STORMWATER POLLUTION PREVENTION PLAN

Mixed Residential Development

900 King Street
Village of Rye Brook, NY

Applicant/Operator/Owner: 900 King Street Owner, LLC
200 Madison Avenue, 26th Floor
New York, NY 10016

Prepared by:

JMC Project 16222

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I. INTRODUCTION

This Stormwater Pollution Prevention Plan has been prepared for the 17.77 acre Mixed Residential Development property, located in the Village of Rye Brook, Westchester County, New York (hereinafter referred to as the "Site"). The site is bordered by Hutchinson River Parkway to the north and west, The Arbors residential development, Arbor Drive, Rye Brook High School and Harkness Park to the south and east, and Rye Brook Village Hall, Police and Fire Departments to the northeast. The development has been designed in accordance with the following:

- Requirements of the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-15-002, effective January 29, 2015, last modified November 23, 2016.
- Chapter 217 "Stormwater Management" of the Village Zoning Code

The property is currently developed as an office building with a parking lot within the PUD "Planned Unit Development District." The project includes the removal of the existing, mostly vacant, office building and large surface parking lot and the construction of an integrated age-restricted residential community consisting of approximately 160 two-bedroom units within a four-story Independent Living (IL) facility in the center of the Site; approximately 85 units of Assisted Living / Memory Care (AL) in a four-story structure in the northeast portion of the Site; and 24 two- and three-bedroom residential townhouses in the western portion of the Site. The Site would continue to be accessed from Arbor Drive and a new circular drive would be constructed within the Site that would connect and provide access to the Proposed Project's three components.

II. STORMWATER MANAGEMENT PLANNING

In order to be eligible for coverage under the NYSDEC SPDES General Permit No. GP-0-15-002 for Stormwater Discharges from Construction Activities, the Stormwater Pollution Prevention

Plan (SWPPP) includes stormwater management practices (SMP's) from the publication "New York State Stormwater Management Design Manual," last revised January 2015.

A Stormwater Pollution Prevention Plan has been prepared for this project because it is a construction activity that involves soil disturbances of one (1) or more acres of land. The proposed stormwater facilities have been designed such that the quantity and quality of stormwater runoff during and after construction are not adversely altered or are enhanced when compared to pre-development conditions.

Based on the GIS information provided by the website of the New York State Office of Parks, Recreation and Historic Places, the site does not contain, nor is it immediately adjacent to any properties listed on the State or National Register of Historic Places.

The Six Step Process for Stormwater Site Planning and Practice Selection

Stormwater management using green infrastructure is summarized in the six step process described below. The six step process was adhered to when developing this SWPPP. Information is provided in this SWPPP which documents compliance with the required process as follows:

Step 1: Site Planning

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

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

- Preserving hydrology - Maintaining drainage divides to the maximum extent practicable

- Wetlands and buffers – The site includes wetlands and wetland buffers. The project requires the some light disturbance of the buffers but reduces the amount of impervious area within the wetland buffers.
- Floodplain considerations - The site does not lie within the 100 year flood zone according to the National Flood Insurance Program
- Reduction of impervious surfaces such as:
  i. Reduced roadway, driveway & sidewalks widths
  ii. Underground parking spaces below the building
  iii. Grass paver emergency access drive
- Existing drainage piping from off-site upstream drainage areas is proposed to be replaced and slightly redirected through the site but will continue to discharge in the same locations as existing conditions.
- Forest, vegetative cover – The maximum amount of wooded and vegetative cover has been maintained and/or provided.
- Critical areas have been preserved.
- Topography (contour lines, existing flow paths, steep slopes, etc.) has been maintained or disturbed to the minimum extent practicable.

Step 2: Determine Water Quality Treatment Volume (WQv)

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

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

York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

The NYSDEC Redevelopment Standards include specific criteria for the implementation of surface water quality improvements. The project is a redevelopment and therefore will comply with the strategies outlined within Chapter 9: Redevelopment Projects of the Design Manual. There are different options to control water quality depending on the redevelopment. Since the redevelopment results in the creation of additional pervious area, Water Quality Treatment Option II will be utilized which requires treatment for 25% of the existing impervious area, plus 100% of the additional, new impervious area.

The plan proposes that a minimum of 25% of the existing impervious area, plus 100% of the additional, new impervious area of the disturbance area is captured and treated by the implementation of standard Stormwater Management Practices (SMP's). The project results in a decrease in impervious area.

According to Option II, standard practices such as subsurface infiltration systems can be sized to treat the water quality volume generated from 25% of the existing impervious area plus 100% of the new impervious area. Green practices such as green roofs and porous pavement can be used towards credit in meeting the water quality volume requirements.

Proposed standard SMP's will effectively infiltrate the entire required water quality volume by setting the outlet elevations equal to or greater than the required water quality volume. This also ensures that the Ruinoff Reduction Volume criteria is met. In addition,, the SMP's will infiltrate up to the 2 year storm for their contributing drainage areas.

Stream Channel Protection for a redevelopment project is not required if there is no increase in impervious area or changes to hydrology that increase the discharge rate.

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

RRv is required for this project since it is a combination of both new development and redevelopment.

Green infrastructure techniques or standard SMP's with RRv capacity can potentially reduce the required WQv by incorporating combinations of green infrastructure techniques and standard SMP's within each drainage area on the site.

Green infrastructure techniques are grouped into two categories:

- Practices resulting in a reduction of contributing area such as preservation/restoration of conservation areas, vegetated channels, etc.
- Practices resulting in a reduction of contributing volume such as green roofs, stormwater planters, and rain gardens.

Apply a combination of green infrastructure techniques and standard SMPs with RRv capacity to provide 100% of the WQv calculated in Step 2. If the RRv calculated in this step is greater than or equal to the WQv in Step 2, the RRv requirement has been met and Step 4 can be skipped. If the RRv provided cannot meet or exceed 100% of the WQv, the project must, at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site and is defined as Specific Reduction Factor (S).

The following green infrastructure techniques and practices are provided in the Design Manual:

- **Conservation of Natural Areas**
    - Most of the site is developed and has been for decades. The project does not propose for any undisturbed areas to be included within a conservation easement. Therefore, there is no area to be subtracted from the contributing area for the WQv calculation.
- **Sheet flow to Riparian Buffers or Filter Strips**

- The only well vegetated area on-site with acceptable slopes that lend an opportunity as a buffer and still meet the minimum contributing length of flow is the southern wetland/wooded area. This practice is not practical since there is a high point between the development area and the wetland/wooded area on the south end of the site.

- **Vegetated Swales**
  - The use of sheet flow into vegetated swales shall be implemented along the existing driveways and proposed circular driveway. However, because of limited flow lengths, vegated swales cannot be counted towards RRv. They are provided but are not credited.
- **Tree Planting / Tree Pits**
  - The project includes extensive tree planting around its perimeter as part of the proposed landscaping plan. However, to be conservative, the new trees are not credited towards area reduction for the water quality volume.
- **Disconnection of Rooftop Runoff**
  - This practice is proposed for the smaller townhouse buildings but is not taken credit for in the water quality or runoff reduction calculations.
- **Stream Daylighting**
  - This practice is not possible for this project since there are no existing streams.
- **Rain Gardens**
  - This practice is not practical for this project since a contributing drainage area is limited to 1,000 square feet of rooftop. This practice is typically used in a residential application. There are other practices more suitable that achieve the required water quality and runoff reduction.
- **Green Roofs**
  - This practice is not proposed since the building roof is sloped. There are other practices more suitable that achieve the required water quality and runoff reduction.
- **Stormwater Planters**
  - Infiltration planters are typically proposed at various locations around proposed buildings to collect and infiltrate runoff from portions of the building rooftops. Small drainage areas, less than 15,000 square feet can be collected by roof drains and discharged into stormwater planters which infiltrate stormwater prior to entering the underground storm pipes. The location of the proposed roof drain leaders are not in locations that a

large planter could be practical to construct since it would block proposed windows and doors. There are other practices more suitable that achieve the required water quality and runoff reduction.

- **Rain Barrels and Cisterns**
  - Underground storage tanks installed to collect stormwater runoff to be used for irrigation purposes are not proposed since there are other practices more suitable that achieve the required water quality and runoff reduction.
- **Porous Paving**
  - This practice is being utilized in the form of grass pavers at the emergency access driveway proposed to connect the adjacent Village Fire Department to the proposed circular driveway. Porous pavement can be used to provide RRv however, because the soil on-site in the area of the emergency access drive is classified as hydrologic soil group C, no RRv credit is taken. The other paved areas of the site are not acceptable for porous pavement because they will be higher traffic areas.
- **Standard Practices with RRv Capacity**
  - **Infiltration Practices –** Subsurface infiltration systems are proposed to treat and retain runoff from the majority of the proposed new disturbance area of the site.

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

Step 4: Determine the minimum RRv Required

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

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

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

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

The Channel Protection Volume (CPv), Overbank Flood Control (Qp) and Extreme Flood Control (Qf) must be met for the plan to be completed. This is accomplished by using practices such as infiltration basins, dry detention basins, etc. to meet water quantity requirements. The following standards must be met:

1. **Stream Channel Protection (CPv)**

   Stream Channel Protection Volume Requirements (CPv) are designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. Reduction of runoff for meeting stream channel protection objectives, where site conditions allow, is encouraged and the volume reduction achieved through green infrastructure can be deducted from CPv. Trout waters may be exempted from the 24-hour ED requirement, with only 12 hours of extended detention required to meet this criterion. Detention time may be calculated using either a center of mass method or plug flow calculation method.

   CPv for a redevelopment project is not required if there is no increase in impervious area or changes to hydrology that increase the discharge rate. This criterion, as defined in Chapter 4 of New York State Stormwater Design Manual, is not based on a pre versus post-development comparison. However, for a redevelopment project this requirement is relaxed. If the hydrology and hydraulic study shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required.

2. **Overbank Flood (Qp) which is the 10 year storm.**

   Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates.

3. **Extreme Storm (Qf) which is the 100 year storm.**

   100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates.

Based on the foregoing, this project is eligible for coverage under NYSDEC SPDES General Permit No. GP-0-15-002.

III. STUDY METHODOLOGY

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

The 1, 2, 10, 25, 50 and 100 year storm recurrence intervals were reviewed in the design of the stormwater management facilities (see Appendices A & B Existing/Proposed Hydrologic Calculations).

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

Base Data and Design Criteria

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

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

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

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

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

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

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

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

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

9. The time of concentration was calculated using the methods described in Chapter 3 of TR-55, Second Edition, June 1986. Manning's kinematics wave equation was used to determine

the travel time of sheet flow. The 2-year 24 hour precipitation amount of 3.45 inches was used in the equation for all storm events. The travel time for shallow concentrated flow was computed using Figure 3-1 and Table 3-1 of TR-55. Manning's Equation was used to determine the travel time for channel reaches.

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

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

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

13. The storm flows for the 1, 2, 10, 25, 50 & 100 year recurrence interval storms were analyzed for the total watershed areas. The Type III distribution design storm for a 24 hour duration was used and the mass rainfall for each design storm was taken from the Extreme Precipitation in New York & New England developed by the Natural Resource Conservation Service (NRCS) and the Northeast Regional Climate Center (NRCC) as follows:

24 Hour Rainfall Amounts

Design Storm Recurrence Interval	Inches of Rainfall
1 Year	**2.85**
2 Year	**3.45**
10 Year	**5.11**
25 Year	**6.40**
50 Year	**7.60**
100 Year	**9.02**

IV. EXISTING CONDITIONS

The existing conditions of the project site consists of a two-story office building surrounded by parking lots to the north. The building has parking inside on the first level with access through the existing parking lot and direct access to Arbor Drive. There is another access driveway off

of Arbor Drive to the existing parking lot. The site generally slopes from north to south. There is an existing detention basin along the east side of the site that receives the stormwater runoff from the existing building and parking lot, as well as some adjacent Village properties on the other side of the detention basin along the east side of the site. After stormwater runoff exits the project site through the existing detention basin, it flows to the municipal drainage system through Harkness Park and then along the Blind Brook High School driveway to King Street.

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

- Wetlands (jurisdictional, wetland of special concern)
- Waterways (major, perennial, intermittent, springs)
- Buffers (stream, wetland, forest, etc.)
- Floodplains
- Forest, vegetative cover
- Critical areas
- Topography (contour lines, existing flow paths, steep slopes, etc.)
- Soil (hydrologic soil groups, highly erodible soils, etc.)
- Bedrock, significant geology features

Based on the United States Department of Agriculture (USDA) Web Soil Survey, all on-site soils are well drained or undefined and belong to hydrological groups B and C. The soil types, boundaries and drainage areas/designations are depicted on Drawing DA-1 within Appendix E.

Three separate Design Points (1 and 2 plus a "Bypass") were identified for comparing peak rates of runoff in existing and proposed conditions. There are eight separate drainage areas identified in existing conditions based on the existing drainage divides at the site.

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

Existing Drainage Area 1A (EDA-1A) is 10.253 acres in size and is located on the northern portion of the site along the Hutchinson River Parkway. This area consists of half of the existing building, sidewalks, most of the parking lot, lawn, as well as woods and brush along the northern property boundary. This drainage area drains north to south, is collected by the existing drainage system in the parking lot and eventually to an existing detention basin along the eastern property boundary, designated as EX DET 1. The existing detention basin has an outlet control structure that discharges to another detention basin area on-site downstream., designated as EX DET 2. The runoff then discharges into a 24 inch diameter pipe that runs beneath Arbor Drive, which is designated as Design Point #1. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 83 and 8 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area 1B (EDA-1B) is 1.717 acres in size and is located north off the site along the Hutchinson River Parkway. This area consists of half of a portion of the Hutchinson River Parkway, a wooded area north of the parkway and lawn area along the sides of the parkway. This drainage area drains south onto the parkway, into the drainage conveyance system in the parkway and discharges onto the site, designated as Junction 1B. The runoff flows across a lawn area and onto the existing parking lot. It is collected by the existing drainage system in the parking lot and conveyed to the existing detention basin along the eastern property boundary. This travel path is designated as Reach 1B. The runoff eventually flows to Design Point #1 as described above. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 77 and 5 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area 1C (EDA-1C) is 3.452 acres in size and is located in the middle of the site. This area consists of half of the existing building, a portion of the driveway and a portion of the parking lot, as well as small lawn, wooded and brush along the eastern parking lot boundary. This drainage area drains southwest to northeast, is collected by the existing drainage system in the parking lot and eventually to the existing detention basin along the eastern property boundary. The runoff eventually flows to Design Point #1 as described above. The Curve

Number (CN) and Time of Concentration (Tc) for this drainage area are 94 and 5 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area 1D (EDA-1D) is 1.598 acres in size and is located off-site to the east of the property. This area consists of off-site existing Village buildings, driveways, parking lots, as well as small lawn, wooded and brush along the eastern property boundary. This drainage area drains southwest into the existing detention basin along the eastern property boundary. The runoff eventually flows to Design Point #1 as described above. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 83 and 5 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area 1E (EDA-1E) is 2.622 acres in size and is located along the southeast side of the site along Arbor Drive. This area consists of wooded area, brush and lawn along the roadway, the access driveways to the building and a portion of the roadway. This drainage area drains northeast and then into a 15 inch diameter pipe within Arbor Drive that conveys the runoff to the 24 inch diameter pipe that runs beneath Arbor Drive. The existing detention basin (EX DET 1) that receives runoff from EDA-1A, 1B, 1C and 1D discharges to EX DET 2. EX DET 2 is within EDA-1E and a portion of EDA-1E drains overland into it. EX DET 2 then discharges into a 24 inch diameter pipe that runs beneath Arbor Drive, which is designated as Design Point #1. The pipe is part of the Village drainage conveyance system that runs beneath Arbor Drive and towards the adjacent park. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 78 and 15 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area 1F (EDA-1F) is 1.353 acres in size and is located off-site to the northeast of the property. This area consists of off-site existing Village buildings, driveways, parking lots, as well as small lawn, wooded and brush along the northeastern property boundary. This drainage area drains southwest into the Village drainage conveyance system and discharges onto the site, designated as Junction 1F. The runoff is conveyed along a travel path that is designated as Reach 1F which flows to EX DET 2 and to Design Point #1. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 83 and 5 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area 2 (EDA-2) is 5.560 acres in size and is located at the south end of the site. This area consists of wooded area and wetlands stretching from east to west along the south end of the site. Some townhouse buildings and lawn areas from the The Arbors development drain onto the site in EDA-2. This drainage area drains west into a small watercourse and then into a 15 inch diameter pipe at the southern corner of the site, which is designated as Design Point #2. The pipe is part of the Village drainage conveyance system that runs beneath Arbor Drive and towards the adjacent school. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 72 and 13 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Existing Drainage Area "Bypass" is 21.542 acres in size and is located north off the site along the Hutchinson River Parkway. This area consists of a portion of the Hutchinson River Parkway and a large portion of the residential area north of the parkway. This drainage area drains south onto and through the parkway via the existing drainage conveyance system in the parkway and is piped through the site to the EX DET 2 along Arbor Drive to Design Point #1. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 86 and 31 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

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

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

Storm Recurrence Interval	DP-1	DP-2	Bypass
1 year	7.25	3.18	21.23
2 year	17.61	5.05	28.33
10 year	41.62	10.96	48.44
25 year	53.99	15.98	64.33
50 year	71.13	20.81	79.18
100 year	91.11	26.64	96.68

The volumes of runoff to each design point are shown in the table below.

Table 2
Summary of Runoff Volumes in Existing Conditions
(Cubic Feet)

Storm Recurrence Interval	DP-1	DP-2	Bypass
1 year	68,105	14,536	119,999
2 year	105,713	21,963	160,613
10 year	216,966	46,072	279,120
25 year	307,626	67,072	374,573
50 year	393,794	87,696	464,775
100 year	497,184	113,019	572,603

V. PROPOSED CONDITIONS

The proposed improvements consist of the construction of a four-story Independent Living facility in the center of the Site and 12 residential townhouse in the western portion of the Site. The Site would continue to be accessed from Arbor Drive and a new circular driveway would be constructed within the Site that would connect and provide access throughout the site. A grass paver emergency access drive is proposed to connect the adjacent Village Fire Department to the proposed circular driveway.

The proposed drainage improvements include standard stormwater practices such as vegetated swales, subsurface infiltration systems and improvements to the existing stormwater detention basin. The project decreases impervious area overall but the main drainage area, which includes most of the proposed development, increases in size because of the site layout and grading design. Therefore, more area drains to the existing detention basin and Design Point #1 along Arbor Drive than in existing conditions. As a result, in addition to slight expansion and maintenance to the existing detention basin by removal of overgrown and dead vegetation, debris, etc., other stormwater practices are required to provide peak rate attenuation.

Furthermore, in addition these practices provide opportunities to enhance water quality and provide runoff reduction volume from the development area through infiltration. The grass paver emergency drive, vegetated swales and disconnected impervious areas will result in

additional infiltration not considered in the SWPPP's hydrologic model, resulting in a conservative analysis. The existing site does not have any stormwater practices with infiltration to provide water quality and runoff reduction.

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

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

1. Feasibility – Ponds are designed based upon unique physical environmental considerations noted in the NYS Stormwater Management Design Manual (NYSSMDM) Table 7.2 "Physical Feasibility Matrix".

2. Conveyance – The design conveys runoff to the designed pond in a manner that is safe, minimizes erosion and disruption to natural drainage channel and promotes filtering and infiltration.

3. Pretreatment – All pond provide pretreatment in accordance with NYSSMDM design guidelines.

4. Treatment Geometry – The plan provides water quality treatment in accordance with NYSSMDM guidelines noted Table 6.1 "Water Quality Volume Distributing in Pond Design".

5. Environmental/Landscaping –Extensive landscaping has been provided for each proposed practice to enhance pollutant removal and provide aesthetic enhancement to the property.

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

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

Three separate Design Points (1 and 2 plus a "Bypass") were identified for comparing peak rates of runoff in existing and proposed conditions. Nine separate drainage areas were identified in proposed conditions based on the proposed drainage divides at the site.

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

Proposed Drainage Area 1A-1 (PDA-1A-1) is 12.846 acres in size and is located in the middle of the site and along the northern boundary adjacent tot the Hutchinson River Parkway. This area consists of the proposed assisted and independent living building, most of the circular access driveway, sidewalks, parking areas, the emergency grass paver access driveway to the firehouse, lawn, as well as woods and brush along the northern property boundary. This drainage area is collected by the proposed drainage conveyance system from the building, in the parking areas, the circular access driveway and eventually to the existing detention basin along the eastern property boundary, designated as EX DET 1 and eventually to Design Point #1 as described in the Existing Conditions section of the report. The proposed improvements include a slight expansion and clean-up of EX DET 1. Additional volume is provided by land grading and a retaining wall. The existing basin is also filled with overgrown vegetation and debris that will be removed and restored with new landscape plantings. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 83 and 10 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 1A-2 (PDA-1A-2) is 1.535 acres in size and is located at the southern most portion of the site and along Arbor Drive. This area consists of some of the proposed small townhouse buildings, townhouse driveways, a portion of the circular access driveway, sidewalks and lawn. This drainage area is collected by the proposed drainage conveyance system in the circular access driveway and conveyed to a proposed underground infiltration system, designated as INFIL 1A-2. INFIL 1A-2 consists of 61 StormTech MC-4500 chambers with an outlet control structure that contains an overflow weir that will hold back the volume of runoff and force it to infiltrate before leaving the system. The weir elevation is set just below the crown

of the chambers and the runoff volume that will infiltrate is greater than he required water quality volume. The higher storms will be discharged from the system and conveyed to EX DET 1 and then eventually to Design Point #1 as described in the Existing Conditions section of the report. Soil testing has not yet been performed on-site . An assumed soil percolation rate of 2 inches per hour was used in the analysis. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 85 and 10 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 1A-3 (PDA-1A-3) is 1.647 acres in size and is located at the southwestern portion of the site and along the Hutchinson River Parkway. This area consists of some of the proposed small townhouse buildings, townhouse driveways, a portion of the circular access driveway, sidewalks and lawn as well as woods and brush along the northern property boundary. This drainage area is collected by the proposed drainage conveyance system in the circular access driveway and conveyed to a proposed underground infiltration system, designated as INFIL 1A-3. INFIL 1A-3 consists of 32 StormTech MC-3500 chambers with an outlet control structure that contains an overflow weir that will hold back the volume of runoff and force it to infiltrate before leaving the system. The weir elevation is set just below the crown of the chambers and the runoff volume that will infiltrate is greater than he required water quality volume. The higher storms will be discharged from the system and conveyed to EX DET 1 and then eventually to Design Point #1 as described in the Existing Conditions section of the report. Soil testing has not yet been performed on-site . An assumed soil percolation rate of 2 inches per hour was used in the analysis. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 85 and 10 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 1B (PDA-1B) is 1.717 acres in size and is the same as EDA-1B. However, in proposed conditions, a small depression, designated as Detention 1B, is proposed to promote some water quality prior to being piped into the proposed conveyance system. The runoff eventually flows to Design Point #1 as described above. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 77 and 5 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 1D (PDA-1D) is 1.598 acres in size and is the same as EDA-1D and flows to Design Point #1 as described above. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 83 and 5 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 1E (PDA-1E) is 1.408 acres and is essentially the same as EDA-1E except has been reduced in size from 2.622 acres to 1.408 acres. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 81 and 7 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 1F (PDA-1F) is 1.353 acres in size and is the same as EDA-1F. The runoff is conveyed along a travel path that is designated as Reach 1F which is slightly different than in existing conditions. PDA-1F still flows to EX DET 2 and to Design Point #1. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 88 and 8 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area 2 (PDA-2) is 4.545 acres and is essentially the same as EDA-2 except has been reduced in size from 5.560 acres to 4.545 acres. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 73 and 13 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

Proposed Drainage Area "Bypass" is 21.542 acres in size which the same as existing conditions. The runoff is conveyed along a travel path that is slightly different than in existing conditions. PDA Bypass still flows to EX DET 2 and to Design Point #1. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 86 and 31 minutes, respectively. Refer to Drawing DA-1 in Appendix E.

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

Table 3
Summary of Proposed Peak Rates of Runoff in Proposed Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1	DP-2	Bypass
1 year	3.02	2.81	21.23
2 year	4.05	4.38	28.33
10 year	28.72	9.30	48.44
25 year	43.54	13.45	64.33
50 year	63.42	17.42	79.18
100 year	85.92	22.20	96.68

There are reductions in peak rates of runoff from proposed to existing conditions based on review of the tables.

The volumes of runoff to each design point are shown in the following Table.

Table 4
Summary of Runoff Volumes in Proposed Conditions
(Cubic Feet)

Storm Recurrence Interval	DP-1	DP-2	Bypass
1 year	33,479	12,646	119,999
2 year	66,554	18,907	160,613
10 year	174,654	39,049	279,120
25 year	268,723	56,476	374,573
50 year	358,514	73,534	464,775
100 year	466,481	94,427	572,603

There are reductions in Runoff Volumes when comparing in existing and proposed conditions based on review of the tables.

As demonstrated in the tables, the proposed stormwater improvements will result in significant reductions of peak rates of runoff for all storms and design points analyzed, except the Bypass which is unchanged. The proposed stormwater improvements will also result in reductions of

stormwater runoff volume from the contributing drainage areas when comparing existing and proposed conditions.

VI. SOIL EROSION & SEDIMENT CONTROL

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

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

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

The owner or operator shall have each of the contractors and subcontractors identified above sign a copy of the certification statement to be provided before they commence any construction activity.

Soil Description

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

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

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

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

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

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

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

Per the Soil Survey, the types of soils are shown on the drainage area maps. This soils are hydrologic group B and C and are well drained according to the soil maps.

On-Site Pollution Prevention

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

- Temporary Riser and Anti-Vortex Device
- Silt Fence
- Baled Filter
- Baled Fence and Checks
- Baled Erosion Fence
- Silt Sack
- Stone Check Dam
- Excavated Drop Inlet Protection
- Curb Drop Inlet Protection
- Stone & Block Drop Inlet Protection

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

Temporary Control Measures

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

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

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

2. Stabilized Construction Entrance consists 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.

3. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 70% of the disturbed area has a perennial vegetative cover. This amount is required to

adequately function as a sediment and erosion control facility. Grass lining will also be used to line temporary channels and the surrounding disturbed areas.

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

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

6. Erosion Control Matting will be utilized on slopes and within swales, where applicable, to provide stabilization in advance of vegetation being established. Such matting will be biodegradable to facilitate long term growth of vegetation in swales, on slopes and within stormwater management facilities.

7. Sediments Traps will be used with the permanent SMP's until their contributing areas drainage are stabilized. Once stabilized, the temporary risers will be removed and final grading/planting of the basins will be completed for permanent use as Stormwater Management basins. Sediment trap sizing calculations shall be provided.

8. Temporary Sediment Basins will be constructed to intercept sediment laden runoff and trap and retain the sediment. The sediment basins are sized to provide a sediment storage volume of 3,600 cubic feet per acre draining to the basin. The Sediment Basins will be used with the permanent SMP's until their contributing drainage areas are stabilized. Once stabilized, the temporary risers will be removed, permanent outlet control structures will be installed and final grading/planting of the sediment basins will be completed for permanent use as Stormwater Management basins. Sediment Basin sizing standards, details and calculations shall be provided.

9. Temporary Riser and Anti-Vortex Devices- are placed at the bottom of the temporary sediment basins where they intercept and collect debris and litter from the pond before they can enter the off-site storm drainage system.

10. Stone Check Dams are small barriers of crushed stone which will be laid across the grass swales which are approximately 12 inches high, located every one foot of elevation change along the swales so that the crest elevation of the downstream dam is at the same elevation of the toe of the upstream dam.

11. Sediment Sump Pits are temporary excavations constructed to capture and filter runoff and accumulated water for pumping to stabilized areas or catch basins.

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

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

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

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

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

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

Concrete Material and Equipment Management

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

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

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

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

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

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

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

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

Construction Site Chemical Control

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

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

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

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

When storing petroleum products, follow these guidelines:

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

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

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

Solid Waste Management and Portable Sanitary Management

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

Portable sanitary units may be utilized on-site or bathrooms will be provided within construction trailers. A sanitation removal company will be hired to pump/remove any sanitary waste. In the

event that portable sanitary units are used and then cleaned after being emptied, the rinse water may not be disposed of to the storm drain system. It shall be contained for later disposal if it can't be disposed of on-site. Remove paper and trash before cleaning the portable sanitary units. The portable sanitary units shall be located away from the storm drain system if possible. Provide over head cover for wash areas if possible. Maintain spill response material and equipment on site to eliminate the potential for contaminants and wash water from entering the storm drain system.

Permanent Control Measures and Facilities for Long Term Protection

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

1. Vegetated Swales will function to provide additional treatment of stormwater runoff by removal of pollutants and will promote a reduction of peak flows and provide runoff infiltration.

2. Infiltration System (I-2) which is a standard SMP that will be used to treat the runoff volume generated from a portion of the developed area and provide additional water quality and runoff volume reduction. The smaller storms will be retained and the higher storms will be released gradually. Refer to the Proposed Hydrologic Calculations and Runoff Reduction and Water Quality Volume Sizing Calculations, in Appendix B.

   The StormTech MC-3500 and MC-4500 Recharge Chambers are domed shaped fully opened bottom corrugated chambers with perforated side walls. Chambers allow stormwater to be stored within the dome void until it can infiltrate into the ground. They are able to be used for residential, commercial or industrial applications and provide an easy way to treat and dispose of stormwater runoff underground. Water is infiltrated into the ground through the chambers and surrounding crushed stone and will replenish the groundwater as a natural condition.

The Isolator Row is a row of StormTech chambers that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as stormwater rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage access of the adjacent stone and chambers from sediment accumulation.

The Isolator Row is designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but includes a high flow weir such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other standard chambers. By treating stormwater prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured.

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

4. Rip-Rap Energy Dissipators At discharge points from the stormwater drainage system into the stormwater management basins, rip-rap pads consisting of angular rocks will be placed to dissipate velocity and reduce the risk of erosion. The rip-rap pads will be 10 feet wide by 10 feet long.

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

Specifications for Soil Restoration

Prior to the final stabilization of the disturbed areas, soil restoration will be required for all vegetated areas to recover the original properties and porosity of the soil. Soil Restoration Requirements are provided on Table 7 below:

Table 5

Soil Restoration Requirements

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only – no change in grade	HSG A&B	HSG C&D	Protect area from any ongoing construction activities
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A&B	HSG C&D	Clearing and grubbing
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration**	
Heavy traffic areas on site (especially) in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (decompaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area.
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.

** Per "Deep Ripping and De-compaction, DEC 2008."

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

1. Apply 3 inches of compost over subsoil.

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

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

Specifications for Final Stabilization of Graded Areas

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

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

- Permanent Lawns - April 15 (provided soil is frost-free and not excessively moist) to May 15; August 15 to October 15.
- Temporary Lawn Seeding - if outside of the time periods noted above, the areas shall be seeded immediately on completion of topsoil operations with annual ryegrass (Italian rye) at a

rate of six pounds per 1,000 square feet. Temporary lawn installation is permitted provided the soil is frost-free and not excessively moist. The permanent lawn is to be installed the next planting season.

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

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

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

(a) Sunny sites

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

(b) Shady sites

Kentucky Bluegrass	0.8-1.0 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	2.6-3.3 pounds/1000 square feet

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

VII. CONSTRUCTION PHASE AND POST-CONSTRUCTION MAINTENANCE

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

1. During Construction

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

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

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

The qualified professional will also be responsible for observing the adequacy of the vegetation growth (trees, shrubs, groundcovers and turfgrasses) in newly graded areas and for ordering

additional plantings in the event that the established plant materials do not adequately protect the ground surface from erosion.

2. Following Construction

Site maintenance activities on the property will include:

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

Grounds maintenance on the site will be performed by landscaping contractor.

Fertilizer is typically applied twice in the year - once in the spring and once in the fall. The application of fertilizer is usually necessary to maintain healthy lawn growth due to competition for nutrients with trees and shrubs and since the clippings are often removed. It is not recommended that fertilizer be applied during the summer. It is at this time that lawns are typically dormant.

Fertilizers come in three basic types: (1) Organic; (2) Soluble synthetic and (3) Slow release.

Organic fertilizers are derived from plant or animal waste. Since they are heavier and bulkier than other fertilizers, it is necessary to apply a much greater amount at one time. Soluble synthetic fertilizers are predictable with determining the exact impact on a lawn. However more applications are necessary since their effect is often short term. Slow release fertilizers have a high percentage of nitrogen so quantities that need be handled at one time are smaller. Slow release fertilizers will be utilized by the project.

A complete fertilizer contains all three of the primary nutrients - nitrogen (N), phosphorus (P) and potassium in the form of potash (K). Typically, a 3-1-2 ratio of nutrients (N-P-K) is used for lawn applications.

Fertilizer shall be applied by the landscape contractor in accordance with the manufacturer's instructions. The application of fertilizer does require some skill on the part of the operator. Should there be a spill of fertilizer, the landscape contractor shall be required to scrape or vacuum it up. The area will then be watered in accordance with the manufacturer's instructions to ensure that the fertilizer becomes soluble and available to plants and does not run off.

900 King Street Owner, LLC will be responsible for the long-term operation and maintenance of the permanent stormwater management practices. The permanent stormwater management practices shall be maintained in accordance with the Maintenance Inspection Checklists provided in the Appendix D.

VIII. CONCLUSION

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

- New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-15-002, effective January 29, 2015, last modified November 23, 2016.
- New York State Stormwater Management Design Manual.
- Chapter 217 "Stormwater Management" of the Village Zoning Code

The project employs a variety of practices to enhance stormwater quality and reduce peak rates of runoff associated with the proposed improvements. These measures include vegetated swales,

subsurface infiltration systems and improvements to the existing stormwater detention basin. These improvements will also mitigate runoff volumes from the proposed improvements as runoff volumes will be slightly reduced or maintained in all the analyzed storms.

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

APPENDIX A

EXISTING HYDROLOGIC CALCULATIONS

APPENDIX B

PROPOSED HYDROLOGIC CALCULATIONS

APPENDIX C

NYSDEC STORMWATER SIZING CALCULATIONS

APPENDIX D

STORMWATER PRACTICE/CDS UNITS OPERATION, MAINTENANCE AND MANAGEMENT INSPECTION CHECKLIST

APPENDIX E

DRAWINGS