

# **STORMWATER MANAGEMENT PLAN & DRAINAGE ANALYSIS**

**20 Lyman Place  
Village of Dobbs Ferry - New York**

**October 12, 2021**



**Hudson Engineering & Consulting, P.C.**

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**STORMWATER MANAGEMENT  
PLAN & DRAINAGE ANALYSIS  
20 Lyman Place  
Village of Dobbs Ferry - New York**

***INTRODUCTION***

This Stormwater Management Plan presents the proposed Best Management Practices (BMPs) to control erosion and sedimentation and manage stormwater during and upon construction of the proposed additions, patio, and alterations at 20 Lyman Place in the Village of Dobbs Ferry, Westchester County, New York.

This Plan consists of this narrative and a plan set entitled: “Proposed Additions & Alterations, 20 Lyman Place, Village of Dobbs Ferry, Westchester County - New York”, all as prepared by Hudson Engineering and Consulting, P.C., Elmsford, New York, last revised October 12, 2021. The design is in accordance with the Village of Dobbs Ferry requirements. The approximate area of the limits of disturbance is 0.20-acres. Since the project disturbance is less than one acre the New York State Department of Environmental Conservation [NYSDEC] stormwater regulations are not applicable.

***METHODOLOGY***

The stormwater analysis was developed utilizing the Soil Conservation Service (SCS) TR-20, 24-hour Type III storm events (HydroCad®) to assist with the design of the mitigating practices. The “Curve Number” (CN) value determination is based on soil type, vegetation, and land use. The design is in accordance with the Village of Dobbs Ferry’s stormwater regulations. The CN and  $T_c$  data are input into the computer model. The project site is then modeled for the peak rates of runoff from the 100-year Type III – 24-hour storm event in the post-developed condition.

***PRE-DESIGN INVESTIGATIVE ANALYSIS***

A pre-design investigative analysis was performed including percolation and deep holes tests in the locations shown on the plans. A series of deep hole tests were excavated and labeled in the vicinity of the potential stormwater mitigation practice [TP-1 & TP-2], as shown on the plans:

- TP-1: A percolation rate of 1.40-minutes per inch (42.86-inches per hour) was observed. A percolation rate of 20-inches per hour was utilized in the design.
- TP-2: A percolation rate of 1.50-minutes per inch (40-inches per hour) was observed. This location was not used in the design.

*The percolation test data sheet is attached.*

Two (2) deep test hole were excavated and labeled [TP-1 & TP-2] as shown on the plans.

- TP-1 was excavated to a depth of 96-inches. The test revealed topsoil to a depth of 6-inches, and light brown sandy loam to the invert. No groundwater was observed. No ledge rock was encountered.
- TP-2 was excavated to a depth of 53-inches. The test revealed topsoil to a depth of 6-inches, and dark brown sandy loam to the invert. No groundwater was observed. Ledge rock was encountered at the invert.

*The deep test-hole log is attached.*

### **PRE-DEVELOPED CONDITION**

In the pre-developed condition, the site is characterized as moderately sloping from north to south. The soil classification based upon USDA Web Soil Survey is a combination of Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky and Urban land Charlton-Chatfield complex, hilly, very rocky. The site is located along the northern side of Lyman Place, 150 feet from the intersection of Temple Road and Lyman Place. The site consists of an existing dwelling, detached garage, shed, asphalt driveway and a stone patio.

### **POST-DEVELOPED CONDITION**

In the Post-Developed Condition, the project site is modeled as one (1) Watershed denoted as *Watershed 1*. Watershed 1 is analyzed as follows:

Watershed 1 contains 1,230 square feet of impervious area in the form of the proposed additions and patio. The weighted Complex Number (CN) value is 98 and the Time of Concentration ( $T_c$ ) is calculated as a direct entry of 1 minute. The stormwater runoff from this tributary area is conveyed via a comprehensive drainage system to four (4) Cultec® 280 HD stormwater chambers set in one of gravel at the sides and invert. The system is designed to fully accept (no release) the entire stormwater runoff volume for the 100-year storm event from the watershed and exfiltrate the runoff into the surrounding soil.

### **EROSION AND SEDIMENT CONTROL COMPONENTS**

The primary aim of the soil and sediment control measures is to reduce soil erosion from areas stripped of vegetation during and after construction and to prevent silt from reaching the off-site drainage structures and downstream properties. The Sediment and Erosion Control Components are an integral component of the construction sequencing and will be implemented to control sedimentation and re-establish vegetation.

Planned erosion and sedimentation control practices during construction include the installation, inspection and maintenance of the inlet protection, soil stockpile areas, diversion swales, and silt fencing. General land grading practices, including land stabilization and construction sequencing are also integrated into the Sediment and Erosion Control Plan. Dust control is not expected to be a problem due to the limited area of exposure, the undisturbed perimeter of trees around the project area and the relatively short time of exposure. Should excessive dust be generated, it will be controlled by sprinkling.

All proposed soil erosion and sediment control practices have been designed in accordance with the following publications:

- New York State standards and Specifications for Erosion and Sediment Control, July 2016.
- New York State General Permit for Stormwater Discharges, GP-0-20-002 (General permit).
- “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 proposed soil erosion and sediment control devices include the planned erosion control practices outlined below. Maintenance procedures for each erosion control practice have also been outlined below.

#### • **SILT FENCE**

Silt fence (geo-textile filter cloth) shall be placed in locations depicted on the approved plans. The purpose of the silt fence is to reduce the velocity of sediment laden stormwater from small drainage areas and to intercept the transported sediment load. In general, silt fence shall be used at the toe of slopes or intermediately within slopes where obvious channel concentration of stormwater is not present.

##### Maintenance

Silt fencing shall be inspected at a minimum of once per week and prior to and within 24 hours following a rain event  $\frac{1}{2}$ " or greater. Inspections shall include ensuring that the fence material is tightly secured to the woven wire and the wire is secured to the wood posts. In addition, overlapping filter fabric shall be secured and the fabric shall be maintained a minimum of six (6) inches below grade. If any “bulges” develop in the fence, that section of fence shall be replaced within 24 hours with new fence section. Any sediment build-up against the fence shall be removed within 24 hours and deposited on-site a minimum of 100 feet outside of any wetland or watercourse.

The installation of silt fencing will be maintained or replaced until the fencing is no longer necessary. Once the site is stabilized, all silt fences shall be removed. The immediate area occupied by the silt fence will be shaped to an acceptable grade and stabilized.

- **SOIL/SHOT ROCK STOCKPILING**

All soil and shot rock stripped from the construction area during grubbing and mass grading shall be stockpiled in locations shown on the plans, but in no case shall they be placed within 100' of a wetland or watercourse. The stockpiled soils shall be re-used during finish-grading to provide a suitable growing medium for plant establishment. Soil stockpiles shall be protected from erosion by vegetating the stockpile with rapidly –germinating grass seed (during the May 1<sup>st</sup> – October 30<sup>th</sup>) planting season or covering the stockpile with tarpaulin the remainder of the year. Install silt fence around toe of slope.

Maintenance

Sediment controls (silt fence) surrounding the stockpiles shall be inspected according to the recommended maintenance outline above. *All stockpiles shall be inspected for signs of erosion or problems with seed establishment weekly or tarpaulin and prior to and within 24 hours following a rain event ½" or greater.*

- **GENERAL LAND GRADING**

The intent of the Erosion & Sediment Control Plan is to control disturbed areas such that soils are protected from erosion by temporary methods and by permanent vegetation. Where practicable, all cut and fill slopes shall be kept to a maximum slope of 2:1. In the event that a slope must exceed a 2:1 slope, it will be stabilized with stone riprap. On fill slopes, all material will be placed in layers not to exceed 12 inches in depth and compacted. Diversion swales shall be constructed on the top of all fill embankments to divert any overland flows away from the fill slopes.

- **SURFACE STABILIZATION**

All disturbed areas will be protected from erosion with the use of vegetative measures (i.e., grass seed mix, sod) hydro mulch netting or hay. When activities temporarily cease during construction, soil stockpiles and exposed soil should be stabilized by seed, mulch, or other appropriate measures within 7 days after construction activity has ceased, or 24 hours prior to a rain event ½" or greater.

All seeded areas will be re-seeded areas as necessary and mulched according to the site plan to maintain a vigorous, dense vegetative cover,

Erosion control barriers (silt fencing) shall be placed around exposed areas during construction. Where exposed areas are immediately uphill from a wetland or watercourse, the erosion control barrier will consist of double rows of silt fencing. Any areas stripped of vegetation during construction will be vegetated and/or mulch, but in no case more than 14 days to prevent erosion of the exposed soils. And topsoil removed during construction will be temporarily stockpiled for future use in grading and landscaping.

As mentioned above, temporary vegetation will be established to protect exposed soil areas during construction. If growing conditions are not suitable for the temporary vegetation, mulch will be used to the satisfaction of the Town Engineer. Materials that may be used for mulching include straw, hay, salt hay, wood fiber, synthetic soil stabilizers, mulch netting, sod, or hydro mulch. In site areas where significant erosion potential exists (steep slopes) and where specifically directed by the Town's representative, Curlex Excelsior erosion control blankets (manufactured by American Excelsior or approved equal) shall be installed. 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.

- **Temporary Stabilization (May 1<sup>st</sup> through October 31<sup>st</sup> planting season)**

The following seeding application should be used depending on the time of year.

- Spring/summer or early fall, seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (0.7 lb./1000 sq. ft. or use 1 lb/1000 sq. ft.).
- Late fall or early winter, seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs/1000 sq. ft.).

- **Permanent Stabilization (May 1<sup>st</sup> through October 31<sup>st</sup> planting season)**

1. Provide minimum of four (4) inches topsoil for all new lawn areas. Top dress all existing disturbed lawn areas with two (2) inches of topsoil.
2. Grass seed shall be evenly sown by mechanical seeder at a rate of 3.0-4.0 pounds per 1,000 square feet.
3. Fine rake, roll and water to a depth of one inch all seeded areas.
4. Apply air-dried hay or straw mulch to provide 90% coverage of surface (90 lbs. per 1,000 SF). Use small grain straw where mulch is maintained for more than three months
5. Contractor shall provide, at his own expense, protection against trespassing and other damage to lawn areas.

6. Lawn seed mix shall include:

a. General Recreation areas and lawns:

- 65% Kentucky Bluegrass blend
- 20% Perennial Rye
- 15% Fine fescue

Sod may be used as an alternate to seeding in select areas.

Slow-release fertilizers will be applied by hand to horticultural plantings as part of regular horticultural maintenance program and shall be limited to a single spring application.

***CONSTRUCTION PRACTICES TO MINIMIZE STORMWATER CONTAMINATION***

Adequate measures shall be taken to minimize contaminant particles arising from the discharge of solid materials, including building materials, grading operations, and the reclamation and placement of pavement, during project construction, including but not limited to:

- Building materials, garbage, and debris shall be cleaned up daily and deposited into dumpsters, which will be periodically removed from the site and appropriately disposed of.
- Dump trucks hauling material from the construction site will be covered with a tarpaulin.
- The paved street adjacent to the site entrance will be swept daily to remove excess mud, dirt, or rock tracked from the site.
- Petroleum products will be stored in tightly sealed containers that are clearly labeled.
- All vehicles on site will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.
- All spills will be cleaned up immediately upon discovery. Spills large enough to reach the storm system will be reported to the National Response Center at 1-800-424-8802.
- Materials and equipment necessary for spill cleanup will be kept in the temporary material storage trailer onsite. Equipment will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, and sand, saw dust, and plastic and metal trash containers.
- All paint containers and curing compounds will be tightly sealed and stored when not required for use. Excess paint will not be discharged to

the storm system but will be properly disposed according to the manufacturer's instructions.

- Sanitary waste will be collected from portable units a minimum of two times a week to avoid overfilling.
- Any asphalt substances used on-site will be applied according to the manufacturer's recommendation.
- Fertilizers will be stored in a covered shed and partially used bags will be transferred to a sealable bin to avoid spills and will be applied only in the minimum amounts recommended by the manufacturer and worked into the soil to limit exposure to stormwater.
- No disturbed area shall be left un-stabilized for longer than 14 days during the growing season.
- When erosion is likely to be a problem, grubbing operations shall be scheduled and performed such that grading operations and permanent erosion control features can follow within 24 hours thereafter.
- As work progresses, patch seeding shall be done as required on areas previously treated to maintain or establish protective cover.
- Drainage pipes and swales/ditches shall be constructed in a sequence from outlet to inlet to stabilize outlet areas and ditches before water is directed to the new installation or any portion thereof unless conditions unique to the location warrant an alternative method.

### ***STORMWATER MANAGEMENT FACILITIES MAINTENANCE PROGRAM***

The following maintenance plan has been developed to maintain the proper function of all drainage and erosion and sediment control facilities:

- Minimize the use of road salt for maintenance of driveway areas.
- Drainage inlets shall be vacuum swept twice a year, at the conclusion of the landscape season in the fall and at the conclusion of the sand and de-icing season in the spring.
- All infiltration systems shall be inspected immediately after construction as well as every six (6) months (spring and fall) for clogging of inlet and outlet piping. During dry weather conditions, inlet and outlet piping shall be manually cleaned and cleared of debris. All debris accumulated within the infiltration system shall be vacuumed out or removed manually. To prevent sediment from accumulating within system, the pre-treatment basin shall be cleaned as recommended above.



The permanent maintenance program will be managed by the future homeowners upon completion of construction and acceptance of the improvements.

### ***CONCLUSION***


The stormwater management plan proposed meets all the requirements set forth by the Village of Dobbs Ferry. Design modification requirements that may occur during the approval process will be performed and submitted for review to the Village of Dobbs Ferry.

# Hydrologic Soil Group—Westchester County, New York




## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points






 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available


### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York  
 Survey Area Data: Version 17, Sep 1, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 22, 2020—Sep 23, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CrC	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	3.3	40.7%
UID	Urban land-Charlton-Chatfield complex, hilly, very rocky		4.8	59.3%
<b>Totals for Area of Interest</b>			<b>8.1</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

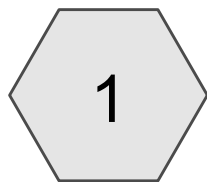
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

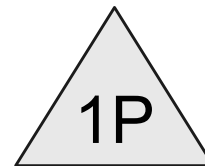
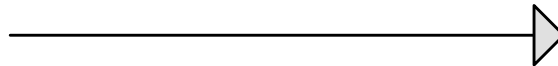
Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

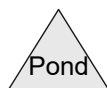
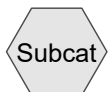
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



Watershed 1



Four (4) Cultec 280HD  
Units



**Proposed Condition 2021-10-11**

Type III 24-hr 100 year Rainfall=8.93"

Prepared by Hudson Engineering &amp; Consulting, P.C.

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**Summary for Subcatchment 1: Watershed 1**

Runoff = 0.30 cfs @ 12.01 hrs, Volume= 891 cf, Depth= 8.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100 year Rainfall=8.93"

	Area (sf)	CN	Description
*	571	98	Proposed Additions
*	491	98	Proposed Patio
*	58	98	Proposed Porch
*	110	98	Existing Shed & Extension
	1,230	98	Weighted Average
	1,230		100.00% Impervious Area

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

**Summary for Pond 1P: Four (4) Cultec 280HD Units**

Inflow Area = 1,230 sf, 100.00% Impervious, Inflow Depth = 8.69" for 100 year event  
 Inflow = 0.30 cfs @ 12.01 hrs, Volume= 891 cf  
 Outflow = 0.08 cfs @ 11.76 hrs, Volume= 891 cf, Atten= 72%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.76 hrs, Volume= 891 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs  
 Peak Elev= 302.51' @ 12.29 hrs Surf.Area= 176 sf Storage= 120 cf

Plug-Flow detention time= 5.8 min calculated for 891 cf (100% of inflow)  
 Center-of-Mass det. time= 5.8 min ( 741.1 - 735.3 )

Volume	Invert	Avail.Storage	Storage Description
#1A	301.00'	114 cf	<b>10.33'W x 17.00'L x 3.21'H Field A</b> 564 cf Overall - 182 cf Embedded = 381 cf x 30.0% Voids
#2A	302.00'	182 cf	<b>Cultec R-280HD x 4 Inside #1</b> Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
		297 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	301.00'	<b>20.000 in/hr Exfiltration over Surface area</b>

**Discarded OutFlow** Max=0.08 cfs @ 11.76 hrs HW=301.03' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher





**HUDSON**  
**ENGINEERING**  
&  
**CONSULTING, P.C.**

SITE ADDRESS: 20 Lyman Place

TOWN/VILLAGE: Dobbs Ferry

DATE: 10/06/2021 TIME: 12:00pm

WEATHER: M. Cloudy TEMP. 64° F

WITNESSED BY: Nicholas Shirriah

**DEEP TEST HOLE DATA SHEET – STORMWATER MANAGEMENT SYSTEM**

DEPTH	HOLE NO. <u>1</u>	HOLE NO. <u>2</u>	HOLE NO. <u>3</u>	HOLE NO. <u>4</u>
G.L.	0 – 6" Topsoil	0 – 6" Topsoil		
6"				
12"				
18"	6 – 96"	6 – 53"		
24"	Light brown	Dark brown		
30"	Sandy loam	Sandy loam		
36"				
42"	No GW	Ledge @ 53"		
48"	No Ledge	No GW		
54"				
60"				
66"				
72"				
78"				
84"				
90"				
96"				
102"				
108"				

- Indicate level at which Ground Water (GW), Mottling and/or Ledge Rock is encountered.
- Indicate level for which water level rises after being encountered.

EXCAVATION PERFORMED BY: PRECISION FIELD TESTING





**HUDSON**  
ENGINEERING  
&  
CONSULTING, P.C.

SITE ADDRESS: 20 Lyman Place

TOWN/VILLAGE: Dobbs Ferry

DATE: 10/06/2021 TIME: 12:40pm

WEATHER: M. Sunny TEMP. 64° F

WITNESSED BY: Nicholas Shirriah

**PERCOLATION TEST HOLE DATA SHEET – STORMWATER MANAGEMENT SYSTEM**

Owner

HOLE #	CLOCK TIME				PERCOLATION				
Hole Number	Run No.	Start	Stop	Elapse Time (Min.)	Depth to Water From Ground Surface		Water Level in Inches Drop in inches	Soil Rate	
					Start Inches	Stop Inches		Min. per inch	Inches per Hour
# <u>1</u>  4" Ø	1	12:47	1:09	22	22	46	24	0.9	66.67
	2	1:10	1:41	31	22	46	24	1.3	46.15
	3	1:42	2:13	31	22	46	24	1.3	46.15
	4	2:15	2:49	34	22	46	24	1.4	42.86
	5								
# <u>2</u>  4" Ø	1	12:58	1:29	31	22	46	24	1.3	46.15
	2	1:29	1:42	31	22	46	24	1.3	46.15
	3	1:45	2:21	36	22	46	24	1.5	40
	4	2:22	2:58	36	22	46	24	1.5	40
	5								
# <u>  </u>  4" Ø	1								
	2								
	3								
	4								
	5								

Notes:

- 1) Tests to be repeated at the same depth until approximately equal soil rates are obtained at each percolation test hole. All data to be submitted for review.
- 2) Depth measurements to be made from top of hole