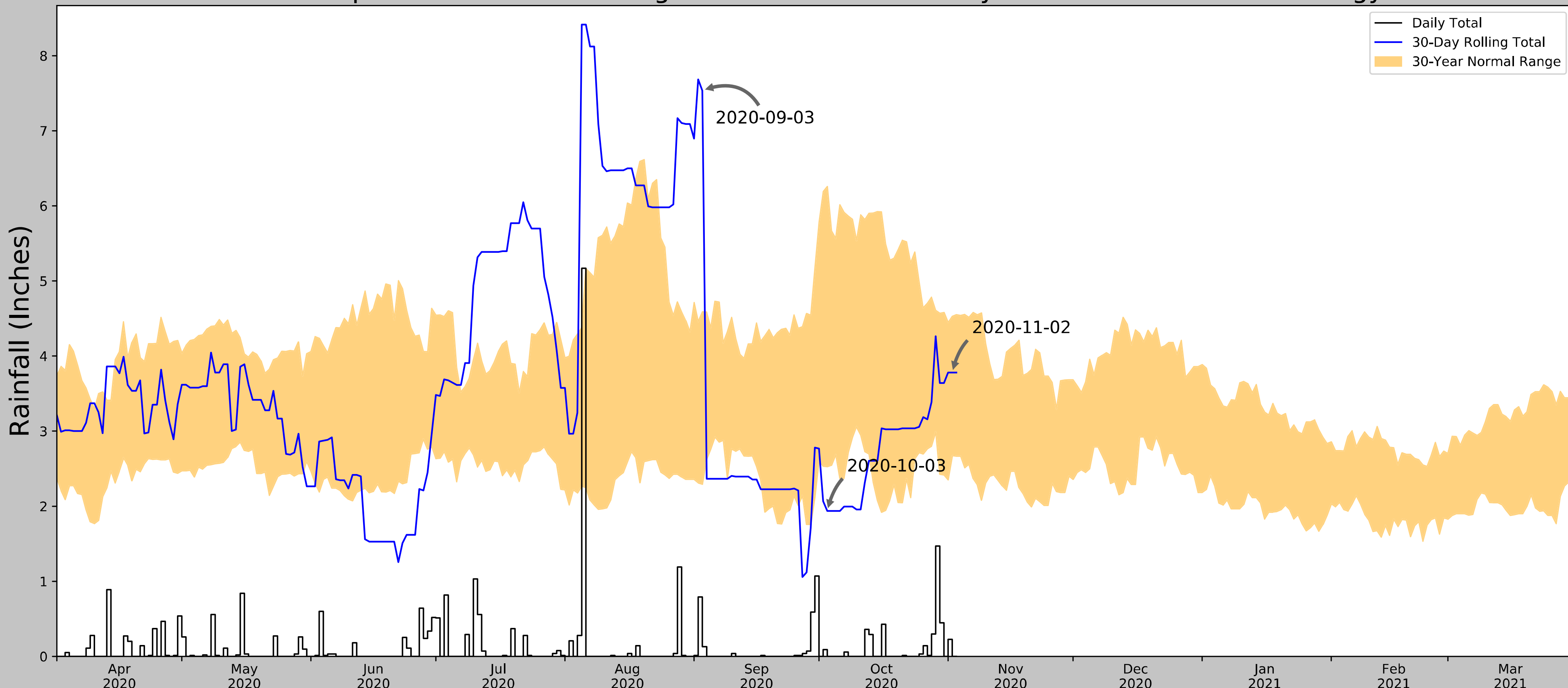
Hydric Soil Present? Yes [ ] No [X]

Remarks:

Attachment B

Antecedent Precipitation Tool Results

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	41.422927, -74.416575
Observation Date	2020-11-02
Elevation (ft)	460.1
Drought Index (PDSI)	Not available (2020-10)
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2020-11-02	2.672047	4.529134	3.779528	Normal	2	3	6
2020-10-03	2.525591	6.258268	1.937008	Dry	1	2	2
2020-09-03	2.291339	4.588189	7.535433	Wet	3	1	3
Result							Normal Conditions - 11

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
MONTGOMERY ORANGE AP	41.5092, -74.265	365.157	9.855	94.943	5.37	8153	80
MIDDLETOWN 2 NW	41.4603, -74.4489	700.131	3.078	240.031	2.124	3131	0
GARDNERVILLE	41.3458, -74.4872	459.974	6.465	0.126	2.91	33	0
WURTSBORO 0.2 SSW	41.5739, -74.4871	537.074	11.051	76.974	5.824	33	10
VERNON TWP 1.7 N	41.2215, -74.488	458.99	14.402	1.11	6.497	3	0

Attachment C

Representative Photos

Photo #1 - Sample Point W01 Looking Southwest

Photo #2 - Sample Point W02 Looking Southeast

EnSol, Inc.
Environmental Solutions
661 Main Street, Niagara Falls, NY 14301
Ph:716-285-3920 Fax: 716-285-3928

SAMPLE POINT W01 AND W02

DOM KAM LLC
366 HIGHLAND AVENUE EXTENSION
MIDDLETOWN, NY 10940

PROJECT PHOTOGRAPHS

Prepared By: RJE
Date Prepared: 11/16/20
Filename: Site Photos.xls

WETLAND DELINEATION REPORT

PN: 20-0062 November 2020

Photo #3 - Sample Point W03 Looking Southeast

Photo #4 - Sample Point W04 Looking East

EnSol, Inc.
Environmental Solutions
661 Main Street, Niagara Falls, NY 14301
Ph:716-285-3920 Fax: 716-285-3928

SAMPLE POINT W03 AND W04
DOM KAM LLC
366 HIGHLAND AVENUE EXTENSION
MIDDLETOWN, NY 10940

PROJECT PHOTOGRAPHS

Prepared By: RJE
Date Prepared: 11/16/20
Filename: Site Photos.xls

WETLAND DELINEATION REPORT

PN: 20-0062 November 2020

Photo #5 - Sample Point W05 Looking North

Photo #6 - Drainageway 1 Looking East Adjacent to Wetland E

EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**SAMPLE POINT W05 AND Drainageway 1** **DOM KAM LLC** **366 HIGHLAND AVENUE EXTENSION** **MIDDLETOWN, NY 10940**	PROJECT PHOTOGRAPHS
Prepared By: RJE Date Prepared: 11/16/20 Filename: Site Photos.xls	**WETLAND DELINEATION REPORT**	3 Page No. PN: 20-0062 November 2020

Photo #7 - Sample Point W06 Looking Northwest

Photo #8 -Sample Point U01 Looking West

EnSol, Inc.
Environmental Solutions
661 Main Street, Niagara Falls, NY 14301
Ph:716-285-3920 Fax: 716-285-3928

SAMPLE POINT W06 AND U01
DOM KAM LLC
366 HIGHLAND AVENUE EXTENSION
MIDDLETOWN, NY 10940

PROJECT PHOTOGRAPHS

Prepared By: RJE
Date Prepared: 11/16/20
Filename: Site Photos.xls

WETLAND DELINEATION REPORT

PN: 20-0062 November 2020

Photo #9 - Sample Point U02 Looking North

Photo #10 - Sample Point U03 Looking Southeast

EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**SAMPLE POINT U02 AND U03** **DOM KAM LLC** **366 HIGHLAND AVENUE EXTENSION** **MIDDLETOWN, NY 10940**	PROJECT PHOTOGRAPHS
Prepared By: RJE Date Prepared: 11/16/20 Filename: Site Photos.xls	**WETLAND DELINEATION REPORT**	5 Page No. PN: 20-0062 November 2020

Attachment D

References

References:

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Attachment B

NOTES:

1. THIS SURVEY IS SUBJECT TO ANY FINDINGS OF A TITLE SEARCH.
2. SUBSURFACE STRUCTURES AND UTILITIES NOT VISIBLE AT THE TIME OF SURVEY HAVE NOT BEEN SHOWN.
3. REFERENCES:

   MAP ENTITLED "SUBDIVISION PLAN AND LOT LINE CHANGE, PORTION OF LANDS NOW OR FORMERLY OF [illegible], TOWN OF WAWAYANDA, ORANGE COUNTY, NEW YORK" DATED JUNE 7, 1997, LAST REVISED JANUARY 29, 1998 AND FILED IN THE ORANGE COUNTY CLERK'S OFFICE ON FEBRUARY 18, 1998, AS FILED MAP NO. 20-98.

   MAP ENTITLED "LOT LINE CHANGE, AUTUMN SKY DEVELOPMENT LOT LINE CHANGE, DOLSONTOWN ROAD, SECTION 1, BLOCK 1, LOTS 58.2, 57.2 & 58, TOWN OF WAWAYANDA, ORANGE COUNTY" DATED NOVEMBER 14, 2018 AND FILED IN THE ORANGE COUNTY CLERK'S OFFICE ON DECEMBER 13, 2018 AS FILED MAP NO. 380-18.

4. SURFACE FEATURES SHOWN ARE BASED ON AN AERIAL MAPPING PREPARED BY [illegible] ASSOCIATES INTERNATIONAL, LLC. ELEVATIONS ARE BASED ON NAVD 88 DATUM.

RECORD OWNERS:

ANGELA LINDENBERG
11 BEVERLY DRIVE
AVON, CT 06001

MAP NO. 20-98

HUM CHAAA LLC
12 PINEHAVEN DRIVE
[illegible], SC [illegible]

AREAS:

GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

CERTIFICATION:

HEREBY CERTIFY TO THE PARTIES OF INTEREST LISTED BELOW THAT THIS MAP SHOWS THE RESULTS OF AN ACTUAL FIELD SURVEY COMPLETED ON NOVEMBER 20, 2020.

L.S.
NEW YORK STATE LICENSE NO.

LANC & TULLY
ENGINEERING AND SURVEYING, P.C.
P.O. Box 687, Rt. 207
Goshen, N.Y. 10924
(845) 294-3700

SURVEY PREPARED FOR

MIKE MARANGI

TOWN OF WAWAYANDA
ORANGE COUNTY, NEW YORK

Scale: 1" = 100'

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Attachment C

ACOE Checklist of Information Included with Requests for Jurisdictional Determinations (JD)

1) Name, mailing address and phone number of:
   a) Current Property Owner
      i) 366 Highland DMI, LLC., 366 Highland Avenue Extension, Middletown, NY 10940
   b) Applicant
      i) Marangi Disposal, 175 NY-303, Valley Cottage, NY 10989
   c) Wetland Delineator
      i) EnSol, Inc., 661 Main Street, Niagara Falls, NY 14301, (716) 285-3920.
   d) Wetland Consultant
      i) David Lenox, PE, & Ryan Elliott, MS., of EnSol, Inc.
      ii) Capital Environmental Consultants, Inc., 243 Fair Street, Suite 4, Kingston, NY 12401, (845) 383-1114.
2) Site Location Map
   a) Figure 1 – Site Location Map showing the property on the USGS Geological Survey 7.5 Minute Quadrangle, Middletown, NY.
   b) Site and Wetlands

Table 2 - Wetland Center Coordinates			
Location	**Latitude**	**Longitude**	**Area onsite (acres)**
Center of Site	41°25'18.5"N	74°24'56.4"W	44.3
Wetland A	41°25'18.53"N	74°25'2.94"W	0.003
Wetland B	41°25'17.94"N	74°25'2.09"W	0.09
Wetland C	41°25'17.07"N	74°25'1.11"W	0.44
Wetland D	41°25'15.16"N	74°24'57.52"W	0.52
Wetland E	41°25'18.51"N	74°24'51.69"W	1.57
Wetland F	41°25'21.84"N	74°25'2.48"W	0.08

3) See attached report -
   a) Purpose of Request
      i) Approved Jurisdictional Determination of Water of the U.S. for the subject property.
   b) Proposed project
      i) The Applicant would like to determine future site development potential.
   c) Parcel size/Review area
      44.3 acres (179,275 square meters)

4) Delineation Report
   a) Current site use
      i) Presently consists of a mowed field.
      ii) Historic site use
         (1) Parcel 6-1-3.32 has been historically used as a dairy farm.
         (2) Parcel 6-1-3.31 was most recently used for a commercial business, Bianchi Floors Inc., and a residence.

b) NWI map
   i) Figure 3-3
c) NYSDEC freshwater wetland map
   i) Figure 3-2
d) NYSDEC tidal wetland map
   i) N/A
e) NRCS soil map
   i) Figure 3-1
f) Watershed
   i) Masonic Creek-Wallkill River Watershed (HUC-12: 020200070401)
g) Watershed size
   i) 30,150 acres
h) Average annual rainfall/snowfall
   i) 40 inches
i) Wetland/Tributary relationship
   i) Wetland A is an isolated wetland with no connectivity to Wetland B, Wetland C, Wetland D, Wetland E, Wetland F, or other offsite wetlands and waterbodies. The wetlands hydrology is maintained by runoff/precipitation.
   ii) Wetland B is an isolated wetland with no connectivity to Wetland A, Wetland C, Wetland D, Wetland E, Wetland F, or other offsite wetlands and waterbodies. The wetlands hydrology is maintained by runoff/precipitation.
   iii) Wetland C is an isolated wetland with no connectivity to Wetland A, Wetland B, Wetland D, Wetland E, Wetland F, or other offsite wetlands and waterbodies. The wetlands hydrology is maintained by runoff/precipitation.
   iv) Wetland D is located on the southwestern boarder of the property. Wetland D drains to Monhagan Brook, after which the brook flows to the east before leaving the site. Monhagan Brook continues to flow east until the brook discharges to the Wallkill River. The Wallkill River flows to the northeast before joining Rondout Creek. Water continues to flow northeast in the creek until the water is discharged to the Hudson River, a traditional navigable water (TNW).
   v) Wetland E is located in the center of the property and is part of an unnamed tributary to Monhagan Brook (Drainageway 1), which flows north to south across the site. Drainageway 1 discharges to Monhagan Brook near the center of Parcel 6-1-3.32. Monhagan Brook flows east until the brook discharges to the Wallkill River. The Wallkill River flows to the northeast before joining Rondout Creek. Water continues to flow northeast in the creek until the water is discharged to the Hudson River, a traditional navigable water (TNW).
   vi) Wetland F is located in the northwest corner of the site. Wetland F is an isolated wetland with no connectivity to Wetland A, Wetland B, Wetland C, Wetland D, Wetland E, or other offsite wetlands and waterbodies. The wetlands hydrology is maintained by runoff/precipitation.
j) River miles to TNW
   i) 55.6 miles
k) Aerial miles to TNW

i) 41.5 miles

l) Potential pollutants

i) There are currently no potential pollutants associated with the wetlands onsite. No evidence of dumping or disposal of hazardous materials was identified during site visits.

m) Potential habitat for species

i) NYS Environmental Assessment Form (EAF) was reviewed in April of 2021 Mapper and USFWS Information for Planning and Consultation (IPAC) was also reviewed.

(1) The species list contains one endangered species, the Indiana Bat (*Myotis sodalis*), and two threatened species, the Northern Long-eared Bat (*Myotis septentrionalis*), and the Small Whorled Pogonia (*Isotria medeoloides*).

(a) Indiana Bat (*Myotis sodalis*)

(i) IPaC results indicate that the project site is outside of the area designated as critical habitat for this species.

(b) Northern Long-eared Bat (*Myotis septentrionalis*)

(i) The project site is not within 1.5 miles of a known summer occurrence. The project site is within five miles of Goshen, New York, which has NYSDEC documented winter occurrences of *M. septentrionalis*, however none of the coordinates provided by the USWFS are within five miles of the site.

(c) Small Whorled Pogonia (*Isotria medeoloides*)

(i) The hedgerow on the southwest corner of Parcel 6-1-3.32 may provide suitable habitat for this species, however, the canopy cover has few breaks, which may impact this species' ability to survive in this area. *I. medeoloides* was not observed during the wetland delineation.

(2) The species list also contains five migratory birds, the bald eagle (*Haliaeetus leucocephalus*), the black-capped chickadee (*Poecile atricapillus practicus*), the bobolink (*Dolichonyx oryzivorus*), the rusty blackbird (*Euphagus carolinus*), and the wood thrush (*Hylocichla mustelina*).

(3) Potential habitat for *H. leucocephalus*, *P. atricapillus practicus, E. carolinus*, and *H. mustelina* exists in hedgerow and floodplain forest type vegetation communities.

(4) Potential breeding habitat for *D. oryzivorus* and foraging habitat for *E. carolinus* exists in the meadow and successional old field areas of the site.

(a) E. Carolinus is reported not to breed in the project area.

n) Vegetative cover types onsite:

i) Wetland A: According to the March 2014 Ecological Communities of New York State Second Edition, the vegetative community in Wetland A is best described as a 'Wet Meadow.'

(1) Wetland plants:

(a) Lamp rush (*Juncus effusus*) (OBL),

(b) Foxtail sedge (*Carex* v*ulpinoidea*) (OBL),

(c) Reed canary grass (*Phalaris arundinacea)* (FACW),

(d) Willow herb (*Epilobium spp*.), and

(e) Canada thistle (*Cirsium arvense*) (FACU).

ii) Wetland B: According to the March 2014 Ecological Communities of New York State Second Edition, the vegetative community in Wetland B is best described as a 'Wet Meadow.'
   (1) Wetland plants:
      (a) Lamp rush (*Juncus effusus*) (OBL),
      (b) Foxtail sedge (*Carex* v*ulpinoidea*) (OBL),
      (c) Reed canary grass (*Phalaris arundinacea)* (FACW),
      (d) Purple loosestrife (*Lythrum salicaria*) (OBL),
      (e) *Asteraceae spp.*, and
      (f) Willow herb (*Epilobium spp*.).

iii) Wetland C: According to the March 2014 Ecological Communities of New York State Second Edition, the vegetative community in Wetland C is best described as a 'Wet Meadow.'
   (1) Wetland plants:
      (a) Lamp rush (*Juncus effusus*) (OBL),
      (b) Blunt broom sedge (*Carex tribuloides*) (FACW), and
      (c) Foxtail sedge (*Carex* v*ulpinoidea*) (OBL).
   (2) Upland vegetation residing beyond the wetland/upland interface included:
      (a) Timothy (*Phelum pratense*) (FACU),
      (b) Ground ivy (*Glechoma hederacae*) (FACU),
      (c) *Galium spp.*,
      (d) *Ranunculus spp.*,
      (e) Queen Anne's lace (*Daucus carota*) (UPL) and
      (f) Common dandelion (*Taraxacum officinale*) (FACU).

iv) Wetland D: According to the March 2014 Ecological Communities of New York State Second Edition, the vegetative community in Wetland D is best described as a 'Shallow Emergent Marsh.'
   (1) Wetland plants:
      (a) Reed canary grass (*Phalaris arundinacea)* (FACW),
      (b) Cattail hybrid (*Typha x glauca*) (OBL),
      (c) Arrow-leaved tearthumb (*Persicaria sagittata*) (OBL) and
      (d) Wool grass (*Scirpus cypernius*) (OBL).
   (2) Upland vegetation residing beyond the wetland/upland interface included:
      (a) Pin oak (*Quercus palustris*) (FACW),
      (b) Swamp white oak (*Quercus bicolor*) (FACW),
      (c) Border privet (*Ligustrum obtusifolium*) (FACU),
      (d) Reed canary grass (*Phalaris arundinacea)* (FACW),
      (e) Blunt broom sedge (*Carex tribuloides*) (FACW),
      (f) Rambler rose (*Rosa multiflora*) (FACU),
      (g) European buckthorn (*Rhamnus cathartica*) (FAC),
      (h) Wrinkle-leaf goldenrod (*Solidago rugosa*) (FAC) and
      (i) *Lonrcera spp.*

v) Wetland E: According to the March 2014 Ecological Communities of New York State Second Edition, the vegetative community in Wetland E is best described as a 'Shallow Emergent Marsh.'
   (1) Wetland plants:
      (a) Reed canary grass (*Phalaris arundinacea)* (FACW),
      (b) Wool grass (*Scirpus cypernius*) (OBL),
      (c) *Cyperaceae spp.*,
      (d) Purple loosestrife (*Lythrum salicaria*) (OBL),
      (e) Green vervain (*Scirpus atrovirens*) (OBL),
      (f) Blue vervain (*Verbena hastata*) (FACW), and
      (g) Yellow nutsedge (*Cyperus esculentus*) (FACW).
   (2) Upland vegetation residing beyond the wetland/upland interface included:
      (a) Silver maple (*Acer saccharinum*) (FACW),
      (b) American elm (*Ulmus americana*) (FACW),
      (c) European buckthorn (*Rhamnus cathartica*) (FAC)
      (d) Late goldenrod (*Solidago gigantea*) (FACW),
      (e) *Cyperaceae spp.,*
      (f) Reed canary grass (*Phalaris arundinacea)* (FACW),
      (g) *Asteraceae spp.,*
      (h) Garlic mustard (*Alliaria petoilata*) (FACU),
      (i) Eastern poison ivy (*Toxicodendron radicans*) (FAC) and
      (j) *Vitis spp.*

vi) Wetland F: According to the March 2014 Ecological Communities of New York State Second Edition, the vegetative community in Wetland F is best described as a 'Wet Meadow.'
   (1) Wetland plants:
      (a) Reed canary grass (*Phalaris arundinacea)* (FACW),
      (b) Lamp rush (*Juncus effusus*) (OBL) and
      (c) Foxtail sedge (*Carex* v*ulpinoidea*) (OBL).

vii) Wetland Delineation Forms
   (1) Attachment A

viii) Site photographs of all representative areas of the site (taken during the growing season), including any connections between tributaries or between tributaries and wetlands.
   (1) Attachment C

5) Surveyed delineation drawing, including the following:
   a) Drawing date
      i) Figure 5-1 – Wetland Delineation Map, prepared by EnSol, Inc, on February 19, 2021
   b) Scale
      i) Figure 5-1 – 1" = 150'
   c) Revision dates
      i) N/A
   d) North arrow

    i) Figure 5-1
e) Existing topographic contours
    i) Figure 5-1
f) Benchmarks
    i) Figure 5-1
g) Stamp of a licensed surveyor
    i) Figure 5-1
h) Boundary lines of the parcel and wetlands with acres shown
    i) Figure 5-1
i) Boundary lines of the project site with acres shown
    i) Figure 5-1
j) Delineation flags shown as points that are connected by straight lines (or extend off site at parcel boundaries), and are identified on the drawing with the corresponding number and/or letter that is written on the flag in the field
    i) Figure 5-1
k) Appropriate hatching and/or shading to identify the extent of waters of the US, including jurisdictional wetlands, and any "isolated" or non-jurisdictional waterbodies or wetlands
    i) Figure 5-1
l) All defined tributaries on the site, identified either via flagging or a standard tributary symbol that is in the legend, and locations of any other connections between waters (e.g. culverts, ditches and/or swales)
    i) Figure 5-1
m) Table outlining the acres of the waters of the US, and "isolated" or non-jurisdictional waters, in addition to the linear feet of all tributaries within the boundaries of the project site or parcel.
    i) Table 2, Table 3 and Figure 5-1.

Table 3 – Navigable Waters Protection Rule (NWPR) Evaluation

Name	Jurisdictional under NWPR	Definition
Wetland A	No	Isolated
Wetland B	No	Isolated
Wetland C	No	Isolated
Wetland D	Yes	Wetland directly abutting a non-navigable tributary (Monhagan Brook) of a Traditional Navigable Water (Hudson River) that is relatively permanent
Wetland E	Yes	Wetland directly abutting a non-navigable tributary (Monhagan Brook) of a Traditional Navigable Water (Hudson River) that is relatively permanent
Wetland F	No	Isolated

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Attachment D

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
Wetland A	NEW YORK	PEM	SLOPE	Area	0.003	ACRE	ISOLATE	41.42181300	-74.41748600	
Wetland B	NEW YORK	PEM	DEPRESS	Area	0.09	ACRE	ISOLATE	41.42165200	-74.41725000	
Wetland C	NEW YORK	PEM	DEPRESS	Area	0.44	ACRE	ISOLATE	41.42141100	-74.41697700	
Wetland D	NEW YORK	PEM	DEPRESS	Area	0.52	ACRE	RPWWD	41.42088000	-74.41597900	Walkill River
Wetland E	NEW YORK	PEM	DEPRESS	Area	1.57	ACRE	RPWWD	41.42180900	-74.41435900	Walkill River
Wetland F	NEW YORK	PEM	SLOPE	Area	0.08	ACRE	ISOLATE	41.42273500	-74.41735800	

Section 11

Noise Evaluation: Town Noise Criteria
Proposed Dom-Mar Transfer and Recycling Facility
Town of Wawayanda, Orange County, NY

INTRODUCTION

DOM KAM LLC of Middletown, NY (DOM KAM) is the applicant for a combined development located at 1128 Dolsontown Road in Wawayanda, NY (Facility). The Facility will consist of a transfer station/recycling facility on the western portion of the development and a fleet maintenance facility on the eastern portion of the development. This Noise Evaluation has been prepared to summarize detailed modeling of the combined total projected noise to be produced by the Facility in comparison with the Town regulations which are discussed in greater detail in the section below. This evaluation has been completed via sound modeling using standard modeling techniques in general accordance with International Organization for Standardization standard ISO 9613-2 (Attenuation of Sound During Propagation Outdoors).

A depiction of the proposed facility is included as Attachment 1. It should be noted that this evaluation considers only operations of the proposed Facility, not construction of the Facility. The proposed operating hours of the Facility are 4am-7pm (Monday-Friday) and 5am-4pm (Saturday).

REGULATORY REQUIREMENTS – TOWN OF WAWAYANDA

Noise associated with the operation of the Facility will be governed by the Town's zoning code. Paragraph D of Code Chapter 195-23 (General Commercial and Industrial Standards) states that *"Noise shall not exceed an intensity of 65 decibels as measured 100 feet from the boundaries of the lot where such use is situated"*.

NOISE TERMINOLOGY

Sound results from traveling compression waves that move through the atmosphere. Sound from a single source can be schematically or graphically represented in the same manner as when an object is dropped into a still water body. The waves ripple outward and radiate away from the source or center in straight lines, decreasing in intensity as they travel outward. As sound waves pass through a point in the atmosphere, the waves result in an alternate compression and expansion of the air. Human perception of sound results from vibrations induced within the ear by these pressure waves.

The perceived loudness of a sound is directly proportional to the magnitude of the pressure fluctuations within a given sound wave. The larger the amplitude of the pressure fluctuation, the louder the sound is perceived by the human receptor. Sound pressure is measured in a unit called a Pascal (a measure of force per unit area of the air pressure wave). The human ear is sensitive to a very large range of sound pressures, from 0.00002 Pascals to 200 Pascals. In order to make the numbers more manageable, a logarithmic sound pressure scale known as the decibel scale is used. Each increase of 10 decibels (dB) is equivalent to 3.2 times greater sound pressure. Each increase of 20 decibels is equivalent to a ten-fold increase in sound pressure. The range of audible sound pressure levels that can be heard by the human ear is from 0 dB to over 130 dB, which is the threshold of painful noise. The maximum achievable sound level is about 194 dB.

In contrast, the pitch of a sound is related to the frequency of the sound wave (the number of waves that pass any point in one second); high frequencies are associated with a high pitch and low frequencies are associated with a low pitch. In actuality, sound heard in everyday life generally consists of a range of frequencies and the perceived pitch reflects those frequencies that dominate in amplitude. The characterization of noise or sound therefore considers both its loudness, and frequency (pitch).

For analysis of environmental noise the A-weighted decibel scale, or dB(A) scale, is generally used. This scale weighs different frequencies in a complex sound in proportion to the human ear's sensitivity and assigns one dB(A) value to the sound. The dB(A) scale provides a good measure of human perception of a sound's loudness, provides a good assessment of speech interference, and defines community disturbance conditions. This means the dB(A) scale is appropriate for measuring the impact of a new sound source on the existing audio environment. In addition to its recognition by the NYSDEC, the widely-gained acceptance and use of noise A-weighting is substantiated by the fact that the US EPA, Federal Aviation Administration (FAA), Department of Defense (DOD), and American Conference of Governmental Industrial Hygienists (ACGIH) have all adopted this measurement standard.

SITE LOCATION AND SURROUNDING AREA

The Facility is situated in a mixed residential/commercial environment, and surrounding property uses are depicted on Figure 1 and are also summarized as follows:

- North: Dolsontown Road then Residential and undeveloped commercial lots
- East: Commercial (tire & vehicle sales / self-storage)
- South: Interstate 84
- West: Undeveloped commercial lot

Topography of the Facility and surrounding area generally slopes in a southerly direction toward Monhagen Brook, which is located approximately 600 feet south of the Facility.

PRIMARY RECEPTORS

To demonstrate compliance with Town regulatory guidance summarized above, noise impacts were calculated at several places located 100 feet from the subject property line (receiver numbers 1-6 in the model results discussed below).

FACILITY NOISE MODELING

A detailed model was developed to predict noise levels generated by operations at the Facility. All sound modeling was completed using the SoundPlan Essential software provided by Navcon Engineering Network. Assumptions regarding traffic and equipment operating on the site were developed based on projected Facility operations.

Noise generated at the Facility will generally fall into two categories: vehicular traffic and operations of site-related equipment as described below.

<u>Modeling Scenario</u>

As described further below, the modeled day and night scenarios considered the potential maximum equipment and traffic noise scenarios for conservative modeling purposes. It should also be noted that the primary noise sources at the Facility will be either on-site traffic (trucks and automobiles) or the operation of heavy equipment (only on the Phase 1/transfer station portion of the Facility) which is associated with material unloading, handling, and consolidation/loading to outbound tractor-trailers Details of the separate heavy equipment and traffic modeling scenarios are described further below.

Model Inputs – Traffic

Noise resulting from predicted site vehicular traffic was modeled within the SoundPlan Essential software in accordance with the United States Department of Transportation Federal Highway Administration Traffic Noise Model TNM 3.0. There will be three distinct traffic patterns on the combined development as follows:

- The western pattern which will be combined automobile traffic for Facility employees as well as customers using the residential drop off area.
- The central pattern which will be combined medium and heavy truck traffic for inbound and outbound materials as well as on-site traffic between the building and recyclables storage area
- The eastern pattern which will be combined automobile and medium truck traffic for employees and operations of the maintenance garage

For the purpose of conservative modeling, the combined estimated peak-hour traffic volumes were used for all traffic types in both the night (4am-7am) and day (7am-7pm) scenarios. A detailed breakdown of those peak-hour volumes is presented below as Table 1. Modeling also assumed a maximum on-site vehicular traffic speed of 35 km/h for all vehicle types.

<table>
<tr><th colspan="4">Table 1
Summary of Modeled On-Site Peak Hour Traffic Volumes</th></tr>
<tr><th>Traffic Pattern</th><th>Vehicle Type</th><th>Night Volume (4am-7am)</th><th>Day Volume (7am-7pm)</th></tr>
<tr><td>Western</td><td>Automobiles (employees/users)</td><td>10</td><td>22</td></tr>
<tr><td rowspan="2">Central</td><td>Medium Trucks (inbound)</td><td>5</td><td>12</td></tr>
<tr><td>Heavy Trucks (outbound)</td><td>3</td><td>10*</td></tr>
<tr><td rowspan="2">Eastern</td><td>Automobiles (employees)</td><td>10</td><td>12</td></tr>
<tr><td>Medium Trucks (service)</td><td>14</td><td>7</td></tr>
</table>

(*) includes combination of 6 trucks/hr for outbound loads and 4 trucks/hr for onsite transfers to recyclables storage area

Model Inputs – Industry

The transfer station is designed so that initial material deliveries are brought into the building via four large overhead doors located on the south side of the building (facing away from Dolsontown Road and the residential receptor across the road). Outbound tractor-trailers will be loaded within the building and then exit the building through two large overhead doors on the north side of the building once loaded. To minimize noise emanating out of the front of the building, the outbound doors will only be opened to allow outbound vehicles to exit and will remain closed at all other times. This model assumes operation of the heavy equipment at locations just outside the south/inbound doors as a conservative scenario representing operation of the machinery just at the door openings while opened. It should be noted that the Facility design also includes periodic operations of a baler within the OCC portion of the building. The baler is not incorporated into this model as it will be operated within the building with the doors closed and also will not be operated simultaneously with the excavator and loader as further discussed below.

Noise resulting from industrial sources (Facility equipment and machinery) was modeled in accordance with International Organization for Standardization standard ISO 9613-2 (Attenuation of Sound During Propagation Outdoors) (Attachment 2). Modeled industrial noise sources include the simultaneous operation of two pieces of equipment outdoors (one excavator and one front-end loader).

Noise generated from the excavator and front-end loader, at a distance of 50 feet from the noise source, was assumed at levels of 85dB(A) and 80dB(A) respectively. These assumed values are based on Table 9.1 (Default Noise Emission Reference Levels and Usage Factors) of the Construction Noise Handbook published by the Federal Highway Administration which is included as Attachment 3.

The multiple sources are calculated within the model in consideration of the Additive Effects of Multiple Sound Sources theory which states that the total sound pressure created by multiple sound sources does not create a mathematical additive effect. For instance, two proximal noise sources that are 70dB(A) each do not have a combined noise level of 140dB(A). In this case the combined noise level is 73dB(A).

<u>Model Inputs – Buildings</u>
The SoundPlan modeling software considers the entire three-dimensional environment of the modeled area, rather than completing just simple two-dimensional distance attenuation calculations. One of the four buildings currently existing on the property will remain in addition to the proposed Facility building as depicted in Attachment 1. All site buildings that will be present at the completion of the development were included in the model as well as the residential building located across Dolsontown Road. Buildings meet the definition of a screening barrier as discussed in section 7.4 of ISO 9613-2 and, to account for their anticipated effect on sound propagation, were incorporated into the model at assumed heights of six meters (existing residence and site building to remain) and twelve meters (proposed Facility building).

<u>Model Inputs – Topography</u>
As an additional consideration of the three-dimensional environment of the modeled area, SoundPlan uses ground elevation data published by Google Earth® as the base of the model, and all resulting model calculations consider the topography of the model area.

<u>Model Attenuation Calculations – Distance Attenuation</u>
The primary attenuation calculation is sound level reduction over distance. As defined in DEP-00-1, sound pressure levels (SPL) change in inverse proportion to the square of the distance from the sound source. At distances greater than 50 feet from a sound source, every doubling of the distance produces a 6dB reduction in the sound.

<u>Model Attenuation Calculations – Landscape Buffer Zones</u>
Existing heavily-vegetated areas consisting mainly of mature trees are present to the south and west of the proposed Facility. These buffer zones were incorporated in the model to include predictions of additional sound attenuation associated with vegetative buffer zones. All vegetative buffer zones were modeled at an assumed height of ten meters (mature trees). This model only includes vegetated areas that are currently present. The final site design includes planting of additional vegetative buffer areas which were not considered by the model and, once grown to mature height, will provide for additional attenuation.

<u>Model Attenuation Calculations – Atmospheric Absorption</u>

Additional noise attenuation via atmospheric absorption is also considered in the model in general accordance with section 7.2 of ISO 9613. The primary variables that affect atmospheric absorption are temperature, humidity, and pressure. As defined in Part 360.19(j)(5), noise assessments are allowed to utilize average annual conditions when calculating atmospheric absorption. This model was prepared based upon atmospheric conditions of a temperature of 48 degrees (F), humidity of 75%, and air pressure of 1,013mbar.

<u>Model Attenuation Calculations – Ground Effect</u>
The final attenuation effect included in the model calculation is the ground effect as defined in section 7.3 of ISO 9613. In summary, the ground effect applies additional attenuation of noise over soft (non-reflective) ground surfaces. The ground effect factor ranges from 0 (hard surfaces) to 1 (soft surfaces). A ground effect of 0 assumes complete reflectivity of the surface and therefore no additional ground effect attenuation would be applied to any ground surface defined with an effect factor of 0. For purposes of this model, the entire combined development footprint was assigned a ground effect factor of 0 and remaining undeveloped/vegetated areas within the model area were assigned a ground effect factor of 1.

<u>Conservative Modeling Scenario</u>
Using the inputs described above, "worst-case" operation scenarios were analyzed in this modeling effort consisting of the following variables:

- *Maximum potential on-site traffic loads.* The actual average traffic loads during typical Facility day and night operations are lower; however, the maximum potential day and night hourly loads were used for modeling.
- *Simultaneous operation of equipment.* The model assumes simultaneous, and continuous, operation of the two pieces of equipment described above (one excavator and one front-end loader). Simultaneous and continuous operation of both pieces of equipment is a condition that will rarely occur during actual Facility operations as the equipment will more typically be operated individually and on an intermittent basis.
- *Outdoor operation of equipment.* As described above, this model considers the operation of the equipment at outdoor locations adjacent to the inbound doors. During actual operations this equipment will more typically be operated within the building (with the outbound doors closed and the inbound doors open). In effect, the placement of these noise sources at these outdoor locations in the model over-estimates a "worst case" scenario of the equipment operating right at the inbound door openings.
- *Ground Effects.* As discussed above, a ground effect of 0 (hard surfaces) was applied to the entire development area. The development footprint contains multiple interior landscaped areas (soft surfaces). However the model considers the entire footprint as a hard surface for both conservative purposes and model simplicity.
- *Additional Vegetative Screening.* As indicated in Attachment 1, the final facility design may also include additional plantings along the western and northern facility boundaries. The primary purpose of these plantings will be for visual screening but, as they mature, they will also act as additional vegetative attenuation areas. However, for conservative modeling purposes, these areas were not included in this modeling effort.

<u>Model Results</u>
Using all modeling inputs and attenuation factors described above, the model was run and the final results are presented on Figures 2, 3, and 4 (attached). All model results are presented as 1-hour Leq

values representing the scenarios defined above. Figure 2 displays the final predicted noise levels (from Facility operations only) at each of the receptor locations. And Figures 3 and 4 respectively display color-coded heat maps of the predicted noise levels during proposed day and night Facility operations.

As indicated on Figure 2, the predicted noise levels at the Town receptor receivers (locations 100' from the property line) range from 44.3 to 64.2 dB(A). These values are also summarized in Table 2 below.

Table 2
Summary of Model Results – Town Receivers

#	100-foot Offset Receiver Location	Town Regulatory Limit	Day (7am-7pm) Receiver Result dB(A)	Night (4am-7am) Receiver Result dB(A)
1	West	65	63.7	63.7
2	Southwest	65	64.2	64.1
3	South	65	60.7	60.7
4	Northwest 1	65	46.9	44.3
5	Northwest 2	65	46.7	44.5
6	Northeast	65	50.8	48.2

Note that the model displays only noise generated by the previously-described inputs and does not factor in additional background/ambient noise that is generated by business operations, local road, and highway traffic within the study area.

CONCLUSIONS

Based upon the modeling effort, predicted noise levels at all Town property line offset receivers are lower than the Town standard of 65dB(A). Also, as noted above, the model scenario considers "worst case"/maximum operating conditions for conservative modeling purposes. The actual average noise output of the Facility is anticipated to be less than what is represented by this modeling scenario.

Figures
Figure 1 – Adjacent Properties
Figure 2 – Point Receiver Results
Figure 3 – Noise Map – Day
Figure 4 – Noise Map – Night

Attachments
Attachment 1 – Proposed Facility Site Plan
Attachment 2 – International Standard ISO 9613-2: Attenuation of Sound During Propagation Outdoors
Attachment 3 – FHWA Construction Noise Handbook, Chapter 9

Figures

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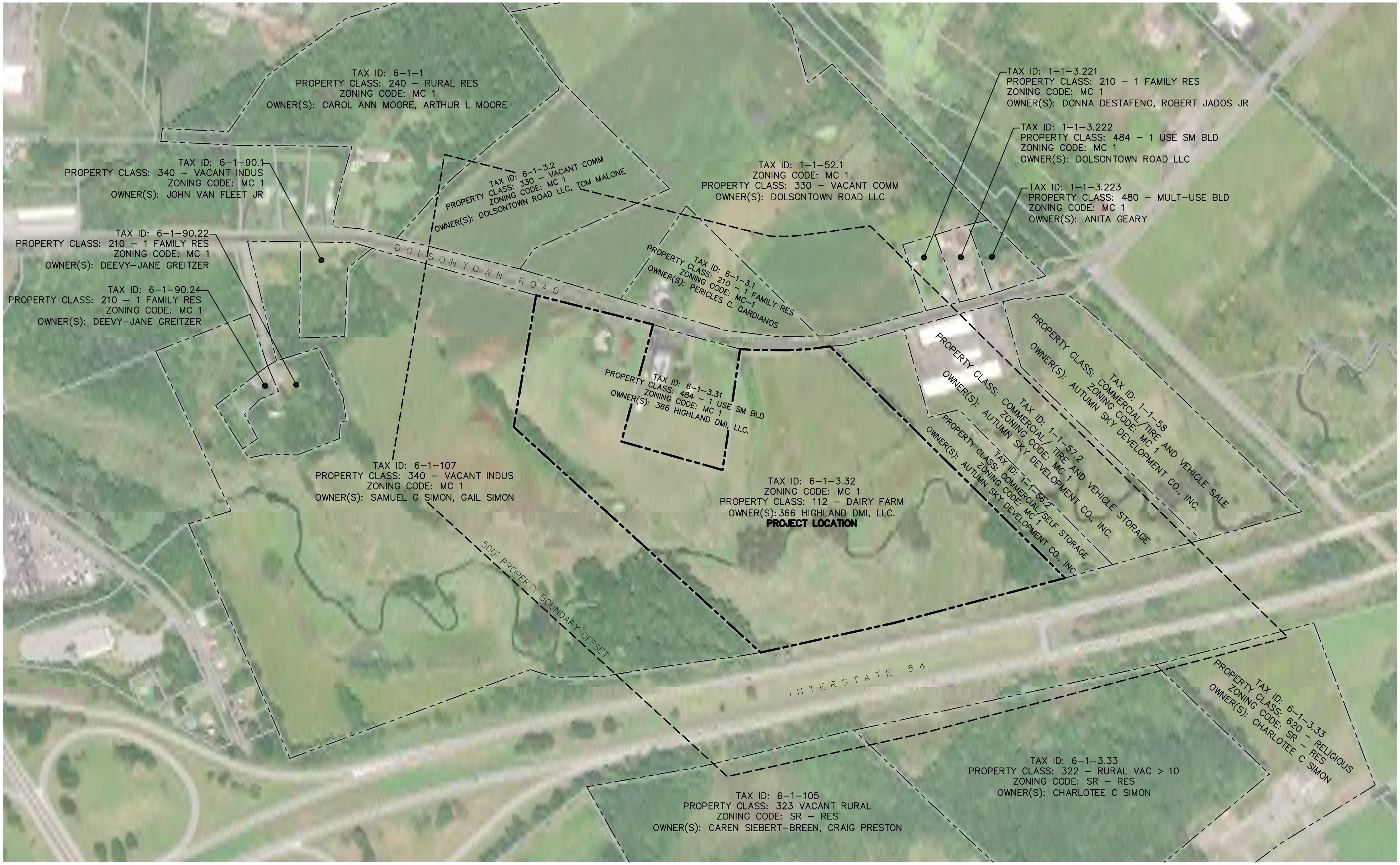

NOTES:

1. BASE MAP OBTAINED FROM THE ORANGE COUNTY GIS PARCEL VIEWER, ACCESSED ON 12/4/2020

N

SCALE: 300' 0' 300' 600'

ADJACENT PROPERTIES

DOM-MAR TRANSFER AND RECYCLING FACILITY

DOMKAM, LLC.

TOWN OF WAWAYANDA, STATE OF NEW YORK

EnSol, Inc.
Environmental Solutions
661 MAIN STREET
NIAGARA FALLS, NY 14301
PHONE (716) 285-3920
FAX (716) 285-3928

FIGURE 1

DECEMBER 2020

PN: 20-0062

Figure 2
Point Reciever Results
Dom-Mar Transfer & Recycling Facility
Noise Evaluation

Red line = 65dB during the Day
two pieces of equipment running
and full traffic load (29 trucks & 34 cars/hr)

Green line = 65dB during the Night
two pieces of equipment running
and full traffic load (22 trucks & 22 cars/hr)

Recievers 1-7 at a distance of 100'
from property line for Town evaluation

Predicted noise levels (dB(A)) at
Reciver locations:
Data box left cell = day results (7am-7pm)
Data box right cell = night results (4am-7am)

Ground atttenuation of entire
proposed development (blue line)
set at 0.0 (hard surface) for conservative
modeling purposes

Vegetative attenuation areas set at default height
of 10 meters

Modeled Atmospheric Conditions:
Temperature = 48 F
Humidity = 75%
Air Pressure = 1,013 mbar

Noise modeling completed with SoundPlan
Essential ver. 5.1 modeling software

Signs and symbols

- Property Line
- Ground effects
- Volume attenuation areas
- Receiver
- Traffic Noise Emission Line
- Point source (site equipment)
- Limit line Day: 65 dB(A)
- Limit line Night: 65 dB(A)

0 50 100 200 300 400 feet

N

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Figure 3
Noise Map - Day
Dom-Mar Transfer & Recycling Facility
Noise Evaluation

Day Time Operating Assumptions

1) Day operation hours:
   7am - 7pm (M-F)
   7am - 4pm (Sat)
2) Equipment
   One Excavator @ 85dB (at 50')*
   One Loader @ 80dB (at 50')*
   * - per FHWA Table 9.1
3) Simultaneous operation of both pieces of equipment is a conservative modeling scenario as typical operations will likely include operation of one piece of equipment.
4) Maximum anticipated hourly traffic volume of:
   PHASE 1 CARS (western traffic pattern)
   22 cars (employee, visitor, & res.drop off)
   PHASE 1 TRUCKS (central traffic pattern)
   12 medium trucks (inbound materials) and
   10 heavy trucks (6 outbound & 4 yard tractor)
   PHASE 2 COMBINED (eastern traffic pattern)
   7 medium trucks (maintenance)
   12 cars (employees & visitors)

Signs and symbols

- Property Line
- Ground effects
- Volume attenuation areas
- Traffic Noise Emission Line
- Point source (site equipment)

Levels in dB(A)

< 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
85 - 90
>= 90

0 50 100 200 300 400 feet

N

EnSol

Figure 4
Noise Map - Night
Dom-Mar Transfer & Recycling Facility
Noise Evaluation

Night Time Operating Assumptions

1) Night operation hours:
   4am - 7am (M-F)
   5am - 7am (Sat)
2) Equipment
   One Excavator @ 85dB (at 50')*
   One Loader @ 80dB (at 50')*
   * - per FHWA Table 9.1
3) Simultaneous operation of both pieces of equipment is a conservative modeling scenario as typical operations will likely include operation of one piece of equipment.
4) Maximum anticipated hourly traffic volume of:
   PHASE 1 CARS (western traffic pattern)
   10 cars (employee, visitor, & res.drop off)
   PHASE 1 TRUCKS (central traffic pattern)
   5 medium trucks (inbound materials) and
   3 heavy trucks (outbound materials)
   PHASE 2 COMBINED (eastern traffic pattern)
   14 medium trucks (maintenance)
   10 cars (employees & visitors)

Signs and symbols

- Property Line
- Ground effects
- Volume attenuation areas
- Traffic Noise Emission Line
- Point source (site equipment)

Levels in dB(A)

Levels in dB(A)
< 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
80 - 85
85 - 90
>= 90

0 50 100 200 300 400 feet

N

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Attachment 1

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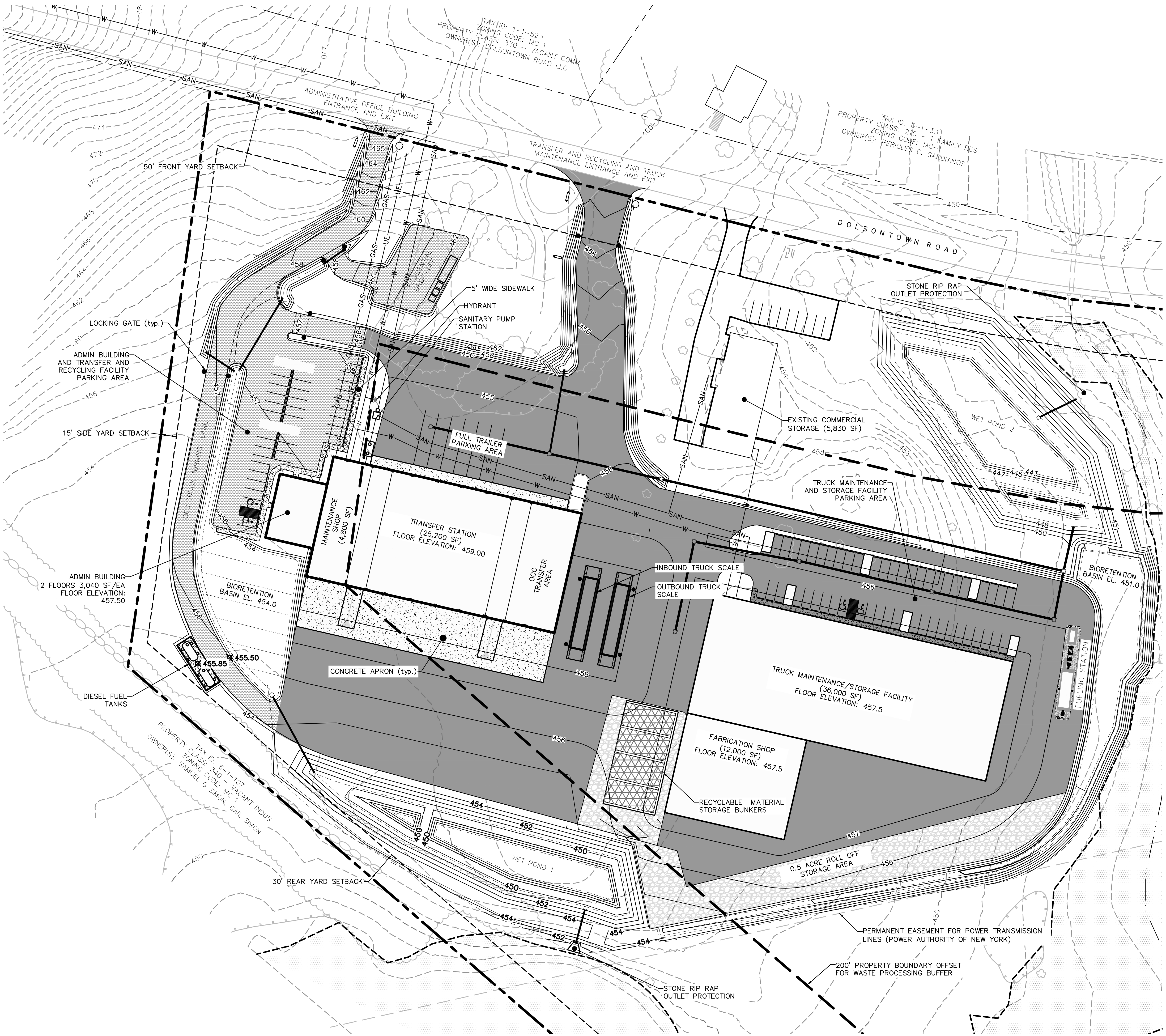
Proposed Facility Site Plan



LEGEND:

- 450 EXISTING GROUND MAJOR CONTOUR
- EXISTING GROUND MINOR CONTOUR
- 450 PROPOSED GRADING MAJOR CONTOUR
- 448 PROPOSED GRADING MINOR CONTOUR
- PROPERTY BOUNDARY
- PROPERTY BOUNDARY SETBACK
- EXISTING BUILDING
- APPARENT JURISDICTIONAL FEDERAL WETLAND
- OUTDOOR SIGNAGE
- STANDARD DUTY PAVEMENT
- HEAVY DUTY PAVEMENT
- CONCRETE
- GRAVEL
- SAN SANITARY FORCEMAIN
- W WATER LINE
- UE UNDERGROUND ELECTRIC
- GAS NATURAL GAS LINE
- PROPOSED SWALE
- PROPOSED STORM SEWER
- PROPOSED CATCH BASIN

NOTES:

1. EXISTING PROPERTY LINE, BUILDINGS AND TOPOGRAPHY FROM A SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
2. ELEVATIONS BASED ON NAVD88 DATUM, HORIZONTAL DATUM IS NEW YORK STATE PLANE EAST.
3. THE EXISTING COMMERCIAL STORAGE BUILDING SHALL BE CONNECTED TO THE EXTENDED 12-INCH WATER MAIN INSIDE THE NORTH ROW OF DOLSONTOWN ROAD.
4. WETLAND BOUNDARY AND APPARENT JURISDICTION FROM DOLSONTOWN ROAD WETLAND DELINEATION REPORT PREPARED BY ENSOL, INC. DATED DECEMBER 2020. WETLAND BOUNDARY SURVEY LOCATIONS ARE FROM THE SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
5. EACH RESIDENTIAL, INDUSTRIAL, COMMERCIAL SUBDIVISION OR SITE PLANS SHALL CONTRIBUTE RECREATIONAL FEES CALCULATED ON THE BASIS OF GROSS FLOOR AREA FOR ALL NEW CONSTRUCTION.
6. THE TRANSFER AND RECYCLING FACILITY IS PROPOSED TO OPERATE FROM 4:00AM TO 7:00PM MONDAY THROUGH FRIDAY, AND FROM 5:00AM TO 4:00PM ON SATURDAY. THE PROPOSED OPERATION HOURS REQUIRE A WAIVER FROM THE TOWN BOARD FROM SECTION 152-17D.(7) OF THE TOWN CODE.

NO.	REVISION	BY	DATE

EnSol
661 Main St.
Niagara Falls, NY 14301
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE:
CONCEPTUAL FULL BUILD SITE PLAN

ISSUE:
REVIEW

DES:	DRN:	CHK:
DL	SJD	DL

PROJECT NO:	DATE:
029-A0001	APRIL 2021

GRAPHIC SCALE:
0' 50' 100'

FILE:
Sheet 4 - Conceptual Full Build Site Plan.dwg

REV NO:	SHEET NO:
0	4

Attachment 2

EnSol, Inc. *Environmental Solutions*

professional engineering – business consulting

International Standard ISO 9613-2: Attenuation of Sound During Propagation Outdoors

INTERNATIONAL STANDARD

ISO 9613-2

First edition
1996-12-15

Acoustics — Attenuation of sound during propagation outdoors —

Part 2:
General method of calculation

Acoustique — Atténuation du son lors de sa propagation à l'air libre —

Partie 2: Méthode générale de calcul

Reference number
ISO 9613-2:1996(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9613-2 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

ISO 9613 consists of the following parts, under the general title *Acoustics — Attenuation of sound during propagation outdoors:*

— *Part 1: Calculation of the absorption of sound by the atmosphere*

— *Part 2: General method of calculation*

Part 1 is a detailed treatment restricted to the attenuation by atmospheric absorption processes. Part 2 is a more approximate and empirical treatment of a wider subject — the attenuation by all physical mechanisms.

Annexes A and B of this part of ISO 9613 are for information only.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

The ISO 1996 series of standards specifies methods for the description of noise outdoors in community environments. Other standards, on the other hand, specify methods for determining the sound power levels emitted by various noise sources, such as machinery and specified equipment (ISO 3740 series), or industrial plants (ISO 8297). This part of ISO 9613 is intended to bridge the gap between these two types of standard, to enable noise levels in the community to be predicted from sources of known sound emission. The method described in this part of ISO 9613 is general in the sense that it may be applied to a wide variety of noise sources, and covers most of the major mechanisms of attenuation. There are, however, constraints on its use, which arise principally from the description of environmental noise in the ISO 1996 series of standards.

Acoustics — Attenuation of sound during propagation outdoors —

Part 2:
General method of calculation

1 Scope

This part of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level (as described in parts 1 to 3 of ISO 1996) under meteorological conditions favourable to propagation from sources of known sound emission.

These conditions are for downwind propagation, as specified in 5.4.3.3 of ISO 1996-2:1987 or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night. Inversion conditions over water surfaces are not covered and may result in higher sound pressure levels than predicted from this part of ISO 9613.

The method also predicts a long-term average A-weighted sound pressure level as specified in ISO 1996-1 and ISO 1996-2. The long-term average A-weighted sound pressure level encompasses levels for a wide variety of meteorological conditions.

The method specified in this part of ISO 9613 consists specifically of octave-band algorithms (with nominal midband frequencies from 63 Hz to 8 kHz) for calculating the attenuation of sound which originates from a point sound source, or an assembly of point sources. The source (or sources) may be moving or stationary. Specific terms are provided in the algorithms for the following physical effects:

— geometrical divergence;

— atmospheric absorption;

— ground effect;

— reflection from surfaces;

— screening by obstacles.

Additional information concerning propagation through housing, foliage and industrial sites is given in annex A.

This method is applicable in practice to a great variety of noise sources and environments. It is applicable, directly or indirectly, to most situations concerning road or rail traffic, industrial noise sources, construction activities, and many other ground-based noise sources. It does not apply to sound from aircraft in flight, or to blast waves from mining, military or similar operations.

To apply the method of this part of ISO 9613, several parameters need to be known with respect to the geometry of the source and of the environment, the ground surface characteristics, and the source strength in terms of octave-band sound power levels for directions relevant to the propagation.

NOTE 1 If only A-weighted sound power levels of the sources are known, the attenuation terms for 500 Hz may be used to estimate the resulting attenuation.

The accuracy of the method and the limitations to its use in practice are described in clause 9.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9613. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9613 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1996-1:1982, *Acoustics — Description and measurement of environmental noise — Part 1: Basic quantities and procedures.*

ISO 1996-2:1987, *Acoustics — Description and measurement of environmental noise — Part 2: Acquisition of data pertinent to land use.*

ISO 1996-3:1987, *Acoustics — Description and measurement of environmental noise — Part 3: Application to noise limits.*

ISO 9613-1:1993, *Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere.*

IEC 651:1979, *Sound level meters,* and Amendment 1:1993.

3 Definitions

For the purposes of this part of ISO 9613, the definitions given in ISO 1996-1 and the following definitions apply. (See table 1 for symbols and units.)

3.1 equivalent continuous A-weighted sound pressure level, L_{AT}: Sound pressure level, in decibels, defined by equation (1):

$$L_{AT} = 10 \lg \left\{ \left[(1/T) \int_0^T p_A^2(t)\, dt \right] \Big/ p_0^2 \right\} \text{ dB} \qquad \dots (1)$$

where

$p_A(t)$ is the instantaneous A-weighted sound pressure, in pascals;

p_0 is the reference sound pressure ($= 20 \times 10^{-6}$ Pa);

T is a specified time interval, in seconds.

The A-frequency weighting is that specified for sound level meters in IEC 651.

NOTE 2 The time interval T should be long enough to average the effects of varying meteorological parameters. Two different situations are considered in this part of ISO 9613, namely short-term downwind and long-term overall averages.

Table 1 — Symbols and units

Symbol	Definition	Unit
A	octave-band attenuation	dB
C_{met}	meteorological correction	dB
d	distance from point source to receiver (see figure 3)	m
d_p	distance from point source to receiver projected onto the ground plane (see figure 1)	m
$d_{s,o}$	distance between source and point of reflection on the reflecting obstacle (see figure 8)	m
$d_{o,r}$	distance between point of reflection on the reflecting obstacle and receiver (see figure 8)	m
d_{ss}	distance from source to (first) diffraction edge (see figures 6 and 7)	m
d_{sr}	distance from (second) diffraction edge to receiver (see figures 6 and 7)	m
D_I	directivity index of the point sound source	—
D_z	screening attenuation	—
e	distance between the first and second diffraction edge (see figure 7)	m
G	ground factor	—
h	mean height of source and receiver	m
h_s	height of point source above ground (see figure 1)	m
h_r	height of receiver above ground (see figure 1)	m
h_m	mean height of the propagation path above the ground (see figure 3)	m
H_{max}	largest dimension of the sources	m
l_{min}	minimum dimension (length or height) of the reflecting plane (see figure 8)	m
L	sound pressure level	dB
α	atmospheric attenuation coefficient	dB/km
β	angle of incidence	rad
ρ	sound reflection coefficient	—

3.2 equivalent continuous downwind octave-band sound pressure level, L_{fT}(DW): Sound pressure level, in decibels, defined by equation (2):

$$L_{fT}(\mathrm{DW}) = 10 \lg \left\{ \left[(1/T) \int_0^T p_f^2(t)\,\mathrm{d}t \right] \Big/ p_0^2 \right\} \ \mathrm{dB} \qquad \ldots (2)$$

where $p_f(t)$ is the instantaneous octave-band sound pressure downwind, in pascals, and the subscript f represents a nominal midband frequency of an octave-band filter.

NOTE 3 The electrical characteristics of the octave-band filters should comply at least with the class 2 requirements of IEC 1260.

3.3 insertion loss (of a barrier)**:** Difference, in decibels, between the sound pressure levels at a receiver in a specified position under two conditions:

a) with the barrier removed, and

b) with the barrier present (inserted),

and no other significant changes that affect the propagation of sound.

4 Source description

The equations to be used are for the attenuation of sound from point sources. Extended noise sources, therefore, such as road and rail traffic or an industrial site (which may include several installations or plants, together with traffic moving on the site) shall be represented by a set of sections (cells), each having a certain sound power and directivity. Attenuation calculated for sound from a representative point within a section is used to represent the attenuation of sound from the entire section. A line source may be divided into line sections, an area source into area sections, each represented by a point source at its centre.

However, a group of point sources may be described by an equivalent point sound source situated in the middle of the group, in particular if

a) the sources have approximately the same strength and height above the local ground plane,

b) the same propagation conditions exist from the sources to the point of reception, and

c) the distance d from the single equivalent point source to the receiver exceeds twice the largest dimension H_{max} of the sources ($d > 2H_{max}$).

If the distance d is smaller ($d \leqslant 2H_{max}$), or if the propagation conditions for the component point sources are different (e.g. due to screening), the total sound source shall be divided into its component point sources.

NOTE 4 In addition to the real sources described above, image sources will be introduced to describe the reflection of sound from walls and ceilings (but not by the ground), as described in 7.5.

5 Meteorological conditions

Downwind propagation conditions for the method specified in this part of ISO 9613 are as specified in 5.4.3.3 of ISO 1996-2:1987, namely

— wind direction within an angle of ± 45° of the direction connecting the centre of the dominant sound source and the centre of the specified receiver region, with the wind blowing from source to receiver, and

— wind speed between approximately 1 m/s and 5 m/s, measured at a height of 3 m to 11 m above the ground.

The equations for calculating the average downwind sound pressure level L_{AT}(DW) in this part of ISO 9613, including the equations for attenuation given in clause 7, are the average for meteorological conditions within these limits. The term average here means the average over a short time interval, as defined in 3.1.

These equations also hold, equivalently, for average propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights.

6 Basic equations

The equivalent continuous downwind octave-band sound pressure level at a receiver location, L_{fT}(DW), shall be calculated for each point source, and its image sources, and for the eight octave bands with nominal midband frequencies from 63 Hz to 8 kHz, from equation (3):

$$L_{fT}(\mathrm{DW}) = L_W + D_c - A \qquad \ldots (3)$$

where

L_W is the octave-band sound power level, in decibels, produced by the point sound source relative to a reference sound power of one picowatt (1 pW);

D_c is the directivity correction, in decibels, that describes the extent by which the equivalent continuous sound pressure level from the point sound source deviates in a specified direction from the level of an omnidirectional point sound source producing sound power level L_W; D_c equals the directivity index D_I of the point sound source plus an index D_Ω that accounts for sound propagation into solid angles less than 4π steradians; for an omnidirectional point sound source radiating into free space, $D_c = 0$ dB;

A is the octave-band attenuation, in decibels, that occurs during propagation from the point sound source to the receiver.

NOTES

5 The letter symbol A (in italic type) signifies attenuation in this part of ISO 9613 except in subscripts, where it designates the A-frequency weighting (in roman type).

6 Sound power levels in equation (3) may be determined from measurements, for example as described in the ISO 3740 series (for machinery) or in ISO 8297 (for industrial plants).

The attenuation term A in equation (3) is given by equation (4):

$$A = A_{\text{div}} + A_{\text{atm}} + A_{\text{gr}} + A_{\text{bar}} + A_{\text{misc}} \qquad \ldots (4)$$

where

A_{div} is the attenuation due to geometrical divergence (see 7.1);

A_{atm} is the attenuation due to atmospheric absorption (see 7.2);

A_{gr} is the attenuation due to the ground effect (see 7.3);

A_{bar} is the attenuation due to a barrier (see 7.4);

A_{misc} is the attenuation due to miscellaneous other effects (see annex A).

General methods for calculating the first four terms in equation (4) are specified in this part of ISO 9613. Information on three contributions to the last term, A_{misc} (the attenuation due to propagation through foliage, industrial sites and areas of houses), is given in annex A.

The equivalent continuous A-weighted downwind sound pressure level shall be obtained by summing the contributing time-mean-square sound pressures calculated according to equations (3) and (4) for each point sound source, for each of their image sources, and for each octave band, as specified by equation (5):

$$L_{\text{A}T}(\text{DW}) = 10 \lg \left\{ \sum_{i=1}^{n} \left[\sum_{j=1}^{8} 10^{0{,}1\left[L_{fT}(ij) + A_f(j)\right]} \right] \right\} \text{ dB} \qquad \ldots (5)$$

where

n is the number of contributions i (sources and paths);

j is an index indicating the eight standard octave-band midband frequencies from 63 Hz to 8 kHz;

A_f denotes the standard A-weighting (see IEC 651).

The long-term average A-weighted sound pressure level $L_{\text{A}T}(\text{LT})$ shall be calculated according to

$$L_{\text{A}T}(\text{LT}) = L_{\text{A}T}(\text{DW}) - C_{\text{met}} \qquad \ldots (6)$$

where C_{met} is the meteorological correction described in clause 8.

The calculation and significance of the various terms in equations (1) to (6) are explained in the following clauses. For a more detailed treatment of the attenuation terms, see the literature references given in annex B.

7 Calculation of the attenuation terms

7.1 Geometrical divergence (A_{div})

The geometrical divergence accounts for spherical spreading in the free field from a point sound source, making the attenuation, in decibels, equal to

$$A_{\text{div}} = \left[20 \lg(d/d_0) + 11\right] \text{ dB} \qquad \ldots (7)$$

where

d is the distance from the source to receiver, in metres;

d_0 is the reference distance (= 1 m).

NOTE 7 The constant in equation (7) relates the sound power level to the sound pressure level at a reference distance d_0 which is 1 m from an omnidirectional point sound source.

7.2 Atmospheric absorption (A_{atm})

The attenuation due to atmospheric absorption A_{atm}, in decibels, during propagation through a distance d, in metres, is given by equation (8):

$$A_{atm} = \alpha d/1\,000 \qquad \ldots (8)$$

where α is the atmospheric attenuation coefficient, in decibels per kilometre, for each octave band at the midband frequency (see table 2).

For values of α at atmospheric conditions not covered in table 2, see ISO 9613-1.

NOTES

8 The atmospheric attenuation coefficient depends strongly on the frequency of the sound, the ambient temperature and relative humidity of the air, but only weakly on the ambient pressure.

9 For calculation of environmental noise levels, the atmospheric attenuation coefficient should be based on average values determined by the range of ambient weather which is relevant to the locality.

7.3 Ground effect (A_{gr})

7.3.1 General method of calculation

Ground attenuation, A_{gr}, is mainly the result of sound reflected by the ground surface interfering with the sound propagating directly from source to receiver. The downward-curving propagation path (downwind) ensures that this attenuation is determined primarily by the ground surfaces near the source and near the receiver. This method of calculating the ground effect is applicable only to ground which is approximately flat, either horizontally or with a constant slope. Three distinct regions for ground attenuation are specified (see figure 1):

a) the source region, stretching over a distance from the source towards the receiver of $30h_s$, with a maximum distance of d_p (h_s is the source height, and d_p the distance from source to receiver, as projected on the ground plane);

b) the receiver region, stretching over a distance from the receiver back towards the source of $30h_r$, with a maximum distance of d_p (h_r is the receiver height);

c) a middle region, stretching over the distance between the source and receiver regions. If $d_p < (30h_s + 30h_r)$, the source and receiver regions will overlap, and there is no middle region.

According to this scheme, the ground attenuation does not increase with the size of the middle region, but is mostly dependent on the properties of source and receiver regions.

The acoustical properties of each ground region are taken into account through a ground factor G. Three categories of reflecting surface are specified as follows.

Table 2 — Atmospheric attenuation coefficient α for octave bands of noise

Temperature	Relative humidity	**Atmospheric attenuation coefficient α**, dB/km							
		Nominal midband frequency, Hz							
°C	%	63	125	250	500	1 000	2 000	4 000	8 000
10	70	0,1	0,4	1,0	1,9	3,7	9,7	32,8	117
20	70	0,1	0,3	1,1	2,8	5,0	9,0	22,9	76,6
30	70	0,1	0,3	1,0	3,1	7,4	12,7	23,1	59,3
15	20	0,3	0,6	1,2	2,7	8,2	28,2	88,8	202
15	50	0,1	0,5	1,2	2,2	4,2	10,8	36,2	129
15	80	0,1	0,3	1,1	2,4	4,1	8,3	23,7	82,8

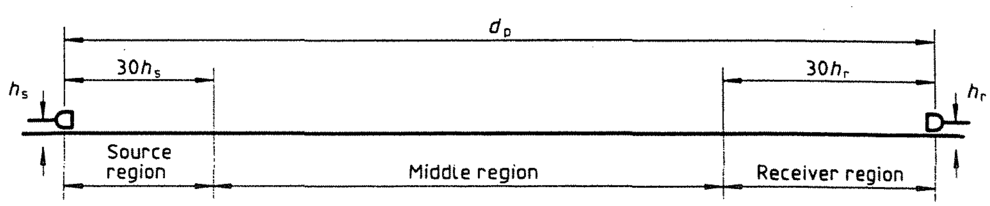


Figure 1 — Three distinct regions for determination of ground attenuation

a) **Hard ground,** which includes paving, water, ice, concrete and all other ground surfaces having a low porosity. Tamped ground, for example, as often occurs around industrial sites, can be considered hard. For hard ground $G = 0$.

NOTE 10 It should be recalled that inversion conditions over water are not covered by this part of ISO 9613.

b) **Porous ground,** which includes ground covered by grass, trees or other vegetation, and all other ground surfaces suitable for the growth of vegetation, such as farming land. For porous ground $G = 1$.

c) **Mixed ground:** if the surface consists of both hard and porous ground, then G takes on values ranging from 0 to 1, the value being the fraction of the region that is porous.

To calculate the ground attenuation for a specific octave band, first calculate the component attenuations A_s for the source region specified by the ground factor G_s (for that region), A_r for the receiver region specified by the ground factor G_r, and A_m for the middle region specified by the ground factor G_m, using the expressions in table 3. (Alternatively, the functions a', b', c' and d' in table 3 may be obtained directly from the curves in figure 2.) The total ground attenuation for that octave band shall be obtained from equation (9):

$$A_{gr} = A_s + A_r + A_m \qquad \ldots (9)$$

NOTE 11 In regions with buildings, the influence of the ground on sound propagation may be changed (see A.3).

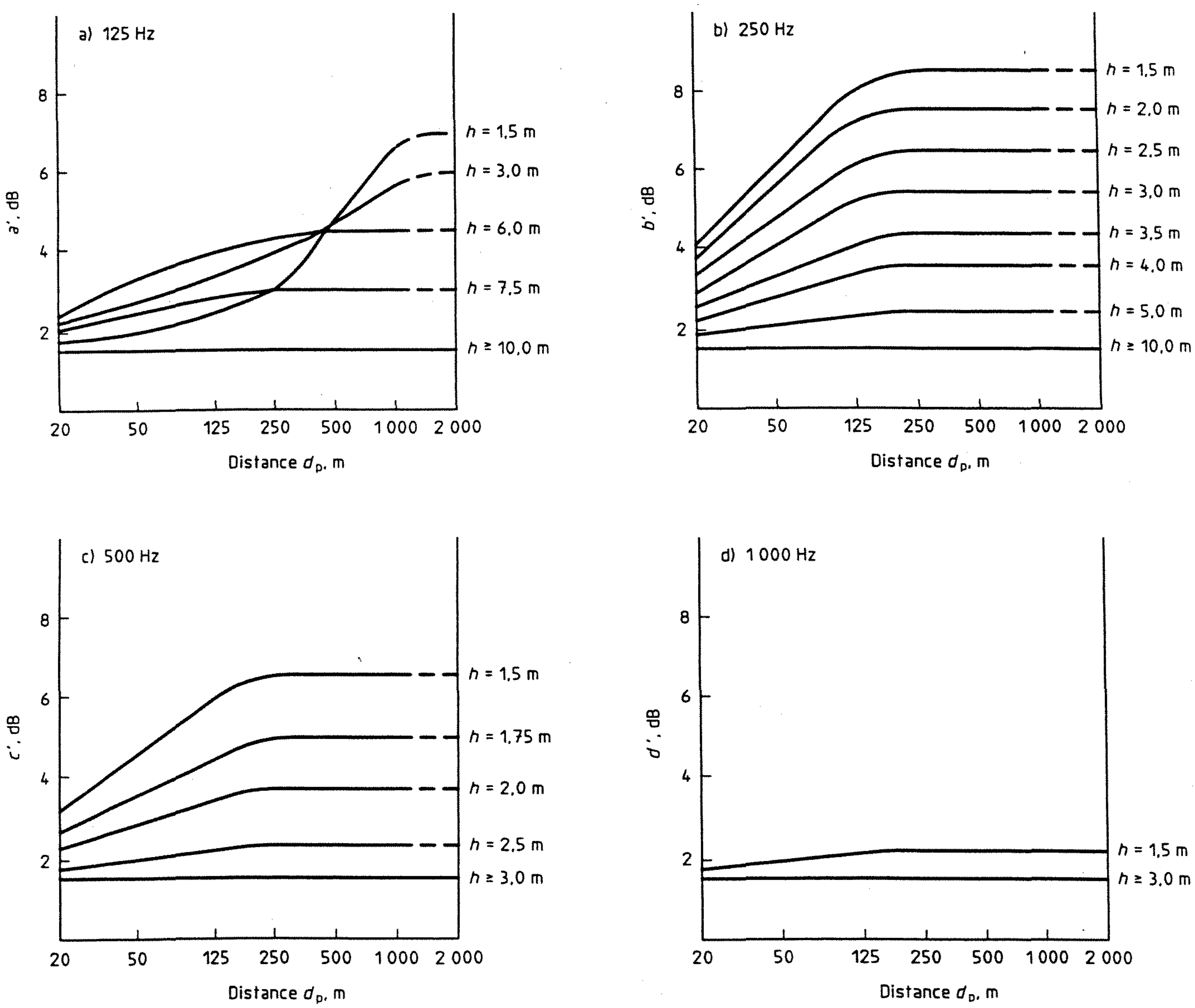


Figure 2 — Functions a', b', c' and d' representing the influence of the source-to-receiver distance d_p and the source or receiver height h, respectively, on the ground attenuation A_s (computed from equations in table 3)

Table 3 — Expressions to be used for calculating ground attenuation contributions A_s, A_r and A_m in octave bands

Nominal midband frequency Hz	A_s or A_r 1) dB	A_m dB
63	$-1,5$	$-3q$ 2)
125	$-1,5+G\times a'(h)$	$-3q(1-G_m)$
250	$-1,5+G\times b'(h)$	
500	$-1,5+G\times c'(h)$	
1 000	$-1,5+G\times d(h)$	
2 000	$-1,5(1-G)$	
4 000	$-1,5(1-G)$	
8 000	$-1,5(1-G)$	

NOTES

$$a'(h)=1,5+3,0\times e^{-0,12(h-5)^2}\left(1-e^{-d_p/50}\right)+5,7\times e^{-0,09h^2}\left(1-e^{-2,8\times 10^{-6}\times d_p^2}\right)$$

$$b'(h)=1,5+8,6\times e^{-0,09h^2}\left(1-e^{-d_p/50}\right)$$

$$c'(h)=1,5+14,0\times e^{-0,46h^2}\left(1-e^{-d_p/50}\right)$$

$$d'(h)=1,5+5,0\times e^{-0,9h^2}\left(1-e^{-d_p/50}\right)$$

1) For calculating A_s, take $G=G_s$ and $h=h_s$. For calculating A_r, take $G=G_r$ and $h=h_r$. See 7.3.1 for values of G for various ground surfaces.

2) $q=0$ when $d_p\leqslant 30(h_s+h_r)$

$$q=1-\frac{30(h_s+h_r)}{d_p} \quad \text{when } d_p>30(h_s+h_r)$$

where d_p is the source-to-receiver distance, in metres, projected onto the ground planes.

7.3.2 Alternative method of calculation for A-weighted sound pressure levels

Under the following specific conditions

— only the A-weighted sound pressure level at the receiver position is of interest,

— the sound propagation occurs over porous ground or mixed ground most of which is porous (see 7.3.1),

— the sound is not a pure tone,

and for ground surfaces of any shape, the ground attenuation may be calculated from equation (10):

$$A_{gr}=4,8-(2h_m/d)\left[17+(300/d)\right]\geqslant 0 \text{ dB} \quad \ldots (10)$$

where

h_m is the mean height of the propagation path above the ground, in metres;

d is the distance from the source to receiver, in metres.

The mean height h_m may be evaluated by the method shown in figure 3. Negative values for A_{gr} from equation (10) shall be replaced by zeros.

NOTE 12 For short distances d, equation (10) predicts no attenuation and equation (9) may be more accurate.

When the ground attenuation is calculated using equation (10), the directivity correction D_c in equation (3) shall include a term D_Ω, in decibels, to account for the apparent increase in sound power level of the source due to reflections from the ground near the source.

$$D_\Omega=10\lg\left\{1+\left[d_p^2+(h_s-h_r)^2\right]\Big/\left[d_p^2+(h_s+h_r)^2\right]\right\} \text{ dB} \quad \ldots (11)$$

where

h_s is the height of the source above the ground, in metres;

h_r is the height of the receiver above the ground, in metres;

d_p is the source-to-receiver distance projected onto the ground plane, in metres.

7.4 Screening (A_{bar})

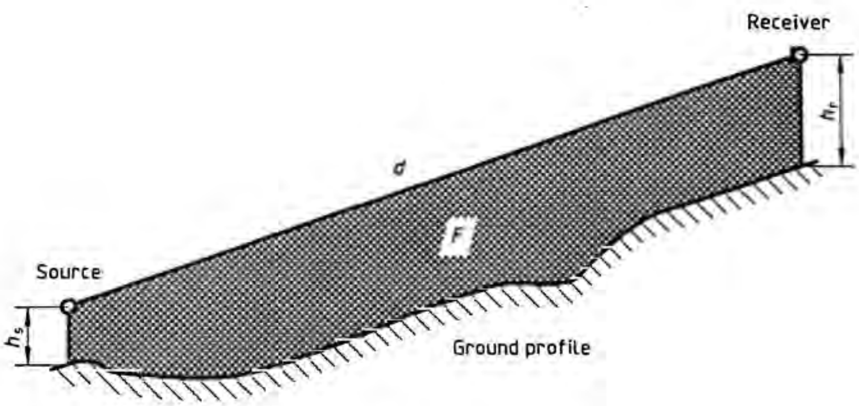
An object shall be taken into account as a screening obstacle (often called a barrier) if it meets the following requirements:

— the surface density is at least 10 kg/m^2;

— the object has a closed surface without large cracks or gaps (consequently process installations in chemical plants, for example, are ignored);

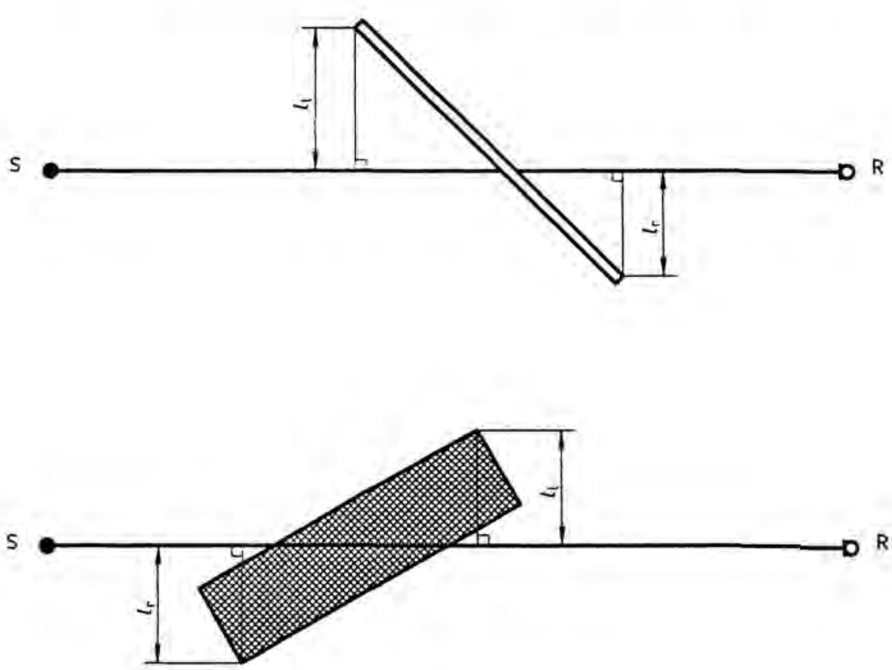
— the horizontal dimension of the object normal to the source-receiver line is larger than the acoustic wavelength λ at the nominal midband frequency for the octave band of interest; in other words $l_l + l_r > \lambda$ (see figure 4).

Each object that fulfils these requirements shall be represented by a barrier with vertical edges. The top edge of the barrier is a straight line that may be sloping.



$h_m = F/d$, where F is the area

Figure 3 — Method for evaluating the mean height h_m



NOTE — An object is only considered to be a screening obstacle when its horizontal dimension perpendicular to the source-receiver line SR is larger than the wavelength: $(l_l + l_r) > \lambda$

Figure 4 — Plan view of two obstacles between the source (S) and the receiver (R)

For the purposes of this part of ISO 9613, the attenuation by a barrier, A_{bar}, shall be given by the insertion loss. Diffraction over the top edge and around a vertical edge of a barrier may both be important. (See figure 5.) For downwind sound propagation, the effect of diffraction (in decibels) over the top edge shall be calculated by

$$A_{bar} = D_z - A_{gr} > 0 \qquad \text{. . . (12)}$$

and for diffraction around a vertical edge by

$$A_{bar} = D_z > 0 \qquad \text{. . . (13)}$$

where

D_z is the barrier attenuation for each octave band [see equation (14)];

A_{gr} is the ground attenuation **in the absence of the barrier** (i.e. with the screening obstacle removed) (see 7.3).

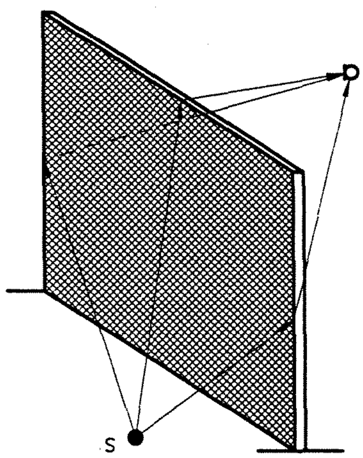


Figure 5 — Different sound propagation paths at a barrier

NOTES

13 When A_{bar} as defined by equation (12) is substituted in equation (4) to find the total attenuation A, the two A_{gr} terms in equation (4) will cancel. The barrier attenuation D_z in equation (12) then includes the effect of the ground in the presence of the barrier.

14 For large distances and high barriers, the insertion loss calculated by equation (12) is not sufficiently confirmed by measurements.

15 In calculation of the insertion loss for multisource industrial plants by high buildings (more than 10 m above the ground), and also for high-noise sources within the plant, equation (13) should be used in both cases for determining the long-term average sound pressure level [using equation (6)].

16 For sound from a depressed highway, there may be attenuation in addition to that indicated by equation (12) along a ground surface outside the depression, due to that ground surface.

To calculate the barrier attenuation D_z, assume that only one significant sound-propagation path exists from the sound source to the receiver. If this assumption is not valid, separate calculations are required for other propagation paths (as illustrated in figure 5) and the contributions from the various paths to the squared sound pressure at the receiver are summed.

The barrier attenuation D_z, in decibels, shall be calculated for this path by equation (14):

$$D_z = 10 \lg \left[3 + (C_2/\lambda) C_3 z K_{met} \right] \text{ dB} \qquad \text{. . . (14)}$$

where

C_2 is equal to 20, and includes the effect of ground reflections; if in special cases ground reflections are taken into account separately by image sources, $C_2 = 40$;

C_3 is equal to 1 for single diffraction (see figure 6);

$$C_3 = \left[1 + (5\lambda/e)^2 \right] \Big/ \left[(1/3) + (5\lambda/e)^2 \right] \qquad \text{. . . (15)}$$

for double diffraction (see figure 7);

λ is the wavelength of sound at the nominal midband frequency of the octave band, in metres;

z is the difference between the pathlengths of diffracted and direct sound, as calculated by equations (16) and (17), in metres;

K_{met} is the correction factor for meteorological effects, given by equation (18);

e is the distance between the two diffraction edges in the case of double diffraction (see figure 7).

For single diffraction, as shown in figure 6, the pathlength difference z shall be calculated by means of equation (16):

$$z = \left[(d_{ss} + d_{sr})^2 + a^2 \right]^{1/2} - d \qquad \text{. . . (16)}$$

where

d_{ss} is the distance from the source to the (first) diffraction edge, in metres;

d_{sr} is the distance from the (second) diffraction edge to the receiver, in metres;

a is the component distance parallel to the barrier edge between source and receiver, in metres.

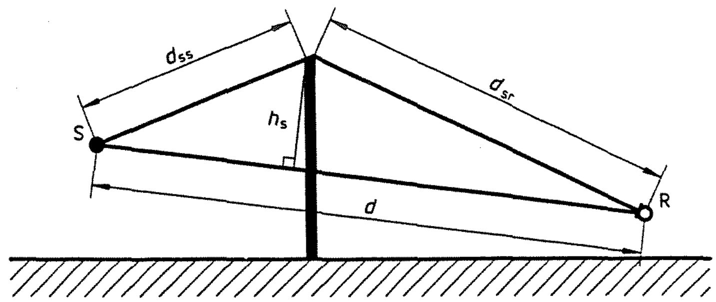


Figure 6 — Geometrical quantities for determining the pathlength difference for single diffraction

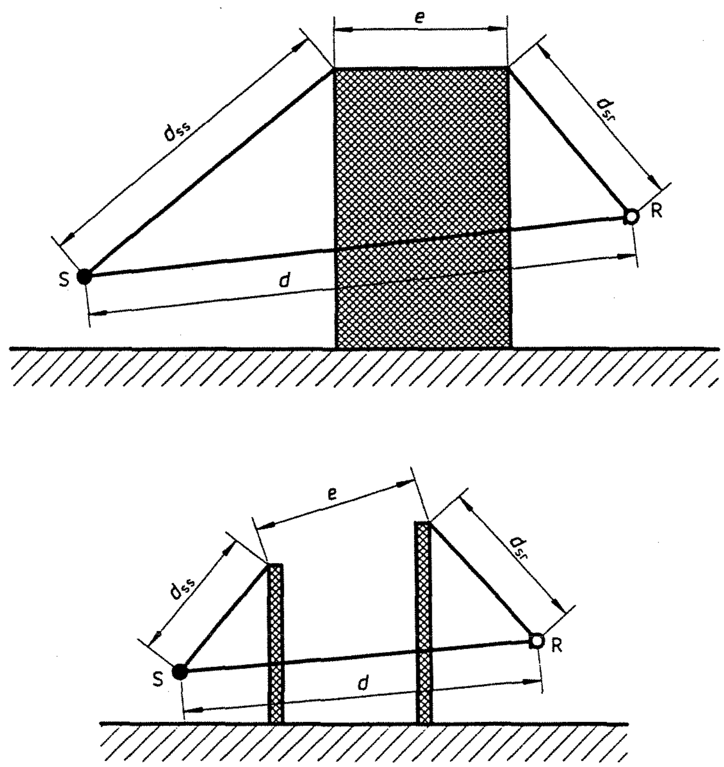


Figure 7 — Geometrical quantities for determining the pathlength difference for double diffraction

If the line of sight between the source S and receiver R passes above the top edge of the barrier, z is given a negative sign.

For double diffraction, as shown in figure 7, the pathlength difference z shall be calculated by

$$z = \left[\left(d_{ss} + d_{sr} + e \right)^2 + a^2 \right]^{1/2} - d \qquad \ldots (17)$$

The correction factor K_{met} for meteorological conditions in equation (14) shall be calculated using equation (18):

$$K_{met} = \exp\left[-(1/2000)\sqrt{d_{ss} d_{sr} d/(2z)} \right] \quad \text{for } z > 0 \qquad \ldots (18)$$

$$K_{met} = 1 \quad \text{for } z \leqslant 0$$

For lateral diffraction around obstacles, it shall be assumed that $K_{met} = 1$ (see figure 5).

NOTES

17 For source-to-receiver distances less than 100 m, the calculation using equation (14) shows that K_{met} may be assumed equal to 1, to an accuracy of 1 dB.

18 Equation (15) provides a continuous transition from the case of single diffraction ($e = 0$) where $C_3 = 1$, to that of a well-separated double diffraction ($e \gg \lambda$) where $C_3 = 3$.

19 A barrier may be less effective than calculated by equations (12) to (18) as a result of reflections from other acoustically hard surfaces near the sound path from the source to the receiver or by multiple reflections between an acoustically hard barrier and the source.

The barrier attenuation D_z, in any octave band, should not be taken to be greater than 20 dB in the case of single diffraction (i.e. thin barriers) and 25 dB in the case of double diffraction (i.e. thick barriers).

The barrier attenuation for two barriers is calculated using equation (14) for double diffraction, as indicated in the lower part of figure 7. The barrier attenuation for more than two barriers may also be calculated approximately using equation (14), by choosing the two most effective barriers, neglecting the effects of the others.

7.5 Reflections

Reflections are considered here in terms of image sources. These reflections are from outdoor ceilings and more or less vertical surfaces, such as the façades of buildings, which can increase the sound pressure levels at the receiver. The effect of reflections from the ground are not included because they enter into the calculation of A_{gr}.

The reflections from an obstacle shall be calculated for all octave bands for which all the following requirements are met:

— a specular reflection can be constructed, as shown in figure 8;

— the magnitude of the sound reflection coefficient for the surface of the obstacle is greater than 0,2;

— the surface is large enough for the nominal midband wavelength λ (in metres) for the octave band under consideration to obey the relationship

$$1/\lambda > \left[2/(l_{\min}\cos\beta)^2\right]\left[d_{s,o}d_{o,r}/(d_{s,o}+d_{o,r})\right] \quad \ldots (19)$$

where

λ is the wavelength of sound (in metres) at the nominal midband frequency f (in hertz) of the octave band $\left(\lambda = \dfrac{340\ \text{m/s}}{f}\right)$;

$d_{s,o}$ is the distance between the source and the point of reflection on the obstacle;

$d_{o,r}$ is the distance between the point of reflection on the obstacle and the receiver;

β is the angle of incidence, in radians (see figure 8);

$l_{\min}$ is the minimum dimension (length or height) of the reflecting surface (see figure 8).

If any of these conditions is not met for a given octave band, then reflections shall be neglected.

The real source and source image are handled separately. The sound power level of the source image $L_{W,\text{im}}$ shall be calculated from

$$L_{W,\text{im}} = L_W + 10\lg(\rho)\ \text{dB} + D_{\text{Ir}} \quad \ldots (20)$$

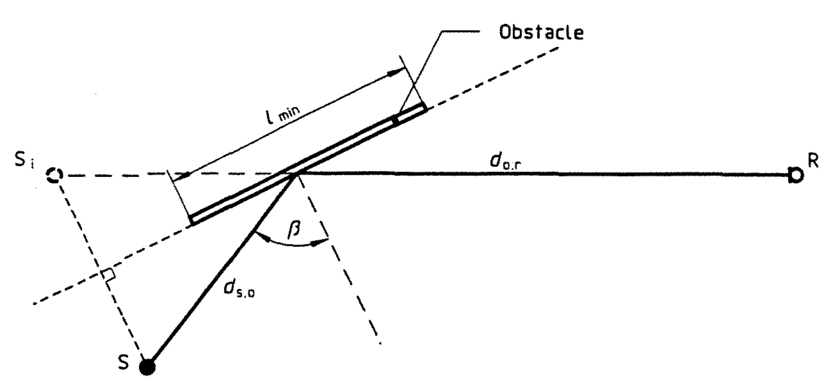
where

ρ is the sound reflection coefficient at angle β on the surface of the obstacle ($\geqslant 0{,}2$) (see figure 8);

D_{Ir} is the directivity index of the source in the direction of the receiver image.

If specific data for the sound reflection coefficient are not available, the value may be estimated using table 4.

For the sound source image, the attenuation terms of equation (4), as well as ρ and D_{Ir} in equation (20), shall be determined according to the propagation path of the reflected sound.



NOTE — A path $d_{s,o} + d_{o,r}$ connecting the source S and receiver R by reflection from the obstacle exists in which β, the angle of incidence, is equal to the angle of reflection. The reflected sound appears to come from the source image S_i.

Figure 8 — Specular reflection from an obstacle

Table 4 — Estimates of the sound reflection coefficient ρ

Object	ρ
Flat hard walls	1
Walls of building with windows and small additions or bay	0,8
Factory walls with 50 % of the surface consisting of openings, installations or pipes	0,4
Cylinders with hard surfaces (tanks, silos)	$\dfrac{D \sin(\phi/2)}{2d_{sc}}$ *) where D is the diameter of the cylinder; d_{sc} is the distance from the source to the centre C of the cylinder; ϕ is the supplement of the angle between lines SC and CR.
Open installations (pipes, towers, etc.)	0
*) This expression applies only if the distance d_{sc} from the source S to cylinder C is much smaller than the distance d_{cr} from the cylinder to receiver; see figure 9.	

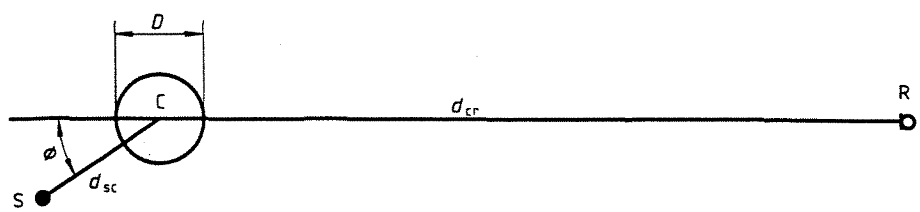


Figure 9 — Estimation of sound reflection coefficient for a cylinder

8 Meteorological correction (C_{met})

Use of equation (3) leads directly to an equivalent continuous A-weighted sound pressure level L_{AT} at the receiver for meteorological conditions which are favourable for propagation from the sound source to that receiver, as described in clause 5. This may be the appropriate condition for meeting a specific community noise limit, i.e. a level which is seldom exceeded (see ISO 1996-3). Often, however, a long-term average A-weighted sound pressure level L_{AT}(LT) is required, where the time interval T is several months or a year. Such a period will normally include a variety of meteorological conditions, both favourable and unfavourable to propagation. A value for L_{AT}(LT) may be obtained in this situation from that calculated for L_{AT}(DW) via equation (3), by using the meteorological correction C_{met} in equation (6).

A value (in decibels) for C_{met} in equation (6) may be calculated using equations (21) and (22) for the case of a point sound source with an output which is effectively constant with time:

$$C_{met} = 0 \qquad \text{if } d_p \leqslant 10(h_s + h_r) \qquad \ldots (21)$$

$$C_{met} = C_0 \left[1 - 10(h_s + h_r)/d_p\right] \qquad \text{if } d_p > 10(h_s + h_r) \qquad \ldots (22)$$

where

h_s is the source height, in metres;

h_r is the receiver height, in metres;

d_p is the distance between the source and receiver projected to the horizontal ground plane, in metres;

C_0 is a factor, in decibels, which depends on local meteorological statistics for wind speed and direction, and temperature gradients.

The effects of meteorological conditions on sound propagation are small for short distances d_p, and for longer distances at greater source and receiver heights. Equations (21) and (22) account approximately for these factors, as shown in figure 10

Values in metres

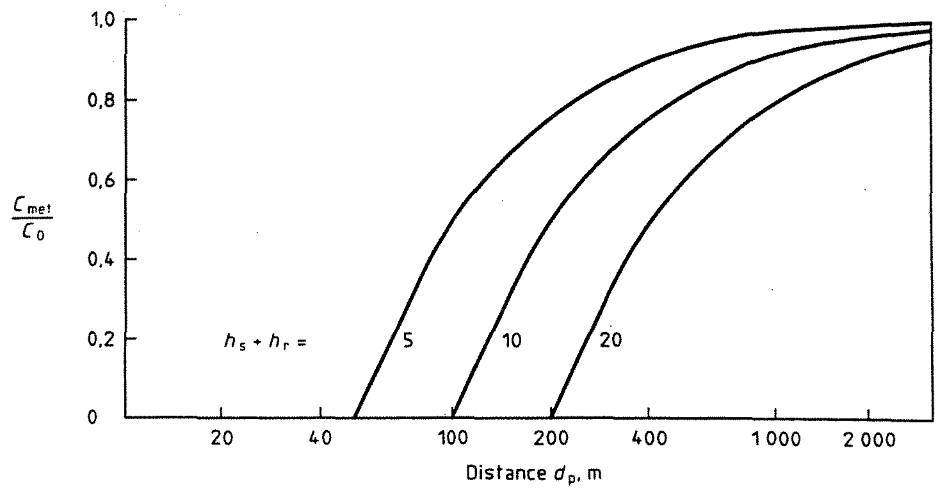


Figure 10 — Meteorological correction C_{met}

NOTES

20 A value for C_0 in equations (21) and (22) may be estimated from an elementary analysis of the local meteorological statistics. For example, if the meteorological conditions favourable to propagation described in clause 5 are found to occur for 50 % of the time period of interest, and the attenuation during the other 50 % is higher by 10 dB or more, then the sound energy which arrives for meteorological conditions unfavourable to propagation may be neglected, and C_0 will be approximately + 3 dB.

21 The meteorological conditions for evaluating C_0 may be established by the local authorities.

22 Experience indicates that values of C_0 in practice are limited to the range from zero to approximately + 5 dB, and values in excess of 2 dB are exceptional. Thus only very elementary statistics of the local meteorology are needed for a ± 1 dB accuracy in C_0.

For a source that is composed of several component point sources, h_s in equations (21) and (22) represents the predominant source height, and d_p the distance from the centre of that source to the receiver.

9 Accuracy and limitations of the method

The attenuation of sound propagating outdoors between a fixed source and receiver fluctuates due to variations in the meteorological conditions along the propagation path. Restricting attention to moderate downwind conditions of propagation, as specified in clause 5, limits the effect of variable meteorological conditions on attenuation to reasonable values.

There is information to support the method of calculation given in clauses 4 to 8 (see annex B) for broadband noise sources. The agreement between calculated and measured values of the average A-weighted sound pressure level for downwind propagation, L_{AT}(DW), supports the estimated accuracy of calculation shown in table 5. These estimates of accuracy are restricted to the range of conditions specified for the validity of the equations in clauses 3 to 8 and are independent of uncertainties in sound power determination.

NOTE 24 The estimates of accuracy in table 5 are for downwind conditions averaged over independent situations (as specified in clause 5). They should not necessarily be expected to agree with the variation in measurements made at a given site on a given day. The latter can be expected to be considerably larger than the values in table 5.

The estimated errors in calculating the average downwind octave-band sound pressure levels, as well as pure-tone sound pressure levels, under the same conditions, may be somewhat larger than the estimated errors given for A-weighted sound pressure levels of broad-band sources in table 5.

In table 5, an estimate of accuracy is not provided in this part of ISO 9613 for distances d greater than the 1 000 m upper limit.

Throughout this part of ISO 9613 the meteorological conditions under consideration are limited to only two cases:

a) moderate downwind conditions of propagation, or their equivalent, as defined in clause 5;

b) a variety of meteorological conditions as they exist over months or years.

The use of equations (1) to (5) and (7) to (20) (and therefore also table 5) is limited to case a): meteorological conditions only. Case b) is relevant only to the use of equations (6), (21) and (22). There are also a substantial number of limitations (non-meteorological) in the use of individual equations. Equation (9) is, for example, limited to approximately flat terrain. These specific limitations are described in the text accompanying the relevant equation.

Table 5 — Estimated accuracy for broadband noise of L_{AT}(DW) calculated using equations (1) to (10)

Height, h *)	Distance, d *)	
	$0 < d < 100$ m	100 m $< d < 1\,000$ m
$0 < h < 5$ m	± 3 dB	± 3 dB
5 m $< h < 30$ m	± 1 dB	± 3 dB

*) h is the mean height of the source and receiver.
d is the distance between the source and receiver.

NOTE — These estimates have been made from situations where there are no effects due to reflection or attenuation due to screening.

Annex A
(informative)

Additional types of attenuation (A_{misc})

The term A_{misc} in equation (4) covers contributions to the attenuation from miscellaneous effects not accessible by the general methods of calculating the attenuation specified in clause 7. These contributions include

— A_{fol}, the attenuation of sound during propagation through foliage,

— A_{site}, the attenuation during propagation through an industrial site, and

— A_{hous}, the attenuation during propagation through a built-up region of houses,

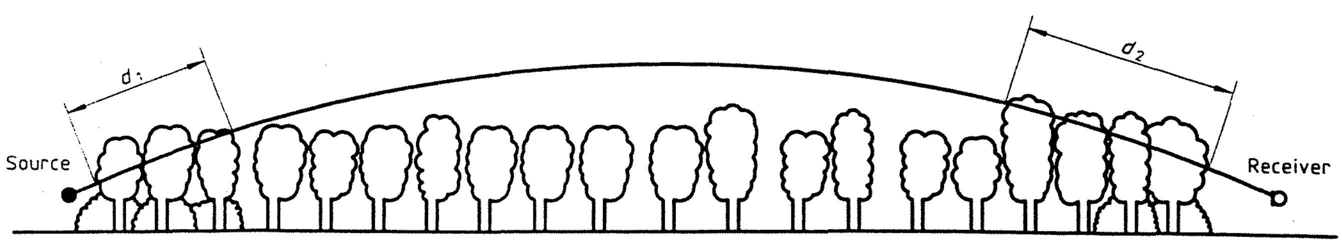
which are all considered in this annex.

For calculating these additional contributions to the attenuation, the curved downwind propagation path may be approximated by an arc of a circle of radius 5 km, as shown in figure A.1.

A.1 Foliage (A_{fol})

The foliage of trees and shrubs provides a small amount of attenuation, but only if it is sufficiently dense to completely block the view along the propagation path, i.e. when it is impossible to see a short distance through the foliage. The attenuation may be by vegetation close to the source, or close to the receiver, or by both situations, as illustrated in figure A.1. Alternatively, the path for the distances d_1 and d_2 may be taken as falling along lines at propagation angles of 15° to the ground.

The first line in table A.1 gives the attenuation to be expected from dense foliage if the total path length through the foliage is between 10 m and 20 m, and the second line if it is between 20 m and 200 m. For path lengths greater than 200 m through dense foliage, the attenuation for 200 m should be used.



NOTE — $d_f = d_1 + d_2$

For calculating d_1 and d_2, the curved path radius may be assumed to be 5 km.

Figure A.1 — Attenuation due to propagation through foliage increases linearly with propagation distance d_f through the foliage

Table A.1 — Attenuation of an octave band of noise due to propagation a distance d_f through dense foliage

Propagation distance d_f m	**Nominal midband frequency** Hz 63	125	250	500	1 000	2 000	4 000	8 000
	Attenuation, dB:							
$10 \leqslant d_f \leqslant 20$	0	0	1	1	1	1	2	3
	Attenuation, dB/m:							
$20 \leqslant d_f \leqslant 200$	0,02	0,03	0,04	0,05	0,06	0,08	0,09	0,12

A.2 Industrial sites (A_{site})

At industrial sites, an attenuation can occur due to scattering from installations (and other objects), which may be described as A_{site}, unless accounted for under A_{bar}, or the sound source radiation specification. The term installations includes miscellaneous pipes, valves, boxes, structural elements, etc.

As the value of A_{site} depends strongly on the type of site, it is recommended that it is determined by measurements. However, for an estimate of this attenuation, the values in table A.2 may be used. The attenuation increases linearly with the length of the curved path d_s through the installations (see figure A.2), with a maximum of 10 dB.

A.3 Housing (A_{hous})

A.3.1 When either the source or receiver, or both are situated in a built-up region of houses, an attenuation will occur due to screening by the houses. However, this effect may largely be compensated by propagation between houses and by reflections from other houses in the vicinity. This combined effect of screening and reflections that constitutes A_{hous} can be calculated for a specific situation, at least in principle, by applying the procedures for both A_{bar} and reflections described in 7.4 and 7.5. Because the value of A_{hous} is very situation-dependent, such a calculation may be justified in practice. A more useful alternative, particularly for the case of multiple reflections where the accuracy of calculation suffers, may be to measure the effect, either in the field or by modelling.

A.3.2 An approximate value for the A-weighted attenuation A_{hous}, which should not exceed 10 dB, may also be estimated as follows. There are two separate contributions

$$A_{hous} = A_{hous,1} + A_{hous,2} \qquad \text{... (A.1)}$$

A.3.3 An average value for $A_{hous,1}$ (in decibels) may be calculated using the equation

$$A_{hous,1} = 0{,}1 B d_b \quad \text{dB} \qquad \text{... (A.2)}$$

where

- B is the density of the buildings along that path, given by the total plan area of the houses divided by the total ground area (including that covered by the houses);
- d_b is the length of the sound path, in metres, through the built-up region of houses, determined by a procedure analogous to that shown in figure A.1.

The path length d_b may include a portion d_1 near the source and a portion d_2 near the receiver, as indicated in figure A.1.

The value of A_{hous} shall be set equal to zero in the case of a small source with a direct, unobstructed line of sight to the receiver down a corridor gap between housing structures.

NOTE 25 The A-weighted sound pressure level at specific individual positions in a region of houses may differ by up to 10 dB from the average value predicted using equations (A.1) and (A.2).

Table A.2 — Attenuation coefficient of an octave band of noise during propagation through installations at industrial plants

Nominal midband frequency, Hz	63	125	250	500	1 000	2 000	4 000	8 000
A_{site}, dB/m	0	0,015	0,025	0,025	0,02	0,02	0,015	0,015

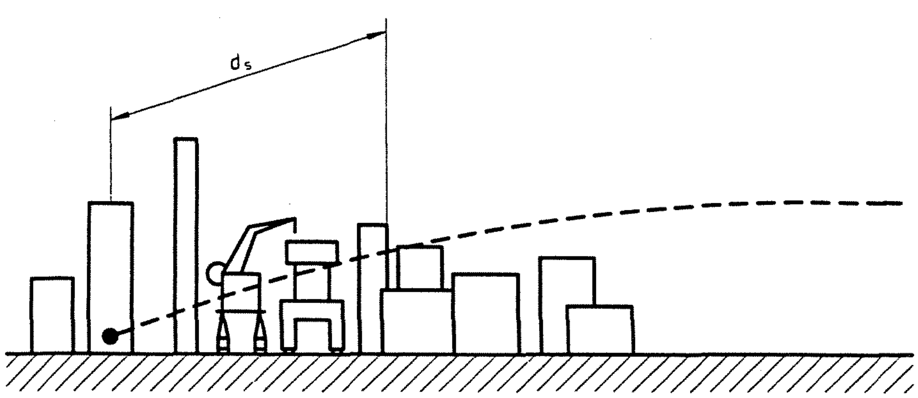


Figure A.2 — The attenuation A_{site} increases linearly with the propagation distance d_s through the installations at industrial plants

A.3.4 If there are well-defined rows of buildings near a road, a railway, or a similar corridor, an additional term $A_{hous,2}$ may be included (provided this term is less than the insertion loss of a barrier at the same position with the mean height of the buildings):

$$A_{hous,2} = -10 \lg[1 - (p/100)] \text{ dB} \qquad \text{. . . (A.3)}$$

where p (the percentage of the length of the façades relative to the total length of the road or railway in the vicinity) is $\leqslant 90$ %.

A.3.5 In a built-up region of houses, the value of $A_{hous,1}$ [as calculated by equation (A.2)] interacts as follows with the value for A_{gr}, the attenuation due to the ground [as calculated by equation (9) or equation (10)].

Let $A_{gr,b}$ be the ground attenuation in the built-up region, and $A_{gr,0}$ be the ground attenuation if the houses were removed [i.e. as calculated by equation (9) or equation (10)]. For propagation through the built-up region in general, $A_{gr,b}$ is assumed to be zero in equation (4). If, however, the value of $A_{gr,0}$ is greater than that of A_{hous}, then the influence of A_{hous} is ignored and only the value of $A_{gr,0}$ is included in equation (4).

The interaction above is essentially to allow for a range of housing density B. For low-density housing, the value of A_{gr} is dominant, while for high-density housing A_{hous} dominates.

Annex B
(informative)

Bibliography

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[2] ISO 2204:1979, *Acoustics — Guide to International Standards on the measurement of airborne acoustical noise and evaluation of its effect on human beings.*

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[13] Engineering Equipment Material Users Association, *Publication 140,* London, 1985.

1) To be published. (Revision of ISO 266:1975)

ICS 17.140.01

Descriptors: acoustics, noise (sound), airborne sound, wave propagation, attenuation, rules of calculation.

Price based on 18 pages

Attachment 3

EnSol, Inc. *Environmental Solutions*

professional engineering – business consulting

FHWA Construction Noise Handbook, Chapter 9

Construction Noise Handbook

9.0 Construction Equipment Noise Levels and Ranges

9.1 Equipment Type Inventory and Related Emission Levels

Noise levels generated by individual pieces of construction equipment and specific construction operations form the basis for the prediction of construction-related noise levels. A variety of information exists related to sound emissions related to such equipment and operations. This data transcends the period beginning in the 1970s thru 2006. This information exists for both stationary and mobile sources and for steady, intermittent, and impulse type generators of noise.

9.1.1 Stationary Equipment

Stationary equipment consists of equipment that generates noise from one general area and includes items such as pumps, generators, compressors, etc. These types of equipment operate at a constant noise level under normal operation and are classified as non-impact equipment. Other types of stationary equipment such as pile drivers, jackhammers, pavement breakers, blasting operations, etc., produce variable and sporadic noise levels and often produce impact-type noises. Impact equipment is equipment that generates impulsive noise, where impulsive noise is defined as noise of short duration (generally less than one second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition. For impact equipment, the noise is produced by the impact of a mass on a surface, typically repeating over time.

9.1.2 Mobile Equipment

Mobile equipment such as dozers, scrapers, graders, etc., may operate in a cyclic fashion in which a period of full power is followed by a period of reduced power. Other equipment such as compressors, although generally considered to be stationary when operating, can be readily relocated to another location for the next operation.

9.2 Sources of Information

Construction-related equipment and operation noise level data may be provided by numerous sources, including suppliers, manufacturers, agencies, organizations, etc. Some information is included in this document, and many web-based links are given for equipment manufacturers.

9.3 Specifics of Construction Equipment and Operation Noise Inventories

Details included in each specific inventory of construction equipment and operation noise emission levels are often variable in terms of how data is represented. Some inventories include ranges of noise levels while others present single numbers for each equipment type. Others provide levels for specific models of each type of construction equipment. Often, different noise descriptors are used, such as L_{Aeq}, L_{max}, L_{10}, sound power level, etc. As such, the array of data does not readily lend itself to being combined into a single table or easily compared. As such, this Handbook attempts to summarize a variety of such inventories and provide links to each, thereby providing the reader with a variety of sources from which to choose the appropriate levels for use in his or her respective analysis.

9.4 Summaries of Referenced Inventories

Included below are examples of several inventories of construction-related noise emission values. These and additional inventories are included on the companion CD-ROM.

9.4.1 RCNM Inventory

Equipment and operation noise levels in this inventory are expressed in terms of L_{max} noise levels and are accompanied by a usage factor value. They have been recently updated and are based on extensive measurements taken in conjunction with the Central Artery/Tunnel (CA/T) Project. Table 9.1 summarizes the equipment noise emissions database used by the CA/T Project. While these values represent the "default" values for use in the RCNM, user-defined equipment and corresponding noise levels can be added.

Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors.

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 L_{max} @ 50 feet (dBA, slow)	Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
All Other Equipment > 5	No	50	85	N/A	0

HP					
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	N/A	0
Blasting	Yes	N/A	94	N/A	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	N/A	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS Signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	N/A	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	N/A	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2

Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/Chipping Gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (single nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Sheers (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	N/A	0
Tractor	No	40	84	N/A	0
Vacuum Excavator (Vac-Truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

For each generic type of equipment listed in Table 9.1, the following information is provided:

- an indication as to whether or not the equipment is an impact device;
- the acoustical usage factor to assume for modeling purposes;
- the specification "Spec" limit for each piece of equipment expressed as an L_{max} level in dBA "slow" at a reference distance of 50 foot from the loudest side of the equipment;
- the measured "Actual" emission level at 50 feet for each piece of equipment based on hundreds of emission measurements performed on CA/T work sites; and
- the number of samples that were averaged together to compute the "Actual" emission level.

A comparison of the "Spec" emission limits against the "Actual" emission levels reveals that the Spec limits were set, in general, to realistically obtainable noise levels based on the equipment used by contractors on the CA/T Project. When measured in the field, some equipment such as pile drivers, sand blasting, demolition shears, and pumps tended to exceed their applicable emission limit. As such, these noisy devices needed to have some form of noise mitigation in place in order to comply with the Spec emission limits. Other equipment, such as clamshell shovels, concrete mixer trucks, truck-mounted drill rigs, man-lifts, chipping guns, ventilation fans, pavers, dump trucks, and flatbed trucks, easily complied. Therefore, the Spec emission limits for these devices could have been reduced somewhat further. It is recommended that the user review the RCNM User's Guide contained in Appendix A for detailed guidance regarding application of values contained in Table 9.1.

9.4.2 FHWA Special Report Inventories

Appendix A of the 1977 Handbook provides tables of construction equipment noise levels and ranges. The majority of the data were provided by the American Road Builders Association. These data were taken during a 1973 survey in which member contractors were asked to secure readings of noise exposure to operators of various types of equipment. Additionally, the contractors were asked to take readings at 50 feet from the machinery. These 50-foot peak readings are provided in Tables 9.2 through 9.8. Though the data were produced under varying conditions and degrees of expertise, the values are relatively consistent.

Table 9.2 Construction Equipment Noise Levels Based on Limited Data Samples - Cranes.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Northwestern	80D	77	Within 15m 1958 mod
Northwestern	8	84	Within 15m 1940 mod
Northwestern	6	72	Within 15m 1965 mod
American	7260	82	Within 15m 1967 mod
American	599	76	Within 15m 1969 mod
American	5299	70	Within 15m 1972 mod
American	4210	82	Within 15m 1968 mod
Buck Eye	45C	79	Within 15m 1972 mod
Buck Eye	308	74	Within 15m 1968 mod
Buck Eye	30B	73	Within 15m 1965 mod
Buck Eye	30B	70	Within 15m 1959 mod
Link Belt	LS98	76	Within 15m 1956 mod
Manitowoc	4000	94	Within 15m 1956 mod
Grove	RF59	82	Within 15m 1973 mod
Koehr	605	76	Within 15m 1967 mod
Koehr	435	86	Within 15m 1969 mod
Koehr	405	84	Within 15m 1969 mod

Table 9.3 Construction Equipment Noise Levels Based on Limited Data Samples - Backhoes.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Link Belt	4000	92	Within 15m 1971 mod
John Deere	609A	85	Within 15m 1971 mod
Case	680C	74	Within 15m 1973 mod
Drott	40 yr.	82	Within 15m 1971 mod
Koehr	1066	81 & 84	Within 15m 2 tested

Table 9.4 Construction Equipment Noise Levels Based on Limited Data Samples - Front Loaders.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	980	84	Within 15m 1972 mod
Caterpillar	977K	79	Within 15m 1969 mod
Caterpillar	977	87	Within 15m 1971 mod
Caterpillar	977	94	Within 15m 1967 mod
Caterpillar	966C	84	Within 15m 1973 mod
Caterpillar	966C	85	Within 15m 1972 mod
Caterpillar	966	81	Within 15m 1972 mod
Caterpillar	966	77	Within 15m 1972 mod
Caterpillar	966	85	Within 15m 1966 mod

Caterpillar	955L	90	Within 15m ;1973 mod
Caterpillar	955K	79	Within 15m 1969 mod
Caterpillar	955H	94	Within 15m 1963 mod
Caterpillar	950	78 & 80	Within 15m 1972 mod
Caterpillar	950	75	Within 15m 1968 mod
Caterpillar	950	88	Within 15m 1967 mod
Caterpillar	950	86	Within 15m 1965 mod
Caterpillar	944A	80	Within 15m 1965 mod
Caterpillar	850	82	Within 15m 1968 mod
Michigan	75B	90	Within 15m 1969 mod
Michigan	475A	96	Within 15m 1967 mod
Michigan	275	85	Within 15m 1971 mod
Michigan	125	87	Within 15m 1967 mod
Hough	65	82	Within 15m 1971 mod
Hough	60	91	Within 15m 1961 mod
Hough	400B	94	Within 15m 1961 mod
Hough	H90	86	Within 15m 1961 mod
Trojan	3000	85	Within 15m 1956 mod
Trojan	RT	82	Within 15m 1965 mod
Payloader	H50	85	Within 15m 1963 mod

Table 9.5 Construction Equipment Noise Levels Based on Limited Data Samples - Dozers.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	D5	83	Within 15m 1967 mod
Caterpillar	D6	85	Within 15m 1967 mod
Caterpillar	D6	86	Within 15m 1964 mod
Caterpillar	D6	81	Within 15m 1967 mod
Caterpillar	D6B	83	Within 15m 1967 mod
Caterpillar	D6C	82	Within 15m 1962 mod
Caterpillar	D7	85	Within 15m 1956 mod
Caterpillar	D7	86	Within 15m 1969 mod
Caterpillar	D7	84	Within 15m 1969 mod
Caterpillar	D7	78	Within 15m 1970 mod
Caterpillar	D7	78	Within 15m 1972 mod
Caterpillar	D7E	86	Within 15m 1965 mod
Caterpillar	D7E	78	Within 15m 1970 mod
Caterpillar	D7E	84	Within 15m 1973 mod
Caterpillar	D7F	80	Within 15m 1972 mod
Caterpillar	D8	92	Within 15m 1954 mod
Caterpillar	D8	95	Within 15m 1968 mod
Caterpillar	D8	86	Within 15m 1972 mod
Caterpillar	D8H	88	Within 15m 1966 mod
Caterpillar	D8H	82	Within 15m 1972 mod
Caterpillar	D9	85	Within 15m 1972 mod

Caterpillar	D9	94	Within 15m 1972 mod
Caterpillar	D9	90	Within 15m 1963 mod
Caterpillar	D9	87	Within 15m 1965 mod
Caterpillar	D9	90	Within 15m 1965 mod
Caterpillar	D9	88	Within 15m 1968 mod
Caterpillar	D9	92	Within 15m 1972 mod
Caterpillar	D9G	85	Within 15m 1965 mod
Allis Chambers	HD41	93	Within 15m 1970 mod
International	TD15	79	Within 15m 1970 mod
International	TD20	87	Within 15m 1970 mod
International	TD25	90	Within 15m 1972 mod
International	TD8	83	Within 15m 1970 mod
Case	1150	82	Within 15m 1972 mod
John Deer	350B	77	Within 15m 1971 mod
John Deer	450B	65	Within 15m 1972 mod
Terex	8230	70	Within 15m 1972 mod
Terex	8240	93	Within 15m 1969 mod
Michigan	280	85	Within 15m 1961 mod
Michigan	280	90	Within 15m 1962 mod
Caterpillar	824	90	Within 15m 1968 mod

Table 9.6 Construction Equipment Noise Levels Based on Limited Data Samples - Graders.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	16	91	Within 15m 1969 mod
Caterpillar	16	86	Within 15m 1968 mod
Caterpillar	140	83	Within 15m 1970 mod
Caterpillar	14E	84	Within 15m 1972 mod
Caterpillar	14E	85	Within 15m 1971 mod
Caterpillar	14C	85	Within 15m 1971 mod
Caterpillar	14B	84	Within 15m 1967 mod
Caterpillar	12F	82	Within 15m 1961-72 mod
Caterpillar	12F	72-92	Within 15m 1961-72 mod
Caterpillar	12E	81.3	Within 15m 1959-67 mod
Caterpillar	12E	80-83	Within 15m 1959-67 mod
Caterpillar	12	84.7	Within 15m 1960-67 mod
Caterpillar	12	82-88	Within 15m 1960-67 mod
Gallon	T500	84	Within 15m 1964 mod
Allis Chambers		87	Within 15m 1964 mod

Table 9.7 Construction Equipment Noise Levels Based on Limited Data Samples - Scrapers.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	660	92	Within 15m
Caterpillar	641B	85	Within 15m 1972 mod
Caterpillar	641B	86	Within 15m 1972 mod

Caterpillar	641	80 & 84	Within 15m 1972 mod
Caterpillar	641	83 & 89	Within 15m 1965 mod
Caterpillar	637	87	Within 15m 1971 mod
Caterpillar	633	87	Within 15m 1972 mod
Caterpillar	631C	89	Within 15m 1973 mod
Caterpillar	631C	83	Within 15m 1972 mod
Caterpillar	631B	94	Within 15m 1969 mod
Caterpillar	631B	84-87	Within 15m 1968 mod
Caterpillar		85 avg.	Within 15m 1968 mod
Caterpillar	621	90	Within 15m 1970 mod
Caterpillar	621	86	Within 15m 1967 mod
Caterpillar	613	76	Within 15m 1972 mod
Terex	TS24	87	Within 15m 1972 mod
Terex	TS24	84-91	
Terex	TS24	82	Within 15m 1971 mod
Terex	TS24	81-83	Within 15m 1971 mod
Terex	TS24	94	Within 15m 1966 mod
Terex	TS24	92-98	Within 15m 1966 mod
Terex	TS24	94.7	Within 15m 1963 mod
Terex	TS24	94-95	Within 15m 1963 mod
Terex	TS14	82	Within 15m 1969 mod
Terex	S35E	84	Within 15m 1971 mod

Table 9.8 Noise Levels of Standard Compressors.

Manufacturer	Model	Silenced or Standard	Type Eng.	Type Comp.	Test Avg. Cond. (cfm.psi)	Avg. Cond. Noise Lev. (cfm.psi) (dBA) at 7m*
Atlas	ST-48	Standard	Diesel	Reciprocal	160,100	83.6
Atlas	ST-95	Standard	Diesel	Reciprocal	330,105	80.2
Atlas	VSS-170Dd	Silenced	Diesel	Reciprocal	170,850	70.2
Atlas	VT-85M	Standard	Gas	Reciprocal	85,100	81.4
Atlas	VS-85Dd	Silenced	Gas	Reciprocal	85,100	75.5
Atlas	VSS-125Dd	Silenced	Diesel	Reciprocal	125,100	70.1
Atlas	STS-35Dd	Silenced	Diesel	Reciprocal	125,100	73.5
Atlas	VSS-170Dd	Silenced	Diesel	Reciprocal	170,100	
Gardner-Denver	SPWDA/2	Silenced	Diesel	Rotary-Screw	1200,000	73.3
Gardner-Denver	SPQDA/2	Silenced	Diesel	Rotary-Screw	750,000	78.2
Gardner-Denver	SPHGC	Silenced	Gas	Rotary-Screw	185,000	77.1
Ingersoll-Rand	DXL 1200	Standard	Diesel	Rotary-Screw	1200,125	92.6
Ingersoll-Rand	DXL 1200 (doors open)	Standard	Diesel	Rotary-Screw	1200,125	
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	76.0
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-	900,125	75.1

				Screw		
Ingersoll-Rand	DXLCU1050	Standard	Diesel	Rotary-Screw	1050,125	90.2
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	75.3
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	75.0
Ingersoll-Rand	DXL 900	Standard	Diesel	Rotary-Screw	900,125	89.9
Ingersoll-Rand	DXL 750	Standard	Diesel	Rotary-Screw	750,125	87.7
Jaeger	A	Standard	Gas	Rotary-Screw	175,100	88.2
Jaeger	A(doors open)	Standard	Gas	Rotary-Screw	175,100	
Jaeger	E	Standard	Gas	Vane	85,100	81.5
Jaeger	E(doors open)	Standard	Gas	Vane	85,100	
Worthington	60 G/2Qt	Silenced	Gas	Vane	160,100	74.2
Worthington	750-QTEX	Silenced	Diesel	Rotary-Screw	750,100	74.7

*Data taken from EPA Report - EPA 550/9-76-004.

9.4.3 FTA Noise and Vibration Assessment Procedure

Chapter 12 of the FTA Transit Noise and Vibration Guidance Handbook discusses construction noise evaluation methodology and contains the noise emission levels for construction equipment displayed in Table 9.9.

Table 9.9 FTA Construction Equipment Noise Emission Levels.

Equipment	Typical Noise Level (dBA) 50 ft from Source*
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane Derrick	88
Crane Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic Tool	85

Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

*Table based on EPA Report, measured data from railroad construction equipment taken during Northeast Corridor improvement project and other measured data.

9.5 Links to Equipment Manufacturers

Table 9.10 contains web-based links to manufacturers of construction equipment. While few of these links contain noise-related data associated with the equipment, they provide descriptions and/or specifications related to the equipment, as well as sources for possibly obtaining additional information related to the equipment. Information in this table is by no means all-inclusive and does not represent any type of endorsement of the manufacturers, suppliers, or equipment. Users are hereby advised that the referenced websites may have certain restrictions, copyrights, etc., associated with any use of data contained therein.

Table 9.10 Equipment Manufacturers and Websites.

Equipment	Manufacturer	Website Address
Arrow Boards		
	North Star	http://northstar-traffic.com/index.cfm?SC=14&PT=1
	Trafcom	http://www.trafcon.com
	Allmand	http://www.allmand.com/MB%20AB%20page.htm
Articulated Trucks		
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=196
	Hitachi	http://www.hitachi-c-m.com/global/products/articulate/index.html
	Terex	http://www.terex.com/main.php
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/articulatedhaulers/
Asphalt Saws		
	Allied	http://www.alliedcp.com/products/rotocut.asp
Augers - See Drills / Augers		
Backhoes - See Loaders/Backhoes		
Boring Equipment - See Pile Drivers/Boring Equipment		
Compaction Equipment		
	Allied	http://www.alliedcp.com/products/compactor.asp
Compressors		
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5714,00.html
	Compair	http://www.compair.com/Products/Portable_Compressors.aspx
Concrete and Asphalt Batch/Mixing Plants and Equipment		

	Con-E-Co	http://www.con-e-co.com/products.cfm
	Terex	http://www.terex.com/main.php
	Gunter & Zimmerman	http://www.guntert.com/concrete_mobilebatching.asp
	Rex Con	http://www.rexcon.com
Concrete Breakers/ Hydraulic Hammers/Hydraulic Breakers		
	Drillman	http://www.drillmanindia.com/concrete-breaker.html
	Hydro Khan	http:/www.sangi.co.kr/english/e_product1_2.php
	Stanley	http://www.stanley-hydraulic-tools.com/Hand%20Held/NoAmbreakers.htm
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/breakers.htm
Concrete Chain Saws		
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/concrete-saws.htm
Concrete Core Drilling Machines		
	Multiquip	http://www.multiquip.com/multiquip/318_ENU_HTML.htm
Concrete Cutters		
	Vermeer	http://www.vermeermfg.com/vcom/TrenchingEquipment/Line.jsp?PrdlnID=3618
Concrete/Material Pumps		
	Multiquip	http://www.multiquip.com/multiquip/309_ENU_HTML.htm
	Reed	http://www.reedpumps.com/
Concrete Mixer Trucks		
	Oshkosh	http://www.oshkoshtruck.com/concrete/products~overview~home.cfm
	London	http://www.lmi.ca/mixers.cfm
	Terex/Advance	http://www.advancemixer.com
Concrete Saws		
	Multiquip	http://www.multiquip.com/multiquip/315_ENU_HTML.htm
	Diamond Core Cut	http://www.diamondproducts.com/dp_home.htm
Concrete Screeds		
	Multiquip	http://www.multiquip.com/multiquip/317_ENU_HTML.htm
Concrete Vibrators		
	Multiquip	http://www.multiquip.com/multiquip/313_ENU_HTML.htm
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5722,00.html
Cranes		
	Malcolm Drilling	www.malcolmdrilling.com
	Link-Belt	http://www.linkbelt.com/lit/products/frameproducthome.htm
	Casagrande	http://www.casagrandegroup.com
	Liebherr	http://www.liebherr.com/em/en/35381.asp
	Terex	http://www.terex.com/main.php
Crawler Tractors - See Dozers/Crawler Tractors		
Crushing and Screening Equipment		
	Cedarapids	http://www.cedarapids.com/crushscr.htm
	Hitachi	http://www.hitachi-c-m.com/
	Komatsu	http://www.komatsu.com/ce/products/mobile_crushers.html
	Terex	http://www.terex.com/main.php
Crushers/Pulverizers		
	Hydro Khan	http://www.sangi.co.kr/english/e_product3.php

Cutoff Saws		
	Multiquip	http://www.multiquip.com/multiquip/309_ENU_HTML.htm
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/cutoff%20saw.htm
Dozers/CrawlerTractors		
	John Deere	http://www.deere.com/en_US/cfd/construction/deere_const/crawlers/deere_dozer_selection.html
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=2
	Komatsu	http://www.komatsu.com/ce/products/crawler_dozers.html
Dewatering Pumps		
	Multiquip	http://www.multiquip.com/multiquip/371_ENU_HTML.htm
Drills / Augers		
	Malcolm Drilling	www.malcolmdrilling.com
	Casagrande	www.casagrandegroup.com
	Soilmec	http://www.soilmec.com/_vti_g1_techno.aspx?rpstry=4_
	Terex	http://www.terex.com/main.php
Excavators		
	Hitachi	http://www.hitachi-c-m.com/global/products/excavator/index.html
	Caterpiller	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/compactexcavators/
		http://www.volvo.com/constructionequipment/na/en-us/products/wheeledexcavators/
		http://www.volvo.com/constructionequipment/na/en-us/products/crawlerexcavators/
	John Deere	http://www.deere.com/en_US/cfd/construction/deere_const/excavators/deere_excavator_selection.html
	Liebherr	http://www.liebherr.com/em/en/18891.asp
	Soilmec	http://www.soilmec.com/_vti_g1_t02.aspx?rpstry=29_
	Gehl	http://www.gehl.com
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=216
	Komatsu	http://www.komatsu.com/ce/products/crawler_excavators.html
		http://www.komatsu.com/ce/products/wheel_excavators.html
	Terex	http://www.terex.com/main.php
	Link-Belt	http://www.lbxco.com/lx_series.asp
	Gradall	http://www.gradall.com/
	Badger Daylighting	http://www.badgerinc.com/
Fork Lifts - See Lifts / Variable Reach Fork Lifts/ Material Handlers		
Generators		
	Terex	http://www.terex.com/main.php
	Multiquip	http://www.multiquip.com/multiquip/212_ENU_HTML.htm
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5714,00.html
	Baldor	http://www.baldor.com/products/generators/ts.asp
Graders		
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=190
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/MotorGraders/
	Komatsu	http://www.komatsu.com/ce/products/motor_graders.html
	Terex	http://www.terex.com/main.php

Hand Compaction Equipment		
	Terex	http://www.terex.com/main.php
	Multiquip	http://www.multiquip.com/multiquip/56_ENU_HTML.htm
Hydraulic Hammers/Hydraulic Breakers - See Concrete Breakers/ Hydraulic Hammers/Hydraulic Breakers		
Jackhammers - See Rock Drilling Equipment/Jackhammers		
Lifts / Variable Reach Fork Lifts/ Material Handlers		
	Genie Lift	www.genielift.com
	Sky Track	www.kirby-smith.com/
	Ingersol-Rand	www.ingersollrand.com
	Terex	http://www.terex.com/main.php
	Roadtec	http://www.roadtec.com/www/docs/102/mtv-material-transfer-vehicle/
Light Towers		
	Baldor	http://www.baldor.com/products/generators/mlt.asp
	Multiquip	http://www.multiquip.com/multiquip/293_ENU_HTML.htm
	Allmand	http://www.allmand.com/Night%20Lite%20Pro%20page.htm
Loaders/Backhoes		
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=54
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/backhoeloaders/
	John Deere	http://www.deere.com/en_US/cfd/construction/deere_const/backhoes/deere_backhoe_selection.html
	Komatsu	http://www.komatsu.com/ce/products/backhoe_loaders.html
Material Handlers - See Lifts / Variable Reach Fork Lifts/ Material Handlers		
Milling Machines		
	Wirtgen	http://www.wirtgenamerica.com/en-us/
Mining Trucks - See Rigid Dump Trucks/Mining Trucks		
Pans - See Scrapers/Pans		
Pavers/Paving Equipment		
	Caterpillar/ Barber Greene	http://www.cat.com/cda/layout?m=37840&x=7
	Rosco	http://www.leeboy.com/rosco/
	Bomag	http://www.bomag.com/americas/index.aspx?&Lang=478
	Gehl	http://www.gehl.com/const/prodpg_ap.html
	Leeboy	http://www.leeboy.com/leeboy/
	Terex	http://www.terex.com/main.php
	Ingersoll-Rand	http://www.road-development.irco.com/Default.aspx?MenuItemID=12
	Vogele	http://www.vogeleamerica.com/noflash.html
	GOMACO	http://www.gomaco.com/index.html
	Roadtec	http://www.roadtec.com
Pile Drivers/Boring Equipment		
	Soilmec	http://www.soilmec.com/_vti_g1_t09.aspx?rpstry=29_
	Leffer	http://www.leffer.com/hme.html
	Bauer	http://www.bauer.de/en/maschinenbau/produkte/drehbohrgeraete/bg_reihe/usbg15h.htm
Pipelayers/Trenchers		

	Liebherr	http://www.liebherr.com/em/en/18908.asp
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=28&archived=1
	Vermeer	http://www.vermeermfg.com/vcom/TrenchingEquipment/trenching-equipment.htm
	Ditchwitch	http://www.ditchwitch.com/dwcom/Product/ProductView/115
	Eagle	http://www.guntert.com/trenchers_home.asp
Profilers - See Roadway Planers/Profilers		
Rammers		
	Multiquip	http://www.multiquip.com/multiquip/56_ENU_HTML.htm
Rebar Benders/Cutters		
	Multiquip	http://www.multiquip.com/multiquip/1316_ENU_HTML.htm
Recyclers - See Stabilizers/Recyclers		
Rigid Dump Trucks/Mining Trucks		
	Hitachi	http://www.hitachi-c-m.com/global/products/rigid/index.html
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Liebherr	http://www.liebherr.com/em/en/18898.asp
	Komatsu	http://www.komatsu.com/ce/products/dump_trucks.html
	Terex	http://www.terex.com/main.php
Roadway Planers/Profilers		
	Terex	http://www.terex.com/main.php
	Roadtec	http://www.roadtec.com/products/cold_planers/default.htm
Rock Drilling Equipment/Jackhammers		
	Drillman	http://www.drillmanindia.com/rock-drilling-machine.html
	Whaker	http://www.wackergroup.com/webapp/wcs/stores/servlet/
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5721,00.html
	Allied	http://www.alliedcp.com/products/hammers.asp
Rollers - See Tampers/Rollers		
Scrapers/Pans		
	Terex	http://www.terex.com/main.php
Screening Equipment - See Crushing and Screening Equipment		
Slabbuster		
	Allied	http://www.alliedcp.com/products/slabbuster.asp
Slip Form Pavers		
	Huron	http://www.huronmanufacturing.com/
	Guntert & Zimmerman	http://www.guntert.com/concreteSlipformPavers.asp
Stabilizers/Recyclers		
	Bomag	http://www.bomag.com/americas/index.aspx?&Lang=478
	Komatsu	http://www.komatsu.com/ce/products/mobile_crushers.html
	Terex	http://www.terex.com/main.php
	Wirtgen	http://www.wirtgenamerica.com/en-us/
	Roadtec	http://www.roadtec.com
Sweepers		
	Elgin	http://www.elginsweeper.com
	Johnston	http://www.johnstonsweepers.com/

Tampers/ Rollers		
	Bomag	http://www.bomag.com/americas/index.aspx?&Lang=478
	Komatsu	http://www.komatsu.com/ce/products/vibratory_rollers.html
	Whaker	http://www.wackergroup.com/webapp/wcs/stores/servlet/
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/tamper.htm
	Multiquip	http://www.multiquip.com/multiquip/181_ENU_HTML.htm
	Ingersoll-Rand	http://www.road-development.irco.com/Default.aspx?MenuItemID=15
Trenchers - See Pipelayers/Trenchers		
Trucks - See Articulated Trucks, Concrete Mixer Trucks, Rigid Dump Trucks/Mining Trucks		
Vacuum Units		
	Advanced Recycling Systems	www.arsrecycling.com/
	Vacmasters	http://www.vacmasters.com/airsystm.htm
	Vector	http://www.vector-vacuums.com/
Variable Message Signs		
	Allmand	http://www.allmand.com/MB%20only%20page.htm
	North Star	http://northstar-traffic.com/index.cfm?SC=13&PT=1
	Trafcom	http://www.trafcon.com
	Daktronics	http://www.daktronics.com/vms_prod/dak_vms_products.cfm
Vibratory Rammers		
	Whaker	http://www.wackergroup.com/webapp/wcs/stores/servlet/
Welders/Welding Equipment		
	Airgas	www.airgas.com
	Multiquip	http://www.multiquip.com/multiquip/408_ENU_HTML.htm
	Miller	http://www.millerwelds.com/products/
	Lincoln	http://www.mylincolnelectric.com/Catalog/equipmentseries.asp?browse=101|400|
Wheel Loaders		
	Hitachi	http://www.hitachi-c-m.com/global/products/loader/index.html
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=30
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/wheelloaders/
	Terex	http://www.terex.com/main.php
	Komatsu	http://www.komatsu.com/ce/products/wheel_loaders.html
	TCM	http://www.tcmglobal.net/products/main02.html

Section 12

Full Environmental Assessment Form Part 1

for

DOM-MAR Transfer and Recycling Facility

Dolsontown Road
Town of Wawayanda
Orange County, New York

Issued: *February 24, 2021*
Revised: *May 11, 2021*

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Note: Site Plan (prepared by EnSol) submitted separately.

PROJECT NARRATIVE

1.0 INTRODUCTION

1.1 Project Summary

DOM KAM LLC of Middletown, New York is seeking site plan and special use permit approval from the Planning Board to construct and operate a solid waste management facility, which will include a transfer station and recycling facility (Dom-Mar Transfer and Recycling Facility or Facility) on Dolsontown Road in the Town of Wawayanda, Orange County, New York (see Figures 1 and 2).[1] The project is located in an MC-1 Zone on a 44.3-acre property, comprised of two tax parcels (6-1-3.31 and 6-1-3.32) owned by the Applicant. Both parcels are located on the south side of Dolsontown Road approximately 0.6 miles east of the intersection of Dolson Avenue and Dolsontown Road within Orange County's Agricultural District #2. Tax parcel 6-1-3.32 includes approximately 39.20 acres and is developed with multiple vacant farm buildings and a silo formerly used as a dairy farm and Tax Parcel 6-1-3.31 includes approximately 5.10 acres developed with one residence and a commercial building. The two lots will be consolidated as part of the proposed action. The project area encompasses approximately 18.39 ac. A transmission line crosses the properties in the east/west direction south of the proposed development.

The proposed Facility will process and transfer municipal solid waste (MSW), construction and demolition debris (C&D), and industrial waste (IW)[2] for disposal, sorting and packaging of Old Corrugated Containers (OCC), and simple floor sorting for hardfill, brush, clean wood, and picked metal from the C&D for further processing and recovery. The Facility will operate as a transfer Facility in accordance with Subpart 362-3, defined in Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 360 in paragraph 360.2(b)(276) as "… a Facility that receives solid waste for the purpose of subsequent transfer to another Facility for further processing, treatment, transfer, or disposal."

The facility's proposed design capacity based on a weekly average is 950 tons per day (tpd) comprised of the following. The acceptance rates for each material are as follows:

- An average rate of 600 tons per day of MSW, permitted in accordance with Part 362-3;
- An average rate of 300 tons per day of C&D, permitted in accordance with Part 362-3 and registered in accordance with Part 361-5;
- An average rate of 40 tons per day of industrial waste, permitted in accordance with Part 362-3; and
- An average 10 tons per day of old corrugated containers, registered in accordance with Part 361-1.

---

[1] Solid waste management facilities are regulated by Town of Wawayanda Code Section 152, which requires the Planning Board approval of a site plan and special use permit. The project site is zoned MC-1, Mixed Commercial. Per chapter 152-17 A. (3) of the town code a solid waste management facility may be permitted as a special use in the MC-1 zoning district. The facility also requires approval under New York State Department of Environmental Conservation (NYSDEC) Part 360 and Part 362 regulations.
[2] Solid industrial waste, non-hazardous, no liquids, sludges or slurries.

Materials delivered to the transfer station are expected to be collected in Orange, Sullivan, and Putnam Counties in New York, Sussex and Passaic counties in New Jersey, and Wayne and Pike Counties in Pennsylvania. Market conditions, material availability, contracts and other economic factors will govern the specific limits of the service in those counties. The Facility will not accept medical, hazardous wastes, friable asbestos, liquids or septage, or any other unauthorized materials.

The planned full development of the project area may include the construction of a Truck Maintenance and Storage Facility at least five years after construction of the Transfer and Recycling Facility. In response to the Town's permitting concerns regarding potential project segmentation the full potential development of the site is being evaluated for the SEQR process. The project will be undertaken in two phases. The 1st phase will include the Dom-Mar Transfer and Recycling Facility, the 2nd phase would include the Truck Maintenance and Storage Facility.

Phase 1 (comprising 7ac.) will be comprised of the following:

- Transfer station building
  - 25,200 SF Transfer area/collection truck drop-off lanes
  - 6,080 SF Administration building, with separate exterior entrance
  - 4,800 SF Shop
- C&D recycling storage bins
- Residential drop-off area
- Five (5) trailer parking spaces
- Incoming and outgoing scales and a scale house (outside of transfer building, located to the east)
- Approximately 35 parking spaces

Phase 2 (comprising 4 ac) will be comprised of the following:

- 36,000 SF Truck maintenance shop
  - Overnight truck parking spaces
  - Truck washing area
- 12,000 SF Fabrication shop
- Fueling station
- Rolloff storage area (0.5 acres)
- Approximately 50 vehicle parking spaces

Entry to the facility will be by two (2) access drives. The central drive will be dedicated to transfer station queuing and truck traffic, and the western drive will be for administration building traffic. Traffic circulation on site will be controlled per activity.

The transfer station includes commercial truck loading/unloading areas, a tipping floor, waste storage areas, and overhead doors. Sunken loading docks will be equipped with scales where the trucks will be top loaded by an excavator. Incoming materials will be pushed into separate storage areas by equipment until it is loaded into the transfer trucks. Buildings are anticipated to be approximately 42 feet height.

Per 152-17C. (12) the proposed facility provides a buffer zone of not less than 200 feet from the property boundary line wherein no waste shall be stored or processed. Per 152-17D. (7) a solid waste management facility shall only receive solid waste from the hours of 7:00 am to 5:00 pm, Monday through Friday, and from 7:00 am until 2:00 pm on Saturday. The Transfer and Recycling Facility is proposed to have the ability to accept waste from 4:00 am until 7:00 pm, Monday through Friday, and from 5:00 am until 4:00 pm on Saturday with NYSDEC approval and a waiver from the Town per 152-23 of the Town Code. The additional hours are requested to maintain service during holidays or inclement weather, during which collection routes may run at a delay and there is increased public and municipal demand.

The 1st phase is expected to begin construction the last quarter of 2021. This phase is anticipated to have ten (10) employees for the transfer station, and 20 office workers for the administration building. The second phase will include the maintenance shop and truck wash and fabrication shop (an additional 40 drivers and ten (10) mechanics), with associated parking and the fueling station. The 2nd phase may be undertaken in 2026 at the earliest and take six-to-eight months. The entire project is anticipated to be completed in five years at the earliest.

1.2 Permits/Approvals

Table 1 provides a list of the approvals/permits that are anticipated for the project.

Table 1: Approvals/Permits

AGENCY	APPROVAL/PERMIT
Town of Wawayanda Town Board	Waiver of operating hours per local law 152-17 D (7)
Town of Wawayanda Planning Board	Site plan Special permit approval Lot Consolidation
Town of Wawayanda – Water and Sewer Department	Sewer and water connections
Town of Wawayanda – Highway Department	Road Occupancy/ Street Encroachment Permit for Access Drives
Town of Wawayanda – Buildings Department	Building permit
Orange County Department of Planning	GML 239m referral
Orange County Health Department	Approval of Public Water Extension and On-site Water System
New York State Department of Environmental Conservation	Part 360 Permit; Part 360 Registration (C&D, Recycling); Multi-sector General Permit (GP) Industrial Activities; SPDES GP 0-20-001; Approval of Sanitary Sewer Extension

2.0 LAND USE, ZONING, AND PUBLIC POLICY

2.1 Land Use

The project site is located within an area that is characterized by a mix of uses, including agriculture, residential, commercial, community services and public services. There are also undeveloped areas, see Figure 3. The site is not located within 500 feet of a health care facility, educational facility, library, community center, park, or playground and will not result in significantly adverse impacts to land use.

2.2 Zoning

The project site lies withing the Mixed Commercial 1 "MC-1" Zoning District. Town Code Section 195-12 allows transfer stations as an exception to the prohibited uses in the MC-1 zoning district. The Facility is anticipated to comply with Town Code Section 152 with one exception. The Transfer and Recycling Facility is proposed to have the ability to accept waste from 4:00 am until 7:00 pm, Monday through Friday, and from 5:00 am until 4:00 pm on Saturday with NYSDEC approval and a waiver from the Town Board per 152-23 of the Town Code. The additional hours are requested to maintain service during holidays or inclement weather, during which collection routes may run at a delay and there is increased public and municipal demand. Based on the design and layout of the facility in accordance with the NYSDEC and Town of Wawayanda Code regulations the additional hours are not expected to significantly impact the health, safety and welfare of the public and the environment.

3.0 SOILS AND AQUATIC RESOURCES

3.1 Soils

The topography of the project site is steeper in the northern portion with approximately 3 to 8% slopes and flatter in the southern portion with 0 to 3% slopes. The existing ground cover consists of predominately grassed areas with wooded and brushed covered areas throughout the remainder of the site.

Figure 4 shows the soil types that are expected to be present on the project site, and Table 2 provides characteristics of these soil types, according to the Orange County Soil Survey information available in GIS from the Natural Resource Conservation Service website.

Table 2: Characteristics of Soil Types within Project Area

% of Project site	Soil Symbol	Soil type	Slopes	Drainage	Depth to water	Depth to Restrictive Layer
1.8	ErB	Erie gravelly silt loam	3 to 8 percent slopes	Somewhat poorly drained	6 – 18 inches	10 – 21 inches to fragipan
1.8	HoB	Hoosic gravelly sandy loam	3 to 8 percent slopes	Somewhat excessively drained	> 80 inches	> 80 inches
36.9	MdB	Mardin gravelly silt loam	3 to 8 percent slopes	Moderately well drained	13 – 24 inches	14 – 26 inches to fragipan
3.4	RbA	Rhinebeck silt loam	0 to 3 percent slopes	Somewhat poorly drained	6 – 18 inches	> 80 inches
56.1	Wd	Wayland soils complex, non-calcareous substratum	0 to 3 percent slopes	Frequently flooded	--	--
		Wayland		Poorly drained	0 - 6 inches	> 80 inches
		Wayland, very poorly drained		Very poorly drained	0 inches	> 80 inches

Site development will occur within the areas anticipated to be comprised of RbA and MdB soil types. The depth to bedrock on the site may be located less than five feet from the ground surface. Rock encountered during construction is anticipated to be removed by mechanical methods (ripping). Hard rock excavation methods, which includes jack hammering (with a ram hoe) and/or blasting, are not anticipated during construction. If required, pre-drilling and splitting could be used to control and expedite both methods of removal. If blasting is needed, then all blasting operations will adhere to New York State and local ordinances governing the use of explosives. The State regulations are contained in 12 NYCRR 39 and include such requirements as licensing of operators, magazine (explosive storage) certification, and rules for conducting operations in a safe manner. Proper program guidelines will be established between the State, the Town of Wawayanda, and the blasting contractor prior to undertaking this activity. Blasting contractors in New York State are required to possess a valid New York State Department of Labor (NYSDOL) issued Blaster Certificate of Competence.

If water is encountered above three feet below the surface, footings and footing drains will be designed in accordance with accepted construction practices to alleviate any problems associated with a high water table. With this practice, no significant impacts due to the presence of water above three feet below the surface are anticipated.

3.2 Aquatic Resources

According to NYSDEC EAF Mapper, the NYSDEC Environmental Resource Mapper, and available GIS mapping, the site contains two Class C waterbodies, Monhagan Brook and an unnamed tributary to Monhagan Brook. There are no State-regulated wetlands on or adjacent to the project site.

According to National Wetland Inventory information available through GIS, the property contains Federally regulated wetlands, see Figures 5 and 6.

A wetland delineation was conducted by EnSol, Inc. on November 3, 2020 in the northwest portion of the site, which contained part of Parcel 6-1-3.32 and all of Parcel 6-1-3.31, see Attachment A. The delineation identified six wetland areas (0.61 ac. of wet meadow and 2.09 ac. of shallow emergent marsh) and one drainageway (intermittent channel) within the 18.8-acre delineation area. Drainageway 1 flows onto the site after crossing under Dolsontown Road to the north of the site. This drainageway then flows north to south through the site, eventually discharging to Monhagan Brook. Drainageway 1 is mapped and is classified as a Class C waterbody in the NYSDEC Environmental Resource Mapper and as a freshwater emergent wetland (PEM1E) in the National Wetlands Inventory Mapper, though the location of the Drainageway appears to be misrepresented on the Environmental Resource Mapper.

According to the Delineation report, Drainageway 1, Wetlands D and E are jurisdictional under the new "Waters of the United States" rule. The remaining wetlands are asserted to be non-jurisdictional as they do not abut, nor do they appear to be inundated by flooding in a typical year by either Drainageway 1 or Monhagan Brook.

The proposed project will disturb Wetlands A, B, C, and F, for a total 0.60 ac., which are determined to be non-jurisdictional in the Delineation Report.

The project site is located within the Masonic Creek-Wallkill River Watershed and is identified in the FEAF (automated by the NYSDEC EAF Mapper) as being located over a principal aquifer. Per section 152-17 B. (1) of the Town Code, solid waste management facilities shall not be placed on primary or principal aquifers. The location of principal and primary aquifers in the vicinity of the proposed project was assessed using the Upstate New York Aquifer Viewer from the United States Geological Survey. Figure 9 shows the Aquifer Viewer results. At a scale of 1:250,000 no aquifers were shown within the vicinity of the project. Additional discussion and reference maps are provided in Attachment E. Based on a review of these maps, the facility will not be placed on a primary or principal aquifer.

4.0 UTILITIES

4.1 Water and Wastewater

The project site is within the Town of Wawayanda's Water District Number 1. The Town of Wawayanda has an agreement with the City of Middletown to purchase up to 200,000 gallons per day (gpd). The proposed project will be connected to the Town of Wawayanda's water system via a new 12-inch, Class 52 Ductile Iron Pipe water main which will connect to the existing 12-inch diameter water main located within Dolsontown Road. Additional fire hydrants will be installed along Dolsontown Road. The Town of Wawayanda's current water supply and storage systems is anticipated to have capacity to support the proposed project.

The City of Middletown treats a portion of the wastewater from the Town of Wawayanda through an intermunicipal agreement at the City of Middletown's Waste Water Treatment Plant (WWTP). Currently, there is no municipal sanitary sewer located within the project site. As part of the proposed action, a sanitary sewer pump station will collect onsite wastewater and discharge it via a PVC force main to an existing sanitary sewer manhole located along Dolsontown Road adjacent to Parcel Number 6-1-90.1. The additional wastewater flows will not adversely impact the plant's operations and adequate reserve treatment capacity exists to support the project. Therefore, no improvements are planned or proposed for the WWTP.

The anticipated average daily water demand/wastewater generation was calculated using Table B-3 of the NYSDEC *Design Standards for Intermediate Sized Wastewater Treatment Systems,* 2014. The resulting anticipated average daily domestic water demand for the proposed development is summarized in Table 3 below.

Table 3: Project Domestic Water Demands

Type of Unit	No. of Units	Water Demand	Total Water Demand
Phase 1			
Office Building Employee	20	15 gpd/unit	300 gpd
Transfer Station Employee	10	15 gpd/unit	150 gpd
Add for Shower	10	10 gpd/unit	100 gpd
Tipping Floor Wash Water	1	100 gpd/unit	100 gpd
Commercial Storage Employee	1	15 gpd/unit	15 gpd
Subtotal of Estimated Average Daily Flow			665 gpd
Less 20% Water Saving Reduction			-133 gpd
Total Estimated Average Daily Flow			532 gpd
Phase 2			
Dump Station Vehicle (similar to highway rest area)	40	7 gpd/unit	280 gpd
Maintenance Shop Employee	10	15 gpd/unit	150 gpd
Truck Wash	1	2,000 gpd/unit	2,000 gpd
Subtotal of Estimated Average Daily Flow			2,430 gpd
Less 20% Water Saving Reduction			-486 gpd
Total Estimated Average Daily Flow			1,944 gpd
Full Build			
Total Estimated Average Daily Flow			2,476 gpd

4.3 Stormwater

The project development will require ground disturbance in excess of one acre; therefore, a SWPPP is being prepared pursuant to NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-20-001). A Multi-sector General Permit for Industrial Activities will also be obtained. Stormwater quality will be managed through the implementation of erosion and sediment control measures and stormwater management facilities and discharged to an on-site wetland, and an onsite stream, then to Monhagen Brook. With the implementation of the SWPPP, no adverse impacts related to stormwater will occur.

5.0 TRANSPORTATION

A traffic impact study was performed for each phase of the project. Based on the data provided for Phase 1 (transfer station only), the AM peak activity at the Site is between 8:00 a.m. and 9:00 a.m. with a total of 44 vehicles and the PM Peak activity is between 4:00 p.m. and 5:00 p.m. with a total of 19 vehicles. Trip distribution patterns were estimated from existing peak hour traffic patterns and the probable truck routes of the solid waste facility given the proximity of I-84. The intersection of Route 17M and Dolsontown Road was analyzed. The Phase 1 results show that the eastbound right-turn movement and northbound left-turn movement experience level of service F conditions and very long delays for Existing, No-Build, and Build conditions. With the additional traffic from the proposed project the levels of service remain the same in the Build condition as compared to the No-Build condition with minimal increases in delay. The site driveway operates at good levels of service and will be controlled by a stop sign. No improvements are needed as part of Phase 1 of the proposed project.

Phase 2 involves construction of a truck maintenance facility. The level of activity for the facility was provided by the applicant and results in with 4 additional trips in the AM Peak and 28 additional trips in the PM Peak. Five additional projects are expected to be constructed (warehouse developments, gas station/convenience store, light industrial/office space, and expansion of an existing car wash). These projects, some which include proposed traffic mitigation measures, are expected to be constructed before Phase 2 of the proposed transfer facility project. Traffic generated by the proposed project will noticeably increase delays westbound in the PM peak hour as compared to the No-Build condition. Minor signal timing changes of 1 -2 seconds will mitigate the impacts of the project’s traffic.

6.0 VEGETATION AND WILDLIFE

According to the NYSDEC Environmental Resource Mapper (Figure 6), there are known occurrences of Indiana Bat (endangered) on or in the vicinity of the project site. In a January 7, 2021 letter (Attachment B), NYSDEC stated, “We have no records of rare or state-listed animals or plants, or significant natural communities at the project site. Within 1.75 miles of the project site is a documented summer location of Indiana bat. The bats may travel 2.5 miles or more from documented locations.” Indiana Bats use trees with characteristics like loose or shaggy bark, crevices, and hollows as summer roosting habitat, with these characteristics typically being more important than the tree species. Females have been noted to roost in trees with a diameter at breast height (dbh) as small as 5 inches, while males have been seen roosting in trees as small as 3 inches dbh (U.S. Fish and Wildlife Service, 2008). Trees with suitable characteristics for summer roosting habitat were observed on the site, particularly in the hedgerow along the southwest border of Parcel 6-1-3.32. The main impact of concern for bats is the removal of potential roost trees. Tree clearing will occur between October 1 and March 31 to ensure no potential take of the Indiana bat as during this time, the bats would be hibernating and not present onsite. If any clearing is proposed outside of this range, additional consultation with USFWS and NYSDEC will be required.

According to the US Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool there is one endangered species, the Indiana Bat, and two threatened species, the Northern Long-eared Bat, and the Small Whorled Pogonia that may potentially be affected by activities in this location.

The Northern Long-eared Bat use live or dead trees greater than or equal to three inches dbh with loose or shaggy bark, crevices, and hollows as summer roosting habitat (U.S. Fish and Wildlife Service, 2014). As noted above, the hedgerow along the southwest border of Parcel 6-1-3.32 contains trees that have these characteristics. The tree clearing restrictions stated above will ensure no potential take of the Indiana Bat and Northern Long-eared Bat.

The Small Whorled Pogonia is a small orchid that typically grows on acidic soils in deciduous or deciduous-coniferous forests. mixed-deciduous or mixed-deciduous/coniferous forests in second or third-growth successional stages. This species is commonly found in areas where there are breaks in the forest canopy and may be limited by light availability (U.S. Fish and Wildlife Service, 2019). The hedgerow on the southwest corner of Parcel 6-1- 3.32 may provide suitable habitat for this species, however, the canopy cover has few breaks, which may impact this species' ability to survive in this area. A survey for this species was conducted concurrently with the aquatic resource delineation and no plants were observed.

7.0 HISTORIC AND ARCHEOLOGICAL RESOURCES

According to the NYS Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) Cultural Resource Information System (CRIS) mapping (Figure 7), there are no National or State Historic Register sites on or adjacent to the project site. The CRIS mapping indicates that the project site is within a known archeologically sensitive area. Two buildings on site have been identified as being not eligible for listing on the State Register of Historic Places. Project information has been uploaded to the NYSOPHRP CRIS website requesting review of the proposed project. The (NYSOPRHP) responded with a letter dated December 28, 2020 recommending a Phase 1 Archeological Survey be conducted. A Phase 1 Archeological Investigation was performed by Alfred G. Cammisa, M.A., and Alexander Padilla, B.A. (CAD). A copy of the report is provided as Attachment C.

FULL ENVIRONMENTAL ASSESSMENT FORM (FEAF)
PART 1 FORM

Full Environmental Assessment Form
Part 1 - Project and Setting

Instructions for Completing Part 1

Part 1 is to be completed by the applicant or project sponsor. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either "Yes" or "No". If the answer to the initial question is "Yes", complete the sub-questions that follow. If the answer to the initial question is "No", proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the applicant or project sponsor to verify that the information contained in Part 1is accurate and complete.

A. Project and Applicant/Sponsor Information.

Name of Action or Project: Dom-Mar Transfer and Recycling Facility		
Project Location (describe, and attach a general location map): Dolsontown Road, Town of Wawayanda, Orange County, New York (Tax Parcels: 6-1-3.31 and 6-1-3.32)		
Brief Description of Proposed Action (include purpose or need): DOM KAM LLC of Middletown, New York is seeking site plan and special use permit approval from the Planning Board to construct and operate a solid waste management facility, which will include a transfer station and recycling facility (Dom-Mar Transfer and Recycling Facility or Facility) on Dolsontown Road in the Town of Wawayanda, Orange County, New York. The project is located in an MC-1 Zone on a 44.3-acre property, comprised of two tax parcels (6-1-3.31 and 6-1-3.32) owned by the Applicant. The two lots will be consolidated as part of the proposed action. The project area will encompass 18.39 ac. The proposed Facility will process and transfer municipal solid waste (MSW), construction and demolition debris (C&D), and industrial waste (IW) for disposal, sorting and packaging of Old Corrugated Containers (OCC), and simple floor sorting for hardfill, brush, clean wood, and picked metal from the C&D for further processing and recovery. The facility's proposed design capacity is 950 tons per day (tpd). The new Facility (comprising 11 ac.) will be comprised of the following: 25,200 SF Transfer area/collection truck drop-off lanes, 6,080 SF Administration building, with separate exterior entrance, 4,800 SF Shop, scales and scale house, 36,000 SF truck maintenance shop with truck washing area and overnight truck parking, 12,000 SF fabrication shop, fueling station, rolloff storage, C&D recycling storage bins, residential drop off area, 85 vehicle parking spaces, and 6 trailer parking sp.		
Name of Applicant/Sponsor: DomKam, LLC (Michael Marangi)	Telephone: 845-343-5566 E-Mail: mike@marangidisposal.com	
Address: 366 Highland Avenue Ext.		
City/PO: Middletown	State: NY	Zip Code: 10940
Project Contact (if not same as sponsor; give name and title/role):	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:
Property Owner (if not same as sponsor):	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:

B. Government Approvals

B. Government Approvals, Funding, or Sponsorship. ("Funding" includes grants, loans, tax relief, and any other forms of financial assistance.)

Government Entity		If Yes: Identify Agency and Approval(s) Required	Application Date (Actual or projected)
a. City Counsel, Town Board, or Village Board of Trustees	☑Yes ☐No	Wawayanda Town Board - Waiver of hours of operation per local law 152-17 G	Summer 2021
b. City, Town or Village Planning Board or Commission	☑Yes ☐No	Wawayanda Planning Board - Site Plan, Special Use Permit, Lot Consolidation	Summer 2021
c. City, Town or Village Zoning Board of Appeals	☐Yes ☑No		
d. Other local agencies	☑Yes ☐No	Town of Wawayanda Building Permit; Sewer and Water Connections	Fall 2021
e. County agencies	☑Yes ☐No	Orange County Department of Health - water/sewer connections; GML 239 M	Fall 2021
f. Regional agencies	☐Yes ☑No		
g. State agencies	☑Yes ☐No	DECPart 360 Permit, Part 360 Reg. (C&D, Recyc), SPDES GP 0-20-001;Multi-Sector GP Ind. Act.	Fall 2021
h. Federal agencies	☐Yes ☑No		

i. Coastal Resources.

i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway? ☐Yes ☑No

ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program? ☐Yes ☑No

iii. Is the project site within a Coastal Erosion Hazard Area? ☐Yes ☑No

C. Planning and Zoning

C.1. Planning and zoning actions.

Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed? ☐Yes ☑No

- **If Yes,** complete sections C, F and G.
- **If No,** proceed to question C.2 and complete all remaining sections and questions in Part 1

C.2. Adopted land use plans.

a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located? ☑Yes ☐No

If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located? ☐Yes ☑No

b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway; Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?) ☑Yes ☐No

If Yes, identify the plan(s):

Orange County Greenway - Site is located within a priority growth area. Wallkill River Watershed Management Plan - project will implement stormwater pollution prevention plan (SWPPP) and will obtain permits, as needed, prior to construction and any alteration of aquatic resources. Therefore, no significant adverse impacts to the watershed will occur.

c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan? ☐Yes ☑No

If Yes, identify the plan(s):

The site is not identified as temporary or permanently protected open space in the Orange County Open Space Plan.

C.3. Zoning

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance. ☑ Yes ☐ No
If Yes, what is the zoning classification(s) including any applicable overlay district?
MC-1 Mixed Commercial 1

b. Is the use permitted or allowed by a special or conditional use permit? ☑ Yes ☐ No

c. Is a zoning change requested as part of the proposed action? ☐ Yes ☑ No
If Yes,
i. What is the proposed new zoning for the site? ______

C.4. Existing community services.

a. In what school district is the project site located? Middletown School District

b. What police or other public protection forces serve the project site?
Orange County Sheriff Office, New York State Troop F

c. Which fire protection and emergency medical services serve the project site?
New Hampton Fire District

d. What parks serve the project site?
Shannen Park

D. Project Details

D.1. Proposed and Potential Development

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)? Industrial - Waste Transfer Station and Recycling Center

b. a. Total acreage of the site of the proposed action? 44.3 acres
b. Total acreage to be physically disturbed? 11 acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 44.3 acres

c. Is the proposed action an expansion of an existing project or use? ☐ Yes ☑ No
i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % ______ Units: ______

d. Is the proposed action a subdivision, or does it include a subdivision? ☐ Yes ☑ No
If Yes,
i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types)

ii. Is a cluster/conservation layout proposed? ☐ Yes ☐ No
iii. Number of lots proposed? ______
iv. Minimum and maximum proposed lot sizes? Minimum ______ Maximum ______

e. Will the proposed action be constructed in multiple phases? ☑ Yes ☐ No
i. If No, anticipated period of construction: ______ months
ii. If Yes:
- Total number of phases anticipated 2
- Anticipated commencement date of phase 1 (including demolition) ______ month ______ year 1st Phase - First quarter of 2022 for 6 - 8 months
- Anticipated completion date of final phase ______ month ______ year 2nd Phase - Complete 2026
- Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases: The proposed sanitary pump station will be designed for a phased expansion. Stormwater management will be constructed per phase.

f. Does the project include new residential uses? ☐ Yes ☑ No
If Yes, show numbers of units proposed.

	One Family	Two Family	Three Family	Multiple Family (four or more)
Initial Phase				
At completion of all phases				

g. Does the proposed action include new non-residential construction (including expansions)? ☑ Yes ☐ No
If Yes,
i. Total number of structures 2
ii. Dimensions (in feet) of largest proposed structure: 42 height; 300 width; and 120 length
iii. Approximate extent of building space to be heated or cooled: 3,040 square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? ☑ Yes ☐ No
If Yes,
i. Purpose of the impoundment: stormwater pond
ii. If a water impoundment, the principal source of the water: ☐ Ground water ☐ Surface water streams ☑ Other specify: stormwater
iii. If other than water, identify the type of impounded/contained liquids and their source.
N/A
iv. Approximate size of the proposed impoundment. Volume: TBD million gallons; surface area: TBD acres
v. Dimensions of the proposed dam or impounding structure: TBD height; TBD length
vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete):
TBD

D.2. Project Operations

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both? ☐ Yes ☑ No
(Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite)
If Yes:
i. What is the purpose of the excavation or dredging?
ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?
- Volume (specify tons or cubic yards):
- Over what duration of time?

iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them.

iv. Will there be onsite dewatering or processing of excavated materials? ☐ Yes ☐ No
If yes, describe.

v. What is the total area to be dredged or excavated? acres
vi. What is the maximum area to be worked at any one time? acres
vii. What would be the maximum depth of excavation or dredging? feet
viii. Will the excavation require blasting? ☐ Yes ☐ No
ix. Summarize site reclamation goals and plan:

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area? ☑ Yes ☐ No
If Yes:
i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): No NYSDEC wetlands on site. Proposed disturbance to 0.60 ac. of non-jurisdictional wetlands (wet meadow). No impacts to jurisdictional wetlands.

ii. Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres:
The wetlands identified will be filled during the grading activities on site and redeveloped with pavement and buildings. Further information will be provided during future submissions.

iii. Will the proposed action cause or result in disturbance to bottom sediments? ☐Yes ☑No
If Yes, describe:

iv. Will the proposed action cause or result in the destruction or removal of aquatic vegetation? ☐Yes ☑No
If Yes:
- acres of aquatic vegetation proposed to be removed:
- expected acreage of aquatic vegetation remaining after project completion:
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access):
- proposed method of plant removal:
- if chemical/herbicide treatment will be used, specify product(s):

v. Describe any proposed reclamation/mitigation following disturbance:
None. Wetlands impacted are non-jurisdictional.

c. Will the proposed action use, or create a new demand for water? ☑Yes ☐No
If Yes:
i. Total anticipated water usage/demand per day: 2,476 gallons/day
ii. Will the proposed action obtain water from an existing public water supply? ☑Yes ☐No
If Yes:
- Name of district or service area: Town Water District 1
- Does the existing public water supply have capacity to serve the proposal? ☑Yes ☐No
- Is the project site in the existing district? ☑Yes ☐No
- Is expansion of the district needed? ☐Yes ☑No
- Do existing lines serve the project site? ☑Yes ☐No

iii. Will line extension within an existing district be necessary to supply the project? ☐Yes ☑No
If Yes:
- Describe extensions or capacity expansions proposed to serve this project:
- Source(s) of supply for the district:

iv. Is a new water supply district or service area proposed to be formed to serve the project site? ☐Yes ☑No
If, Yes:
- Applicant/sponsor for new district:
- Date application submitted or anticipated:
- Proposed source(s) of supply for new district:

v. If a public water supply will not be used, describe plans to provide water supply for the project:

vi. If water supply will be from wells (public or private), what is the maximum pumping capacity: _______ gallons/minute.

d. Will the proposed action generate liquid wastes? ☑Yes ☐No
If Yes:
i. Total anticipated liquid waste generation per day: 2,476 gallons/day
ii. Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each):
Sanitary wastewater and Leachate will be directed to sewer.

iii. Will the proposed action use any existing public wastewater treatment facilities? ☑Yes ☐No
If Yes:
- Name of wastewater treatment plant to be used: City of Middletown Waste Water Treatment Plant
- Name of district: Town Sewer District
- Does the existing wastewater treatment plant have capacity to serve the project? ☑Yes ☐No
- Is the project site in the existing district? ☑Yes ☐No
- Is expansion of the district needed? ☐Yes ☑No

- Do existing sewer lines serve the project site? ☐Yes ☑No
- Will a line extension within an existing district be necessary to serve the project? ☑Yes ☐No

  If Yes:
  - Describe extensions or capacity expansions proposed to serve this project: Sanitary sewer pump station will collect onsite wastewater and discharge it via a PVC force main to an existing sanitary sewer manhole located along Dolsontown Road.

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site? ☐Yes ☑No

If Yes:
- Applicant/sponsor for new district: ______
- Date application submitted or anticipated: ______
- What is the receiving water for the wastewater discharge? ______

v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge or describe subsurface disposal plans):

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: None.

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction? ☑Yes ☐No

If Yes:

i. How much impervious surface will the project create in relation to total size of project parcel?

_____ Square feet or 7.92 acres (impervious surface)

_____ Square feet or 44.3 acres (parcel size)

ii. Describe types of new point sources. None.

iii. Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)?

Stormwater management facilities and discharged to an on-site stream, then to Monhagen Brook

- If to surface waters, identify receiving water bodies or wetlands: ______
- Will stormwater runoff flow to adjacent properties? ☐Yes ☑No

iv. Does the proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater? ☐Yes ☑No

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations? ☑Yes ☐No

If Yes, identify:

i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)

Trucks associated with transfer station operations

ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)

Temporary sources during construction.

iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)

Paint shop

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit? ☐Yes ☑No

If Yes:

i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year) ☐Yes ☐No

ii. In addition to emissions as calculated in the application, the project will generate:
- ______Tons/year (short tons) of Carbon Dioxide (CO_2)
- ______Tons/year (short tons) of Nitrous Oxide (N_2O)
- ______Tons/year (short tons) of Perfluorocarbons (PFCs)
- ______Tons/year (short tons) of Sulfur Hexafluoride (SF_6)
- ______Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflourocarbons (HFCs)
- ______Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)? ☐Yes ☑No

If Yes:

i. Estimate methane generation in tons/year (metric): ______

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): ______

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations? ☐Yes ☑No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust):

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services? ☐Yes ☑No

A Traffic Impact Study will be provided as part of a future submission.

If Yes:

i. When is the peak traffic expected (Check all that apply): ☐ Morning ☐ Evening ☐Weekend

☐ Randomly between hours of ______ to ______.

ii. For commercial activities only, projected number of truck trips/day and type (e.g., semi trailers and dump trucks): ______

iii. Parking spaces: Existing ______ Proposed ______ Net increase/decrease ______

iv. Does the proposed action include any shared use parking? ☐Yes ☐No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe:

None

vi. Are public/private transportation service(s) or facilities available within ½ mile of the proposed site? ☐Yes ☐No

vii Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles? ☐Yes ☐No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes? ☐Yes ☐No

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy? ☑Yes ☐No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action: ______

No more than 1,000,000 kW/h per U.S. Energy Information Administration Commercial Buildings Energy Consumption Survey data.

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):

Orange and Rockland

iii. Will the proposed action require a new, or an upgrade, to an existing substation? ☐Yes ☑No

l. Hours of operation. Answer all items which apply.

i. During Construction:

- Monday - Friday: Per Town Code
- Saturday: Per Town Code
- Sunday: Per Town Code
- Holidays: Per Town Code

ii. During Operations:

- Monday - Friday: 4:00 AM - 7:00 PM
- Saturday: 5:00 AM - 4:00 PM
- Sunday: None
- Holidays: None

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both? ☑ Yes ☐ No

If yes:

i. Provide details including sources, time of day and duration:

The facility will operate in compliance with Town Code Section 152, with exception for waiver sought for 152-G. Most work will occur inside buildings. Internal combustion engine equipment used at the Facility will be equipped with mufflers, noise is aimed away from receptors.

ii. Will the proposed action remove existing natural barriers that could act as a noise barrier or screen? ☐ Yes ☑ No

Describe: The site was previously developed as a dairy farm, residence and commercial use

n. Will the proposed action have outdoor lighting? ☑ Yes ☐ No

If yes:

i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:

Lighting design and information will be provided as part of a future submission.

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen? ☐ Yes ☑ No

Describe: The site was previously developed as a dairy farm, residence and commercial use

o. Does the proposed action have the potential to produce odors for more than one hour per day? ☑ Yes ☐ No

If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures:

Facility doors will be kept closed except when vehicles are entering or existing buildings. Engines will idle no longer than five minutes. Burning of materials is not permitted at the Facility. Tipping areas will be swept daily. Facility will comply with Town Code Section 152 as applicable to odors.

p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products 185 gallons in above ground storage or any amount in underground storage? ☑ Yes ☐ No

If Yes:

i. Product(s) to be stored one (1) 10,000 gallon diesel above ground tank; Two (2) 5,000 gallon diesel above ground tanks

ii. Volume(s) ______ per unit time year (e.g., month, year)

iii. Generally, describe the proposed storage facilities:

10,000 gallon diesel aboveground tank for Truck Maintenance and Storage Facility, and two 5,000 gallon diesel aboveground tanks for the Transfer Station

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation? ☑ Yes ☐ No

If Yes:

i. Describe proposed treatment(s):

Pest control application would be applied by licensed applicators using minimal levels of application required.

ii. Will the proposed action use Integrated Pest Management Practices? ☐ Yes ☑ No

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)? ☑ Yes ☐ No

If Yes:

i. Describe any solid waste(s) to be generated during construction or operation of the facility:

- Construction: TBD tons per TBD (unit of time)
- Operation : 0.06 tons per day (unit of time)

ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:

- Construction: TBD
- Operation: According to Environmental Engineering by Joseph A. Salvat, 4th Edition, 1992, solid waste generation is estimated at 1.5 lbs per worker in an office. The project will result in 80 total employees (all phases) = 120 lbs or 0.06 tons per day.

iii. Proposed disposal methods/facilities for solid waste generated on-site:

- Construction: TBD
- Operation: Per Tranfer Station operations

s. Does the proposed action include construction or modification of a solid waste management facility? ☑ Yes ☐ No

If Yes:

i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): transfer station and recycling center

ii. Anticipated rate of disposal/processing:

- 29,450 Tons/month, if transfer or other non-combustion/thermal treatment, or
- ________ Tons/hour, if combustion or thermal treatment

municipal solid waste (MSW), industrial waste (IW) and construction and demolition debris (C&D), old corrugated containers

iii. If landfill, anticipated site life: ________ years

t. Will the proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste? ☐ Yes ☑ No

If Yes:

i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: ________

ii. Generally describe processes or activities involving hazardous wastes or constituents: ________

iii. Specify amount to be handled or generated _____ tons/month

iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: ________

v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility? ☐ Yes ☐ No

If Yes: provide name and location of facility: ________

If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility: ________

E. Site and Setting of Proposed Action

E.1. Land uses on and surrounding the project site

a. Existing land uses.

i. Check all uses that occur on, adjoining and near the project site.

☐ Urban ☐ Industrial ☑ Commercial ☑ Residential (suburban) ☐ Rural (non-farm)

☐ Forest ☑ Agriculture ☐ Aquatic ☑ Other (specify): public services, community services religious use), undeveloped

ii. If mix of uses, generally describe:

____

b. Land uses and covertypes on the project site.

Land use or Covertype	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	0.64	8.56	+7.92
• Forested	0.67	0.39	-0.28
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	14.38	5.48	-8.90
• Agricultural (includes active orchards, field, greenhouse etc.)	0.00	0.00	0.00
• Surface water features (lakes, ponds, streams, rivers, etc.)	0.00	1.86	+1.86
• Wetlands (freshwater or tidal)	2.70	2.10	-0.60
• Non-vegetated (bare rock, earth or fill)	0.00	0.00	0.00
• Other Describe: ________	0.00	0.00	

c. Is the project site presently used by members of the community for public recreation? *i.* If Yes: explain: ______	☐ Yes ☑ No
d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site? If Yes, *i.* Identify Facilities: ______ ______	☐ Yes ☑ No
e. Does the project site contain an existing dam? If Yes: *i.* Dimensions of the dam and impoundment: • Dam height: ______ feet • Dam length: ______ feet • Surface area: ______ acres • Volume impounded: ______ gallons OR acre-feet *ii.* Dam's existing hazard classification: ______ *iii.* Provide date and summarize results of last inspection: ______ ______	☐ Yes ☑ No
f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility? If Yes: *i.* Has the facility been formally closed? ☐ Yes ☐ No • If yes, cite sources/documentation: ______ *ii.* Describe the location of the project site relative to the boundaries of the solid waste management facility: ______ ______ *iii.* Describe any development constraints due to the prior solid waste activities: ______ ______	☐ Yes ☑ No
g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste? If Yes: *i.* Describe waste(s) handled and waste management activities, including approximate time when activities occurred: ______ ______	☐ Yes ☑ No
h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site? If Yes: *i.* Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply: ☐ Yes ☑ No ☐ Yes – Spills Incidents database Provide DEC ID number(s): ______ ☐ Yes – Environmental Site Remediation database Provide DEC ID number(s): ______ ☐ Neither database *ii.* If site has been subject of RCRA corrective activities, describe control measures: ______ ______ ______ *iii.* Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database? ☑ Yes ☐ No If yes, provide DEC ID number(s): V00289, 336029 *iv.* If yes to (i), (ii) or (iii) above, describe current status of site(s): Off site, 0.3 miles from site: V00289 and 336029: Middletown Landfill/Dump; Voluntary Cleanup Program/State Superfund. Potential for groundwater, soil, and surface water contamination due to leaching of material from the landfill. Limited soil sampling does not indicate any significant contamination. Testing of nearby residential drinking water supply wells in May 2000 indicates no impacts from the nearby landfill. Additional subsurface investigation is planned.	☑ Yes ☐ No

v. Is the project site subject to an institutional control limiting property uses? ☐ Yes ☑ No

- If yes, DEC site ID number:
- Describe the type of institutional control (e.g., deed restriction or easement):
- Describe any use limitations:
- Describe any engineering controls:
- Will the project affect the institutional or engineering controls in place? ☐ Yes ☐ No
- Explain:

E.2. Natural Resources On or Near Project Site

a. What is the average depth to bedrock on the project site? > 25 feet

b. Are there bedrock outcroppings on the project site? ☐ Yes ☑ No
If Yes, what proportion of the site is comprised of bedrock outcroppings? ______ %

c. Predominant soil type(s) present on project site: RbA, HoB ______ %
MdB, ErB ______ %
Wd ______ %

ErB = 2% HoB = 2% MdB = 37% Wd = 56% RbA = 3%. Site disturbance will affect MdB and RbA

d. What is the average depth to the water table on the project site? Average: 0 - 6.6 feet

e. Drainage status of project site soils:
☑ Well Drained: 2 % of site
☑ Moderately Well Drained: 37 % of site
☑ Poorly Drained 61 % of site

f. Approximate proportion of proposed action site with slopes:
☑ 0-10%: 100 % of site
☐ 10-15%: ______ % of site
☐ 15% or greater: ______ % of site

g. Are there any unique geologic features on the project site? ☐ Yes ☑ No
If Yes, describe:

h. Surface water features.

i. Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)? ☑ Yes ☐ No

ii. Do any wetlands or other waterbodies adjoin the project site? ☑ Yes ☐ No

If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.

iii. Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency? ☑ Yes ☐ No

iv. For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name 855.5-180 Classification C
- Lakes or Ponds: Name ______ Classification ______
- Wetlands: Name Federal Waters, Federal Waters, Federal Waters,... Approximate Size 2.7 ac.
- Wetland No. (if regulated by DEC) ______

v. Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies? ☑ Yes ☐ No

If yes, name of impaired water body/bodies and basis for listing as impaired:
Name - Pollutants - Uses:Monhagen Brook and tribs – Nutrients;Unknown Toxicity – Recreation;Aquatic Life

i. Is the project site in a designated Floodway? ☐ Yes ☑ No

j. Is the project site in the 100-year Floodplain? ☐ Yes ☑ No

k. Is the project site in the 500-year Floodplain? ☐ Yes ☑ No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer? ☑ Yes ☐ No
If Yes:
i. Name of aquifer: Principal Aquifer
No
Based on available data from the United States Geological Survey, the project site is not located over an aquifer.

m. Identify the predominant wildlife species that occupy or use the project site:

Common Orange County species

n. Does the project site contain a designated significant natural community? ☐Yes ☑No

If Yes:

i. Describe the habitat/community (composition, function, and basis for designation): ______

ii. Source(s) of description or evaluation: ______

iii. Extent of community/habitat:

- Currently: ______ acres
- Following completion of project as proposed: ______ acres
- Gain or loss (indicate + or -): ______ acres

o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? ☑ Yes ☐No

If Yes:

i. Species and listing (endangered or threatened):

Indiana Bat NYSDEC; Indiana Bat and Northern Long-eared Bat, Small Whorled Pogonia - USFWS

p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? ☐Yes ☑No

If Yes:

i. Species and listing: ______

q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? ☐Yes ☑No

If yes, give a brief description of how the proposed action may affect that use: ______

E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☑Yes ☐No

If Yes, provide county plus district name/number: ORAN002

b. Are agricultural lands consisting of highly productive soils present? ☐Yes ☑No

i. If Yes: acreage(s) on project site? Site has not be in agricultural use in the last 5 years or more.

ii. Source(s) of soil rating(s): ______

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? ☐Yes ☑No

If Yes:

i. Nature of the natural landmark: ☐ Biological Community ☐ Geological Feature

ii. Provide brief description of landmark, including values behind designation and approximate size/extent: ______

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? ☐Yes ☑No

If Yes:

i. CEA name: ______

ii. Basis for designation: ______

iii. Designating agency and date: ______

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places? If Yes: *i.* Nature of historic/archaeological resource: ☐ Archaeological Site ☐ Historic Building or District *ii.* Name: ___ *iii.* Brief description of attributes on which listing is based: ___	☐ Yes ☑ No
f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	☑ Yes ☐ No
g. Have additional archaeological or historic site(s) or resources been identified on the project site? If Yes: *i.* Describe possible resource(s): ___ *ii.* Basis for identification: ___	☐ Yes ☑ No
h. Is the project site within fives miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource? If Yes: *i.* Identify resource: See Figure 8 *ii.* Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): state and national register listed; municipal recreation; state recreation; state parks and historic sites *iii.* Distance between project and resource: varies, see Figure 8 miles.	☑ Yes ☐ No
i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666? If Yes: *i.* Identify the name of the river and its designation: ___ *ii.* Is the activity consistent with development restrictions contained in 6NYCRR Part 666? ☐ Yes ☐ No	☐ Yes ☑ No

F. Additional Information

Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

G. Verification

I certify that the information provided is true to the best of my knowledge.

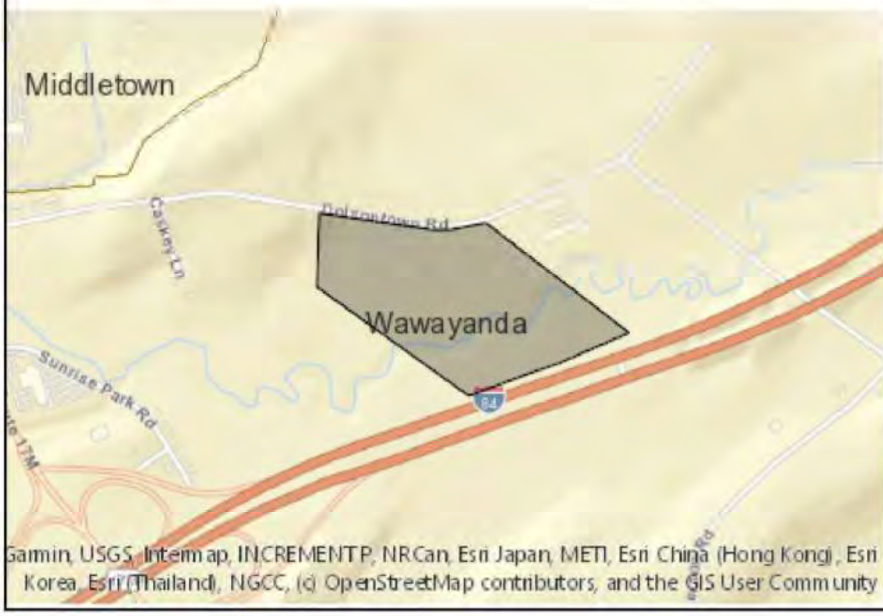
Applicant/Sponsor Name DOM KAM LLC (Michael Marangi) Date May 11, 2021

Signature Walter Fisher P.E. Title Manager, Civil Eng (Agent for Applicant, Chazen Co.)

PRINT FORM

EAF Mapper Summary Report

Tuesday, January 19, 2021 4:58 PM

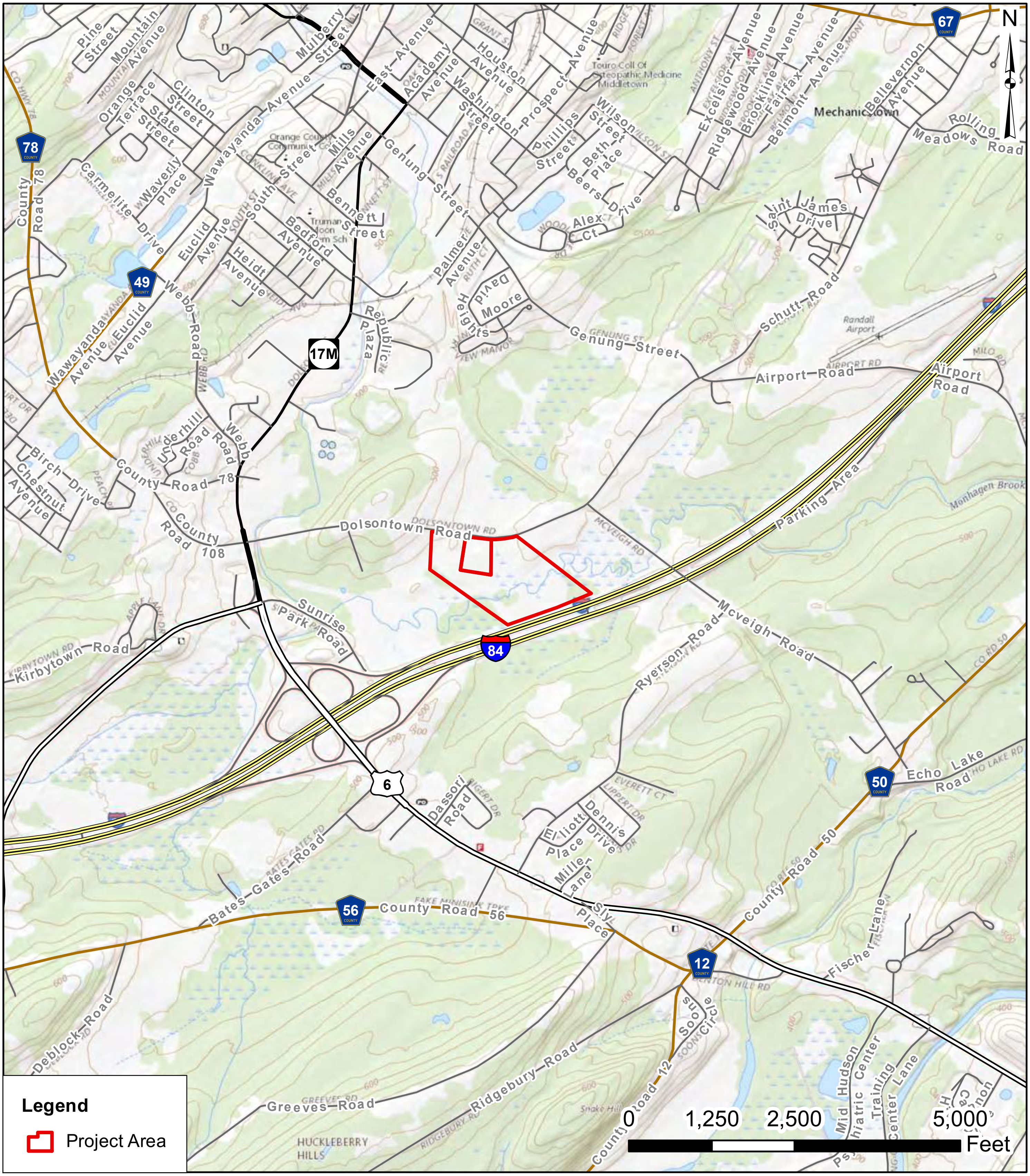


Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.

B.i.i [Coastal or Waterfront Area]	No
B.i.ii [Local Waterfront Revitalization Area]	No
C.2.b. [Special Planning District]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h [DEC Spills or Remediation Site - Potential Contamination History]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Listed]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Environmental Site Remediation Database]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h.iii [Within 2,000' of DEC Remediation Site]	Yes
E.1.h.iii [Within 2,000' of DEC Remediation Site - DEC ID]	V00289, 336029
E.2.g [Unique Geologic Features]	No
E.2.h.i [Surface Water Features]	Yes
E.2.h.ii [Surface Water Features]	Yes
E.2.h.iii [Surface Water Features]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
E.2.h.iv [Surface Water Features - Stream Name]	855.5-180
E.2.h.iv [Surface Water Features - Stream Classification]	C
E.2.h.iv [Surface Water Features - Wetlands Name]	Federal Waters
E.2.h.v [Impaired Water Bodies]	Yes
E.2.h.v [Impaired Water Bodies - Name and Basis for Listing]	Name - Pollutants - Uses:Monhagen Brook and tribs – Nutrients;Unknown Toxicity – Recreation;Aquatic Life

E.2.i. [Floodway]	No
E.2.j. [100 Year Floodplain]	No
E.2.k. [500 Year Floodplain]	No
E.2.l. [Aquifers]	Yes
E.2.l. [Aquifer Names]	Principal Aquifer
E.2.n. [Natural Communities]	No
E.2.o. [Endangered or Threatened Species]	Yes
E.2.o. [Endangered or Threatened Species - Name]	Indiana Bat
E.2.p. [Rare Plants or Animals]	No
E.3.a. [Agricultural District]	Yes
E.3.a. [Agricultural District]	ORAN002
E.3.c. [National Natural Landmark]	No
E.3.d [Critical Environmental Area]	No
E.3.e. [National or State Register of Historic Places or State Eligible Sites]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.3.f. [Archeological Sites]	Yes
E.3.i. [Designated River Corridor]	No

FIGURES



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Capital District Office:
547 River Street, Troy, NY 12180
Phone: (518) 273-0055

North Country Office:
20 Elm Street, Glens Falls, NY 12801
Phone: (518) 812-0513

Marangi Solid Waste Handling Facility

USGS Location Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	1/21/2021
Scale:	1 inch = 2,000 feet
Project:	32034.00
Figure:	1

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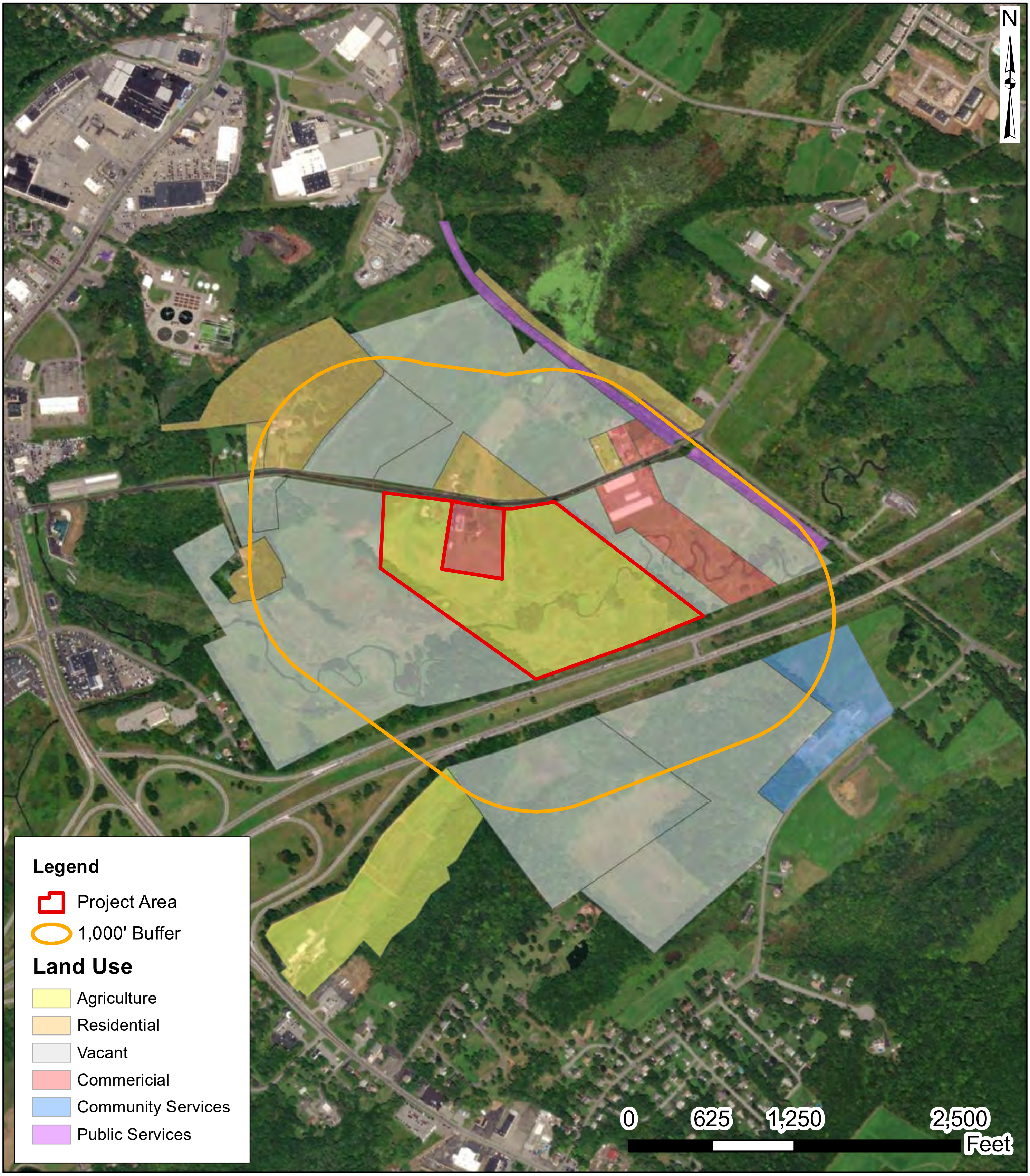
Marangi Solid Waste Handling Facility

Orthophoto Tax Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	1/21/2021
Scale:	1 inch = 500 feet
Project:	32034.00
Figure:	2



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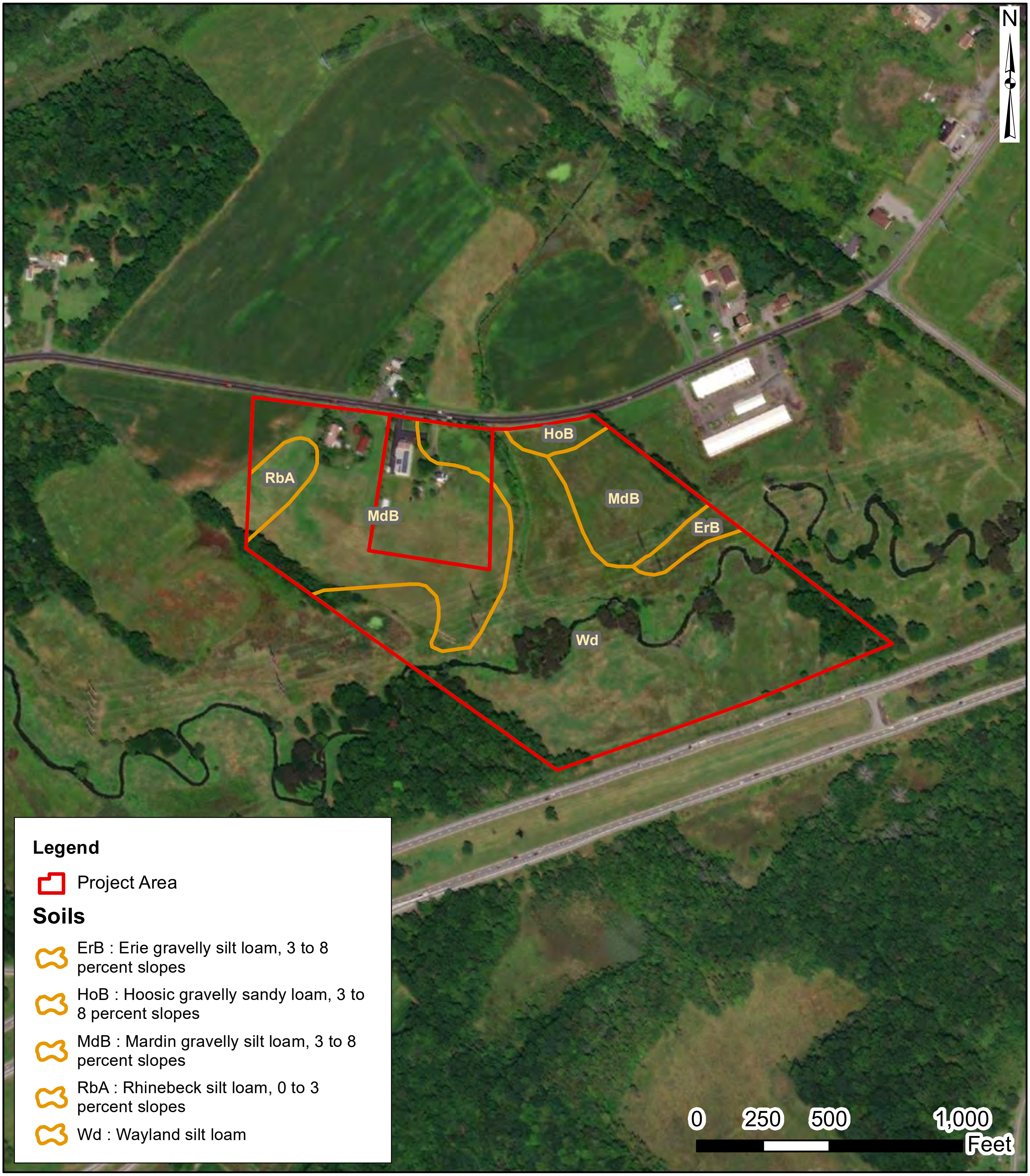
Marangi Solid Waste Handling Facility

Land Use Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	1/21/2021
Scale:	1 inch = 1,000 feet
Project:	32034.00
Figure:	3



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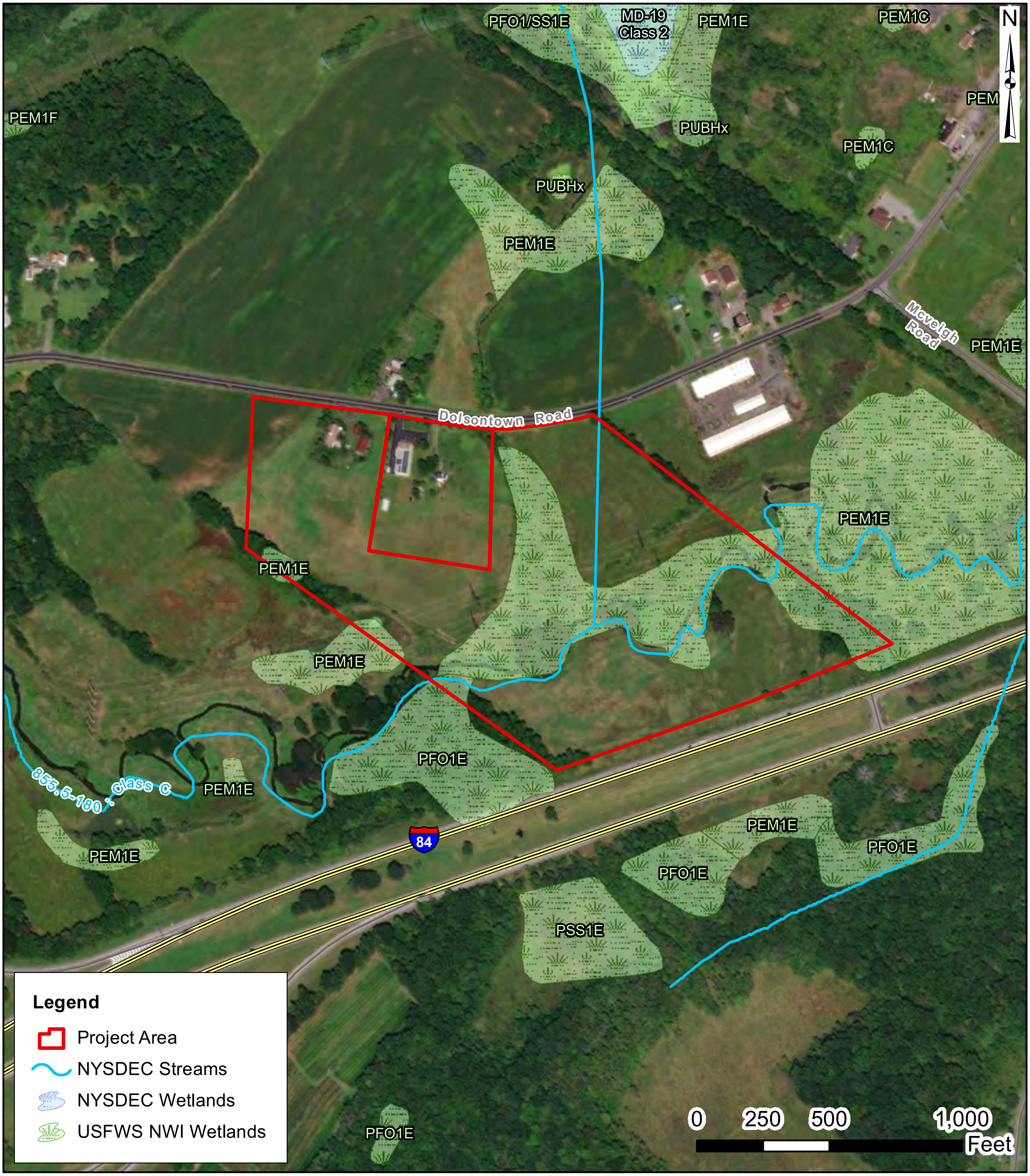
Marangi Solid Waste Handling Facility

Soils Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	1/21/2021
Scale:	1 inch = 500 feet
Project:	32034.00
Figure:	4



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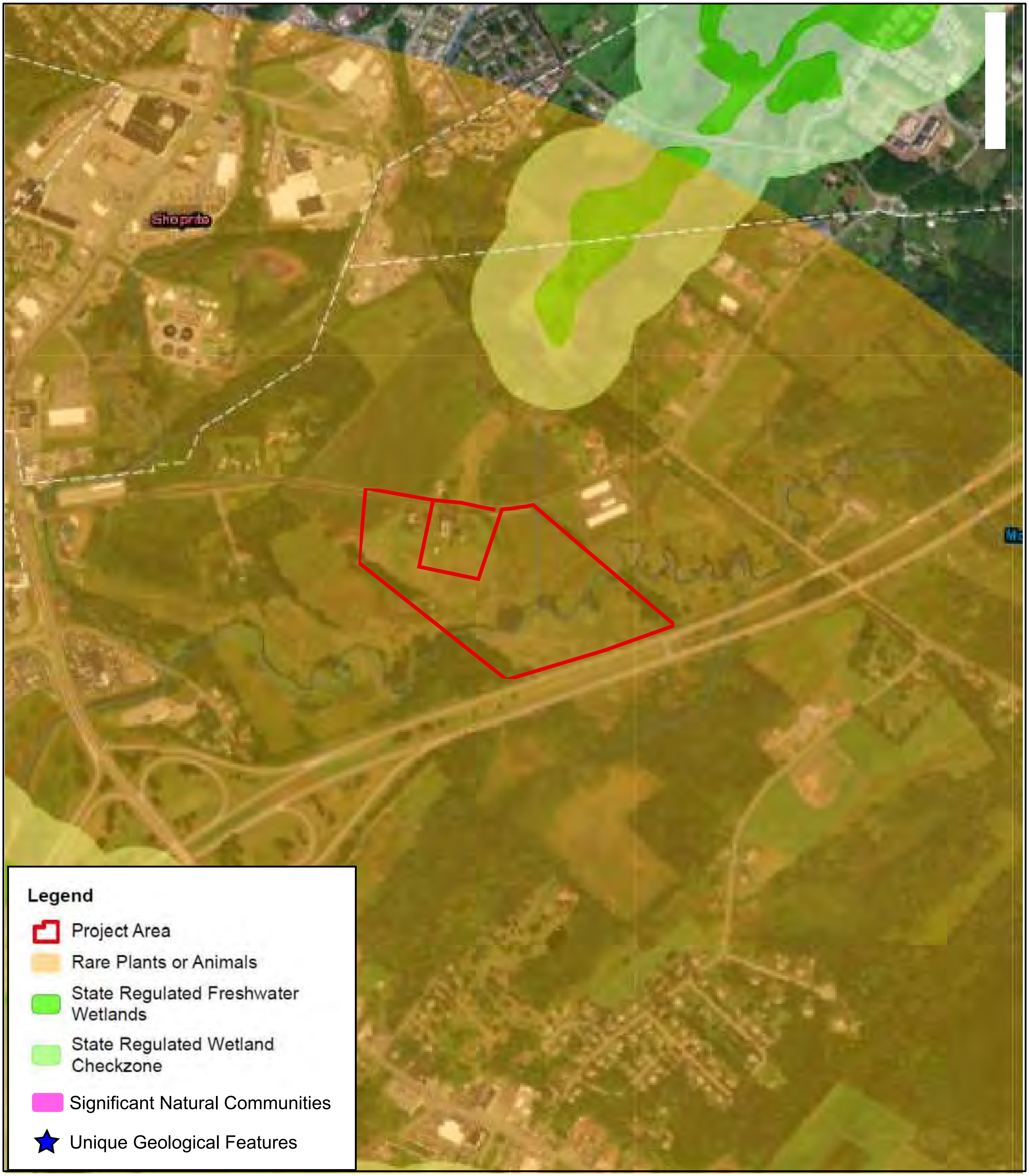
Marangi Solid Waste Handling Facility

Wetlands and Water Resources Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	1/21/2021
Scale:	1 inch = 500 feet
Project:	32034.00
Figure:	5



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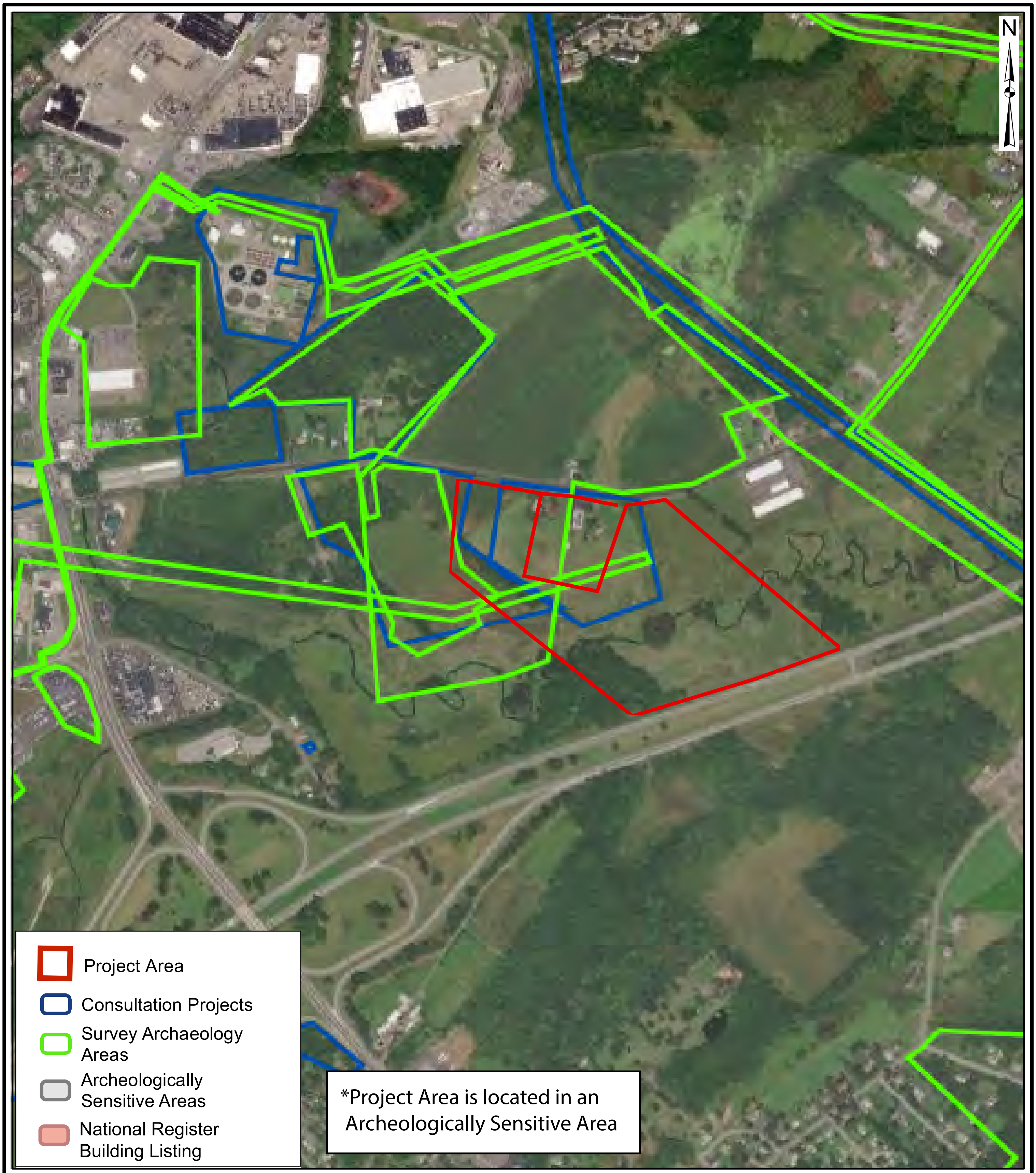
Marangi Solid Waste Handling Facility

NYSDEC Environmental Resource Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	01/21/2021
Scale:	Not to scale
Project:	32034.00
Figure:	6



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North Country Office:
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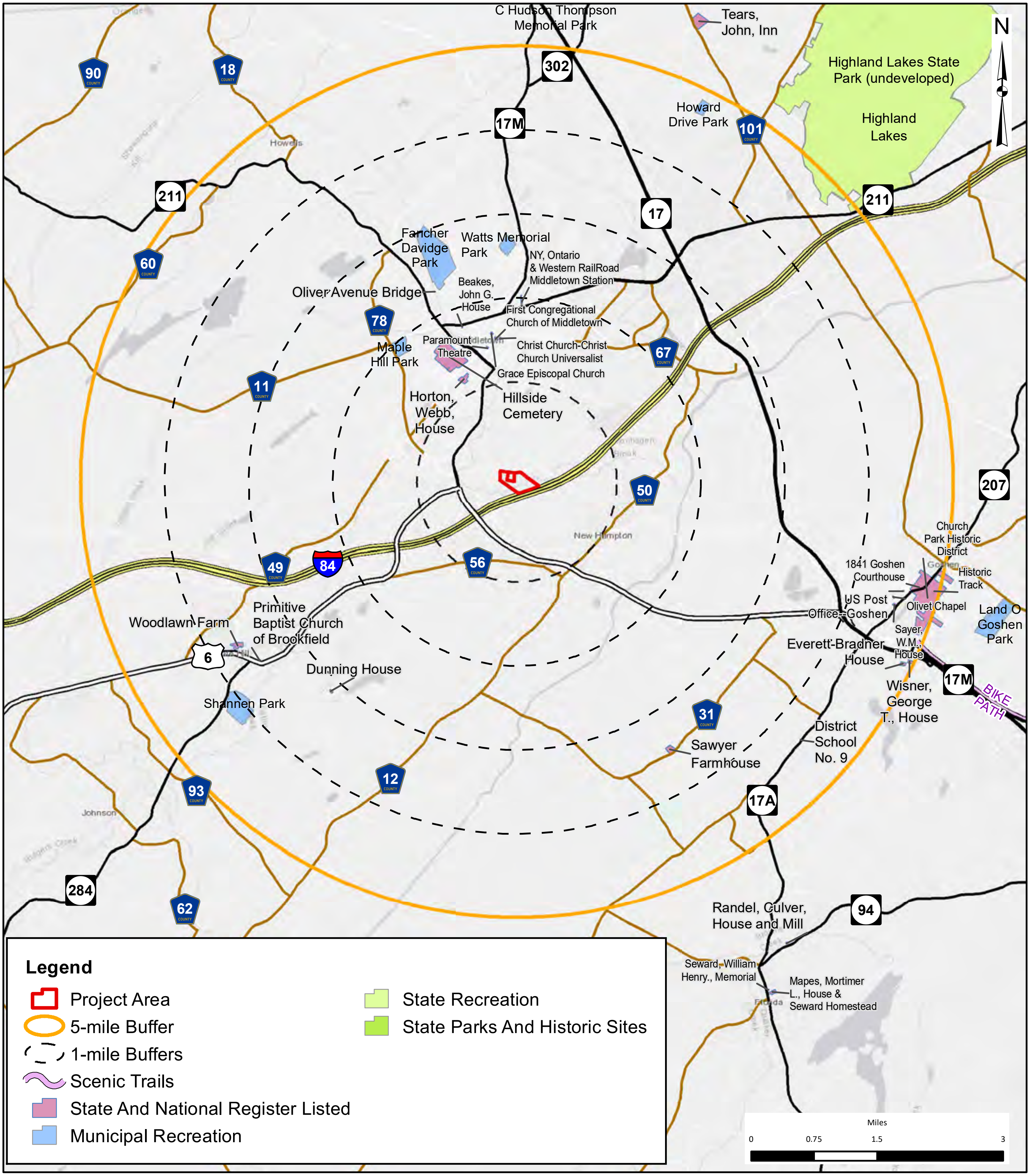
Marangi Solid Waste Handling Facility

NYSOPRHP Cultural Resource Information System (CRIS) Map

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	01/22/2021
Scale:	Not to scale.
Project:	32034.00
Figure:	7



THE Chazen COMPANIES

ENGINEERS
LAND SURVEYORS
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ENVIRONMENTAL & SAFETY PROFESSIONALS
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Marangi Solid Waste Handling Facility

Publicly Accessible Federal, State, or Local Scenic or Aesthetic Resources within 5 Miles

Town of Wawayanda - Orange County, NY

Drawn:	JC
Date:	01/22/2021
Scale:	1 in = 1.6 miles
Project:	32034.00
Figure:	8

NOTES:

1. BASEMAP OBTAINED FROM NY.WATER.USGS.GOV/MAPS/AQUIFER ACCESSED ON 12/4/2020

N

NEW YORK STATE AQUIFER MAP

DOM-MAR TRANSFER AND RECYCLING FACILITY

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TOWN OF WAWAYANDA, STATE OF NEW YORK

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NIAGARA FALLS, NY 14301
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FIGURE 1

MARCH 2021

PN: 20-0062

Section 13

Technical Note

TN 2.01 Minimum and Maximum Burial Depth for Corrugated HDPE Pipe (per AASHTO)

Introduction

The information in this document is designed to provide answers to general cover height questions; the data provided is not intended to be used for project design. The design procedure described in the Structures section (Section 2) of the Drainage Handbook provides detailed information for analyzing most common installation conditions. This procedure should be utilized for project specific designs.

The two common cover height concerns are minimum cover in areas exposed to vehicular traffic and maximum cover heights. Either may be considered "worst case" scenario from a loading perspective, depending on the project conditions.

The minimum and maximum cover heights in this technical note are not applicable to retention/detention systems, where unique configurations of fittings may require different minimum and maximum cover height limits. Please reference ADS Standard Detail 702 "Retention-Detention System (Cross-Section)" for cover height recommendations.

Minimum Cover in Traffic Applications

Pipe diameters from 4- through 48-inch (100-1200 mm) installed in traffic areas (AASHTO H-20, H-25, or HL-93 loads) must have at least one foot (0.3m) of cover over the pipe crown, while 54- and 60-inch (1350 and 1500 mm) pipes must have at least 24 inches (0.6m) of cover. The backfill envelope must be constructed in accordance with the Installation section (Section 5) of the Drainage Handbook and the requirements of ASTM D2321. The backfill envelope must be of the type and compaction listed in Appendix A-5, Table A-5-2 of the Drainage Handbook. In Table 1 below, this condition is represented by a Class III material compacted to 95% standard Proctor density or a Class II material compacted to 90% standard proctor density, although other material can provide similar strength at slightly lower levels of compaction. Structural backfill material should extend to the crown of the pipe; the remaining cover should be appropriate for the installation and as specified by the design engineer. If settlement or rutting is a concern, it may be appropriate to extend the structural backfill to grade. Where pavement is involved, sub-base material can be considered in the minimum burial depth. While rigid pavements can be included in the minimum cover, the thickness of flexible pavements should not be included in the minimum cover.

Additional information that may affect the cover requirements is included in the Installation section (Section 5) of the Drainage Handbook. Some examples of what may need to be considered are temporary heavy equipment, construction loading, paving equipment and similar loads that are less than the design load, the potential of pipe flotation, and the type of surface treatment which will be installed over the pipe zone.

Table 1
Minimum Cover Requirements for ADS N-12®, N-12 ST, and N-12 WT (per AASHTO) with AASHTO H-20, H-25, or HL-93 Load

Inside Diameter, ID, in.(mm)	Minimum Cover ft. (m)	Inside Diameter, ID, in.(mm)	Minimum Cover ft. (m)
4 (100)	1 (0.3)	24 (600)	1 (0.3)
6 (150)	1 (0.3)	30 (750)	1 (0.3)
8 (200)	1 (0.3)	36 (900)	1 (0.3)
10 (250)	1 (0.3)	42 (1050)	1 (0.3)
12 (300)	1 (0.3)	48 (1200)	1 (0.3)
15 (375)	1 (0.3)	54 (1350)	2 (0.6)
18 (450)	1 (0.3)	60 (1500)	2 (0.6)

Notes for Table 1:

1. *Minimum covers presented here were calculated assuming Class III backfill material to 95% standard Proctor density or Class II backfill material to 90% standard Proctor density around the pipe and structural backfill to the crown of the pipe, as recommended in Section 5 of the Drainage Handbook, with an additional layer of compacted traffic lane sub-base for a total cover as required. In shallow traffic installations, especially where pavement is involved, a good quality compacted material to grade is required to prevent surface rutting.*
2. *The minimum covers specified do not include pavement thickness. A pavement section of 0.4' is typical.*
3. *Backfill materials and compaction levels not shown in the table may also be acceptable. Contact ADS for further detail.*
4. *Calculations assume no hydrostatic pressure and native soils that are as strong as the specified minimum backfill recommendations.*

Maximum Cover

Wall thrust generally governs the maximum cover a pipe can withstand and conservative maximum cover heights will result when using the information presented in the *Structures* section (Section 2) of the Drainage Handbook.

The maximum burial depth is highly influenced by the type of backfill and level of compaction around the pipe. General maximum cover limits for ADS N-12, N-12 ST, N-12 WT pipe, (ASTM F2306 and AASTHO M252/M294 Type S pipes) are shown in Table 3 for a variety of backfill conditions.

Table 3 was developed assuming pipe is installed in accordance with ASTM D2321 and the *Installation* section (Section 5) of the Drainage Handbook. Additionally, the calculations assume zero hydrostatic load, incorporate the maximum safety factors represented in Structures section of the Drainage Handbook, use material properties consistent with the expected performance characteristics for N-12 (per ASTM F2306) materials as shown in Table 2 below, and assume the native soil is of adequate strength and is suitable for installation. For applications requiring fill heights greater than those shown in Table 3 or where hydrostatic pressure due to groundwater is present, contact an ADS engineering representative.

Figure 1
ADS N-12→, N-12 ST, and N-12 WT (per AASHTO) Trench Detail Under Pavement

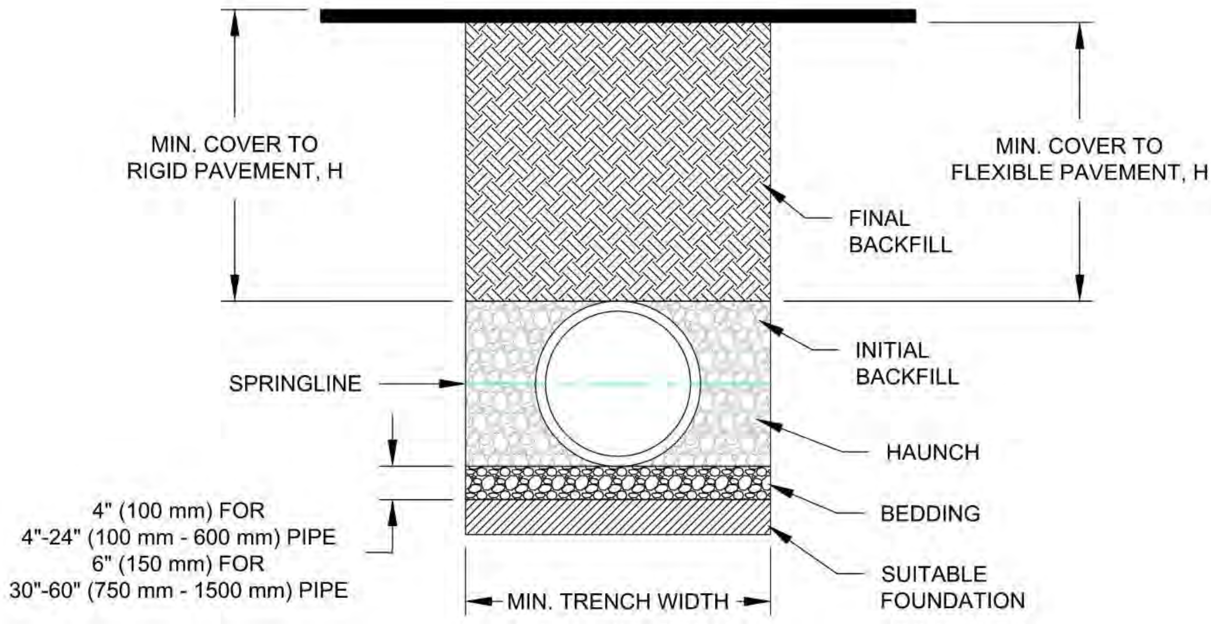

Table 2
ADS N-12 (per AASHTO) Mechanical Properties

Cell Class	Factored Compressive Strain (%)	Tension Strain (%)	Initial		75-Year	
			Fu (psi)	E (psi)	Fu (psi)	E (psi)
ASTM D3350 435400C	4.1	5.0	3,000	110,000	900	21,000

Table 3
Maximum Cover for ADS N-12, N-12 ST, and N-12 WT Pipe (per AASHTO), ft (m)

Diameter in. (mm)	Class 1				Class 2						Class 3			
	Compacted		Dumped		95%		90%		85% [3]		95%		90% [3]	
4 (100)	37	(11.3)	18	(5.5)	25	(7.6)	18	(5.5)	12	(3.7)	18	(5.5)	13	(4.0)
6 (150)	44	(13.4)	20	(6.1)	29	(8.8)	20	(6.1)	14	(4.3)	21	(6.4)	15	(4.6)
8 (200)	32	(9.8)	15	(4.6)	22	(6.7)	15	(4.6)	10	(3.0)	16	(4.9)	11	(3.4)
10 (250)	38	(11.6)	18	(5.5)	26	(7.9)	18	(5.5)	12	(3.7)	18	(5.5)	13	(4.0)
12 (300)	35	(10.7)	17	(5.2)	24	(7.3)	17	(5.2)	8	(2.4)	17	(5.2)	11	(3.4)
15 (375)	38	(11.6)	17	(5.2)	25	(7.6)	17	(5.2)	8	(2.4)	18	(5.5)	11	(3.4)
18 (450)	36	(11.0)	17	(5.2)	24	(7.3)	17	(5.2)	8	(2.4)	17	(5.2)	11	(3.4)
24 (600)	28	(8.5)	13	(4.0)	20	(6.1)	13	(4.0)	7	(2.1)	14	(4.3)	10	(3.0)
30 (750)	28	(8.5)	13	(4.0)	20	(6.1)	13	(4.0)	7	(2.1)	14	(4.3)	9	(2.7)
36 (900)	26	(7.9)	12	(3.7)	18	(5.5)	12	(3.7)	7	(2.1)	13	(4.0)	9	(2.7)
42 (1050)	23	(7.0)	11	(3.4)	16	(4.9)	11	(3.4)	7	(2.1)	11	(3.4)	7	(2.1)
48 (1200)	25	(7.6)	11	(3.4)	17	(5.2)	11	(3.4)	7	(2.1)	12	(3.7)	7	(2.1)
54 (1350)	22	(6.7)	10	(3.0)	16	(4.9)	10	(3.0)	6	(1.8)	11	(3.4)	7	(2.1)
60 (1500)	25	(7.6)	11	(3.4)	17	(5.2)	11	(3.4)	6	(1.8)	12	(3.7)	7	(2.1)

Notes:

1. *Results based on calculations shown in the Structures section of the ADS Drainage Handbook (v20.7). Calculations assume no hydrostatic pressure and a density of 120 pcf (1926 kg/m^3) for overburden material.*
2. *Installation assumed to be in accordance with ASTM D2321 and the Installation section of the Drainage Handbook.*
3. *For installations using lower quality backfill materials or lower compaction efforts, pipe deflection may exceed the 5% design limit; however controlled deflection may not be a structurally limiting factor for the pipe. For installations where deflection is critical, pipe placement techniques or periodic deflection measurements may be required to ensure satisfactory pipe installation.*
4. *Backfill materials and compaction levels not shown in the table may also be acceptable. Contact ADS for further detail.*
5. *Material must be adequately "knifed" into haunch and in between corrugations. Compaction and backfill material is assumed uniform throughout entire backfill zone.*
6. *Compaction levels shown are for standard Proctor density.*
7. *For projects where cover exceeds the maximum values listed above, contact ADS for specific design considerations.*
8. *Calculations assume no hydrostatic pressure. Hydrostatic pressure will result in a reduction in allowable fill height. Reduction in allowable fill height must be assessed by the design engineer for the specific field conditions.*
9. *Fill height for dumped Class I material incorporate an additional degree of conservatism that is difficult to assess due to the large degree of variation in the consolidation of this material as it is dumped. There is limited analytical data on its performance. For this reason, values as shown are estimated to be conservatively equivalent to Class 2, 90% SPD.*