Stormwater Pollution Prevention Plan

For

850 Route 28 LLC

A Proposed

Commercial Redevelopment Project

Situate: 850 Route 28
Town of Kingston
Ulster County, New York

Prepared by:

Medenbach and Eggers
Civil Engineering and Land Surveying, PC
Stone Ridge, New York
Ph: 845-687-0047

January 31, 2019
REVISED May 14, 2019

Barry Medenbach P.E.
NY Lic. No. 60142

Table of Contents:

Sections without page numbers are not provided and in progress.

Appendices:

SECTION 1: General Project Information

1.1 Project Summary:

The project sponsor proposes two buildings for steel and pre-cast concrete fabrication situated on an existing 110.6 acre parcel and is situated off NYS Route 28, near Onteora Lake in the Town of Kingston. Since the project parcel is a previously stone quarry and construction will be taking place within the previously disturbed area the project constitutes as a redevelopment project. Therefore, the project will follow the design criteria outlined in Chapter 9 of the New York State Stormwater Design Manual. Quantity and quality controls will be provided meeting the requirements of section 9.2.1 of the New York State Stormwater Management Design Manual. The SPDES coverage will be under the general permit. The project site consists mainly of exposed rock with partial revegetation. The exposed rock and broken stone rubble are remaining from the once active mine. The site also has approximately 2.3 acres of ponds and the site currently has one existing building, parking/storage area and a long driveway on approximately 3.5 acres. The existing quarry site is to be reclaimed to place two 120,000 SF steel and pre-cast fabrication buildings with storage and parking yards.

Stormwater management for the project will include temporary erosion controls during construction as well as permanent post construction controls, such as dry swales, pipe culverts, and water quality basins. The stormwater management practices will mitigate the impacts of the proposed development for runoff quantity and quality improvements to remove pollutants from the stormwater before it is discharges to the existing ponds on site or over property line to neighboring properties. None of the ponds have any strongly defined outlets. The existing ponds are infiltrating during normal conditions. The existing ponds were constructed as settling ponds during the former mining use. During heavy rains the ponds overflow. Downstream of the ponds a stream forms from the water exiting the existing ponds. The stream flows offsite toward a four foot diameter concrete pipe under NYS route 28. The NYSDEC recognize the string of existing ponds as a protected stream (Tributary of Praymaher Brook C[T] H-171-25-6) and are connected. A NYSDEC Stream Disturbance Permit will be required for the discharges from the two proposed Water Quality Basins to Tributary 6 of the Praymaher Brook. The Praymaher brook is a tributary to the Esopus Creek. The Esopus Creek, Middle, and minor tribs are classified as an impaired waterbody in Appendix E of the NYSDEC SPDES General Permit for Stormwater Discharges(Permit No. GP-0-15-002). The SWPPP has included the second required inspection per week in Section 5.1 and faster soil stabilization requirements in Section 2.3.

The site currently has approximately 26 acres of impervious cover between the existing driveway, existing exposed bedrock, existing building and existing parking/storage areas. There is also another approximately 31 acres of semi-impervious cover that was previously been disturbed from mining on the site, but has been re-vegetation over the past 20 years as described in the Wetland Mapping and Affected Area-Habitat Assessment report performed by H2H Associates, LLC. The Wetland Mapping and Affected Area-Habitat Assessment report can be found in the Appendix. A

large portion of the current impervious cover is being treated by the existing ponds onsite. The majority of the existing driveway and the existing building stormwater drains toward the DEC Wetland KW-3 and which connects to Onteora Lake. The majority of the proposed building, storage, and parking areas stormwater drains to the existing ponds onsite. The remaining portion of the property's stormwater drains offsite has no proposed improvements. The access driveway is 20 to 24 feet wide in good condition and does not need any improvements.

The proposed project is for two 120,000 SF steel and pre-cast fabrication buildings. The sides of the each building have 100 ft wide paved area for truck passage and storage for materials. The ends of the buildings have 170 ft wide paved area for truck movements in and out of the proposed buildings. Each building and paved area has 9.2 acres of impervious cover. The total site will have approximately 19 acres of new roads, buildings, and parking areas. The proposed site will have a total impervious cover of approximately 31.5 acres. Each building and parking area is proposed to be surrounded by dry swales. The dry swales then discharge into two proposed water quality basins prior to discharging to the existing ponds onsite. The water quality basins will be used for water quality volume and to control the flow of water from the site. When all proposed practices are constructed they will reduce all post-development peak flows from the site to less than the peak pre-development rates. Therefore there will be no negative impacts on downstream waters or adjacent lands from the proposed development.

Design point #1 is discharge toward the NYS DEC Wetland KW-3. Design point #2 is where water passes under NYS Route 28. Design points #3, #4, and #5 cross the property line at the south-east portion of the property. The Design point #6 is where the existing ponds discharge across the property line. Design point #7 is over the property line at the north-east corner of the property. Design point #8 is water from the property going to the existing pond A. See the Pre-Development Drainage area map for locations of Design points.The HydroCAD calculations can be found in Appendix H. The reductions of water flow at each of these design points are indicated in the following tables:

Design Point #1 (NYS DEC Wetland KW-3)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	23.8	23.8	0%
10 Year	56.7	56.7	0%
100 Year	107.2	107.2	0%

Design Point #2 (Water to culvert under NYS Route 28)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	73.4	49.1	-33%
10 Year	206.8	151.0	-27%
100 Year	385.1	276.3	-28%

Design Point #3 (Crossing Southern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	2.4	2.4	0%
10 Year	5.8	5.8	0%
100 Year	11.1	11.1	0%

Design Point #4 (Crossing Northern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	4.4	4.4	0%
10 Year	12.2	12.2	0%
100 Year	24.6	24.6	0%

Design Point #5 (Crossing Northern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	16.2	16.2	0%
10 Year	44.3	44.3	0%
100 Year	89.8	89.8	0%

Design Point #6 (Water Crossing property line toward NYS Route 28)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	77.5	51.3	-34%
10 Year	190.8	137.0	-28%
100 Year	353.2	246.8	-30%

Design Point #7 (Crossing Northern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	17.2	12.0	-30%
10 Year	42.1	28.5	-32%
100 Year	80.6	54.0	-33%

Design Point #8 (Discharge going to Pond A)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	7.5	1.7	-77%
10 Year	18.0	3.8	-78%
100 Year	34.0	7.0	-79%

1.2 Contact Information/Responsible Parties:

SWPPP Contact/Prepared by:

Medenbach & Eggers, Civil Engineering and Land Surveying, P.C.
Barry Medenbach, PE
4305 US Highway 209
Stone Ridge, NY 12484
P: 845-687-0047
F: 845-687-4783
E-mail: Barry@mecels.com

Owner/Operator(s):

P:
F:
E-mail:

Project Manager(s) or Site Supervisor(s): (To be filled in before construction)

Company or Organization:
Contact Name:
P:
F:
E:

Emergency 24-Hour Contact:

Company or Organization:

P:

Subcontractor(s)*:

Company or Organization:
Contact Name:
Address:
City, State, Zip:
P:
F:

*Insert additional subcontractor contacts below as needed

1.3 Existing Soils, Slopes, Vegetation and Drainage Patterns:

The majority of the property has been disturbed by mining activities and has no soil or has little pour draining native soil left. A large portion of the quarry is still open stone. There are also several high walls from the mining activity. Approximately 31 acres of the disturbed property has been partially revegetated with trees growing through rock rubble. There is an existing road that runs along the west side of the property which borders the NYS DEC Wetland KW-3. There is also an existing 6,500 SF storage building with a large parking area around the existing building. There is also an existing septic system to the north-west of the existing building. The part of the property that has not been disturbed is mainly wooded. The slopes on the site range from moderate to extremely steep, but the majority of the site is a moderate slope. The property currently has 8 basic design points that cross property line. The drainage point #1 it toward the NYS DEC Wetland KW-3. Design point #2 is where water passes under NYS Route 28. Design points #3, #4, and #5 cross the property line at the south-east portion of the property. The Design point #6 is where the existing ponds discharge across the property line. Design point #7 is over the property line at the north-east corner of the property. Design point #8 is water from the property going to the existing pond A. See the Pre-Development Drainage area map for locations of Design points.

The site has mainly two separate soil classifications as described in the attached USDA-NRCS soil survey. The chart below shows the percentage of each hydrological soil group, the soil survey can be found attached.

Percentage of Each Hydrological Soil Group (HsG) at the MCBS DG project site				
A	B	C	D	Bare Rock - Quarry
0%	0%	34%	11%	55%

1.4 Changes in Cover Estimates:

The following are estimates of the proposed development.

Total project area:	110.6 acres
Approximate construction site area to be disturbed:	±37 acres
Percentage impervious area before construction:	23.5%
Percentage impervious area after construction:	28.3%
Future Impervious Cover:	6 acres
Conservation of natural areas:	0 acres

1.5 Receiving Waters:

The runoff from the majority of the proposed development will flow into several existing ponds within the site. When water leaves the ponds it flows across the property line in an unnamed stream that goes through a 4' diameter culvert and discharges into the NYS DEC wetland KW-3. The western portion of the property discharges directly to the NYS DEC Wetland KW-3 which connects to Onteora Lake. Water from NYS DEC wetland KW-3 and Onteora Lake ultimately discharges to a tributary of the Esopus Creek. Design points #4,#5 and #7 discharges water to the north which ultimately flows to the Saw Kill and then to the Esopus Creek. The stormwater discharges

1.6 Sensitive Site Features to Be Protected:

The only know sensitive site features are some possible Army Corps of Engineers (ACOE) ponds at the center at the site. There is to be no disturbance to these ponds.

1.7 Potential Sources of Pollution:

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing
- Grading and site excavation
- Vehicle tracking
- Topsoil stripping and stockpiling
- Landscaping/stabilization operations

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Re-fueling activities
- Minor equipment maintenance
- Sanitary facilities
- Materials storage of general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.

- General construction activities — paving, concrete pouring building construction
- Concrete Washout Areas

1.8 Historic Preservation:

In the New York State Office of Parks, Recreation and Historic Preservation's opinion that the project will have no impact on archaeological and/or historic resources. Please see the OPRHP Clearance Letter in Appendix D.

1.9 Long-Term Operation and Maintenance:

The Long Term Operation and Maintenance of the proposed projects permanent post construction controls, such as dry swales, pipe culverts, and water quality basins are the responsibility of the owner and operator as specified in Section 1.2. The owner/operator is to provide the Town of Kingston with a Maintenance agreement for the long term operation and maintenance of the post construction stormwater controls. Long-term Maintenance and Operation Guidelines are provided in Appendix G. The Dry Swales and Ponds on site shall be marked with a sign as required per Chapter 3, Section 3.5 of the 2015 NYSDEC Stormwater Management Design Manual.

SECTION 2: Erosion and Sediment Control BMPS

2.1 Minimizing Disturbed Areas, Protecting Natural Features and Soil:

Site disturbance and clearing will be kept within the limits of disturbance as indicated on the subdivision plan. Any sensitive areas such as vegetation areas to be preserved will be clearly flagged prior to disturbance. All contractors will be instructed not to disturb these sensitive areas.

All topsoil from disturbed areas will be striped prior to grading and stockpiled as indicated on the soil erosion control plans. Topsoil will be re-spread on disturbed areas after final grading is complete. A temporary seed will be applied to the topsoil during storage to prevent erosion.

2.2 Temporary BMPS:

The following temporary erosion and sediment controls will be used during construction. The locations and detailed designs of each practice is located within the accompanying construction drawings.

- Silt Fence: to capture sediment in lateral sheet flow leaving disturbed areas
- Stabilized Construction Entrances: to capture sediment from vehicles leaving site
- Temporary Seeding: to stabilize inactive areas or soil stock piles
- Check Dams: to help reduce scour within a channel.

2.3 Sequence of Construction Activity:

The following sequence of soil erosion and sediment control measures shall be followed during the duration of the project. In addition the guidelines in Section 3 of this report shall be implemented where applicable.

1. **Schedule a pre-construction meeting:** a pre-construction meeting shall be held to review plans and inspect site with town officials including the Town Engineer, Contractors, and Project Managers at least one week prior to the start of construction, equipment staging and site disturbance.

2. **Establish Limits of Clearing and Sensitive Areas to be Protected:** Prior to any construction and/or demolition activities commence all vegetation to be persevered shall be protected. In addition the property boundaries and/or limits of clearing shall be clearly marked. A pre-construction meeting shall be held prior to any land disturbance or grading to review plans and inspect site.

3. **Construct Stabilized Access to Site:** Install the stabilized construction entrance prior to passing the existing ponds to the existing open quarry area in order to provide access for construction traffic on and off the site.

4. **Establish Perimeter Controls and Sediment Barriers:** Silt fences will be installed along the perimeters of the limit of disturbance and around any topsoil stockpiles. Silt fences will be installed as per the detail on accompanying plans. Locations of installation are indicated on the soil erosion and sediment control plans for initial clearing and grading of the site.

5. **Land Clearing and Rough Grading:** Land Clearing and Rough Grading: Begin demolition and clearing activities as per plans. The ground surface shall be cleared of all trees, stumps, brush, weeds, roots, matted leaves, small structures, debris, and any other unsuitable material, except as otherwise directed by the engineer. Material accumulated by clearing as described above shall be disposed of by the contractor in a manner satisfactory to the engineer. After clearing and demolition all topsoil shall be stripped and stockpiled for use in final grading as indicated on plans. Excess topsoil not required for final grading may be removed from the site. Rock excavation is to start on the North side of the site and to move south by advancing an east/west trending excavation face. The sedimentation basins (water quality basins) shall be installed prior to the rock removal beginning. The sedimentation basins shall be inspected weekly to check for sediment build up. The permanent drainage conveyance system shall be installed after all the rock has been removed. Establish temporary vegetation on any areas with soil which will not be disturbed for a period 7 days or more. Parking and driveway areas may be stabilized with road base material or bare rock. The water qulality basins shall be cleared of all sediment after each phase of construction is completed.

6. **Soil Stabilization:** In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within (7) days from the date the current

7. **Building Construction:** During the building construction maintain erosion controls.

8. **Landscaping and Final Stabilization:** Place topsoil as indicated and stabilize with grass or landscaping.

9. **Final Inspection and Removal of Temporary BMPS:** Perform final inspection of site to ensure all disturbed areas are stabilized. If all disturbed areas are stabilized temporary erosion control measures shall be removed.

SECTION 3: Good Housekeeping BMPS

3.1 General Construction Equipment and Material Storage Guidelines:

- Construction equipment and maintenance materials will be stored at a centrally located staging area when not in use around the site. Any smaller hand tools or equipment will be stored here in weather proof containers or covered when not in use. The staging area will consist of a temporary gravel pad and all concentrated stormwater runoff will be diverted away from or around the pad.

- Large building materials such as framing material may be stored in the staging area. Such materials will be elevated on wood blocks to minimize contact with runoff.

- The storage areas shall be inspected on a weekly basis and after each storm event. Storage areas will be kept clean and well organized to minimize contamination of stormwater runoff.

3.2 General Construction Waste Management Guidelines:

- All waste building and construction waste materials will be collected and disposed of in trash dumpsters located in a central staging area. Dumpsters will be placed away from stormwater conveyances and drains, and meet all local and state solid-waste management regulations. Only trash and construction debris from the site will be deposited in the dumpsters. All personnel working on the jobsite will be instructed regarding the correct procedure for disposal of trash and construction debris. The individual who manages day-to-day site operations will be responsible for seeing that these practices are followed.

- All dumpsters will be inspected on a weekly basis and after large storm events to ensure no debris are entering stormwater runoff.

- Dumpsters will be emptied as needed and no trash will be stored outside a dumpster if it is full.

- All dumpsters will be removed from the site immediately after all waste generating construction activities are complete.

3.3 Hazardous and Sanitary Waste Management Guidelines:

- All hazardous waste materials such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed designated hazardous material storage area(s). Secondary

containment will be provided for hazardous materials in these areas in the form of spill pallets.

- All hazardous materials will be disposed of in accordance with local, state and federal regulations. All personnel will be instructed regarding the correct procedure for disposing off hazardous waste. The individual who manages day-to-day site operations will be responsible for seeing that these practices are followed.

- All storage areas will be kept clean, inspected weekly and after storm events, have ample cleanup supplies in the event of a spill, material safety data sheets and the contact numbers of appropriate emergency spill response personnel shall be posted in the construction office.

- If necessary, sanitary facilities will be provided at the site in the form of portable toilets. Toilets will be located away from concentrated stormwater flows and checked daily for leakage. All sanitary waste generated from the toilets will be disposed of offsite in accordance with local laws and regulations.

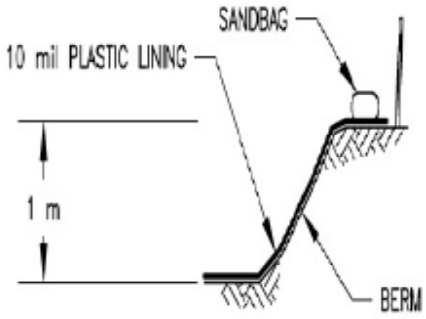
3.4 On-Site Equipment Fueling and Maintenance Guidelines:

- Several types of vehicles and equipment will be used on-site throughout the project, including graders, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes, drilling rigs etc. All major equipment/vehicle fueling and maintenance will be performed on-site at the existing garage. A small pickup bed fuel tank will be kept on-site in the combined staging area. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets in accordance with Section 3.3. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance.

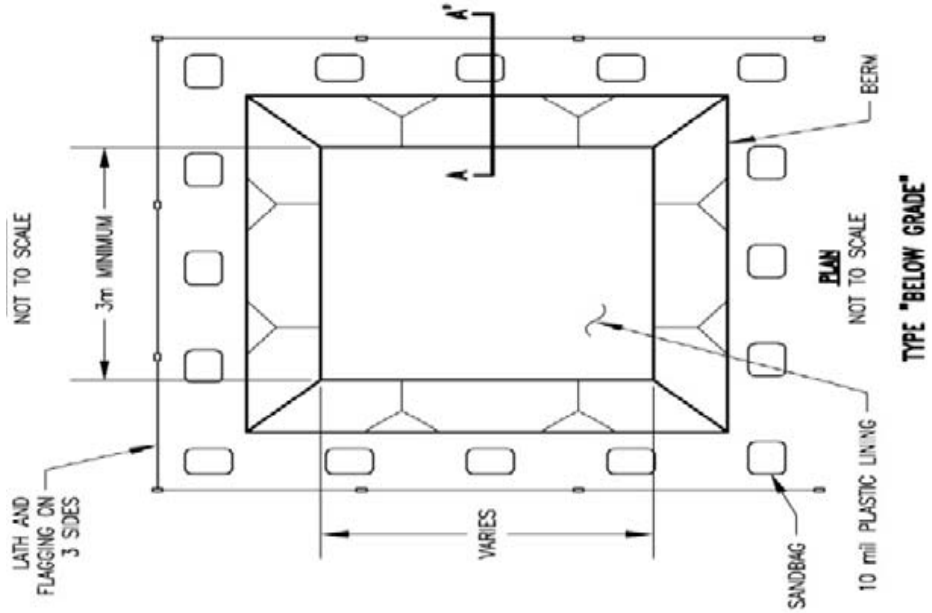
- Equipment/vehicle storage areas and fuel tanks will be inspected weekly and after storm events. Vehicles and equipment will be inspected on each day of use. Leaks will be repaired immediately, or the problem vehicle(s) or equipment will be removed from the project site. Ample supplies of spill-cleanup materials will be kept on-site to immediately clean up any spill.

3.5 Concrete Washouts:

- Designated temporary, below ground concrete washout facilities will be constructed as shown below. Washouts will be centrally located at the discretion of the individuals who manage day to day construction activities. Washouts shall have a minimum length and width of 10 feet but must have sufficient volume to contain all liquid concrete wastes generated from washout operations. The washout areas will be lined with plastic sheeting at least 10 mils thick and free of any holes or tears. Signs will be posted marking the location of the washout areas.



Section A-A



Washout Plan View

- Temporary concrete washout facilities will be located a minimum of (50 feet) from storm drain inlets.

- The washout areas will be inspected daily to ensure that all concrete washing is being discharged into the washout area, no leaks or tears are present, and to identify when concrete wastes need to be removed. The washout areas will be cleaned out once the area is filled to 75 percent of the holding capacity. Once the area's holding capacity has been reached the concrete wastes will be allowed to harden, the concrete will be broken up, removed, and disposed in accordance with local regulations. The plastic sheeting will be replaced if tears occur during removal of concrete wastes from the washout area.

SECTION 4: Post-Construction BMPS

4.1 Post-Development Drainage Improvements and Mitigation:

To mitigate all of the potential stormwater impacts of the project a drainage study has been preformed and a stormwater pollution prevention plan has been prepared in accordance with the New York State Stormwater Management Design Manual (NYSSMDM), SPDES general permit for stormwater discharges GP-0-15-002. Post-development drainage calculations are included in Appendix H. All nodes have the prefix 2-x with descriptions of each sub catchment provided in the calculations. A detailed work sheet is included in Appendix H showing the location of all post development nodes.

When complete the proposed drainage system and re-development will reduce peak runoff rates to less than pre-development levels. The proposed drainage improvements will also reduce pollutant levels in the runoff though several proposed treatment practices. The following sections give a detailed description of the proposed drainage system and on-site mitigations.

4.1.1 Peak Runoff Rate Reduction:

To mitigate the impacts of increased runoff rates after development the project will use dry swales, and water quality basin practices to reduce post-development runoff rates to less than pre-development rates. As required by the NYSSMDM the proposed drainage system will provide the required, overbank flood protection, and extreme storm protection.

We utilized Dry Swales (O-1), and two water quality basins(pocket ponds) to capture water and release it gradually.

To meet overbank flood protection and extreme storm protection requirements the proposed drainage improvements will provide extended detention and release post-development runoff for the 10 and 100 year storms at less than pre-development rates.

When the proposed practices are constructed it will reduce all post-development peak flows from the proposed developed site to less than pre-development rates. Therefore there will be no negative impacts on downstream waters or adjacent lands caused by increased peak flow rates. A detailed description of each practice to be used is provided in section 4.4 Post Development BMP’s.

4.1.2 Pre and Post-development Runoff Rate Comparison:

The tables below show the change in pre and post-development total runoff rates. Runoff rates are calculated in HydroCAD at each of the eight discharge points indicated on the pre and post development maps.

Design Point #1 (NYS DEC Wetland KW-3)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	23.8	23.8	0%
10 Year	56.7	56.7	0%
100 Year	107.2	107.2	0%

Design Point #2 (Water to culvert under NYS Route 28)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	73.4	48.5	-34%
10 Year	206.8	151.0	-27%
100 Year	385.1	276.3	-28%

Design Point #3 (Crossing Southern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	2.4	2.4	0%
10 Year	5.8	5.8	0%
100 Year	11.1	11.1	0%

Design Point #4 (Crossing Northern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	4.4	4.4	0%
10 Year	12.2	12.2	0%
100 Year	24.6	24.6	0%

Design Point #5 (Crossing Northern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	16.2	16.2	0%
10 Year	44.3	44.3	0%
100 Year	89.8	89.8	0%

Design Point #6 (Water Crossing property line toward NYS Route 28)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	77.5	50.8	-34%
10 Year	190.8	137.0	-28%
100 Year	353.2	246.8	-30%

Design Point #7 (Crossing Northern Property line)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	17.2	12.0	-30%
10 Year	42.1	28.5	-32%
100 Year	80.6	54.0	-33%

Design Point #8 (Discharge going to Pond A)			
Storm	**Pre-development (cfs)**	**Post-development (cfs)**	**% Change**
1 Year	7.5	1.7	-77%
10 Year	18.0	3.8	-78%
100 Year	34.0	7.0	-79%

4.1.3 Runoff Calculation Methodology:

Drainage analyses performed for the 1, 10 and 100 year design storms used the Runoff Curve Method as developed by the Soil Conservation Service (SCS), with peak discharge rates, hydrographs, and routing analyses generated using HydroCAD based upon the SCS TR-20 method. Curve numbers and times of concentration were determined using methodology in the SCS Technical Release 55. These calculations are detailed in Appendix H. Curve numbers were selected from soil type and ground cover which were determined from infield inspections and USGS Soil report. The rain fall depths used in the HydroCAD calculations was taken off the Isohyet maps in Section 4 of the 2015 New York State Stormwater Design Manual.

4.2 Runoff Reduction and Water Quality Volumes:

To mitigate the impacts of pollutants in stormwater from the proposed project swales, dry swales and two water quality basins will be used to treat stormwater from the project and remove pollutants before they are discharged into existing ponds. According to section 9.2 of the NYSSMDM the proposed project is a construction project that includes both new development and redevelopment activities and requires treatment of 25% of the existing, disturbed impervious area and full treatment for all of the new development. We are proposing to treat 100% of the Water Quality Volume (WQv) and minimum required Runoff Reduction Volume (RRv) for the new development portion of the project. We are also proposing to treat over 4 times the required Water Quality Volume of the existing disturbed area.

The new development portion of the project has is approximately 6.6 acres of the proposed disturbed site. The other approximate 30.4 acres to be disturbed do not require any runoff reduction per the section 9.2 of the 2015 NYSSSMDM. The 30.4 acres area has been previously disturbed during the rock mining on the site. The RRv for the 6.6 acres is calculated as a percentage of the required WQv. The percentage depends on the sites soils Hydraulic conductivity classification. See Table 3.5 Runoff Reduction Capacity for standard SMPs in the NYSSMDM. The proposed site has limited soil to no soil. Dry swales are proposed around and in between the two buildings sites.

The Dry Swales will provide the required runoff reduction prior to discharging into Water Quality Basin #1 and Water Quality Basin #2. The dry swales RRVs was calculated using 20% of the required WQv toward the RRv.

The Water Quality Volume is being treated by using dry swales and the two stormwater ponds. A detailed description of each practice and their treatment methods is provided in the following section. Below is a table with the required and provided RRv and WQv.

Runoff Reduction Volume and Water Quality Volume			
Required WQv (cubic feet)	**Provided Storage of WQV (cubic feet)**	**Required Runoff Reduction Volume (cubic feet)**	**Provided Runoff Reduction Volume (cubic feet)**
61,350	±201,700	3,962	7,745

4.3 Channel Protection Volume:

Channel protection volume is the 24 hour extended detention of post-developed 1-year, 24-hour storm event; remaining after runoff reduction. According to Section 9.2 of the NYSSMDM, channel protection for redevelopment activities is not required. The proposed project is a redevelopment project and does not increase discharge of stormwater off the property.

4.4 Post-Development BMP's:

4.4.1 Dry Swale :

- Feasibility: Dry swales (0-1) will be used to treat the runoff throughout the project site. The swale was selected for the project because the dry swales can provide runoff reduction and water quality volume.

- Conveyance: The dry swale has been designed to handle storms up to the 10-year while providing a minimum of 6" of free board. The swale will have a maximum side slope of 3:1 and typically be 12 inches in depth. Runoff will be conveyed to the swale as sheet flow or as shallow concentrated flow.

- Pretreatment: The majority of runoff will enter the swales as lateral sheet flow and be pretreated by grass filter strip and gravel check dams.

- Treatment: To meet water quality requirements the dry swales will capture and infiltrate the required water quality volume through the swale floor. Treated runoff with absorb into the sub soils or discharge over a rip rap berm. The following table shows the required and provided water quality storage and for each of the dry swales proposed for the project. The table also shows the runoff reduction volume. Calculated water quality volume is the available storage in the swale

below the crest of the overflow. Calculations for determining the required water quality volume are included in Appendix H.

- Landscaping: All swales will be seeded with a permanent grass seed when complete.

- Maintenance: Grass within the dry swales will be mowed as needed during the growing season to maintain a height of 4 to 6 inches. Sediment removal will be performed when the swales capacity has decreased by 25%.

- Treatment: To meet water quality requirements the dry swales will capture and hold the water quality volume in the swale. See appendix H.1 for the water quality volume and runoff reduction volume provided by the dry swales. Calculated water quality volume is the available storage in the swale below the crest of the overflow.

4.4.2 Stormwater Pond

- General Description: Two ponds are proposed to provide water quality treatment for the proposed construction of impervious area. The pond was selected for use due to the size of the post-development watersheds. To meet overbank flood protection and extreme storm protection requirements the pond will provide extended detention and release post-development runoff for the 10 and 100 year storms at less than pre-development rates. The pond will accomplish this through detaining the runoff and releasing it through an outlet structure designed to release the stormwater gradually over a period of time.

- Practice Feasibility: As mentioned before the pond was selected for use due to the size of the post-development watersheds which will discharge into it. The stormwater pond will be lined with a clay liner capable of holding water. Each pond will have an aquatic bench and a safety bench on any uphill side of the pond. The following table provides a summary of the watershed area for the proposed ponds.

Pond Drainage Areas		
Water Quality Basin (Type)	**Suggested Contributing Drainage Area (Per NYSSMDM)**	**Actual Drainage Area**
WQB #1 (P-3)	25 Ac.	17.4 Ac.
WQB #2 (P-3)	25 Ac.	22.3 Ac.

- All proposed stormwater ponds will be located outside of jurisdictional waters and onsite wetlands.

- Conveyance: The pond has been designed to have a bench on either side. The internal flow path between the forebay and the ponds drainage structure is 1.5 times the width of the pond or greater.

- Inlet Protection: Inlet protection for the pond will be provided in the form of a forebay for the point where concentrated flow enters the pond. The inlets into the forebay will be stabilized with rip-rap.

- Outfall Protection: The outfall point from the proposed pond will be stabilized with rip-rap energy dissipaters and all culvert outfalls will have flared end sections or headwalls.

- Pretreatment: Pretreatment of concentrated flow into the pond will be provided in the form of a forebay. The forebay will be a minimum of four feet deep and be separated from the mircopool by and earthen weir. The forebay the inflow point has been sized to contain a minimum of 10% of the required water quality volume.

- Minimum Water Quality Volume: Runoff entering the pond will be treated through settling and biological uptake of pollutants. The table below indicates the required and provided water quality volume for the water quality basins. The provided water quality volume is the volume below the low flow orifice and volume between the low flow orifice and overflow riser for extended detention. The NYSSMDM only allows for 50% of WQV to come from extended detention.

Treatment Volumes

Water Quality Basin (Type)	Required WQv (cubic feet)	Provided WQv (cubic feet)	% WQv In Permanent Pool (Required)	% WQv In Extended Detention (Required)
WQB #1 (P-3)	52,190	81,920	40,960 (50% Min.)	40,960 (50% Max.)
WQB #2 (P-3)	58,114	81,096	40,548 (50% Min.)	40,548 (50% Max.)
Total WQV:	110,304	163,016	81,508	81,508

- Pond Benches: All permanent pools 4 feet or greater in depth will have an Aquatic bench extending 10-15 feet outward from the permanent pool. Then the slope above the aquatic bench is proposed to be 4(H) to 1(V). Therefore the pond is exempt from needing a safety bench. However, the ponds are designed to have an access road on the uphill side that will act as a safety bench between the pond and proposed slope above the ponds.

- Landscaping Plan: When complete the pond will be seeded with a mix of wetland species to promote a diverse habitat.

- Pond Maintenance: Long term maintenance schedules for the ponds have been provided.

SECTION 5: Inspections

5.1 Site Inspection Frequency:

The owner or operator shall have a qualified inspector conduct site inspections in conformance with the following requirements.

- When soil disturbances are on going inspections shall be conducted by a qualified professional at least two (2) inspections every seven (7) calendar days.

- When soil disturbance activities have been temporarily suspended (winter shutdown etc.) and temporary stabilization measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator must notify the NYS DEC Regional Office in writing prior to reducing the inspection frequency.

- For sites where the soil disturbance activities have been shut down with partial project completion, the qualified inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completion of the project portion are in place and constructed in accordance with the SWPPP. The owner or operator shall notify the NYS DEC Regional Office in writing prior to the shutdown. If soil disturbance is not resumed within 2 years from the shutdown date the owner operator shall have the qualified inspector perform a final inspection to certify all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the “Final Stabilization” and “Post-Construction Stormwater Management Practice” certification statements on the Notice of Termination. The completed Notice of Termination shall be submitted to NYS DEC.

5.2 Site Inspection Reports:

The qualified inspector shall prepare an inspection report subsequent to each and every inspection. All Inspection reports must be signed by the qualified inspector. At a minimum, the inspection report shall include and/or address the following:

1. Date and time of inspection;

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

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

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

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

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

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

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

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

(See Appendix B for Inspection Forms)

5.3 Corrective Actions:

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

(See Appendix C for Corrective Action Log)

SECTION 6: Reporting and Retention of Records

6.1 Record Keeping:

The following documents shall be retained for a period of five (5) years from the date the site achieves final stabilization:

1. Notice of Intent
2. Notice of Intent Acknowledgment Letter
3. SWPPP
4. MS4 SWPPP Acceptance Form
5. Reports and inspections generated during implementation of the plan
6. Notice of Termination

SECTION 7: Stabilization

7.1 Final Stabilization:

Permanent seeding will be applied immediately after the final design grades are achieved on portions of the site but no later than 14 days after construction activities have permanently ceased. Construction debris, trash and temporary BMPs (including silt fences, material storage areas, sanitary toilets, and inlet protection etc.) will also be removed and any areas disturbed during removal will be seeded immediately.

Seedbed Preparation:

1. In areas where disturbance results in subsoil being the final grade surface, topsoil will be spread over the finished area at minimum depth of 2 to 6 inches.
2. The seedbed will be free of large clods, rocks, woody debris and other objectionable materials.
3. Fertilizer and lime will be applied to the seedbed according to the manufacturer's recommendations or soil tests.
4. The top layer of soil will be loosened to a depth of 3–5 inches by raking, tilling, disking or other suitable means.

See accompanying plans for seed and application rates.

SECTION 8: Certifications

- **Operators Certification**

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

Name (please print): _____

Title _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

- **Qualified Professional's Credentials & Certification**

" I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): _____

Title _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

- **Contractors Certification**

" 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"

Name (please print): _____

Title _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

Appendix A

Pre-Construction Meeting Documents and Inspection

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name_____
Permit No._____ **Date of Authorization**_____
Name of Operator _____
Prime Contractor _____

a. Preamble to Site Assessment and Inspections -The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, 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 (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] 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. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).
2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.
3 "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.

b. Pre-construction Site Assessment Checklist

(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA
[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA
[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA
[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA
[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA
[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA
[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

Appendix B

Weekly Construction Inspection Reports

Weekly Stormwater Construction Site Inspection Report

General Information			
Project Name			
NPDES Tracking No.		**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: ❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ❑Yes ❑No **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:			
Have any discharges occurred since the last inspection? ❑Yes ❑No **If yes, describe:**			
Are there any discharges at the time of inspection? ❑Yes ❑No **If yes, describe:**			

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		❑Yes ❑No	❑Yes ❑No	
2		❑Yes ❑No	❑Yes ❑No	
3		❑Yes ❑No	❑Yes ❑No	
4		❑Yes ❑No	❑Yes ❑No	
5		❑Yes ❑No	❑Yes ❑No	
6		❑Yes ❑No	❑Yes ❑No	
7		❑Yes ❑No	❑Yes ❑No	
8		❑Yes ❑No	❑Yes ❑No	
9		❑Yes ❑No	❑Yes ❑No	
10		❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
11		❑Yes ❑No	❑Yes ❑No	
12		❑Yes ❑No	❑Yes ❑No	
13		❑Yes ❑No	❑Yes ❑No	
14		❑Yes ❑No	❑Yes ❑No	
15		❑Yes ❑No	❑Yes ❑No	
16		❑Yes ❑No	❑Yes ❑No	
17		❑Yes ❑No	❑Yes ❑No	
18		❑Yes ❑No	❑Yes ❑No	
19		❑Yes ❑No	❑Yes ❑No	
20		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco,	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
	concrete) available, clearly marked, and maintained?			
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature:_____ **Date:**_____

CONSTRUCTION DURATION INSPECTION

SITE PLAN/SKETCH

Inspector (print name)	**Date of Inspection**
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Appendix C

Corrective Action Log

Corrective Action Log

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

Appendix D

1. **Notice of Intent**
2. **Letter of Acknowledgment**
3. **Permit**
4. **OPRHP Clearance Letter**

Appendix D.1

Notice of Intent

0644089821

NOTICE OF INTENT

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

NYR _____ (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

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 prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
850 Route 28 LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
AURINGER

Owner/Operator Contact Person First Name
TOM

Owner/Operator Mailing Address
180 MEISTER BLVD

City
FREEPORT

State
NY

Zip
11520-

Phone (Owner/Operator)
6467732172

Fax (Owner/Operator)
- -

Email (Owner/Operator)
tom@uscraneriggingllc.com

FED TAX ID
- (not required for individuals)

Project Site Information

Project/Site Name
850 ROURT 28

Street Address (NOT P.O. BOX)
850 ROUTE 28

Side of Street
● **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
TOWN OF KINGSTON

State: NY
Zip:
County: ULSTER
DEC Region: 3

Name of Nearest Cross Street
WAUGHKONK ROAD

Distance to Nearest Cross Street (Feet)
2000

Project In Relation to Cross Street
● **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel
38.4-1-36.100

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 576507

Y Coordinates (Northing): 4664477884488

2. What is the nature of this construction project?

○ **New Construction**

● **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ● INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME — Number of Lots
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ● INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
1101.06.6	37.307.0	26.206.0	3.83.8

5. Do you plan to disturb more than 5 acres of soil at any one time? ● **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
%	%	34%	11%

7. Is this a phased project? ● **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 07/01/2019 - **End Date** 05/01/2022

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Tributary of the Esopus Creek

NYS DEC Wetland

9a. Type of waterbody identified in Question 9?

- ● Wetland / State Jurisdiction On Site (Answer 9b)
- ● Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ● Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ● Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ● **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ● **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ● **Yes** ○ **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ● Yes ○ No ○ Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?

New York State Department of
Transportation

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ Yes ● No ○ Unknown

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ Yes ● No

19. Is this property owned by a state authority, state agency, federal government or local government? ○ Yes ● No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ Yes ● No

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ● Yes ○ No

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ● Yes ○ No
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ● Yes ○ No

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer
Medenbach & Eggers

Contact Name (Last, Space, First)
Medenbach Barry

Mailing Address
4305 US Highway 209

City
Stone Ridge

State Zip
NY 12484 5620

Phone
8456870407047

Fax
8456877783

Email
BARRY@MECELS.COM

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name
BARRY

MI
C

Last Name
MEDENBACH

Signature

Date
/ /

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ● Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ● Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ● Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ● Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ● Vegetating Waterways

Permanent Structural

- ● Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ● Land Grading
- ● Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ● Riprap Slope Protection
- ● Rock Outlet Protection
- ● Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ● **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

1.411414 **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

7738089822

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)		and/or	
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
○ Stormwater Planter (RR-7)			
○ Rain Barrel/Cistern (RR-8)			
○ Porous Pavement (RR-9)			
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
○ Underground Infiltration System (I-4)			
○ Bioretention (F-5)			
● Dry Swale (O-1)			3.83
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
● Wet Extended Detention (P-3)			2.17
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
○ Organic Filter (F-4)			
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
○ Hydrodynamic	
○ Wet Vault	
○ Media Filter	
○ Other	

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

0.108 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ● **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

0.009 **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

● **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

4.445 **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).

4.643

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ● **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required . **acre-feet**

CPv Provided . **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

385.9 **CFS**

Post-development

302.3 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

732.4 **CFS**

Post-development

570.0 **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

The soil amounts in question #6 do not add up to 100% because the site is an unreclaimed stone quarry with a large amount of exposed rock. #36. The Channel Protection for the redevelopment activity is not required because there are no changes to hydrology that increase the discharge rate from the project site.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ● Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ● Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ● SPDES Multi-Sector GP [N][Y][R][ ][ ][ ][ ][ ][ ]
- ○ Other [ ]
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ● **No**
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ][ ] . [ ]

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ● **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator 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 hereby certify that this document and the corresponding documents were prepared under my direction or supervision. 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) business 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.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date / /

Appendix D.2

Letter of Acknowledgement

Appendix D.3

Permit

Appendix D.4

OPRHP Clearance Letter

NEW YORK STATE OF OPPORTUNITY.
Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

July 24, 2018

Mr. Solomon Latham
4305 Highway 209
Stone Ridge, NY 12484

Re: DEC
850 Route 28 LLC: Steel and Concrete Fabrication Facility
850 Route 28, Town of Kingston, Ulster County, NY
18PR04534

Dear Mr. Latham:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the OPRHP and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8) and its implementing regulations (6 NYCRR Part 617).

Based upon this review, it is the New York State Office of Parks, Recreation and Historic Preservation's opinion that your project will have no impact on archaeological and/or historic resources listed in or eligible for the New York State and National Registers of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Michael F. Lynch, P.E., AIA

Director, Division for Historic Preservation

Appendix E

Notice of Termination

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

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

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): _____

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

_____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? _____ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

IX. Owner or Operator Certification

I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

Appendix F

BMP Construction/Installation Guidelines

Stormwater/Wetland Pond Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
Pre-Construction/Materials and Equipment		
Pre-construction meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked		
1. Material (including protective coating, if specified)		
2. Diameter		
3. Dimensions of metal riser or pre-cast concrete outlet structure		
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans		
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope		
6. Number and dimensions of prefabricated anti-seep collars		
7. Watertight connectors and gaskets		
8. Outlet drain valve		
Project benchmark near pond site		
Equipment for temporary de-watering		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
2. Subgrade Preparation		
Area beneath embankment stripped of all vegetation, topsoil, and organic matter		
3. Pipe Spillway Installation		
Method of installation detailed on plans		
A. Bed preparation		
Installation trench excavated with specified side slopes		
Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation)		
Invert at proper elevation and grade		
B. Pipe placement		
Metal / plastic pipe		
1. Watertight connectors and gaskets properly installed		
2. Anti-seep collars properly spaced and having watertight connections to pipe		
3. Backfill placed and tamped by hand under “haunches” of pipe		
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
3. Pipe Spillway Installation		
Concrete pipe		
1. Pipe set on blocks or concrete slab for pouring of low cradle		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area		
3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set		
4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix		
6. Upper half of anti-seep collar(s) formed with reinforcing steel set		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.		
C. Backfilling		
Fill placed in maximum 8 inch lifts		
Backfill taken minimum 2 feet above top of anti-seep collar elevation before traversing with heavy equipment		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Riser / Outlet Structure Installation		
Riser located within embankment		
A. Metal riser		
Riser base excavated or formed on stable subgrade to design dimensions		
Set on blocks to design elevations and plumbed		
Reinforcing bars placed at right angles and projecting into sides of riser		
Concrete poured so as to fill inside of riser to invert of barrel		
B. Pre-cast concrete structure		
Dry and stable subgrade		
Riser base set to design elevation		
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely		
Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway		
C. Poured concrete structure		
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set		
Structure formed to design dimensions, with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
Forms stripped & inspected for “honeycomb” prior to backfilling; parge if necessary		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Embankment Construction		
Fill material		
Compaction		
Embankment		
1. Fill placed in specified lifts and compacted with appropriate equipment		
2. Constructed to design cross-section, side slopes and top width		
3. Constructed to design elevation plus allowance for settlement		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes		
Inlet pipes have adequate outfall protection		
Forebay(s)		
Pond benches		
7. Earth Emergency Spillway Construction		
Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width		
Entrance channel, crest, and exit channel constructed to design grades and elevations		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
8. Outlet Protection		
A. End section		
Securely in place and properly backfilled		
B. Endwall		
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified		
Endwall formed to design dimensions with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary)		
Forms stripped and structure inspected for "honeycomb" prior to backfilling; parge if necessary		
C. Riprap apron / channel		
Apron / channel excavated to design cross-section with proper transition to existing ground		
Filter fabric in place		
Stone sized as per plan and uniformly place at the thickness specified		
9. Vegetative Stabilization		
Approved seed mixture or sod		
Proper surface preparation and required soil amendments		
Excelsior mat or other stabilization, as per plan		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
10. Miscellaneous		
Drain for ponds having a permanent pool		
Trash rack / anti-vortex device secured to outlet structure		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required)		
Access road		
Set aside for clean-out maintenance		
11. Stormwater Wetlands		
Adequate water balance		
Variety of depth zones present		
Approved pondscaping plan in place Reinforcement budget for additional plantings		
Plants and materials ordered 6 months prior to construction		
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window)		
Wetland buffer area preserved to maximum extent possible		

Comments:

Actions to be Taken:

Open Channel System Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility location staked out		
2. Excavation		
Size and location		
Side slope stable		
Soil permeability		
Groundwater / bedrock		
Lateral slopes completely level		
Longitudinal slopes within design range		
Excavation does not compact subsoils		
3. Check dams		
Dimensions		
Spacing		
Materials		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
4. Structural Components		
Underdrain installed correctly		
Inflow installed correctly		
Pretreatment devices installed		
5. Vegetation		
Complies with planting specifications		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
6. Final inspection		
Dimensions		
Check dams		
Proper outlet		
Effective stand of vegetation and stabilization		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Appendix G

BMP Long-Term Maintenance and Operation Guidelines

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
Location: _____
Site Status: _____

Date: _____
Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam “As-Built”		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

Actions to be Taken:

Version 1.8 Total Water Quality Volume Calculation
Last Updated: 11/09/2015 WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	

Design Point:	Kingston	
P=	1.50	*inch*

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	103.78	27.52	27%	0.29	163,116	Previously Disturbed
2	6.62	3.83	58%	0.57	20,571	New development
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	110.40	31.35	28%	0.31	**183,687**	**Subtotal 1**
Total	110.40	31.35	28%	0.31	**183,687**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques

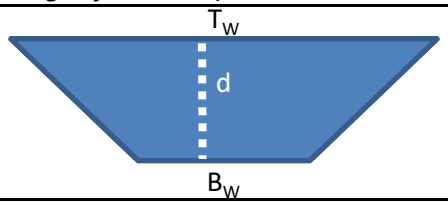
	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
"<<Initial WQv"	110.40	31.35	28%	0.31	183,687
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	**110.40**	**31.35**	28%	0.31	183,687
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	110.40	31.35	28%	0.31	**183,687**

Dry Swale Worksheet

Design Point:	Kingston

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	6.62	3.83	0.58	0.57	20571.21	1.50	
Enter Impervious Area Reduced by Disconnection of Rooftops			58%	0.57	20,571	<<WQv after adjusting for Disconnected Rooftops	

Pretreatment Provided			Pretreatment Technique
Pretreatment (10% of WQv)	2,057	ft^3	

Calculate Available Storage Capacity			
Bottom Width	8	*ft*	Design with a bottom width no greater than eight feet to avoid potential gullying and channel braiding, but no less than two feet
Side Slope (X:1)	3	*Okay*	Channels shall be designed with moderate side slopes (flatter than 3:1) for most conditions. 2:1 is the absolute maximum side slope
Longitudinal Slope	4%	*Okay*	*Maximum longitudinal slope shall be 4%*
Flow Depth	0.75	*ft*	*Maximum ponding depth of one foot at the mid-point of the channel, and a maximum depth of 18" at the end point of the channel (for storage of the WQv)*
Top Width	12.5	*ft*	
Area	7.69	*sf*	
Minimum Length	2408	*ft*	
Actual Length	4770	*ft*	
End Point Depth check	1.50	*Okay*	*A maximum depth of 18" at the end point of the channel (for storage of the WQv)*
Storage Capacity	38,726	ft^3	
Soil Group (HSG)		C	

Runoff Reduction				
Is the Dry Swale contributing flow to another practice?			Select Practice	
RRv	**7,745**	***ft^3***	**Runnoff Reduction equals 40% in HSG A and B and 20% in HSG C and D up to the WQv**	
Volume Treated	12,826	ft^3	This is the difference between the WQv calculated and the runoff reduction achieved in the swale	
Volume Directed	0	ft^3	This volume is directed another practice	
Volume √	*Okay*		Check to be sure that channel is long enough to store WQv	

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A		55%
B		40%
C		30%
D	**6.62**	20%
Total Area	6.62	
Calculate the Minimum RRv		
S =	**0.20**	
Impervious =	3.83	*acre*
Precipitation	1.5	*in*
Rv	0.95	
Minimum RRv	**3,962**	***ft3***
	0.09	af

RIP RAP CALCULATIONS | 850 ROUTE 28 LLC | CALEB CARR

FIGURE 3.16, PAGE 3.42, NYS STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL USED FOR RIP RAP CALCULATIONS.

$TW < 0.50\,D_o$

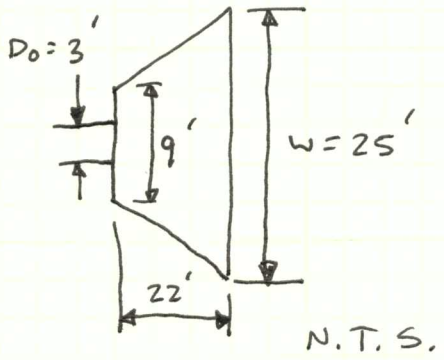
1. 36" PIPE OUTLET FROM WATER QUALITY BASIN #1

$D_o = 3'$ $Q = 58$ cfs

d_{50} FROM FIGURE 3.16 = 0.7 = 8.4" ROUND UP TO 9"

L_a FROM FIGURE 3.16 = 22'

$W = D_o + L_a = 3' + 22' = 25'$



N.T.S.

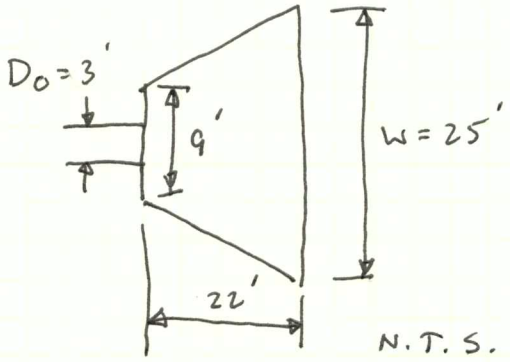
2. 36" PIPE OUTLET FROM WATER QUALITY BASIN #2

$D_o = 3'$ $Q = 56$ cfs

d_{50} FROM FIGURE 3.16 = 0.6' = 7.2" ROUND UP TO 9" TO MATCH PIPE OUTLET OF WQB#1

L_a FROM FIGURE 3.16 = 19'

$W = D_o + L_a = 3' + 19' = 22'$



N.T.S.

5/14/2019

Appendix H

1. **Water Quality Volume Calculations**
2. **Soil Survey**
3. **Site Vicinity Map**
4. **HydroCAD Calculations**
5. **Drainage Area Maps**

Appendix H.1

Water Quality Volume Calculations
And Runoff Reduction Volume

Appendix H.2

Soil Survey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Ulster County, New York

850 rt 28 PARCEL

March 13, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map
Index Sheet

Map Scale: 1:13,200 if printed on A landscape (11" x 8.5") sheet.

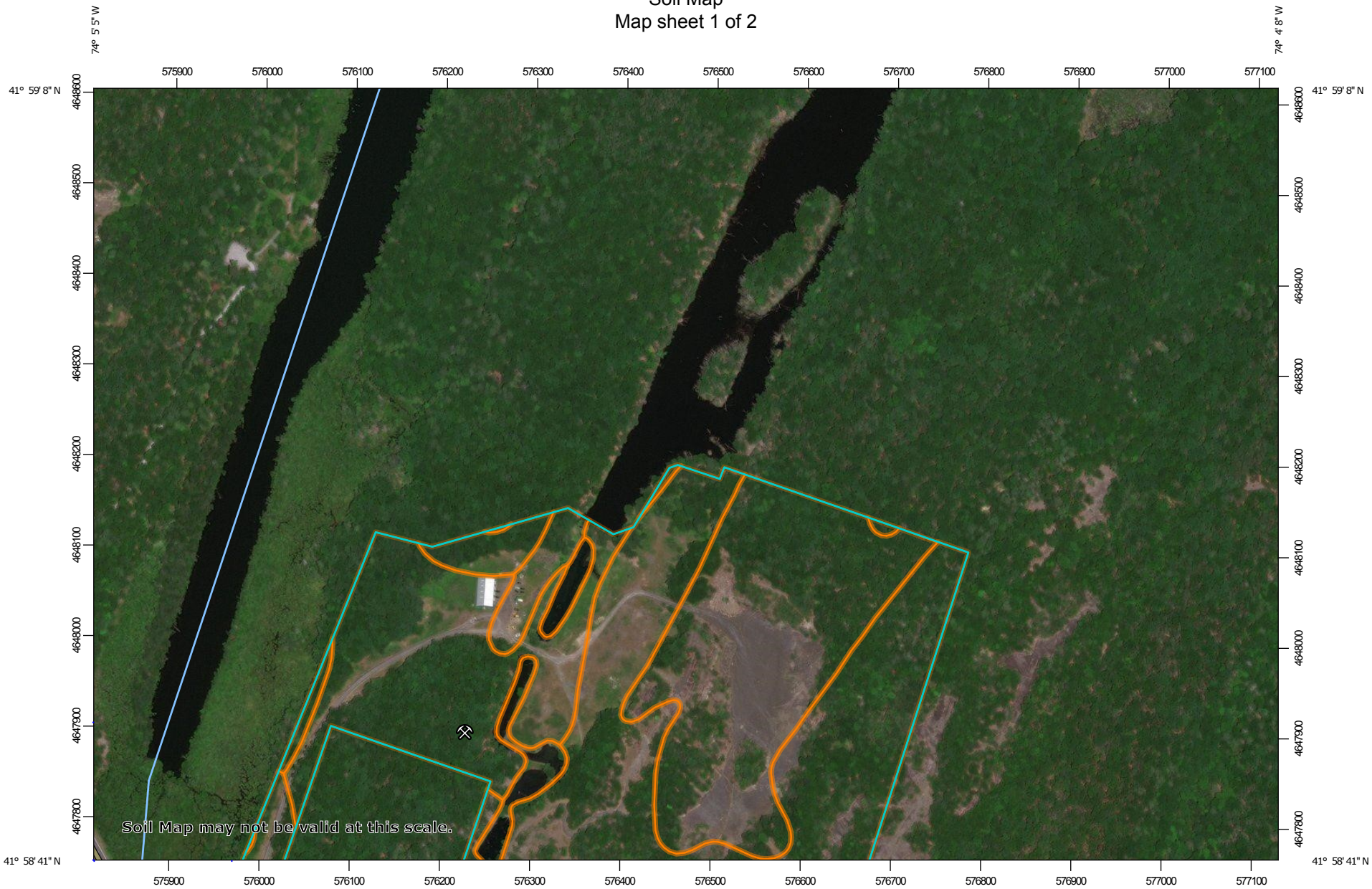
N

Meters
0 150 300 600 900

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Custom Soil Resource Report
Soil Map
Map sheet 1 of 2



Joins sheet 2

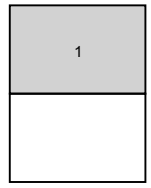
Map Scale: 1:6,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



Map Sheet Location

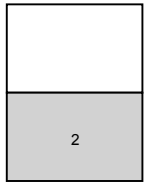
Custom Soil Resource Report
Soil Map
Map sheet 2 of 2

Map Scale: 1:6,000 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



Map Sheet Location

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 15, Oct 8, 2017

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ARD	Arnot-Lordstown-Rock outcrop complex, moderately steep	12.2	11.1%
LOC	Lordstown-Arnot-Rock outcrop complex, sloping	53.3	48.2%
MO	Menlo very bouldery soils	1.6	1.4%
Pa	Palms muck	0.5	0.4%
QU	Quarry	40.6	36.7%
RXF	Rock outcrop-Arnot complex, 25 to 70 percent slopes	0.3	0.3%
W	Water	2.1	1.9%
Totals for Area of Interest		**110.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Ulster County, New York

ARD—Arnot-Lordstown-Rock outcrop complex, moderately steep

Map Unit Setting

National map unit symbol: 9xfj
Elevation: 750 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Arnot and similar soils: 35 percent
Lordstown and similar soils: 30 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arnot

Setting

Landform: Benches, ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 18 inches: very channery silt loam
H3 - 18 to 22 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Lordstown

Setting

Landform: Hills, benches, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from sandstone and siltstone

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 5 inches: channery silt loam
H2 - 5 to 33 inches: channery silt loam
H3 - 33 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydric soil rating: Unranked

Minor Components

Bath

Percent of map unit: 3 percent
Hydric soil rating: No

Hoosic

Percent of map unit: 3 percent
Hydric soil rating: No

Swartswood
Percent of map unit: 3 percent
Hydric soil rating: No

Tuller
Percent of map unit: 3 percent
Hydric soil rating: No

Valois
Percent of map unit: 3 percent
Hydric soil rating: No

LOC—Lordstown-Arnot-Rock outcrop complex, sloping

Map Unit Setting
National map unit symbol: 9xh5
Elevation: 750 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Lordstown and similar soils: 35 percent
Arnot and similar soils: 25 percent
Rock outcrop: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lordstown

Setting
Landform: Ridges, hills, benches
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from sandstone and siltstone

Typical profile
O - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 5 inches: channery silt loam
H2 - 5 to 33 inches: channery silt loam
H3 - 33 to 37 inches: unweathered bedrock

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Arnot

Setting

Landform: Benches, ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 4 inches: channery silt loam
H2 - 4 to 18 inches: very channery silt loam
H3 - 18 to 22 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydric soil rating: Unranked

Minor Components

Bath

Percent of map unit: 5 percent
Hydric soil rating: No

Odessa

Percent of map unit: 5 percent
Hydric soil rating: No

Schoharie

Percent of map unit: 5 percent
Hydric soil rating: No

Valois

Percent of map unit: 5 percent
Hydric soil rating: No

Wurtsboro

Percent of map unit: 5 percent
Hydric soil rating: No

MO—Menlo very bouldery soils

Map Unit Setting

National map unit symbol: 9xhd
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Menlo and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Menlo

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Loamy till

Typical profile

O - 0 to 3 inches: moderately decomposed plant material
H1 - 3 to 5 inches: silt loam
H2 - 5 to 16 inches: gravelly fine sandy loam
H3 - 16 to 33 inches: gravelly fine sandy loam
H4 - 33 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 12 to 25 inches to fragipan
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Atherton

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Lamson

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Palms

Percent of map unit: 5 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

Pa—Palms muck

Map Unit Setting

National map unit symbol: 9xht
Elevation: 250 to 1,500 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Palms and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palms

Setting

Landform: Swamps, marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over loamy glacial drift

Typical profile

H1 - 0 to 7 inches: muck
H2 - 7 to 44 inches: muck
H3 - 44 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: Very high (about 20.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Canandaigua
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Carlisle
Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

Lamson
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Lyons
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Wayland
Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

QU—Quarry

Map Unit Setting
National map unit symbol: 9xj2
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Quarry: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quarry

Properties and qualities
Slope: 0 to 15 percent
Depth to restrictive feature: 0 to 40 inches to lithic bedrock

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Arnot
Percent of map unit: 5 percent
Hydric soil rating: No

Lyons
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Rock outcrop
Percent of map unit: 5 percent
Hydric soil rating: Unranked

Udorthents
Percent of map unit: 5 percent
Hydric soil rating: No

RXF—Rock outcrop-Arnot complex, 25 to 70 percent slopes

Map Unit Setting
National map unit symbol: 2wbnb
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Rock outcrop: 55 percent
Arnot, extremely stony, and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Description of Arnot, Extremely Stony

Setting
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountaintop, mountainflank, free face, side slope, nose slope, free face
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Loamy till derived mainly from acid sandstone, siltstone, and shale

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: channery silt loam
Bw1 - 3 to 12 inches: very channery silt loam
Bw2 - 12 to 17 inches: very channery silt loam
2R - 17 to 27 inches: bedrock

Properties and qualities

Slope: 25 to 70 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lordstown, extremely stony

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 9xk9
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

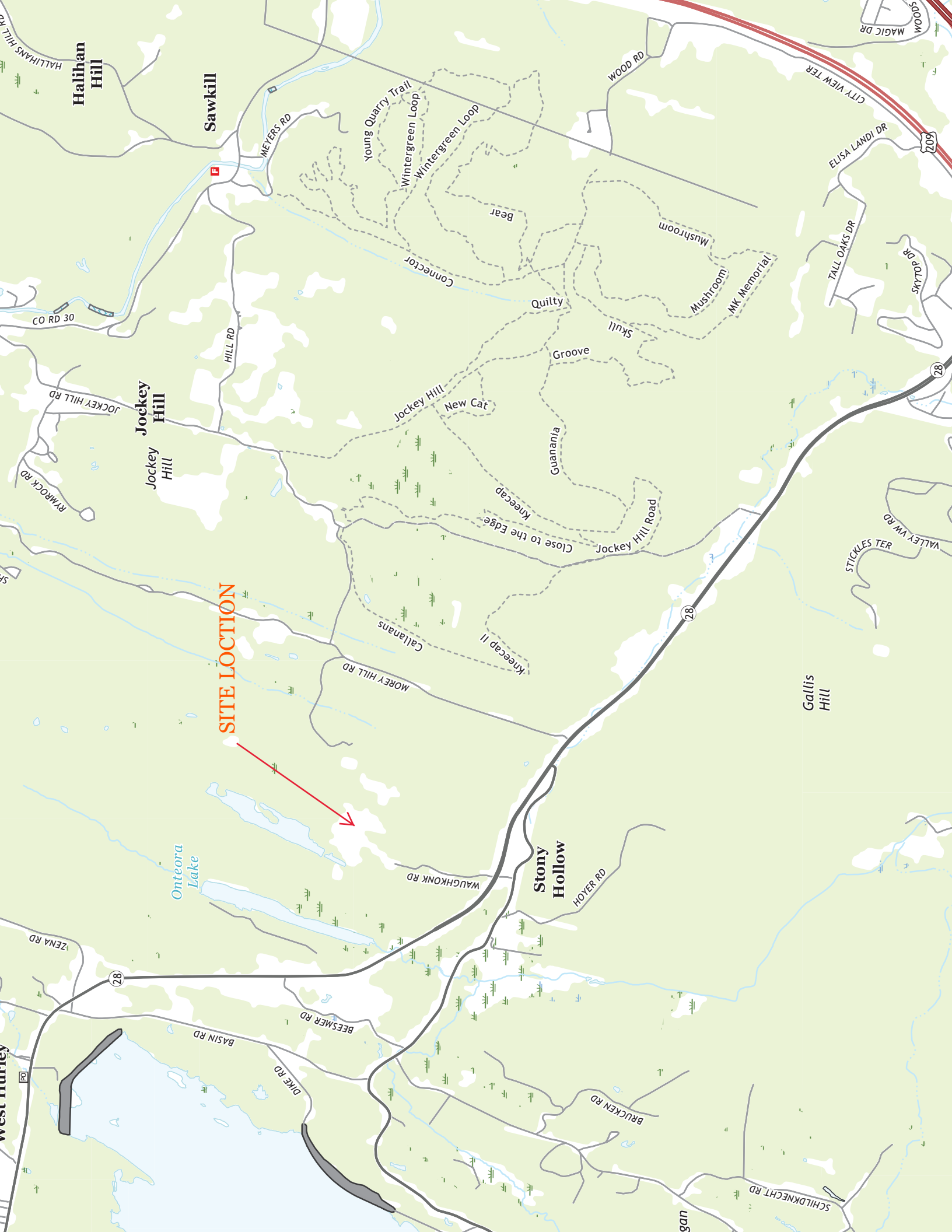
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

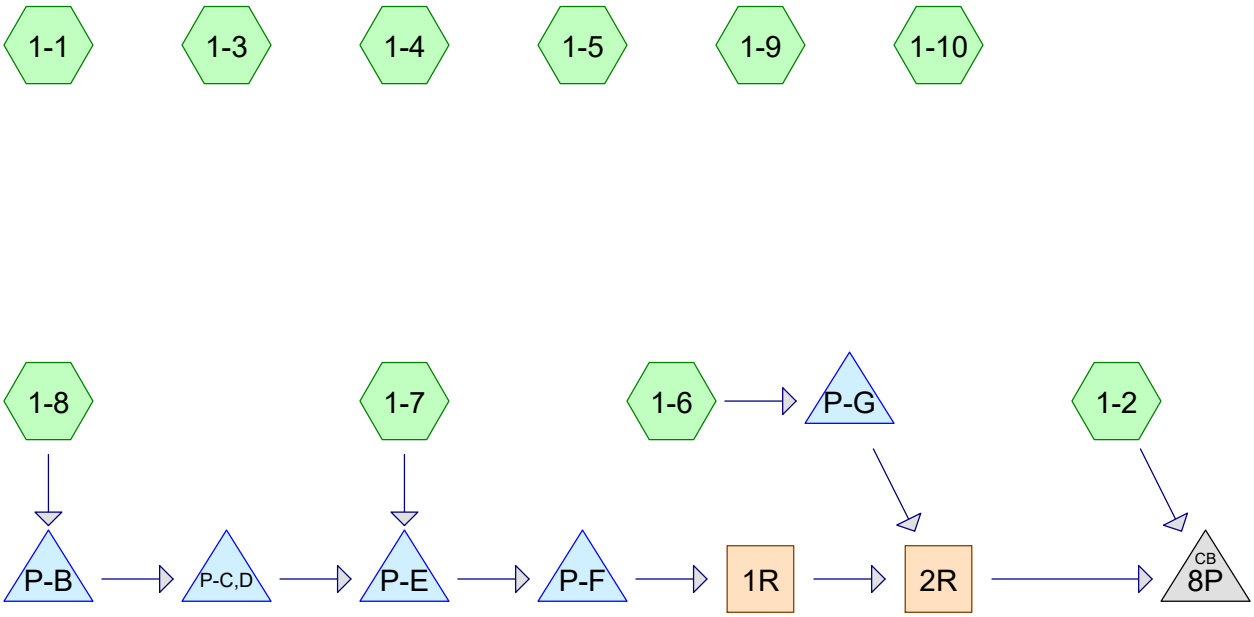
Appendix H.3

Site Vicinity Map


Halihan Hill
Sawkill
Jockey Hill
Jockey Hill
Stony Hollow
Gallis Hill
Onteora Lake
SITE LOCTION
MEYERS RD
Young Quarry Trail
Wintergreen Loop
Wintergreen Loop
WOOD RD
CITY VIEW TER
ELISA LANDI DR
TALL OAKS DR
SKYTOP DR
MAGIC DR
Bear
Mushroom
Connector
Quilty
Skull
Groove
Mushroom
MK Memorial
Jockey Hill
New Cat
Guanania
Kneecap
Close to the Edge
Jockey Hill Road
Callahans
Kneecap II
CO RD 30
HILL RD
JOCKEY HILL RD
RIMROCK RD
MOREY HILL RD
STICKLES TER
VALLEY VW RD
WAUGHKONK RD
HOYER RD
ZENA RD
BEESMER RD
BASIN RD
DIKE RD
BRUCKEN RD
SCHILDKNECHT RD
28
209

Appendix H.5 & H.6

HydroCAD Calculations
And Drainage Area Maps



Subcat Reach Pond Link

Drainage Diagram for E17 064 850 Route 28 Pre
Prepared by {enter your company name here} 1/8/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.944	79	50-75% Grass cover, Fair, HSG C (1-1)
18.043	82	Woods/grass comb., Fair, HSG D (1-10,1-7)
46.569	82	Woods/grass comb., Poor, HSG C (1-4,1-5,1-6)
0.121	86	Grass Area around ponds (1-7)
15.356	86	Woods over rock (1-10,1-9)
31.248	86	Woods/grass comb., Poor, HSG D (1-1,1-2,1-3)
0.607	89	<50% Grass cover, Poor, HSG D (1-2)
2.948	91	Gravel roads, HSG D (1-1,1-6)
15.147	91	Rubble with trees (1-7)
4.591	91	Woods over rock (1-8)
1.992	91	Woods/grass comb., Poor, HSG D (1-6)
20.839	98	Bare Rock (1-10,1-7,1-8,1-9)
0.312	98	Bare Rock and Water (1-2)
1.570	98	Paved parking & roofs (1-1)
2.332	98	Water (1-6,1-7,1-8)
162.619		

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-1: 1-1 (Design Point #1) Runoff Area=1,055,792 sf Runoff Depth=1.48"
Flow Length=575' Tc=29.9 min CN=87 Runoff=23.79 cfs 2.989 af

Subcatchment 1-10: 1-10 (Design Point #7) Runoff Area=957,026 sf Runoff Depth=1.41"
Flow Length=1,538' Tc=43.0 min CN=86 Runoff=17.16 cfs 2.579 af

Subcatchment 1-2: 1-2 Runoff Area=464,367 sf Runoff Depth=1.48"
Flow Length=500' Tc=17.2 min CN=87 Runoff=13.25 cfs 1.315 af

Subcatchment 1-3: 1-3 (Design Point #3) Runoff Area=85,780 sf Runoff Depth=1.41"
Flow Length=270' Tc=16.3 min CN=86 Runoff=2.38 cfs 0.231 af

Subcatchment 1-4: 1-4 (Design Point #4) Runoff Area=370,700 sf Runoff Depth=1.15"
Flow Length=930' Tc=59.7 min CN=82 Runoff=4.43 cfs 0.814 af

Subcatchment 1-5: 1-5) (Design Point #5) Runoff Area=1,295,601 sf Runoff Depth=1.15"
Flow Length=1,602' Tc=55.2 min CN=82 Runoff=16.18 cfs 2.843 af

Subcatchment 1-6: 1-6 Runoff Area=488,582 sf Runoff Depth=1.27"
Flow Length=500' Tc=17.2 min CN=84 Runoff=11.92 cfs 1.190 af

Subcatchment 1-7: 1-7 Runoff Area=1,246,456 sf Runoff Depth=1.71"
Flow Length=1,765' Tc=12.2 min CN=90 Runoff=46.78 cfs 4.079 af

Subcatchment 1-8: 1-8 Runoff Area=754,946 sf Runoff Depth=2.26"
Flow Length=1,470' Tc=6.4 min CN=96 Runoff=42.58 cfs 3.260 af

Subcatchment 1-9: 1-9 (Design Point #8) Runoff Area=364,441 sf Runoff Depth=1.48"
Flow Length=1,300' Tc=35.8 min CN=87 Runoff=7.54 cfs 1.032 af

Reach 1R: Reach between Pond F and G Avg. Depth=0.58' Max Vel=5.57 fps Inflow=38.11 cfs 3.236 af
n=0.030 L=250.0' S=0.0320 '/' Capacity=357.02 cfs Outflow=37.93 cfs 3.236 af

Reach 2R: Reach to Route 28 (Design Point Avg. Depth=0.90' Max Vel=2.54 fps Inflow=37.93 cfs 3.378 af
n=0.030 L=1,000.0' S=0.0040 '/' Capacity=126.22 cfs Outflow=29.06 cfs 3.378 af

Pond 8P: Road Culvert Storage Peak Elev=657.19' Inflow=36.13 cfs 4.693 af
12.0" x 160.0' Culvert Outflow=36.13 cfs 4.693 af

Pond P-B: Pond B Peak Elev=459.82' Storage=126,579 cf Inflow=42.58 cfs 3.260 af
Outflow=0.85 cfs 0.377 af

Pond P-C,D: Pond C and D Peak Elev=456.03' Storage=635 cf Inflow=0.85 cfs 0.377 af
Outflow=0.83 cfs 0.377 af

Pond P-E: Pond E Peak Elev=456.40' Storage=40,156 cf Inflow=46.78 cfs 4.456 af
Outflow=45.08 cfs 3.710 af

Pond P-F: Pond E Peak Elev=455.36' Storage=47,142 cf Inflow=45.08 cfs 3.710 af
Outflow=38.11 cfs 3.236 af

Pond P-G: Pond G Peak Elev=459.81' Storage=45,644 cf Inflow=11.92 cfs 1.190 af
Outflow=0.75 cfs 0.142 af

Total Runoff Area = 162.619 ac Runoff Volume = 20.333 af Average Runoff Depth = 1.50"
84.59% Pervious Area = 137.566 ac 15.41% Impervious Area = 25.053 ac

Subcatchment 1-1: 1-1 (Design Point #1)

Runoff = 23.79 cfs @ 12.42 hrs, Volume= 2.989 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
851,042	86	Woods/grass comb., Poor, HSG D
68,407	98	Paved parking & roofs
95,207	91	Gravel roads, HSG D
41,136	79	50-75% Grass cover, Fair, HSG C
1,055,792	87	Weighted Average
987,385		Pervious Area
68,407		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	150	0.0270	0.10		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
3.6	325	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	70	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	30	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.9	575	Total			

Subcatchment 1-10: 1-10 (Design Point #7)

Runoff = 17.16 cfs @ 12.61 hrs, Volume= 2.579 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
342,945	86	Woods over rock
452,081	82	Woods/grass comb., Fair, HSG D
162,000	98	Bare Rock
957,026	86	Weighted Average
795,026		Pervious Area
162,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.1	20	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.5	1,110	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.8	308	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
43.0	1,538	Total			

Subcatchment 1-2: 1-2

Runoff = 13.25 cfs @ 12.24 hrs, Volume= 1.315 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
424,327	86	Woods/grass comb., Poor, HSG D
13,600	98	Bare Rock and Water
26,440	89	<50% Grass cover, Poor, HSG D
464,367	87	Weighted Average
450,767		Pervious Area
13,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 1-3: 1-3 (Design Point #3)

Runoff = 2.38 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
85,780	86	Woods/grass comb., Poor, HSG D
85,780		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	58	0.0300	0.09		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	62	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	150	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.3	270	Total			

Subcatchment 1-4: 1-4 (Design Point #4)

Runoff = 4.43 cfs @ 12.81 hrs, Volume= 0.814 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
370,700	82	Woods/grass comb., Poor, HSG C
370,700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.7	150	0.0130	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
26.0	780	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.7	930	Total			

Subcatchment 1-5: 1-5) (Design Point #5)

Runoff = 16.18 cfs @ 12.76 hrs, Volume= 2.843 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
1,295,601	82	Woods/grass comb., Poor, HSG C
1,295,601		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	150	0.0400	0.12		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
14.1	642	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	120	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	450	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	240	0.0660	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
55.2	1,602	Total			

Subcatchment 1-6: 1-6

Runoff = 11.92 cfs @ 12.25 hrs, Volume= 1.190 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
362,256	82	Woods/grass comb., Poor, HSG C
86,776	91	Woods/grass comb., Poor, HSG D
6,322	98	Water
33,228	91	Gravel roads, HSG D
488,582	84	Weighted Average
482,260		Pervious Area
6,322		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 1-7: 1-7

Runoff = 46.78 cfs @ 12.16 hrs, Volume= 4.079 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
659,790	91	Rubble with trees
333,851	82	Woods/grass comb., Fair, HSG D
61,264	98	Water
186,280	98	Bare Rock
5,271	86	Grass Area around ponds
1,246,456	90	Weighted Average
998,912		Pervious Area
247,544		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.1100	3.09		**Sheet Flow, Ridge** Smooth surfaces n= 0.011 P2= 3.50"
1.0	220	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.1	220	0.0300	1.73		**Shallow Concentrated Flow, Steep Slope** Nearly Bare & Untilled Kv= 10.0 fps
3.8	250	0.0120	1.10		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.3	375	0.0750	2.74		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.2	550	0.0650	4.10		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.2	1,765	Total			

Subcatchment 1-8: 1-8

Runoff = 42.58 cfs @ 12.09 hrs, Volume= 3.260 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
200,000	91	Woods over rock
34,000	98	Water
520,946	98	Bare Rock
754,946	96	Weighted Average
200,000		Pervious Area
554,946		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.1330	3.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
3.1	935	0.0620	5.05		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	385	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	1,470	Total			

Subcatchment 1-9: 1-9 (Design Point #8)

Runoff = 7.54 cfs @ 12.49 hrs, Volume= 1.032 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
325,941	86	Woods over rock
38,500	98	Bare Rock
364,441	87	Weighted Average
325,941		Pervious Area
38,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0730	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	300	0.0360	0.95		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	520	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	160	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	170	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
35.8	1,300	Total			

Reach 1R: Reach between Pond F and G

Inflow Area = 45.946 ac, Inflow Depth = 0.85" for 1 Year event
Inflow = 38.11 cfs @ 12.29 hrs, Volume= 3.236 af
Outflow = 37.93 cfs @ 12.31 hrs, Volume= 3.236 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.57 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 2.4 min

Peak Storage= 1,704 cf @ 12.30 hrs, Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 357.02 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 250.0' Slope= 0.0320 '/'
Inlet Invert= 454.00', Outlet Invert= 446.00'

‡

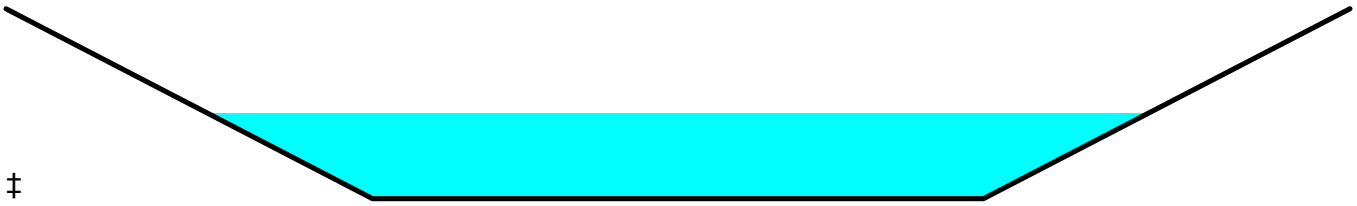
Reach 2R: Reach to Route 28 (Design Point #2)

Inflow Area = 57.162 ac, Inflow Depth = 0.71" for 1 Year event
Inflow = 37.93 cfs @ 12.31 hrs, Volume= 3.378 af
Outflow = 29.06 cfs @ 12.55 hrs, Volume= 3.378 af, Atten= 23%, Lag= 14.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 6.6 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 23.8 min

Peak Storage= 11,450 cf @ 12.44 hrs, Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 126.22 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 1,000.0' Slope= 0.0040 '/'
Inlet Invert= 446.00', Outlet Invert= 442.00'



‡

Pond 8P: Road Culvert Storage

Inflow Area = 67.823 ac, Inflow Depth = 0.83" for 1 Year event
Inflow = 36.13 cfs @ 12.53 hrs, Volume= 4.693 af
Outflow = 36.13 cfs @ 12.53 hrs, Volume= 4.693 af, Atten= 0%, Lag= 0.0 min
Primary = 36.13 cfs @ 12.53 hrs, Volume= 4.693 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 657.19' @ 12.53 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**12.0" x 160.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 441.84' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=36.13 cfs @ 12.53 hrs HW=657.16' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 36.13 cfs @ 46.00 fps)

Pond P-B: Pond B

Inflow Area = 17.331 ac, Inflow Depth = 2.26" for 1 Year event
Inflow = 42.58 cfs @ 12.09 hrs, Volume= 3.260 af
Outflow = 0.85 cfs @ 17.60 hrs, Volume= 0.377 af, Atten= 98%, Lag= 330.8 min
Primary = 0.85 cfs @ 17.60 hrs, Volume= 0.377 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 358.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 459.82' @ 17.60 hrs Surf.Area= 40,608 sf Storage= 126,579 cf

Plug-Flow detention time= 693.6 min calculated for 0.377 af (12% of inflow)
Center-of-Mass det. time= 432.2 min (1,211.6 - 779.4)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	229,100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	25,000	0	0
458.00	34,000	59,000	59,000
459.80	40,000	66,600	125,600
460.00	45,000	8,500	134,100
462.00	50,000	95,000	229,100

Device	Routing	Invert	Outlet Devices
#1	Primary	459.80'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=0.66 cfs @ 17.60 hrs HW=459.82' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.66 cfs @ 0.55 fps)

Pond P-C,D: Pond C and D

Inflow Area = 17.331 ac, Inflow Depth = 0.26" for 1 Year event
Inflow = 0.85 cfs @ 17.60 hrs, Volume= 0.377 af
Outflow = 0.83 cfs @ 17.90 hrs, Volume= 0.377 af, Atten= 3%, Lag= 17.8 min
Primary = 0.83 cfs @ 17.90 hrs, Volume= 0.377 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 357.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 456.03' @ 17.90 hrs Surf.Area= 20,189 sf Storage= 635 cf

Plug-Flow detention time= 12.8 min calculated for 0.377 af (100% of inflow)
Center-of-Mass det. time= 12.8 min (1,224.4 - 1,211.6)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	214,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	20,000	0	0
458.00	32,000	52,000	52,000
460.00	40,000	72,000	124,000
462.00	50,000	90,000	214,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**40.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.60 cfs @ 17.90 hrs HW=456.03' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.60 cfs @ 0.48 fps)

Pond P-E: Pond E

Inflow Area = 45.946 ac, Inflow Depth = 1.16" for 1 Year event
Inflow = 46.78 cfs @ 12.16 hrs, Volume= 4.456 af
Outflow = 45.08 cfs @ 12.20 hrs, Volume= 3.710 af, Atten= 4%, Lag= 2.2 min
Primary = 45.08 cfs @ 12.20 hrs, Volume= 3.710 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 456.40' @ 12.20 hrs Surf.Area= 19,409 sf Storage= 40,156 cf

Plug-Flow detention time= 124.4 min calculated for 3.710 af (83% of inflow)
Center-of-Mass det. time= 44.2 min (897.9 - 853.6)

Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	127,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
456.00	18,500	32,500	32,500
458.00	23,000	41,500	74,000
460.00	30,000	53,000	127,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=45.05 cfs @ 12.20 hrs HW=456.40' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 45.05 cfs @ 2.23 fps)

Pond P-F: Pond E

Inflow Area = 45.946 ac, Inflow Depth = 0.97" for 1 Year event
Inflow = 45.08 cfs @ 12.20 hrs, Volume= 3.710 af
Outflow = 38.11 cfs @ 12.29 hrs, Volume= 3.236 af, Atten= 15%, Lag= 5.4 min
Primary = 38.11 cfs @ 12.29 hrs, Volume= 3.236 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 453.60' Surf.Area= 13,600 sf Storage= 20,480 cf
Peak Elev= 455.36' @ 12.29 hrs Surf.Area= 17,063 sf Storage= 47,142 cf (26,662 cf above start)

Plug-Flow detention time= 171.7 min calculated for 2.766 af (75% of inflow)
Center-of-Mass det. time= 30.2 min (928.0 - 897.9)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	153,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	12,000	0	0
454.00	14,000	26,000	26,000
456.00	18,500	32,500	58,500
458.00	23,000	41,500	100,000
460.00	30,000	53,000	153,000

Device	Routing	Invert	Outlet Devices
#1	Primary	455.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=38.10 cfs @ 12.29 hrs HW=455.36' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 38.10 cfs @ 2.11 fps)

Pond P-G: Pond G

Inflow Area = 11.216 ac, Inflow Depth = 1.27" for 1 Year event
Inflow = 11.92 cfs @ 12.25 hrs, Volume= 1.190 af
Outflow = 0.75 cfs @ 18.30 hrs, Volume= 0.142 af, Atten= 94%, Lag= 363.3 min
Primary = 0.75 cfs @ 18.30 hrs, Volume= 0.142 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 459.81' @ 18.30 hrs Surf.Area= 11,000 sf Storage= 45,644 cf

Plug-Flow detention time= 569.7 min calculated for 0.142 af (12% of inflow)
Center-of-Mass det. time= 411.4 min (1,259.4 - 848.0)

Volume	Invert	Avail.Storage	Storage Description
#1	444.00'	45,644 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
444.00	5,000	0	0
446.00	6,322	11,322	11,322
448.00	8,500	14,822	26,144
450.00	11,000	19,500	45,644

Device	Routing	Invert	Outlet Devices
#1	Primary	459.80'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=0.19 cfs @ 18.30 hrs HW=459.81' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.36 fps)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-1: 1-1 (Design Point #1) Runoff Area=1,055,792 sf Runoff Depth=3.57"
Flow Length=575' Tc=29.9 min CN=87 Runoff=56.72 cfs 7.205 af

Subcatchment 1-10: 1-10 (Design Point #7) Runoff Area=957,026 sf Runoff Depth=3.47"
Flow Length=1,538' Tc=43.0 min CN=86 Runoff=42.07 cfs 6.348 af

Subcatchment 1-2: 1-2 Runoff Area=464,367 sf Runoff Depth=3.57"
Flow Length=500' Tc=17.2 min CN=87 Runoff=31.51 cfs 3.169 af

Subcatchment 1-3: 1-3 (Design Point #3) Runoff Area=85,780 sf Runoff Depth=3.47"
Flow Length=270' Tc=16.3 min CN=86 Runoff=5.81 cfs 0.569 af

Subcatchment 1-4: 1-4 (Design Point #4) Runoff Area=370,700 sf Runoff Depth=3.08"
Flow Length=930' Tc=59.7 min CN=82 Runoff=12.17 cfs 2.184 af

Subcatchment 1-5: 1-5) (Design Point #5) Runoff Area=1,295,601 sf Runoff Depth=3.08"
Flow Length=1,602' Tc=55.2 min CN=82 Runoff=44.28 cfs 7.632 af

Subcatchment 1-6: 1-6 Runoff Area=488,582 sf Runoff Depth=3.27"
Flow Length=500' Tc=17.2 min CN=84 Runoff=30.68 cfs 3.057 af

Subcatchment 1-7: 1-7 Runoff Area=1,246,456 sf Runoff Depth=3.88"
Flow Length=1,765' Tc=12.2 min CN=90 Runoff=103.05 cfs 9.243 af

Subcatchment 1-8: 1-8 Runoff Area=754,946 sf Runoff Depth=4.53"
Flow Length=1,470' Tc=6.4 min CN=96 Runoff=82.26 cfs 6.546 af

Subcatchment 1-9: 1-9 (Design Point #8) Runoff Area=364,441 sf Runoff Depth=3.57"
Flow Length=1,300' Tc=35.8 min CN=87 Runoff=17.95 cfs 2.487 af

Reach 1R: Reach between Pond F and G Avg. Depth=1.11' Max Vel=8.09 fps Inflow=120.45 cfs 11.686 af
n=0.030 L=250.0' S=0.0320 '/' Capacity=357.02 cfs Outflow=120.33 cfs 11.686 af

Reach 2R: Reach to Route 28 (Design Poi Avg. Depth=2.09' Max Vel=4.04 fps Inflow=154.69 cfs 13.697 af
n=0.030 L=1,000.0' S=0.0040 '/' Capacity=126.22 cfs Outflow=137.36 cfs 13.697 af

Pond 8P: Road Culvert Storage Peak Elev=4,615.25' Inflow=159.40 cfs 16.866 af
12.0" x 160.0' Culvert Outflow=159.40 cfs 16.866 af

Pond P-B: Pond B Peak Elev=460.20' Storage=143,113 cf Inflow=82.26 cfs 6.546 af
Outflow=44.27 cfs 3.663 af

Pond P-C,D: Pond C and D Peak Elev=456.51' Storage=10,932 cf Inflow=44.27 cfs 3.663 af
Outflow=39.14 cfs 3.663 af

Pond P-E: Pond E Peak Elev=456.78' Storage=47,684 cf Inflow=123.65 cfs 12.906 af
Outflow=121.76 cfs 12.160 af

Pond P-F: Pond E Peak Elev=455.78' Storage=54,443 cf Inflow=121.76 cfs 12.160 af
Outflow=120.45 cfs 11.686 af

Pond P-G: Pond G Peak Elev=460.14' Storage=45,644 cf Inflow=30.68 cfs 3.057 af
Outflow=35.12 cfs 2.011 af

Total Runoff Area = 162.619 ac Runoff Volume = 48.440 af Average Runoff Depth = 3.57"
84.59% Pervious Area = 137.566 ac 15.41% Impervious Area = 25.053 ac

Subcatchment 1-1: 1-1 (Design Point #1)

Runoff = 56.72 cfs @ 12.39 hrs, Volume= 7.205 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
851,042	86	Woods/grass comb., Poor, HSG D
68,407	98	Paved parking & roofs
95,207	91	Gravel roads, HSG D
41,136	79	50-75% Grass cover, Fair, HSG C
1,055,792	87	Weighted Average
987,385		Pervious Area
68,407		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	150	0.0270	0.10		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
3.6	325	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	70	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	30	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.9	575	Total			

Subcatchment 1-10: 1-10 (Design Point #7)

Runoff = 42.07 cfs @ 12.57 hrs, Volume= 6.348 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
342,945	86	Woods over rock
452,081	82	Woods/grass comb., Fair, HSG D
162,000	98	Bare Rock
957,026	86	Weighted Average
795,026		Pervious Area
162,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.1	20	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.5	1,110	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.8	308	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
43.0	1,538	Total			

Subcatchment 1-2: 1-2

Runoff = 31.51 cfs @ 12.23 hrs, Volume= 3.169 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
424,327	86	Woods/grass comb., Poor, HSG D
13,600	98	Bare Rock and Water
26,440	89	<50% Grass cover, Poor, HSG D
464,367	87	Weighted Average
450,767		Pervious Area
13,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 1-3: 1-3 (Design Point #3)

Runoff = 5.81 cfs @ 12.22 hrs, Volume= 0.569 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
85,780	86	Woods/grass comb., Poor, HSG D
85,780		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	58	0.0300	0.09		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	62	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	150	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.3	270	Total			

Subcatchment 1-4: 1-4 (Design Point #4)

Runoff = 12.17 cfs @ 12.80 hrs, Volume= 2.184 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
370,700	82	Woods/grass comb., Poor, HSG C
370,700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.7	150	0.0130	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
26.0	780	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.7	930	Total			

Subcatchment 1-5: 1-5) (Design Point #5)

Runoff = 44.28 cfs @ 12.75 hrs, Volume= 7.632 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
1,295,601	82	Woods/grass comb., Poor, HSG C
1,295,601		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	150	0.0400	0.12		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
14.1	642	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	120	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	450	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	240	0.0660	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
55.2	1,602	Total			

Subcatchment 1-6: 1-6

Runoff = 30.68 cfs @ 12.23 hrs, Volume= 3.057 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
362,256	82	Woods/grass comb., Poor, HSG C
86,776	91	Woods/grass comb., Poor, HSG D
6,322	98	Water
33,228	91	Gravel roads, HSG D
488,582	84	Weighted Average
482,260		Pervious Area
6,322		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 1-7: 1-7

Runoff = 103.05 cfs @ 12.16 hrs, Volume= 9.243 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
659,790	91	Rubble with trees
333,851	82	Woods/grass comb., Fair, HSG D
61,264	98	Water
186,280	98	Bare Rock
5,271	86	Grass Area around ponds
1,246,456	90	Weighted Average
998,912		Pervious Area
247,544		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.1100	3.09		**Sheet Flow, Ridge** Smooth surfaces n= 0.011 P2= 3.50"
1.0	220	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.1	220	0.0300	1.73		**Shallow Concentrated Flow, Steep Slope** Nearly Bare & Untilled Kv= 10.0 fps
3.8	250	0.0120	1.10		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.3	375	0.0750	2.74		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.2	550	0.0650	4.10		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.2	1,765	Total			

Subcatchment 1-8: 1-8

Runoff = 82.26 cfs @ 12.09 hrs, Volume= 6.546 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
200,000	91	Woods over rock
34,000	98	Water
520,946	98	Bare Rock
754,946	96	Weighted Average
200,000		Pervious Area
554,946		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.1330	3.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
3.1	935	0.0620	5.05		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	385	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	1,470	Total			

Subcatchment 1-9: 1-9 (Design Point #8)

Runoff = 17.95 cfs @ 12.49 hrs, Volume= 2.487 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
325,941	86	Woods over rock
38,500	98	Bare Rock
364,441	87	Weighted Average
325,941		Pervious Area
38,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0730	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	300	0.0360	0.95		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	520	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	160	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	170	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
35.8	1,300	Total			

Reach 1R: Reach between Pond F and G

Inflow Area = 45.946 ac, Inflow Depth = 3.05" for 10 Year event
Inflow = 120.45 cfs @ 12.26 hrs, Volume= 11.686 af
Outflow = 120.33 cfs @ 12.28 hrs, Volume= 11.686 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.09 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.53 fps, Avg. Travel Time= 1.6 min

Peak Storage= 3,719 cf @ 12.27 hrs, Average Depth at Peak Storage= 1.11'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 357.02 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 250.0' Slope= 0.0320 '/'
Inlet Invert= 454.00', Outlet Invert= 446.00'

‡

Reach 2R: Reach to Route 28 (Design Point #2)

Inflow Area = 57.162 ac, Inflow Depth = 2.88" for 10 Year event
Inflow = 154.69 cfs @ 12.28 hrs, Volume= 13.697 af
Outflow = 137.36 cfs @ 12.42 hrs, Volume= 13.697 af, Atten= 11%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.04 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 16.6 min

Peak Storage= 34,031 cf @ 12.35 hrs, Average Depth at Peak Storage= 2.09'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 126.22 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 1,000.0' Slope= 0.0040 '/'
Inlet Invert= 446.00', Outlet Invert= 442.00'

‡

Pond 8P: Road Culvert Storage

Inflow Area = 67.823 ac, Inflow Depth = 2.98" for 10 Year event
Inflow = 159.40 cfs @ 12.41 hrs, Volume= 16.866 af
Outflow = 159.40 cfs @ 12.41 hrs, Volume= 16.866 af, Atten= 0%, Lag= 0.0 min
Primary = 159.40 cfs @ 12.41 hrs, Volume= 16.866 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 4,615.25' @ 12.41 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**12.0" x 160.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 441.84' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=159.35 cfs @ 12.41 hrs HW=4,613.00' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 159.35 cfs @ 202.90 fps)

Pond P-B: Pond B

Inflow Area = 17.331 ac, Inflow Depth = 4.53" for 10 Year event
Inflow = 82.26 cfs @ 12.09 hrs, Volume= 6.546 af
Outflow = 44.27 cfs @ 12.22 hrs, Volume= 3.663 af, Atten= 46%, Lag= 7.8 min
Primary = 44.27 cfs @ 12.22 hrs, Volume= 3.663 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 358.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 460.20' @ 12.22 hrs Surf.Area= 45,498 sf Storage= 143,113 cf

Plug-Flow detention time= 229.5 min calculated for 3.663 af (56% of inflow)
Center-of-Mass det. time= 117.1 min (879.8 - 762.8)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	229,100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	25,000	0	0
458.00	34,000	59,000	59,000
459.80	40,000	66,600	125,600
460.00	45,000	8,500	134,100
462.00	50,000	95,000	229,100

Device	Routing	Invert	Outlet Devices
#1	Primary	459.80'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=44.25 cfs @ 12.22 hrs HW=460.20' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 44.25 cfs @ 2.22 fps)

Pond P-C,D: Pond C and D

Inflow Area = 17.331 ac, Inflow Depth = 2.54" for 10 Year event
Inflow = 44.27 cfs @ 12.22 hrs, Volume= 3.663 af
Outflow = 39.14 cfs @ 12.31 hrs, Volume= 3.663 af, Atten= 12%, Lag= 5.5 min
Primary = 39.14 cfs @ 12.31 hrs, Volume= 3.663 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 357.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 456.51' @ 12.31 hrs Surf.Area= 23,047 sf Storage= 10,932 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 8.2 min (888.1 - 879.8)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	214,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	20,000	0	0
458.00	32,000	52,000	52,000
460.00	40,000	72,000	124,000
462.00	50,000	90,000	214,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**40.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=39.09 cfs @ 12.31 hrs HW=456.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 39.09 cfs @ 1.92 fps)

Pond P-E: Pond E

Inflow Area = 45.946 ac, Inflow Depth = 3.37" for 10 Year event
Inflow = 123.65 cfs @ 12.21 hrs, Volume= 12.906 af
Outflow = 121.76 cfs @ 12.24 hrs, Volume= 12.160 af, Atten= 2%, Lag= 1.6 min
Primary = 121.76 cfs @ 12.24 hrs, Volume= 12.160 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 456.78' @ 12.24 hrs Surf.Area= 20,263 sf Storage= 47,684 cf

Plug-Flow detention time= 53.6 min calculated for 12.157 af (94% of inflow)
Center-of-Mass det. time= 21.8 min (844.3 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	127,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
456.00	18,500	32,500	32,500
458.00	23,000	41,500	74,000
460.00	30,000	53,000	127,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=121.69 cfs @ 12.24 hrs HW=456.78' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 121.69 cfs @ 3.11 fps)

Pond P-F: Pond E

Inflow Area = 45.946 ac, Inflow Depth = 3.18" for 10 Year event
Inflow = 121.76 cfs @ 12.24 hrs, Volume= 12.160 af
Outflow = 120.45 cfs @ 12.26 hrs, Volume= 11.686 af, Atten= 1%, Lag= 1.4 min
Primary = 120.45 cfs @ 12.26 hrs, Volume= 11.686 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 453.60' Surf.Area= 13,600 sf Storage= 20,480 cf
Peak Elev= 455.78' @ 12.26 hrs Surf.Area= 18,000 sf Storage= 54,443 cf (33,963 cf above start)

Plug-Flow detention time= 57.9 min calculated for 11.216 af (92% of inflow)
Center-of-Mass det. time= 11.0 min (855.3 - 844.3)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	153,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	12,000	0	0
454.00	14,000	26,000	26,000
456.00	18,500	32,500	58,500
458.00	23,000	41,500	100,000
460.00	30,000	53,000	153,000

Device	Routing	Invert	Outlet Devices
#1	Primary	455.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=120.31 cfs @ 12.26 hrs HW=455.78' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 120.31 cfs @ 3.09 fps)

Pond P-G: Pond G

Inflow Area = 11.216 ac, Inflow Depth = 3.27" for 10 Year event
Inflow = 30.68 cfs @ 12.23 hrs, Volume= 3.057 af
Outflow = 35.12 cfs @ 12.26 hrs, Volume= 2.011 af, Atten= 0%, Lag= 1.7 min
Primary = 35.12 cfs @ 12.26 hrs, Volume= 2.011 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 460.14' @ 12.26 hrs Surf.Area= 11,000 sf Storage= 45,644 cf

Plug-Flow detention time= 166.8 min calculated for 2.011 af (66% of inflow)
Center-of-Mass det. time= 67.5 min (888.5 - 820.9)

Volume	Invert	Avail.Storage	Storage Description
#1	444.00'	45,644 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
444.00	5,000	0	0
446.00	6,322	11,322	11,322
448.00	8,500	14,822	26,144
450.00	11,000	19,500	45,644

Device	Routing	Invert	Outlet Devices
#1	Primary	459.80'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=34.78 cfs @ 12.26 hrs HW=460.14' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 34.78 cfs @ 2.05 fps)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-1: 1-1 (Design Point #1) Runoff Area=1,055,792 sf Runoff Depth=6.94"
Flow Length=575' Tc=29.9 min CN=87 Runoff=107.23 cfs 14.012 af

Subcatchment 1-10: 1-10 (Design Point #7) Runoff Area=957,026 sf Runoff Depth=6.82"
Flow Length=1,538' Tc=43.0 min CN=86 Runoff=80.61 cfs 12.481 af

Subcatchment 1-2: 1-2 Runoff Area=464,367 sf Runoff Depth=6.94"
Flow Length=500' Tc=17.2 min CN=87 Runoff=59.47 cfs 6.163 af

Subcatchment 1-3: 1-3 (Design Point #3) Runoff Area=85,780 sf Runoff Depth=6.82"
Flow Length=270' Tc=16.3 min CN=86 Runoff=11.10 cfs 1.119 af

Subcatchment 1-4: 1-4 (Design Point #4) Runoff Area=370,700 sf Runoff Depth=6.34"
Flow Length=930' Tc=59.7 min CN=82 Runoff=24.63 cfs 4.493 af

Subcatchment 1-5: 1-5) (Design Point #5) Runoff Area=1,295,601 sf Runoff Depth=6.34"
Flow Length=1,602' Tc=55.2 min CN=82 Runoff=89.77 cfs 15.703 af

Subcatchment 1-6: 1-6 Runoff Area=488,582 sf Runoff Depth=6.58"
Flow Length=500' Tc=17.2 min CN=84 Runoff=60.20 cfs 6.147 af

Subcatchment 1-7: 1-7 Runoff Area=1,246,456 sf Runoff Depth=7.30"
Flow Length=1,765' Tc=12.2 min CN=90 Runoff=187.58 cfs 17.403 af

Subcatchment 1-8: 1-8 Runoff Area=754,946 sf Runoff Depth=8.02"
Flow Length=1,470' Tc=6.4 min CN=96 Runoff=141.79 cfs 11.583 af

Subcatchment 1-9: 1-9 (Design Point #8) Runoff Area=364,441 sf Runoff Depth=6.94"
Flow Length=1,300' Tc=35.8 min CN=87 Runoff=33.96 cfs 4.837 af

Reach 1R: Reach between Pond F and G Avg. Depth=1.81' Max Vel=10.57 fps Inflow=295.60 cfs 24.882 af
n=0.030 L=250.0' S=0.0320 '/' Capacity=357.02 cfs Outflow=295.17 cfs 24.882 af

Reach 2R: Reach to Route 28 (Design Poi Avg. Depth=3.73' Max Vel=4.79 fps Inflow=357.93 cfs 29.982 af
n=0.030 L=1,000.0' S=0.0040 '/' Capacity=126.22 cfs Outflow=335.10 cfs 29.982 af

Pond 8P: Road Culvert Storage Peak Elev=25,052.53' Inflow=387.12 cfs 36.145 af
12.0" x 160.0' Culvert Outflow=387.12 cfs 36.145 af

Pond P-B: Pond B Peak Elev=460.59' Storage=161,315 cf Inflow=141.79 cfs 11.583 af
Outflow=124.46 cfs 8.699 af

Pond P-C,D: Pond C and D Peak Elev=457.06' Storage=24,681 cf Inflow=124.46 cfs 8.699 af
Outflow=115.66 cfs 8.699 af

Pond P-E: Pond E Peak Elev=457.43' Storage=61,149 cf Inflow=302.51 cfs 26.102 af
Outflow=298.59 cfs 25.356 af

Pond P-F: Pond E Peak Elev=456.42' Storage=66,380 cf Inflow=298.59 cfs 25.356 af
Outflow=295.60 cfs 24.882 af

Pond P-G: Pond G Peak Elev=460.30' Storage=45,644 cf Inflow=60.20 cfs 6.147 af
Outflow=63.28 cfs 5.100 af

Total Runoff Area = 162.619 ac Runoff Volume = 93.939 af Average Runoff Depth = 6.93"
84.59% Pervious Area = 137.566 ac 15.41% Impervious Area = 25.053 ac

Subcatchment 1-1: 1-1 (Design Point #1)

Runoff = 107.23 cfs @ 12.39 hrs, Volume= 14.012 af, Depth= 6.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
851,042	86	Woods/grass comb., Poor, HSG D
68,407	98	Paved parking & roofs
95,207	91	Gravel roads, HSG D
41,136	79	50-75% Grass cover, Fair, HSG C
1,055,792	87	Weighted Average
987,385		Pervious Area
68,407		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	150	0.0270	0.10		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
3.6	325	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	70	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	30	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.9	575	Total			

Subcatchment 1-10: 1-10 (Design Point #7)

Runoff = 80.61 cfs @ 12.57 hrs, Volume= 12.481 af, Depth= 6.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
342,945	86	Woods over rock
452,081	82	Woods/grass comb., Fair, HSG D
162,000	98	Bare Rock
957,026	86	Weighted Average
795,026		Pervious Area
162,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.1	20	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.5	1,110	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.8	308	0.0450	1.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
43.0	1,538	Total			

Subcatchment 1-2: 1-2

Runoff = 59.47 cfs @ 12.23 hrs, Volume= 6.163 af, Depth= 6.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
424,327	86	Woods/grass comb., Poor, HSG D
13,600	98	Bare Rock and Water
26,440	89	<50% Grass cover, Poor, HSG D
464,367	87	Weighted Average
450,767		Pervious Area
13,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 1-3: 1-3 (Design Point #3)

Runoff = 11.10 cfs @ 12.22 hrs, Volume= 1.119 af, Depth= 6.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
85,780	86	Woods/grass comb., Poor, HSG D
85,780		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	58	0.0300	0.09		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	62	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	150	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.3	270	Total			

Subcatchment 1-4: 1-4 (Design Point #4)

Runoff = 24.63 cfs @ 12.80 hrs, Volume= 4.493 af, Depth= 6.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
370,700	82	Woods/grass comb., Poor, HSG C
370,700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.7	150	0.0130	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
26.0	780	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.7	930	Total			

Subcatchment 1-5: 1-5) (Design Point #5)

Runoff = 89.77 cfs @ 12.70 hrs, Volume= 15.703 af, Depth= 6.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
1,295,601	82	Woods/grass comb., Poor, HSG C
1,295,601		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	150	0.0400	0.12		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
14.1	642	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	120	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	450	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	240	0.0660	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
55.2	1,602	Total			

Subcatchment 1-6: 1-6

Runoff = 60.20 cfs @ 12.23 hrs, Volume= 6.147 af, Depth= 6.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
362,256	82	Woods/grass comb., Poor, HSG C
86,776	91	Woods/grass comb., Poor, HSG D
6,322	98	Water
33,228	91	Gravel roads, HSG D
488,582	84	Weighted Average
482,260		Pervious Area
6,322		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 1-7: 1-7

Runoff = 187.58 cfs @ 12.16 hrs, Volume= 17.403 af, Depth= 7.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
659,790	91	Rubble with trees
333,851	82	Woods/grass comb., Fair, HSG D
61,264	98	Water
186,280	98	Bare Rock
5,271	86	Grass Area around ponds
1,246,456	90	Weighted Average
998,912		Pervious Area
247,544		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.1100	3.09		**Sheet Flow, Ridge** Smooth surfaces n= 0.011 P2= 3.50"
1.0	220	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.1	220	0.0300	1.73		**Shallow Concentrated Flow, Steep Slope** Nearly Bare & Untilled Kv= 10.0 fps
3.8	250	0.0120	1.10		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.3	375	0.0750	2.74		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
2.2	550	0.0650	4.10		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.2	1,765	Total			

Subcatchment 1-8: 1-8

Runoff = 141.79 cfs @ 12.09 hrs, Volume= 11.583 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
200,000	91	Woods over rock
34,000	98	Water
520,946	98	Bare Rock
754,946	96	Weighted Average
200,000		Pervious Area
554,946		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.1330	3.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
3.1	935	0.0620	5.05		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.5	385	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	1,470	Total			

Subcatchment 1-9: 1-9 (Design Point #8)

Runoff = 33.96 cfs @ 12.46 hrs, Volume= 4.837 af, Depth= 6.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
325,941	86	Woods over rock
38,500	98	Bare Rock
364,441	87	Weighted Average
325,941		Pervious Area
38,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0730	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
5.3	300	0.0360	0.95		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	520	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	160	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	170	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
35.8	1,300	Total			

Reach 1R: Reach between Pond F and G

Inflow Area = 45.946 ac, Inflow Depth = 6.50" for 100 Year event
Inflow = 295.60 cfs @ 12.20 hrs, Volume= 24.882 af
Outflow = 295.17 cfs @ 12.22 hrs, Volume= 24.882 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.57 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.11 fps, Avg. Travel Time= 1.3 min

Peak Storage= 6,987 cf @ 12.21 hrs, Average Depth at Peak Storage= 1.81'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 357.02 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 250.0' Slope= 0.0320 '/'
Inlet Invert= 454.00', Outlet Invert= 446.00'

‡

Reach 2R: Reach to Route 28 (Design Point #2)

Inflow Area = 57.162 ac, Inflow Depth = 6.29" for 100 Year event
Inflow = 357.93 cfs @ 12.21 hrs, Volume= 29.982 af
Outflow = 335.10 cfs @ 12.32 hrs, Volume= 29.982 af, Atten= 6%, Lag= 6.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.79 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 13.5 min

Peak Storage= 70,047 cf @ 12.27 hrs, Average Depth at Peak Storage= 3.73'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 126.22 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 1,000.0' Slope= 0.0040 '/'
Inlet Invert= 446.00', Outlet Invert= 442.00'

‡

Pond 8P: Road Culvert Storage

Inflow Area = 67.823 ac, Inflow Depth = 6.40" for 100 Year event
Inflow = 387.12 cfs @ 12.32 hrs, Volume= 36.145 af
Outflow = 387.12 cfs @ 12.32 hrs, Volume= 36.145 af, Atten= 0%, Lag= 0.0 min
Primary = 387.12 cfs @ 12.32 hrs, Volume= 36.145 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 25,052.53' @ 12.32 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**12.0" x 160.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 441.84' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=386.93 cfs @ 12.32 hrs HW=25,029.19' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 386.93 cfs @ 492.66 fps)

Pond P-B: Pond B

Inflow Area = 17.331 ac, Inflow Depth = 8.02" for 100 Year event
Inflow = 141.79 cfs @ 12.09 hrs, Volume= 11.583 af
Outflow = 124.46 cfs @ 12.13 hrs, Volume= 8.699 af, Atten= 12%, Lag= 2.7 min
Primary = 124.46 cfs @ 12.13 hrs, Volume= 8.699 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 358.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 460.59' @ 12.13 hrs Surf.Area= 46,487 sf Storage= 161,315 cf

Plug-Flow detention time= 168.3 min calculated for 8.699 af (75% of inflow)
Center-of-Mass det. time= 82.0 min (833.6 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	229,100 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	25,000	0	0
458.00	34,000	59,000	59,000
459.80	40,000	66,600	125,600
460.00	45,000	8,500	134,100
462.00	50,000	95,000	229,100

Device	Routing	Invert	Outlet Devices
#1	Primary	459.80'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=124.26 cfs @ 12.13 hrs HW=460.59' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 124.26 cfs @ 3.13 fps)

Pond P-C,D: Pond C and D

Inflow Area = 17.331 ac, Inflow Depth = 6.02" for 100 Year event
Inflow = 124.46 cfs @ 12.13 hrs, Volume= 8.699 af
Outflow = 115.66 cfs @ 12.18 hrs, Volume= 8.699 af, Atten= 7%, Lag= 2.5 min
Primary = 115.66 cfs @ 12.18 hrs, Volume= 8.699 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 357.00' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 457.06' @ 12.18 hrs Surf.Area= 26,385 sf Storage= 24,681 cf

Plug-Flow detention time= 6.3 min calculated for 8.699 af (100% of inflow)
Center-of-Mass det. time= 6.2 min (839.8 - 833.6)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	214,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	20,000	0	0
458.00	32,000	52,000	52,000
460.00	40,000	72,000	124,000
462.00	50,000	90,000	214,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**40.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=115.54 cfs @ 12.18 hrs HW=457.06' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 115.54 cfs @ 2.72 fps)

Pond P-E: Pond E

Inflow Area = 45.946 ac, Inflow Depth = 6.82" for 100 Year event
Inflow = 302.51 cfs @ 12.17 hrs, Volume= 26.102 af
Outflow = 298.59 cfs @ 12.19 hrs, Volume= 25.356 af, Atten= 1%, Lag= 1.3 min
Primary = 298.59 cfs @ 12.19 hrs, Volume= 25.356 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 457.43' @ 12.19 hrs Surf.Area= 21,707 sf Storage= 61,149 cf

Plug-Flow detention time= 32.3 min calculated for 25.356 af (97% of inflow)
Center-of-Mass det. time= 15.0 min (814.8 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	127,000 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
456.00	18,500	32,500	32,500
458.00	23,000	41,500	74,000
460.00	30,000	53,000	127,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=298.37 cfs @ 12.19 hrs HW=457.42' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 298.37 cfs @ 4.19 fps)

Pond P-F: Pond E

Inflow Area = 45.946 ac, Inflow Depth = 6.62" for 100 Year event
Inflow = 298.59 cfs @ 12.19 hrs, Volume= 25.356 af
Outflow = 295.60 cfs @ 12.20 hrs, Volume= 24.882 af, Atten= 1%, Lag= 1.1 min
Primary = 295.60 cfs @ 12.20 hrs, Volume= 24.882 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 453.60' Surf.Area= 13,600 sf Storage= 20,480 cf
Peak Elev= 456.42' @ 12.20 hrs Surf.Area= 19,435 sf Storage= 66,380 cf (45,900 cf above start)

Plug-Flow detention time= 34.4 min calculated for 24.412 af (96% of inflow)
Center-of-Mass det. time= 8.0 min (822.9 - 814.8)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	153,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	12,000	0	0
454.00	14,000	26,000	26,000
456.00	18,500	32,500	58,500
458.00	23,000	41,500	100,000
460.00	30,000	53,000	153,000

Device	Routing	Invert	Outlet Devices
#1	Primary	455.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=295.31 cfs @ 12.20 hrs HW=456.41' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 295.31 cfs @ 4.17 fps)

Pond P-G: Pond G

Inflow Area = 11.216 ac, Inflow Depth = 6.58" for 100 Year event
Inflow = 60.20 cfs @ 12.23 hrs, Volume= 6.147 af
Outflow = 63.28 cfs @ 12.23 hrs, Volume= 5.100 af, Atten= 0%, Lag= 0.2 min
Primary = 63.28 cfs @ 12.23 hrs, Volume= 5.100 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 460.30' @ 12.23 hrs Surf.Area= 11,000 sf Storage= 45,644 cf

Plug-Flow detention time= 108.8 min calculated for 5.099 af (83% of inflow)
Center-of-Mass det. time= 40.1 min (841.5 - 801.4)

Volume	Invert	Avail.Storage	Storage Description
#1	444.00'	45,644 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
444.00	5,000	0	0
446.00	6,322	11,322	11,322
448.00	8,500	14,822	26,144
450.00	11,000	19,500	45,644

Device	Routing	Invert	Outlet Devices
#1	Primary	459.80'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=62.89 cfs @ 12.23 hrs HW=460.30' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 62.89 cfs @ 2.49 fps)

Subcat Reach Pond Link

Drainage Diagram for E17 064 850 Route 28 Post 1
Prepared by {enter your company name here} 1/8/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
0.944	79	50-75% Grass cover, Fair, HSG C (2-1)
6.202	82	Woods/grass comb., Fair, HSG D (2-10)
38.253	82	Woods/grass comb., Poor, HSG C (2-4,2-5)
5.948	86	Woods over rock (2-10,2-9)
21.506	86	Woods/grass comb., Poor, HSG D (2-1,2-3)
2.186	91	Gravel roads, HSG D (2-1)
3.381	98	Bare Rock (2-10,2-9)
1.570	98	Paved parking & roofs (2-1)
79.991		

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2-1: 2-1 (Design Point #1) Runoff Area=1,055,792 sf Runoff Depth=1.48"
Flow Length=575' Tc=29.9 min CN=87 Runoff=23.79 cfs 2.989 af

Subcatchment 2-10: 2-10 (Design Point #7) Runoff Area=620,155 sf Runoff Depth=1.48"
Flow Length=1,500' Tc=41.3 min CN=87 Runoff=11.95 cfs 1.756 af

Subcatchment 2-3: 2-3 (Design Point #3) Runoff Area=85,780 sf Runoff Depth=1.41"
Flow Length=270' Tc=16.3 min CN=86 Runoff=2.38 cfs 0.231 af

Subcatchment 2-4: 2-4 (Design Point #4) Runoff Area=370,700 sf Runoff Depth=1.15"
Flow Length=930' Tc=59.7 min CN=82 Runoff=4.43 cfs 0.814 af

Subcatchment 2-5: 2-5 (Design Point #5) Runoff Area=1,295,601 sf Runoff Depth=1.15"
Flow Length=1,602' Tc=55.2 min CN=82 Runoff=16.18 cfs 2.843 af

Subcatchment 2-9: 2-9 (Design Point #8) Runoff Area=56,390 sf Runoff Depth=1.63"
Flow Length=685' Tc=19.4 min CN=89 Runoff=1.69 cfs 0.176 af

Total Runoff Area = 79.991 ac Runoff Volume = 8.810 af Average Runoff Depth = 1.32"
93.81% Pervious Area = 75.040 ac 6.19% Impervious Area = 4.952 ac

Subcatchment 2-1: 2-1 (Design Point #1)

Runoff = 23.79 cfs @ 12.42 hrs, Volume= 2.989 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
851,042	86	Woods/grass comb., Poor, HSG D
68,407	98	Paved parking & roofs
95,207	91	Gravel roads, HSG D
41,136	79	50-75% Grass cover, Fair, HSG C
1,055,792	87	Weighted Average
987,385		Pervious Area
68,407		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	150	0.0270	0.10		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
3.6	325	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	70	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	30	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.9	575	Total			

Subcatchment 2-10: 2-10 (Design Point #7)

Runoff = 11.95 cfs @ 12.57 hrs, Volume= 1.756 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
218,000	86	Woods over rock
270,155	82	Woods/grass comb., Fair, HSG D
132,000	98	Bare Rock
620,155	87	Weighted Average
488,155		Pervious Area
132,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.1	20	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	830	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.5	370	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	180	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.3	1,500	Total			

Subcatchment 2-3: 2-3 (Design Point #3)

Runoff = 2.38 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
85,780	86	Woods/grass comb., Poor, HSG D
85,780		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	58	0.0300	0.09		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	62	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	150	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.3	270	Total			

Subcatchment 2-4: 2-4 (Design Point #4)

Runoff = 4.43 cfs @ 12.81 hrs, Volume= 0.814 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
370,700	82	Woods/grass comb., Poor, HSG C
370,700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.7	150	0.0130	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
26.0	780	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.7	930	Total			

Subcatchment 2-5: 2-5 (Design Point #5)

Runoff = 16.18 cfs @ 12.76 hrs, Volume= 2.843 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
1,295,601	82	Woods/grass comb., Poor, HSG C
1,295,601		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	150	0.0400	0.12		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
14.1	642	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	120	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	450	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	240	0.0660	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
55.2	1,602	Total			

Subcatchment 2-9: 2-9 (Design Point #8)

Runoff = 1.69 cfs @ 12.27 hrs, Volume= 0.176 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
41,100	86	Woods over rock
15,290	98	Bare Rock
56,390	89	Weighted Average
41,100		Pervious Area
15,290		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	130	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	100	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	100	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.2	255	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	685	Total			

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2-1: 2-1 (Design Point #1) Runoff Area=1,055,792 sf Runoff Depth=3.57"
Flow Length=575' Tc=29.9 min CN=87 Runoff=56.72 cfs 7.205 af

Subcatchment 2-10: 2-10 (Design Point #7) Runoff Area=620,155 sf Runoff Depth=3.57"
Flow Length=1,500' Tc=41.3 min CN=87 Runoff=28.49 cfs 4.232 af

Subcatchment 2-3: 2-3 (Design Point #3) Runoff Area=85,780 sf Runoff Depth=3.47"
Flow Length=270' Tc=16.3 min CN=86 Runoff=5.81 cfs 0.569 af

Subcatchment 2-4: 2-4 (Design Point #4) Runoff Area=370,700 sf Runoff Depth=3.08"
Flow Length=930' Tc=59.7 min CN=82 Runoff=12.17 cfs 2.184 af

Subcatchment 2-5: 2-5 (Design Point #5) Runoff Area=1,295,601 sf Runoff Depth=3.08"
Flow Length=1,602' Tc=55.2 min CN=82 Runoff=44.28 cfs 7.632 af

Subcatchment 2-9: 2-9 (Design Point #8) Runoff Area=56,390 sf Runoff Depth=3.77"
Flow Length=685' Tc=19.4 min CN=89 Runoff=3.82 cfs 0.407 af

Total Runoff Area = 79.991 ac Runoff Volume = 22.229 af Average Runoff Depth = 3.33"
93.81% Pervious Area = 75.040 ac 6.19% Impervious Area = 4.952 ac

Subcatchment 2-1: 2-1 (Design Point #1)

Runoff = 56.72 cfs @ 12.39 hrs, Volume= 7.205 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
851,042	86	Woods/grass comb., Poor, HSG D
68,407	98	Paved parking & roofs
95,207	91	Gravel roads, HSG D
41,136	79	50-75% Grass cover, Fair, HSG C
1,055,792	87	Weighted Average
987,385		Pervious Area
68,407		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	150	0.0270	0.10		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
3.6	325	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	70	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	30	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.9	575	Total			

Subcatchment 2-10: 2-10 (Design Point #7)

Runoff = 28.49 cfs @ 12.53 hrs, Volume= 4.232 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
218,000	86	Woods over rock
270,155	82	Woods/grass comb., Fair, HSG D
132,000	98	Bare Rock
620,155	87	Weighted Average
488,155		Pervious Area
132,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.1	20	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	830	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.5	370	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	180	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.3	1,500	Total			

Subcatchment 2-3: 2-3 (Design Point #3)

Runoff = 5.81 cfs @ 12.22 hrs, Volume= 0.569 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
85,780	86	Woods/grass comb., Poor, HSG D
85,780		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	58	0.0300	0.09		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	62	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	150	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.3	270	Total			

Subcatchment 2-4: 2-4 (Design Point #4)

Runoff = 12.17 cfs @ 12.80 hrs, Volume= 2.184 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
370,700	82	Woods/grass comb., Poor, HSG C
370,700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.7	150	0.0130	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
26.0	780	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.7	930	Total			

Subcatchment 2-5: 2-5 (Design Point #5)

Runoff = 44.28 cfs @ 12.75 hrs, Volume= 7.632 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
1,295,601	82	Woods/grass comb., Poor, HSG C
1,295,601		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	150	0.0400	0.12		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
14.1	642	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	120	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	450	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	240	0.0660	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
55.2	1,602	Total			

Subcatchment 2-9: 2-9 (Design Point #8)

Runoff = 3.82 cfs @ 12.26 hrs, Volume= 0.407 af, Depth= 3.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
41,100	86	Woods over rock
15,290	98	Bare Rock
56,390	89	Weighted Average
41,100		Pervious Area
15,290		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	130	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	100	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	100	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.2	255	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	685	Total			

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2-1: 2-1 (Design Point #1) Runoff Area=1,055,792 sf Runoff Depth=6.94"
Flow Length=575' Tc=29.9 min CN=87 Runoff=107.23 cfs 14.012 af

Subcatchment 2-10: 2-10 (Design Point #7) Runoff Area=620,155 sf Runoff Depth=6.94"
Flow Length=1,500' Tc=41.3 min CN=87 Runoff=53.95 cfs 8.230 af

Subcatchment 2-3: 2-3 (Design Point #3) Runoff Area=85,780 sf Runoff Depth=6.82"
Flow Length=270' Tc=16.3 min CN=86 Runoff=11.10 cfs 1.119 af

Subcatchment 2-4: 2-4 (Design Point #4) Runoff Area=370,700 sf Runoff Depth=6.34"
Flow Length=930' Tc=59.7 min CN=82 Runoff=24.63 cfs 4.493 af

Subcatchment 2-5: 2-5 (Design Point #5) Runoff Area=1,295,601 sf Runoff Depth=6.34"
Flow Length=1,602' Tc=55.2 min CN=82 Runoff=89.77 cfs 15.703 af

Subcatchment 2-9: 2-9 (Design Point #8) Runoff Area=56,390 sf Runoff Depth=7.18"
Flow Length=685' Tc=19.4 min CN=89 Runoff=7.04 cfs 0.774 af

Total Runoff Area = 79.991 ac Runoff Volume = 44.332 af Average Runoff Depth = 6.65"
93.81% Pervious Area = 75.040 ac 6.19% Impervious Area = 4.952 ac

Subcatchment 2-1: 2-1 (Design Point #1)

Runoff = 107.23 cfs @ 12.39 hrs, Volume= 14.012 af, Depth= 6.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
851,042	86	Woods/grass comb., Poor, HSG D
68,407	98	Paved parking & roofs
95,207	91	Gravel roads, HSG D
41,136	79	50-75% Grass cover, Fair, HSG C
1,055,792	87	Weighted Average
987,385		Pervious Area
68,407		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2	150	0.0270	0.10		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
3.6	325	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	70	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.7	30	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
29.9	575	Total			

Subcatchment 2-10: 2-10 (Design Point #7)

Runoff = 53.95 cfs @ 12.53 hrs, Volume= 8.230 af, Depth= 6.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
218,000	86	Woods over rock
270,155	82	Woods/grass comb., Fair, HSG D
132,000	98	Bare Rock
620,155	87	Weighted Average
488,155		Pervious Area
132,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.1	20	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	830	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.5	370	0.0270	0.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.3	180	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
41.3	1,500	Total			

Subcatchment 2-3: 2-3 (Design Point #3)

Runoff = 11.10 cfs @ 12.22 hrs, Volume= 1.119 af, Depth= 6.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
85,780	86	Woods/grass comb., Poor, HSG D
85,780		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	58	0.0300	0.09		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	62	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.4	150	0.0130	0.57		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.3	270	Total			

Subcatchment 2-4: 2-4 (Design Point #4)

Runoff = 24.63 cfs @ 12.80 hrs, Volume= 4.493 af, Depth= 6.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
370,700	82	Woods/grass comb., Poor, HSG C
370,700		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.7	150	0.0130	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
26.0	780	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
59.7	930	Total			

Subcatchment 2-5: 2-5 (Design Point #5)

Runoff = 89.77 cfs @ 12.70 hrs, Volume= 15.703 af, Depth= 6.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
1,295,601	82	Woods/grass comb., Poor, HSG C
1,295,601		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	150	0.0400	0.12		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
14.1	642	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	120	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	450	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	240	0.0660	1.28		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
55.2	1,602	Total			

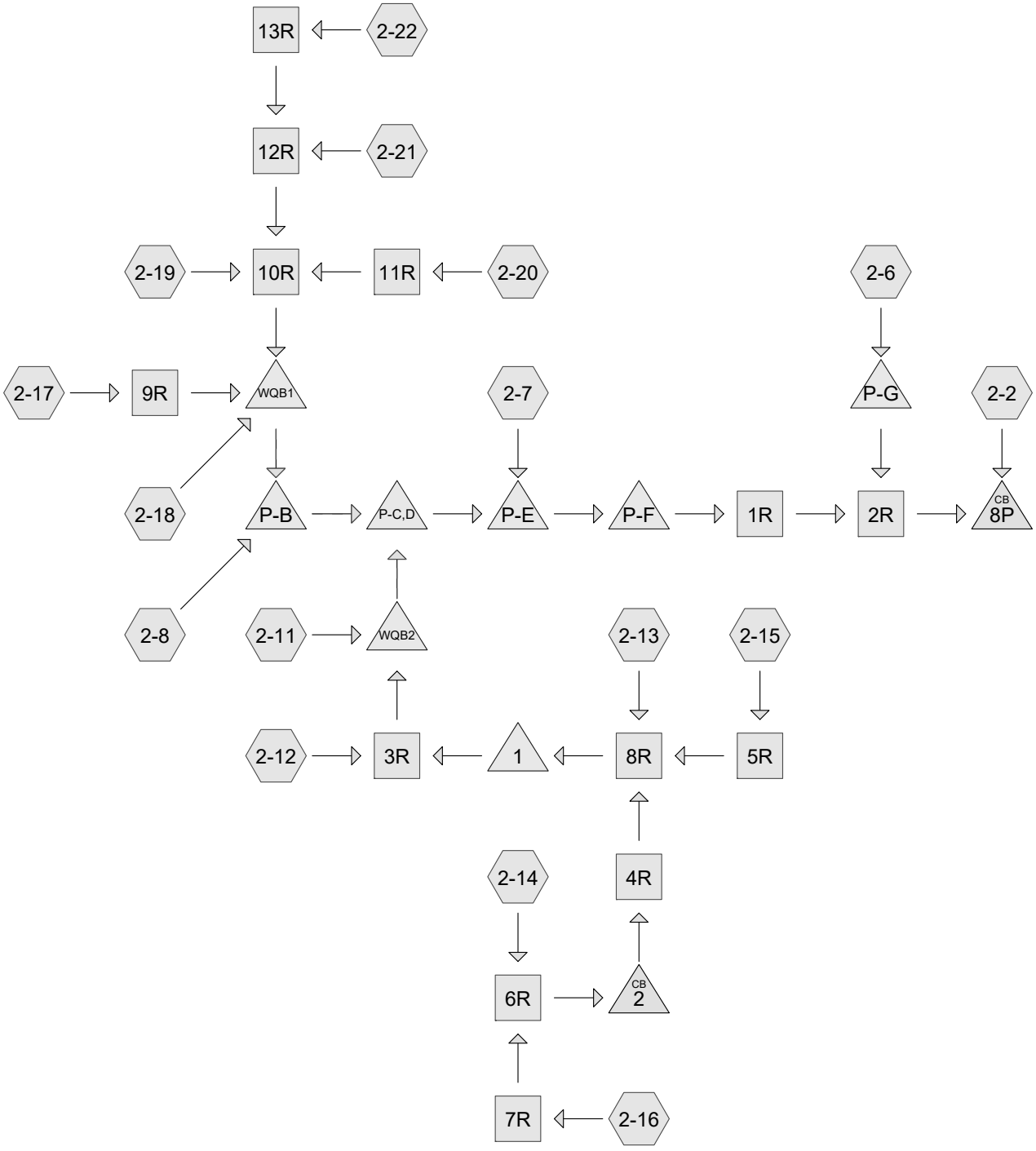
Subcatchment 2-9: 2-9 (Design Point #8)

Runoff = 7.04 cfs @ 12.26 hrs, Volume= 0.774 af, Depth= 7.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
41,100	86	Woods over rock
15,290	98	Bare Rock
56,390	89	Weighted Average
41,100		Pervious Area
15,290		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.3	130	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	100	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	100	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.2	255	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	685	Total			



Subcat Reach Pond Link

Drainage Diagram for E17 064 850 Route 28 Post 2
Prepared by Medenbach & Eggers 5/17/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcats)
16.205	82	Woods/grass comb., Fair, HSG D (2-11,2-18,2-6,2-7)
9.862	86	Woods/grass comb., Poor, HSG D (2-2,2-7)
0.607	89	<50% Grass cover, Poor, HSG D (2-2)
13.676	91	Gravel roads, HSG D (2-12,2-13,2-14,2-15,2-16,2-17,2-19,2-20,2-21,2-22,2-6)
10.062	91	Woods over rock (2-12,2-14,2-7,2-8)
6.540	98	Bare Rock (2-12,2-2,2-7,2-8)
20.298	98	Paved parking & roofs (2-11,2-13,2-14,2-15,2-16,2-17,2-18,2-19,2-20,2-21,2-22)
2.332	98	Water (2-6,2-7,2-8)
79.583		

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2-11: 2-11 Runoff Area=23,000 sf Runoff Depth=1.21"
Tc=6.0 min CN=83 Runoff=0.74 cfs 0.053 af

Subcatchment 2-12: 2-12 Runoff Area=254,085 sf Runoff Depth=1.97"
Flow Length=1,415' Tc=30.2 min CN=93 Runoff=7.45 cfs 0.957 af

Subcatchment 2-13: 2-13 Runoff Area=135,234 sf Runoff Depth=2.06"
Flow Length=600' Slope=0.0500 '/' Tc=6.4 min CN=94 Runoff=7.16 cfs 0.533 af

Subcatchment 2-14: 2-14 Runoff Area=182,245 sf Runoff Depth=2.06"
Flow Length=600' Slope=0.0500 '/' Tc=6.4 min CN=94 Runoff=9.65 cfs 0.719 af

Subcatchment 2-15: 2-15 Runoff Area=260,970 sf Runoff Depth=2.26"
Tc=6.0 min CN=96 Runoff=14.93 cfs 1.127 af

Subcatchment 2-16: 2-16 Runoff Area=114,850 sf Runoff Depth=2.26"
Tc=6.0 min CN=96 Runoff=6.57 cfs 0.496 af

Subcatchment 2-17: 2-17 Runoff Area=132,260 sf Runoff Depth=2.26"
Tc=6.0 min CN=96 Runoff=7.57 cfs 0.571 af

Subcatchment 2-18: 2-18 Runoff Area=73,420 sf Runoff Depth=1.71"
Tc=6.0 min CN=90 Runoff=3.37 cfs 0.240 af

Subcatchment 2-19: 2-19 Runoff Area=85,798 sf Runoff Depth=2.16"
Tc=6.0 min CN=95 Runoff=4.76 cfs 0.354 af

Subcatchment 2-2: 2-2 Runoff Area=464,367 sf Runoff Depth=1.48"
Flow Length=500' Tc=17.2 min CN=87 Runoff=13.25 cfs 1.315 af

Subcatchment 2-20: 2-20 Runoff Area=254,000 sf Runoff Depth=2.26"
Tc=6.0 min CN=96 Runoff=14.53 cfs 1.097 af

Subcatchment 2-21: 2-21 Runoff Area=113,600 sf Runoff Depth=2.06"
Tc=6.0 min CN=94 Runoff=6.10 cfs 0.448 af

Subcatchment 2-22: 2-22 Runoff Area=100,000 sf Runoff Depth=2.26"
Tc=6.0 min CN=96 Runoff=5.72 cfs 0.432 af

Subcatchment 2-6: 2-6 Runoff Area=488,582 sf Runoff Depth=1.27"
Flow Length=500' Tc=17.2 min CN=84 Runoff=11.92 cfs 1.190 af

Subcatchment 2-7: 2-7 Runoff Area=552,745 sf Runoff Depth=1.55"
Flow Length=1,140' Tc=34.1 min CN=88 Runoff=12.34 cfs 1.643 af

Subcatchment 2-8: 2-8 Runoff Area=231,489 sf Runoff Depth=2.36"
Flow Length=335' Tc=2.8 min CN=97 Runoff=15.24 cfs 1.046 af

Reach 1R: Reach between Pond F and G Avg. Depth=0.64' Max Vel=5.91 fps Inflow=45.29 cfs 7.944 af
n=0.030 L=250.0' S=0.0320 '/' Capacity=357.02 cfs Outflow=45.23 cfs 7.944 af

Reach 2R: Reach to Route 28 (Design Point Avg. Depth=1.16' Max Vel=2.92 fps Inflow=50.80 cfs 8.874 af
n=0.030 L=1,000.0' S=0.0040 '/' Capacity=126.22 cfs Outflow=45.40 cfs 8.868 af

Reach 3R: DRY SWALE Avg. Depth=0.65' Max Vel=6.10 fps Inflow=37.22 cfs 3.831 af
n=0.030 L=300.0' S=0.0330 '/' Capacity=272.37 cfs Outflow=37.10 cfs 3.831 af

Reach 4R: DRY SWALE Avg. Depth=0.23' Max Vel=6.85 fps Inflow=13.19 cfs 1.214 af
n=0.030 L=210.0' S=0.1495 '/' Capacity=579.77 cfs Outflow=13.18 cfs 1.214 af

Reach 5R: DRY SWALE Avg. Depth=0.52' Max Vel=2.97 fps Inflow=14.93 cfs 1.127 af
n=0.030 L=580.0' S=0.0103 '/' Capacity=152.50 cfs Outflow=13.84 cfs 1.127 af

Reach 6R: DRY SWALE Avg. Depth=0.48' Max Vel=3.06 fps Inflow=13.30 cfs 1.214 af
n=0.030 L=250.0' S=0.0120 '/' Capacity=164.24 cfs Outflow=13.19 cfs 1.214 af

Reach 7R: DRY SWALE Avg. Depth=0.31' Max Vel=2.19 fps Inflow=6.57 cfs 0.496 af
n=0.030 L=580.0' S=0.0103 '/' Capacity=152.50 cfs Outflow=5.87 cfs 0.496 af

Reach 8R: DRY SWALE Avg. Depth=0.81' Max Vel=4.15 fps Inflow=32.32 cfs 2.875 af
n=0.030 L=250.0' S=0.0120 '/' Capacity=164.24 cfs Outflow=32.14 cfs 2.875 af

Reach 9R: DRY SWALE Avg. Depth=0.24' Max Vel=3.61 fps Inflow=7.57 cfs 0.571 af
n=0.030 L=460.0' S=0.0391 '/' Capacity=296.59 cfs Outflow=7.29 cfs 0.571 af

Reach 10R: DRY SWALE Avg. Depth=0.55' Max Vel=5.09 fps Inflow=25.83 cfs 2.331 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=25.32 cfs 2.331 af

Reach 11R: DRY SWALE Avg. Depth=0.38' Max Vel=4.13 fps Inflow=14.53 cfs 1.097 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=13.91 cfs 1.097 af

Reach 12R: DRY SWALE Avg. Depth=0.29' Max Vel=3.49 fps Inflow=8.95 cfs 0.880 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=8.79 cfs 0.880 af

Reach 13R: DRY SWALE Avg. Depth=0.29' Max Vel=2.05 fps Inflow=5.72 cfs 0.432 af
n=0.030 L=600.0' S=0.0100 '/' Capacity=149.93 cfs Outflow=5.03 cfs 0.432 af

Pond 1: Culvert Peak Elev=480.61' Storage=334 cf Inflow=32.14 cfs 2.875 af
36.0" x 60.0' Culvert Outflow=32.09 cfs 2.875 af

Pond 2: Culvert Peak Elev=479.49' Inflow=13.19 cfs 1.214 af
36.0" x 60.0' Culvert Outflow=13.19 cfs 1.214 af

Pond 8P: Road Culvert Storage (Design Point #2) Peak Elev=828.61' Inflow=48.47 cfs 10.183 af
12.0" x 160.0' Culvert Outflow=48.47 cfs 10.183 af

Pond P-B: Pond B Peak Elev=460.50' Storage=159,090 cf Inflow=28.57 cfs 4.179 af
Primary=10.69 cfs 3.962 af Secondary=0.00 cfs 0.000 af Outflow=10.69 cfs 3.962 af

Pond P-C,D: Pond C and D Peak Elev=456.99' Storage=22,709 cf Inflow=38.89 cfs 7.770 af
Outflow=36.96 cfs 7.522 af

Pond P-E: Pond E Peak Elev=456.42' Storage=40,523 cf Inflow=49.07 cfs 9.165 af
Outflow=48.34 cfs 8.418 af

Pond P-F: Pond E Peak Elev=455.40' Storage=47,854 cf Inflow=48.34 cfs 8.418 af
Outflow=45.29 cfs 7.944 af

Pond P-G: Pond G Peak Elev=446.16' Storage=12,365 cf Inflow=11.92 cfs 1.190 af
Outflow=11.54 cfs 0.930 af

Pond WQB1: Water Quality Basin #1 Peak Elev=467.74' Storage=81,551 cf Inflow=33.71 cfs 3.142 af
Primary=24.00 cfs 3.134 af Secondary=0.00 cfs 0.000 af Outflow=24.00 cfs 3.134 af

Pond WQB2: Water Quality Basin #2 Peak Elev=462.65' Storage=72,870 cf Inflow=37.52 cfs 3.885 af
Primary=32.71 cfs 3.807 af Secondary=0.00 cfs 0.000 af Outflow=32.71 cfs 3.807 af

Total Runoff Area = 79.583 ac Runoff Volume = 12.221 af Average Runoff Depth = 1.84"
63.35% Pervious Area = 50.413 ac 36.65% Impervious Area = 29.171 ac

Subcatchment 2-11: 2-11

Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
22,000	82	Woods/grass comb., Fair, HSG D
1,000	98	Paved parking & roofs
23,000	83	Weighted Average
22,000		Pervious Area
1,000		Impervious Area

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

Subcatchment 2-12: 2-12

Runoff = 7.45 cfs @ 12.39 hrs, Volume= 0.957 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
164,105	91	Woods over rock
27,182	91	Gravel roads, HSG D
62,798	98	Bare Rock
254,085	93	Weighted Average
191,287		Pervious Area
62,798		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	100	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	260	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.5	390	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	565	0.0620	2.49		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
30.2	1,415	Total			

Subcatchment 2-13: 2-13

Runoff = 7.16 cfs @ 12.09 hrs, Volume= 0.533 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
85,900	91	Gravel roads, HSG D
49,334	98	Paved parking & roofs
135,234	94	Weighted Average
85,900		Pervious Area
49,334		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.62		**Sheet Flow, Ridge** Fallow n= 0.050 P2= 3.50"
3.7	500	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.4	600	Total			

Subcatchment 2-14: 2-14

Runoff = 9.65 cfs @ 12.09 hrs, Volume= 0.719 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
18,778	91	Gravel roads, HSG D
77,612	98	Paved parking & roofs
85,855	91	Woods over rock
182,245	94	Weighted Average
104,633		Pervious Area
77,612		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.62		**Sheet Flow, Ridge** Fallow n= 0.050 P2= 3.50"
3.7	500	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.4	600	Total			

Subcatchment 2-15: 2-15

Runoff = 14.93 cfs @ 12.08 hrs, Volume= 1.127 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
65,300	91	Gravel roads, HSG D
195,670	98	Paved parking & roofs
260,970	96	Weighted Average
65,300		Pervious Area
195,670		Impervious Area

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

Subcatchment 2-16: 2-16

Runoff = 6.57 cfs @ 12.08 hrs, Volume= 0.496 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
38,185	91	Gravel roads, HSG D
76,665	98	Paved parking & roofs
114,850	96	Weighted Average
38,185		Pervious Area
76,665		Impervious Area

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

Subcatchment 2-17: 2-17

Runoff = 7.57 cfs @ 12.08 hrs, Volume= 0.571 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
32,100	91	Gravel roads, HSG D
100,160	98	Paved parking & roofs
132,260	96	Weighted Average
32,100		Pervious Area
100,160		Impervious Area

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

Subcatchment 2-18: 2-18

Runoff = 3.37 cfs @ 12.09 hrs, Volume= 0.240 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
34,760	82	Woods/grass comb., Fair, HSG D
38,660	98	Paved parking & roofs
73,420	90	Weighted Average
34,760		Pervious Area
38,660		Impervious Area

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

Subcatchment 2-19: 2-19

Runoff = 4.76 cfs @ 12.08 hrs, Volume= 0.354 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
35,798	91	Gravel roads, HSG D
50,000	98	Paved parking & roofs
85,798	95	Weighted Average
35,798		Pervious Area
50,000		Impervious Area

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

Subcatchment 2-2: 2-2

Runoff = 13.25 cfs @ 12.24 hrs, Volume= 1.315 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
424,327	86	Woods/grass comb., Poor, HSG D
13,600	98	Bare Rock
26,440	89	<50% Grass cover, Poor, HSG D
464,367	87	Weighted Average
450,767		Pervious Area
13,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 2-20: 2-20

Runoff = 14.53 cfs @ 12.08 hrs, Volume= 1.097 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
88,000	91	Gravel roads, HSG D
166,000	98	Paved parking & roofs
254,000	96	Weighted Average
88,000		Pervious Area
166,000		Impervious Area

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

Subcatchment 2-21: 2-21

Runoff = 6.10 cfs @ 12.09 hrs, Volume= 0.448 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
62,500	91	Gravel roads, HSG D
51,100	98	Paved parking & roofs
113,600	94	Weighted Average
62,500		Pervious Area
51,100		Impervious Area

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

Subcatchment 2-22: 2-22

Runoff = 5.72 cfs @ 12.08 hrs, Volume= 0.432 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
22,000	91	Gravel roads, HSG D
78,000	98	Paved parking & roofs
100,000	96	Weighted Average
22,000		Pervious Area
78,000		Impervious Area

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

Subcatchment 2-6: 2-6

Runoff = 11.92 cfs @ 12.25 hrs, Volume= 1.190 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
362,256	82	Woods/grass comb., Fair, HSG D
6,322	98	Water
120,004	91	Gravel roads, HSG D
488,582	84	Weighted Average
482,260		Pervious Area
6,322		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 2-7: 2-7

Runoff = 12.34 cfs @ 12.47 hrs, Volume= 1.643 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
153,353	91	Woods over rock
286,857	82	Woods/grass comb., Fair, HSG D
61,264	98	Water
46,000	98	Bare Rock
5,271	86	Woods/grass comb., Poor, HSG D
552,745	88	Weighted Average
445,481		Pervious Area
107,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0200	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
5.1	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	130	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.5	340	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.4	200	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	250	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	120	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
34.1	1,140	Total			

Subcatchment 2-8: 2-8

Runoff = 15.24 cfs @ 12.04 hrs, Volume= 1.046 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.70"

Area (sf)	CN	Description
35,000	91	Woods over rock
34,000	98	Water
162,489	98	Bare Rock
231,489	97	Weighted Average
35,000		Pervious Area
196,489		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
1.3	235	0.0210	2.94		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.8	335	Total			

Reach 1R: Reach between Pond F and G

Inflow Area = 57.707 ac, Inflow Depth > 1.65" for 1 Year event
Inflow = 45.29 cfs @ 12.60 hrs, Volume= 7.944 af
Outflow = 45.23 cfs @ 12.62 hrs, Volume= 7.944 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.91 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 2.7 min

Peak Storage= 1,914 cf @ 12.61 hrs, Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 357.02 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 250.0' Slope= 0.0320 '/'
Inlet Invert= 454.00', Outlet Invert= 446.00'

‡

Reach 2R: Reach to Route 28 (Design Point #6)

Inflow Area = 68.923 ac, Inflow Depth > 1.55" for 1 Year event
Inflow = 50.80 cfs @ 12.61 hrs, Volume= 8.874 af
Outflow = 45.40 cfs @ 12.83 hrs, Volume= 8.868 af, Atten= 11%, Lag= 12.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.92 fps, Min. Travel Time= 5.7 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 20.0 min

Peak Storage= 15,562 cf @ 12.73 hrs, Average Depth at Peak Storage= 1.16'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 126.22 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 1,000.0' Slope= 0.0040 '/'
Inlet Invert= 446.00', Outlet Invert= 442.00'

‡

Reach 3R: DRY SWALE

Inflow Area = 21.749 ac, Inflow Depth = 2.11" for 1 Year event
Inflow = 37.22 cfs @ 12.20 hrs, Volume= 3.831 af
Outflow = 37.10 cfs @ 12.22 hrs, Volume= 3.831 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.10 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 3.2 min

Peak Storage= 1,827 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 272.37 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 300.0' Slope= 0.0330 '/'
Inlet Invert= 474.40', Outlet Invert= 464.50'

‡

Reach 4R: DRY SWALE

Inflow Area = 6.820 ac, Inflow Depth = 2.14" for 1 Year event
Inflow = 13.19 cfs @ 12.15 hrs, Volume= 1.214 af
Outflow = 13.18 cfs @ 12.17 hrs, Volume= 1.214 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.85 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.86 fps, Avg. Travel Time= 1.9 min

Peak Storage= 404 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 579.77 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 210.0' Slope= 0.1495 '/'
Inlet Invert= 512.40', Outlet Invert= 481.00'

‡

Reach 5R: DRY SWALE

Inflow Area = 5.991 ac, Inflow Depth = 2.26" for 1 Year event
Inflow = 14.93 cfs @ 12.08 hrs, Volume= 1.127 af
Outflow = 13.84 cfs @ 12.17 hrs, Volume= 1.127 af, Atten= 7%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.97 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 13.4 min

Peak Storage= 2,706 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.50 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0103 '/'
Inlet Invert= 487.00', Outlet Invert= 481.00'

‡

Reach 6R: DRY SWALE

Inflow Area = 6.820 ac, Inflow Depth = 2.14" for 1 Year event
Inflow = 13.30 cfs @ 12.11 hrs, Volume= 1.214 af
Outflow = 13.19 cfs @ 12.15 hrs, Volume= 1.214 af, Atten= 1%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.06 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 5.4 min

Peak Storage= 1,077 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 164.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 250.0' Slope= 0.0120 '/'
Inlet Invert= 516.00', Outlet Invert= 513.00'

‡

Reach 7R: DRY SWALE

Inflow Area = 2.637 ac, Inflow Depth = 2.26" for 1 Year event
Inflow = 6.57 cfs @ 12.08 hrs, Volume= 0.496 af
Outflow = 5.87 cfs @ 12.20 hrs, Volume= 0.496 af, Atten= 11%, Lag= 6.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 17.5 min

Peak Storage= 1,558 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.50 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0103 '/'
Inlet Invert= 522.00', Outlet Invert= 516.00'

‡

Reach 8R: DRY SWALE

Inflow Area = 15.916 ac, Inflow Depth = 2.17" for 1 Year event
Inflow = 32.32 cfs @ 12.16 hrs, Volume= 2.875 af
Outflow = 32.14 cfs @ 12.18 hrs, Volume= 2.875 af, Atten= 1%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.15 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 4.1 min

Peak Storage= 1,939 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 164.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 250.0' Slope= 0.0120 '/'
Inlet Invert= 481.00', Outlet Invert= 478.00'

‡

Reach 9R: DRY SWALE

Inflow Area = 3.036 ac, Inflow Depth = 2.26" for 1 Year event
Inflow = 7.57 cfs @ 12.08 hrs, Volume= 0.571 af
Outflow = 7.29 cfs @ 12.14 hrs, Volume= 0.571 af, Atten= 4%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.61 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 8.1 min

Peak Storage= 931 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 296.59 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 460.0' Slope= 0.0391 '/'
Inlet Invert= 482.50', Outlet Invert= 464.50'

‡

Reach 10R: DRY SWALE

Inflow Area = 12.704 ac, Inflow Depth = 2.20" for 1 Year event
Inflow = 25.83 cfs @ 12.15 hrs, Volume= 2.331 af
Outflow = 25.32 cfs @ 12.20 hrs, Volume= 2.331 af, Atten= 2%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.09 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 7.6 min

Peak Storage= 2,884 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 11R: DRY SWALE

Inflow Area = 5.831 ac, Inflow Depth = 2.26" for 1 Year event
Inflow = 14.53 cfs @ 12.08 hrs, Volume= 1.097 af
Outflow = 13.91 cfs @ 12.15 hrs, Volume= 1.097 af, Atten= 4%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.13 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 9.4 min

Peak Storage= 1,956 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 12R: DRY SWALE

Inflow Area = 4.904 ac, Inflow Depth = 2.15" for 1 Year event
Inflow = 8.95 cfs @ 12.12 hrs, Volume= 0.880 af
Outflow = 8.79 cfs @ 12.21 hrs, Volume= 0.880 af, Atten= 2%, Lag= 5.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.49 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 10.3 min

Peak Storage= 1,460 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 13R: DRY SWALE

Inflow Area = 2.296 ac, Inflow Depth = 2.26" for 1 Year event
Inflow = 5.72 cfs @ 12.08 hrs, Volume= 0.432 af
Outflow = 5.03 cfs @ 12.21 hrs, Volume= 0.432 af, Atten= 12%, Lag= 7.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.05 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 19.1 min

Peak Storage= 1,477 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 149.93 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 600.0' Slope= 0.0100 '/'
Inlet Invert= 522.00', Outlet Invert= 516.00'

‡

Pond 1: Culvert

Inflow Area = 15.916 ac, Inflow Depth = 2.17" for 1 Year event
Inflow = 32.14 cfs @ 12.18 hrs, Volume= 2.875 af
Outflow = 32.09 cfs @ 12.19 hrs, Volume= 2.875 af, Atten= 0%, Lag= 0.4 min
Primary = 32.09 cfs @ 12.19 hrs, Volume= 2.875 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 480.61' @ 12.19 hrs Surf.Area= 392 sf Storage= 334 cf

Plug-Flow detention time= 0.2 min calculated for 2.874 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (798.6 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	478.00'	11,170 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
478.00	20	0	0
480.00	150	170	170
482.00	950	1,100	1,270
484.00	2,325	3,275	4,545
486.00	4,300	6,625	11,170

Device	Routing	Invert	Outlet Devices
#1	Primary	478.00'	**36.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 477.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=32.08 cfs @ 12.19 hrs HW=480.60' (Free Discharge)
└**1=Culvert** (Barrel Controls 32.08 cfs @ 6.58 fps)

Pond 2: Culvert

Inflow Area = 6.820 ac, Inflow Depth = 2.14" for 1 Year event
Inflow = 13.19 cfs @ 12.15 hrs, Volume= 1.214 af
Outflow = 13.19 cfs @ 12.15 hrs, Volume= 1.214 af, Atten= 0%, Lag= 0.0 min
Primary = 13.19 cfs @ 12.15 hrs, Volume= 1.214 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 479.49' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	478.00'	**36.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 477.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=13.18 cfs @ 12.15 hrs HW=479.49' (Free Discharge)
└**1=Culvert** (Barrel Controls 13.18 cfs @ 5.49 fps)

Pond 8P: Road Culvert Storage (Design Point #2)

Inflow Area = 79.583 ac, Inflow Depth > 1.54" for 1 Year event
Inflow = 48.47 cfs @ 12.82 hrs, Volume= 10.183 af
Outflow = 48.47 cfs @ 12.82 hrs, Volume= 10.183 af, Atten= 0%, Lag= 0.0 min
Primary = 48.47 cfs @ 12.82 hrs, Volume= 10.183 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 828.61' @ 12.82 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**12.0" x 160.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 441.84' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=48.46 cfs @ 12.82 hrs HW=828.53' (Free Discharge)
└**1=Culvert** (Barrel Controls 48.46 cfs @ 61.70 fps)

Pond P-B: Pond B

Inflow Area = 22.740 ac, Inflow Depth > 2.21" for 1 Year event
Inflow = 28.57 cfs @ 12.30 hrs, Volume= 4.179 af
Outflow = 10.69 cfs @ 12.88 hrs, Volume= 3.962 af, Atten= 63%, Lag= 34.8 min
Primary = 10.69 cfs @ 12.88 hrs, Volume= 3.962 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 459.00' Surf.Area= 37,333 sf Storage= 94,667 cf
Peak Elev= 460.50' @ 12.88 hrs Surf.Area= 55,674 sf Storage= 159,090 cf (64,424 cf above start)

Plug-Flow detention time= 642.3 min calculated for 1.789 af (43% of inflow)
Center-of-Mass det. time= 157.6 min (1,053.8 - 896.2)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	455,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	25,000	0	0
458.00	34,000	59,000	59,000
459.80	40,000	66,600	125,600
460.00	45,000	8,500	134,100
462.00	88,000	133,000	267,100
464.00	100,000	188,000	455,100

Device	Routing	Invert	Outlet Devices
#1	Secondary	470.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57
#2	Primary	459.20'	**36.0" x 70.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 458.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=10.68 cfs @ 12.88 hrs HW=460.50' (Free Discharge)
└**2=Culvert** (Barrel Controls 10.68 cfs @ 5.38 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=459.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-C,D: Pond C and D

Inflow Area = 45.017 ac, Inflow Depth > 2.07" for 1 Year event
Inflow = 38.89 cfs @ 12.33 hrs, Volume= 7.770 af
Outflow = 36.96 cfs @ 12.41 hrs, Volume= 7.522 af, Atten= 5%, Lag= 5.3 min
Primary = 36.96 cfs @ 12.41 hrs, Volume= 7.522 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 456.99' @ 12.41 hrs Surf.Area= 25,933 sf Storage= 22,709 cf

Plug-Flow detention time= 57.8 min calculated for 7.522 af (97% of inflow)

Center-of-Mass det. time= 19.2 min (1,000.1 - 980.9)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	214,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	20,000	0	0
458.00	32,000	52,000	52,000
460.00	40,000	72,000	124,000
462.00	50,000	90,000	214,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.50'	**40.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=36.90 cfs @ 12.41 hrs HW=456.99' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 36.90 cfs @ 1.89 fps)

Pond P-E: Pond E

Inflow Area = 57.707 ac, Inflow Depth > 1.91" for 1 Year event
Inflow = 49.07 cfs @ 12.43 hrs, Volume= 9.165 af
Outflow = 48.34 cfs @ 12.48 hrs, Volume= 8.418 af, Atten= 1%, Lag= 3.3 min
Primary = 48.34 cfs @ 12.48 hrs, Volume= 8.418 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 456.42' @ 12.48 hrs Surf.Area= 19,451 sf Storage= 40,523 cf

Plug-Flow detention time= 101.2 min calculated for 8.418 af (92% of inflow)
Center-of-Mass det. time= 27.5 min (1,000.4 - 972.9)

Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	127,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
456.00	18,500	32,500	32,500
458.00	23,000	41,500	74,000
460.00	30,000	53,000	127,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=48.24 cfs @ 12.48 hrs HW=456.42' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 48.24 cfs @ 2.28 fps)

Pond P-F: Pond E

Inflow Area = 57.707 ac, Inflow Depth > 1.75" for 1 Year event
Inflow = 48.34 cfs @ 12.48 hrs, Volume= 8.418 af
Outflow = 45.29 cfs @ 12.60 hrs, Volume= 7.944 af, Atten= 6%, Lag= 7.0 min
Primary = 45.29 cfs @ 12.60 hrs, Volume= 7.944 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 453.60' Surf.Area= 13,586 sf Storage= 20,469 cf
Peak Elev= 455.40' @ 12.60 hrs Surf.Area= 17,164 sf Storage= 47,854 cf (27,385 cf above start)

Plug-Flow detention time= 129.0 min calculated for 7.473 af (89% of inflow)
Center-of-Mass det. time= 19.5 min (1,019.9 - 1,000.4)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	153,005 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	12,000	0	0
454.00	13,983	25,983	25,983
456.00	18,513	32,496	58,479
458.00	23,000	41,513	99,992
460.00	30,013	53,013	153,005

Device	Routing	Invert	Outlet Devices
#1	Primary	455.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=45.13 cfs @ 12.60 hrs HW=455.40' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 45.13 cfs @ 2.23 fps)

Pond P-G: Pond G

Inflow Area = 11.216 ac, Inflow Depth = 1.27" for 1 Year event
Inflow = 11.92 cfs @ 12.25 hrs, Volume= 1.190 af
Outflow = 11.54 cfs @ 12.29 hrs, Volume= 0.930 af, Atten= 3%, Lag= 2.4 min
Primary = 11.54 cfs @ 12.29 hrs, Volume= 0.930 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 446.16' @ 12.29 hrs Surf.Area= 6,499 sf Storage= 12,365 cf

Plug-Flow detention time= 125.2 min calculated for 0.930 af (78% of inflow)
Center-of-Mass det. time= 41.9 min (889.9 - 848.0)

Volume	Invert	Avail.Storage	Storage Description
#1	444.00'	45,644 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
444.00	5,000	0	0
446.00	6,322	11,322	11,322
448.00	8,500	14,822	26,144
450.00	11,000	19,500	45,644

Device	Routing	Invert	Outlet Devices
#1	Primary	446.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=11.51 cfs @ 12.29 hrs HW=446.16' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 11.51 cfs @ 1.42 fps)

Pond WQB1: Water Quality Basin #1

Inflow Area = 17.426 ac, Inflow Depth = 2.16" for 1 Year event
Inflow = 33.71 cfs @ 12.18 hrs, Volume= 3.142 af
Outflow = 24.00 cfs @ 12.32 hrs, Volume= 3.134 af, Atten= 29%, Lag= 8.2 min
Primary = 24.00 cfs @ 12.32 hrs, Volume= 3.134 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 465.00' Surf.Area= 10,550 sf Storage= 40,960 cf
Peak Elev= 467.74' @ 12.32 hrs Surf.Area= 18,498 sf Storage= 81,551 cf (40,591 cf above start)

Plug-Flow detention time= 332.1 min calculated for 2.193 af (70% of inflow)
Center-of-Mass det. time= 140.7 min (939.1 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	130,978 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
458.00	3,500	0	0	3,500
460.00	4,550	8,027	8,027	4,642
462.00	5,825	10,349	18,376	6,015
464.00	7,710	13,491	31,867	7,988
465.00	10,550	9,093	40,960	10,848
466.00	14,110	12,287	53,247	14,429
468.00	19,200	33,180	86,426	19,600
470.00	25,500	44,551	130,978	25,989

Device	Routing	Invert	Outlet Devices
#1	Primary	462.50'	**36.0" x 40.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 460.50' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	465.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	466.50'	**4.00' W x 1.00' H Vert. Primary Overflow** C= 0.600
#4	Device 1	467.50'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

#5	Secondary	468.00'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=23.93 cfs @ 12.32 hrs HW=467.74' (Free Discharge)
- **1=Culvert** (Passes 23.93 cfs of 58.09 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 1.49 cfs @ 7.60 fps)
  - **3=Primary Overflow** (Orifice Controls 16.24 cfs @ 4.06 fps)
  - **4=Orifice/Grate** (Weir Controls 6.20 cfs @ 1.61 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=465.00' (Free Discharge)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond WQB2: Water Quality Basin #2

Inflow Area =	22.277 ac,	Inflow Depth =	2.09"	for	1 Year event
Inflow =	37.52 cfs @	12.22 hrs,	Volume=	3.885 af	
Outflow =	32.71 cfs @	12.31 hrs,	Volume=	3.807 af,	Atten= 13%, Lag= 5.1 min
Primary =	32.71 cfs @	12.31 hrs,	Volume=	3.807 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 460.00' Surf.Area= 11,500 sf Storage= 37,611 cf
Peak Elev= 462.65' @ 12.31 hrs Surf.Area= 15,541 sf Storage= 72,870 cf (35,258 cf above start)

Plug-Flow detention time= 238.9 min calculated for 2.943 af (76% of inflow)
Center-of-Mass det. time= 97.7 min (905.1 - 807.3)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	96,149 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
452.00	1,900	0	0	1,900
454.00	2,840	4,709	4,709	2,901
456.00	4,000	6,807	11,516	4,132
458.00	5,500	9,460	20,976	5,709
460.00	11,500	16,635	37,611	11,744
460.25	12,000	2,937	40,548	12,253
462.00	14,000	22,728	63,276	14,374
464.00	19,000	32,873	96,149	19,456

Device	Routing	Invert	Outlet Devices
#1	Primary	458.25'	**36.0" x 45.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 458.00' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	460.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	461.25'	**4.00' W x 1.00' H Vert. Primary Overflow** C= 0.600
#4	Device 1	462.25'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#5	Secondary	462.75'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=32.62 cfs @ 12.31 hrs HW=462.65' (Free Discharge)
└**1=Culvert** (Passes 32.62 cfs of 51.14 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.39 cfs @ 7.06 fps)
  ├**3=Primary Overflow** (Orifice Controls 18.02 cfs @ 4.50 fps)
  └**4=Orifice/Grate** (Weir Controls 13.22 cfs @ 2.07 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=460.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2-11: 2-11 Runoff Area=23,000 sf Runoff Depth=3.17"
Tc=6.0 min CN=83 Runoff=1.96 cfs 0.140 af

Subcatchment 2-12: 2-12 Runoff Area=254,085 sf Runoff Depth=4.20"
Flow Length=1,415' Tc=30.2 min CN=93 Runoff=15.37 cfs 2.041 af

Subcatchment 2-13: 2-13 Runoff Area=135,234 sf Runoff Depth=4.31"
Flow Length=600' Slope=0.0500 '/' Tc=6.4 min CN=94 Runoff=14.38 cfs 1.115 af

Subcatchment 2-14: 2-14 Runoff Area=182,245 sf Runoff Depth=4.31"
Flow Length=600' Slope=0.0500 '/' Tc=6.4 min CN=94 Runoff=19.37 cfs 1.502 af

Subcatchment 2-15: 2-15 Runoff Area=260,970 sf Runoff Depth=4.53"
Tc=6.0 min CN=96 Runoff=28.83 cfs 2.263 af

Subcatchment 2-16: 2-16 Runoff Area=114,850 sf Runoff Depth=4.53"
Tc=6.0 min CN=96 Runoff=12.69 cfs 0.996 af

Subcatchment 2-17: 2-17 Runoff Area=132,260 sf Runoff Depth=4.53"
Tc=6.0 min CN=96 Runoff=14.61 cfs 1.147 af

Subcatchment 2-18: 2-18 Runoff Area=73,420 sf Runoff Depth=3.88"
Tc=6.0 min CN=90 Runoff=7.39 cfs 0.544 af

Subcatchment 2-19: 2-19 Runoff Area=85,798 sf Runoff Depth=4.42"
Tc=6.0 min CN=95 Runoff=9.37 cfs 0.725 af

Subcatchment 2-2: 2-2 Runoff Area=464,367 sf Runoff Depth=3.57"
Flow Length=500' Tc=17.2 min CN=87 Runoff=31.51 cfs 3.169 af

Subcatchment 2-20: 2-20 Runoff Area=254,000 sf Runoff Depth=4.53"
Tc=6.0 min CN=96 Runoff=28.06 cfs 2.202 af

Subcatchment 2-21: 2-21 Runoff Area=113,600 sf Runoff Depth=4.31"
Tc=6.0 min CN=94 Runoff=12.25 cfs 0.936 af

Subcatchment 2-22: 2-22 Runoff Area=100,000 sf Runoff Depth=4.53"
Tc=6.0 min CN=96 Runoff=11.05 cfs 0.867 af

Subcatchment 2-6: 2-6 Runoff Area=488,582 sf Runoff Depth=3.27"
Flow Length=500' Tc=17.2 min CN=84 Runoff=30.68 cfs 3.057 af

Subcatchment 2-7: 2-7 Runoff Area=552,745 sf Runoff Depth=3.67"
Flow Length=1,140' Tc=34.1 min CN=88 Runoff=28.61 cfs 3.880 af

Subcatchment 2-8: 2-8 Runoff Area=231,489 sf Runoff Depth=4.65"
Flow Length=335' Tc=2.8 min CN=97 Runoff=28.95 cfs 2.058 af

Reach 1R: Reach between Pond F and G Avg. Depth=1.09' Max Vel=7.98 fps Inflow=114.99 cfs 18.635 af
n=0.030 L=250.0' S=0.0320 '/' Capacity=357.02 cfs Outflow=114.94 cfs 18.634 af

Reach 2R: Reach to Route 28 (Design Poi Avg. Depth=2.07' Max Vel=4.01 fps Inflow=137.01 cfs 21.431 af
n=0.030 L=1,000.0' S=0.0040 '/' Capacity=126.22 cfs Outflow=134.30 cfs 21.425 af

Reach 3R: DRY SWALE Avg. Depth=0.98' Max Vel=7.67 fps Inflow=74.70 cfs 7.916 af
n=0.030 L=300.0' S=0.0330 '/' Capacity=272.37 cfs Outflow=74.60 cfs 7.916 af

Reach 4R: DRY SWALE Avg. Depth=0.35' Max Vel=8.99 fps Inflow=27.72 cfs 2.498 af
n=0.030 L=210.0' S=0.1495 '/' Capacity=579.77 cfs Outflow=27.68 cfs 2.498 af

Reach 5R: DRY SWALE Avg. Depth=0.77' Max Vel=3.74 fps Inflow=28.83 cfs 2.263 af
n=0.030 L=580.0' S=0.0103 '/' Capacity=152.50 cfs Outflow=27.30 cfs 2.263 af

Reach 6R: DRY SWALE Avg. Depth=0.74' Max Vel=3.95 fps Inflow=27.90 cfs 2.498 af
n=0.030 L=250.0' S=0.0120 '/' Capacity=164.24 cfs Outflow=27.72 cfs 2.498 af

Reach 7R: DRY SWALE Avg. Depth=0.47' Max Vel=2.80 fps Inflow=12.69 cfs 0.996 af
n=0.030 L=580.0' S=0.0103 '/' Capacity=152.50 cfs Outflow=11.70 cfs 0.996 af

Reach 8R: DRY SWALE Avg. Depth=1.22' Max Vel=5.22 fps Inflow=66.59 cfs 5.875 af
n=0.030 L=250.0' S=0.0120 '/' Capacity=164.24 cfs Outflow=66.25 cfs 5.875 af

Reach 9R: DRY SWALE Avg. Depth=0.36' Max Vel=4.61 fps Inflow=14.61 cfs 1.147 af
n=0.030 L=460.0' S=0.0391 '/' Capacity=296.59 cfs Outflow=14.26 cfs 1.147 af

Reach 10R: DRY SWALE Avg. Depth=0.83' Max Vel=6.49 fps Inflow=52.76 cfs 4.731 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=51.97 cfs 4.731 af

Reach 11R: DRY SWALE Avg. Depth=0.57' Max Vel=5.22 fps Inflow=28.06 cfs 2.202 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=27.24 cfs 2.202 af

Reach 12R: DRY SWALE Avg. Depth=0.46' Max Vel=4.59 fps Inflow=19.13 cfs 1.803 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=18.84 cfs 1.803 af

Reach 13R: DRY SWALE Avg. Depth=0.43' Max Vel=2.63 fps Inflow=11.05 cfs 0.867 af
n=0.030 L=600.0' S=0.0100 '/' Capacity=149.93 cfs Outflow=10.07 cfs 0.867 af

Pond 1: Culvert Peak Elev=482.99' Storage=2,540 cf Inflow=66.25 cfs 5.875 af
36.0" x 60.0' Culvert Outflow=63.54 cfs 5.875 af

Pond 2: Culvert Peak Elev=480.36' Inflow=27.72 cfs 2.498 af
36.0" x 60.0' Culvert Outflow=27.72 cfs 2.498 af

Pond 8P: Road Culvert Storage (Design Point #2) Peak Elev=4,188.20' Inflow=151.02 cfs 24.594 af
12.0" x 160.0' Culvert Outflow=151.02 cfs 24.594 af

Pond P-B: Pond B Peak Elev=461.49' Storage=225,283 cf Inflow=74.33 cfs 8.470 af
Primary=27.15 cfs 8.247 af Secondary=0.00 cfs 0.000 af Outflow=27.15 cfs 8.247 af

Pond P-C,D: Pond C and D Peak Elev=457.39' Storage=33,723 cf Inflow=92.29 cfs 16.224 af
Outflow=89.20 cfs 15.976 af

Pond P-E: Pond E Peak Elev=456.76' Storage=47,140 cf Inflow=116.14 cfs 19.856 af
Outflow=115.50 cfs 19.109 af

Pond P-F: Pond E Peak Elev=455.75' Storage=53,997 cf Inflow=115.50 cfs 19.109 af
Outflow=114.99 cfs 18.635 af

Pond P-G: Pond G Peak Elev=446.31' Storage=13,343 cf Inflow=30.68 cfs 3.057 af
Outflow=30.60 cfs 2.797 af

Pond WQB1: Water Quality Basin #1 Peak Elev=468.26' Storage=91,537 cf Inflow=69.90 cfs 6.423 af
Primary=57.88 cfs 6.338 af Secondary=5.48 cfs 0.075 af Outflow=63.37 cfs 6.412 af

Pond WQB2: Water Quality Basin #2 Peak Elev=463.17' Storage=81,238 cf Inflow=75.62 cfs 8.055 af
Primary=55.51 cfs 7.727 af Secondary=14.57 cfs 0.251 af Outflow=70.08 cfs 7.978 af

Total Runoff Area = 79.583 ac Runoff Volume = 26.642 af Average Runoff Depth = 4.02"
63.35% Pervious Area = 50.413 ac 36.65% Impervious Area = 29.171 ac

Subcatchment 2-11: 2-11

Runoff = 1.96 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
22,000	82	Woods/grass comb., Fair, HSG D
1,000	98	Paved parking & roofs
23,000	83	Weighted Average
22,000		Pervious Area
1,000		Impervious Area

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

Subcatchment 2-12: 2-12

Runoff = 15.37 cfs @ 12.39 hrs, Volume= 2.041 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
164,105	91	Woods over rock
27,182	91	Gravel roads, HSG D
62,798	98	Bare Rock
254,085	93	Weighted Average
191,287		Pervious Area
62,798		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	100	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	260	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.5	390	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	565	0.0620	2.49		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
30.2	1,415	Total			

Subcatchment 2-13: 2-13

Runoff = 14.38 cfs @ 12.09 hrs, Volume= 1.115 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
85,900	91	Gravel roads, HSG D
49,334	98	Paved parking & roofs
135,234	94	Weighted Average
85,900		Pervious Area
49,334		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.62		**Sheet Flow, Ridge** Fallow n= 0.050 P2= 3.50"
3.7	500	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.4	600	Total			

Subcatchment 2-14: 2-14

Runoff = 19.37 cfs @ 12.09 hrs, Volume= 1.502 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
18,778	91	Gravel roads, HSG D
77,612	98	Paved parking & roofs
85,855	91	Woods over rock
182,245	94	Weighted Average
104,633		Pervious Area
77,612		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.62		**Sheet Flow, Ridge** Fallow n= 0.050 P2= 3.50"
3.7	500	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.4	600	Total			

Subcatchment 2-15: 2-15

Runoff = 28.83 cfs @ 12.08 hrs, Volume= 2.263 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
65,300	91	Gravel roads, HSG D
195,670	98	Paved parking & roofs
260,970	96	Weighted Average
65,300		Pervious Area
195,670		Impervious Area

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

Subcatchment 2-16: 2-16

Runoff = 12.69 cfs @ 12.08 hrs, Volume= 0.996 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
38,185	91	Gravel roads, HSG D
76,665	98	Paved parking & roofs
114,850	96	Weighted Average
38,185		Pervious Area
76,665		Impervious Area

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

Subcatchment 2-17: 2-17

Runoff = 14.61 cfs @ 12.08 hrs, Volume= 1.147 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
32,100	91	Gravel roads, HSG D
100,160	98	Paved parking & roofs
132,260	96	Weighted Average
32,100		Pervious Area
100,160		Impervious Area

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

Subcatchment 2-18: 2-18

Runoff = 7.39 cfs @ 12.09 hrs, Volume= 0.544 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
34,760	82	Woods/grass comb., Fair, HSG D
38,660	98	Paved parking & roofs
73,420	90	Weighted Average
34,760		Pervious Area
38,660		Impervious Area

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

Subcatchment 2-19: 2-19

Runoff = 9.37 cfs @ 12.08 hrs, Volume= 0.725 af, Depth= 4.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
35,798	91	Gravel roads, HSG D
50,000	98	Paved parking & roofs
85,798	95	Weighted Average
35,798		Pervious Area
50,000		Impervious Area

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

Subcatchment 2-2: 2-2

Runoff = 31.51 cfs @ 12.23 hrs, Volume= 3.169 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
424,327	86	Woods/grass comb., Poor, HSG D
13,600	98	Bare Rock
26,440	89	<50% Grass cover, Poor, HSG D
464,367	87	Weighted Average
450,767		Pervious Area
13,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 2-20: 2-20

Runoff = 28.06 cfs @ 12.08 hrs, Volume= 2.202 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
88,000	91	Gravel roads, HSG D
166,000	98	Paved parking & roofs
254,000	96	Weighted Average
88,000		Pervious Area
166,000		Impervious Area

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

Subcatchment 2-21: 2-21

Runoff = 12.25 cfs @ 12.08 hrs, Volume= 0.936 af, Depth= 4.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
62,500	91	Gravel roads, HSG D
51,100	98	Paved parking & roofs
113,600	94	Weighted Average
62,500		Pervious Area
51,100		Impervious Area

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

Subcatchment 2-22: 2-22

Runoff = 11.05 cfs @ 12.08 hrs, Volume= 0.867 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
22,000	91	Gravel roads, HSG D
78,000	98	Paved parking & roofs
100,000	96	Weighted Average
22,000		Pervious Area
78,000		Impervious Area

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

Subcatchment 2-6: 2-6

Runoff = 30.68 cfs @ 12.23 hrs, Volume= 3.057 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
362,256	82	Woods/grass comb., Fair, HSG D
6,322	98	Water
120,004	91	Gravel roads, HSG D
488,582	84	Weighted Average
482,260		Pervious Area
6,322		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 2-7: 2-7

Runoff = 28.61 cfs @ 12.46 hrs, Volume= 3.880 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
153,353	91	Woods over rock
286,857	82	Woods/grass comb., Fair, HSG D
61,264	98	Water
46,000	98	Bare Rock
5,271	86	Woods/grass comb., Poor, HSG D
552,745	88	Weighted Average
445,481		Pervious Area
107,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0200	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
5.1	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	130	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.5	340	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.4	200	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	250	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	120	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
34.1	1,140	Total			

Subcatchment 2-8: 2-8

Runoff = 28.95 cfs @ 12.04 hrs, Volume= 2.058 af, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=5.00"

Area (sf)	CN	Description
35,000	91	Woods over rock
34,000	98	Water
162,489	98	Bare Rock
231,489	97	Weighted Average
35,000		Pervious Area
196,489		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
1.3	235	0.0210	2.94		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.8	335	Total			

Reach 1R: Reach between Pond F and G

Inflow Area = 57.707 ac, Inflow Depth > 3.88" for 10 Year event
Inflow = 114.99 cfs @ 12.42 hrs, Volume= 18.635 af
Outflow = 114.94 cfs @ 12.44 hrs, Volume= 18.634 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.98 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 2.1 min

Peak Storage= 3,603 cf @ 12.43 hrs, Average Depth at Peak Storage= 1.09'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 357.02 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 250.0' Slope= 0.0320 '/'
Inlet Invert= 454.00', Outlet Invert= 446.00'

‡

Reach 2R: Reach to Route 28 (Design Point #6)

Inflow Area = 68.923 ac, Inflow Depth > 3.73" for 10 Year event
Inflow = 137.01 cfs @ 12.41 hrs, Volume= 21.431 af
Outflow = 134.30 cfs @ 12.53 hrs, Volume= 21.425 af, Atten= 2%, Lag= 7.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.01 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 16.2 min

Peak Storage= 33,472 cf @ 12.46 hrs, Average Depth at Peak Storage= 2.07'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 126.22 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 1,000.0' Slope= 0.0040 '/'
Inlet Invert= 446.00', Outlet Invert= 442.00'

‡

Reach 3R: DRY SWALE

Inflow Area = 21.749 ac, Inflow Depth = 4.37" for 10 Year event
Inflow = 74.70 cfs @ 12.21 hrs, Volume= 7.916 af
Outflow = 74.60 cfs @ 12.23 hrs, Volume= 7.916 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.67 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 2.5 min

Peak Storage= 2,919 cf @ 12.22 hrs, Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 272.37 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 300.0' Slope= 0.0330 '/'
Inlet Invert= 474.40', Outlet Invert= 464.50'

‡

Reach 4R: DRY SWALE

Inflow Area = 6.820 ac, Inflow Depth = 4.39" for 10 Year event
Inflow = 27.72 cfs @ 12.15 hrs, Volume= 2.498 af
Outflow = 27.68 cfs @ 12.16 hrs, Volume= 2.498 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.99 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.27 fps, Avg. Travel Time= 1.5 min

Peak Storage= 647 cf @ 12.15 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 579.77 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 210.0' Slope= 0.1495 '/'
Inlet Invert= 512.40', Outlet Invert= 481.00'

‡

Reach 5R: DRY SWALE

Inflow Area = 5.991 ac, Inflow Depth = 4.53" for 10 Year event
Inflow = 28.83 cfs @ 12.08 hrs, Volume= 2.263 af
Outflow = 27.30 cfs @ 12.15 hrs, Volume= 2.263 af, Atten= 5%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.74 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 10.7 min

Peak Storage= 4,239 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.77'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.50 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0103 '/'
Inlet Invert= 487.00', Outlet Invert= 481.00'

‡

Reach 6R: DRY SWALE

Inflow Area = 6.820 ac, Inflow Depth = 4.39" for 10 Year event
Inflow = 27.90 cfs @ 12.12 hrs, Volume= 2.498 af
Outflow = 27.72 cfs @ 12.15 hrs, Volume= 2.498 af, Atten= 1%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.95 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 4.3 min

Peak Storage= 1,756 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.74'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 164.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 250.0' Slope= 0.0120 '/'
Inlet Invert= 516.00', Outlet Invert= 513.00'

‡

Reach 7R: DRY SWALE

Inflow Area = 2.637 ac, Inflow Depth = 4.53" for 10 Year event
Inflow = 12.69 cfs @ 12.08 hrs, Volume= 0.996 af
Outflow = 11.70 cfs @ 12.17 hrs, Volume= 0.996 af, Atten= 8%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.80 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 14.2 min

Peak Storage= 2,426 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.50 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0103 '/'
Inlet Invert= 522.00', Outlet Invert= 516.00'

‡

Reach 8R: DRY SWALE

Inflow Area = 15.916 ac, Inflow Depth = 4.43" for 10 Year event
Inflow = 66.59 cfs @ 12.14 hrs, Volume= 5.875 af
Outflow = 66.25 cfs @ 12.17 hrs, Volume= 5.875 af, Atten= 1%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.22 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 3.2 min

Peak Storage= 3,174 cf @ 12.15 hrs, Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 164.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 250.0' Slope= 0.0120 '/'
Inlet Invert= 481.00', Outlet Invert= 478.00'

‡

Reach 9R: DRY SWALE

Inflow Area = 3.036 ac, Inflow Depth = 4.53" for 10 Year event
Inflow = 14.61 cfs @ 12.08 hrs, Volume= 1.147 af
Outflow = 14.26 cfs @ 12.13 hrs, Volume= 1.147 af, Atten= 2%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.61 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 6.7 min

Peak Storage= 1,424 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 296.59 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 460.0' Slope= 0.0391 '/'
Inlet Invert= 482.50', Outlet Invert= 464.50'

‡

Reach 10R: DRY SWALE

Inflow Area = 12.704 ac, Inflow Depth = 4.47" for 10 Year event
Inflow = 52.76 cfs @ 12.14 hrs, Volume= 4.731 af
Outflow = 51.97 cfs @ 12.18 hrs, Volume= 4.731 af, Atten= 1%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.49 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 6.0 min

Peak Storage= 4,651 cf @ 12.15 hrs, Average Depth at Peak Storage= 0.83'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 11R: DRY SWALE

Inflow Area = 5.831 ac, Inflow Depth = 4.53" for 10 Year event
Inflow = 28.06 cfs @ 12.08 hrs, Volume= 2.202 af
Outflow = 27.24 cfs @ 12.13 hrs, Volume= 2.202 af, Atten= 3%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.22 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 7.5 min

Peak Storage= 3,026 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 12R: DRY SWALE

Inflow Area = 4.904 ac, Inflow Depth = 4.41" for 10 Year event
Inflow = 19.13 cfs @ 12.12 hrs, Volume= 1.803 af
Outflow = 18.84 cfs @ 12.18 hrs, Volume= 1.803 af, Atten= 2%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.59 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 8.4 min

Peak Storage= 2,379 cf @ 12.15 hrs, Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 13R: DRY SWALE

Inflow Area = 2.296 ac, Inflow Depth = 4.53" for 10 Year event
Inflow = 11.05 cfs @ 12.08 hrs, Volume= 0.867 af
Outflow = 10.07 cfs @ 12.18 hrs, Volume= 0.867 af, Atten= 9%, Lag= 6.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.63 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 15.5 min

Peak Storage= 2,302 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 149.93 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 600.0' Slope= 0.0100 '/'
Inlet Invert= 522.00', Outlet Invert= 516.00'

‡

Pond 1: Culvert

Inflow Area = 15.916 ac, Inflow Depth = 4.43" for 10 Year event
Inflow = 66.25 cfs @ 12.17 hrs, Volume= 5.875 af
Outflow = 63.54 cfs @ 12.20 hrs, Volume= 5.875 af, Atten= 4%, Lag= 1.9 min
Primary = 63.54 cfs @ 12.20 hrs, Volume= 5.875 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 482.99' @ 12.20 hrs Surf.Area= 1,628 sf Storage= 2,540 cf

Plug-Flow detention time= 0.2 min calculated for 5.874 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (778.1 - 777.8)

Volume	Invert	Avail.Storage	Storage Description
#1	478.00'	11,170 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
478.00	20	0	0
480.00	150	170	170
482.00	950	1,100	1,270
484.00	2,325	3,275	4,545
486.00	4,300	6,625	11,170

Device	Routing	Invert	Outlet Devices
#1	Primary	478.00'	**36.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 477.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=63.51 cfs @ 12.20 hrs HW=482.98' (Free Discharge)
└**1=Culvert** (Inlet Controls 63.51 cfs @ 8.98 fps)

Pond 2: Culvert

Inflow Area = 6.820 ac, Inflow Depth = 4.39" for 10 Year event
Inflow = 27.72 cfs @ 12.15 hrs, Volume= 2.498 af
Outflow = 27.72 cfs @ 12.15 hrs, Volume= 2.498 af, Atten= 0%, Lag= 0.0 min
Primary = 27.72 cfs @ 12.15 hrs, Volume= 2.498 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 480.36' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	478.00'	**36.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 477.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=27.70 cfs @ 12.15 hrs HW=480.36' (Free Discharge)
└**1=Culvert** (Barrel Controls 27.70 cfs @ 6.38 fps)

Pond 8P: Road Culvert Storage (Design Point #2)

Inflow Area = 79.583 ac, Inflow Depth > 3.71" for 10 Year event
Inflow = 151.02 cfs @ 12.51 hrs, Volume= 24.594 af
Outflow = 151.02 cfs @ 12.51 hrs, Volume= 24.594 af, Atten= 0%, Lag= 0.0 min
Primary = 151.02 cfs @ 12.51 hrs, Volume= 24.594 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 4,188.20' @ 12.51 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**12.0" x 160.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 441.84' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=151.00 cfs @ 12.51 hrs HW=4,187.31' (Free Discharge)
└**1=Culvert** (Barrel Controls 151.00 cfs @ 192.26 fps)

Pond P-B: Pond B

Inflow Area = 22.740 ac, Inflow Depth > 4.47" for 10 Year event
Inflow = 74.33 cfs @ 12.21 hrs, Volume= 8.470 af
Outflow = 27.15 cfs @ 12.61 hrs, Volume= 8.247 af, Atten= 63%, Lag= 23.9 min
Primary = 27.15 cfs @ 12.61 hrs, Volume= 8.247 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 459.00' Surf.Area= 37,333 sf Storage= 94,667 cf
Peak Elev= 461.49' @ 12.61 hrs Surf.Area= 77,110 sf Storage= 225,283 cf (130,617 cf above start)

Plug-Flow detention time= 334.7 min calculated for 6.074 af (72% of inflow)
Center-of-Mass det. time= 119.7 min (965.3 - 845.6)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	455,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	25,000	0	0
458.00	34,000	59,000	59,000
459.80	40,000	66,600	125,600
460.00	45,000	8,500	134,100
462.00	88,000	133,000	267,100
464.00	100,000	188,000	455,100

Device	Routing	Invert	Outlet Devices
#1	Secondary	470.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57
#2	Primary	459.20'	**36.0" x 70.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 458.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=27.14 cfs @ 12.61 hrs HW=461.49' (Free Discharge)
└**2=Culvert** (Barrel Controls 27.14 cfs @ 6.47 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=459.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-C,D: Pond C and D

Inflow Area = 45.017 ac, Inflow Depth > 4.32" for 10 Year event
Inflow = 92.29 cfs @ 12.29 hrs, Volume= 16.224 af
Outflow = 89.20 cfs @ 12.35 hrs, Volume= 15.976 af, Atten= 3%, Lag= 3.4 min
Primary = 89.20 cfs @ 12.35 hrs, Volume= 15.976 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 457.39' @ 12.35 hrs Surf.Area= 28,367 sf Storage= 33,723 cf

Plug-Flow detention time= 33.7 min calculated for 15.976 af (98% of inflow)

Center-of-Mass det. time= 13.2 min (921.4 - 908.2)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	214,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	20,000	0	0
458.00	32,000	52,000	52,000
460.00	40,000	72,000	124,000
462.00	50,000	90,000	214,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.50'	**40.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=89.16 cfs @ 12.35 hrs HW=457.39' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 89.16 cfs @ 2.49 fps)

Pond P-E: Pond E

Inflow Area = 57.707 ac, Inflow Depth > 4.13" for 10 Year event
Inflow = 116.14 cfs @ 12.37 hrs, Volume= 19.856 af
Outflow = 115.50 cfs @ 12.40 hrs, Volume= 19.109 af, Atten= 1%, Lag= 1.6 min
Primary = 115.50 cfs @ 12.40 hrs, Volume= 19.109 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 456.76' @ 12.40 hrs Surf.Area= 20,202 sf Storage= 47,140 cf

Plug-Flow detention time= 54.1 min calculated for 19.109 af (96% of inflow)
Center-of-Mass det. time= 15.4 min (917.7 - 902.3)

Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	127,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
456.00	18,500	32,500	32,500
458.00	23,000	41,500	74,000
460.00	30,000	53,000	127,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=115.46 cfs @ 12.40 hrs HW=456.76' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 115.46 cfs @ 3.05 fps)

Pond P-F: Pond E

Inflow Area = 57.707 ac, Inflow Depth > 3.97" for 10 Year event
Inflow = 115.50 cfs @ 12.40 hrs, Volume= 19.109 af
Outflow = 114.99 cfs @ 12.42 hrs, Volume= 18.635 af, Atten= 0%, Lag= 1.4 min
Primary = 114.99 cfs @ 12.42 hrs, Volume= 18.635 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 453.60' Surf.Area= 13,586 sf Storage= 20,469 cf
Peak Elev= 455.75' @ 12.42 hrs Surf.Area= 17,956 sf Storage= 53,997 cf (33,528 cf above start)

Plug-Flow detention time= 62.3 min calculated for 18.161 af (95% of inflow)
Center-of-Mass det. time= 9.4 min (927.1 - 917.7)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	153,005 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	12,000	0	0
454.00	13,983	25,983	25,983
456.00	18,513	32,496	58,479
458.00	23,000	41,513	99,992
460.00	30,013	53,013	153,005

Device	Routing	Invert	Outlet Devices
#1	Primary	455.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=114.95 cfs @ 12.42 hrs HW=455.75' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 114.95 cfs @ 3.05 fps)

Pond P-G: Pond G

Inflow Area = 11.216 ac, Inflow Depth = 3.27" for 10 Year event
Inflow = 30.68 cfs @ 12.23 hrs, Volume= 3.057 af
Outflow = 30.60 cfs @ 12.25 hrs, Volume= 2.797 af, Atten= 0%, Lag= 0.9 min
Primary = 30.60 cfs @ 12.25 hrs, Volume= 2.797 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 446.31' @ 12.25 hrs Surf.Area= 6,661 sf Storage= 13,343 cf

Plug-Flow detention time= 64.7 min calculated for 2.796 af (91% of inflow)
Center-of-Mass det. time= 21.9 min (842.8 - 820.9)

Volume	Invert	Avail.Storage	Storage Description
#1	444.00'	45,644 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
444.00	5,000	0	0
446.00	6,322	11,322	11,322
448.00	8,500	14,822	26,144
450.00	11,000	19,500	45,644

Device	Routing	Invert	Outlet Devices
#1	Primary	446.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=30.48 cfs @ 12.25 hrs HW=446.31' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 30.48 cfs @ 1.96 fps)

Pond WQB1: Water Quality Basin #1

Inflow Area = 17.426 ac, Inflow Depth = 4.42" for 10 Year event
Inflow = 69.90 cfs @ 12.16 hrs, Volume= 6.423 af
Outflow = 63.37 cfs @ 12.21 hrs, Volume= 6.412 af, Atten= 9%, Lag= 3.2 min
Primary = 57.88 cfs @ 12.21 hrs, Volume= 6.338 af
Secondary = 5.48 cfs @ 12.21 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 465.00' Surf.Area= 10,550 sf Storage= 40,960 cf
Peak Elev= 468.26' @ 12.21 hrs Surf.Area= 19,971 sf Storage= 91,537 cf (50,577 cf above start)

Plug-Flow detention time= 204.0 min calculated for 5.471 af (85% of inflow)
Center-of-Mass det. time= 97.4 min (875.4 - 778.0)

Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	130,978 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
458.00	3,500	0	0	3,500
460.00	4,550	8,027	8,027	4,642
462.00	5,825	10,349	18,376	6,015
464.00	7,710	13,491	31,867	7,988
465.00	10,550	9,093	40,960	10,848
466.00	14,110	12,287	53,247	14,429
468.00	19,200	33,180	86,426	19,600
470.00	25,500	44,551	130,978	25,989

Device	Routing	Invert	Outlet Devices
#1	Primary	462.50'	**36.0" x 40.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 460.50' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	465.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	466.50'	**4.00' W x 1.00' H Vert. Primary Overflow** C= 0.600
#4	Device 1	467.50'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

#5	Secondary	468.00'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=57.82 cfs @ 12.21 hrs HW=468.26' (Free Discharge)
- **1=Culvert** (Passes 57.82 cfs of 61.99 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 1.64 cfs @ 8.35 fps)
  - **3=Primary Overflow** (Orifice Controls 21.48 cfs @ 5.37 fps)
  - **4=Orifice/Grate** (Weir Controls 34.70 cfs @ 2.85 fps)

Secondary OutFlow Max=5.36 cfs @ 12.21 hrs HW=468.26' (Free Discharge)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 5.36 cfs @ 1.37 fps)

Pond WQB2: Water Quality Basin #2

Inflow Area =	22.277 ac,	Inflow Depth =	4.34"	for	10 Year event
Inflow =	75.62 cfs @	12.23 hrs,	Volume=	8.055 af	
Outflow =	70.08 cfs @	12.28 hrs,	Volume=	7.978 af,	Atten= 7%, Lag= 3.2 min
Primary =	55.51 cfs @	12.28 hrs,	Volume=	7.727 af	
Secondary =	14.57 cfs @	12.28 hrs,	Volume=	0.251 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 460.00' Surf.Area= 11,500 sf Storage= 37,611 cf
Peak Elev= 463.17' @ 12.28 hrs Surf.Area= 16,825 sf Storage= 81,238 cf (43,626 cf above start)

Plug-Flow detention time= 147.2 min calculated for 7.113 af (88% of inflow)
Center-of-Mass det. time= 62.7 min (849.2 - 786.5)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	96,149 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
452.00	1,900	0	0	1,900
454.00	2,840	4,709	4,709	2,901
456.00	4,000	6,807	11,516	4,132
458.00	5,500	9,460	20,976	5,709
460.00	11,500	16,635	37,611	11,744
460.25	12,000	2,937	40,548	12,253
462.00	14,000	22,728	63,276	14,374
464.00	19,000	32,873	96,149	19,456

Device	Routing	Invert	Outlet Devices
#1	Primary	458.25'	**36.0" x 45.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 458.00' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	460.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	461.25'	**4.00' W x 1.00' H Vert. Primary Overflow** C= 0.600
#4	Device 1	462.25'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#5	Secondary	462.75'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=55.51 cfs @ 12.28 hrs HW=463.17' (Free Discharge)
└**1=Culvert** (Inlet Controls 55.51 cfs @ 7.85 fps)
  ├**2=Orifice/Grate** (Passes < 1.54 cfs potential flow)
  ├**3=Primary Overflow** (Passes < 22.80 cfs potential flow)
  └**4=Orifice/Grate** (Passes < 45.94 cfs potential flow)

Secondary OutFlow Max=14.54 cfs @ 12.28 hrs HW=463.17' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Weir Controls 14.54 cfs @ 1.74 fps)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2-11: 2-11 Runoff Area=23,000 sf Runoff Depth=6.46"
Tc=6.0 min CN=83 Runoff=3.88 cfs 0.284 af

Subcatchment 2-12: 2-12 Runoff Area=254,085 sf Runoff Depth=7.66"
Flow Length=1,415' Tc=30.2 min CN=93 Runoff=27.19 cfs 3.723 af

Subcatchment 2-13: 2-13 Runoff Area=135,234 sf Runoff Depth=7.78"
Flow Length=600' Slope=0.0500 '/' Tc=6.4 min CN=94 Runoff=25.14 cfs 2.013 af

Subcatchment 2-14: 2-14 Runoff Area=182,245 sf Runoff Depth=7.78"
Flow Length=600' Slope=0.0500 '/' Tc=6.4 min CN=94 Runoff=33.88 cfs 2.712 af

Subcatchment 2-15: 2-15 Runoff Area=260,970 sf Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=49.70 cfs 4.004 af

Subcatchment 2-16: 2-16 Runoff Area=114,850 sf Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=21.87 cfs 1.762 af

Subcatchment 2-17: 2-17 Runoff Area=132,260 sf Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=25.19 cfs 2.029 af

Subcatchment 2-18: 2-18 Runoff Area=73,420 sf Runoff Depth=7.30"
Tc=6.0 min CN=90 Runoff=13.43 cfs 1.025 af

Subcatchment 2-19: 2-19 Runoff Area=85,798 sf Runoff Depth=7.90"
Tc=6.0 min CN=95 Runoff=16.26 cfs 1.297 af

Subcatchment 2-2: 2-2 Runoff Area=464,367 sf Runoff Depth=6.94"
Flow Length=500' Tc=17.2 min CN=87 Runoff=59.47 cfs 6.163 af

Subcatchment 2-20: 2-20 Runoff Area=254,000 sf Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=48.37 cfs 3.897 af

Subcatchment 2-21: 2-21 Runoff Area=113,600 sf Runoff Depth=7.78"
Tc=6.0 min CN=94 Runoff=21.42 cfs 1.691 af

Subcatchment 2-22: 2-22 Runoff Area=100,000 sf Runoff Depth=8.02"
Tc=6.0 min CN=96 Runoff=19.04 cfs 1.534 af

Subcatchment 2-6: 2-6 Runoff Area=488,582 sf Runoff Depth=6.58"
Flow Length=500' Tc=17.2 min CN=84 Runoff=60.20 cfs 6.147 af

Subcatchment 2-7: 2-7 Runoff Area=552,745 sf Runoff Depth=7.06"
Flow Length=1,140' Tc=34.1 min CN=88 Runoff=53.39 cfs 7.463 af

Subcatchment 2-8: 2-8 Runoff Area=231,489 sf Runoff Depth=8.14"
Flow Length=335' Tc=2.8 min CN=97 Runoff=49.62 cfs 3.605 af

Reach 1R: Reach between Pond F and G Avg. Depth=1.49' Max Vel=9.50 fps Inflow=204.99 cfs 35.254 af
n=0.030 L=250.0' S=0.0320 '/' Capacity=357.02 cfs Outflow=204.94 cfs 35.253 af

Reach 2R: Reach to Route 28 (Design Poi Avg. Depth=2.97' Max Vel=4.56 fps Inflow=246.77 cfs 41.140 af
n=0.030 L=1,000.0' S=0.0040 '/' Capacity=126.22 cfs Outflow=243.49 cfs 41.133 af

Reach 3R: DRY SWALE Avg. Depth=1.36' Max Vel=9.22 fps Inflow=160.65 cfs 14.214 af
n=0.030 L=300.0' S=0.0330 '/' Capacity=272.37 cfs Outflow=134.70 cfs 14.214 af

Reach 4R: DRY SWALE Avg. Depth=0.50' Max Vel=11.09 fps Inflow=50.03 cfs 4.474 af
n=0.030 L=210.0' S=0.1495 '/' Capacity=579.77 cfs Outflow=49.94 cfs 4.474 af

Reach 5R: DRY SWALE Avg. Depth=1.05' Max Vel=4.48 fps Inflow=49.70 cfs 4.004 af
n=0.030 L=580.0' S=0.0103 '/' Capacity=152.50 cfs Outflow=47.64 cfs 4.004 af

Reach 6R: DRY SWALE Avg. Depth=1.04' Max Vel=4.78 fps Inflow=50.33 cfs 4.474 af
n=0.030 L=250.0' S=0.0120 '/' Capacity=164.24 cfs Outflow=50.03 cfs 4.474 af

Reach 7R: DRY SWALE Avg. Depth=0.65' Max Vel=3.40 fps Inflow=21.87 cfs 1.762 af
n=0.030 L=580.0' S=0.0103 '/' Capacity=152.50 cfs Outflow=20.56 cfs 1.762 af

Reach 8R: DRY SWALE Avg. Depth=1.68' Max Vel=6.22 fps Inflow=118.95 cfs 10.491 af
n=0.030 L=250.0' S=0.0120 '/' Capacity=164.24 cfs Outflow=118.51 cfs 10.491 af

Reach 9R: DRY SWALE Avg. Depth=0.49' Max Vel=5.61 fps Inflow=25.19 cfs 2.029 af
n=0.030 L=460.0' S=0.0391 '/' Capacity=296.59 cfs Outflow=24.74 cfs 2.029 af

Reach 10R: DRY SWALE Avg. Depth=1.15' Max Vel=7.81 fps Inflow=94.00 cfs 8.418 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=92.99 cfs 8.418 af

Reach 11R: DRY SWALE Avg. Depth=0.79' Max Vel=6.29 fps Inflow=48.37 cfs 3.897 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=47.25 cfs 3.897 af

Reach 12R: DRY SWALE Avg. Depth=0.65' Max Vel=5.66 fps Inflow=34.92 cfs 3.225 af
n=0.030 L=580.0' S=0.0284 '/' Capacity=252.89 cfs Outflow=34.44 cfs 3.225 af

Reach 13R: DRY SWALE Avg. Depth=0.60' Max Vel=3.20 fps Inflow=19.04 cfs 1.534 af
n=0.030 L=600.0' S=0.0100 '/' Capacity=149.93 cfs Outflow=17.74 cfs 1.534 af

Pond 1: Culvert Peak Elev=497.26' Storage=11,170 cf Inflow=118.51 cfs 10.491 af
36.0" x 60.0' Culvert Outflow=143.44 cfs 10.491 af

Pond 2: Culvert Peak Elev=481.73' Inflow=50.03 cfs 4.474 af
36.0" x 60.0' Culvert Outflow=50.03 cfs 4.474 af

Pond 8P: Road Culvert Storage (Design Point #2) Peak Elev=12,979.97' Inflow=276.30 cfs 47.296 af
12.0" x 160.0' Culvert Outflow=276.30 cfs 47.296 af

Pond P-B: Pond B Peak Elev=462.61' Storage=322,079 cf Inflow=124.11 cfs 15.067 af
Primary=46.67 cfs 14.841 af Secondary=0.00 cfs 0.000 af Outflow=46.67 cfs 14.841 af

Pond P-C,D: Pond C and D Peak Elev=457.79' Storage=45,272 cf Inflow=156.15 cfs 29.260 af
Outflow=153.92 cfs 29.012 af

Pond P-E: Pond E Peak Elev=457.11' Storage=54,429 cf Inflow=205.95 cfs 36.475 af
Outflow=205.38 cfs 35.728 af

Pond P-F: Pond E Peak Elev=456.11' Storage=60,506 cf Inflow=205.38 cfs 35.728 af
Outflow=204.99 cfs 35.254 af

Pond P-G: Pond G Peak Elev=446.49' Storage=14,543 cf Inflow=60.20 cfs 6.147 af
Outflow=60.08 cfs 5.887 af

Pond WQB1: Water Quality Basin #1 Peak Elev=468.98' Storage=106,726 cf Inflow=125.72 cfs 11.473 af
Primary=67.03 cfs 10.647 af Secondary=38.48 cfs 0.815 af Outflow=105.51 cfs 11.462 af

Pond WQB2: Water Quality Basin #2 Peak Elev=463.80' Storage=92,483 cf Inflow=137.12 cfs 14.498 af
Primary=60.47 cfs 12.713 af Secondary=57.07 cfs 1.707 af Outflow=117.54 cfs 14.420 af

Total Runoff Area = 79.583 ac Runoff Volume = 49.347 af Average Runoff Depth = 7.44"
63.35% Pervious Area = 50.413 ac 36.65% Impervious Area = 29.171 ac

Subcatchment 2-11: 2-11

Runoff = 3.88 cfs @ 12.09 hrs, Volume= 0.284 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
22,000	82	Woods/grass comb., Fair, HSG D
1,000	98	Paved parking & roofs
23,000	83	Weighted Average
22,000		Pervious Area
1,000		Impervious Area

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

Subcatchment 2-12: 2-12

Runoff = 27.19 cfs @ 12.39 hrs, Volume= 3.723 af, Depth= 7.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
164,105	91	Woods over rock
27,182	91	Gravel roads, HSG D
62,798	98	Bare Rock
254,085	93	Weighted Average
191,287		Pervious Area
62,798		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	100	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	260	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.5	390	0.0550	1.17		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	565	0.0620	2.49		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
30.2	1,415	Total			

Subcatchment 2-13: 2-13

Runoff = 25.14 cfs @ 12.09 hrs, Volume= 2.013 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
85,900	91	Gravel roads, HSG D
49,334	98	Paved parking & roofs
135,234	94	Weighted Average
85,900		Pervious Area
49,334		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.62		**Sheet Flow, Ridge** Fallow n= 0.050 P2= 3.50"
3.7	500	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.4	600	Total			

Subcatchment 2-14: 2-14

Runoff = 33.88 cfs @ 12.09 hrs, Volume= 2.712 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
18,778	91	Gravel roads, HSG D
77,612	98	Paved parking & roofs
85,855	91	Woods over rock
182,245	94	Weighted Average
104,633		Pervious Area
77,612		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	100	0.0500	0.62		**Sheet Flow, Ridge** Fallow n= 0.050 P2= 3.50"
3.7	500	0.0500	2.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.4	600	Total			

Subcatchment 2-15: 2-15

Runoff = 49.70 cfs @ 12.08 hrs, Volume= 4.004 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
65,300	91	Gravel roads, HSG D
195,670	98	Paved parking & roofs
260,970	96	Weighted Average
65,300		Pervious Area
195,670		Impervious Area

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

Subcatchment 2-16: 2-16

Runoff = 21.87 cfs @ 12.08 hrs, Volume= 1.762 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
38,185	91	Gravel roads, HSG D
76,665	98	Paved parking & roofs
114,850	96	Weighted Average
38,185		Pervious Area
76,665		Impervious Area

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

Subcatchment 2-17: 2-17

Runoff = 25.19 cfs @ 12.08 hrs, Volume= 2.029 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
32,100	91	Gravel roads, HSG D
100,160	98	Paved parking & roofs
132,260	96	Weighted Average
32,100		Pervious Area
100,160		Impervious Area

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

Subcatchment 2-18: 2-18

Runoff = 13.43 cfs @ 12.08 hrs, Volume= 1.025 af, Depth= 7.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
34,760	82	Woods/grass comb., Fair, HSG D
38,660	98	Paved parking & roofs
73,420	90	Weighted Average
34,760		Pervious Area
38,660		Impervious Area

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

Subcatchment 2-19: 2-19

Runoff = 16.26 cfs @ 12.08 hrs, Volume= 1.297 af, Depth= 7.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
35,798	91	Gravel roads, HSG D
50,000	98	Paved parking & roofs
85,798	95	Weighted Average
35,798		Pervious Area
50,000		Impervious Area

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

Subcatchment 2-2: 2-2

Runoff = 59.47 cfs @ 12.23 hrs, Volume= 6.163 af, Depth= 6.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
424,327	86	Woods/grass comb., Poor, HSG D
13,600	98	Bare Rock
26,440	89	<50% Grass cover, Poor, HSG D
464,367	87	Weighted Average
450,767		Pervious Area
13,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 2-20: 2-20

Runoff = 48.37 cfs @ 12.08 hrs, Volume= 3.897 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
88,000	91	Gravel roads, HSG D
166,000	98	Paved parking & roofs
254,000	96	Weighted Average
88,000		Pervious Area
166,000		Impervious Area

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

Subcatchment 2-21: 2-21

Runoff = 21.42 cfs @ 12.08 hrs, Volume= 1.691 af, Depth= 7.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
62,500	91	Gravel roads, HSG D
51,100	98	Paved parking & roofs
113,600	94	Weighted Average
62,500		Pervious Area
51,100		Impervious Area

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

Subcatchment 2-22: 2-22

Runoff = 19.04 cfs @ 12.08 hrs, Volume= 1.534 af, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
22,000	91	Gravel roads, HSG D
78,000	98	Paved parking & roofs
100,000	96	Weighted Average
22,000		Pervious Area
78,000		Impervious Area

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

Subcatchment 2-6: 2-6

Runoff = 60.20 cfs @ 12.23 hrs, Volume= 6.147 af, Depth= 6.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
362,256	82	Woods/grass comb., Fair, HSG D
6,322	98	Water
120,004	91	Gravel roads, HSG D
488,582	84	Weighted Average
482,260		Pervious Area
6,322		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	150	0.1250	0.18		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
0.7	100	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	250	0.0800	1.41		**Shallow Concentrated Flow, Steep Slope** Woodland Kv= 5.0 fps
17.2	500	Total			

Subcatchment 2-7: 2-7

Runoff = 53.39 cfs @ 12.46 hrs, Volume= 7.463 af, Depth= 7.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
153,353	91	Woods over rock
286,857	82	Woods/grass comb., Fair, HSG D
61,264	98	Water
46,000	98	Bare Rock
5,271	86	Woods/grass comb., Poor, HSG D
552,745	88	Weighted Average
445,481		Pervious Area
107,264		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	50	0.0200	0.07		**Sheet Flow, Ridge** Woods: Light underbrush n= 0.400 P2= 3.50"
5.1	50	0.1600	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	130	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.5	340	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.4	200	0.0110	0.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	250	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	120	0.2700	8.37		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
34.1	1,140	Total			

Subcatchment 2-8: 2-8

Runoff = 49.62 cfs @ 12.04 hrs, Volume= 3.605 af, Depth= 8.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.50"

Area (sf)	CN	Description
35,000	91	Woods over rock
34,000	98	Water
162,489	98	Bare Rock
231,489	97	Weighted Average
35,000		Pervious Area
196,489		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.09		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"
1.3	235	0.0210	2.94		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.8	335	Total			

Reach 1R: Reach between Pond F and G

Inflow Area = 57.707 ac, Inflow Depth > 7.33" for 100 Year event
Inflow = 204.99 cfs @ 12.43 hrs, Volume= 35.254 af
Outflow = 204.94 cfs @ 12.45 hrs, Volume= 35.253 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.50 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 1.8 min

Peak Storage= 5,393 cf @ 12.44 hrs, Average Depth at Peak Storage= 1.49'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 357.02 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 250.0' Slope= 0.0320 '/'
Inlet Invert= 454.00', Outlet Invert= 446.00'

‡

Reach 2R: Reach to Route 28 (Design Point #6)

Inflow Area = 68.923 ac, Inflow Depth > 7.16" for 100 Year event
Inflow = 246.77 cfs @ 12.40 hrs, Volume= 41.140 af
Outflow = 243.49 cfs @ 12.51 hrs, Volume= 41.133 af, Atten= 1%, Lag= 7.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.56 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 13.5 min

Peak Storage= 53,351 cf @ 12.45 hrs, Average Depth at Peak Storage= 2.97'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 126.22 cfs

10.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 1,000.0' Slope= 0.0040 '/'
Inlet Invert= 446.00', Outlet Invert= 442.00'

‡

Reach 3R: DRY SWALE

Inflow Area = 21.749 ac, Inflow Depth = 7.84" for 100 Year event
Inflow = 160.65 cfs @ 12.16 hrs, Volume= 14.214 af
Outflow = 134.70 cfs @ 12.18 hrs, Volume= 14.214 af, Atten= 16%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.22 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 2.0 min

Peak Storage= 4,387 cf @ 12.17 hrs, Average Depth at Peak Storage= 1.36'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 272.37 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 300.0' Slope= 0.0330 '/'
Inlet Invert= 474.40', Outlet Invert= 464.50'

‡

Reach 4R: DRY SWALE

Inflow Area = 6.820 ac, Inflow Depth = 7.87" for 100 Year event
Inflow = 50.03 cfs @ 12.14 hrs, Volume= 4.474 af
Outflow = 49.94 cfs @ 12.15 hrs, Volume= 4.474 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.09 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.74 fps, Avg. Travel Time= 1.3 min

Peak Storage= 947 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 579.77 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 210.0' Slope= 0.1495 '/'
Inlet Invert= 512.40', Outlet Invert= 481.00'

‡

Reach 5R: DRY SWALE

Inflow Area = 5.991 ac, Inflow Depth = 8.02" for 100 Year event
Inflow = 49.70 cfs @ 12.08 hrs, Volume= 4.004 af
Outflow = 47.64 cfs @ 12.14 hrs, Volume= 4.004 af, Atten= 4%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.48 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 8.7 min

Peak Storage= 6,179 cf @ 12.11 hrs, Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.50 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0103 '/'
Inlet Invert= 487.00', Outlet Invert= 481.00'

‡

Reach 6R: DRY SWALE

Inflow Area = 6.820 ac, Inflow Depth = 7.87" for 100 Year event
Inflow = 50.33 cfs @ 12.11 hrs, Volume= 4.474 af
Outflow = 50.03 cfs @ 12.14 hrs, Volume= 4.474 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.78 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 3.5 min

Peak Storage= 2,617 cf @ 12.12 hrs, Average Depth at Peak Storage= 1.04'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 164.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 250.0' Slope= 0.0120 '/'
Inlet Invert= 516.00', Outlet Invert= 513.00'

‡

Reach 7R: DRY SWALE

Inflow Area = 2.637 ac, Inflow Depth = 8.02" for 100 Year event
Inflow = 21.87 cfs @ 12.08 hrs, Volume= 1.762 af
Outflow = 20.56 cfs @ 12.16 hrs, Volume= 1.762 af, Atten= 6%, Lag= 4.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.40 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 11.7 min

Peak Storage= 3,510 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 152.50 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0103 '/'
Inlet Invert= 522.00', Outlet Invert= 516.00'

‡

Reach 8R: DRY SWALE

Inflow Area = 15.916 ac, Inflow Depth = 7.91" for 100 Year event
Inflow = 118.95 cfs @ 12.13 hrs, Volume= 10.491 af
Outflow = 118.51 cfs @ 12.15 hrs, Volume= 10.491 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.22 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 2.6 min

Peak Storage= 4,762 cf @ 12.14 hrs, Average Depth at Peak Storage= 1.68'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 164.24 cfs

8.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 250.0' Slope= 0.0120 '/'
Inlet Invert= 481.00', Outlet Invert= 478.00'

‡

Reach 9R: DRY SWALE

Inflow Area = 3.036 ac, Inflow Depth = 8.02" for 100 Year event
Inflow = 25.19 cfs @ 12.08 hrs, Volume= 2.029 af
Outflow = 24.74 cfs @ 12.12 hrs, Volume= 2.029 af, Atten= 2%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.61 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 5.5 min

Peak Storage= 2,032 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 296.59 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 460.0' Slope= 0.0391 '/'
Inlet Invert= 482.50', Outlet Invert= 464.50'

‡

Reach 10R: DRY SWALE

Inflow Area = 12.704 ac, Inflow Depth = 7.95" for 100 Year event
Inflow = 94.00 cfs @ 12.13 hrs, Volume= 8.418 af
Outflow = 92.99 cfs @ 12.16 hrs, Volume= 8.418 af, Atten= 1%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.81 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 4.9 min

Peak Storage= 6,905 cf @ 12.14 hrs, Average Depth at Peak Storage= 1.15'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 11R: DRY SWALE

Inflow Area = 5.831 ac, Inflow Depth = 8.02" for 100 Year event
Inflow = 48.37 cfs @ 12.08 hrs, Volume= 3.897 af
Outflow = 47.25 cfs @ 12.13 hrs, Volume= 3.897 af, Atten= 2%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.29 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 6.2 min

Peak Storage= 4,364 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 12R: DRY SWALE

Inflow Area = 4.904 ac, Inflow Depth = 7.89" for 100 Year event
Inflow = 34.92 cfs @ 12.12 hrs, Volume= 3.225 af
Outflow = 34.44 cfs @ 12.17 hrs, Volume= 3.225 af, Atten= 1%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.66 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 6.9 min

Peak Storage= 3,532 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 252.89 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 580.0' Slope= 0.0284 '/'
Inlet Invert= 481.00', Outlet Invert= 464.50'

‡

Reach 13R: DRY SWALE

Inflow Area = 2.296 ac, Inflow Depth = 8.02" for 100 Year event
Inflow = 19.04 cfs @ 12.08 hrs, Volume= 1.534 af
Outflow = 17.74 cfs @ 12.17 hrs, Volume= 1.534 af, Atten= 7%, Lag= 5.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.20 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 12.9 min

Peak Storage= 3,331 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 149.93 cfs

8.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 16.00'
Length= 600.0' Slope= 0.0100 '/'
Inlet Invert= 522.00', Outlet Invert= 516.00'

‡

Pond 1: Culvert

Inflow Area = 15.916 ac, Inflow Depth = 7.91" for 100 Year event
Inflow = 118.51 cfs @ 12.15 hrs, Volume= 10.491 af
Outflow = 143.44 cfs @ 12.16 hrs, Volume= 10.491 af, Atten= 0%, Lag= 0.4 min
Primary = 143.44 cfs @ 12.16 hrs, Volume= 10.491 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 497.26' @ 12.16 hrs Surf.Area= 4,300 sf Storage= 11,170 cf

Plug-Flow detention time= 0.5 min calculated for 10.489 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (764.4 - 763.8)

Volume	Invert	Avail.Storage	Storage Description
#1	478.00'	11,170 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
478.00	20	0	0
480.00	150	170	170
482.00	950	1,100	1,270
484.00	2,325	3,275	4,545
486.00	4,300	6,625	11,170

Device	Routing	Invert	Outlet Devices
#1	Primary	478.00'	**36.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 477.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=143.10 cfs @ 12.16 hrs HW=497.18' (Free Discharge)
└**1=Culvert** (Inlet Controls 143.10 cfs @ 20.25 fps)

Pond 2: Culvert

Inflow Area = 6.820 ac, Inflow Depth = 7.87" for 100 Year event
Inflow = 50.03 cfs @ 12.14 hrs, Volume= 4.474 af
Outflow = 50.03 cfs @ 12.14 hrs, Volume= 4.474 af, Atten= 0%, Lag= 0.0 min
Primary = 50.03 cfs @ 12.14 hrs, Volume= 4.474 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 481.73' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	478.00'	**36.0" x 60.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 477.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=49.99 cfs @ 12.14 hrs HW=481.72' (Free Discharge)
└**1=Culvert** (Barrel Controls 49.99 cfs @ 7.29 fps)

Pond 8P: Road Culvert Storage (Design Point #2)

Inflow Area = 79.583 ac, Inflow Depth > 7.13" for 100 Year event
Inflow = 276.30 cfs @ 12.48 hrs, Volume= 47.296 af
Outflow = 276.30 cfs @ 12.48 hrs, Volume= 47.296 af, Atten= 0%, Lag= 0.0 min
Primary = 276.30 cfs @ 12.48 hrs, Volume= 47.296 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 12,979.97' @ 12.48 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	442.00'	**12.0" x 160.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 441.84' S= 0.0010 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=276.27 cfs @ 12.48 hrs HW=12,977.19' (Free Discharge)
└**1=Culvert** (Barrel Controls 276.27 cfs @ 351.76 fps)

Pond P-B: Pond B

Inflow Area = 22.740 ac, Inflow Depth = 7.95" for 100 Year event
Inflow = 124.11 cfs @ 12.21 hrs, Volume= 15.067 af
Outflow = 46.67 cfs @ 12.57 hrs, Volume= 14.841 af, Atten= 62%, Lag= 21.4 min
Primary = 46.67 cfs @ 12.57 hrs, Volume= 14.841 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 459.00' Surf.Area= 37,333 sf Storage= 94,667 cf
Peak Elev= 462.61' @ 12.57 hrs Surf.Area= 91,672 sf Storage= 322,079 cf (227,412 cf above start)

Plug-Flow detention time= 236.0 min calculated for 12.667 af (84% of inflow)
Center-of-Mass det. time= 102.3 min (913.1 - 810.7)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	455,100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	25,000	0	0
458.00	34,000	59,000	59,000
459.80	40,000	66,600	125,600
460.00	45,000	8,500	134,100
462.00	88,000	133,000	267,100
464.00	100,000	188,000	455,100

Device	Routing	Invert	Outlet Devices
#1	Secondary	470.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57
#2	Primary	459.20'	**36.0" x 70.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 458.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=46.68 cfs @ 12.57 hrs HW=462.61' (Free Discharge)
└**2=Culvert** (Barrel Controls 46.68 cfs @ 7.27 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=459.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P-C,D: Pond C and D

Inflow Area = 45.017 ac, Inflow Depth > 7.80" for 100 Year event
Inflow = 156.15 cfs @ 12.26 hrs, Volume= 29.260 af
Outflow = 153.92 cfs @ 12.37 hrs, Volume= 29.012 af, Atten= 1%, Lag= 6.4 min
Primary = 153.92 cfs @ 12.37 hrs, Volume= 29.012 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 457.79' @ 12.37 hrs Surf.Area= 30,713 sf Storage= 45,272 cf

Plug-Flow detention time= 21.9 min calculated for 29.006 af (99% of inflow)

Center-of-Mass det. time= 10.2 min (875.2 - 865.0)

Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	214,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
456.00	20,000	0	0
458.00	32,000	52,000	52,000
460.00	40,000	72,000	124,000
462.00	50,000	90,000	214,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.50'	**40.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=153.90 cfs @ 12.37 hrs HW=457.79' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 153.90 cfs @ 2.99 fps)

Pond P-E: Pond E

Inflow Area = 57.707 ac, Inflow Depth > 7.58" for 100 Year event
Inflow = 205.95 cfs @ 12.39 hrs, Volume= 36.475 af
Outflow = 205.38 cfs @ 12.42 hrs, Volume= 35.728 af, Atten= 0%, Lag= 1.3 min
Primary = 205.38 cfs @ 12.42 hrs, Volume= 35.728 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 457.11' @ 12.42 hrs Surf.Area= 20,998 sf Storage= 54,429 cf

Plug-Flow detention time= 33.4 min calculated for 35.728 af (98% of inflow)
Center-of-Mass det. time= 11.2 min (872.3 - 861.1)

Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	127,000 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
456.00	18,500	32,500	32,500
458.00	23,000	41,500	74,000
460.00	30,000	53,000	127,000

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=205.32 cfs @ 12.42 hrs HW=457.11' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 205.32 cfs @ 3.70 fps)

Pond P-F: Pond E

Inflow Area = 57.707 ac, Inflow Depth > 7.43" for 100 Year event
Inflow = 205.38 cfs @ 12.42 hrs, Volume= 35.728 af
Outflow = 204.99 cfs @ 12.43 hrs, Volume= 35.254 af, Atten= 0%, Lag= 1.2 min
Primary = 204.99 cfs @ 12.43 hrs, Volume= 35.254 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 453.60' Surf.Area= 13,586 sf Storage= 20,469 cf
Peak Elev= 456.11' @ 12.43 hrs Surf.Area= 18,757 sf Storage= 60,506 cf (40,037 cf above start)

Plug-Flow detention time= 37.6 min calculated for 34.776 af (97% of inflow)
Center-of-Mass det. time= 7.0 min (879.3 - 872.3)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	153,005 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
452.00	12,000	0	0
454.00	13,983	25,983	25,983
456.00	18,513	32,496	58,479
458.00	23,000	41,513	99,992
460.00	30,013	53,013	153,005

Device	Routing	Invert	Outlet Devices
#1	Primary	455.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=204.88 cfs @ 12.43 hrs HW=456.11' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 204.88 cfs @ 3.70 fps)

Pond P-G: Pond G

Inflow Area = 11.216 ac, Inflow Depth = 6.58" for 100 Year event
Inflow = 60.20 cfs @ 12.23 hrs, Volume= 6.147 af
Outflow = 60.08 cfs @ 12.24 hrs, Volume= 5.887 af, Atten= 0%, Lag= 0.7 min
Primary = 60.08 cfs @ 12.24 hrs, Volume= 5.887 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 446.49' @ 12.24 hrs Surf.Area= 6,854 sf Storage= 14,543 cf

Plug-Flow detention time= 40.2 min calculated for 5.887 af (96% of inflow)
Center-of-Mass det. time= 15.9 min (817.3 - 801.4)

Volume	Invert	Avail.Storage	Storage Description
#1	444.00'	45,644 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
444.00	5,000	0	0
446.00	6,322	11,322	11,322
448.00	8,500	14,822	26,144
450.00	11,000	19,500	45,644

Device	Routing	Invert	Outlet Devices
#1	Primary	446.00'	**50.0' long (Profile 10) Broad-Crested Rectangular Weir** Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.51 3.48 3.42 3.48 3.57

Primary OutFlow Max=59.98 cfs @ 12.24 hrs HW=446.49' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 59.98 cfs @ 2.45 fps)

Pond WQB1: Water Quality Basin #1

Inflow Area = 17.426 ac, Inflow Depth = 7.90" for 100 Year event
Inflow = 125.72 cfs @ 12.15 hrs, Volume= 11.473 af
Outflow = 105.51 cfs @ 12.22 hrs, Volume= 11.462 af, Atten= 16%, Lag= 4.2 min
Primary = 67.03 cfs @ 12.22 hrs, Volume= 10.647 af
Secondary = 38.48 cfs @ 12.22 hrs, Volume= 0.815 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 465.00' Surf.Area= 10,550 sf Storage= 40,960 cf
Peak Elev= 468.98' @ 12.22 hrs Surf.Area= 22,182 sf Storage= 106,726 cf (65,766 cf above start)

Plug-Flow detention time= 140.7 min calculated for 10.522 af (92% of inflow)
Center-of-Mass det. time= 67.9 min (831.9 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	130,978 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
458.00	3,500	0	0	3,500
460.00	4,550	8,027	8,027	4,642
462.00	5,825	10,349	18,376	6,015
464.00	7,710	13,491	31,867	7,988
465.00	10,550	9,093	40,960	10,848
466.00	14,110	12,287	53,247	14,429
468.00	19,200	33,180	86,426	19,600
470.00	25,500	44,551	130,978	25,989

Device	Routing	Invert	Outlet Devices
#1	Primary	462.50'	**36.0" x 40.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 460.50' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	465.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	466.50'	**4.00' W x 1.00' H Vert. Primary Overflow** C= 0.600
#4	Device 1	467.50'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

#5	Secondary	468.00'	**15.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=67.03 cfs @ 12.22 hrs HW=468.98' (Free Discharge)
- **1=Culvert** (Inlet Controls 67.03 cfs @ 9.48 fps)
  - **2=Orifice/Grate** (Passes < 1.83 cfs potential flow)
  - **3=Primary Overflow** (Passes < 27.04 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 93.77 cfs potential flow)

Secondary OutFlow Max=38.37 cfs @ 12.22 hrs HW=468.98' (Free Discharge)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 38.37 cfs @ 2.61 fps)

Pond WQB2: Water Quality Basin #2

Inflow Area = 22.277 ac, Inflow Depth = 7.81" for 100 Year event
Inflow = 137.12 cfs @ 12.18 hrs, Volume= 14.498 af
Outflow = 117.54 cfs @ 12.25 hrs, Volume= 14.420 af, Atten= 14%, Lag= 3.9 min
Primary = 60.47 cfs @ 12.25 hrs, Volume= 12.713 af
Secondary = 57.07 cfs @ 12.25 hrs, Volume= 1.707 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 460.00' Surf.Area= 11,500 sf Storage= 37,611 cf
Peak Elev= 463.80' @ 12.25 hrs Surf.Area= 18,477 sf Storage= 92,483 cf (54,872 cf above start)

Plug-Flow detention time= 100.6 min calculated for 13.553 af (93% of inflow)
Center-of-Mass det. time= 43.3 min (815.5 - 772.3)

Volume	Invert	Avail.Storage	Storage Description
#1	452.00'	96,149 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
452.00	1,900	0	0	1,900
454.00	2,840	4,709	4,709	2,901
456.00	4,000	6,807	11,516	4,132
458.00	5,500	9,460	20,976	5,709
460.00	11,500	16,635	37,611	11,744
460.25	12,000	2,937	40,548	12,253
462.00	14,000	22,728	63,276	14,374
464.00	19,000	32,873	96,149	19,456

Device	Routing	Invert	Outlet Devices
#1	Primary	458.25'	**36.0" x 45.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 458.00' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	460.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	461.25'	**4.00' W x 1.00' H Vert. Primary Overflow** C= 0.600
#4	Device 1	462.25'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#5	Secondary	462.75'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=60.47 cfs @ 12.25 hrs HW=463.80' (Free Discharge)
└**1=Culvert** (Inlet Controls 60.47 cfs @ 8.55 fps)
  ├**2=Orifice/Grate** (Passes < 1.72 cfs potential flow)
  ├**3=Primary Overflow** (Passes < 27.53 cfs potential flow)
  └**4=Orifice/Grate** (Passes < 96.03 cfs potential flow)

Secondary OutFlow Max=56.97 cfs @ 12.25 hrs HW=463.80' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Weir Controls 56.97 cfs @ 2.70 fps)

MAGNETIC NORTH 1986

N

DESIGN POINT #8

DESIGN POINT #7

DESIGN POINT #1

DESIGN POINT #4

DESIGN POINT #6

DESIGN POINT #5

DESIGN POINT #3

DESIGN POINT #2

PREVIOUSLY DISTURBED AREA

NYS DEC WETLAND KW-3

ROUTE 28

ONTEORA TRAIL

WAUGHKONK RD.

A

B

C

D

E

F

G

1-1

1-2

1-3

1-4

1-5

1-6

1-7

1-8

1-9

1-10

Dig New York Safely.
- Call Before You Dig
- Wait The Required Time
- Confirm Utility Response
- Respect The Marks
- Dig With Care

CALL 811
www.digsafelynewyork.com

MAP REVISION DATES		
DATE	REVISION	BY

OWNER/DEVELOPER

850 ROUTE 28 LLC
C/O DAN LEFEVER
KINGSTON, NY

TAX MAP ID#
38.4–1–36.100

LOT AREA
±110.6 ACRES

PRE–DEVELOPMENT DRAINAGE AREA

FOR

850 ROUTE 28 LLC

TOWN OF KINGSTON
ULSTER COUNTY ~ NEW YORK

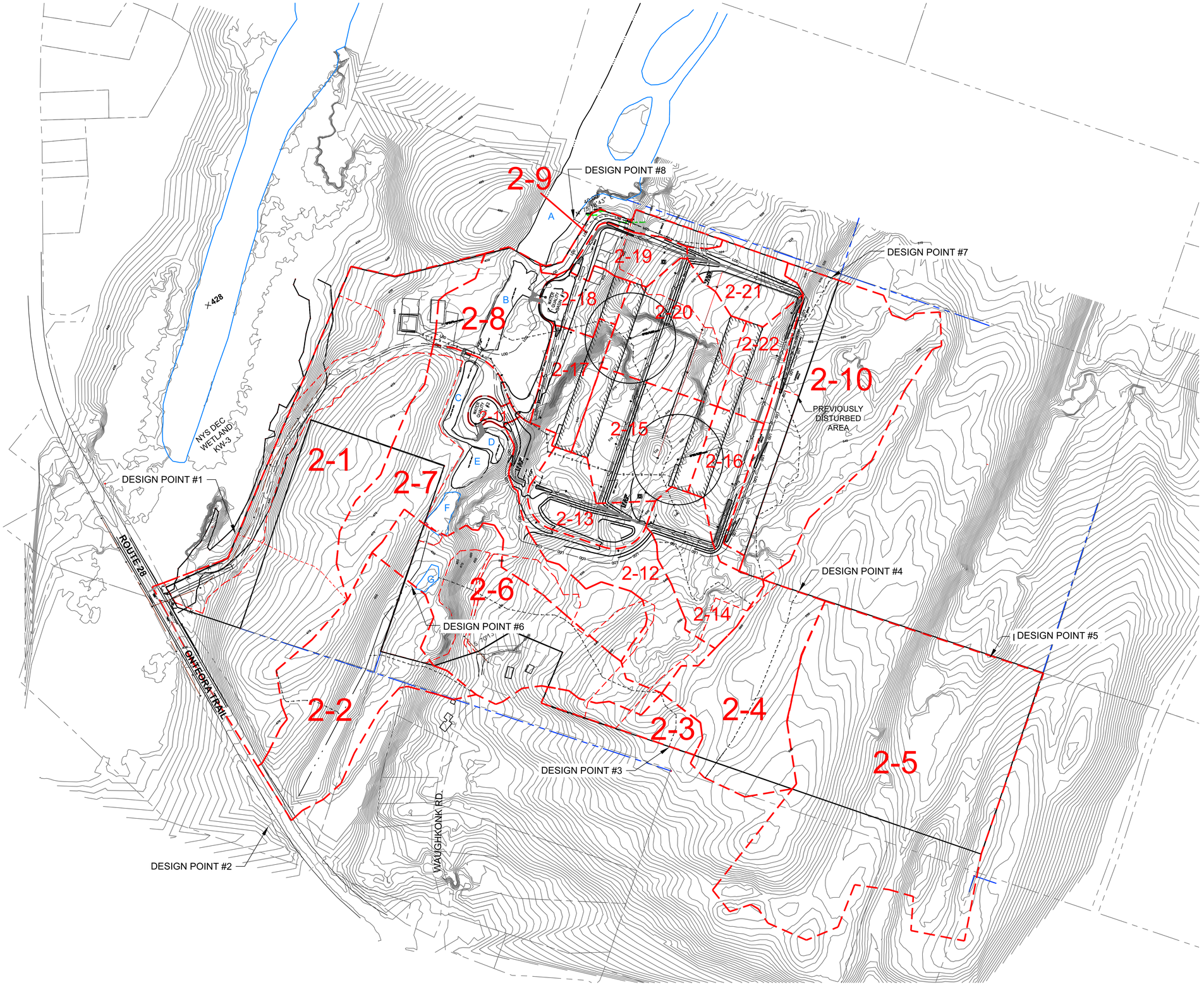
200 0 200 400 600

Scale: 1" = 200'

JANUARY 10, 2018

MEDENBACH & EGGERS
CIVIL ENGINEERING & LAND SURVEYING, P.C.
STONE RIDGE, NEW YORK (845) 687–0047

E17 064



MAP REVISION DATES		
DATE	REVISION	BY
5/14/2019	REVISED POND DRAINAGE AREA BOUNDARY	CC

OWNER/DEVELOPER

850 ROUTE 28 LLC
C/O DAN LEFEVER
KINGSTON, NY

TAX MAP ID#
38.4-1-36.100

LOT AREA
±110.6 ACRES

POST-DEVELOPMENT DRAINAGE AREA

FOR

850 ROUTE 28 LLC

TOWN OF KINGSTON
ULSTER COUNTY NEW YORK

200 0 200 400 600

Scale: *1" = 200'*

JANUARY 10, 2019

MEDENBACH & EGGERS
CIVIL ENGINEERING & LAND SURVEYING, P.C.
STONE RIDGE, NEW YORK (845) 687-0047

E17 064