Appendix J
Storm Water Pollution Prevention Plan

Stormwater Pollution Prevention Plan

Brunswick Meadows
Residential Condominium Community

Town of Brunswick
County of Rensselaer
State of New York

January 13, 2005
Revised April 9, 2007

Project Sponsor:

J.P.J. Partnership
6 Century Hill Drive
Latham, New York 12110
(518) 785-9600

Prepared By:

Thomas M. Murley, P.E.
32 Hialeah Drive
Troy, New York 12182
(518) 235-8920

Stormwater Pollution Prevention Plan

Brunswick Meadows
Residential Condominium Community

January 13, 2005 - Revised April 9, 2007

Table of Contents

Stormwater Pollution Prevention Plan

Brunswick Meadows
Residential Condominium Community

January 13, 2005 - Revised April 9, 2007

Exhibits

Exhibit A - Project Location Map
Exhibit B - Site Plan Layout
Exhibit C - Soil Data
Exhibit D - Specifications and Details
Exhibit E – SWPPP Forms & Reports

- **Operator's Certification Statement No. 1**
- **Operator's Certification Statement No. 2**
- **Contractor Certification Statement**
- **Contractors and Subcontractors Certification Summary Log**
- **Inspection Report**
- **Construction Activities Report**
- **Sedimentation and Erosion Control Stabilization Measures Report**
- **Rainfall Log Report**
- **Training Log Report**
- **Final Stabilization Certification Report**

Exhibit F – NYSDEC SPDES General Permit No. GP-02-01
Exhibit G – NYSDEC Notice of Intent ("NOI")
Exhibit H – NYSDEC Notice of Termination ("NOT")
Exhibit I – Erosion and Sedimentation Control Plan

Introduction

The purpose of this Stormwater Pollution Prevention Plan (SWPPP) is to comply with the NYSDEC SPDES Stormwater Permit for construction activities for the Brunswick Meadows project, a 124-unit residential condominium community to be developed in the Town of Brunswick, Rensselaer County, New York. The proposed site of this residential condominium community is on the south side of New York State Route 142, also known as Grange Road and approximately 500 feet east of the City of Troy and Town of Brunswick municipal boundary line. The proposed site is bordered generally on the north by NYS Route 142 and bordered on the west by lands of Niagara Mohawk Power Corporation. Located to the west of the site is Hialeah Estates, a 25 lot residential single-family home subdivision located in the City of Troy constructed in the early 1970's. A project location map is included as Exhibit A.

Approximately 18.3 acres of land is to be developed for the proposed Brunswick Meadows project. See attached Exhibit B for a proposed site plan of the project. The southern part of the site is presently vacant brush / wooded land with a running stream traversing through the site leading to the old Lansingburgh Water Works Storage Reservoir located to the west of the project site. The middle portion of the site is presently vacant land. The northerly portion of the site is a mowed grass lawn.

The northerly portion of the site (400 feet south from NYS Route 142) is currently zoned as a "R-15 Residential" and the remaining part of the site is zoned as "A-40 Agricultural". The predominate land use in the surrounding area is residential in nature with mostly single-family homes. It is proposed that the Brunswick Meadows residential condominium community be established as a Planned Development District (PDD) in accordance with the Town of Brunswick Zoning Ordinance regulations outlined in Article IV Section 10. The PDD zoning designation will allow for a development design to maximize choices in the types of environment, housing, densities, occupancy tenure, lot sizes, community facilities, usable open space and recreational areas within a large parcel of land in which residential uses are proposed. The intent of this PDD zoning district is to foster a creative and efficient use of land resulting in small networks of utilities and streets, the preservation of existing natural resources and a development pattern consistent with community needs and standards.

The infrastructure design presented in this report is expected to provide the required measures necessary to mitigate any unanticipated impacts generated by this project.

Project Description

The Brunswick Meadows residential condominium community that is proposed will consist of 124 units of condominium residences constructed in 31 buildings with four (4) dwelling units in each building. The overall density of the proposed project will be approximately 6.77 unit per acre. Approximately 60 % of the site will be open green space and walking trails.

These condominium units will be constructed and marketed towards the retirement-aged homeowners and young single couples. Each condominium unit will contain a minimum of two (2) bedrooms, a single car garage, separate entrances and individual driveway. Estimated sale price for the condominium units will be in the $140,000 to $150,000 range depending upon the unit's type, size and location. Living areas of the condominiums will be approximately 1,350 square feet for the first floor units and approximately 1,600 square feet for the second floor units

The infrastructure included as part of this project are sanitary collection sewers, stormwater collection sewers, water distribution main, fire hydrants and a private street, all which are to be built to Town of Brunswick specifications. The water system and sanitary sewer system is expected to be conveyed by deed to the Town of Brunswick for future operation and maintenance. The Brunswick Meadows Homeowners Association will maintain the roadways, parking areas and the storm water management systems. Electric, natural gas, cable TV and telephone facilities necessary to service the residential units will be installed underground by the various private utility companies. All costs associated with the development of this project and infrastructure will be borne by the developer.

Topography

Overall, approximately 85% of the project site drains generally to the west towards the City of Troy boundary line and enters a culvert that leads under Hialeah Drive and into the old Lansingburgh Water Works Storage Reservoir. The remaining 15% of the site drains southerly towards the stream that leads to the old Lansingburgh Water Works Storage Reservoir near Biscayne Boulevard in the City of Troy. See Exhibit A for the USGS contours of the site.

The topography at the north end of the project is gently rolling land with patches of brush and small trees scattered through out the site. The topography at the south end of the project slopes moderately towards the stream located along the proposed southerly property line. This moderate slope is heavily wooded and will remain intact in its present natural state.

It is proposed that this wooded area along the stream be used as public open space along with a nature-walking trail to be connected with Brunswick Meadows Way at several access points. A small picnic table pavilion with barbecue grills will also be constructed in this wooded area to allow residents to gather for community events and sight seeing of the wilderness. Selective thinning of some of the trees and brush along the stream and trails will take place under the direction of the project engineer. Extreme care will be taken to avoid any damage to this wooded overlook area during the clearing and construction operations. The vegetated buffer along the stream corridor protects the ecological values of the stream as well as provides recreational opportunities for walking and hiking. Protecting this stream corridor will be a very important part of the project. This buffer along the stream protects the water quality and hydrology of the area thus ensuring that the wetland will continue to provide its ecological services and provide for important wildlife habitat.

The existing wooded / brush areas along the west property line adjacent to the Niagara Mohawk Power Company right-of-way shall be preserved as much as possible to act as a buffer between the Hialeah Estates development and the proposed Brunswick Meadows site. The wooded / brush area located near the property lines with the existing homes along NYS Route 142 will be preserved and additional landscaping will be planted to act as a buffer for these single family homes.

Soils & Wetlands

The *"Soil Survey of Rensselaer County, New York"* published by the United States Department of Agricultural Soil Conservation Service provides the "Building Site Development" properties and engineering characteristics for the soils in the Brunswick Meadows site. See Exhibit C.

The Brunswick Meadows soils, as found from the north portion of the site to the south end of the site, are classified as follows:

- **BnC – Bernardston – Nassau complex, rolling.**
- **SwA – Shaker very fine sandy loam, sandy substratum, 0 to 4 percent slopes.**
- **ElB – Elmridge very fine sandy loam, 3 to 8 percent slopes.**
- **HuE – Hudson silt loam, steep.**
- **FlA – Fluvaquents – Udifluvents complex, 0 to 3 percent slopes.**

The site is generally will drained, however, some areas of perched groundwater maybe encountered during excavation, however, the quantities and flow rates are expected to be relatively small. It is expected, based upon the excavations in the adjacent Hialeah Estates development, that the installation of the various utilities will be accomplished with the use of a standard hydraulic excavator. Rock is not expected to be encountered anywhere on the site. Acceptable spoil materials may be used as fill for any low-lying areas on the site.

The condominium building structures will be built on shallow spread footings on undisturbed, inorganic soil or on controlled fill that, in turn, rests on these undisturbed soils. No special foundation conditions are expected to be required for any of the structures. Select stone fill shall be used around footing drains where a high water table is encountered during excavation. A qualified licensed professional engineer shall design the building foundations after further soil investigations have been performed.

A wetland delineation survey indicates that there are two areas that are designated as United States Army Corps of Engineers (USACOE) wetlands. One of these USACOE wetlands is located at the south end of the project and consists of the stream and the buffer land adjacent to the stream as it traverses through the site in an east / west direction. The second USACOE wetland is located in the middle of the site adjacent to the City of Troy and Town of Brunswick boundary line. This area drains into the old Lansingburgh Water Works Storage Reservoir. There are no NYSDEC wetlands located within or adjacent to the site.

To protect the surrounding environment during construction, the project will have a Storm Water Pollution Prevention Plan (SWPPP) prepared and approved by the New York State Department of Environmental Conservation (NYSDEC). This SWPPP will incorporate erosion control methods as required by the *"New York Guidelines for Urban Erosion and Sediment Control".*

Stormwater Management Objectives

The primary stormwater management objective is to provide water quantity and quality control from the developed area to protect the downstream water channel.

A Stormwater Pollution Prevention Plan (SWPPP) is a plan for controlling runoff and pollutants from a site during and after construction activities. The principle objective of a SWPPP is to comply with the NYSDEC SPDES Stormwater Permit GP-02-01 for construction activities by planning and implementing the following practices:

- **Reduction or elimination of erosion and sediment loading to water bodies during construction;**
- **Control of the impact of stormwater runoff on the water quality of the receiving waters;**
- **Control of the increased volume and peak rate of runoff during and after construction;**
- **Maintenance of stormwater controls during and after completion of construction.**

A well-designed SWPPP requires proper selection, sizing and siting of stormwater management practices to protect water resources from stormwater impacts. Erosion and Sediment Control (ESC), Water Quantity Control, and Water Quality Controls are inter-related components of a SWPPP.

The proposed Brunswick Meadows project is regulated under NYSDEC SPDES General Permit (GP-02-01) for Stormwater Discharges from Construction Activity, and will require a full Stormwater Pollution Prevention Plan (SWPPP) to be prepared and be in place in advance of start of construction. The Stormwater Pollution Prevention Plan (SWPPP) for this project will comply with the New York State Stormwater Management Design Manual, dated August 2003. The construction site or post- construction runoff will not be discharging a pollutant of concern to either an impaired water identified on the New York State 303(d) List of Impaired Waters or to a watershed where an EPA approved Total Maximum Daily Load (TMDL) analysis has been completed for a pollutant of concern which would be discharged from construction or post-construction runoff.

To be covered under SPDES General Permit (GP-02-01) the Operator of the project site will submit a Notice Of Intent (NOI), five (5) business days in advance of construction, to NYSDEC for stormwater discharges from the proposed construction activity. The Contractor shall manage the discharge of stormwater from the site in accordance with the General Permit conditions and the requirements outlined in this SWPPP. The Contractor shall be responsible for conducting the stormwater management practices in accordance with the General Permit. The Contractor shall be responsible for providing qualified inspectors to conduct the inspections required by the SWPPP. The Contractor shall be

responsible for any enforcement action taken or imposed by Federal, State or Local agencies, including the cost of fines, construction delays, and remedial actions resulting from the Contractor's failure to comply with the General Permit and the SWPPP provisions. It shall be the responsibility of the Contractor to make changes to the SWPPP necessary when the Contractor or any of his subcontractors elects to use borrow or fill or material storage sites, either contiguous to or remote from the construction site, when such sites are used solely for this construction site. Such sites are considered to be part of the construction site covered by the General Permit and this SWPPP.

All contractors and subcontractors involved in earthwork operations at the site are required to review and understand the SWPPP and certify in writing such knowledge. Inspections by qualified personnel will be required at weekly periods and after each rainfall event of one-half (1/2 ") inch or greater within a 24-hour time period.

The existing City of Troy Hialeah Drive / old Lansingburgh Water Works Storage Reservoir storm sewer system discharges into the Oil Mill Creek that is located on the north side of Northern Drive. The Oil Mill Creek is a Class "C" stream. The best usage of Class "C" waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

The thirty-one condominium buildings will not have basements thus eliminating the need for sump pumps. Roof gutters for the buildings will be installed and connected to the storm water collection system. The storm water runoff for the buildings and parking areas will be collected at several drop inlets located throughout the site and connected to the Brunswick Meadows Way storm sewer system. This system will than discharge into a new detention pond to be located along the north side of the site.

All of the utilities, necessary to serve the project, will be located underground. The proposed 12-inch and 8-inch water lines will be connected to an existing 12-inch water main located at the intersection of Hialeah Drive and NYS Route 142 (Livingston Avenue) in the City of Troy, approximately 600 feet west of the Brunswick Meadows site. The proposed 8-inch sanitary sewer line will be connected to an existing 8-inch sanitary sewer main that is located in Hialeah Drive at the intersection of NYS Route 142 (Livingston Avenue). The location and size of the electric, gas, telephone and cable TV underground lines will not be finalized until after the project site is at final grade and the installation of the water and sanitary sewer lines are installed and backfilled. The utility companies (electric, gas, telephone and cable TV) will than install their facilities in a joint trench, as is common practice in new residential projects. These private utility companies will be provided with a copy of this SWPPP and be required to comply with its conditions.

Pre-development Conditions

The existing 18.3-acre site is predominately a grassy vacant field. The parcel of land to be developed is gently rolling land with mowed grass and cornfields throughout the site. The land slopes generally to the west towards the Town of Brunswick and City of Troy boundary line. The area at the south end of the project site is traversed by a stream that flows into the old Lansingburgh Water Works Storage Reservoir. This area will not be disturbed by the construction, but will be retained in its natural state for open space and walking trails.

The *"Soil Survey of Renselaer County, New York"* published by the United States Department of Agricultural Soil Conservation Service provides the "Building Site Development" properties and engineering characteristics for the soils in the Brunswick Meadows site.

The Brunswick Meadows soils, as found from the north portion of the site to the south end of the site, are classified as follows:

- **BnC – Bernardston – Nassau complex, rolling.**
- **SwA – Shaker very fine sandy loam, sandy substratum, 0 to 4 percent slopes.**
- **ElB – Elmridge very fine sandy loam, 3 to 8 percent slopes.**
- **HuE – Hudson silt loam, steep.**
- **FlA – Fluvaquents – Udifluvents complex, 0 to 3 percent slopes.**

The site is generally will drained, however, some areas of perched groundwater maybe encountered during excavation, however, the quantities and flow rates are expected to be relatively small. It is expected, based upon the test pits dug throughout the site in December 2004 and the excavations dug over the past several years in the adjacent Hialeah Estates development, that the installation of the various utilities would be accomplished with the use of a standard hydraulic excavator. Rock is not expected to be encountered anywhere on the site. Acceptable spoil materials may be used as fill for any low-lying areas on the site.

The condominium building structures will be built on shallow spread footings on undisturbed, inorganic soil or on controlled fill that, in turn, rests on these undisturbed soils. No special foundation conditions are expected to be required for any of the structures. Select stone fill shall be used around footing drains where a high water table is encountered during excavation. A qualified licensed professional engineer shall design the building foundations after further soil investigations have been performed.

A wetland delineation survey indicates that there are two areas that are designated as United States Army Corps of Engineers (USACOE) wetlands. One of these USACOE wetlands is located at the south end of the project and consists of the stream and the land adjacent to the stream as it traverses through the site in an east / west direction. The second USACOE wetland is located in the middle of the site

adjacent to the City of Troy and Town of Brunswick boundary line. This area drains into the old Lansingburgh Water Works Storage Reservoir. There are no NYSDEC wetlands located within or adjacent to the site.

Existing topsoil will be stockpiled in an area on the higher portion of the site for later use in the disturbed areas of the site to re-establish vegetation. Acceptable spoil materials removed during the grading operation will be used as fill and compacted on the east portion of the site.

To protect the surrounding environment during construction, the project will incorporate erosion control methods as required by the "New York State Standards and Specifications Erosion and Sediment Control", dated August, 2005.

Post-development Conditions

The project consists of the development of 124 condominium residential units of housing to be located in thirty-one two-story buildings (four units in each building). The site, after development, will be maintain as a New York State approved Homeowner Association operated and regulated by the resident owners of the condominiums. There will be a total of 336 parking spaces consisting of 124 spaces to be located in individual garages, 180 parking spaces located in the paved driveways in front of the garages and approximately 32 unassigned paved parking spaces located throughout the landscaped project site.

The proposed storm water management system for this project will consist of pre-cast concrete drop inlets located throughout the site connected by 12-inch and 18-inch HDPE pipe to a stormwater management detention pond located on the west portion of the site. This detention pond and appurtenances will than discharge into an existing stream that connects with the existing City of Troy storm sewer system located in Hialeah Drive. The Hialeah Drive storm sewer system, consisting of a 24-inch pipe, flows westerly into the old Lansingburgh Water Works Storage Reservoir. The old Lansingburgh Water Works Storage Reservoir connects to Oil Mill Creek located along the north side of Northern Drive. This storm sewer system flows westerly down Northern Drive and eventually into the Hudson River.

The old Lansingburgh Water Works Storage Reservoir was constructed in the 1800's as the municipal water system for the than Village of Lansingburgh and is located upstream from Oil Mill Creek near the intersection of Northern Drive and Leversee Road. This reservoir is presently used only for storm water management and recreational fishing for the Miami Beach Subdivision.

The Oil Mill Creek flows generally in a westerly direction into the old Lansingburgh Water Works Distributing Reservoir located on Northern Drive approximately 300 feet west of Oakwood Avenue. The old Lansingburgh Water Works Distributing Reservoir, also built in the 1800's is presently used only for storm water management and recreational fishing. The Oil Mill Creek flows generally in a westerly and northerly direction from the old Lansingburgh Water Works Distributing Reservoir through the north end of the City of Troy to a point north of the Waterford Bridge where it contributes flow into the Hudson River approximately 2 miles further to the west.

The City of Troy Department of Public Utilities indicates there is sufficient capacity in the existing storm sewer system to serve the Brunswick Meadows project as proposed.

Detailed specifications for the stormwater management system are as follows:

1. **Information, specifications and shop drawings for all storm sewer materials used shall be submitted to and approved by the design engineer or his representative and the Town of Brunswick prior to the placement of any orders for said material.**
2. **Pre-cast reinforced concrete drop inlets shall be installed as shown on the plans and shall be as manufactured by Fort Miller Company or equal as approved by the Town of Brunswick. The castings shall be heavy-duty cast iron capable of supporting a H-20 wheel loading.**
3. **Storm sewer pipe shall be HDPE as shown on the plans.**
4. **All drop inlets deeper than 5 feet shall have steps.**
5. **Whenever possible manholes and drop inlets deeper than 5 feet shall have eccentric cone tops.**
6. **All storm sewer pipes shall be bedded in a minimum of six (6) inches of crushed stone or pea stone and shall be backfilled and compacted with approximately twelve (12) inches of fine sandy gravel over the top of the pipe. The remainder of the trench shall be backfilled and compacted with acceptable material as ordered by the design engineer or his representative. Backfill shall be placed in such a manner as not to disturb the alignment of the pipe.**
7. **Trench backfill shall be placed in lifts not exceeding 12 inches in thickness prior to compaction and than compacted to 95% maximum dry density as determined by the Proctor method.**
8. **Backfill shall be of a suitable material removed from the excavation except where other material is specified or shown on the plans. Debris, frozen material, large clods or stones, organic matter or other unsuitable materials as determined by the design engineer or his representative shall not be used for backfill in the trench.**
9. **All piping shall be installed in dry conditions. Contractor shall perform necessary pumping and baling to make sure the trench is dry when the pipe is installed and during backfill and compaction.**

Erosion and Sediment Control

Erosion and sedimentation control will comply with the technical standards as contained in the document, "*New York State Standards and Specifications for Erosion and Sediment Control*" dated August, 2005.

Erosion and sedimentation control will be achieved in two phases:

1. **Temporary controls shall be installed and maintained throughout the site during construction activity. This will include silt fencing, hay bales, stone check dams, tracking pads at construction entrances, parking and equipment maintenance pads, silt fencing at drainage inlets and temporary seeding of disturbed areas susceptible to erosion. All appropriate stormwater control measures shall be in place before any site work construction and earthwork shall take place on any part of the project that requires such measures. All disturbed areas shall be seeded as soon as possible after completion of construction in that area. No area shall be left unstabilized within 14 days after completion of construction activities. Erosion control devices shall be maintained daily by the Contractor and shall be inspected once a week and after every one-half inch rainfall event occurring in a 24 hour period. A rain gauge shall be installed and maintained on the site to determine rainfall amounts. Dust control is not expected to be a problem due to the small area of exposure, the undisturbed perimeter of trees around the site, the shale / rock soil conditions and the relatively short time period of exposure (not to exceed 9 months). Should excessive dust be generated, it will be controlled by water sprinkling.**

2. **Permanent controls include the installation of geotextile erosion control blankets on slope areas as needed; planting of vegetation, including appropriate buffer shrubbery; vegetative filter strips along the paved parking areas; installation of sumps on drainage catch basins; construction of a detention pond and appurtenances; discharges from roof downspouts will be protected by splash blocks, sod and piping to drainage catch basins; concrete curbing / sidewalks will be used to control and direct runoff to drainage catch basins; and the construction of permanent landscaped areas to control and minimize storm water runoff from affecting areas of steep slopes.**

Water Quality Control

Water quality control (post-construction stormwater control practices) will comply with the technical standards as contained in the document, "*New York State Stormwater Management Design Manual*" published by the New York State Department of Environmental Conservation, Albany, New York and dated August 2003. This maintenance manual defines the tasks to be accomplished by the Owner / Developer in achieving the proper operation of the stormwater management system.

Water Quantity Control

Water quantity control (post-construction stormwater control practices) will comply with the technical standards as contained in the document, "*New York State Stormwater Management Design Manual*" published by the New York State Department of Environmental Conservation, Albany, New York and dated August 2003. This maintenance manual defines the tasks to be accomplished by the Owner / Developer in achieving the proper operation of the stormwater management system.

Pre-construction Stage

- **The Operator and Contractor shall obtain all necessary permits as required.**
- **A pre-construction meeting shall be held with all applicable project personnel, agencies representatives and the various contractors and subcontractors that will be involved with the project. An emergency telephone listing shall be developed and distributed accordingly.**
- **Prior to commencement of clearing and grading activities on the site, silt fencing, stone check dams and protective hay bale barriers shall be installed along the site's property lines where drainage runoff could leave the site.**
- **Existing drainage catch basins adjacent to the site will be inspected and cleaned out to allow for maximum sump volume during storm events.**
- **Drainage fabric and hay bales barriers will be installed at existing catch basins off-site to prevent erosion from entering the existing storm sewer system.**
- **A staging work pad / parking area will be constructed out of recycled asphalt pavement material for the excavating equipment to be used on the site.**
- **Evaluate, mark and protect important trees and associated rooting zones that are to remain.**
- **Portable toilets for the construction workers are to be delivered to the site and a regular schedule is to be developed for maintaining the units.**
- **Solid waste dumpster will be delivered to the site and emptied on a regular basis to control litter and construction debris from leaving the site during storm events and strong wind conditions.**
- **Contractor's Project Manager and Superintendent shall be certified and trained at a pre-construction meeting with the Operator's Project Manager and the Operator's Engineer.**
- **A SWPPP logbook shall be maintained at the site to record and document with a date and time of all construction activities and rainfall events. This logbook shall contain the Contractor's Certifications and the Inspection Reports for the project.**

Construction Stage

- **Establish a temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highways.**
- **As grading and excavation progresses, existing drainage patterns in undisturbed areas shall be maintained to direct runoff to existing storm water management system facilities.**
- **Construct the stormwater management detention pond and appurtenances.**
- **Establish vegetation on the stormwater detention pond site upon completion of infrastructure work.**
- **In all disturbed areas appropriate erosion control and pollution prevention devices shall be installed as work progresses.**
- **Stockpile the topsoil stripped from the site. Topsoil shall be protected, stabilized and sited in a location away from storm drains and property lines.**
- **Material stockpiles (crushed stone, sand and gravel) for the utility line construction shall be located in areas of the site that will not be in a direct line of surface runoff. Silt fencing shall be installed around the material stockpiles that are not being actively used for construction.**
- **Immediately upon completion of the utility line construction vegetative cover shall be re-established on all disturbed areas. If the weather / season conditions do not allow vegetative cover to be re-established, than appropriate rip rap stone material shall be used to seal the top of the utility trenches from erosion.**
- **Sediment tracked onto the public highways shall be removed or cleaned on a daily basis.**
- **Install additional sediment traps and barriers as needed during site grading and excavation. Install stone check dams to lower velocity of storm drainage runoff as needed.**
- **Excavation for footings, clearing, or other earth disturbance shall only take place after the sediment and erosion controls are installed.**
- **Avoid disturbance of steep slopes. An undisturbed buffer shall be maintained to control runoff from steep slopes.**
- **A concrete spoil / dumping area shall be developed and maintained on site in such a location as to avoid creating runoff of this slurry material from leaving or tracking off of the site. This spoil area shall be restored and reseeded in accordance with the specifications for the project.**
- **Temporary on-site storage of diesel fuel for construction equipment and construction chemicals will be in secured facilities and located in upland areas that will not be affected by stormwater runoff conditions. These materials and their site storage locations will be coordinated with the local fire department in case of emergencies.**
- **Sediment shall be removed from behind sediment silt fence when it becomes approximately 6-inches deep at the fence. The sediment fence shall be repaired as necessary to maintain a barrier. Sediment must be removed from**

sediment traps and sumps whenever their capacity has been reduced by 50 percent of the design capacity.

- **Erosion control devices shall be maintained daily by the Contractor and shall be inspected once a week and after every one-half inch rainfall event occurring in a 24 hour period.**
- **After building construction has progress to a stage where no further earthwork is required than the contractor shall complete pavement construction with the exception of the final asphalt concrete top course.**
- **Seed and mulch balance of lawn and install landscaping as required to complete site work as soon as possible after building construction has progressed to interior work.**
- **Clean all stormwater management facilities and appurtenances.**
- **Complete final top course of asphalt concrete pavement.**

Post-construction Stage

- **Inspect and clean all new drainage and stormwater management structures as needed to make sure that they are working as designed.**
- **Inspect all roof leaders and down spouts areas to assure proper working conditions.**
- **Maintain the landscaping, trees, shrubs, mulch and grass as designed.**
- **Advised the homeowner association of the need to maintain the stormwater management improvements as outlined in this stormwater pollution prevention plan.**
- **Evaluate the post-construction runoff condition on the site.**

Exhibit A

Brunswick Meadows
Project Location Map

0 0.1 0.2 0.3 0.4 0.5 km

0 0.09 0.18 0.27 0.36 0.45 mi

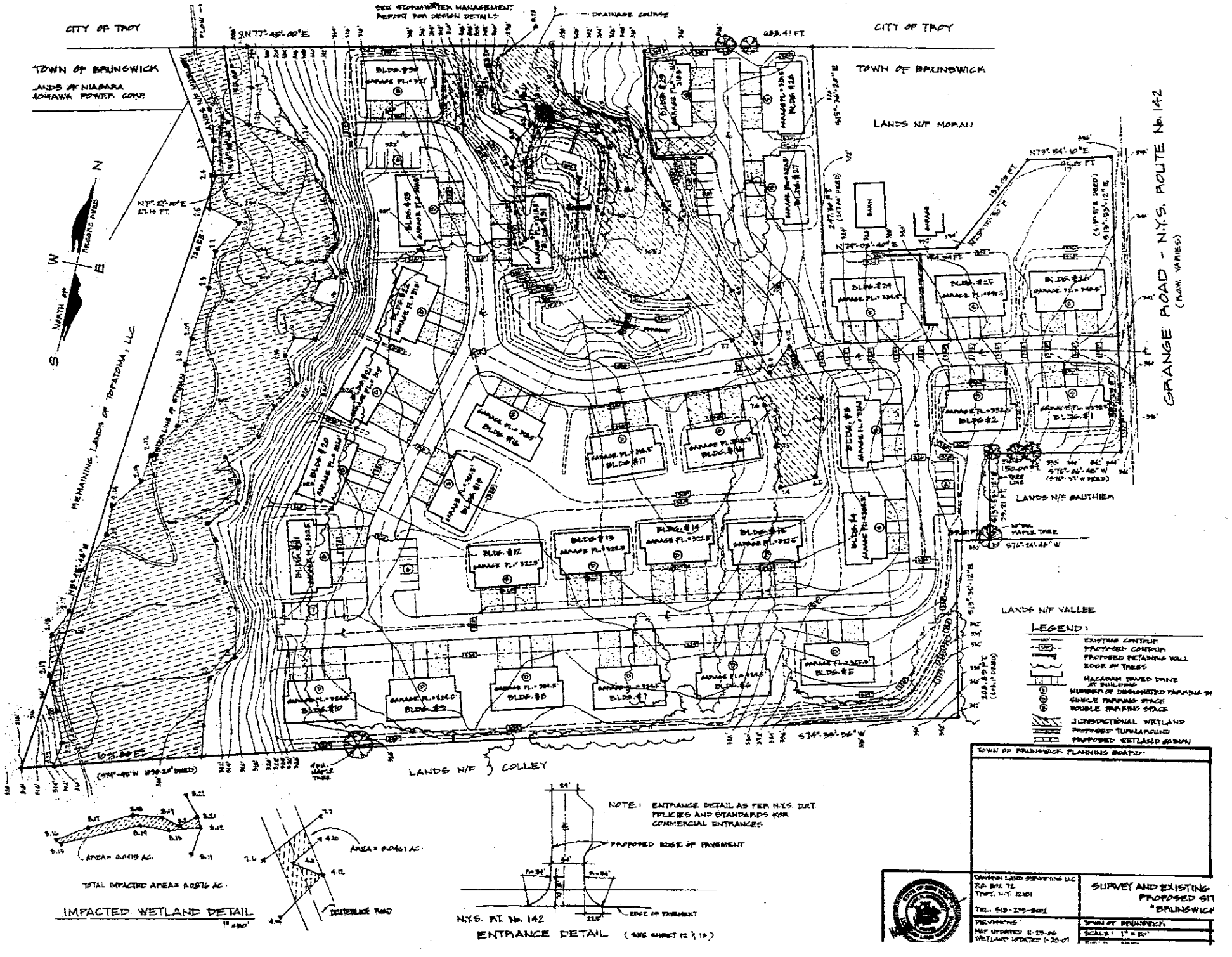
M * G

M=-14.35
G=0.917

Map center is UTM 18 610420E 4737310N (WGS84/NAD83)
Troy North quadrangle
Projection is UTM Zone 18 NAD83 Datum

Exhibit B

Brunswick Meadows
Site Plan Layout



DETAIL OF PROPOSED DEVELOPMENT

Exhibit C

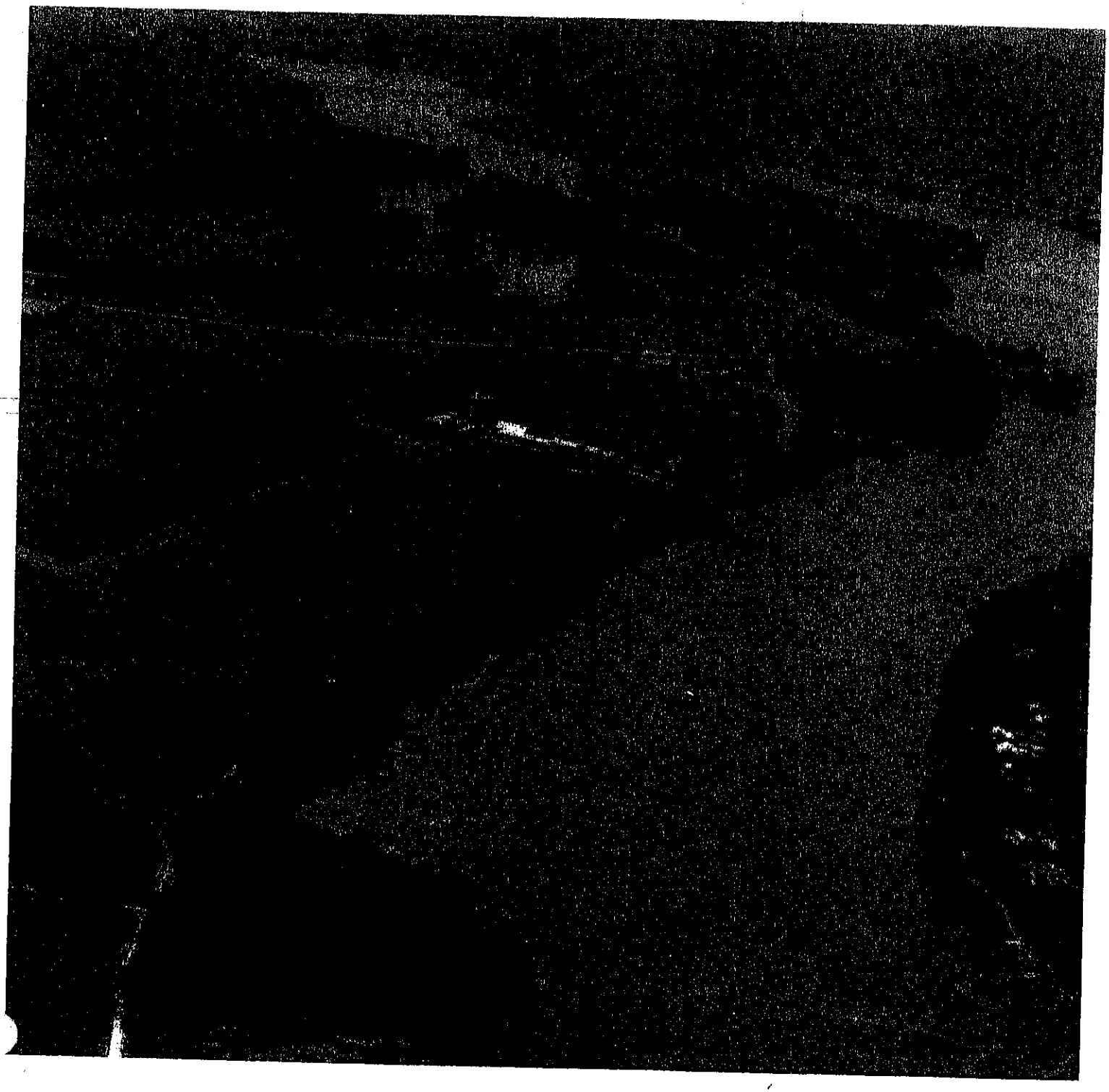
Brunswick Meadows
Soil Data

United States Department of Agriculture

Soil Conservation Service

In cooperation with Cornell University Agricultural Experiment Station

Soil Survey of Rensselaer County, New York



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL LEGEND

The publication symbols consist of letters. The first letter, always a capital, is the initial letter of the soil name. The second letter is a lower case letter. The third letter always a capital, A, B, C, D, E or F shows the slope. Symbols without a slope letter are those for miscellaneous areas or soils named for higher categories.

SYMBOL	NAME
AtB	Albrights silt loam, 3 to 8 percent slopes
AtC	Albrights silt loam, 8 to 15 percent slopes
AtD	Albrights silt loam, 15 to 25 percent slopes
AmC	Albrights very stony silt loam, 3 to 15 percent slopes
AmD	Albrights very stony silt loam, 15 to 40 percent slopes
AnA	Alden silt loam, 0 to 3 percent slopes
AoA	Alden very stony silt loam, 0 to 3 percent slopes
BeB	Bernardston gravelly silt loam, 3 to 8 percent slopes
BeC	Bernardston gravelly silt loam, 8 to 15 percent slopes
BeD	Bernardston gravelly silt loam, 15 to 25 percent slopes
BeE	Bernardston gravelly silt loam, 25 to 35 percent slopes
BfC	Bernardston very stony silt loam, 3 to 15 percent slopes
BfD	Bernardston very stony silt loam, 15 to 40 percent slopes
BnB	Bernardston-Nassau complex, undulating
BnC	Bernardston-Nassau complex, rolling
BnD	Bernardston-Nassau complex, hilly
BoD	Bernardston-Pittstown association, very stony, moderately steep
BrA	Brayton very stony silt loam, nearly level
BuC	Buckland very stony loam, sloping
BuD	Buckland very stony loam, moderately steep
BuF	Buckland very stony loam, very steep
CaA	Carlisle muck, 0 to 1 percent slopes
CbA	Castile gravelly silt loam, 0 to 5 percent slopes
ChA	Chenango very gravelly loam, 0 to 3 percent slopes
ChB	Chenango very gravelly loam, 3 to 8 percent slopes
CkB	Chenango gravelly loam, fan, 3 to 8 percent slopes
Du	Dumps, landfill
ElB	Elmridge very fine sandy loam, 3 to 8 percent slopes
FlA	Fluvaquents-Udifluvents complex, 0 to 3 percent slopes
FrA	Fredon silt loam, 0 to 4 percent slopes
GlC	Glover very stony loam, very rocky, sloping
GlD	Glover very stony loam, very rocky, moderately steep
GmF	Glover-Rock outcrop complex, very steep
HaA	Hamlin silt loam, 0 to 3 percent slopes
HbA	Haven silt loam, 0 to 3 percent slopes
HbB	Haven silt loam, 3 to 8 percent slopes
HoA	Hoosic gravelly sandy loam, 0 to 3 percent slopes
HoB	Hoosic gravelly sandy loam, 3 to 8 percent slopes
HoC	Hoosic gravelly sandy loam, rolling
HoD	Hoosic gravelly sandy loam, hilly
HoE	Hoosic gravelly sandy loam, steep
HuB	Hudson silt loam, 3 to 8 percent slopes
HuC	Hudson silt loam, 8 to 15 percent slopes
HuD	Hudson silt loam, hilly
HuE	Hudson silt loam, steep
LmA	Limerick silt loam, 0 to 3 percent slopes
LoA	Loxley and Beseman mucks, 0 to 1 percent slopes
MaC	Macomber-Taconic slaty silt loams, very rocky, sloping
MaE	Macomber-Taconic slaty silt loams, very rocky, steep
MaF	Macomber-Taconic slaty silt loams, very rocky, very steep
MbA	Madalin silt loam, 0 to 3 percent slopes
NaB	Nassau-Manlius complex, undulating
NaC	Nassau-Manlius complex, rolling
NrC	Nassau-Rock outcrop, complex, rolling
NrD	Nassau-Rock outcrop complex, hilly
ObA	Occum Variant-Barbour Variant complex, 0 to 3 percent slopes
PaA	Palms muck, 0 to 1 percent slopes
Pg	Pits, gravel
PtB	Pittstown gravelly silt loam, 3 to 8 percent slopes
PtC	Pittstown gravelly silt loam, 8 to 15 percent slopes
PuC	Pittstown-Bernardston association, very stony, sloping
RaA	Raynham silt loam, 0 to 5 percent slopes
RhA	Rhinebeck silt loam, 0 to 3 percent slopes
RhB	Rhinebeck silt loam, 3 to 8 percent slopes
RkA	Riverhead fine sandy loam, 0 to 3 percent slopes
RkB	Riverhead fine sandy loam, 3 to 8 percent slopes
RkC	Riverhead fine sandy loam, rolling
Sa	Saprists and Aquents, ponded
ScA	Scio very fine sandy loam, 0 to 3 percent slopes
ScB	Scio very fine sandy loam, 3 to 8 percent slopes
SrA	Scriba silt loam, 0 to 3 percent slopes
SrB	Scriba silt loam, 3 to 8 percent slopes
StB	Scriba very stony silt loam, 3 to 8 percent slopes
SvB	Scriba-Pittstown association, very stony, gently sloping
SwA	Shaker very fine sandy loam, sandy substratum, 0 to 4 percent slopes
TeA	Teel silt loam, 0 to 3 percent slopes
Ud	Udorthents, loamy
Us	Udorthents, sandy
UnA	Unadilla silt loam, 0 to 3 percent slopes
UnB	Unadilla silt loam, 3 to 8 percent slopes
UnC	Unadilla silt loam, 8 to 15 percent slopes
Ur	Urban land
WnA	Windsor loamy sand, 0 to 3 percent slopes
WnB	Windsor loamy sand, 3 to 8 percent slopes
WnC	Windsor loamy sand, 8 to 15 percent slopes
WnE	Windsor loamy sand, 25 to 35 percent slopes
W	Water


FlA
HoB
HuE
EtB
FlA
HkC
BnC
RkB
Ud
HuC
HuB
HuE
HoC
MrD
CkB
AnA
Lm
BnC
HuB
NrC
BnC
BnB
SrB
HuC
142
HkC
BnC
NrD
FlA
BnD
EtB
SwA
Pg
HoB
NaC
BnD
BnC
BnB
BnB
BnC
NrD
HuC
BnC
BeB
FlA
BeD
BeC
Du
PtC
BeB
BeD
PtB
BeC
NrD
PtC

Exhibit D

Stormwater Pollution Prevention Plan Specifications and Details

STANDARD AND SPECIFICATIONS FOR BRUSH MATTING

Definition

A mulch or mattress of hardwood brush layed on a slope and fastened down with stakes and wire.

Purpose

To protect the soil surface on slopes from erosive forces and act as a mulch for seeding and plant use until they are established.

Conditions Where Practice Applies

Brush matting is used primarily on streambanks where the velocity is less than 6 feet per second and excessive runoff from streamflow has created erosive conditions. This practice can resist temporary inundation but not scour or undercutting.

Design Criteria

Layer Thickness - The brush shall be a minimum of 12 inches thick.

Height - The matting shall be placed up the bank to the point of average high water. The toe of the matting should be located in a rock trench that extends from the normal water line to the channel bottom or 2 feet which ever is greater.

Slope - The maximum slope shall be 1.5:1.

Anchoring - The matting shall be anchored on the slope by a grid of 3 foot stakes driven on 3 foot centers each way. No. 9 galvanized wire is then tied between the stakes and tightened to secure the mat. The upstream edge of the mat should be keyed into the bank 2 feet.

Materials - The plant materials should be willow or dogwood brush placed downstream to upstream with stems inclined at approximately 30 degrees with the butt end placed upstream.

See figure 4.2 on page 4.6 for details.

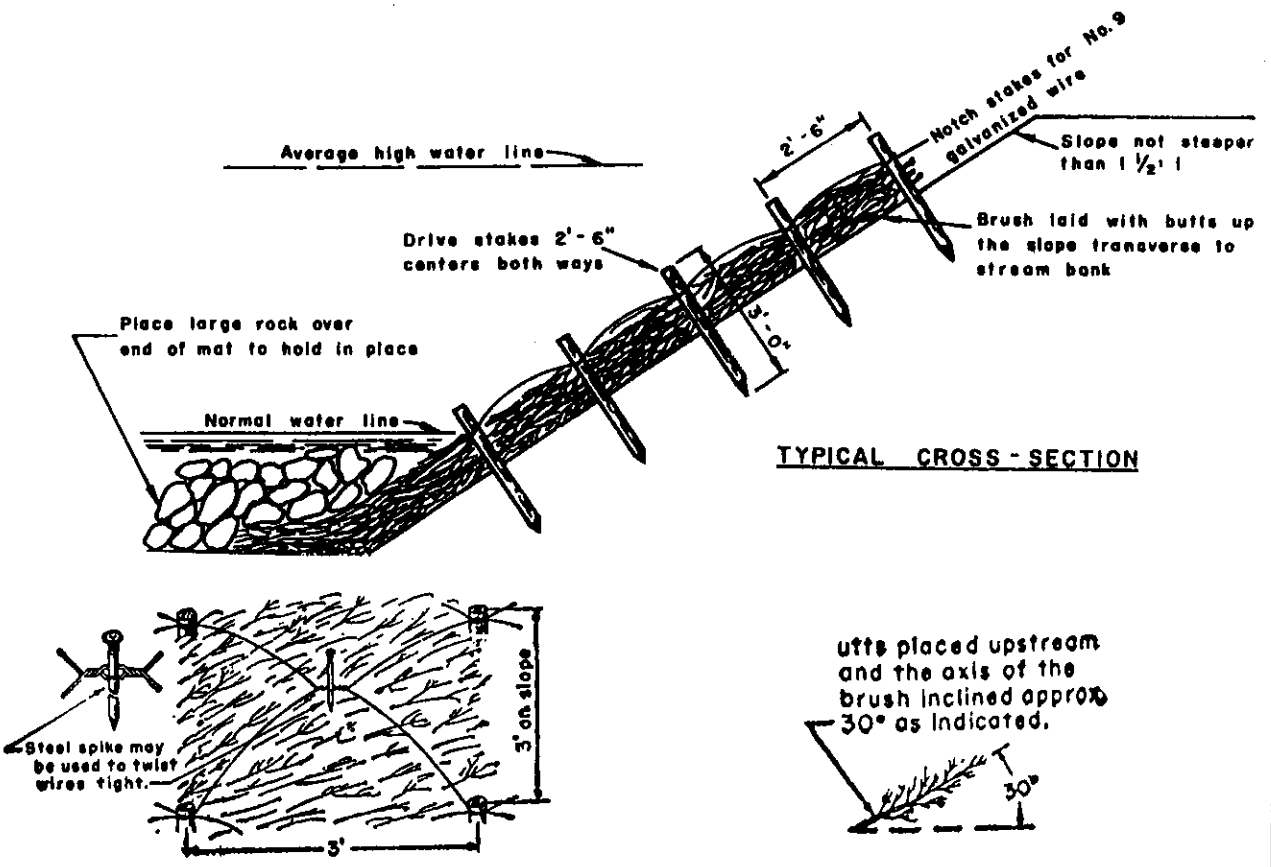
Construction Specifications

1. Prepare slope surface by grading to a uniform, smooth surface clear of obstruction. Slopes should be planted before the brush matting is installed.
2. Lay hardwood brush beginning at the downstream end of the work. The toe should be installed first.
3. The butt end of the brush will be placed upstream and plant materials inclined approximately 30 degrees.
4. The upstream edge of the mat will be keyed into the slope 2 feet. Stakes will be driven throughout the mat on 3 foot centers each way beginning along the toe of the mat.
5. No. 9 galvanized wire will be attached to the stakes and tightened to secure the mat.
6. Slope areas above the matting will be shaped and seeded.

Maintenance

Scheduled inspections the first year are necessary to make sure the anchoring system is sound. Broken wire or missing stakes should be replaced immediately. Any toe material missing should be replaced.

Figure 4.2
Brush Matting Details



CONSTRUCTION SPECIFICATIONS

1. PREPARE SLOPE SURFACE BY GRADING TO A UNIFORM, SMOOTH SURFACE.
2. LAY HARDWOOD BRUSH IN AN UPSTREAM DIRECTION BEGINNING AT THE DOWN-STREAM END. THE TOE SHOULD BE ESTABLISHED FIRST.
3. THE BUTT END OF THE BRUSH WILL BE PLACED UPSTREAM AND THE PLANT MATERIALS INCLINED APPROXIMATELY 30 DEGREES.
4. THE UPSTREAM EDGE OF THE MAT WILL BE KEYED INTO THE SLOPE 2 FEET. STAKES WILL BE DRIVEN THROUGHOUT THE MATTING ON 3 FOOT CENTERS EACH WAY BEGINNING ALONG THE TOE OF THE MAT.
5. NO. 9 GALVANIZED WIRE WILL BE ATTACHED TO THE STAKES OVER THE MAT AND TIGHTENED TO SECURE THE MAT.
6. SLOPE AREAS ABOVE THE MAT WILL BE SLOPED AND SEEDED.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	BRUSH MATTING	STANDARD SYMBOL BM

STANDARD AND SPECIFICATION FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary Swales are constructed:

1. To divert flows from a disturbed area.
2. Intermittently across disturbed areas to shorten overland flow distances.
3. To direct sediment laden water along the base of slopes to a trapping device.
4. To transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.4 for details.

	Swale A	Swale B
Drainage Area	< 5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or Flatter	2:1 or Flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specifications for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 10 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A(<5 Ac)	Flow Channel B(5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with Jute or Excelsior; Sod, or lined with 2 in. stone
3	5.1-8.0%	Seed and cover with Jute or Excelsior, Sod line with 2 in. stone	Line with 4-8 in. stone or Recycled Concrete Equivalent[2]
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2]	Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.

[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

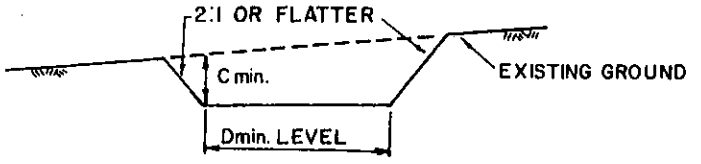
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

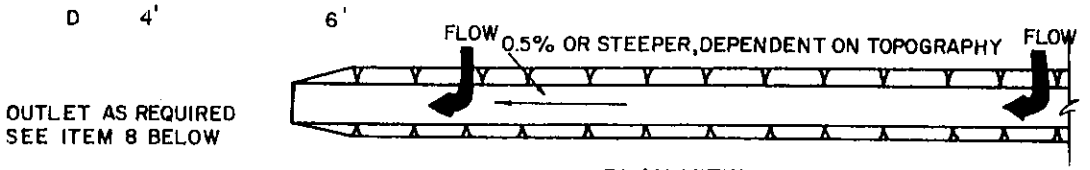
If swale is used to divert flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale Details



CROSS SECTION

	SWALE A	SWALE B
C	1'	1'
D	4'	6'



PLAN VIEW

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED ON CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE CHART BELOW:

FLOW CHANNEL STABILIZATION

TYPE OF TREATMENT	CHANNEL GRADE	A (5 AC OR LESS)	B (5 AC - 10 AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1-8.0%	SEED WITH JUTE OR EXCELSIOR; SOD	LINED RIP-RAP 4-8" RECYCLED CONCRETE EQUIVALENT
4	8.1-20%	LINED 4-8" RIP-RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	TEMPORARY SWALE	STANDARD SYMBOL A-2 / B-3

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.3 on page 5A.6 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from effected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area - Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres see earth dike; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height - 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike - 2 feet minimum.

Width of swale - 2 feet minimum.

Grade - Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 20 percent.

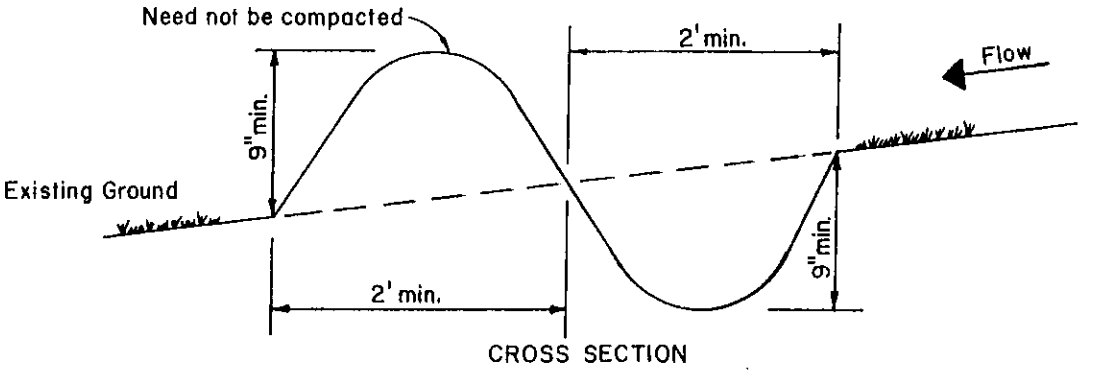
Stabilization - The disturbed area of the dike and swale shall be stabilized within 10 days of installation, in accordance with the standard and specifications for seed and straw mulch or straw mulch only if not in the seeding season.

Outlet

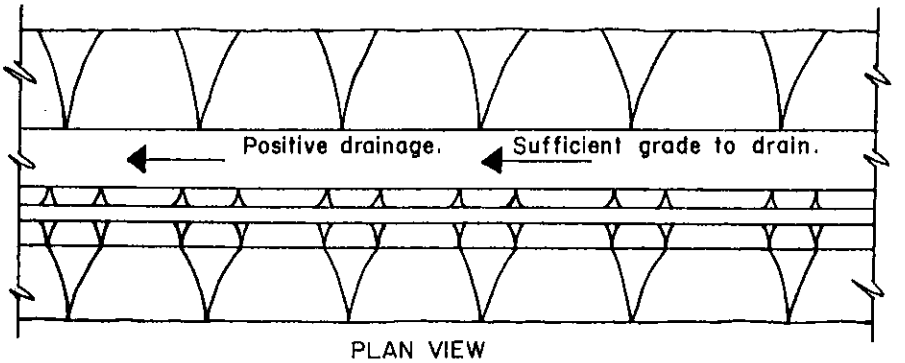
1. Perimeter dike/swale shall have an outlet that functions with a minimum of erosion.
2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.
3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.
4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 5A.3
Perimeter Dike/Swale Details

not to scale



CROSS SECTION



PLAN VIEW

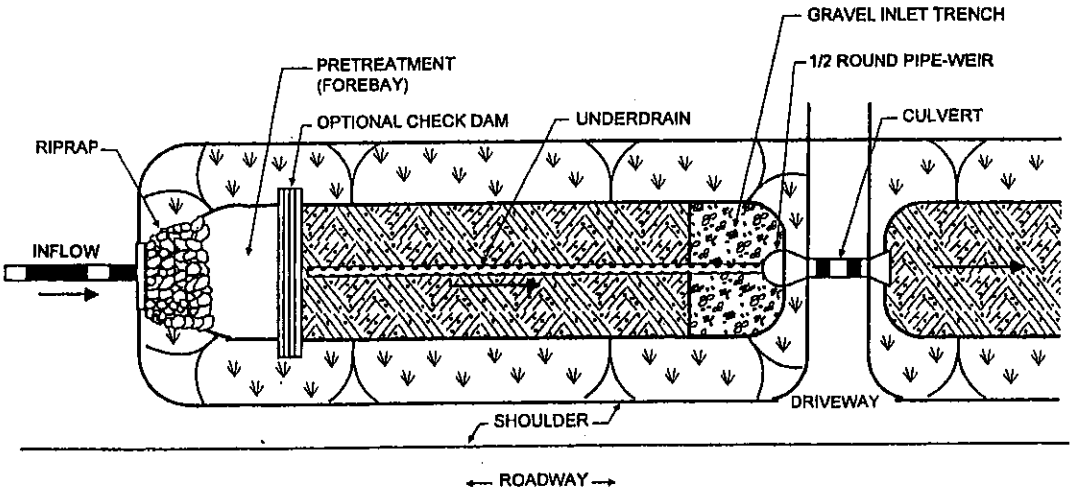
CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTRUBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SEED AND STRAW MULCH, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

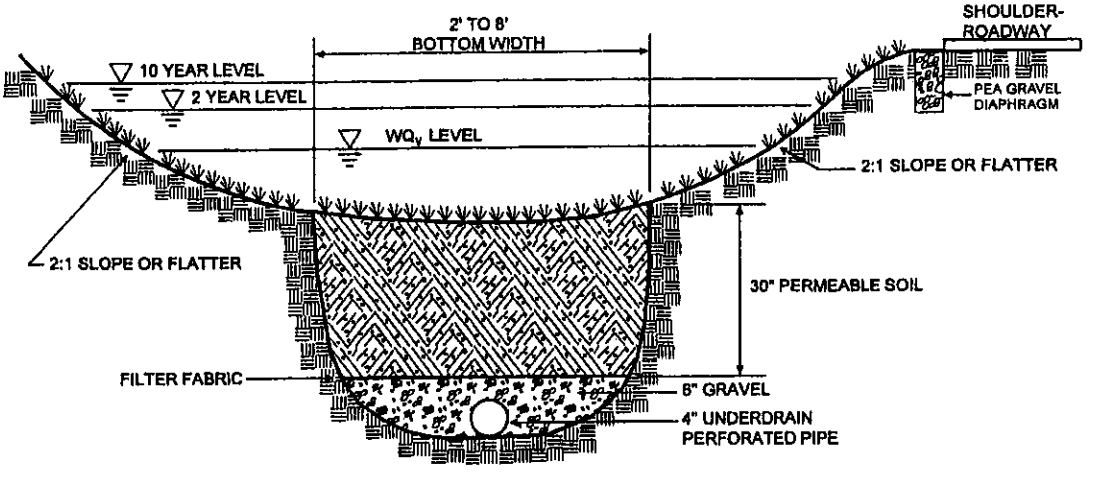
Max. Drainage Area Limit: 2 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	PERIMETER DIKE/SWALE	STANDARD SYMBOL →PD→

Figure 6.20 Dry Swale (O-1)



PLAN VIEW



SECTION

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
2 -1/2:1	40	50
3:1	33	75
3-1/2:1	30	100
4:1	25	125

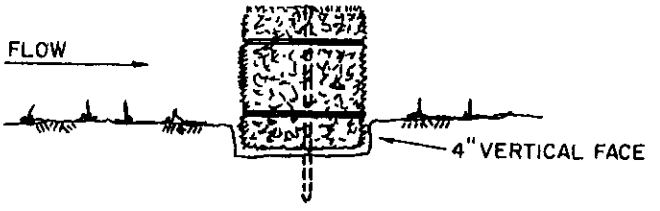
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Design Criteria

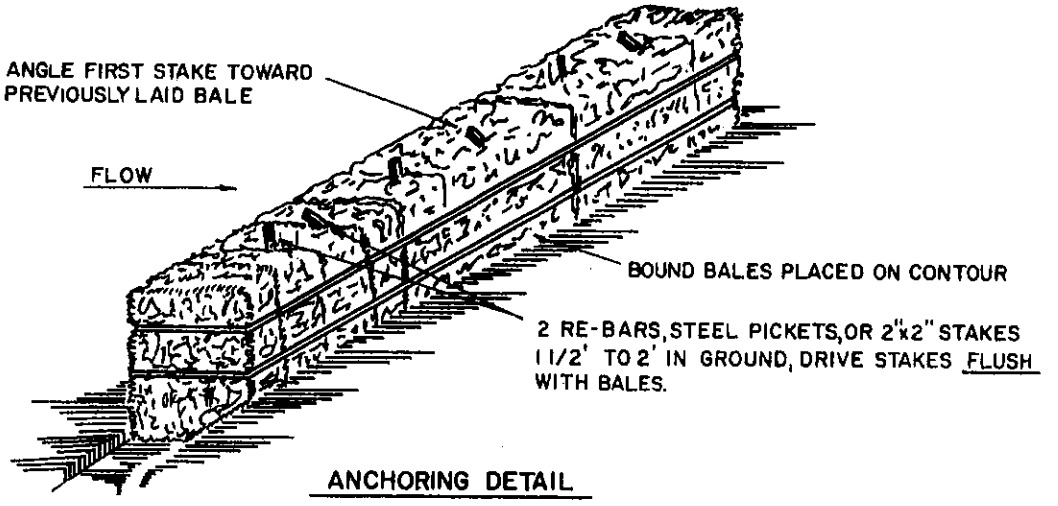
A design is not required. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.8 on page 5A.18 or details.

Figure 5A.8
Straw Bale Dike Details



BEDDING DETAIL

DRAINAGE AREA NO MORE THAN 1/4 ac. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

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 PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	STRAW BALE DIKE	STANDARD SYMBOL SBD

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric (filter cloth) 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.

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 are:

Slope Steepness	Maximum Slope Length (Ft)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

2. Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of 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. All silt fences shall be placed as close to the area as possible, and the area below the fence must be undisturbed or stabilized.

A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

1. The type, size, and spacing of fence posts.
2. The size of woven wire support fences.
3. The type of filter cloth used.
4. The method of anchoring the filter cloth.
5. The method of fastening the filter cloth to the fencing support.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. See Figure 5A.9 on page 5A.20 for details.

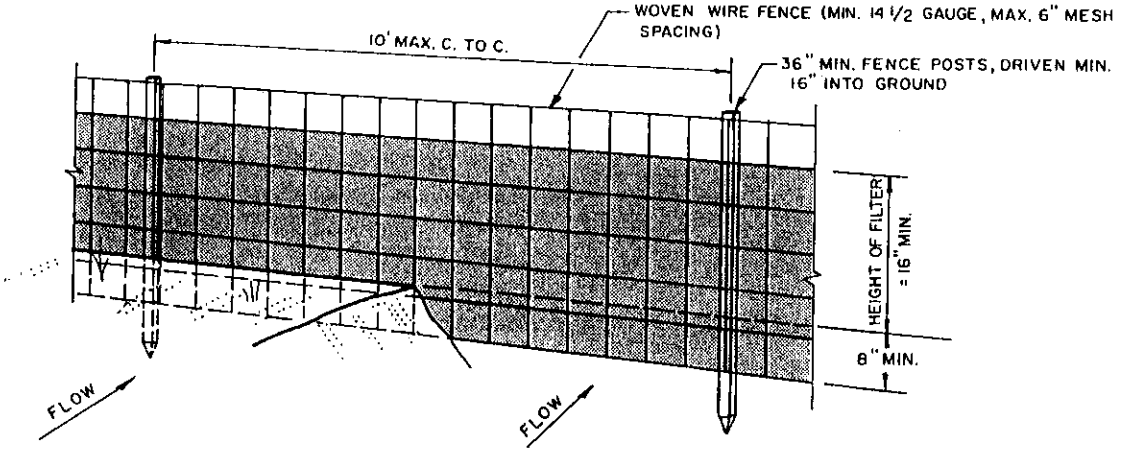
Criteria for Silt Fence Materials

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. Statewide acceptability shall depend on in field and/or laboratory observations and evaluations.

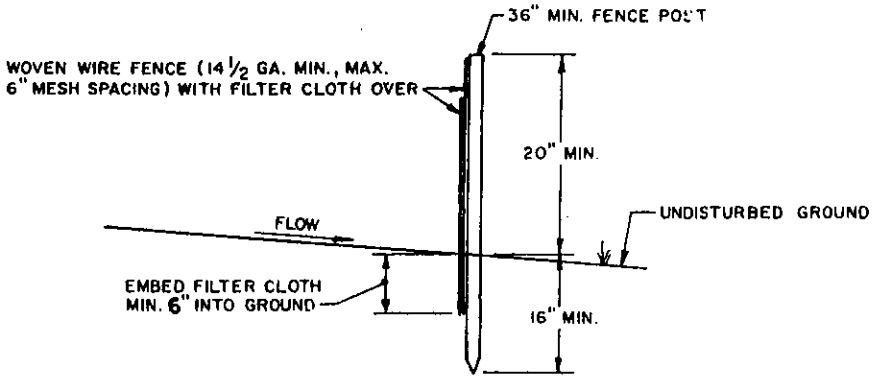
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve 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 14-1/2 gage with a maximum 6 in. mesh opening, or as approved.
4. Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.9.

Figure 5A.9
Silt Fence Details



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE

POSTS: STEEL EITHER "T" OR "U" TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14 1/2 GA. 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL.

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	SILT FENCE	STANDARD SYMBOL

STANDARD AND SPECIFICATIONS FOR CHECK DAM

Definition

Small temporary stone dams constructed across a drainageway.

Purpose

To reduce erosion in a drainage channel by restricting the velocity of flow in the channel.

Condition Where Practice Applies

This practice is used as a temporary or emergency measure to limit erosion by reducing flow in small open channels that are degrading or subject to erosion; and where permanent stabilization is impractical due to short period of usefulness and time constraints of construction.

Design Criteria

Drainage Area: Maximum drainage area above the check dam shall not exceed two (2) acres.

Height: Not greater than 2 feet. Center shall be maintained 9 inches lower than abutments at natural ground elevation.

Side Slopes: Shall be 2:1 or flatter

Spacing: The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam.

Stone Size: Use graded stone 2 to 15 inches in size (NYS - DOT Light Stone Fill meets these requirements).

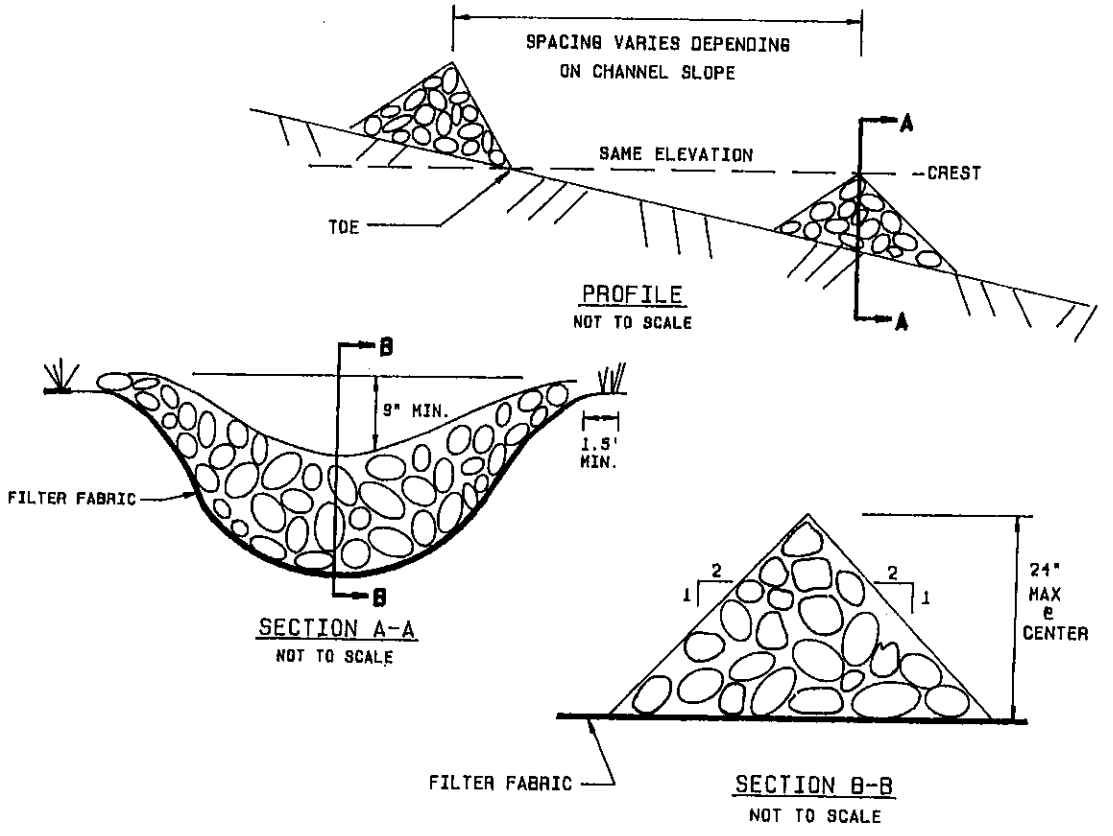
The overflow of the check dams will be stabilized to resist erosion that might be caused by the check dam. See Figure 5A.10 on page 5A.22 for details.

Maintenance

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures a liner of stone or other suitable material should be installed in that portion of the channel.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. Replace stones as needed to maintain the design cross section of the structures.

Figure 5A.10
Check Dam Details



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONES.

MAXIMUM DRAINAGE AREA 2 ACRES.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	CHECK DAM	STANDARD SYMBOL

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition

A permeable barrier installed around inlets in the form of a fence, berm or excavation around an opening, thereby reducing sediment content of sediment laden water.

Purpose

To prevent 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 five (5) 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. Sod Drop Inlet Protection

V. Curb Drop Inlet Protection

Design Criteria

Drainage Area - The drainage area for storm drain inlets should be in accordance with the specific type of inlet used. (Type I through Type V).

Type I - Excavated Drop Inlet Protection

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 the 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 in the site in a stabilized manner.

See details for Excavated Drop Inlet Protection in Figure 5A.12 on page 5A.27.

Type II - Fabric Drop Inlet Protection

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.

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.

See Figure 5A.13 for Details for Filter Fabric Drop Inlet Protection on page 5A.28.

Type III - Stone and Block Drop Inlet Protection

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 or wire

mesh with 1/2 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 downslope from the inlet to insure 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 stabilize in a manner appropriate to the site.

See Figure 5A.14 for Details for Stone and Block Drop Inlet Protection on page 5A.29.

Type IV - Sod Drop Inlet Protection

The drainage area should be limited to 2 acres and the velocity over the sod kept below 5 feet per second. Place the sod to form a turf mat completely covering the soil surface for a minimum distance of 4 feet from each side of the drop inlet where runoff will enter. The slope of the sodden area should not exceed 4:1. (This can be a permanent practice).

During the first 4 weeks, water sod as often as necessary to maintain moist soil to a depth of 2 inches. Maintain a grass height of a least 2 inches with no more than 1/3 the shoot height (grass leaf) removed in any mowing. Apply fertilizer and lime as necessary to maintain the desired growth and sod density.

See figure 5A.15 Details for Sod Drop Inlet Protection on page 5A.30.

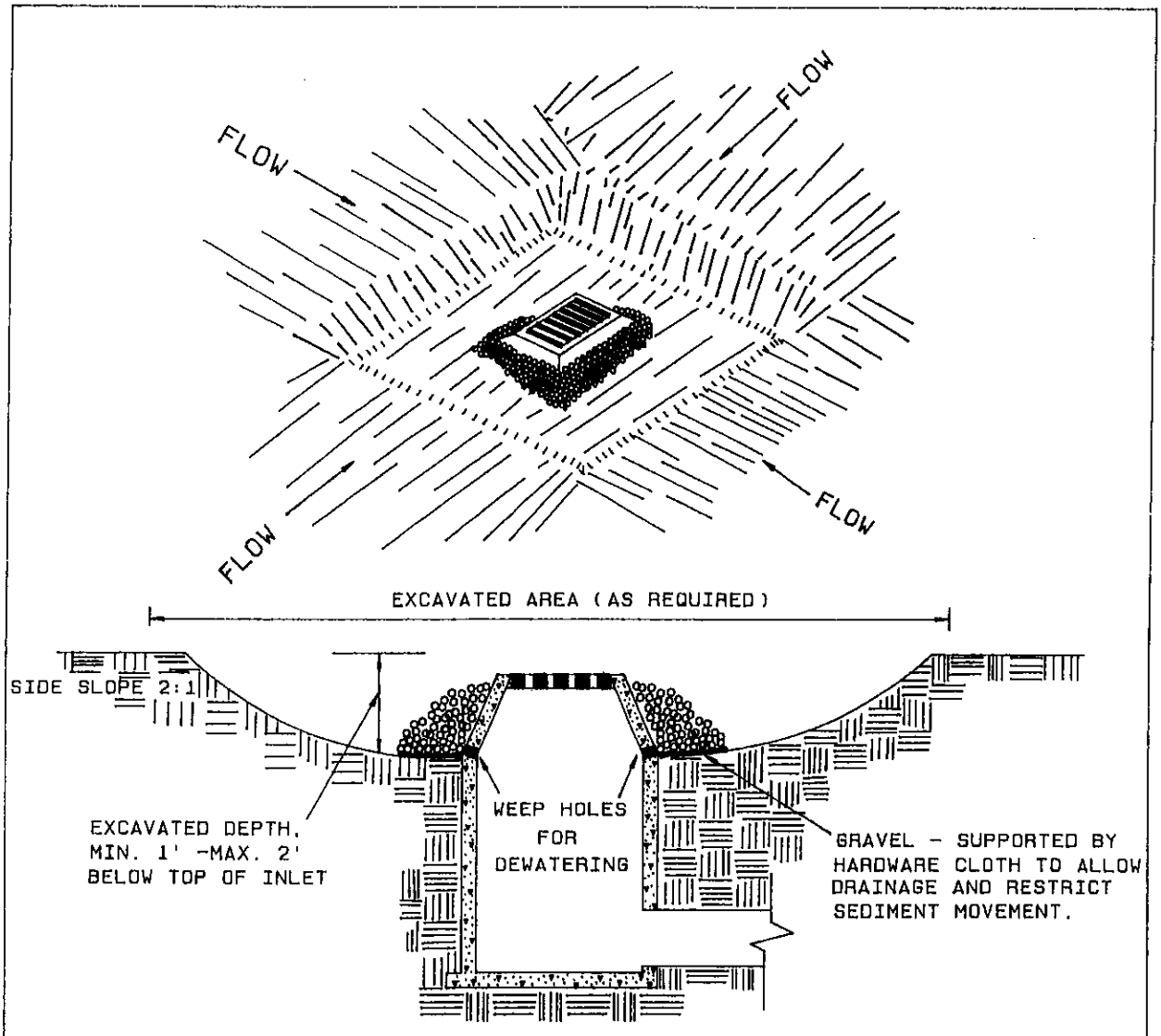
Type V - Curb Drop Inlet Protection

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 directing flow into the inlet.

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.

See Figure 5A.16 for Details for Curb Drop Inlet Protection on page 5A.31.

Figure 5A.12
Excavated Drop Inlet Protection Details



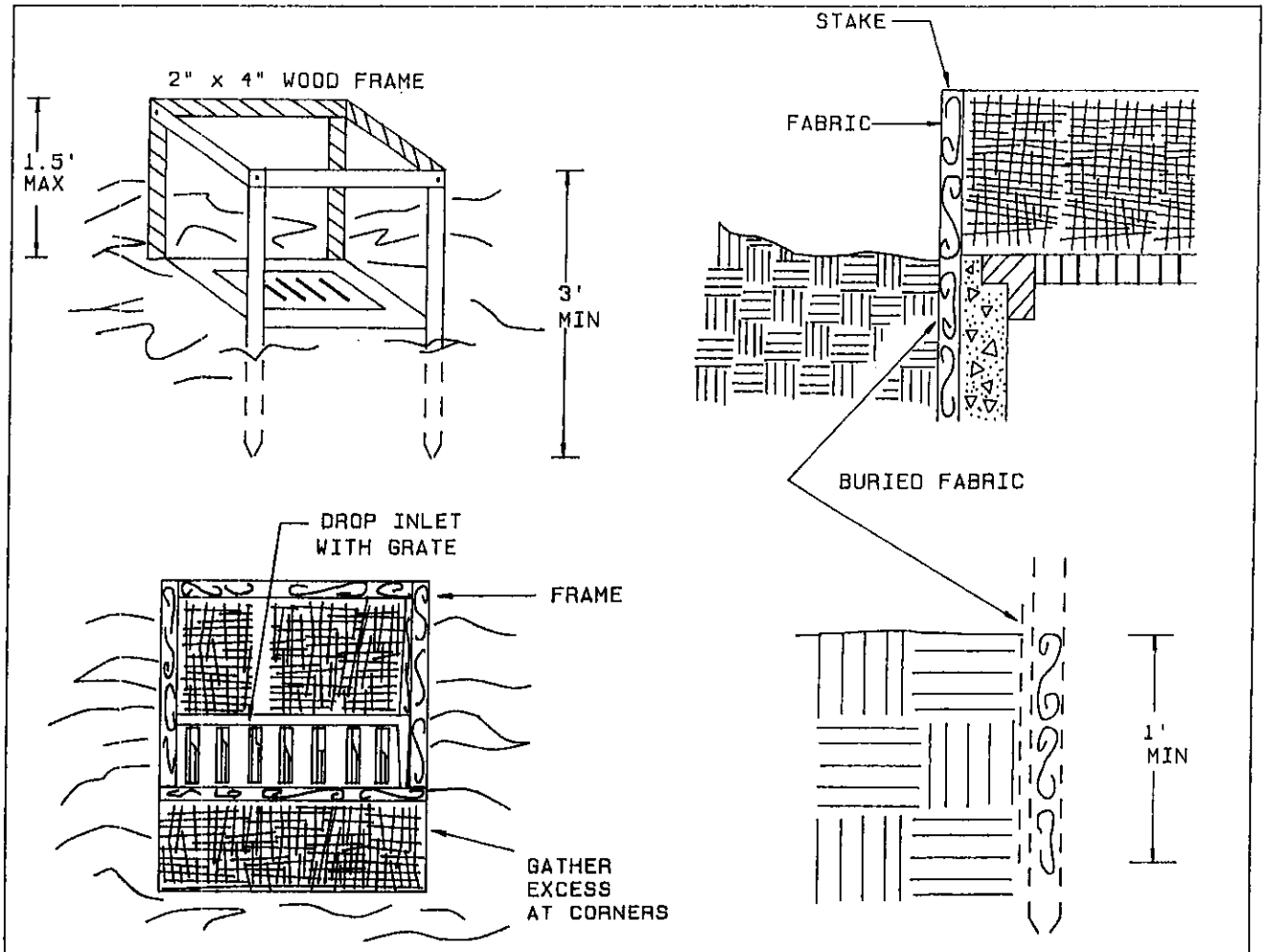
CONSTRUCTION SPECIFICATIONS

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 STABLIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL BASIN WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABLIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	EXCAVATED DROP INLET PROTECTION	STANDARD SYMBOL

Figure 5A.13
Filter Fabric Drop Inlet Protection Details



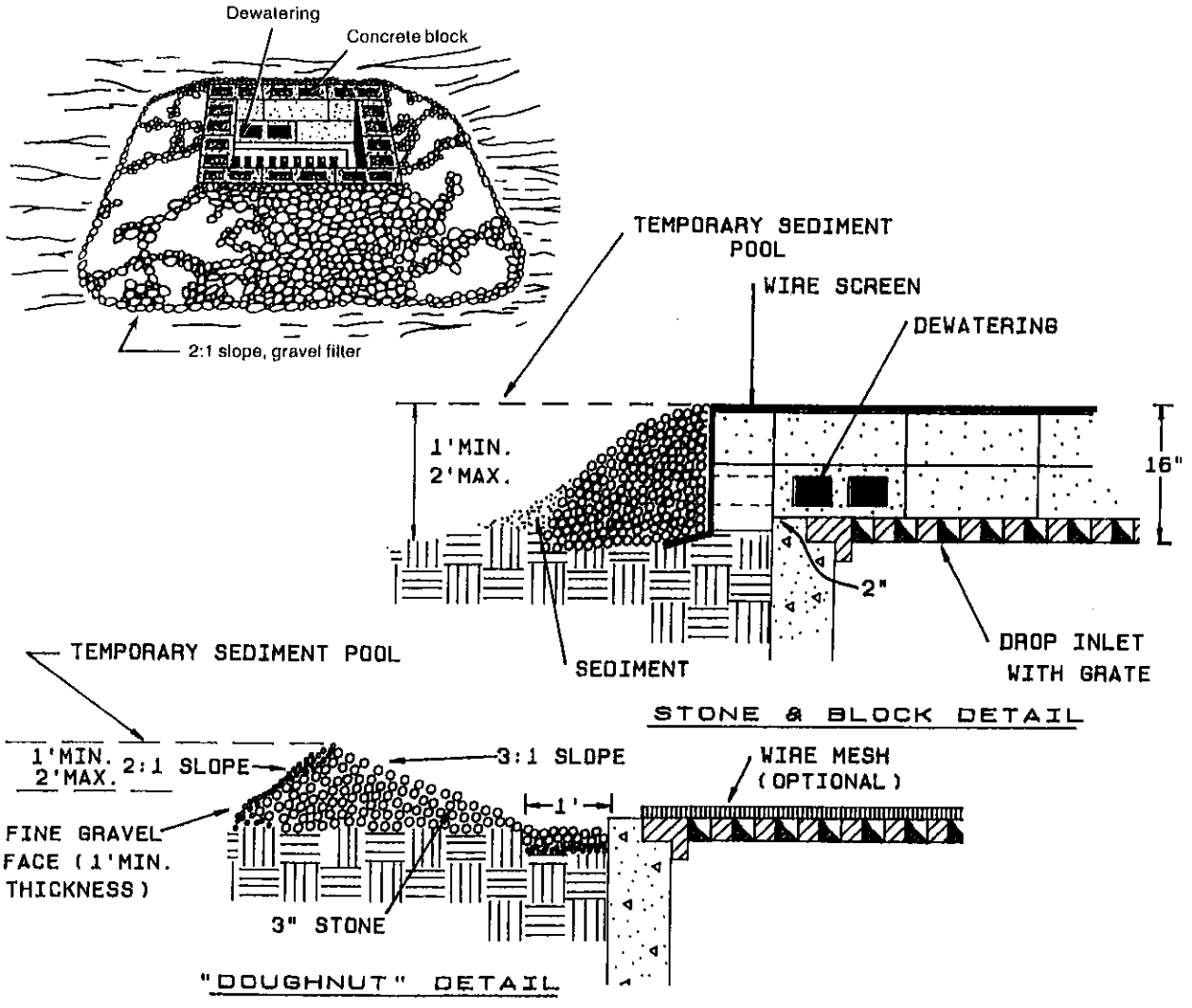
CONSTRUCTION SPECIFICATIONS

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

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	FILTER FABRIC DROP INLET PROTECTION	STANDARD SYMBOL

Figure 5A.14
Stone & Block Drop Inlet Protection Details



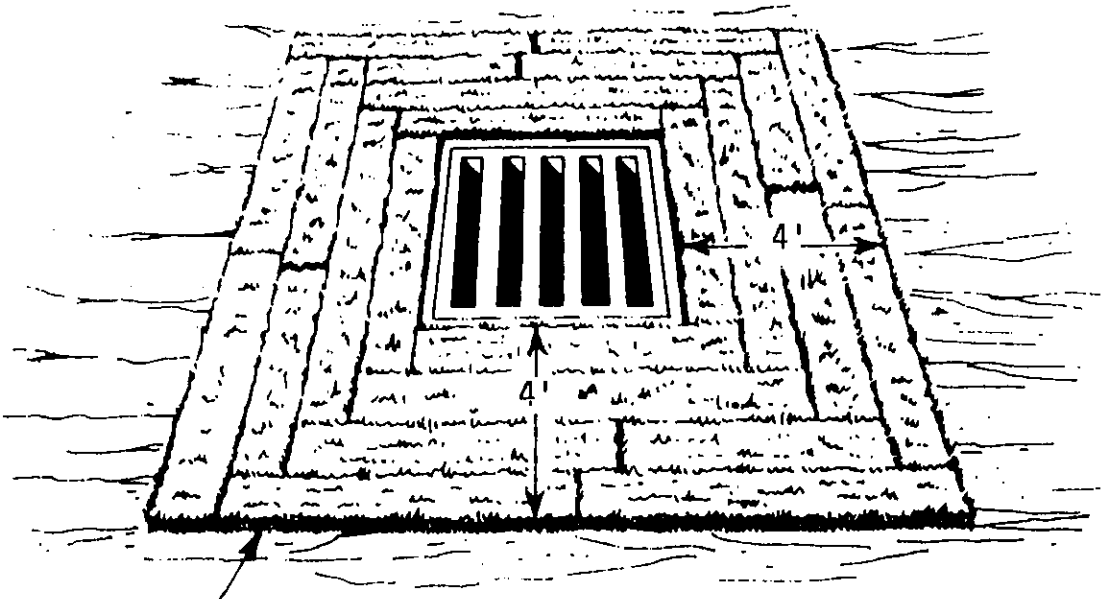
CONSTRUCTION SPECIFICATIONS

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 THE 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

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	STONE & BLOCK DROP INLET PROTECTION STRUCTURE	STANDARD SYMBOL

Figure 5A.15
Sod Drop Inlet Protection Details



CONSTRUCTION SPECIFICATIONS

1. BRING THE AREA TO BE SODDED TO FINAL GRADE ELEVATION WITH TOPSOIL. ADD FERTILIZER AND LIME AND INSTALL SOD IN ACCORDANCE WITH THE PRACTICE ON SODDING.
2. LAY ALL SOD STRIPS PERPENDICULAR TO THE DIRECTION OF FLOW.
3. MAINTAIN A MINIMUM WIDTH OF 4 FEET IN ALL FLOW DIRECTIONS.
4. SOD STRIPS SHALL BE STAGGERED SO ADJACENT STRIP ENDS ARE NOT ALIGNED.

MAXIMUM DRAINAGE AREA 2 ACRES

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	SOD DROP INLET PROTECTION	STANDARD SYMBOL

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP

Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and to 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 right-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 discharge from a disturbed area.

Sediment traps should not be used to artificially break up a natural drainage area into smaller sections where a larger device (sediment basin) would be better suited.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specifications for Sediment Basin on page 5A.47.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through VI).

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, 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 1800 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 1/2 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 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 (preferably undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system.

Trap Details Needed on Erosion and Sediment Control Plans

There is no standard symbol for a sediment trap. Each trap shall be delineated on the plans in such 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 form 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 six (6) 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. Storm Inlet Sediment Trap
IV. Swale Sediment Trap
V. Stone Outlet Sediment Trap
VI. 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 corrugated metal. The top of the embankment shall be at least 1 1/2 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 1/2 to 1/4 inch hardware clothwire then wrapped with filter cloth (Mirafi lOOX, Poly Filter GB or a filter cloth with an equivalent 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) acres 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.17 (1) and 5A.17 (2) on pages 5A.36 and 5A.37.

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 length (feet) shall be equal to four (4) times the drainage area (acres) and a minimum length 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.18 on page 5A.38.

III. Storm Inlet Sediment Trap

A Storm Inlet 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 tap 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. Storm inlet 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 Storm Inlet Sediment Trap ST-III in Figure 5A.19 on page 5A.39.

IV. Swale Sediment Trap

A Swale Sediment Trap consists of a trap formed by over excavating a swale or a drainage ditch. The outlet of the swale sediment trap is controlled by the invert of the downstream swale. Swale sediment traps are placed in surface drain ditches just before the runoff water leaves the property, enters a watercourse at the end of cut sections, or immediately preceding ditch inlets or stabilized outlets. Often a section of concrete liner is left out to construct the swale trap in that section. Once the contributory drainage area is stabilized, the trap may be removed and the swale or ditch reconstructed. The swale sediment trap shall be used only where no other device is feasible. The swale sediment trap shall be limited to a maximum drainage area of two (2) acres. The volume of this trap shall be computed at the elevation of the invert of the outlet.

See Details for Swale Sediment Trap ST-IV in Figure 5A.20 on Page 5A.40.

V. 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 1,800 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 Outlet Sediment Trap ST-V in Figure 5A.21 on page 5A.41.

VI. 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 1800 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-VI
(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

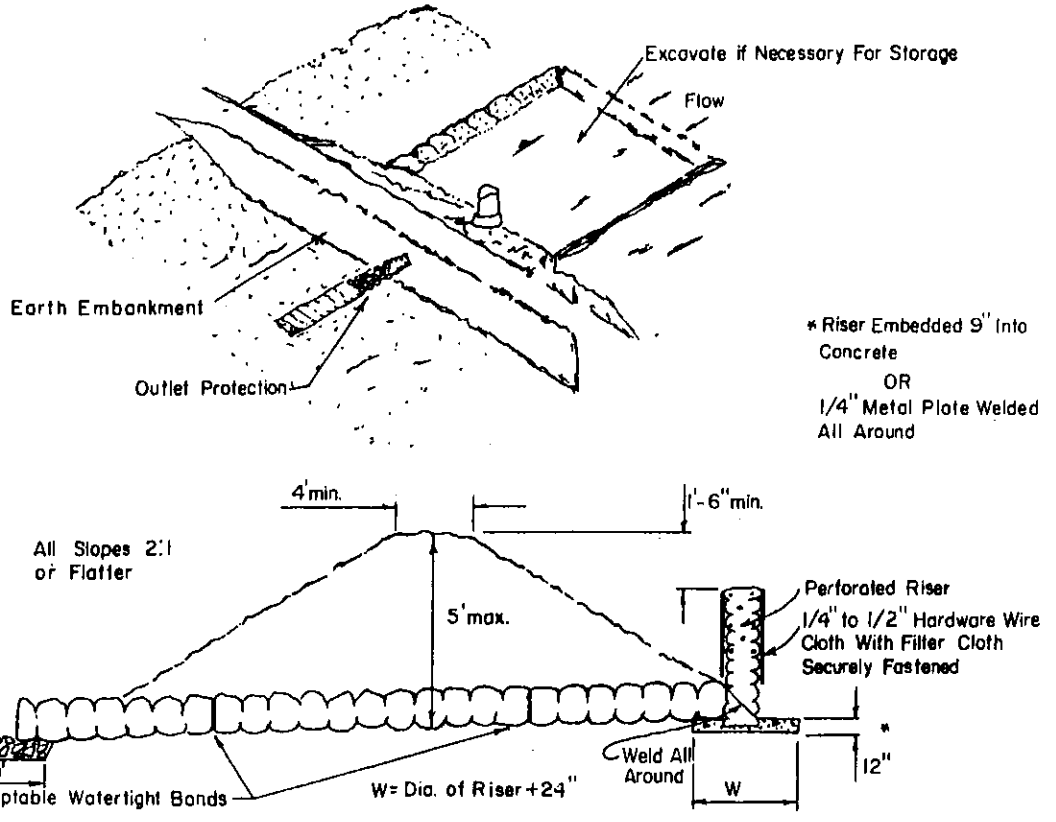
See Details for Riprap Outlet Sediment Trap ST-VI on Figure 5A.22 on page 5A.42.

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.23 on page 5A.44 for details.

Figure 5A.17 (1)
Pipe Outlet Sediment Trap: ST-I

PIPE OUTLET SEDIMENT TRAP ST-I



EMBANKMENT SECTION THRU RISER

SIZES OF PIPE NEEDED

Barrel Diameter _____ .

Riser Diameter _____ .

Note:

Construction Specification should be attached to this detail to complete design.

Max. Drainage Area: 5 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	PIPE OUTLET SEDIMENT TRAP ST-I 1 of 2	STANDARD DRAWING

Figure 5A.17 (2)
Pipe Outlet Sediment Trap: ST-I - Construction Specifications

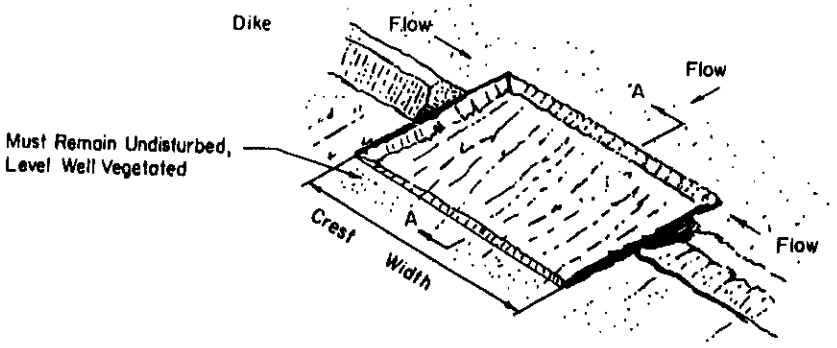
CONSTRUCTION SPECIFICATION FOR PIPE OUTLET TRAP: ST-1

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 1800 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 IN SUCH A MANNER THAT IT WILL NOT ERODE.
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 WATER POLLUTION ARE MINIMIZED.
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 FILTER CLOTH COME TOGETHER, THEY SHALL BE OVERLAPPED, 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 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 PLATER.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	PIPE OUTLET SEDIMENT TRAP ST-1 2of2	STANDARD SYMBOL

Figure 5A.18
Grass Outlet Sediment Trap: ST- II

GRASS OUTLET SEDIMENT TRAP ST-II



SECTION A-A

EXCAVATED GRASS OUTLET SEDIMENT TRAP

CONSTRUCTION SPECIFICATION FOR ST-II

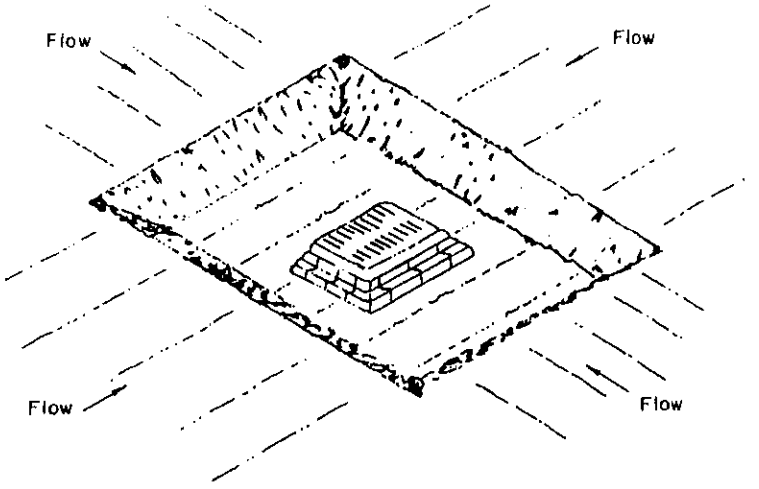
1. Volume of sediment storage shall be 1800 cubic feet per acre of contributory drainage area.
2. Minimum crest width shall be 4 X Drainage Area.
3. Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to ½ the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.
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 water pollution shall be minimized.
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

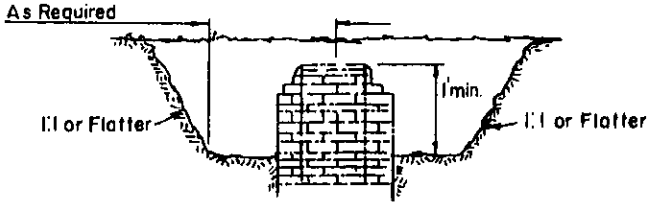
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	GRASS OUTLET SEDIMENT TRAP ST-II	STANDARD SYMBOL

Figure 5A.19
Storm Inlet Sediment Trap: ST-III

STORM INLET SEDIMENT TRAP ST-III



YARD DRAIN



CROSS SECTION

CONSTRUCTION SPECIFICATION FOR ST-III

1. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to ½ 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.

2. The volume of sediment storage shall be 1800 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 water pollution shall be minimized.

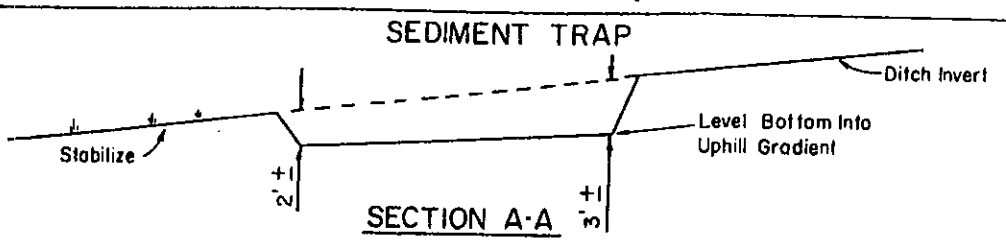
5. The sediment trap shall be removed and the area stabilized when the constructed drainage area has been properly stabilized.

6. All cut slopes shall be 1:1 or flatter.

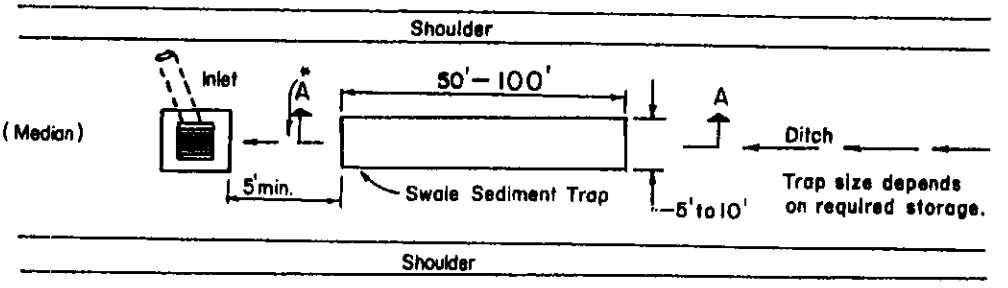
Maximum Drainage Area: 3 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	STORM INLET SEDIMENT TRAP ST-III	STANDARD SYMBOL

Figure 5A.20
Swale Outlet Sediment Trap: ST- IV



SWALE SEDIMENT TRAP



* To Remain Stabilized Or Covered With A 6" Lining Of 2" Stone

CONSTRUCTION SPECIFICATION FOR ST-IV

1. The swale sediment trap shall be constructed in accordance with the dimensions provided on the design drawings or sized to provide the minimum storage necessary 1800 cubic feet of storage for each acre of drainage area.

2. Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to ½ 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.

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 water pollution shall be minimized.

5. The sediment trap shall be removed and area stabilized when the contributory drainage area has been properly stabilized.

6. The swale sediment trap will be properly backfilled and the swale or ditch reconstructed.

Maximum Drainage Area: 2 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	SWALE SEDIMENT TRAP – ST IV	STANDARD SYMBOL

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with filter cloth 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.38 on page 5A.74 for details.

Aggregate Size: Use 2 in. 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).

Filter cloth: 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 Filter Cloth

The filter cloth 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 Openning Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth (in)	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, Miraft 600X, or equivalent.

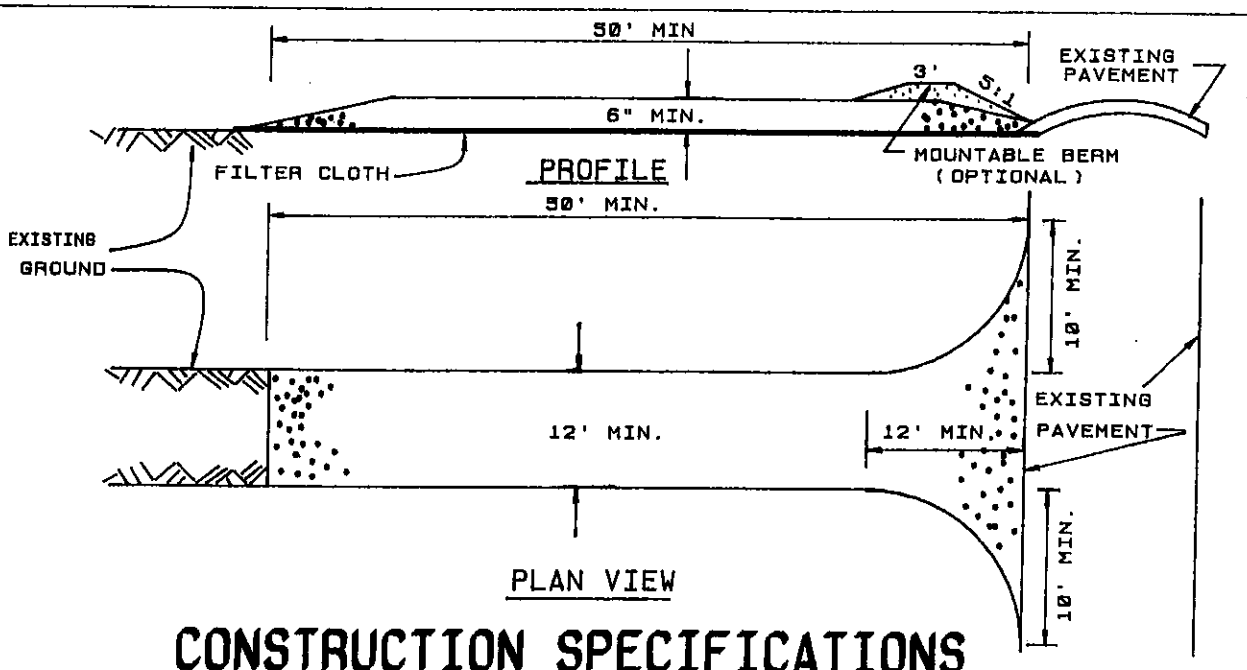
[3] Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

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.38
Stabilized Construction Entrance Details



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" 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. FILTER CLOTH - 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 ACROSS 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 AN 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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	STABLIZED CONSTRUCTION ENTRANCE	STANDARD SYMBOL

STANDARD AND SPECIFICATIONS FOR CONSTRUCTION ROAD STABILIZATION

Definition

The stabilization of temporary construction access routes, on-site vehicle transportation routes and construction parking areas.

Purpose

To control erosion on temporary construction routes and parking areas.

Condition Where Practice Applies

All traffic routes and parking areas for temporary use by construction traffic.

Design Criteria

Construction roads should be located to reduce erosion potential, minimize impact on existing site resources and maintain operations in a safe manner. Highly erosive soils, wet or rocky areas, and steep slopes should be avoided. Roads should be routed where seasonal water tables are deeper than 18 inches. Surface runoff and control should be in accordance with other standards.

Road Grade - A maximum grade of 12% is recommended, although grades up to 15% are possible for short distances.

Road Width - 14 foot minimum for one-way traffic or 24 foot minimum for two-way traffic

Side Slope of Road Embankment - 2:1 or flatter

Ditch capacity - On site roadside ditch and culvert capacities shall be the 10 yr. peak runoff.

Stone surface - Use a 6-inch course of NYS DOT base course or equivalent as specified in NYS - Standards and Specifications for Highways.

Construction Specifications

1. Clear and strip roadbed and parking areas of all vegetation, roots, and other objectionable material.
2. Locate parking areas on naturally flat areas as available. Keep grades sufficient for drainage but not more than 2 to 3%.
3. Provide surface drainage and divert excess runoff to stabilized areas.
4. Maintain cut and fill slopes to 2:1 or flatter and stabilize with vegetation as soon as grading is accomplished.
5. Spread 6-inch course of crushed stone evenly over the full width of the road smooth to avoid depressions.
6. Provide appropriate sediment control measures to prevent offsite sedimentation.

Maintenance

Inspect construction roads and parking areas periodically for condition of surface. Topdress with new gravel as needed. Check ditches for erosion and sedimentation after rainfall events. Maintain vegetation in a healthy, vigorous condition. Areas producing sediment should be treated immediately.

Exhibit E

Stormwater Pollution Prevention Plan Forms and Reports

Stormwater Pollution Prevention Plan
Contractors Certification Statement

Certification Statement - All contractors and subcontractors identified in the SWPPP must sign a copy of the following certification statement before undertaking any construction activity at the site:

> ***"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollution 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."***

Contractor Information:

Project Information: **Brunswick Meadows**
NYS Route 142 (Grange Road)
Town of Brunswick
County of Rensselaer
State of New York

Company Name _____

Mailing Address _____

City _____

State _____ **ZIP Code** _____

Name _____

Title _____

Signature _____

Telephone Number _____

Date _____

Stormwater Pollution Prevention Plan
Operator's Certification Statement No. 1

Certification Statement – The SWPPP and all reports required by the permit and other information requested by the NYSDEC or local agency shall be signed and certified as follows by the Operator of the project or a duly authorized representative of the Operator:

> ***"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. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "***

Operator's Information:

Project Information: **Brunswick Meadows**
NYS Route 142 (Grange Road)
Town of Brunswick
County of Rensselaer
State of New York

Company Name _____

Mailing Address _____

City _____

State _____ **ZIP Code** _____

Name _____

Title / Position _____

Signature _____

Telephone Number _____

Date _____

Stormwater Pollution Prevention Plan
Operator's Certification Statement No. 2

Certification Statement – The SWPPP required by the permit shall be signed and certified as follows by the Operator of the project or a duly authorized representative of the Operator:

> ***"I certify under penalty of law that all appropriate stormwater control measures will be in place before commencement of construction of any segment of the project that requires such measures. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "***

Operator's Information:

Project Information: **Brunswick Meadows**
NYS Route 142 (Grange Road)
Town of Brunswick
County of Rensselaer
State of New York

Company Name _____

Mailing Address _____

City _____

State _____ **ZIP Code** _____

Name _____

Title / Position _____

Signature _____

Telephone Number _____

Date _____

Stormwater Pollution Prevention Plan
Inspection Report

Date: _____ **Time:** _____

Project Information: **Brunswick Meadows**
NYS Route 142 (Grange Road)
Town of Brunswick
County of Rensselaer
State of New York

Inspector: _____ **Title:** _____

Weather: _____

Temperature: _____ **Rainfall Past 24 Hours:** _____

Comments:

Actions to be taken:

Signature: _____ **Date:** _____ **Time:** _____

Stormwater Pollution Prevention Plan

Brunswick Meadows

Town of Brunswick
County of Rensselaer
State of New York

Contractors and Subcontractors Certification Summary Log

Company Name	
Address	
Contact Name	
Telephone Number	
Cell Phone/Pager	
Scope of Services	
Certification Date	

Company Name	
Address	
Contact Name	
Telephone Number	
Cell Phone/Pager	
Scope of Services	
Certification Date	

Company Name	
Address	
Contact Name	
Telephone Number	
Cell Phone/Pager	
Scope of Services	
Certification Date	

Project Manager_____

Stormwater Pollution Prevention Plan

Brunswick Meadows

Town of Brunswick
County of Rensselaer
State of New York

Construction Activities Report

A record of dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be maintained until final site stabilization is achieved and the Notice of Termination is filed.

MAJOR GRADING, CONSTRUCTION, OR STABILIZATION ACTIVITIES

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Project Manager_____

Stormwater Pollution Prevention Plan

Brunswick Meadows

Town of Brunswick
County of Rensselaer
State of New York

Sedimentation and Erosion Control Stabilization Measures Report

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF LAST RAINFALL _____

AREA	DATE SINCE LAST RAINFALL	DATE OF NEXT DISTURBANCE	STABILIZED? (YES/N0)	STABILIZED WITH	CONDITION

STABILIZATION REQUIRED: _____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE _____

INSPECTOR: _____ DATE: _____ **Project Manager** _____
(Print)

_____
(Signature)

Stormwater Pollution Prevention Plan

Brunswick Meadows

Town of Brunswick
County of Rensselaer
State of New York

Rainfall Log Report

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Day												
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
PM Initials												

Stormwater Pollution Prevention Plan

Brunswick Meadows

Town of Brunswick
County of Rensselaer
State of New York

Training Log Report

Stormwater Pollution Prevention Plan Topic: (Check as appropriate)

- ☐ Temporary Soil Stabilization
- ☐ Temporary Sediment Control
- ☐ Wind Erosion Control
- ☐ Tracking Control
- ☐ Non-Storm Water Management
- ☐ Waste Management and Materials Pollution Control
- ☐ Erosion & Sediment Control Plan

Specific Training Objective: _____

Date: _____

Instructor: _____
Location: _____
Telephone: _____

Attendee Roster		
Name	Company	Telephone

Project Manager_____

Stormwater Pollution Prevention Plan

Brunswick Meadows

Town of Brunswick
County of Rensselaer
State of New York

Final Stabilization Certification Report

1. ☐ All soil-disturbing activities are complete.

2. ☐ Temporary Erosion and Sediment Control Measures have been removed or will be removed at the appropriate time.

3. ☐ All areas of the Construction Site not otherwise covered by a permanent pavement or structure have been stabilized with a uniform perennial vegetative cover with a density of 85% or equivalent measures have been employed.

CONTRACTOR'S CERTIFICATION:

"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified project that are authorized by NPDES general permit have been eliminated and that all disturbed areas and soils at the construction site have achieved Final Stabilization and all temporary erosion and sediment control measures have been removed or will be removed at the appropriate time."

Company Name _____

Name (Print) _____

Signature _____

Date _____

Exhibit F

NYSDEC
SPDES General Permit No. GP-02-01

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES

from

CONSTRUCTION ACTIVITY

Permit No. GP-02-01

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

Effective Date: January 8, 2003

Expiration: January 8, 2008

William R. Adriance
Chief Permit Administrator

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

Authorized Signature

William R. Adriance

Date: January 8, 2003

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

Preface

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater discharges from certain construction activities to waters of the United States[1] are unlawful unless they are authorized by a NPDES (National Pollutant Discharge Elimination System) permit or by a state permit program. New York's SPDES (State Pollutant Discharge Elimination System) is a NPDES-approved program with permits issued in accordance with the Environmental Conservation Law ("ECL"). Discharges of pollutants to all other "Waters of New York State" such as groundwaters are also unlawful unless they are authorized by a SPDES permit.

A discharger, owner, or operator may[2] obtain coverage under this general permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this General Permit and the NOI for New York are available by calling (518) 402-8109 or at any Department of Environmental Conservation (the Department) regional office (see Appendix A on Page 23). They are also available on the Department's website at:

www.dec.state.ny.us

---

[1] "Waters of the United States" means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; and
(b) All interstate waters, including interstate "wetlands"; and
(c) All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
    (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    (3) Which are used or could be used for industrial purposes by industries in interstate commerce; and
(d) All impoundments of waters otherwise defined as waters of the United States under this definition; and
(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; and
(f) The territorial sea; and
(g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal areas in wetlands) nor resulted from the impoundment of waters of the United States.

[2] "may" refers to circumstances under which the discharger is ineligible for coverage under this general permit because of other provisions of this permit. Dischargers which are excluded from coverage under this general permit as provided for in Part I, Section C, for example, are not authorized to discharge under this permit. This also applies to possible situations in which an NOI has been submitted and/or a regulatory fee paid pursuant to Article 72 of the ECL. The submittal of an NOI and/or regulatory fee has no bearing or relevance whatsoever on the eligibility of the construction activity discharging stormwater runoff under the authority of this permit.

Local Programs of a Regulated MS4

Under the federal Phase II stormwater program, many cities, villages, towns, and other public entities in New York State which are located within "Urbanized Areas" as defined by the U.S. Census and who operate a Municipal Separate Storm Sewer System ("MS4") will be required to obtain SPDES permit coverage for stormwater discharges under their jurisdiction and control (see 40CFR Part 122 §122.26.32). Additionally, MS4s may be designated by the Department as regulated MS4s. Among other requirements, the Phase 2 NPDES stormwater regulations require regulated MS4s to address stormwater runoff from construction activities. Construction activities covered under this general permit, which are subject to stormwater runoff controls of a regulated MS4, will also need to comply with the MS4's controls.

Five (5) Day Coverage

Prior to the submission of an NOI, the owner or operator must have completed a Storm Water Pollution Prevention Plan (SWPPP) that complies with all requirements of this general permit. Submitting an NOI is an affirmation that a SWPPP has been prepared and will be implemented. If an applicant certifies that the SWPPP has been developed in conformance with the Department's technical standards, the applied-for activity may obtain coverage under this general permit in five (5) business days after the Department's receipt of the NOI provided, that the activity is eligible for coverage under this general permit and that the Department has not informed the applicant otherwise.

Sixty (60) Day Coverage

While the Department's technical standards are appropriate statewide, it is recognized that there may be situations where stormwater management goals can best be met by alternative means that are more suitable given local conditions.

For construction projects in these situations, applicants must identify in their NOI each of the deviations from the Department's technical standards that they are seeking. Applicants must also explain why the deviations are needed or desired and what impacts to water quality, if any, can be expected if the deviation were allowed. Applicants must also explain the actions, if any, that local board(s) have taken with respect to the deviation(s). For applicants which cannot certify conformance with the Department's technical standards, the SWPPP must also be certified by a licensed/certified professional that the SWPPP has been developed in a manner which will insure compliance with water quality standards and with the substantive intent of this permit.

In cases of deviations from the Department's technical standards, applicants must allow sixty (60) business days after the receipt by the Department of a completed NOI and certification before gaining coverage under this general permit and before initiating any construction activity. During this 60 day period, the Department may conduct further review of the NOI and SWPPP. If additional information is needed to complete the review, the NOI will be considered

incomplete and the applicant will be so advised. The intent of this provision is to require conformance the Department's technical standards wherever possible and appropriate. At the same time, alternative means to address stormwater control may be allowed under this general permit where they are more suitable for the site in question and where they will not diminish water quality protection.

There are other scenarios under which coverage under this general permit will not occur until 60 business days from the receipt of a completed NOI. For example, if the construction activity or post construction runoff causes the discharge of a pollutant of concern to a water identified on the 303(d) list or a watershed with an approved TMDL for that pollutant of concern, coverage under the general permit will not occur until sixty (60) business days from the receipt by the Department of a completed NOI. For these projects the operator may be required to submit the SWPPP and/or appropriate certification(s) to the Department for review. The flowchart shown in Figure 1 on page vi will help to describe the process under which certain conditions exist that require possible further analysis and water quality/quantity considerations.

Computer Tool Available For Completion of SWPPPs and NOIs Under Development

The Department is currently developing an interactive computer software tool entitled "How to Prepare SWPPPs and Notices of Intent" to assist applicants in both developing SWPPPs and completing NOIs. This will be available in the near future for use on the Department website as well as being packaged independently on compact discs. This tool will contain guidance as well as many useful links to reference materials and documents concerning erosion and sedimentation control, as well as to the design of stormwater management practices . The Department's website will contain the latest information and guidance on the various tools available.

The Department's Technical Standards

The Department's technical standards for erosion and sediment control are contained in the document, *"New York Standards and Specifications for Erosion and Sediment Control"*[3] published by the Empire State Chapter of the Soil and Water Conservation Society. For the design of water quantity and water quality controls (post-construction stormwater control practices), the Department's technical standards are detailed in the *"New York State Stormwater Management Design Manual."* Both of these documents are available on the Department's website. If an applicant certifies that stormwater management practices will conform to the Department's technical standards, then coverage under the permit may occur sooner than otherwise would be the case if non-conformance with the manuals existed. See Figure 1 on page vi for more information.

---

3 Previously, the *"New York Guidelines for Urban Erosion and Sediment Control"*, also commonly referred to as the "Blue Book".

Permit Valid for Any Size Disturbance

This permit may be used for construction activities involving any amount of disturbed acreage, provided that all other eligibility conditions in subsection B of Part I are satisfactorily met (see page 2 of this permit). Thus, this permit may apply to activities identified under 40 CFR Part 122, subsection 122.26(b)(14)(x) which are also referred to as "NPDES Phase 1 construction activities" involving soil disturbances of five (5) acres or more. This permit may also apply to activities identified under 40 CFR Part 122, subsection 122.26(b)(15) which are also referred to as "NPDES Phase 2 small construction activities" involving soil disturbances of between one (1) and five (5) acres. And, this permit may also apply to construction activities involving soil disturbances of less than one (1) acre if the Department determines that a SPDES permit is required pursuant to the ECL. In any and all cases, all of the eligibility provisions of this general permit must be met in order to gain coverage.

Notice of Termination

After construction is completed as defined in the general permit (see Part II beginning on Page 7), cancellation of coverage is accomplished by the submittal of a Notice of Termination ("NOT"). Failure to submit a NOT may result in the continued obligation to pay a yearly Regulatory Fee established pursuant to Article 72 of the ECL and/or may be cause for suspension of permit coverage.

Previous versions of NOIs, NOTs and Notices of Intent, Transfer and Termination ("NOITT"s) cannot be used in conjunction with this general permit. There is a new NOI required for obtaining coverage under this general permit. Failure to include information identified as "mandatory" entries on the new NOI form may prevent and/or delay discharge authorization being sought under this permit.

The new NOT will also include an identification of any permanent structures that are being left on the site after stabilization occurs and after termination of permit coverage under this general permit. The NOT will also include a certification that the structures were constructed as described in the SWPPP and that an Operation and Maintenance ("O&M") manual has been prepared and has been made available to the owner of such permanent structures who is expected to conduct the necessary O&M over the life of the structure(s).

Ineligible Activities

The submittal of a completed NOI and/or the payment of an annual regulatory fee by an applicant does not necessarily mean that an applicant is covered under this permit if the applicant is ineligible for coverage under this permit under the terms cited in Part I of this permit. In other words, submitting a completed NOI and paying an annual regulatory fee does not automatically gain an applicant permit coverage if the applicant is ineligible for coverage under this permit even if the Department fails to immediately inform the applicant of such ineligibility.

Permit Expiration Date

Coverage under this general permit is available January 8, 2003 and will expire five (5) years after issuance on January 8, 2008.

Activities Previously Covered Under GP-93-06

In a separate proposal, the Department is also concurrently seeking to re-issue GP-93-06 with an expiration of August 1, 2003. The purpose of this action is to provide a transition period for permittees which have had SPDES permit coverage under GP-93-06 immediately prior to January 8, 2003, the effective date of GP-02-01. **Prior to August 1, 2003**, these activities will need to:
(1) stabilize their sites in accordance with GP-93-06 and submit an NOT; or, if necessary,
(2) gain coverage under GP-02-01 by submitting a new NOI.

For **new** construction activities, coverage under GP-93-06 will not be available after the effective date of GP-02-01, January 8, 2003. Such discharges may be eligible for coverage under GP-02-01 (see Part I.B. on page 2 of this permit).

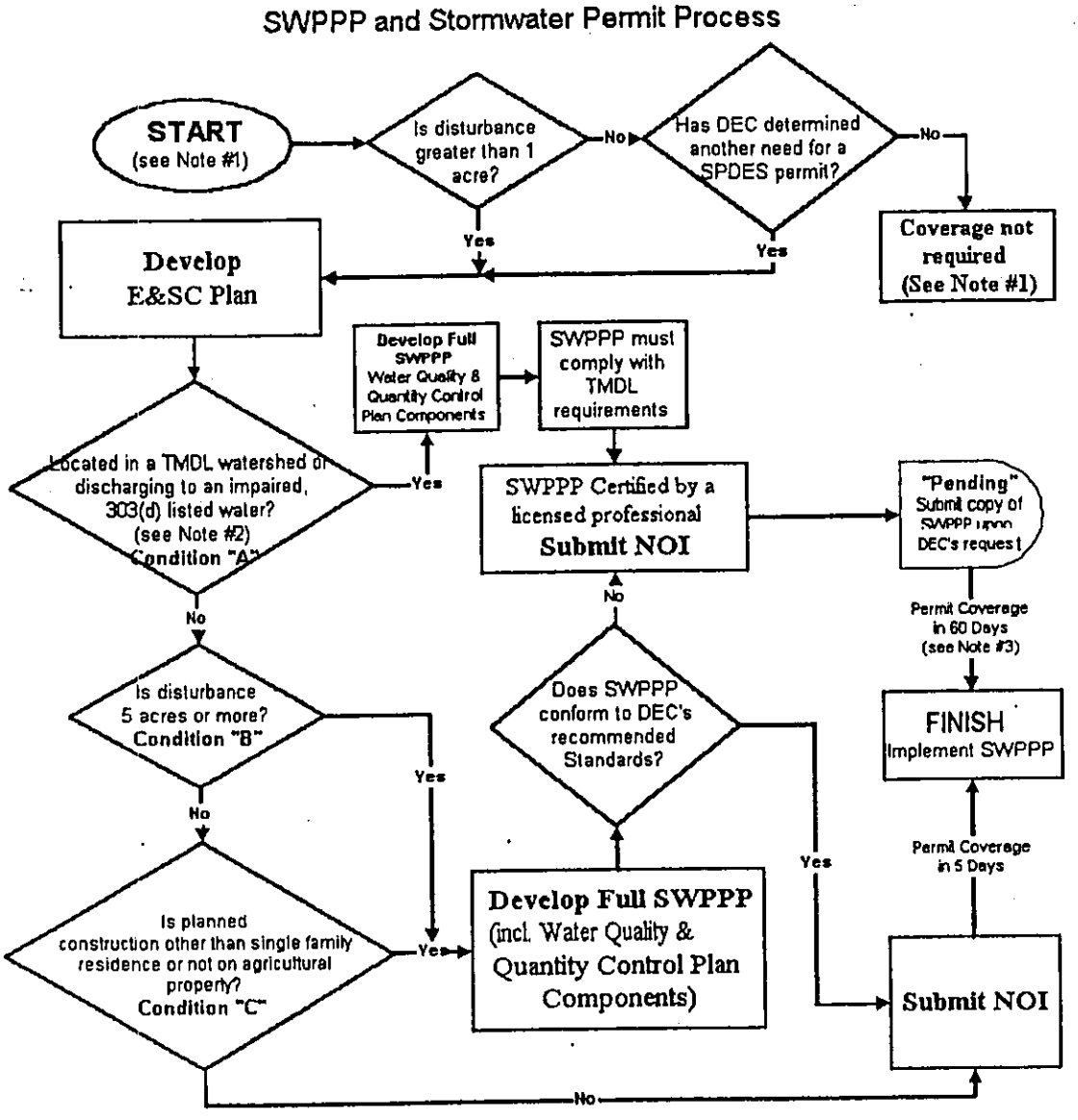
Water Quality Violations Not Permitted

This permit does not authorize any person to cause or contribute to a condition in contravention of any water quality standards that are contained in the Rules and Regulations of the State of New York (see Part I of this permit on page 2) even if the permittee is in compliance with all other provisions of this permit. Any violations of water quality standards may be considered by the Department to be violations of this permit and/or the ECL, including its accompanying regulations.

Other Department Permits

Construction activities may also require other Department permits in addition to the coverage provided by this general permit including, but not limited to, dam safety, wetlands and stream protection. Such other Department permits must be obtained separately from coverage under this general permit. Further information concerning these permits should be sought from the Regional Permit Administrator at the appropriate Department regional office (See Appendix A on page 23).

FIGURE 1



NOTES:

1 Under any of the above conditions other environmental permits may be required. DEC may require permit for construction disturbance < 1 acre on a case by case basis.

2. and the following exists: construction and/or stormwater discharges from the construction or post-construction site contain the pollutant of concern identified in the TMDL or 303(d) listing.

3. After receipt by DEC of completed application

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

FROM CONSTRUCTION ACTIVITIES

TABLE OF CONTENTS

Part I. COVERAGE UNDER THIS PERMIT

A. **Maintaining Water Quality** - It shall be a violation of this general permit and the Environmental Conservation Law ("ECL") for any discharge authorized by this general permit 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 including, but not limited to:

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 and 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.

B. **Eligibility Under This General Permit**

1. This permit may authorize all discharges of stormwater from construction activity[4] to surface waters and groundwaters except for ineligible discharges identified under subparagraph C of this Part (see below). Discharge authorization under this permit requires the submittal of a completed NOI.

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

3. Notwithstanding paragraphs B.1 and B.2 above, the following non-stormwater discharges may be authorized by this permit: discharges from fire

---

[4] This includes discharges of stormwater associated with industrial activity identified under 40 CFR Part 122, subsection 122.26(b)(14)(x), small construction activities identified under 40 CFR Part 122, subsection 122.26(b)(15) or any other stormwater from construction activities that are not otherwise ineligible for coverage under this permit (See Part I, subsection B beginning on page 2).

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; springs; 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 general 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(see Part III beginning on Page 7). Under all circumstances, the permittee must still comply with water quality standards (see Part I, subsection A on Page 2).

C. **Activities Which Are Ineligible for Coverage Under This General Permit** - All of the following stormwater discharges from construction activities are **not** authorized by this permit:

1. Discharges after construction activities have been completed and the site has undergone final stabilization[5];

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

3. Discharges that are subject to an existing SPDES individual or general permit or which are required to obtain an individual or alternative general permit pursuant to Part V, subparagraph K (see page 21) of this permit;

4. Discharges that are likely to adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;

5. Discharges which are subject to an existing effluent (limitation) guideline addressing stormwater and/or process wastewater unless said guidelines are contained herein; or

6. Discharges which either cause or contribute to a violation of water quality standards adopted pursuant to the ECL and its accompanying regulations (See subsection A of Part I on page 2).

---

[5] "Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 80% has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

D. Authorization Under This General Permit

1. An operator[6] must submit a completed NOI form in order to be authorized to discharge under this general permit. The NOI form shall be one which is associated with this general permit, signed in accordance with Part V. H.(see Page 19) of this permit and submitted to the address indicated on the NOI form. NOIs and NOITTs used in association with either previous or other general permits are not valid for obtaining coverage under this general permit. The submittal of an NOI is an affirmation to the operators' understanding and belief that the activity is eligible for coverage under this permit and that a SWPPP has been prepared and will be implemented in accordance with Part III of this permit.

2. All contractors and subcontractors of the operator identified under Part III.E.1 (see page 17) must provide the certification cited under Part III.E.2 (see page 17). Such certifications shall become part of the SWPPP for the construction activity covered under this general permit.

3. Unless notified by the Department to the contrary, operators who are eligible for coverage under this permit **and** who submit an NOI in accordance with the requirements of this permit, may be authorized to discharge stormwater from construction activities under the terms and conditions of this permit, and in accordance with the following timetable:

a. For construction activities which:

(1) develop a SWPPP in conformance with the Department's technical standards (See subsection D of Part III on page 10), and do not or will not discharge a pollutant of concern to an impaired water or a TMDL watershed;

or

(2) as of the effective date of this general permit, GP-02-01, have obtained coverage under, and are operating in compliance with, GP-93-06; and do not or will not discharge a pollutant of concern to an impaired water or a TMDL watershed;

authorization to discharge under this permit may occur <u>five (5) business days</u> after the date on which the NOI is received by the Department.

---

6 For the purposes of this permit, the term "operator" means the person, persons, or legal entity which owns or leases the property on which the construction activity is occurring. Also, see Part V., subsection H. on page 19 of this permit.

b. For activities which do not comply with the preceding subsection (i.e. Part I.D.3.a.), authorization to discharge under this permit will begin no sooner than sixty (60) business days from the receipt of the completed NOI unless notified differently by the Department pursuant to Part V, subsection K of this permit (see page 21). For activities not satisfying Part I.D.3.a.(1) above, or for construction site runoff subject to a TMDL (see Figure 1 on page vi), the SWPPP must be prepared by a licensed/certified professional[7] and include a certification stating that the SWPPP has been developed in a manner which will assure compliance with water quality standards (see Part I.A.) and with the substantive intent of this permit.

c. For construction activities which are subject to a sixty-day period provision identified in the preceding subparagraph b., the SWPPP shall include each of the components identified in Part III.A.1.b. (see page 8).

4. At its sole discretion, the Department may deny or terminate coverage under this permit and require coverage under another SPDES permit at any time based on a review of the NOI, the SWPPP or other relevant information (see Part V, subsection K of this permit on page 21).

5. A copy of the NOI and a brief description of the project shall be posted at the construction site in a prominent place for public viewing.

6. A signed copy of the NOI, the SWPPP, and any reports required by this permit shall also be submitted concurrently to the local governing body and any other authorized agency[8] having jurisdiction or regulatory control over the construction project.

7. New stormwater discharges from construction activities that require any other Uniform Procedures Act permit (Environmental Conservation Law, 6 NYCRR Part 621) cannot be covered under this general permit until the other required permits are obtained. Upon satisfaction of the State Environmental Quality Review Act ("SEQRA") for the proposed action and issuance of necessary permits, the applicant may submit an NOI to obtain coverage under this general

---

7 A "licensed/certified professional" means a person currently licensed to practice engineering in New York State or is a Certified Professional in Erosion and Sediment Control (CPESC).

8 For the purposes of this general permit, "any other authorized agency" shall include any local, regional, or state entity or agency except the Department which has authority to review stormwater discharge from the project, including authority under any approved watershed protection plan or regulations.

permit.[9] In order to facilitate the Department's review of a multi-permitted project, an applicant should submit, at a minimum, a copy of the SWPPP which contains the information specified in Appendix B (see page 24). This information will assist the Department in determining whether or not coverage under this general permit or another SPDES permit is the more appropriate option. The Department may also require the submission of additional information in order to determine the SWPPP's conformance with the Department's technical standards.

8. Upon renewal of this general permit or issuance of a new general permit, the permittee is required to notify the Department of its intent to be covered by the new general permit. Coverage will continue under this permit for its term unless action is taken to terminate permit coverage as provided elsewhere in this permit. See also Part V. subsection B. on page 18 of this permit.

9. In the event of a transfer of ownership or responsibility for stormwater runoff, there can be no "automatic" transfer of permit coverage from one permittee to the next without appropriate notification from the dischargers. The former permittee must submit an NOT and notify the new discharger of the possible need for the new discharger to submit a new NOI (see Section E, subparagraph 2 below).

E. **Deadlines for Notification**

1. Operators who intend to obtain coverage under this general permit for stormwater runoff from construction activities must submit an NOI in accordance with the requirements of this Part at least five (5), or sixty (60) business days, as appropriately determined from Part I, Section D.3 (see page 4) prior to the commencement of construction[10] activities.

2. For stormwater runoff from construction activities where the operator changes, a new NOI must be submitted by the new operator in accordance with the requirements of this permit. The former operator must submit a NOT in accordance with Part II (see page 7) of this permit and notify the new operator of the requirement to submit a new NOI to obtain coverage under this permit. The new operator must also review and sign the SWPPP in accordance with Part III.B.(see page 9) and continue implementation of the SWPPP as required by this

---

9 The purposes of this subsection is to assure that the requirements of SEQRA are fulfilled, if necessary, before any discharge authorization under this general permit is granted.

10 "Commencement of Construction" means the initial disturbance of soils associated with clearing, grading, or excavating activities, or other construction activities.

permit.

Part II. TERMINATION OF COVERAGE[11]

Where a site has been finally stabilized, the operator must submit a NOT form prescribed by the Department for use with this general permit. The NOT shall be signed in accordance with Part V. H.(see page 19) of this permit and submitted to the address indicated on the approved NOT form.

The permittee must identify all permanent stormwater management structures that have been constructed and provide the owner(s) of such structures with a manual describing the operation and maintenance practices that will be necessary in order for the structure to function as designed after the site has been stabilized. The permittee must also certify that the permanent structure(s) have been constructed as described in the SWPPP.

Part III. STORMWATER POLLUTION PREVENTION PLANS ("SWPPP"s)

A. General

1. SWPPP Preparation

a. A SWPPP shall be developed by the operator for construction activities at each site to be covered by this permit, prior to the initiation of activities requiring coverage under this permit. SWPPPs shall be prepared in accordance with sound engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges. In addition, the SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in stormwater discharges and to assure compliance with the terms and conditions of this permit. Operators are encouraged to have their SWPPP reviewed for adequacy and completeness by the local soil and water conservation district ("SWCD") and/or other professionals qualified in erosion and sediment control practices[12] and stormwater management. Moreover, if the construction activity is identified under Part I, subsection D.3.b. (See page 5), or for construction site runoff subject to a TMDL (see Figure 1 on page vi), the SWPPP must include a certification by a licensed/certified professional.

---

11 Submittal of an NOT will terminate coverage under this general permit and will also remove the permittee from subsequent billings of the annual regulatory fee levied under Article 72 of the ECL.

12 For example, CPESC, Inc. administers a certified program of individuals under its CPESC (Certified Professional in Erosion and Sediment Control) program which is sponsored by the International Erosion Control Association (IECA) and the Soil and Water Conservation Society (SWCS) and is endorsed by USDA - Natural Resources Conservation Service. CPESC, Inc. also administers the CPSWQ (Certified Professional in Stormwater Quality) program.

b. All SWPPPs shall include erosion and sediment controls. For construction activities meeting either Condition "A", "B" or "C" described below, the SWPPP shall also include water quantity and water quality controls (post-construction stormwater control practices).(see Part III. D.).

(1) Condition A - Construction site or post construction runoff discharging a pollutant of concern to either an impaired water identified on DEC's 303(d) list or a TMDL watershed for which pollutants in stormwater have been identified as a source of the impairment.

(2) Condition B - Construction site runoff from Phase 1 construction activities (construction activities disturbing five (5) or more acres) identified under 40 CFR Part 122, §122.26(b)(14)(x).

(3) Condition C - Construction site runoff from construction activity disturbing between one (1) and five (5) acres of land during the course of the project, exclusive of the construction of single family residences and construction activities at agricultural properties.

2. **SWPPP Implementation** - Operators are responsible for implementing the provisions of the SWPPP and ensuring that all contractors and subcontractors who perform professional services at the site provide certification of the SWPPP in accordance with Part I.D.2. (see page 4) and Part III.E.2. (see page 17) of this permit. All contractors and subcontractors identified in the SWPPP in accordance with Part III.E.1. (see page 17) of this permit must agree to implement applicable provisions of the SWPPP and satisfy the certification requirement of Part III.E.2. (see page17). However, contractors and subcontractors who are not operators, as defined in this permit (see page 4), are not required to submit a NOI in addition to the NOI submitted by the operator.

3. **Deadlines for SWPPP Preparation and Compliance** - The SWPPP must be developed prior to the submittal of an NOI and provide for compliance with the terms and schedule of the SWPPP beginning with the initiation of construction activities. The operator shall also certify in the SWPPP that all appropriate stormwater control measures will be in place before commencement of construction of any segment of the project that requires such measures.

4. **Local Requirements** - Developing a SWPPP that complies with the requirements listed herein does not relieve an operator from the obligation of complying with stormwater management requirements of the local government having jurisdiction over the project.

5. **Activities Previously Covered Under GP-93-06** - For construction activities which are covered by GP-93-06 as of the effective date of this permit (GP-02-01), the continued implementation of their SWPPP that was developed and implemented in accordance with GP-93-06 is acceptable until such time as:

(a) an NOT is submitted;

(b) the Department notifies them otherwise in accordance with this permit, including Part V, subsection K (see page 21); or

(c) this permit expires.

B. **Signature and SWPPP Review**

1. The SWPPP shall be signed in accordance with Part V. H.(see page 19), and be retained at the site where the construction activity occurs in accordance with Part IV (see retention of records on page 17) of this permit.

2. The permittee shall submit a copy of the SWPPP and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity. The operator shall make SWPPPs available upon request to the Department and any local agency having jurisdiction; or in the case of a stormwater discharge associated with industrial activity which discharges through a municipal separate storm sewer system, to the municipal operator of the system.

3. The Department, or its authorized representative, may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. Such notification shall identify those provisions of the permit which are not being met by the SWPPP and identify which provisions of the SWPPP require modifications in order to meet the minimum requirements of this permit. Within seven (7) days of such notification, (or as otherwise provided by the Department) the permittee shall make the required changes to the SWPPP and shall submit to the Department a written certification that the requested changes have been made. Notwithstanding the foregoing, the Department reserves all rights to enforce the terms of the ECL.

C. **Keeping SWPPPs Current** - The permittee 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 SWPPP proves to be ineffective in:

   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP required by this permit, or

   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity.

3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP (see Part III.E, page 17 below). Amendments to the SWPPP may be reviewed by the Department in the same manner as provided by Part III.B (see page 9 above).

D. **General Contents of SWPPPs** -

1. **Standards for construction activities covered under this permit** - The Department's technical standards for erosion and sediment controls are detailed in the "*New York Standards and Specifications for Erosion and Sediment Control*"[13] published by the Empire State Chapter of the Soil and Water Conservation Society. For the design of water quality and water quantity controls (post-construction stormwater control practices), the Department's technical standards are detailed in the "*New York State Stormwater Management Design Manual.*"

If an operator certifies that the SWPPP has been developed in conformance with the Department's technical standards referenced above, they may obtain coverage under this general permit in five (5) business days from the Department's receipt of the NOI, provided the construction activity does not meet Condition A in Part III.A.1.b. For SWPPPs which will not conform with the Department's technical standards, the SWPPP must be prepared by a licensed/certified professional and include a certification stating that the SWPPP has been developed in a manner which will assure compliance with the State's water quality standards and with the substantive intent of this permit. In addition, coverage under this general permit will not begin until sixty (60) business days from the receipt of a completed NOI.

---

13 Previously, the "*New York Guidelines for Urban Erosion and Sediment Control*," also commonly referred to as the "Blue Book."

2. **Minimum SWPPP Components** SWPPPs prepared pursuant to this general permit shall present fully designed and engineered stormwater management practices with all necessary maps, plans and construction drawings. The SWPPP must, at a minimum, include the following:

a. For all construction activities subject to this general permit -

(1). provide background information about the scope of the project, including the location, type and size of project.

(2) provide a 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; 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 off-site material, waste, borrow or equipment storage areas; and location(s) of the stormwater discharge(s);

(3) provide a description of the soil(s) present at the site;

(4) provide a construction phasing plan 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 Guidelines for Urban Erosion and Sediment Control, there shall not be more than five (5) acres of disturbed soil at any one time without prior written approval from the Department;

(5) provide 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 storm water discharges;

(6) provide a description of construction and waste materials expected to be stored on-site with updates as appropriate, and a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response;

(7) describe the temporary and permanent structural and vegetative measures to be used for soil stabilization, runoff control and sediment control for each stage of the project from initial land

clearing and grubbing to project close-out;

(8) identify and show on a site map/construction drawing(s) the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

(9) provide the dimensions, material specifications and installation details for all erosion and sediment control practices, including the siting and sizing of any temporary sediment basins;

(10) identify temporary practices that will be converted to permanent control measures;

(11) provide an implementation schedule for staging temporary erosion and sediment control practices, including the timing of initial placement and the duration that each practice should remain in place;

(12) provide a maintenance schedule to ensure continuous and effective operation of the erosion and sediment control practices;

(13) provide the names(s) of the receiving water(s);

(14) provide a delineation of SWPPP implementation responsibilities for each part of the site;

(15) provide a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable; and

(16) provide any existing data that describes the stormwater runoff characteristics at the site.

b. For construction activities meeting Condition A, B or C in Part III.A.1.b.

(1) provide all the information required in Parts III.D.2.a.1 - 16 above;

(2) provide a description of each post-construction stormwater control practice;

(3) identify and show on a site map/construction drawing(s) the specific location(s) and size(s) of each post-construction stormwater control practice;

(4) provide a hydrologic and hydraulic analysis for all structural components of the stormwater control system for the applicable design storms;

(5) provide a comparison of post-development stormwater runoff conditions with pre-development conditions;

(6) provide the dimensions, material specifications and installation details for each post-construction stormwater control practice;

(7) provide a maintenance schedule to ensure continuous and effective operation of each post-construction stormwater control practice.

The following three subsections, Part III.D. 3. through Part III.D. 5., apply only to construction activities covered under this general permit which meet Conditions "A" , "B"[14] or "C" in Part III. A.1.b. Beginning with Part III.E. below (see page 17) the requirements set forth therein apply to all permittees covered under this permit.

3. Site Assessment and Inspections -

a. The operator shall have a qualified professional[15] conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP and required by Part III.D. (see page 10) of this permit have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. During each inspection, the qualified professional shall record the following information:

(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 the 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

---

14 Condition "B" includes construction activities covered under GP-93-06 and, therefore, are subject to Part III.D.3 through Part III.D. 5.

15 "Qualified professional" means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist.

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

(6) All deficiencies that are identified with the implementation of the SWPPP.

b. The operator shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction,[16] the operator shall certify in the site log book that the SWPPP, prepared in accordance with Part III.D. (see page 10) of this permit, meets all Federal, State and local erosion and sediment control requirements.

The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

c. Prior to filing of the Notice of Termination or the end of permit term, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[17] 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.

d. The operator shall certify that the requirements of Parts III.D.3., III.D.4. and III.D.5 of this permit have been satisfied within 48 hours of actually meeting such requirements.

---

16 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

17 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

4. **Stabilization**[18] - The operator 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 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:

a. Where the initiation of stabilization measures by the 14th 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;

b. Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures need not be initiated on that portion of the site.

5. **Maintenance** - Sediment shall be removed from sediment traps or sediment ponds whenever their capacity has been reduced by fifty (50) percent from the design capacity.

---

18 "Stabilization" means covering or maintaining an existing cover over soil. Cover can be vegetative (e.g. grass, trees, seed and mulch, shrubs, or turf) or non-vegetative (e.g. geotextiles, riprap, or gabions).

E. **Contractors**

1. The SWPPP must clearly identify for each measure identified in the SWPPP, the contractor(s) and subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part III.E.2 (see below) of this permit in accordance with Part V.H.(see page 19) of this permit. All certifications must be included in the SWPPP. Additionally, new contractors and subcontractors (see subsection C.3. above) need to similarly certify.

2. **Certification Statement** - All contractors and subcontractors identified in a SWPPP in accordance with Part III.E.1 (see above) 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 certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the 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."

The certification must include the name and title of the person providing the signature in accordance with Part V.H.(see page 19) of this permit; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

Part IV. MONITORING, REPORTING AND RETENTION OF RECORDS

A. The Department may, at its sole discretion, require monitoring of discharge(s) from the permitted construction activity after notifying the permittee in writing of the basis for such monitoring, the parameters and frequency at which monitoring shall occur and the associated reporting requirements, if any.

B. The operator shall retain copies of SWPPPs and any reports submitted in conjunction with this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

C. The operator shall retain a copy of the SWPPP required by this permit at the construction site from the date of initiation of construction activities to the date of final

stabilization.

D. The operator shall also prepare a written summary of its status with respect to compliance with this general permit at a minimum frequency of every three months during which coverage under this permit exists. The summary should address the status of achieving each component of the SWPPP . This summary shall be handled in the same manner as prescribed for SWPPPs under Part III, subsection B (see Page 9).

E. **Addresses** - Except for the submittal of NOIs and NOTs, all written correspondence under this permit directed to the Department, including the submittal of individual permit applications, shall be sent to the address of the appropriate Department Office as listed in Appendix A (see page 23).

Part V. STANDARD PERMIT CONDITIONS

A. **Duty to Comply** - The 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 permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against either the operator or the contractor/subcontractor; permit revocation 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. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the operator or the operator's on-site representative.

B. **Continuation of the Expired General Permit** - This permit expires five (5) years after issuance on January 8, 2008. However, coverage may be obtained under the expired general permit which will continue in force and effect until a new general permit is issued. After issuance of a new general permit, those with coverage under GP-02-01 will have six (6) months from the effective date of the new general permit to complete their project or obtain coverage under the new permit. Unless otherwise notified by the Department in writing, operators seeking authorization under a new general permit must submit a new NOI in accordance with the terms of such new general permit. See also Part I, subsection D.8. on page 6.

C. **Penalties for Violations of Permit Conditions** - There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $25,000 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 a permittee 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 permittee 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 permittee shall furnish any information requested by any agency with regulatory or review authority over this project for the purpose of determining compliance with this permit or compliance with any other regulatory requirements placed on the project in conjunction with this permit. Failure to provide requested information shall be a violation of this permit. Such regulating agencies include but are not limited to the Department, SWCDs,[19] local planning, zoning, health, and building departments that review and approve erosion and sediment control plans, grading plans, and Stormwater Management Plans, as well as MS4s into whose system runoff from the permitted project or activity discharges. The SWPPP and inspection reports required by this general permit are public documents that the operator must make available for inspection, review and copying by any person within five (5) business days of the operator receiving a written request by any such person to review the SWPPP and/or the inspection reports. Copying of documents will be done at the requester's expense.

G. **Other Information** - When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to the Department, he or she shall promptly submit such facts or information.

H. **Signatory Requirements** - All NOIs, NOTs, SWPPPs, reports, certifications or information required by this permit or submitted pursuant to this permit, shall be signed as follows:

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

   a. For a corporation: by (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person authorized to and who performs similar policy or decision-making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

---

[19] "SWCD" means Soil and Water Conservation District

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) 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 all reports required by the permit and other information requested by the Department or local agency shall be signed by a person described above 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 above and submitted to the Department.

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 manager, operator, superintendent, or 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).

c. **Certification** - Except for NOIs and NOTs, any person signing documents in accordance with this Part shall make the following 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. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

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.

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.

K. **Denial of Coverage Under This Permit**

1. At its sole discretion, the Department may require any person authorized by this permit to apply for and/or obtain either an individual SPDES permit or an alternative SPDES general permit. Where the Department requires a discharger authorized to discharge under this permit to apply for an individual SPDES permit, the Department shall notify the discharger in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of issuance or denial of the individual SPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate Department Office indicated in Appendix A of this permit. The Department may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual SPDES permit application as required by the Department under this paragraph, then the applicability of this permit to the individual SPDES permittee is automatically terminated at the end of the day specified by the Department for application submittal.

2. Any discharger authorized by this permit may request to be excluded from the coverage under this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 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 A on page 23 of this permit). The request may be granted by issuance of an individual permit or an alternative general permit at the discretion of the Department.

3. When an individual SPDES permit is issued to a discharger covered by this permit, or the discharger is authorized to discharge under an alternative SPDES general permit, the applicability of this permit to the individual SPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual SPDES permit is denied to an operator otherwise subject to this permit, or the operator is denied for coverage under an alternative SPDES general permit, the applicability of this permit to the individual SPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Department.

L. **Proper Operation and Maintenance** - The permittee 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 permittee to achieve compliance with the conditions of this permit and with the requirements of SWPPPs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

M. **Inspection and Entry** - The permittee 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:

1. Enter upon the permittee'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, revoked, or renewed. The filing of a request by the permittee for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not stay compliance with any terms of this permit.

APPENDIX A

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	Bldg 40 - SUNY @ Stony Brook Stony Brook, NY 11790-2356 Tel. (631) 444-0365	Bldg 40 - SUNY @ Stony Brook Stony Brook, NY 11790-2356 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	200 White Plains Road, 5th Floor Tarrytown, NY 10591-5805 Tel. (914) 332-1835
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	Route 86, PO Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Hudson Street 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

APPENDIX B

Information Required of Construction Activities Which Are Identified Under Part I, subsection D.7. (see page 5)

A. The location (including a map) and the nature of the construction activity;

B. The total area of the site and the area of the site that is expected to undergo excavation during the life of the permit;

C. Proposed measures, including best management practices, to control pollutants in storm water discharges during construction, including a brief description of applicable State and local erosion and sediment control requirements;

D. Proposed measures to control pollutants in storm water discharges that will occur after construction operations have been completed, including a brief description of applicable State or local erosion and sediment control requirements;

E. An estimate of the runoff coefficient of the site and the increase in impervious area after the construction addressed in the permit application is completed, the nature of the fill material and existing data describing the soil or the quality of the discharge; and

F. The name of the receiving water(s).

Exhibit G

NYSDEC
Notice of Intent ("NOI")

SPDES General Permit
For Stormwater Discharges

From

Construction Activity

Permit No. GP-02-01

Notice of Intent ("NOI")

New York State Department of Environmental Conservation

Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NOTICE OF INTENT for Stormwater Discharges Associated with Construction Activity UNDER SPDES GENERAL PERMIT #GP-02-01

NYR _ _ _ _ _ _
(for DEC use only)

IMPORTANT: **All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this general permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to completing and submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.**

Section I: Applicant/Activity Information

1. Owner/Operator Name:			
2a. Mailing Address:	2b. City	2c. State	2d. Zip
3. Contact Person: 3a. First Name: 3b. Last Name:	3c. Phone:	3d. E-mail:	
4a. Site/Project Name:		4b. Existing use of the site:	
5a. Street Address:	5b. City:	State: NY	5c. Zip
6. County:	7. Site Location: 7a. X Coordinates:_____	7b. Y coordinates:_____	

Section II: Disturbance Activity/Discharge Characteristics

8. Future use of the site:	9. Duration of disturbance activity (use mm/dd/yyyy) from: to:
10. Total site acreage: (acres)	11. Total acres of disturbed area of overall plan of development or sale:
12. Soil (Hydrologic Soil Group):	13. What is the maximum slope of disturbed area: %

14. What is the percentage of impervious area of the site? 14a. before commencement of the project %
14b. after completion of the project: %

15. Will there be permanent stormwater management practices? ☐ yes ☐ no

16. Is this a phased project? ☐ yes ☐ no

Section III: Receiving System(s)

17. Does any part of the project lie within a regulated 100-year flood plain? ☐ yes ☐ no
18. Does the site/activity lie within the boundaries of the New York City watershed? ☐ yes ☐ no
19. Does runoff from site enter a storm sewer or ditch maintained by a local, Federal or State governmental unit (MS4)? ☐ yes ☐ no
If the answer to 19 is no, skip to question 20.
19a. Provide the name of the government owning the storm sewer system:
19b. Is the MS4 a "regulated MS4" as defined under 40 CFR Section 122.32? ☐ yes ☐ no ☐ don't know
19c. Does the MS4 have a SPDES permit for their storm sewer system? ☐ yes ☐ no ☐ don't know
19d. Is the runoff from the site tributary to a Combined Sewer Overflow (CSO)? ☐ yes ☐ no
20. What is the name of the nearest surface water body into which the runoff will enter?
21. Does the runoff discharge to a receiving water identified as 303(d) listed segment ☐, or "TMDL" water ☐, or neither ☐?

Section IV: Stormwater Pollution Prevention Plan

22. What components are required for the SWPPP? (Consult the SWPPP and Stormwater Permit Process flow chart and check all that apply): 22a. ☐ Erosion and Sediment Control Plan 22b. ☐ Water Quality and Quantity Controls

23. Is the Construction Sequence Schedule for the planned management practices prepared? ☐ yes ☐ no

Will the Stormwater Pollution Prevention Plan be in conformance with:
24a. local government requirements? ☐yes ☐no 24b. NYSDEC requirements? ☐yes ☐no
If the answer to 24b. is yes, skip to Section VI.

Section V. Supplemental Information (only if you answered "no" to question 24.b.)

25. **Before submitting this NOI, you must have your SWPPP certified by a licensed Professional.**
This certification must state that the SWPPP has been developed in a manner which will enssure compliance with water quality standards and with the substantive intent of this permit (see general permit for additional information).
Is your plan certified by a licensed Professional? ☐yes ☐no

- Do not submit your SWPPP to DEC unless requested.
- A copy of your SWPPP must be submitted to the local jurisdiction(s) as required under Part III, subsection B.2 (also see question #29 below).
- State each deviation from the Department's Technical Standards, reasons supporting each deviation request and an analysis of the water quality impacts in your SWPPP.
- Use Section VII below to summarize the justification statement in one paragraph.
- Allow sixty (60) days from the receipt of your completed application for permit coverage to provide DEC an opportunity to review the application and supporting information.

Section VI. Reviews and Approvals

Has your SWPPP been reviewed by: 26a. ☐ local Soil and Water Conservation District 26b. ☐ Professional Engineer
26c. ☐ Certified Professional Erosion Control Specialist 26d. ☐ Licensed Landscape Architect. 26e. ☐ None

27. Are there other DEC permits required or already obtained for this project? ☐yes ☐no
28. If the answer to 27 is no, skip to question 29.
28a. If this NOI is submitted for the purpose of continuing previous coverage under the general permit for stormwater runoff from construction activities (GP-93-06), please indicate the SPDES reference number assigned under GP-93-06: NYR1_____
28b. If there is another SPDES permit, please indicate the permit number: NY
28c. If there are other DEC permits, please provide one of the permit numbers: _____

29. Has a copy of your SWPPP been submitted to the governing jurisdiction as required by the permit? ☐ yes ☐ no

Section VII. Details (use this space, maximum of 650 characters, to further explain answers where necessary)

Section VIII. Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I also certify under penalty of law that this document and the corresponding documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) 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. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

30a. Printed Name:	30b. Title/Position:	30c. Phone:
Signature:	30d. E-mail:	30e. Date:

Reset All Fields

Exhibit H

NYSDEC
Notice of Termination ("NOT")

SPDES General Permit
For Stormwater Discharges

From

Construction Activity

Permit No. GP-02-01

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NOTICE OF TERMINATION for Storm Water Discharges Associated with Construction Activity UNDER SPDES GENERAL PERMIT: ☐ #GP-93-06 or ☐ #GP-02-01

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Permittee Information

1. Owner/Operator Name:

2a. Mailing Address:	2b. City/State/Zip:

3a. Contact Person:	3b. Phone:	3c. E-mail:

II. Site Activity Information

4. Facility/Project Site Name:

5a. Street Address:	5b. City/State/Zip:

6. County:

III. Reason for Termination

7. ☐ Is site stabilized in accordance with permit and SWPPP? ☐ yes ☐ no ☐ Other reason for termination of permit coverage: (briefly explain)

IV. Final Site Information

8a. Are there permanent stormwater control structures remaining on the site? ☐ yes ☐ no
If the answer to question 8a. is no, go to question 8e.
If the answer to question 8a. is yes, answer the following questions 8b., 8c., and 8d.:
8b. Is the design and function of each described in the final SWPPP? ☐ yes ☐ no
8c. Have the new owners been given a copy of the operation and maintenance requirements for long-term operation? ☐ yes ☐ no
8d. Who will be responsible for long-term maintenance?

8e. What is the final percent imperviousness of the site? _____%

V. Certification

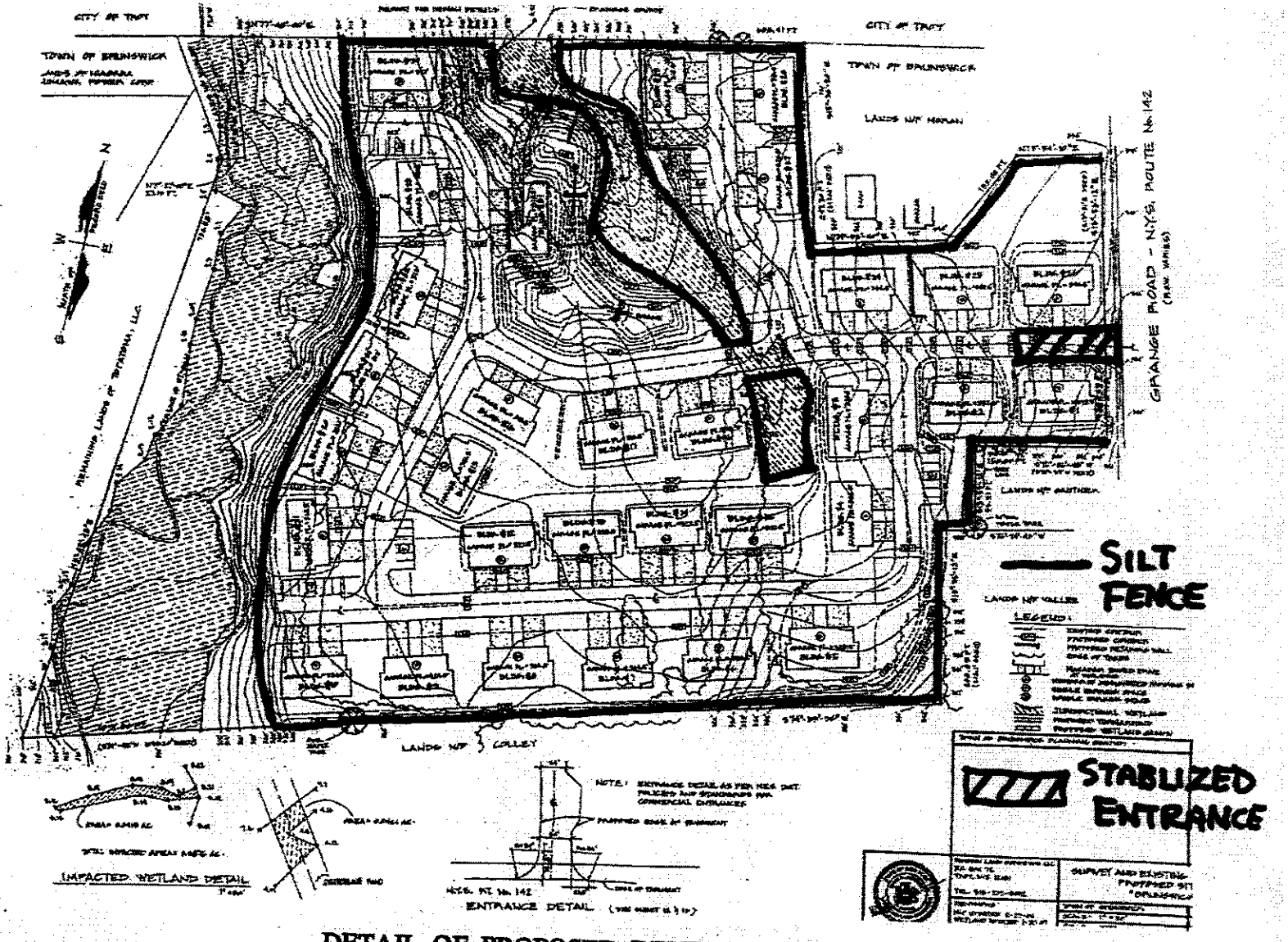
I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name:	Title/Position:	
Mailing Address:	Telephone:	E-mail:
Signature:	Date:	

Exhibit I

Stormwater Pollution Prevention Plan

Erosion and Sedimentation Control Plan



DETAIL OF PROPOSED DEVELOPMENT

Exhibit 4.1
New York Rainfall Maps for Different Rainfall Frequencies

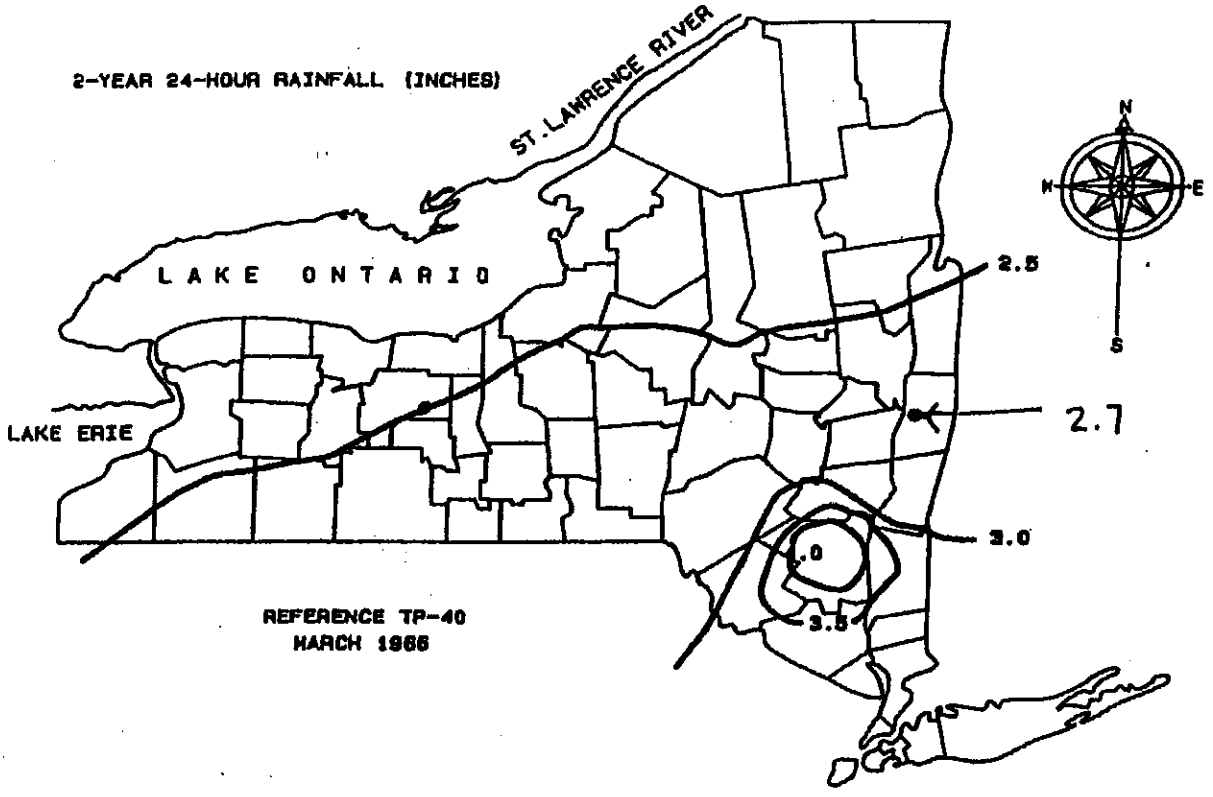
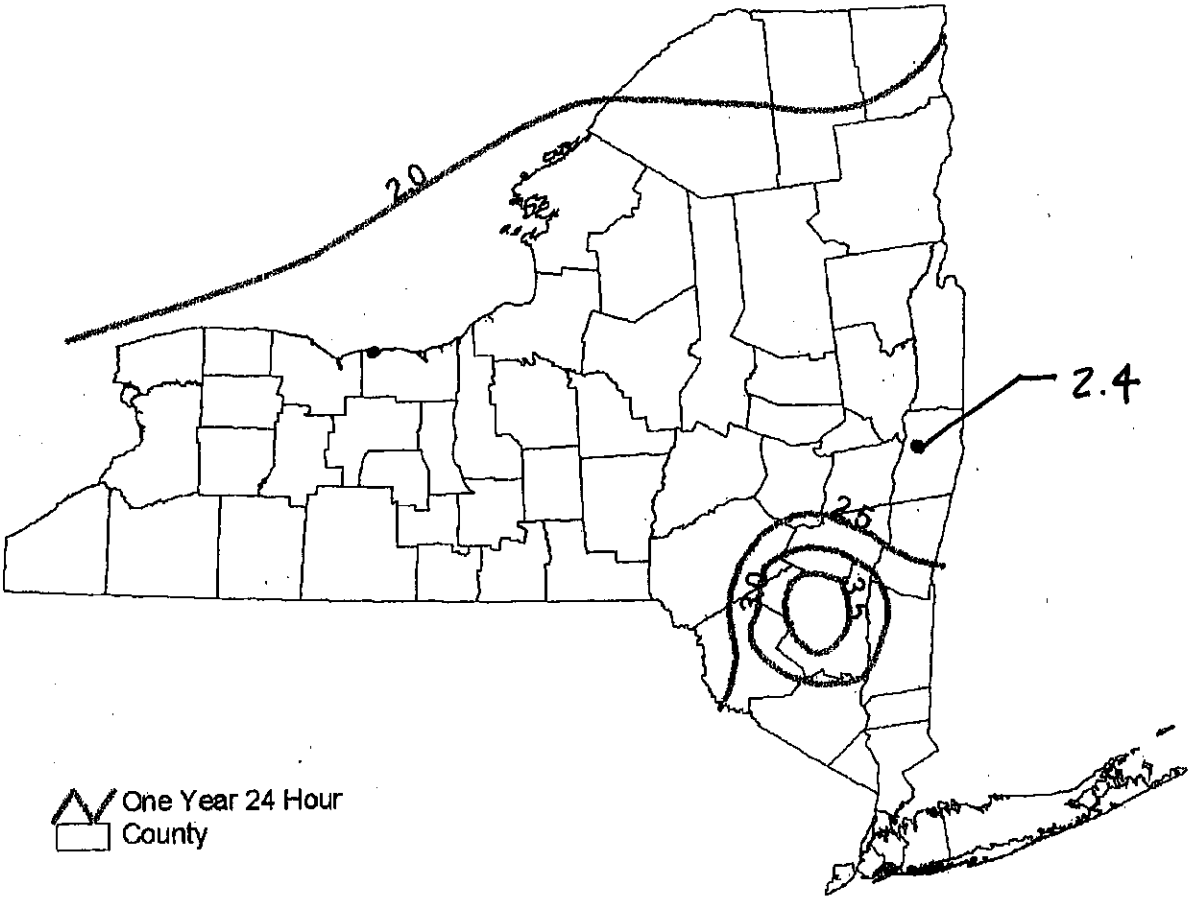
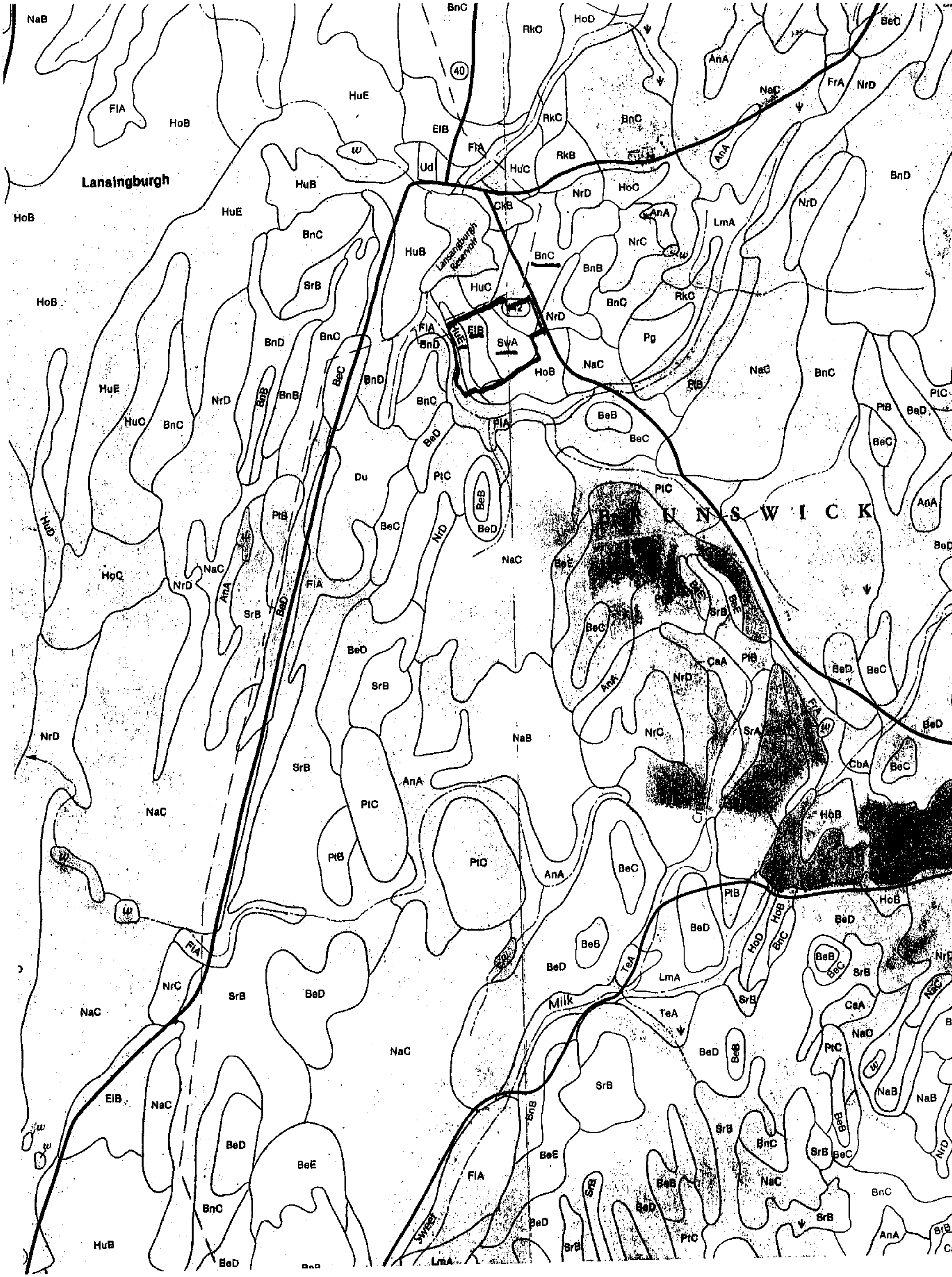


Figure 4.4 One-Year Design Storm




Lansingburgh
Lansingburgh Reservoir
40
BRUNSWICK
Milk
Sweet

SOIL SERIES USED IN NEW YORK AND THEIR HYDROLOGIC GROUPS

ADAMS ..... A
ADJIDAUMO ..... D
ADRIAN ..... A/D
AGWAM ..... B
ALBRIGHTS C
ALDEN ..... D
ALLAGASH ..... B
ALLARD ..... B
ALLIS ..... D
ALTMAR ..... B
ALTON ..... A
AMBOY C
AMENIA ..... B
ANGOLA C
APPLETON C
AQUENTS ..... D
AQUEPTS ..... --
AQUOLLS ..... --
ARKPORT ..... B
ARNOT ..... C/D
ASHVILLE ..... D
ATHERTON ..... B/D
ATKINS ..... D
ATSION ..... C/D
AU GRES ..... B
AURELIE ..... D
AURORA C
BARBOUR ..... B
BARCELONA C
BARRE ..... D
BASH C
BASHER ..... B
BATH C
BECKET C
BECRAFT ..... B
BELGRADE ..... B
BENSON ..... D
BERKSHIRE ..... B
[illegible] C
BERRYLAND ..... B/D
BESEMAN ..... A/D
BICE ..... B
BIDDEFORD ..... D
BIRDSALL ..... D
BLASDELL ..... A
BOMBAY ..... B
BONAPARTE ..... A
BONO ..... D
BOOTS ..... A/D
BRACEVILLE C
BRAYTON C
BRIDGEHAMTON ..... B
BRIGGS ..... A
BRINKERTON ..... D
BROADLABIN C
BROCKPORT ..... D
BUCKLAND ..... D
BURDETT C
BURNHAM ..... D
BUSTI C
BUXTON C
CAMBRIDGE C
CAMILLUS ..... B
CAMRODEN C
CANAAN C
CANADICE ..... D
CANANDAIGUA ..... D
CANASERAGA C
CANEADEA ..... D
CANFIELD C
CANTON ..... B
CARBONDALE ..... A/D
CARLISLE ..... A/D
CARROLLTON C
CARVER ..... A
CASTILE ..... B
CATHRO ..... A/D
CAVODE C
CAYUGA C
CAZENOVIA ..... B
CHADAKOIN ..... B
CHAGRIN ..... B
CHARLTON ..... B
CHATFIELD ..... B
CHAUMONT ..... D
CHAUTAUQUA C
CHEEKTOWAGA ..... D
CHENANGO ..... A
CHESHIRE ..... B
CHIPPENY ..... D
CHIPPEWA ..... D
CHOCORUA ..... D
CHURCHVILLE ..... D
CLAVERACK C
CLYMER ..... B
COHOCTAH ..... B/D
COLLAMER C
COLONIE ..... A
COLOSSE ..... A
COLTON ..... A
CONESUS ..... B
CONSTABLE ..... A
COOK ..... D
COSAD C
COVEYTOWN C
COVINGTON ..... D
CRARY C
CROGHAN ..... B
DALTON C
DANLE C
DANNEMORA ..... D
DARIEN C
DAWSON ..... A/D
DEERFIELD ..... B
DEFORD C
DEKALB C
DEPEYSTER C
DERB C
DIXMONT C
DORA ..... B/D
DOVER ..... B
DUANE ..... B
DUNKIRK ..... B
DUTCHESS ..... B
EDWARDS ..... B/D
EELWEIR C
ELKA C
[illegible] C
ELMWOOD C
ELNORA ..... B
EMPEYVILLE C
ENFIELD ..... B
ENSLEY ..... B/D
ERIE C
ERNEST C
ESSEX C
FAHEY ..... B
FARMINGTON C
FARNHAM ..... B
FLACKVILLE C
FLUVAQUENTS ..... --
FONDA ..... D
FREDON C
FREETOWN ..... D
FREMONT C
FREWSBURG C
GALEN ..... B
GALOO ..... C/D
GALWAY ..... B
GEORGIA C
GETZVILLE ..... D
GILPIN C
GLOUCESTER ..... A
GLOVER ..... C/D
GRANBY ..... A/D
GREENE ..... B
GREENWOOD ..... A/D
GRENVILLE ..... B
GROTON ..... A

SOIL SERIES USED IN NEW YORK AND THEIR HYDROLOGIC GROUPS

QUETICO .....D
RAQUETTE .....B
RAYNE .....B
RAYNHAM C
RAYPOL C
RED HOOK C
RED WATER C
REMSEN .....D
RHINEBECK .....D
RICKER .....A
RIDGEBURY C
RIFLE .....A/D
RIGA .....D
RINGLING .....D
RIPPOWAM C
RIVERHEAD .....B
ROCK OUTCROP .....D
ROMULUS .....D
RUMNEY C
RUSE .....D
SACO .....D
SALMON .....B
SAPRISTS .....A/D
SAUGATUCK C
SCANTIC .....D
SCABORO .....D
SCHOHARIE C
SCHROON .....B
SCHUYLER .....B
SCIO .....B
SCITUATE C
SCRIBA C
SEARSPORT .....D
SEBAGO .....D
[illegible] C
SKERRY C
SLOAN .....B/D
SODUS C
ST. ALBENS .....B
STAFFORD C
STISSING C
STOCKBRIDGE C
STOCKHOLM C
STOWE C
SUCCESS .....A
SUDBURY .....B
SUN .....D
SUNAPEE .....B
SUNCOOL .....A
SUNY .....D
SURPLUS C
SUTTON .....B
SWANTON .....C/D
SWARTSWOOD C
SWORMVILLE C
TACONIC .....C/D
TAWAS .....A/D
TEEL .....B
TIOGA .....B
TOQUERVILLE .....D
TOR .....D
TORULL .....D
TOERVILLE .....B
TRESTLE .....B
TROUT RIVER .....A
TUGHILL .....D
TULLER .....D
TUNBRIDGE C
TUNKHANNOCK .....A
UDIFLUVENTS .....B
UDIPSAMMENTS
UDORTHENTS .....A
UNADILLA .....B
URBAN LAND
VALOIS .....B
VARICK .....D
VARYSBURG .....B
VENANGO C
VERGENNES C
VLY C
VOLUSIA C
WADDINGTON .....A
WAKELAND C
WAKEVILLE .....B
WALLACE .....B
WALLINGTON C
WALLKILL .....C/D
WAPOLE C
WAMPSVILLE .....B
WAPPINGER .....B
WAREHAM C
WARNERS C
WASSAIC .....B
WATCHAUG .....B
WAUBEK .....B
WAYLAND .....C/D
WEAVER C
WEGATCHIE .....D
WELLSBORO C
WESTBURY C
WESTLAND .....B/D
WETHERSFIELD C
WHARTON C
WHATELY .....D
WHITMAN .....D
WILLETTE .....A/D
WILLIAMSON C
WILLOWEMOC C
WILPOINT .....D
WINDSOR .....A
WINOOSKI .....B
WOODBRIDGE C
WOODLAWN .....B
WOODSTOCK .....D
WOOSTER C
WORDEN C
WORTH C
WURTSBORO C
WYALUSING .....D
YALESVILLE C

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
CkB----------	0-10	6-18	1.20-1.50	0.6-6.0	0.08-0.15	4.5-5.5	Low----------	0.24	3	2-6
Chenango	10-24	6-18	1.25-1.55	0.6-6.0	0.05-0.14	4.5-6.0	Low----------	0.17		
	24-60	1-8	1.45-1.65	6.0-20	0.01-0.03	5.1-7.8	Low----------	0.17		
Du*.										
Dumps										
[illegible]	0-9	2-8	1.05-1.30	[illegible]	0.14-0.24	5.1-6.0	Low----------	0.24	3	2-6
[illegible]	9-36	2-8	1.35-1.60	[illegible]	0.13-0.22	5.1-6.0	Low----------	0.24		
	36-60	35-60	1.55-1.80	<0.2	0.12-0.18	5.1-6.0	Moderate-----	0.49		
FlA*:										
Fluvaquents.										
Udifluvents.										
FrA----------	0-8	7-20	1.20-1.40	0.6-2.0	0.12-0.20	5.1-7.3	Low----------	0.24	3	3-5
Fredon	8-23	7-20	1.20-1.40	0.2-2.0	0.12-0.20	5.1-7.3	Low----------	0.24		
	23-60	2-10	1.30-1.50	6.0-20	0.02-0.06	5.1-8.4	Low----------	0.17		
GlC, GlD----------	0-2	4-18	0.60-0.80	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.20	2	5-10
Glover	2-18	4-18	1.10-1.70	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.20		
	18	---	---	---	---	---	----------	-----		
GmF*:										
Glover----------	0-2	4-18	0.60-0.80	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.20	2	5-10
	2-18	4-18	1.10-1.70	0.6-2.0	0.12-0.20	4.5-5.0	Low----------	0.20		
	18	---	---	---	---	---	----------	-----		
Rock outcrop.										
HaA----------	0-9	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.1-7.3	Low----------	0.49	5	2-6
Hamlin	9-34	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-7.3	Low----------	0.49		
	34-60	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.6-7.8	Low----------	0.49		
HbA, HbB----------	0-10	5-18	1.10-1.40	0.6-2.0	0.15-0.25	4.5-6.0	Low----------	0.43	3	2-6
Haven	10-30	2-18	1.25-1.55	0.6-2.0	0.08-0.12	4.5-6.0	Low----------	0.24		
	30-60	0-3	1.45-1.65	>20	0.01-0.03	4.5-6.0	Low----------	0.17		
HoA, HoB, HoC, HoD, HoE---------	0-9	1-10	1.10-1.40	2.0-20	0.05-0.12	4.5-5.5	Low----------	0.17	3-2	2-6
Hoosic	9-23	1-10	1.25-1.55	2.0-20	0.05-0.11	4.5-5.5	Low----------	0.17		
	23-60	0-5	1.45-1.65	>20	0.01-0.05	4.5-6.0	Low----------	0.17		
HuB, HuC, HuD, [illegible]	0-8	20-40	1.00-1.25	[illegible]	0.16-0.21	5.1-7.3	Moderate-----	0.49	3	3-6
[illegible]	8-16	35-60	1.15-1.40	[illegible]	0.13-0.17	5.1-7.3	Moderate-----	0.28		
	16-28	25-60	1.15-1.40	[illegible]	0.13-0.17	5.6-7.8	Moderate-----	0.28		
	28-60	35-60	1.15-1.40	[illegible]	0.12-0.20	6.6-8.4	Moderate-----	0.28		
LmA----------	0-8	4-10	1.10-1.50	0.6-2.0	0.18-0.30	5.1-7.3	Low----------	0.49	3	2-5
Limerick	8-60	1-8	1.20-1.50	0.6-2.0	0.18-0.25	5.6-7.3	Low----------	0.49		
LoA*:										
Loxley----------	0-60	---	0.10-0.35	0.2-6.0	0.35-0.45	3.6-5.5	----------	-----	---	>70
Beseman----------	0-38	---	0.10-0.25	0.2-6.0	0.55-0.65	3.6-5.0	----------	-----	---	>70
	38-60	10-28	1.45-1.65	0.2-0.6	0.11-0.18	3.6-7.3	Low----------	-----		
MaC*, MaE*, MaF*:										
Macomber---------	0-3	10-27	1.10-1.40	0.6-2.0	0.10-0.17	4.5-5.5	Low----------	0.24	3	2-6
	3-23	10-27	1.20-1.50	0.6-2.0	0.04-0.11	4.5-5.5	Low----------	0.24		
	23	---	---	---	---	---	----------	-----		
Taconic----------	0-5	10-27	1.10-1.40	0.6-6.0	0.10-0.17	4.5-5.5	Low----------	0.24	2	2-6
	5-14	10-27	1.20-1.50	0.6-6.0	0.04-0.11	4.5-5.5	Low----------	0.24		
	14	---	---	---	---	---	----------	-----		

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
ScA, ScB--------- Scio	0-12 12-41 41-60	2-15 2-15 0-5	1.20-1.50 1.20-1.50 1.45-1.65	0.6-2.0 0.6-2.0 2.0-20	0.18-0.21 0.17-0.20 0.02-0.19	4.5-6.0 4.5-6.0 5.1-7.8	Low---------- Low---------- Low----------	0.49 0.64 0.17	3	2-8
SrA, SrB--------- Scriba	0-21 21-50 50-60	1-18 1-18 1-18	1.10-1.40 1.70-2.00 1.65-1.95	0.6-2.0 0.06-0.2 0.06-0.2	0.14-0.18 0.01-0.04 0.01-0.04	3.6-6.5 5.1-7.3 5.1-8.4	Low---------- Low---------- Low----------	0.28 0.20 0.20	3	3-7
StB-------------- Scriba	0-21 21-50 50-60	1-18 1-18 1-18	1.10-1.40 1.70-2.00 1.65-1.95	0.6-2.0 0.06-0.2 0.06-0.2	0.08-0.16 0.01-0.04 0.01-0.04	3.6-6.5 5.1-7.3 5.1-8.4	Low---------- Low---------- Low----------	0.20 0.20 0.20	3	3-7
SvB*: Scriba---------- Pittstown------- [illegible]	0-21 21-50 50-60 0-9 9-24 24-60 0-9 9-23 23-48 48-60	1-18 1-18 1-18 2-12 2-12 2-12 2-8 2-8 35-60 2-5	1.10-1.40 1.70-2.00 1.65-1.95 1.00-1.30 1.30-1.60 1.70-2.00 1.00-1.25 1.35-1.60 1.55-1.80 1.40-1.65	0.6-2.0 0.06-0.2 0.06-0.2 0.6-2.0 0.6-2.0 0.06-0.2 [illegible]	0.08-0.16 0.01-0.04 0.01-0.04 0.15-0.20 0.15-0.20 0.10-0.15 0.14-0.24 0.13-0.22 0.12-0.18 0.02-0.08	3.6-6.5 5.1-7.3 5.1-8.4 4.5-6.0 4.5-6.0 4.5-6.0 5.1-6.5 5.1-6.5 5.6-7.3 5.6-7.8	Low---------- Low---------- Low---------- Low---------- Low---------- Low---------- Low---------- Low---------- Moderate----- Low----------	0.20 0.20 0.20 0.24 0.37 0.24 0.24 0.24 0.49 0.17	3 3 3 	3-7 2-6 2-10
TeA-------------- Teel	0-12 12-40 40-60	8-18 5-18 3-10	1.15-1.40 1.15-1.45 1.25-1.55	0.6-2.0 0.6-2.0 0.6-2.0	0.18-0.21 0.17-0.19 0.12-0.19	5.1-7.3 5.1-7.8 5.6-7.8	Low---------- Low---------- Low----------	0.49 0.49 0.49	5	2-6
Ud*, Ue*. Udorthents										
UnA, UnB, UnC---- Unadilla	0-7 7-62	2-18 1-18	1.20-1.50 1.20-1.50	0.6-2.0 0.6-2.0	0.18-0.21 0.17-0.20	4.5-6.0 4.5-7.3	Low---------- Low----------	0.49 0.64	3	2-7
Ur*. Urban land										
WnA, WnB, WnC, WnE-------------- Windsor	0-8 8-21 21-60	1-3 0-3 0-2	1.00-1.20 1.30-1.55 1.40-1.65	>6.0 >6.0 >6.0	0.08-0.12 0.02-0.12 0.01-0.08	4.5-6.0 4.5-6.0 4.5-6.5	Low---------- Low---------- Low----------	0.17 0.17 0.17	5	2-4

* See description of the map unit for composition and behavior characteristics of the map unit.

of the subsoil is friable, yellowish brown gravelly silt loam, and the lower part is brown and dark brown gravelly loam. The substratum is a dense fragipan that extends to a depth of 60 inches or more. It is very firm, mottled, light olive brown gravelly loam.

Typically, the Nassau soil has a surface layer of very friable, dark brown very shaly silt loam 7 inches thick. The subsoil is friable, yellowish brown very shaly loam to a depth of 15 inches. Folded and fractured shale is below a depth of 15 inches.

Included with these soils in mapping are many areas of Manlius soils and of soils that are similar to the Bernardston soil but that are 40 to 60 inches deep over bedrock. Manlius soils are moderately deep. Also included in low areas, depressions, and seep spots are Pittstown and Scriba soils. Pittstown soils are moderately well drained, and Scriba soils are somewhat poorly drained. In some areas, the soils are red and have more clay than is usual for Bernardston or Nassau soils. Near Stephentown are areas of soils that have a gravelly fine sandy loam subsoil. Areas of included soils make up about 25 percent of this map unit and are as large as 3 acres.

In the Bernardston soil a seasonal high water table is perched above the fragipan early in spring. Permeability is moderate above the fragipan and slow in it. Permeability is moderate in the Nassau soil. Depth to bedrock is 10 to 20 inches in the Nassau soil and more than 60 inches in the Bernardston soil. Rooting depth is restricted by the fragipan in the Bernardston soil and by the bedrock in the Nassau soil. Available water capacity is moderate in the Bernardston soil and very low to low in the Nassau soil. Surface runoff is medium on both soils. In unlimed areas, reaction is very strongly acid to medium acid in the Bernardston soil and very strongly acid or strongly acid in the Nassau soil.

Most areas of this complex are used for corn, hay, and pasture. Some areas are used for woodland or are idle.

These soils are suited to corn, small grains, and hay (fig. 5). The Nassau soil is droughty because bedrock is close to the surface. Erosion is a moderate hazard if these soils are cultivated. Contour tillage is not always feasible because of the undulating topography. Standard management practices—such as crop rotation, conservation tillage, cover crops, and crop residue incorporated into the soil—control erosion and maintain organic matter content.

These soils are well suited to pasture. Overgrazing can weaken the sod cover and increase erosion, especially on the droughty Nassau soil. Maintenance of desirable plant species, rotational grazing, annual mowing, and applications of lime and fertilizer are needed.

The potential productivity for woodland is moderate on the Bernardston soil and low on the Nassau soil. Windthrow is a moderate hazard and seedling mortality is severe on the Nassau soil, mainly because it is shallow. Controlling brush and weeds improves seedling survival. Droughtiness slows seedling growth. Norway spruce, white spruce, European larch, eastern white pine, Scotch pine, and red pine are suitable for planting.

These soils have limitations for many urban uses. The slowly permeable fragipan in the Bernardston soil and the shallowness of the Nassau soil severely limit use for septic tank filter fields.

The capability classification is IIe.

BnC—Bernardston-Nassau complex, rolling. The soils of this complex are on uplands where the surface topography is controlled by the underlying folded shale and slate bedrock. Slope ranges from 5 to 16 percent. Texture of the surface layer ranges from gravelly loam to very shaly silt loam. The Bernardston soil is well drained, is more than 60 inches deep over bedrock, and has a fragipan. The Nassau soil is somewhat excessively drained and is less than 20 inches deep over bedrock.

This complex is 45 percent Bernardston soil, 35 percent Nassau soil, and 20 percent other soils. The individual soils are so intermingled that they could not be mapped separately. The areas of this complex are long and wide and rectangular. They are as large as 50 acres or more.

Typically, the Bernardston soil has a surface layer of friable, brown gravelly silt loam 8 inches thick. The subsoil extends to a depth of 30 inches. The upper part of the subsoil is friable, yellowish brown gravelly silt loam and the lower part is friable, dark yellowish brown, brown, and dark brown gravelly loam. The substratum is a dense fragipan that extends to a depth of 60 inches or more. It is very firm, mottled, light olive brown gravelly loam.

Typically, the Nassau soil has a surface layer of very friable, dark brown very shaly silt loam 7 inches thick. The subsoil is friable, yellowish brown very shaly loam to a depth of 15 inches. Folded and fractured shale is below a depth of 15 inches.

Included with these soils in mapping are areas of Manlius, Pittstown, and Scriba soils. Manlius soils are moderately deep. Pittstown soils are moderately well drained, and Scriba soils are somewhat poorly drained; these soils are in depressions and seep spots. Also included are areas of soils that are similar to the Bernardston soils but that are 40 to 60 inches deep over bedrock. In some areas the soils are red and have more clay than is usual for Bernardston or Nassau soils. Near Stephentown are areas of soils that have a gravelly fine sandy loam subsoil. Areas of included soils make up about 20 percent of this map unit and are as large as 3 acres.

In the Bernardston soil a seasonal high water table is perched above the fragipan early in spring. Permeability is moderate above the fragipan and slow in it. Permeability is moderate in the Nassau soil. Depth to bedrock is 10 to 20 inches in the Nassau soil and more

Figure 5.—Bernardston-Nassau complex, undulating, (foreground) is suited to both corn and hay.

than 60 inches in the Bernardston soil. Rooting depth is restricted by the fragipan in the Bernardston soil and by the bedrock in the Nassau soil. Available water capacity is moderate in the Bernardston soil and very low to low in the Nassau soil. Surface runoff is medium to rapid in both soils. In unlimed areas, reaction is very strongly acid through medium acid in the Bernardston soil and very strongly acid or strongly acid in the Nassau soil.

Most areas of this complex are used for corn, hay, and pasture. Some areas are used for woodland or are idle.

This mapping unit is suited to corn, small grains, and hay. The Nassau soil is droughty because bedrock is close to the surface. Erosion is a hazard in unprotected areas. Contour tillage is not always feasible because of the rolling topography. Standard management practices—such as crop rotation, conservation tillage, cover crops, and crop residue incorporated into the soil—control erosion, improve tilth, and maintain organic matter content. Sodforming crops also reduce erosion.

These soils are suited to pasture. Overgrazing can weaken the sod cover, especially on the droughty Nassau soil. Maintenance of desirable plant species, annual mowing, and lime and fertilizer are needed.

The potential productivity for woodland is moderate on the Bernardston soil and low on the Nassau soil. Windthrow is a moderate hazard and seedling mortality is severe on the Nassau soil because it is shallow. Removing brush and weeds improves seedling survival. Norway spruce, white spruce, red pine, eastern white pine, Scotch pine, and European larch are suitable for planting.

These soils have limitations for many urban uses. The slowly permeable fragipan in the Bernardston soil and the shallowness of the Nassau soil severely limit use for septic tank filter fields. The rolling topography is a problem for some uses.

The capability classification is IIIe.

BnD—Bernardston-Nassau complex, hilly. The soils of this complex are in areas on uplands where the surface topography is controlled by the underlying folded shale and slate bedrock. Slope ranges from 10 to 30

Available water capacity is very low to moderate. Runoff is medium. In unlimed areas, reaction is strongly acid or very strongly acid in the surface layer and very strongly acid to medium acid in the subsoil. Depth to bedrock is more than 60 inches.

Most areas of this soil are used for hay, corn, grain, and pasture for dairy farms.

This soil is suited to most crops grown in the area. Small rock fragments interfere with some tillage and seeding operations and may cause excessive wear of machinery. Droughtiness is a limitation in midsummer. Standard management practices—such as conservation tillage, cover crops, crop rotation, cross-slope tillage, and crop residue incorporated into the soil—improve tilth, conserve moisture, and maintain organic matter content. These practices also reduce the hazard of erosion.

This soil is suitable for pasture. The main limitation is droughtiness. Rotational grazing and annual mowing help to maintain high quality seedings.

Potential productivity for timber is high. Planting seedlings when the soil is moist in spring insures survival. Growth of seedlings may be slowed by droughtiness and plant competition. Eastern white pine, Norway spruce, and European larch are suitable for planting.

Rare flooding, rapid permeability, a water table less than 6 feet below the surface early in spring, and many small rock fragments limit many urban uses. This soil is a probable source of sand and gravel.

The capability classification is IIs.

Du—Dumps, landfill. This map unit consists of sanitary landfills, dumps, and other sites that have been used for the disposal of trash and rubble. The material deposited in these areas is generally not soil. In normal practice, an excavation is made, refuse is dumped and spread in a layer, and the area is covered with a layer of soil material. There are generally several successive layers of refuse and compacted soil material. Cover material used on these sites is commonly loamy and has less than 20 percent rock fragments. Because of the variability of material in the disposal site, differential settling is common in the filled trenches.

Areas that have been covered for the final time and abandoned as active dumping sites are included in this map unit.

Because of the variability of deposited refuse and cover material, permeability, available water capacity, tilth, and other properties vary considerably. At some sites, methane and hydrogen sulfide gases are produced by the decomposition of organic refuse.

Onsite investigation is needed to determine the potential of any area for various uses. Properly covered and graded areas can often be used for hay, pasture, timber, or recreation.

No capability classification is assigned.

EIB—Elmridge very fine sandy loam, 3 to 8 percent slopes. This gently sloping soil is on smooth areas on the dissected lake plain. This soil is deep and moderately well drained. The areas are irregular in shape and are generally 3 to 25 acres in size.

Typically, the surface layer is friable, dark grayish brown very fine sandy loam 9 inches thick. The subsoil extends to a depth of 36 inches. The upper part of the subsoil is friable, yellowish brown fine sandy loam; and the lower part is friable, mottled, dark yellowish brown fine sandy loam. The substratum is firm, olive brown and brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Shaker and Windsor soils. Shaker soils are poorly drained. Windsor soils are deep, sandy, and excessively drained, and they are on knolls. Also included are spots of soils that are similar to this Elmridge soil but that are well drained, soils that have a very fine sandy loam subsoil, and soils that are neutral or mildly alkaline in the underlying clay. In some areas this soil is nearly level. Areas of included soils make up about 15 percent of this map unit and are as large as 3 acres.

In spring and during other wet periods, a perched water table is at a depth of 18 to 36 inches. The clayey substratum restricts downward movement of water and roots. Permeability is moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate to high. Runoff is medium. In unlimed areas, the reaction is strongly acid or medium acid throughout the soil. Depth to bedrock is more than 60 inches.

This soil is used mainly for cultivated crops, hay, and pasture. Some of the acreage is idle.

This soil is suited to farming and is used for silage corn in rotation with hay and pasture. Erosion is a moderate hazard if the soil is cultivated and not protected by conservation practices. Subsurface drainage is needed in places to eliminate wetness that interferes with management and reduces production.

This soil is suited to pasture. Proper seeding rates, rotational grazing, annual mowing, and application of lime and fertilizer increase pasture yields.

Potential productivity for timber is moderately high. Eastern white pine, white spruce, Norway spruce, and European larch are suitable for planting.

This soil has limitations for nonfarm uses. The slow or very slow permeability in the substratum and the seasonal high water table severely limit use for septic tank absorption fields.

The capability classification is IIw.

FIA—Fluvaquents-Udifluvents complex, 0 to 3 percent slopes. These nearly level soils are on flood plains. They formed in recent alluvium. The Fluvaquents are in low areas that are flooded frequently; the Udifluvents are in slightly higher areas. The soils are deep, are very poorly drained to moderately well drained,

conservation tillage, and crop residue incorporated into the soil reduce erosion, increase organic matter content, and promote good tilth. Draining wet spots and drainageways allows more efficient use of some fields.

This soil is suited to pasture. Restricting grazing during wetter periods and rotational grazing prevent soil compaction, maintain pasture seedings, and reduce erosion. The hazard of erosion is more severe on long slopes.

Potential productivity for timber is high. Seedlings can be planted by machine, but seasonal wetness may delay planting early in spring. Constructing logging roads across the slope reduces erosion. Eastern white pine, yellow-poplar, and black walnut are suitable for planting.

This soil is limited for urban uses by the seasonal wetness and the slow or very slow permeability of the subsoil and substratum. Erosion is a severe hazard during construction. Frost heaving is also a problem for some uses.

The capability classification is IIIe.

HuD—Hudson silt loam, hilly. This moderately steep soil formed in silt and clay deposits. Slope ranges from 10 to 30 percent but is mostly 15 to 25 percent. This soil is deep and moderately well drained. The areas are long and wide and are generally 3 to 30 acres in size.

Typically, the surface layer is friable, dark brown silt loam 5 inches thick. The subsurface layer is friable, brown silt loam 3 inches thick. The subsoil is firm and extends to a depth of 28 inches. It is yellowish brown silty clay in the upper part and is plastic and sticky, mottled, brown silty clay in the lower part. The substratum is firm, plastic and sticky, grayish brown and light olive brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Nassau soils, which are shallow. Also included are areas of soils that have a loamy fine sand surface layer or a gravelly surface layer. In some spots this soil is so eroded that the subsoil is exposed. Areas of included soils make up about 20 percent of this map unit and are as large as 3 acres.

Early in spring, a seasonal high water table is perched 18 to 24 inches below the surface. Rooting depth is somewhat restricted by the clayey subsoil. Permeability is moderate to moderately slow in the surface and subsurface layers and slow or very slow in the subsoil. Available water capacity is high. Runoff is rapid to very rapid. In unlimed areas, reaction is strongly acid to neutral in the surface and subsurface layers and medium acid to mildly alkaline in the subsoil. Depth to bedrock is more than 60 inches.

This soil is used mostly for pasture, hay, and woodland. Some areas are idle.

This soil is poorly suited to cultivated crops because of the moderately steep slope. Erosion is a hazard. Hay generally does well on this soil, but deep-rooted plants can be damaged by frost heaving.

This soil is suited to pasture. Restricting grazing during wetter periods maintains pasture seedings and reduces erosion. Rotational grazing is also needed. The hazard of erosion is more severe on the longer slopes.

Potential productivity for timber is high. However, the short, dissected, moderately steep slopes cause serious problems in management. Erosion of logging roads is a severe hazard. Constructing logging roads on the contour and using water bars reduce erosion. Eastern white pine, yellow-poplar, and black walnut are suitable for planting.

This soil has limitations for urban uses. The principal limitations are moderately steep slope, severe erosion hazard, the seasonal high water table, frost action, and slow or very slow permeability. This soil is also subject to sliding and slumping when undercut during road construction and maintenance.

The capability classification is IVe.

HuE—Hudson silt loam, steep. This soil formed in silt and clay deposits. Slope ranges from 25 to 45 percent but is mostly 25 to 35 percent. This soil is deep and moderately well drained. The areas are long and narrow and are generally 3 to 40 acres in size.

Typically, the surface layer is friable, dark brown silt loam 5 inches thick. The subsurface layer is friable, brown silt loam 3 inches thick. The subsoil is firm and extends to a depth of 28 inches. It is yellowish brown silty clay in the upper part and plastic and sticky, mottled, brown silty clay in the lower part. The substratum is firm, plastic and sticky, grayish brown and light olive brown silty clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Unadilla and Windsor soils. Unadilla soils are well drained, and Windsor soils are excessively drained. Also included are areas of soils that have a gravelly surface layer and areas of loamy alluvial soils along small drainageways. In spots this soil is so eroded that the clayey subsoil is exposed. Areas of included soils make up about 20 percent of this map unit and are as large as 3 acres.

Early in spring, a seasonal high water table is perched 18 to 24 inches below the surface. Rooting depth is somewhat restricted by the clayey subsoil. Permeability is moderate to moderately slow in the surface and subsurface layers and slow or very slow in the subsoil. Available water capacity is high. Runoff is very rapid. In unlimed areas, reaction is strongly acid to neutral in the surface and subsurface layers and medium acid to mildly alkaline in the subsoil. Depth to bedrock is more than 60 inches.

This soil is used mostly for woodland or is idle. A small acreage is used for pasture.

Included with these soils in mapping are areas of poorly drained and very poorly drained soils, stratified gravelly soils, and shallow soils. Areas of included soils make up 10 percent of this map unit and are as large as 10 acres.

In Scriba and in Pittstown soils, a seasonal high water table is perched above the fragipan in spring and during other wet periods. Depth to the top of the fragipan ranges from 12 to 21 inches in the Scriba soils and 15 to 30 inches in the Pittstown soils. Rooting depth is restricted by the fragipan and by the seasonal high water table. Permeability is moderate above the fragipan and slow in the pan. Available water capacity is low to moderate in the Scriba soils and moderate in the Pittstown soils. Runoff is slow. Reaction ranges from extremely acid to slightly acid above the fragipan in the Scriba soils and from very strongly acid to medium acid throughout the Pittstown soils. Depth to bedrock is more than 60 inches.

Most areas of this unit are used for woodland or are idle.

This map unit is not suited to cultivation. Large stones on the surface, seasonal wetness, and a short growing season severely limit crop production. Erosion can be a problem on long slopes. Accessibility to many areas of this unit is poor.

Pasture management is difficult because of the large stones on the surface, seasonal wetness, and poor accessibility. Standard management practices such as annual mowing and reseeding are extremely difficult. Restricting grazing during wet periods and rotational grazing prevent soil compaction and trampling of pasture plants.

Potential productivity for timber is moderately high. Use of harvesting and planting equipment are moderately hindered by the large stones on the surface and the seasonal wetness. Water bars on logging roads reduce erosion during and after harvest. Eastern white pine, white spruce, Norway spruce, and European larch are suitable for planting.

These soils are generally not suitable for urban uses because of the seasonal high water table, the slowly permeable fragipan, and poor accessibility.

The capability classification is VIIs.

SwA—Shaker very fine sandy loam, sandy substratum, 0 to 4 percent slopes. This nearly level soil is in slight depressions and nearly flat areas. It formed in a thin mantle of loamy material over clayey sediment. This soil is deep and is somewhat poorly drained to poorly drained. The areas are rectangular and are generally 3 to 15 acres in size.

Typically, the surface layer is friable, very dark grayish brown very fine sandy loam 9 inches thick. The subsoil is friable and extends to a depth of 23 inches. It is mottled, grayish brown and dark brown fine sandy loam. The upper part of the substratum, to a depth of 48 inches, is firm, brown silty clay. The lower part of the substratu very friable, dark grayish brown loamy fine sand to a depth of 60 inches or more.

Included with this soil in mapping are many large a of soils that are similar to this Shaker soil but that ar somewhat poorly drained and areas of soils that hav surface layer of loamy fine sand or loamy sand. Also included are areas of soils in which the lower part o substratum is loamy or clayey and areas of soils in v the depth to the clayey deposits ranges from less th 18 inches to more than 40 inches. Areas of Elmridge soils are included on a few small knolls. Areas of included soils make up about 15 percent of this map and are as large as 3 acres.

In spring and during other wet periods, the water is at or near the surface. Rooting depth is limited by seasonal high water table and the dense, clayey substratum. Permeability is moderately rapid in the surface layer, slow or very slow in the clayey substra and rapid in the underlying sandy deposits. Available water capacity is moderate to high. Surface runoff is slow. In unlimed areas, reaction ranges from strongl acid to slightly acid in the surface layer and subsoil from medium acid to neutral in the clayey substratu

Many areas of this soil are used for hay, corn, gra and pasture for dairy farms.

This soil is suited to crops. Unless the soil is drain seasonal wetness can delay planting in spring and c limit the choice of crop varieties. Standard manager practices—such as conservation tillage, cover crops crop residue incorporated into the soil, and crop rotation—improve tilth and maintain organic matter content.

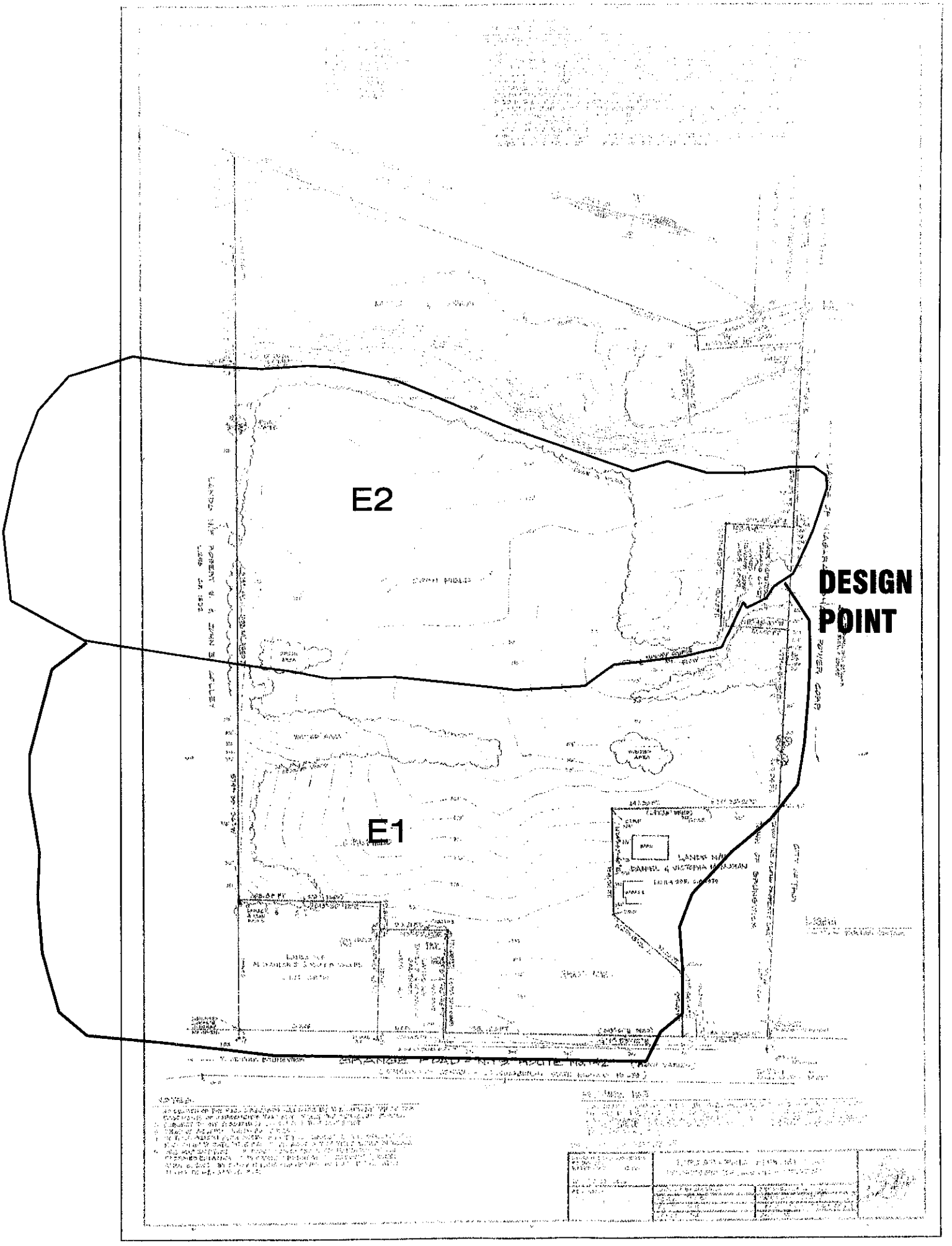
This soil is suited to pasture. Proper seeding rate rotational grazing, stocking the proper number of an per acre, and annual mowing help to maintain production. Restricting grazing during wet periods h to prevent soil compaction and trampling of pasture plants.

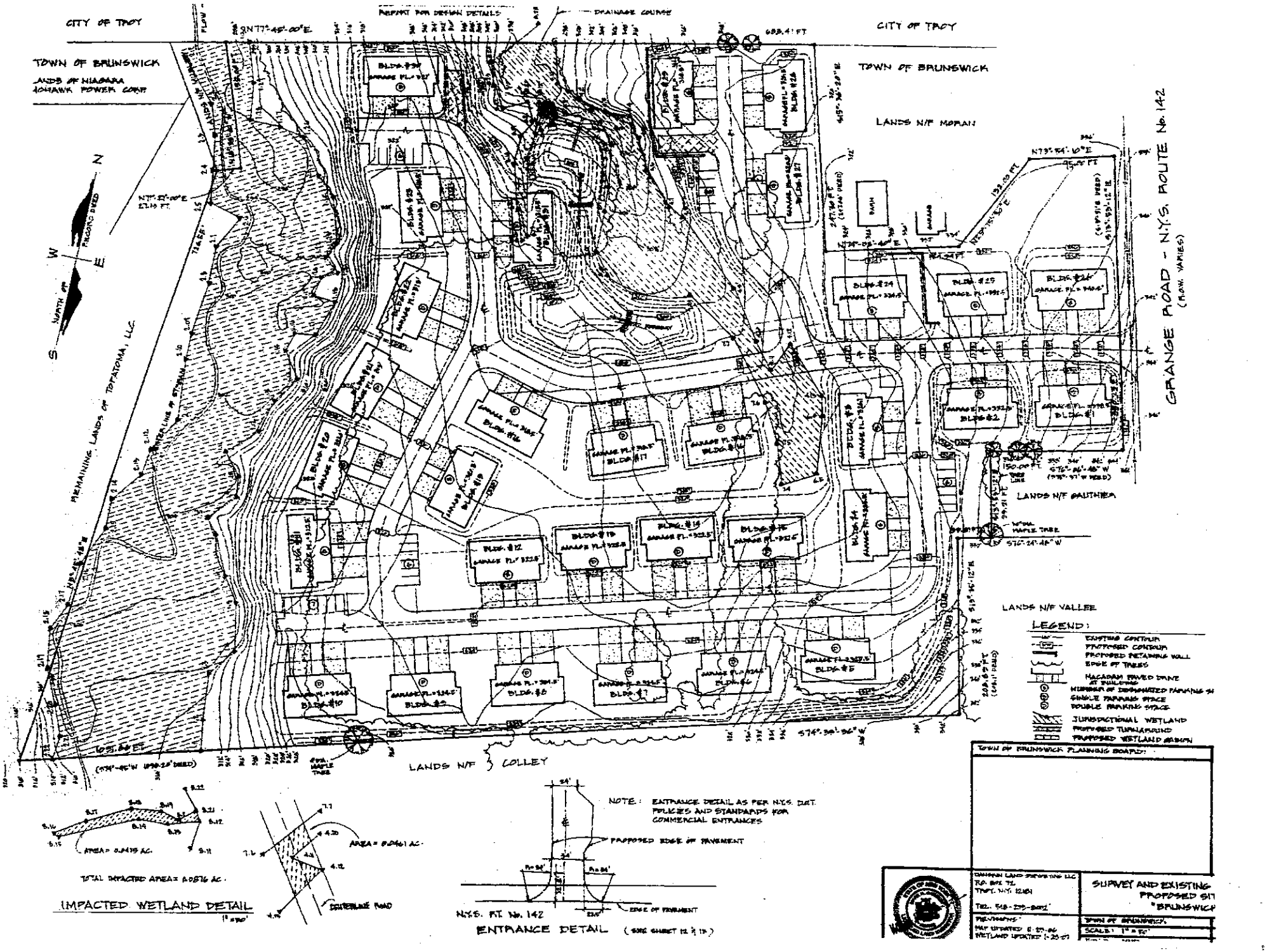
Potential productivity for woodland is low. Seasor wetness severely hinders planting and harvesting a reduces seedling survival. Windthrow is a hazard because of the shallow rooting depth. Eastern white pine, white spruce, and northern white-cedar are su for planting.

This soil has limitations for urban use. The slowly very slowly permeable, clayey substratum and the seasonal high water table severely limit many uses heaving is also a problem for some uses.

The capability classification is IIIw.

TeA—Teel silt loam, 0 to 3 percent slopes. Th nearly level soil is on flood plains. It is moderately drained to somewhat poorly drained and is deep. It long, narrow areas along secondary streams and in wider areas along the Hudson River. The areas ran from 3 to 20 acres.


E2
E1
DESIGN
POINT



DETAIL OF PROPOSED DEVELOPMENT

PROPOSED CONDITIONS

STORMWATER RUNOFF TABLE

	1 yr. Runoff (CFS)	10 yr. Runoff (CFS)	100 yr. Runoff (CFS)
Pre-Development			
Design Point	12.42	34.73	60.64
Post-Development			
Design Point	2.92	27.81	49.74
Difference	**-9.5**	**-6.92**	**-10.9**

Brunswick Meadows
2/07

Channel Protection Storage Volume

Total Drainage Area	18 acres			
Initial abstraction (Ia) for CN of	78	Ia = (200/CN - 2)	=	0.564
P =	2.2 inches	Ia/P	=	0.256
Tc	0.5 Hours			
From TR-55 Exhibit 4-II		qu	=	480 csm/in
From Manual Figure 8.5		qo/qi	=	0.038
		Vs/Vr = 0.683 - 1.43(qo/qi) + 1.64(qo/qi)^2 - 0.804(qo/qi)^3	=	0.630
Where Vs equals channel protection storage (Cpv) & Vr equals the volume of runoff in inches. From Hydro Cad/H		Vr	=	1.23 inches
		Vs = Cpv = Vs/Vr*'	=	1.16 ac-ft
		Cpv	=	50,631.97 cu-ft

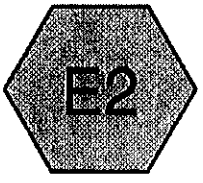
Average Release Rate = 0.59 cfs

From Water Quality Calc sheet WQv-ED wsel =	320.0 feet
Set the Cpv Pool elevation	322.0 feet
Average Head (h) =	2 feet
Use orifice equation to compute x-section area and dia. Q = CA(2gh)^0.5 solve for A	0.086 feet
Solve for Diameter	3.97 inches

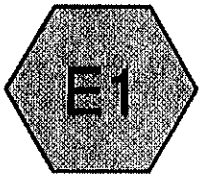
Brunswick Meadows
2/07

Water Quality Volume

Total Drainage Area (A)	18	acres	
90% Rainfall Event (P)	0.9	inches	
Percent Impervious Cover (I)	41	%	
Runoff Coefficient Rv = 0.05 + 0.009(I)	0.419		Minumum Rv = 0.2
WQv = P Rv A /12	0.57	ac-ft	
	24,639.71	cu-ft	



West Section



East Section

Subcat Reach Pond Link

Drainage Diagram for E-bruns-Meadows
Prepared by Erdman Anthony 5/22/2006

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: East Section Runoff Area=332,897 sf Runoff Depth>0.89"
Flow Length=1,000' Tc=27.1 min CN=83 Runoff=6.76 cfs 0.565 af

Subcatchment E2: West Section Runoff Area=457,408 sf Runoff Depth>0.56"
Flow Length=745' Tc=25.7 min CN=76 Runoff=5.66 cfs 0.491 af

Total Runoff Area = 18.143 ac Runoff Volume = 1.056 af Average Runoff Depth = 0.70"

Subcatchment E1: East Section

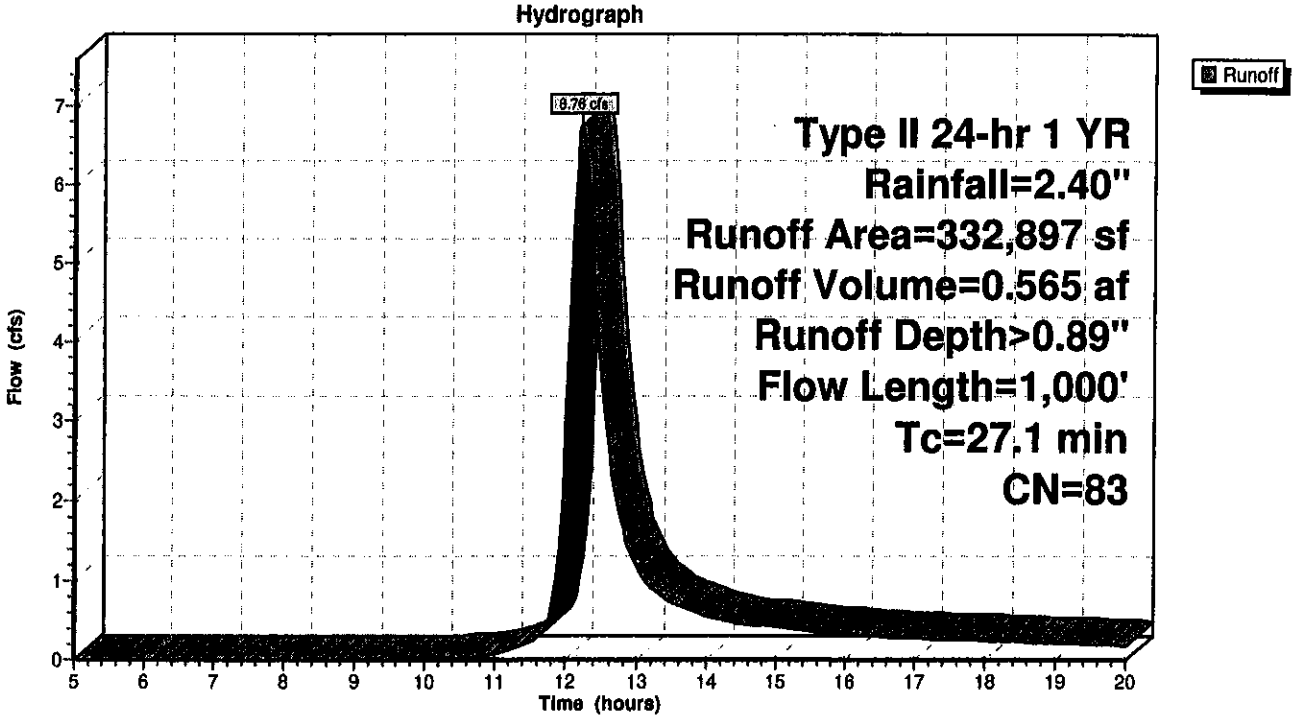
Runoff = 6.76 cfs @ 12.22 hrs, Volume= 0.565 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
87,382	73	Woods, Fair, HSG C
215,690	85	Legumes, straight row, Poor, HSG C
29,825	98	Paved parking & roofs
332,897	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow, 1A TO 1B** Grass: Dense n= 0.240 P2= 2.70"
7.1	640	0.0280	1.5		**Shallow Concentrated Flow, 1B TO 1C** Cultivated Straight Rows Kv= 9.0 fps
3.7	210	0.0580	0.9	3.76	**Channel Flow, 1C TO 1D** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.240
27.1	1,000	Total			

Subcatchment E1: East Section



Subcatchment E2: West Section

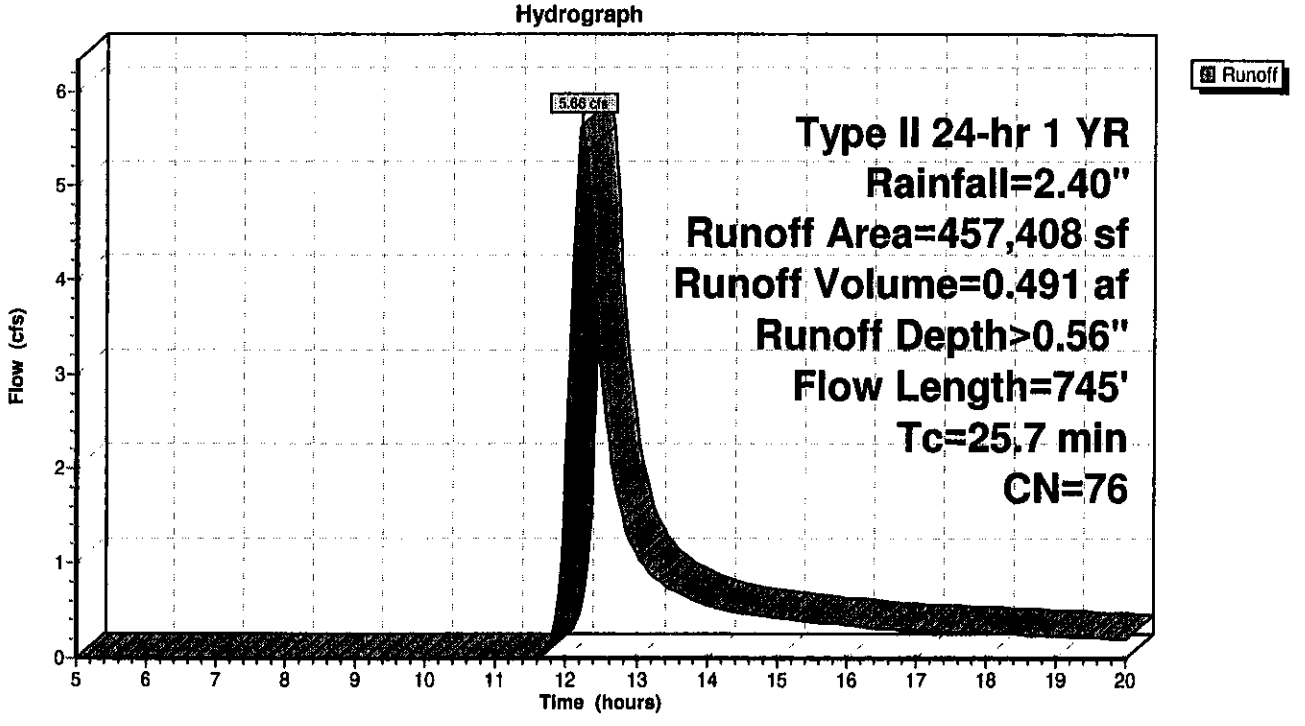
Runoff = 5.66 cfs @ 12.22 hrs, Volume= 0.491 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
254,291	70	Woods, Good, HSG C
203,117	83	Legumes, contoured, Poor, HSG C
457,408	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow, 2A TO 2B** Grass: Dense n= 0.240 P2= 2.70"
7.7	500	0.0240	1.1		**Shallow Concentrated Flow, 2B TO 2C** Short Grass Pasture Kv= 7.0 fps
1.7	95	0.1000	0.9	1.88	**Channel Flow, 2C TO 2D** Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.240
25.7	745	Total			

Subcatchment E2: West Section



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: East Section Runoff Area=332,897 sf Runoff Depth>2.18"
Flow Length=1,000' Tc=27.1 min CN=83 Runoff=16.78 cfs 1.391 af

Subcatchment E2: West Section Runoff Area=457,408 sf Runoff Depth>1.65"
Flow Length=745' Tc=25.7 min CN=76 Runoff=17.95 cfs 1.443 af

Total Runoff Area = 18.143 ac Runoff Volume = 2.833 af Average Runoff Depth = 1.87"

Subcatchment E1: East Section

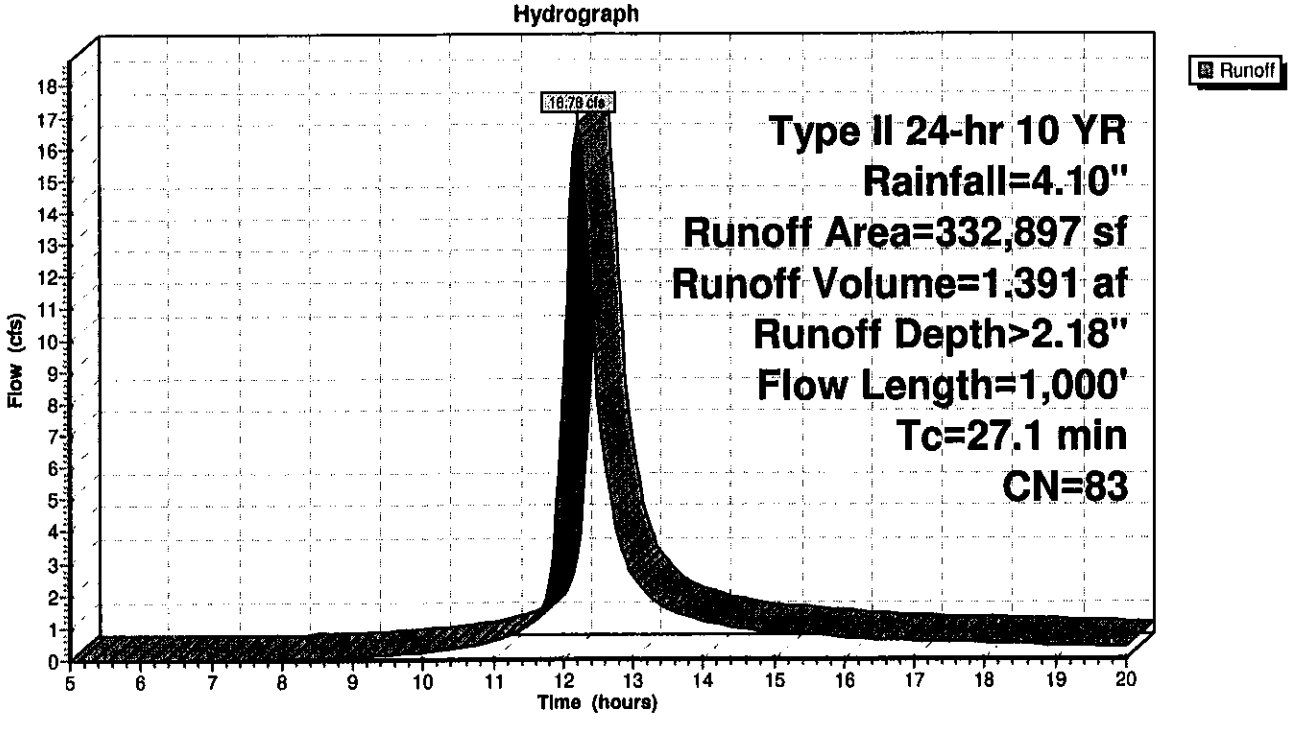
Runoff = 16.78 cfs @ 12.21 hrs, Volume= 1.391 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
87,382	73	Woods, Fair, HSG C
215,690	85	Legumes, straight row, Poor, HSG C
29,825	98	Paved parking & roofs
332,897	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow, 1A TO 1B** Grass: Dense n= 0.240 P2= 2.70"
7.1	640	0.0280	1.5		**Shallow Concentrated Flow, 1B TO 1C** Cultivated Straight Rows Kv= 9.0 fps
3.7	210	0.0580	0.9	3.76	**Channel Flow, 1C TO 1D** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.240
27.1	1,000	Total			

Subcatchment E1: East Section



Subcatchment E2: West Section

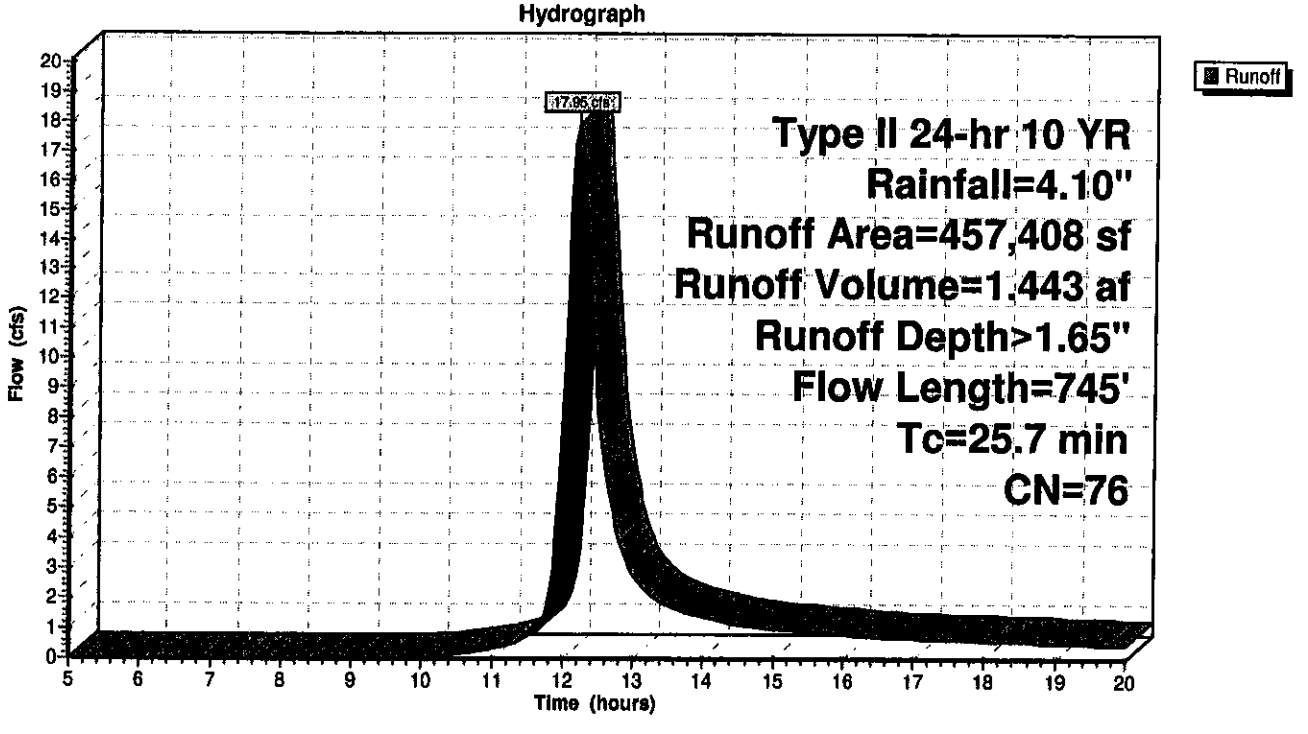
Runoff = 17.95 cfs @ 12.20 hrs, Volume= 1.443 af, Depth> 1.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
254,291	70	Woods, Good, HSG C
203,117	83	Legumes, contoured, Poor, HSG C
457,408	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow, 2A TO 2B** Grass: Dense n= 0.240 P2= 2.70"
7.7	500	0.0240	1.1		**Shallow Concentrated Flow, 2B TO 2C** Short Grass Pasture Kv= 7.0 fps
1.7	95	0.1000	0.9	1.88	**Channel Flow, 2C TO 2D** Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.240
25.7	745	Total			

Subcatchment E2: West Section



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: East Section Runoff Area=332,897 sf Runoff Depth>3.62"
Flow Length=1,000' Tc=27.1 min CN=83 Runoff=27.48 cfs 2.306 af

Subcatchment E2: West Section Runoff Area=457,408 sf Runoff Depth>2.95"
Flow Length=745' Tc=25.7 min CN=76 Runoff=32.17 cfs 2.578 af

Total Runoff Area = 18.143 ac Runoff Volume = 4.884 af Average Runoff Depth = 3.23"

Subcatchment E1: East Section

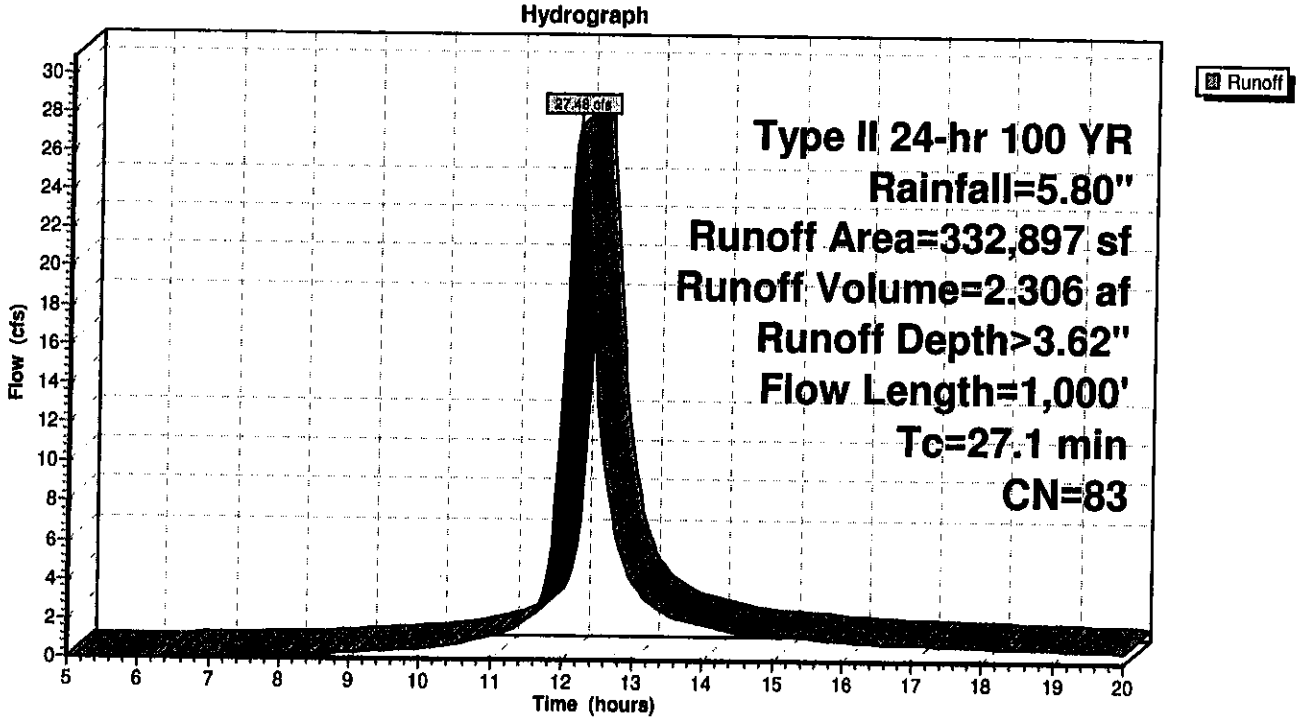
Runoff = 27.48 cfs @ 12.20 hrs, Volume= 2.306 af, Depth> 3.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
87,382	73	Woods, Fair, HSG C
215,690	85	Legumes, straight row, Poor, HSG C
29,825	98	Paved parking & roofs
332,897	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow, 1A TO 1B** Grass: Dense n= 0.240 P2= 2.70"
7.1	640	0.0280	1.5		**Shallow Concentrated Flow, 1B TO 1C** Cultivated Straight Rows Kv= 9.0 fps
3.7	210	0.0580	0.9	3.76	**Channel Flow, 1C TO 1D** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.240
27.1	1,000	Total			

Subcatchment E1: East Section



Subcatchment E2: West Section

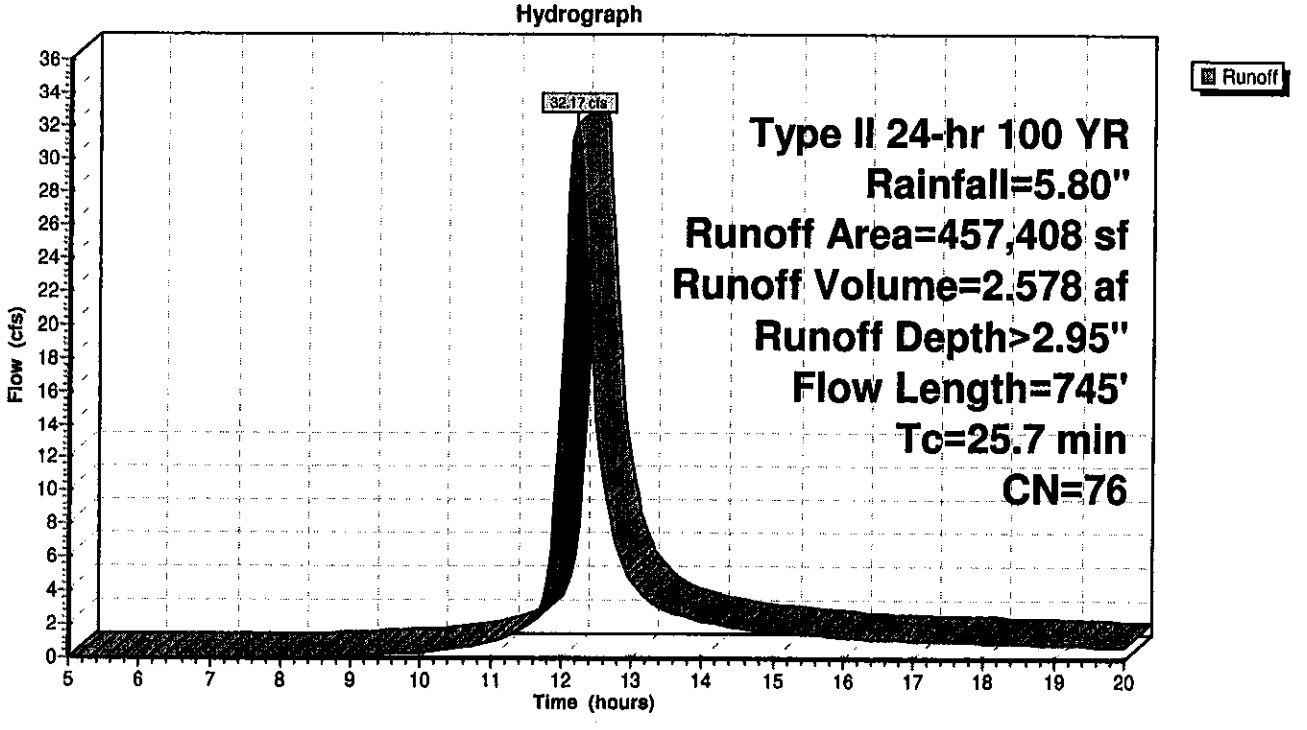
Runoff = 32.17 cfs @ 12.19 hrs, Volume= 2.578 af, Depth> 2.95"

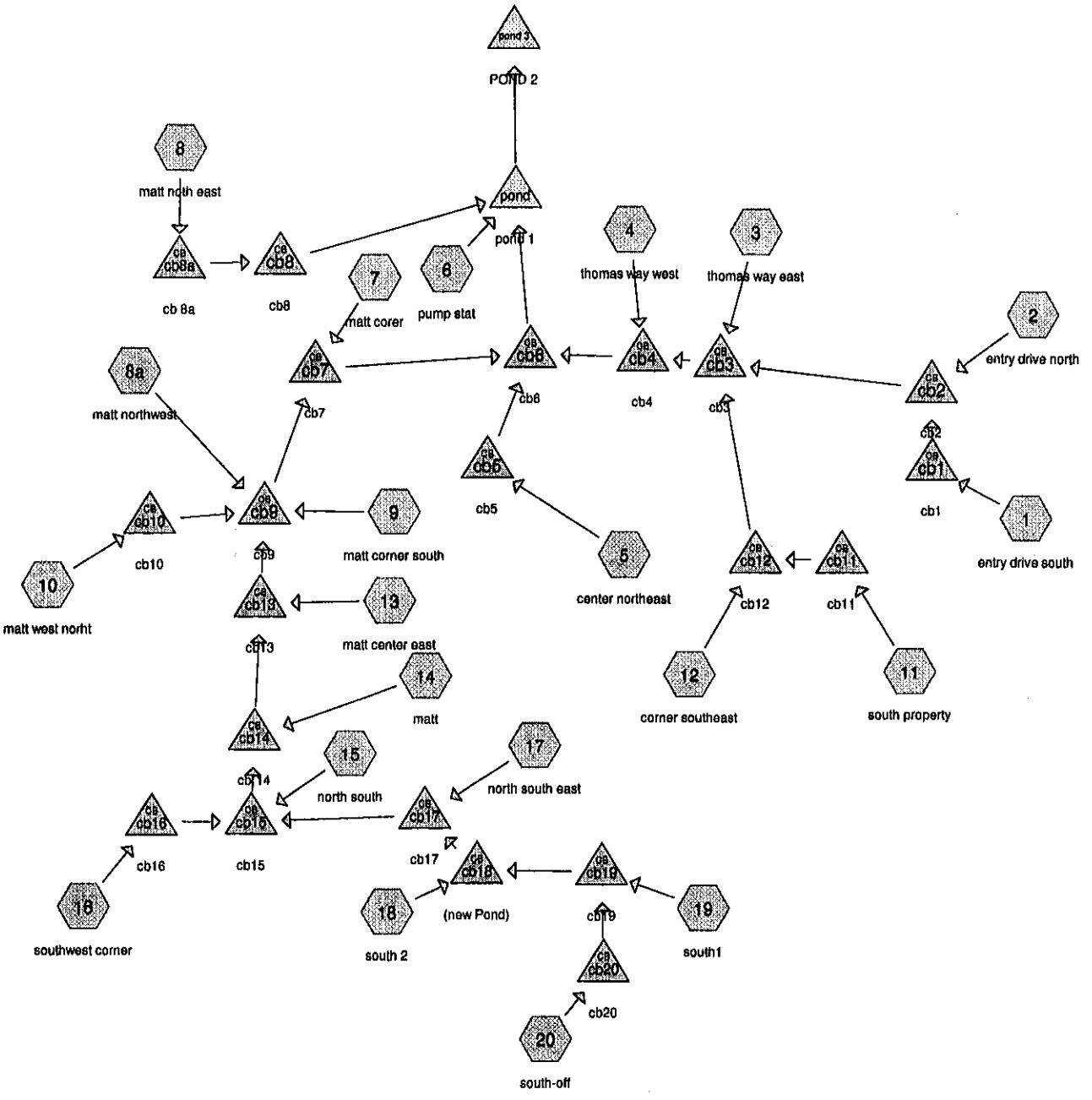
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
254,291	70	Woods, Good, HSG C
203,117	83	Legumes, contoured, Poor, HSG C
457,408	76	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow, 2A TO 2B** Grass: Dense n= 0.240 P2= 2.70"
7.7	500	0.0240	1.1		**Shallow Concentrated Flow, 2B TO 2C** Short Grass Pasture Kv= 7.0 fps
1.7	95	0.1000	0.9	1.88	**Channel Flow, 2C TO 2D** Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.240
25.7	745	Total			

Subcatchment E2: West Section





Subcat Reach Pond Link

Drainage Diagram for p-bruns-mdws-2-16-07
Prepared by {enter your company name here}

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: entry drive south Runoff Area=36,392 sf Runoff Depth>1.13"
Flow Length=390' Tc=15.0 min CN=87 Runoff=1.32 cfs 0.079 af

Subcatchment 2: entry drive north Runoff Area=67,334 sf Runoff Depth>0.78"
Flow Length=465' Tc=24.1 min CN=81 Runoff=1.28 cfs 0.101 af

Subcatchment 3: thomas way east Runoff Area=100,755 sf Runoff Depth>0.64"
Flow Length=800' Tc=29.3 min CN=78 Runoff=1.35 cfs 0.124 af

Subcatchment 4: thomas way west Runoff Area=26,833 sf Runoff Depth>1.13"
Flow Length=340' Tc=14.5 min CN=87 Runoff=0.99 cfs 0.058 af

Subcatchment 5: center northeast Runoff Area=31,680 sf Runoff Depth>1.01"
Flow Length=280' Tc=13.3 min CN=85 Runoff=1.09 cfs 0.061 af

Subcatchment 6: pump stat Runoff Area=7,800 sf Runoff Depth>1.26"
Flow Length=190' Tc=15.5 min CN=89 Runoff=0.31 cfs 0.019 af

Subcatchment 7: matt corer Runoff Area=6,093 sf Runoff Depth>1.34"
Flow Length=60' Tc=12.6 min CN=90 Runoff=0.28 cfs 0.016 af

Subcatchment 8: matt noth east Runoff Area=29,115 sf Runoff Depth>1.12"
Flow Length=170' Tc=22.1 min CN=87 Runoff=0.86 cfs 0.063 af

Subcatchment 8a: matt northwest Runoff Area=17,231 sf Runoff Depth>1.26"
Flow Length=180' Tc=12.3 min CN=89 Runoff=0.76 cfs 0.042 af

Subcatchment 9: matt corner south Runoff Area=6,460 sf Runoff Depth>1.26"
Flow Length=230' Tc=19.0 min CN=89 Runoff=0.23 cfs 0.016 af

Subcatchment 10: matt west norht Runoff Area=17,361 sf Runoff Depth>1.13"
Flow Length=250' Tc=15.2 min CN=87 Runoff=0.62 cfs 0.037 af

Subcatchment 11: south property Runoff Area=65,015 sf Runoff Depth>0.84"
Flow Length=505' Tc=10.9 min CN=82 Runoff=2.01 cfs 0.104 af

Subcatchment 12: corner southeast Runoff Area=8,407 sf Runoff Depth>1.93"
Flow Length=290' Tc=23.3 min CN=97 Runoff=0.38 cfs 0.031 af

Subcatchment 13: matt center east Runoff Area=11,560 sf Runoff Depth>1.26"
Flow Length=170' Tc=22.3 min CN=89 Runoff=0.38 cfs 0.028 af

Subcatchment 14: matt Runoff Area=10,816 sf Runoff Depth>0.89"
Flow Length=150' Tc=22.1 min CN=83 Runoff=0.25 cfs 0.018 af

Subcatchment 15: north south Runoff Area=21,863 sf Runoff Depth>1.41"
Flow Length=230' Tc=9.3 min CN=91 Runoff=1.17 cfs 0.059 af

Subcatchment 16: southwest corner Runoff Area=37,970 sf Runoff Depth>0.47"
Flow Length=230' Tc=63.2 min CN=74 Runoff=0.20 cfs 0.034 af

Subcatchment 17: north south east Runoff Area=19,130 sf Runoff Depth>1.19"
Flow Length=210' Tc=18.4 min CN=88 Runoff=0.66 cfs 0.044 af

Subcatchment 18: south 2 Runoff Area=49,843 sf Runoff Depth>0.94"
Flow Length=450' Tc=36.8 min CN=84 Runoff=0.88 cfs 0.089 af

Subcatchment 19: south1 Runoff Area=36,960 sf Runoff Depth>1.00"
Flow Length=100' Tc=22.7 min CN=85 Runoff=0.95 cfs 0.071 af

Subcatchment 20: south-off Runoff Area=180,622 sf Runoff Depth>0.21"
Flow Length=700' Tc=61.0 min CN=65 Runoff=0.32 cfs 0.073 af

Pond cb1: cb1 Peak Elev=317.56' Inflow=1.32 cfs 0.079 af
15.0" x 20.0' Culvert Outflow=1.32 cfs 0.079 af

Pond cb10: cb10 Peak Elev=312.70' Inflow=0.62 cfs 0.037 af
12.0" x 20.0' Culvert Outflow=0.62 cfs 0.037 af

Pond cb11: cb11 Peak Elev=316.26' Inflow=2.01 cfs 0.104 af
18.0" x 20.0' Culvert Outflow=2.01 cfs 0.104 af

Pond cb12: cb12 Peak Elev=315.52' Inflow=2.31 cfs 0.135 af
19.0" x 60.0' Culvert Outflow=2.31 cfs 0.135 af

Pond cb13: cb13 Peak Elev=314.00' Inflow=3.38 cfs 0.417 af
27.0" x 120.0' Culvert Outflow=3.38 cfs 0.417 af

Pond cb14: cb`14 Peak Elev=315.26' Inflow=3.02 cfs 0.389 af
28.0" x 80.0' Culvert Outflow=3.02 cfs 0.389 af

Pond cb15: cb15 Peak Elev=315.77' Inflow=2.79 cfs 0.370 af
28.0" x 20.0' Culvert Outflow=2.79 cfs 0.370 af

Pond cb16: cb16 Peak Elev=317.53' Inflow=0.20 cfs 0.034 af
11.0" x 20.0' Culvert Outflow=0.20 cfs 0.034 af

Pond cb17: cb17 Peak Elev=318.06' Inflow=2.26 cfs 0.277 af
23.0" x 120.0' Culvert Outflow=2.26 cfs 0.277 af

Pond cb18: (new Pond) Peak Elev=318.77' Inflow=1.73 cfs 0.233 af
21.0" x 12.0' Culvert Outflow=1.73 cfs 0.233 af

Pond cb19: cb19 Peak Elev=319.90' Inflow=0.99 cfs 0.144 af
15.0" x 60.0' Culvert Outflow=0.99 cfs 0.144 af

Pond cb2: cb2 Peak Elev=316.90' Inflow=2.40 cfs 0.180 af
22.0" x 60.0' Culvert Outflow=2.40 cfs 0.180 af

Pond cb20: cb20 Peak Elev=321.28' Inflow=0.32 cfs 0.073 af
12.0" x 60.0' Culvert Outflow=0.32 cfs 0.073 af

Pond cb3: cb3 Peak Elev=312.53' Inflow=5.27 cfs 0.439 af
24.0" x 20.0' Culvert Outflow=5.27 cfs 0.439 af

Pond cb4: cb4 Peak Elev=311.64' Inflow=6.24 cfs 0.497 af
40.0" x 60.0' Culvert Outflow=6.24 cfs 0.497 af

Pond cb5: cb5 Peak Elev=310.18' Inflow=1.09 cfs 0.061 af
36.0" x 20.0' Culvert Outflow=1.09 cfs 0.061 af

Pond cb6: cb6 Peak Elev=308.07' Inflow=12.53 cfs 1.085 af
48.0" x 20.0' Culvert Outflow=12.53 cfs 1.085 af

Pond cb7: cb7 Peak Elev=310.36' Inflow=5.19 cfs 0.527 af
42.0" x 120.0' Culvert Outflow=5.19 cfs 0.527 af

Pond cb8: cb8 Peak Elev=314.11' Inflow=0.86 cfs 0.063 af
24.0" x 80.0' Culvert Outflow=0.86 cfs 0.063 af

Pond cb8a: cb 8a Peak Elev=314.78' Inflow=0.86 cfs 0.063 af
15.0" x 20.0' Culvert Outflow=0.86 cfs 0.063 af

Pond cb9: cb9 Peak Elev=311.61' Inflow=4.89 cfs 0.511 af
36.0" x 20.0' Culvert Outflow=4.89 cfs 0.511 af

Pond pond: pond 1 Peak Elev=307.36' Storage=24,487 cf Inflow=13.52 cfs 1.166 af
Outflow=4.01 cfs 0.638 af

Pond pond 3: POND 2 Peak Elev=303.65' Storage=2,195 cf Inflow=4.01 cfs 0.638 af
Primary=2.92 cfs 0.631 af Secondary=0.00 cfs 0.000 af Outflow=2.92 cfs 0.631 af

Total Runoff Area = 18.118 ac Runoff Volume = 1.166 af Average Runoff Depth = 0.77"

Subcatchment 1: entry drive south

Runoff = 1.32 cfs @ 12.07 hrs, Volume= 0.079 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
7,730	98	bldg
9,333	98	road
2,160	98	driveway
17,169	74	>75% Grass cover, Good, HSG C
36,392	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.1		**Sheet Flow, 1a to 1b** Grass: Dense n= 0.240 P2= 2.40"
1.0	290	0.0550	4.8		**Shallow Concentrated Flow, 1b to 1c** Paved Kv= 20.3 fps
15.0	390	Total			

Subcatchment 2: entry drive north

Runoff = 1.28 cfs @ 12.19 hrs, Volume= 0.101 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
7,726	98	bldg
1,160	98	driveway
10,158	98	road
48,290	74	>75% Grass cover, Good, HSG C
67,334	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 2A TO B** Grass: Dense n= 0.240 P2= 2.40"
1.7	180	0.0120	1.8		**Shallow Concentrated Flow, 2B TO 2C** Unpaved Kv= 16.1 fps
0.7	185	0.0530	4.7		**Shallow Concentrated Flow, 2C TO 2D** Paved Kv= 20.3 fps
24.1	465	Total			

Subcatchment 3: thomas way east

Runoff = 1.35 cfs @ 12.26 hrs, Volume= 0.124 af, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
10,595	98	bldg
3,140	98	driveway
9,119	98	road
22,501	74	grass good "C'
55,400	71	Meadow, non-grazed, HSG C
100,755	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 3A TO 3B** Grass: Dense n= 0.240 P2= 2.40"
6.2	600	0.0100	1.6		**Shallow Concentrated Flow, 3B TO 3C** Unpaved Kv= 16.1 fps
1.4	100	0.0200	1.2		**Sheet Flow, 3** Smooth surfaces n= 0.011 P2= 2.40"
29.3	800	Total			

Subcatchment 4: thomas way west

Runoff = 0.99 cfs @ 12.07 hrs, Volume= 0.058 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
7,630	98	bldg
2,060	98	driveway
5,155	98	road
11,988	74	>75% Grass cover, Good, HSG C
26,833	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.1		**Sheet Flow, 4A TO 4B** Grass: Dense n= 0.240 P2= 2.40"
2.0	240	0.0100	2.0		**Shallow Concentrated Flow, 4B TO 4C** Paved Kv= 20.3 fps
14.5	340	Total			

Subcatchment 5: center northeast

Runoff = 1.09 cfs @ 12.06 hrs, Volume= 0.061 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
7,700	98	bldg
2,400	98	driveway
4,740	98	road
16,840	74	>75% Grass cover, Good, HSG C
31,680	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.1		**Sheet Flow, 5A TO 5B** Grass: Dense n= 0.240 P2= 2.40"
0.2	20	0.0100	1.6		**Shallow Concentrated Flow, 5B TO 5C** Unpaved Kv= 16.1 fps
1.7	160	0.0100	1.6		**Shallow Concentrated Flow, 5C TO 5D** Unpaved Kv= 16.1 fps
13.3	280	Total			

Subcatchment 6: pump stat

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 0.019 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
1,275	98	bldg
2,800	74	>75% Grass cover, Good, HSG C
3,725	98	Road / driveway
7,800	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	60	0.0100	0.1		**Sheet Flow, 6A TO 6B** Grass: Dense n= 0.240 P2= 2.40"
1.1	130	0.0100	2.0		**Shallow Concentrated Flow, 6B TO 6C** Paved Kv= 20.3 fps
15.5	190	Total			

Subcatchment 7: matt corer

Runoff = 0.28 cfs @ 12.04 hrs, Volume= 0.016 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
1,952	74	>75% Grass cover, Good, HSG C
4,141	98	paved / bldg
6,093	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	60	0.0140	0.1		**Sheet Flow, 7A TO 7B** Grass: Dense n= 0.240 P2= 2.40"

Subcatchment 8: matt noth east

Runoff = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
4,795	98	bldg
2,160	98	driveway
8,244	98	road
13,916	74	>75% Grass cover, Good, HSG C
29,115	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 8A TO 8B** Grass: Dense n= 0.240 P2= 2.40"
0.4	70	0.0170	2.6		**Shallow Concentrated Flow, 8B TO 8C** Paved Kv= 20.3 fps
22.1	170	Total			

Subcatchment 8a: matt northwest

Runoff = 0.76 cfs @ 12.04 hrs, Volume= 0.042 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
5,195	98	bldg
1,800	98	driveway
3,630	98	road
6,606	74	>75% Grass cover, Good, HSG C
17,231	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	80	0.0300	0.1		**Sheet Flow, 8A TO 8B** Grass: Dense n= 0.240 P2= 2.40"
0.6	100	0.0200	2.9		**Shallow Concentrated Flow, 8AB TO 8AC** Paved Kv= 20.3 fps
12.3	180	Total			

Subcatchment 9: matt corner south

Runoff = 0.23 cfs @ 12.12 hrs, Volume= 0.016 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
2,433	74	>75% Grass cover, Good, HSG C
4,027	98	pavement / bldg
6,460	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5	100	0.0150	0.1		**Sheet Flow, 9A TO 9B** Grass: Dense n= 0.240 P2= 2.40"
0.5	130	0.0500	4.5		**Shallow Concentrated Flow, 9B TO 9C** Paved Kv= 20.3 fps
19.0	230	Total			

Subcatchment 10: matt west norht

Runoff = 0.62 cfs @ 12.08 hrs, Volume= 0.037 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
5,795	98	bldg
1,550	98	driveway
2,200	98	road
7,816	74	>75% Grass cover, Good, HSG C
17,361	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	80	0.0200	0.1		**Sheet Flow, 10A TO 10B** Grass: Dense n= 0.240 P2= 2.40"
1.4	170	0.0100	2.0		**Shallow Concentrated Flow, 10B TO 10C** Paved Kv= 20.3 fps
15.2	250	Total			

Subcatchment 11: south property

Runoff = 2.01 cfs @ 12.03 hrs, Volume= 0.104 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
9,663	98	bldg
2,700	98	driveway
8,981	98	road
43,671	74	>75% Grass cover, Good, HSG C
65,015	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1600	0.2		**Sheet Flow, 11A TO 11B** Grass: Dense n= 0.240 P2= 2.40"
1.2	115	0.0100	1.6		**Shallow Concentrated Flow, 11B TO 11C** Unpaved Kv= 16.1 fps
2.5	290	0.0090	1.9		**Shallow Concentrated Flow, 2C TO 2D** Paved Kv= 20.3 fps
10.9	505	Total			

Subcatchment 12: corner southeast

Runoff = 0.38 cfs @ 12.15 hrs, Volume= 0.031 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
8,007	98	road/ drive/bldg
400	74	>75% Grass cover, Good, HSG C
8,407	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 12A TO 12B** Grass: Dense n= 0.240 P2= 2.40"
1.6	190	0.0090	1.9		**Shallow Concentrated Flow, 12B TO 12C** Paved Kv= 20.3 fps
23.3	290	Total			

Subcatchment 13: matt center east

Runoff = 0.38 cfs @ 12.15 hrs, Volume= 0.028 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
4,165	74	>75% Grass cover, Good, HSG C
7,395	98	road/bldg
11,560	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 13A TO 13B** Grass: Dense n= 0.240 P2= 2.40"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow, 13B TO 13C** Paved Kv= 20.3 fps
22.3	170	Total			

Subcatchment 14: matt

Runoff = 0.25 cfs @ 12.16 hrs, Volume= 0.018 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
6,676	74	>75% Grass cover, Good, HSG C
4,140	98	road/bldg
10,816	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 14A TO 14B** Grass: Dense n= 0.240 P2= 2.40"
0.4	50	0.0100	2.0		**Shallow Concentrated Flow, 14B TO 14C** Paved Kv= 20.3 fps
22.1	150	Total			

Subcatchment 15: north south

Runoff = 1.17 cfs @ 12.01 hrs, Volume= 0.059 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
7,530	98	bldg
4,320	98	driveway
3,260	98	road
6,753	74	>75% Grass cover, Good, HSG C
21,863	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	60	0.0450	0.1		**Sheet Flow, 15A TO 15B** Grass: Dense n= 0.240 P2= 2.40"
1.4	170	0.0100	2.0		**Shallow Concentrated Flow, 15B TO 15C** Paved Kv= 20.3 fps
9.3	230	Total			

Subcatchment 16: southwest corner

Runoff = 0.20 cfs @ 12.75 hrs, Volume= 0.034 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
1,845	98	bldg
4,790	98	road
1,350	98	driveway
6,985	74	>75% Grass cover, Good, HSG C
23,000	65	Brush, Good, HSG C
37,970	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
62.3	100	0.0080	0.0		**Sheet Flow, 16A TO 16B** Woods: Dense underbrush n= 0.800 P2= 2.40"
0.9	130	0.0150	2.5		**Shallow Concentrated Flow, 16B TO 16C** Paved Kv= 20.3 fps
63.2	230	Total			

Subcatchment 17: north south east

Runoff = 0.66 cfs @ 12.11 hrs, Volume= 0.044 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
5,798	98	bldg
2,160	98	driveway
3,070	98	road
8,102	74	>75% Grass cover, Good, HSG C
19,130	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	75	0.0100	0.1		**Sheet Flow, 17A TO 17B** Grass: Dense n= 0.240 P2= 2.40"
1.1	135	0.0110	2.1		**Shallow Concentrated Flow, 17B TO 17C** Paved Kv= 20.3 fps
18.4	210	Total			

Subcatchment 18: south 2

Runoff = 0.88 cfs @ 12.34 hrs, Volume= 0.089 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
11,595	98	house
4,320	98	driveway
4,321	98	road
29,607	74	>75% Grass cover, Good, HSG C
49,843	84	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	100	0.0100	0.1		**Sheet Flow, 18A TO 18B** Woods: Light underbrush n= 0.400 P2= 2.40"
4.1	350	0.0050	1.4		**Shallow Concentrated Flow, 18B TO 18C** Paved Kv= 20.3 fps
36.8	450	Total			

Subcatchment 19: south1

Runoff = 0.95 cfs @ 12.16 hrs, Volume= 0.071 af, Depth> 1.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
9,662	98	bldg
3,780	98	drive
3,090	98	road
20,428	74	>75% Grass cover, Good, HSG C
36,960	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0090	0.1		**Sheet Flow, 19A TO 19B** Grass: Dense n= 0.240 P2= 2.40"

Subcatchment 20: south-off

Runoff = 0.32 cfs @ 12.85 hrs, Volume= 0.073 af, Depth> 0.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.40"

Area (sf)	CN	Description
180,622	65	Brush, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	100	0.0100	0.1		**Sheet Flow, 20a to 20b** Woods: Light underbrush n= 0.400 P2= 2.40"
28.3	600	0.0050	0.4		**Shallow Concentrated Flow, 20b to 20c** Woodland Kv= 5.0 fps
61.0	700	Total			

Pond cb1: cb1

Inflow Area = 0.835 ac, Inflow Depth > 1.13" for 1 YR event
Inflow = 1.32 cfs @ 12.07 hrs, Volume= 0.079 af
Outflow = 1.32 cfs @ 12.07 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 1.32 cfs @ 12.07 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.56' @ 12.07 hrs
Flood Elev= 322.70'
Plug-Flow detention time= 0.0 min calculated for 0.078 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (793.6 - 793.6)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**15.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 316.48' S= 0.0260 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.29 cfs @ 12.07 hrs HW=317.55' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.29 cfs @ 3.7 fps)

Pond cb10: cb10

Inflow Area = 0.399 ac, Inflow Depth > 1.13" for 1 YR event
Inflow = 0.62 cfs @ 12.08 hrs, Volume= 0.037 af
Outflow = 0.62 cfs @ 12.08 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.08 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.70' @ 12.08 hrs
Flood Elev= 316.10'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (793.7 - 793.7)

Device	Routing	Invert	Outlet Devices
#1	Primary	312.30'	**12.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.78' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.61 cfs @ 12.08 hrs HW=312.69' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.61 cfs @ 3.2 fps)

Pond cb11: cb11

Inflow Area = 1.493 ac, Inflow Depth > 0.84" for 1 YR event
Inflow = 2.01 cfs @ 12.03 hrs, Volume= 0.104 af
Outflow = 2.01 cfs @ 12.03 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.0 min
Primary = 2.01 cfs @ 12.03 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 316.26' @ 12.03 hrs
Flood Elev= 319.30'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (804.6 - 804.6)

Device	Routing	Invert	Outlet Devices
#1	Primary	315.60'	**18.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 315.08' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.96 cfs @ 12.03 hrs HW=316.25' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.96 cfs @ 3.9 fps)

Pond cb12: cb12

Inflow Area = 1.686 ac, Inflow Depth > 0.96" for 1 YR event
Inflow = 2.31 cfs @ 12.04 hrs, Volume= 0.135 af
Outflow = 2.31 cfs @ 12.04 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min
Primary = 2.31 cfs @ 12.04 hrs, Volume= 0.135 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 315.52' @ 12.04 hrs
Flood Elev= 319.30'
Plug-Flow detention time= 0.0 min calculated for 0.135 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.83'	**19.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.75' S= 0.0513 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.27 cfs @ 12.04 hrs HW=315.51' (Free Discharge)
1=Culvert (Inlet Controls 2.27 cfs @ 2.8 fps)

Pond cb13: cb13

Inflow Area = 8.466 ac, Inflow Depth > 0.59" for 1 YR event
Inflow = 3.38 cfs @ 12.11 hrs, Volume= 0.417 af
Outflow = 3.38 cfs @ 12.11 hrs, Volume= 0.417 af, Atten= 0%, Lag= 0.0 min
Primary = 3.38 cfs @ 12.11 hrs, Volume= 0.417 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.00' @ 12.11 hrs
Flood Elev= 319.20'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	313.25'	**27.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.20' S= 0.0171 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=3.36 cfs @ 12.11 hrs HW=314.00' (Free Discharge)
1=Culvert (Barrel Controls 3.36 cfs @ 4.3 fps)

Pond cb14: cb`14

Inflow Area = 8.200 ac, Inflow Depth > 0.57" for 1 YR event
Inflow = 3.02 cfs @ 12.10 hrs, Volume= 0.389 af
Outflow = 3.02 cfs @ 12.10 hrs, Volume= 0.389 af, Atten= 0%, Lag= 0.0 min
Primary = 3.02 cfs @ 12.10 hrs, Volume= 0.389 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 315.26' @ 12.10 hrs
Flood Elev= 321.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (824.9 - 824.9)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.50'	**28.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 313.50' S= 0.0125 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=3.01 cfs @ 12.10 hrs HW=315.26' (Free Discharge)
↑**1=Culvert** (Barrel Controls 3.01 cfs @ 3.7 fps)

Pond cb15: cb15

Inflow Area = 7.952 ac, Inflow Depth > 0.56" for 1 YR event
Inflow = 2.79 cfs @ 12.08 hrs, Volume= 0.370 af
Outflow = 2.79 cfs @ 12.08 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.0 min
Primary = 2.79 cfs @ 12.08 hrs, Volume= 0.370 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 315.77' @ 12.08 hrs
Flood Elev= 321.70'
Plug-Flow detention time= 0.0 min calculated for 0.369 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (825.6 - 825.6)

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**28.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 314.75' S= 0.0125 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.78 cfs @ 12.08 hrs HW=315.77' (Free Discharge)
↑**1=Culvert** (Barrel Controls 2.78 cfs @ 3.4 fps)

Pond cb16: cb16

Inflow Area = 0.872 ac, Inflow Depth > 0.47" for 1 YR event
Inflow = 0.20 cfs @ 12.75 hrs, Volume= 0.034 af
Outflow = 0.20 cfs @ 12.75 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.20 cfs @ 12.75 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.53' @ 12.75 hrs
Flood Elev= 321.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (864.2 - 864.2)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.30'	**11.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 316.78' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.20 cfs @ 12.75 hrs HW=317.53' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.20 cfs @ 2.4 fps)

Pond cb17: cb17

Inflow Area = 6.578 ac, Inflow Depth > 0.50" for 1 YR event
Inflow = 2.26 cfs @ 12.19 hrs, Volume= 0.277 af
Outflow = 2.26 cfs @ 12.19 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.0 min
Primary = 2.26 cfs @ 12.19 hrs, Volume= 0.277 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.06' @ 12.19 hrs
Flood Elev= 322.20'
Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= 0.0 min (831.6 - 831.6)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.43'	**23.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 315.20' S= 0.0186 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.24 cfs @ 12.19 hrs HW=318.06' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.24 cfs @ 2.7 fps)

Pond cb18: (new Pond)

Inflow Area = 6.139 ac, Inflow Depth > 0.46" for 1 YR event
Inflow = 1.73 cfs @ 12.24 hrs, Volume= 0.233 af
Outflow = 1.73 cfs @ 12.24 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min
Primary = 1.73 cfs @ 12.24 hrs, Volume= 0.233 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.77' @ 12.24 hrs
Flood Elev= 322.20'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (838.8 - 838.8)

Device	Routing	Invert	Outlet Devices
#1	Primary	318.20'	**21.0" x 12.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 317.68' S= 0.0433 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.72 cfs @ 12.24 hrs HW=318.77' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.72 cfs @ 2.6 fps)

Pond cb19: cb19

Inflow Area = 4.995 ac, Inflow Depth > 0.35" for 1 YR event
Inflow = 0.99 cfs @ 12.17 hrs, Volume= 0.144 af
Outflow = 0.99 cfs @ 12.17 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.17 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 319.90' @ 12.17 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (851.1 - 851.1)

Device	Routing	Invert	Outlet Devices
#1	Primary	319.40'	**15.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 318.40' S= 0.0167 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.98 cfs @ 12.17 hrs HW=319.90' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.98 cfs @ 3.2 fps)

Pond cb2: cb2

Inflow Area = 2.381 ac, Inflow Depth > 0.90" for 1 YR event
Inflow = 2.40 cfs @ 12.11 hrs, Volume= 0.180 af
Outflow = 2.40 cfs @ 12.11 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Primary = 2.40 cfs @ 12.11 hrs, Volume= 0.180 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 316.90' @ 12.12 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (806.9 - 806.9)

Device	Routing	Invert	Outlet Devices
#1	Primary	316.23'	**22.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.75' S= 0.0747 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.37 cfs @ 12.11 hrs HW=316.89' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.37 cfs @ 2.8 fps)

Pond cb20: cb20

Inflow Area = 4.147 ac, Inflow Depth > 0.21" for 1 YR event
Inflow = 0.32 cfs @ 12.85 hrs, Volume= 0.073 af
Outflow = 0.32 cfs @ 12.85 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.85 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 321.28' @ 12.85 hrs
Flood Elev= 324.00'
Plug-Flow detention time= 0.0 min calculated for 0.073 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (895.5 - 895.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	**12.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 318.40' S= 0.0433 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.31 cfs @ 12.85 hrs HW=321.28' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.31 cfs @ 1.8 fps)

Pond cb3: cb3

Inflow Area = 6.380 ac, Inflow Depth > 0.83" for 1 YR event
Inflow = 5.27 cfs @ 12.09 hrs, Volume= 0.439 af
Outflow = 5.27 cfs @ 12.09 hrs, Volume= 0.439 af, Atten= 0%, Lag= 0.0 min
Primary = 5.27 cfs @ 12.09 hrs, Volume= 0.439 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.53' @ 12.09 hrs
Flood Elev= 315.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (809.0 - 809.0)

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**24.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 310.98' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=5.23 cfs @ 12.09 hrs HW=312.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.23 cfs @ 4.7 fps)

Pond cb4: cb4

Inflow Area = 6.996 ac, Inflow Depth > 0.85" for 1 YR event
Inflow = 6.24 cfs @ 12.08 hrs, Volume= 0.497 af
Outflow = 6.24 cfs @ 12.08 hrs, Volume= 0.497 af, Atten= 0%, Lag= 0.0 min
Primary = 6.24 cfs @ 12.08 hrs, Volume= 0.497 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.64' @ 12.08 hrs
Flood Elev= 315.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (807.1 - 807.1)

Device	Routing	Invert	Outlet Devices
#1	Primary	310.73'	**40.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 307.50' S= 0.0538 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=6.17 cfs @ 12.08 hrs HW=311.63' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.17 cfs @ 3.2 fps)

Pond cb5: cb5

Inflow Area = 0.727 ac, Inflow Depth > 1.01" for 1 YR event
Inflow = 1.09 cfs @ 12.06 hrs, Volume= 0.061 af
Outflow = 1.09 cfs @ 12.06 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.06 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 310.18' @ 12.06 hrs
Flood Elev= 313.70'
Plug-Flow detention time= 0.0 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	309.80'	**36.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 309.28' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.07 cfs @ 12.06 hrs HW=310.18' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.07 cfs @ 2.1 fps)

Pond cb6: cb6

Inflow Area = 17.271 ac, Inflow Depth > 0.75" for 1 YR event
Inflow = 12.53 cfs @ 12.07 hrs, Volume= 1.085 af
Outflow = 12.53 cfs @ 12.07 hrs, Volume= 1.085 af, Atten= 0%, Lag= 0.0 min
Primary = 12.53 cfs @ 12.07 hrs, Volume= 1.085 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 308.07' @ 12.07 hrs
Flood Elev= 313.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (810.7 - 810.7)

Device	Routing	Invert	Outlet Devices
#1	Primary	307.10'	**48.0" x 20.0' long Culvert X 2.00** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 306.80' S= 0.0150 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=12.31 cfs @ 12.07 hrs HW=308.06' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 12.31 cfs @ 4.0 fps)

Pond cb7: cb7

Inflow Area = 9.548 ac, Inflow Depth > 0.66" for 1 YR event
Inflow = 5.19 cfs @ 12.07 hrs, Volume= 0.527 af
Outflow = 5.19 cfs @ 12.07 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 5.19 cfs @ 12.07 hrs, Volume= 0.527 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 310.36' @ 12.07 hrs
Flood Elev= 316.70'
Plug-Flow detention time= 0.0 min calculated for 0.527 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (815.5 - 815.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	309.55'	**42.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 307.15' S= 0.0200 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=5.10 cfs @ 12.07 hrs HW=310.35' (Free Discharge)
1=Culvert (Inlet Controls 5.10 cfs @ 3.1 fps)

Pond cb8: cb8

Inflow Area = 0.668 ac, Inflow Depth > 1.12" for 1 YR event
Inflow = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af
Outflow = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.11' @ 12.15 hrs
Flood Elev= 318.24'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (799.1 - 799.1)

Device	Routing	Invert	Outlet Devices
#1	Primary	313.73'	**24.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 310.50' S= 0.0404 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.85 cfs @ 12.15 hrs HW=314.11' (Free Discharge)
1=Culvert (Inlet Controls 0.85 cfs @ 2.1 fps)

Pond cb8a: cb 8a

Inflow Area = 0.668 ac, Inflow Depth > 1.12" for 1 YR event
Inflow = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af
Outflow = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.15 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 314.78' @ 12.15 hrs
Flood Elev= 318.24'
Plug-Flow detention time= 0.0 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.30'	**15.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 313.98' S= 0.0160 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.85 cfs @ 12.15 hrs HW=314.78' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.85 cfs @ 2.9 fps)

Pond cb9: cb9

Inflow Area =	9.408 ac,	Inflow Depth >	0.65"	for	1 YR event
Inflow =	4.89 cfs @	12.08 hrs,	Volume=	0.511 af	
Outflow =	4.89 cfs @	12.08 hrs,	Volume=	0.511 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.89 cfs @	12.08 hrs,	Volume=	0.511 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.61' @ 12.08 hrs
Flood Elev= 316.10'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (816.5 - 816.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	310.78'	**36.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 309.80' S= 0.0490 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=4.85 cfs @ 12.08 hrs HW=311.60' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.85 cfs @ 3.1 fps)

Pond pond: pond 1

Inflow Area =	18.118 ac,	Inflow Depth >	0.77"	for	1 YR event
Inflow =	13.52 cfs @	12.08 hrs,	Volume=	1.166 af	
Outflow =	4.01 cfs @	12.61 hrs,	Volume=	0.638 af,	Atten= 70%, Lag= 32.1 min
Primary =	4.01 cfs @	12.61 hrs,	Volume=	0.638 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 307.36' @ 12.61 hrs Surf.Area= 10,600 sf Storage= 24,487 cf
Plug-Flow detention time= 167.4 min calculated for 0.638 af (55% of inflow)
Center-of-Mass det. time= 81.4 min (891.1 - 809.7)

Volume	Invert	Avail.Storage	Storage Description
#1	304.00'	56,309 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 61,639 cf Overall - 5,329 cf Embedded = 56,309 cf
#2	304.00'	5,329 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) Inside #1
		61,639 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	5,125	405.0	0	0	5,125
305.00	6,327	432.0	5,715	5,715	6,971
306.00	7,459	454.0	6,885	12,601	8,585
307.00	9,216	548.0	8,322	20,923	16,097
308.00	13,301	654.0	11,196	32,119	26,253
309.00	14,560	689.0	13,926	46,045	30,054
310.00	16,651	702.0	15,594	61,639	31,652

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	1,531	167.0	0	0	1,531
305.00	1,956	183.0	1,739	1,739	2,010
306.00	2,505	207.0	2,225	3,964	2,780
306.50	2,962	227.0	1,365	5,329	3,479

Device	Routing	Invert	Outlet Devices
#1	Primary	308.70'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	305.00'	**4.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 305.50' S= -0.0125 '/' Cc= 0.900 n= 0.020
#3	Primary	307.20'	**18.00' W x 4.00' H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.92 cfs @ 12.61 hrs HW=307.36' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Culvert** (Outlet Controls 0.25 cfs @ 2.9 fps)
- **3=Orifice/Grate** (Orifice Controls 3.67 cfs @ 1.3 fps)

Pond pond 3: POND 2

Inflow Area = 18.118 ac, Inflow Depth > 0.42" for 1 YR event
Inflow = 4.01 cfs @ 12.61 hrs, Volume= 0.638 af
Outflow = 2.92 cfs @ 12.90 hrs, Volume= 0.631 af, Atten= 27%, Lag= 17.2 min
Primary = 2.92 cfs @ 12.90 hrs, Volume= 0.631 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 303.65' @ 12.90 hrs Surf.Area= 1,692 sf Storage= 2,195 cf
Plug-Flow detention time= 11.1 min calculated for 0.628 af (98% of inflow)
Center-of-Mass det. time= 7.3 min (898.3 - 891.1)

Volume	Invert	Avail.Storage	Storage Description
#1	302.00'	15,799 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
302.00	929	143.0	0	0	929
303.00	1,435	172.0	1,173	1,173	1,673
304.00	1,837	194.0	1,632	2,805	2,339
305.00	2,654	208.0	2,233	5,038	2,830
306.00	3,189	231.0	2,917	7,955	3,663
307.00	3,894	254.0	3,536	11,491	4,583
308.00	4,737	272.0	4,309	15,799	5,381

Device	Routing	Invert	Outlet Devices
#1	Primary	304.00'	**24.0" x 20.0' long Culvert X 2.00** CMP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 302.00' S= 0.1000 '/' Cc= 0.900 n= 0.020
#2	Secondary	306.20'	**20.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Primary	302.00'	**10.0" x 20.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 300.80' S= 0.0600 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.92 cfs @ 12.90 hrs HW=303.65' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
└**3=Culvert** (Inlet Controls 2.92 cfs @ 5.4 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=302.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: entry drive south Runoff Area=36,392 sf Runoff Depth>2.54"
Flow Length=390' Tc=15.0 min CN=87 Runoff=2.89 cfs 0.177 af

Subcatchment 2: entry drive north Runoff Area=67,334 sf Runoff Depth>2.02"
Flow Length=465' Tc=24.1 min CN=81 Runoff=3.38 cfs 0.261 af

Subcatchment 3: thomas way east Runoff Area=100,755 sf Runoff Depth>1.79"
Flow Length=800' Tc=29.3 min CN=78 Runoff=3.96 cfs 0.345 af

Subcatchment 4: thomas way west Runoff Area=26,833 sf Runoff Depth>2.54"
Flow Length=340' Tc=14.5 min CN=87 Runoff=2.17 cfs 0.130 af

Subcatchment 5: center northeast Runoff Area=31,680 sf Runoff Depth>2.36"
Flow Length=280' Tc=13.3 min CN=85 Runoff=2.50 cfs 0.143 af

Subcatchment 6: pump stat Runoff Area=7,800 sf Runoff Depth>2.72"
Flow Length=190' Tc=15.5 min CN=89 Runoff=0.65 cfs 0.041 af

Subcatchment 7: matt corer Runoff Area=6,093 sf Runoff Depth>2.82"
Flow Length=60' Tc=12.6 min CN=90 Runoff=0.57 cfs 0.033 af

Subcatchment 8: matt noth east Runoff Area=29,115 sf Runoff Depth>2.53"
Flow Length=170' Tc=22.1 min CN=87 Runoff=1.90 cfs 0.141 af

Subcatchment 8a: matt northwest Runoff Area=17,231 sf Runoff Depth>2.72"
Flow Length=180' Tc=12.3 min CN=89 Runoff=1.58 cfs 0.090 af

Subcatchment 9: matt corner south Runoff Area=6,460 sf Runoff Depth>2.72"
Flow Length=230' Tc=19.0 min CN=89 Runoff=0.48 cfs 0.034 af

Subcatchment 10: matt west norht Runoff Area=17,361 sf Runoff Depth>2.54"
Flow Length=250' Tc=15.2 min CN=87 Runoff=1.37 cfs 0.084 af

Subcatchment 11: south property Runoff Area=65,015 sf Runoff Depth>2.11"
Flow Length=505' Tc=10.9 min CN=82 Runoff=5.00 cfs 0.263 af

Subcatchment 12: corner southeast Runoff Area=8,407 sf Runoff Depth>3.48"
Flow Length=290' Tc=23.3 min CN=97 Runoff=0.67 cfs 0.056 af

Subcatchment 13: matt center east Runoff Area=11,560 sf Runoff Depth>2.72"
Flow Length=170' Tc=22.3 min CN=89 Runoff=0.79 cfs 0.060 af

Subcatchment 14: matt Runoff Area=10,816 sf Runoff Depth>2.19"
Flow Length=150' Tc=22.1 min CN=83 Runoff=0.62 cfs 0.045 af

Subcatchment 15: north south Runoff Area=21,863 sf Runoff Depth>2.92"
Flow Length=230' Tc=9.3 min CN=91 Runoff=2.32 cfs 0.122 af

Subcatchment 16: southwest corner Runoff Area=37,970 sf Runoff Depth>1.48"
Flow Length=230' Tc=63.2 min CN=74 Runoff=0.72 cfs 0.108 af

Subcatchment 17: north south east Runoff Area=19,130 sf Runoff Depth>2.63"
Flow Length=210' Tc=18.4 min CN=88 Runoff=1.42 cfs 0.096 af

Subcatchment 18: south 2 Runoff Area=49,843 sf Runoff Depth>2.26"
Flow Length=450' Tc=36.8 min CN=84 Runoff=2.13 cfs 0.215 af

Subcatchment 19: south1 Runoff Area=36,960 sf Runoff Depth>2.36"
Flow Length=100' Tc=22.7 min CN=85 Runoff=2.22 cfs 0.167 af

Subcatchment 20: south-off Runoff Area=180,622 sf Runoff Depth>0.94"
Flow Length=700' Tc=61.0 min CN=65 Runoff=2.05 cfs 0.326 af

Pond cb1: cb1 Peak Elev=317.89' Inflow=2.89 cfs 0.177 af
15.0" x 20.0' Culvert Outflow=2.89 cfs 0.177 af

Pond cb10: cb10 Peak Elev=312.93' Inflow=1.37 cfs 0.084 af
12.0" x 20.0' Culvert Outflow=1.37 cfs 0.084 af

Pond cb11: cb11 Peak Elev=316.75' Inflow=5.00 cfs 0.263 af
18.0" x 20.0' Culvert Outflow=5.00 cfs 0.263 af

Pond cb12: cb12 Peak Elev=315.97' Inflow=5.52 cfs 0.319 af
19.0" x 60.0' Culvert Outflow=5.52 cfs 0.319 af

Pond cb13: cb13 Peak Elev=314.46' Inflow=8.09 cfs 1.139 af
27.0" x 120.0' Culvert Outflow=8.09 cfs 1.139 af

Pond cb14: cb`14 Peak Elev=315.73' Inflow=7.30 cfs 1.079 af
28.0" x 80.0' Culvert Outflow=7.30 cfs 1.079 af

Pond cb15: cb15 Peak Elev=316.25' Inflow=6.70 cfs 1.033 af
28.0" x 20.0' Culvert Outflow=6.70 cfs 1.033 af

Pond cb16: cb16 Peak Elev=317.75' Inflow=0.72 cfs 0.108 af
11.0" x 20.0' Culvert Outflow=0.72 cfs 0.108 af

Pond cb17: cb17 Peak Elev=318.49' Inflow=5.75 cfs 0.804 af
23.0" x 120.0' Culvert Outflow=5.75 cfs 0.804 af

Pond cb18: (new Pond) Peak Elev=319.19' Inflow=4.76 cfs 0.707 af
21.0" x 12.0' Culvert Outflow=4.76 cfs 0.707 af

Pond cb19: cb19 Peak Elev=320.29' Inflow=2.76 cfs 0.492 af
15.0" x 60.0' Culvert Outflow=2.76 cfs 0.492 af

Pond cb2: cb2 Peak Elev=317.32' Inflow=5.85 cfs 0.437 af
22.0" x 60.0' Culvert Outflow=5.85 cfs 0.437 af

Pond cb20: cb20 Peak Elev=321.80' Inflow=2.05 cfs 0.326 af
12.0" x 60.0' Culvert Outflow=2.05 cfs 0.326 af

Pond cb3: cb3 Peak Elev=313.37' Inflow=13.36 cfs 1.101 af
24.0" x 20.0' Culvert Outflow=13.36 cfs 1.101 af

Pond cb4: cb4 Peak Elev=312.21' Inflow=15.49 cfs 1.232 af
40.0" x 60.0' Culvert Outflow=15.49 cfs 1.232 af

Pond cb5: cb5 Peak Elev=310.39' Inflow=2.50 cfs 0.143 af
36.0" x 20.0' Culvert Outflow=2.50 cfs 0.143 af

Pond cb6: cb6 Peak Elev=308.67' Inflow=29.80 cfs 2.754 af
48.0" x 20.0' Culvert Outflow=29.80 cfs 2.754 af

Pond cb7: cb7 Peak Elev=310.80' Inflow=11.72 cfs 1.379 af
42.0" x 120.0' Culvert Outflow=11.72 cfs 1.379 af

Pond cb8: cb8 Peak Elev=314.30' Inflow=1.90 cfs 0.141 af
24.0" x 80.0' Culvert Outflow=1.90 cfs 0.141 af

Pond cb8a: cb 8a Peak Elev=315.06' Inflow=1.90 cfs 0.141 af
15.0" x 20.0' Culvert Outflow=1.90 cfs 0.141 af

Pond cb9: cb9 Peak Elev=312.07' Inflow=11.20 cfs 1.346 af
36.0" x 20.0' Culvert Outflow=11.20 cfs 1.346 af

Pond pond: pond 1 Peak Elev=307.83' Storage=29,943 cf Inflow=31.98 cfs 2.936 af
Outflow=29.31 cfs 2.401 af

Pond pond 3: POND 2 Peak Elev=305.74' Storage=7,146 cf Inflow=29.31 cfs 2.401 af
Primary=27.81 cfs 2.388 af Secondary=0.00 cfs 0.000 af Outflow=27.81 cfs 2.388 af

Total Runoff Area = 18.118 ac Runoff Volume = 2.936 af Average Runoff Depth = 1.94"

Subcatchment 1: entry drive south

Runoff = 2.89 cfs @ 12.07 hrs, Volume= 0.177 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,730	98	bldg
9,333	98	road
2,160	98	driveway
17,169	74	>75% Grass cover, Good, HSG C
36,392	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.1		**Sheet Flow, 1a to 1b** Grass: Dense n= 0.240 P2= 2.40"
1.0	290	0.0550	4.8		**Shallow Concentrated Flow, 1b to 1c** Paved Kv= 20.3 fps
15.0	390	Total			

Subcatchment 2: entry drive north

Runoff = 3.38 cfs @ 12.18 hrs, Volume= 0.261 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,726	98	bldg
1,160	98	driveway
10,158	98	road
48,290	74	>75% Grass cover, Good, HSG C
67,334	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 2A TO B** Grass: Dense n= 0.240 P2= 2.40"
1.7	180	0.0120	1.8		**Shallow Concentrated Flow, 2B TO 2C** Unpaved Kv= 16.1 fps
0.7	185	0.0530	4.7		**Shallow Concentrated Flow, 2C TO 2D** Paved Kv= 20.3 fps
24.1	465	Total			

Subcatchment 3: thomas way east

Runoff = 3.96 cfs @ 12.24 hrs, Volume= 0.345 af, Depth> 1.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
10,595	98	bldg
3,140	98	driveway
9,119	98	road
22,501	74	grass good "C'
55,400	71	Meadow, non-grazed, HSG C
100,755	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 3A TO 3B** Grass: Dense n= 0.240 P2= 2.40"
6.2	600	0.0100	1.6		**Shallow Concentrated Flow, 3B TO 3C** Unpaved Kv= 16.1 fps
1.4	100	0.0200	1.2		**Sheet Flow, 3** Smooth surfaces n= 0.011 P2= 2.40"
29.3	800	Total			

Subcatchment 4: thomas way west

Runoff = 2.17 cfs @ 12.06 hrs, Volume= 0.130 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,630	98	bldg
2,060	98	driveway
5,155	98	road
11,988	74	>75% Grass cover, Good, HSG C
26,833	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.1		**Sheet Flow, 4A TO 4B** Grass: Dense n= 0.240 P2= 2.40"
2.0	240	0.0100	2.0		**Shallow Concentrated Flow, 4B TO 4C** Paved Kv= 20.3 fps
14.5	340	Total			

Subcatchment 5: center northeast

Runoff = 2.50 cfs @ 12.05 hrs, Volume= 0.143 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,700	98	bldg
2,400	98	driveway
4,740	98	road
16,840	74	>75% Grass cover, Good, HSG C
31,680	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.1		**Sheet Flow, 5A TO 5B** Grass: Dense n= 0.240 P2= 2.40"
0.2	20	0.0100	1.6		**Shallow Concentrated Flow, 5B TO 5C** Unpaved Kv= 16.1 fps
1.7	160	0.0100	1.6		**Shallow Concentrated Flow, 5C TO 5D** Unpaved Kv= 16.1 fps
13.3	280	Total			

Subcatchment 6: pump stat

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.041 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
1,275	98	bldg
2,800	74	>75% Grass cover, Good, HSG C
3,725	98	Road / driveway
7,800	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	60	0.0100	0.1		**Sheet Flow, 6A TO 6B** Grass: Dense n= 0.240 P2= 2.40"
1.1	130	0.0100	2.0		**Shallow Concentrated Flow, 6B TO 6C** Paved Kv= 20.3 fps
15.5	190	Total			

Subcatchment 7: matt corer

Runoff = 0.57 cfs @ 12.04 hrs, Volume= 0.033 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
1,952	74	>75% Grass cover, Good, HSG C
4,141	98	paved / bldg
6,093	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	60	0.0140	0.1		**Sheet Flow, 7A TO 7B** Grass: Dense n= 0.240 P2= 2.40"

Subcatchment 8: matt noth east

Runoff = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
4,795	98	bldg
2,160	98	driveway
8,244	98	road
13,916	74	>75% Grass cover, Good, HSG C
29,115	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 8A TO 8B** Grass: Dense n= 0.240 P2= 2.40"
0.4	70	0.0170	2.6		**Shallow Concentrated Flow, 8B TO 8C** Paved Kv= 20.3 fps
22.1	170	Total			

Subcatchment 8a: matt northwest

Runoff = 1.58 cfs @ 12.04 hrs, Volume= 0.090 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
5,195	98	bldg
1,800	98	driveway
3,630	98	road
6,606	74	>75% Grass cover, Good, HSG C
17,231	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	80	0.0300	0.1		**Sheet Flow, 8A TO 8B** Grass: Dense n= 0.240 P2= 2.40"
0.6	100	0.0200	2.9		**Shallow Concentrated Flow, 8AB TO 8AC** Paved Kv= 20.3 fps
12.3	180	Total			

Subcatchment 9: matt corner south

Runoff = 0.48 cfs @ 12.11 hrs, Volume= 0.034 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
2,433	74	>75% Grass cover, Good, HSG C
4,027	98	pavement / bldg
6,460	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5	100	0.0150	0.1		**Sheet Flow, 9A TO 9B** Grass: Dense n= 0.240 P2= 2.40"
0.5	130	0.0500	4.5		**Shallow Concentrated Flow, 9B TO 9C** Paved Kv= 20.3 fps
19.0	230	Total			

Subcatchment 10: matt west norht

Runoff = 1.37 cfs @ 12.07 hrs, Volume= 0.084 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
5,795	98	bldg
1,550	98	driveway
2,200	98	road
7,816	74	>75% Grass cover, Good, HSG C
17,361	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	80	0.0200	0.1		**Sheet Flow, 10A TO 10B** Grass: Dense n= 0.240 P2= 2.40"
1.4	170	0.0100	2.0		**Shallow Concentrated Flow, 10B TO 10C** Paved Kv= 20.3 fps
15.2	250	Total			

Subcatchment 11: south property

Runoff = 5.00 cfs @ 12.03 hrs, Volume= 0.263 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
9,663	98	bldg
2,700	98	driveway
8,981	98	road
43,671	74	>75% Grass cover, Good, HSG C
65,015	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1600	0.2		**Sheet Flow, 11A TO 11B** Grass: Dense n= 0.240 P2= 2.40"
1.2	115	0.0100	1.6		**Shallow Concentrated Flow, 11B TO 11C** Unpaved Kv= 16.1 fps
2.5	290	0.0090	1.9		**Shallow Concentrated Flow, 2C TO 2D** Paved Kv= 20.3 fps
10.9	505	Total			

Subcatchment 12: corner southeast

Runoff = 0.67 cfs @ 12.15 hrs, Volume= 0.056 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
8,007	98	road/ drive/bldg
400	74	>75% Grass cover, Good, HSG C
8,407	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 12A TO 12B** Grass: Dense n= 0.240 P2= 2.40"
1.6	190	0.0090	1.9		**Shallow Concentrated Flow, 12B TO 12C** Paved Kv= 20.3 fps
23.3	290	Total			

Subcatchment 13: matt center east

Runoff = 0.79 cfs @ 12.15 hrs, Volume= 0.060 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
4,165	74	>75% Grass cover, Good, HSG C
7,395	98	road/bldg
11,560	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 13A TO 13B** Grass: Dense n= 0.240 P2= 2.40"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow, 13B TO 13C** Paved Kv= 20.3 fps
22.3	170	Total			

Subcatchment 14: matt

Runoff = 0.62 cfs @ 12.15 hrs, Volume= 0.045 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
6,676	74	>75% Grass cover, Good, HSG C
4,140	98	road/bldg
10,816	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 14A TO 14B** Grass: Dense n= 0.240 P2= 2.40"
0.4	50	0.0100	2.0		**Shallow Concentrated Flow, 14B TO 14C** Paved Kv= 20.3 fps
22.1	150	Total			

Subcatchment 15: north south

Runoff = 2.32 cfs @ 12.00 hrs, Volume= 0.122 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
7,530	98	bldg
4,320	98	driveway
3,260	98	road
6,753	74	>75% Grass cover, Good, HSG C
21,863	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	60	0.0450	0.1		**Sheet Flow, 15A TO 15B** Grass: Dense n= 0.240 P2= 2.40"
1.4	170	0.0100	2.0		**Shallow Concentrated Flow, 15B TO 15C** Paved Kv= 20.3 fps
9.3	230	Total			

Subcatchment 16: southwest corner

Runoff = 0.72 cfs @ 12.69 hrs, Volume= 0.108 af, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
1,845	98	bldg
4,790	98	road
1,350	98	driveway
6,985	74	>75% Grass cover, Good, HSG C
23,000	65	Brush, Good, HSG C
37,970	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
62.3	100	0.0080	0.0		**Sheet Flow, 16A TO 16B** Woods: Dense underbrush n= 0.800 P2= 2.40"
0.9	130	0.0150	2.5		**Shallow Concentrated Flow, 16B TO 16C** Paved Kv= 20.3 fps
63.2	230	Total			

Subcatchment 17: north south east

Runoff = 1.42 cfs @ 12.10 hrs, Volume= 0.096 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
5,798	98	bldg
2,160	98	driveway
3,070	98	road
8,102	74	>75% Grass cover, Good, HSG C
19,130	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	75	0.0100	0.1		**Sheet Flow, 17A TO 17B** Grass: Dense n= 0.240 P2= 2.40"
1.1	135	0.0110	2.1		**Shallow Concentrated Flow, 17B TO 17C** Paved Kv= 20.3 fps
18.4	210	Total			

Subcatchment 18: south 2

Runoff = 2.13 cfs @ 12.32 hrs, Volume= 0.215 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
11,595	98	house
4,320	98	driveway
4,321	98	road
29,607	74	>75% Grass cover, Good, HSG C
49,843	84	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	100	0.0100	0.1		**Sheet Flow, 18A TO 18B** Woods: Light underbrush n= 0.400 P2= 2.40"
4.1	350	0.0050	1.4		**Shallow Concentrated Flow, 18B TO 18C** Paved Kv= 20.3 fps
36.8	450	Total			

Subcatchment 19: south1

Runoff = 2.22 cfs @ 12.16 hrs, Volume= 0.167 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
9,662	98	bldg
3,780	98	drive
3,090	98	road
20,428	74	>75% Grass cover, Good, HSG C
36,960	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0090	0.1		**Sheet Flow, 19A TO 19B** Grass: Dense n= 0.240 P2= 2.40"

Subcatchment 20: south-off

Runoff = 2.05 cfs @ 12.70 hrs, Volume= 0.326 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=4.10"

Area (sf)	CN	Description
180,622	65	Brush, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	100	0.0100	0.1		**Sheet Flow, 20a to 20b** Woods: Light underbrush n= 0.400 P2= 2.40"
28.3	600	0.0050	0.4		**Shallow Concentrated Flow, 20b to 20c** Woodland Kv= 5.0 fps
61.0	700	Total			

Pond cb1: cb1

Inflow Area = 0.835 ac, Inflow Depth > 2.54" for 10 YR event
Inflow = 2.89 cfs @ 12.07 hrs, Volume= 0.177 af
Outflow = 2.89 cfs @ 12.07 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min
Primary = 2.89 cfs @ 12.07 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.89' @ 12.07 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (775.7 - 775.7)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**15.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 316.48' S= 0.0260 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.84 cfs @ 12.07 hrs HW=317.88' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.84 cfs @ 4.3 fps)

Pond cb10: cb10

Inflow Area = 0.399 ac, Inflow Depth > 2.54" for 10 YR event
Inflow = 1.37 cfs @ 12.07 hrs, Volume= 0.084 af
Outflow = 1.37 cfs @ 12.07 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.07 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.93' @ 12.07 hrs
Flood Elev= 316.10'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (775.8 - 775.8)

Device	Routing	Invert	Outlet Devices
#1	Primary	312.30'	**12.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.78' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.35 cfs @ 12.07 hrs HW=312.92' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.35 cfs @ 3.8 fps)

Pond cb11: cb11

Inflow Area = 1.493 ac, Inflow Depth > 2.11" for 10 YR event
Inflow = 5.00 cfs @ 12.03 hrs, Volume= 0.263 af
Outflow = 5.00 cfs @ 12.03 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min
Primary = 5.00 cfs @ 12.03 hrs, Volume= 0.263 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 316.75' @ 12.03 hrs
Flood Elev= 319.30'
Plug-Flow detention time= 0.0 min calculated for 0.262 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	315.60'	**18.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 315.08' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=4.87 cfs @ 12.03 hrs HW=316.73' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.87 cfs @ 4.8 fps)

Pond cb12: cb12

Inflow Area = 1.686 ac, Inflow Depth > 2.27" for 10 YR event
Inflow = 5.52 cfs @ 12.03 hrs, Volume= 0.319 af
Outflow = 5.52 cfs @ 12.03 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.0 min
Primary = 5.52 cfs @ 12.03 hrs, Volume= 0.319 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 315.97' @ 12.03 hrs
Flood Elev= 319.30'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (778.6 - 778.6)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.83'	**19.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.75' S= 0.0513 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=5.39 cfs @ 12.03 hrs HW=315.95' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.39 cfs @ 3.6 fps)

Pond cb13: cb13

Inflow Area = 8.466 ac, Inflow Depth > 1.61" for 10 YR event
Inflow = 8.09 cfs @ 12.14 hrs, Volume= 1.139 af
Outflow = 8.09 cfs @ 12.14 hrs, Volume= 1.139 af, Atten= 0%, Lag= 0.0 min
Primary = 8.09 cfs @ 12.14 hrs, Volume= 1.139 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.46' @ 12.14 hrs
Flood Elev= 319.20'
Plug-Flow detention time= 0.0 min calculated for 1.135 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (810.4 - 810.4)

Device	Routing	Invert	Outlet Devices
#1	Primary	313.25'	**27.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.20' S= 0.0171 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=8.07 cfs @ 12.14 hrs HW=314.46' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 8.07 cfs @ 5.4 fps)

Pond cb14: cb`14

Inflow Area = 8.200 ac, Inflow Depth > 1.58" for 10 YR event
Inflow = 7.30 cfs @ 12.13 hrs, Volume= 1.079 af
Outflow = 7.30 cfs @ 12.13 hrs, Volume= 1.079 af, Atten= 0%, Lag= 0.0 min
Primary = 7.30 cfs @ 12.13 hrs, Volume= 1.079 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 315.73' @ 12.13 hrs
Flood Elev= 321.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (812.3 - 812.3)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.50'	**28.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 313.50' S= 0.0125 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=7.28 cfs @ 12.13 hrs HW=315.73' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.28 cfs @ 4.6 fps)

Pond cb15: cb15

Inflow Area = 7.952 ac, Inflow Depth > 1.56" for 10 YR event
Inflow = 6.70 cfs @ 12.12 hrs, Volume= 1.033 af
Outflow = 6.70 cfs @ 12.12 hrs, Volume= 1.033 af, Atten= 0%, Lag= 0.0 min
Primary = 6.70 cfs @ 12.12 hrs, Volume= 1.033 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 316.25' @ 12.12 hrs
Flood Elev= 321.70'
Plug-Flow detention time= 0.0 min calculated for 1.030 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**28.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 314.75' S= 0.0125 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=6.68 cfs @ 12.12 hrs HW=316.25' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.68 cfs @ 4.2 fps)

Pond cb16: cb16

Inflow Area = 0.872 ac, Inflow Depth > 1.48" for 10 YR event
Inflow = 0.72 cfs @ 12.69 hrs, Volume= 0.108 af
Outflow = 0.72 cfs @ 12.69 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Primary = 0.72 cfs @ 12.69 hrs, Volume= 0.108 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.75' @ 12.69 hrs
Flood Elev= 321.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.30'	**11.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 316.78' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=0.72 cfs @ 12.69 hrs HW=317.75' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.72 cfs @ 3.3 fps)

Pond cb17: cb17

Inflow Area = 6.578 ac, Inflow Depth > 1.47" for 10 YR event
Inflow = 5.75 cfs @ 12.21 hrs, Volume= 0.804 af
Outflow = 5.75 cfs @ 12.21 hrs, Volume= 0.804 af, Atten= 0%, Lag= 0.0 min
Primary = 5.75 cfs @ 12.21 hrs, Volume= 0.804 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.49' @ 12.21 hrs
Flood Elev= 322.20'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.43'	**23.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 315.20' S= 0.0186 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=5.74 cfs @ 12.21 hrs HW=318.49' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.74 cfs @ 3.5 fps)

Pond cb18: (new Pond)

Inflow Area = 6.139 ac, Inflow Depth > 1.38" for 10 YR event
Inflow = 4.76 cfs @ 12.28 hrs, Volume= 0.707 af
Outflow = 4.76 cfs @ 12.28 hrs, Volume= 0.707 af, Atten= 0%, Lag= 0.0 min
Primary = 4.76 cfs @ 12.28 hrs, Volume= 0.707 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 319.19' @ 12.28 hrs
Flood Elev= 322.20'
Plug-Flow detention time= 0.0 min calculated for 0.705 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (823.5 - 823.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	318.20'	**21.0" x 12.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 317.68' S= 0.0433 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=4.75 cfs @ 12.28 hrs HW=319.19' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.75 cfs @ 3.4 fps)

Pond cb19: cb19

Inflow Area = 4.995 ac, Inflow Depth > 1.18" for 10 YR event
Inflow = 2.76 cfs @ 12.21 hrs, Volume= 0.492 af
Outflow = 2.76 cfs @ 12.21 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min
Primary = 2.76 cfs @ 12.21 hrs, Volume= 0.492 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 320.29' @ 12.21 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (833.5 - 833.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	319.40'	**15.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 318.40' S= 0.0167 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.75 cfs @ 12.21 hrs HW=320.29' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.75 cfs @ 4.1 fps)

Pond cb2: cb2

Inflow Area = 2.381 ac, Inflow Depth > 2.20" for 10 YR event
Inflow = 5.85 cfs @ 12.11 hrs, Volume= 0.437 af
Outflow = 5.85 cfs @ 12.11 hrs, Volume= 0.437 af, Atten= 0%, Lag= 0.0 min
Primary = 5.85 cfs @ 12.11 hrs, Volume= 0.437 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.32' @ 12.11 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= 0.0 min (788.8 - 788.8)

Device	Routing	Invert	Outlet Devices
#1	Primary	316.23'	**22.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.75' S= 0.0747 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.80 cfs @ 12.11 hrs HW=317.32' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.80 cfs @ 3.6 fps)

Pond cb20: cb20

Inflow Area = 4.147 ac, Inflow Depth > 0.94" for 10 YR event
Inflow = 2.05 cfs @ 12.70 hrs, Volume= 0.326 af
Outflow = 2.05 cfs @ 12.70 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.0 min
Primary = 2.05 cfs @ 12.70 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 321.80' @ 12.70 hrs
Flood Elev= 324.00'
Plug-Flow detention time= 0.0 min calculated for 0.326 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	**12.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 318.40' S= 0.0433 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.05 cfs @ 12.70 hrs HW=321.80' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.05 cfs @ 3.0 fps)

Pond cb3: cb3

Inflow Area = 6.380 ac, Inflow Depth > 2.07" for 10 YR event
Inflow = 13.36 cfs @ 12.08 hrs, Volume= 1.101 af
Outflow = 13.36 cfs @ 12.08 hrs, Volume= 1.101 af, Atten= 0%, Lag= 0.0 min
Primary = 13.36 cfs @ 12.08 hrs, Volume= 1.101 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 313.37' @ 12.08 hrs
Flood Elev= 315.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (791.9 - 791.9)

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**24.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 310.98' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=13.24 cfs @ 12.08 hrs HW=313.36' (Free Discharge)
↑**1=Culvert** (Barrel Controls 13.24 cfs @ 5.7 fps)

Pond cb4: cb4

Inflow Area = 6.996 ac, Inflow Depth > 2.11" for 10 YR event
Inflow = 15.49 cfs @ 12.08 hrs, Volume= 1.232 af
Outflow = 15.49 cfs @ 12.08 hrs, Volume= 1.232 af, Atten= 0%, Lag= 0.0 min
Primary = 15.49 cfs @ 12.08 hrs, Volume= 1.232 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.21' @ 12.08 hrs
Flood Elev= 315.70'
Plug-Flow detention time= 0.0 min calculated for 1.232 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (790.1 - 790.1)

Device	Routing	Invert	Outlet Devices
#1	Primary	310.73'	**40.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 307.50' S= 0.0538 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=15.33 cfs @ 12.08 hrs HW=312.20' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 15.33 cfs @ 4.1 fps)

Pond cb5: cb5

Inflow Area = 0.727 ac, Inflow Depth > 2.36" for 10 YR event
Inflow = 2.50 cfs @ 12.05 hrs, Volume= 0.143 af
Outflow = 2.50 cfs @ 12.05 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
Primary = 2.50 cfs @ 12.05 hrs, Volume= 0.143 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 310.39' @ 12.05 hrs
Flood Elev= 313.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (779.8 - 779.8)

Device	Routing	Invert	Outlet Devices
#1	Primary	309.80'	**36.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 309.28' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.50 cfs @ 12.05 hrs HW=310.39' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.50 cfs @ 3.9 fps)

Pond cb6: cb6

Inflow Area = 17.271 ac, Inflow Depth > 1.91" for 10 YR event
Inflow = 29.80 cfs @ 12.07 hrs, Volume= 2.754 af
Outflow = 29.80 cfs @ 12.07 hrs, Volume= 2.754 af, Atten= 0%, Lag= 0.0 min
Primary = 29.80 cfs @ 12.07 hrs, Volume= 2.754 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 308.67' @ 12.07 hrs
Flood Elev= 313.70'
Plug-Flow detention time= 0.0 min calculated for 2.754 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	307.10'	**48.0" x 20.0' long Culvert X 2.00** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 306.80' S= 0.0150 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=29.33 cfs @ 12.07 hrs HW=308.65' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 29.33 cfs @ 4.8 fps)

Pond cb7: cb7

Inflow Area = 9.548 ac, Inflow Depth > 1.73" for 10 YR event
Inflow = 11.72 cfs @ 12.08 hrs, Volume= 1.379 af
Outflow = 11.72 cfs @ 12.08 hrs, Volume= 1.379 af, Atten= 0%, Lag= 0.0 min
Primary = 11.72 cfs @ 12.08 hrs, Volume= 1.379 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 310.80' @ 12.08 hrs
Flood Elev= 316.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (803.5 - 803.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	309.55'	**42.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 307.15' S= 0.0200 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=11.62 cfs @ 12.08 hrs HW=310.79' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.62 cfs @ 3.8 fps)

Pond cb8: cb8

Inflow Area = 0.668 ac, Inflow Depth > 2.53" for 10 YR event
Inflow = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af
Outflow = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min
Primary = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.30' @ 12.15 hrs
Flood Elev= 318.24'
Plug-Flow detention time= 0.0 min calculated for 0.141 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (781.3 - 781.3)

Device	Routing	Invert	Outlet Devices
#1	Primary	313.73'	**24.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 310.50' S= 0.0404 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.89 cfs @ 12.15 hrs HW=314.30' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.89 cfs @ 2.6 fps)

Pond cb8a: cb 8a

Inflow Area = 0.668 ac, Inflow Depth > 2.53" for 10 YR event
Inflow = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af
Outflow = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min
Primary = 1.90 cfs @ 12.15 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 315.06' @ 12.15 hrs
Flood Elev= 318.24'
Plug-Flow detention time= 0.0 min calculated for 0.141 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (781.3 - 781.3)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.30'	**15.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 313.98' S= 0.0160 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.89 cfs @ 12.15 hrs HW=315.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.89 cfs @ 3.5 fps)

Pond cb9: cb9

Inflow Area = 9.408 ac, Inflow Depth > 1.72" for 10 YR event
Inflow = 11.20 cfs @ 12.09 hrs, Volume= 1.346 af
Outflow = 11.20 cfs @ 12.09 hrs, Volume= 1.346 af, Atten= 0%, Lag= 0.0 min
Primary = 11.20 cfs @ 12.09 hrs, Volume= 1.346 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.07' @ 12.09 hrs
Flood Elev= 316.10'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (804.4 - 804.4)

Device	Routing	Invert	Outlet Devices
#1	Primary	310.78'	**36.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 309.80' S= 0.0490 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=11.13 cfs @ 12.09 hrs HW=312.06' (Free Discharge)
└**1=Culvert** (Inlet Controls 11.13 cfs @ 3.9 fps)

Pond pond: pond 1

Inflow Area = 18.118 ac, Inflow Depth > 1.94" for 10 YR event
Inflow = 31.98 cfs @ 12.08 hrs, Volume= 2.936 af
Outflow = 29.31 cfs @ 12.16 hrs, Volume= 2.401 af, Atten= 8%, Lag= 5.0 min
Primary = 29.31 cfs @ 12.16 hrs, Volume= 2.401 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 307.83' @ 12.16 hrs Surf.Area= 12,561 sf Storage= 29,943 cf
Plug-Flow detention time= 82.8 min calculated for 2.401 af (82% of inflow)
Center-of-Mass det. time= 31.0 min (826.2 - 795.2)

Volume	Invert	Avail.Storage	Storage Description
#1	304.00'	56,309 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 61,639 cf Overall - 5,329 cf Embedded = 56,309 cf
#2	304.00'	5,329 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) Inside #1
		61,639 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	5,125	405.0	0	0	5,125
305.00	6,327	432.0	5,715	5,715	6,971
306.00	7,459	454.0	6,885	12,601	8,585
307.00	9,216	548.0	8,322	20,923	16,097
308.00	13,301	654.0	11,196	32,119	26,253
309.00	14,560	689.0	13,926	46,045	30,054
310.00	16,651	702.0	15,594	61,639	31,652

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	1,531	167.0	0	0	1,531
305.00	1,956	183.0	1,739	1,739	2,010
306.00	2,505	207.0	2,225	3,964	2,780
306.50	2,962	227.0	1,365	5,329	3,479

Device	Routing	Invert	Outlet Devices
#1	Primary	308.70'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	305.00'	**4.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 305.50' S= -0.0125 '/' Cc= 0.900 n= 0.020
#3	Primary	307.20'	**18.00' W x 4.00' H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=29.01 cfs @ 12.16 hrs HW=307.83' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Culvert** (Outlet Controls 0.28 cfs @ 3.2 fps)
- **3=Orifice/Grate** (Orifice Controls 28.73 cfs @ 2.5 fps)

Pond pond 3: POND 2

Inflow Area = 18.118 ac, Inflow Depth > 1.59" for 10 YR event
Inflow = 29.31 cfs @ 12.16 hrs, Volume= 2.401 af
Outflow = 27.81 cfs @ 12.22 hrs, Volume= 2.388 af, Atten= 5%, Lag= 3.6 min
Primary = 27.81 cfs @ 12.22 hrs, Volume= 2.388 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 305.74' @ 12.22 hrs Surf.Area= 3,045 sf Storage= 7,146 cf
Plug-Flow detention time= 8.2 min calculated for 2.388 af (99% of inflow)
Center-of-Mass det. time= 6.3 min (832.5 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	302.00'	15,799 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
302.00	929	143.0	0	0	929
303.00	1,435	172.0	1,173	1,173	1,673
304.00	1,837	194.0	1,632	2,805	2,339
305.00	2,654	208.0	2,233	5,038	2,830
306.00	3,189	231.0	2,917	7,955	3,663
307.00	3,894	254.0	3,536	11,491	4,583
308.00	4,737	272.0	4,309	15,799	5,381

Device	Routing	Invert	Outlet Devices
#1	Primary	304.00'	**24.0" x 20.0' long Culvert X 2.00** CMP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 302.00' S= 0.1000 '/' Cc= 0.900 n= 0.020
#2	Secondary	306.20'	**20.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Primary	302.00'	**10.0" x 20.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 300.80' S= 0.0600 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=27.38 cfs @ 12.22 hrs HW=305.72' (Free Discharge)
└─**1=Culvert** (Inlet Controls 22.61 cfs @ 3.9 fps)
└─**3=Culvert** (Inlet Controls 4.77 cfs @ 8.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=302.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: entry drive south Runoff Area=36,392 sf Runoff Depth>4.04"
Flow Length=390' Tc=15.0 min CN=87 Runoff=4.50 cfs 0.282 af

Subcatchment 2: entry drive north Runoff Area=67,334 sf Runoff Depth>3.43"
Flow Length=465' Tc=24.1 min CN=81 Runoff=5.67 cfs 0.441 af

Subcatchment 3: thomas way east Runoff Area=100,755 sf Runoff Depth>3.13"
Flow Length=800' Tc=29.3 min CN=78 Runoff=6.92 cfs 0.603 af

Subcatchment 4: thomas way west Runoff Area=26,833 sf Runoff Depth>4.04"
Flow Length=340' Tc=14.5 min CN=87 Runoff=3.37 cfs 0.208 af

Subcatchment 5: center northeast Runoff Area=31,680 sf Runoff Depth>3.84"
Flow Length=280' Tc=13.3 min CN=85 Runoff=3.97 cfs 0.233 af

Subcatchment 6: pump stat Runoff Area=7,800 sf Runoff Depth>4.25"
Flow Length=190' Tc=15.5 min CN=89 Runoff=0.99 cfs 0.063 af

Subcatchment 7: matt corer Runoff Area=6,093 sf Runoff Depth>4.36"
Flow Length=60' Tc=12.6 min CN=90 Runoff=0.85 cfs 0.051 af

Subcatchment 8: matt noth east Runoff Area=29,115 sf Runoff Depth>4.04"
Flow Length=170' Tc=22.1 min CN=87 Runoff=2.96 cfs 0.225 af

Subcatchment 8a: matt northwest Runoff Area=17,231 sf Runoff Depth>4.25"
Flow Length=180' Tc=12.3 min CN=89 Runoff=2.40 cfs 0.140 af

Subcatchment 9: matt corner south Runoff Area=6,460 sf Runoff Depth>4.25"
Flow Length=230' Tc=19.0 min CN=89 Runoff=0.74 cfs 0.052 af

Subcatchment 10: matt west norht Runoff Area=17,361 sf Runoff Depth>4.04"
Flow Length=250' Tc=15.2 min CN=87 Runoff=2.13 cfs 0.134 af

Subcatchment 11: south property Runoff Area=65,015 sf Runoff Depth>3.54"
Flow Length=505' Tc=10.9 min CN=82 Runoff=8.18 cfs 0.440 af

Subcatchment 12: corner southeast Runoff Area=8,407 sf Runoff Depth>5.02"
Flow Length=290' Tc=23.3 min CN=97 Runoff=0.96 cfs 0.081 af

Subcatchment 13: matt center east Runoff Area=11,560 sf Runoff Depth>4.24"
Flow Length=170' Tc=22.3 min CN=89 Runoff=1.21 cfs 0.094 af

Subcatchment 14: matt Runoff Area=10,816 sf Runoff Depth>3.63"
Flow Length=150' Tc=22.1 min CN=83 Runoff=1.01 cfs 0.075 af

Subcatchment 15: north south Runoff Area=21,863 sf Runoff Depth>4.46"
Flow Length=230' Tc=9.3 min CN=91 Runoff=3.45 cfs 0.187 af

Subcatchment 16: southwest corner Runoff Area=37,970 sf Runoff Depth>2.72"
Flow Length=230' Tc=63.2 min CN=74 Runoff=1.34 cfs 0.198 af

Subcatchment 17: north south east Runoff Area=19,130 sf Runoff Depth>4.14"
Flow Length=210' Tc=18.4 min CN=88 Runoff=2.19 cfs 0.152 af

Subcatchment 18: south 2 Runoff Area=49,843 sf Runoff Depth>3.71"
Flow Length=450' Tc=36.8 min CN=84 Runoff=3.45 cfs 0.354 af

Subcatchment 19: south1 Runoff Area=36,960 sf Runoff Depth>3.83"
Flow Length=100' Tc=22.7 min CN=85 Runoff=3.55 cfs 0.271 af

Subcatchment 20: south-off Runoff Area=180,622 sf Runoff Depth>1.96"
Flow Length=700' Tc=61.0 min CN=65 Runoff=4.58 cfs 0.676 af

Pond cb1: cb1 Peak Elev=318.21' Inflow=4.50 cfs 0.282 af
15.0" x 20.0' Culvert Outflow=4.50 cfs 0.282 af

Pond cb10: cb10 Peak Elev=313.13' Inflow=2.13 cfs 0.134 af
12.0" x 20.0' Culvert Outflow=2.13 cfs 0.134 af

Pond cb11: cb11 Peak Elev=317.26' Inflow=8.18 cfs 0.440 af
18.0" x 20.0' Culvert Outflow=8.18 cfs 0.440 af

Pond cb12: cb12 Peak Elev=316.50' Inflow=8.92 cfs 0.521 af
19.0" x 60.0' Culvert Outflow=8.92 cfs 0.521 af

Pond cb13: cb13 Peak Elev=314.90' Inflow=13.57 cfs 2.005 af
27.0" x 120.0' Culvert Outflow=13.57 cfs 2.005 af

Pond cb14: cb`14 Peak Elev=316.18' Inflow=12.36 cfs 1.911 af
28.0" x 80.0' Culvert Outflow=12.36 cfs 1.911 af

Pond cb15: cb15 Peak Elev=316.71' Inflow=11.37 cfs 1.836 af
28.0" x 20.0' Culvert Outflow=11.37 cfs 1.836 af

Pond cb16: cb16 Peak Elev=317.95' Inflow=1.34 cfs 0.198 af
11.0" x 20.0' Culvert Outflow=1.34 cfs 0.198 af

Pond cb17: cb17 Peak Elev=318.92' Inflow=9.97 cfs 1.452 af
23.0" x 120.0' Culvert Outflow=9.97 cfs 1.452 af

Pond cb18: (new Pond) Peak Elev=319.64' Inflow=8.63 cfs 1.301 af
21.0" x 12.0' Culvert Outflow=8.63 cfs 1.301 af

Pond cb19: cb19 Peak Elev=320.91' Inflow=5.41 cfs 0.947 af
15.0" x 60.0' Culvert Outflow=5.41 cfs 0.947 af

Pond cb2: cb2 Peak Elev=317.72' Inflow=9.52 cfs 0.723 af
22.0" x 60.0' Culvert Outflow=9.52 cfs 0.723 af

Pond cb20: cb20 Peak Elev=322.97' Inflow=4.58 cfs 0.676 af
12.0" x 60.0' Culvert Outflow=4.58 cfs 0.676 af

Pond cb3: cb3 Peak Elev=314.64' Inflow=22.13 cfs 1.847 af
24.0" x 20.0' Culvert Outflow=22.13 cfs 1.847 af

Pond cb4: cb4 Peak Elev=312.70' Inflow=25.59 cfs 2.055 af
40.0" x 60.0' Culvert Outflow=25.59 cfs 2.055 af

Pond cb5: cb5 Peak Elev=310.55' Inflow=3.97 cfs 0.233 af
36.0" x 20.0' Culvert Outflow=3.97 cfs 0.233 af

Pond cb6: cb6 Peak Elev=309.16' Inflow=48.48 cfs 4.671 af
48.0" x 20.0' Culvert Outflow=48.48 cfs 4.671 af

Pond cb7: cb7 Peak Elev=311.17' Inflow=18.95 cfs 2.383 af
42.0" x 120.0' Culvert Outflow=18.95 cfs 2.383 af

Pond cb8: cb8 Peak Elev=314.45' Inflow=2.96 cfs 0.225 af
24.0" x 80.0' Culvert Outflow=2.96 cfs 0.225 af

Pond cb8a: cb 8a Peak Elev=315.30' Inflow=2.96 cfs 0.225 af
15.0" x 20.0' Culvert Outflow=2.96 cfs 0.225 af

Pond cb9: cb9 Peak Elev=312.47' Inflow=18.18 cfs 2.332 af
36.0" x 20.0' Culvert Outflow=18.18 cfs 2.332 af

Pond pond: pond 1 Peak Elev=308.10' Storage=33,478 cf Inflow=51.88 cfs 4.959 af
Outflow=49.78 cfs 4.419 af

Pond pond 3: POND 2 Peak Elev=306.56' Storage=9,842 cf Inflow=49.78 cfs 4.419 af
Primary=38.60 cfs 4.234 af Secondary=11.14 cfs 0.168 af Outflow=49.74 cfs 4.402 af

Total Runoff Area = 18.118 ac Runoff Volume = 4.959 af Average Runoff Depth = 3.28"

Subcatchment 1: entry drive south

Runoff = 4.50 cfs @ 12.06 hrs, Volume= 0.282 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
7,730	98	bldg
9,333	98	road
2,160	98	driveway
17,169	74	>75% Grass cover, Good, HSG C
36,392	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	100	0.0300	0.1		**Sheet Flow, 1a to 1b** Grass: Dense n= 0.240 P2= 2.40"
1.0	290	0.0550	4.8		**Shallow Concentrated Flow, 1b to 1c** Paved Kv= 20.3 fps
15.0	390	Total			

Subcatchment 2: entry drive north

Runoff = 5.67 cfs @ 12.17 hrs, Volume= 0.441 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
7,726	98	bldg
1,160	98	driveway
10,158	98	road
48,290	74	>75% Grass cover, Good, HSG C
67,334	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 2A TO B** Grass: Dense n= 0.240 P2= 2.40"
1.7	180	0.0120	1.8		**Shallow Concentrated Flow, 2B TO 2C** Unpaved Kv= 16.1 fps
0.7	185	0.0530	4.7		**Shallow Concentrated Flow, 2C TO 2D** Paved Kv= 20.3 fps
24.1	465	Total			

Subcatchment 3: thomas way east

Runoff = 6.92 cfs @ 12.23 hrs, Volume= 0.603 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
10,595	98	bldg
3,140	98	driveway
9,119	98	road
22,501	74	grass good "C'
55,400	71	Meadow, non-grazed, HSG C
100,755	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 3A TO 3B** Grass: Dense n= 0.240 P2= 2.40"
6.2	600	0.0100	1.6		**Shallow Concentrated Flow, 3B TO 3C** Unpaved Kv= 16.1 fps
1.4	100	0.0200	1.2		**Sheet Flow, 3** Smooth surfaces n= 0.011 P2= 2.40"
29.3	800	Total			

Subcatchment 4: thomas way west

Runoff = 3.37 cfs @ 12.06 hrs, Volume= 0.208 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
7,630	98	bldg
2,060	98	driveway
5,155	98	road
11,988	74	>75% Grass cover, Good, HSG C
26,833	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.5	100	0.0400	0.1		**Sheet Flow, 4A TO 4B** Grass: Dense n= 0.240 P2= 2.40"
2.0	240	0.0100	2.0		**Shallow Concentrated Flow, 4B TO 4C** Paved Kv= 20.3 fps
14.5	340	Total			

Subcatchment 5: center northeast

Runoff = 3.97 cfs @ 12.05 hrs, Volume= 0.233 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
7,700	98	bldg
2,400	98	driveway
4,740	98	road
16,840	74	>75% Grass cover, Good, HSG C
31,680	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0500	0.1		**Sheet Flow, 5A TO 5B** Grass: Dense n= 0.240 P2= 2.40"
0.2	20	0.0100	1.6		**Shallow Concentrated Flow, 5B TO 5C** Unpaved Kv= 16.1 fps
1.7	160	0.0100	1.6		**Shallow Concentrated Flow, 5C TO 5D** Unpaved Kv= 16.1 fps
13.3	280	Total			

Subcatchment 6: pump stat

Runoff = 0.99 cfs @ 12.07 hrs, Volume= 0.063 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
1,275	98	bldg
2,800	74	>75% Grass cover, Good, HSG C
3,725	98	Road / driveway
7,800	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	60	0.0100	0.1		**Sheet Flow, 6A TO 6B** Grass: Dense n= 0.240 P2= 2.40"
1.1	130	0.0100	2.0		**Shallow Concentrated Flow, 6B TO 6C** Paved Kv= 20.3 fps
15.5	190	Total			

Subcatchment 7: matt corer

Runoff = 0.85 cfs @ 12.04 hrs, Volume= 0.051 af, Depth> 4.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
1,952	74	>75% Grass cover, Good, HSG C
4,141	98	paved / bldg
6,093	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	60	0.0140	0.1		**Sheet Flow, 7A TO 7B** Grass: Dense n= 0.240 P2= 2.40"

Subcatchment 8: matt noth east

Runoff = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
4,795	98	bldg
2,160	98	driveway
8,244	98	road
13,916	74	>75% Grass cover, Good, HSG C
29,115	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 8A TO 8B** Grass: Dense n= 0.240 P2= 2.40"
0.4	70	0.0170	2.6		**Shallow Concentrated Flow, 8B TO 8C** Paved Kv= 20.3 fps
22.1	170	Total			

Subcatchment 8a: matt northwest

Runoff = 2.40 cfs @ 12.04 hrs, Volume= 0.140 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
5,195	98	bldg
1,800	98	driveway
3,630	98	road
6,606	74	>75% Grass cover, Good, HSG C
17,231	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	80	0.0300	0.1		**Sheet Flow, 8A TO 8B** Grass: Dense n= 0.240 P2= 2.40"
0.6	100	0.0200	2.9		**Shallow Concentrated Flow, 8AB TO 8AC** Paved Kv= 20.3 fps
12.3	180	Total			

Subcatchment 9: matt corner south

Runoff = 0.74 cfs @ 12.11 hrs, Volume= 0.052 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
2,433	74	>75% Grass cover, Good, HSG C
4,027	98	pavement / bldg
6,460	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.5	100	0.0150	0.1		**Sheet Flow, 9A TO 9B** Grass: Dense n= 0.240 P2= 2.40"
0.5	130	0.0500	4.5		**Shallow Concentrated Flow, 9B TO 9C** Paved Kv= 20.3 fps
19.0	230	Total			

Subcatchment 10: matt west norht

Runoff = 2.13 cfs @ 12.07 hrs, Volume= 0.134 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
5,795	98	bldg
1,550	98	driveway
2,200	98	road
7,816	74	>75% Grass cover, Good, HSG C
17,361	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	80	0.0200	0.1		**Sheet Flow, 10A TO 10B** Grass: Dense n= 0.240 P2= 2.40"
1.4	170	0.0100	2.0		**Shallow Concentrated Flow, 10B TO 10C** Paved Kv= 20.3 fps
15.2	250	Total			

Subcatchment 11: south property

Runoff = 8.18 cfs @ 12.02 hrs, Volume= 0.440 af, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
9,663	98	bldg
2,700	98	driveway
8,981	98	road
43,671	74	>75% Grass cover, Good, HSG C
65,015	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.1600	0.2		**Sheet Flow, 11A TO 11B** Grass: Dense n= 0.240 P2= 2.40"
1.2	115	0.0100	1.6		**Shallow Concentrated Flow, 11B TO 11C** Unpaved Kv= 16.1 fps
2.5	290	0.0090	1.9		**Shallow Concentrated Flow, 2C TO 2D** Paved Kv= 20.3 fps
10.9	505	Total			

Subcatchment 12: corner southeast

Runoff = 0.96 cfs @ 12.15 hrs, Volume= 0.081 af, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
8,007	98	road/ drive/bldg
400	74	>75% Grass cover, Good, HSG C
8,407	97	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 12A TO 12B** Grass: Dense n= 0.240 P2= 2.40"
1.6	190	0.0090	1.9		**Shallow Concentrated Flow, 12B TO 12C** Paved Kv= 20.3 fps
23.3	290	Total			

Subcatchment 13: matt center east

Runoff = 1.21 cfs @ 12.15 hrs, Volume= 0.094 af, Depth> 4.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
4,165	74	>75% Grass cover, Good, HSG C
7,395	98	road/bldg
11,560	89	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 13A TO 13B** Grass: Dense n= 0.240 P2= 2.40"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow, 13B TO 13C** Paved Kv= 20.3 fps
22.3	170	Total			

Subcatchment 14: matt

Runoff = 1.01 cfs @ 12.15 hrs, Volume= 0.075 af, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
6,676	74	>75% Grass cover, Good, HSG C
4,140	98	road/bldg
10,816	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	100	0.0100	0.1		**Sheet Flow, 14A TO 14B** Grass: Dense n= 0.240 P2= 2.40"
0.4	50	0.0100	2.0		**Shallow Concentrated Flow, 14B TO 14C** Paved Kv= 20.3 fps
22.1	150	Total			

Subcatchment 15: north south

Runoff = 3.45 cfs @ 12.00 hrs, Volume= 0.187 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
7,530	98	bldg
4,320	98	driveway
3,260	98	road
6,753	74	>75% Grass cover, Good, HSG C
21,863	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	60	0.0450	0.1		**Sheet Flow, 15A TO 15B** Grass: Dense n= 0.240 P2= 2.40"
1.4	170	0.0100	2.0		**Shallow Concentrated Flow, 15B TO 15C** Paved Kv= 20.3 fps
9.3	230	Total			

Subcatchment 16: southwest corner

Runoff = 1.34 cfs @ 12.68 hrs, Volume= 0.198 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
1,845	98	bldg
4,790	98	road
1,350	98	driveway
6,985	74	>75% Grass cover, Good, HSG C
23,000	65	Brush, Good, HSG C
37,970	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
62.3	100	0.0080	0.0		**Sheet Flow, 16A TO 16B** Woods: Dense underbrush n= 0.800 P2= 2.40"
0.9	130	0.0150	2.5		**Shallow Concentrated Flow, 16B TO 16C** Paved Kv= 20.3 fps
63.2	230	Total			

Subcatchment 17: north south east

Runoff = 2.19 cfs @ 12.10 hrs, Volume= 0.152 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
5,798	98	bldg
2,160	98	driveway
3,070	98	road
8,102	74	>75% Grass cover, Good, HSG C
19,130	88	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	75	0.0100	0.1		**Sheet Flow, 17A TO 17B** Grass: Dense n= 0.240 P2= 2.40"
1.1	135	0.0110	2.1		**Shallow Concentrated Flow, 17B TO 17C** Paved Kv= 20.3 fps
18.4	210	Total			

Subcatchment 18: south 2

Runoff = 3.45 cfs @ 12.32 hrs, Volume= 0.354 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
11,595	98	house
4,320	98	driveway
4,321	98	road
29,607	74	>75% Grass cover, Good, HSG C
49,843	84	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	100	0.0100	0.1		**Sheet Flow, 18A TO 18B** Woods: Light underbrush n= 0.400 P2= 2.40"
4.1	350	0.0050	1.4		**Shallow Concentrated Flow, 18B TO 18C** Paved Kv= 20.3 fps
36.8	450	Total			

Subcatchment 19: south1

Runoff = 3.55 cfs @ 12.15 hrs, Volume= 0.271 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
9,662	98	bldg
3,780	98	drive
3,090	98	road
20,428	74	>75% Grass cover, Good, HSG C
36,960	85	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	100	0.0090	0.1		**Sheet Flow, 19A TO 19B** Grass: Dense n= 0.240 P2= 2.40"

Subcatchment 20: south-off

Runoff = 4.58 cfs @ 12.67 hrs, Volume= 0.676 af, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=5.80"

Area (sf)	CN	Description
180,622	65	Brush, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.7	100	0.0100	0.1		**Sheet Flow, 20a to 20b** Woods: Light underbrush n= 0.400 P2= 2.40"
28.3	600	0.0050	0.4		**Shallow Concentrated Flow, 20b to 20c** Woodland Kv= 5.0 fps
61.0	700	Total			

Pond cb1: cb1

Inflow Area = 0.835 ac, Inflow Depth > 4.04" for 100 YR event
Inflow = 4.50 cfs @ 12.06 hrs, Volume= 0.282 af
Outflow = 4.50 cfs @ 12.06 hrs, Volume= 0.282 af, Atten= 0%, Lag= 0.0 min
Primary = 4.50 cfs @ 12.06 hrs, Volume= 0.282 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.21' @ 12.06 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.00'	**15.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 316.48' S= 0.0260 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.43 cfs @ 12.06 hrs HW=318.19' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.43 cfs @ 4.7 fps)

Pond cb10: cb10

Inflow Area =	0.399 ac,	Inflow Depth >	4.04"	for 100 YR event
Inflow =	2.13 cfs @	12.07 hrs, Volume=	0.134 af	
Outflow =	2.13 cfs @	12.07 hrs, Volume=	0.134 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.13 cfs @	12.07 hrs, Volume=	0.134 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 313.13' @ 12.07 hrs
Flood Elev= 316.10'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	312.30'	**12.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.78' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.10 cfs @ 12.07 hrs HW=313.12' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.10 cfs @ 4.1 fps)

Pond cb11: cb11

Inflow Area =	1.493 ac,	Inflow Depth >	3.54"	for 100 YR event
Inflow =	8.18 cfs @	12.02 hrs, Volume=	0.440 af	
Outflow =	8.18 cfs @	12.02 hrs, Volume=	0.440 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.18 cfs @	12.02 hrs, Volume=	0.440 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.26' @ 12.02 hrs
Flood Elev= 319.30'
Plug-Flow detention time= 0.0 min calculated for 0.439 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	315.60'	**18.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 315.08' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=7.98 cfs @ 12.02 hrs HW=317.23' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.98 cfs @ 4.5 fps)

Pond cb12: cb12

Inflow Area = 1.686 ac, Inflow Depth > 3.71" for 100 YR event
Inflow = 8.92 cfs @ 12.03 hrs, Volume= 0.521 af
Outflow = 8.92 cfs @ 12.03 hrs, Volume= 0.521 af, Atten= 0%, Lag= 0.0 min
Primary = 8.92 cfs @ 12.03 hrs, Volume= 0.521 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 316.50' @ 12.03 hrs
Flood Elev= 319.30'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.83'	**19.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.75' S= 0.0513 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=8.70 cfs @ 12.03 hrs HW=316.46' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.70 cfs @ 4.4 fps)

Pond cb13: cb13

Inflow Area = 8.466 ac, Inflow Depth > 2.84" for 100 YR event
Inflow = 13.57 cfs @ 12.16 hrs, Volume= 2.005 af
Outflow = 13.57 cfs @ 12.16 hrs, Volume= 2.005 af, Atten= 0%, Lag= 0.0 min
Primary = 13.57 cfs @ 12.16 hrs, Volume= 2.005 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.90' @ 12.16 hrs
Flood Elev= 319.20'
Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= 0.0 min (802.7 - 802.7)

Device	Routing	Invert	Outlet Devices
#1	Primary	313.25'	**27.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.20' S= 0.0171 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=13.55 cfs @ 12.16 hrs HW=314.90' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 13.55 cfs @ 6.1 fps)

Pond cb14: cb`14

Inflow Area = 8.200 ac, Inflow Depth > 2.80" for 100 YR event
Inflow = 12.36 cfs @ 12.16 hrs, Volume= 1.911 af
Outflow = 12.36 cfs @ 12.16 hrs, Volume= 1.911 af, Atten= 0%, Lag= 0.0 min
Primary = 12.36 cfs @ 12.16 hrs, Volume= 1.911 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 316.18' @ 12.16 hrs
Flood Elev= 321.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (804.5 - 804.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.50'	**28.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 313.50' S= 0.0125 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=12.34 cfs @ 12.16 hrs HW=316.18' (Free Discharge)
1=Culvert (Barrel Controls 12.34 cfs @ 5.3 fps)

Pond cb15: cb15

Inflow Area = 7.952 ac, Inflow Depth > 2.77" for 100 YR event
Inflow = 11.37 cfs @ 12.18 hrs, Volume= 1.836 af
Outflow = 11.37 cfs @ 12.18 hrs, Volume= 1.836 af, Atten= 0%, Lag= 0.0 min
Primary = 11.37 cfs @ 12.18 hrs, Volume= 1.836 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 316.71' @ 12.18 hrs
Flood Elev= 321.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	315.00'	**28.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 314.75' S= 0.0125 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=11.35 cfs @ 12.18 hrs HW=316.70' (Free Discharge)
1=Culvert (Barrel Controls 11.35 cfs @ 4.7 fps)

Pond cb16: cb16

Inflow Area = 0.872 ac, Inflow Depth > 2.72" for 100 YR event
Inflow = 1.34 cfs @ 12.68 hrs, Volume= 0.198 af
Outflow = 1.34 cfs @ 12.68 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 12.68 hrs, Volume= 0.198 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.95' @ 12.68 hrs
Flood Elev= 321.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (829.7 - 829.7)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.30'	**11.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 316.78' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=1.34 cfs @ 12.68 hrs HW=317.95' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.34 cfs @ 3.8 fps)

Pond cb17: cb17

Inflow Area =	6.578 ac,	Inflow Depth >	2.65"	for 100 YR event
Inflow =	9.97 cfs @	12.22 hrs, Volume=	1.452 af	
Outflow =	9.97 cfs @	12.22 hrs, Volume=	1.452 af,	Atten= 0%, Lag= 0.0 min
Primary =	9.97 cfs @	12.22 hrs, Volume=	1.452 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.92' @ 12.22 hrs
Flood Elev= 322.20'
Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= 0.0 min (809.3 - 809.3)

Device	Routing	Invert	Outlet Devices
#1	Primary	317.43'	**23.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 315.20' S= 0.0186 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=9.93 cfs @ 12.22 hrs HW=318.91' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.93 cfs @ 4.1 fps)

Pond cb18: (new Pond)

Inflow Area =	6.139 ac,	Inflow Depth >	2.54"	for 100 YR event
Inflow =	8.63 cfs @	12.31 hrs, Volume=	1.301 af	
Outflow =	8.63 cfs @	12.31 hrs, Volume=	1.301 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.63 cfs @	12.31 hrs, Volume=	1.301 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 319.64' @ 12.31 hrs
Flood Elev= 322.20'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (814.4 - 814.4)

Device	Routing	Invert	Outlet Devices
#1	Primary	318.20'	**21.0" x 12.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 317.68' S= 0.0433 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=8.62 cfs @ 12.31 hrs HW=319.64' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 8.62 cfs @ 5.5 fps)

Pond cb19: cb19

Inflow Area = 4.995 ac, Inflow Depth > 2.27" for 100 YR event
Inflow = 5.41 cfs @ 12.56 hrs, Volume= 0.947 af
Outflow = 5.41 cfs @ 12.56 hrs, Volume= 0.947 af, Atten= 0%, Lag= 0.0 min
Primary = 5.41 cfs @ 12.56 hrs, Volume= 0.947 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 320.91' @ 12.56 hrs
Flood Elev= 322.70'
Plug-Flow detention time= 0.0 min calculated for 0.947 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (823.7 - 823.7)

Device	Routing	Invert	Outlet Devices
#1	Primary	319.40'	**15.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 318.40' S= 0.0167 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=5.40 cfs @ 12.56 hrs HW=320.90' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 5.40 cfs @ 4.6 fps)

Pond cb2: cb2

Inflow Area = 2.381 ac, Inflow Depth > 3.64" for 100 YR event
Inflow = 9.52 cfs @ 12.11 hrs, Volume= 0.723 af
Outflow = 9.52 cfs @ 12.11 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.0 min
Primary = 9.52 cfs @ 12.11 hrs, Volume= 0.723 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.72' @ 12.11 hrs
Flood Elev= 322.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (777.9 - 777.9)

Device	Routing	Invert	Outlet Devices
#1	Primary	316.23'	**22.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 311.75' S= 0.0747 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=9.44 cfs @ 12.11 hrs HW=317.71' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.44 cfs @ 4.1 fps)

Pond cb20: cb20

Inflow Area = 4.147 ac, Inflow Depth > 1.96" for 100 YR event
Inflow = 4.58 cfs @ 12.67 hrs, Volume= 0.676 af
Outflow = 4.58 cfs @ 12.67 hrs, Volume= 0.676 af, Atten= 0%, Lag= 0.0 min
Primary = 4.58 cfs @ 12.67 hrs, Volume= 0.676 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 322.97' @ 12.67 hrs
Flood Elev= 324.00'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	**12.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 318.40' S= 0.0433 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=4.57 cfs @ 12.67 hrs HW=322.96' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.57 cfs @ 5.8 fps)

Pond cb3: cb3

Inflow Area =	6.380 ac,	Inflow Depth >	3.47"	for	100 YR event
Inflow =	22.13 cfs @	12.08 hrs,	Volume=	1.847 af	
Outflow =	22.13 cfs @	12.08 hrs,	Volume=	1.847 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.13 cfs @	12.08 hrs,	Volume=	1.847 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.64' @ 12.08 hrs
Flood Elev= 315.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	311.50'	**24.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 310.98' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=21.94 cfs @ 12.08 hrs HW=314.60' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 21.94 cfs @ 7.0 fps)

Pond cb4: cb4

Inflow Area =	6.996 ac,	Inflow Depth >	3.52"	for	100 YR event
Inflow =	25.59 cfs @	12.07 hrs,	Volume=	2.055 af	
Outflow =	25.59 cfs @	12.07 hrs,	Volume=	2.055 af,	Atten= 0%, Lag= 0.0 min
Primary =	25.59 cfs @	12.07 hrs,	Volume=	2.055 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.70' @ 12.07 hrs
Flood Elev= 315.70'
Plug-Flow detention time= 0.0 min calculated for 2.048 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	310.73'	**40.0" x 60.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 307.50' S= 0.0538 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=25.21 cfs @ 12.07 hrs HW=312.68' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 25.21 cfs @ 4.8 fps)

Pond cb5: cb5

Inflow Area = 0.727 ac, Inflow Depth > 3.84" for 100 YR event
Inflow = 3.97 cfs @ 12.05 hrs, Volume= 0.233 af
Outflow = 3.97 cfs @ 12.05 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min
Primary = 3.97 cfs @ 12.05 hrs, Volume= 0.233 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 310.55' @ 12.05 hrs
Flood Elev= 313.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	309.80'	**36.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 309.28' S= 0.0260 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=3.95 cfs @ 12.05 hrs HW=310.55' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.95 cfs @ 4.3 fps)

Pond cb6: cb6

Inflow Area = 17.271 ac, Inflow Depth > 3.25" for 100 YR event
Inflow = 48.48 cfs @ 12.07 hrs, Volume= 4.671 af
Outflow = 48.48 cfs @ 12.07 hrs, Volume= 4.671 af, Atten= 0%, Lag= 0.0 min
Primary = 48.48 cfs @ 12.07 hrs, Volume= 4.671 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.16' @ 12.07 hrs
Flood Elev= 313.70'
Plug-Flow detention time= 0.0 min calculated for 4.671 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (787.5 - 787.5)

Device	Routing	Invert	Outlet Devices
#1	Primary	307.10'	**48.0" x 20.0' long Culvert X 2.00** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 306.80' S= 0.0150 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=47.76 cfs @ 12.07 hrs HW=309.14' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 47.76 cfs @ 5.4 fps)

Pond cb7: cb7

Inflow Area = 9.548 ac, Inflow Depth > 3.00" for 100 YR event
Inflow = 18.95 cfs @ 12.09 hrs, Volume= 2.383 af
Outflow = 18.95 cfs @ 12.09 hrs, Volume= 2.383 af, Atten= 0%, Lag= 0.0 min
Primary = 18.95 cfs @ 12.09 hrs, Volume= 2.383 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.17' @ 12.09 hrs
Flood Elev= 316.70'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (796.0 - 796.0)

Device	Routing	Invert	Outlet Devices
#1	Primary	309.55'	**42.0" x 120.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 307.15' S= 0.0200 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=18.83 cfs @ 12.09 hrs HW=311.17' (Free Discharge)
↑**1=Culvert** (Inlet Controls 18.83 cfs @ 4.3 fps)

Pond cb8: cb8

Inflow Area = 0.668 ac, Inflow Depth > 4.04" for 100 YR event
Inflow = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af
Outflow = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min
Primary = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.45' @ 12.14 hrs
Flood Elev= 318.24'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (770.6 - 770.6)

Device	Routing	Invert	Outlet Devices
#1	Primary	313.73'	**24.0" x 80.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 310.50' S= 0.0404 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.95 cfs @ 12.14 hrs HW=314.45' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.95 cfs @ 2.9 fps)

Pond cb8a: cb 8a

Inflow Area = 0.668 ac, Inflow Depth > 4.04" for 100 YR event
Inflow = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af
Outflow = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min
Primary = 2.96 cfs @ 12.14 hrs, Volume= 0.225 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 315.30' @ 12.14 hrs
Flood Elev= 318.24'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	314.30'	**15.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 313.98' S= 0.0160 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=2.95 cfs @ 12.14 hrs HW=315.29' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.95 cfs @ 3.9 fps)

Pond cb9: cb9

Inflow Area = 9.408 ac, Inflow Depth > 2.97" for 100 YR event
Inflow = 18.18 cfs @ 12.09 hrs, Volume= 2.332 af
Outflow = 18.18 cfs @ 12.09 hrs, Volume= 2.332 af, Atten= 0%, Lag= 0.0 min
Primary = 18.18 cfs @ 12.09 hrs, Volume= 2.332 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 312.47' @ 12.09 hrs
Flood Elev= 316.10'
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Device	Routing	Invert	Outlet Devices
#1	Primary	310.78'	**36.0" x 20.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 309.80' S= 0.0490 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=18.11 cfs @ 12.09 hrs HW=312.47' (Free Discharge)
└**1=Culvert** (Inlet Controls 18.11 cfs @ 4.4 fps)

Pond pond: pond 1

Inflow Area = 18.118 ac, Inflow Depth > 3.28" for 100 YR event
Inflow = 51.88 cfs @ 12.08 hrs, Volume= 4.959 af
Outflow = 49.78 cfs @ 12.13 hrs, Volume= 4.419 af, Atten= 4%, Lag= 3.1 min
Primary = 49.78 cfs @ 12.13 hrs, Volume= 4.419 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 308.10' @ 12.13 hrs Surf.Area= 13,426 sf Storage= 33,478 cf
Plug-Flow detention time= 59.6 min calculated for 4.404 af (89% of inflow)
Center-of-Mass det. time= 24.5 min (810.8 - 786.4)

Volume	Invert	Avail.Storage	Storage Description
#1	304.00'	56,309 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 61,639 cf Overall - 5,329 cf Embedded = 56,309 cf
#2	304.00'	5,329 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) Inside #1
		61,639 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	5,125	405.0	0	0	5,125
305.00	6,327	432.0	5,715	5,715	6,971
306.00	7,459	454.0	6,885	12,601	8,585
307.00	9,216	548.0	8,322	20,923	16,097
308.00	13,301	654.0	11,196	32,119	26,253
309.00	14,560	689.0	13,926	46,045	30,054
310.00	16,651	702.0	15,594	61,639	31,652

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
304.00	1,531	167.0	0	0	1,531
305.00	1,956	183.0	1,739	1,739	2,010
306.00	2,505	207.0	2,225	3,964	2,780
306.50	2,962	227.0	1,365	5,329	3,479

Device	Routing	Invert	Outlet Devices
#1	Primary	308.70'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	305.00'	**4.0" x 40.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 305.50' S= -0.0125 '/' Cc= 0.900 n= 0.020
#3	Primary	307.20'	**18.00' W x 4.00' H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=49.37 cfs @ 12.13 hrs HW=308.10' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Culvert** (Outlet Controls 0.30 cfs @ 3.4 fps)
- **3=Orifice/Grate** (Orifice Controls 49.07 cfs @ 3.0 fps)

Pond pond 3: POND 2

Inflow Area = 18.118 ac, Inflow Depth > 2.93" for 100 YR event
Inflow = 49.78 cfs @ 12.13 hrs, Volume= 4.419 af
Outflow = 49.74 cfs @ 12.15 hrs, Volume= 4.402 af, Atten= 0%, Lag= 1.4 min
Primary = 38.60 cfs @ 12.15 hrs, Volume= 4.234 af
Secondary = 11.14 cfs @ 12.15 hrs, Volume= 0.168 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 306.56' @ 12.15 hrs Surf.Area= 3,574 sf Storage= 9,842 cf
Plug-Flow detention time= 6.9 min calculated for 4.402 af (100% of inflow)
Center-of-Mass det. time= 5.5 min (816.3 - 810.8)

Volume	Invert	Avail.Storage	Storage Description
#1	302.00'	15,799 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
302.00	929	143.0	0	0	929
303.00	1,435	172.0	1,173	1,173	1,673
304.00	1,837	194.0	1,632	2,805	2,339
305.00	2,654	208.0	2,233	5,038	2,830
306.00	3,189	231.0	2,917	7,955	3,663
307.00	3,894	254.0	3,536	11,491	4,583
308.00	4,737	272.0	4,309	15,799	5,381

Device	Routing	Invert	Outlet Devices
#1	Primary	304.00'	**24.0" x 20.0' long Culvert X 2.00** CMP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 302.00' S= 0.1000 '/' Cc= 0.900 n= 0.020
#2	Secondary	306.20'	**20.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Primary	302.00'	**10.0" x 20.0' long Culvert** CMP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 300.80' S= 0.0600 '/' Cc= 0.900 n= 0.020

Primary OutFlow Max=38.58 cfs @ 12.15 hrs HW=306.56' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 33.31 cfs @ 5.3 fps)
└—**3=Culvert** (Barrel Controls 5.27 cfs @ 9.7 fps)

Secondary OutFlow Max=11.08 cfs @ 12.15 hrs HW=306.56' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 11.08 cfs @ 1.6 fps)