

STORMWATER POLLUTION PREVENTION PLAN

ENGINEER'S REPORT

for

Rinaldi Property

10 Lot Subdivision

39 Stormytown Road

Town of Ossining

Westchester, NY

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Last Revised: July 27, 2019

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Introduction

This report has been prepared in accordance with Chapter 168 of the Town of Ossining for approval of a 10 Lot single family residential subdivision. The construction activity includes the construction of a new cul-de-sac approximately 733 feet long with access along Stormytown Road, approximately 550 linear feet west of the intersection of Reeback Drive. The new road generally follows the alignment of an existing sanitary sewer main previously installed and is adjacent to an open channel drainage swale.

The 6.68-acre site consists of one existing residence with 3 accessory structures. The balance of the site is undeveloped and encumbered partially by steep slopes, a watercourse, and a 10 feet wide utility easement for the sanitary sewer main.

This report is prepared in conjunction with the proposed improvements shown on Plans prepared ARQ. HT Design Group, hereinafter called the ***Plans***.

I. Site Description

Existing Improvement

Existing improvements on the property include a 2 story single family residence, macadam driveways, and 3 accessory wood framed structures.

Existing Tress

The site plan has been designed to protect as many healthy mature trees as possible. Trees within the limit of disturbance are shown to be removed. Refer to the plans for location of all existing trees on the property.

Soils

Provided herein is a copy of the USDA NRCS Soil Survey report prepared for this property. The soil types have been identified to be mostly ChE Charlton Loam 25-35 percent slopes (25% of the site area), CuD Chatfield-Hollis-Rock outcrop complex 15-35 percent slopes (23% of the site area), LcB Leicester Loam 3 to 8 percent slopes (18% of the site area). CrC Charlton-Chatfield complex and PnC Paxton Fine sandy loam make up the balance of the site soils.

Deep hole excavation tests were excavated to observe for the presence of bedrock, water or any confining layer. The following table is a summary of the tests:

Deep test performed on March 29, 2019

Test Pit #1 - LOT 1	
Depth 72"	Surface Elevation ±304.0
0-6"	Topsoil
6"-48"	Brown Sandy Loam
36"-72"	Gray Silty Loam
	Rock @ 72" - No Water

Test Pit #2 – Lot 5	
Depth 80"	Surface Elevation ±283.0
0-6"	Topsoil
6"-48"	Brown Sandy Loam
36"-80"	Gray Silty Loam
	Rock @ 80" - No Water

Test Pit #3 -LOT 2	
Depth 80"	Surface Elevation \pm 312.0
0-6"	Topsoil
6"-48"	Brown Sandy Loam
36"-80"	Gray Silty Loam
	Rock @ 80"

Test Pit #5 - LOT 5	
Depth 84"	Surface Elevation \pm 302.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	No Water

Test Pit #7 - LOT 6	
Depth 84"	Surface Elevation \pm 312.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	No Water

Test Pit #9 - LOT 5 (roadway drainage)	
Depth 84"	Surface Elevation \pm 294.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	No Water

Test Pit #11 - LOT 9	
Depth 84"	Surface Elevation \pm 318.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	Water @ 36" seeping-in from the sides

Test Pit #4 -LOT 4	
Depth 84"	Filled in Area, Elevation \pm 310.0
0-4"	Topsoil
4"-48"	Dark Brown Sandy Loam with some concrete building remains
48" -84"	Dark Sandy Loam, some stones - No Water

Test Pit #6 - LOT 4	
Depth 84"	Surface Elevation \pm 314.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	No Water

Test Pit #8 - LOT 8	
Depth 84"	Surface Elevation \pm 310.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	No Water

Test Pit #10 - CUL-DE-SAC	
Depth 84"	Surface Elevation \pm 306.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	No Water

Test Pit #12 - LOT 10	
Depth 84"	Surface Elevation \pm 302.0
0-6"	Topsoil
6" - 48"	Brown Sandy Loam
48"-84"	Brown Loam with Grey Silty Loam
	Water @ 24" seeping-in from the sides

The drainage design for the individual lots and the roadway were prepared utilizing the soil profiles discovered during the test excavations. Water was only encountered within the deep tests holes on proposed lots 9 and 10 in the southerly most portion of the site. Runoff from these lots will be collected and treated within the infiltration system in the proposed cul-de-sac. Rock was only encountered in test pit #3 at 80", however, a minimum of 36" will be maintained between the confining layer and infiltration surface. Based on the on-site soils, a conservative rate of 30 min/in was used for the design of the onsite infiltration systems.

Flood Plain

The project area is outside the 100- and 500-year flood plain as mapped by FEMA.

Site Drainage Characteristics

The site is located in the Oliver Pond Basin as shown on Westchester County GIS and is divided into 3 drainage areas that discharge to one Design Point, DP-1. DA1 is approximately 2.31 acres and drains toward to the northerly property line to the existing water course. DA2 is approximately 1.40 acres and drains toward Stormtown Road to the existing drainage culvert in the northwest corner of the parcel. DA3 is approximately 3.81 acres and includes the southerly portion of the parcel which drains from west to east, also toward the adjacent watercourse. No changes to the existing drainage pattern are proposed. The watercourse discharges to the south into Kill Brook which is a tributary to the Hudson River. Upon review of the EPA's Stormwater Discharge Mapping Tool, the receiving waterbody is listed as unidentified. It is anticipated that the activities proposed with this application will not have a negative impact to the receiving water body.

Proposed Improvements

The proposed application includes the construction of a new 773 linear feet cul-de-sac and 9 new single family dwellings. Proposed improvements are shown on plans prepared by ARQ. HT Design Group.

II. Stormwater Management Methodology and Design

A. Methodology

The on-site stormwater management design was analyzed using HydroCAD® stormwater modeling software 10.00, which models Type III 24 hour stormwater flows using those methods contained in "Urban Hydrology for Small Watersheds Technical Release No. 55," prepared by the United States Department of Agriculture Soil Conservation Service.

This report includes a drainage design in accordance with the 2015 Stormwater Management Design manual. The total required WQv is calculated using 90% rainfall event and runoff from the HydroCAD 1-year storm event and will be treated within the onsite infiltration system which consists of a trench drain, Cultec 330 XLHD infiltrators, StormTrap Structures and a hydrodynamic separator. The entire proposed storage volume is to be infiltrated to meet RRV and CPv.

B. Drainage Design

The drainage improvements have been designed to capture the stormwater runoff from the additional impervious surfaces on the site via roof leaders, drainage inlets and swales.

A drainage swale has been specified on the uphill side of the cul-de-sac to capture offsite runoff which is directed to a level spreader discharge to the existing stream. All runoff from the proposed homes and new driveways will be directed individual infiltration systems proposed on each lot.

Runoff from the proposed impervious surfaces is directed to the proposed infiltration trench and underground infiltration system to address water quantity of the additional storm water runoff. The following table summarizes the existing and proposed cover types.

Summary of Cover Types

Cover Type	Pre Development Area (sf)	Post Development Area (sf)	Change in Area (sf)
Impervious	21,066	54,071	+33,005
Pervious	311,225	278,220	-33,005

C. Proposed Drainage Mitigation System

The stormwater management plan has been implemented to control the peak rate of runoff for the development, as well as provide water quality improvement, in accordance with NYSDEC standards

Cul-de-sac:

A proposed high point is designed in the new cul-de-sac at station 2+00. Runoff from the first 200 feet of roadway will drain towards a proposed catch basin prior to the intersection of Stormytown Road. The water quality volume from this portion of the roadway will be treated by a proposed bio swale with an overflow to the adjacent stream culvert. The remaining runoff from the proposed cul-de-sac will be collected through a series of inlets directed to a hydrodynamic swirl separator prior to entering a proposed Stormtrap infiltration system to be located within a drainage easement in Lot 5 to provide water quality and quantify runoff mitigation.

Individual Lots:

Runoff from roofs will be directed to Cultec 330 XL infiltrators at each of the proposed dwelling units to treat the runoff of the roof as well as the driveways.

Detailed flow control calculations (routings) are also included herewith.

Throughout the construction process, strict adherence to **Plan** and Specifications will be maintained to minimize sediment and pollutants from discharging off site. All areas within the subject site (for the pre and post conditions) were analyzed to a single design point at the north east corner of the property along South Bedford Road.

Summary of Stormwater Runoff Rates

Storm Event	Rainfall Depth	Pre Development Rate (cfs)	Post Development Rate (cfs)	Pre Runoff Volume (cf)	Post Runoff Volume (cf)
1 Year	2.83"	2.95	4.14	14,971	19,975
2 Year	3.42"	5.57	6.14	24,246	28,589
10 year	5.09"	14.47	12.22	55,636	54,967
25 Year	6.40"	22.51	17.29	84,206	77,328
100 year	9.04"	40.41	28.23	148,966	138,773

D. Inspection and Maintenance

- StormTrap infiltration structures: Units must be inspected once a year, sediment shall be

removed. Trees that develop over the infiltrator system shall be removed during routine maintenance of the respective areas.

- SiteSaverSSTS4-2: Unit shall be inspected 2x yearly in the fall and spring season (approximately November and April (or after last snowfall event). All sediment shall be vacuumed to maintain capacity and function.
- Cultec 330 XL Chambers: Infiltrators shall be inspected once a year, sediment shall be removed. Trees that develop over the infiltrator system shall be removed during routine maintenance of the respective areas.

- CULTEC MAINTENANCE PROCEDURES

Step 1) Inspect Isolator Row for sediment

A) Inspection ports (if present)

- i. Remove lid from floor box frame
- ii. Remove cap from inspection riser
- iii. Using a flashlight and stadia rod, measure depth of sediment
- iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

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

Step 2) Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

Step 3) Replace all caps, lids and covers

Step 4) Inspect & clean catch basins and manholes upstream of the Cultec system following the procedures for Classic Manifold Inlet System

Refer to Cultec Design Manual for further information.

- Eccentric Pipe Header Inspection

These guidelines do not supersede a pipe manufacturer's recommended I&M procedures.

Consult with the manufacturer of the pipe header system for specific I&M procedures.

Inspection of the header system should be carried out quarterly. Headers may be accessed through risers, access ports or manholes. Amount of sediment shall be observed visually.

Cleanout of sediment should occur when the sediment volume has reduced the storage area by 25% or the depth of sediment has reached approximately 25% of the diameter of the structure. Refer to Cultec Design Manual for further information.

- Eccentric Pipe Manifold Maintenance

Cleanout of accumulated material should be accomplished by vacuum pumping the material from the header. Cleanout should be accomplished during dry weather. Care should be taken to avoid flushing sediments out through the outlet pipes and into the chamber rows. Eccentric Header Step-by-Step Maintenance Procedures:

1. Locate manholes connected to the manifold system
2. Remove grates or covers
3. Measure the depth of sediment
4. If sediment is at a depth of about 25% pipe volume or 25% pipe diameter proceed to step 5. If not proceed to step 6.
5. Vacuum pump the sediment. Do not flush sediment out inlet pipes.
6. Replace grates and covers
7. Record depth and date and schedule next inspection Refer to Cultec Design Manual for further information.

- Catch Basins/Inlets: Shall be inspected once a year, trash and debris shall be removed.

III. Stormwater Pollution Prevention Plan

Temporary and permanent erosion control and pollution prevention measures will be maintained and inspected in accordance with the **Plan**. All proposed soil erosion and sediment control and pollution prevention practices are designed in accordance with the following publications:

- New York State Standards and Specifications for Erosion and Sediment Control, 2016, latest edition.
- New York State Guidelines for Urban Erosion and Sediment Control, latest edition,
- New York State General Permit for Stormwater Discharges,
- "Reducing the Impacts of Stormwater Runoff from New Development", as published by the New York State Department of Environmental Conservation (NYSDEC), second edition, April 1993.

The contractor shall provide a trained individual (carrying card/certification by the NYSDEC) to be present on site at all times during soil disturbing activities. A copy of the card shall be maintained in the SWPPP.

Inspections of site erosion and sediment controls shall be completed at a minimum of twice weekly by a qualified inspector in accordance with NYSDEC SPDES General Permit (GP-0-15-002).

A. Soil Erosion and Sediment Control Plan

The primary goal of the soil erosion and sediment control measures is to reduce soil erosion from areas stripped of vegetation during and after construction, and to prevent discharge of silt offsite. Sediment control barriers shall be placed around exposed areas during construction. The barriers shall consist of silt fence. Alternate practice may be implemented by the contractor after approval from the Design Engineer and the Town Engineer.

Any areas stripped of vegetation during construction will be left bare for the shortest time possible but not longer than 7 days if area is planned to remain inactive. Any topsoil removed during construction will be temporarily stockpiled for future use in grading and landscaping. Stockpile locations have been provided on the **Plan** and shall be contained within a silt fence/hay bale barrier.

Temporary vegetation will be established to protect exposed soil areas during construction. If growing conditions are not suitable for the temporary vegetation, mulch or alternative cover may be used. Materials that may be used for mulching include; straw, wood fiber, synthetic soil stabilizers, mulch netting, and sod. A permanent vegetative cover will be established upon completion of construction of those areas that have been brought to finish grade and to remain undisturbed. After final grades are established, disturbed areas shall be restored in accordance with Chapter 5 Soil Restorations Standards of the NYSDEC Stormwater Management Design Manual.

A stone construction access is specified to minimize sediment tracking onto South Bedford Road. The purpose of a stabilized entrance is to remove as much soil from the construction vehicle tires prior to exiting the site and traveling on the existing roadways. During construction, inlet protection (as applicable) will be installed at each storm sewer inlet to minimize the conveyance of silt and sediment through the storm sewer system.

For dewatering activities during excavation of the footings, a dewatering pump shall be located in a perforated tub surrounded by filter fabric and stone (or approved alternative). Clean discharge should be directed to onsite drainage appurtenances to minimize erosion of soils. Discharge with suspended sediment shall be connected to a sediment bag on undisturbed ground in a location where the discharge will not cause erosion or flow over exposed soils.

If the contractor encounters ground water during the excavation of the filtering system, he shall notify the design engineer immediately. The contractor shall store all excavated material at the designated location shown on the **Plan** with the appropriate erosion control measures corresponding to the stockpile detail.

B. Construction Phasing Plan

Construction shall be implemented in the following order:

1. Erosion and sediment control (ESC) measures and Pollution Prevention (PP) implementation,
 - a) Install tree protection.
 - b) Tag/Mark all trees that need to be removed.
 - c) Install silt fences along the limit of disturbance.
 - d) Existing driveway to be used as access.
 - e) Install temporary sanitary facilities (portable toilets) in a location that is at least 20 feet from any drainage facility or flow path. Recommend staking the facility to prevent accidental tipping by construction activity or wind.
 - f) Install waste container – maintain rigorous site cleaning schedule to prevent debris from blowing off site. Construction waste shall be stored in a dumpster and carried off-site on a regular basis.
 - g) Allocate concrete washout areas.
2. All existing structures to be demolished except for the existing house and septic field. The existing house and septic field are to remain functional until construction is complete to serve as a construction trailer.
3. Clearing and grubbing,
 - a) Strip top soil and stockpile. Initiate cover practices and sediment controls at the base of the stockpile. Stockpile can be temporarily stabilized with tarp or mulch and/or temporary seeding.
 - b) Disturbed areas where construction will cease for more than 7 days will be stabilized with erosion controls, such as hydro-seeding, hydro-mulch, or straw. Straw mulch shall be applied at the

rate of 2 tons per acre.

4. Construct temporary erosion control measures including temporary sediment traps, swales, and sediment control measures.
5. Excavate to foundations subgrade elevation
 - a) Install dewatering practice if necessary.
6. Construct improvements.
7. Demolish existing house and Install subsurface storage system and site drainage to capture runoff.
8. Final stabilization of disturbed areas
 - a) Install minimum 6" topsoil and final stabilize with lawn or mulch in landscape areas. Refer to chapter 5 Table 5.3 of the NYS Stormwater Management Design Manual for all soil restoration requirements.
 - b) Remove all Temporary Erosion and Sediment Control (ESC) and Pollution Prevention (PP) measures upon approval of design engineer and/or ESC inspector.
 - c) File for SPDES notice of Termination.

C. Stormwater Management Facilities Maintenance Program

Awarded contractor shall be responsible for the proper implementation of the ESC and PP practices. The following maintenance program is proposed in order to maintain the proper function of all drainage and erosion and sediment control facilities:

- Inspect erosion and sediment control devices and construction access point routinely and if necessary remove accumulated sedimentation and debris.
- Inspect all catch basins receiving runoff from disturbed areas after each runoff producing rainfall event; remove accumulated sediment or debris as necessary in the sump and invert.
- Sediment shall be removed from temporary sediment control facilities once 50% of its capacity is reached.
- Practices shall be restored to full capacity prior to forecasted significant rainfall events.
- Disturbed areas shall be inspected after runoff producing rain events for rill and gully erosion. Rills and gullies shall be regraded and uphill areas shall be inspected and protected to minimize concentrated flow.
- Restore and re-seed any eroded areas as soon as possible
- The Stormwater Management Facilities Maintenance Program will be managed by the home owner and shall include removal of sediment from the on-site catch basins and underground storage facilities.

D. Pollution Prevention, Material Handling and Waste Management

Contractor shall be responsible for all waste materials being collected and disposed of into one (1) metal trash dumpster. Dumpster shall be placed away from stormwater conveyances and drains, and meet all local and state solid-waste management regulations. Only trash and construction debris from the site will be deposited in the dumpster.

Contractor shall not store erodible or hazardous materials on any roadway. Oil and machinery fuels shall be kept to a necessary minimum and stored in structurally sound and sealed shipping containers or stored in the contractor's vehicles. Hazardous-material storage should be segregated from other non-waste materials. All hazardous materials will be disposed of in accordance with federal, state, and municipal regulations.

Equipment refueling on site shall be executed over covered soil to contain any potential accidental spills.

Contractor shall maintain a Spill Kit on site.

All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags will be hauled off-site immediately after the spill is cleaned up for disposal. Spills large enough to discharge to surface water shall be reported to the NYSDEC by calling the NYS Spill Hotline. Federal agencies can be notified by calling the National Response Center.

- NYS Spill Hotline: 1-800-457-7362
- National Response Center at 1-800-424-8802.

Material safety data sheets, a material inventory, and emergency contact information will be maintained on site.

Contractor shall be responsible for maintaining the cleanliness of the streets (driveways/parking and adjacent areas) and storm drain inlet protection (as applicable) Best Management Practices (BMPs) throughout the construction project.

Contractor shall provide adequate designated concrete washout areas throughout the construction project and will be responsible for proper disposal of the concrete, mortar or grout collected there.

One (1) temporary sanitary facility (portable toilet) shall be provided at the site in the combined staging area. The toilet shall be located at least 20 feet from a drainage facility or concentrated flow path and traffic flow. The unit shall be staked down to prevent wind overtopping the unit.

Wood pallets, cardboard boxes, and other recyclable construction scraps will be disposed of in a designated dumpster for recycling. Construction equipment and maintenance materials shall be stored at the combined staging area.

E. Final Stabilization

Permanent seeding shall be applied immediately after the final design grades are achieved as applicable throughout the site but no later than seven (7) days after construction activities have ceased. After stabilization, accumulated sediment shall be removed from site for disposal along with construction debris, trash and temporary BMPs e.g. silt fences, straw bales, material storage areas, sanitary toilets, etc.

Seedbed preparation/grass application

A minimum depth of 2 to 6 inches shall be applied on areas where disturbance results in subsoil being the final grade surface. The seedbed shall be free of large clods, rocks, woody debris and other intrusive materials; fertilizer shall be applied accordingly.

Conclusion:

The implementation of this stormwater management plan will mitigate the post development stormwater flows to the predevelopment rates and not adversely affect the adjacent properties or the existing drainage system in South Bedford Road.

APPENDIX A

Stormwater Routings Pre & Post Development Calculations

APPENDIX B

USDA Soils Report

APPENDIX C

FEMA Flood Plain Map

APPENDIX D

Soil Testing

Test Pit #5 (Location of Infiltrators)	
Depth 84"	Performed on 4/28/17
0-6"	Topsoil
6"-36"	Fine sand moderately compacted
36"-84"	Light brown sandy loam

Percolation Test No: 5 (Depth 48") Performed on 4/28/17

Min. Elapsed	Depth to Water From Ground Surface		Water Level Drop	Soil Rate (Min./in. drop)
	Start (in.)	Stop (in.)		
41	38	41	3	13.67
42	38	41	3	14.00
42	38	41	3	14.00

Test Pit #6 (Location of Rain Garden)	
Depth 84"	Performed on 4/28/17
0-12"	Topsoil
12"-36"	Brown Sandy Loam
36"-84"	Light brown loam with some sand

Percolation Test No: 6 (Depth 29") Performed on 4/28/17

Min. Elapsed	Depth to Water From Ground Surface		Water Level Drop	Soil Rate (Min./in. drop)
	Start (in.)	Stop (in.)		
40	19	22	3	13.33
43	19	22	3	14.33
44	19	22	3	14.67

APPENDIX E

Inspection Report Template

APPENDIX F

Contractor Certification Statement

APPENDIX G

MS4 Acceptance Form

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Notice of Intent

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Water Quality Calculations

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Stormwater Maintenance Agreement

APPENDIX L

Advanced Drainage Solutions Operation & Maintenance