STORMWATER POLLUTION PREVENTION PLAN

RESIDENTIAL DEVELOPMENT

1165 GREACEN POINT ROAD
VILLAGE OF MAMARONECK, NEW YORK

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JMC Project 18100

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APPENDICES

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REFERENCED DRAWINGS FOR SWPPP DESIGN AND DETAILS

JMC SITE PLANS

Dwg. No.	Title	Rev. No./Date	
C-000	"Cover Sheet"	4	06/08/2020
C-010	"Existing Conditions Map"	4	06/08/2020
C-020	"Demolition & Tree Removal Plan"	4	06/08/2020
C-100	"Layout Plan"	4	06/08/2020
C-200	"Grading & Utilities Plan"	4	06/08/2020
C-300	"Erosion & Sediment Control Plan"	4	06/08/2020
C-900	"Construction Details"	4	06/08/2020
C-901	"Construction Details"	4	06/08/2020

I. INTRODUCTION

This Stormwater Pollution Prevention Plan has been prepared for the 1.09 acre site, located at 1165 Greacen Point Road in the Village of Mamaroneck, Westchester County, New York (hereinafter referred to as the "Site"). The site is bordered by the Delancey Cove to the northwest, Greacen Point Road to the southeast, and single-family homes to the southwest and northeast. The development has been designed in accordance with the following:

- Chapter 294 "Stormwater Management and Erosion and Sediment Control" of the Village of Mamaroneck Zoning Code

The project proposes the demolition of the existing single-family home and construction of a new single-family home with associated improvements including driveway / parking areas, landscaping improvements, deck and patio areas, an onsite wastewater treatment system, and stormwater management facilities.

II. STORMWATER MANAGEMENT PLANNING

A Stormwater Pollution Prevention Plan has been prepared for this project because it is a land development activity that involves:

- Disturbance of land greater than 1,000 square feet

The proposed stormwater facilities have been designed such that the quantity and quality of stormwater runoff during and after construction are not adversely altered or are enhanced when compared to pre-development conditions in the 25-year storm event.

The Six Step Process for Stormwater Site Planning and Practice Selection

Stormwater management using green infrastructure is summarized in the six step process described below. The six step process was adhered to when developing this SWPPP.

Information is provided in this SWPPP which documents compliance with the required process as follows:

Step 1: Site Planning

Implement planning practices that protect natural resources and utilize the hydrology of the site. Strong consideration must be given to reducing impervious cover to aid in the preservation of natural resources including protecting natural areas, avoiding sensitive areas and minimizing grading and soil disturbance.

Step 2: Determine Water Quality Treatment Volume (WQv)

Determine the required WQv for the site based on the site layout, impervious areas and sub-catchments. This initial calculation of WQv will have to be revised after green infrastructure techniques are applied. The following method has been used to calculate the WQv.

- **90% Rule -** According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule. The method is based on 90% of the average annual stormwater runoff volume which must be provided due to impervious surfaces. The Water Quality Volume (denoted as the WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at a site. The average rainfall storm depth for 90% of storms in New York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

Proposed SMP's will effectively treat 100% of the 1-year storm for all new impervious areas which is above and beyond the water quality requirements for Redevelopment Projects.

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

RRv is not required for this project since it is a redevelopment; however, a Cistern is proposed to collect rainwater for irrigation and will provide water quality and runoff reduction.

- **Rain Barrels and Cisterns**
  - Underground storage tanks installed to collect stormwater runoff to be used for irrigation purposes the project will have an irrigation system for the lawn and landscaped areas.

The Minimum RRv capacity required must be provided by green infrastructure techniques to verify that the RRv requirement has been met. The RRv that is provided by the green infrastructure techniques can then be subtracted from the Total Required WQv that must be provided by the SMP's.

Step 4: Determine the minimum RRv Required

The minimum RRv is calculated similar to the WQV. However, it is determined using only the new impervious cover and accounts for the hydrologic soil group present. In no case shall the runoff reduction achieved from the newly constructed impervious area be less than the minimum runoff reduction volume (RRv_{min}).

Step 5: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume

Apply the standard SMP's to meet additional water quality volume requirements that cannot be addressed by applying the green infrastructure techniques. The standard SMP's with RRv capacity must be implemented to verify that the RRv requirement has been met.

Step 6: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

The Village of Mamaroneck requires that the Peak Rate from the 25 year storm event be mitigated under post-development conditions. This is accomplished by using practices such as infiltration basins, dry detention basins, etc. to meet water quantity requirements.

III. STUDY METHODOLOGY

Runoff rates were calculated based upon the standards set forth by the United States Department of Agriculture Natural Resources Conservation Service Technical Release 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986. The methodology set forth in TR-55 considers a multitude of characteristics for watershed areas including soil types, soil permeability, vegetative cover, time of concentration, topography, rainfall intensity, ponding areas, etc.

The 25-year storm recurrence intervals were reviewed in the design of the stormwater management facilities (see Appendix A for the Hydrologic Calculations).

Anticipated drainage conditions were analyzed taking into account the rate of runoff which will result from the construction of buildings, parking areas and other impervious surfaces associated with the site development.

Base Data and Design Criteria

For the stormwater management analysis, the following base information and methodology were used:

1. The site drainage patterns and outfall facilities were reviewed by JMC personnel for the purpose of gathering background data and confirming existing mapping of the watershed areas.

2. An Existing Drainage Area Map was developed from the topographical survey. The drainage area map reflects the existing conditions within and around the project area.

3. A Proposed Drainage Area Map was developed from the proposed grading design superimposed over the topographical survey. The drainage area map reflects the proposed conditions within the project area and the existing conditions to remain in the surrounding area.

4. The United States Department of Agriculture (USDA) Web Soil Survey of the site available on its website at http://websoilsurvey.nrcd.usda.gov.

5. Soil Survey of Putnam and Westchester Counties, 1994.

6. The United States Department of Agriculture Natural Resources Conservation Service National Engineering Handbook, Section 4 - Hydrology", dated March 1985.

7. The United States Department of Agriculture Natural Resources Conservation Service Technical Report No. 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986.

8. United States Department of Commerce Weather Bureau Technical Release No. 40 Rainfall Frequency Atlas of the United States.

9. The time of concentration was calculated using the methods described in Chapter 3 of TR-55, Second Edition, June 1986. Manning's kinematics wave equation was used to determine the travel time of sheet flow. The 2-year 24 hour precipitation amount of 3.45 inches was used in the equation for all storm events. The travel time for shallow concentrated flow was computed using Figure 3-1 and Table 3-1 of TR-55. Manning's Equation was used to determine the travel time for channel reaches.

10. All hydrologic calculations were performed with the Bentley PondPack software package version 10.0.

11. The New York State Stormwater Management Design Manual, revised January 2015.

12. New York Standards and Specifications for Erosion and Sediment Control, November 2016.

13. The storm flows for the 25-year recurrence interval storms were analyzed for the total watershed areas. The Type III distribution design storm for a 24 hour duration was used and the mass rainfall for each design storm was taken from the Extreme Precipitation in New York & New England developed by the Natural Resource Conservation Service (NRCS) and the Northeast Regional Climate Center (NRCC) as follows:

24 Hour Rainfall Amounts

Design Storm Recurrence Interval	Inches of Rainfall
25 Year	6.41

IV. EXISTING CONDITIONS

The existing conditions of the project site consists of a 2,000± S.F. single-family residence, including deck and porch, driveway and parking areas, areas of lawn, and a wetland in the rear of the property adjacent to Delancey Cove. After stormwater runoff exits the project site, it flows to Delancey Cove.

The following natural features, conservation areas, resource areas and drainage patterns of the project site have been identified and utilized to develop Drawing DA-1 "Existing Drainage Area Map" which is included in Appendix E:

- Wetlands (jurisdictional, wetland of special concern)
- Waterways (major, perennial, intermittent, springs)
- Buffers (stream, wetland, forest, etc.)
- Floodplains

- Topography (contour lines, existing flow paths, steep slopes, etc.)
- Soil (hydrologic soil groups, highly erodible soils, etc.)

Based on the USDA Web soil survey, all on-site soils are poorly drained and belong to hydrological group D. The soil types, boundaries and drainage areas/designations are depicted on Drawing DA-1 within Appendix E.

Two separate Design Lines (DL-1 through DL-2) were identified for comparing peak rates of runoff in existing and proposed conditions. Similarly, two separate drainage areas were identified in existing conditions based on the existing drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards.

The following is a description of each of the drainage areas analyzed in the existing conditions analysis:

<u>Existing Drainage Area 1 (EDA-1)</u> is 0.55 acres in size and is located on the northwestern portion of the site adjacent to the wetland area. This area consists of the existing single-family residence, driveway and parking areas, and areas of lawn. This drainage area drains overland to the wetland area, and ultimately to Delancey Cove.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 80 and 10.6 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

<u>Existing Drainage Area 2 (EDA-2)</u> is 0.18 acres in size and is located on the southeastern portion of the site adjacent to the wetland area. This area consists of the existing driveway and areas of lawn. This drainage area drains overland toward Greacon Point Road, and ultimately to Delancey Cove.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 78 and 6.7 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

The peak rates of runoff to the design points from the drainage areas for each storm are shown in the table below:

Table 1
Summary of Peak Rates of Runoff in Existing Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DL-1	DL-2
25 year	2.11	0.69

V. PROPOSED CONDITIONS

The proposed improvements consist of the construction of a 3,655± S.F. single-family residence with associated improvements consisting of driveway / parking areas, landscaping improvements, deck and patio areas, an onsite wastewater treatment system, and stormwater management facilities.

The proposed drainage improvements include a variety of stormwater practices including a Permavoid subsurface detention facility and a rainwater cistern to water quality treatment and irrigation. After treatment for water quality and peak rate attenuation, stormwater discharges will utilize energy dissipating aprons which will drain to the existing wetland buffer and wetland. The vegetated practices and overland discharges provide multiple opportunities for water quality enhancement and infiltration in addition to the proposed stormwater management basins. These overland conveyances of stormwater runoff will result in additional infiltration not considered in the SWPPP's hydrologic model, resulting in a conservative analysis.

This section describes the design and analysis of the proposed conditions used to demonstrate that the SWPPP meets the requirements of the General Permit.

The Six Step Process For Stormwater Site Planning and Practice Selection

Step 1: Site Planning

The following practices and site features were incorporated in the site design:

- Preserving hydrology - Maintaining drainage divides
- Wetlands and buffers – The site includes 0.37 acres of wetlands and 0.41 acres of wetland buffers. The project requires the disturbance of 0.30± acres of wetland buffer.
- Floodplain considerations - The site lies within the 100 year flood zone according to the National Flood Insurance Program Flood Insurance Rate Map (FIRM) No. 36119C0361F, effective date 09/28/2007.
- Waterways (major, perennial, intermittent, springs) – The location, setback, cross section, etc. of the existing waterway has been maintained.
- Topography (contour lines, existing flow paths, steep slopes, etc.) has been maintained or disturbed to the minimum extent practicable.
- Soil (hydrologic soil groups, highly erodible soils, etc.)

Step 2: Determine Water Quality Treatment Volume (WQv)

The following method has been used to calculate the WQv.

- **90% Rule -** According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule. The method is based on 90% of the average annual stormwater runoff volume which must be provided due to impervious surfaces. The Water Quality Volume (denoted as the WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at a site. The average rainfall storm depth for 90% of storms in New York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

Proposed SMP's will effectively treat 100% of the 1 year storm for all new impervious areas which is above and beyond the water quality requirements for Redevelopment Projects.

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

RRv is not required for this project since it is a redevelopment; however, a Cistern is proposed to collect rainwater for irrigation and will provide water quality and runoff reduction.

Step 4: Determine the minimum RRv Required

RRv calculations have not been provided as runoff reduction is not required.

Step 5: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume

The entirety of the required Water Quality Volume has been met through the proposed rainwater cistern. Please refer to the Water Quality Calculations in Appendix B.

Step 6: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

- Permavoid Subsurface Detention System

  Description

  A subsurface detention system is proposed to store and detain stormwater runoff from the proposed house and driveway. This system has been designed to attenuate the peak rate of runoff during a 25-year storm event.

All practices exceed the required elements of SMP criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual. A summary of each category is provided below.

1. Feasibility – Stormwater practices are designed based upon unique physical environmental considerations noted in the NYS Stormwater Management Design Manual (NYSSMDM).
2. Conveyance – The design conveys runoff to the designed stormwater practice in a manner that is safe, minimizes erosion and disruption to natural drainage channel and promotes filtering and infiltration.

3. Pretreatment – All stormwater practices provide pretreatment as required in accordance with NYSSMDM design guidelines.

4. Treatment Geometry – The plan provides water quality treatment in accordance with NYSSMDM guidelines.

5. Maintenance – Maintenance for the environment practices has been provided and is detain the SWPPP Report as required. Maintenance access is provided in the design plans.

In order to determine the post-development rates of runoff generated on-site, the following drainage areas were analyzed in the post-development conditions. These areas are graphically depicted on Drawing DA-2 "Proposed Drainage Area Map" located in Appendix E.

Two separate Design Lines (DL-1 through DL-2) were identified for comparing peak rates of runoff in existing and proposed conditions. Similarly, three separate drainage areas were identified in proposed conditions based on the proposed drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards.

The following is a description of each of the drainage areas analyzed in the proposed conditions analysis:

Proposed Drainage Area 1A (PDA-1A) is 0.31 acres in size and is located in the center of the site and consists of the proposed single-family residence, driveway and parking areas, front sidewalk, and lawn. This drainage area drains towards a series of drain inlets where runoff is then conveyed to the rainwater cistern, and then to the Permavoid system for detention. After being detained, runoff is slowly released via an outlet control structure to a rip-rap apron , where it then flows overland to Delancey Cove.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 88 and 5.0 minutes, respectively.

Proposed Drainage Area 1B (PDA-1B) is 0.26 acres in size and is located on the northwestern portion of the site. This area consists of the backyard lawn areas which drain overland to the wetland and then to Delancey Cove.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 80 and 5.0 minutes, respectively.

Proposed Drainage Area 2 (PDA-2) is 0.16 acres in size and is located on the southeastern portion of the site. This area consists of the front yard and a portion of the proposed driveway. This drainage area drains overland toward Greacen Point Road and ultimately to Delancey Cove.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 81 and 5.0 minutes, respectively.

Refer to Drawing DA-2 in Appendix E.

The peak rates of runoff to the design point of each of the analyzed drainage areas for each storm are shown on the table below:

Table 2
Summary of Proposed Peak Rates of Runoff in Proposed Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DL-1	DL-2
25 year	1.99	0.69

The reductions in peak rates of runoff from proposed to existing conditions are shown on the table below:

Table 3
Percent Reductions in Peak Rates of Runoff (Existing vs. Proposed Conditions)
(Cubic Feet per Second)

Design Point	Storm Recurrence Frequency (Years)	Existing Peak Runoff Rate (cfs)	Proposed Peak Runoff Rate (cfs)	Percent Reduction (%)
1	25 year	2.11	1.99	5.7
2	25 year	0.69	0.69	0.0

As demonstrated in Table 4, the proposed stormwater improvements will result in reductions of peak rates of runoff for all design points analyzed.

VI. SOIL EROSION & SEDIMENT CONTROL

A potential impact of the proposed development on any soils or slopes will be that of erosion and transport of sediment during construction. An Erosion and Sediment Control Management Program will be established for the proposed development, beginning at the start of construction and continuing throughout its course, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," November 2016. A continuing maintenance program will be implemented for the control of sediment transport and erosion control after construction and throughout the useful life of the project.

The Operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify that the appropriate erosion and sediment controls, as shown on the Sediment & Erosion Control Plans, have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Operator shall have a qualified professional conduct one site inspection at least every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

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 certification statement provided in Appendix D before they commence any construction activity.

Soil Description

As provided by the United States Department of Agriculture, Soil Conservation Service "Web Soil Survey," soil classifications which exist on the subject site are described below.

Soils are placed into four hydrologic groups: A, B, C, and D. In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

A. (Low runoff potential). The soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well drained to excessively drained sands or gravels. They have a high rate of water transmission.

B. The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well drained to well drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission.

C. The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission.

D. (High runoff potential). The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

A soil's tendency to erode is also described in the USDA web soil survey. The ratings in this interpretation indicate the hazard of soil loss from unsurfaced areas. The ratings are based on soil erosion factor K, slope, and content of rock fragments. The hazard is described as "slight," "moderate," or "SEVERE." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the temporarily unsurfaced / unstabilized during construction may require occasional maintenance, and that simple erosion-control measures are needed; and "SEVERE" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that erosion-control measures are needed.

Per the Soil Survey, the following soils listed below are present at the site. Following this list is a detailed description of each soil type found on the property:

SYM.	H.S.G.	DESCRIPTION
UhB	D	Urban land-Charlton complex, 3 to 8 percent slopes
UwB	D	Urban land-Woodbridge complex, 3 to 8 percent slopes

UhB, Urban land-Charlton complex, 3 to 8 percent slopes

This unit consists of areas of Urban land and the very deep, well drained, and gently sloping Charlton soil. It is on ridges and hilltops that are underlain by folded bedrock. The parent material consists of coarse-loamy melt-out till derived from gneiss, granite, and/or schist. Depth to the top of a seasonal high water table is at a depth of more than 60 inches. Available water capacity is moderate.

Hydrologic group: D
Erosion Hazard Rating: Severe

UhB, Urban land-Woodbridge complex, 3 to 8 percent slopes

This unit consists of areas of Urban land and the gently sloping, very deep, moderately well drained Woodbridge soil. The parent material consists of coarse-loamy melt-out till derived from gneiss, granite, and/or schist. Depth to the top of a seasonal high water table is at a depth of 1.5 feet. Available water capacity is moderate.

Hydrologic group: D
Erosion Hazard Rating: Severe

On-Site Pollution Prevention

There are temporary pollution prevention measures used to control litter and construction debris on site, such as:

- Silt Fence
- Inlet Protection

There will be inlet protection provided for all storm drains and inlets with the use of silt sack inlet protection inserts and stone & block drop inlet protection, which keep silt, sediment and construction litter and debris out of the on-site stormwater drainage system.

Temporary Control Measures

Temporary control measures and facilities will include silt fences, construction ditches, stabilized construction access, temporary seeding, mulching and sediment traps with temporary riser and anti-vortex devices.

Throughout the construction of the proposed development, temporary control facilities will be implemented to control on-site erosion and sediment transfer. Construction ditches, if required, will be used to direct stormwater runoff to temporary sediment traps for settlement. The sediment traps will be constructed as part of this project will serve as temporary sediment basins to remove sediment and pollutants from the stormwater runoff produced during construction. Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction access, seeding, mulching and inlet protection are as follows:

1. Silt Fence is constructed using a geotextile fabric. The fence will be either 18 inches or 30 inches high. The height of the fence can be increased in the event of placing these devices on uncompacted fills or extremely loose undisturbed soils. The fences will not be placed in areas which receive concentrated flows such as ditches, swales and channels nor will the filter fabric material be placed across the entrance to pipes, culverts, spillway structures, sediment traps or basins.

2. Stabilized Construction Access consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 24 feet in width by 8 inches in depth.

3. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 80% of the disturbed area has a perennial vegetative cover. This amount is required to adequately function as a sediment and erosion control facility. Grass lining will also be used to line temporary channels and the surrounding disturbed areas.

4. Mulching is used as an anchor for seeding and disturbed areas to reduce soil loss due to storm events. These areas will be mulched with straw at a rate of 3 tons per acre such that the mulch forms a continuous blanket. Mulch must be placed after seeding or within 48 hours after seeding is completed.

5. Inlet Protection will be provided for all stormwater basins and inlets with the use of curb & gutter inlet protection and stone & block inlet protection structures, which will keep silt, sediment and construction debris out of the storm system. Existing structures within existing paved areas will be protected using "Silt Sacks" inside the structures.

The contractor shall be responsible for maintaining the temporary sediment and erosion control measures throughout construction. This maintenance will include, but not be limited to, the following tasks:

1. For dust control purposes, moisten all exposed graded areas with water at least twice a day in those areas where soil is exposed and cannot be planted with a temporary cover due to construction operations or the season (December through March).

2. Inspection of erosion and sediment control measures shall be performed at the end of each construction day and immediately following each rainfall event. All required repairs shall be immediately executed by the contractor.

3. Sediment deposits shall be removed when they reach approximately ⅓ the height of the silt fence. All such sediment shall be properly disposed of in fill areas on the site, as directed by the Owner's Field Representative. Fill shall be protected following disposal with mulch, temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

4. Rake all exposed areas parallel to the slope during earthwork operations.

5. Following final grading, the disturbed area shall be stabilized with a permanent surface treatment (i.e. turf grass, pavement or sidewalk). During rough grading, areas which are not to be disturbed for fourteen or more days shall be stabilized with the temporary seed mixture, as defined on the plans. Seed all piles of dirt in exposed soil areas that will not receive a permanent surface treatment.

Concrete Material and Equipment Management

Concrete washouts shall be used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solid for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of area waters and harm aquatic life. Solids that are improperly disposed of can clog storm drain pipes and cause flooding. Installing concrete washout facilities not only prevents pollution but also is a matter of good housekeeping at your construction site.

Prefabricated concrete washout containers can be delivered to the site to provide maintenance and disposal of materials. Regular pick-ups of solid and liquid waste materials will be necessary. To prevent leaks on the job site, ensure that prefabricated washout containers are watertight. A self installed concrete washout facility can be utilized although they are much less reliable than prefabricated containers and are prone to leaks. There are many design options for the washout, but they are preferably built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structures can also be used if they are sized and constructed correctly and are diligently maintained. One of the most common problems with self-installed concrete washout facilities is that they can leak or be breached as a result of constant use, therefore the contractor shall be sure to use quality materials and inspect the facilities on a daily basis.

Washouts must be sized to handle solids, wash water, and rainfall to prevent overflow. Concrete Washout Systems, Inc. estimates that 7 gallons of wash water are used to wash one truck chute and 50 gallons are used to wash out the hopper of a concrete pump truck.

For larger sites, a below-grade washout should be at least 10 feet wide and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 12-inches of freeboard must be provided. The pit must be lined with plastic sheeting of at least 10-mil thickness without holes or tears to prevent leaching of liquids into the ground. Concrete wash water should never be placed in a pit that is connected to the storm drain system or that drains to nearby waterways.

An above-grade washout can be constructed at least 10 feet wide by 10 feet long and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 4-inches of freeboard must be provided. The washout structures can be constructed with staked straw bales or sandbags double-or triple lined with plastic sheeting of at least 10-mil thickness without holes or tears.

Concrete washout facilities shall not be located within 50 feet of storm drains, open ditches, or water bodies and should be placed in locations that allow for convenient access for concrete trucks. The contractor shall check all concrete washout facilities daily to determine if they have been filled to 75 percent capacity, which is when materials need to be removed. Both above-and below-ground self-installed washouts should be inspected daily to ensure that plastic linings are intact and sidewalls have not been damaged by construction activities. Prefabricated washout containers should be inspected daily as well as to ensure the container is not leaking or nearing 75 percent capacity. Inspectors should also note whether the facilities are being used regularly. Additional signage for washouts may be needed in more convenient locations if concrete truck operators are not utilizing them.

The washout structures must be drained or covered prior to predicted rainstorms to prevent overflows. Hardened solids either whole or broken must be removed and then they may be reused onsite or hauled away for recycling.

Once materials are removed from the concrete washout, a new structure must be built or excavated, or if the previous structure is still intact, inspect it for signs of weakening or damage and make any necessary repairs. Line the structure with new plastic that is free of holes or tears and replace signage if necessary. It is very important that new plastic be used after every cleaning because pumps and concrete removal equipment can damage the existing liner.

Construction Site Chemical Control

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides; fertilizers used for vegetative stabilization; petrochemicals; construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary waste.

Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State and local regulations that govern their usage, handling, storage, and disposal.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.
Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage areas, and notifying neighboring property owners prior to spraying.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity of 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and
- Keep lids securely fastened.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.

Thinners or solvents should not be discharged into sanitary or storm systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled.

<u>Solid Waste Management and Portable Sanitary Management</u>

The purpose of this management measure is to prevent the potential for solid waste such as construction debris, trash, etc. from construction sites due to improper handling and storage. Debris and litter should be removed periodically from the BMP's and surrounding areas to prevent clogging of pipes and structures. All construction material shall be stored in designated staging areas. Roll-off containers shall be placed on site and all empty containers, construction debris and litter shall be placed in the containers.

Portable sanitary units may be utilized on-site or bathrooms will be provided within construction trailers. A sanitation removal company will be hired to pump/remove any sanitary waste. In the event that portable sanitary units are used and then cleaned after being emptied, the rinse water may not be disposed of to the storm drain system. It shall be contained for later disposal if it can't be disposed of on-site. Remove paper and trash before cleaning the portable sanitary units. The portable sanitary units shall be located away from the storm drain system if possible. Provide over head cover for wash areas if possible. Maintain spill response material and equipment on site to eliminate the potential for contaminants and wash water from entering the storm drain system.

Permanent Control Measures and Facilities for Long Term Protection

Towards the completion of construction, permanent sediment and erosion control measures will be developed for long term erosion protection. The following permanent control measures and facilities have been proposed to be implemented for the project:

1. Drain Inlets will be used to remove some of the coarse sand and grit sediment before entering the drainage system. Each catch basin will be constructed with an 18 inch deep sump.

2. A Cistern will be used to store and provide water quality treatment for the stormwater runoff on the site. Some sediment will be collected and trapped before water is discharged to the detention system and then to the rear of the property.

3. Rip-Rap Energy Dissipators At discharge points from the stormwater management system, rip-rap pads consisting of angular rocks will be placed to dissipate velocity and reduce the risk of erosion.

4. Seeding of at least 70% perennial vegetative cover will be used to produce a permanent uniform erosion resistant surface. The seeded areas will be mulched with straw at a rate of 2 tons per acre such that the mulch forms a continuous blanket.

Specifications for Soil Restoration

Prior to the final stabilization of the disturbed areas, soil restoration will be required for all vegetated areas to recover the original properties and porosity of the soil. Soil Restoration Requirements are provided on Table 4 below:

Table 4

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">Clearing and grubbing</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>
</table>

* 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."

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following full soil restoration steps applied:

1. Apply 3 inches of compost over subsoil.

2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor-mounted disc, or tiller, mixing, and circulating air and compost into subsoils.

3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.

<u>Specifications for Final Stabilization of Graded Areas</u>

Final stabilization of graded areas consists of the placement of topsoil and installation of landscaping (unless the area is to be paved, or a building is to be constructed in the location). Topsoil is to be spread as soon as grading operations are completed. Topsoil is to be placed to a minimum depth of six inches on all embankments, planting areas and seeding/sod areas. The subgrade is to be scarified to a depth of two inches to provide a bond of the topsoil with the subsoil. Topsoil is to be raked to an even surface and cleared of all debris, roots, stones and other unsatisfactory material.

Planting operations shall be conducted under favorable weather conditions as follows:

- Permanent Lawns - April 15 (provided soil is frost-free and not excessively moist) to May 15; August 15 to October 15.

- Temporary Lawn Seeding - if outside of the time periods noted above, the areas shall be seeded immediately on completion of topsoil operations with annual ryegrass (Italian rye) at a rate of six pounds per 1,000 square feet. Temporary lawn installation is permitted provided the soil is frost-free and not excessively moist. The permanent lawn is to be installed the next planting season.

On slopes with a grade of 3 horizontal to 1 vertical or greater, and in swales, a geotextile netting or mat shall be installed for stabilization purposes as shown on the Plans. Seeded areas are to be mulched with straw or hay at an application rate of 70-90 pounds per 1,000 s.f. Straw or hay mulch must be spread uniformly and anchored immediately after spreading to prevent wind blowing. Mulches must be inspected periodically and in particular after rainstorms to check for erosion. If erosion is observed, additional mulch must be applied. Netting shall be inspected after rainstorms for dislocation or failure; any damage shall be repaired immediately.

All denuded surfaces which will be exposed for a period of over two months or more shall be temporarily hydroseeded with (a) perennial ryegrass at a rate of 40 lbs per acre (1.0 lb per 1000 square feet); (b) Certified "Aroostook" winter rye (cereal rye) @ 100 lb per acre (2.5 lb/1000 s.f.) to be used in the months of October and November.

Permanent turfgrass cover is to consist of a seed mixture as follows:

(a) Sunny sites

Kentucky Bluegrass	2.0-2.6 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	0.4-0.6 pounds/1000 square feet

(b) Shady sites

Kentucky Bluegrass	0.8-1.0 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet

Fine Fescue	2.6-3.3 pounds/1000 square feet

All plant materials shall comply with the standards of the American Association Of Nurserymen with respect to height and caliper as described in its publication American Standard for Nursery Stock, latest edition.

VII. CONSTRUCTION PHASE AND POST-CONSTRUCTION MAINTENANCE

During the construction phase and following construction of the project, a number of maintenance measures will be taken with respect to the site maintenance. Measures to be taken included the following:

1. During Construction

A comprehensive sediment and erosion control plan will be in place during the construction period. Maintenance measures for sediment and erosion controls will include:

A qualified professional acceptable to the municipality will be hired by the owner or operator to monitor the installation and maintenance of the sediment and erosion control plans. The qualified professional shall report directly to the Engineering Consultant and shall be responsible for ensuring compliance with the design of the sediment and erosion control plans.

The qualified professional so hired will inspect all sediment and erosion control measures at least every seven calendar days. In the event that there has been a variance with the design of the sediment and erosion control measures so that the ability of the measures to adequately perform the intended function is lessened or compromised and/or the facilities are not adequately maintained, the qualified professional shall be required to report such variance to the Engineering Consultant within 48 hours and shall be empowered to order immediate repairs to the sediment and erosion control measures.

The qualified professional will also be responsible for observing the adequacy of the vegetation growth (trees, shrubs, groundcovers and turfgrasses) in newly graded areas and for ordering additional plantings in the event that the established plant materials do not adequately protect the ground surface from erosion.

2. Following Construction

Site maintenance activities on the property will include:

- Grounds maintenance, including mowing of lawns;
- Planting of trees, shrubs and groundcovers; pruning of trees and shrubs;
- Maintenance of stormwater management area;

Mr. William Fedyna will be responsible for the long-term operation and maintenance of the permanent stormwater management practices. The permanent stormwater management practices shall be maintained in accordance with the Maintenance Inspection Checklists provided in Appendix C.

VIII. CONCLUSION

This Stormwater Pollution Prevention Plan has been prepared to describe the project's pre and post-development stormwater management improvements and its sediment and erosion control improvements to be utilized during construction. The proposed permanent improvements and the interim improvements to be utilized during construction have been designed in accordance with the requirements of the:

- Chapter 294 "Stormwater Management and Erosion and Sediment Control" of the Village of Mamaroneck Zoning Code

The project employs a variety of practices to enhance stormwater quality and reduce peak rates of runoff associated with the proposed improvements. These measures include a rainwater cistern and a proposed subsurface detention system.

Based on the foregoing, it is our professional opinion that the proposed improvements will provide water quantity and quality enhancements which exceed the above mentioned requirements and are not anticipated to have any adverse impacts to the site or any surrounding areas.

APPENDIX A

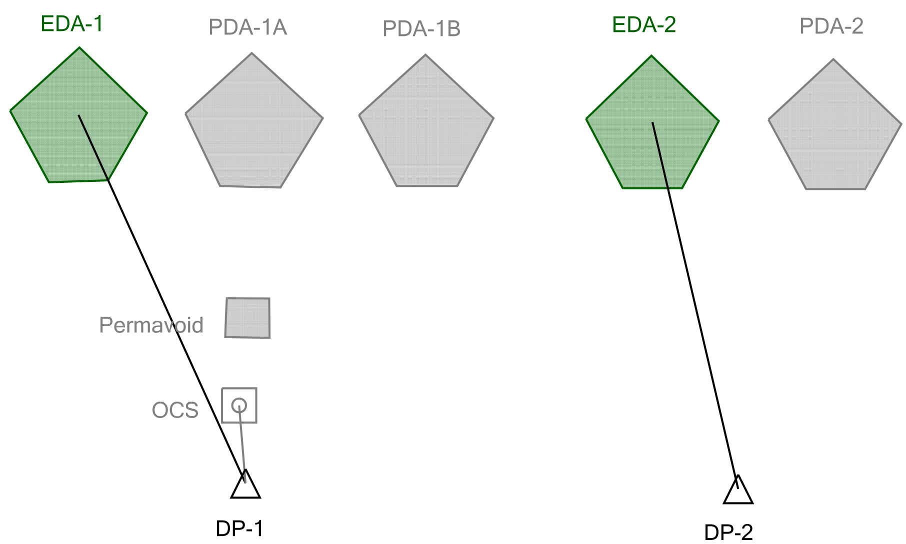
HYDROLOGIC CALCULATIONS

Project Summary

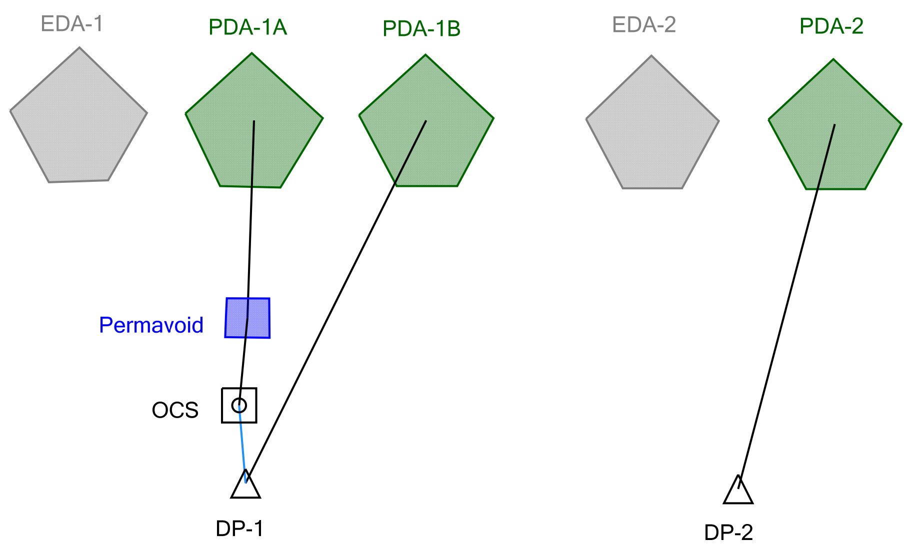
Title	Residential Development
Engineer	JMC Planning Engineering Landscape Architecture & Land Surveying, PLLC
Company	
Date	6/2/2020

Notes

Scenario: Pre-Development 1 Year



Scenario: Post-Development 1 Year



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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
EDA-1	Pre-Development 25 Year	25	8,294.000	12.150	2.11
EDA-2	Pre-Development 25 Year	25	2,512.000	12.100	0.69
PDA-1A	Post-Development 25 Year	25	5,569.000	12.100	1.50
PDA-2	Post-Development 25 Year	25	2,447.000	12.100	0.69
PDA-1B	Post-Development 25 Year	25	3,957.000	12.100	1.11

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
DL-1	Post-Development 25 Year	25	9,475.000	12.150	1.71
DL-1	Pre-Development 25 Year	25	8,294.000	12.150	2.11
DL-2	Post-Development 25 Year	25	2,447.000	12.100	0.69
DL-2	Pre-Development 25 Year	25	2,512.000	12.100	0.69

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft³)
Permavoid (IN)	Post-Development 25 Year	25	5,569.000	12.100	1.50	(N/A)	(N/A)
Permavoid (OUT)	Post-Development 25 Year	25	5,519.000	12.200	1.00	10.82	1,553.000

Subsection: Time-Depth Curve | Return Event: 25 years
Label: Time-Depth - 1 | Storm Event: 25 Year
Scenario: Post-Development 25 Year

Time-Depth Curve: 25 Year	
Label	25 Year
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.2
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.3	0.3	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.4
5.000	0.4	0.4	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.4	0.5
6.000	0.5	0.5	0.5	0.5	0.5
6.500	0.5	0.5	0.5	0.6	0.6
7.000	0.6	0.6	0.6	0.6	0.6
7.500	0.7	0.7	0.7	0.7	0.7
8.000	0.7	0.7	0.8	0.8	0.8
8.500	0.8	0.8	0.9	0.9	0.9
9.000	0.9	1.0	1.0	1.0	1.0
9.500	1.1	1.1	1.1	1.2	1.2
10.000	1.2	1.2	1.3	1.3	1.3
10.500	1.4	1.4	1.5	1.5	1.6
11.000	1.6	1.7	1.7	1.8	1.8
11.500	1.9	2.0	2.2	2.4	2.7
12.000	3.2	3.7	4.0	4.2	4.4
12.500	4.5	4.6	4.6	4.7	4.8
13.000	4.8	4.9	4.9	4.9	5.0
13.500	5.0	5.1	5.1	5.1	5.2
14.000	5.2	5.2	5.3	5.3	5.3
14.500	5.3	5.4	5.4	5.4	5.5
15.000	5.5	5.5	5.5	5.5	5.6
15.500	5.6	5.6	5.6	5.6	5.7
16.000	5.7	5.7	5.7	5.7	5.7
16.500	5.8	5.8	5.8	5.8	5.8
17.000	5.8	5.8	5.9	5.9	5.9

Subsection: Time-Depth Curve | Return Event: 25 years
Label: Time-Depth - 1 | Storm Event: 25 Year
Scenario: Post-Development 25 Year

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.500	5.9	5.9	5.9	5.9	5.9
18.000	5.9	6.0	6.0	6.0	6.0
18.500	6.0	6.0	6.0	6.0	6.0
19.000	6.0	6.1	6.1	6.1	6.1
19.500	6.1	6.1	6.1	6.1	6.1
20.000	6.1	6.1	6.2	6.2	6.2
20.500	6.2	6.2	6.2	6.2	6.2
21.000	6.2	6.2	6.2	6.2	6.2
21.500	6.3	6.3	6.3	6.3	6.3
22.000	6.3	6.3	6.3	6.3	6.3
22.500	6.3	6.3	6.3	6.3	6.3
23.000	6.4	6.4	6.4	6.4	6.4
23.500	6.4	6.4	6.4	6.4	6.4
24.000	6.4	(N/A)	(N/A)	(N/A)	(N/A)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	72.00 ft
Manning's n	0.400
Slope	0.056 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.11 ft/s
Segment Time of Concentration	0.176 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.176 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n (Lf / V) / 3600
Where:	R= Hydraulic radius Aq= Flow area, square feet Wp= Wetted perimeter, feet V= Velocity, ft/sec Sf= Slope, ft/ft n= Manning's n Tc= Time of concentration, hours Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	53.00 ft
Manning's n	0.400
Slope	0.094 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.13 ft/s
Segment Time of Concentration	0.112 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.112 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n (Lf / V) / 3600
Where:	R= Hydraulic radius Aq= Flow area, square feet Wp= Wetted perimeter, feet V= Velocity, ft/sec Sf= Slope, ft/ft n= Manning's n Tc= Time of concentration, hours Lf= Flow length, feet

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.083 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

==== User Defined

Tc =	Value entered by user
Where:	Tc= Time of concentration, hours

Subsection: Time of Concentration Calculations
Label: PDA-1B
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	65.00 ft
Manning's n	0.150
Slope	0.046 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.23 ft/s
Segment Time of Concentration	0.080 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

==== SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	42.00 ft
Manning's n	0.150
Slope	0.065 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.049 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

==== SCS Channel Flow

Tc =	R = Qa / Wp V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n (Lf / V) / 3600
Where:	R= Hydraulic radius Aq= Flow area, square feet Wp= Wetted perimeter, feet V= Velocity, ft/sec Sf= Slope, ft/ft n= Manning's n Tc= Time of concentration, hours Lf= Flow length, feet

Subsection: Runoff CN-Area
Label: EDA-1
Scenario: Pre-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil D	98.000	2,816.364	0.0	0.0	98.000
Pasture, grassland, or range - good - Soil D	80.000	7,220.639	0.0	0.0	80.000
Woods - good - Soil D	77.000	13,971.697	0.0	0.0	77.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	24,008.700	(N/A)	(N/A)	80.366

Subsection: Runoff CN-Area
Label: EDA-2
Scenario: Pre-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil D	98.000	332.527	0.0	0.0	98.000
Pasture, grassland, or range - good - Soil D	80.000	1,167.020	0.0	0.0	80.000
Woods - good - Soil D	77.000	6,150.852	0.0	0.0	77.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	7,650.400	(N/A)	(N/A)	78.370

Subsection: Runoff CN-Area
Label: PDA-1A
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil D	98.000	6,019.635	0.0	0.0	98.000
Pasture, grassland, or range - good - Soil D	80.000	7,298.105	0.0	0.0	80.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	13,317.740	(N/A)	(N/A)	88.136

Subsection: Runoff CN-Area
Label: PDA-1B
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Pasture, grassland, or range - good - Soil D	80.000	11,442.557	0.0	0.0	80.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	11,442.557	(N/A)	(N/A)	80.000

Subsection: Runoff CN-Area
Label: PDA-2
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Pasture, grassland, or range - good - Soil D	80.000	6,525.471	0.0	0.0	80.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil D	98.000	373.332	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	6,898.803	(N/A)	(N/A)	80.974

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.176 hours
Area (User Defined)	24,008.700 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
6.650	0.00	0.00	0.00	0.00	0.00
6.900	0.00	0.00	0.00	0.00	0.00
7.150	0.00	0.01	0.01	0.01	0.01
7.400	0.01	0.01	0.01	0.01	0.01
7.650	0.01	0.01	0.01	0.01	0.01
7.900	0.01	0.01	0.01	0.01	0.01
8.150	0.02	0.02	0.02	0.02	0.02
8.400	0.02	0.02	0.02	0.02	0.02
8.650	0.02	0.03	0.03	0.03	0.03
8.900	0.03	0.03	0.03	0.03	0.04
9.150	0.04	0.04	0.04	0.04	0.04
9.400	0.04	0.05	0.05	0.05	0.05
9.650	0.05	0.05	0.06	0.06	0.06
9.900	0.06	0.06	0.06	0.07	0.07
10.150	0.07	0.07	0.08	0.08	0.08
10.400	0.08	0.09	0.09	0.09	0.10
10.650	0.10	0.10	0.11	0.11	0.11
10.900	0.12	0.12	0.12	0.13	0.13
11.150	0.14	0.15	0.16	0.17	0.18
11.400	0.19	0.20	0.22	0.23	0.27
11.650	0.32	0.40	0.49	0.60	0.71
11.900	0.83	1.02	1.39	1.77	2.04
12.150	2.11	1.91	1.60	1.35	1.17
12.400	1.01	0.87	0.73	0.61	0.51
12.650	0.43	0.38	0.35	0.33	0.31
12.900	0.29	0.28	0.26	0.25	0.24
13.150	0.23	0.22	0.22	0.21	0.21
13.400	0.21	0.20	0.20	0.20	0.19
13.650	0.19	0.19	0.18	0.18	0.17
13.900	0.17	0.17	0.16	0.16	0.16
14.150	0.15	0.15	0.15	0.15	0.15
14.400	0.14	0.14	0.14	0.14	0.14
14.650	0.14	0.13	0.13	0.13	0.13
14.900	0.13	0.13	0.12	0.12	0.12

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 25 years
Label: EDA-1 Storm Event: 25 Year
Scenario: Pre-Development 25 Year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
15.150	0.12	0.12	0.11	0.11	0.11
15.400	0.11	0.11	0.11	0.10	0.10
15.650	0.10	0.10	0.10	0.10	0.09
15.900	0.09	0.09	0.09	0.09	0.08
16.150	0.08	0.08	0.08	0.08	0.08
16.400	0.08	0.08	0.08	0.08	0.08
16.650	0.07	0.07	0.07	0.07	0.07
16.900	0.07	0.07	0.07	0.07	0.07
17.150	0.07	0.07	0.07	0.06	0.06
17.400	0.06	0.06	0.06	0.06	0.06
17.650	0.06	0.06	0.06	0.06	0.06
17.900	0.06	0.05	0.05	0.05	0.05
18.150	0.05	0.05	0.05	0.05	0.05
18.400	0.05	0.05	0.05	0.05	0.05
18.650	0.05	0.05	0.05	0.05	0.05
18.900	0.05	0.05	0.05	0.05	0.05
19.150	0.05	0.05	0.05	0.05	0.05
19.400	0.05	0.05	0.04	0.04	0.04
19.650	0.04	0.04	0.04	0.04	0.04
19.900	0.04	0.04	0.04	0.04	0.04
20.150	0.04	0.04	0.04	0.04	0.04
20.400	0.04	0.04	0.04	0.04	0.04
20.650	0.04	0.04	0.04	0.04	0.04
20.900	0.04	0.04	0.04	0.04	0.04
21.150	0.04	0.04	0.04	0.04	0.04
21.400	0.04	0.04	0.04	0.04	0.04
21.650	0.04	0.04	0.04	0.04	0.04
21.900	0.04	0.04	0.04	0.04	0.03
22.150	0.03	0.03	0.03	0.03	0.03
22.400	0.03	0.03	0.03	0.03	0.03
22.650	0.03	0.03	0.03	0.03	0.03
22.900	0.03	0.03	0.03	0.03	0.03
23.150	0.03	0.03	0.03	0.03	0.03
23.400	0.03	0.03	0.03	0.03	0.03
23.650	0.03	0.03	0.03	0.03	0.03
23.900	0.03	0.03	0.03	(N/A)	(N/A)

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.112 hours
Area (User Defined)	7,650.400 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
7.400	0.00	0.00	0.00	0.00	0.00
7.650	0.00	0.00	0.00	0.00	0.00
7.900	0.00	0.00	0.00	0.00	0.00
8.150	0.00	0.00	0.00	0.00	0.00
8.400	0.00	0.00	0.01	0.01	0.01
8.650	0.01	0.01	0.01	0.01	0.01
8.900	0.01	0.01	0.01	0.01	0.01
9.150	0.01	0.01	0.01	0.01	0.01
9.400	0.01	0.01	0.01	0.01	0.01
9.650	0.01	0.01	0.02	0.02	0.02
9.900	0.02	0.02	0.02	0.02	0.02
10.150	0.02	0.02	0.02	0.02	0.02
10.400	0.02	0.03	0.03	0.03	0.03
10.650	0.03	0.03	0.03	0.03	0.03
10.900	0.03	0.04	0.04	0.04	0.04
11.150	0.04	0.05	0.05	0.05	0.06
11.400	0.06	0.06	0.07	0.08	0.09
11.650	0.11	0.14	0.17	0.21	0.24
11.900	0.29	0.38	0.55	0.64	0.69
12.150	0.64	0.49	0.40	0.35	0.31
12.400	0.26	0.22	0.18	0.15	0.13
12.650	0.11	0.10	0.10	0.09	0.09
12.900	0.09	0.08	0.08	0.07	0.07
13.150	0.07	0.07	0.07	0.07	0.06
13.400	0.06	0.06	0.06	0.06	0.06
13.650	0.06	0.06	0.06	0.05	0.05
13.900	0.05	0.05	0.05	0.05	0.05
14.150	0.05	0.05	0.05	0.05	0.04
14.400	0.04	0.04	0.04	0.04	0.04
14.650	0.04	0.04	0.04	0.04	0.04
14.900	0.04	0.04	0.04	0.04	0.04
15.150	0.04	0.04	0.04	0.03	0.03
15.400	0.03	0.03	0.03	0.03	0.03
15.650	0.03	0.03	0.03	0.03	0.03

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 25 years
Label: EDA-2 Storm Event: 25 Year
Scenario: Pre-Development 25 Year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
15.900	0.03	0.03	0.03	0.03	0.03
16.150	0.03	0.03	0.03	0.02	0.02
16.400	0.02	0.02	0.02	0.02	0.02
16.650	0.02	0.02	0.02	0.02	0.02
16.900	0.02	0.02	0.02	0.02	0.02
17.150	0.02	0.02	0.02	0.02	0.02
17.400	0.02	0.02	0.02	0.02	0.02
17.650	0.02	0.02	0.02	0.02	0.02
17.900	0.02	0.02	0.02	0.02	0.02
18.150	0.02	0.02	0.02	0.02	0.02
18.400	0.02	0.02	0.02	0.02	0.02
18.650	0.02	0.02	0.02	0.01	0.01
18.900	0.01	0.01	0.01	0.01	0.01
19.150	0.01	0.01	0.01	0.01	0.01
19.400	0.01	0.01	0.01	0.01	0.01
19.650	0.01	0.01	0.01	0.01	0.01
19.900	0.01	0.01	0.01	0.01	0.01
20.150	0.01	0.01	0.01	0.01	0.01
20.400	0.01	0.01	0.01	0.01	0.01
20.650	0.01	0.01	0.01	0.01	0.01
20.900	0.01	0.01	0.01	0.01	0.01
21.150	0.01	0.01	0.01	0.01	0.01
21.400	0.01	0.01	0.01	0.01	0.01
21.650	0.01	0.01	0.01	0.01	0.01
21.900	0.01	0.01	0.01	0.01	0.01
22.150	0.01	0.01	0.01	0.01	0.01
22.400	0.01	0.01	0.01	0.01	0.01
22.650	0.01	0.01	0.01	0.01	0.01
22.900	0.01	0.01	0.01	0.01	0.01
23.150	0.01	0.01	0.01	0.01	0.01
23.400	0.01	0.01	0.01	0.01	0.01
23.650	0.01	0.01	0.01	0.01	0.01
23.900	0.01	0.01	0.01	(N/A)	(N/A)

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	13,317.740 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
4.350	0.00	0.00	0.00	0.00	0.00
4.600	0.00	0.00	0.00	0.00	0.00
4.850	0.00	0.00	0.00	0.00	0.00
5.100	0.00	0.00	0.00	0.00	0.00
5.350	0.00	0.00	0.00	0.01	0.01
5.600	0.01	0.01	0.01	0.01	0.01
5.850	0.01	0.01	0.01	0.01	0.01
6.100	0.01	0.01	0.01	0.01	0.01
6.350	0.01	0.01	0.01	0.01	0.01
6.600	0.01	0.01	0.01	0.01	0.01
6.850	0.01	0.01	0.01	0.01	0.01
7.100	0.01	0.01	0.01	0.02	0.02
7.350	0.02	0.02	0.02	0.02	0.02
7.600	0.02	0.02	0.02	0.02	0.02
7.850	0.02	0.02	0.02	0.02	0.02
8.100	0.02	0.02	0.02	0.03	0.03
8.350	0.03	0.03	0.03	0.03	0.03
8.600	0.03	0.03	0.03	0.03	0.04
8.850	0.04	0.04	0.04	0.04	0.04
9.100	0.04	0.04	0.04	0.04	0.05
9.350	0.05	0.05	0.05	0.05	0.05
9.600	0.05	0.05	0.05	0.06	0.06
9.850	0.06	0.06	0.06	0.06	0.06
10.100	0.06	0.07	0.07	0.07	0.07
10.350	0.07	0.08	0.08	0.08	0.08
10.600	0.09	0.09	0.09	0.09	0.09
10.850	0.10	0.10	0.10	0.10	0.11
11.100	0.11	0.12	0.13	0.14	0.14
11.350	0.15	0.16	0.17	0.18	0.21
11.600	0.25	0.31	0.38	0.46	0.54
11.850	0.62	0.70	0.99	1.35	1.46
12.100	1.50	1.24	0.89	0.75	0.65
12.350	0.57	0.49	0.41	0.33	0.27
12.600	0.23	0.21	0.20	0.19	0.18

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
12.850	0.17	0.16	0.16	0.15	0.14
13.100	0.14	0.13	0.13	0.13	0.13
13.350	0.12	0.12	0.12	0.12	0.12
13.600	0.11	0.11	0.11	0.11	0.10
13.850	0.10	0.10	0.10	0.10	0.09
14.100	0.09	0.09	0.09	0.09	0.09
14.350	0.09	0.09	0.08	0.08	0.08
14.600	0.08	0.08	0.08	0.08	0.08
14.850	0.08	0.07	0.07	0.07	0.07
15.100	0.07	0.07	0.07	0.07	0.07
15.350	0.06	0.06	0.06	0.06	0.06
15.600	0.06	0.06	0.06	0.06	0.06
15.850	0.05	0.05	0.05	0.05	0.05
16.100	0.05	0.05	0.05	0.05	0.05
16.350	0.05	0.05	0.05	0.05	0.04
16.600	0.04	0.04	0.04	0.04	0.04
16.850	0.04	0.04	0.04	0.04	0.04
17.100	0.04	0.04	0.04	0.04	0.04
17.350	0.04	0.04	0.04	0.04	0.04
17.600	0.03	0.03	0.03	0.03	0.03
17.850	0.03	0.03	0.03	0.03	0.03
18.100	0.03	0.03	0.03	0.03	0.03
18.350	0.03	0.03	0.03	0.03	0.03
18.600	0.03	0.03	0.03	0.03	0.03
18.850	0.03	0.03	0.03	0.03	0.03
19.100	0.03	0.03	0.03	0.03	0.03
19.350	0.03	0.03	0.03	0.03	0.03
19.600	0.03	0.03	0.03	0.03	0.03
19.850	0.03	0.03	0.03	0.02	0.02
20.100	0.02	0.02	0.02	0.02	0.02
20.350	0.02	0.02	0.02	0.02	0.02
20.600	0.02	0.02	0.02	0.02	0.02
20.850	0.02	0.02	0.02	0.02	0.02
21.100	0.02	0.02	0.02	0.02	0.02
21.350	0.02	0.02	0.02	0.02	0.02
21.600	0.02	0.02	0.02	0.02	0.02
21.850	0.02	0.02	0.02	0.02	0.02
22.100	0.02	0.02	0.02	0.02	0.02
22.350	0.02	0.02	0.02	0.02	0.02
22.600	0.02	0.02	0.02	0.02	0.02
22.850	0.02	0.02	0.02	0.02	0.02
23.100	0.02	0.02	0.02	0.02	0.02
23.350	0.02	0.02	0.02	0.02	0.02

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
23.600	0.02	0.02	0.02	0.02	0.02
23.850	0.02	0.02	0.02	0.02	(N/A)

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	11,442.557 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
6.750	0.00	0.00	0.00	0.00	0.00
7.000	0.00	0.00	0.00	0.00	0.00
7.250	0.00	0.00	0.00	0.00	0.00
7.500	0.00	0.00	0.00	0.00	0.01
7.750	0.01	0.01	0.01	0.01	0.01
8.000	0.01	0.01	0.01	0.01	0.01
8.250	0.01	0.01	0.01	0.01	0.01
8.500	0.01	0.01	0.01	0.01	0.01
8.750	0.01	0.01	0.01	0.02	0.02
9.000	0.02	0.02	0.02	0.02	0.02
9.250	0.02	0.02	0.02	0.02	0.02
9.500	0.02	0.02	0.03	0.03	0.03
9.750	0.03	0.03	0.03	0.03	0.03
10.000	0.03	0.03	0.03	0.04	0.04
10.250	0.04	0.04	0.04	0.04	0.04
10.500	0.05	0.05	0.05	0.05	0.05
10.750	0.05	0.05	0.06	0.06	0.06
11.000	0.06	0.06	0.07	0.07	0.08
11.250	0.08	0.09	0.09	0.10	0.11
11.500	0.11	0.13	0.16	0.20	0.25
11.750	0.30	0.36	0.42	0.48	0.70
12.000	0.97	1.07	1.11	0.93	0.68
12.250	0.57	0.50	0.44	0.38	0.32
12.500	0.25	0.21	0.18	0.16	0.16
12.750	0.15	0.14	0.14	0.13	0.12
13.000	0.12	0.11	0.11	0.10	0.10
13.250	0.10	0.10	0.10	0.10	0.09
13.500	0.09	0.09	0.09	0.09	0.09
13.750	0.08	0.08	0.08	0.08	0.08
14.000	0.08	0.07	0.07	0.07	0.07
14.250	0.07	0.07	0.07	0.07	0.07
14.500	0.07	0.07	0.06	0.06	0.06
14.750	0.06	0.06	0.06	0.06	0.06
15.000	0.06	0.06	0.06	0.06	0.05

Subsection: Unit Hydrograph (Hydrograph Table)
Label: PDA-1B
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
15.250	0.05	0.05	0.05	0.05	0.05
15.500	0.05	0.05	0.05	0.05	0.05
15.750	0.04	0.04	0.04	0.04	0.04
16.000	0.04	0.04	0.04	0.04	0.04
16.250	0.04	0.04	0.04	0.04	0.04
16.500	0.04	0.04	0.04	0.04	0.03
16.750	0.03	0.03	0.03	0.03	0.03
17.000	0.03	0.03	0.03	0.03	0.03
17.250	0.03	0.03	0.03	0.03	0.03
17.500	0.03	0.03	0.03	0.03	0.03
17.750	0.03	0.03	0.03	0.03	0.03
18.000	0.02	0.02	0.02	0.02	0.02
18.250	0.02	0.02	0.02	0.02	0.02
18.500	0.02	0.02	0.02	0.02	0.02
18.750	0.02	0.02	0.02	0.02	0.02
19.000	0.02	0.02	0.02	0.02	0.02
19.250	0.02	0.02	0.02	0.02	0.02
19.500	0.02	0.02	0.02	0.02	0.02
19.750	0.02	0.02	0.02	0.02	0.02
20.000	0.02	0.02	0.02	0.02	0.02
20.250	0.02	0.02	0.02	0.02	0.02
20.500	0.02	0.02	0.02	0.02	0.02
20.750	0.02	0.02	0.02	0.02	0.02
21.000	0.02	0.02	0.02	0.02	0.02
21.250	0.02	0.02	0.02	0.02	0.02
21.500	0.02	0.02	0.02	0.02	0.02
21.750	0.02	0.02	0.02	0.02	0.02
22.000	0.02	0.02	0.02	0.02	0.02
22.250	0.02	0.02	0.02	0.02	0.02
22.500	0.02	0.02	0.02	0.02	0.02
22.750	0.02	0.02	0.02	0.02	0.02
23.000	0.02	0.01	0.01	0.01	0.01
23.250	0.01	0.01	0.01	0.01	0.01
23.500	0.01	0.01	0.01	0.01	0.01
23.750	0.01	0.01	0.01	0.01	0.01
24.000	0.01	(N/A)	(N/A)	(N/A)	(N/A)

Storm Event	25 Year
Return Event	25 years
Duration	24.000 hours
Depth	6.4 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	6,898.803 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
6.700	0.00	0.00	0.00	0.00	0.00
6.950	0.00	0.00	0.00	0.00	0.00
7.200	0.00	0.00	0.00	0.00	0.00
7.450	0.00	0.00	0.00	0.00	0.00
7.700	0.00	0.00	0.00	0.00	0.00
7.950	0.00	0.00	0.01	0.01	0.01
8.200	0.01	0.01	0.01	0.01	0.01
8.450	0.01	0.01	0.01	0.01	0.01
8.700	0.01	0.01	0.01	0.01	0.01
8.950	0.01	0.01	0.01	0.01	0.01
9.200	0.01	0.01	0.01	0.01	0.01
9.450	0.02	0.02	0.02	0.02	0.02
9.700	0.02	0.02	0.02	0.02	0.02
9.950	0.02	0.02	0.02	0.02	0.02
10.200	0.02	0.02	0.03	0.03	0.03
10.450	0.03	0.03	0.03	0.03	0.03
10.700	0.03	0.03	0.03	0.04	0.04
10.950	0.04	0.04	0.04	0.04	0.05
11.200	0.05	0.05	0.06	0.06	0.06
11.450	0.07	0.07	0.08	0.10	0.13
11.700	0.16	0.19	0.23	0.26	0.30
11.950	0.43	0.60	0.66	0.69	0.57
12.200	0.41	0.35	0.31	0.27	0.23
12.450	0.19	0.16	0.13	0.11	0.10
12.700	0.10	0.09	0.09	0.08	0.08
12.950	0.07	0.07	0.07	0.07	0.06
13.200	0.06	0.06	0.06	0.06	0.06
13.450	0.06	0.06	0.06	0.05	0.05
13.700	0.05	0.05	0.05	0.05	0.05
13.950	0.05	0.05	0.05	0.04	0.04
14.200	0.04	0.04	0.04	0.04	0.04
14.450	0.04	0.04	0.04	0.04	0.04
14.700	0.04	0.04	0.04	0.04	0.04
14.950	0.04	0.04	0.03	0.03	0.03

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
15.200	0.03	0.03	0.03	0.03	0.03
15.450	0.03	0.03	0.03	0.03	0.03
15.700	0.03	0.03	0.03	0.03	0.03
15.950	0.03	0.02	0.02	0.02	0.02
16.200	0.02	0.02	0.02	0.02	0.02
16.450	0.02	0.02	0.02	0.02	0.02
16.700	0.02	0.02	0.02	0.02	0.02
16.950	0.02	0.02	0.02	0.02	0.02
17.200	0.02	0.02	0.02	0.02	0.02
17.450	0.02	0.02	0.02	0.02	0.02
17.700	0.02	0.02	0.02	0.02	0.02
17.950	0.02	0.02	0.02	0.01	0.01
18.200	0.01	0.01	0.01	0.01	0.01
18.450	0.01	0.01	0.01	0.01	0.01
18.700	0.01	0.01	0.01	0.01	0.01
18.950	0.01	0.01	0.01	0.01	0.01
19.200	0.01	0.01	0.01	0.01	0.01
19.450	0.01	0.01	0.01	0.01	0.01
19.700	0.01	0.01	0.01	0.01	0.01
19.950	0.01	0.01	0.01	0.01	0.01
20.200	0.01	0.01	0.01	0.01	0.01
20.450	0.01	0.01	0.01	0.01	0.01
20.700	0.01	0.01	0.01	0.01	0.01
20.950	0.01	0.01	0.01	0.01	0.01
21.200	0.01	0.01	0.01	0.01	0.01
21.450	0.01	0.01	0.01	0.01	0.01
21.700	0.01	0.01	0.01	0.01	0.01
21.950	0.01	0.01	0.01	0.01	0.01
22.200	0.01	0.01	0.01	0.01	0.01
22.450	0.01	0.01	0.01	0.01	0.01
22.700	0.01	0.01	0.01	0.01	0.01
22.950	0.01	0.01	0.01	0.01	0.01
23.200	0.01	0.01	0.01	0.01	0.01
23.450	0.01	0.01	0.01	0.01	0.01
23.700	0.01	0.01	0.01	0.01	0.01
23.950	0.01	0.01	(N/A)	(N/A)	(N/A)

Summary for Hydrograph Addition at 'DL-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1B Permavoid

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	PDA-1B	3,956.843	12.100	1.11
Flow (From)		5,518.563	12.200	1.00
Flow (In)	DL-1	9,475.406	12.150	1.71

Subsection: Addition Summary
Label: DL-1
Scenario: Pre-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Summary for Hydrograph Addition at 'DL-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	8,294.216	12.150	2.11
Flow (In)	DL-1	8,294.216	12.150	2.11

Subsection: Addition Summary
Label: DL-2
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Summary for Hydrograph Addition at 'DL-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-2	2,446.547	12.100	0.69
Flow (In)	DL-2	2,446.547	12.100	0.69

Subsection: Addition Summary
Label: DL-2
Scenario: Pre-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Summary for Hydrograph Addition at 'DL-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-2

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	EDA-2	2,511.605	12.100	0.69
Flow (In)	DL-2	2,511.605	12.100	0.69

Subsection: Elevation-Area Volume Curve | Return Event: 25 years
Label: Permavoid | Storm Event: 25 Year
Scenario: Post-Development 25 Year

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ft³)	Volume (Total) (ft³)
8.90	0.0	849.770	0.000	0.000	0.000
10.87	0.0	849.770	2,549.310	1,674.000	1,590.000

Volume Complete Filled With Material
(Adjust Volumes for Voids)

Void Space = 95.0 %

Elevation (Headwater) (ft)	Volume (Total) (ft³)	Volume (Adjusted) (ft³)
8.90	0.000	0.000
10.87	1,674.047	1,590.345

Requested Pond Water Surface Elevations	
Minimum (Headwater)	8.90 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	10.87 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	TW	8.90	10.87
Rectangular Weir	Weir - 1	Forward	TW	10.70	10.87
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	8.90 ft
Orifice Diameter	3.0 in
Orifice Coefficient	0.600

Structure ID: Weir - 1 Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	10.70 ft
Weir Length	4.00 ft
Weir Coefficient	3.33 (ft^0.5)/s

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Subsection: Composite Rating Curve
Label: OCS
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
8.90	0.00	(N/A)	0.00
9.40	0.14	(N/A)	0.00
9.90	0.22	(N/A)	0.00
10.40	0.28	(N/A)	0.00
10.70	0.31	(N/A)	0.00
10.87	1.25	(N/A)	0.00

Contributing Structures
None Contributing
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1 + Weir - 1
Orifice - 1 + Weir - 1

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	8.90 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
8.90	0.00	0.000	849.770	0.00	0.00	0.00
9.40	0.14	403.641	849.770	0.00	0.14	4.63
9.90	0.22	807.282	849.770	0.00	0.22	9.19
10.40	0.28	1,210.922	849.770	0.00	0.28	13.73
10.70	0.31	1,453.107	849.770	0.00	0.31	16.45
10.87	1.25	1,590.345	849.770	0.00	1.25	18.93

Subsection: Pond Routed Hydrograph (total out)
Label: Permavoid (OUT)
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

Peak Discharge	1.00 ft³/s
Time to Peak	12.200 hours
Hydrograph Volume	5,517.483 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
4.850	0.00	0.00	0.00	0.00	0.00
5.100	0.00	0.00	0.00	0.00	0.00
5.350	0.00	0.00	0.00	0.00	0.00
5.600	0.00	0.00	0.00	0.00	0.00
5.850	0.00	0.00	0.00	0.00	0.00
6.100	0.00	0.00	0.01	0.01	0.01
6.350	0.01	0.01	0.01	0.01	0.01
6.600	0.01	0.01	0.01	0.01	0.01
6.850	0.01	0.01	0.01	0.01	0.01
7.100	0.01	0.01	0.01	0.01	0.01
7.350	0.01	0.01	0.01	0.01	0.01
7.600	0.01	0.01	0.01	0.01	0.01
7.850	0.01	0.01	0.02	0.02	0.02
8.100	0.02	0.02	0.02	0.02	0.02
8.350	0.02	0.02	0.02	0.02	0.02
8.600	0.02	0.02	0.02	0.02	0.02
8.850	0.03	0.03	0.03	0.03	0.03
9.100	0.03	0.03	0.03	0.03	0.03
9.350	0.03	0.03	0.03	0.04	0.04
9.600	0.04	0.04	0.04	0.04	0.04
9.850	0.04	0.04	0.04	0.05	0.05
10.100	0.05	0.05	0.05	0.05	0.05
10.350	0.05	0.06	0.06	0.06	0.06
10.600	0.06	0.06	0.06	0.07	0.07
10.850	0.07	0.07	0.07	0.07	0.08
11.100	0.08	0.08	0.08	0.09	0.09
11.350	0.09	0.10	0.10	0.11	0.11
11.600	0.12	0.13	0.14	0.15	0.16
11.850	0.18	0.19	0.22	0.24	0.27
12.100	0.30	0.78	1.00	0.86	0.74
12.350	0.64	0.56	0.47	0.39	0.32
12.600	0.30	0.30	0.30	0.30	0.30
12.850	0.29	0.29	0.29	0.29	0.28
13.100	0.28	0.28	0.27	0.27	0.27
13.350	0.26	0.26	0.26	0.25	0.25
13.600	0.25	0.24	0.24	0.24	0.23
13.850	0.23	0.23	0.22	0.22	0.22
14.100	0.21	0.21	0.20	0.20	0.20
14.350	0.19	0.19	0.18	0.18	0.18

Subsection: Pond Routed Hydrograph (total out)
Label: Permavoid (OUT)
Scenario: Post-Development 25 Year

Return Event: 25 years
Storm Event: 25 Year

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
14.600	0.17	0.17	0.17	0.17	0.16
14.850	0.16	0.16	0.15	0.15	0.15
15.100	0.15	0.14	0.14	0.13	0.13
15.350	0.13	0.12	0.12	0.11	0.11
15.600	0.11	0.10	0.10	0.10	0.10
15.850	0.09	0.09	0.09	0.09	0.08
16.100	0.08	0.08	0.08	0.08	0.07
16.350	0.07	0.07	0.07	0.07	0.07
16.600	0.07	0.06	0.06	0.06	0.06
16.850	0.06	0.06	0.06	0.06	0.05
17.100	0.05	0.05	0.05	0.05	0.05
17.350	0.05	0.05	0.05	0.05	0.05
17.600	0.05	0.05	0.04	0.04	0.04
17.850	0.04	0.04	0.04	0.04	0.04
18.100	0.04	0.04	0.04	0.04	0.04
18.350	0.04	0.04	0.04	0.04	0.04
18.600	0.03	0.03	0.03	0.03	0.03
18.850	0.03	0.03	0.03	0.03	0.03
19.100	0.03	0.03	0.03	0.03	0.03
19.350	0.03	0.03	0.03	0.03	0.03
19.600	0.03	0.03	0.03	0.03	0.03
19.850	0.03	0.03	0.03	0.03	0.03
20.100	0.03	0.03	0.03	0.03	0.03
20.350	0.03	0.03	0.03	0.03	0.03
20.600	0.03	0.03	0.03	0.03	0.03
20.850	0.03	0.03	0.02	0.02	0.02
21.100	0.02	0.02	0.02	0.02	0.02
21.350	0.02	0.02	0.02	0.02	0.02
21.600	0.02	0.02	0.02	0.02	0.02
21.850	0.02	0.02	0.02	0.02	0.02
22.100	0.02	0.02	0.02	0.02	0.02
22.350	0.02	0.02	0.02	0.02	0.02
22.600	0.02	0.02	0.02	0.02	0.02
22.850	0.02	0.02	0.02	0.02	0.02
23.100	0.02	0.02	0.02	0.02	0.02
23.350	0.02	0.02	0.02	0.02	0.02
23.600	0.02	0.02	0.02	0.02	0.02
23.850	0.02	0.02	0.02	0.02	(N/A)

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APPENDIX B

NYSDEC STORMWATER SIZING CALCULATIONS

CISTERN WORKSHEET

JMC Project:	**18100**
Design Point:	**DL-1**

RAINWATER HARVESTING TANK CALCULATIONS

Drainage Area: PDA-1A

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.14	Ac
Area	A	0.31	Ac
Percent Impervious	%I	45.20	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.46	CF
TOTAL VOLUME Required [WQ_V = (P x R_V x A) / 12]	WQ_V	**760**	CF

Minimum Cistern Size			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	760	CF
Conversion Factor (7.5 gals/cf)		7.50	Gals/CF
Required Cistern Volume Vol = (WQ_V x 7.5)	Vol	**5,703**	Gals

Proposed Cistern Size			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Calculated Cistern area (Length x Width)	LxW	96	SF
Cistern Height	H	8	FT
Provided Cistern Volume (Length x Width x Height)	PVol	768	CF
Provided Cistern Volume in Gallons [Pvol = LxWxHx7.5]	PVol	**5760**	Gal

Runoff Reduction		
DESCRIPTION	*VALUE*	*UNITS*
Is Proposed Vol > Required Vol ?	**YES**	
RRv Provided per Cistern	768	CF
RRv Provided per Cistern in Gallons	5,760	Gal

Date Printed: 6/2/2020

APPENDIX C

TEMPORARY EROSION AND SEDIMENT CONTROL & PERMANENT STORMWATER PRACTICE INSPECTION CHECKLIST

Temporary Erosion and Sediment Control Inspection and Maintenance Checklist

Erosion and Sediment Control Measure	Inspection/Maintenance Intervals	Inspection/Maintenance Requirements
Stabilized Construction Entrance	Daily	• Periodic top dressing with additional aggregate as required • Clean sediment in public right-of-ways immediately
Silt Fence	Weekly + After Each Rain	• Remove & redistribute sediment when bulges develop in the silt fence.
Inlet Protection	Weekly + After Each Rain	• Remove sediment as necessary and replace filter fabric, crushed stone etc. • Any broken and damaged components should be replaced. • Check all materials for proper anchorage and secure as necessary.

Permanent Stormwater Management Practice Inspection and Maintenance Checklist

Stormwater Management Practice	Inspection/Maintenance Intervals	Inspection/Maintenance Requirements
Rip-Rap Apron/Energy Dissipator and Check Dams	Annually + After Major Storms	• Check for evidence of flows going around the structure. • Check for evidence at downstream toe and repair as needed. • Clean sediment and install additional aggregate as necessary.
Drain Inlets	Monthly	• Check for blockage and/or erosion at top of each inlet. Repair/remove as necessary. • Check for sediment and debris collected within sumps and clean out as necessary.
Subsurface Stormwater Management Detention Facility	Annually + After Major Storms	• Check level of sediment and debris accumulated within the system. • Check structural integrity of the system pipes, structures, etc. for cracking, bulging or deterioration. Repair/remove as necessary. • Confirm all inlets and outlet structures/pipes are operating properly.

The owner/operator responsible for inspection and maintenance as outlined above:

Mr. William Fedyna
219 W 81st Street, Apt. 9D
New York, NY 10024
Phone: (646) 321-2081

APPENDIX D

CONTRACTOR'S CERTIFICATION

Site Planning
Civil Engineering
Landscape Architecture
Land Surveying
Transportation Engineering
Environmental Studies
Entitlements
Construction Services
3D Visualization
Laser Scanning

JMC Project 18100
Residential Development
1165 Greacen Point Road
Village of Mamaroneck, NY

CONTRACTOR'S CERTIFICATION

"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 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"

Company Name: ____

Address: ____

Telephone Number: ____

Name and Title: ____

Signature: _______________________________________Date: _______________

Permit Identification No.:____

Name and Title of Trained Contractor:_____________________________________

Elements of the SWPPP Contractor is responsible for:__________________________

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APPENDIX E

DRAWINGS