PRELIMINARY STORMWATER MANAGEMENT PLAN

Prepared for

State Land Corp.
Crompond Road (Route 202)
Town of Yorktown, NY

Prepared by:

Site Design Consultants
251F Underhill Avenue
Yorktown Heights, New York 10598
914-962-4488

Joseph C. Riina, P.E.
NYS Lic. No. 64431
CPESC No. 2670
CPSWQ No. 0073

February 2012

STORMWATER MANAGEMENT PLAN

Prepared for

State Land Corp.
Crompond Road (Route 202)
Town of Yorktown, NY

Property Owner: Charles Monaco
State Land Corp.
3967 Provost Avenue
Bronx, NY 10466

Site Engineer: Joseph C. Riina, P.E.
NYS Lic. No. 64431
CPESC No. 2670
CPSQW No. 0073

Site Design Consultants
251-F Underhill Avenue
Yorktown Heights, NY 10598
914-962-4488

February 2012

Table of Contents

List of Figures

Appendices

State Land Corp.

1.0 Project Description

The subject property is located along Route 202 in the Town of Yorktown, Westchester County, New York (See Figure 1.1 Location Map and Figure 1.2 Vicinity Map). The project site is comprised of one tax parcel with an overall parcel size of 100 acres. The tax parcel designation is Section 26.17 Block 1 Lot 1. The property is currently Zoned R1-160 Single Family Residential. It is proposed to change the zoning to C-3 Commercial Zone. The zone can accommodate most commercial retail uses as well as office space. It is expected that the future development of the parcel after the zone change would be mainly retail/office use. The property is currently undeveloped. The property is bordered by Sylvan Glen Town Preserve to the north and west, residential properties to the east, and commercial properties to the south and along route 202.

The property is mostly forested with areas of local wetlands and watercourses. There is a NYS DEC designated wetland A-11 at the southwest corner of the property. The topography slopes upward from south to north with most of the slopes being moderate to steep. Surface runoff is conveyed overland or through the watercourses. A portion of the property is tributary to the NYS DEC wetland to the west, but the majority sheds to the east to a culvert which conveys the runoff to the Hunterbrook a NYS DEC classified steam. The stream eventually discharges to the Croton Reservoir to the south.

The proposal to change the existing zoning from residential to commercial will open up development of the site to similar uses which front on the same roadway. For purposes of demonstration of development possibilities a Preliminary Site Plan has been prepared for which this Preliminary Stormwater Management Report was generated. This Plan shows two independent retail sites with possible building layouts to attract a variety of retail and office uses, while minimizing impacts. The Site Plan shows a single access point on route 202 which divides into individual access for the two sites. The Plan also shows a right-of-way for the Bear Mountain Parkway Extension. This right-of-way is Master Planned as part of the Inter-Municipal Sustainable Development Study to eventually connect the two existing segments of BMP. The remaining lands north of the right-of-way are proposed to be dedicated as Open Space. This Open Space is approximately 52 acres and abuts a Town Park known as Sylvan Glen. This preliminary proposal shows a potential disturbance of 27.83 acres. A general construction sequence has been provided in Appendix D.

As with any project of this magnitude a comprehensive Stormwater Management Plan would be prepared. The Plan would address water quality issues as well as flood impacts adjoining and downstream from the project. Green infrastructure and standard treatment practices would be incorporated into the project to reduce water quality impacts. Stormwater control features would be included to attenuate large storm events by temporarily storing surface runoff. Additionally, to further mitigate the impacts of the development of this project it is proposed to provide a stormwater management plan which will have a regional benefit. Specifically, the project would provide additional flood attenuation which will help to alleviate a downstream flooding condition. The Stormwater Management Plan would be prepared in accordance with the State and local standards. This report as stated is a preliminary plan to manage stormwater.

The following Report and Plans included in Appendix L describe, in detail, the design and implementation of the Stormwater Management Plan.

2.0 Stormwater Regulatory Requirements

2.1 Stormwater Impacts

Urban stormwater impacts relate to significant changes to stormwater quantity and quality as a result of land development. "Urban Development has a profound influence on the quality of New York's waters."[1] This proposed development will change the runoff characteristics of this site altering the quantity and quality of the surface stormwater. The impacts of this must be mitigated by managing the stormwater prior to discharge. This would be accomplished by the capture and treatment of surface runoff prior to discharge.

Development of a site alters the hydrology therefore changing the characteristics of the surface and groundwater discharge of runoff. Changing the surface conditions alters a site's natural ability to store, treat, or infiltrate runoff. The change also allows for the discharge of potentially damaging pollutants and sediments to adjoining water bodies. This can occur during the construction phase, and long-term after development. During the construction phase, graded, destabilized, areas are subject to erosion which can cause the displacement of sediment. After development, changes in the surface conditions, such as impervious surfaces, roofs and pavement, or lawn surfaces can generate pollutants which would be collected and discharged through runoff. Some of the pollutants of concern are: Total Suspended Solids (TSS); Biological Oxygen Demand (BOD); Total Phosphorus (TP); and Total Nitrogen (TN), as well as oil or grease, and chloride.

The most common sources of these pollutants from developed sites are atmospheric deposition, fertilizers, pesticides, and leaked discharges from vehicle. These pollutants would collect on these impervious surfaces and quickly wash off during even the smallest storm event.

In the planning and design of the development, stormwater will be managed to minimize potential impacts. A Stormwater Management and Pollution Prevention Plan will be prepared. This Plan will deal with all aspects of the stormwater management programs such as identifying potential pollutant sources, design of temporary and permanent features, implementation, and maintenance.

[1] New York State Stormwater Management Design Manual, August 2010, Page 2-1.

State Land Corp.

2.2 Regulatory Obligation

2.2.1 USEPA/NYSDEC

The Federal Government's Clean Water Act (CWA), Section 402 states "Stormwater discharges from certain construction activities are unlawful unless they are authorized by a National Pollutant Discharge Elimination System ("NPDES") permit or by a state permit program." New York State is a NPDES delegated State. The necessary permitting is administered through the State Pollutant Discharge Elimination System (SPDES) under the General Permit, GP-0-10-001, for Stormwater Discharges from Construction Activity. The Permit requires that any development meeting the disturbance thresholds listed in Tables 1 and 2 of Appendix B of the General Permit must prepare a SWPPP. Activities listed in Table 1 require preparation of only an Erosion and Sediment Control Plan. Those listed in Table 2 would additionally require post-construction stormwater management practices. This project does require an E&SC and a SWPPP.

This project requires filing a Notice of Intent under the New York State Department of Environmental Conservation General Permit 0-10-001. This project has a disturbance which is more than one acre. It is located in an Enhanced Phosphorous Watershed (EPW). Therefore this project requires the preparation of a full Stormwater Pollution Prevention Plan and must comply with the enhanced phosphorous criteria in the NYS DEC SMDM.

The Plan identifies the potential sources of pollution, and a design prepared and implemented to reduce pollutant loadings. This project will be required to prepare the following to be in compliance:

- Notice of Intent registered with the NYS DEC;
- MS4 SWPPP Acceptance Form signed by an authorized representative of the Municipality;
- Prepare an Erosion and Sediment Control Plan;
- Design and implement a stormwater quality treatment system to capture and treat the stormwater runoff volume generated by the one-year rainfall event, in order to meet enhances phosphorous treatment standards.
- Design and implement a stormwater management system to capture and attenuate all storm events up to the 100-year storm.

State Land Corp.

2.2.2 Local Municipality

In addition, this project requires approval under Chapter 248, Stormwater Management and Erosion and Sediment Control, of the Town of Yorktown Code. The Code requires compliance with the NYS DEC GP-0-10-001

2.2.3 NYC DEP

This site is located within the limits of the New York City Watershed. This project is required, therefore, to comply with Chapter 18 of the "Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and its Sources."

The technical standards providing guidance in the preparation of the E&SC and SWPPP are the latest revisions of the following:

- "New York Standards & Specifications for Erosion and Sediment Control" (NYSSESC) published by the Empire State Chapter of the Soil and Water Conservation Society; and;
- "New York State Stormwater Management Design Manual" prepared by the Center of Watershed Protection, for the NYS DEC;
- Town of Yorktown – Town Code Chapter 248 Stormwater Management and Erosion and Sediment Control;
- NYC DEP Watershed – Chapter 18 of Title 15 of the Rules of the City of New York – Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Sources.

3.0 Reducing Pollutant Impacts

3.1 Sources of Impact

For this project, the potential for contamination of stormwater occurs both during construction and after the completion of development. The goal to achieve reduced impacts involves containment and treatment of the various pollutants.

Each phase will require temporary sediment and erosion control measures. The greatest source of pollutants during these phases is the potential of soil erosion. The nature of the construction plan is to have exposed soils which can erode and potentially discharge to sensitive areas. During construction, existing vegetation is removed exposing soils. Also, stockpiling of soils takes place. These conditions if not stabilized, are subject to erosion during rainfall events and wind conditions. Sediment discharged to a wetland can destroy vegetation and habitat affecting the function of the wetland. This degradation potential can be irreversible and eliminate its function in the ecosystem. Increases in turbidity to open water bodies such as streams, ponds, etc., are an additional environmental impact.

The implementation of proper erosion control measures and sediment containment along with a planned construction sequence can minimize or eliminate these potential impacts. The selection and implementation of erosion and sediment practices are described in a later section of this Report.

The post-development state of this project not only will yield a potential for sediment discharges or Total Suspended Solids (TSS), but also other pollutants which can impact the adjacent water bodies. The contaminants of highest concern are Total Phosphorus (TP), Total Nitrogen (TN), and Biochemical Oxygen Demand (BOD). Modification of the surface conditions of the site, specifically increasing the impervious nature of the ground cover, increases the concentration and potential discharge of these pollutants. The development of the site reduces native vegetative cover, and therefore affects the land's natural ability to store, treat or infiltrate runoff. This includes impervious surfaces, such as roads, buildings, and also landscaped areas, specifically lawns. These increases in imperviousness allow for greater concentrations or pollutants to collect and be carried off by runoff. Some of the pollutants are deposited by atmospheric conditions. However, other sources are applied or discharged to the surface of the site. The landscape areas are subject to fertilizers, weed control, and pesticide products. This too is a large potential for pollutants which if discharged untreated could have long term impacts. A full listing of the potential pollutants which can be considered in stormwater can be found in Table 2.1 of the New York State Stormwater Management Design Manual (NYS SMDM).

The concentrations are collected in stormwater runoff and rapidly discharge to the adjacent water bodies if not treated properly. The pollutants are collected and conveyed during the initial part of the storm event or the 90% rainfall. This is 90% of the average annual stormwater runoff volume. For this part of the State it is equivalent to approximately 1.2 inches. This is also commonly referred to as the "first flush." The requirement of the NYSDEC SPDES General Permit GP-0-10-001 requires that this volume of runoff is to be collected and treated by the means described in the NYS SMDM. The method to be used is the unified stormwater sizing criteria in which a water quality volume is determined and a practice is selected which best fits the criteria provided. This is described further in Section 6.0.

Further treatment is required to enhance the phosphorus removal since this project is located within the NYC Croton Reservoir East of Hudson which is a phosphorus enhanced watershed. As stated earlier, in order to comply with the NYS DEC Enhanced Phosphorus Removal Standards, the WQv to be treated to be the one-year, 24-hour storm.

3.2 Stormwater Management During Construction

The Erosion and Sediment Control plan will be implemented during all phases of construction until the completion of the project. This will minimize or eliminate the potential short-term adverse impacts which may occur during construction. After completion, the erosion and sediment control will become a maintenance plan to insure that permanent erosion and sediment controls continue to function and prevent the transport of sediments.

The Erosion and Sediment Control plan includes the Sequence of Construction and designed measures to be installed, operated and maintained during all aspects of construction. The appropriate measures were selected and detailed in plan for implementation by the site contractor. The main objective of the plan is to prevent erosion from occurring by stabilization of the construction site where possible. Sediment controls are to be used as a containment system to allow the removal of sediment from runoff to the greatest extent possible before leaving the work site. Control methods and standards utilized are provided in the NYSSESC.

Potential sources of destabilization of the site have been determined so that proper measures will be used. The locations and methods designed for erosion and sediment control measures change as the construction sequence progresses. The priority is to stabilize disturbed areas subject to erosion and use containment and / or filtering practices where sediment may concentrate. Some of the practices and methods that will be used for this project are:

- Minimization of open disturbance by use of stabilizers such as seed, mulch, and erosion blankets, stone, etc. Areas not subject to construction traffic for extended periods will be temporarily stabilized.
- The work areas will be contained. Down grade perimeters will be lined with barriers such as silt fence, diversions, berms, etc.
- Where possible, clean stormwater will be diverted away or around the work site to reduce the amount of runoff requiring treatment.
- Sediment traps will be constructed where heavy concentrations of runoff may accumulate.
- Dust control measures will be maintained on-site such as water trucks.
- Runoff will be prevented from gaining erosive velocities on long slopes. This can be achieved with seed and mulch, erosion control blankets, curb dams and multiple rows of silt fence.
- Existing drainage structures will be protected from sediment-laden runoff.
- Regular weekly inspections and reports (see Appendix J for Report Form) to be filed with the Operator and Town.

Additional methods of practices may be employed dependent on the situation. The NYSSESC consists of NYS DEC accepted and recommended practices. The design requirements of temporary and permanent erosion and sediment control practices of this Manual have been followed.

Prior to completion of the project, all permanent structural features will be cleaned, restored, and re-vegetated as necessary. The erosion and sediment control phase of the project is complete when all work is done and all areas are stabilized. The post-construction Stormwater Management Inspection and Maintenance Agreement (Schedule "B" in Appendix K) will describe the long term inspection schedule, periodic maintenance requirements, and the responsible party.

3.3 Stormwater Management Post-Construction

The post-construction design of the project must be included in the Stormwater Pollution Prevention and Stormwater Management Plans to minimize or eliminate potential long-term adverse impacts which might be caused by surface runoff from the site. This will deal with the management of the stormwater upon completion and operation of the site. The plan will be an analysis of all potential impacts due to stormwater and the means of protecting adjoining water bodies.

The management plan begins with conceptual designs of the collection and conveyance system and the proposed treatment practices. The treatment practices are subject to different parameters and must be designed to best fit the site including green infrastructure planning. Some of the limitations that may be encountered include soil types and properties, depth to groundwater or bedrock, distance to structures, and maintenance. A list of acceptable practices can be found in Chapters 3, 5, and 10 of the NYS Stormwater Design Manual (SMDM). Chapter 3 states "The Practices on this list are selected based on the following criteria:

1. Can capture and treat the full water quality volume (WQV)
2. Are capable of 80% TSS removal and 40% TP removal
3. Have acceptable longevity in the field
4. Have a pre-treatment mechanism."

Green Infrastructure Practices include:

I. Preservation of Natural Resources
II. Reduction of Impervious Cover
III. Runoff Reduction Techniques

The five broad groups of standard stormwater management practices are:

I. Stormwater Ponds
II. Stormwater Wetlands
III. Infiltration Practices
IV. Filtering Practices
V. Open-channel Practices

These practices "are presumed to meet water quality requirements set forth in this manual if designed in accordance with the sizing criteria presented in Chapter 4 and constructed in accordance with the performance criteria in Chapter 6."[2] This however is modified with the fact that the project must meet the enhanced phosphorus criteria in Chapter 10.

Green Infrastructure – Runoff Reduction

Chapter 3 of the NYS DEC introduces a planning process for site development which has "increased emphasis on a holistic approach" to urban stormwater runoff management. This is to be done by reducing pollutant-laden runoff by the use of green infrastructure which promotes replication of pre-development hydrology. This is done by designing selected practices which will allow for infiltration, ground water recharge, reuse, recycling and evaporation/evapotranspiration of surface runoff Water Quality Volumes from developed areas.

The implementation of this planning process is defined in a five step approach as follows:

1. Preservation of features and reduction of impervious surfaces.
2. Determination of the project's Water Quality Volume.
3. Incorporating green infrastructure and standard stormwater management practices that provide a Runoff Reduction Volume Capacity.
4. Use of standard stormwater management practices to treat Water Quality Volume not addressed by green infrastructure.
5. Design of storage facility for volume and peak rate volumes.

This methodology is provided in more detail in Chapter 3 of the SMDM as well as the Flow Chart at the end of Chapter 3 (see Figure 3.1).

This process is required for new and redevelopment projects. Chapter 4 Section 4.3 requires the calculation of Runoff Reduction Volume (RRv) and that 100% of post-development Water Quality Volume should be treated on-site using green infrastructure or standard SMP's. If this goal cannot be met, at a minimum, a specific reduction factor(s) based on the hydrologic soil group (HSG) can be applied but justification must be provided as to why the pre-construction condition cannot be met.

Enhanced Phosphorus Removal Standards

The enhanced phosphorus standards were developed for projects located in phosphorus limited watersheds in order to meet water quality objectives for these watersheds. Enhanced phosphorus removal is required. This will require the implementation of the criteria in Chapter 10 of SMDM where additional performance standards must be implemented. In these standards, the WQv is computed to be the entire one-year 24-hour design storm for the post-development watershed. The one-year storm volume is determined using the SCS Method. The developed volume

[2] Pg. 3-7 NYS Stormwater Management Design Manual, August 2010.

becomes the basis for treating the WQv as per Chapter 4 of the SMDM including the five steps that apply to runoff reduction.

The design will meet enhanced phosphorous removal standards for achieving water quality standards. The guidelines and practices used in selecting and the sizing analyses are found in Chapters 5, 6 and 10 of the NYS DEC Stormwater Management Design Manual August 2010.

After the preliminary selection of treatment practices, the water quality volume size will be determined.

The treatment methods could be a single practice or a combination of practices. The previously described controlling factors will initially eliminate some treatment methods. The remaining practices will be selected based on feasible locations, functionability, maintenance factors, and cost. An additional factor is to try and select practices which will not only provide an environmental benefit, but also aesthetic value.

4.0 Site Characteristics

4.1 Soils

On-site soils were classified by using the USDA Natural Resources Conservation Service (NRCS) Websoil survey for Westchester County, NY, see Figure 4.1 – Soil Map.

The predominant soil types for this project are Charlton and Woodbridge Paxton. These soils are moderately to well-drained soils and are subject to seasonal groundwater. The Hydrologic classification of these soils range from "HSG" A to C. The erosion hazard level for this soil is slight to moderate. This soil's properties are essential in the design and proper construction management of the site. The following is the list of soils on the site. Independent soil tests were performed for a previous project. The results are located in the Appendix E of this Report.

4.2 Hydrology

Currently, the surface runoff pattern is in a southerly direction which divides into two water sheds. Approximately 25 acres of the property currently sheds to the west towards the NYS DEC wetland. The remainder of the site which is part of a 162 acre watershed sheds to the east where it passes through a culvert under route 202 and into the Hunterbrook. Eventually, both watersheds meet downstream from the point chosen as the design point. Surface water and groundwater seeps discharge as overland flow while discharge from pocket wetlands, are conveyed via perennial or intermittent watercourses.

Under the proposed condition, it would be proposed to maintain to the greatest extent possible the hydrology of the site. The intent is to maintain and enhance the main channel through the site. Further, all other conveyed flows whose existing pattern would be interrupted by the development would be intercepted before reaching the impervious areas of the development and redirected to the current point of discharge. The surface runoff generated by the impervious areas of the project will be collected by a series of methods including water quality treatment practices and structural practices eventually discharging to subsurface practices. Once in these subsurface structures if soil conditions allow infiltration will occur or storage and controlled discharge to the outfall point prior to crossing under Route 202. Overall the surface runoff pattern will not be significantly altered. The ultimate goal is to reduce downstream impacts reducing pollutant loads and flooding. For the purpose of the analysis, the east watershed is the subject of analysis since the development will discharge to that area. Ultimately, the two subareas discharge to the Hunterbrook which terminates at the new Croton Reservoir.

In an effort to mitigate downstream flooding, this project provides for the chance to create regional stormwater management opportunities. Two locations in the upper part of the watershed have been shown as possible stormwater management areas. These two areas provide an opportunity to create a modified version of a pocket wetland. By taking advantage of the topography, an earthen berm can be created which will provide for temporary storage of surface runoff during large storm events. The earthen berms as shown are five feet in height with a natural stone weir which will allow existing base flows to continue and will also provide controlled release of larger stored storms. The earthen berm will be vegetated and will eventually become part of the natural landscape; and could also become part of the trail system. This will be done with minimal disturbance and will provide natural ponding areas that will also provide discharge. These two areas provide significant additional storage above that provided for by proposed development reducing downstream peak flow by up to 30%.

5.0 Hydrologic Analysis

The method used to compute project runoff was the Soil Conservation Service TR-55. The basis for the analysis was the Type III, 24-hour storm, for the 1 year, 2 year, 10 year, 25 year, and 100-year storm event. The rainfall depth for the respective storm events are 3.1, 3.5, 5.0, 6.0, and 7.5. The runoff coefficient "CN" and Time of Concentration for existing and post-development conditions were computed using Standard TR-55 criteria.

5.1 Pre-Development Condition

A hydrologic analysis has been prepared for the watershed under existing conditions as described in Section 4.2. This was done specifically detailing the hydrologic conditions of each of the three subareas for comparison of peak discharges at the design points. The analysis includes routing through the existing stormwater basin. The contributing watersheds are shown on Figure 5.1 Pre-Development Watershed Map.

State Land Corp.

The Drainage Basin sizes, curve numbers and travel times used in the analysis are summarized in the Table below:

Pre-Development Conditions Watershed Analysis Variables

Drainage Basin	Area (acres)	Curve Number CN	Travel Time, Tc (hrs)
Subarea HB# 11	162	64	0.272

5.2 Post-Development Condition

A hydrologic analysis has been prepared for the watershed under the proposed condition described in Section 4.2. This was done specifically detailing the hydrology of each of the three subareas for comparison to the existing peak discharges at the design point. This analysis will reflect the changes in surface conditions as well as the redirection of additional areas to the stormwater basin. Collected surface runoff will be routed through the stormwater management facilities. The contributing watersheds are shown on Figure 5.2 Post-Development Watershed Map.

The hydrologic analysis assumes that full soil restoration as required in Chapter 5 (Table 5.3) of SMDM will be implemented. The areas of soil restoration will be shown on the E&SC Plan if required (See Section 8.0).

The Drainage Basin sizes, curve numbers and travel times used in the analysis are summarized in the Table below:

Post-Development Conditions Watershed Analysis Variables

Drainage Basin	Area (acres)	Curve Number CN	Travel Time, Tc (hrs)
PST-HB#11	111.60	63	0.439
PST-HB#11a	16.00	70	0.576
PST-HB#11b	19.00	67	0.247
SLC-East Site	5.70	93	0.25
SLC_West Site	9.92	96	0.25

6.0 Unified Stormwater Sizing Criteria

6.1 Methodology

To satisfy the requirements of the NYS DEC General Permit and the Town of Yorktown a combination of Green Infrastructure Techniques and standard practices have been selected. These practices meet attenuation as well as stormwater quality goals. The guidelines and practices used in selecting and the sizing analyses are found in Chapters 4, 5, and 6 of the NYS DEC Stormwater Management Design Manual.

6.2 Water Quality Volume (WQv)

The Treatment volumes are determined as prescribed by the standard methods as outlined in the NYS DEC SMDM. This Water Quality Volume WQv requirement is normally based on the 90% rainfall event. This equates to 90% of the average rainfall for the specific region. However, for this project the treatment volumes exceed that requirement by treating the 1-year storm event. This site is located in the Croton Watershed which is an enhanced phosphorous basin. This requires implementation of the enhanced phosphorus standards for the capture and treatment of the runoff from the 1-year, 24-hour rainfall event, which represents the water quality volume.

The 1-year, 24-hour runoff volume required to be captured and treated has been further defined as the runoff volume from the contributing drainage areas for the proposed project. The volume proposed to be captured will be that volume generated by a 1-year, 24-hour storm or greater. With the design provided, this entire volume will be captured and retained for an extended period of 24-hours for pollutants to settle out of the contained runoff. Excess stormwater above the water quality volume will be diverted to subsurface storage for the larger storm events. The volumes to be treated have been calculated as shown in the following table.

Water Quality Volume

Drainage Area	WQv based on 90% Rainfall Event	WQv based on 1-year Rainfall Event	Total WQv Runoff Reduction Volume	WQv Credit	WQv Credit provided by Standard Practices	Storm Year Treated
Project Site	2.00 ac-ft	7.67 ac-ft	9.98 ac-ft	2.31 ac-ft	4.25 ac-ft	1 yr

These volumes meet the requirements of the NYS DEC, Town of Yorktown, and the NYC DEP for the limitation of phosphorous export.

As can be seen by the results of the Water Quality Treatment provided, there is a credit available in the volumes provided for. This was determined by a combination of runoff reduction practices, and standard practices mainly infiltration.

6.3 Runoff Reduction (RRv)

Green infrastructure design as part of the planning process enables the reduction of runoff from a project. These practices in turn reduce the requirements of water quality treatment and flood protection. The selection of green infrastructure practices is developed using a five-step process detailed in Section 3 of the SMDM. A flow chart of this process is included as Figure 3.1 of this Report. Design of the practices can be found in Appendix H of this Report. The selection and justification of green practices can be found in Appendix G of this Report which would be followed at the design phase of this project.

The Runoff Reduction planning process was implemented for this project. The Preliminary Stormwater Management Planning and Practice Selection Worksheet can be found in Appendix H. The Runoff Reduction Practices implemented for this project include the following:

- Conservation of Natural Areas (52 Acres)
- Green Infrastructure – Bio-retention
- Standard Practices – Infiltration

The combination of these practices provided for the original water quality volume for the watershed from 7.67 ac-ft and an additional amount of 6.5 ac-ft. This is summarized in Section 6.3. The requirement for runoff reduction has been met for this project.

6.4 Stream Channel Protection Volume Requirements (CPv)

This requirement is for the protection of stream channels from receiving erosive velocities. This goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event that remains after runoff reduction is applied to the project. Trout waters may be exempted to only provide 12-hour detention. It is also not required if the discharge is to a pipe or hardened channel. The detention time is measured by the center of mass method or plug flow calculation method. Further criteria for the application of the Cpv can be found in Section 4.4 of the SMDM.

6.5 Overbank Flood Control (Qp)

The purpose of this sizing criteria for overbank flood control is to avoid an increase in the frequency and magnitude of out-of-bank flooding that may be the result of development. These are flow events where channel capacity is exceeded and spill over to flood plains. To meet the criteria the proposed stormwater management system for the project must attenuate the 10-year, 24-hour storm event to pre-development peak discharge rate. Detailed criteria can be found in Section 4.5 of the SMDM.

6.6 Extreme Flood Control Criteria (Qf)

The purpose of the extreme flood analysis is to prevent flood damage from large storm events by maintaining predevelopment 100-year flood plain boundaries and protecting the integrity of stormwater management practices. The basis of the analysis is to maintain pre-development peak rates of runoff for the 100-year, 24-hour storm event with proper stormwater management. Detailed criteria can be found in Section 4.6 of the SMDM.

A summary of peak discharge rates at each design point for the pre and post-developed storm events analyzed for each drainage basin is summarized in the tables below:

Design Point 1:

Storm Event (year)	Pre-Developed Peak Flow (cfs)	Post-Developed Peak Flow (cfs)	Net Change of Peak Flow (cfs)	Percent Change
1	43.13	31.55	-11.58	-27%
10	166.71	114.89	-51.82	-30%
25	245.84	169.39	-76.45	-30%
100	374.32	259.39	-114.93	-30%

As can be seen by the results, peak discharge rates have decreased for all scenarios.

Summary of Flood Storage Volumes

Subsurface Stormwater Management System #1 (SSMS #1):

Storm Event	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Volume Ac-ft	Maximum Water Surface Elevation (ft)
1	20.75	1.27	0.82	347.13
10	34.52	1.83	1.52	348.50
25	41.70	2.08	1.89	349.40
100	52.43	2.23	2.03	350.00

Subsurface Stormwater Management System #2 (SSMS #2):

Storm Event	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Volume Ac-ft	Maximum Water Surface Elevation (ft)
1	10.91	0.52	0.423	349.84
10	18.94	0.70	0.83	351.12
25	23.14	0.79	1.05	351.88
100	29.41	0.91	1.26	353.00

State Land Corp.

Pocket Wetland / Pond #1 (PW #1):

Storm Event	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Volume Ac-ft	Maximum Water Surface Elevation (ft)
1	6.72	0.31	0.29	532.66
10	19.63	3.39	0.98	533.84
25	27.36	6.14	1.35	534.35
100	39.56	10.91	1.93	534.97

Pocket Wetland / Pond #2 (PW #2):

Storm Event	Peak Inflow (cfs)	Peak Outflow (cfs)	Storage Volume Ac-ft	Maximum Water Surface Elevation (ft)
1	8.32	0.07	0.24	562.49
10	27.97	0.53	0.937	563.11
25	40.05	0.90	1.43	563.39
100	59.37	1.55	2.22	563.73

7.0 Stormwater Management Practices Selection, Justification and Design

The stormwater management practices selection process detailed in Chapters 3 and 7 of the NYS Stormwater Management Design Manual was followed to help select the practices chosen. These Chapters provide a series of matrices which allows logical selection of treatment practices based on several factors. The factors are as follows:

1. Land Use – rural;
2. Physical Feasibility – location, slope, drainage area, groundwater table;
3. Watershed / Regional Factors – near Croton Reservoir;
4. Stormwater Management Capability – can meet all requirements;
5. Community and Environmental Factors – meets all requirements.

The selection of the treatment practice was based on evaluating the site to determine what would best fit the conditions providing maximum benefits. The goal was to select practices which would meet treatment and attenuation standards and minimize the disturbance footprint. The selection of Stormwater Practices was based on the surface and subsurface conditions of the site. In addition, the site design concept is to create a natural and environmentally sensitive setting. The well-drained soils made it very conducive to the use of infiltrators and the recharge of surface water which provided high value treatment.

Infiltration – Underground Infiltration Systems (I-4) NYS DEC SMDM: Stormwater Infiltration Practices capture and temporarily store stormwater. The stormwater is then infiltrated into the existing soil strata over an extended period of time allowing recharge into the groundwater. For this project, if soil conditions are suitable, captured stormwater will be infiltrated and provide the recharge of the WQv from the specific drainage area. The WQv will be fully-retained and infiltrate into the existing soils. This is a preferred method of the treatment of the WQv which in this case is the one-year storm.

Maintenance	
Required	Provided
Infiltration practice shall never serve as a temporary sediment trap during construction.	This Erosion and Sediment Control Plan includes separate locations for temporary sediment traps which do not coincide with the practice locations.
An observation well shall be installed in every practice and shall have lockable cap.	The subsurface stormwater management system will have access manholes.
Direct access shall be provided to the practice for maintenance and rehabilitation.	Direct access and observation will be served by a manhole cover.

See Routing Calculations in Appendix F and H for sizing calculations.

<u>Bioretention (F-5) NYSDEC SMDM:</u>

A Water Quality Volume was determined for each of the treatment areas and discharged into the associated bioretention basin. The Stormwater Management Practice selected is a Bioretention (F-5) as described in the NYS DEC SMDM. This design is a combination of an extended detention and peat/sand filter bed for the treatment of water. The basin is supplemented with plantings and blended into the landscape features of the project. The Bioretention Basin will be located at the lowest possible hydraulic location to intercept and treat runoff mainly from the roofs of the new building and parking areas. As described in earlier sections of this report, the required Water Quality Volume has been exceeded in the design. The Water Quality Volumes are summarized in Section 6.2. A typical cross section of the proposed Bioretention can be found in the Report, Appendix H.

The Bioretention System is designed to initially intercept stormwater in a forebay or water quality inlet, or grass filter strip, to dissipate velocity, and encourage the dropping out of sediments and debris. To properly provide pretreatment, the criteria set forth in the SMDM must be met and shall be sized to contain 25% of the WQv. The water quality volume is treated by providing extended detention to temporarily store the WQv and pass it through a filter bed of top soil, a peat/sand mix. Filtered runoff is then collected in an underdrain system and discharged to the subsurface stormwater management system (SSMS). Partial exfiltration into the surrounding soils may also occur. The inlet is designed to bypass larger flows (volumes greater than the WQv) to the SSMS. This will provide the necessary storage for channel and flood protection.

Stormwater Wetlands – Modified Pocket Wetland: (Regional Stormwater Management)

In an effort to provide much needed regional stormwater management beyond that to be provided for this project, two areas have been selected which can facilitate this. Two areas in the upper part of the watershed identified based on topographical features, can be utilized to create in-line management of surface runoff. These areas are contained in a natural drain where water currently accumulates in small local wetlands. The concept is to construct a berm reaching across the lower reach of the drain. The disturbance would be limited to this berm. A natural stone weir would control outflow from this area which will store larger storm events. This will provide attenuation of peak flows therefore reducing downstream impacts due to flooding. Further, the soils beyond the pockets of wetlands are very well drained soils which will also allow for some infiltration which will reduce pollutants transported downstream. The base flows will continue to flow as it does naturally. The berm will be vegetated and will eventually blend into the natural surroundings.

In General:

- Controls should be inspected periodically for the first few months after construction and on a semi-annual basis thereafter. They should also be inspected after major storm events (greater than 0.5 inches).
- All stormwater controls shall be inspected and cleaned of any debris or sediment.
- Any erosion shall be repaired and stabilized with seeding and mulch or stone.

Please note that additional notes regarding maintenance activities are contained on the project Construction Drawings and should be adhered to during and after construction.

The selection and justification of green practices can be found in Appendix G of this Report. The design of the practices can be found in Appendix H of this Report.

8.0 Erosion and Sediment Control

Erosion and sediment control practices will be selected and designed in accordance with the NYSSESC. The practices used for these types of projects are described below. Standard details and specifications are included in Appendix I as well as on the Construction Plans. Initial locations of each practice are shown on the Plans as construction progresses it may become necessary to repair, replace or relocate these practices as conditions warrant.

Stabilized Construction Entrance:

This has been specified for the entrance of the driveway. The installation will occur at the beginning of the project as described in the Suggested Construction Sequence. It will be maintained so as to prevent the tracking of sediment off-site.

Silt / Sediment Fence and Haybales:

Silt fence and haybales have been specified to control and contain sediment from leaving areas under disturbance to undisturbed areas. The fence shall be installed as best as possible following the contours and will be spaced in accordance with the NYSSESC. The fence will be inspected daily, repaired, and sediment removed as necessary.

Soil Stockpile:

Areas are provided for temporary stockpiling of delivered soil material for the construction. These areas will be contained with sediment fence to prevent the movement of sediment. The stockpiles, if not active for more than seven (7) days, will be seeded and mulched. The stockpile areas were placed to best suit the proposed construction activity. The stockpile will be installed as described in the Construction Sequence.

Temporary and Permanent Vegetative Cover:

This stabilization measure may be temporary and in other cases permanent vegetative cover is used. The vegetative cover specifications are based on the NYSSESC Manual. On the Constructions Plans are notes, locations, and specifications as to the vegetative cover requirements. In the notes, there are specific situations and time constraints related to stabilization of disturbed areas. The specifications give seed and fertilizer mixes as well as placement. Any disturbed area expected to remain exposed for more than seven (7) days shall receive temporary vegetative cover.

Storm Drain Inlet Protection:

The inlet protection is specified to provide a permeable barrier around drainage inlets to reduce sediment content in runoff before entering the storm drain system.

Erosion Blankets:

Erosion blankets and seeding shall be used for the stabilization of slopes 3:1 or greater or as otherwise specified. The blankets shall be installed as per the Plans and Details, and the manufacturer's specifications. They shall be stapled or staked in place as per the manufacturer's specifications. The blankets may be installed at locations other than those shown on the Plans as directed by the Town Engineer, Project Engineer, or other persons inspecting the site under the direction of the aforementioned.

Soil Restoration:

Soil restoration is a required practice for construction projects where soil compaction occurs to soils which will be permanently vegetated. This compaction is typically a result of heavy vehicle traffic, cutting or filling, and areas which may receive heavy surcharges. This becomes more pronounced in soils with greater fines content specifically when wet. These actions can change soil properties which affect its ability to drain or absorb surface water and will also affect the survivability of vegetation. In order to maintain the integrity of the stormwater management plan these areas must receive soil restoration. See Figure 8.1 taken from the NYSSMDM for requirements.

This project has soils which fall in the hydrologic soil group HSG "C." Therefore, for instances when dealing with this soil group, soil restorations are required for the development areas subject to permanent vegetation. Soil restoration can be done by tilling or aerating the soil to a depth of 12-inches. In heavy traffic areas, 3-inches of compost shall be placed over the compacted areas prior to the tilling. After the restoration, a 3/8" metal bar should be able to be hand pushed into the soil. Areas within the drip-line of trees should not be tilled.

Temporary Sediment Traps:

The Sediment Traps will be placed in strategic locations. The locations are the point of concentration of runoff and therefore the logical place to collect sediment. Within the Erosion Control Notes and Construction Sequence, there are specific requirements for the installation and maintenance during construction. Upon stabilization of the site, the sediment will be removed and the permanent stormwater basin can be constructed as detailed. The size of the sediment basin as per the NYSSESC Manual is based on 3600 cubic feet per acre of drainage area.

Rock Outlet Protection:

Rock outlet protection is specified at discharge points of pipes and channels to reduce depth, velocity, and the energy of water to avoid downstream erosion. Specific usage for this project is discharge at the inlet and outlet points of the stormwater basin. The sizing criteria used is from the NYSSESC Manual.

State Land Corp.

Water Bars:

Water bars shall be used for diversion of surface runoff to limit the accumulation of erosive velocities of water. The water bars shall be installed as per the Plans and Details. The water bars may be installed at locations other than those shown on the Plans as directed by the Town Engineer, Project Engineer, or other persons inspecting the site under the direction of the aforementioned.

Other Controls:

Waste Disposal:

Solid, sanitary and toxic waste must be disposed of in a proper manner in accordance with applicable local, state and federal regulations. It is prohibited to burn, bury or pour out onto ground or into the storm sewers any solvents, paints, stains, gasoline, diesel fuel, used motor oil, hydraulic fluid, anti-freeze, cement curing compounds, or other toxic or hazardous wastes. The Contractor shall be responsible for disposal of all waste off site.

Concrete Truck Washout:

Wash out of cement trucks should occur in a designated diked area where the washings can be collected and disposed of properly when they harden.

Dust Control:

Generation of dust shall be minimized by limiting the extent of exposed soils and re-establishing vegetative cover in these areas as soon as possible. Additional and/or temporary methods to minimize dust may include wetting, mulching, spray adhesives, stone covering and wind barriers.

Stabilization:

The Contractor shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven (7) days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instance:

> *Where the initiation of stabilization measures by the 7th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.*

State Land Corp.

All areas not designated as buildings, roads, driveways, parking lots, walks, or aprons shall be established as lawn or vegetative areas. Permanent planting and vegetation shall be provided per approved the landscaping plan.

9.0 Construction Sequence

A key objective of the SWPPP is to reduce erosion and sedimentation potentials for the project. As a means to accomplish this, a suggested construction sequence was developed to assist the developer with incorporating, into the project, various controls designed to reduce such potentials. The sequence considers the performance of development activities in a phased approach, in conjunction with the installation, construction and monitoring of erosion and sedimentation control devices prior to and during construction.

Appendix D contains the project specific Suggested Construction Sequence. Essentially, the sequence has been broken down into various activities designed to ensure that certain erosion/sedimentation controls are in place, prior to and during construction, in recognition of site development.

Prior to any construction activities, the Owner, Engineer and any Contactors to perform land-disturbing activities shall meet to review this SWPPP to insure a thorough understanding of its contents and overall intent. Certifications to this effect shall be signed by the Owner and Contractor. Certifications are provided on the Construction Plans and in Appendix C.

The Responsible Party during and after Construction is as follows:

Mr. Charles Monaco
State Land Corp.
3967 Provost Avenue
Bronx, NY 10466
914-774-9542

10.0 Inspection and Reporting

Unless notified by the NYSDEC, the Owner or Operator shall have a qualified inspector conduct site inspections in accordance with the Permit requirements; for a site with on-going soil disturbance activities, a qualified inspector shall conduct a site inspection at least once every seven (7) calendar days. If a project has received prior written approval by the NYSDEC for the disturbance of greater than five (5) acres of soils at any one time, the inspection frequency shall be increased to a minimum of two (2) per seven (7) calendar day period separated by two (2) calendar days for as long as the five (5) acre threshold is exceeded. The qualified inspector, as defined in SPEDES General Permit guidelines, shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

1. Date and time of inspection.

2. Name and title of person(s) performing inspection.

3. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of inspection.

4. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow.

5. A description of the condition of all natural surface waterbodies located within, or immediately, adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface waterbody.

6. Identification of all erosion and sediment control practices that need repair or maintenance.

7. Identification of all erosion and sediment control practice that were not installed properly or are not functioning as designed and need to be reinstalled or replaced.

8. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection.

9. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards.

10. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practices.

11. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing correction actions. The qualified inspector shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed.

State Land Corp.

Within one business day of the completion of an inspection, the qualified inspector shall notify the Owner or Operator and appropriate Contractor (or Subcontractor) of any corrective actions that need to be taken. The Contractor (or Subcontractor) shall begin implementing the corrective action within one business day of this notification and shall complete the corrective actions in a reasonable time frame. All inspection reports shall be signed by the qualified inspector. A sample inspection report is included in Appendix J.

The Owner or Operator shall maintain a record of all inspection reports in a site log book until all disturbed areas have achieved final stabilization and the N.O.T. has been submitted to the DEC. The site log book shall be maintained on site and be made available to the permitting authority upon request.

Prior to filing of the Notice of Termination or the end of permit term, the Owner or Operator shall have the qualified professional perform a final site inspection. The qualified professional shall be provided with a certified final asbuilt survey. The survey shall locate and provide detailed information for the permanent stormwater facilities. The information provided shall include and not be limited to the following: rim and invert elevations of all structures, outlets, weirs, etc.; pipe material and sizes; basin dimensions, elevations and topography; and any other pertinent information specific to the stormwater practice constructed.

Upon final review of the asbuilt survey and completed site improvements, the qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

The qualified professional shall then complete the Notice of Termination (NOT) to be signed by the Owner. The NOT with the required supporting documentation shall be submitted to the MS4 for signature of approval which will then be forwarded to the NYS DEC.

11.0 Installation and Maintenance of Stormwater Management Practices

11.1 During Construction

The Contractor shall be responsible for the installation and maintenance of all temporary erosion control measures. The Contractor shall also be responsible for the installation of permanent control measures. The Operator shall be responsible for the maintenance of all permanent control measures.

All temporary erosion control measures installed on the project site shall be observed and maintained to ensure that they are operating as intended as follows:

1. Temporary measures will be inspected by the trained Contractor daily. Any necessary repairs, replacements, or upgrades will be made immediately.

2. Accumulated sediments will be removed as required to keep the measures functional. In the case of silt fencing and haybales (if applicable), remove deposits where accumulations reach half the height of the fence or bale. In the case of sediment basins, remove deposits whenever their capacity has been reduced by fifty percent (50%) from the design capacity.

3. All erosion of the silt fence will be repaired immediately with compacted backfill materials.

4. Disturbed areas, stockpile areas, areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system or downstream.

5. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

6. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

7. The permanent storm drainage system shall be inspected and cleaned of all sediment prior to completion of project.

11.2 After Construction

The long-term operation and maintenance of the stormwater management system will be the responsibility of the Owner. A legally binding document will be signed detailing the responsible parties and required actions.

A sample of the Stormwater Management Inspection and Maintenance Agreement is included, as Schedule "B" in Appendix K.

The following is the proposed Inspection and Maintenance Schedule:

Control to be Inspected	Inspection Frequency	Maintenance Threshold Criteria	Maintenance Procedure
Drain Inlets	Quarterly	3"+ accumulated sediment	Remove debris and sediment annually.

Swales and Channels	Semi-Annually	Debris and leaves and Sediment at 5%	Remove debris and sediment semi-annually
Subsurface Infiltration	Bi-annually	Debris and leaves and Sediment at 5%	Remove debris and sediment
Bioretention	Quarterly	Ponding for more than 48 hours	Remove accumulated sediment and debris; weed and replace plants and mulch as needed.
Porous Pavement	Quarterly	Paving does not dewater between storms	Clean area of debris and sediment; vacuum sweep area.

Recommended Maintenance Access:

Pre-Treatment Chamber

Access through manhole cover. Pump down permanent water volume. Vacuum sediment.

Subsurface Infiltration

Access through manhole cover. Vacuum sediment and debris.

Drain Inlets:

Access through grate structure and remove debris and sediment with hand tools or vacuum truck.

In General:

- Controls should be inspected periodically for the first few months after construction and on a semi-annual basis thereafter. They should also be inspected after major storm events (greater than 0.5 inches).
- All stormwater controls shall be inspected and cleaned of any debris or sediment.
- Any erosion shall be repaired and stabilized with seeding and mulch or stone.

- Maintenance and access shall comply with all local, State and Federal safety codes and guidelines.

Please note that additional notes regarding maintenance activities are contained on the project Construction Drawings and should be adhered to during and after construction.

12.0 Owner / Contractor Responsibilities

12.1 Owner / Operator Certification Statement

The Owner/Operator of the project for the purpose of this Permit (see Appendix A). The Owner must sign a copy of the Owner's Certification Statement before construction commences (see Appendix C).

12.2 Contractor Certification Statement

The Owner is responsible for ensuring all Contractors and Subcontractors associated with site work construction activities identified within this SWPPP agree to implement applicable provisions of the SWPPP and sign a copy of the Contractor Certification Statement (see Appendix C) before construction commences.

In addition, the Owner/Operator is responsible to make sure that all Contractors and Subcontractors shall identify at least one person representing the Company at the site will be responsible for implementation of the SWPPP. This person will be known as the Trained Contractor and will have the required 4-hour Certification. This Certification is available through the NYS DEC. The listing of courses can be found at the NYS DEC Website.

12.3 Retention of Records

The Owner shall retain a copy of the most current SWPPP at the construction site from the date construction is initiated at the site until the date of construction at the site is completed and the N.O.T. has been filed.

Once work is completed, the Owner shall submit to the NYSDEC a Notice of Termination (see Appendix A).

The Owner shall retain copies of the N.O.I, N.O.T., Acknowledgement Letter, MS4 SWPPP Acceptance Form, SWPPP and all reports required by the General Permit for a period of five (5) years from the date that the site achieves final stabilization unless the NYSDEC specifies another time period in writing.

13.0 Conclusion

The Preliminary Stormwater Management Plan has been established for this project in accordance with the requirements of NYS DEC GP-0-10-001and the Town Code of Yorktown. This plan will effectively control stormwater generated by this project during and after construction. The management of the stormwater is based on controlling increases in peak runoff as well as water quality. The design of the water quality component not only will treat runoff due to the project, but also provide additional benefit. The project will also create the possibility to provide the reduction of peak runoff downstream, specifically at Old Crompond Road and the Hill Pond corridor. Overall it would improve the existing conditions.

The final design of the project will detail the proposed practices and will establish the method with which they will be constructed. The detail will include layout, grading, plantings, outlet structures, and any other component as required for the design based on the Erosion and Sediment Control established in this Report. These will be part of the project Construction Drawings. The Sequence of Construction and required maintenance will also be set forth as part of the final construction plan. The full Construction Plan shall be considered part of the Stormwater Management Plan or Stormwater Pollution Prevention Plan.

The effectiveness of the stormwater practices selected in design will be insured by implementing a maintenance plan. The maintenance plan details specific activities, safeguards and provisions to be monitored and performed by specified frequencies. By adhering to the maintenance plan, optimum performance of the stormwater practices can be expected.

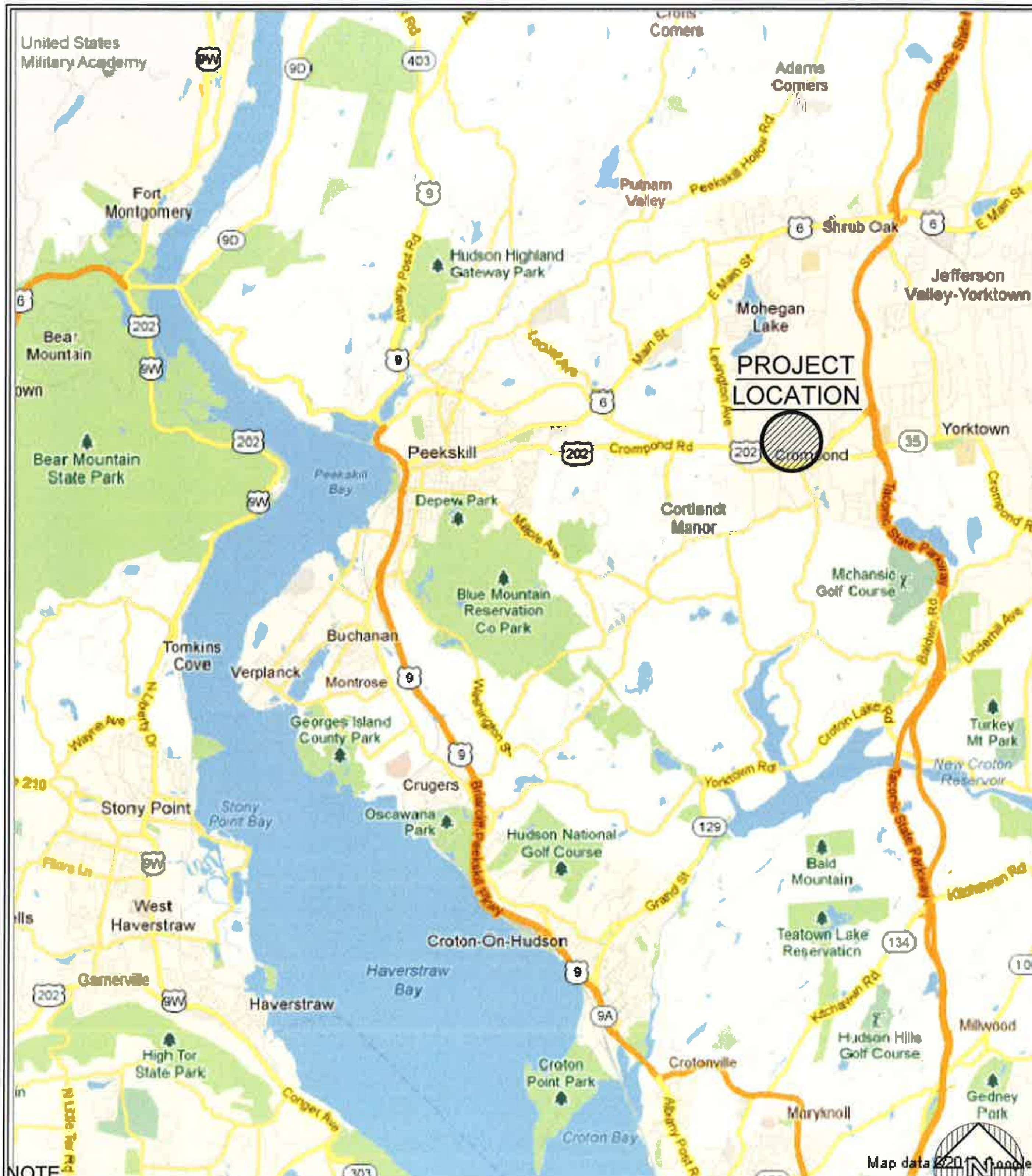
Based on the results of the analysis and recommended maintenance practices for the collection and treatment system, the proposed stormwater control designs will provide maximum control efficiency, high effectiveness for removal of pollutants of concern, and the best attainable post-development pollutant loading scenario.

In conclusion, the Stormwater Management Plan will not create negative downstream impacts as a result of this project.

Joseph C. Riina, P.E

March 12, 2012

FIGURES



NOTE:
1. Map Source: Google Maps Image.

FIGURE 1.1 - LOCATION MAP
PREPARED FOR

CHARLES MONACO
a.k.a State Land Corp.
ROUTE 202

Town Of Yorktown Westchester Co., New York

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

NOT TO SCALE
DATE 3/16/12

FIGURE 1.2 - VICINITY MAP
PREPARED FOR

CHARLES MONACO
a.k.a State Land Corp.
ROUTE 202

Town Of Yorktown — Westchester Co., New York

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

NOT TO SCALE
DATE: 3/16/12

SOILS CHART

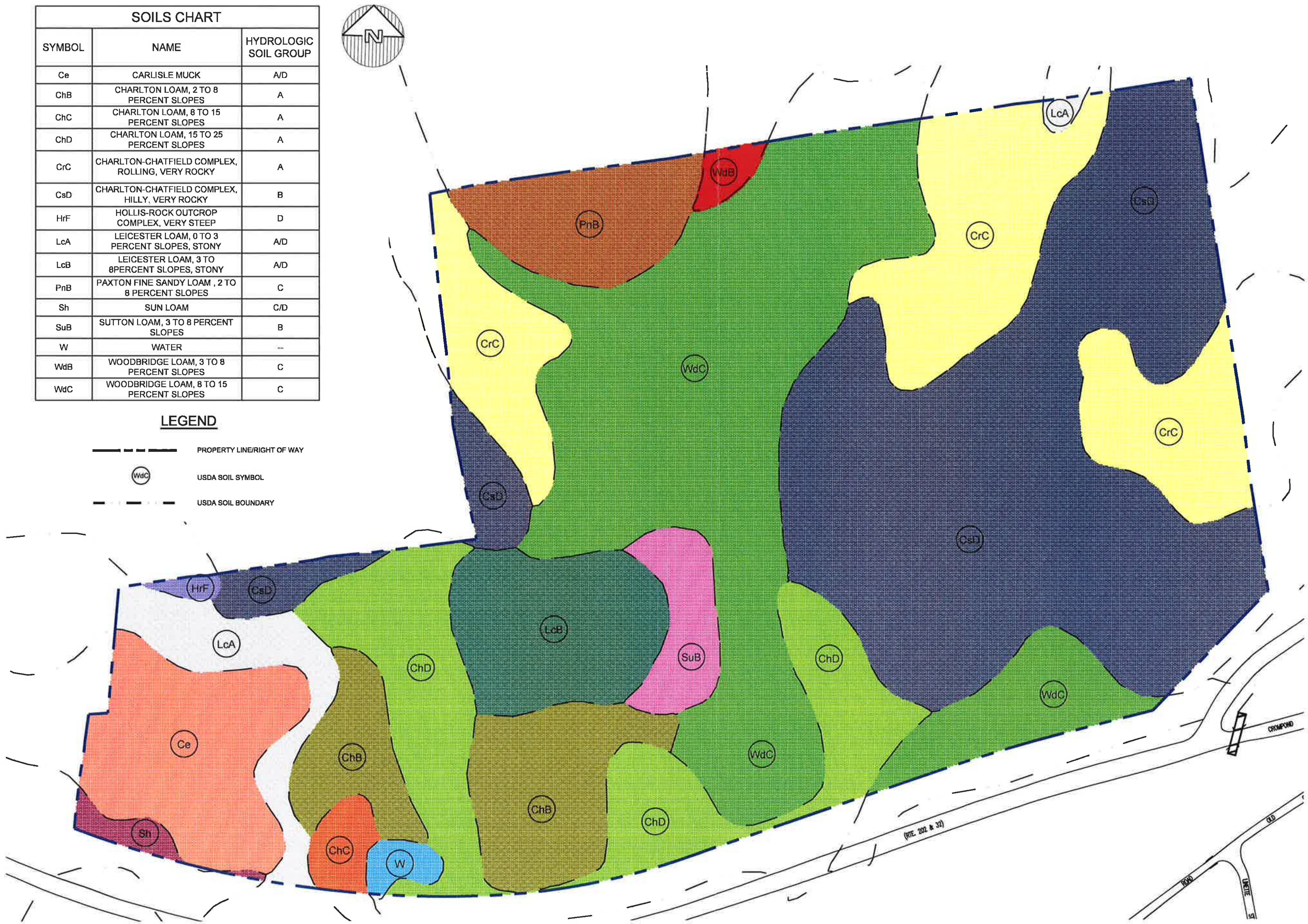
SYMBOL	NAME	HYDROLOGIC SOIL GROUP
Ce	CARLISLE MUCK	A/D
ChB	CHARLTON LOAM, 2 TO 8 PERCENT SLOPES	A
ChC	CHARLTON LOAM, 8 TO 15 PERCENT SLOPES	A
ChD	CHARLTON LOAM, 15 TO 25 PERCENT SLOPES	A
CrC	CHARLTON-CHATFIELD COMPLEX, ROLLING, VERY ROCKY	A
CsD	CHARLTON-CHATFIELD COMPLEX, HILLY, VERY ROCKY	B
HrF	HOLLIS-ROCK OUTCROP COMPLEX, VERY STEEP	D
LcA	LEICESTER LOAM, 0 TO 3 PERCENT SLOPES, STONY	A/D
LcB	LEICESTER LOAM, 3 TO 8PERCENT SLOPES, STONY	A/D
PnB	PAXTON FINE SANDY LOAM , 2 TO 8 PERCENT SLOPES	C
Sh	SUN LOAM	C/D
SuB	SUTTON LOAM, 3 TO 8 PERCENT SLOPES	B
W	WATER	--
WdB	WOODBRIDGE LOAM, 3 TO 8 PERCENT SLOPES	C
WdC	WOODBRIDGE LOAM, 8 TO 15 PERCENT SLOPES	C

LEGEND

PROPERTY LINE/RIGHT OF WAY

WdC USDA SOIL SYMBOL

USDA SOIL BOUNDARY



SCALE: NTS

DATE: 3/07/12

Site Design Consultants

Civil Engineers • Land Planners

251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

FIGURE 4.1 - SOILS MAP

PREPARED FOR

CHARLES MONACO

a.k.a State Land Corp.

ROUTE 202

Town Of Yorktown Westchester Co., New York

NOTE: UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 7209 (2) OF THE NEW YORK STATE EDUCATION LAW.

FIGURE 4.2 - SOIL TESTING LOCATIONS
PREPARED FOR

CHARLES MONACO
a.k.a State Land Corp.
ROUTE 202

Town Of Yorktown — Westchester Co., New York

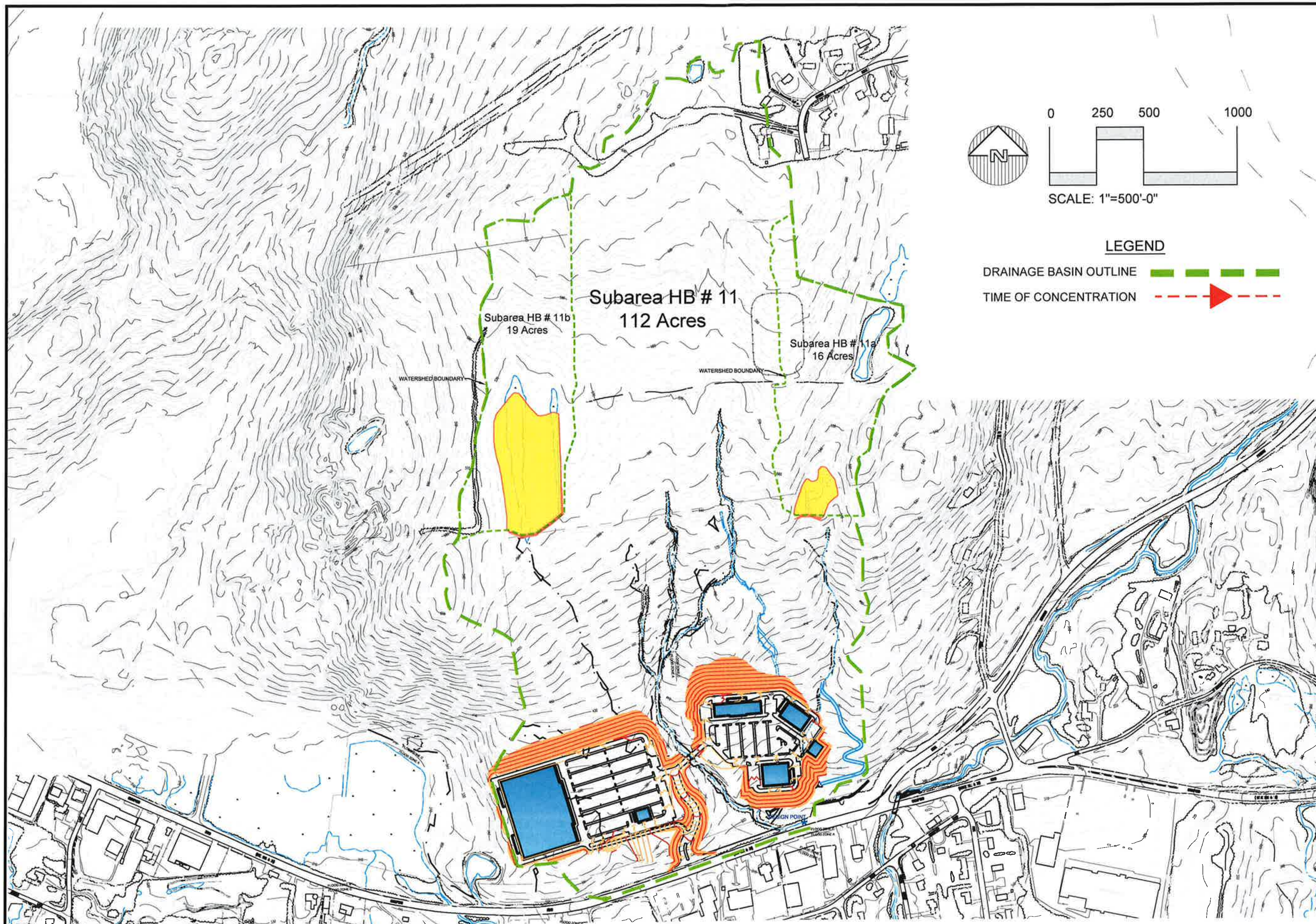
GTA

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

(410) 879-9446 • FAX (410) 893-3437

TEST PIT LOCATION PLAN
YORKTOWN SITE
WEST CHESTER COUNTY,NEW YORK

SCALE:	DATE:	DRAWN BY:	DESIGN BY:	REVIEW BY	JOB NO.:
	NOV 2000	TMS			00555



NOTE: UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 7209 (2) OF THE NEW YORK STATE EDUCATION LAW.

DATE: 3/16/12

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

FIGURE 5.1 & 5.2 WATERSHED MAP
PREPARED FOR
CHARLES MONACO
a.k.a State Land Corp.
ROUTE 202

Town Of Yorktown
Westchester Co., New York

Table 5.3 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**	
	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 (de-compaction 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".

FIGURE 5.3 - SOIL RESTORATION REQUIREMENTS
PREPARED FOR
CHARLES MONACO
a.k.a State Land Corp.
ROUTE 202
Town Of Yorktown Westchester Co., New York

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

DATE: 3/16/12

APPENDIX A

List of Required Approvals and Applications:

Town of Yorktown Site Plan Approval
Town of Yorktown Building Permit

New York State Department of Environmental Conservation
General Permit GP-0-10-001 "Notice of Intent"

New York State Department of Environmental Conservation
SWPPP MS4 Acceptance Form

New York State Department of Environmental Conservation
"Notice of Termination"

New York City Department of Environmental Protection
Stormwater Pollution Plan Approval

APPENDIX B

Regulatory Ordinances:

NYS DEC General Permit No. GP-0-10-001

Local Ordinance

NYC DEP

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

from

CONSTRUCTION ACTIVITY

Permit No. GP-0-10-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2010 Expiration Date: January 28, 2015

William R. Adriance
Chief Permit Administrator

William R. Adriance January 28, 2010
Authorized Signature Date

Address: NYS DEC
Div. Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL").*

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:

http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES

FROM CONSTRUCTION ACTIVITIES

TABLE OF CONTENTS

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application - This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

B. Maintaining Water Quality - It shall be a violation of this permit and the *ECL* for any *discharge* to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

C. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph D. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater discharges from *construction activities.*

3. Notwithstanding paragraphs C.1 and C.2 above, the following non-stormwater *discharges* may be authorized by this permit: discharges from fire fighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated groundwater or spring water; uncontaminated discharges from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who discharge as noted in this paragraph, and with the exception of flows from fire fighting activities, these discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with water quality standards in Part I.B.

D. Activities Which Are Ineligible for Coverage Under This General Permit - All of the following are **not** authorized by this permit:

1. *Discharges* after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharges* that are mixed with sources of non-stormwater other than those expressly authorized under subsection C.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII, subparagraph K of this permit;

4. *Discharges* from *construction activities* that adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects that:

    a. are tributary to waters of the state classified as AA or AA-s; and

b. disturb one or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects that:
   a. are tributary to waters of the state classified as AA or AA-s; and

   b. disturb two or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

8. *Construction activities* that adversely affect a property that is listed or is eligible for listing on the State or National Register of Historic Places (Note: includes Archeological sites), unless there are written agreements in place with the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) or other governmental agencies to mitigate the effects, or there are local land use approvals evidencing the same.

Part II. OBTAINING PERMIT COVERAGE

A. Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the address below in order to be authorized to *discharge* under this permit. The NOI form shall be one which is associated with this permit, signed in accordance with Part VII.H. of this permit.

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4*, or by a duly authorized representative of that person, and then submit that form along with the NOI to the address referenced under "Notice of Intent (NOI) Submittal".

3. This requirement does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of Owner or Operator).

4. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

5. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act (SEQRA) have been satisfied, when SEQRA is applicable,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act (UPA)* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Regional Office in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. an NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

(Part II. B. 3)

a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

i. Five (5) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 and/or 3, or

ii. Sixty (60) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 or 3.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

i. Five (5) business days from the date the Department receives a complete NOI and signed "MS4 SWPPP Acceptance" form,

4. The Department may suspend or deny an *owner's or operator's* coverage under this permit if the Department determines that the SWPPP does not meet the permit requirements.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department.

C. <u>General Requirements For Owners or Operators With Permit Coverage</u>

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination (NOT) has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-10-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form and inspection reports at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department.

(Part II. C. 2)

The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the MS4 (provided the MS4 is not the *owner or operator* of the construction activity). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

    a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

    b. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

    c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

    d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

    e. The *owner or operator* shall include the requirements above in their SWPPP.

4. The Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements.

(Part II. C)

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4,* the *owner or operator* shall notify the *MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *MS4,* the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *MS4* prior to commencing construction of the post-construction stormwater management practice.

D. Permit Coverage for Discharges Authorized Under GP-0-08-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001), a*n owner or operator* of *construction activity* with coverage under GP-0-08-001, as of the effective date of GP-0-10-001, shall be authorized to *discharge* in accordance with GP-0-10-001 unless otherwise notified by the Department.

E. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1.. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

   Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the pollutants in stormwater discharges and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

    a. whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater *discharges* from the site;

    b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the discharge of pollutants; and

    c. to address issues or deficiencies identified during an inspection by the *qualified inspector*, the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit.

6. 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.

(Part III. A. 6)

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 following certification statement below before they commence any *construction activity*:

> "I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

8. The SWPPP must include documentation supporting the determination of permit eligibility with regard to Part I.D.8. (Historic Places or Archeological Resource). At a minimum, the supporting documentation shall include the following:

a. Information on whether the stormwater discharge or *construction activities* would have an effect on a property (historic or archeological resource) that is listed or eligible for listing on the State or National Register of Historic Places;

b. Results of historic resources screening determinations conducted. Information regarding the location of historic places listed, or eligible for listing, on the State or National Registers of Historic Places and areas of archeological sensitivity that may indicate the need for a survey can be obtained online by viewing the New York State Office of Parks, Recreation and Historic Places (OPRHP) online resources located on their web site at: http://nysparks.state.ny.us/shpo/online-tools/ (using The Geographic Information System for Archeology and National Register). OPRHP can also be contacted at: NYS OPRHP, State Historic Preservation Office, Peebles Island Resources Center, P.O. Box 189, Waterford, NY 12188-0189, phone: 518-237-8643;

c. A description of measures necessary to avoid or minimize adverse impacts on places listed, or eligible for listing, on the State or National Register of Historic Places. If the *owner or operator* fails to describe and implement such measures, the stormwater *discharge* is ineligible for coverage under this permit; and

d. Where adverse effects may occur, any written agreements in place with OPRHP or other governmental agency to mitigate those effects, or local land use approvals evidencing the same.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Where erosion and sediment control practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

    a. Background information about the scope of the project, including the location, type and size of project;

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s), wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater discharge(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each construction activity that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of final stabilization;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

(Part III. B. 1)

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6., to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards.

2. Post-construction stormwater management practice component - All construction projects identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual ("Design Manual"). If the Design Manual is revised during the term of this permit, an *owner or operator* must begin using the revised version of the Design Manual to prepare their SWPPP six (6) months from the final revision date of the Design Manual.

   Where post-construction stormwater management practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard.

   At a minimum, the post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. The dimensions, material specifications and installation details for each post-construction stormwater management practice;

d. Identification of any elements of the design that are not in conformance with the Design Manual. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards;

e. A hydrologic and hydraulic analysis for all structural components of the stormwater management control system;

f. A detailed summary (including calculations) of the sizing criteria that was used to design all post-construction stormwater management practices. At a minimum, the summary shall address the required design criteria from the applicable chapter of the Design Manual; including the identification of and justification for any deviations from the Design Manual, and identification of any design criteria that are not required based on the design criteria or waiver criteria included in the Design Manual; and

g. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.g. above.

(Part III. C)

C. **Required SWPPP Components by Project Type** - Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices and all post-construction stormwater management practices identified in the SWPPP are maintained in effective operating condition at all times.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Owner or Operator Maintenance Inspection Requirements

1. The *owner or operator* shall inspect, in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, the erosion and sediment controls identified in the SWPPP to ensure that they are being maintained in effective operating condition at all times.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *owner or operator* can stop conducting the maintenance inspections. The *owner or operator* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *owner or operator* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

(Part IV. C)

C. <u>Qualified Inspector Inspection Requirements</u> - The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- Licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- Someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

    a. the construction of a single family residential subdivision with 25% or less impervious cover at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

    b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

    c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

    d. construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

    a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

(Part IV. C. 2)

b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the Regional Office stormwater contact person (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the MS4 (provided the MS4 is not the *owner or operator* of the construction activity) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the Regional Office stormwater contact person (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the MS4 (provided the MS4 is not the *owner or operator* of the construction activity). in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* <u>and</u> all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1..

(Part IV. C. 3)

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of discharge to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of discharge from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

    a. Date and time of inspection;

    b. Name and title of person(s) performing inspection;

    c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

    d. A description of the condition of the runoff at all points of discharge from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

    e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

    f. Identification of all erosion and sediment control practices that need repair or maintenance;

    g. Identification of all erosion and sediment control practices that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

    h. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

(Part IV. C 4)

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

k. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector*. Pursuant to Part II.C.2., the inspection reports shall be maintained on site with the SWPPP.

Part V. <u>TERMINATION OF PERMIT COVERAGE</u>

A. <u>Termination of Permit Coverage</u>

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1. The NOT form shall be one which is associated with this general permit, signed in accordance with Part VII.H.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

a. Total project completion - All construction activity identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT, certify that all disturbed areas have achieved *final stabilization;* and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall also have the MS4 sign the "MS4 Acceptance" statement on the NOT. The *owner or operator* shall have the principal executive officer, ranking elected official, or duly authorized representative from the *regulated, traditional land use control MS4*, sign the "MS4 Acceptance" statement. The MS4 official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The MS4 can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector's* final site inspection certification(s) required in Part V.3.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

(Part V. A. 5)

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has modified their deed of record to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention - The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the site achieves *final stabilization*. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

B. Addresses - With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate Department Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply - The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied.

(Part VII. A)

The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

B. Continuation of the Expired General Permit - This permit expires five (5) years from the effective date. However, coverage may be obtained under the expired general permit, which will continue in force and effect, until a new general permit is issued. Unless otherwise notified by the Department in writing, an *owner or operator* seeking authorization under the new general permit must submit a new NOI in accordance with the terms of such new general permit.

C. Enforcement - Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense - It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate - The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to minimize or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information - The *owner or operator* shall make available to the Department for review and copying or furnish to the Department within five (5) business days of receipt of a Department request for such information, any information requested for the purpose of determining compliance with this permit. This can include, but is not limited to, the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form, executed maintenance agreement, and inspection reports. Failure to provide information requested by the Department within the request timeframe shall be a violation of this permit.

The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review the NOI, SWPPP or inspection reports. Copying of documents will be done at the requester's expense.

G. Other Information - When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any other report, or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or impervious area), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. <u>Signatory Requirements</u>

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        i. a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

        ii. the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

    b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

    c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

        i. the chief executive officer of the agency, or

(Part VII. H. 1. c)

ii. a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Part VII.H.1.;

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

   c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights - The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity.*

J. Severability - The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

(Part VII. K)

K. Denial of Coverage Under This Permit

1. At its sole discretion, the Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Regional Water Engineer, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. Any *owner or operator* authorized by this permit may request to be excluded from the coverage under this permit by applying for an individual permit or another general permit. In such cases, the *owner or operator* shall submit an individual application or an alternative general permit application in accordance with the requirements of this general permit, 40 CFR 122.26(c)(1)(ii) and 6 NYCRR Part 621, with reasons supporting the request, to the Department at the address for the appropriate Department Office (see addresses in Appendix F).The request may be granted by issuance of an individual permit or another general permit at the discretion of the Department.

3. When an individual SPDES permit is issued to a discharger authorized to discharge under a general SPDES permit for the same discharge(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance - The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry - The *owner or operator* shall allow the Department or an authorized representative of EPA, the State, or, in the case of a construction site which discharges through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

(Part VII. M)

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

N. Permit Actions - At the Department's sole discretion, this permit may, at any time, be modified, suspended, revoked, or renewed. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions - Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports – Article 17 of the ECL provides for a civil penalty of $37,500 per day per violation of this permit. Articles 175 and 210 of the New York State Penal Law provide for a criminal penalty of a fine and/or imprisonment for falsifying forms and reports required by this permit.

R. Other Permits – Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "Construction Activity(ies)" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 authorizing a category of discharges.

Groundwater - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct construction activities are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that construction activities may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;
ii. Designed or used for collecting or conveying stormwater;
iii. Which is not a *combined sewer*; and
iv. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from construction activity.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the construction activity is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in Parts 700 et seq of this Title.

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics in order to prepare a SWPPP that conforms to the Department's technical standard. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

Routine Maintenance Activity - means construction activity that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* will be responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B

Required SWPPP Components by Project Type

Table 1

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home not located in one of the watersheds listed in Appendix C and not *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other agricultural building, silo, stock yard or pen.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Bike paths and trails • Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics • Spoil areas that will be covered with vegetation • Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions • Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions • Demolition project where vegetation will be established and no redevelopment is planned • Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover* • Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: • All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* <u>and</u> *alter the hydrology from pre to post development* conditions, <u>and</u> are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4

Figure 1 - New York City Watershed East of the Hudson

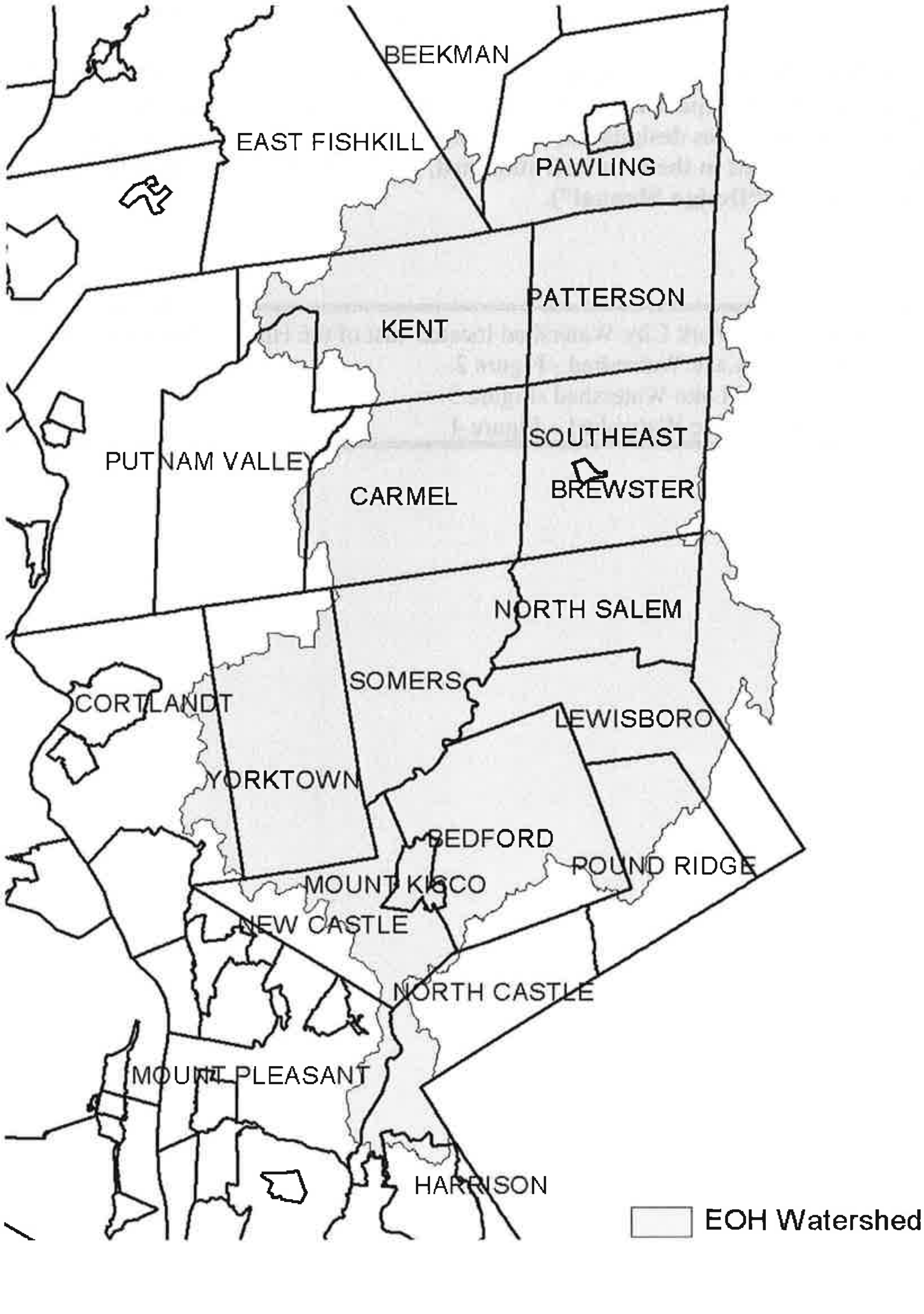


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

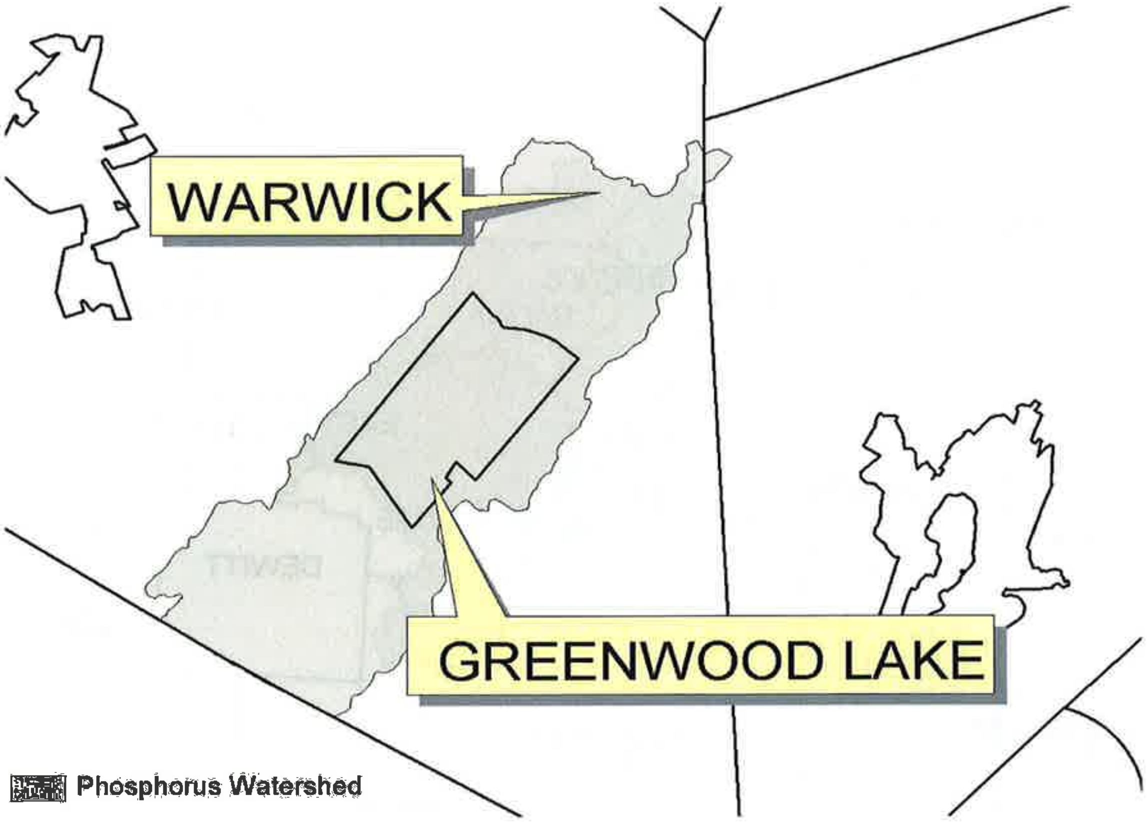
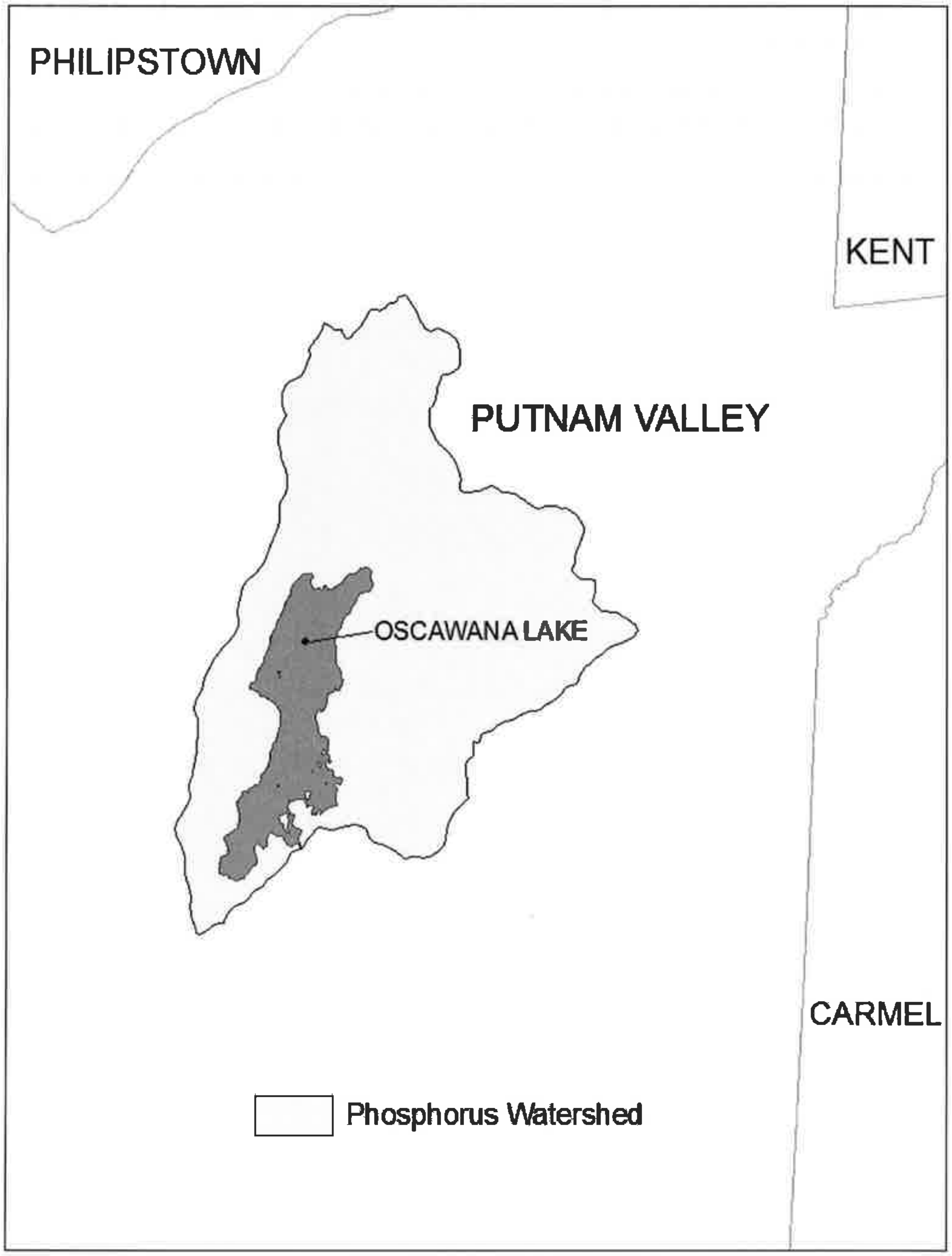


Figure 4 - Oscawana Lake Watershed



APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivision construction activities that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

COUNTY	WATERBODY	COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond	Monroe	Genesee River, Lower, Main Stem
Albany	Basic Creek Reservoir	Monroe	Genesee River, Middle, Main Stem
Bronx	Van Cortlandt Lake	Monroe	Black Creek, Lower, and minor tribs
Broome	Whitney Point Lake/Reservoir	Monroe	Buck Pond
Broome	Beaver Lake	Monroe	Long Pond
Broome	White Birch Lake	Monroe	Cranberry Pond
Chautauqua	Chautauqua Lake, North	Monroe	Mill Creek and tribs
Chautauqua	Chautauqua Lake, South	Monroe	Shipbuilders Creek and tribs
Chautauqua	Bear Lake	Monroe	Minor tribs to Irondequoit Bay
Chautauqua	Chadakoin River and tribs	Monroe	Thomas Creek/White Brook and tribs
Chautauqua	Lower Cassadaga Lake	Nassau	Glen Cove Creek, Lower, and tribs
Chautauqua	Middle Cassadaga Lake	Nassau	LI Tribs (fresh) to East Bay
Chautauqua	Findley Lake	Nassau	East Meadow Brook, Upper, and tribs
Clinton	Great Chazy River, Lower, Main Stem	Nassau	Hempstead Bay
Columbia	Kinderhook Lake	Nassau	Hempstead Lake
Columbia	Robinson Pond	Nassau	Grant Park Pond
Dutchess	Hillside Lake	Niagara	Bergholtz Creek and tribs
Dutchess	Wappinger Lakes	Oneida	Ballou, Nail Creeks
Dutchess	Fall Kill and tribs	Onondaga	Ley Creek and tribs
Dutchess	Rudd Pond	Onondaga	Onondaga Creek, Lower and tribs
Erie	Rush Creek and tribs	Onondaga	Onondaga creek, Middle and tribs
Erie	Ellicott Creek, Lower, and tribs	Onondaga	Onondaga Creek, Upper, and minor tribs
Erie	Beeman Creek and tribs	Onondaga	Harbor Brook, Lower, and tribs
Erie	Murder Creek, Lower, and tribs	Onondaga	Ninemile Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs	Onondaga	Minor tribs to Onondaga Lake
Erie	Little Sister Creek, Lower, and tribs	Ontario	Honeoye Lake
Essex	Lake George (primary county listed as Warren)	Ontario	Hemlock Lake Outlet and minor tribs
Genesee	Black Creek, Upper, and minor tribs	Ontario	Great Brook and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem	Oswego	Lake Neatahwanta
Genesee	Tonawanda Creek, Upper, and minor tribs	Putnam	Oscawana Lake
Genesee	Little Tonawanda Creek, Lower, and tribs	Putnam	Lake Carmel
Genesee	Oak Orchard Creek, Upper, and tribs	Queens	Jamaica Bay, Eastern, and tribs (Queens)
Genesee	Bowen Brook and tribs	Queens	Bergen Basin
Genesee	Bigelow Creek and tribs	Queens	Shellbank Basin
Greene	Schoharie Reservoir	Rensselaer	Snyders Lake
Greene	Sleepy Hollow Lake	Richmond	Grasmere, Arbutus and Wolfes Lakes
Herkimer	Steele Creek tribs	Saratoga	Dwaas Kill and tribs
Kings	Hendrix Creek	Saratoga	Tribs to Lake Lonely
Lewis	Mill Creek/South Branch and tribs	Saratoga	Lake Lonely
Livingston	Conesus Lake	Saratoga	Schuyler Creek and tribs
Livingston	Jaycox Creek and tribs	Schenectady	Collins Lake
Livingston	Mill Creek and minor tribs		

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Schoharie	Engleville Pond		
Schoharie	Summit Lake		
St. Lawrence	Black Lake Outlet/Black Lake		
Steuben	Lake Salubria		
Steuben	Smith Pond		
Suffolk	Millers Pond		
Suffolk	Mattituck (Marratooka) Pond		
Suffolk	Tidal tribs to West Moriches Bay		
Suffolk	Canaan Lake		
Suffolk	Lake Ronkonkoma		
Tompkins	Cayuga Lake, Southern End		
Tompkins	Owasco Inlet, Upper, and tribs		
Ulster	Ashokan Reservoir		
Ulster	Esopus Creek, Upper, and minor tribs		
Warren	Lake George		
Warren	Tribs to L.George, Village of L George		
Warren	Huddle/Finkle Brooks and tribs		
Warren	Indian Brook and tribs		
Warren	Hague Brook and tribs		
Washington	Tribs to L.George, East Shore of Lake George		
Washington	Cossayuna Lake		
Wayne	Port Bay		
Wayne	Marbletown Creek and tribs		
Westchester	Peach Lake		
Westchester	Mamaroneck River, Lower		
Westchester	Mamaroneck River, Upper, and minor tribs		
Westchester	Sheldrake River and tribs		
Westchester	Blind Brook, Lower		
Westchester	Blind Brook, Upper, and tribs		
Westchester	Lake Lincolndale		
Westchester	Lake Meahaugh		
Wyoming	Java Lake		
Wyoming	Silver Lake		

Note: The list above identifies those waters from the final New York State "2008 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated May 26, 2008, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD, PO BOX 220 WARRENSBURG, NY 12885-0220 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

CHAPTER 248 STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL

[HISTORY: Adopted by the Town Board of the Town of Yorktown 10-19-2010 by L.L. No. 10-2010.
Editor's Note: This local law also repealed former Ch. 248, Stormwater Management, adopted 5-4-2004 by L.L. No. 12-2004.
Amendments noted where applicable.]

GENERAL REFERENCES

Conservation Board — See Ch. 10, Art. II.

Building construction administration — See Ch. 15.

Blasting and explosives — See Ch. 124.

Building construction and fire prevention — See Ch. 130.

Conservation areas — See Ch. 140.

Environmental quality review — See Ch. 161.

Flood damage prevention — See Ch. 175.

Freshwater wetlands — See Ch. 178.

Land development — See Ch. 195.

Illicit discharges, activities and connections — See Ch. 247.

Zoning — See Ch. 300.

§ 248-1 Findings of fact.

It is hereby determined that:

A.
Land development activities and associated increases in site impervious cover often after the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, flooding, stream channel erosion, or sediment transport and deposition;

B.
This stormwater runoff contributes to increased quantities of waterborne pollutants, including siltation of aquatic habitat for fish and other desirable species:

C.
Clearing and grading during construction tends to increase soil erosion and add to the loss of native vegetation necessary for terrestrial and aquatic habitats;

D.
Improper design and construction of stormwater management practices can increase the velocity of stormwater ronoff, thereby increasing stream bank erosion and sedimentation;

E.
Impervious surfaces allow less water to percolate into the soil, thereby decreasing groundwater recharge and stream base flow;

F.
Substantial economic losses can result from these adverse impacts on the waters of the municipality;

G.
Stormwater runoff, soil erosion and nonpoint source pollution can be controlled and minimized through the regulation of stormwater runoff from land development activities;

H.
The regulation of stormwater runoff discharges from land development activities in order to control and minimize

increases in stormwater runoff rates and volumes, soil erosion, stream channel erosion, and nonpoint source pollution associated with stormwater runoff is in the public interest and will minimize threats to public health and safety;

I.
Regulation of land development activities by means of performance standards governing stormwater management and site design will produce development compatible with the natural functions of a particular site or an entire watershed and thereby mitigate the adverse effects of erosion and sedimentation from development.

§ 248-2 Intent and purpose.

It is the intent of the Town of Yorktown to establish minimum stormwater management requirements and controls to safeguard persons, protect property, prevent damage to the environment, and promote the public welfare by guiding, regulating, and controlling the design, use and maintenance of any development or other activity which disturbs or breaks the surface of soil or results in the movement of earth on land situated in the Town. This chapter seeks to meet those purposes by achieving the following objectives:

A.
Meet the requirements of minimum measures 4 and 5 of the SPDES general permit for stormwater discharges from municipal separate stormwater sewer systems (MS4s), as amended or revised;

B.
Require land development activities to conform to the substantive requirements of the New York State Department of Environmental Conservation State Pollutant Discharge Elimination System (SPDES) general permit for construction activities, as amended or revised;

C.
Minimize increases in stormwater runoff from land development activities in order to reduce flooding, siltation, increases in stream temperature, and stream bank erosion and maintain the integrity of stream channels;

D.
Minimize increases in pollution caused by stormwater runoff from land development activities which would otherwise degrade local water quality;

E.
Minimize the total annual volume of stormwater runoff which flows from any specific site during and following development to the maximum extent practicable; and

F.
Reduce stormwater runoff rates and volumes, soil erosion and nonpoint source pollution, wherever possible, through stormwater management practices and to ensure that these management practices are properly maintained and eliminate threats to public safety.

§ 248-3 Definitions.

A.
Customary meanings. Except where specifically defined herein, all words used in this chapter shall carry their customary meanings. Certain words or phrases used in this chapter shall be interpreted as defined below, and where ambiguity exists, words or phrases shall be interpreted so as to give this chapter its most reasonable application in carrying out the regulatory goals as stated in § 248-2.

B.
Defined phrases. As used in this chapter, the following terms shall have the meanings indicated:

ADDITION
Any work on an existing structure that changes the external dimensions of such structure.

ADJACENT PARCEL
All parcels contiguous to the subject parcel, as well as all parcels downstream of the subject parcel within the natural or actual drainageway or watercourse.

AGENT

Any Town of Yorktown official who is designated to administer and enforce this chapter.

AGRICULTURAL ACTIVITY
The activity of an active farm, including grazing and watering livestock, irrigating crops, harvesting crops, using land for growing agricultural products, and cutting timber for sale, but shall not include the operation of a dude ranch, or similar operation, or the construction of new structures associated with agricultural activities.

ALTERATION
Any work on an existing structure that affects the interior of the structure but does not change its external dimensions.

APPLICANT
A property owner or agent of a property owner who has filed an application for a land development activity.

APPROVING AUTHORITY
The Planning Board, Town Board, Town Engineer or his/her authorized representative, or other approving authority to whom oversight of this chapter is given by the Town Board.

BUILDING
Any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet.

BUILDING INSPECTOR
The Building Inspector of the Town of Yorktown, or his/her assistant.

BUILDING PERMIT
A permit issued by the municipality for the construction, erection, or alteration of a structure or building.

CERTIFICATION
A formal attestation that the specific inspections and tests, where required, have been performed and that such tests comply with applicable requirements of this chapter.

CERTIFIED CUBIC YARDS
The measurement used to determine the amount of material in excavation and/or fill measured by the method of average end areas.

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC)
A person who has received training and is certified by CPESC Inc. to review, inspect, and/or maintain erosion and sediment control practices.

CHANNEL
A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

CLEARING
Any activity that removes the vegetative surface cover.

DEDICATION
The deliberate appropriation of property by its owner for general public use.

DESIGN MANUAL
The New York State Stormwater Management Design Manual, most recent version including applicable updates, that serves as the official guide for stormwater management principles, methods and practices.

DEVELOPER
A person who undertakes land development activities.

DEVELOPMENT
Any man-made change to unimproved real estate, including but not limited to the building of other structures, mining, dredging, filling, grading, paving, removal of vegetation, excavation, blasting or drilling operations.

DRAINAGEWAY
Any channel that conveys surface runoff throughout the site.

EROSION AND SEDIMENT CONTROL PERMIT
A permit issued by the Town of Yorktown for an approved erosion and sediment control plan which allows for the construction or alteration of ground improvements and structures for the control of erosion, runoff and grading.

EROSION AND SEDIMENT CONTROL PLAN
A plan or set of plans, prepared by a New York State licensed engineer, architect, landscape architect, or certified professional in erosion and sediment control (CPESC) or by the Westchester County Soil and Water Conservation District, indicating the specific measures and sequencing to be used to control sediment and erosion on a development site both during and after construction.

EROSION CONTROL
A measure that prevents erosion.

EROSION CONTROL MANUAL
The most recent version of the New York Standards and Specifications for Erosion and Sediment Control Manual, commonly known as the "Blue Book."

EXCAVATION
Any act by which organic matter, earth, sand, gravel, rock, or any other similar material is cut into, dug, quarried. uncovered, removed, displaced, or spread, and shall include the resulting conditions.

EXISTING GRADE
The elevation of the existing ground surface prior to excavation or filling.

FILL
Any act by which earth, sand, gravel, or other material is deposited, placed, replaced, dumped, transported, or moved by man to a new location.

FINAL GRADE
The elevation of the ground or pavement surface after the grading work is completed in accordance with the approved plan.

FLOODWAY
The channel of a river, stream, brook, or other watercourse and the adjacent areas that must he reserved in order to convey the one-hundred-year flood without cumulatively increasing the water surface elevation more than one foot, as shown on the Federal Emergency Management Agency Floodway Map.

GRADING
Excavation or fill or any combination thereof, and shall include the conditions resulting from any excavation or fill.

IMPERVIOUS COVER
Those surfaces, improvements and structures that cannot effectively infiltrate rainfall, snowmelt and water (e.g., building rooftops, pavement, sidewalks, driveways, etc.).

INDUSTRIAL STORMWATER PERMIT
A State Pollutant Discharge Elimination System permit issued to a commercial industry or group of industries which regulates the pollutant levels associated with industrial stormwater discharges or specifies on-site pollution control strategies.

INFILTRATION
The process of percolating stormwater into the subsoil.

JURISDICTIONAL WETLAND
An area identified pursuant to requirements of Chapter 178 of the Town of Yorktown Town Code.

LAND DEVELOPMENT ACTIVITY

Construction activity, including clearing, grading, excavation. soil disturbance or placement of fill, that results in land disturbance of equal to or greater than 5.000 square feet of total land area that is part of a larger common plan of development or sale, even though multiple separate and distinct land development activities may take place at different times on different schedules.

LANDOWNER
The legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

MAINTENANCE AGREEMENT
A legally recorded document that acts as a property deed restriction and which provides for long-term maintenance of stormwater management practices.

NATURAL DRAINAGE
Channels formed in the existing topography of the land prior to changes made by human activities.

NONPOINT SOURCE POLLUTION
Pollution from any source other than from any discernible, confined, and discrete conveyances and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

NYSDEC
New York State Department of Environmental Conservation.

PARCEL
All contiguous land under one ownership.

PERIMETER CONTROL
A barrier that prevents sediment from leaving a site by either filtering sediment-laden runoff or diverting the runoff to a sediment trap or basin.

PERMANENT VEGETATION
Mature ground cover to control soil erosion satisfactorily and to survive weather conditions.

PERMTTTEE
Any person to whom a permit is issued.

PERMITTING AUTHORITY
The administrative board or public official empowered to grant permits under this chapter.

PERSON
Any individual, firm, or corporation (public or private), the State of New York, and its agencies or political subdivisions, and the United States of America, its agencies and instrumentalities, and any agent, servant, or employee of the foregoing.

PHASING
Clearing a parcel of land in distinct pieces or parts, with the stabilization of each piece completed before the clearing of the next.

POLLUTANT OF CONCERN
Sediment or a water quality measurement that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the land development activity.

PROJECT
Land development activity.

QUALIFIED INSPECTOR
A person who is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed professional engineer, certified professional in erosion and sediment control (CPESC), or licensed landscape architect, or other New York State Department of Environmental Conservation (NYSDEC) endorsed individual(s). It also means someone working under the direct supervision of the licensed professional engineer or licensed landscape architect, provided that person has training in the

principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing a site inspection has received four hours of training, endorsed by the NYSDEC, from a soil and water conservation district, CPESC Inc. or other NYSDEC endorsed entity in proper erosion and sediment control principles every three years.

QUALIFLED PROFESSIONAL
A person who is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed professional engineer, registered landscape architect or other NYSDEC endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics in order to prepare a SWPPP that conforms to the NYSDEC's technical standard. All components of the SWPPP that involve the practice of engineering, as defined by the New York State Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

RECHARGE
The replenishment of underground water reserves.

REMOVAL
Cutting vegetation to the ground or leaving it as stumpage; complete extraction or killing by spraying.

SEDIMENT CONTROL
Measures that prevent eroded sediment from leaving the site.

SENSITIVE AREAS
Cold-water fisheries, shellfish beds, swimming beaches, groundwater recharge areas, water supply reservoirs, wetlands, watercourses and water bodies, and habitats for threatened, endangered or special-concern species.

SITE
A parcel of land or a contiguous combination thereof, where grading work is performed as a single unified operation (would include all phases of a single development).

SITE DEVELOPMENT
Altering terrain and/or vegetation and any type of construction.

SOIL STABILIZATION
Measures that protect soil from the erosive forces of rain, flowing water, and wind, including, but not limited to, vegetative establishment, mulching, and the early application of gravel or stone base on areas to be paved.

SPDES GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES
A permit under the New York State Pollutant Discharge Elimination System (SPDES) issued to developers of construction activities to regulate disturbance of one or more acres of land.

SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM MUNICIPAL SEPARATE STORMWATER SEWER SYSTEMS
A permit under the New York State Pollution Discharge Elimination System (SPDES) issued to municipalities to regulate discharges from municipal separate storm sewers for compliance with EPA-established water quality standards and/or to specify stormwater control standards.

STABILIZATION
The use of practices that prevent exposed soil from eroding.

START OF CONSTRUCTION
The first land-disturbing activity associated with a development, such as tree cutting, clearing, grading, and filling; installation of streets and walkways; excavation for basement, footings, piers, or foundations; erection of temporary forms; and installation of accessory buildings, such as garages.

STOP-WORK ORDER
An order issued which requires that all construction activity on a site be stopped.

STORMWATER
Rainwater, surface runoff, snowmelt and drainage.

STORMWATER HOTSPOT
A land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff, based on monitoring studies.

STORMWATER MANAGEMENT
The use of structural or nonstructural practices that are designed to reduce stormwater runoff and mitigate its adverse impacts on property, natural resources and the environment.

STORMWATER MANAGEMENT FACILITY
One or a series of stormwater management practices installed, stabilized and operating for the purpose of controlling stormwater runoff.

STORMWATER MANAGEMENT OFFICER
An employee or officer designated by the Town of Yorktown to accept and review stormwater pollution prevention plans, forward the plans to the applicable municipal board and inspect stormwater practices, and under this chapter, the duly appointed Town Engineer or his/her designated representative.

STORMWATER MANAGEMENT PRACTICES (SMPs)
Measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing flood damage and preventing or reducing point source or nonpoint source pollution inputs to stormwater runoff and water bodies.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)
A plan for controlling stormwater runoff and pollutants from a site during and after construction activities.

STORMWATER RUNOFF
Flow on the surface of the ground, resulting from precipitation.

STRIPPING
Any activity which removes the vegetative surface cover, including tree removal, clearing, and storage or removal of topsoil.

SURFACE WATERS OF THE STATE OF NEW YORK
Lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marches, inlets, canals, the Atlantic Ocean within the territorial seas of the State of New York and other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

TEMPORARY STREAM CROSSING
A temporary structural span installed across a watercourse for use by construction traffic. Structures may include, but are not limited to, bridges, pipes, culverts, or fords.

TOWN ENGINEER
The duly appointed Town Engineer or his/her designated representative, and under this chapter, an employee or officer designated by the Town of Yorktown to accept and review stormwater pollution prevention plans, forward the plans to the applicable municipal board and inspect stormwater practices.

VARIANCE
A grant of relief from the requirements of this chapter which permits a person to undertake construction in a manner otherwise prohibited by this chapter where specific enforcement would result in unnecessary hardship.

WATERCOURSE
A permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.

WATERWAY
A channel that directs surface runoff to a watercourse or to the public storm drain.

WET SEASON
The period from October 15 to April 15 or as determined by the Town Engineer.

§ 248-4 Applicability.

A.
General applicability. The regulations established in this provision shall apply to all construction activities of 5,000 square feet and/or all construction activities that move 50 cubic yards or more of soil material within the Town of Yorktown, including any activity not physically completed prior to the effective date of this chapter. As used in this section, the term "physically completed" shall mean the actual completion of construction activities related to a regulated activity, including filling, erecting structures or other improvement or development activities.

B.
Grandfathered projects. The provisions of this chapter shall not apply to any land use, improvement or development that has been physically completed prior to the effective date of this chapter.

C.
Current projects.

(1)
A regulated. activity that was approved prior to the effective date of this chapter but which is not in conformity with the provisions of this chapter may be continued subject to the following:

(a)
All such activities shall continue to be governed by the present regulations of the Town of Yorktown.

(b)
No such activity shall be expanded, changed, enlarged or altered without compliance with this chapter.

(c)
If such activity is discontinued for 12 consecutive months, any resumption of the activity shall conform to this chapter.

(d)
If any such use or activity is destroyed by human activities, a force of nature or an act of God, it shall not be resumed except in conformity with the provisions of this chapter.

(2)
Activities or adjuncts thereof that are or become nuisances shall not be entitled to continue.

§ 248-5 Exempt activities; regulated activities.

No construction activity shall be conducted, unless identified in § 248-5A as an exempt activity, without a written permit from the approval authority and full compliance with the terms of this chapter and other applicable regulations.

A.
Exempt activities. The following uses shall be permitted as of right to the extent that they are not prohibited or regulated by any other law, ordinance, or regulation and to the extent that they do not constitute a pollution or erosion hazard:

(1)
Normal lawn maintenance.

(2)
Agricultural activity as defined in this chapter.

(3)
Routine maintenance activities that are performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility.

(4)
Grading of land in a uniform manner or other land disturbance activity that is less than 5,000 square feet in area.

(5)
Alteration of the exterior of a building and alteration of a building, provided that such exterior alteration does not increase land coverage.

(6)
Installation, renovation, or replacement of a septic system to serve an existing dwelling or structure(s).

(7)
Any emergency activity which is immediately necessary to the protection of life, property or natural resources.

(8)
Repairs to any stormwater management practice or facility deemed necessary by the Stormwater Management Officer.

(9)
Installation of fence, sign, telephone, and electric poles and other kinds of posts or poles.

(10)
Activities of an individual engaging in home gardening by growing flowers, vegetables and other plants primarily for use by that person and his or her family.

(11)
Landscaping and horticultural activities in connection with an existing structure.

B.
Regulated activities subject to review of Planning Board. The Planning Board is the approval authority for stormwater management and erosion and sediment control applications in conjunction with the following:

(1)
Site plan applications.

(2)
Subdivision applications.

(3)
Wetland applications, which require Planning Board review, in accordance with Chapter 178.

C.
Regulated activities subject to review of the Town Board. The Town Board is the approval authority for stormwater management and erosion and sediment control applications in conjunction with the following:

(1)
Land disturbance greater than 20,000 square feet or activities in which greater than 200 cubic yards of fill will be deposited and/or removed from a parcel.

(2)
Site plan applications not subject to Planning Board approval.

D.
Regulated activities subject to administrative permit. The Town Engineer is the approval authority for any development that does not fall within Subsections A and B above and proposes to disturb 5,000 square feet or more in area or the movement of 50 cubic yards or more of material.

§ 248-6 Stormwater pollution prevention plans.

No application for approval of a land development activity shall be reviewed until the appropriate board had received a stormwater pollution prevention plan (SWPPP) prepared in accordance with the specifications in this chapter.

A.

Contents of stormwater pollution prevention plans.

(1)
All SWPPPs shall provide the following background information and erosion and sediment controls:

(a)
Background information about the scope of the project, including the location, type and size of project, the name (s), addresses(s) and phone number(s) of the owner(s) and/or developer(s).

(b)
Site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map should show the total site area; all improvements; area of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; sensitive areas; and location(s) of the stormwater discharges(s). Site map should be at a scale no smaller than one inch equals 100 feet (e.g., one inch equals 500 feet is smaller than one inch equals 100 feet).

(c)
Description of the soil(s) present at the site, including an identification of the hydrologic soil group (HSG).

(d)
Construction phasing plan and sequence of operations describing the intended sequence of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance. Consistent with the New York Standards and Specifications for Erosion and Sediment Control (Erosion Control Manual), not more than five acres shall be disturbed at any one time unless pursuant to an approved SWPPP.

(e)
Description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in stormwater runoff.

(f)
Temporary and permanent soil stabilization plan that meets the requirements of the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of final stabilization.

(g)
A site map/construction drawing(s) specifying the location(s), size(s) and length(s) of each erosion and sediment control practice.

(h)
Dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices, including the siting and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils.

(i)
Description and location of any stormwater discharges associated with industrial activity other than construction at the site, including, but not limited to, stormwater discharges from asphalt plants and concrete plants located on the construction site.

(j)
A description of the minimum erosion and sediment control practices to be installed or implemented for each construction activity that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented.

(k)
An inspection schedule for the developer or the contractor(s) that will be responsible for installing, constructing, repairing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP to ensure continuous and effective operation of the practices. The inspection schedule shall be in accordance with

the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

(l)
Identification of any elements of the design that are not in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standard.

(2)
Land development activities as defined in § 248-3 of this chapter that disturb one or more acres of land and are listed in § 248-6A(2)(a) through (w) below shall also include water quantity and water quality controls (postconstruction stormwater runoff controls) designed in conformance with the enhanced phosphorus removal standards in the New York State Stormwater Management Design Manual.

(a)
Single-family home construction;

(b)
Single-family residential subdivisions;

(c)
Multifamily residential developments, includes townhomes, condominiums, senior housing complexes, and apartment complexes;

(d)
Airports;

(e)
Amusement parks;

(f)
Campgrounds;

(g)
Commercial developments;

(h)
Churches and other places of worship;

(i)
Construction of a barn or other agricultural building (e.g., silo) and structural practices as identified in Table II in the Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State that include the construction or reconstruction of impervious area, excluding projects that involve soil disturbances of less than five acres;

(j)
Golf courses;

(k)
Institutional facilities; includes hospitals, prisons, schools and colleges;

(l)
Industrial facilities; includes industrial parks;

(m)
Landfills;

(n)
Municipal facilities; includes highway garages, transfer stations, office buildings, POTWs and water treatment plants;

(o)

Office complexes;

(p)
Sports complexes;

(q)
Racetracks; includes racetracks with earthen (dirt) surface;

(r)
Road construction or reconstruction;

(s)
Parking lot construction or reconstruction;

(t)
Athletic fields (natural grass) that include the construction or reconstruction of impervious area (greater than 5% of disturbed area) or alter the hydrology from predevelopment to postdevelopment conditions;

(u)
Athletic fields with artificial turf;

(v)
Permanent access roads or parking areas surfaced with impervious cover, and substations constructed as part of an overhead electric transmission line project, wind power project or cell tower project; and

(w)
All other construction activities, not listed above, that include the construction or reconstruction of impervious area and alter the hydrology from predevelopment to postdevelopment conditions.

(3)
SWPPP requirements for land development activities that are subject to § 248-6A(2):

(a)
All information in § 248-6A(1) of this chapter;

(b)
Description of each postconstruction stormwater management practice;

(c)
Site map/construction drawing(s) showing the specific location(s) and size(s) of each postconstruction stormwater management practice;

(d)
Hydrologic and hydraulic analysis for all structural components of the stormwater management system for the applicable design storms;

(e)
A detailed summary (including calculations) of the sizing criteria that was used to design all postconstruction stormwater management practices. At a minimum, the summary shall address the required design criteria from the applicable chapter(s) of the New York State Stormwater Management Design Manual, including the identification of and justification for any deviations from the Design Manual, and identification of any design criteria that are not required based on the redevelopment criteria or waiver criteria included in the Design Manual;

(f)
Dimensions, material specifications and installation details for each postconstruction stormwater management practice;

(g)
An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each postconstruction stormwater management practice. The plan shall identify the entity that will be responsible for the long-term operation and maintenance of each practice;

(h)

Maintenance easements to ensure access to all stormwater management practices at the site for the purpose of inspection and repair. Easements shall be recorded on the plan and shall remain in effect with transfer of title to the property;

(i)
Inspection and maintenance agreements binding on all subsequent landowners served by the on-site stormwater management measures in accordance with § 248-8 of this chapter.

B.
Plan preparation and certification. For land development activities as defined in §§ 248-3 and 248-6A(2) of this chapter, the SWPPP shall be prepared by a qualified professional as defined in this chapter and must be signed by the professional preparing the plan, who shall certify that the design of all stormwater management practices meet the requirements in this chapter.

C.
Other environmental permits. The applicant shall assure that all other applicable environmental permits have been or will be acquired for the land development activity prior to approval of the final SWPPP.

D.
Contractor qualifications/certification.

(1)
Each contractor and subcontractor identified in the SWPPP who will be responsible for installing, constructing, repairing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP and the postconstruction stormwater management practice installation must sign and date a copy of the following contractor certification statement before undertaking any land development activity: "I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Stormwater Pollution Prevention Plan; and that I, or one of my on-site staff, has received a minimum of four hours of acceptable training in erosion and sediment control within the last three years. I also understand that it is unlawful for any person to cause or contribute to a violation of water quality standards."

(2)
The certification must include the name and title of the person providing the signature; address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

(3)
The certification statement(s) shall become part of the SWPPP for the land development activity.

E.
A copy of the SWPPP shall be retained at the site of the land development activity during construction from the date of initiation of construction activities to the date of final stabilization.

F.
Working in or crossing watercourses.

(1)
Construction vehicles should be kept out of watercourses to the greatest extent possible. Where channel work is necessary, precautions must be taken to stabilize the work area during construction to minimize erosion. The channel (including bed and banks) must be restabilized at the end of each day once in-channel work has begun. Channel work is not permitted during the wet season or as may be prescribed by the approval authority.

(2)
Where a watercourse must be crossed by construction vehicles regularly during construction, a temporary stream crossing, diversion, or dewatering plan must be provided. In the event that any work is conducted in wetlands, as the term is defined in Chapter 178 of the Code of the Town of Yorktown, those permit procedures shall apply.

G.
Underground utility construction.

(1)
The construction of underground utility lines involving installation, maintenance, or repair which disturbs more

than 10,000 square feet shall be subject to the following criteria:

(a)
No more than 300 feet of trench are to be opened at one time unless approval to open a greater length is granted by the Town Engineer.

(b)
Where consistent with safety and space considerations, excavated material is to be placed on the uphill side of the trenches.

(c)
Trench dewatering devices shall discharge in a manner which will not adversely affect flowing streams, drainage systems, or off-site property.

(2)
Individual service connections, telephone, and electric lines and underground public utility lines under streets or sidewalks are exempt from the above requirements.

§ 248-7 Performance and design criteria.

A.
Technical standards. For the purpose of this chapter, the following documents shall serve as the official guides and specifications for stormwater management. Stormwater management practices that are designed and constructed in accordance with these technical documents shall be presumed to meet the standards imposed by this chapter:

(1)
The New York State Stormwater Management Design Manual (New York State Department of Environmental Conservation, most current version or its successor, referred to as the Design Manual), including the enhanced phosphorus removal standards.

(2)
New York Standards and Specifications for Erosion and Sediment Control (Empire State Chapter of the Soil and Water Conservation Society, 2005, most current version or its successor, hereafter referred to as the "Erosion Control Manual").

B.
Equivalence to technical standards. Where stormwater management practices are not designed in accordance with the technical standards referenced in § 248-7A, the applicant or developer must demonstrate equivalence to these standards and the SWPPP shall be prepared by a licensed professional.

C.
Water quality standards. Any land development activity shall not cause an increase in turbidity that will result in substantial visible contrast to natural conditions in surface waters of the State of New York.

§ 248-8 Maintenance, inspection and repair of stormwater facilities.

A.
Maintenance and inspection during construction.

(1)
The applicant or developer of the land development activity shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the applicant or developer to achieve compliance with the conditions of this chapter. Sediment shall be removed from sediment traps of sediment ponds whenever their design capacity has been reduced by 50%.

(2)
For land development activities as defined in § 248-3 of this chapter that disturb one or more acres of land, the applicant shall have a qualified inspector conduct site inspections and document the effectiveness of all erosion and sediment control practices every seven days. Inspection reports shall be maintained in a site logbook and copies furnished to the Town Engineer within seven days of inspection.

B.
Maintenance easement(s). Prior to the issuance of any approval that has a stormwater management facility as one of the requirements, the applicant or developer must execute a maintenance agreement that shall be binding on all subsequent landowners served by the stormwater management facility. The easement shall provide for access to the facility at reasonable times for periodic inspection by the Town of Yorktown to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by this chapter. The easement shall be recorded by the grantor in the office of the County Clerk after approval by the counsel for the Town of Yorktown.

C.
Maintenance after construction. The owner or operator of permanent stormwater management practice(s) installed in accordance with this chapter shall ensure that the practice(s) are operated and maintained to achieve the goals of this chapter. Proper operation and maintenance also includes, as a minimum, the following:

(1)
A preventive/corrective maintenance program for all critical facilities and systems of treatment and control (or related appurtenances) which are installed or used by the owner or operator to achieve the goals of this chapter.

(2)
Written procedures for operation and maintenance and training new maintenance personnel.

(3)
Discharges from the SMPs shall not exceed design criteria or cause or contribute to water quality standard violations in accordance with § 248-7C.

D.
Maintenance agreements. The Town of Yorktown shall approve a formal maintenance agreement for stormwater management facilities binding on all subsequent landowners and recorded in the office of the County Clerk as a deed restriction on the property prior to final plan approval. The maintenance agreement shall be consistent with the terms and conditions of the Sample Stormwater Control Facility Maintenance Agreement as prepared by the New York State Department of Environmental Conservation and on file at the Town Clerk and Planning and Engineering offices. The Town of Yorktown, in lieu of a maintenance agreement, at its sole discretion, may accept dedication of any existing or future stormwater management facility, provided that such facility meets all the requirements of this chapter and includes adequate and perpetual access and sufficient area, by easement or otherwise, for inspection and regular maintenance.

§ 248-9 Procedures for permits.

A.
Application required. Except as otherwise provided in this chapter, no person shall commence or perform any land-disturbing activity not exempted from this section, including but not limited to grading, stripping, excavating or filling, without first obtaining a stormwater management and erosion and sediment control permit from the permitting authority. Application for a permit shall be made to the approval authority on forms furnished by the Planning and Engineering Department. When a stormwater management and an erosion and sediment control permit is required for improvements associated with a subdivision, site plan or wetland application, a separate erosion and sediment control application form is not required; however, the required fee shall be submitted in accordance with a fee schedule adopted by the Town Board. The approval authority shall review the subdivision, site plan or wetland applications using the standards established by this chapter.

B.
Coordination with other reviews. It is the intent of this chapter to incorporate the consideration of stormwater management, soil erosion and sediment control into the Town's extant land use and development approval procedures in conjunction with the procedures of the State Environmental Quality Review Act whenever applicable. To the maximum extent possible, the review, hearings and decision upon any application processed under this chapter shall be coincident with similar procedures that the approval authority may undertake in regard to other applications that are directly related.

C.
Notice to agencies. Upon submission of a completed application, the Planning and Engineering Department or the Town Board shall notify all interested agencies required by applicable statutes, the Town Board, the Conservation Board and any agency so designated by resolution of the Town Board of an opportunity to provide comment.

D.
Town of Yorktown Conservation Board review. The Conservation Board shall review the Planning Board and Town Board applications within 30 days of the date of the Planning and Engineering Department's or Town Board's transmittal letter and shall file a written report to the approval authority with its recommendations concerning the application. Such report shall evaluate the proposed operation or project in terms of the findings, intent and standards of this chapter.

E.
Westchester County Soil and Water Conservation District review. The Westchester County Soil and Water Conservation District may be consulted for review and recommendations for all applications for any permits involving land-disturbing activity which involves construction on slopes in excess of 25%, excavation or fill of 20,000 cubic yards or more of material, is within 100 feet of a watercourse, as defined herein, or within 100 feet of wetlands as classified by the unified definition or for any applications for permits involving any land-disturbing activities in the Town of Yorktown. If the Westchester County Soil and Water Conservation District fails to make any recommendation within 30 days upon receipt of mailing, such referral shall be deemed to constitute no objection to the application.

F.
SEQRA compliance. An application shall not be deemed complete until and unless the applicant has complied fully with the procedures of the State Environmental Quality Review Act.

G.
Expiration of approval. All permits shall expire upon completion of the acts specified and, unless otherwise indicated, shall be valid for a period of one year from the date of issue. An extension of an original permit may be granted upon written request to the approval authority by the original permit holder or his/her legal agent. The approval authority may require a new application be filed if, in its judgment, the original intent of the permit is altered or extended by the renewal or if the applicant has failed to abide by the terms of the original permit in any way. The request for renewal of a permit shall follow the same form and procedure as the original application.

H.
Administrative review. If the application is determined to require administrative review, the Town Engineer or his/her authorized representative has the authority to waive any requirement as listed under § 248-7.

§ 248-10 Permit application.

An application for a stormwater management and an erosion and sediment control permit shall be made by the owner of the property or his authorized agent with the Planning and Engineering Department. Each application shall include an erosion and sediment control plan. Each application shall bear the name(s) and address(es) of the owner or developer of the site and of any consulting firm retained by the applicant, together with the name of the applicant's principal contact at such firm. Furthermore, each application shall include a certification that any land clearing, construction or development involving the movement of earth shall be in accordance with the plans approved by issuance of the permit.

§ 248-11 Required application submissions.

Each application for a permit hereunder shall be accompanied by the following information and/or items, except submittals and/or their substantial equivalents as in the case of the administrative permit application where required by the Town Engineer or his/her authorized representative.

A.
An application form as provided by the Planning and Engineering Departments.

B.
A completed stormwater pollution prevention plan as detailed in § 248-6.

§ 248-12 Improvement security.

The applicant may be required to file with the Town of Yorktown a stormwater management and erosion and sediment control bond or other improvement security satisfactory to the Town Attorney in an amount deemed sufficient by the permitting authority to cover all costs of improvements, landscaping, maintenance of improvements, and landscaping for such period as specified by the Town, and engineering inspection costs to cover the cost of failure or repair of improvements installed on the site.

§ 248-13 Review of application; approval.

Each application for a stormwater management plan and an erosion and sediment control permit shall be reviewed and acted upon according to the following procedures:

A.
The permitting authority will review each application for a stormwater management plan and an erosion and sediment control permit to determine its completeness and conformance with the provisions of this chapter. The permitting authority, within 31 days of receipt of the application, shall make a determination as to whether an application is complete.

B.
Referrals. The permitting authority, upon receipt of a completed application or upon a determination of completion, may refer the completed application and supporting plans and documents to the Westchester County Soil and Water Conservation District on all applications meeting the criteria set forth in this chapter. All applications not handled by the Town Engineer administratively may be referred to the Conservation Board for review and comment. The Westchester County Soil and Conservation District or the Conservation Board, as applicable, shall be required to review the application within 30 days of receipt thereof and shall file a written report with the permitting authority with its recommendations concerning the application, including, but not limited to, an evaluation of the completeness of the application. Such report shall evaluate the proposed operation or project in terms of the management objectives and principles of this chapter and shall include the effect of such operation or project on the project area. The permitting authority may also refer any application, where applicable, to any other local governmental or public agency within whose jurisdiction the site is located, for review and comment.

C.
No stormwater management and erosion and sediment control permit shall be issued for the proposed site plan, subdivision or wetland unless:

(1)
The development has been approved by the Town of Yorktown, where applicable;

(2)
Such permit is accompanied by or combined with a valid building permit issued by the Town of Yorktown; and

(3)
The proposed earthmoving is coordinated with any overall development previously approved by the Town of Yorktown for the area in which the site is situated.

D.
Pending preparation and approval of a revised plan, development activities shall be allowed by the approval authority.

§ 248-14 Responsibility for damages.

The permittee shall not be relieved of responsibility for damage to persons or property otherwise imposed by law, and the Town of Yorktown or its officers will not be made liable for such damage by:

A.
The issuance of a permit under this chapter;

B.
Compliance with the provisions of that permit or with conditions attached thereto;

C.
Failure of municipal officials to observe or recognize hazardous or unsightly conditions;

D.
Failure of municipal officials to recommend denial of or to deny a permit; or

E.
Exemptions from the permit requirements of this chapter.

§ 248-15 Erosion and sediment control inspection.

A.
Required inspections; notification; violations.

(1)
The Town of Yorktown Stormwater Management Officer may require such inspections as necessary to determine compliance with this chapter and may either approve that portion of the work completed or notify the applicant wherein the work fails to comply with the requirements of this chapter and the stormwater pollution prevention plan (SWPPP), as approved. To obtain inspections, the applicant shall notify the Town of Yorktown enforcement official at least 48 hours before any of the following as required by the Stormwater Management Officer:

(a)
Start of construction.

(b)
Installation of sediment and erosion control measures.

(c)
Completion of site clearing.

(d)
Completion of rough grading.

(e)
Completion of final grading.

(f)
Close of the construction season.

(g)
Completion of final landscaping.

(h)
Successful establishment of landscaping in public areas.

(2)
If any violations are found, the applicant and developer shall be notified in writing of the nature of the violation and the required corrective actions. No further work shall be conducted except for site stabilization until any violations are corrected and all work previously completed has received approval by the Stormwater Management Officer or the Town Engineer or his/her authorized representative.

B.
Stormwater management practice inspections. The Town of Yorktown Stormwater Management Officer is responsible for conducting inspections of stormwater management practices (SMPs). All applicants are required to submit as-built plans for any stormwater management practices located on site after final construction is completed. The plan must show the final design specifications for all stormwater management facilities and must be certified by a professional engineer.

C.
Inspection of stormwater facilities after project completion. Inspection programs shall be established on any reasonable basis, including but not limited to routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher-than-typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher-than-usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards of the SPDES stormwater permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to, reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the

condition of drainage control facilities and other stormwater management practices.

D.
Submission of reports. The Town of Yorktown Stormwater Management Officer may require monitoring and reporting from entities subject to this chapter as are necessary to determine compliance with this chapter.

E.
Right-of-entry for inspection. When any new stormwater management facility is installed on private property or when any new connection is made between private property and the public stormwater system, the landowner shall grant to the Town of Yorktown the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection as specified in § 248-15C.

F.
Special precautions.

(1)
If at any stage of the grading (at any development site), the Town Engineer or his/her authorized representative determines, by inspection, that the nature of the site is such that further work authorized by an existing permit is likely to imperil any property, public way, watercourse, or drainage structure, the Stormwater Management Officer, Town Engineer or his/her authorized representative may require as a condition of allowing the work to be done that such reasonable precautions be taken as are considered advisable to avoid the likelihood of such peril. Special precautions may include, but are not limited to, reducing the grade of exposed slope, construction of additional drainage facilities, berms, terracing, compaction or cribbing, installation of plant materials for erosion control, and recommendations to use a registered engineer, CPESC individual and/or geologist, which may make requirements for further work.

(2)
Where it appears that storm damage may result from incomplete grading on any construction site, work may be stopped and the permittee may be required to install temporary structures or take such other measures as may be necessary to protect adjoining property or public safety. On large developments or where unusual site conditions prevail, the Town Engineer may specify the time of start for grading and time of completion or may require that the operations be conducted in specific stages to ensure completion of protective measures or devices prior to the advent of seasonal rains.

§ 248-16 Performance guarantee; recordkeeping.

A.
Construction completion guarantee. In order to ensure the full and faithful completion of all land development activities related to compliance with all conditions set forth by the Town of Yorktown in its approval of the stormwater pollution prevention plan, the Town of Yorktown may require the applicant or developer to provide, prior to construction, a performance bond, cash escrow, or irrevocable letter of credit from an appropriate financial or surety institution which guarantees satisfactory completion of the project and names the Town of Yorktown as beneficiary. The security shall be in an amount to be determined by the Town of Yorktown based on submission of final design plans, with reference to actual construction and landscaping costs. The performance guarantee shall remain in force until the surety is released from liability by the Town of Yorktown, provided that such period shall not be less than one year from the date of final acceptance or such other certification that the facility(ies) have been constructed in accordance with the approved plans and specifications and that a one-year inspection has been conducted and the facilities have been found to be acceptable to the Town of Yorktown. Per annum interest on cash escrow deposits shall be reinvested in the account until the surety is released from liability.

B.
Maintenance guarantee. Where stormwater management and erosion and sediment control facilities are to be operated and maintained by the developer or by a corporation that owns or manages a commercial or industrial facility, the developer, prior to construction, may be required to provide the Town of Yorktown with an irrevocable letter of credit from an approved financial institution or surety to ensure proper operation and maintenance of all stormwater management and erosion control facilities both during and after construction, and until the facilities are removed from operation. If the developer or landowner fails to properly operate and maintain stormwater management and erosion and sediment control facilities, the Town of Yorktown may draw upon the account to cover the costs of proper operation and maintenance, including engineering and inspection costs.

C.
Recordkeeping. The Town of Yorktown may require entities subject to this chapter to maintain records

demonstrating compliance with this chapter.

§ 248-17 Enforcement; penalties for offenses.

A.
Notice of violation. When the Town of Yorktown determines that a land development activity is not being carried out in accordance with the requirements of this chapter, it may issue a written notice of violation to the landowner. The notice of violation shall contain:

(1)
The name and address of the landowner, developer or applicant;

(2)
The address, when available, or a description of the building, structure or land upon which the violation is occurring;

(3)
A statement specifying the nature of the violation;

(4)
A description of the remedial measures necessary to bring the land development activity into compliance with this chapter and a time schedule for the completion of such remedial action;

(5)
A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;

(6)
A statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within 15 days of service of notice of violation.

B.
Stop-work orders. The Town of Yorktown may issue a stop-work order for violation of this chapter. Persons receiving a stop-work order shall be required to halt all land development activities, except those activities that address the violations leading to the stop-work order. The stop-work order shall be in effect until the Town of Yorktown confirms that the land development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a stop-work order in a timely manner may result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this chapter.

C.
Violations. Any land development activity that is commenced or is conducted contrary to this chapter may be restrained by injunction or otherwise abated in a manner provided by law.

D.
Enforcement.

(1)
Civil sanctions.

(a)
Any person found violating any provision of this chapter or conditions duly imposed pursuant thereto shall be served by the Town Engineer or his/her authorized representative with a written notice stating the nature of the violation and providing a specified time within which the violation shall cease and satisfactory corrective action taken by the violator.

(b)
Any person who is found to have violated, disobeyed or disregarded any provision of this chapter shall be liable to the people of the Town of Yorktown for a civil penalty not to exceed $10,000 for every such violation, to be assessed by the Town Court, after a hearing or opportunity to be heard before the Town Court.

(c)
The Town Court shall have the power, following a hearing, to direct the violator to cease violation of the chapter

and satisfactorily restore the affected area to its condition prior to the violation or otherwise complete the terms and conditions of the permit. The Town Court may order the use of all or part of any performance bonds to complete, restore or otherwise improve the affected area.

(2)
Criminal sanctions.

(a)
Any person found violating any provision of this chapter or conditions duly imposed pursuant thereto shall, for the first offense, be guilty of a violation punishable by a fine of not less than $500 nor more than $1,000.

(b)
For a second and each subsequent offense, such person shall be guilty of a misdemeanor punishable by a fine of not less than $1,000 nor more than $2,000 or a term of imprisonment of no more than six months, or both.

(c)
Each offense shall be a separate and distinct offense and, in the case of a continuing offense, each day's continuance thereof shall be deemed a separate and distinct offense.

(d)
The Town Attorney shall prosecute any person alleged to have violated the provisions of this chapter and shall seek equitable relief to restrain any violation or threatened violation of its provisions.

E.
Withholding of certificate of occupancy. If any building or land development activity is installed or conducted in violation of this chapter, the Stormwater Management Officer may prevent the occupancy of said building or land.

F.
Restoration of lands. Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the Town of Yorktown may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

§ 248-18 Fees for services.

The Town of Yorktown may require any person undertaking land development activities regulated by this chapter to pay reasonable costs at prevailing rates for review of SWPPPs, inspections or SMP maintenance performed by the Town of Yorktown or performed by a third party for the Town of Yorktown.

§ 248-19 Amendment of plans.

Major amendments to the site development or the stormwater pollution prevention plan shall be submitted to the permitting authority and shall be processed and approved or disapproved in the same manner as the original plans. Field modifications of a minor nature may be authorized by the permitting authority by written authorization to the permittee. There shall be no oral authorization amending an erosion and sediment control plan.

§ 248-20 Expiration of permit.

All erosion and sediment control permits shall expire if the work authorized by such permit is not substantially started within one year or is not completed by a date which shall be specified in the permit. The permitting authority may, upon written presentation of sufficient justification for delay made prior to the expiration of the permit, grant a reasonable extension of time to begin the work prescribed under the permit. An extension of an original permit may be granted upon written request to the permitting authority at least 30 days prior to the expiration date of the original permit. The request for a renewal of a permit shall follow the same form and procedure as the original application.

§ 248-21 Conflicting provisions.

If in any case the provisions of this chapter conflict with any other provisions of the Code of the Town of Yorktown, the provisions which impose the more stringent requirement shall apply.

§ 248-22 Compliance with other regulations.

All development and improvement allowed by right or allowed by permit shall also conform to all rules and regulations contained in the Code of the Town of Yorktown and all other applicable laws and regulations.

APPENDIX C

Owner/Operator Certification

Contractor Certification

State Land Corp.

OWNER/OPERATOR CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Name (please print) ______________________________

Title ______________________________

Date ______________________________

Address ______________________________

Phone ______________________________

E-mail ______________________________

Signature ______________________________

Name of Trained Individual ______________________________

CONTRACTOR CERTIFICATION

Contractor Certification Statement – All contractors and subcontractors identified in a SWPPP in accordance with Part III.E.1 (SPDES General Permit for Stormwater Runoff from Construction Activity, GP-0-10-001, January 2010) of this permit shall sign a copy of the following certification statement before undertaking any construction activity at the site identified in the SWPPP:

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the *Owner or Operator* must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

Individual Contractor:

Name and Title (please print) ____________________

Signature of Contractor ____________________

Name of Trained Individual ____________________

Company / Contracting Firm:

Name of Company ____________________

Address of Company ____________________

Telephone Number / Cell Number ____________________

Site Information:

Address of Site ____________________

____

Today's Date: ____________________

APPENDIX D

Construction Sequence

Use of erosion and sediment control structures and practices are important to maintaining site stability under runoff and during daily construction activities. The Construction Sequence should be staged with erosion and sediment controls, as follows, with all controls in place and implemented prior to respective infrastructure construction. As construction proceeds, the controls should be monitored, maintained and replaced as needed. Additional controls may be required as needed to address unforeseen situations.

Refer to The Construction Drawings for all plans and details which relate to the Construction Sequence. This Sequence should be followed in conjunction with all Plans, Notes, and the Stormwater Pollution Prevention Plan. Prior to the commencement of work, the Owner and General Contractor shall read and understand the Sequence for Construction. The Sequence shall be discussed at the time of the Pre-construction Meeting.

During construction of the project, the Contractor is responsible to coordinate all required inspections with various agencies and the Project Engineer.

Use of erosion and sediment control structures and practices are important to maintaining site stability under runoff and during daily construction activities. Construction sequence should be staged with erosion and sediment controls as follows with all controls in place and implemented prior to respective infrastructure construction.

Refer to the Plan Set for all plans and details which relate to Construction Sequence.

1. A licensed surveyor must define infrastructure locations, limits of disturbance, stormwater basin limits, and grades in the field prior to start of any construction.

2. Install all temporary erosion control measures as shown on the Erosion and Sediment Control Plan and the associated Details.

3. Cut and clear trees within work area. Timbered trees, wood chips, and stumps shall be removed off-site.

4. Start construction of project access points, set-up staging areas and install anti-tracking pads as shown on Erosion and Sediment Control Plan.

5. Rough grade road, building, and parking area.

6. Begin excavation of building foundations and utilities. Protect open excavations. Where applicable, place fill on the up-slopes and side edges of fill area. Fill should be pushed in place and stabilized with tacking perpendicular to the slope. Place soil stockpiles in locations shown on the Erosion and Sediment Control Plans and associated Details.

7. Upon completion of foundation backfill to grade and immediately stabilized areas that will not receive traffic or disturbance within one week.

8. Begin the excavation and installation of utilities and drainage system. Protect trenches and open excavations from erosion. Refer to manufacturer's recommendations for installation of the water treatment and detention system. All drainage inlets shall be protected from sediment entering. There shall be no direct unfiltered discharge into the subsurface stormwater system.

9. During building and site construction maintain and re-establish as required erosion control and stabilization measures as required by the site plan and details.

10. Install base course of Item 4 in all pavement areas. Stabilize all open areas with seed and mulch.

11. Construct remainder of road and parking areas. First install curbs, asphalt binder, and concrete sidewalk.

12. Backfill curbs, grade, place final soil topping and put in place permanent vegetative cover over all disturbed areas, landscape beds, slopes, etc.

13. Once site stabilization has taken place, remove all temporary erosion and sediment controls.

APPENDIX E

Soil Testing Data

PRELIMINARY GEOTECHNICAL EXPLORATION
YORKTOWN SITE
WESTCHESTER COUNTY, NEW YORK
NOVEMBER 2000

INTRODUCTION

The Pulte Home Corporation of the Delaware Valley (Pulte) is considering the purchase of approximately 100 acres of land, located near Yorktown, Westchester County, New York. The property is planned to be developed with 44 single-family residences. The configuration of the proposed site development including number and size of lots, layout of roads, and proposed grading was indicated on a plan entitled "Topography Schematic Subdivision," prepared by Tim Miller Associates, Inc. (Miller), of Cold Spring, New York, revised June 2000.

In conjunction with the proposed development, Geo-Technology Associates, Inc. (GTA) was retained to perform a preliminary geotechnical exploration of the project site. Included in our field exploration were 22 test pits, which were excavated to depths of approximately 4 to 14 feet below the existing ground surface. Limited laboratory testing was performed on selected samples recovered from the test pits to characterize general subsurface conditions. Conclusions and recommendations regarding site development were derived from engineering analysis of field and laboratory data and on plans for the proposed development as provided by your office. An Environmental Site Assessment has been prepared by GTA and is transmitted under separate cover.

SITE DESCRIPTION

The subject property is located along the northern side of U.S. Route 202, immediately northwest of the intersection with Bear Mountain Parkway. The site comprises approximately 100 acres of land, and is referenced as Lands of State Land Corporation. The subject property consists primarily of undeveloped wooded land. The site currently contains a series of stone walls, 2 to 4 feet in height. No buildings were observed on the site.

The topographic information on the plan by Miller indicates that the ground surface elevations on the site range from approximately 566 feet above Mean Sea Level (MSL), at the northwestern corner of the site, to approximately 305 feet above MSL, at the southeastern corner, adjacent to Route 202. The northern portion is very steeply sloping, with slopes as steep as 3 horizontal to 1 vertical, while the southern portion is gently to moderately sloping, with a large, nearly flat wetland area at the southwestern corner of the property. Two deeply eroded, intermittent streams, which are oriented north to south, transect the eastern and central portions of the site, conveying runoff toward the southeastern corner of the site. The site and vicinity are gently to steeply sloping, with regional drainage directed to the south, toward the New Croton Reservoir. Based on the topography, surficial drainage from adjacent areas to the north appears to be directed toward the site. Land adjacent to the north, east, and west of the site is primarily undeveloped and wooded. The land across U.S. Route 202, to the south, has been developed for commercial and residential use.

PROPOSED CONSTRUCTION

It is GTA's understanding that the subject property is planned to be developed with 44 single-family residences, which will be serviced by public utilities. The plan by Miller indicates that the on-site grading will involve cuts of as much as 20 feet and fills of as much as 35 feet. Excavations for basements will likely extend to depths of as much as 10 to 15 feet below the existing ground surface.

RELEVANT GEOLOGY

The *Geologic Map of New York, Lower Hudson Sheet* (1970) indicates that the site vicinity is located within the Piedmont Physiographic Province. Typically, the Piedmont is characterized by hard, crystalline, igneous and metamorphic rock formations. Specifically, the site is indicated to be underlain by the Proterozoic Age biotite-quartz-plagioclase gneiss, with subordinate granitic gneiss, amphibolite, and calsilicate rock

The *Surficial Geologic Map of New York, Lower Hudson Sheet* (1989) indicates that the majority of the subject site is situated within an area covered by glacial till, ranging in thickness from

1 to 50 meters. The extreme southern portion of the site is mapped as being underlain by Outwash Sand and Gravel, ranging in thickness from 2 to 20 meters.

SUBSURFACE EXPLORATION

The field exploration consisted of excavating test pits at 22 locations using a Caterpillar 320 trackhoe. The test pits, designated as TP-1 through TP-22, were excavated on November 9 and 10, 2000, to depths of approximately 4 to 14 feet below the existing ground surface. Test pits were excavated across the site at accessible areas selected and field located by GTA. The approximate locations of the test pits are indicated on the Test Pit Location Plan, attached in Appendix A. Elevations provided on the logs are interpolated from topography shown on the available site plans and should not be relied upon as accurate indications of test pit locations or elevations.

Samples retrieved from the test pits were returned to GTA's laboratory for visual classification by laboratory personnel and limited laboratory testing. Descriptions as provided on the logs are visual, supplemented by available laboratory test results.

SUBSURFACE CONDITIONS

The test pits generally confirmed the underlying geologic formation as the gneiss. No significant thickness of glacial till was encountered. The Outwash Sand and Gravel was encountered only in Test Pit TP-1. Site subsoils were generally found to be residual soil derived from the in situ decomposition of the parent gneiss, transitioning into weathered rock with depth. Predominant overburden soil materials consisted of micaceous silty sand, with minor percentages of clay and rock fragments. The more cohesive soils (clays and silts) were typically encountered near the ground surface, at the gently sloping portions of the site. The granular soils typically consisted of coarse to fine sand, with varying amounts of non-plastic to slightly plastic clayey silt. The underlying parent gneiss bedrock was slightly to moderately weathered at the depths of test pit refusal, with occasional boulders encountered in the residual soil matrix.

Topsoil thicknesses generally ranged from approximately 12 to 20 inches, averaging approximately 16 inches. Topsoil thickness is often greater in low-lying areas and less at the steeper portions of the site. The logs of the test pits are attached in Appendix B.

Groundwater was encountered during excavation only in Test Pit TP-1, at a depth of 8 feet. The remaining test pits were dry upon completion. Groundwater or perched levels during the wet season of the year (late winter/early spring) may likely rise to be within a few feet of the existing ground surface at the low-lying portions of the site and areas adjacent to wetlands.

Visual observations indicated the near-surface materials (i.e. materials generally within the upper 1 to 2 feet) ranged from soft or loose to medium stiff or medium dense in consistency. The underlying residual soils were generally medium dense to dense, with the density typically increasing with depth up to the point of refusal. Approximately one-half of the test pits encountered refusal on rock at depths ranging from 4 to 9 feet below the existing ground surface, averaging 7 feet, indicating shallow weathered rock conditions are prevalent across the site.

LABORATORY TESTING

Selected samples recovered from the field exploration were tested for limited laboratory analysis including mechanical properties for classification in accordance with the Unified Soil Classification System (USCS), moisture-density relationship testing, and natural moisture content determination. By classifying the soils in accordance with USCS, information regarding the materials potential usage beneath foundation systems and pavements can be evaluated. It should be noted that the particle sizes referred to as sand and gravel were predominately rock fragments. Results of this testing are as follows:

SUMMARY OF INDEX PROPERTY TESTING

LOCATION	DEPTH (ft.)	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	USCS CLASSIFICATION
TP-2	1.0 to 5.0	NP	--	Silty sand (SM)
TP-3	5.0 to 5.5	19	3	Silty sand (SM)
TP-5	4.0 to 4.5	NP	--	Silty sand (SM)
TP-18	2.5 to 3.0	20	5	Silty sand (SM)
TP-20	1.0 to 5.0	NP	--	Silty sand (SM)
TP-21	6.5 to 7.0	NP	--	Silty sand (SM)

NP = non-plastic

Bulk samples from Test Pits TP-2 and TP-20, obtained from depths of approximately 1 to 5 feet below the existing ground surface, were tested for moisture-density relationships. The samples were classified as a silty sand and were determined to have Standard Proctor (ASTM D-1557, AASHTO T-99) maximum dry densities of 117.0 pounds per cubic foot (pcf) at an optimum moisture content of 13.5 percent and 122.0 pcf at an optimum moisture content of 11.0 percent, respectively.

Natural soil moistures for selected samples were determined to range from 5.3 to 18.6 percent, averaging approximately 12 percent. Based on the natural moisture contents and moisture-density testing, the majority of the soils will generally have moistures of 10 to 15 percent, which is within the working range of the optimum moisture for compaction. The results of laboratory testing are included in Appendix C.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of this study, it is our opinion that development of the site with the proposed residential subdivision is feasible using standard construction practices, given that the following recommendations are followed, and that the level of care is maintained during construction. Preliminary details are provided as follows.

Foundations

The proposed structures can likely be supported on shallow spread footings designed for a net allowable bearing pressure of 2,500 pounds per square foot (psf). This allowable bearing pressure applies to the undisturbed residual soils beneath the 1- to 2-foot thickness of loose surficial soils, and to properly compacted and controlled fills. Standard footing details should prove acceptable for this project. Minimum widths for wall footings of 16 inches and column footings of 24 inches are recommended when design based on above bearing pressures results in a more narrow footing. Maximum settlement on the order of 1 inch total and ½ inch differential can be anticipated, based upon the loads assumed herein. Exterior footings should be founded a minimum depth below final exterior grades consistent with local building code to provide protection from frost action. The actual design bearing pressures to be used at specific building locations will need to be evaluated as part of the final geotechnical engineering study.

Footings should be supported on the stiff or medium dense natural soils below any soft or loose surficial soils, which are not considered adequate for direct foundation support. Soft soils and existing fill may be encountered to depths of approximately one to two feet below the existing ground surface, and foundations should be extended through these materials to a more stable stratum. Any soft layers at slab subgrade levels should be compacted in-place in accordance with our site grading recommendations or excavated to a stable stratum.

Excavations for basements, if required, will likely encounter moderately to slightly weathered rock. It appears that excavation to foundation subgrade levels of 8 to 10 feet below existing grade can generally be accomplished with standard earthwork equipment. Excavations greater than this depth will likely require rock excavation techniques, such as hydraulic hammers or blasting. If footings are excavated into the rock, they should be over-excavated by a minimum of 6 inches, with the resultant void backfilled with sand to serve as a cushion against potential differential settlement due to hard, unyielding materials at footing bottom.

Groundwater was encountered in only one of the test pits at the completion of excavation and is not expected to be a problem during excavation for foundations. However, should groundwater be encountered during construction, the excavation should be dewatered through the use of sumps and removing the water by pumping away from the building site.

Detailed foundation excavation evaluations should be performed in each footing excavation prior to the placement of reinforcing steel or concrete. These evaluations should be performed by a representative of the Geotechnical Engineer to confirm that the design allowable soil bearing pressure is available. The foundation bearing surface evaluations should be performed using a combination of visual observation, hand-rod probing, and Dynamic Cone Penetrometer (DCP) testing. Concrete placement should be performed the same day the footings are excavated to prevent exposure and potential weakening of the foundation subgrade.

Floor Design

Floor slabs can be designed as concrete slabs on grade. GTA recommends that the concrete floor slabs supported on grade be founded on a 4-inch (minimum) coarse granular layer covered with polyethylene vapor barrier to interrupt the rise of capillary moisture through the slab. Natural and compacted fill subgrades for support of the floor slabs should be observed to verify stability prior to placement of concrete. The slabs may bear on wall projections; however, they should be jointed so that the foundation walls can settle slightly without affecting the slab.

Lateral Earth Pressure

The subsoils at this site are generally described as sands with varying percentages of silt and gravel-sized rock fragments. The Standard Proctor maximum dry densities for representative bulk samples were determined to be 117.0 and 122.0 pcf.

Assuming backfill against foundation walls is properly compacted, approximating 92 percent compaction, the in-place dry density will be approximately 110 pcf, yielding a bulk wet density of approximately 122 pcf. Based on typical soil gradations, an angle of shearing resistance (or internal friction) of 32 degrees can be estimated. Finally, assuming slight deflection of the wall will occur and that "active" earth pressures will develop, the coefficient of horizontal earth pressure is 0.307, yielding an equivalent fluid pressure of 37 psf/foot of depth, or 37 pcf. Therefore, we recommend that the below grade walls be designed for an EFP of 45 pcf. This pressure includes to the use of slightly plastic soils ($PI \leq 5$). Any moderately plastic soils, should be excluded from use as foundation backfill.

Surface and Subsurface Drainage

Final grades should be established to provide adequate surface drainage away from the foundations and building perimeters. A minimum grade of 2 percent is recommended to direct surface water from proposed structures.

Groundwater was encountered in only one of the test pits, and is not anticipated to occur at depths of 10 feet or less across the majority of the site. Should groundwater be encountered in excavations, dewatering techniques should be used to protect below-grade construction. In utility trenches, water can normally be removed by "sump and pump" techniques. Interior sump pumps are recommended for foundation drainage if below grade areas are proposed.

Below Grade Utilities

The natural soils and weathered rock are considered suitable for support of below grade utilities. GTA recommends a 6-inch granular bedding be placed to provide uniform support, as dictated by site conditions or as otherwise required by local code.

Based upon the results of the test pits, we anticipate that the majority of excavation for the installation of sanitary sewer will encounter weathered rock or bedrock. Refusal was encountered in eleven of the test pits at depths of approximately 4 to 9 feet. It is anticipated that the weathered rock can generally be excavated with heavy-duty excavation equipment to depths of 2 to 4 feet below the test pit refusal depths. However, isolated areas of "more competent" rock will likely require the use of hydraulic hoe rams or blasting for removal. Excavations below 10 to 12 feet should expect to encounter bedrock that will require rock removal techniques.

Contractors should provide adequate earth support and dewatering systems in utility trench excavations. Subsurface utility construction at or below 5 feet may encounter groundwater at low-lying areas or during the wet season. Problems associated with groundwater include seepage into the excavation, partial loss of stability, and sloughing of soils. These problems can be reduced at the time of construction through the use of "sump and pump" dewatering techniques. Utility pipe systems below pavement and other structural areas should be backfilled using controlled, compacted fill. The backfill should be constructed in accordance with our site grading recommendations.

Backfill and compaction of the soils to the degree specified in the *Site Grading* section of this report will likely require that the soils be moisture conditioned prior to placement and compaction within the trench. The excavated materials should be spread in thin layers and aerated by discing to within 4 percentage points of the optimum moisture. If the soils are not dried, suitable borrow material will need to be imported to the site for utility trench backfill. With the on-site soils likely being within the "working range" of optimum, it should be anticipated that a majority of the soils excavated from trenches can be used as trench backfill.

Site Grading

It appears that roadway and lot grading will require cuts of as much as 20 feet and fills of as much as 35 feet. Materials classified as ML, CL-ML, SC, SM, SC-SM, GC, GM, and GC-GM are considered suitable for use in fill construction. The results of laboratory testing indicate that the soils across the site will be within the working range of optimum moisture for compaction, with the moisture content of the soils generally in the range of 10 to 15 percent, compared to optimum moisture contents estimated to also range from 10 to 15 percent. The excavated materials will need to be within 3 to 4 percentage points of the optimum moisture for compaction before compactive effort is applied.

Off-site borrow, if required, should meet Unified Soil Classification System (USCS) designations SM, SP, SW, GP, GM, or GW and be approved by the geotechnical engineer. New fills constructed on slopes steeper than 5H:1V (horizontal to vertical) should be keyed into existing slopes to protect the stability of the embankment. All fill slopes steeper than 5H:1V should be placed as structural fill and be controlled and compacted to minimum densities and specified below.

All fills should be constructed in 8-inch loose thickness lifts and compacted to the following specifications:

Fills supporting foundations, retaining walls, floor slabs, and within walls or slopes steeper than 4H:1V	95% of ASTM D-698 Moisture: 4% ± of optimum
Fills within top 1 foot of pavement	100% of ASTM D-698 Moisture: 2% ± of optimum
Fills below 1 foot of pavement and utility backfill	95% of ASTM D-698 Moisture: 4% ± of optimum

Fill construction should be monitored by a full-time soils technician under the direct supervision of a registered geotechnical engineer. All compactive effort should be verified by in-place density testing.

Considering the thickness of fill on some of the lots approaches 30 feet, control of the filling operation in these areas is critical in reducing the potential for excessive settlement of the residential structure. It is also recommended that the completed fill placement be allowed to consolidate in place for a minimum of 3 months before residential construction is initiated. It is advisable to monitor the settlement of the fill to verify that consolidation is virtually complete before foundations are constructed on the lots with 10 feet or more of controlled fill below slab level.

Roadway

Cuts and fills of as much as 20 and 35 feet, respectively, will be required to establish proposed roadway grades. The surficial soils may be very weak and wet depending on the weather conditions and time of year construction proceeds and may be unsuitable for direct support of pavements. Undercutting, reworking and drying, or the use of geosynthetics may be necessary in some areas for subgrade stabilization depending on the final site grades and time of year construction proceeds. The subsoils at a depth of 1.5 to 2 feet should be able to provide satisfactory support for pavements; however, some areas may demonstrate instability depending on plasticity and moisture content. A pavement design should be performed once the roadway grades and anticipated traffic loading are known.

DESIGN DEVELOPMENT AND CONSTRUCTION MONITORING SCOPE

We recommended that during design development and construction of the subject project, that GTA be retained to provide additional design consultation and observation and testing during construction generally as follows.

- Review final site and architectural plans to determine if they conform with the intent of this report.

- Recommend and perform additional subsurface exploration if deemed appropriate based on the site layout and local code requirements.

- Provide on-site observation and testing of structural fills.

- Observe excavated footings for compliance with the project drawings and the intent of this geotechnical report.

LIMITATIONS

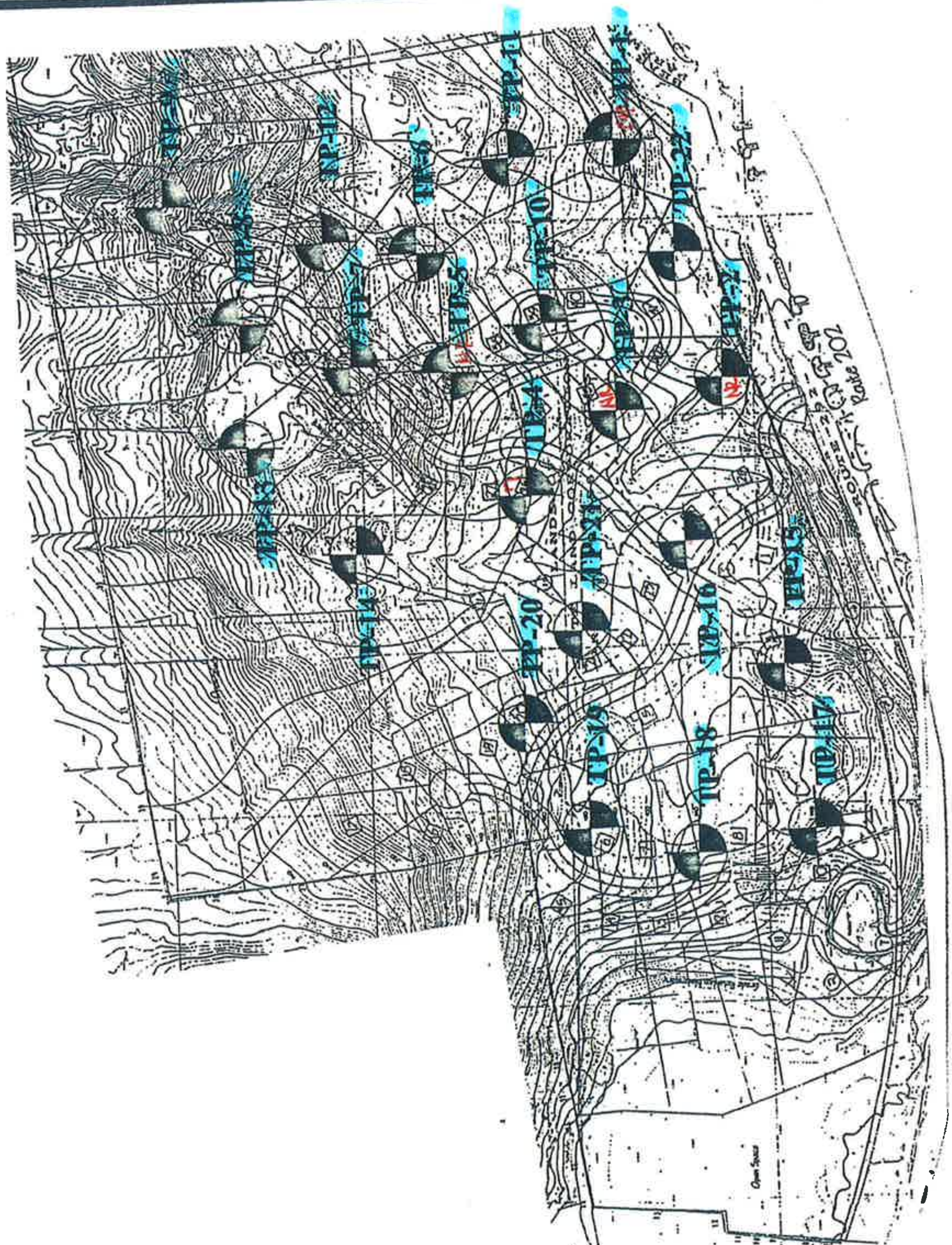
The analysis and recommendations contained in this report are based on the data obtained from the test pits. The test pits indicate soil (rock) conditions only at specific locations and times, and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between the test pit locations. If variations in subsurface conditions from those described are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. Geo-Technology Associates, Inc. is not responsible for any claims, damages, or liability associates with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the express written authorization of Geo-Technology Associates, Inc.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client. An environmental site assessment was conducted for this site, which addresses environmental concerns, and is transmitted under separate cover.

This report and the attached logs are instruments of service. If certain conditions or items are noted during our investigation, Geo-Technology Associates, Inc. may be required by prevailing statutes to notify and provide information to regulatory or enforcement agencies. Geo-Technology Associates, Inc. will notify our Client should a required disclosure condition exist.

This report has been prepared for the exclusive use of Pulte Home Corporation of the Delaware Valley in accordance with generally accepted geotechnical engineering practice. No warranty, express or implied, is made. Use and reproduction of this report by any other person without the expressed written permission of GTA and Pulte Home Corporation of the Delaware Valley is unauthorized and such use is at the sole risk of the user.



GTA

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

(410) 879-9446 • FAX (410) 893-3437

TEST PIT LOCATION PLAN
YORKTOWN SITE
WEST CHESTER COUNTY, NEW YORK

SCALE:	DATE: NOV 2000	DRAWN BY: TMS	DESIGN BY:	REVIEW BY	JOB NO.: 00555

LOG OF TEST PIT NO. TP-1

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: 8.0
GROUND SURFACE ELEVATION: 340.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
340.0	0	ML		Brown, moist, SILT, some mf sand, trace rock fragments	Topsoil +/- 24"
	5			Tan, moist, SILT and mf SAND, little rock fragments	
334.0		SM		Brown, very moist, cf SAND, some gravel, little silt	▽
330.0					
				B.O.H. @ 10.0'	

NOTES: Elevations are interpolated and are considered approximate

GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-2

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

PROJECT NO: **00555**

DATE STARTED: **November 10, 2000**
DATE COMPLETED: **November 10, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **335.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
335.0	0	ML		Brown, moist, SILT, some mf sand, trace rock fragments	Topsoil +/- 24"
332.5		SM		Light brown, moist, fine SAND and SILT, some gravel	
	5			Light brown, moist, mf SAND, little silt, little gravel	
	10			Tan, very moist, mf SAND, little silt, some gravel	
322.0				B.O.H. @ 13.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-2

LOG OF TEST PIT NO. TP-3

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 370.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
370.0	0	ML		Brown, moist, SILT, some fine sand Gray/ tan, moist, SILT, some fine sand, little rock fragments	Topsoil +/- 12"
	5				
361.5		SM		Orange/ tan, moist, mf SAND, some silt, little rock Gray/ tan, moist, mf SAND, some silt, some rock fragments	
	10				
356.0				B.O.H. @ 14.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-3

LOG OF TEST PIT NO. TP-4

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation
PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 400.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
400.0	0	SM		Brown, moist, mf SAND, some silt, little rock fragments	Topsoil +/- 18"
396.5	5			Highly WEATHERED ROCK	
393.0				Refusal at 7.0' B.O.H. @ 7.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-5

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 430.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
430.0	0	ML		Brown, moist, SILT, some fine sand, trace rock fragments	Topsoil +/- 24"
426.0		SM		Gray/ tan, moist, mf SAND, some silt, little rock fragments	
	5				
420.0	10			B.O.H. @ 10.0'	

NOTES: **Elevations are interpolated and are considered approximate**

LOG OF TEST PIT NO. TP-6

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 430.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
430.0	0	SM		Gray/ tan, moist, cf SAND, little silt, trace rock fragments	Topsoil +/- 18"
	5				
423.0				Refusal at 7.0' B.O.H. @ 7.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-6

LOG OF TEST PIT NO. TP-7

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 420.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
420.0	0	ML		Brown, moist, SILT and fine SAND, little rock fragments	Topsoil +/- 20"
416.0	5	SM		Gray/ tan, moist, mf SAND, little silt, some rock fragments	
413.0				Refusal at 7.0' B.O.H. @ 7.0'	

NOTES: **Elevations are interpolated and are considered approximate**

LOG OF TEST PIT NO. TP-8

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

PROJECT NO: 00555

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 440.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
440.0	0		△ △ △	Highly WEATHERED ROCK, some mf sand, little silt	Topsoil +/- 12"
	5				
432.0				B.O.H. @ 8.0'	

NOTES: Elevations are interpolated and are considered approximate

LOG OF TEST PIT NO. TP-9

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

DATE STARTED: **November 10, 2000**
DATE COMPLETED: **November 10, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

PROJECT NO: **00555**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **490.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
490.0	0	SM		Brown, moist, mf SAND, some silt, little rock fragments Gray/ tan, moist, mf SAND, some silt, trace rock fragments	Topsoil +/- 16"
483.0	5				
				Refusal at 7.0' B.O.H. @ 7.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-9

LOG OF TEST PIT NO. TP-10

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 370.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
370.0	0	SM		Brown, moist, mf SAND, some silt, little rock fragments Gray/ tan, moist, cf SAND, little silt, little rock fragments	Topsoil +/- 16"
	5				
361.0				Refusal at 9.0' B.O.H. @ 9.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-10

Sheet 1 of 1

LOG OF TEST PIT NO. TP-11

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 370.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
370.0	0			Tan/ light brown, moist, highly WEATHERED ROCK, some mf sand, little silt	Topsoil +/-16"
366.0				Refusal at 4.0' B.O.H. @ 4.0'	

NOTES: **Elevations are interpolated and are considered approximate**

LOG OF TEST PIT NO. TP-12

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 10, 2000
DATE COMPLETED: November 10, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 440.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
440.0	0	ML		Brown, moist, SILT, some fine sand, some rock fragments	Topsoil +/- 15"
436.0				Refusal at 4.0' B.O.H. @ 4.0'	

NOTES: **Elevations are interpolated and are considered approximate**

LOG OF TEST PIT NO. TP-13

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 11, 2000
DATE COMPLETED: November 11, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 300.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
300.0	0	SM		Tan, moist, mf SAND, some silt, little rock fragments	Topsoil +/- 15"
	5				
293.0				Refusal @ 7.0' B.O.H. @ 7.0'	

NOTES: Elevations are interpolated and are considered approximate

LOG OF TEST PIT NO. TP-14

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

PROJECT NO: 00555

DATE STARTED: November 11, 2000
DATE COMPLETED: November 11, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 450.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
450.0	0	SM		Tan, moist, mf SAND, some silt, little rock fragments	Topsoil +/- 14"
	5				
444.0				Refusal at 6.0' B.O.H. @ 6.0'	

NOTES: Elevations are interpolated and are considered approximate

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-14

LOG OF TEST PIT NO. TP-15

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

PROJECT NO: **00555**

DATE STARTED: **November 11, 2000**
DATE COMPLETED: **November 11, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **360.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
360.0	0	SM		Light brown, moist, mf SAND and SILT, little rock fragments	Topsoil +/- 16"
	5			Gray/ tan, moist, mf SAND, little silt, little rock fragments	
				Brown;moist, mf SAND, little silt, some rock fragments	
351.0				Refusal at 9.0' B.O.H. @ 9.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-15

LOG OF TEST PIT NO. TP-16

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

PROJECT NO: **00555**

DATE STARTED: **November 11, 2000**
DATE COMPLETED: **November 11, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **375.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
375.0	0	ML		Brown, moist, SILT, some fine sand, trace cobbles	Topsoil +/- 16"
370.0	5	SM		Gray/ brown, moist, mf SAND, some silt, little rock fragments	
364.0	10				
				B.O.H. @ 11.0'	

NOTES: **Elevations are interpolated and are considered approximate**

LOG OF TEST PIT NO. TP-17

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

DATE STARTED: November 11, 2000
DATE COMPLETED: November 11, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

PROJECT NO: 00555

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 360.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
360.0	0	SM		Gray, moist, fine SAND and SILT	Topsoil +/- 17"
	5			Gray/ brown, moist, mf SAND and SILT, little rock fragments	
	10				
348.0				B.O.H. @ 12.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-17

LOG OF TEST PIT NO. TP-18

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

PROJECT NO: **00555**

DATE STARTED: **November 11, 2000**
DATE COMPLETED: **November 11, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **390.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
390.0	0	ML		Tan, moist, clayey SILT, little fine sand	Topsoil +/- 16"
	5			Tan, moist, clayey SILT, little fine sand, little rock fragments	
	10				
379.0				B.O.H. @ 11.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-19

PROJECT: Yorktown Site
PROJECT LOCATION: West Chester County, New York
CLIENT: Pulte Home Corporation

DATE STARTED: November 11, 2000
DATE COMPLETED: November 11, 2000
CONTRACTOR: Adamsville Construction
EQUIPMENT: CAT 322L

PROJECT NO: 00555

GROUNDWATER ENCOUNTERED: Dry
GROUND SURFACE ELEVATION: 420.0
DATUM: Topo
LOGGED BY: MM
CHECKED BY: JLW

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
420.0	0	SM		Tan, moist, mf SAND and SILT Tan, moist, mf SAND and SILT, little rock fragments	Topsoil +/- 24"
	5				
413.0				B.O.H. @ 7.0'	

NOTES: Elevations are interpolated and are considered approximate

GEO-TECHNOLOGY
ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-20

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

DATE STARTED: **November 11, 2000**
DATE COMPLETED: **November 11, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

PROJECT NO: **00555**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **440.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
440.0	0	ML		Light brown, moist, clayey SILT, some fine sand, little rock fragments	Topsoil +/- 24"
436.0		SM		Gray/ tan, moist, mf SAND, some silt, trace rock fragments	
	5				
	10				
429.0				B.O.H. @ 11.0'	

NOTES: **Elevations are interpolated and are considered approximate**

GTA
GEO-TECHNOLOGY ASSOCIATES, INC.
3445-A Box Hill Corporate Center Drive
Abingdon, Maryland 21009

LOG OF TEST PIT NO. TP-20

LOG OF TEST PIT NO. TP-21

PROJECT: **Yorktown Site**
PROJECT LOCATION: **West Chester County, New York**
CLIENT: **Pulte Home Corporation**

DATE STARTED: **November 11, 2000**
DATE COMPLETED: **November 11, 2000**
CONTRACTOR: **Adamsville Construction**
EQUIPMENT: **CAT 322L**

PROJECT NO: **00555**

GROUNDWATER ENCOUNTERED: **Dry**
GROUND SURFACE ELEVATION: **400.0**
DATUM: **Topo**
LOGGED BY: **MM**
CHECKED BY: **JLW**

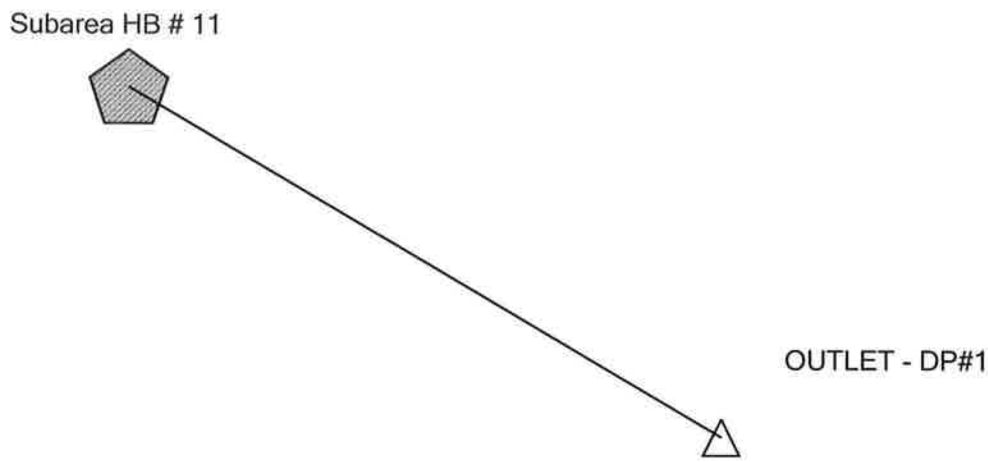
ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
400.0	0	SM		Brown, moist, fine SAND, some silt, little rock fragments	Topsoil +/- 24"
	5			Gray/ brown, moist, fine SAND, some silt, little rock fragments	
	10				
388.0				B.O.H. @ 12.0'	

NOTES: **Elevations are interpolated and are considered approximate**

APPENDIX F

Hydrologic Analysis

Scenario: Pre Developed - 1 year



Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Project Summary	
Title	Hunterbrook Drainage Basin # 11 - Generic Drainage Study State Land Corp-Pre Developed Condition
Engineer	Joseph C. Riina, P.E.
Company	Site Design Consultants
Date	3/8/2012

Notes	Preliminary Drainage Study for State Land Corp - Hunter Brook Drainage Basin #11 - SCS-TR20 Stormwater Runoff Analysis for the 1 year, 10-year, 25 -year and 100-year, Type III, 24-hr Storm Event. Pre Developed Condition

Table of Contents

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Subarea HB # 11	Pre Developed - 1 year	1	6.841	12.450	43.13
Subarea HB # 11	Pre Develped - 10 year	10	21.117	12.350	166.71
Subarea HB # 11	Pre Developed - 25 year	25	30.255	12.350	245.84
Subarea HB # 11	Pre Developed - 100 year	100	45.294	12.350	374.32

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
OUTLET - DP#1	Pre Developed - 1 year	1	6.841	12.450	43.13
OUTLET - DP#1	Pre Develped - 10 year	10	21.117	12.350	166.71
OUTLET - DP#1	Pre Developed - 25 year	25	30.255	12.350	245.84
OUTLET - DP#1	Pre Developed - 100 year	100	45.294	12.350	374.32

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Time of Concentration Calculations | Return Event: 1 years
Label: Subarea HB # 11 | Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow

Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow

Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Flow Area	9.0 ft²
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

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

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface: V = 16.1345 * (Sf**0.5) Paved Surface: V = 20.3282 * (Sf**0.5) (Lf / V) / 3600
Where:	V= Velocity, ft/sec Sf= Slope, ft/ft Tc= Time of concentration, hours Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours n= Manning's n Lf= Flow length, feet P= 2yr, 24hr Rain depth, inches Sf= Slope, %

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow	
Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Flow Area	9.0 ft²
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

Tc =

R = Qa / Wp

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:

Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow	
Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Flow Area	9.0 ft^2
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

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

(Lf / V) / 3600

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

==== SCS TR-55 Shallow Concentration Flow

Tc =
Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow

Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow

Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Flow Area	9.0 ft²
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

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

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface: V = 16.1345 * (Sf**0.5) Paved Surface: V = 20.3282 * (Sf**0.5) (Lf / V) / 3600
Where:	V= Velocity, ft/sec Sf= Slope, ft/ft Tc= Time of concentration, hours Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours n= Manning's n Lf= Flow length, feet P= 2yr, 24hr Rain depth, inches Sf= Slope, %

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Runoff CN-Area
Label: Subarea HB # 11

Return Event: 1 years
Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	61.630	0.0	0.0	55.000
Woods - good	70.000	99.780	0.0	0.0	70.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	161.410	(N/A)	(N/A)	64.273

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Runoff CN-Area | Return Event: 10 years
Label: Subarea HB # 11 | Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	61.630	0.0	0.0	55.000
Woods - good	70.000	99.780	0.0	0.0	70.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	161.410	(N/A)	(N/A)	64.273

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Runoff CN-Area | Return Event: 25 years
Label: Subarea HB # 11 | Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	61.630	0.0	0.0	55.000
Woods - good	70.000	99.780	0.0	0.0	70.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	161.410	(N/A)	(N/A)	64.273

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Runoff CN-Area | Return Event: 100 years

Label: Subarea HB # 11 | Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	61.630	0.0	0.0	55.000
Woods - good	70.000	99.780	0.0	0.0	70.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	161.410	(N/A)	(N/A)	64.273

Unit Hydrograph Method (Computational Notes)
Definition of Terms

At	Total area (acres): At = Ai+Ap
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^-1)
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of 0.1333Tc, rtm, and th (Smallest dt is then adjusted to match up with Tp)
UDdt	User specified override computational main time increment (only used if UDdt is => .1333Tc)
D(t)	Point on distribution curve (fraction of P) for time step t
K	2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)
Ks	Hydrograph shape factor = Unit Conversions * K: = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K Default Ks = 645.333 * 0.75 = 484
Lag	Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: Si = (1000/CNi) - 10
Sp	S for pervious area: Sp = (1000/CNp) - 10
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp	Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr	Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

Unit Hydrograph Method
Computational Notes
Precipitation

Column (1)	Time for time step t
Column (2)	D(t) = Point on distribution curve for time step t
Column (3)	Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)
Column (4)	Pa(t) = D(t) x P: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

Column (5)	Rap(t) = Accumulated pervious runoff for time step t
	If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0
	If (Pa(t) is > 0.2Sp) then use:
	
	Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6)	Rip(t) = Incremental pervious runoff for time step t Rip(t) = Rap(t) - Rap(t-1) Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

Impervious Area Runoff

Column (7 & 8)...	Did not specify to use impervious areas.

Incremental Weighted Runoff

Column (9)	R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t) R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS Unit Hydrograph Method

Column (10)	Q(t) is computed with the SCS unit hydrograph method using R(t) and Qu(t).

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Unit Hydrograph Summary — Return Event: 1 years
Label: Subarea HB # 11 — Storm Event: 1-yr

Storm Event	1-yr
Return Event	1 years
Duration	24.000 hours
Depth	3.1 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	161.410 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.445 hours
Flow (Peak, Computed)	43.24 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.450 hours
Flow (Peak Interpolated Output)	43.13 ft³/s

Drainage Area	
SCS CN (Composite)	64.000
Area (User Defined)	161.410 acres
Maximum Retention (Pervious)	5.6 in
Maximum Retention (Pervious, 20 percent)	1.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.5 in
Runoff Volume (Pervious)	6.904 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	6.841 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

SCS Unit Hydrograph Parameters	
Unit peak, qp	416.36 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Unit Hydrograph Summary — Return Event: 10 years

Label: Subarea HB # 11 — Storm Event: 10-yr

Storm Event	10-yr
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	161.410 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.348 hours
Flow (Peak, Computed)	166.84 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	166.71 ft^3/s

Drainage Area	
SCS CN (Composite)	64.000
Area (User Defined)	161.410 acres
Maximum Retention (Pervious)	5.6 in
Maximum Retention (Pervious, 20 percent)	1.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.6 in
Runoff Volume (Pervious)	21.260 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	21.117 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

SCS Unit Hydrograph Parameters	
Unit peak, qp	416.36 ft³/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Unit Hydrograph Summary — Return Event: 25 years

Label: Subarea HB # 11 — Storm Event: 25-yr

Storm Event	25-yr
Return Event	25 years
Duration	24.000 hours
Depth	6.0 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	161.410 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.348 hours
Flow (Peak, Computed)	246.12 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	245.84 ft³/s

Drainage Area	
SCS CN (Composite)	64.000
Area (User Defined)	161.410 acres
Maximum Retention (Pervious)	5.6 in
Maximum Retention (Pervious, 20 percent)	1.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.3 in
Runoff Volume (Pervious)	30.445 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	30.255 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Unit Hydrograph Summary
Label: Subarea HB # 11

Return Event: 25 years
Storm Event: 25-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	416.36 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Storm Event	100-yr
Return Event	100 years
Duration	24.000 hours
Depth	7.5 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	161.410 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.348 hours
Flow (Peak, Computed)	374.89 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	374.32 ft³/s

Drainage Area

SCS CN (Composite)	64.000
Area (User Defined)	161.410 acres
Maximum Retention (Pervious)	5.6 in
Maximum Retention (Pervious, 20 percent)	1.1 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	45.554 ac-ft

Hydrograph Volume (Area under Hydrograph curve)

Volume	45.294 ac-ft

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Subsection: Unit Hydrograph Summary | Return Event: 100 years

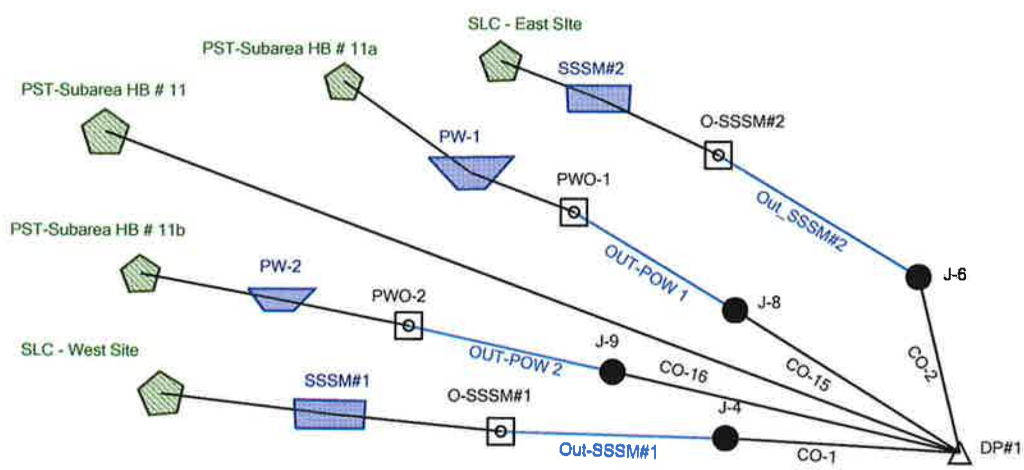
Label: Subarea HB # 11 | Storm Event: 100-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	416.36 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook # 11 Drainage Basin - State Land Corp Drainage Study

Index

Scenario: Post Development - 1year



Hunterbrook Drainage Basin #11 - State Land Corp

Project Summary	
Title	Hunterbrook #11 Drainage Basin - Generic Drainage Study State Land Corp - Post Development
Engineer	Joseph C. Riina, P.E.
Company	Site Design Consultants
Date	3/8/2012

Notes	Preliminary Drainage Study for State Land Corp - Hunter Brook Drainage Basin #11 - SCS-TR20 Stormwater Runoff Analysis for the 1 year, 10-year, 25 -year and 100-year, Type III, 24-hr Storm Event. Post Development

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
PST-Subarea HB # 11	Post Development - 1year	1	4.382	12.450	26.64
PST-Subarea HB # 11	Post Development - 10 Year	10	13.943	12.350	109.00
PST-Subarea HB # 11	Post Development - 25 year	25	20.123	12.350	162.65
PST-Subarea HB # 11	Post Development - 100 year	100	30.343	12.350	250.22
SLC - West Site	Post Development - 1year	1	2.185	12.150	20.75
SLC - West Site	Post Development - 10 Year	10	3.737	12.150	34.52
SLC - West Site	Post Development - 25 year	25	4.557	12.150	41.70
SLC - West Site	Post Development - 100 year	100	5.790	12.150	52.43
SLC - East SIte	Post Development - 1year	1	1.101	12.200	10.91
SLC - East SIte	Post Development - 10 Year	10	1.975	12.200	18.94
SLC - East SIte	Post Development - 25 year	25	2.441	12.150	23.14
SLC - East SIte	Post Development - 100 year	100	3.143	12.150	29.41
PST-Subarea HB # 11a	Post Development - 1year	1	1.017	12.500	6.72
PST-Subarea HB # 11a	Post Development - 10 Year	10	2.692	12.450	19.63
PST-Subarea HB # 11a	Post Development - 25 year	25	3.711	12.450	27.36
PST-Subarea HB # 11a	Post Development - 100 year	100	5.344	12.450	39.56
PST-Subarea HB # 11b	Post Development - 1year	1	0.990	12.250	8.32
PST-Subarea HB # 11b	Post Development - 10 Year	10	2.824	12.200	27.97
PST-Subarea HB # 11b	Post Development - 25 year	25	3.968	12.200	40.05
PST-Subarea HB # 11b	Post Development - 100 year	100	5.826	12.200	59.37

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
J-4	Post Development - 1year	1	0.598	12.750	1.37
J-4	Post Development - 10 Year	10	1.065	12.800	1.83
J-4	Post Development - 25 year	25	1.302	12.800	2.08
J-4	Post Development - 100 year	100	1.630	12.350	2.23
J-6	Post Development - 1year	1	0.251	12.750	0.52
J-6	Post Development - 10 Year	10	0.451	12.850	0.70
J-6	Post Development - 25 year	25	0.553	12.900	0.79
J-6	Post Development - 100 year	100	0.685	12.500	0.91
DP#1	Post Development - 1year	1	11.281	12.450	31.55
DP#1	Post Development - 10 Year	10	22.393	12.350	114.89
DP#1	Post Development - 25 year	25	29.679	12.350	169.51
DP#1	Post Development - 100 year	100	41.706	12.350	259.39
J-8	Post Development - 1year	1	0.080	13.250	0.31
J-8	Post Development - 10 Year	10	0.851	13.200	3.39
J-8	Post Development - 25 year	25	1.505	13.100	6.14
J-8	Post Development - 100 year	100	2.625	13.050	10.91
J-9	Post Development - 1year	1	0.021	12.700	0.07
J-9	Post Development - 10 Year	10	0.133	12.800	0.53
J-9	Post Development - 25 year	25	0.247	12.800	0.90
J-9	Post Development - 100 year	100	0.474	12.800	1.55

Pond Summary

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
SSSM#1 (IN)	Post Development - 1year	1	2.185	12.150	20.75	(N/A)	(N/A)
SSSM#1 (OUT)	Post Development - 1year	1	0.598	12.750	1.37	347.13	0.822
SSSM#1 (IN)	Post Development - 10 Year	10	3.737	12.150	34.52	(N/A)	(N/A)
SSSM#1 (OUT)	Post Development - 10 Year	10	1.065	12.800	1.83	348.50	1.516
SSSM#1 (IN)	Post Development - 25 year	25	4.557	12.150	41.70	(N/A)	(N/A)
SSSM#1 (OUT)	Post Development - 25 year	25	1.302	12.800	2.08	349.40	1.887
SSSM#1 (IN)	Post Development - 100 year	100	5.790	12.150	52.43	(N/A)	(N/A)
SSSM#1 (OUT)	Post Development - 100 year	100	1.630	12.350	2.23	350.00	2.028
SSSM#2 (IN)	Post Development - 1year	1	1.101	12.200	10.91	(N/A)	(N/A)
SSSM#2 (OUT)	Post Development - 1year	1	0.251	12.750	0.52	349.84	0.423
SSSM#2 (IN)	Post Development - 10 Year	10	1.975	12.200	18.94	(N/A)	(N/A)
SSSM#2 (OUT)	Post Development - 10 Year	10	0.451	12.850	0.70	351.12	0.826
SSSM#2 (IN)	Post Development - 25 year	25	2.441	12.150	23.14	(N/A)	(N/A)
SSSM#2 (OUT)	Post Development - 25 year	25	0.553	12.900	0.79	351.88	1.049
SSSM#2 (IN)	Post Development - 100 year	100	3.143	12.150	29.41	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
SSSM#2 (OUT)	Post Development - 100 year	100	0.685	12.500	0.91	353.00	1.262
PW-1 (IN)	Post Development - 1year	1	1.017	12.500	6.72	(N/A)	(N/A)
PW-1 (OUT)	Post Development - 1year	1	0.080	13.250	0.31	532.66	0.293
PW-1 (IN)	Post Development - 10 Year	10	2.692	12.450	19.63	(N/A)	(N/A)
PW-1 (OUT)	Post Development - 10 Year	10	0.851	13.200	3.39	533.84	0.978
PW-1 (IN)	Post Development - 25 year	25	3.711	12.450	27.36	(N/A)	(N/A)
PW-1 (OUT)	Post Development - 25 year	25	1.505	13.100	6.14	534.35	1.348
PW-1 (IN)	Post Development - 100 year	100	5.344	12.450	39.56	(N/A)	(N/A)
PW-1 (OUT)	Post Development - 100 year	100	2.625	13.050	10.91	534.97	1.926
PW-2 (IN)	Post Development - 1year	1	0.990	12.250	8.32	(N/A)	(N/A)
PW-2 (OUT)	Post Development - 1year	1	0.021	12.700	0.07	562.49	0.243
PW-2 (IN)	Post Development - 10 Year	10	2.824	12.200	27.97	(N/A)	(N/A)
PW-2 (OUT)	Post Development - 10 Year	10	0.133	12.800	0.53	563.11	0.937
PW-2 (IN)	Post Development - 25 year	25	3.968	12.200	40.05	(N/A)	(N/A)
PW-2 (OUT)	Post Development - 25 year	25	0.247	12.800	0.90	563.39	1.428

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PW-2 (IN)	Post Development - 100 year	100	5.826	12.200	59.37	(N/A)	(N/A)
PW-2 (OUT)	Post Development - 100 year	100	0.474	12.800	1.55	563.73	2.224

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time-Depth Curve | Return Event: 25 years
Label: Westchester_1-100 | Storm Event: 25-yr

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

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.2	0.2	0.2	0.2	0.2
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.3
4.000	0.3	0.3	0.3	0.3	0.3
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.4	0.4	0.4
5.500	0.4	0.4	0.4	0.4	0.4
6.000	0.4	0.4	0.5	0.5	0.5
6.500	0.5	0.5	0.5	0.5	0.5
7.000	0.5	0.6	0.6	0.6	0.6
7.500	0.6	0.6	0.6	0.7	0.7
8.000	0.7	0.7	0.7	0.7	0.8
8.500	0.8	0.8	0.8	0.8	0.9
9.000	0.9	0.9	0.9	0.9	1.0
9.500	1.0	1.0	1.0	1.1	1.1
10.000	1.1	1.2	1.2	1.2	1.3
10.500	1.3	1.3	1.4	1.4	1.5
11.000	1.5	1.5	1.6	1.7	1.7
11.500	1.8	1.9	2.0	2.2	2.5
12.000	3.0	3.5	3.8	4.0	4.1
12.500	4.2	4.3	4.3	4.4	4.5
13.000	4.5	4.5	4.6	4.6	4.7
13.500	4.7	4.7	4.8	4.8	4.8
14.000	4.9	4.9	4.9	5.0	5.0
14.500	5.0	5.0	5.1	5.1	5.1
15.000	5.1	5.1	5.2	5.2	5.2
15.500	5.2	5.2	5.3	5.3	5.3
16.000	5.3	5.3	5.3	5.4	5.4
16.500	5.4	5.4	5.4	5.4	5.4

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time-Depth Curve | Return Event: 25 years
Label: Westchester_1-100 | Storm Event: 25-yr

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

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
17.000	5.5	5.5	5.5	5.5	5.5
17.500	5.5	5.5	5.5	5.5	5.6
18.000	5.6	5.6	5.6	5.6	5.6
18.500	5.6	5.6	5.6	5.6	5.7
19.000	5.7	5.7	5.7	5.7	5.7
19.500	5.7	5.7	5.7	5.7	5.7
20.000	5.7	5.7	5.8	5.8	5.8
20.500	5.8	5.8	5.8	5.8	5.8
21.000	5.8	5.8	5.8	5.8	5.8
21.500	5.9	5.9	5.9	5.9	5.9
22.000	5.9	5.9	5.9	5.9	5.9
22.500	5.9	5.9	5.9	5.9	5.9
23.000	5.9	6.0	6.0	6.0	6.0
23.500	6.0	6.0	6.0	6.0	6.0
24.000	6.0	(N/A)	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 1 years
Label: PST-Subarea HB # 11 | Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow	
Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 1 years
Label: PST-Subarea HB # 11 — Storm Event: 1-yr

Flow Area	9.0 ft^2
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:

Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 10 years

Label: PST-Subarea HB # 11 — Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow	
Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 10 years
Label: PST-Subarea HB # 11 | Storm Event: 1-yr

Flow Area	9.0 ft^2
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =

(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:

Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Hunterbrook Drainage Basin #11 - State Land Corp

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow	
Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations
Label: PST-Subarea HB # 11

Return Event: 25 years
Storm Event: 1-yr

Flow Area	9.0 ft²
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:

Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 100 years

Label: PST-Subarea HB # 11 — Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.400
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.188 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	780.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.055 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	900.00 ft
Is Paved?	True
Slope	0.010 ft/ft
Average Velocity	2.03 ft/s
Segment Time of Concentration	0.123 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,020.00 ft
Is Paved?	False
Slope	0.140 ft/ft
Average Velocity	6.04 ft/s
Segment Time of Concentration	0.047 hours

Segment #5: TR-55 Shallow Concentrated Flow	
Hydraulic Length	95.00 ft
Is Paved?	False
Slope	0.280 ft/ft
Average Velocity	8.54 ft/s
Segment Time of Concentration	0.003 hours

Segment #6: TR-55 Channel Flow

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations
Label: PST-Subarea HB # 11

Return Event: 100 years
Storm Event: 1-yr

Flow Area	9.0 ft²
Hydraulic Length	1,150.00 ft
Manning's n	0.030
Slope	0.080 ft/ft
Wetted Perimeter	9.71 ft
Average Velocity	13.35 ft/s
Segment Time of Concentration	0.024 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.439 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:

Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations
Label: PST-Subarea HB # 11a

Return Event: 1 years
Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.06 ft/s
Segment Time of Concentration	0.461 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,286.00 ft
Is Paved?	False
Slope	0.040 ft/ft
Average Velocity	3.23 ft/s
Segment Time of Concentration	0.111 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	122.00 ft
Is Paved?	False
Slope	0.220 ft/ft
Average Velocity	7.57 ft/s
Segment Time of Concentration	0.004 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.576 hours

==== SCS Channel Flow

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

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface: V = 16.1345 * (Sf**0.5) Paved Surface: V = 20.3282 * (Sf**0.5) (Lf / V) / 3600
Where:	V= Velocity, ft/sec Sf= Slope, ft/ft Tc= Time of concentration, hours Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 10 years
Label: PST-Subarea HB # 11a | Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.06 ft/s
Segment Time of Concentration	0.461 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	1,286.00 ft
Is Paved?	False
Slope	0.040 ft/ft
Average Velocity	3.23 ft/s
Segment Time of Concentration	0.111 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	122.00 ft
Is Paved?	False
Slope	0.220 ft/ft
Average Velocity	7.57 ft/s
Segment Time of Concentration	0.004 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.576 hours

==== SCS Channel Flow

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

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface: V = 16.1345 * (Sf**0.5) Paved Surface: V = 20.3282 * (Sf**0.5) (Lf / V) / 3600
Where:	V= Velocity, ft/sec Sf= Slope, ft/ft Tc= Time of concentration, hours Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 25 years
Label: PST-Subarea HB # 11a | Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.06 ft/s
Segment Time of Concentration	0.461 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	1,286.00 ft
Is Paved?	False
Slope	0.040 ft/ft
Average Velocity	3.23 ft/s
Segment Time of Concentration	0.111 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	122.00 ft
Is Paved?	False
Slope	0.220 ft/ft
Average Velocity	7.57 ft/s
Segment Time of Concentration	0.004 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.576 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 25 years
Label: PST-Subarea HB # 11a | Storm Event: 1-yr

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 100 years
Label: PST-Subarea HB # 11a | Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow

Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.06 ft/s
Segment Time of Concentration	0.461 hours

Segment #2: TR-55 Shallow Concentrated Flow

Hydraulic Length	1,286.00 ft
Is Paved?	False
Slope	0.040 ft/ft
Average Velocity	3.23 ft/s
Segment Time of Concentration	0.111 hours

Segment #3: TR-55 Shallow Concentrated Flow

Hydraulic Length	122.00 ft
Is Paved?	False
Slope	0.220 ft/ft
Average Velocity	7.57 ft/s
Segment Time of Concentration	0.004 hours

Time of Concentration (Composite)

Time of Concentration (Composite)	0.576 hours

==== SCS Channel Flow

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

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface: V = 16.1345 * (Sf**0.5) Paved Surface: V = 20.3282 * (Sf**0.5) (Lf / V) / 3600
Where:	V= Velocity, ft/sec Sf= Slope, ft/ft Tc= Time of concentration, hours Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 1 years
Label: PST-Subarea HB # 11b — Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.191 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	800.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.056 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.247 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 10 years
Label: PST-Subarea HB # 11b — Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.191 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	800.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.056 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.247 hours

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 25 years
Label: PST-Subarea HB # 11b — Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.191 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	800.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.056 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.247 hours

==== SCS Channel Flow

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

==== SCS TR-55 Shallow Concentration Flow

Tc =	Unpaved surface: V = 16.1345 * (Sf**0.5) Paved Surface: V = 20.3282 * (Sf**0.5) (Lf / V) / 3600
Where:	V= Velocity, ft/sec Sf= Slope, ft/ft Tc= Time of concentration, hours Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations — Return Event: 100 years

Label: PST-Subarea HB # 11b — Storm Event: 1-yr

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.410
Slope	0.090 ft/ft
2 Year 24 Hour Depth	3.5 in
Average Velocity	0.15 ft/s
Segment Time of Concentration	0.191 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	800.00 ft
Is Paved?	False
Slope	0.060 ft/ft
Average Velocity	3.95 ft/s
Segment Time of Concentration	0.056 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.247 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Time of Concentration Calculations | Return Event: 100 years
Label: PST-Subarea HB # 11b | Storm Event: 1-yr

==== SCS Channel Flow

Tc =

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

(Lf / V) / 3600

Where:

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

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area
Label: PST-Subarea HB # 11

Return Event: 1 years
Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	48.810	0.0	0.0	55.000
Woods - good	70.000	50.100	0.0	0.0	70.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.620	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	9.100	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	3.030	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	111.660	(N/A)	(N/A)	62.974

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area — Return Event: 10 years
Label: PST-Subarea HB # 11 — Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	48.810	0.0	0.0	55.000
Woods - good	70.000	50.100	0.0	0.0	70.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.620	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	9.100	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	3.030	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	111.660	(N/A)	(N/A)	62.974

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area — Return Event: 25 years
Label: PST-Subarea HB # 11 — Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	48.810	0.0	0.0	55.000
Woods - good	70.000	50.100	0.0	0.0	70.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.620	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	9.100	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	3.030	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	111.660	(N/A)	(N/A)	62.974

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area — Return Event: 100 years

Label: PST-Subarea HB # 11 — Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Woods - good	55.000	48.810	0.0	0.0	55.000
Woods - good	70.000	50.100	0.0	0.0	70.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.620	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	9.100	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	3.030	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	111.660	(N/A)	(N/A)	62.974

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area
Label: SLC - West Site

Return Event: 1 years
Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	9.240	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.460	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.220	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	9.920	(N/A)	(N/A)	95.752

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area | Return Event: 10 years
Label: SLC - West Site | Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	9.240	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.460	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.220	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	9.920	(N/A)	(N/A)	95.752

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area
Label: SLC - West Site

Return Event: 25 years
Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	9.240	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.460	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.220	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	9.920	(N/A)	(N/A)	95.752

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Runoff CN-Area
Label: SLC - West Site

Return Event: 100 years
Storm Event: 1-yr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	9.240	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.460	0.0	0.0	61.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.220	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	9.920	(N/A)	(N/A)	95.752

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method (Computational Notes)

Definition of Terms

At	Total area (acres): At = Ai+Ap
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^-1)
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of 0.1333Tc, rtm, and th (Smallest dt is then adjusted to match up with Tp)
UDdt	User specified override computational main time increment (only used if UDdt is => .1333Tc)
D(t)	Point on distribution curve (fraction of P) for time step t
K	2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)
Ks	Hydrograph shape factor = Unit Conversions * K: = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K Default Ks = 645.333 * 0.75 = 484
Lag	Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: Si = (1000/CNi) - 10
Sp	S for pervious area: Sp = (1000/CNp) - 10
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp	Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr	Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

Unit Hydrograph Method
Computational Notes
Precipitation

Column (1)	Time for time step t
Column (2)	D(t) = Point on distribution curve for time step t
Column (3)	Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)
Column (4)	Pa(t) = D(t) x P: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

Column (5)	Rap(t) = Accumulated pervious runoff for time step t
	If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0
	If (Pa(t) is > 0.2Sp) then use:
	
	Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6)	Rip(t) = Incremental pervious runoff for time step t Rip(t) = Rap(t) - Rap(t-1) Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

Impervious Area Runoff

Column (7 & 8)...	Did not specify to use impervious areas.

Incremental Weighted Runoff

Column (9)	R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t) R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS Unit Hydrograph Method

Column (10)	Q(t) is computed with the SCS unit hydrograph method using R(t) and Qu(t).

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: PST-Subarea HB # 11

Return Event: 1 years
Storm Event: 1-yr

Storm Event	1-yr
Return Event	1 years
Duration	24.000 hours
Depth	3.1 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	111.660 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.445 hours
Flow (Peak, Computed)	26.69 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.450 hours
Flow (Peak Interpolated Output)	26.64 ft³/s

Drainage Area	
SCS CN (Composite)	63.000
Area (User Defined)	111.660 acres
Maximum Retention (Pervious)	5.9 in
Maximum Retention (Pervious, 20 percent)	1.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.5 in
Runoff Volume (Pervious)	4.423 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.382 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: PST-Subarea HB # 11 | Storm Event: 1-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	288.03 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 10 years
Label: PST-Subarea HB # 11 | Storm Event: 10-yr

Storm Event	10-yr
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	111.660 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.348 hours
Flow (Peak, Computed)	109.07 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	109.00 ft³/s

Drainage Area	
SCS CN (Composite)	63.000
Area (User Defined)	111.660 acres
Maximum Retention (Pervious)	5.9 in
Maximum Retention (Pervious, 20 percent)	1.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.5 in
Runoff Volume (Pervious)	14.040 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	13.943 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 10 years
Label: PST-Subarea HB # 11 | Storm Event: 10-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	288.03 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 25 years
Label: PST-Subarea HB # 11 — Storm Event: 25-yr

Storm Event	25-yr
Return Event	25 years
Duration	24.000 hours
Depth	6.0 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	111.660 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.348 hours
Flow (Peak, Computed)	162.82 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	162.65 ft³/s

Drainage Area	
SCS CN (Composite)	63.000
Area (User Defined)	111.660 acres
Maximum Retention (Pervious)	5.9 in
Maximum Retention (Pervious, 20 percent)	1.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.2 in
Runoff Volume (Pervious)	20.252 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	20.123 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: PST-Subarea HB # 11 | Storm Event: 25-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	288.03 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Storm Event	100-yr
Return Event	100 years
Duration	24.000 hours
Depth	7.5 in
Time of Concentration (Composite)	0.439 hours
Area (User Defined)	111.660 acres

Computational Time Increment	0.049 hours
Time to Peak (Computed)	12.348 hours
Flow (Peak, Computed)	250.59 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.350 hours
Flow (Peak Interpolated Output)	250.22 ft^3/s

Drainage Area	
SCS CN (Composite)	63.000
Area (User Defined)	111.660 acres
Maximum Retention (Pervious)	5.9 in
Maximum Retention (Pervious, 20 percent)	1.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.3 in
Runoff Volume (Pervious)	30.520 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	30.343 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.439 hours
Computational Time Increment	0.049 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

SCS Unit Hydrograph Parameters	
Unit peak, qp	288.03 ft^3/s
Unit peak time, Tp	0.293 hours
Unit receding limb, Tr	1.171 hours
Total unit time, Tb	1.464 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: PST-Subarea HB # 11a | Storm Event: 1-yr

Storm Event	1-yr
Return Event	1 years
Duration	24.000 hours
Depth	3.1 in
Time of Concentration (Composite)	0.576 hours
Area (User Defined)	16.000 acres

Computational Time Increment	0.048 hours
Time to Peak (Computed)	12.474 hours
Flow (Peak, Computed)	6.74 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.500 hours
Flow (Peak Interpolated Output)	6.72 ft^3/s

Drainage Area	
SCS CN (Composite)	70.000
Area (User Defined)	16.000 acres
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.8 in
Runoff Volume (Pervious)	1.027 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.017 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.576 hours
Computational Time Increment	0.048 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Return Event: 1 years
Label: PST-Subarea HB # 11a
Storm Event: 1-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.49 ft^3/s
Unit peak time, Tp	0.384 hours
Unit receding limb, Tr	1.535 hours
Total unit time, Tb	1.919 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 10 years
Label: PST-Subarea HB # 11a — Storm Event: 10-yr

Storm Event	10-yr
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.576 hours
Area (User Defined)	16.000 acres

Computational Time Increment	0.048 hours
Time to Peak (Computed)	12.426 hours
Flow (Peak, Computed)	19.65 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.450 hours
Flow (Peak Interpolated Output)	19.63 ft³/s

Drainage Area	
SCS CN (Composite)	70.000
Area (User Defined)	16.000 acres
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	2.715 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.692 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.576 hours
Computational Time Increment	0.048 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: PST-Subarea HB # 11a

Return Event: 10 years
Storm Event: 10-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.49 ft^3/s
Unit peak time, Tp	0.384 hours
Unit receding limb, Tr	1.535 hours
Total unit time, Tb	1.919 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: PST-Subarea HB # 11a | Storm Event: 25-yr

Storm Event	25-yr
Return Event	25 years
Duration	24.000 hours
Depth	6.0 in
Time of Concentration (Composite)	0.576 hours
Area (User Defined)	16.000 acres

Computational Time Increment	0.048 hours
Time to Peak (Computed)	12.426 hours
Flow (Peak, Computed)	27.46 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.450 hours
Flow (Peak Interpolated Output)	27.36 ft³/s

Drainage Area	
SCS CN (Composite)	70.000
Area (User Defined)	16.000 acres
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.8 in
Runoff Volume (Pervious)	3.740 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	3.711 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.576 hours
Computational Time Increment	0.048 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: PST-Subarea HB # 11a | Storm Event: 25-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.49 ft^3/s
Unit peak time, Tp	0.384 hours
Unit receding limb, Tr	1.535 hours
Total unit time, Tb	1.919 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 100 years
Label: PST-Subarea HB # 11a | Storm Event: 100-yr

Storm Event	100-yr
Return Event	100 years
Duration	24.000 hours
Depth	7.5 in
Time of Concentration (Composite)	0.576 hours
Area (User Defined)	16.000 acres

Computational Time Increment	0.048 hours
Time to Peak (Computed)	12.426 hours
Flow (Peak, Computed)	39.81 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.450 hours
Flow (Peak Interpolated Output)	39.56 ft³/s

Drainage Area	
SCS CN (Composite)	70.000
Area (User Defined)	16.000 acres
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.0 in
Runoff Volume (Pervious)	5.384 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.344 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.576 hours
Computational Time Increment	0.048 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: PST-Subarea HB # 11a

Return Event: 100 years
Storm Event: 100-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	31.49 ft^3/s
Unit peak time, Tp	0.384 hours
Unit receding limb, Tr	1.535 hours
Total unit time, Tb	1.919 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 1 years
Label: PST-Subarea HB # 11b — Storm Event: 1-yr

Storm Event	1-yr
Return Event	1 years
Duration	24.000 hours
Depth	3.1 in
Time of Concentration (Composite)	0.247 hours
Area (User Defined)	19.000 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.241 hours
Flow (Peak, Computed)	8.38 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.250 hours
Flow (Peak Interpolated Output)	8.32 ft³/s

Drainage Area	
SCS CN (Composite)	66.842
Area (User Defined)	19.000 acres
Maximum Retention (Pervious)	5.0 in
Maximum Retention (Pervious, 20 percent)	1.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	0.995 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.990 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.247 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: PST-Subarea HB # 11b | Storm Event: 1-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	86.99 ft^3/s
Unit peak time, Tp	0.165 hours
Unit receding limb, Tr	0.660 hours
Total unit time, Tb	0.825 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 10 years

Label: PST-Subarea HB # 11b — Storm Event: 10-yr

Storm Event	10-yr
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.247 hours
Area (User Defined)	19.000 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.208 hours
Flow (Peak, Computed)	28.02 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	27.97 ft³/s

Drainage Area	
SCS CN (Composite)	66.842
Area (User Defined)	19.000 acres
Maximum Retention (Pervious)	5.0 in
Maximum Retention (Pervious, 20 percent)	1.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.8 in
Runoff Volume (Pervious)	2.836 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.824 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.247 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 10 years
Label: PST-Subarea HB # 11b | Storm Event: 10-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	86.99 ft^3/s
Unit peak time, Tp	0.165 hours
Unit receding limb, Tr	0.660 hours
Total unit time, Tb	0.825 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: PST-Subarea HB # 11b | Storm Event: 25-yr

Storm Event	25-yr
Return Event	25 years
Duration	24.000 hours
Depth	6.0 in
Time of Concentration (Composite)	0.247 hours
Area (User Defined)	19.000 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.175 hours
Flow (Peak, Computed)	40.09 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	40.05 ft³/s

Drainage Area	
SCS CN (Composite)	66.842
Area (User Defined)	19.000 acres
Maximum Retention (Pervious)	5.0 in
Maximum Retention (Pervious, 20 percent)	1.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.5 in
Runoff Volume (Pervious)	3.983 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	3.968 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.247 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: PST-Subarea HB # 11b

Return Event: 25 years
Storm Event: 25-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	86.99 ft^3/s
Unit peak time, Tp	0.165 hours
Unit receding limb, Tr	0.660 hours
Total unit time, Tb	0.825 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 100 years
Label: PST-Subarea HB # 11b — Storm Event: 100-yr

Storm Event	100-yr
Return Event	100 years
Duration	24.000 hours
Depth	7.5 in
Time of Concentration (Composite)	0.247 hours
Area (User Defined)	19.000 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.175 hours
Flow (Peak, Computed)	59.72 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	59.37 ft³/s

Drainage Area	
SCS CN (Composite)	66.842
Area (User Defined)	19.000 acres
Maximum Retention (Pervious)	5.0 in
Maximum Retention (Pervious, 20 percent)	1.0 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	5.847 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.826 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.247 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: PST-Subarea HB # 11b

Return Event: 100 years
Storm Event: 100-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	86.99 ft^3/s
Unit peak time, Tp	0.165 hours
Unit receding limb, Tr	0.660 hours
Total unit time, Tb	0.825 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 1 years

Label: SLC - East SIte — Storm Event: 1-yr

Storm Event	1-yr
Return Event	1 years
Duration	24.000 hours
Depth	3.1 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	5.700 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	11.04 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	10.91 ft³/s

Drainage Area	
SCS CN (Composite)	92.740
Area (User Defined)	5.700 acres
Maximum Retention (Pervious)	0.8 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.3 in
Runoff Volume (Pervious)	1.104 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.101 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: SLC - East SIte | Storm Event: 1-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	25.83 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: SLC - East SIte

Return Event: 10 years
Storm Event: 10-yr

Storm Event	10-yr
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	5.700 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	19.24 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.200 hours
Flow (Peak Interpolated Output)	18.94 ft³/s

Drainage Area	
SCS CN (Composite)	92.740
Area (User Defined)	5.700 acres
Maximum Retention (Pervious)	0.8 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.2 in
Runoff Volume (Pervious)	1.981 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.975 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: SLC - East SIte

Return Event: 10 years
Storm Event: 10-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	25.83 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: SLC - East SIte

Return Event: 25 years
Storm Event: 25-yr

Storm Event	25-yr
Return Event	25 years
Duration	24.000 hours
Depth	6.0 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	5.700 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	23.50 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	23.14 ft³/s

Drainage Area	
SCS CN (Composite)	92.740
Area (User Defined)	5.700 acres
Maximum Retention (Pervious)	0.8 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.2 in
Runoff Volume (Pervious)	2.448 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.441 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

SCS Unit Hydrograph Parameters	
Unit peak, qp	25.83 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: SLC - East SIte

Return Event: 100 years
Storm Event: 100-yr

Storm Event	100-yr
Return Event	100 years
Duration	24.000 hours
Depth	7.5 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	5.700 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	29.85 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	29.41 ft³/s

Drainage Area	
SCS CN (Composite)	92.740
Area (User Defined)	5.700 acres
Maximum Retention (Pervious)	0.8 in
Maximum Retention (Pervious, 20 percent)	0.2 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.6 in
Runoff Volume (Pervious)	3.152 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	3.143 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 100 years
Label: SLC - East SIte — Storm Event: 100-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	25.83 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: SLC - West Site | Storm Event: 1-yr

Storm Event	1-yr
Return Event	1 years
Duration	24.000 hours
Depth	3.1 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	9.920 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	21.08 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	20.75 ft³/s

Drainage Area	
SCS CN (Composite)	96.000
Area (User Defined)	9.920 acres
Maximum Retention (Pervious)	0.4 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.7 in
Runoff Volume (Pervious)	2.191 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.185 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary — Return Event: 1 years
Label: SLC - West Site — Storm Event: 1-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	44.96 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary
Label: SLC - West Site

Return Event: 10 years
Storm Event: 10-yr

Storm Event	10-yr
Return Event	10 years
Duration	24.000 hours
Depth	5.0 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	9.920 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	35.02 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	34.52 ft³/s

Drainage Area	
SCS CN (Composite)	96.000
Area (User Defined)	9.920 acres
Maximum Retention (Pervious)	0.4 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.5 in
Runoff Volume (Pervious)	3.747 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	3.737 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 10 years
Label: SLC - West Site | Storm Event: 10-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	44.96 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: SLC - West Site | Storm Event: 25-yr

Storm Event	25-yr
Return Event	25 years
Duration	24.000 hours
Depth	6.0 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	9.920 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	42.30 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	41.70 ft³/s

Drainage Area	
SCS CN (Composite)	96.000
Area (User Defined)	9.920 acres
Maximum Retention (Pervious)	0.4 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.5 in
Runoff Volume (Pervious)	4.569 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.557 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: SLC - West Site | Storm Event: 25-yr

SCS Unit Hydrograph Parameters	
Unit peak, qp	44.96 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Unit Hydrograph Summary | Return Event: 100 years
Label: SLC - West Site | Storm Event: 100-yr

Storm Event	100-yr
Return Event	100 years
Duration	24.000 hours
Depth	7.5 in
Time of Concentration (Composite)	0.250 hours
Area (User Defined)	9.920 acres

Computational Time Increment	0.033 hours
Time to Peak (Computed)	12.166 hours
Flow (Peak, Computed)	53.17 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	52.43 ft³/s

Drainage Area	
SCS CN (Composite)	96.000
Area (User Defined)	9.920 acres
Maximum Retention (Pervious)	0.4 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.0 in
Runoff Volume (Pervious)	5.805 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.790 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.250 hours
Computational Time Increment	0.033 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

SCS Unit Hydrograph Parameters	
Unit peak, qp	44.96 ft^3/s
Unit peak time, Tp	0.167 hours
Unit receding limb, Tr	0.667 hours
Total unit time, Tb	0.833 hours

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume
Label: SSSM#1

Return Event: 1 years
Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	345.00 ft
Pipe Storage Downstream Invert	345.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	45
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
345.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
345.50	0.50	1.0	100.00	0.00	0.50	1.0	0.106
346.00	1.00	2.8	100.00	0.00	1.00	2.8	0.289
346.50	1.50	5.0	100.00	0.00	1.50	5.0	0.512
347.00	2.00	7.3	100.00	0.00	2.00	7.3	0.758
347.50	2.50	9.8	100.00	0.00	2.50	9.8	1.014
348.00	3.00	12.3	100.00	0.00	3.00	12.3	1.271
348.50	3.50	14.7	100.00	0.00	3.50	14.7	1.517
349.00	4.00	16.8	100.00	0.00	4.00	16.8	1.740
349.50	4.50	18.6	100.00	0.00	4.50	18.6	1.923
350.00	5.00	19.6	100.00	100.00	5.00	19.6	2.028

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume
Label: SSSM#1

Return Event: 10 years
Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	345.00 ft
Pipe Storage Downstream Invert	345.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	45
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
345.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
345.50	0.50	1.0	100.00	0.00	0.50	1.0	0.106
346.00	1.00	2.8	100.00	0.00	1.00	2.8	0.289
346.50	1.50	5.0	100.00	0.00	1.50	5.0	0.512
347.00	2.00	7.3	100.00	0.00	2.00	7.3	0.758
347.50	2.50	9.8	100.00	0.00	2.50	9.8	1.014
348.00	3.00	12.3	100.00	0.00	3.00	12.3	1.271
348.50	3.50	14.7	100.00	0.00	3.50	14.7	1.517
349.00	4.00	16.8	100.00	0.00	4.00	16.8	1.740
349.50	4.50	18.6	100.00	0.00	4.50	18.6	1.923
350.00	5.00	19.6	100.00	100.00	5.00	19.6	2.028

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume
Label: SSSM#1

Return Event: 25 years
Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	345.00 ft
Pipe Storage Downstream Invert	345.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	45
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft^2)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft^2)	Total Volume (ac-ft)
345.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
345.50	0.50	1.0	100.00	0.00	0.50	1.0	0.106
346.00	1.00	2.8	100.00	0.00	1.00	2.8	0.289
346.50	1.50	5.0	100.00	0.00	1.50	5.0	0.512
347.00	2.00	7.3	100.00	0.00	2.00	7.3	0.758
347.50	2.50	9.8	100.00	0.00	2.50	9.8	1.014
348.00	3.00	12.3	100.00	0.00	3.00	12.3	1.271
348.50	3.50	14.7	100.00	0.00	3.50	14.7	1.517
349.00	4.00	16.8	100.00	0.00	4.00	16.8	1.740
349.50	4.50	18.6	100.00	0.00	4.50	18.6	1.923
350.00	5.00	19.6	100.00	100.00	5.00	19.6	2.028

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume | Return Event: 100 years
Label: SSSM#1 | Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	345.00 ft
Pipe Storage Downstream Invert	345.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	45
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
345.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
345.50	0.50	1.0	100.00	0.00	0.50	1.0	0.106
346.00	1.00	2.8	100.00	0.00	1.00	2.8	0.289
346.50	1.50	5.0	100.00	0.00	1.50	5.0	0.512
347.00	2.00	7.3	100.00	0.00	2.00	7.3	0.758
347.50	2.50	9.8	100.00	0.00	2.50	9.8	1.014
348.00	3.00	12.3	100.00	0.00	3.00	12.3	1.271
348.50	3.50	14.7	100.00	0.00	3.50	14.7	1.517
349.00	4.00	16.8	100.00	0.00	4.00	16.8	1.740
349.50	4.50	18.6	100.00	0.00	4.50	18.6	1.923
350.00	5.00	19.6	100.00	100.00	5.00	19.6	2.028

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume
Label: SSSM#2

Return Event: 1 years
Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	348.00 ft
Pipe Storage Downstream Invert	348.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	28
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
348.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
348.50	0.50	1.0	100.00	0.00	0.50	1.0	0.066
349.00	1.00	2.8	100.00	0.00	1.00	2.8	0.180
349.50	1.50	5.0	100.00	0.00	1.50	5.0	0.318
350.00	2.00	7.3	100.00	0.00	2.00	7.3	0.471
350.50	2.50	9.8	100.00	0.00	2.50	9.8	0.631
351.00	3.00	12.3	100.00	0.00	3.00	12.3	0.791
351.50	3.50	14.7	100.00	0.00	3.50	14.7	0.944
352.00	4.00	16.8	100.00	0.00	4.00	16.8	1.082
352.50	4.50	18.6	100.00	0.00	4.50	18.6	1.196
353.00	5.00	19.6	100.00	100.00	5.00	19.6	1.262

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume | Return Event: 10 years
Label: SSSM#2 | Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	348.00 ft
Pipe Storage Downstream Invert	348.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	28
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
348.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
348.50	0.50	1.0	100.00	0.00	0.50	1.0	0.066
349.00	1.00	2.8	100.00	0.00	1.00	2.8	0.180
349.50	1.50	5.0	100.00	0.00	1.50	5.0	0.318
350.00	2.00	7.3	100.00	0.00	2.00	7.3	0.471
350.50	2.50	9.8	100.00	0.00	2.50	9.8	0.631
351.00	3.00	12.3	100.00	0.00	3.00	12.3	0.791
351.50	3.50	14.7	100.00	0.00	3.50	14.7	0.944
352.00	4.00	16.8	100.00	0.00	4.00	16.8	1.082
352.50	4.50	18.6	100.00	0.00	4.50	18.6	1.196
353.00	5.00	19.6	100.00	100.00	5.00	19.6	1.262

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume | Return Event: 25 years
Label: SSSM#2 | Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	348.00 ft
Pipe Storage Downstream Invert	348.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	28
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
348.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
348.50	0.50	1.0	100.00	0.00	0.50	1.0	0.066
349.00	1.00	2.8	100.00	0.00	1.00	2.8	0.180
349.50	1.50	5.0	100.00	0.00	1.50	5.0	0.318
350.00	2.00	7.3	100.00	0.00	2.00	7.3	0.471
350.50	2.50	9.8	100.00	0.00	2.50	9.8	0.631
351.00	3.00	12.3	100.00	0.00	3.00	12.3	0.791
351.50	3.50	14.7	100.00	0.00	3.50	14.7	0.944
352.00	4.00	16.8	100.00	0.00	4.00	16.8	1.082
352.50	4.50	18.6	100.00	0.00	4.50	18.6	1.196
353.00	5.00	19.6	100.00	100.00	5.00	19.6	1.262

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pipe Volume | Return Event: 100 years
Label: SSSM#2 | Storm Event: 1-yr

Volume Results (Pipe)	
Pipe Storage Upstream Invert	348.00 ft
Pipe Storage Downstream Invert	348.00 ft
Pipe Storage Length	100.00 ft
Pipe Storage Diameter	60.0 in
Pipe Storage Number of Barrels	28
Pipe Storage Slice Width	2.00 ft
Pipe Storage Vertical Increment	0.50 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
348.00	0.00	0.0	100.00	0.00	0.00	0.0	0.000
348.50	0.50	1.0	100.00	0.00	0.50	1.0	0.066
349.00	1.00	2.8	100.00	0.00	1.00	2.8	0.180
349.50	1.50	5.0	100.00	0.00	1.50	5.0	0.318
350.00	2.00	7.3	100.00	0.00	2.00	7.3	0.471
350.50	2.50	9.8	100.00	0.00	2.50	9.8	0.631
351.00	3.00	12.3	100.00	0.00	3.00	12.3	0.791
351.50	3.50	14.7	100.00	0.00	3.50	14.7	0.944
352.00	4.00	16.8	100.00	0.00	4.00	16.8	1.082
352.50	4.50	18.6	100.00	0.00	4.50	18.6	1.196
353.00	5.00	19.6	100.00	100.00	5.00	19.6	1.262

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data
Label: Copy of Outlet HB#11a

Return Event: 1 years
Storm Event: 1-yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	532.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	535.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Vnotch Weir Tailwater Settings	Weir - 1 Tailwater	Forward	TW	532.00 (N/A)	535.00 (N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data — Return Event: 1 years
Label: Copy of Outlet HB#11a — Storm Event: 1-yr

Structure ID: Weir - 1 Structure Type: Vnotch Weir	
Number of Openings	1
Elevation	532.00 ft
V-Notch Angle	28.00 degrees
Weir Coefficient	3.00 (ft^0.5)/s

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

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
532.00	0.00	(N/A)	0.00
532.50	0.13	(N/A)	0.00
533.00	0.71	(N/A)	0.00
533.50	1.97	(N/A)	0.00
534.00	4.04	(N/A)	0.00
534.50	7.06	(N/A)	0.00
535.00	11.14	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.13;
H=1.00; Htw=.00; Qfree=.71;
H=1.50; Htw=.00; Qfree=1.97;
H=2.00; Htw=.00; Qfree=4.04;
H=2.50; Htw=.00; Qfree=7.06;
H=3.00; Htw=.00; Qfree=11.14;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves | Return Event: 10 years
Label: Copy of Outlet HB#11a | Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
532.00	0.00	(N/A)	0.00
532.50	0.13	(N/A)	0.00
533.00	0.71	(N/A)	0.00
533.50	1.97	(N/A)	0.00
534.00	4.04	(N/A)	0.00
534.50	7.06	(N/A)	0.00
535.00	11.14	(N/A)	0.00

Computation Messages

H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.13;
H=1.00; Htw=.00; Qfree=.71;
H=1.50; Htw=.00; Qfree=1.97;
H=2.00; Htw=.00; Qfree=4.04;
H=2.50; Htw=.00; Qfree=7.06;
H=3.00; Htw=.00; Qfree=11.14;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves
Label: Copy of Outlet HB#11a

Return Event: 25 years
Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
532.00	0.00	(N/A)	0.00
532.50	0.13	(N/A)	0.00
533.00	0.71	(N/A)	0.00
533.50	1.97	(N/A)	0.00
534.00	4.04	(N/A)	0.00
534.50	7.06	(N/A)	0.00
535.00	11.14	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.13;
H=1.00; Htw=.00; Qfree=.71;
H=1.50; Htw=.00; Qfree=1.97;
H=2.00; Htw=.00; Qfree=4.04;
H=2.50; Htw=.00; Qfree=7.06;
H=3.00; Htw=.00; Qfree=11.14;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves — Return Event: 100 years
Label: Copy of Outlet HB#11a — Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
532.00	0.00	(N/A)	0.00
532.50	0.13	(N/A)	0.00
533.00	0.71	(N/A)	0.00
533.50	1.97	(N/A)	0.00
534.00	4.04	(N/A)	0.00
534.50	7.06	(N/A)	0.00
535.00	11.14	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.13;
H=1.00; Htw=.00; Qfree=.71;
H=1.50; Htw=.00; Qfree=1.97;
H=2.00; Htw=.00; Qfree=4.04;
H=2.50; Htw=.00; Qfree=7.06;
H=3.00; Htw=.00; Qfree=11.14;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data | Return Event: 1 years
Label: Copy of Outlet SSSM#1a | Storm Event: 1-yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	345.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	350.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward	TW	345.00	350.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data — Return Event: 1 years
Label: Copy of Outlet SSSM#1a — Storm Event: 1-yr

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	6.0 in
Length	10.00 ft
Length (Computed Barrel)	10.00 ft
Slope (Computed)	0.010 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.079
Kr	0.100
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 2
K	0.5340
M	0.5550
C	0.0196
Y	0.9000
T1 ratio (HW/D)	1.070
T2 ratio (HW/D)	1.209
Slope Correction Factor	-0.500

Use unsubmerged inlet control 1 equation below T1 elevation.
Use submerged inlet control 1 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	345.54 ft	T1 Flow	0.49 ft³/s
T2 Elevation	345.60 ft	T2 Flow	0.56 ft³/s

Hunterbrook Drainage Basin #11 - State Land Corp

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves — Return Event: 1 years
Label: Copy of Outlet SSSM#1a — Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.60 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
345.00	0.00	(N/A)	0.00
345.50	0.36	(N/A)	0.00
346.00	0.82	(N/A)	0.00
346.50	1.10	(N/A)	0.00
347.00	1.32	(N/A)	0.00
347.50	1.51	(N/A)	0.00
348.00	1.68	(N/A)	0.00
348.50	1.83	(N/A)	0.00
349.00	1.98	(N/A)	0.00
349.50	2.11	(N/A)	0.00
350.00	2.23	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
CRIT.DEPTH CONTROL Vh= .130ft Dcr= .306ft CRIT.DEPTH Hev= .00ft
FULL FLOW...Lfull=7.93ft Vh=.273ft HL=.580ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.483ft HL=1.097ft Hev= .00ft
FULL FLOW...Lfull=9.92ft Vh=.701ft HL=1.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.918ft HL=2.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.137ft HL=2.601ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.355ft HL=3.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.574ft HL=3.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.793ft HL=4.100ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=2.012ft HL=4.599ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves — Return Event: 10 years

Label: Copy of Outlet SSSM#1a — Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.60 ft³/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
345.00	0.00	(N/A)	0.00
345.50	0.36	(N/A)	0.00
346.00	0.82	(N/A)	0.00
346.50	1.10	(N/A)	0.00
347.00	1.32	(N/A)	0.00
347.50	1.51	(N/A)	0.00
348.00	1.68	(N/A)	0.00
348.50	1.83	(N/A)	0.00
349.00	1.98	(N/A)	0.00
349.50	2.11	(N/A)	0.00
350.00	2.23	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
CRIT.DEPTH CONTROL Vh= .130ft Dcr= .306ft CRIT.DEPTH Hev= .00ft
FULL FLOW...Lfull=7.93ft Vh=.273ft HL=.580ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.483ft HL=1.097ft Hev= .00ft
FULL FLOW...Lfull=9.92ft Vh=.701ft HL=1.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.918ft HL=2.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.137ft HL=2.601ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.355ft HL=3.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.574ft HL=3.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.793ft HL=4.100ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=2.012ft HL=4.599ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves | Return Event: 25 years
Label: Copy of Outlet SSSM#1a | Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.60 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
345.00	0.00	(N/A)	0.00
345.50	0.36	(N/A)	0.00
346.00	0.82	(N/A)	0.00
346.50	1.10	(N/A)	0.00
347.00	1.32	(N/A)	0.00
347.50	1.51	(N/A)	0.00
348.00	1.68	(N/A)	0.00
348.50	1.83	(N/A)	0.00
349.00	1.98	(N/A)	0.00
349.50	2.11	(N/A)	0.00
350.00	2.23	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
CRIT.DEPTH CONTROL Vh= .130ft Dcr= .306ft CRIT.DEPTH Hev= .00ft
FULL FLOW...Lfull=7.93ft Vh=.273ft HL=.580ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.483ft HL=1.097ft Hev= .00ft
FULL FLOW...Lfull=9.92ft Vh=.701ft HL=1.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.918ft HL=2.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.137ft HL=2.601ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.355ft HL=3.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.574ft HL=3.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.793ft HL=4.100ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=2.012ft HL=4.599ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves | Return Event: 100 years
Label: Copy of Outlet SSSM#1a | Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.60 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
345.00	0.00	(N/A)	0.00
345.50	0.36	(N/A)	0.00
346.00	0.82	(N/A)	0.00
346.50	1.10	(N/A)	0.00
347.00	1.32	(N/A)	0.00
347.50	1.51	(N/A)	0.00
348.00	1.68	(N/A)	0.00
348.50	1.83	(N/A)	0.00
349.00	1.98	(N/A)	0.00
349.50	2.11	(N/A)	0.00
350.00	2.23	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
CRIT.DEPTH CONTROL Vh= .130ft Dcr= .306ft CRIT.DEPTH Hev= .00ft
FULL FLOW...Lfull=7.93ft Vh=.273ft HL=.580ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.483ft HL=1.097ft Hev= .00ft
FULL FLOW...Lfull=9.92ft Vh=.701ft HL=1.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.918ft HL=2.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.137ft HL=2.601ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.355ft HL=3.099ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.574ft HL=3.599ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.793ft HL=4.100ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=2.012ft HL=4.599ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data | Return Event: 1 years
Label: Outlet HB#11b | Storm Event: 1-yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	562.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	565.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Vnotch Weir Tailwater Settings	Weir - 1 Tailwater	Forward	TW	562.00 (N/A)	565.00 (N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data | Return Event: 1 years
Label: Outlet HB#11b | Storm Event: 1-yr

Structure ID: Weir - 1 Structure Type: Vnotch Weir	
Number of Openings	1
Elevation	562.00 ft
V-Notch Angle	15.00 degrees
Weir Coefficient	3.00 (ft^0.5)/s

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

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

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves
Label: Outlet HB#11b

Return Event: 1 years
Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
562.00	0.00	(N/A)	0.00
562.50	0.07	(N/A)	0.00
563.00	0.38	(N/A)	0.00
563.50	1.04	(N/A)	0.00
564.00	2.13	(N/A)	0.00
564.50	3.73	(N/A)	0.00
565.00	5.88	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.07;
H=1.00; Htw=.00; Qfree=.38;
H=1.50; Htw=.00; Qfree=1.04;
H=2.00; Htw=.00; Qfree=2.13;
H=2.50; Htw=.00; Qfree=3.73;
H=3.00; Htw=.00; Qfree=5.88;

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
562.00	0.00	(N/A)	0.00
562.50	0.07	(N/A)	0.00
563.00	0.38	(N/A)	0.00
563.50	1.04	(N/A)	0.00
564.00	2.13	(N/A)	0.00
564.50	3.73	(N/A)	0.00
565.00	5.88	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.07;
H=1.00; Htw=.00; Qfree=.38;
H=1.50; Htw=.00; Qfree=1.04;
H=2.00; Htw=.00; Qfree=2.13;
H=2.50; Htw=.00; Qfree=3.73;
H=3.00; Htw=.00; Qfree=5.88;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves | Return Event: 25 years
Label: Outlet HB#11b | Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
562.00	0.00	(N/A)	0.00
562.50	0.07	(N/A)	0.00
563.00	0.38	(N/A)	0.00
563.50	1.04	(N/A)	0.00
564.00	2.13	(N/A)	0.00
564.50	3.73	(N/A)	0.00
565.00	5.88	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.07;
H=1.00; Htw=.00; Qfree=.38;
H=1.50; Htw=.00; Qfree=1.04;
H=2.00; Htw=.00; Qfree=2.13;
H=2.50; Htw=.00; Qfree=3.73;
H=3.00; Htw=.00; Qfree=5.88;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves
Label: Outlet HB#11b

Return Event: 100 years
Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Weir - 1 (Vnotch Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
562.00	0.00	(N/A)	0.00
562.50	0.07	(N/A)	0.00
563.00	0.38	(N/A)	0.00
563.50	1.04	(N/A)	0.00
564.00	2.13	(N/A)	0.00
564.50	3.73	(N/A)	0.00
565.00	5.88	(N/A)	0.00

Computation Messages
H=.00; Htw=.00; Qfree=.00;
H=.50; Htw=.00; Qfree=.07;
H=1.00; Htw=.00; Qfree=.38;
H=1.50; Htw=.00; Qfree=1.04;
H=2.00; Htw=.00; Qfree=2.13;
H=2.50; Htw=.00; Qfree=3.73;
H=3.00; Htw=.00; Qfree=5.88;

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data | Return Event: 1 years
Label: Outlet SSSM#2a | Storm Event: 1-yr

Requested Pond Water Surface Elevations	
Minimum (Headwater)	348.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	353.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular Tailwater Settings	Culvert - 1 Tailwater	Forward	TW	348.00 (N/A)	353.00 (N/A)

Structure ID: Culvert - 1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	4.0 in
Length	10.00 ft
Length (Computed Barrel)	10.00 ft
Slope (Computed)	0.010 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.500
Kb	0.135
Kr	0.100
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 2
K	0.5340
M	0.5550
C	0.0196
Y	0.9000
T1 ratio (HW/D)	1.070
T2 ratio (HW/D)	1.209
Slope Correction Factor	-0.500

Use unsubmerged inlet control 1 equation below T1 elevation.
Use submerged inlet control 1 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	348.36 ft	T1 Flow	0.18 ft³/s
T2 Elevation	348.40 ft	T2 Flow	0.20 ft³/s

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Outlet Input Data | Return Event: 1 years
Label: Outlet SSSM#2a | Storm Event: 1-yr

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

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

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.20 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
348.00	0.00	(N/A)	0.00
348.50	0.23	(N/A)	0.00
349.00	0.36	(N/A)	0.00
349.50	0.47	(N/A)	0.00
350.00	0.55	(N/A)	0.00
350.50	0.62	(N/A)	0.00
351.00	0.69	(N/A)	0.00
351.50	0.75	(N/A)	0.00
352.00	0.80	(N/A)	0.00
352.50	0.86	(N/A)	0.00
353.00	0.91	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
BACKWATER CONTROL.. Vh= .112ft hwDi= .332ft Lbw= 10.0ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.271ft HL=.764ft Hev= .00ft
FULL FLOW...Lfull=9.95ft Vh=.445ft HL=1.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.620ft HL=1.767ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.795ft HL=2.266ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.970ft HL=2.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.146ft HL=3.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.321ft HL=3.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.497ft HL=4.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.672ft HL=4.767ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves | Return Event: 10 years
Label: Outlet SSSM#2a | Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.20 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
348.00	0.00	(N/A)	0.00
348.50	0.23	(N/A)	0.00
349.00	0.36	(N/A)	0.00
349.50	0.47	(N/A)	0.00
350.00	0.55	(N/A)	0.00
350.50	0.62	(N/A)	0.00
351.00	0.69	(N/A)	0.00
351.50	0.75	(N/A)	0.00
352.00	0.80	(N/A)	0.00
352.50	0.86	(N/A)	0.00
353.00	0.91	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
BACKWATER CONTROL.. Vh= .112ft hwDi= .332ft Lbw= 10.0ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.271ft HL=.764ft Hev= .00ft
FULL FLOW...Lfull=9.95ft Vh=.445ft HL=1.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.620ft HL=1.767ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.795ft HL=2.266ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.970ft HL=2.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.146ft HL=3.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.321ft HL=3.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.497ft HL=4.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.672ft HL=4.767ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves — Return Event: 25 years

Label: Outlet SSSM#2a — Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.20 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
348.00	0.00	(N/A)	0.00
348.50	0.23	(N/A)	0.00
349.00	0.36	(N/A)	0.00
349.50	0.47	(N/A)	0.00
350.00	0.55	(N/A)	0.00
350.50	0.62	(N/A)	0.00
351.00	0.69	(N/A)	0.00
351.50	0.75	(N/A)	0.00
352.00	0.80	(N/A)	0.00
352.50	0.86	(N/A)	0.00
353.00	0.91	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
BACKWATER CONTROL.. Vh= .112ft hwDi= .332ft Lbw= 10.0ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.271ft HL=.764ft Hev= .00ft
FULL FLOW...Lfull=9.95ft Vh=.445ft HL=1.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.620ft HL=1.767ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.795ft HL=2.266ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.970ft HL=2.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.146ft HL=3.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.321ft HL=3.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.497ft HL=4.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.672ft HL=4.767ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Individual Outlet Curves
Label: Outlet SSSM#2a

Return Event: 100 years
Storm Event: 1-yr

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.20 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
348.00	0.00	(N/A)	0.00
348.50	0.23	(N/A)	0.00
349.00	0.36	(N/A)	0.00
349.50	0.47	(N/A)	0.00
350.00	0.55	(N/A)	0.00
350.50	0.62	(N/A)	0.00
351.00	0.69	(N/A)	0.00
351.50	0.75	(N/A)	0.00
352.00	0.80	(N/A)	0.00
352.50	0.86	(N/A)	0.00
353.00	0.91	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
BACKWATER CONTROL.. Vh= .112ft hwDi= .332ft Lbw= 10.0ft Hev= .00ft
FULL FLOW...Lfull=9.78ft Vh=.271ft HL=.764ft Hev= .00ft
FULL FLOW...Lfull=9.95ft Vh=.445ft HL=1.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.620ft HL=1.767ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.795ft HL=2.266ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=.970ft HL=2.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.146ft HL=3.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.321ft HL=3.766ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.497ft HL=4.267ft Hev= .00ft
FULL FLOW...Lfull=9.98ft Vh=1.672ft HL=4.767ft Hev= .00ft

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Infiltration Calculations — Return Event: 1 years

Label: PW-1 (IN) — Storm Event: 1-yr

Average Infiltration Rating Table

Elevation (Water Surface) (ft)	Area (Total) (ft^2)	Flow (Infiltration) (ft^3/s)
532.00	17,424.0	0.00
532.50	20,350.4	1.88
533.00	23,503.9	2.18
533.50	26,884.4	2.49
534.00	30,492.0	2.82
534.50	37,730.0	3.49
535.00	45,738.0	4.24

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary — Return Event: 1 years
Label: PW-1 (IN) — Storm Event: 1-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	532.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	6.72 ft³/s	Time to Peak (Flow, In)	12.500 hours
Infiltration (Peak)	1.98 ft³/s	Time to Peak (Infiltration)	13.250 hours
Flow (Peak Outlet)	0.31 ft³/s	Time to Peak (Flow, Outlet)	13.250 hours

Elevation (Water Surface, Peak)	532.66 ft
Volume (Peak)	0.293 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	1.017 ac-ft
Volume (Total Infiltration)	0.906 ac-ft
Volume (Total Outlet Outflow)	0.080 ac-ft
Volume (Retained)	0.029 ac-ft
Volume (Unrouted)	-0.002 ac-ft
Error (Mass Balance)	0.2 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary — Return Event: 10 years

Label: PW-1 (IN) — Storm Event: 10-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	532.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	19.63 ft³/s	Time to Peak (Flow, In)	12.450 hours
Infiltration (Peak)	2.72 ft³/s	Time to Peak (Infiltration)	13.200 hours
Flow (Peak Outlet)	3.39 ft³/s	Time to Peak (Flow, Outlet)	13.200 hours

Elevation (Water Surface, Peak)	533.84 ft
Volume (Peak)	0.978 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	2.692 ac-ft
Volume (Total Infiltration)	1.774 ac-ft
Volume (Total Outlet Outflow)	0.851 ac-ft
Volume (Retained)	0.063 ac-ft
Volume (Unrouted)	-0.004 ac-ft
Error (Mass Balance)	0.1 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: PW-1 (IN)

Return Event: 25 years
Storm Event: 25-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	532.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	27.36 ft³/s	Time to Peak (Flow, In)	12.450 hours
Infiltration (Peak)	3.29 ft³/s	Time to Peak (Infiltration)	13.100 hours
Flow (Peak Outlet)	6.14 ft³/s	Time to Peak (Flow, Outlet)	13.100 hours

Elevation (Water Surface, Peak)	534.35 ft
Volume (Peak)	1.348 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	3.711 ac-ft
Volume (Total Infiltration)	2.117 ac-ft
Volume (Total Outlet Outflow)	1.505 ac-ft
Volume (Retained)	0.084 ac-ft
Volume (Unrouted)	-0.004 ac-ft
Error (Mass Balance)	0.1 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary | Return Event: 100 years
Label: PW-1 (IN) | Storm Event: 100-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	532.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft^3/s
Flow (Initial Infiltration)	0.00 ft^3/s
Flow (Initial, Total)	0.00 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	39.56 ft^3/s	Time to Peak (Flow, In)	12.450 hours
Infiltration (Peak)	4.19 ft^3/s	Time to Peak (Infiltration)	13.050 hours
Flow (Peak Outlet)	10.91 ft^3/s	Time to Peak (Flow, Outlet)	13.050 hours

Elevation (Water Surface, Peak)	534.97 ft
Volume (Peak)	1.926 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	5.344 ac-ft
Volume (Total Infiltration)	2.596 ac-ft
Volume (Total Outlet Outflow)	2.625 ac-ft
Volume (Retained)	0.120 ac-ft
Volume (Unrouted)	-0.004 ac-ft
Error (Mass Balance)	0.1 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: PW-1 (OUT) Storm Event: 1-yr

Peak Discharge	0.31 ft³/s
Time to Peak	13.250 hours
Hydrograph Volume	0.080 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.800	0.00	0.00	0.00	0.00	0.01
12.050	0.01	0.01	0.02	0.02	0.03
12.300	0.04	0.05	0.07	0.08	0.09
12.550	0.11	0.12	0.13	0.16	0.20
12.800	0.22	0.25	0.26	0.28	0.29
13.050	0.30	0.31	0.31	0.31	0.31
13.300	0.31	0.31	0.31	0.31	0.30
13.550	0.30	0.29	0.29	0.28	0.28
13.800	0.27	0.26	0.26	0.25	0.24
14.050	0.24	0.23	0.22	0.21	0.20
14.300	0.20	0.19	0.18	0.17	0.16
14.550	0.15	0.15	0.14	0.13	0.12
14.800	0.12	0.12	0.12	0.12	0.12
15.050	0.11	0.11	0.11	0.11	0.11
15.300	0.10	0.10	0.10	0.10	0.10
15.550	0.10	0.10	0.09	0.09	0.09
15.800	0.09	0.09	0.09	0.09	0.08
16.050	0.08	0.08	0.08	0.08	0.08
16.300	0.08	0.08	0.07	0.07	0.07
16.550	0.07	0.07	0.07	0.07	0.07
16.800	0.07	0.06	0.06	0.06	0.06
17.050	0.06	0.06	0.06	0.06	0.06
17.300	0.06	0.06	0.06	0.05	0.05
17.550	0.05	0.05	0.05	0.05	0.05
17.800	0.05	0.05	0.05	0.05	0.05
18.050	0.05	0.05	0.05	0.04	0.04
18.300	0.04	0.04	0.04	0.04	0.04
18.550	0.04	0.04	0.04	0.04	0.04
18.800	0.04	0.04	0.04	0.04	0.04
19.050	0.04	0.04	0.04	0.04	0.03
19.300	0.03	0.03	0.03	0.03	0.03
19.550	0.03	0.03	0.03	0.03	0.03
19.800	0.03	0.03	0.03	0.03	0.03
20.050	0.03	0.03	0.03	0.03	0.03
20.300	0.03	0.03	0.03	0.03	0.03
20.550	0.03	0.03	0.03	0.03	0.03
20.800	0.03	0.03	0.03	0.03	0.03

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: PW-1 (OUT) Storm Event: 1-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
21.050	0.03	0.03	0.03	0.03	0.03
21.300	0.03	0.02	0.02	0.02	0.02
21.550	0.02	0.02	0.02	0.02	0.02
21.800	0.02	0.02	0.02	0.02	0.02
22.050	0.02	0.02	0.02	0.02	0.02
22.300	0.02	0.02	0.02	0.02	0.02
22.550	0.02	0.02	0.02	0.02	0.02
22.800	0.02	0.02	0.02	0.02	0.02
23.050	0.02	0.02	0.02	0.02	0.02
23.300	0.02	0.02	0.02	0.02	0.02
23.550	0.02	0.02	0.02	0.02	0.02
23.800	0.02	0.02	0.02	0.02	0.02

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) — Return Event: 10 years
Label: PW-1 (OUT) — Storm Event: 10-yr

Peak Discharge	3.39 ft³/s
Time to Peak	13.200 hours
Hydrograph Volume	0.851 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.350	0.00	0.00	0.00	0.00	0.00
10.600	0.00	0.00	0.00	0.00	0.01
10.850	0.01	0.01	0.01	0.01	0.01
11.100	0.01	0.01	0.01	0.01	0.02
11.350	0.02	0.02	0.02	0.02	0.02
11.600	0.03	0.03	0.03	0.03	0.04
11.850	0.04	0.05	0.06	0.06	0.08
12.100	0.09	0.11	0.16	0.28	0.41
12.350	0.56	0.73	1.02	1.31	1.58
12.600	1.83	2.09	2.37	2.61	2.81
12.850	2.97	3.10	3.20	3.28	3.33
13.100	3.36	3.38	3.39	3.38	3.37
13.350	3.35	3.32	3.28	3.24	3.20
13.600	3.16	3.11	3.06	3.01	2.96
13.850	2.90	2.85	2.80	2.74	2.69
14.100	2.63	2.58	2.52	2.47	2.41
14.350	2.36	2.30	2.25	2.20	2.14
14.600	2.09	2.04	1.99	1.95	1.92
14.850	1.88	1.85	1.81	1.78	1.75
15.100	1.71	1.68	1.65	1.62	1.58
15.350	1.55	1.52	1.49	1.46	1.43
15.600	1.39	1.36	1.33	1.30	1.27
15.850	1.24	1.21	1.18	1.15	1.12
16.100	1.09	1.06	1.03	1.00	0.97
16.350	0.94	0.92	0.89	0.86	0.83
16.600	0.80	0.78	0.75	0.72	0.70
16.850	0.69	0.68	0.66	0.65	0.63
17.100	0.62	0.61	0.59	0.58	0.56
17.350	0.55	0.54	0.52	0.51	0.50
17.600	0.48	0.47	0.46	0.44	0.43
17.850	0.42	0.40	0.39	0.38	0.37
18.100	0.35	0.34	0.33	0.31	0.30
18.350	0.29	0.28	0.27	0.25	0.24
18.600	0.23	0.22	0.21	0.19	0.18
18.850	0.17	0.16	0.15	0.14	0.13
19.100	0.12	0.12	0.12	0.12	0.11
19.350	0.11	0.11	0.11	0.11	0.10

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) | Return Event: 10 years
Label: PW-1 (OUT) | Storm Event: 10-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
19.600	0.10	0.10	0.10	0.10	0.09
19.850	0.09	0.09	0.09	0.09	0.09
20.100	0.09	0.08	0.08	0.08	0.08
20.350	0.08	0.08	0.08	0.08	0.07
20.600	0.07	0.07	0.07	0.07	0.07
20.850	0.07	0.07	0.07	0.07	0.07
21.100	0.06	0.06	0.06	0.06	0.06
21.350	0.06	0.06	0.06	0.06	0.06
21.600	0.06	0.06	0.06	0.06	0.06
21.850	0.06	0.06	0.05	0.05	0.05
22.100	0.05	0.05	0.05	0.05	0.05
22.350	0.05	0.05	0.05	0.05	0.05
22.600	0.05	0.05	0.05	0.05	0.05
22.850	0.05	0.05	0.05	0.05	0.05
23.100	0.05	0.05	0.05	0.04	0.04
23.350	0.04	0.04	0.04	0.04	0.04
23.600	0.04	0.04	0.04	0.04	0.04
23.850	0.04	0.04	0.04	0.04	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: PW-1 (OUT) Storm Event: 25-yr

Peak Discharge	6.14 ft^3/s
Time to Peak	13.100 hours
Hydrograph Volume	1.505 ac-ft

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
9.650	0.00	0.00	0.00	0.00	0.00
9.900	0.00	0.00	0.00	0.00	0.00
10.150	0.01	0.01	0.01	0.01	0.01
10.400	0.01	0.01	0.01	0.01	0.01
10.650	0.01	0.02	0.02	0.02	0.02
10.900	0.02	0.02	0.03	0.03	0.03
11.150	0.03	0.03	0.03	0.04	0.04
11.400	0.04	0.04	0.05	0.05	0.05
11.650	0.06	0.06	0.07	0.07	0.08
11.900	0.09	0.10	0.11	0.14	0.23
12.150	0.35	0.49	0.67	0.99	1.38
12.400	1.79	2.30	2.87	3.40	3.88
12.650	4.36	4.80	5.17	5.46	5.69
12.900	5.87	5.99	6.07	6.12	6.14
13.150	6.13	6.10	6.05	5.99	5.92
13.400	5.84	5.75	5.65	5.55	5.45
13.650	5.35	5.24	5.13	5.03	4.92
13.900	4.81	4.71	4.60	4.50	4.40
14.150	4.30	4.20	4.10	4.01	3.93
14.400	3.85	3.77	3.69	3.62	3.54
14.650	3.47	3.40	3.33	3.25	3.18
14.900	3.12	3.05	2.98	2.92	2.85
15.150	2.79	2.72	2.66	2.60	2.54
15.400	2.48	2.42	2.36	2.31	2.25
15.650	2.19	2.14	2.08	2.03	1.97
15.900	1.94	1.90	1.86	1.83	1.79
16.150	1.75	1.72	1.68	1.65	1.61
16.400	1.58	1.54	1.51	1.47	1.44
16.650	1.40	1.37	1.34	1.30	1.27
16.900	1.24	1.21	1.18	1.14	1.11
17.150	1.08	1.05	1.02	1.00	0.97
17.400	0.94	0.91	0.88	0.85	0.83
17.650	0.80	0.77	0.75	0.72	0.70
17.900	0.69	0.68	0.66	0.65	0.63
18.150	0.62	0.61	0.59	0.58	0.56
18.400	0.55	0.54	0.52	0.51	0.50
18.650	0.48	0.47	0.46	0.45	0.43

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: PW-1 (OUT) Storm Event: 25-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
18.900	0.42	0.41	0.40	0.38	0.37
19.150	0.36	0.35	0.34	0.32	0.31
19.400	0.30	0.29	0.28	0.27	0.26
19.650	0.25	0.23	0.22	0.21	0.20
19.900	0.19	0.18	0.17	0.16	0.15
20.150	0.14	0.13	0.13	0.12	0.12
20.400	0.12	0.12	0.11	0.11	0.11
20.650	0.11	0.11	0.11	0.10	0.10
20.900	0.10	0.10	0.10	0.10	0.09
21.150	0.09	0.09	0.09	0.09	0.09
21.400	0.09	0.09	0.08	0.08	0.08
21.650	0.08	0.08	0.08	0.08	0.08
21.900	0.08	0.08	0.08	0.07	0.07
22.150	0.07	0.07	0.07	0.07	0.07
22.400	0.07	0.07	0.07	0.07	0.07
22.650	0.07	0.07	0.07	0.06	0.06
22.900	0.06	0.06	0.06	0.06	0.06
23.150	0.06	0.06	0.06	0.06	0.06
23.400	0.06	0.06	0.06	0.06	0.06
23.650	0.06	0.06	0.06	0.06	0.05
23.900	0.05	0.05	0.05	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) — Return Event: 100 years
Label: PW-1 (OUT) — Storm Event: 100-yr

Peak Discharge	10.91 ft^3/s
Time to Peak	13.050 hours
Hydrograph Volume	2.625 ac-ft

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
8.750	0.00	0.00	0.00	0.00	0.00
9.000	0.00	0.00	0.00	0.00	0.00
9.250	0.01	0.01	0.01	0.01	0.01
9.500	0.01	0.01	0.01	0.01	0.01
9.750	0.01	0.01	0.02	0.02	0.02
10.000	0.02	0.02	0.02	0.02	0.03
10.250	0.03	0.03	0.03	0.03	0.03
10.500	0.04	0.04	0.04	0.04	0.04
10.750	0.05	0.05	0.05	0.05	0.06
11.000	0.06	0.06	0.07	0.07	0.07
11.250	0.08	0.08	0.08	0.09	0.09
11.500	0.10	0.10	0.11	0.11	0.12
11.750	0.13	0.17	0.21	0.27	0.34
12.000	0.43	0.54	0.69	1.00	1.41
12.250	1.88	2.61	3.43	4.33	5.34
12.500	6.30	7.19	8.04	8.78	9.39
12.750	9.88	10.26	10.54	10.74	10.86
13.000	10.91	10.91	10.87	10.79	10.68
13.250	10.54	10.39	10.22	10.04	9.85
13.500	9.65	9.45	9.25	9.04	8.84
13.750	8.63	8.43	8.23	8.03	7.84
14.000	7.65	7.46	7.27	7.09	6.93
14.250	6.77	6.61	6.46	6.31	6.16
14.500	6.01	5.87	5.73	5.60	5.47
14.750	5.34	5.21	5.09	4.97	4.85
15.000	4.74	4.63	4.52	4.41	4.31
15.250	4.21	4.11	4.02	3.94	3.86
15.500	3.78	3.71	3.63	3.56	3.49
15.750	3.41	3.34	3.27	3.20	3.13
16.000	3.06	2.99	2.93	2.86	2.79
16.250	2.73	2.66	2.60	2.54	2.47
16.500	2.41	2.35	2.29	2.23	2.17
16.750	2.12	2.06	2.01	1.96	1.92
17.000	1.88	1.85	1.81	1.78	1.74
17.250	1.71	1.67	1.64	1.60	1.57
17.500	1.54	1.51	1.47	1.44	1.41
17.750	1.38	1.35	1.31	1.28	1.25

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out)
Label: PW-1 (OUT)

Return Event: 100 years
Storm Event: 100-yr

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
18.000	1.22	1.19	1.16	1.13	1.10
18.250	1.07	1.04	1.02	0.99	0.96
18.500	0.93	0.91	0.88	0.85	0.83
18.750	0.80	0.77	0.75	0.73	0.71
19.000	0.69	0.68	0.67	0.66	0.64
19.250	0.63	0.62	0.61	0.60	0.58
19.500	0.57	0.56	0.55	0.54	0.53
19.750	0.51	0.50	0.49	0.48	0.47
20.000	0.46	0.45	0.44	0.43	0.42
20.250	0.41	0.39	0.38	0.37	0.36
20.500	0.35	0.34	0.33	0.32	0.31
20.750	0.31	0.30	0.29	0.28	0.27
21.000	0.26	0.25	0.24	0.23	0.22
21.250	0.21	0.20	0.20	0.19	0.18
21.500	0.17	0.16	0.15	0.15	0.14
21.750	0.13	0.12	0.12	0.12	0.12
22.000	0.12	0.12	0.11	0.11	0.11
22.250	0.11	0.11	0.11	0.11	0.10
22.500	0.10	0.10	0.10	0.10	0.10
22.750	0.10	0.10	0.09	0.09	0.09
23.000	0.09	0.09	0.09	0.09	0.09
23.250	0.09	0.09	0.08	0.08	0.08
23.500	0.08	0.08	0.08	0.08	0.08
23.750	0.08	0.08	0.08	0.08	0.08
24.000	0.08	(N/A)	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Infiltration Calculations — Return Event: 1 years
Label: PW-2 (IN) — Storm Event: 1-yr

Average Infiltration Rating Table

Elevation (Water Surface) (ft)	Area (Total) (ft^2)	Flow (Infiltration) (ft^3/s)
562.00	13,068.0	0.00
562.50	32,172.1	2.98
563.00	59,739.3	5.53
563.50	95,769.7	8.87
564.00	140,263.2	12.99
564.50	174,940.3	16.20
565.00	213,444.0	19.76

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: PW-2 (IN)

Return Event: 1 years
Storm Event: 1-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	562.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	8.32 ft³/s	Time to Peak (Flow, In)	12.250 hours
Infiltration (Peak)	2.91 ft³/s	Time to Peak (Infiltration)	12.700 hours
Flow (Peak Outlet)	0.07 ft³/s	Time to Peak (Flow, Outlet)	12.700 hours

Elevation (Water Surface, Peak)	562.49 ft
Volume (Peak)	0.243 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	0.990 ac-ft
Volume (Total Infiltration)	0.946 ac-ft
Volume (Total Outlet Outflow)	0.021 ac-ft
Volume (Retained)	0.014 ac-ft
Volume (Unrouted)	-0.009 ac-ft
Error (Mass Balance)	0.9 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary	Return Event: 10 years
Label: PW-2 (IN)	Storm Event: 10-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	562.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	27.97 ft³/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	6.29 ft³/s	Time to Peak (Infiltration)	12.800 hours
Flow (Peak Outlet)	0.53 ft³/s	Time to Peak (Flow, Outlet)	12.800 hours

Elevation (Water Surface, Peak)	563.11 ft
Volume (Peak)	0.937 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	2.824 ac-ft
Volume (Total Infiltration)	2.640 ac-ft
Volume (Total Outlet Outflow)	0.133 ac-ft
Volume (Retained)	0.034 ac-ft
Volume (Unrouted)	-0.017 ac-ft
Error (Mass Balance)	0.6 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: PW-2 (IN)

Return Event: 25 years
Storm Event: 25-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	562.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	40.05 ft³/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	8.15 ft³/s	Time to Peak (Infiltration)	12.800 hours
Flow (Peak Outlet)	0.90 ft³/s	Time to Peak (Flow, Outlet)	12.800 hours

Elevation (Water Surface, Peak)	563.39 ft
Volume (Peak)	1.428 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	3.968 ac-ft
Volume (Total Infiltration)	3.654 ac-ft
Volume (Total Outlet Outflow)	0.247 ac-ft
Volume (Retained)	0.046 ac-ft
Volume (Unrouted)	-0.021 ac-ft
Error (Mass Balance)	0.5 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: PW-2 (IN)

Return Event: 100 years
Storm Event: 100-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	562.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	59.37 ft³/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	10.80 ft³/s	Time to Peak (Infiltration)	12.800 hours
Flow (Peak Outlet)	1.55 ft³/s	Time to Peak (Flow, Outlet)	12.800 hours

Elevation (Water Surface, Peak)	563.73 ft
Volume (Peak)	2.223 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	5.826 ac-ft
Volume (Total Infiltration)	5.260 ac-ft
Volume (Total Outlet Outflow)	0.474 ac-ft
Volume (Retained)	0.067 ac-ft
Volume (Unrouted)	-0.025 ac-ft
Error (Mass Balance)	0.4 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out)   Return Event: 1 years
Label: PW-2 (OUT)   Storm Event: 1-yr

Peak Discharge	0.07 ft³/s
Time to Peak	12.700 hours
Hydrograph Volume	0.021 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.850	0.00	0.00	0.00	0.00	0.01
12.100	0.01	0.02	0.03	0.03	0.04
12.350	0.05	0.05	0.06	0.06	0.06
12.600	0.06	0.06	0.07	0.07	0.06
12.850	0.06	0.06	0.06	0.06	0.06
13.100	0.06	0.06	0.06	0.06	0.06
13.350	0.05	0.05	0.05	0.05	0.05
13.600	0.05	0.05	0.05	0.05	0.05
13.850	0.05	0.05	0.04	0.04	0.04
14.100	0.04	0.04	0.04	0.04	0.04
14.350	0.04	0.04	0.04	0.04	0.04
14.600	0.04	0.04	0.03	0.03	0.03
14.850	0.03	0.03	0.03	0.03	0.03
15.100	0.03	0.03	0.03	0.03	0.03
15.350	0.03	0.03	0.03	0.03	0.03
15.600	0.03	0.03	0.03	0.03	0.03
15.850	0.02	0.02	0.02	0.02	0.02
16.100	0.02	0.02	0.02	0.02	0.02
16.350	0.02	0.02	0.02	0.02	0.02
16.600	0.02	0.02	0.02	0.02	0.02
16.850	0.02	0.02	0.02	0.02	0.02
17.100	0.02	0.02	0.02	0.02	0.02
17.350	0.02	0.02	0.02	0.02	0.02
17.600	0.02	0.02	0.01	0.01	0.01
17.850	0.01	0.01	0.01	0.01	0.01
18.100	0.01	0.01	0.01	0.01	0.01
18.350	0.01	0.01	0.01	0.01	0.01
18.600	0.01	0.01	0.01	0.01	0.01
18.850	0.01	0.01	0.01	0.01	0.01
19.100	0.01	0.01	0.01	0.01	0.01
19.350	0.01	0.01	0.01	0.01	0.01
19.600	0.01	0.01	0.01	0.01	0.01
19.850	0.01	0.01	0.01	0.01	0.01
20.100	0.01	0.01	0.01	0.01	0.01
20.350	0.01	0.01	0.01	0.01	0.01
20.600	0.01	0.01	0.01	0.01	0.01
20.850	0.01	0.01	0.01	0.01	0.01

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: PW-2 (OUT) Storm Event: 1-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
21.100	0.01	0.01	0.01	0.01	0.01
21.350	0.01	0.01	0.01	0.01	0.01
21.600	0.01	0.01	0.01	0.01	0.01
21.850	0.01	0.01	0.01	0.01	0.01
22.100	0.01	0.01	0.01	0.01	0.01
22.350	0.01	0.01	0.01	0.01	0.01
22.600	0.01	0.01	0.01	0.01	0.01
22.850	0.01	0.01	0.01	0.01	0.01
23.100	0.01	0.01	0.01	0.01	0.01
23.350	0.01	0.01	0.01	0.01	0.01
23.600	0.01	0.01	0.01	0.01	0.01
23.850	0.01	0.01	0.01	0.01	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: PW-2 (OUT) Storm Event: 10-yr

Peak Discharge	0.53 ft³/s
Time to Peak	12.800 hours
Hydrograph Volume	0.133 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.750	0.00	0.00	0.00	0.00	0.00
11.000	0.00	0.00	0.00	0.00	0.00
11.250	0.00	0.01	0.01	0.01	0.01
11.500	0.01	0.01	0.01	0.01	0.02
11.750	0.02	0.02	0.03	0.03	0.04
12.000	0.05	0.06	0.10	0.15	0.21
12.250	0.27	0.32	0.36	0.40	0.44
12.500	0.47	0.49	0.51	0.52	0.53
12.750	0.53	0.53	0.53	0.52	0.52
13.000	0.52	0.51	0.50	0.50	0.49
13.250	0.48	0.48	0.47	0.46	0.45
13.500	0.44	0.44	0.43	0.42	0.41
13.750	0.40	0.40	0.39	0.38	0.37
14.000	0.37	0.36	0.35	0.35	0.34
14.250	0.33	0.33	0.32	0.31	0.31
14.500	0.30	0.30	0.29	0.28	0.28
14.750	0.27	0.27	0.26	0.25	0.25
15.000	0.24	0.24	0.23	0.23	0.22
15.250	0.22	0.21	0.21	0.20	0.19
15.500	0.19	0.18	0.18	0.17	0.17
15.750	0.16	0.16	0.15	0.15	0.14
16.000	0.14	0.13	0.13	0.13	0.12
16.250	0.12	0.11	0.11	0.10	0.10
16.500	0.09	0.09	0.08	0.08	0.08
16.750	0.07	0.07	0.07	0.06	0.06
17.000	0.06	0.06	0.06	0.06	0.06
17.250	0.05	0.05	0.05	0.05	0.05
17.500	0.05	0.05	0.05	0.05	0.04
17.750	0.04	0.04	0.04	0.04	0.04
18.000	0.04	0.04	0.04	0.04	0.04
18.250	0.04	0.03	0.03	0.03	0.03
18.500	0.03	0.03	0.03	0.03	0.03
18.750	0.03	0.03	0.03	0.03	0.03
19.000	0.03	0.03	0.03	0.03	0.03
19.250	0.03	0.03	0.03	0.03	0.03
19.500	0.03	0.02	0.02	0.02	0.02
19.750	0.02	0.02	0.02	0.02	0.02

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: PW-2 (OUT) Storm Event: 10-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
20.000	0.02	0.02	0.02	0.02	0.02
20.250	0.02	0.02	0.02	0.02	0.02
20.500	0.02	0.02	0.02	0.02	0.02
20.750	0.02	0.02	0.02	0.02	0.02
21.000	0.02	0.02	0.02	0.02	0.02
21.250	0.02	0.02	0.02	0.02	0.02
21.500	0.02	0.02	0.02	0.02	0.02
21.750	0.02	0.02	0.02	0.02	0.02
22.000	0.02	0.02	0.02	0.02	0.02
22.250	0.02	0.02	0.02	0.02	0.02
22.500	0.02	0.02	0.02	0.02	0.02
22.750	0.02	0.02	0.02	0.02	0.02
23.000	0.02	0.02	0.02	0.02	0.02
23.250	0.02	0.02	0.02	0.02	0.02
23.500	0.02	0.02	0.01	0.01	0.01
23.750	0.01	0.01	0.01	0.01	0.01
24.000	0.01	(N/A)	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: PW-2 (OUT) Storm Event: 25-yr

Peak Discharge	0.90 ft³/s
Time to Peak	12.800 hours
Hydrograph Volume	0.247 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.100	0.00	0.00	0.00	0.00	0.00
10.350	0.00	0.00	0.00	0.00	0.00
10.600	0.00	0.01	0.01	0.01	0.01
10.850	0.01	0.01	0.01	0.01	0.01
11.100	0.01	0.01	0.01	0.01	0.02
11.350	0.02	0.02	0.02	0.02	0.02
11.600	0.03	0.03	0.03	0.04	0.04
11.850	0.05	0.06	0.07	0.11	0.16
12.100	0.22	0.30	0.38	0.48	0.57
12.350	0.65	0.71	0.77	0.81	0.84
12.600	0.87	0.88	0.89	0.90	0.90
12.850	0.90	0.89	0.89	0.88	0.87
13.100	0.87	0.86	0.85	0.84	0.83
13.350	0.82	0.81	0.80	0.79	0.78
13.600	0.77	0.76	0.75	0.74	0.73
13.850	0.71	0.70	0.69	0.68	0.67
14.100	0.66	0.65	0.64	0.63	0.62
14.350	0.60	0.59	0.58	0.57	0.56
14.600	0.55	0.54	0.53	0.52	0.51
14.850	0.50	0.49	0.48	0.47	0.46
15.100	0.45	0.44	0.43	0.42	0.41
15.350	0.40	0.39	0.38	0.37	0.36
15.600	0.36	0.35	0.34	0.33	0.33
15.850	0.32	0.31	0.30	0.30	0.29
16.100	0.28	0.28	0.27	0.26	0.26
16.350	0.25	0.24	0.24	0.23	0.22
16.600	0.22	0.21	0.21	0.20	0.19
16.850	0.19	0.18	0.18	0.17	0.17
17.100	0.16	0.16	0.15	0.15	0.14
17.350	0.14	0.13	0.13	0.12	0.12
17.600	0.11	0.11	0.10	0.10	0.09
17.850	0.09	0.09	0.08	0.08	0.07
18.100	0.07	0.07	0.06	0.06	0.06
18.350	0.06	0.06	0.06	0.05	0.05
18.600	0.05	0.05	0.05	0.05	0.05
18.850	0.05	0.05	0.05	0.04	0.04
19.100	0.04	0.04	0.04	0.04	0.04

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: PW-2 (OUT) Storm Event: 25-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
19.350	0.04	0.04	0.04	0.04	0.04
19.600	0.04	0.04	0.04	0.03	0.03
19.850	0.03	0.03	0.03	0.03	0.03
20.100	0.03	0.03	0.03	0.03	0.03
20.350	0.03	0.03	0.03	0.03	0.03
20.600	0.03	0.03	0.03	0.03	0.03
20.850	0.03	0.03	0.03	0.03	0.03
21.100	0.03	0.03	0.03	0.03	0.03
21.350	0.03	0.03	0.03	0.02	0.02
21.600	0.02	0.02	0.02	0.02	0.02
21.850	0.02	0.02	0.02	0.02	0.02
22.100	0.02	0.02	0.02	0.02	0.02
22.350	0.02	0.02	0.02	0.02	0.02
22.600	0.02	0.02	0.02	0.02	0.02
22.850	0.02	0.02	0.02	0.02	0.02
23.100	0.02	0.02	0.02	0.02	0.02
23.350	0.02	0.02	0.02	0.02	0.02
23.600	0.02	0.02	0.02	0.02	0.02
23.850	0.02	0.02	0.02	0.02	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: PW-2 (OUT) Storm Event: 100-yr

Peak Discharge	1.55 ft³/s
Time to Peak	12.800 hours
Hydrograph Volume	0.474 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
9.250	0.00	0.00	0.00	0.00	0.00
9.500	0.00	0.00	0.00	0.00	0.00
9.750	0.00	0.00	0.01	0.01	0.01
10.000	0.01	0.01	0.01	0.01	0.01
10.250	0.01	0.01	0.01	0.01	0.01
10.500	0.01	0.02	0.02	0.02	0.02
10.750	0.02	0.02	0.02	0.02	0.02
11.000	0.03	0.03	0.03	0.03	0.03
11.250	0.03	0.04	0.04	0.04	0.04
11.500	0.05	0.05	0.05	0.06	0.06
11.750	0.07	0.09	0.12	0.15	0.20
12.000	0.25	0.33	0.44	0.59	0.75
12.250	0.90	1.03	1.16	1.26	1.34
12.500	1.41	1.46	1.50	1.53	1.54
12.750	1.55	1.55	1.55	1.55	1.54
13.000	1.53	1.52	1.51	1.50	1.49
13.250	1.47	1.46	1.45	1.43	1.41
13.500	1.40	1.38	1.37	1.35	1.34
13.750	1.32	1.30	1.29	1.27	1.25
14.000	1.24	1.22	1.20	1.19	1.17
14.250	1.15	1.13	1.12	1.10	1.08
14.500	1.07	1.05	1.03	1.02	1.00
14.750	0.99	0.97	0.96	0.94	0.93
15.000	0.91	0.90	0.88	0.87	0.85
15.250	0.84	0.83	0.81	0.80	0.78
15.500	0.77	0.76	0.74	0.73	0.71
15.750	0.70	0.69	0.67	0.66	0.65
16.000	0.63	0.62	0.61	0.59	0.58
16.250	0.57	0.55	0.54	0.53	0.52
16.500	0.51	0.49	0.48	0.47	0.46
16.750	0.45	0.43	0.42	0.41	0.40
17.000	0.39	0.38	0.37	0.36	0.35
17.250	0.35	0.34	0.33	0.32	0.31
17.500	0.31	0.30	0.29	0.28	0.28
17.750	0.27	0.26	0.26	0.25	0.24
18.000	0.24	0.23	0.22	0.22	0.21
18.250	0.20	0.20	0.19	0.19	0.18

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: PW-2 (OUT) Storm Event: 100-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
18.500	0.17	0.17	0.16	0.16	0.15
18.750	0.15	0.14	0.14	0.13	0.13
19.000	0.12	0.12	0.11	0.11	0.11
19.250	0.10	0.10	0.09	0.09	0.09
19.500	0.08	0.08	0.07	0.07	0.07
19.750	0.07	0.06	0.06	0.06	0.06
20.000	0.06	0.06	0.06	0.05	0.05
20.250	0.05	0.05	0.05	0.05	0.05
20.500	0.05	0.05	0.05	0.05	0.05
20.750	0.04	0.04	0.04	0.04	0.04
21.000	0.04	0.04	0.04	0.04	0.04
21.250	0.04	0.04	0.04	0.04	0.04
21.500	0.04	0.04	0.04	0.04	0.04
21.750	0.04	0.03	0.03	0.03	0.03
22.000	0.03	0.03	0.03	0.03	0.03
22.250	0.03	0.03	0.03	0.03	0.03
22.500	0.03	0.03	0.03	0.03	0.03
22.750	0.03	0.03	0.03	0.03	0.03
23.000	0.03	0.03	0.03	0.03	0.03
23.250	0.03	0.03	0.03	0.03	0.03
23.500	0.03	0.03	0.03	0.03	0.03
23.750	0.03	0.03	0.03	0.03	0.03
24.000	0.03	(N/A)	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Elevation-Volume-Flow Table (Pond)
Label: SSSM#1

Return Event: 1 years
Storm Event: 1-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	345.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
345.00	0.00	0.000	0.000	0.00	0.00	0.00
345.50	0.36	0.106	0.332	1.34	1.70	52.80
346.00	0.82	0.289	0.479	1.93	2.75	142.53
346.50	1.10	0.512	0.599	2.42	3.51	251.22
347.00	1.32	0.758	0.707	2.85	4.17	370.88
347.50	1.51	1.014	0.811	3.27	4.78	495.66
348.00	1.68	1.271	0.915	3.69	5.37	620.41
348.50	1.83	1.517	1.024	4.13	5.96	740.00
349.00	1.98	1.740	1.144	4.61	6.59	848.56
349.50	2.11	1.923	1.290	5.20	7.31	937.97
350.00	2.23	2.028	1.623	6.54	8.78	990.53

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: SSSM#1 (IN)

Return Event: 1 years
Storm Event: 1-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	345.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	20.75 ft³/s	Time to Peak (Flow, In)	12.150 hours
Infiltration (Peak)	2.96 ft³/s	Time to Peak (Infiltration)	12.750 hours
Flow (Peak Outlet)	1.37 ft³/s	Time to Peak (Flow, Outlet)	12.750 hours

Elevation (Water Surface, Peak)	347.13 ft
Volume (Peak)	0.822 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	2.185 ac-ft
Volume (Total Infiltration)	1.570 ac-ft
Volume (Total Outlet Outflow)	0.598 ac-ft
Volume (Retained)	0.017 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: SSSM#1 (IN)

Return Event: 10 years
Storm Event: 10-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	345.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	34.52 ft³/s	Time to Peak (Flow, In)	12.150 hours
Infiltration (Peak)	4.13 ft³/s	Time to Peak (Infiltration)	12.800 hours
Flow (Peak Outlet)	1.83 ft³/s	Time to Peak (Flow, Outlet)	12.800 hours

Elevation (Water Surface, Peak)	348.50 ft
Volume (Peak)	1.516 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	3.737 ac-ft
Volume (Total Infiltration)	2.643 ac-ft
Volume (Total Outlet Outflow)	1.065 ac-ft
Volume (Retained)	0.028 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary — Return Event: 25 years
Label: SSSM#1 (IN) — Storm Event: 25-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	345.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft^3/s
Flow (Initial Infiltration)	0.00 ft^3/s
Flow (Initial, Total)	0.00 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	41.70 ft^3/s	Time to Peak (Flow, In)	12.150 hours
Infiltration (Peak)	5.09 ft^3/s	Time to Peak (Infiltration)	12.800 hours
Flow (Peak Outlet)	2.08 ft^3/s	Time to Peak (Flow, Outlet)	12.800 hours

Elevation (Water Surface, Peak)	349.40 ft
Volume (Peak)	1.887 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	4.557 ac-ft
Volume (Total Infiltration)	3.220 ac-ft
Volume (Total Outlet Outflow)	1.302 ac-ft
Volume (Retained)	0.034 ac-ft
Volume (Unrouted)	-0.001 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: SSSM#1 (OUT) Storm Event: 1-yr

Peak Discharge	1.37 ft³/s
Time to Peak	12.750 hours
Hydrograph Volume	0.598 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
3.200	0.00	0.00	0.00	0.00	0.00
3.450	0.00	0.00	0.00	0.00	0.00
3.700	0.00	0.00	0.01	0.01	0.01
3.950	0.01	0.01	0.01	0.01	0.01
4.200	0.01	0.01	0.01	0.01	0.01
4.450	0.01	0.01	0.01	0.01	0.01
4.700	0.02	0.02	0.02	0.02	0.02
4.950	0.02	0.02	0.02	0.02	0.02
5.200	0.02	0.02	0.02	0.02	0.02
5.450	0.03	0.03	0.03	0.03	0.03
5.700	0.03	0.03	0.03	0.03	0.03
5.950	0.03	0.03	0.03	0.03	0.03
6.200	0.04	0.04	0.04	0.04	0.04
6.450	0.04	0.04	0.04	0.04	0.04
6.700	0.04	0.05	0.05	0.05	0.05
6.950	0.05	0.05	0.05	0.05	0.05
7.200	0.06	0.06	0.06	0.06	0.06
7.450	0.06	0.06	0.07	0.07	0.07
7.700	0.07	0.07	0.07	0.07	0.08
7.950	0.08	0.08	0.08	0.08	0.08
8.200	0.08	0.09	0.09	0.09	0.09
8.450	0.09	0.10	0.10	0.10	0.10
8.700	0.11	0.11	0.11	0.11	0.12
8.950	0.12	0.12	0.12	0.13	0.13
9.200	0.13	0.14	0.14	0.14	0.15
9.450	0.15	0.15	0.16	0.16	0.16
9.700	0.17	0.17	0.17	0.18	0.18
9.950	0.18	0.19	0.19	0.19	0.20
10.200	0.20	0.21	0.21	0.21	0.22
10.450	0.22	0.23	0.23	0.24	0.24
10.700	0.25	0.26	0.26	0.27	0.27
10.950	0.28	0.29	0.29	0.30	0.31
11.200	0.31	0.32	0.33	0.34	0.35
11.450	0.36	0.37	0.39	0.40	0.42
11.700	0.44	0.47	0.51	0.55	0.61
11.950	0.69	0.78	0.86	0.93	1.02
12.200	1.10	1.16	1.21	1.26	1.29

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: SSSM#1 (OUT) Storm Event: 1-yr

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
12.450	1.32	1.34	1.35	1.36	1.36
12.700	1.37	1.37	1.37	1.36	1.36
12.950	1.36	1.35	1.35	1.34	1.34
13.200	1.33	1.32	1.32	1.31	1.30
13.450	1.30	1.29	1.28	1.27	1.26
13.700	1.26	1.25	1.24	1.23	1.22
13.950	1.22	1.21	1.20	1.19	1.18
14.200	1.17	1.16	1.16	1.15	1.14
14.450	1.13	1.12	1.11	1.11	1.10
14.700	1.09	1.08	1.07	1.06	1.05
14.950	1.03	1.02	1.01	1.00	0.99
15.200	0.98	0.97	0.96	0.95	0.94
15.450	0.93	0.92	0.91	0.90	0.89
15.700	0.88	0.87	0.86	0.85	0.84
15.950	0.83	0.82	0.80	0.78	0.76
16.200	0.75	0.73	0.71	0.69	0.68
16.450	0.66	0.64	0.63	0.61	0.59
16.700	0.58	0.56	0.55	0.53	0.52
16.950	0.50	0.49	0.48	0.46	0.45
17.200	0.44	0.43	0.41	0.40	0.39
17.450	0.38	0.36	0.35	0.34	0.32
17.700	0.31	0.30	0.28	0.27	0.26
17.950	0.25	0.24	0.24	0.23	0.22
18.200	0.21	0.21	0.20	0.19	0.19
18.450	0.18	0.18	0.17	0.17	0.16
18.700	0.16	0.15	0.15	0.15	0.14
18.950	0.14	0.14	0.14	0.13	0.13
19.200	0.13	0.13	0.12	0.12	0.12
19.450	0.12	0.12	0.11	0.11	0.11
19.700	0.11	0.11	0.11	0.11	0.11
19.950	0.10	0.10	0.10	0.10	0.10
20.200	0.10	0.10	0.10	0.10	0.10
20.450	0.09	0.09	0.09	0.09	0.09
20.700	0.09	0.09	0.09	0.09	0.09
20.950	0.09	0.09	0.09	0.09	0.09
21.200	0.09	0.08	0.08	0.08	0.08
21.450	0.08	0.08	0.08	0.08	0.08
21.700	0.08	0.08	0.08	0.08	0.08
21.950	0.08	0.08	0.08	0.08	0.08
22.200	0.08	0.08	0.08	0.07	0.07
22.450	0.07	0.07	0.07	0.07	0.07
22.700	0.07	0.07	0.07	0.07	0.07

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out)
Label: SSSM#1 (OUT)

Return Event: 1 years
Storm Event: 1-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
22.950	0.07	0.07	0.07	0.07	0.07
23.200	0.07	0.07	0.07	0.07	0.07
23.450	0.07	0.07	0.07	0.07	0.06
23.700	0.06	0.06	0.06	0.06	0.06
23.950	0.06	0.06	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) — Return Event: 10 years
Label: SSSM#1 (OUT) — Storm Event: 10-yr

Peak Discharge	1.83 ft³/s
Time to Peak	12.800 hours
Hydrograph Volume	1.065 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2.100	0.00	0.00	0.00	0.00	0.00
2.350	0.00	0.00	0.00	0.01	0.01
2.600	0.01	0.01	0.01	0.01	0.01
2.850	0.01	0.01	0.01	0.01	0.01
3.100	0.02	0.02	0.02	0.02	0.02
3.350	0.02	0.02	0.02	0.02	0.03
3.600	0.03	0.03	0.03	0.03	0.03
3.850	0.03	0.03	0.03	0.04	0.04
4.100	0.04	0.04	0.04	0.04	0.04
4.350	0.04	0.05	0.05	0.05	0.05
4.600	0.05	0.05	0.05	0.05	0.06
4.850	0.06	0.06	0.06	0.06	0.06
5.100	0.06	0.06	0.07	0.07	0.07
5.350	0.07	0.07	0.07	0.07	0.07
5.600	0.08	0.08	0.08	0.08	0.08
5.850	0.08	0.08	0.08	0.09	0.09
6.100	0.09	0.09	0.09	0.09	0.09
6.350	0.09	0.10	0.10	0.10	0.10
6.600	0.10	0.10	0.11	0.11	0.11
6.850	0.11	0.11	0.12	0.12	0.12
7.100	0.12	0.12	0.13	0.13	0.13
7.350	0.13	0.14	0.14	0.14	0.14
7.600	0.15	0.15	0.15	0.15	0.16
7.850	0.16	0.16	0.16	0.17	0.17
8.100	0.17	0.17	0.18	0.18	0.18
8.350	0.19	0.19	0.19	0.20	0.20
8.600	0.21	0.21	0.21	0.22	0.22
8.850	0.23	0.23	0.24	0.24	0.25
9.100	0.25	0.26	0.26	0.27	0.27
9.350	0.28	0.28	0.29	0.29	0.30
9.600	0.30	0.31	0.32	0.32	0.33
9.850	0.33	0.34	0.35	0.35	0.36
10.100	0.36	0.37	0.37	0.38	0.38
10.350	0.39	0.40	0.40	0.41	0.42
10.600	0.43	0.44	0.44	0.45	0.46
10.850	0.47	0.49	0.50	0.51	0.52
11.100	0.53	0.54	0.56	0.57	0.59

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: SSSM#1 (OUT) Storm Event: 10-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
11.350	0.61	0.63	0.65	0.67	0.70
11.600	0.73	0.76	0.80	0.84	0.88
11.850	0.92	0.97	1.03	1.11	1.18
12.100	1.28	1.37	1.47	1.55	1.61
12.350	1.67	1.71	1.75	1.78	1.80
12.600	1.81	1.82	1.83	1.83	1.83
12.850	1.83	1.83	1.83	1.83	1.82
13.100	1.82	1.81	1.81	1.80	1.80
13.350	1.79	1.78	1.78	1.77	1.77
13.600	1.76	1.75	1.75	1.74	1.73
13.850	1.72	1.72	1.71	1.70	1.70
14.100	1.69	1.68	1.67	1.67	1.66
14.350	1.65	1.64	1.63	1.63	1.62
14.600	1.61	1.60	1.59	1.58	1.58
14.850	1.57	1.56	1.55	1.54	1.54
15.100	1.53	1.52	1.51	1.50	1.49
15.350	1.49	1.48	1.47	1.46	1.45
15.600	1.44	1.43	1.42	1.41	1.40
15.850	1.40	1.39	1.38	1.37	1.36
16.100	1.35	1.34	1.33	1.32	1.31
16.350	1.30	1.29	1.28	1.27	1.26
16.600	1.25	1.24	1.23	1.22	1.21
16.850	1.20	1.19	1.18	1.17	1.16
17.100	1.15	1.14	1.13	1.12	1.11
17.350	1.10	1.09	1.08	1.07	1.05
17.600	1.04	1.03	1.02	1.00	0.99
17.850	0.98	0.97	0.96	0.95	0.94
18.100	0.92	0.91	0.90	0.89	0.88
18.350	0.87	0.86	0.85	0.84	0.83
18.600	0.81	0.79	0.77	0.75	0.74
18.850	0.72	0.70	0.68	0.66	0.65
19.100	0.63	0.61	0.60	0.58	0.57
19.350	0.55	0.54	0.52	0.51	0.50
19.600	0.48	0.47	0.46	0.44	0.43
19.850	0.42	0.41	0.40	0.38	0.37
20.100	0.36	0.35	0.33	0.32	0.31
20.350	0.30	0.29	0.28	0.27	0.26
20.600	0.25	0.24	0.24	0.23	0.22
20.850	0.22	0.21	0.21	0.20	0.20
21.100	0.19	0.19	0.18	0.18	0.18
21.350	0.17	0.17	0.17	0.16	0.16
21.600	0.16	0.16	0.15	0.15	0.15

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) | Return Event: 10 years
Label: SSSM#1 (OUT) | Storm Event: 10-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
21.850	0.15	0.15	0.14	0.14	0.14
22.100	0.14	0.14	0.14	0.13	0.13
22.350	0.13	0.13	0.13	0.13	0.13
22.600	0.13	0.12	0.12	0.12	0.12
22.850	0.12	0.12	0.12	0.12	0.12
23.100	0.12	0.12	0.11	0.11	0.11
23.350	0.11	0.11	0.11	0.11	0.11
23.600	0.11	0.11	0.11	0.11	0.11
23.850	0.10	0.10	0.10	0.10	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: SSSM#1 (OUT) Storm Event: 25-yr

Peak Discharge	2.08 ft^3/s
Time to Peak	12.800 hours
Hydrograph Volume	1.302 ac-ft

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
1.750	0.00	0.00	0.00	0.00	0.00
2.000	0.00	0.00	0.00	0.01	0.01
2.250	0.01	0.01	0.01	0.01	0.01
2.500	0.01	0.01	0.02	0.02	0.02
2.750	0.02	0.02	0.02	0.02	0.02
3.000	0.03	0.03	0.03	0.03	0.03
3.250	0.03	0.03	0.04	0.04	0.04
3.500	0.04	0.04	0.04	0.04	0.05
3.750	0.05	0.05	0.05	0.05	0.05
4.000	0.05	0.06	0.06	0.06	0.06
4.250	0.06	0.06	0.07	0.07	0.07
4.500	0.07	0.07	0.07	0.07	0.08
4.750	0.08	0.08	0.08	0.08	0.08
5.000	0.09	0.09	0.09	0.09	0.09
5.250	0.09	0.09	0.10	0.10	0.10
5.500	0.10	0.10	0.10	0.11	0.11
5.750	0.11	0.11	0.11	0.11	0.11
6.000	0.12	0.12	0.12	0.12	0.12
6.250	0.12	0.13	0.13	0.13	0.13
6.500	0.13	0.13	0.14	0.14	0.14
6.750	0.14	0.15	0.15	0.15	0.15
7.000	0.16	0.16	0.16	0.16	0.17
7.250	0.17	0.17	0.18	0.18	0.18
7.500	0.18	0.19	0.19	0.19	0.20
7.750	0.20	0.20	0.21	0.21	0.21
8.000	0.21	0.22	0.22	0.22	0.23
8.250	0.23	0.24	0.24	0.24	0.25
8.500	0.25	0.26	0.26	0.27	0.27
8.750	0.28	0.28	0.29	0.29	0.30
9.000	0.30	0.31	0.32	0.32	0.33
9.250	0.34	0.34	0.35	0.35	0.36
9.500	0.37	0.37	0.38	0.38	0.39
9.750	0.40	0.40	0.41	0.41	0.42
10.000	0.43	0.44	0.44	0.45	0.46
10.250	0.47	0.48	0.49	0.50	0.51
10.500	0.52	0.53	0.54	0.55	0.57
10.750	0.58	0.59	0.61	0.62	0.64

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: SSSM#1 (OUT) Storm Event: 25-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
11.000	0.65	0.67	0.68	0.70	0.72
11.250	0.74	0.76	0.78	0.81	0.83
11.500	0.84	0.86	0.88	0.90	0.93
11.750	0.96	1.00	1.06	1.11	1.17
12.000	1.25	1.33	1.43	1.53	1.64
12.250	1.73	1.80	1.87	1.92	1.96
12.500	2.00	2.03	2.05	2.07	2.08
12.750	2.08	2.08	2.08	2.08	2.08
13.000	2.07	2.07	2.06	2.06	2.05
13.250	2.04	2.03	2.02	2.02	2.01
13.500	2.00	1.99	1.98	1.97	1.97
13.750	1.96	1.95	1.94	1.94	1.93
14.000	1.92	1.91	1.90	1.89	1.89
14.250	1.88	1.87	1.86	1.85	1.84
14.500	1.83	1.83	1.82	1.81	1.80
14.750	1.79	1.78	1.77	1.77	1.76
15.000	1.75	1.74	1.73	1.72	1.72
15.250	1.71	1.70	1.69	1.68	1.67
15.500	1.66	1.65	1.65	1.64	1.63
15.750	1.62	1.61	1.60	1.59	1.58
16.000	1.57	1.56	1.55	1.55	1.54
16.250	1.53	1.52	1.51	1.50	1.49
16.500	1.48	1.47	1.46	1.45	1.44
16.750	1.43	1.42	1.41	1.40	1.39
17.000	1.38	1.37	1.36	1.36	1.35
17.250	1.34	1.33	1.32	1.31	1.30
17.500	1.29	1.27	1.26	1.25	1.24
17.750	1.23	1.22	1.21	1.20	1.19
18.000	1.18	1.17	1.16	1.15	1.14
18.250	1.13	1.12	1.11	1.10	1.09
18.500	1.07	1.06	1.05	1.04	1.02
18.750	1.01	1.00	0.99	0.98	0.97
19.000	0.95	0.94	0.93	0.92	0.91
19.250	0.90	0.89	0.88	0.87	0.86
19.500	0.85	0.84	0.83	0.81	0.79
19.750	0.78	0.76	0.74	0.72	0.70
20.000	0.69	0.67	0.65	0.64	0.62
20.250	0.60	0.59	0.57	0.56	0.55
20.500	0.53	0.52	0.50	0.49	0.48
20.750	0.47	0.45	0.44	0.43	0.42
21.000	0.41	0.40	0.39	0.37	0.36
21.250	0.35	0.34	0.33	0.31	0.30

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) — Return Event: 25 years
Label: SSSM#1 (OUT) — Storm Event: 25-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
21.500	0.29	0.28	0.27	0.27	0.26
21.750	0.25	0.24	0.24	0.23	0.23
22.000	0.22	0.21	0.21	0.21	0.20
22.250	0.20	0.19	0.19	0.19	0.18
22.500	0.18	0.18	0.17	0.17	0.17
22.750	0.17	0.16	0.16	0.16	0.16
23.000	0.15	0.15	0.15	0.15	0.15
23.250	0.15	0.14	0.14	0.14	0.14
23.500	0.14	0.14	0.14	0.13	0.13
23.750	0.13	0.13	0.13	0.13	0.13
24.000	0.13	(N/A)	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: SSSM#1 (OUT) Storm Event: 100-yr

Peak Discharge	2.23 ft^3/s
Time to Peak	13.700 hours
Hydrograph Volume	1.630 ac-ft

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
1.450	0.00	0.00	0.00	0.00	0.00
1.700	0.00	0.01	0.01	0.01	0.01
1.950	0.01	0.01	0.01	0.02	0.02
2.200	0.02	0.02	0.02	0.02	0.02
2.450	0.03	0.03	0.03	0.03	0.03
2.700	0.04	0.04	0.04	0.04	0.04
2.950	0.04	0.05	0.05	0.05	0.05
3.200	0.05	0.06	0.06	0.06	0.06
3.450	0.06	0.07	0.07	0.07	0.07
3.700	0.07	0.08	0.08	0.08	0.08
3.950	0.08	0.09	0.09	0.09	0.09
4.200	0.09	0.10	0.10	0.10	0.10
4.450	0.10	0.11	0.11	0.11	0.11
4.700	0.11	0.12	0.12	0.12	0.12
4.950	0.12	0.13	0.13	0.13	0.13
5.200	0.13	0.14	0.14	0.14	0.14
5.450	0.14	0.14	0.15	0.15	0.15
5.700	0.15	0.15	0.16	0.16	0.16
5.950	0.16	0.16	0.17	0.17	0.17
6.200	0.17	0.17	0.17	0.18	0.18
6.450	0.18	0.18	0.19	0.19	0.19
6.700	0.19	0.20	0.20	0.20	0.21
6.950	0.21	0.21	0.22	0.22	0.22
7.200	0.23	0.23	0.23	0.24	0.24
7.450	0.24	0.25	0.25	0.26	0.26
7.700	0.26	0.27	0.27	0.28	0.28
7.950	0.28	0.29	0.29	0.30	0.30
8.200	0.30	0.31	0.31	0.32	0.32
8.450	0.33	0.33	0.34	0.35	0.35
8.700	0.36	0.36	0.37	0.38	0.38
8.950	0.39	0.39	0.40	0.41	0.41
9.200	0.42	0.43	0.44	0.45	0.45
9.450	0.46	0.47	0.48	0.49	0.50
9.700	0.51	0.52	0.53	0.54	0.55
9.950	0.56	0.58	0.59	0.60	0.61
10.200	0.62	0.64	0.65	0.66	0.68
10.450	0.69	0.71	0.72	0.74	0.76

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: SSSM#1 (OUT) Storm Event: 100-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
10.700	0.77	0.79	0.81	0.83	0.84
10.950	0.85	0.86	0.87	0.88	0.89
11.200	0.90	0.92	0.93	0.95	0.96
11.450	0.98	1.00	1.02	1.05	1.08
11.700	1.11	1.14	1.18	1.23	1.30
11.950	1.36	1.44	1.53	1.64	1.76
12.200	1.88	2.00	2.11	2.23	2.23
12.450	2.23	2.23	2.23	2.23	2.23
12.700	2.23	2.23	2.23	2.23	2.23
12.950	2.23	2.23	2.23	2.23	2.23
13.200	2.23	2.23	2.23	2.23	2.23
13.450	2.23	2.23	2.23	2.23	2.23
13.700	2.23	2.23	2.23	2.23	2.23
13.950	2.23	2.23	2.23	2.23	2.23
14.200	2.23	2.23	2.23	2.23	2.23
14.450	2.23	2.22	2.20	2.17	2.15
14.700	2.13	2.11	2.10	2.08	2.07
14.950	2.06	2.05	2.04	2.02	2.01
15.200	2.00	1.99	1.98	1.97	1.96
15.450	1.95	1.94	1.93	1.92	1.91
15.700	1.90	1.89	1.88	1.86	1.85
15.950	1.84	1.83	1.82	1.81	1.80
16.200	1.79	1.78	1.77	1.76	1.75
16.450	1.75	1.74	1.73	1.72	1.71
16.700	1.70	1.69	1.68	1.67	1.66
16.950	1.65	1.64	1.63	1.62	1.61
17.200	1.60	1.59	1.58	1.57	1.56
17.450	1.55	1.54	1.53	1.52	1.51
17.700	1.50	1.49	1.48	1.47	1.46
17.950	1.45	1.44	1.43	1.42	1.41
18.200	1.40	1.39	1.38	1.37	1.36
18.450	1.35	1.34	1.33	1.32	1.31
18.700	1.30	1.29	1.28	1.27	1.26
18.950	1.25	1.24	1.23	1.22	1.21
19.200	1.20	1.19	1.18	1.17	1.16
19.450	1.15	1.14	1.13	1.12	1.11
19.700	1.10	1.09	1.07	1.06	1.05
19.950	1.04	1.03	1.01	1.00	0.99
20.200	0.98	0.97	0.96	0.95	0.94
20.450	0.93	0.92	0.91	0.90	0.89
20.700	0.88	0.87	0.86	0.85	0.84
20.950	0.83	0.81	0.79	0.78	0.76

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: SSSM#1 (OUT) Storm Event: 100-yr

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
21.200	0.74	0.72	0.71	0.69	0.67
21.450	0.66	0.64	0.63	0.61	0.60
21.700	0.58	0.57	0.56	0.54	0.53
21.950	0.52	0.50	0.49	0.48	0.47
22.200	0.46	0.44	0.43	0.42	0.41
22.450	0.40	0.39	0.38	0.37	0.36
22.700	0.35	0.33	0.32	0.31	0.30
22.950	0.29	0.29	0.28	0.27	0.26
23.200	0.25	0.25	0.24	0.24	0.23
23.450	0.23	0.22	0.22	0.21	0.21
23.700	0.20	0.20	0.20	0.19	0.19
23.950	0.19	0.18	(N/A)	(N/A)	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary — Return Event: 1 years
Label: SSSM#2 (IN) — Storm Event: 1-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	348.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	10.91 ft³/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	1.69 ft³/s	Time to Peak (Infiltration)	12.750 hours
Flow (Peak Outlet)	0.52 ft³/s	Time to Peak (Flow, Outlet)	12.750 hours

Elevation (Water Surface, Peak)	349.84 ft
Volume (Peak)	0.423 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	1.101 ac-ft
Volume (Total Infiltration)	0.841 ac-ft
Volume (Total Outlet Outflow)	0.251 ac-ft
Volume (Retained)	0.009 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary — Return Event: 10 years
Label: SSSM#2 (IN) — Storm Event: 10-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	348.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	18.94 ft³/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	2.36 ft³/s	Time to Peak (Infiltration)	12.850 hours
Flow (Peak Outlet)	0.70 ft³/s	Time to Peak (Flow, Outlet)	12.850 hours

Elevation (Water Surface, Peak)	351.12 ft
Volume (Peak)	0.826 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	1.975 ac-ft
Volume (Total Infiltration)	1.508 ac-ft
Volume (Total Outlet Outflow)	0.451 ac-ft
Volume (Retained)	0.016 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary
Label: SSSM#2 (IN)

Return Event: 25 years
Storm Event: 25-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	348.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	23.14 ft³/s	Time to Peak (Flow, In)	12.150 hours
Infiltration (Peak)	2.80 ft³/s	Time to Peak (Infiltration)	12.900 hours
Flow (Peak Outlet)	0.79 ft³/s	Time to Peak (Flow, Outlet)	12.900 hours

Elevation (Water Surface, Peak)	351.88 ft
Volume (Peak)	1.049 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	2.441 ac-ft
Volume (Total Infiltration)	1.868 ac-ft
Volume (Total Outlet Outflow)	0.553 ac-ft
Volume (Retained)	0.020 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Level Pool Pond Routing Summary | Return Event: 100 years
Label: SSSM#2 (IN) | Storm Event: 100-yr

Infiltration	
Infiltration Method (Computed)	Average Infiltration Rate
Infiltration Rate (Average)	4.0000 in/h

Initial Conditions	
Elevation (Water Surface, Initial)	348.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	23.14 ft³/s	Time to Peak (Flow, In)	12.150 hours
Infiltration (Peak)	2.80 ft³/s	Time to Peak (Infiltration)	12.900 hours
Flow (Peak Outlet)	0.79 ft³/s	Time to Peak (Flow, Outlet)	12.900 hours

Elevation (Water Surface, Peak)	351.88 ft
Volume (Peak)	1.049 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	2.441 ac-ft
Volume (Total Infiltration)	1.868 ac-ft
Volume (Total Outlet Outflow)	0.553 ac-ft
Volume (Retained)	0.020 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: SSSM#2 (OUT) Storm Event: 1-yr

Peak Discharge	0.52 ft³/s
Time to Peak	12.750 hours
Hydrograph Volume	0.251 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
5.300	0.00	0.00	0.00	0.00	0.00
5.550	0.00	0.00	0.00	0.00	0.00
5.800	0.00	0.00	0.00	0.00	0.00
6.050	0.00	0.00	0.00	0.01	0.01
6.300	0.01	0.01	0.01	0.01	0.01
6.550	0.01	0.01	0.01	0.01	0.01
6.800	0.01	0.01	0.01	0.01	0.01
7.050	0.01	0.01	0.01	0.01	0.01
7.300	0.01	0.01	0.02	0.02	0.02
7.550	0.02	0.02	0.02	0.02	0.02
7.800	0.02	0.02	0.02	0.02	0.02
8.050	0.02	0.02	0.03	0.03	0.03
8.300	0.03	0.03	0.03	0.03	0.03
8.550	0.03	0.03	0.03	0.04	0.04
8.800	0.04	0.04	0.04	0.04	0.04
9.050	0.04	0.05	0.05	0.05	0.05
9.300	0.05	0.05	0.05	0.06	0.06
9.550	0.06	0.06	0.06	0.06	0.07
9.800	0.07	0.07	0.07	0.07	0.07
10.050	0.08	0.08	0.08	0.08	0.08
10.300	0.09	0.09	0.09	0.09	0.10
10.550	0.10	0.10	0.10	0.11	0.11
10.800	0.11	0.12	0.12	0.12	0.13
11.050	0.13	0.13	0.14	0.14	0.15
11.300	0.15	0.16	0.16	0.17	0.18
11.550	0.18	0.19	0.20	0.22	0.23
11.800	0.24	0.25	0.27	0.28	0.30
12.050	0.33	0.37	0.39	0.42	0.45
12.300	0.47	0.48	0.49	0.50	0.51
12.550	0.52	0.52	0.52	0.52	0.52
12.800	0.52	0.52	0.52	0.52	0.52
13.050	0.52	0.52	0.51	0.51	0.51
13.300	0.51	0.51	0.50	0.50	0.50
13.550	0.50	0.49	0.49	0.49	0.49
13.800	0.49	0.48	0.48	0.48	0.48
14.050	0.47	0.47	0.47	0.46	0.46
14.300	0.46	0.45	0.45	0.45	0.44

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: SSSM#2 (OUT) Storm Event: 1-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
14.550	0.44	0.44	0.43	0.43	0.43
14.800	0.42	0.42	0.42	0.41	0.41
15.050	0.41	0.40	0.40	0.40	0.39
15.300	0.39	0.39	0.38	0.38	0.38
15.550	0.37	0.37	0.37	0.36	0.36
15.800	0.36	0.35	0.35	0.34	0.34
16.050	0.33	0.33	0.32	0.32	0.31
16.300	0.31	0.31	0.30	0.30	0.29
16.550	0.29	0.28	0.28	0.28	0.27
16.800	0.27	0.26	0.26	0.26	0.25
17.050	0.25	0.25	0.24	0.24	0.24
17.300	0.23	0.22	0.21	0.20	0.19
17.550	0.19	0.18	0.17	0.16	0.16
17.800	0.15	0.15	0.14	0.14	0.13
18.050	0.13	0.12	0.12	0.11	0.11
18.300	0.11	0.10	0.10	0.10	0.10
18.550	0.09	0.09	0.09	0.09	0.08
18.800	0.08	0.08	0.08	0.08	0.08
19.050	0.08	0.07	0.07	0.07	0.07
19.300	0.07	0.07	0.07	0.07	0.07
19.550	0.06	0.06	0.06	0.06	0.06
19.800	0.06	0.06	0.06	0.06	0.06
20.050	0.06	0.06	0.06	0.06	0.06
20.300	0.05	0.05	0.05	0.05	0.05
20.550	0.05	0.05	0.05	0.05	0.05
20.800	0.05	0.05	0.05	0.05	0.05
21.050	0.05	0.05	0.05	0.05	0.05
21.300	0.05	0.05	0.05	0.05	0.05
21.550	0.05	0.05	0.05	0.05	0.05
21.800	0.05	0.05	0.04	0.04	0.04
22.050	0.04	0.04	0.04	0.04	0.04
22.300	0.04	0.04	0.04	0.04	0.04
22.550	0.04	0.04	0.04	0.04	0.04
22.800	0.04	0.04	0.04	0.04	0.04
23.050	0.04	0.04	0.04	0.04	0.04
23.300	0.04	0.04	0.04	0.04	0.04
23.550	0.04	0.04	0.04	0.04	0.04
23.800	0.04	0.04	0.04	0.04	0.04

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: SSSM#2 (OUT) Storm Event: 10-yr

Peak Discharge	0.70 ft³/s
Time to Peak	12.850 hours
Hydrograph Volume	0.451 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
3.600	0.00	0.00	0.00	0.00	0.00
3.850	0.00	0.00	0.00	0.00	0.00
4.100	0.00	0.00	0.00	0.01	0.01
4.350	0.01	0.01	0.01	0.01	0.01
4.600	0.01	0.01	0.01	0.01	0.01
4.850	0.01	0.01	0.01	0.01	0.01
5.100	0.01	0.01	0.02	0.02	0.02
5.350	0.02	0.02	0.02	0.02	0.02
5.600	0.02	0.02	0.02	0.02	0.02
5.850	0.02	0.02	0.02	0.02	0.03
6.100	0.03	0.03	0.03	0.03	0.03
6.350	0.03	0.03	0.03	0.03	0.03
6.600	0.03	0.03	0.04	0.04	0.04
6.850	0.04	0.04	0.04	0.04	0.04
7.100	0.04	0.04	0.05	0.05	0.05
7.350	0.05	0.05	0.05	0.05	0.05
7.600	0.06	0.06	0.06	0.06	0.06
7.850	0.06	0.06	0.06	0.07	0.07
8.100	0.07	0.07	0.07	0.07	0.08
8.350	0.08	0.08	0.08	0.08	0.08
8.600	0.09	0.09	0.09	0.09	0.10
8.850	0.10	0.10	0.10	0.11	0.11
9.100	0.11	0.11	0.12	0.12	0.12
9.350	0.12	0.13	0.13	0.13	0.14
9.600	0.14	0.14	0.15	0.15	0.15
9.850	0.16	0.16	0.16	0.17	0.17
10.100	0.17	0.18	0.18	0.18	0.19
10.350	0.19	0.20	0.20	0.20	0.21
10.600	0.21	0.22	0.22	0.23	0.23
10.850	0.24	0.24	0.24	0.24	0.25
11.100	0.25	0.25	0.25	0.26	0.26
11.350	0.26	0.27	0.27	0.28	0.29
11.600	0.29	0.30	0.31	0.33	0.34
11.850	0.36	0.38	0.40	0.43	0.46
12.100	0.49	0.53	0.57	0.60	0.62
12.350	0.64	0.66	0.67	0.68	0.69
12.600	0.69	0.70	0.70	0.70	0.70

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: SSSM#2 (OUT) Storm Event: 10-yr

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
12.850	0.70	0.70	0.70	0.70	0.70
13.100	0.70	0.70	0.70	0.70	0.69
13.350	0.69	0.69	0.69	0.69	0.69
13.600	0.68	0.68	0.68	0.68	0.68
13.850	0.67	0.67	0.67	0.67	0.66
14.100	0.66	0.66	0.66	0.65	0.65
14.350	0.65	0.65	0.64	0.64	0.64
14.600	0.64	0.63	0.63	0.63	0.63
14.850	0.62	0.62	0.62	0.62	0.61
15.100	0.61	0.61	0.60	0.60	0.60
15.350	0.60	0.59	0.59	0.59	0.58
15.600	0.58	0.58	0.58	0.57	0.57
15.850	0.57	0.56	0.56	0.56	0.55
16.100	0.55	0.55	0.54	0.54	0.54
16.350	0.53	0.53	0.53	0.52	0.52
16.600	0.52	0.51	0.51	0.51	0.50
16.850	0.50	0.50	0.49	0.49	0.49
17.100	0.48	0.48	0.48	0.47	0.47
17.350	0.47	0.46	0.46	0.45	0.45
17.600	0.45	0.44	0.44	0.43	0.43
17.850	0.43	0.42	0.42	0.41	0.41
18.100	0.41	0.40	0.40	0.39	0.39
18.350	0.39	0.38	0.38	0.38	0.37
18.600	0.37	0.37	0.36	0.36	0.35
18.850	0.34	0.34	0.34	0.33	0.33
19.100	0.32	0.32	0.31	0.31	0.30
19.350	0.30	0.29	0.29	0.29	0.28
19.600	0.28	0.27	0.27	0.27	0.26
19.850	0.26	0.25	0.25	0.25	0.24
20.100	0.24	0.24	0.23	0.22	0.21
20.350	0.21	0.20	0.19	0.18	0.18
20.600	0.17	0.16	0.16	0.15	0.15
20.850	0.14	0.14	0.13	0.13	0.13
21.100	0.12	0.12	0.12	0.11	0.11
21.350	0.11	0.11	0.10	0.10	0.10
21.600	0.10	0.10	0.09	0.09	0.09
21.850	0.09	0.09	0.09	0.09	0.08
22.100	0.08	0.08	0.08	0.08	0.08
22.350	0.08	0.08	0.08	0.08	0.08
22.600	0.07	0.07	0.07	0.07	0.07
22.850	0.07	0.07	0.07	0.07	0.07
23.100	0.07	0.07	0.07	0.07	0.07

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out)
Return Event: 10 years
Label: SSSM#2 (OUT)
Storm Event: 10-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
23.350	0.07	0.07	0.06	0.06	0.06
23.600	0.06	0.06	0.06	0.06	0.06
23.850	0.06	0.06	0.06	0.06	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: SSSM#2 (OUT) Storm Event: 25-yr

Peak Discharge	0.79 ft³/s
Time to Peak	12.900 hours
Hydrograph Volume	0.553 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
3.100	0.00	0.00	0.00	0.00	0.00
3.350	0.00	0.00	0.00	0.00	0.00
3.600	0.00	0.01	0.01	0.01	0.01
3.850	0.01	0.01	0.01	0.01	0.01
4.100	0.01	0.01	0.01	0.01	0.01
4.350	0.01	0.01	0.01	0.02	0.02
4.600	0.02	0.02	0.02	0.02	0.02
4.850	0.02	0.02	0.02	0.02	0.02
5.100	0.02	0.03	0.03	0.03	0.03
5.350	0.03	0.03	0.03	0.03	0.03
5.600	0.03	0.03	0.03	0.03	0.04
5.850	0.04	0.04	0.04	0.04	0.04
6.100	0.04	0.04	0.04	0.04	0.04
6.350	0.05	0.05	0.05	0.05	0.05
6.600	0.05	0.05	0.05	0.05	0.06
6.850	0.06	0.06	0.06	0.06	0.06
7.100	0.06	0.06	0.07	0.07	0.07
7.350	0.07	0.07	0.07	0.08	0.08
7.600	0.08	0.08	0.08	0.08	0.08
7.850	0.09	0.09	0.09	0.09	0.09
8.100	0.10	0.10	0.10	0.10	0.10
8.350	0.11	0.11	0.11	0.11	0.11
8.600	0.12	0.12	0.12	0.13	0.13
8.850	0.13	0.13	0.14	0.14	0.14
9.100	0.15	0.15	0.15	0.16	0.16
9.350	0.17	0.17	0.17	0.18	0.18
9.600	0.18	0.19	0.19	0.20	0.20
9.850	0.20	0.21	0.21	0.22	0.22
10.100	0.22	0.23	0.23	0.24	0.24
10.350	0.24	0.24	0.24	0.25	0.25
10.600	0.25	0.25	0.26	0.26	0.26
10.850	0.26	0.27	0.27	0.27	0.28
11.100	0.28	0.29	0.29	0.30	0.30
11.350	0.31	0.31	0.32	0.33	0.34
11.600	0.35	0.36	0.37	0.38	0.39
11.850	0.41	0.43	0.46	0.49	0.52
12.100	0.55	0.59	0.63	0.66	0.69

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: SSSM#2 (OUT) Storm Event: 25-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
12.350	0.71	0.73	0.75	0.76	0.77
12.600	0.78	0.78	0.79	0.79	0.79
12.850	0.79	0.79	0.79	0.79	0.79
13.100	0.79	0.79	0.79	0.78	0.78
13.350	0.78	0.78	0.78	0.77	0.77
13.600	0.77	0.77	0.77	0.76	0.76
13.850	0.76	0.76	0.75	0.75	0.75
14.100	0.75	0.74	0.74	0.74	0.74
14.350	0.73	0.73	0.73	0.73	0.72
14.600	0.72	0.72	0.71	0.71	0.71
14.850	0.71	0.70	0.70	0.70	0.70
15.100	0.69	0.69	0.69	0.68	0.68
15.350	0.68	0.68	0.67	0.67	0.67
15.600	0.66	0.66	0.66	0.65	0.65
15.850	0.65	0.65	0.64	0.64	0.64
16.100	0.63	0.63	0.63	0.62	0.62
16.350	0.62	0.61	0.61	0.61	0.60
16.600	0.60	0.60	0.59	0.59	0.59
16.850	0.59	0.58	0.58	0.58	0.57
17.100	0.57	0.57	0.56	0.56	0.56
17.350	0.55	0.55	0.55	0.54	0.54
17.600	0.54	0.53	0.53	0.52	0.52
17.850	0.52	0.51	0.51	0.51	0.50
18.100	0.50	0.50	0.49	0.49	0.49
18.350	0.48	0.48	0.48	0.47	0.47
18.600	0.46	0.46	0.46	0.45	0.45
18.850	0.44	0.44	0.44	0.43	0.43
19.100	0.42	0.42	0.42	0.41	0.41
19.350	0.40	0.40	0.40	0.39	0.39
19.600	0.38	0.38	0.38	0.37	0.37
19.850	0.37	0.36	0.36	0.35	0.35
20.100	0.34	0.34	0.33	0.33	0.32
20.350	0.32	0.32	0.31	0.31	0.30
20.600	0.30	0.29	0.29	0.29	0.28
20.850	0.28	0.27	0.27	0.27	0.26
21.100	0.26	0.26	0.25	0.25	0.25
21.350	0.24	0.24	0.24	0.23	0.22
21.600	0.21	0.20	0.20	0.19	0.18
21.850	0.18	0.17	0.16	0.16	0.15
22.100	0.15	0.14	0.14	0.14	0.13
22.350	0.13	0.13	0.12	0.12	0.12
22.600	0.11	0.11	0.11	0.11	0.11

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) — Return Event: 25 years
Label: SSSM#2 (OUT) — Storm Event: 25-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
22.850	0.10	0.10	0.10	0.10	0.10
23.100	0.09	0.09	0.09	0.09	0.09
23.350	0.09	0.09	0.09	0.08	0.08
23.600	0.08	0.08	0.08	0.08	0.08
23.850	0.08	0.08	0.08	0.08	(N/A)

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) | Return Event: 100 years
Label: SSSM#2 (OUT) | Storm Event: 100-yr

Peak Discharge	0.91 ft³/s
Time to Peak	12.850 hours
Hydrograph Volume	0.685 ac-ft

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

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
2.550	0.00	0.00	0.00	0.00	0.00
2.800	0.00	0.00	0.00	0.00	0.00
3.050	0.01	0.01	0.01	0.01	0.01
3.300	0.01	0.01	0.01	0.01	0.01
3.550	0.01	0.01	0.01	0.02	0.02
3.800	0.02	0.02	0.02	0.02	0.02
4.050	0.02	0.02	0.02	0.02	0.03
4.300	0.03	0.03	0.03	0.03	0.03
4.550	0.03	0.03	0.03	0.03	0.04
4.800	0.04	0.04	0.04	0.04	0.04
5.050	0.04	0.04	0.04	0.05	0.05
5.300	0.05	0.05	0.05	0.05	0.05
5.550	0.05	0.05	0.05	0.06	0.06
5.800	0.06	0.06	0.06	0.06	0.06
6.050	0.06	0.06	0.07	0.07	0.07
6.300	0.07	0.07	0.07	0.07	0.07
6.550	0.08	0.08	0.08	0.08	0.08
6.800	0.08	0.09	0.09	0.09	0.09
7.050	0.09	0.09	0.10	0.10	0.10
7.300	0.10	0.10	0.11	0.11	0.11
7.550	0.11	0.11	0.12	0.12	0.12
7.800	0.12	0.13	0.13	0.13	0.13
8.050	0.13	0.14	0.14	0.14	0.14
8.300	0.15	0.15	0.15	0.16	0.16
8.550	0.16	0.17	0.17	0.17	0.18
8.800	0.18	0.18	0.19	0.19	0.20
9.050	0.20	0.21	0.21	0.21	0.22
9.300	0.22	0.23	0.23	0.24	0.24
9.550	0.24	0.24	0.24	0.24	0.25
9.800	0.25	0.25	0.25	0.26	0.26
10.050	0.26	0.26	0.27	0.27	0.27
10.300	0.27	0.28	0.28	0.29	0.29
10.550	0.29	0.30	0.30	0.31	0.31
10.800	0.32	0.32	0.33	0.33	0.34
11.050	0.34	0.35	0.35	0.36	0.37
11.300	0.37	0.38	0.38	0.39	0.40
11.550	0.40	0.41	0.42	0.43	0.45

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: SSSM#2 (OUT) Storm Event: 100-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
11.800	0.47	0.48	0.51	0.53	0.56
12.050	0.59	0.63	0.68	0.72	0.76
12.300	0.80	0.83	0.86	0.89	0.91
12.550	0.91	0.91	0.91	0.91	0.91
12.800	0.91	0.91	0.91	0.91	0.91
13.050	0.91	0.91	0.91	0.91	0.91
13.300	0.91	0.91	0.91	0.91	0.91
13.550	0.91	0.91	0.91	0.91	0.91
13.800	0.90	0.89	0.89	0.88	0.87
14.050	0.87	0.86	0.86	0.85	0.85
14.300	0.84	0.84	0.84	0.83	0.83
14.550	0.83	0.82	0.82	0.82	0.81
14.800	0.81	0.80	0.80	0.80	0.80
15.050	0.79	0.79	0.79	0.78	0.78
15.300	0.78	0.77	0.77	0.77	0.76
15.550	0.76	0.76	0.75	0.75	0.75
15.800	0.74	0.74	0.74	0.73	0.73
16.050	0.73	0.72	0.72	0.72	0.71
16.300	0.71	0.71	0.70	0.70	0.70
16.550	0.70	0.69	0.69	0.69	0.68
16.800	0.68	0.68	0.67	0.67	0.67
17.050	0.66	0.66	0.66	0.65	0.65
17.300	0.65	0.64	0.64	0.64	0.63
17.550	0.63	0.63	0.62	0.62	0.62
17.800	0.61	0.61	0.61	0.60	0.60
18.050	0.60	0.59	0.59	0.59	0.58
18.300	0.58	0.58	0.57	0.57	0.57
18.550	0.56	0.56	0.56	0.55	0.55
18.800	0.55	0.54	0.54	0.53	0.53
19.050	0.53	0.52	0.52	0.52	0.51
19.300	0.51	0.51	0.50	0.50	0.50
19.550	0.49	0.49	0.49	0.48	0.48
19.800	0.48	0.47	0.47	0.47	0.46
20.050	0.46	0.45	0.45	0.44	0.44
20.300	0.44	0.43	0.43	0.43	0.42
20.550	0.42	0.41	0.41	0.41	0.40
20.800	0.40	0.40	0.39	0.39	0.38
21.050	0.38	0.38	0.37	0.37	0.37
21.300	0.36	0.36	0.35	0.35	0.35
21.550	0.34	0.34	0.33	0.33	0.32
21.800	0.32	0.31	0.31	0.31	0.30
22.050	0.30	0.29	0.29	0.29	0.28

Hunterbrook Drainage Basin #11 - State Land Corp

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: SSSM#2 (OUT) Storm Event: 100-yr

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

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
22.300	0.28	0.27	0.27	0.27	0.26
22.550	0.26	0.26	0.25	0.25	0.25
22.800	0.24	0.24	0.24	0.23	0.23
23.050	0.22	0.21	0.20	0.19	0.19
23.300	0.18	0.18	0.17	0.16	0.16
23.550	0.15	0.15	0.15	0.14	0.14
23.800	0.13	0.13	0.13	0.13	0.12

Index

APPENDIX G

SMP Selection

State Land Corp.

Green Infrastructure Planning Evaluation

Group	Practice	Description	Comments
Preservation of Natural Resources	Preservation of Undisturbed Areas	Delineate and place into permanent conservation easement undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	
	Preservation of Buffers	Define, delineate and place in permanent conservation easement naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the lease impact.	
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of practices such as downspout disconnections, grass channels, filter strips, and tree clusters.	
Reduction of Impervious Cover	Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area.	
	Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area.	
	Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area.	
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	

	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	
Runoff Reduction Techniques	Conservation of natural areas	Retain the pre-development hydrologic and water quality Conservation of characteristics of undisturbed natural areas, stream and wetland natural areas buffers by restoring and/or permanently conserving these areas on a site.	
	Sheetflow to riparian buffers or filter strips	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	
	Vegetated open swale	The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration.	
	Tree planting/tree box	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	

	Disconnection of rooftop runoff	Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates	
	Stream daylighting for redevelopment projects	Stream daylight previously-culverted/piped streams to restore natural habitats, better attenuate runoff by increasing the storage size, promoting infiltration, and help reduce pollutant loads.	
	Rain garden	Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	
	Green roof	Capture runoff by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce volume and discharge rate of runoff entering conveyance system.	
	Stormwater planter	Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality.	
	Rain tank/Cistern	Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	
	Porous Pavement	Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils.	
Pond	Micropool Extended Detention Pool (P-1)	Pond that treats the majority of the water quality volume through extended detention, and incorporates a micropool at the outlet of the pond to prevent sediment resuspension.	

	Wet Pond (P-2)	Pond that provides storage for the entire water quality volume in the permanent pool.	
	Wet Extended Detention (P-3)	Pond that treats a portion of the water quality volume by detaining storm flows above a permanent pool for a specified minimum detention time.	
	Multiple Pond System (P-4) Pocket Pond (P-5)	A group of ponds that collectively treat the water quality volume. A stormwater wetland design adapted for the treatment of runoff from small drainage areas that has little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool.	
Wetland	Shallow Wetland (W-1)	A wetland that provides water quality treatment entirely in a wet shallow marsh.	
	Extended Detention Wetland (W-2)	A wetland system that provides some fraction of the water quality volume by detaining storm flows above the marsh surface.	
	Pond/ Wetland System (W-3)	A wetland system that provides a portion of the water quality volume in the permanent pool of a wet pond that precedes the marsh for a specified minimum detention time.	
	Pocket Wetland (W-4)	A shallow wetland design adapted for the treatment of runoff from small drainage areas that has variable water levels and relies on groundwater for its permanent pool.	
Infiltration	Infiltration Trench (I-1)	An infiltration practice that stores the water quality volume in the void spaces of a gravel trench before it is infiltrated into the ground.	
	Infiltration Basin (I-2)	An infiltration practice that stores the water quality volume in a shallow depression, before it is infiltrated it into the ground.	
	Dry Well (I-3)	An infiltration practice similar in design to the infiltration trench, and best suited for treatment of rooftop runoff.	
	Underground Infiltration System (I-4)	An infiltration practice that stores water quality volume in pre-manufactured chambers encased in gravel before it is infiltrated into the ground.	

Filtering Practices	Surface Sand Filter (F-1)	A filtering practice that treats stormwater by settling out larger particles in a sediment chamber, and then filtering stormwater through a sand matrix.	
	Underground Sand Filter (F2)	A filtering practice that treats stormwater as it flows through underground settling and filtering chambers.	
	Perimeter Sand Filter (F-3)	A filter that incorporates a sediment chamber and filer bed as parallel vaults adjacent to a parking lot.	
	Organic Filter (F-4)	A filtering practice that uses an organic medium such as compost in the filter, in the place of sand.	
	Bioretention (F-5)	A shallow depression that treats stormwater as it flows through a soil matrix, and is returned to the storm drain system.	
Open Channels	Dry Swale (O-1)	An open drainage channel or depression explicitly designed to detain and promote the filtration of stormwater runoff into the soil media.	
	Wet Swale (O-2)	An open drainage channel or depression designed to retain water or intercept groundwater for water quality treatment.	

Comment Notes:

1. This improvement is not proposed for the project and does not apply.
2. This practice cannot be applied to this project. It is either deemed (a) inappropriate by the NYS DEC; (b) does not fit the type of project; or (c) cannot be engineered because of practical difficulties such as constructability, maintenance issues, durability, stability or other cause.
3. Minimized to the greatest extent possible within applicable codes.
4. Similar type of practice used.
5. Not applicable.

APPENDIX H

Stormwater Management Practices Design:

Stormwater Management Planning and Practice Selection Worksheet

Source Control Water Quality Volume (WQv) Treatment Practices Summary

Standard Filter Practice Sizing NYSDEC Methodology

Bioretention Design Parameters

Project:	**State Land Corp** **Route 202 - Town of Yorktown, Westchester County, NY**	**Project No.:**	**11-16**
		Date:	**3/7/2012**
Subject:	**Preliminary Stormwater Management Planning** **and Practice Selection Worksheet**	**Completed By:**	**JR**
		Checked By:	**xxx**

Stormwater Management Planning and Practice Selection Worksheet

PLANNING:

Step 1: Plan to preserve, avoid and minimize (indicate any methods utilized):

- ☑ • Preserve undisturbed, natural buffer(s) and critical environmental area(s)
- ☑ • Employ open space, conservation areas and clustering site design techniques
- ☑ • Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shoreline, shallow groundwater, impervious soils, unstable soils
- ☑ • Minimize impervious surfaces: building footprints, parking, roads, sidewalk and driveways
- ☑ • Minimize clearing and grading

WATER QUALITY VOLUME (WQv) *(before application of runoff reduction)* **:**

Step 2: Calculate Water Quality Volume, (WQv): *Subject to Chapter 10 Enhanced Phosphorus Removal Standards*

WQv to be used based on greater of calculated in the following methods: **7.670 ac-ft**

Post-Developed 1-yr, 24-hr storm event hydrograph volume = **7.670 ac-ft**
(from hydrograph output data)

Post-Developed 1-yr, 24-hr Rainfall Depth (inches) = **3.1**

or ***Use the 90% Rule:*** **WQv = (P x Rv x A) / 12**
(from NYSSMDM)

Where:
P = 90% Rainfall Event Number (Fig. 4.1 NYSDEC SMDM)
A = Tributary Drainage Area (acres)
Ai = Impervious Area (acres)
I = Impervious Cover in Proposed Drainage Area (%) *
Rv = 0.05 + 0.009 (I) **
WQv = Required Water Quality Volume (ac-ft)
(*) assumes soil restoration is performed as required by Table 5.2 of the NYS SMDM
(**) Minimum value of Rv shall be 0.2

Design Parameters					Original
P (in)	**A (ac)**	**Ai (ac)**	**I (%)**	**Rv**	**WQv (ac-ft)**
1.2	100.00	14.07	14.1	0.200	**2.000**

Step 3: Determine Minimum Runoff Reduction Volume (RRv) Requirements:

RRv = (P x Rv x S x Ai) / 12

Where:
Rv = 0.95 for impervious surfaces
S = Hydrologic Soil Group (HSG) Specific Reduction Factor

	Hydrologic Soil Group				Weighted
	A	**B**	**C**	**D**	**HSG "S"**
Area (acres)	33.97	29.27	26.26	9.72	0.40

Min. RRv Required = 1.389 ac-ft

AREA REDUCTION PRACTICES:

Step 4: Incorporate Area Reduction Practices *(complete for all applicable practices):*

Practice Description	**Tributary Ai (ac)**	**Drainage Area (ac)**
Conservation of natural areas	0.00	52.00
Riparian buffers/filter strips	0.00	0.00
Tree planting/tree preservation	0.00	0.00

Total Area Reduced =	**52.00**	**ac**
Ai in Reduced Area =	**0.00**	**ac**

Stormwater Management Planning and Practice Selection Worksheet

Step 5: Subtract Total Area Reduction from Overall Drainage Area:

Remaining DA =	**48.00**	**ac**
Remaining Ai =	**14.07**	**ac**

Step 6: Recalculate WQv for Site Area Remaining after Reductions:

Post-developed 1-yr, 24-hr storm event hydrograph volume =

Design Parameters					**Area Reduced WQv (ac-ft)**
P (in)	**A (ac)**	**Ai (ac)**	**I (%)**	**Rv**	
3.1	48.00	14.07	29.3	0.314	**3.891**

Step 7: Determine RRv from Step 2:

RRv = Orig. WQv - Area Red. WQv =	**3.779**	**ac-ft**

If New RRv < 1.389 ac-ft Continue with additional practices unless justification can be provided

ROOFTOP DISCONNECTION:

Step 8: Incorporate Impervious Area Disconnection:

Total disconnected impervious area = 0.00 **ac** (Total area of rooftops discharging to minimum 50 ft wide vegetated buffer)

Step 9: Recalculate WQv with RV Modified for Impervious Disconnection:

Design Parameters		**WQv (ac-ft)**
1-yr Rainfall (in)	**A (acres)**	
3.1	0.00	0.000

Step 10: Determine New RRv:

RRv = Area Red. WQv - Rv Red. WQv=	**3.779**	**ac-ft**

New RRv = RRv (Step 7 + Step 10) = 7.557 ac-ft. If < 1.389 ac-ft Continue with source controlpractices

SOURCE CONTROL WQv TREATMENT PRACTICES:

(SEE FOLLOWING SOURCE CONTROL WQv TREATMENT PRACTICES SUMMARY FOR DETAILS)

Step 11A: Subtotal Drainage Area Tributary to Source Control Treatment Practices =	**15.62**	**ac**
Step 11B: Subtotal Source Control WQv Treatment Volume =	**7.50**	**ac-ft**
Step 11C: Subtotal Runoff Reduction Volume, RRv =	**6.00**	**ac-ft**
Step 11D: Subtotal Treated Impervious Area, Ai =	**14.48**	**ac-ft**

Project:	**State Land Corp** **Route 202 - Town of Yorktown, Westchester County, NY**	**Project No.:**	**11-16**
		Date:	**3/7/2012**
Subject:	**Preliminary Stormwater Management Planning** **and Practice Selection Worksheet**	**Completed By:**	**JR**
		Checked By:	**xxx**

Stormwater Management Planning and Practice Selection Worksheet

TOTAL RUNOFF REDUCTION VOLUME (RRv):

Step 12: Calculate Total RRv Provided:

Total RRv = RRv (Step 10 + Step 11C) = 9.777 ac-ft

Step 13: Compare Total RRv Provided to Original WQv Required:

Is Total RRv Provided ≥ Original WQv Required?
- ☑ Yes, Continue with Water Quantity Controls.
- ☐ No, Continue with Step 14.

Step 14: Compare Total RRv Provided to Minimum RRv Required:

Is Total RRv Provided ≥ Minimum RRv Required?
- ☑ Yes, Provide Remaining WQv with Standard Practices.
- ☐ No, Provide Additional RRv and Recalculate.

Step 15: Calculate Total Drainage Area Treated with Runoff Reduction / Source Control Practices:

(Area Reduction (Step 4) + Total DA Tributary to Source Control (Step 11A)= 67.62 ac

Step 16: Compare Drainage Area Treated with Runoff Reduction / Source Control Practices to Overall Drainage Area:

Overall Drainage Area = 100.00 ac
Drainage Area Treated with Runoff Reduction / Source Control Practices = 67.62 ac

Is Total DA Treated with Runoff Reduction / Source Control Practices?
- ☑ Yes, Continue with Water Quantity Controls.
- ☐ No, Provide Remaining WQv with Standard Practices.

STANDARD WQv TREATMENT:

Step 17: Calculate Required WQv for Remaining Untreated Drainage Area for Treatment with Standard Practices:

Untreated DA = DA (Step 2 - Step 15) = 32.38 ac
Untreated Ai = Total Ai (Step 2) - Treated Ai (Steps 4 + 8 + 11) = -0.41 ac

☑ Subject to NYSDEC: ***Use the 90% Rule:*** **WQv = (P x Rv x A) / 12** *(from Step 2)*

Design Parameters					Remaining WQv (ac-ft)
P (in)	**A (ac)**	**Ai (ac)**	**I (%)**	**Rv**	
3.1	32.38	-0.41	-1.3	0.200	**1.673**

Standard WQv Practice Selected	WQv Provided (ac-ft)
Ponds	0
Wetlands	
Infiltration	4.25
Filters	
Open Channels	

Total WQv with Standard Practice = 0 ac-ft

Is Total WQv Provided by Standard Practices ≥ Remaining WQv?
- ☑ Yes, Continue with Water Quantity Controls.
- ☐ No, Provide Additional WQv with Standard Practices.

NOTE: ONLY SHADED CELLS REQUIRE INPUT.

Project:	**State Land Corp** **Route 202 - Town of Yorktown, Westchester County, NY**	**Project No.:**	**11-16**
		Date:	**Mar-12**
Subject:	**Source Control Water Quality Volume (WQv)** **Treatment Practices Summary**	**Completed By:**	**JR**
		Checked By:	**xxx**

Source Control Water Quality Volume (WQv) Treatment Practices Summary

STORMWATER TREATMENT PRACTICE	HSG	Tributary DA (acres)	Impervious Area (acres)	WQv (ac-ft)	Allowable RRV as % of WQv	RRv (ac-ft)
STANDARD PRACTICES: **(used as source control)**						
Infiltration (soils with k > 0.5 inch / hr only)		0.000	0.000	0.0000	90%	0.0000
Bioretention	A/B	15.620	14.480	7.4975	80%	5.9980
	C/D	0.000	0.000	0.0000	40%	0.0000
Dry Swale	A/B	0.000	0.000	0.0000	40%	0.0000
	C/D	0.000	0.000	0.0000	20%	0.0000
GREEN INFRASTRUCTURE PRACTICES:						
Vegetated Open Swale	A/B	0.000	0.000	0.0000	20%	0.0000
	C/D	0.000	0.000	0.0000	10%	0.0000
Green Roof	N/A	0.000	0.000	0.0000	100%	0.0000
Rain Garden	A/B	0.000	0.000	0.0000	100%	0.0000
	C/D	0.000	0.000	0.0000	40%	0.0000
Stormwater Planters	N/A	0.000	0.000	0.0000	100%	0.0000
Cisterns / Rain Barrels	N/A	0.000	0.000	0.0000	100%	0.0000
Porous Pavement (A/B/C Soils Only)	A/B/C	0.000	0.000	0.0000	100%	0.0000

Subtotal Drainage Area Tributary to Source Control Treatment Practices =	**15.62**	**acres**
Subtotal Treated Impervious Area, Ai =	**14.48**	**acres**
Subtotal Source Control WQv Treatment Volume =	**7.50**	**ac-ft**
Subtotal Runoff Reduction Volume, RRv =	**6.00**	**ac-ft**

NOTE: ONLY SHADED CELLS REQUIRE INPUT.

Project:	**State Land Corp** **Route 202 - Town of Yorktown, Westchester County, NY**	**Project No.:**	**11-16**
		Date:	**Mar-12**
Subject:	**Standard Filter Practice Sizing** **NYSDEC Methodology**		
		Completed By:	**JR**
Drainage Area:	**West Site**	**Checked By:**	**xxx**

Step 1: Calculate Water Quality Volume, (WQv)

WQv = (P x Rv x A) / 12

Where:
P = Rainfall Depth for Storm Event
A = Tributary Drainage Area (sf)
I = Impervious Cover in Proposed Drainage Area (%)
Rv = 0.05 + 0.009 (I)
WQv = Required Water Quality Volume

☑ Subject to NYCDEP: **Therefore, use post-developed 1-yr, 24-hr rainfall depth =**

Design Parameters					Water Quality Volume	
P (in)	**A (acres)**	**Ai (acres)**	**I (%)**	**Rv**	**(Acre-ft)**	**(Cu. Ft.)**
3.1	9.920	9.24	93.15	0.888	**2.2764**	**99161**

2.276 ac-ft **99161 cf**

Step 2: Determine Required Sedimentation Basin Area

For Ai ≤ 75%:	As = 0.066 (WQv)	or	**0.0000 ac**	**0.0 sf**
For Ai > 75%:	As = 0.0081 (WQv)	or	**0.0184 ac**	**803.2 sf**

Step 3: Determine Required Filter Bed Area

Filter Sizing Criteria:

From NYSDEC SMDM: **Af = [WQv * df] / [k * (hf + df) (tf)]**

Where:
Af = Surface area of filter bed (sf)
df = Filter bed depth (ft)
k = Coefficient of permeability of filter media (ft/day)
hf = Average depth of water above filter bed (ft)
tf = Design filter bed drain time (days)
(2 days or 48 hrs is recommended for bioretention)

Filter Basin Design Parameters					Water Quality Volume	
Af (sf)	**df (ft)**	**k (ft/day)**	**hf (ft)**	**tf (days)**	**(cf)**	**(ac-ft)**
25000	2.5	2.85	0.5	2.00	171000	3.9256

Permeability of 30 / 70 - Peat / Sand 2.85 ft/day

Step 4: Verify Adequate Filter Sizing

Hydrologic Soil Group = **A/B**

WQv Required:	2.2764 ac-ft
WQv Provided:	3.9256 ac-ft
Forebay Volume = 25% WQv	0.9814 ac-ft

Proposed Filter Sizing is Adequate

NOTE: ONLY SHADED CELLS REQUIRE INPUT.

Project:	**State Land Corp** **Route 202 - Town of Yorktown, Westchester County, NY**	**Project No.:**	**11-16**
Subject:	**Standard Filter Practice Sizing** **NYSDEC Methodology**	**Date:**	**Mar-12**
		Completed By:	**JR**
Drainage Area:	**East Site**	**Checked By:**	**xxx**

Step 1: Calculate Water Quality Volume, (WQv)

WQv = (P x Rv x A) / 12

Where:
- P = Rainfall Depth for Storm Event
- A = Tributary Drainage Area (sf)
- I = Impervious Cover in Proposed Drainage Area (%)
- Rv = 0.05 + 0.009 (I)
- WQv = Required Water Quality Volume

☑ Subject to NYCDEP: **Therefore, use post-developed 1-yr, 24-hr rainfall depth =**

Design Parameters					Water Quality Volume	
P (in)	**A (acres)**	**Ai (acres)**	**I (%)**	**Rv**	**(Acre-ft)**	**(Cu. Ft.)**
3.1	5.700	5.24	91.93	0.877	**1.2919**	**56276**

1.292 ac-ft **56276 cf**

Step 2: Determine Required Sedimentation Basin Area

For Ai ≤ 75%:	As = 0.066 (WQv)	or	**0.0000 ac**	**0.0 sf**
For Ai > 75%:	As = 0.0081 (WQv)	or	**0.0105 ac**	**455.8 sf**

Step 3: Determine Required Filter Bed Area

Filter Sizing Criteria:

From NYSDEC SMDM: **Af = [WQv * df] / [k * (hf + df) (tf)]**

Where:
- Af = Surface area of filter bed (sf)
- df = Filter bed depth (ft)
- k = Coefficient of permeability of filter media (ft/day)
- hf = Average depth of water above filter bed (ft)
- tf = Design filter bed drain time (days)
  (2 days or 48 hrs is recommended for bioretention)

Filter Design Parameters					Water Quality Volume	
Af (sf)	**df (ft)**	**k (ft/day)**	**hf (ft)**	**tf (days)**	**(cf)**	**(ac-ft)**
22747	2.5	2.85	0.5	2.00	155589	3.5718

Permeability of 30 / 70 - Peat / Sand 2.85 ft/day

Step 4: Verify Adequate Filter Sizing

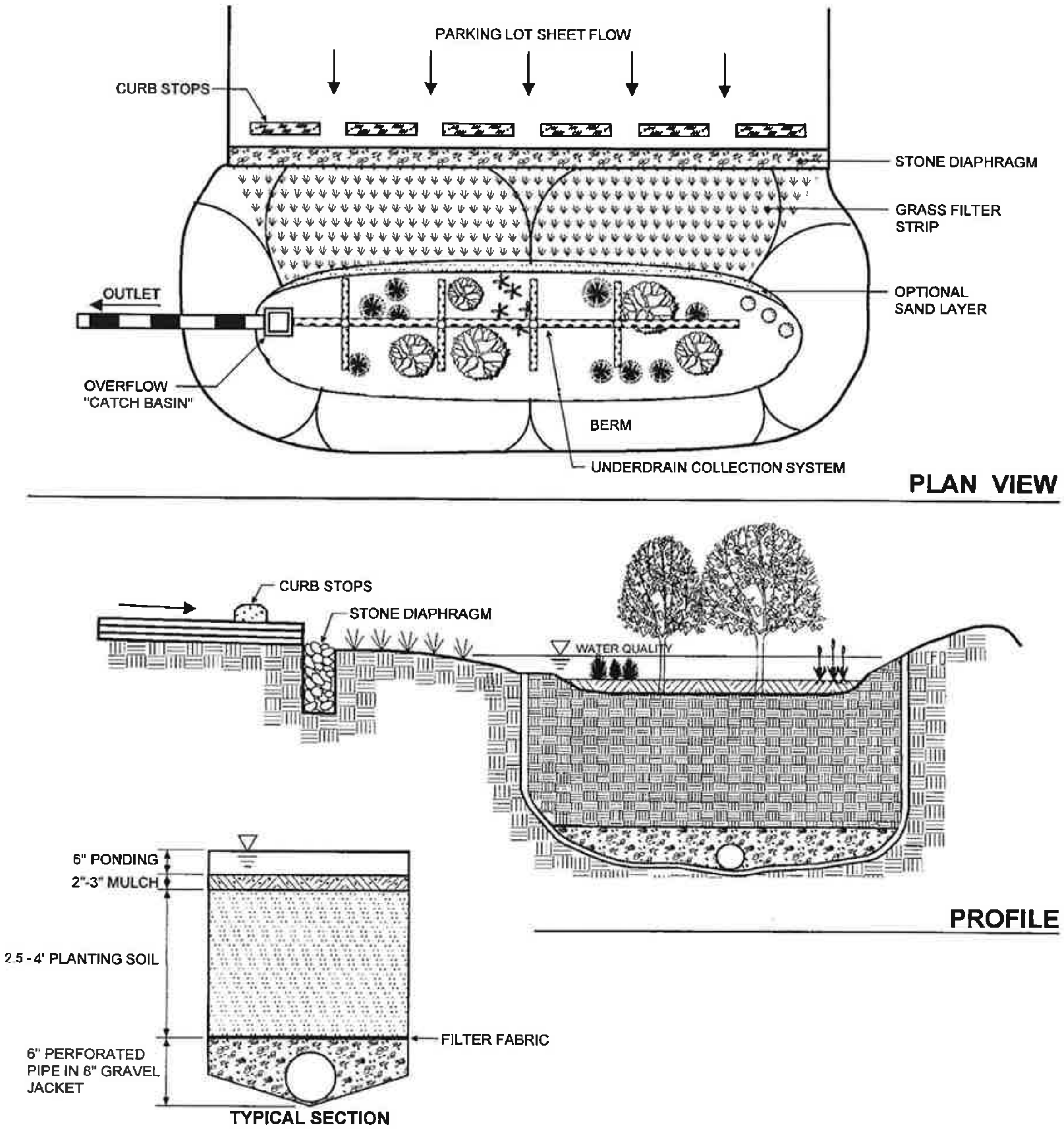
Hydrologic Soil Group = **A/B**

WQv Required:	1.2919 ac-ft
WQv Provided:	3.5718 ac-ft
Forebay Volume = 25% WQv	0.8930 ac-ft

Proposed Filter Sizing is Adequate

NOTE: ONLY SHADED CELLS REQUIRE INPUT.

Figure 6.19 Bioretention (F-5)



6.4.1 Feasibility

Design Guidance

- Most stormwater filters require four to six feet of head, depending on site configuration and land area available. The perimeter sand filter (F-3), however, can be designed to function with as little as 18" to 24" of head.
- The recommended maximum contributing area to an individual stormwater filtering system is usually less than 10 acres. In some situations, larger areas may be acceptable.
- Sand and organic filtering systems are generally applied to land uses with a high percentage of impervious surfaces. Sites with imperviousness less than 75% will require full sedimentation pretreatment techniques.

6.4.2 Conveyance

Required Elements

- If runoff is delivered by a storm drain pipe or is along the main conveyance system, the filtering practice shall be designed off-line (see Appendix K).
- An overflow shall be provided within the practice to pass a percentage of the WQ_v to a stabilized water course. In addition, overflow for the ten-year storm shall be provided to a non-erosive outlet point (i.e., prevent downstream slope erosion).
- A flow regulator (or flow splitter diversion structure) shall be supplied to divert the WQ_v to the filtering practice, and allow larger flows to bypass the practice.
- Stormwater filters shall be equipped with a minimum 4" perforated pipe underdrain (6" is preferred) in a gravel layer. A permeable filter fabric shall be placed between the gravel layer and the filter media.
- Require a minimum 2' separation between the filter bottom and groundwater.

6.4.3 Pretreatment

Required Elements

- Dry or wet pretreatment shall be provided prior to filter media equivalent to at least 25% of the computed WQ_v. The typical method is a sedimentation basin that has a length to width ratio of 1.5:1. The Camp-Hazen equation is used to compute the required surface area for sand and organic filters requiring full sedimentation for pretreatment (WSDE, 1992) as follows:

- The required sedimentation basin area is computed using the following equation:

$$A_s = -(Qo/W) \cdot Ln\,(1-E)$$

where:

A_s = Sedimentation basin surface area (ft^2)
E = sediment trap efficiency (use 90%)
W = particle settling velocity (ft/sec)
use 0.0004 ft/sec for imperviousness (I) ≤75%
use 0.0033 ft/sec for I > 75%
Qo = Discharge rate from basin = (WQ_v/24 hr/3600s)
WQv=Water Quality Volume(cf)

This equation reduces to:

$$A_s = (0.066)\,(WQ_v)\ ft^2 \text{ for } I \leq 75\%$$
$$A_s = (0.0081)\,(WQ_v)\ ft^2 \text{ for } I > 75\%$$

Design Guidance

- Adequate pretreatment for bioretention systems should incorporate all of the following: (a) grass filter strip below a level spreader or grass channel, (b) gravel diaphragm and (c) a mulch layer.
- The grass filter strip should be sized using the guidelines in Table 6.2.

Table 6.2 Guidelines for Filter Strip Pretreatment Sizing

Parameter	Impervious Parking Lots				Residential Lawns			
Maximum Inflow Approach Length (ft.)	35		75		75		150	
Filter Strip Slope	≤2%	≥2%	≤2%	≥2%	≤2%	≥2%	≤2%	≥2%
Filter Strip Minimum Length	10'	15'	20'	25'	10'	12'	15'	18'

- The grass channel should be sized using the following procedure:
  1- Determine the channel length needed to treat the WQ_v, using sizing techniques described in the Grass Channel Fact Sheet (Chapter 5).
  2- Determine the volume directed to the channel for pretreatment
  3- Determine the channel length by multiplying the length determined in step 1 above by the ratio of the volume in step 2 to the WQ_v.

6.4.4 Treatment

Required Elements

- The entire treatment system (including pretreatment) shall be sized to temporarily hold at least 75% of the WQ_v prior to filtration.
- The filter media shall consist of a medium sand (meeting ASTM C-33 concrete sand). Media used for organic filters may consist of peat/sand mix or leaf compost. Peat shall be a reed-sedge hemic peat.
- Bioretention systems shall consist of the following treatment components: A four foot deep planting soil bed, a surface mulch layer, and a six inch deep surface ponding area. Soils shall meet the design criteria outlined in Appendix H.

Design Guidance

- The filter bed typically has a minimum depth of 18". The perimeter filter may have a minimum filter bed depth of 12".
- The filter area for sand and organic filters should be sized based on the principles of Darcy's Law. A coefficient of permeability (k) should be used as follows:

Sand:	3.5 ft/day (City of Austin 1988)
Peat:	2.0 ft/day (Galli 1990)
Leaf compost:	8.7 ft/day (Claytor and Schueler, 1996)
Bioretention Soil:	0.5 ft/day (Claytor and Schueler, 1996)

The required filter bed area is computed using the following equation

$$A_f = (WQ_v)\,(d_f) \,/\, [\,(k)\,(h_f + d_f)\,(t_f)]$$

Where:

A_f = Surface area of filter bed (ft^2)
WQv=Water Quality Volume(cf)
d_f = Filter bed depth (ft)
k = Coefficient of permeability of filter media (ft/day)
h_f = Average height of water above filter bed (ft)
t_f = Design filter bed drain time (days)
(1.67 days or 40 hours is recommended maximum t_f for sand filters, two days for bioretention)

6.4.5 Landscaping

Required Elements

- A dense and vigorous vegetative cover shall be established over the contributing pervious drainage areas before runoff can be accepted into the facility.
- Landscaping is critical to the performance and function of bioretention areas. Therefore, a landscaping plan must be provided for bioretention areas.

Design Guidance

- Surface filters can have a grass cover to aid in pollutant adsorption. The grass should be capable of withstanding frequent periods of inundation and drought.

- Planting recommendations for bioretention facilities are as follows:
  - Native plant species should be specified over non-native species.
  - Vegetation should be selected based on a specified zone of hydric tolerance.
  - A selection of trees with an understory of shrubs and herbaceous materials should be provided.
  - Woody vegetation should not be specified at inflow locations.
  - Trees should be planted primarily along the perimeter of the facility.
  - A tree density of approximately one tree per 100 square feet (i.e., 10 feet on-center) is recommended. Shrubs and herbaceous vegetation should generally be planted at higher densities (five feet on-center and 2.5 feet on center, respectively).

6.4.6 Maintenance

Required Elements

- A legally binding and enforceable maintenance agreement shall be executed between the facility owner and the local review authority to ensure the following:

  - Sediment shall be cleaned out of the sedimentation chamber when it accumulates to a depth of more than six inches. Vegetation within the sedimentation chamber shall be limited to a height of 18 inches. The sediment chamber outlet devices shall be cleaned/repaired when drawdown times exceed 36 hours. Trash and debris shall be removed as necessary.

  - Silt/sediment shall be removed from the filter bed when the accumulation exceeds one inch. When the filtering capacity of the filter diminishes substantially (i.e., when water ponds on the surface of the filter bed for more than 48 hours), the top few inches of discolored material shall be removed and shall be replaced with fresh material. The removed sediments shall be disposed in an acceptable manner (i.e., landfill).
- A stone drop (pea gravel diaphragm) of at least six inches shall be provided at the inlet of bioretention facilities (F-6). Areas devoid of mulch shall be re-mulched on an annual basis. Dead or diseased plant material shall be replaced.

Design Guidance

- Organic filters or surface sand filters that have a grass cover should be mowed a minimum of three times per growing season to maintain maximum grass heights less than 12 inches.

6.4.7 Cold Climate Design Considerations

In cold climates, stormwater filtering systems need to be modified to protect the systems from freezing and frost heaving. The primary cold climate concerns to address with regards to filtering systems are:

- Freezing of the filter bed
- Pipe freezing
- Clogging of filter

NOTE

ALTHOUGH FILTERING SYSTEMS ARE NOT AS EFFECTIVE DURING THE WINTER, THEY ARE OFTEN EFFECTIVE AT TREATING STORM EVENTS IN AREAS WHERE OTHER SMPS ARE NOT PRACTICAL, SUCH AS IN HIGHLY URBANIZED REGIONS. THUS, THEY MAY BE A GOOD DESIGN OPTION, EVEN IF WINTER FLOWS CANNOT BE TREATED. IT IS ALSO IMPORTANT TO REMEMBER THAT THESE SMPS ARE DESIGNED FOR HIGHLY IMPERVIOUS AREAS. IF THE SNOW FROM THEIR CONTRIBUTING AREAS IS TRANSPORTED TO ANOTHER AREA, SUCH AS A PERVIOUS INFILTRATION AREA, A PRACTICE'S PERFORMANCE DURING THE WINTER SEASON MAY BE LESS CRITICAL TO OBTAIN WATER QUALITY GOALS.

Freezing of the Filter Bed

- Place filter beds for underground filter below the frost line to prevent the filtering medium from freezing during the winter.
- Discourage organic filters using peat and compost media, which are ineffective during the winter in cold climates. These organic filters retain water, and consequently can freeze solid and become completely impervious during the winter.
- Combine treatment with another SMP option that can be used as a backup to the filtering system to provide treatment during the winter when the filter is ineffective

Pipe Freezing

- Use a minimum 8" underdrain diameter in a 1' gravel bed. Increasing the diameter of the underdrain makes freezing less likely, and provides a greater capacity to drain standing water from the filter. The porous gravel bed prevents standing water in the system by promoting drainage. Gravel is also less susceptible to frost heaving than finer grained media.
- Replace standpipes with weirs, which can be "frost free." Although weir structures will not always provide detention, they can provide retention storage (i.e., storage with a permanent pool) in the pretreatment chamber.

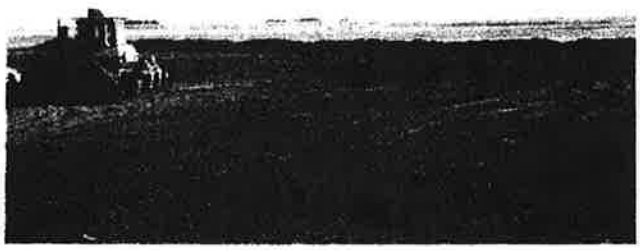
Clogging of Filter with Excess Sand from Runoff

- If a filter is used to treat runoff from a parking lot or roadway that is frequently sanded during snow events, there is a high potential for clogging from sand in runoff. In these cases, the size of the pretreatment chamber should be increased to 40% of the treatment volume. For bioretention systems, a grass strip, such as a swale, of at least twenty-five feet in length should convey flow to the system.
- Filters should always be inspected for sand build-up in the filter chamber following the spring melt event.

APPENDIX I

Standard and Specifications for Erosion and Sediment Control Measures

STANDARD AND SPECIFICATIONS FOR TOPSOILING



Definition

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas.

Purpose

To provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.

2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established.

3. Refer to USDA Soil Conservation Service (presently Natural Resource Conservation Service) soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.

2. Complete rough grading and final grade, allowing for depth of topsoil to be added.

3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted to a minimum depth of 12 inches with a deep ripper or chisel plow prior to topsoiling.

4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.

2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.

3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.

4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.

5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

Application and Grading

1. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.

2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by "tracking" with suitable equipment.

3. Apply topsoil in the following amounts:

Site Conditions	Intended Use	Minimum Topsoil Depth
1. Deep sand or loamy sand	Mowed lawn	6 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	1 in.
2. Deep sandy loam	Mowed lawn	5 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	none
3. Six inches or more: silt loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7"	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2"	9 cu. yds.	405 cu. yds.	3"	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48" x 50 yds. or 48" x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8" x 100" 2-sided plastic, 48" x 180" 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3" pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3"	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 3.8
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PROTECTING VEGETATION DURING CONSTRUCTION

Definition

The protection of trees, shrubs, ground cover and other vegetation from damage by construction equipment.

Purpose

To preserve existing vegetation determined to be important for soil erosion control, water quality protection, shade, screening, buffers, wildlife habitat, wetland protection, and other values.

Condition Where Practice Applies

On planned construction sites where valued vegetation exists and needs to be preserved.

Design Criteria

1. Planning Considerations

   A. Inventory:

      1) Property boundaries, topography, vegetation and soils information should be gathered. Identify potentially high erosion areas, areas with tree windthrow potential, etc. A vegetative cover type map should be made on a copy of a topographic map which shows other natural and manmade features. Vegetation that is desirable to preserve because of its value for screening, shade, critical erosion control, endangered species, aesthetics, etc., should be identified and marked on the map.

      2) Based upon this data, general statements should be prepared about the present condition, potential problem areas, and unique features of the property.

   B. Planning:

      1) After engineering plans (plot maps) are prepared, another field review should take place and recommendations made for the vegetation to be saved. Minor adjustments in location of roads, dwellings, and utilities may be needed. Construction on steep slopes, erodible soils, wetlands, and streams should be avoided. Clearing limits should be delineated (See Section 2).

      2) Areas to be seeded and planted should be identified. Remaining vegetation should blend with their surroundings and/or provide special function such as a filter strip, buffer zone, or screen.

      3) Trees and shrubs of special seasonal interest, such as flowering dogwood, red maple, striped maple, serviceberry, or shadbush, and valuable potential shade trees should be identified and marked for special protective treatment as appropriate.

      4) Trees to be cut should be marked on the plans. If timber can be removed for salable products, a forester should be consulted for marketing advice.

      5) Trees that may become a hazard to people, personal property, or utilities should be removed. These include trees that are weak-wooded, disease-prone, subject to windthrow, or those that have severely damaged root systems.

      6) The vigor of remaining trees may be improved by a selective thinning. A forester should be consulted for implementing this practice.

2. Measures to Protect Vegetation

   A. Limit soil placement over existing tree and shrub roots to a maximum of 3 inches. Soils with loamy texture and good structure should be used.

   B. Use retaining walls and terraces to protect roots of trees and shrubs when grades are lowered. Lowered grades should start no closer than the dripline of the tree. For narrow-canopied trees and shrubs, the stem diameter in inches is converted to feet and doubled, such that a 10 inch tree should be protected to 20 feet.

C. Trenching across tree root systems should be the same minimum distance from the trunk, as in “B”. Tunnels under root systems for underground utilities should start 18 inches or deeper below the normal grounds surface. Tree roots which must be severed should be cut clean. Backfill material that will be in contact with the roots should be topsoil or a prepared planting soil mixture.

D. Construct sturdy fences, or barriers, of wood, steel, or other protective material around valuable vegetation for protection from construction equipment. Place barriers far enough away from trees, but not less than the specifications in "B", so that tall equipment such as backhoes and dump trucks do not contact tree branches.

E. Construction limits should be identified and clearly marked to exclude equipment.

F. Avoid spills of oil/gas and other contaminants.

G. Obstructive and broken branches should be pruned properly. The branch collar on all branches whether living or dead should not be damaged. The 3 or 4 cut method should be used on all branches larger than two inches at the cut. First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

H. Penalties for damage to valuable trees, shrubs, and herbaceous plants should be clearly spelled out in the contract.

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

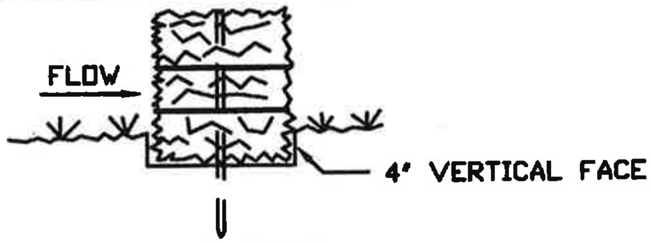
The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of fence and the length of slope above the dike shall be less than 200 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.7 on page 5A.18 or details.

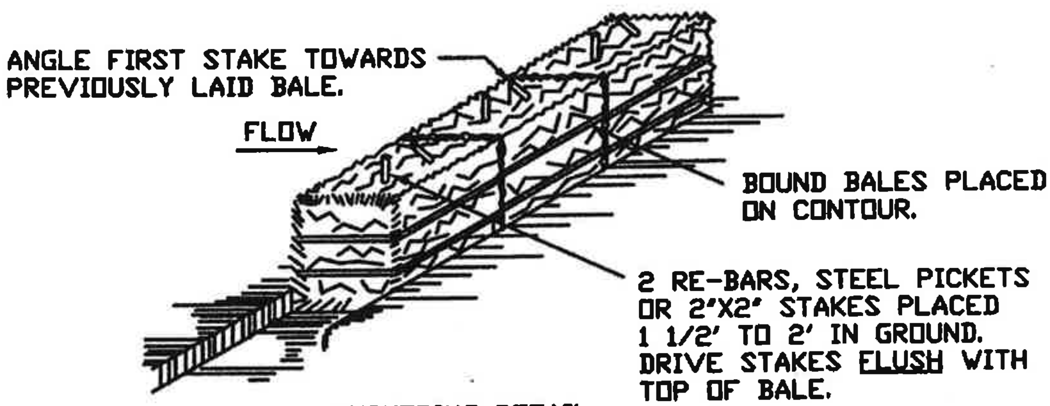
Figure 5A.7
Straw Bale Dike

SYMBOL



BEDDING DETAIL
NOT TO SCALE

DRAINAGE AREA NO MORE THAN 1/4 ACRE PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%.



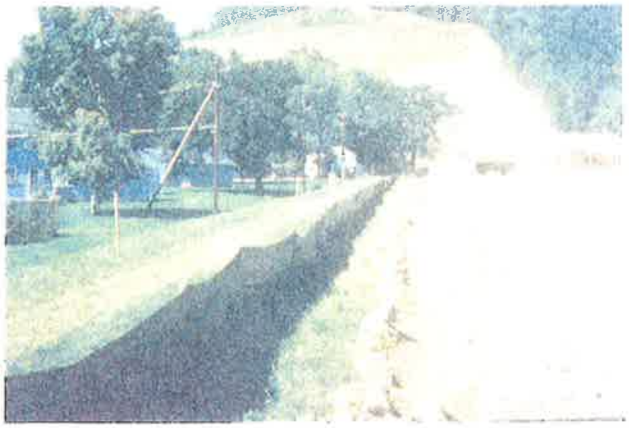
ANCHORING DETAIL
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULLNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STRAW BALE DIKE

STANDARD AND SPECIFICATIONS FOR SILT FENCE



Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition

A temporary, somewhat permeable barrier, installed around inlets in the form of a fence, berm or excavation around an opening, trapping water and thereby reducing the sediment content of sediment laden water by settling.

Purpose

To prevent heavily sediment laden water from entering a storm drain system through inlets.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are four (4) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Curb Drop Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

See details for Excavated Drop Inlet Protection in Figure 5A.11 on page 5A.29.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

See Figure 5A.12 for details on Filter Fabric Drop Inlet Protection on page 5A.30.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

If straw bales are used in lieu of filter fabric, they should be placed tight with the cut edge adhering to the ground at least 3 inches below the elevation of the drop inlet. Two anchor stakes per bale shall be driven flush to bale surface. Straw bales will be replaced every 4 months until the area is stabilized.

Type III – Stone and Block Drop Inlet Protection

See Figure 5A.13 for details on Stone and Block Drop Inlet Protection on page 5A.31.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilized in a manner appropriate to the site.

Type IV – Curb Drop Inlet Protection

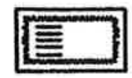
See Figure 5A. 14 for details on Curb Drop Inlet Protection on page 5A.32.

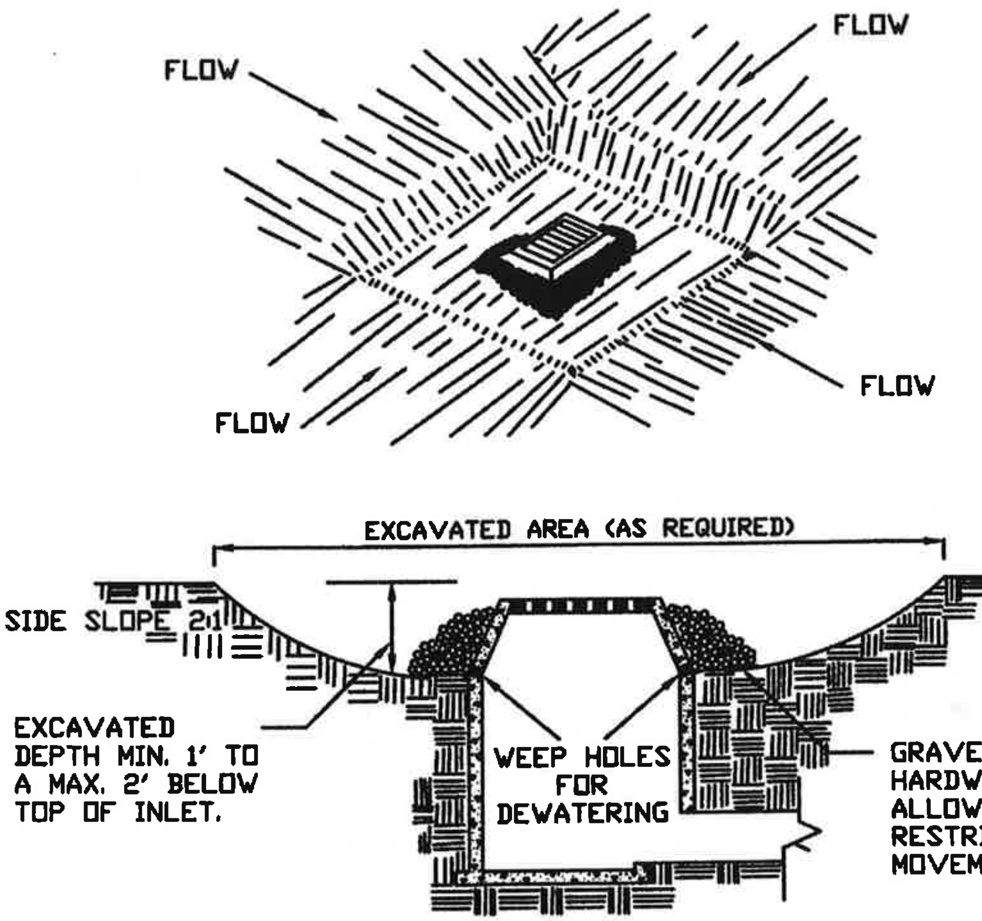
The drainage area should be limited to 1 acre at the drop inlet. The wire mesh must be of sufficient strength to support the filter fabric and stone with the water fully impounded against it. Stone is to be 2 inches in size and clean. The filter fabric must be of a type approved for this purpose with an equivalent opening size (EOS) of 40-85. The protective structure will be constructed to extend beyond the inlet 2 feet in both directions. Assure that storm flow does not bypass the inlet by installing temporary dikes (such as sand bags) directing flow into the inlet. Make sure that the overflow weir is stable. Traffic safety shall be integrated with the use of this practice.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any stone missing should be replaced. Check materials for proper anchorage and secure as necessary.

Figure 5A.11
Excavated Drop Inlet Protection

SYMBOL





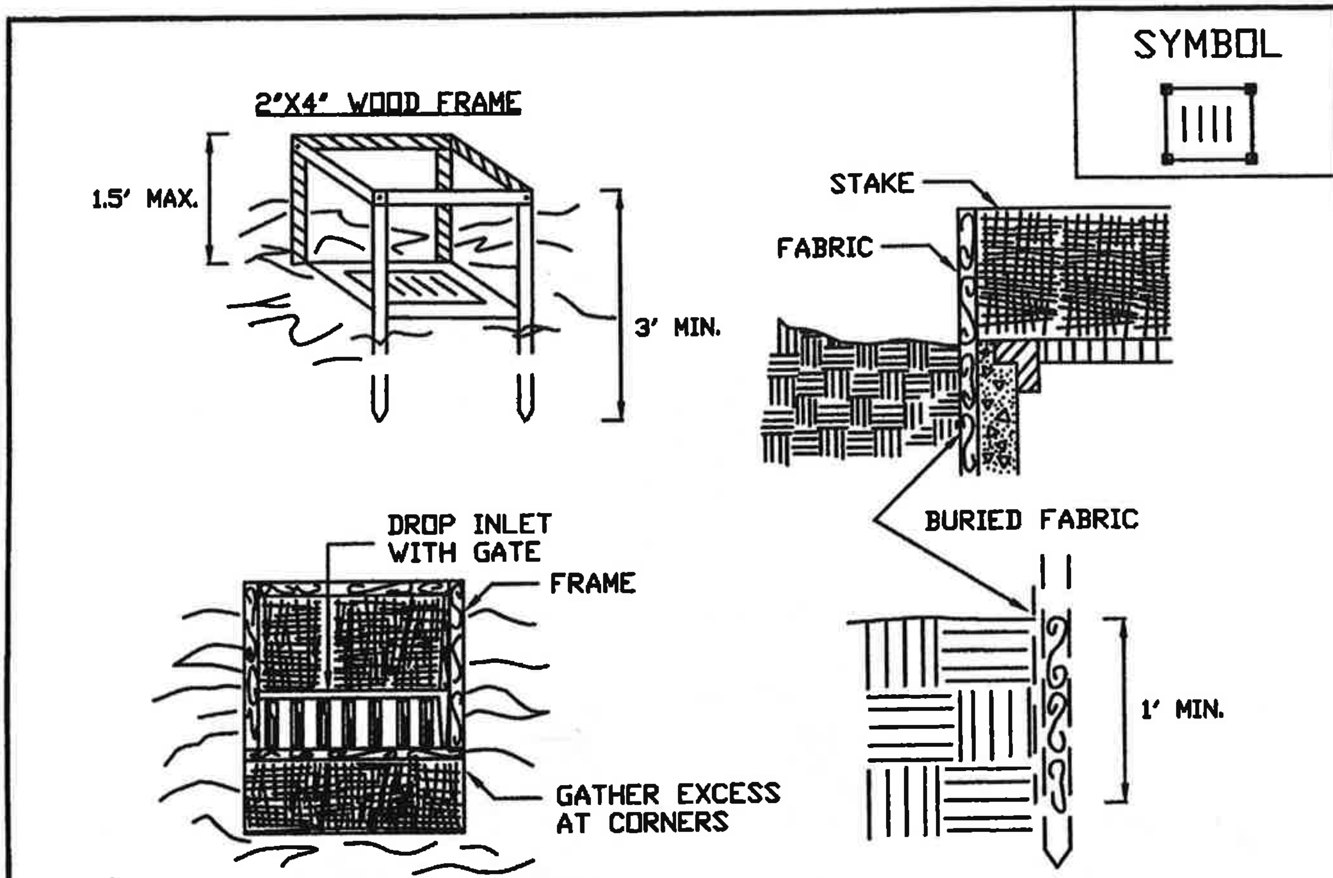
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5A.12
Filter Fabric Drop Inlet Protection



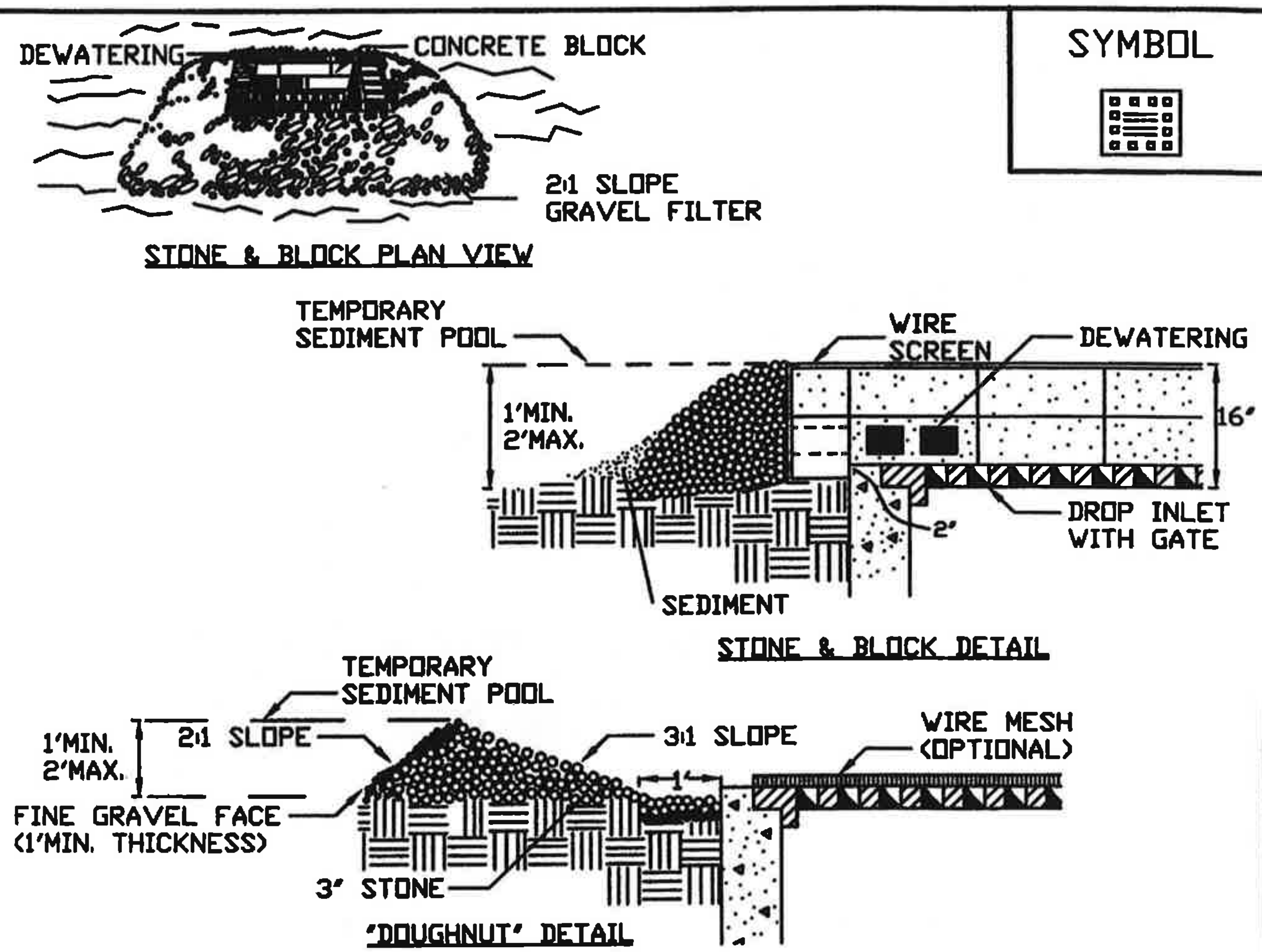
CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUN DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	FILTER FABRIC DROP INLET PROTECTION

Figure 5A.13
Stone & Block Drop Inlet Protection



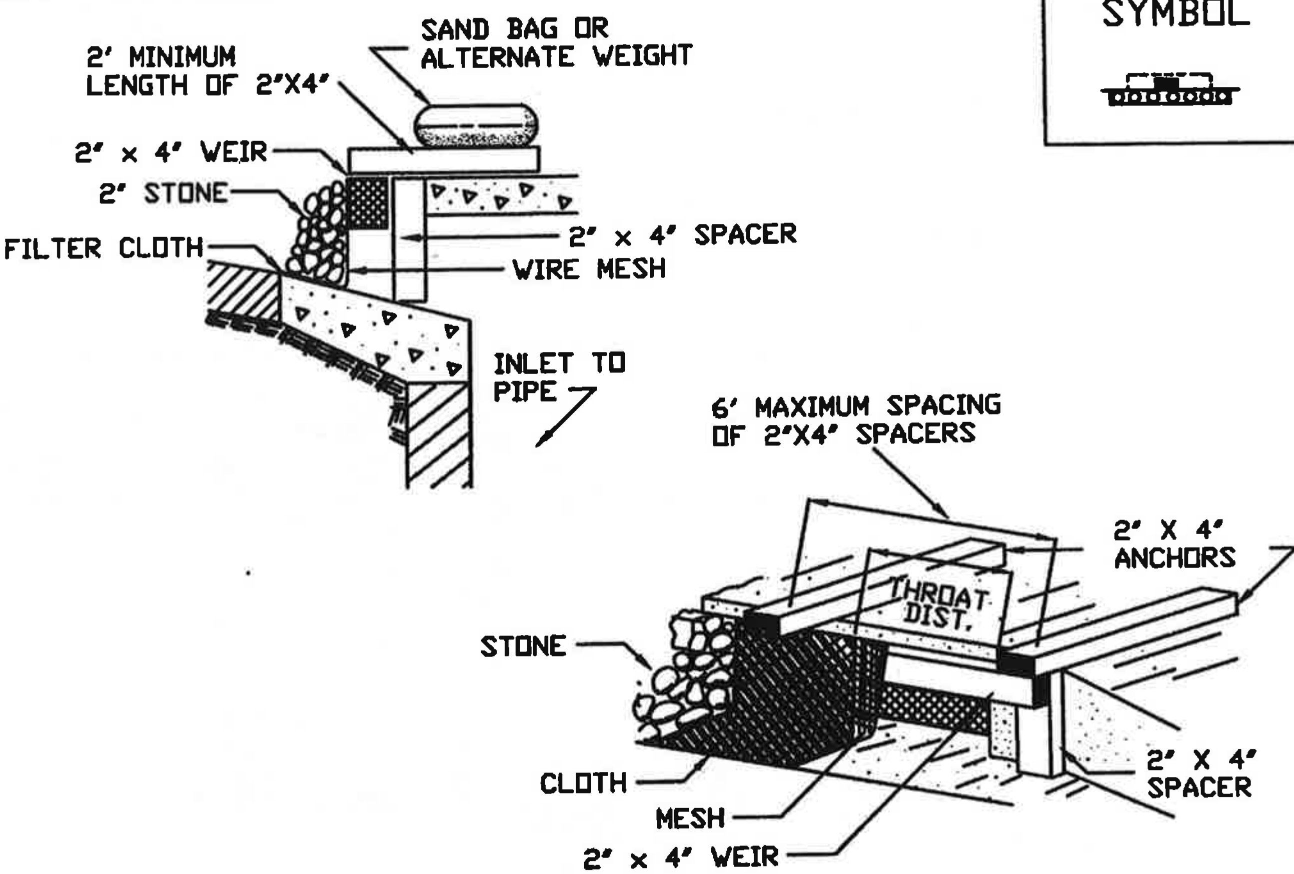
CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

Figure 5A.14
Curb Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN AOS OF 40-85.
2. WOODEN FRAME SHALL BE CONSTRUCTED OF 2" x 4" CONSTRUCTION GRADE LUMBER.
3. WIRE MESH ACROSS THROAT SHALL BE A CONTINUOUS PIECE 30 INCH MINIMUM WIDTH WITH A LENGTH 4 FEET LONGER THAN THE THROAT. IT SHALL BE SHAPED AND SECURELY NAILED TO A 2" x 4" WEIR.
4. THE WEIR SHALL BE SECURELY NAILED TO 2" x 4" SPACERS 9 INCHES LONG SPACED NO MORE THAN 6 FEET APART.
5. THE ASSEMBLY SHALL BE PLACED AGAINST THE INLET AND SECURED BY 2" x 4" ANCHORS 2 FEET LONG EXTENDING ACROSS THE TOP OF THE INLET AND HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHTS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	CURB DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.35 on page 5A.76 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile

The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth	6	10	--

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

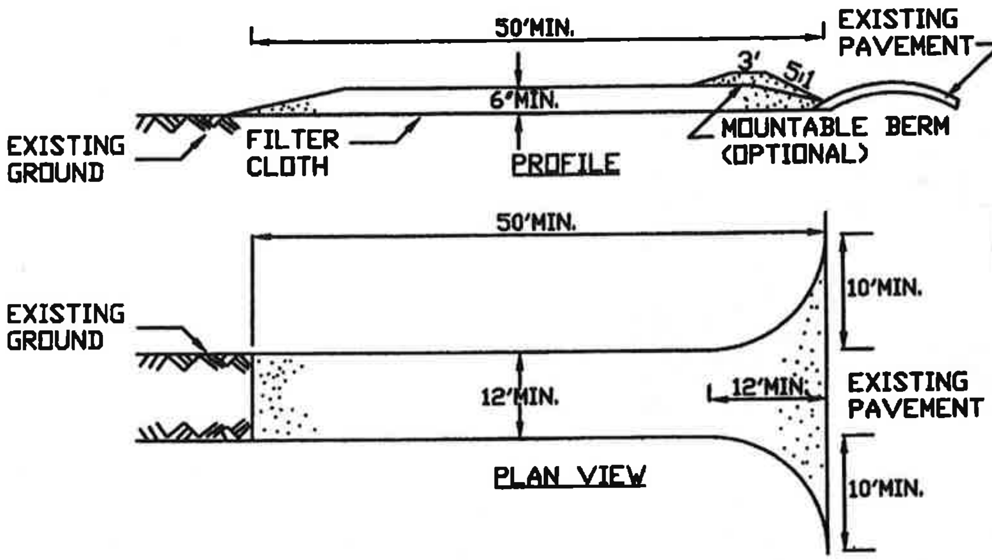
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.35
Stabilized Construction Entrance



SYMBOL

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ENTRANCE

STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition

The control of dust resulting from land-disturbing activities.

Purpose

To prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the local permitting authority.

Construction Specifications

A. **Non-driving Areas** – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access routes.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geotextiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

All Stormwater Pollution Prevention Plans must contain the NYS DEC issued "Conditions for Use" and "Application Instructions" for any polymers used on the site. This information can be obtained from the NYS DEC website.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP

Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment.

Purpose

The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainage way, at a storm drain inlet, or other points of collection from a disturbed area.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specification for Sediment Basin on page 5A.49.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through V).

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of the trap. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are five (5) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Grass Outlet Sediment Trap
III. Catch Basin Sediment Trap
IV. Stone Outlet Sediment Trap
V. Riprap Outlet Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or

2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment traps may be interchangeable in the field with stone outlet or riprap sediment traps provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter.

See details for Pipe Outlet Sediment Trap ST-I in Figure 5A.16 (1) and 5A.16 (2) on pages 5A.38 and 5A.39.

II. Grass Outlet Sediment Trap

A Grass Outlet Sediment Trap consists of a trap formed by excavating the earth to create a holding area. The trap has a discharge point over natural existing grass. The outlet crest width (feet) shall be equal to four (4) times the drainage area (acres) with a minimum width of four (4) feet. The outlet shall be free of any restrictions to flow. The outlet lip must remain undisturbed and level. The volume of this trap shall be computed at the elevation of the crest of the outlet. Grass outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Grass Outlet Sediment Trap ST-II in Figure 5A.17 on page 5A.40.

III. Catch Basin Sediment Trap

A Catch Basin Sediment Trap consists of a basin formed by excavation on natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet.

A yard drain inlet or an inlet in the median strip of a dual highway could use the inlet opening for the type outlet. The trap should be out of the roadway so as not to interfere with future compaction or construction. Placing the trap on the opposite side of the opening and diverting water from the roadway to the trap is one means of doing this. Catch basin sediment traps shall be limited to a three (3) acre maximum drainage area. The volume of this trap is measured at the elevation of the crest of the outlet (invert of the inlet opening).

See details for Catch Basin Sediment Trap ST-III in Figure 5A.18 on page 5A.41.

IV. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe or riprap outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-IV in Figure 5A.19 on page 5A.42.

V. Riprap Outlet Sediment Trap

A Riprap Outlet Sediment Trap consists of a trap formed by an excavation and embankment. The outlet for this trap shall be through a partially excavated channel lined with riprap. This outlet channel shall discharge onto a stabilized area or to a stable watercourse. The riprap outlet sediment trap may be used for drainage areas of up to a maximum of 15 acres.

Design Criteria for Riprap Outlet Sediment Trap

1. The total contributing drainage area (disturbed or undisturbed either on or off the developing property) shall not exceed 15 acres.
2. The storage needs for this trap shall be computed using 3600 cubic feet of required storage for each acre of drainage area. The storage volume provided can be figured by computing the volume of storage area available behind the outlet structure up to an elevation of one (1) foot below the level weir crest.
3. The maximum height of embankment shall not exceed five (5) feet.
4. The elevation of the top of any dike directing water to a riprap outlet sediment trap will equal or exceed the minimum elevation of the embankment along the entire length of this trap.

Riprap Outlet Sediment Trap ST-V
(for Stone Lined Channel)

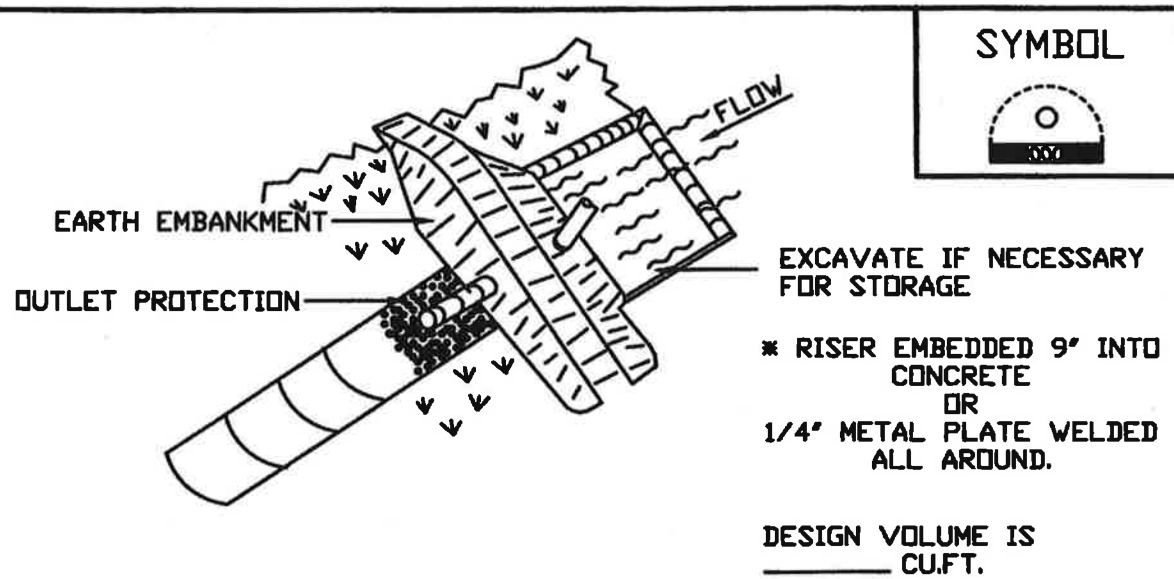
Contributing Drainage Area (ac.)	Depth of Channel (a) (ft.)	Length of Weir (b) (ft.)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0
11	2.0	14.0
12	2.0	14.0
13	2.0	16.0
14	2.0	16.0
15	2.0	18.0

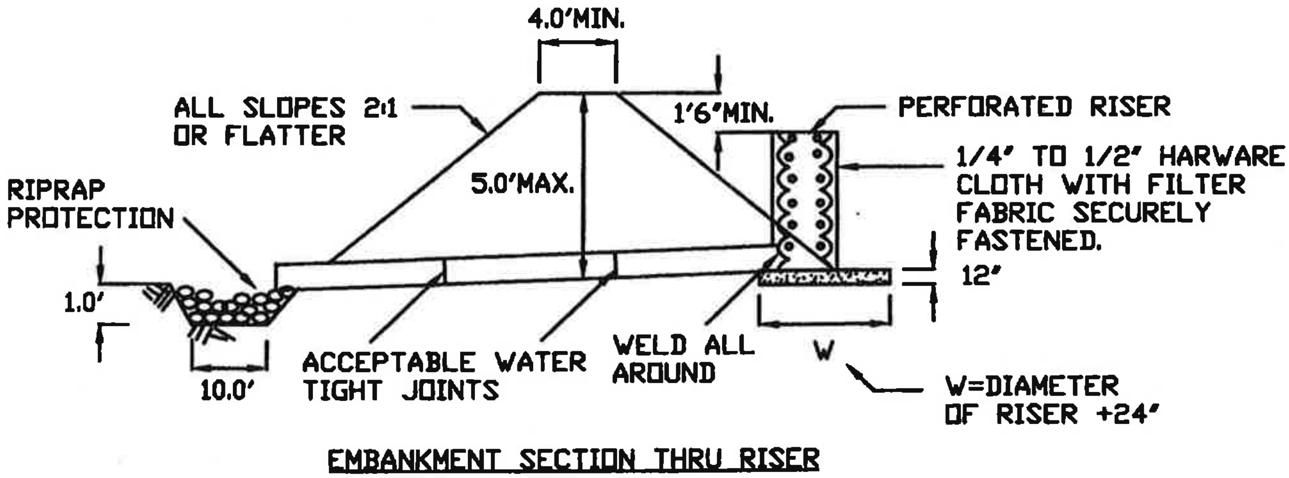
See details for Riprap Outlet Sediment Trap ST-V on Figures 5A.20(1) and 5A.20(2) on pages 5A.43 and 5A.44.

Optional Dewatering Methods

Optional dewatering devices may be designed for use with sediment traps. Included are two methods, which may be used. See Figure 5A.21 on page 5A.45 for details.

Figure 5A.16(1)
Pipe Outlet Sediment Trap: ST-I





SIZES OF PIPE NEEDED:

BARREL DIAMETER: ______
RISER DIAMETER: ______

NOTE:
CONSTRUCTION SPECIFICATION SHOULD BE ATTACHED TO THIS DETAIL TO COMPLETE DESIGN.

MAXIMUM DRAINAGE AREA: 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PIPE OUTLET SEDIMENT TRAP ST-I

Figure 5A.16(2)
Pipe Outlet Sediment Trap: ST-I—Construction Specifications

SYMBOL

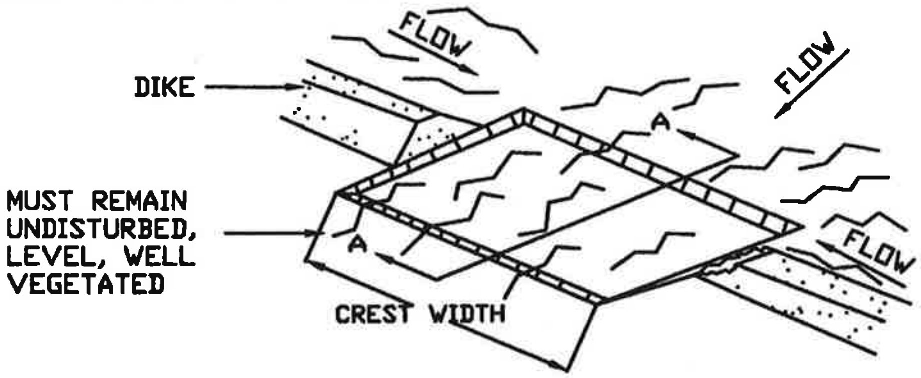
CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

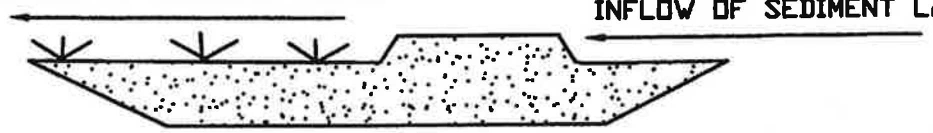
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PIPE OUTLET
SEDIMENT TRAP
ST-I

Figure 5A.17
Grass Outlet Sediment Trap: ST-II



SYMBOL



CREST WIDTH (FT)=4xDRAINAGE AREA (ACRES)

SECTION A - A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

CONSTRUCTION SPECIFICATIONS

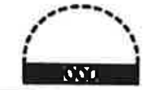
1. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

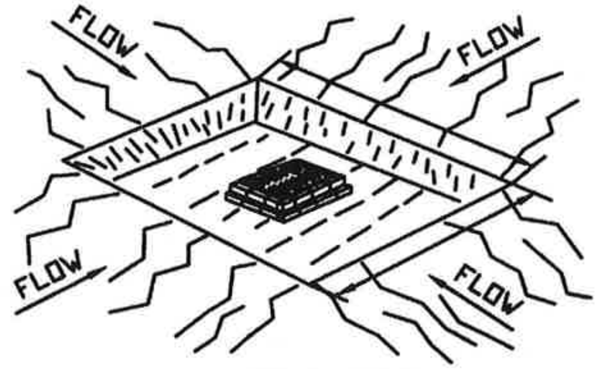
MAXIMUM DRAINAGE AREA: 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASS OUTLET SEDIMENT TRAP ST-II

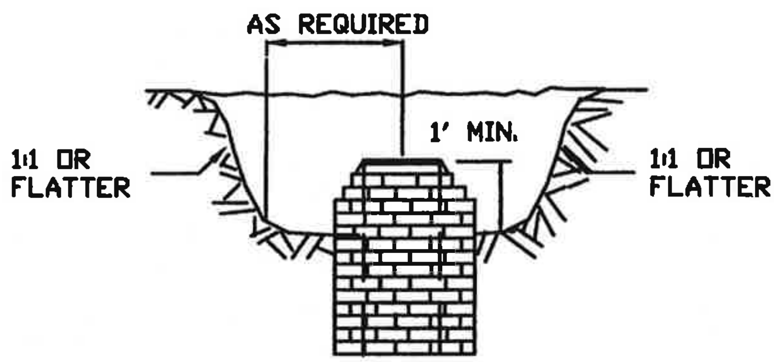
Figure 5A.18
Catch Basin Sediment Trap: ST-III

SYMBOL





YARD DRAIN



CROSS SECTION

CONSTRUCTION SPECIFICATIONS

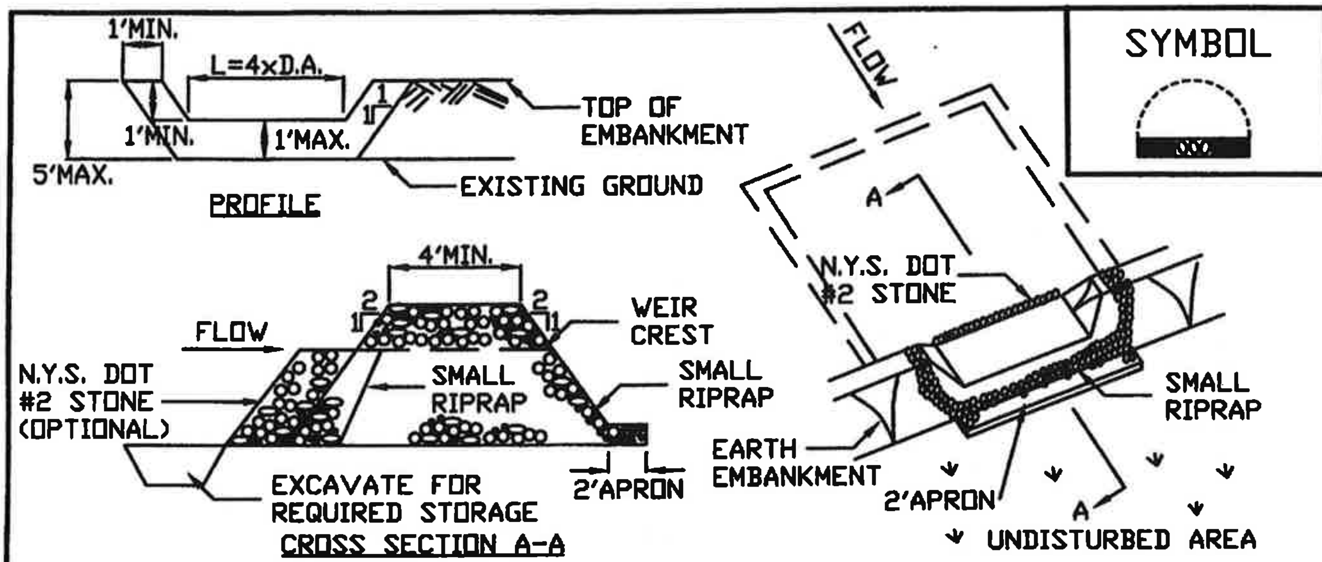
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 3 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

CATCH BASIN
SEDIMENT TRAP
ST-III

Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.20(1)
Riprap Outlet Sediment Trap: ST-V

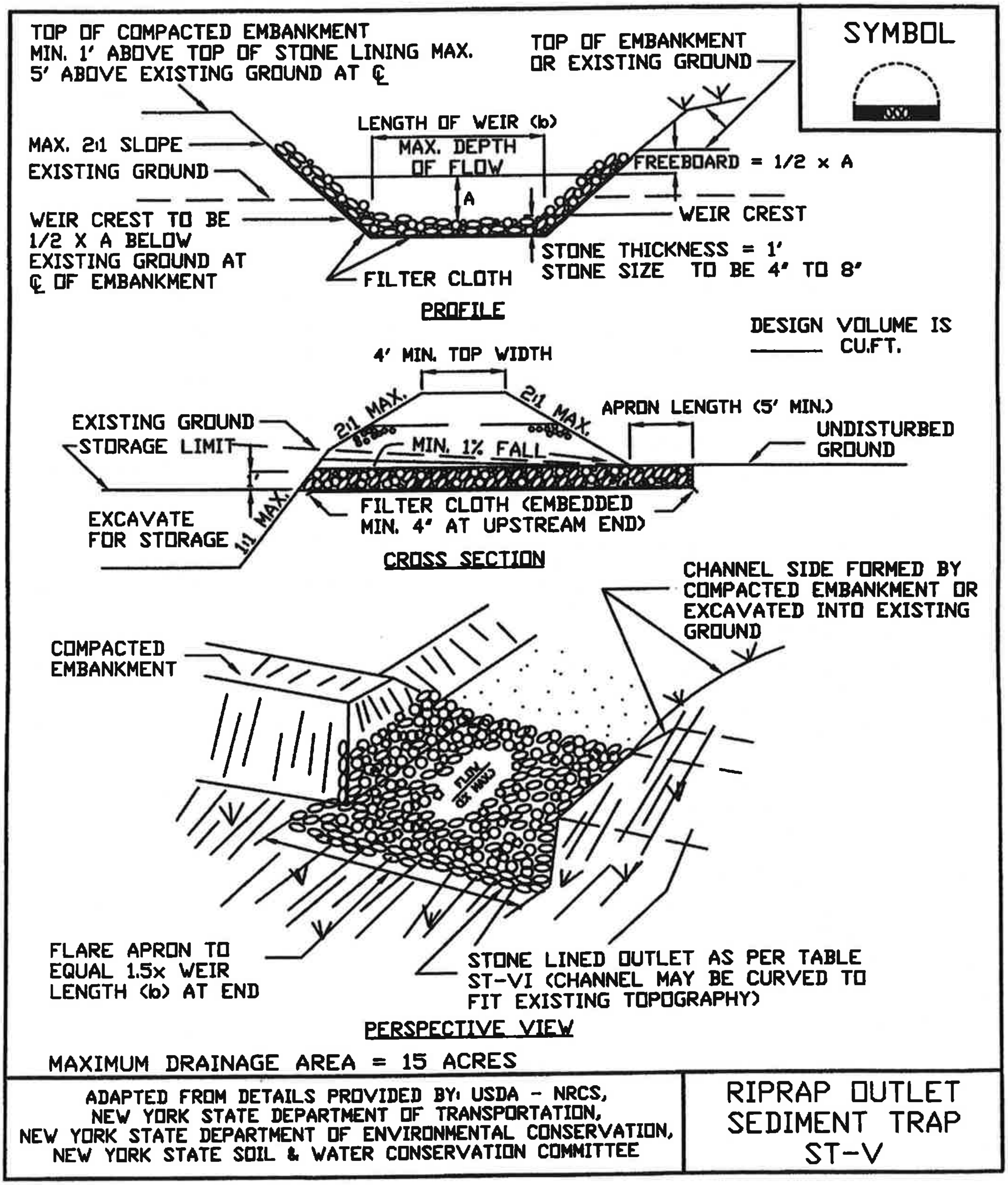


Figure 5A.202)
Riprap Outlet Sediment Trap: ST-V—Construction Specifications

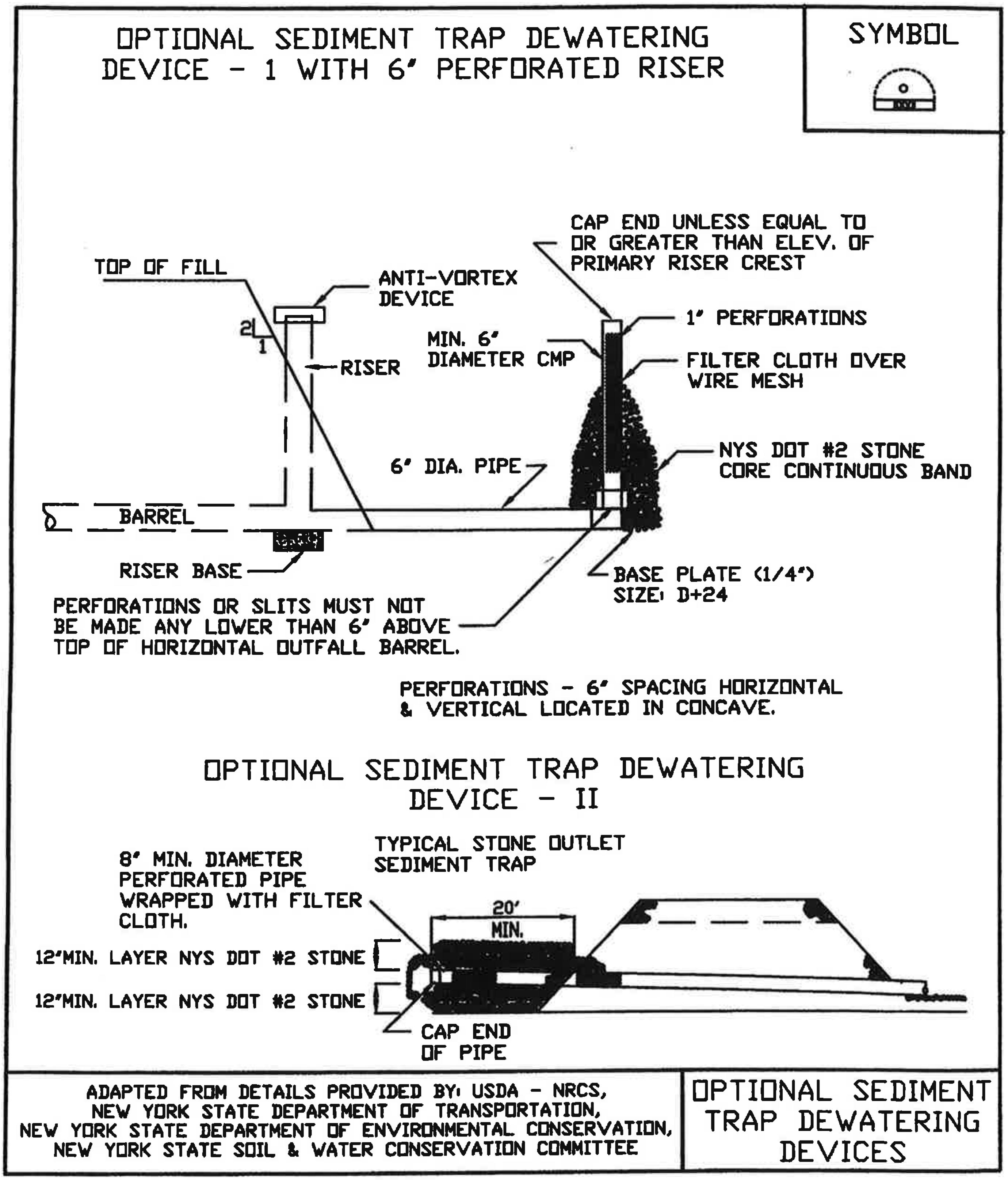
SYMBOL

CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RIPRAP OUTLET SEDIMENT TRAP ST-V

Figure 5A.21
Optional Sediment Trap Dewatering Devices



STANDARD AND SPECIFICATIONS FOR LEVEL SPREADER

Definition

A temporary non-erosive outlet for concentrated runoff, constructed to disperse flow uniformly across a slope.

Purpose

To convert concentrated flow to sheet flow and release it uniformly over a stabilized area.

Conditions Where Practice Applies

Where sediment-free storm runoff can be released in sheet flow down a stabilized slope without causing erosion; where a level lip can be constructed without filling; where the area below the level lip is uniform with a slope of 10% or less and the runoff will not re-concentrate after release; and where no traffic will be allowed over spreader.

Design Criteria

The design capacity shall be determined by estimating the peak flow from the 10-year storm. The drainage area shall be restricted to limit the maximum flows into the spreader to 30 cfs. The level spreader shall have the following minimum dimension:

Design Flow (cfs)	Minimum Entrance Width (ft.)	Depth (ft.)	End Width (ft.)	Length (ft.)
0-10	10	0.5	3	10
10-20	16	0.6	3	20
20-30	24	0.7	3	30

A transition section 20 feet in length shall be constructed from the width of the diversion or channel to the width of the spreader to ensure uniform outflow. This last transition section will blend the diversion grade to zero grade at the beginning of the spreader.

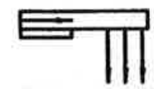
Construct the level lip in undisturbed soil to a uniform height and zeros grade over the length of the spreader. Protect the lip with an erosion resistant material or mat to prevent erosion and allow vegetation to become established.

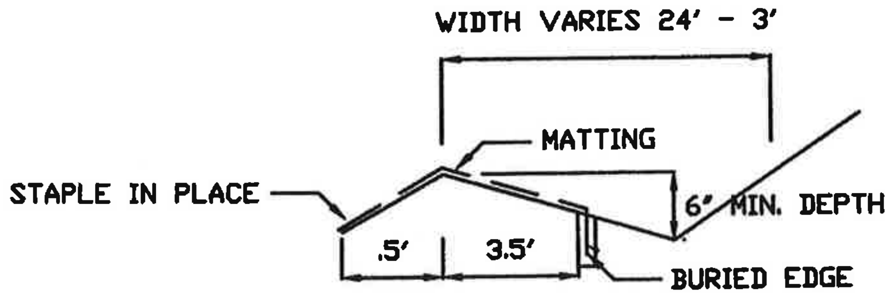
The outlet area should be a generally smooth, well-vegetated areas no steeper than 10 percent.

See Figure 5A.5 on page 5A.14 for details.

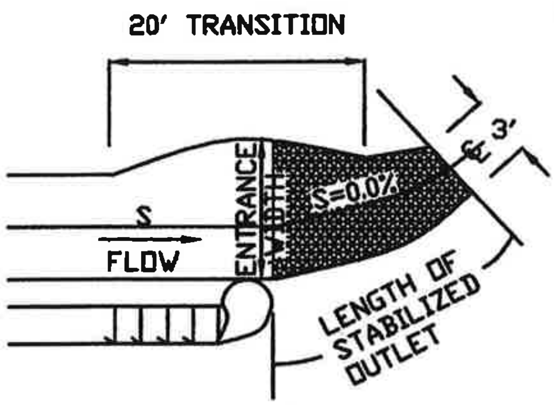
Figure 5A.5
Level Spreader

SYMBOL





CROSS SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

Q(cfs)	E.W.(ft)	D(ft)	LENGTH(ft)
0-10	10	0.5	10
10-20	16	0.6	20
20-30	24	0.7	30

CONSTRUCTION SPECIFICATIONS

1. THE MATTING SHOULD BE A MINIMUM OF 4FT. WIDE EXTENDING 6 INCHES OVER THE LIP AND BURIED 6 INCHES DEEP IN A VERTICAL TRENCH ON THE LOWER EDGE. THE UPPER EDGE SHOULD BUTT AGAINST SMOOTHLY CUT SOD AND BE SECURELY HELD IN PLACE WITH CLOSELY SPACED HEAVY DUTY WIRE STAPLES AT LEAST 12 INCHES IN LENGTH.
2. ENSURE THAT THE LIP IS LEVEL TO UNIFORMLY SPREAD DISCHARGE.
3. THE LIP SHALL BE CONSTRUCTED ON UNDISTURBED SOIL NOT FILL.
4. A 20 FOOT TRANSITION SECTION WILL BE CONSTRUCTED FROM THE DIVERSION CHANNEL TO THE SPREADER TO SMOOTHLY BLEND THE DIFFERENT DIMENSION AND GRADES.
5. THE RUNOFF DISCHARGE WILL BE OUTLETED ONTO A STABILIZED VEGETATED SLOPE NOT EXCEEDING 10%.
6. SEED AND MULCH THE DISTURBED AREA IMMEDIATELY AFTER CONSTRUCTION.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

LEVEL SPREADER

APPENDIX J

Sample Inspection Reports

State Land Corp.

Pre-Construction Site Assessment Checklist Page 1 of 2

Name of Permitted Facility:	Permit Identification #: NYR	Date of Authorization:
Location:	SDC Project No.:	
Name and Telephone Number of Owner/Operator:	Name and Telephone Number of Site Inspector:	
Today's date: Day: S M T W T F S AM or PM	Weather / Temp:	

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes	No	NA	Observations
			Has a Notice of Intent been filed with the NYS Department of Conservation?
			Is the SWPPP on-site? Where? ______________________________
			Is the Plan current? What is the latest revision date? ____________________
			Is a copy of the NOI (with brief description) on-site? Where? ________________
			Have all contractors involved with stormwater-related activities signed a contractor's certification?

2. Resource Protection:

Yes	No	NA	Observations
			Are construction limits clearly flagged or fenced?
			Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
			Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection:

Yes	No	NA	Observations
			Clean stormwater runoff has been diverted from areas to be disturbed.
			Bodies of water located either on-site, or in the vicinity of the site, have been identified or protected.
			Appropriate practices to protect on-site or downstream surface water are installed.
			Are clearing and grading operations divided into areas < 5 acres?

State Land Corp.

Pre-Construction Site Assessment Checklist Page 2 of 2

4. Stabilized Construction Entrance:

Yes	No	NA	Observations
			A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
			Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
			Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls:

Yes	No	NA	Observations
			Silt fence material and installation comply with the standard drawing and specifications.
			Silt fences are installed at appropriate spacing intervals.
			Sediment/detention basin was installed as first hand disturbing activity.
			Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials:

Yes	No	NA	Observations
			The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
			The plan is contained in the SWPPP on page _______________.
			Appropriate materials to control spills are on-site. Where?____________________________.

Note: Provide comments below as necessary:

____

____

____

____

____

____

State Land Corp.

Construction Duration Inspections: Page 1 of 6

Name of Permitted Facility:	Permit Identification #: NYR	Date of Authorization:
Location:	SDC Project No.:	
Name and Telephone Number of Owner/Operator:	Name and Telephone Number of Site Inspector:	
Today's date: Day: S M T W T F S AM or PM	Weather / Temp:	

Permit Reference: Part IV.C.2.a (page 17):

"For construction sites where soil disturbance activities are on-going, the qualified inspector shall conduct a site inspection at least once every seven (7) calendar days."

Directions: Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

Immediate report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

State Land Corp.

Construction Duration Inspections: Page 2 of 6

Identify location, nature of work, by contractor and subcontractors for each operation:

PLAN / SKETCH

Inspector (print name) Date of Inspection

Qualified Professional (print name) Qualified Professional Signature

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Construction Duration Inspections: Page 3 of 6

Maintaining Water Quality

Yes	No	NA	Observations
			Is there an increase in turbidity causing a substantial contrast to natural conditions?
			Is there residue from oil and floating substances, visible oil film, or globules or grease?
			All disturbances are within the limits of the approved plans.
			Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes	No	NA	Observations
			Is construction site litter and debris appropriately managed?
			Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
			Is construction impacting the adjacent property?
			Is dust adequately controlled?

2. Temporary Stream Crossing

Yes	No	NA	Observations
			Maximum diameter pipe necessary to span creek without dredging are installed.
			Installed non-woven geotextile fabric beneath approaches.
			Is fill composed of aggregate (no earth or soil)?
			Rock on approaches is clean enough to remove mud from vehicles and prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering

Yes	No	NA	Observations
			Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
			Clean water from upstream pool is being pumped to the downstream pool.
			Sediment-laden water from work area is being discharged to a silt-trapping device.
			Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader

Yes	No	NA	Observations
			Installed per plan.
			Constructed on undisturbed soil, not on fill, receiving only clean, non-sediment laden flow.
			Flow sheets out of level spreader without erosion on downstream edge.

Construction Duration Inspections: Page 4 of 6

3. Interceptor Dikes and Swales

Yes	No	NA	Observations
			Installed per plan with minimum side slopes 2H:1V or flatter.
			Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
			Sediment-laden runoff directed to sediment trapping structure.

4. Stone Check Dam

Yes	No	NA	Observations
			Is channel stable? (Flow is not eroding soil underneath or around the structure.)
			Check is in good condition. (Rocks in place and no permanent pools behind the structure.)
			Has accumulated sediment been removed?

5. Rock Outlet Protection

Yes	No	NA	Observations
			Installed as per Plan
			Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes	No	NA	Observations
			Stockpiles are stabilized with vegetation and/or mulch.
			Sediment control is installed at the toe of the slope.

2. Revegetation

Yes	No	NA	Observations
			Temporary seedings and mulch have been applied to idle areas.
			Four inches minimum of topsoil has been applied under permanent seedings.

Sediment Control Practices

1. Stabilized Construction Entrance

Yes	No	NA	Observations
			Stone is clean enough to effectively remove mud from vehicles.
			Installed per standards and specifications?
			Does all traffic use the stabilized entrance to enter and leave site?
			Is adequate drainage provided to prevent ponding at entrance?

Construction Duration Inspections: Page 5 of 6

2. Silt Fence – Sediment accumulation is _____ % of design capacity.

Yes	No	NA	Observations
			Installed on Contour, 10-feet from toe of slope (not across conveyance channels).
			Joints constructed by wrapping the two ends together for continuous support.
			Fabric buried 6-inches minimum.
			Posts are stable, fabric is tight and without rips or frayed areas.

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices) – Sediment accumulation ____% of design capacity.

Yes	No	NA	Observations
			Installed concrete blocks lengthwise so open ends face outward, not upward.
			Placed wire screen between No. 3 crushed stone and concrete blocks.
			Drainage area is 1 acre or less.
			Excavated area is 900 cubic feet.
			Excavated side slopes should be 2:1.
			2" x 4" frame is constructed and structurally sound.
			Posts 3-foot maximum spacing between posts.
			Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
			Posts are stable, fabric is tight and without rips or frayed areas.

4. Temporary Sediment Trap – Sediment accumulation is _____% of design capacity.

Yes	No	NA	Observations
			Outlet structure is constructed per the approved plan or drawing.
			Geotextile fabric has been placed beneath rock fill.

5. Temporary Sediment Trap – Sediment accumulation is _____% of design capacity.

Yes	No	NA	Observations
			Basin and outlet structure constructed per the approved plan.
			Basin side slopes are stabilized with seed/mulch.
			Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Recommended maintenance or additional measures:

____
____
____
____
____

Notes or Comments:

____
____
____
____
____

Construction Duration Inspections: Page 6 of 6

Modifications to the SWPPP
(To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this Permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification and Reason:

State Land Corp.

Stormwater Management Pond/Wetland Construction Inspection Checklist

Name of Permitted Facility:	Permit Identification #: NYR	Date of Authorization:
Location:	SDC Project No.:	
Name and Telephone Number of Owner/Operator:	Name and Telephone Number of Site Inspector:	
Today's date: Day: S M T W T F S AM or PM	Weather / Temp:	

Permit Reference: Part IV.C.2.a (page 17):

"For construction sites where soil disturbance activities are on-going, the qualified inspector shall conduct a site inspection at least once every seven (7) calendar days."

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
1. Pre-Construction / Materials and Equipment		
Pre-Construction Meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked.		
1. Material (including protective coating, if specified).		
2. Diameter.		
3. Dimensions of metal riser or pre-cast concrete outlet structure.		
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans.		
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope.		

Post-Development Stormwater Management Practice Construction Inspection Checklist Page 2 of 8

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
6. Number and dimensions of prefabricated anti-seep collars.		
7. Watertight connectors and gaskets.		
8. Outlet drain valve.		
Project benchmark near pond site.		
Equipment for temporary de-watering.		
2. Subgrade Preparation		
Area beneath embankment stripped of all vegetation, topsoil and organic matter.		
3. Pipe Spillway Installation		
Method of installation details on plans.		
A. Bed Preparation		
Installation trench excavated with specified side slopes.		
Stable, uniform, dry subgrade of relatively impervious material. (If subgrade is wet, contractor shall have defined steps before proceeding with installation.)		
Invert at proper elevation and grade.		
B. Pipe Placement – Metal / Plastic		
1. Watertight connectors and gaskets properly installed.		
2. Anti-seep collars properly spaced and having watertight connections to pipe.		
3. Backfill placed and tamped by hand under "haunches" of pipe.		

Post-Development Stormwater Management Practice Construction Inspection Checklist Page 3 of 8

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2-feet of cover over pipe is reached.		
Pipe Placement – Concrete Pipe		
1. Pipe set on blocks or concrete slab for pouring of low cradle.		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area.		
3. Excavation for lower half of anti-seep collars(s) with reinforcing steel set.		
4. Entire area where anti-seep collars(s) will come in contact with pipe coated with mastic or other approved waterproof sealant.		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix.		
6. Upper half of anti-seep collars(s) formed with reinforcing steel set.		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary).		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Purge if necessary.		

Post-Development Stormwater Management Practice Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
C. Backfilling		
Fill placed in maximum 8-inch lifts.		
Backfill taken minimum 2-feet above top of anti-seep collar elevation before traversing with heavy equipment.		
4. Riser / Outlet /Structure Installation		
Riser located within embankment.		
A. Metal riser		
1. Rise base excavated or formed on stable subgrade to design dimensions.		
2. Set on blocks to design elevations and plumbed.		
3. Reinforcing bars placed at right angles and projecting into sides of riser.		
4. Concrete poured as to fill inside of riser to invert of barrel.		
B. Pre-Cast Concrete Structure		
1. Dry and stable elevation.		
2. Riser base set to design elevation.		
3. If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely.		
4. Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway.		

Post-Development Stormwater Management Practice
Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
C. Poured Concrete Structure		
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set.		
Structure formed to design dimensions, with reinforcing steel set as per Plan.		
Concrete of an approved mix and vibrated into place (protect from freezing while curing, if necessary).		
Forms stripped and inspected for "honeycomb" prior to backfilling; parge if necessary.		
5. Embankment Construction		
Fill Material		
Compaction		
Embankment		
1. Fill placed in specified lifts and compacted with appropriate equipment.		
2. Constructed to design cross-section , side slopes and top width.		
3. Constructed to design elevation plus allowance for settlement.		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes.		
Inlet pipes have adequate outfall protection.		
Forebay(s).		
Pond benches.		

Post-Development Stormwater Management Practice Construction Inspection Checklist
Page 6 of 8

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
7. Earth Emergency Spillway Construction		
Spillway located in cur or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width.		
Entrance channel, crest, and exit channel constructed to design grades and elevations.		
8. Outlet Protection		
A. End Section		
Securely in place and properly backfilled.		
B. Endwall		
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified.		
Endwall formed to design dimensions with reinforcing steel set as per Plan.		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary).		
Forms stripped and structure inspected for “honeycomb” prior to backfilling; parge if necessary.		
C. Riprap Apron / Channel		
Apron / Channel excavated to design cross-section with proper transition to existing ground.		

Post-Development Stormwater Management Practice Construction Inspection Checklist

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
Filter fabric in place.		
Stone sized as per Plan and uniformly placed at the thickness specified.		
9. Vegetative Stabilization		
Approved seed mixture or sod.		
Proper surface preparation and required soil amendments.		
Excelsior mat or other stabilization, as per Plan.		
10. Miscellaneous		
Drain for ponds having a permanent pool.		
Trash rack / anti-vortex device secured to outlet structure.		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required).		
Access road.		
Set aside for clean-out maintenance.		
11. Stormwater Wetlands		
Adequate water balance.		
Variety of depth zones present.		
Approved pondscaping plan in place. Reinforcement budget for additional plantings.		
Plants and materials ordered 6 months prior to construction.		
Construction planned to allow for adequate planting and establishment of plant community (April–June planting window).		
Wetland buffer area preserved to maximum extent possible.		

Post-Development Stormwater Management Practice Construction Inspection Checklist

Comments:

Actions to be Taken:

APPENDIX K

Schedule "B"

Schedule B

Stormwater Control Facility Maintenance Agreement

State Land Corp.

Whereas, the Municipality of Yorktown ("Municipality") and the State Land Corp. ("Facility Owner") want to enter into an agreement to provide for the long term maintenance and continuation of stormwater control measures approved by the Municipality for the below named project, and

Whereas, the Municipality and the Facility Owner desire that the stormwater control measures be built in accordance with the approved project plans and thereafter be maintained, cleaned, repaired, replaced and continued in perpetuity in order to ensure optimum performance of the components. Therefore, the Municipality and the Facility Owner agree as follows:

1. This agreement binds the Municipality and the Facility Owner, its successors and assigns, to the maintenance provision depicted in the approved project plans which are attached as Schedule A of this agreement.

2. The Facility Owner shall maintain, clean, repair, replace and continue the stormwater control measures depicted in Schedule A as necessary to ensure optimum performance of the measures to design specifications. The stormwater control measures shall include, but shall not be limited to, the following: drainage, ditches, swales, dry wells, infiltrators, drop inlets, pipes, culverts, soil absorption devices and retention ponds.

3. The Facility Owner shall be responsible for all expenses related to the maintenance of the stormwater control measures and shall establish a means for the collection and distribution of expenses among parties for any commonly-owned facilities.

4. The Facility Owner shall provide for the periodic inspection of the stormwater control measures, not less than once in every five-year period, to determine the condition and integrity of the measures. Such inspection shall be performed by a Professional Engineer licensed by the State of New York. The inspecting engineer shall prepare and submit to the Municipality within 30 days of the inspection, a written report of the findings including recommendations for those actions necessary for the continuation of the stormwater control measures.

5. The Facility Owner shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the stormwater control measures except in accordance with written approval of the Municipality.

6. The Facility Owner shall undertake necessary repairs and replacement of the stormwater control measures at the direction of the Municipality or in accordance with the recommendations of the inspecting engineer.

7. The Facility Owner shall provide to the Municipality within 30 days of the date of this agreement, a security for the maintenance and continuation of the stormwater control measures in the form of (a Bond, letter of credit or escrow account).

8. This agreement shall be recorded in the Office of the County Clerk, County of Westchester together with the deed for the common property and shall be included in the offering plan and/or prospectus approved pursuant to Chapter 248 of the Town Code of Yorktown.

9. If ever the Municipality determines that the Facility Owner has failed to construct or maintain the stormwater control measures in accordance with the project plan or has failed to undertake corrective action specified by the Municipality or by the inspecting engineer, the Municipality is authorized to undertake such steps as reasonably necessary for the preservation, continuation or maintenance of the stormwater control measures and to affix the expenses thereof as a lien against the property.

10. This agreement is effective ____________________.

11. By certifying this document the Facility Owner acknowledges that he/she understands and has agreed to and will comply with the approved Stormwater Management Plan and associated construction documents referenced herein for this site.

State Land Corp.

State of New York)
)ss:
County of Westchester)

On this ___________ day of ______________ in the year _______, before me, the undersigned, a Notary Public in and for said State, personally appeared ___________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

______________________________ ______________________________
Name of Facility Owner Signature of Facility Owner

____
Notary Public

• •

State of New York)
)ss:
County of Westchester)

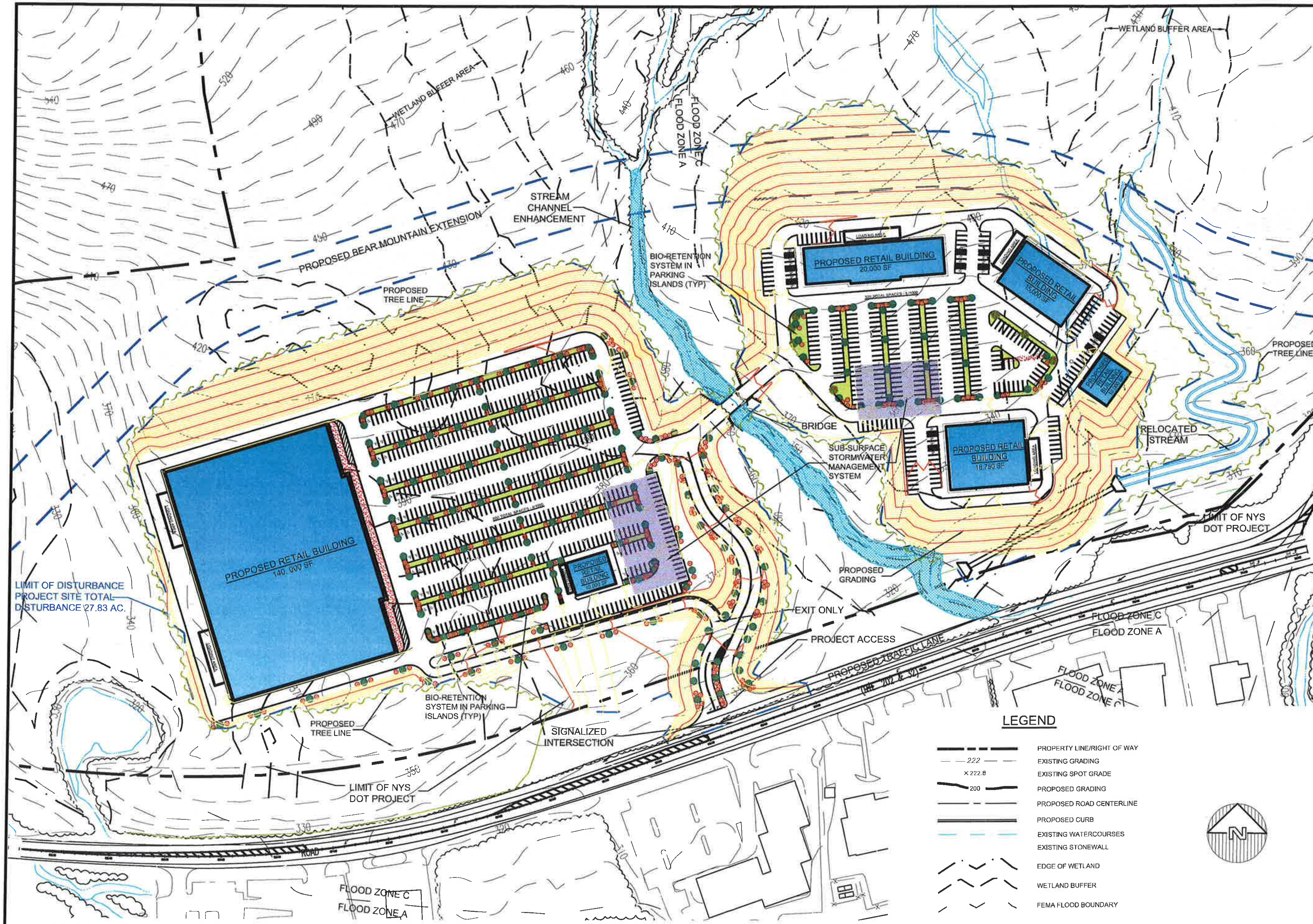
On this ___________ day of ______________ in the year _______, before me, the undersigned, a Notary Public in and for said State, personally appeared ___________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual or the person upon behalf of which the individual acted, executed the instrument.

______________________________ ______________________________
Name of Town Official Signature of Town Official

____
Notary Public

APPENDIX L

Figure 3 – Preliminary Site Improvement Plan
Prepared for
"Charles Monaco aka State Land Corp."



SCALE: NTS

DATE: 3/07/12

Site Design Consultants
Civil Engineers • Land Planners
251 F Underhill Avenue Yorktown Heights, NY 10598
(914) 962-4488 - Fax (914) 962-7386
www.sitedesignconsultants.com

FIGURE 3 - PRELIMINARY SITE IMPROVEMENT PLAN

PREPARED FOR

CHARLES MONACO

a.k.a State Land Corp.

ROUTE 202

Town Of Yorktown

Westchester Co., New York

NOTE: UNAUTHORIZED ALTERATIONS OR ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 7209 (2) OF THE NEW YORK STATE EDUCATION LAW.