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A. PROJECT INTRODUCTION

I. PROJECT DESCRIPTION

This report identifies and mitigates the potential stormwater impacts associated with the proposed _____ Project. The parcel is approximately 2.59 acres and is located in the City of _____, Westchester County, New York. The project site (i.e. proposed disturbance area) is approximately 0.90 acres. The property contains frontage along _____ and is southeast of the intersection of _____Avenue and _____. The site is located within the Lower Long Island Sound Watershed and generally drains in the south and east directions (refer to enclosed Figure 1). The property is located within the 500 Year and 100 Year floodplains. This is based on floodplain mapping obtained from the Westchester County Geographic Information System (GIS) and the Federal Emergency Management Agency (FEMA). The subject parcel lies within the City of _____ R-1 Zoning District.

Stormwater runoff within the property generally flows in the northeast and southwest directions. Runoff exits the property at several different locations. Stormwater travels onto the existing adjacent driveway and residential parcels, and eventually reaches the Long Island Sound. The ultimate receiving water body is the Long Island Sound (i.e. a tidal waterbody).

The subject site is owned by _____. The property is vacant and consists primarily of open green space and lawn area. The property also contains a beach area (adjacent to the Long Island Sound). An existing masonry stone sea wall is located within the southern portion of the parcel. This sea wall runs parallel to the southern property line. This existing stone sea wall separates the beach and lawn areas of the property.

The proposed project includes the following site improvements:

- Construction ±1,700 square foot _____ and ±6,050 square foot sports court
- Construction of a bituminous (asphalt) concrete pavement ingress/egress driveway
- Installation of Portland Cement/Belgian Block Paver walkways
- Earthwork and surface grading activities
- Drainage improvements including a Stormwater Management Practices (SMP)
- Installation of public utilities (i.e. sanitary sewer, domestic water, electric, gas, cable and telephone)
- Additional plantings and landscaping

The proposed Stormwater Management Practice (SMP) includes a subsurface Stormwater Management Area (SMA). The proposed Stormwater Management Area includes a proprietary subsurface plastic chamber infiltration system with vertical PVC overflow grates to finished grade. The proposed SMA is a NYSDEC verified proprietary product that contains an open chamber bottom and perforated chamber sidewalls to allow stormwater to flow both vertically and horizontally within and out of the system. The Stormtech™ or approved equal are polypropylene chambers fabricated through injection molding and thermoforming techniques. This system incorporates an “Isolator Row” to help enhance Total Suspended Solids (TSS) removal from stormwater initially entering the SMA. This row also provides easy access for inspection and maintenance. The proposed Stormwater Management Practice is expected to remove targeted pollutants such as Phosphorus, Nitrogen, Metals (i.e. Cadmium, Copper, Lead and Zinc) and Pathogens (i.e. Coliform, Streptococci and E. Coli). Stormwater quality is expected to be enhanced with the implementation of the proposed Stormwater Management Area.

Stormwater runoff from the proposed _____, sports court, walkways, asphalt concrete driveway and lawn areas will be conveyed via subsurface HDPE storm pipes and overland flow to the SMP for treatment. Runoff entering the proposed Stormwater Management Area will then be stored and infiltrated into the subsoil strata. Stormwater runoff exceeding the design capacity of the SMP will be conveyed through four (4) vertical PVC overflow pipes with hinged grates. Runoff will intentionally overflow from the SMA, travel south via overland flow and discharge directly onto the beach area of the Long Island Sound. Stormwater peak flow runoff rates will be evaluated for the design storm events described in this report at the hydrological analysis (design) points. This report studies the pre and post-development drainage conditions of the 1, 2, 5, 10 and 25 year rainfall events. The selected design point will be analyzed to demonstrate that the proposed improvements will not adversely affect adjacent properties (i.e. by reducing drainage areas and thus decreasing peak rates of runoff and volumes).

Please refer to Appendix 'A' for existing and proposed hydrologic calculations. Also refer to Appendix 'K' Drainage Area Maps for an illustration of the pre and post-development drainage areas and hydrologic analysis (design) points.

The proposed land disturbance associated with the project is approximately 0.90 acres. Therefore, based on the City of _____ Code, this project is classified as a "Land Disturbing Activity". Chapter _____ "Surface Water, Erosion and Sediment Control", §_____-5(A) of the City of _____ Code states the following:

LAND DISTURBING ACTIVITY

"Any change to land which may result in soil erosion from water or wind and the movement of soil into waters or onto lands, including but not limited to clearing, grading, excavating, transporting and filling of land."

Chapter _____ "Surface Water, Erosion and Sediment Control", §_____-5(A) of the City of _____ Code states the following:

"No person shall commence or carry out any development or land-disturbing activity involving less than one acre on any lot(s) in the City of _____ without first obtaining a surface water, erosion and sediment control permit from the City Engineer, and thereafter complying with the requirements of this chapter. Any development or land-disturbing activity involving equal to or greater than one acre shall comply with the requirements of Chapter _____."

Since the project proposes to disturb less than one (1) acre of land, it is not considered a **"**Land Development/Redevelopment Activity" as defined in Chapter _____ "Stormwater Management", §_____-6 of the Code. Therefore, this project is not subject to the requirements set forth in this Chapter. However, this SWPPP contains many of the required SWPPP elements outlined in Chapter _____ "Stormwater Management".

This SWPPP has been prepared using the following criteria from Chapter _____ "Surface Water, Erosion and Sediment Control", §_____-5(A.)(c)(e)(h) of the City of _____ Code:

1. *§_____-5(A.)(c) – "Sites of less than four acres with a proposed net increase of less than 75% in impervious surfaces shall provide for a twenty-five-year stormwater detention storage facility or facilities."*
2. *§_____-5(A.)(e) – "Detention facility maximum discharge rates for preconstruction conditions for the one-hundred-year storm and the twenty-five-year storm shall be as follows:*

[1] One-hundred-year storm: one-hundred- , fifty- , twenty-five- , ten- and two-year storms.

[2] Twenty-five-year storm: twenty-five- , ten- , five- and two-year storms."

3. *§_____-5(A.)(h) – "The City Engineer may waive or reduce the requirements of this section if it is determined by him that existing storm drains or storm drains proposed to be constructed are of adequate size, and will discharge surface water runoff directly to Long Island Sound, Milton Harbor or Port Chester Harbor."*

This SWPPP has been prepared using the following criteria from Chapter 4 "Unified Sizing Criteria", Section 4.5 "Overbank Flood Control (Qp)" of the NYSDEC Stormwater Management Design Manual, last revised August 2010:

1. *Page 4-9 of Section 4.5 "Overbank Flood Control (Qp)" –* "*The overbank flood control requirement (Qp) does not apply in certain conditions, including: The site discharges directly to tidal waters…"*

Based on the criteria from §_____-5(A.)(h), water quantity (i.e. peak flow rate attenuation) controls are not required, but have been implemented for this project. However, based on §_____-5(A)(c)(e) the proposed Stomwater Management Area has been designed to safely store, treat and attenuate storm events up to and including the two (2) year design storm. All storm events exceeding the two (2) year design event will safely overflow from the SMA through vertical PVC overflow structures to the ground surface. The proposed subsurface SMA is further discussed in Section A "Project Introduction", Section III "Proposed Conditions" and Section D "Stormwater Management Practice (SMP)".

The proposed development does not require coverage under NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-10-001) since the proposed land disturbance does not exceed the one (1) acre threshold, and is not located within an East of Hudson (EOH) Watershed. The proposed Stormwater Management Practice (SMP), Stormwater Pollution Prevention Plan (SWPPP) and Erosion and Sediment Control (E&S) Plan have been prepared in accordance with the following:

- City of _____ Code, Part II "General Legislation", Chapter 100 "Floodplain Management"
- City of _____ Code, Part II "General Legislation", Chapter 162 "Storm Sewer System"
- City of _____ Code, Part II "General Legislation", Chapter _____ "Surface Water, Erosion and Sediment Control"
- New York State Department of Environmental Conservation (NYSDEC) Stormwater Management Design Manual, last revised August 2010.
- New York State Standards and Specifications for Urban Erosion and Sediment Control, dated August 2005.

The proposed Stormwater Management Practice have been designed to exceed water quality requirements in accordance with the City of _____ Code, last amended or revised, and the New York State Department of Environmental Conservation (NYSDEC) Stormwater Management Design Manual, last revised August 2010.

II. EXISTING CONDITIONS

The subject site is approximately 2.59 acres. The property is vacant and consists primarily of lawn area and trees. The property also contains a paved walkway and a beach area (adjacent to the Long Island Sound). An

existing masonry stone sea wall is located within the southern portion of the parcel. This sea wall runs parallel to the southern property line. This existing stone sea wall separates the beach and lawn areas of the property. The site also contains a portion of the Long Island Sound. This tidal waterbody is considered a wetland area. Therefore, there is a one hundred (100) wetland buffer area that begins at the existing stone masonry sea wall and extends one hundred (100) feet north into the property.

Portions of the property are located within Federal Emergency Management Area (FEMA) floodplain zones. These zones include the following:

- Zone X
- Zone AE 12
- Zone AE 13
- Zone VE 15
- Zone VE 17

For hydrologic analysis purposes, the existing drainage boundaries have been identified as "EDA–1", "EDA–2", "EDA–3" and "EDA–4". As part of the TR-20 and TR-55 methodology, the areas analyzed under existing conditions are identical to the areas analyzed under proposed conditions. An SCS curve number and a time of concentration were calculated for pre and post development conditions. The existing drainage patterns were analyzed to provide a comparison to the post-development peak runoff rates generated by the project area at the design points.

Existing Drainage Area "EDA–1" - is approximately 0.33 acres in size and contains more a part of the northern portion of the property. An SCS curve number of 66 and a time of concentration of 9.6 minutes were calculated for this drainage area. This area consists of existing lawn and trees. Stormwater runoff from this area generally flows to the north. Runoff within this area travels via overland flow (shallow concentrated), and discharges off-site to an adjacent asphalt concrete driveway (Design Point 1). This runoff ultimately reaches the Long Island Sound via overland and piped flow.

Existing Drainage Area "EDA–2" - is approximately 0.30 acres in size and contains a part of the eastern portion of the property. An SCS curve number of 61 and a time of concentration of 13.9 minutes were calculated for this drainage area. This area consists of existing lawn and trees and a stone masonry retaining wall along the eastern property line. Stormwater runoff from this area generally flows to the east. Runoff within this area travels via overland flow (sheet and shallow concentrated flow), and discharges off-site to an adjacent residential property (Design Point 2). This runoff ultimately reaches the Long Island Sound via overland and piped flow.

Existing Drainage Area "EDA–3" - is approximately 1.09 acres in size and contains a significant portion of the property. An SCS curve number of 61 and a time of concentration of 16.6 minutes were calculated for this drainage area. This area consists of existing lawn and trees, a stone masonry retaining wall along the eastern property line, stony masonry sea wall along the southern property line, beach area, wetland (i.e. Long Island Sound) and associated one hundred (100) foot wetland buffer. Stormwater runoff from this area generally flows in a southwestern direction. Runoff within this area travels via overland flow (sheet and shallow concentrated flow), and discharges off-site to the Long Island Sound (Design Point 3). Overland runoff leaves this drainage area through a six (6) vitrified clay pipe constructed within the existing masonry sea wall. This runoff ultimately reaches the Long Island Sound via overland flow from the beach area.

Existing Drainage Area "EDA–4" - is approximately 0.37 acres in size and contains a part of the western portion of the property. An SCS curve number of 61 and a time of concentration of 15.7 minutes were calculated for this drainage area. This area consists of existing lawn and trees. Stormwater runoff from this area generally flows to the southwest. Runoff within this area travels via overland flow (sheet and shallow concentrated flow), and discharges off-site to an adjacent residential property (Design Point 4). This runoff ultimately reaches the Long Island Sound via overland flow.

A graphical representation of the existing drainage areas discussed above can be found in Appendix K, Drawing EDA entitled "Existing Drainage Area Map".

The peak runoff rates for the 1, 2, 5, 10 and 25 year recurrent storm events at Design Point 1, 2, 3 and 4 are summarized in Table 1 below.

Table 1

Summary of Peak Runoff Rates – Existing Conditions at Design Points 1, 2, 3 and 4

(All Flows in Cubic Feet per Second)

Storm Recurrence Frequency (years)	Peak Rate of Runoff (cfs)			
	Design Point 1	Design Point 2	Design Point 3	Design Point 4
1	0.11	0.04	0.14	0.05
2	0.23	0.11	0.38	0.13
5	0.44	0.25	0.86	0.30
10	0.56	0.34	1.14	0.40
25	0.81	0.52	1.76	0.61

III. PROPOSED CONDITIONS

The proposed project includes the following site improvements:

- Construction ±1,700 square foot _____, ±780 square foot storage barn and ±6,050 square foot sports court and
- Construction of a bituminous (asphalt) concrete pavement ingress/egress driveway
- Installation of Portland Cement/Flagstone walkways
- Installation of Belgian Block storage facility apron and pavers
- Earthwork and surface grading activities
- Drainage improvements and a Stormwater Management Practice (SMP)
- Installation of public utilities (i.e. sanitary sewer, domestic water, electric, gas, cable and telephone)
- Additional plantings and landscaping

Stormwater runoff from the proposed driveway, _____, storage barn, parking area, walkways, terraces and lawn areas will be collected and conveyed via drainage structures and underground storm pipes to the proposed subsurface Stormwater Management Area (SMA).

The drainage improvements associated with the project include the installation of a proposed subsurface Stormwater Management Practice (SMP) designed to both store and treat stormwater runoff from the proposed disturbed areas. Once runoff reaches and flows through the proposed SMP, pollutants such as Phosphorus, Nitrogen, Metals (i.e. Cadmium, Copper, Lead and Zinc) and Pathogens (i.e. Coliform, Streptococci and E. Coli) are expected to be removed. An HDPE storm pipe conveyance system will route subsurface runoff from the areas described above to the proposed SMA.

The proposed SMP has been designed to exceed the NYSDEC water quality volume requirements associated with the development. The proposed HDPE storm pipe conveyance system has been designed to accommodate stormwater flow rates up to and including the ten (10) year storm event. (Please refer to Appendix K for the hydraulic analysis of the proposed storm sewer). Please note that during the 25 year storm event, drainage structures CB A-3-1 and CB A-4 are the only structures that experience a surcharge and stormwater overflow. The remainder of the storm sewer conveys stormwater runoff without the hydraulic grade line (HGL) reaching the ground surface.

For purposes of hydrologic analysis, the drainage areas under proposed conditions have been identified as four (4) drainage areas; "PDA–1", "PDA–2A" "PDA–3" and "PDA–4". As in existing conditions, the drainage areas discharge stormwater to the off-site adjacent properties and on-site areas, and eventually to the Long Island Sound. A significant portion of the proposed development will be routed through the proposed subsurface plastic chamber infiltration system. A description of the proposed drainage areas are as follows:

Proposed Drainage Area "PDA–1" – is approximately 0.11 acres in size and contains more a part of the northern portion of the property. An SCS curve number of 86 and a time of concentration of 4.5 minutes were calculated for this drainage area. This area consists of existing lawn and trees and proposed lawn area. Stormwater runoff from this area generally flows to the north. Runoff within this area travels via overland flow (shallow concentrated), and discharges off-site to an adjacent asphalt concrete driveway (Design Point 1). This runoff ultimately reaches the Long Island Sound via overland and piped flow.

Proposed Drainage Area "PDA–2" - is approximately 0.16 acres in size and contains a part of the eastern portion of the property. An SCS curve number of 61 and a time of concentration of 5.9 minutes were calculated for this drainage area. This area consists of existing lawn and trees, proposed lawn and a stone masonry retaining wall along the eastern property line. Stormwater runoff from this area generally flows to the east. Runoff within this area travels via overland flow (sheet and shallow concentrated flow), and discharges off-site to an adjacent residential property (Design Point 2). This runoff ultimately reaches the Long Island Sound via overland and piped flow.

Proposed Drainage Area "PDA–3A" – is approximately 0.64 acres and contains the northern half of the property. An SCS curve number of 80 a time of concentration of 8.9 minutes were calculated for this drainage area. This area consists of the following:

- ±1,700 square foot _____
- ±780 square foot storage barn
- ±6,050 square foot sports court
- Bituminous (asphalt) concrete pavement ingress/egress driveway
- Portland Cement/Flagstone walkways
- Belgian Block storage facility apron and pavers

- Lawn areas and trees
- Proposed Subsurface Stormwater Management Area (SMA)

Stormwater runoff from PDA-3A travels via overland (sheet and channel) and is routed through the storm pipe network (pipe flow) to the proposed subsurface Stormwater Management Area (SMA). Stormwater will be treated through a proprietary subsurface plastic chamber infiltration system with PVC overflow drains/vents. The subsurface polypropylene chambers have been sized to treat greater than 100% of the required water quality volume. The Stormtech™ or approved equal, will be implemented to serve primarily as a water quality control, and inherently water quantity control (i.e. for the 1 and 2 year storms) for runoff before entering the Long Island Sound. The NYSDEC required water quality volume (WQv) for the total developed (disturbed) area is 1,614 cubic feet. The water quality volume provided is 1,737 cubic feet (Refer to Appendix 'B' for water quality volume and flow calculations). Please note, this 1,737 cubic feet allows for two (2) inches of freeboard below the top of the plastic chambers. If the water quality volume was calculated to the top of the six (6) inch layer of crushed stone above the chambers, the water quality volume provided is 2,175 cubic feet. The proposed subsurface Stormwater Management Area (SMA) is further discussed in Section D "Stormwater Management Practices" of this SWPPP.

Proposed Drainage Area "PDA–3B" - is approximately 1.00 acres in size and contains a significant portion of the property. An SCS curve number of 61 and a time of concentration of 16.6 minutes were calculated for this drainage area. This area consists of existing lawn and trees, proposed lawn area and a stone masonry retaining wall along the eastern property line, stony masonry sea wall along the southern property line, beach area, wetland (i.e. Long Island Sound) and associated one hundred (100) foot wetland buffer. Stormwater runoff from this area generally flows in a southwestern direction. Runoff within this area travels via overland flow (sheet and shallow concentrated flow), and discharges off-site to the Long Island Sound (Design Point 3). Overland runoff leaves this drainage area through a six (6) vitrified clay pipe constructed within the existing masonry sea wall. This runoff ultimately reaches the Long Island Sound via overland flow from the beach area.

Proposed Drainage Area "PDA–4" - is approximately 0.20 acres in size and contains a part of the western portion of the property. An SCS curve number of 61 and a time of concentration of 8.8 minutes were calculated for this drainage area. This area consists of existing lawn and trees and proposed lawn area. Stormwater runoff from this area generally flows to the southwest. Runoff within this area travels via overland flow (sheet and shallow concentrated flow), and discharges off-site to an adjacent residential property (Design Point 4). This runoff ultimately reaches the Long Island Sound via overland flow.

Please refer to Appendix K, Drawing PDA entitled "Proposed Drainage Area Map" for a graphical representation of the "Proposed Conditions" drainage areas discussed above.

The peak runoff rates for the 1, 2, 5, 10 and 25 year storm events at Design Points 1, 2, 3 and 4 are summarized in Table 2 on the following page:

Table 2

Summary of Peak Runoff Rates – Proposed Conditions at Design Points 1, 2, 3 and 4

(All Flows in Cubic Feet per Second)

Storm Recurrence Frequency (years)	Peak Rate of Runoff (cfs)			
	Design Point 1	Design Point 2	Design Point 3	Design Point 4
1	0.04	0.02	0.13	0.03
2	0.09	0.08	0.35	0.09
5	0.17	0.17	0.79	0.20
10	0.22	0.23	1.05	0.26
25	0.32	0.35	1.61	0.40

A comparison of Tables 1 and 2 indicates a decrease in the peak rates of runoff generated by the site for the 1 and 2 year design storms at Design Point 3, upon implementation of the proposed Stormwater Management Practice (SMP). The reduction in peak rates is a result of the large volume of water infiltrated in the proposed subsurface Stormwater Management Area (SMA). The peak rates of runoff for the 1, 2, 5, 10 and 25 year design storms have been reduced at Design Points 1, 2 and 4 (adjacent properties). Tables 3, 4, 5 and 6 on the following pages summarize this comparison:

Table 3

Summary of Existing and Proposed Peak Runoff Rates for Design Point 1

(All Flows in Cubic Feet per Second)

Storm Recurrence Frequency (Years)	Existing Conditions	Proposed Conditions	Net Change (%)
	Design Point 1	Design Point 1	Design Point 1
1	0.11	0.04	-63.6
2	0.23	0.09	-60.9
5	0.44	0.17	-61.4
10	0.56	0.22	-60.7
25	0.81	0.32	-60.5

Table 4

Summary of Existing and Proposed Peak Runoff Rates for Design Point 2

(All Flows in Cubic Feet per Second)

Storm Recurrence Frequency (Years)	Existing Conditions	Proposed Conditions	Net Change (%)
	Design Point 2	Design Point 2	Design Point 2
1	0.04	0.02	-50.0
2	0.11	0.08	-27.3
5	0.25	0.17	-32.0
10	0.34	0.23	-32.3
25	0.52	0.35	-32.7

Table 5

Summary of Existing and Proposed Peak Runoff Rates for Design Point 3

(All Flows in Cubic Feet per Second)

Storm Recurrence Frequency (Years)	Existing Conditions	Proposed Conditions	Net Change (%)
	Design Point 3	Design Point 3	Design Point 3
1	0.14	0.13	-7.1
2	0.38	0.35	-7.9
5	0.86	0.96	+11.6
10	1.15	2.00	+73.9
25	1.76	3.68	+109.1

Table 6

Summary of Existing and Proposed Peak Runoff Rates for Design Point 4

(All Flows in Cubic Feet per Second)

Storm Recurrence Frequency (Years)	Existing Conditions	Proposed Conditions	Net Change (%)
	Design Point 4	Design Point 4	Design Point 4
1	0.05	0.03	-40.0
2	0.13	0.09	-30.8
5	0.30	0.20	-33.3
10	0.40	0.26	-35.0
25	0.61	0.40	-34.4

B. ANALYSIS METHODS

Hydrologic modeling including runoff depths were calculated based upon standards set forth by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) TR-20 "Computer Program for Project Formulation Hydrology" method, and the USDA Natural Resources Conservation Service (NRCS) Technical Release 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986. The methodology set forth in USDA (SCS) TR-20 and (NRCS) TR-55 considers numerous characteristics for drainage areas including, time of concentration, topography, soil types, soil permeability, vegetative cover, ponding and depressed areas, rainfall intensity, etc. The USDA SCS TR-20 also allows a time of concentration (Tc) of less than 6 minutes to be evaluated for the hydrologic analysis. Therefore, the existing and proposed drainage areas analyzed in this SWPPP include calculated times of concentration less than 6.0 minutes (0.1 hr). A (Tc) of 6.0 minutes (0.1 hr) is an applied limitation associated with the NRCS TR-55 "Tabular Hydrograph Method" (simplied version of the (SCS) TR-20 hydrologic analysis method

The twenty-five (25) year storm recurrence was reviewed in the design of the proposed storm sewer network. Please refer to Appendix K for the hydraulic analysis of the proposed on-site storm sewer. The proposed storm sewer was designed using the USDA SCS TR-20. This hydrologic analysis method enables the analysis to include the effects of a tailwater condition within the proposed Stormwater Management Area on the proposed storm sewer network (i.e. as the SMA overflows and affects the hydraulic grade line (HGL) of the proposed storm pipes).

In analyzing the impact of the proposed development on downstream and adjacent waters and properties, the peak rates of runoff were quantified for the 1, 2, 5, 10 and 25 year storm events. Stormwater runoff rates were then examined for both existing and proposed conditions in the design of the proposed Stormwater Management Practice (Please refer to Appendix A–Existing and Proposed Hydrologic Calculations). These rates were examined to ensure that even though water quantity requirements are waived, that adjacent properties were not adversely affected.

Future drainage conditions were analyzed based on the increased rate and volume of runoff resulting from the proposed improvements associated with the site development.

Design Parameters

For the proposed stormwater system (i.e. SMA and storm sewer network) design, the following design parameters were used:

1. An existing drainage area and existing conditions map were developed from a topographical survey prepared by Ward Carpenter Engineers, Inc. last revised March 25, 2011. The drainage area map illustrates the existing features on the property and adjacent off–site areas.

2. Existing municipal and on–site drainage infrastructure was observed by (Consultant Name) to verify existing features of the watershed.

3. U.S.G.S. Quadrangle Map for _____, New York, last revised 1979.

4. USDA National Resource Conservation Service (NRCS) Web Soil Survey.

5. New York State Department of Environmental Conservation (NYSDEC) Stormwater Management Design Manual, last revised August 2010.

6. New York State Standards and Specifications for Urban Erosion and Sediment Control, dated August 2005.

7. City of _____ Code, as last amended or revised.

8. Hydrologic and Hydraulic calculations were developed with the HydroCAD Stormwater Modeling software package version 8.5.

9. The peak discharges rates for the 1, 2, 5, 10 and 25 storm events were analyzed for the watershed areas. The Type III distribution design storm for the 24-hour duration was used and rainfall depth for the various design storms are as follows:

Design Storm	Inches of Rainfall
1 Year	2.8
2 Year	3.5
5 Year	4.5
10 Year	5.0
25 Year	6.0

C. PROJECT MAPS/DRAWINGS

Relevant project maps are attached in Appendices E and K and include the following:

1. Erosion and Sediment Control Plan (Drawings C-600)

2. Existing Drainage Area Map (Drawing EDA)

3. Proposed Drainage Area Map (Drawing PDA)

A full set of project drawings prepared by (Consultant Name) will accompany the SWPPP.

D. STORMWATER MANAGEMENT PRACTICE (SMP)

The proposed Stormwater Management Practice (SMP) for the project includes a proprietary subsurface plastic chamber infiltration system with four (4) PVC overflow drains with hinged grates. The proposed SMA is a NYSDEC verified proprietary product that contains an open chamber bottom and perforated chamber sidewalls to allow stormwater to flow both vertically and horizontally within and out of the system. The Stormtech™ or approved equal are polypropylene chambers fabricated through injection molding and thermoforming techniques. This system incorporates an "Isolator Row" to help enhance Total Suspended Solids (TSS) removal from stormwater initially entering the SMA. This row also provides easy access for inspection and maintenance. The proposed Stormwater Management Practice is expected to remove targeted pollutants such as Phosphorus, Nitrogen, Metals (i.e. Cadmium, Copper, Lead and Zinc) and Pathogens (i.e. Coliform, Streptococci and E. Coli). Stormwater quality is expected to be enhanced with the implementation of the proposed Stormwater Management Area. The proposed Stormwater Management Area has been designed to store and treat the required NYSDEC water quality volume (WQv). The SMA also attenuates the increase in peak rates of runoff for the 1 and 2 year storm events at Design Point 3.

The Stormwater Management Area (SMA) will consist of fifty-two (52) subsurface plastic chambers at invert elevation 8.00, and will store, treat and detain runoff volumes for various storm events. The bottom of the clean washed 3/4" crushed stone elevation is 7.00. The top of the sixteen (16) inch high SC-310 chambers is at elevation 9.33. The top of the six (6) inch layer of clean washed crushed stone placed above the plastic chambers is at elevation 9.83. The proposed Stormwater Management Area contain a twelve (12) inch HDPE header (manifold) pipe with 12 inch x 8 inch tees (stubs) and distribution pipes that connect to chamber end caps within each row. The rim elevation for CB A-1 and the system overflow catch basins is 11.25

Access manholes (CB A-1 and BMH A-2) will be provided at the corners of the proposed system for maintenance purposes. The proposed SMA has not been design with an outlet culvert. This was done to avoid disturbance within the City regulated one hundred (100) wetland buffer. Alternatively, four (4) – twelve (12) inch vertical PVC inline drains will be installed on top of the chambers at the locations depicted on the supporting (Consultant Name) drawings. Drainage structure CB A-1 will contain a slotted grate to also allow stormwater to overflow or "bubble-up" from within the subsurface system to finished grade. The rim elevation for CB A-1 and the system overflow catch basins is 11.25. The system overflows consists of twelve (12) inch diameter PVC inline drains that connect to four - (4) inch PVC vents at the top of several chambers. These twelve (12) inch PVC overflow drains will contain a hinged slotted grate. Under circumstances (i.e. events greater than the 2 year design storm) where the peak water surface elevation within the system rises and reaches the ground surface, the uplift from the water pressure will allow the hinged grates to open as needed for water to overflow to the surrounding ground surface. Stormwater will then continue to travel through the wetland buffer as it does in existing conditions. The hinged grates will allow stormwater to slowly overflow from the top of the proposed overflow structures, sheet flow through the wetland buffer and eventually reach the Long Island Sound (Design Point 3).

A bypass manhole (BMH A-2) will direct a portion of the stormwater flow to the "isolator row". The isoloator row is the first row of chambers surrounded with filter fabric connected to BMH A-2. The fabric-wrapped chambers provide for settling and filtration of sediment as stormwater rises within the "isolator row". This sediment ultimately passes through the filter fabric. Sediments are captured in the "isolator row" protecting the storage areas of the adjacent stone and chambers from sediment accumulation. Woven and non-woven geotextile fabrics are used for the "isolator row".

The subsurface infiltration system design incorporates the "required elements" identified in Chapter 6, Section 6.3 of the design manual, including underlying soils having an infiltration rate of at least 0.5 inches per hour. Two (2) percolation tests (PT-1 and PT-2) were performed in the area of the proposed Stormwater Management Area. PT-1 yielded an infiltration rate of 15.7 inches/hour. PT-2 yielded an infiltration rate of 4.5 inches/hour. Conservatively, we assumed an infiltration rate of 4.5 inches/hour for the subsoil strata below the proposed SMA. Five test pits (TP-1 through TP-5) were performed. Rock was encountered approximately sixty (60) inches below the existing ground surface at TP-1. TP-1 is located within the area of the manifold pipe and inspection manholes, not within the area of infiltration. The remaining test pits did not encounter rock. All test pits, excluding TP-1, encountered groundwater approximately eight (8) feet below existing grade (elevation ±3.5). The elevation of the bottom of the crushed stone reservoir for the SMA is 7.00. Therefore, the separation distance between groundwater and/or bedrock is greater than three (3) feet. This is in accordance with the "Required Elements" listed in Chapter 6, "Infiltration", Section 6.3.1 "Feasibility" of the New York State Stomwater Management Design Manual last revised August 2010. Please refer to Appendix I "Test Pit and Percolation Test Plan" and Appendix J "Test Pit and Percolation Test Data Sheet" of this SWPPP for additional information.

The NYSDEC required water quality volume (WQv) for the total developed (disturbed) area is 1,614 cubic feet. The water quality volume provided 1,737 cubic feet (Refer to Appendix 'B' for water quality volume and flow calculations). The minimum pretreatment volume (25% of the WQv) is approximately 404 cubic feet. The provided pretreatment volume is 482 cubic feet. The pre-treatment components are as follows:

1. 136 L.F. 8 foot wide, 6 inch deep swale = 363 cubic feet

2. 36 L.F. 8 foot wide, 3 inch deep swale = 48 cubic feet

3. Two – 24" diameter PVC catch basin with 2 foot deep sump = 12 cubic feet

4. Two – 30" diameter PVC catch basin with 2 foot deep sump = 20 cubic feet

5. Five (5) diameter precast concrete bypass manhole = 39

Total Provided Pretreatment Volume = 363 cubic feet + 48 cubic feet + 12 cubic feet + 20 cubic feet + 39 cubic feet

Total Provided Pretreatment Volume = 482 cubic feet

Please note, the 1,737 cubic feet of treated volume allows for two (2) inches of freeboard below the top of the plastic chambers. If the water quality volume was calculated to the top of the six (6) inch layer of crushed stone above the chambers, the water quality volume provided is 2,175 cubic feet.

Since this proposed SMP is an infiltration practice, it is considered a standard Stormwater Management Practice (SMP) with "Runoff Reduction Volume (RRv) Capacity". This standard SMP meets ninety percent (90%) of the "Runoff Reduction (RRv)" criteria. It is important to note, that meeting the newly implemented NYSDEC "Runoff Reduction Volume (RRv)" is only required if coverage was needed under NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-10-001).

Although not required by the City of _____ or the NYSDEC, the proposed SMP has been designed to convey peak rates of runoff for the 1 and 2 year storm events. The proposed subsurface stormwater management area has been sized to store and treat the required water quality volume (WQv) and convey peak rates of runoff as defined in the following sections of the New York State Stomwater Management Design Manual last revised August 2010:

1. Chapter 3 "Stormwater Management Planning" including Section 3.6 "The Five Step Process for Stormwater Site Planning and Practice Selection".
2. Chapter 4 "Unified Sizing Criteria" including Section 4.1 "Introduction", Section 4.2.", "Section 4.3 "Runoff Reduction Volume (RRv)".
3. Required elements of Section 6.3 "Stormwater Infiltration" (I-2 Infiltration Basin), including Section 6.3.1 "Feasibility", 6.3.2 "Conveyance", 6.3.3 "Pretreatnent", 6.3.4 "Treatment", 6.3.5 "Landscaping" and 6.3.6 "Maintenance".
4. 9.5.6 "Alternative Stormwater Management Practices Proprietary Practices"
5. Appendix B "Hydrologic Analysis Tools"

The proposed water quality and quantity controls have been designed in accordance with the design guidelines of the New York State Stormwater Management Design Manual, last revised August 2010.

Table 7

Summary of Maximum Water Surface Elevation (WSEL) – Subsurface Plastic Chamber System (SMA)

(All Elevations in Feet)

Storm Recurrence Frequency (years)	Maximum Water Surface Elevation (WSEL) (feet)
1	8.09
2	8.66
5	11.31
10	11.35
25	11.41

Please note, that the rim elevation for PVC overflow in-line drains within the proposed Stormwater Management Area is 11.25. The peak WSEL associated with the 5, 10 and 25 year storm events reach a maximum WSEL of 11.41. This runoff will overflow from the SMA and continue to travel through the wetland buffer (i.e. lawn area) as in existing conditions.

E. EROSION AND SEDIMENT CONTROL

The plans provide for specific erosion and sediment controls to be employed during construction. It is the intent to provide effective erosion control by minimizing land disturbance at any given time, containing sediment from disturbed areas, treating runoff where possible, and stabilizing disturbed soils as soon as possible. Construction of the proposed development can potentially impact soils and by erosion and transport of sediment. An Erosion and Sediment Control Management Program has been established to mitigate these impacts, for the entire duration of the project, as outlined in the New York Guidelines for Urban Erosion & Sediment Control, dated August 2005. A continuing maintenance program will be implemented for the control of sediment transport and erosion control for the duration of the project as well as after construction.

EXISTING TOPOGRAPHIC FEATURES OF SITE AREA

The existing topography is shown on (Consultant Name) Drawing C-100 and C-101 "Existing Conditions Map", C–200 and C–201 "Grading and Drainage Plan", and C–300 and C–301 "Erosion and Sediment Control Plan" at a scale of 1"=10'. Two foot contour intervals are provided on the plans. The plans include the location of the project relative to identifiable land features such as roads, buildings, wooded areas, etc.

SOIL DESCRIPTION

Based on the information obtained from the USDA Soil Survey, the soil type located within the project area consists of Urban land (Uf) and Urban land – Charlton complex (UhB).

CrC – Charlton-Chatfield Complex, rolling, very rocky

The Charlton component makes up approximately 50 percent of the map unit. Slopes are 2 to 15 percent. This component is on hills, ridges and till plains. The parent material consists of acid loamy till derived mainly from schist, gneiss, or granite. The Kf erodibility factor assigned to the top mineral soil layer is 0.28 and the soil loss tolerance factor T is 4. Depth to a root restrictive layer is greater than 60 inches. The Hydrologic Soil Group (HSG) is B. The natural drainage class is well drained. Water movement in the most restrictive layer is

moderately high. Depth to a seasonal water table is 60 inches. Available water capacity is moderate. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This soil does not meet hydric criteria.

The Chatfield component makes up approximately 30 percent of the map unit. Slopes are 2 to 15 percent. This component is on hills, ridges and till plains. The parent material consists of acid loamy till derived mainly from schist, gneiss, or granite. The Kf erodibility factor assigned to the top mineral soil layer is 0.28 and the soil loss tolerance factor T is 3. Depth to a root restrictive layer is 20 to 40 inches. The Hydrologic Soil Group (HSG) is B. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Depth to a seasonal water table is 60 inches. Available water capacity is low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 5 percent. This soil does not meet hydric criteria.

CtC – Charlton-Hollis-Rock outcrop complex, rolling

The Charlton component makes up approximately 50 percent of the map unit. Slopes are 2 to 15 percent. This component is on hills, ridges and till plains. The parent material consists of acid loamy till derived mainly from schist, gneiss, or granite. The Kf erodibility factor assigned to the top mineral soil layer is 0.28 and the soil loss tolerance factor T is 4. Depth to a root restrictive layer is greater than 60 inches. The Hydrologic Soil Group (HSG) is B. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Depth to a seasonal water table is 60 inches. Available water capacity is moderate. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This soil does not meet hydric criteria.

The Hollis component makes up approximately 30 percent of the map unit. Slopes are 3 to 15 percent. This component is on hills, ridges. The parent material consists of a thin mantle of loamy till derived mainly from schist, gneiss, or granite. The Kf erodibility factor assigned to the top mineral soil layer is 0.28 and the soil loss tolerance factor T is 2. Depth to a root restrictive layer is 10 to 20 inches. The Hydrologic Soil Group (HSG) is C/D. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Depth to a seasonal water table is 80 inches. Available water capacity is very low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This soil does not meet hydric criteria.

Table 8 on the following page summarizes the characteristics of the on-site soils:

Table 8

On-Site Soil Characteristics

Map Unit	Soil Name	Erosion Hazard	Hydrologic Group	Surface Runoff Potential	Depth to Root Restrictive Feature (in)	Depth to Seasonal Water table (in)
Crc	Charlton-Chatifeld	–	B	Moderate	>60	>60-80
CtC	Charlton-Hollis-Rock	Slight to Moderate	C/D	Moderate to High	10-20	80

I. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

Temporary Erosion & Sediment Control Measures will be used throughout the construction of the proposed improvements to control on-site erosion and sediment transfer. These measures include a stabilized construction entrance, silt fence, storm drain inlet protection, dust control, temporary seeding and mulching.

The temporary erosion & sediment controls that will be used during the development of the site include the following:

- Stabilized Construction Entrance – will be constructed at the entrance to the area of construction and will consist of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 20 feet in width by 8 inches in depth.

- Silt Fence at downgradient slopes and around stockpile areas – is a temporary geotextile fabric used to intercept sediment laden runoff from small drainage areas.

- Storm Drain Inlet Protection – is a permeable barrier placed around the drain inlet to reduce the amount of sediment entering the storm drainage system.

- Dust Control – consisting of spraying the ground surface with water to prevent dust emissions from vehicular and construction traffic.

- Seeding – will be used to create a vegetative surface 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. The temporary seeding will be placed within the proposed parking area only.

- 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.

- Erosion & Sediment Control Notes – Construction sequencing is included on the Erosion and Sediment Control Plan to direct the Contractor how to proceed during construction to prevent and minimize erosion.

II. PERMANENT EROSION AND SEDIMENT CONTROL MEASURES

The intent of the permanent erosion and sediment control measures is to permanently stabilize the ground surface via vegetative and structural practices, while controlling and reducing runoff velocities. Towards the completion of the development of the site, permanent erosion and sediment control measures will be developed for long term erosion protection. _____ will be the responsible party for the long term maintenance of the permanent control measures. The following permanent control measures will be developed for long term erosion protection:

- Seeding – 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 3 tons per acre such that the mulch forms a continuous blanket. Optimum times for planting are the early spring and fall; however plantings can be started in the summer provided adequate mulch and moisture is supplied.

- Landgrading – is the reshaping of the existing land surface in accordance with the Grading and Drainage Plan. Proper grading will ensure the intended drainage areas are directed to the Stormwater Management Practice (SMP). Landgrading also includes the removal of stockpile soils from the site which are in excess to project needs, and the removal of assorted brush designated in areas to be cleared.

- Sumps – will be used to remove some of the coarse sand and grit sediment before entering the proposed drainage system. The proposed drainage structures will be constructed with a twenty–four (24) inch deep sump.

- Subsurface Stormwater Management Area – is a system consisting of proprietary plastic chambers that allows water to infiltrate through the bottom and sidewalls through crushed stone into the subsoil strata. This SMP is expected to remove pollutants such as Phosphorus, Nitrogen, Metals (i.e. Cadmium, Copper, Lead and Zinc) and Pathogens (i.e. Coliform, Streptococci and E. Coli) from stormwater runoff.

F. MAINTENANCE AND INSPECTION REQUIREMENTS

Maintenance and inspections are required in order to ensure the stormwater and erosion and sediment control practices are performing as designed. Temporary and permanent maintenance and inspection requirements are further discussed below. Proper maintenance and inspections will ensure the longevity and effectiveness of the SWPPP and Erosion and Sediment Control Plan.

I. SHORT AND LONG TERM MAINTENANCE AND INSPECTION REQUIREMENTS

Inspections during construction should be performed to verify all practices are functioning properly; correctly maintained, and accumulated sediment is removed from all structures. The Contractor will also examine the site for any evidence of soil erosion, the potential for pollutants to enter the storm drain system, turbid discharges at all outfalls, and the potential for soil and other materials to be transported on the public roadway at the site entrance. In addition to these guidelines, the project plans will provide more specific erosion control guidelines, as well as a construction sequence to serve as a general guide for the Contractor though the construction process. The Contractor shall be responsible for maintaining the temporary erosion and sediment control measures through out construction. This maintenance will include, but not be limited to, the following tasks:

a. SHORT TERM MAINTENANCE AND INSPECTION SCHEDULE AND REQUIREMENTS

- The construction entrance should be checked daily to ensure no sediment is being deposited onto the public roadway. Should sediment be observed, it should be immediately removed from the street, and the stone in the construction entrance replaced the same day.

- Inlet protection will be inspected daily to check for debris and sediment buildup and clogging. In the event debris and sediment buildup and clogging is observed, the wire mesh and crushed stone are to be cleaned and/or replaced in order to guarantee proper function of the drainage system.

- Inlets and outlets to subsurface drainage pipes are to remain clear at all times. An inspection is to be made daily to ensure that pipes are functioning and that stormwater flow is unrestricted. In the event material is found to have clogged subsurface pipes, all attempts should immediately be made to clear such debris. In the event material is out of reach, appropriate measures must be taken to ensure pipes are cleared and actions taken to prevent such incidents from reoccurring.

- Trenches are also to be inspected daily to ensure proper movement of stormwater. Any large debris or collections of sediment are to immediately be removed and properly disposed.

- 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).

- 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.

- Sediment deposits shall be removed when they reach approximately 1/3 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. Any damaged or torn fence shall be replaced. Fill shall be protected following disposal with mulch, temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

- Rake all exposed areas parallel to the slope during earthwork operations to minimize concentrated flow across unstabilized areas.

- Following final grading, the disturbed area shall be stabilized with a permanent surface treatment (i.e. grass, pavement, sidewalk, etc.). During rough grading, areas which are not to be disturbed for (7) seven or more days shall be stabilized with the temporary seed mixture, as defined on the plans.

b. LONG TERM MAINTENANCE AND INSPECTION SCHEDULE AND REQUIREMENTS

StormTech™ (OR APPROVED EQUAL) PLASTIC CHAMBER SYSTEM

- Inspection of the "Isolator Row" shall be conducted bi-annually (twice a year)
- The "Isolator Row" shall be cleaned when the accumulated sediment reaches an average depth of three (3) inches. If sediment accumulates to a three (3) inch depth, the cleaning procedures shall be followed as described below.
- For the PVC overflow in-line drains, open the hinged grate and use a flashlight and stadia rod to measure the depth of the sediment.

- At the bypass manhole (BMH A-2), remove the manhole cover at the upstream end of the "Isolator Row".
- Using a flashlight, inspect down the "Isolator Row". Mirrors on poles or cameras may be used to avoid a confined space entry.
- Cleanout the "Isolator Row" using the JetVac process.
    - A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 degress or more is preferable.
    - Apply multiple passes of JetVac until backflush water is clean.
    - Vacuum bypass manhole and inspection manhole (DMH A-1) sump as required.
- Proper documentation shall include: Dates and results of each inspection, proposed and installed repairs, renovations, improvements, type and amount of captured pollutants, procedure for disposal of pollutants, preparation and submittal of reports, documentation of nutrient and sediment reduction credits.
- Disposal of all removed pollutants shall be properly documented and in accordance with all applicable local, state and federal regulations.
- The bypass and inspection manholes are confined space environments. Only properly trained personnel possessing the necessary safety equipment should enter the unit to perform particular maintenance and/or inspection activities.
- Sparks and flames shall be kept away from system at all times, as it may contain flammable material.
- Manhole covers shall be replaced securely to their frames after inspection or maintenance.
- Refer to Appendix D of the SWPPP for site specific inspection and maintenance procedures outlined by the manufacturer.

G. ADDITIONAL STORMWATER POLLUTION PREVENTION MEASURES

During construction, specific pollution prevention measure will be implemented to control litter, construction chemical and construction debris from becoming a pollutant source in stormwater runoff. These pollution prevention measures are described below.

WASTE DISPOSAL

All liquid waste materials will be collected and stored in sealed metal containers approved by the Engineer. All trash and construction debris from the site will be deposited in the approved containers. Containers will be serviced as necessary, and the trash will be hauled to an approved disposal site or licensed landfill. All onsite personnel will be instructed in the proper procedures for waste disposal, and notices stating proper practices will be posted in the field office. The General Contractor's representative responsible for the conduct of work on the site will be responsible for seeing waste disposal procedures are followed.

HAZARDOUS WASTE

All hazardous waste materials will be disposed of in a manner specified by local, state and regulations or by the manufacturer. Site personnel will be instructed in these practices, and the individual designated as the Contractor's on-site representative will be responsible for seeing that these practices are followed.

SANITARY WASTE

Portable sanitary facilities will be provided on the construction site. Sanitary waste will be collected from the portable units in a timely manner by a licensed waste management Contractor, and as required by any local, state and federal regulations.

H. CONSTRUCTION MATERIALS STORAGE AND SPILL PREVENTION RESPONSE (SPR)

During construction, building and waste materials are expected to be stored on site. A description of the controls to reduce pollutants from these materials, and storage practices to minimize exposure of materials and spill prevention response (SPR) are discussed below.

1. NON-STORM WATER DISCHARGES

The following non-storm water discharges are anticipated during the course of this project:

- Discharges from water line flushing.
- Pavement wash-water, where no spills or leaks of toxic or hazardous materials have occurred.
- Uncontaminated ground water (if encountered) associated with dewatering activities.

2. MATERIALS INVENTORY

The following materials or substances are expected to be present on the site during the construction period. These materials will be handled and stored appropriately, and in accordance with local, state and federal regulations.

- Concrete and Portland Cement
- Detergents
- Paints
- Metals
- Bituminous Materials
- Petroleum Based Products
- Cleaning Solvents
- Wood
- Epoxy Based Mortars, Grouts, etc.
- Fertilizers

3. SPILL PREVENTION

HOUSE KEEPING

- Only needed products will be stored on-site by the Contractor.
- Except for bulk materials, the Contractor will store all materials under cover and in appropriate containers.
- Products must be stored in original containers and labeled.
- Material mixing will be conducted in accordance with the manufacturer's recommendations.
- When possible, all products will be completely used before properly disposing of the container off site.
- The manufacturer's directions for disposal of materials and containers will be followed.
- The Contractor's site superintendent will inspect materials storage areas regularly to ensure proper use and disposal.
- Dust generated will be controlled in an environmentally safe manner.
- Vegetation areas not essential to the construction project will be preserved and maintained as noted on the drawings.

HAZARDOUS MATERIALS

- Products will be kept in original containers unless the container is not resealable.
- Original labels and material safety data sheets will be retained in a safe place to relay important product information.
- If surplus product must be disposed of, manufacturer's label directions for disposal will be followed.
- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
- Wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any storm water system or storm water treatment system.
- Potential pH-modifying materials such as: bulk cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, and mixer washout waters will be collected on site.

PRODUCT SPECIFIC PRACTICES

Petroleum Products

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

Fertilizers

Once applied, fertilizers will be worked into the soil to limit the exposure to storm water. Fertilizers will be stored in an enclosed area. The contents of partially used fertilizer bags will be transferred to sealable containers to avoid spills.

Paints

All containers will be tightly sealed and stored when not required for use. The excess will be disposed of according to the manufacturer's instructions and applicable state and local regulations.

Concrete Trucks

Contractors will provide designated truck washout areas on the site. These areas must be self contained and not connected to any storm water outlet of the site. Upon completion of construction, washout areas will be properly stabilized.

SPILL CONTROL PRACTICES

In addition to the housekeeping and material management practices, the following practices will be followed for spill prevention and cleanup (if needed):

- For all hazardous materials stored on site, the manufacturer's recommended methods for spill clean up will be clearly posted. Site personnel will be made aware of the procedures, and the locations of the information and cleanup supplies.
- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as booms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for clean up purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- After a spill, a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator. The Contractor is responsible for ensuring that the site superintendent has had appropriate training for hazardous materials handling, spill management, and cleanup.

4. SPILL RESPONSE

The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into storm water runoff and conveyance systems. If the release has impacted on-site storm water, it is critical to contain the released materials on-site and prevent their release into receiving waters. If a spill of pollutants threatens storm water or surface water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants.

- The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.

- If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
- Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
- If oil sheen is observed on surface water, action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
- If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to the contacts listed below.
- Personnel with primary responsibility for spill response and clean up will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

5. SPILL NOTIFICATION

In the event of a spill, the Contractor's site superintendent will make the appropriate notification(s), consistent with the following procedures:

- A reportable spill is a quantity of five (5) gallons or more or any spill of oil which: (1) violates water quality standards, (2) produces a "sheen" on a surface water, or (3) causes a sludge or emulsion. This spill must be reported immediately to the agencies listed below.

- Any spill of oil or hazardous substance to waters of the state must be reported immediately by telephone to the following agencies:

  - 911 – Police, Fire and EMS
  - _____ Fire Department Headquarters
    15 Locust Ave, _____ NY, 10580
    _____ FD Business Line: (914) 967-4530
  - NYS Department of Environmental Conservation (NYSDEC)
    Spill Reporting Hotline
    (1800) 457–7362
  - National Response Center: (1800) 424-8802
  - Local Emergency Planning Committee (LEPC)
    Westchester County Office of Emergency Management
    200 Bradhurst Avenue
    Hawthorne, NY 10532
    (914) 864–5450

- Westchester County Department of Health (WCDOH)
  Spill Reporting Hotline
  (914) 813-5000
- U.S. Environmental Protection Agency (USEPA)
  EPCRA Information Hotline
  (1800) 535–0202
- U.S. Department of Labor and Occupational Safety and Health Administration (OSHA)
  Tarrytown, NY
  (914) 524–7510

6. CONSTRUCTION CHANGES

When changes are made to the construction project that will require alterations in the temporary erosion controls of the site, the Storm Water Pollution Prevention Plan (SWPPP) will be amended to provide appropriate protection to disturbed areas, all storm water structures, and adjacent waters. The SWPPP and supporting drawings will be modified to reflect the changes. Copies of the revised SWPPP will be submitted to the Village of _____ and the Contractor. The SWPPP will be retained in a designated on–site area for review for the duration of the project.

I. CONCLUSION

The Stormwater Pollution Prevention Plan (SWPPP) for the proposed _____ Project will provide water quality treatment and water quantity control (not required, but provided) for stormwater in accordance with the City of _____ Code requirements, and the New York State Department of Environmental Conservation (NYSDEC) Stormwater Management Design Manual, last revised August 2010. The subsurface plastic chamber system will be coupled with an "Isolator Row" for pretreatment of stormwater runoff as it enters the SMA. The proposed Stormwater Management Practice is expected to remove pollutants such as Phosphorus, Nitrogen, Metals (i.e. Cadmium, Copper, Lead and Zinc) and Pathogens (i.e. Coliform, Streptococci and E. Coli). Water quality is expected to be enhanced prior to discharge from the site and into the Long Island Sound.

The proposed Stormwater Management Practice (SMP) and a properly implemented maintenance program and spill prevention response will effectively mitigate any potential adverse impacts of stormwater runoff from the proposed improvements. Downstream areas (on-site and off–site), and adjacent properties, are not expected to be adversely affected by the project with the implementation of the proposed Stormwater Pollution Prevention Plan (SWPPP).

Sincerely,

APPENDIX A

EXISTING AND PROPOSED HYDROLOGIC CALCULATIONS

APPENDIX B

NYSDEC WATER QUALITY VOLUME AND WATER QUALITY PEAK FLOW CALCULATION WORKSHEET

APPENDIX C

StormTech™ SC-310 CHAMBER PRODUCT DATA SHEET AND CUMULATIVE STORAGE EXCEL SPREADSHEET

APPENDIX D

StormTech™ SC-310 CHAMBER MAINTENANCE GUIDELINES

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DRAINAGE AREA MAPS

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APPENDIX I

TEST PIT AND PERCOLATION TEST PLAN

APPENDIX J

TEST PIT AND PERCOLATION TEST DATA SHEET

APPENDIX K

PROPOSED STORM SEWER HYDRAULIC ANALYSIS