LINDEN Engineering Partners, LLC

100 TradCenter, Suite G700
Woburn, MA 01801
Tel: (781) 933-3711 Fax: (781) 287-1277
Email:lep@lindeneng.com

STORMWATER REPORT

TOWN OF LYNNFIELD. MA
KING RAIL RESERVE GOLF COURSE CLUBHOUSE
397 WALNUT STREET aka 1 KING RAIL DRIVE
LYNNFIELD, MA
August 31, 2023

Owner and Applicant:
Town of Lynnfield, MA
c/o Ms. Lisa DeMeo, P.E., Town Engineer
Town Hall, 55 Summer Street
Lynnfield, MA 01940

Prepared by:
LINDEN ENGINEERING PARTNERS, LLC
18 Henderson Road
Woburn, MA 01801

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Summary:

The proposed project falls under the provisions of the Stormwater Regulations under the Massachusetts Wetlands Protection Act. The project is considered a mix of New Development and Redevelopment under those regulations and full compliance with those regulations is not required.

The proposed stormwater system for the project has been designed so that with the exception of a portion of the outdoor patio and a very small portion of the paved cart path, all of the stormwater from the project within the limit of work will be fully treated in accordance with the regulations. The proposed system provides treatment for TSS and Total Phosphorous by infiltrating 1" of runoff into the ground. This is accomplished by constructing two infiltration basins and one subsurface infiltration structure.

The net effect of the proposed stormwater measures is that the peak runoff from the project area is controlled and does not exceed the existing peak runoff, similarly the volume of the runoff from the project area is controlled and does not exceed the existing runoff volume. The Total Suspended Solids and Total Phosphorus reduction requirements of the regulations are also met by the proposed system.

This report details the existing and proposed hydrological and hydraulic conditions for the Redevelopment of a portion of the King Rail Reserve Golf Course in Lynnfield, MA. This report has been prepared in conformance with the requirements of the Massachusetts Department of Environmental Protection (MADEP) 2008 Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (Massachusetts Wetlands Act Regulations (MAWPA Regs)) and the Town of Lynnfield Stormwater Bylaw. The report has been organized to follow the MADEP Stormwater Checklist.

Site Description:

The project which is the subject of this report is located at 397 Walnut Street aka 1 King Rail Drive on the western side of Walnut Street in Lynnfield, MA. The portion of the property which is the subject of this application is a portion of the larger 103*7* acre site. The property is shown on the Town of Lynnfield Assessor's Map 45 as Lot 999. The property is owned by the Town of Lynnfield,

Existing Conditions:

The portion of the site which is the subject of the proposed work is located at the southern end of the property. The area is presently improved for an existing gravel parking area and driveway along with paved and gravel paths/ Portions of the area are grassed and minor portions are wooded. Drainage from the project area either flows overland to the existing drainage basin on the Market Street property or overland to Reedy Meadow.

Proposed Conditions:

The redevelopment of the site consists of the paving of the entrance drive, the regrading of the existing gravel parking area and paving some minor portions of the lot, construction of a new gravel golf cart storage area and construction of a new clubhouse building with associated site improvements and utilities.

A small portion of the drainage from the project area will continue to flow overland to the basin on the Market Street property and overland and piped to Reedy Meadow. The proposed project includes the construction of two new surface infiltration basins and one new subsurface infiltration structure.

Stormwater Standard 1: No New Untreated Discharges

The proposed project does not include any new untreated discharges. In addition, all of the runoff from the redeveloped site will be treated with deep sump catch basins, surface and subsurface infiltration systems and stormwater treatment units and the peak rates of runoff and runoff volume from the project area will be reduced when compared to the existing conditions.

Standard 1 has been fully met by the proposed project.

Stormwater Standard 2: Peak Rate Attenuation

The proposed project involves the redevelopment of an existing developed site. As such, compliance with Stormwater Standard 2 is required only to the maximum extent practicable and measures must be taken to improve existing conditions.

As part of this study our firm prepared existing and proposed runoff calculations for the project for the 2, 10, 25 and 100 year storms. We have attached to this

report the full printout for the 100 year storm and reduced printouts for the 2, 10, and 25year storms from our HydroCAD Model for the project. All of the stormwater modeling calculations were prepared using SCS Methods consistent with the requirements of the Regulations. The calculations were prepared using HydroCAD software, Version 10.00 by Applied Microcomputers Systems.

Soils data for the stormwater study was obtained from the previous applications for the site and particularly the on-site soil testing conducted for those applications which indicate that the soils are SCS Hydrologic Soils Group B.

Ground cover data is based on the existing and proposed site conditions using on the ground survey and observations of the site. Times of concentration are based on the tributary watershed characteristics and SCS Methodology with a minimum time of concentration of 6 minutes as prescribed by the methodology. Rainfall data for the study is based on U.S. Weather Bureau Technical Paper #40.

Stormwater mitigation for the proposed project is provided by the installation of two new surface infiltration basins and one new subsurface infiltration structure. These structures will infiltrate the required portion of the runoff and the additional volume will allow mitigation of the peak runoff from the redeveloped site. Our calculations did not include any exfiltration from these systems (a conservative approach).

A summary of the peak rate of runoff calculations from the project area to Reedy Meadow is as follows:

PEAK RUNOFF TO REEDY MEADOW			
Storm Return Period (years)	Existing Peak Rate of Runoff (c.f.s.)	Proposed (Site Developed) Peak Rate of Runoff (c.f.s.)	Difference c.f.s. (%)
2	2.57	1.56	-1.01 (-39.2%)
10	4.85	4.48	-0.38 (-7.8%)
25	6.47	6.07	-0.40 (-6.1%)
100	8.48	7.91	-0.57 (-6.7%)

A summary of the runoff volume calculations from the project area to Reedy Meadow is as follows:

PEAK RUNOFF TO REEDY MEADOW			
Storm Return Period (years)	Existing Runoff Volume (acre feet)	Proposed (Site Developed) Runoff Volume (acre feet)	Difference Acre feet (%)
2	0.254	0.204	-0.050 (-19.6%)
10	0.491	0.448	-0.043 (-8.7%)
25	0.658	0.619	-0.039 (-5.9%)
100	0.866	0.831	-0.035 (-4.0%)

A review of the above summaries indicates that the redevelopment of the site as proposed will not increase the peak rate of runoff or runoff volume from the site to Reedy Meadow. Note that in the above calculations the gravel golf cart storage area and gravel parking area and paths were considered as impervious.

Based on the results of the calculations Standard 2 has been met by the proposed project.

Stormwater Standard 3: Recharge

The proposed project involves a mix of new development and redevelopment. As such, compliance with Stormwater Standard 3 is required only to the maximum extent practicable and measures must be taken to improve existing conditions. Test pits previously conducted at the site by others indicate the soils to be Hydrologic Soils Group B with a recharge rate of 2.41 inches/hour.

Given that the soils in the work area are HSG B the required infiltration is 0.35 inches x the impervious area. Since the subsurface infiltration structures have been designed to infiltrate 1.0 inches of water based on the proposed impervious area as detailed under Standard 4 below, these systems exceed the recharge requirement of the standards. All of the systems have been located a minimum of 2 feet above the ESHGWT.

Based on the fact that the infiltrated volume exceeds the required infiltration volume, Standard 3 has been fully met by the proposed project.

Stormwater Standard 4: Water Quality

The proposed project involves ta mix of new development and redevelopment. As such, compliance with Stormwater Standard 4 is required only to the maximum extent practicable and measures must be taken to improve existing conditions. Treatment for the runoff from the impervious surfaces is provided by a sediment forebay and a Surface Infiltration Basin, a second Surface Infiltration Basin and new deep sump catch basins with hooded outlets, a Cascade Stormwater Treatment Unit along with a Surface Infiltration Structure.

Calculations for these systems are as follows:

Infiltration Basin #1:

Tributary Impervious Area On Site = 3,025 s.f.
Water Quality Volume = 3,025 s.f. x 1.0”/12”/ft. = 252.08 c.f.
Captured Volume at the Overflow Depth = 570 c.f. which is > 252.08 c.f.
Time to Empty = 0.5 ft. deep x 12 in./ft./2.41 in./hr. = 2.5 hrs. < 72 hrs

Infiltration Basin #2:

Tributary Impervious Area = 2,360 s.f.
Water Quality Volume = 2,360 s.f. x 1.0” = 196.7 c.f.
Captured Volume at the Overflow Depth = 417 c.f. which is > 196.7 c.f.
Time to Empty = 1.5 ft. deep x 12 in./ft/2.41 in./hr. = 7.5 hrs. < 72 hrs

Subsurface Infiltration Structure #1:

Tributary Impervious Area = 25,150 s.f.
Water Quality Volume = 25,150 s.f. x 1.0” = 2,096 c.f.
Captured Volume at the Overflow Depth = 2,110 c.f. which is > 2,096 c.f.
Time to Empty = 1.8 ft. deep x 12 in./ft./2.41 in./hr. = 9.0 hrs. < 72 hrs

Note that in the above calculations the gravel golf cart storage area and gravel parking area and paths were considered as impervious.

TSS and Phosphorous Removal

Runoff from the proposed gravel and impervious surfaces is being treated by a Surface Infiltration Basin, a second Surface Infiltration Basin and new deep sump catch basins with hooded outlets, a Cascade Stormwater Treatment Unit along

with a Surface Infiltration Structure. Total Suspended Solids (TSS) calculations are as follows:

Infiltration Basin #1:

- Infiltration basin which captures the WQV (1") with pretreatment (sediment forebay) removes 80% of the TSS.

Infiltration Basin #2:

- Infiltration basin which captures the WQV (1") removes 80% of the TSS. Note that pretreatment is not required for roof runoff which is considered clean.

Subsurface Infiltration Structure #1:

- Pretreatment is provided by deep sump catch basins.
- The Cascade Stormwater Treatment Unit removes 80% of the TSS leaving a residual load of 20%.
- The Subsurface Infiltration Structure which captures the WQV (1") removed 80% of the residual load (20%) for a remaining load of 4% or an aggregate removal of 96%.

There is a deminimus impervious area of 600 s.f. which flows overland for more than 75 feet and qualifies for a LID credit.

The aggregate TSS removal for the project is as follows:

(5385 s.f. x 80% + 25150 s.f. x 96% + 600 s.f. x 0%)/31125 s.f. = 91.3% TSS Removal. This aggregate 91.3% removal of TSS exceeds the 80% requirement for redevelopment and 90% for new development.

Calculations for the Cascade Stormwater Treatment Unit is as follows:

Unit #1:
Impervious Area = 25,150 s.f. (0.57736 acres), time of concentration = 0.10 hours
WQF = (qu)(A)(WQV)
WQF = (774 csm/in)(0.57736 acres)(0.0015625 mi2/acre)(1 in)
WQF ≈ 0.698 CFS Note: The chosen Unit can treat 1.48 c.f.s.

Total Phosphorous removal is provided by infiltration of stormwater into the ground. Information from the EPA Pollutant Removal Tool and the Massachusetts MS4 General Permit (appendix f, attachment 3, page 51) states that for HSG B soil with an infiltration rate of 2.41 inches/hour, retaining 1 inch of runoff results in the removal of 98% of the Total Phosphorous load which exceeds the 50% requirement for redevelopment and 60% for new development.

The runoff quality from the proposed project represents a significant improvement compared to existing conditions. Therefore, in our opinion, Standard 4 has been fully met by the proposed project.

Stormwater Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

The project does not contain any activities that are classified as Land Uses with Higher Potential Pollutant Loads as defined by the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs). Therefore Standard 5 has been met by the proposed project to the extent practicable.

Stormwater Standard 6: Critical Areas

The proposed project does discharge stormwater runoff to a critical area as defined by the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs). The project uses stormwater management strategies recommended for such areas.

Therefore Standard 6 has been fully met by the proposed project.

Stormwater Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

The proposed project involves a mix of redevelopment and new development. As such, compliance with Stormwater Standards 2, 3, 4, 5, and 6 is required only to the maximum extent practicable and measures must be taken to improve existing conditions. Throughout this report we have listed the areas of compliance with the standards in the 2008 MADEP Stormwater Handbook. The proposed project has been carefully thought through and designed to meet the requirements of stormwater standards 1, 2, 3, 4, 5 & 6.

Stormwater Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

Erosion Control and Construction Sequencing

With regard to work proposed on the project and erosion and siltation control, the sequence of activities will generally take place as follows:

1. Prior to site demolition activities, place all erosion controls (compost filled Filtrexx Soxx, straw bales and straw wattles along with silt sacks) in the locations specified on the drawings.

2. Damaged or loose siltation controls shall be replaced as necessary to maintain their function of controlling erosion and siltation. Silt sacks in catch basins shall be replaced as necessary to maintain its function of controlling erosion and siltation.

3. Remove any accumulation of silt or soil build-up behind the erosion controls as it occurs.

4. Throughout excavation, and grading operations the Contractor shall take other necessary precautions, including installation of temporary drainage swales, siltation sumps/filtration dams, check dams, straw bales, straw wattles and temporary pipe, to direct and control drainage from disturbed areas on the site so that erosion and siltation is minimal. In addition, no erosion or discharge of silt or larger particles shall occur in wetland areas or onto adjacent properties.

5. Remove all erosion control measures only when construction is completed, upland surfaces are stabilized, and the drainage system is fully operational, and the removal of the devices has been approved by the Owner and the Civil Engineer and the Town of Lynnfield.

If the Contractor anticipates deviations from the above procedures, he shall obtain written approval from the Owner and the Civil Engineer prior to proceeding.

Erosion and Sediment Control BMP’s

The Erosion and Sediment Controls represent the suggested best management practices proposed for the project. The Contractor's approach to controlling stormwater runoff from the site may vary however he must implement appropriate corresponding erosion control measures.

The use of erosion and sediment controls are mandatory and must be employed to minimize impacts to adjacent areas during construction. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize off-site impacts.

The control practices which are required to minimize stormwater pollution during construction must remain functional until disturbed areas have been stabilized. Erosion control products are to be installed and maintained in accordance with manufacturer's specifications and good engineering practices.

The most important aspects of controlling erosion and sedimentation are limiting the extent of drainage structures. These fundamental principles will be the key factors in the contractor's control of erosion on the project site. If appropriate, the contractor will construct temporary diversion swales and settling basins or use a settling tank. If additional drainage or erosion control measures are needed, they will be located up-gradient from the straw bales and silt fences.

The contractor is responsible for the maintenance and repair of all erosion control devices on-site. All erosion control devices will be regularly inspected. At no time will silt-laden water be allowed to enter sensitive areas (wetlands, streams, and drainage systems). Any runoff from disturbed surfaces will be directed through a sedimentation process prior to being discharged to the existing on site drainage system.

The contractor will establish a staging area for the overnight storage of equipment and stockpiling of materials. In the staging area, the contractor will have a stockpile of materials required to control erosion on-site to be used to supplement or repair erosion control devices. These materials will include, but are not limited to straw bales, straw wattles, compost filled Filtrexx Soxx, siltation control fence, stakes, erosion control matting, and crushed stone. As mentioned previously, erosion and sedimentation controls will be employed to minimize the erosion and transport of sediment into resource areas during the earthwork and construction phases of the Project. Erosion and sedimentation control measures will be

installed prior to site excavation or disturbance and will be maintained throughout the construction period.

The contractor is responsible for erosion control on the site and will utilize supplemental erosion control measures to supplement the erosion controls shown on the plans prepared for this project to work with his day to day operations at the site.

Primary erosion control techniques proposed include compost filled filtrexx soxx, , straw wattles, straw bale barriers and silt sacks, inlet sediment traps, siltation control dikes, a stabilized construction entrance, temporary diversion channels, and temporary sedimentation ponds when applicable. A detailed description of each technique is discussed below. During the growing season, slope stabilization will be achieved by applying topsoil followed by seeding and mulching as soon as final grades are achieved. Organic mulching, jute netting, geo-textiles, or a combination will be used to stabilize slopes completed outside of the growing season.

Best Management Practices (BMPs)

Compost Filled Filtrexx Soxx, Straw Wattles and Straw bales

Erosion control barriers will be installed in the locations shown on the drawings or as directed in the field by the Owner and the Civil Engineer prior to the start of construction. These barriers will remain in place until all tributary surfaces have been fully stabilized.

The barriers will be placed to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site. In areas where high runoff velocities or high sediment loads are expected, silt fencing may be installed adjacent to the straw wattle barriers. This semi-permeable barrier made of a synthetic porous fabric will provide additional protection. The barriers will be replaced as determined by periodic field inspection. The underside of the barriers will be kept in close contact with the earth and reset as necessary. Straw wattles will be maintained and cleaned until slopes have healthy stands of grass and all proposed paved areas have been paved with the binder course of pavement.

Drain System Protection

Silt Sack sediment traps supplemented with straw bale erosion checks will be installed at drainage structures and maintained and cleaned until slopes have healthy stands of grass. Catch basins, drain inlets, stormwater treatment units and storm drain pipes will be cleaned of sediment and debris after the completion of construction. Sediment collected in structures will be disposed of properly and covered, if stored on-site.

- Until tributary areas are stabilized, catch basin inlets will be fitted with Silt Sacks. If intense rainfall is predicted before all tributary areas are stabilized, erosion control measures will be reinforced for the duration of the storm. Downstream areas will be inspected, and any sediment removed at the end of the storm.

- Unfiltered water will not be allowed to enter pipes from unstabilized surfaces.

- Trench excavation will be limited to the minimum length required for daily pipe installation. All trenches will be backfilled as soon as possible. The ends of pipes will be closed nightly with plywood

- During construction of the site, silt-laden waters should be intercepted prior to reaching catch basins. Any gross depositions of materials on paved surfaces will be removed by sweeping.

- All paved areas will be swept on a weekly basis, as permitted by weather, during the construction period.

- Catch basins should be inspected monthly and cleaned in anticipation of the winter season in November and at the same time the roads are swept in the spring.

Utility Construction

The Contractor will construct utility trenches in a manner that will not direct runoff toward wetlands or to drainage system structures.

Stabilization Activities

All disturbed surfaces will be stabilized within 14 days after construction in any portion of the project site is completed or is temporarily halted, unless additional construction is intended to be initiated within 14 days. The Contractor will not disturb more area than can be stabilized within 14 days unless the area is to remain active. The Contractor will not disturb more area than can be stabilized within the same construction season.

Slope Stabilization

The smallest practicable area of land will be exposed at a time. Slopes greater than three-to-one (horizontal to vertical) will be stabilized with seed, organic mulch, jute fabric, or rip-rap, as appropriate, to prevent erosion during construction. After disturbed areas have been stabilized, the temporary erosion control measures will be removed, and accumulated sediment will be removed and disposed of in an appropriate location. Disturbed areas will be stabilized with appropriate ground cover as soon as possible. After the removal of temporary erosion control measures, disturbed areas will receive a layer of topsoil with seeding for stabilization.

Stabilized Construction Entrance

Temporary stabilized construction entrance or entrances will be installed at the project site. The purpose of the construction entrance is to remove sediment attached to vehicle tires and to minimize sediment transport and deposition onto public road surfaces. The construction entrance or entrances will be composed of crushed stone which will be replenished as necessary to maintain their proper function.

Inspections

The Contractor shall perform the following inspections in accordance with the 2022 EPA Construction General Permit Conditions which require routine inspections of the site and careful documentation of events and conditions. The following inspection activities will be completed by a qualified, designated site monitor.

- Erosion control, sedimentation prevention, and stormwater management measures will be inspected at least once per week throughout the construction period.

- All controls, outfalls, and potential problem areas will also be inspected within 24 hours of any storm exceeding 0.25 inches of precipitation.

A log of inspection results will be maintained on-site and will include the name of the inspector, date, major observations, and necessary corrective measures.

Built up sediment will be removed when it has reached one-third the height of the straw wattle.

All needed repairs or modifications will be reported to the contractors to permit the timely implementation of required actions. Where necessary repairs do not pose an immediate concern, repairs or modifications will be implemented within two (2) days of inspection.

A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of this CPPPP, and actions taken will be made and retained as part of the CPPPP.

Maintenance

The following maintenance practices will be used by the Contractor to maintain erosion and sediment controls. Maintenance activities will be documented on his Inspection Report.

Erosion and sediment control measures and other protective measures must be maintained in effective operating condition.

• If site inspections indicate that the BMPs are not operating effectively, maintenance must be performed as soon as possible and before the next storm event whenever practicable to maintain the continued effectiveness of the BMPs.
• If existing BMPs need to be modified or if additional BMPs are necessary for any reason, implementation must be completed before next storm event whenever practicable.

- Pollution prevention measures must be maintained in good working order. If a repair is necessary, it will be initiated, if practicable, within 24 hours of report.
- Accumulated sediment within the catch basin inlet protection must be removed on a weekly basis.
- Maintenance and inspection of pollution prevention measures must be continued on the site for as long as a portion of the site remains disturbed.
- Stabilization measures will be initiated as soon as practicable on portions of the site where construction has temporarily or permanently ceased. This will occur in NO CASE more than 14 days after construction activities have temporarily or permanently ceased.
- If issues are identified at hazardous materials storage areas, corrective actions will be implemented immediately. If leaks or spills are identified procedures outlined in Standard 9 will be followed.

Stormwater Standard 9: Operation and Maintenance Plan

Property Description:

The property which is the subject of this O & M Manual is located at 397 Walnit Street aka 1 King Rail Drive in Lynnfield, MA. The land area of the property consists of 103.0± acres and contains the King Rail Reserve Golf Course.

Operation and Maintenance Plan

In accordance with the Stormwater Management Regulations issued by the Department of Environmental Protection (DEP) and the Town of Lynnfield Stormwater Management Bylaw, Linden Engineering Partners, LLC has prepared the following Operation and Maintenance Plan for the clubhouse portion of the property.

This plan is broken into two major sections. The first section describes operational management practices. The second section is devoted to the operation and maintenance plan.

<u>Basic Information</u>

Property Owner & Financially Responsible Party:
Town of Lynnfield, MA
c/o Ms. Lisa DeMeo, P.E., Town Engineer

Good Housekeeping BMP's (Construction and Post Construction Periods)

The following good housekeeping practices will be followed onsite during and after the construction project:

- An effort will be made to store only enough product required to do a particular job. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.

Material Handling and Waste Management

Hazardous Products:

These practices will be used to reduce the risks associated with hazardous materials. Material Safety Data Sheets (MSDSs) for each substance with hazardous properties that is used on the property will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the property management office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product they are using, particularly regarding spill control techniques.

- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data will be retained; they contain important product information.

- If surplus product must be disposed of, manufacture's or local and State recommended methods for proper disposal will be followed.

Hazardous Waste

All hazardous waste material will be disposed of in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed.

Sanitary Wastes

All sanitary waste will be disposed of by means of the municipal sewer system connected to the building on the property

Equipment Fueling

No fuel shall be stored on the property except for fuel stored in approved containers. All fueling areas will be inspected and cleaned weekly as necessary.

Spill Prevention and Control Plan

The property manager will train all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with storm water discharges. If such contact occurs, the storm water discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated storm water. It shall be the responsibility of the job site superintendent to properly train all personnel in spill prevention and clean up procedures.

In order to minimize the potential for a spill of hazardous materials to come into contact with storm water, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, chemicals, acids, paints, paint solvents, cleaning solvents will be stored in a secure location, with their lids on, under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on the property at all times.

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site. Catch basin inlet cover blankets and inflatable pipe plugs will be used to seal the openings in the outlet control structure and isolate product in the wet basin should a spill occur.

4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed:

1. All spills will be cleaned up immediately after discovery.

2. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.

3. The property manager will be notified immediately.

4. Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill.

The property manager will be the spill prevention and response coordinator. He/she will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the property management office.

Allowable Non-Stormwater Discharge Management

Certain types of discharges are allowed under the NPDES Permit System, and it is the intent of this O & M Plan to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed

to come into contact with the water prior to or after its discharge. The control measures that have been outlined previously in this O & M Plan will be strictly followed to ensure that no contamination of these non-stormwater discharges takes place. The following non-stormwater discharges that may occur from the job site include:

- Discharges from fire-fighting activities
- Fire Hydrant flushings
- Waters used to wash vehicles where detergents are not used
- Water used to control dust in accordance with off-site vehicle tracking
- Potable water including uncontaminated water line flushings
- Routine external building wash down that does not use detergents
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
- Uncontaminated air conditioner compressor condensate
- Uncontaminated ground water or spring water
- Foundation or footing drains where flows are not contaminated with process materials such as solvents
- Uncontaminated excavation dewatering
- Landscape irrigation

STORMWATER MANAGEMENT SYSTEM MAINTENANCE

Stormwater BMP's

Several types of structural and non-structural water quality controls in various combinations are proposed to treat stormwater generated on the site. These measures include deep sump catch basins, stormwater treatment units, above ground and underground infiltration systems. These Water quality treatment measures will result in the removal of most of the total suspended solids (TSS) load in runoff prior to discharge from the site, consistent with DEP's TSS removal standards.

Post-Development Activities

1. Paved Areas: Paved Areas shall be mechanically swept during the dry weather to remove excess sediments, thereby reducing the amount of sediments that the drainage system will have to remove from the runoff.

Paved areas shall be mechanically swept a minimum of two times each year (in the spring after all snow and ice have melted and late in the fall prior to snowfall).

2. The use of salt or chemicals for de-icing on the paved areas during the winter months shall be limited to the minimum amount necessary to maintain pedestrian and vehicle safety. Alternative measures to sodium chloride are encouraged for use at the site.

3. Deep Sump Catch Basins: All Catch basins shall be inspected at least four times/year (once in the spring at the end of snowfall and once at the end of the fall foliage season and two other times spaced throughout the year) to verify that the inlet openings are not clogged by debris and to determine if the sump needs to be cleaned). Any debris shall be removed from the inlet grates and disposed of properly. The catch basin sumps shall be inspected and cleaned whenever the depth of the sediment is 25% or more of the sump depth or cleaned a minimum of twice annually. Material shall be removed from the catch basins and disposed of in accordance with all applicable regulations.

4. The Stormwater Treatment Units (Cascade): Stormwater Treatment Units shall be cleaned and inspected a minimum of four times per year for the first year and twice per year thereafter if the silt trap is not full in six months . Cleaning shall be in strict conformance with the manufacturer's written instructions which are attached to this Operations and Maintenance Plan.

5. The Subsurface (Underground) Infiltration Structures and the inlet/outlet pipes shall be inspected a minimum of twice/year for signs of accumulated water, debris and rodent activity. Remove any debris that is observed. Implement appropriate corrective action if any issues are discovered during the inspections.

6. The sediment forebays shall be inspected a minimum of twice/year. Collected sediment shall be removed and any signs of erosion shall be repaired.

7. The above ground infiltration basins shall be Inspected at least twive per year to ensure the basin is operating as designed. Inspect the outlet pipes and structure for evidence of clogging or excessive outflow releases.

During inspections, note any changes to the basins or the contributing watershed area because these may affect basin performance. At least twice a year, mow the vegetation in and around the basin. Remove sediment from the basin as necessary, and at least once every 10 years.

8. All sediments removed from the site drainage facilities shall be disposed of properly and in accordance with all applicable local and state regulations.

9. All vegetated slope areas on the site shall be stabilized following completion of construction and maintained to control erosion. Any disturbed areas shall be re-seeded and stabilized by the application of jute mesh if the slope exceeds 3 feet horizontal to 1 foot vertical.

10. Maintenance Responsibilities: All post-construction maintenance activities shall be documented and kept on file and made available to the Town of Lynnfield Conservation Commission. Post-construction maintenance shall be the responsibility of the Property Owner.

All structural BMP's and maintenance responsibilities as identified on the site plans and within this document will be owned and maintained by the owner of the property and shall run with the title of the property.

Annual Reporting Form

The Owner of the facility shall keep complete records of all BMP maintenance activities.

Annual Operating Budget

The estimated annual operating budget for the O & M Plan for property is $ 4,000.

Plan of BMP's

Reference is made to the site utility plan for the project for the location of all BMP's.

Conclusion

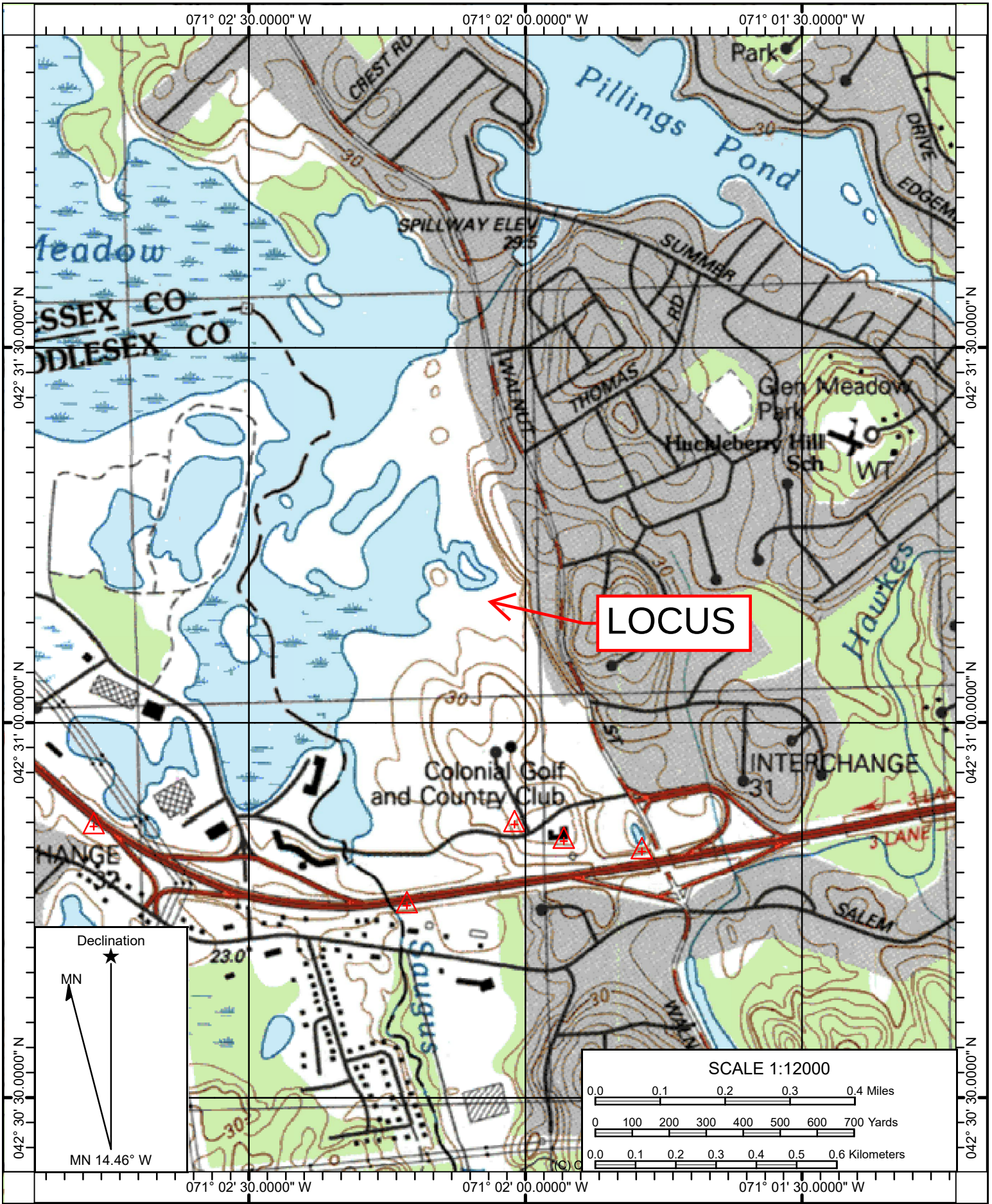
The construction of the improvements as proposed will provide runoff control for the completed project as required by the MADEP Stormwater Regulations.

Stormwater Standard 10: Prohibition of Illicit Discharges

A signed Illicit Discharge Compliance Statement will be provided prior to the discharge of stormwater through any of the new stormwater management BMPs. We note, however, that the project has been designed to avoid illicit discharges.

STORMWATER REPORT
KING RAIL RESERVE GOLF COURSE CLUBHOUSE
397 WALNUT STREET aka 1 KING RAIL DRIVE
LYNNFIELD, MA

LOCUS MAP



Name: READING
Date: 8/31/23
Scale: 1 inch = 1,000 ft.

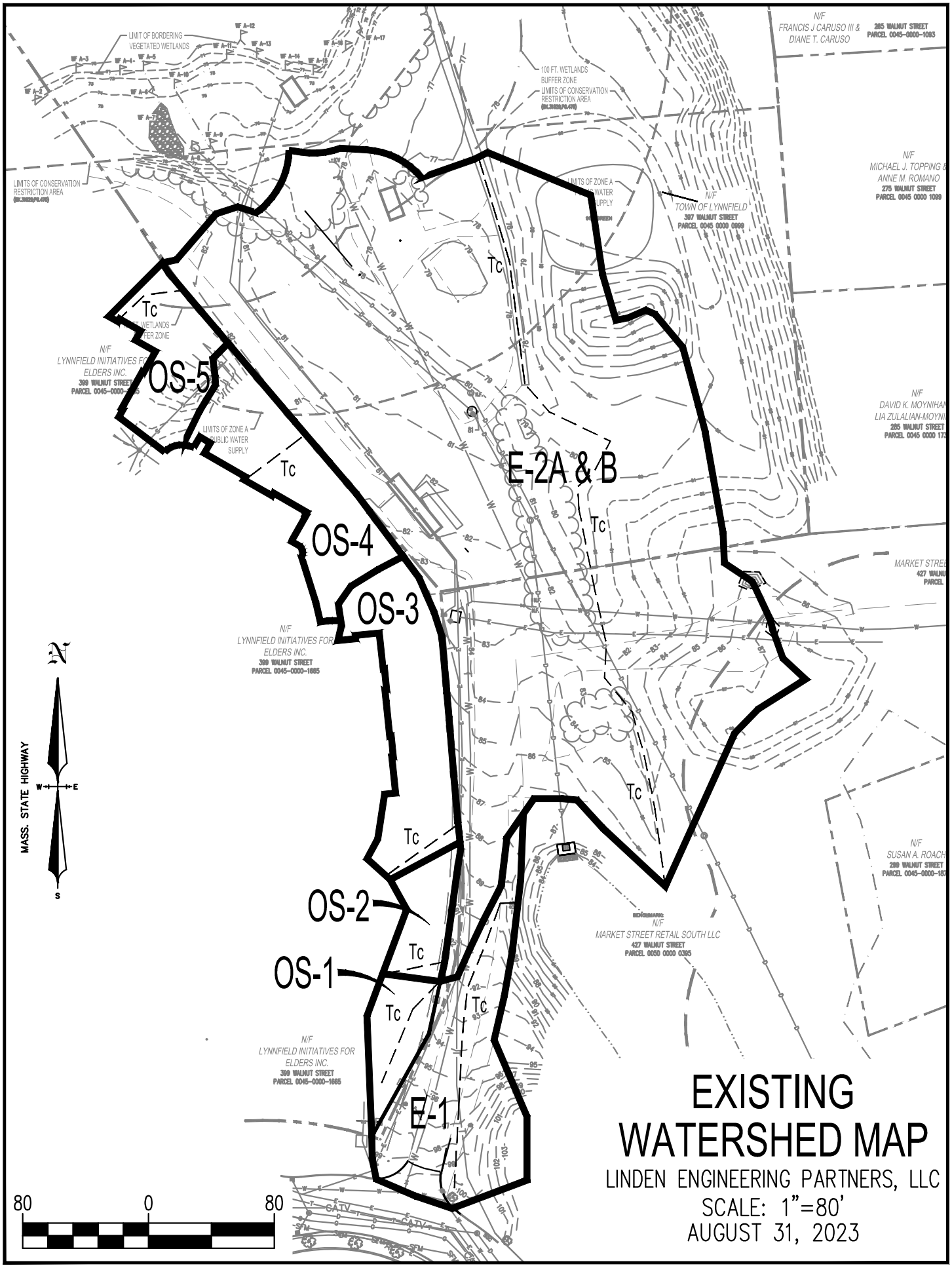
Location: 042° 31' 09.5418" N, 071° 02' 03.3024" W
Caption: KING RAIL GOLF CLUBHOUSE

Datum: NAD27

STORMWATER REPORT
KING RAIL RESERVE GOLF COURSE CLUBHOUSE
397 WALNUT STREET aka 1 KING RAIL DRIVE
LYNNFIELD, MA

EXISTING CONDITIONS RUNOFF CALCULATIONS

(2, 10. 25 & 100 YEAR STORMS)


OS-5
OS-4
OS-3
OS-2
OS-1
E-1
E-2A & B
Tc
LIMIT OF BORDERING VEGETATED WETLANDS
LIMITS OF CONSERVATION RESTRICTION AREA
100 FT. WETLANDS BUFFER ZONE
LIMITS OF CONSERVATION RESTRICTION AREA
LIMITS OF ZONE A PUBLIC WATER SUPPLY
N/F FRANCIS J CARUSO III & DIANE T. CARUSO
285 WALNUT STREET
PARCEL 0045-0000-1093
N/F MICHAEL J. TOPPING & ANNE M. ROMANO
275 WALNUT STREET
PARCEL 0045 0000 1099
N/F TOWN OF LYNNFIELD
397 WALNUT STREET
PARCEL 0045 0000 0999
N/F LYNNFIELD INITIATIVES FOR ELDERS INC.
399 WALNUT STREET
PARCEL 0045-0000-1685
N/F DAVID K. MOYNIHAN LIA ZULALIAN-MOYNI
285 WALNUT STREET
PARCEL 0045 0000 173
MARKET STREE
427 WALNU
PARCEL
N/F SUSAN A. ROACH
299 WALNUT STREET
PARCEL 0045-0000-167
N/F MARKET STREET RETAIL SOUTH LLC
427 WALNUT STREET
PARCEL 0050 0000 0395
MASS. STATE HIGHWAY
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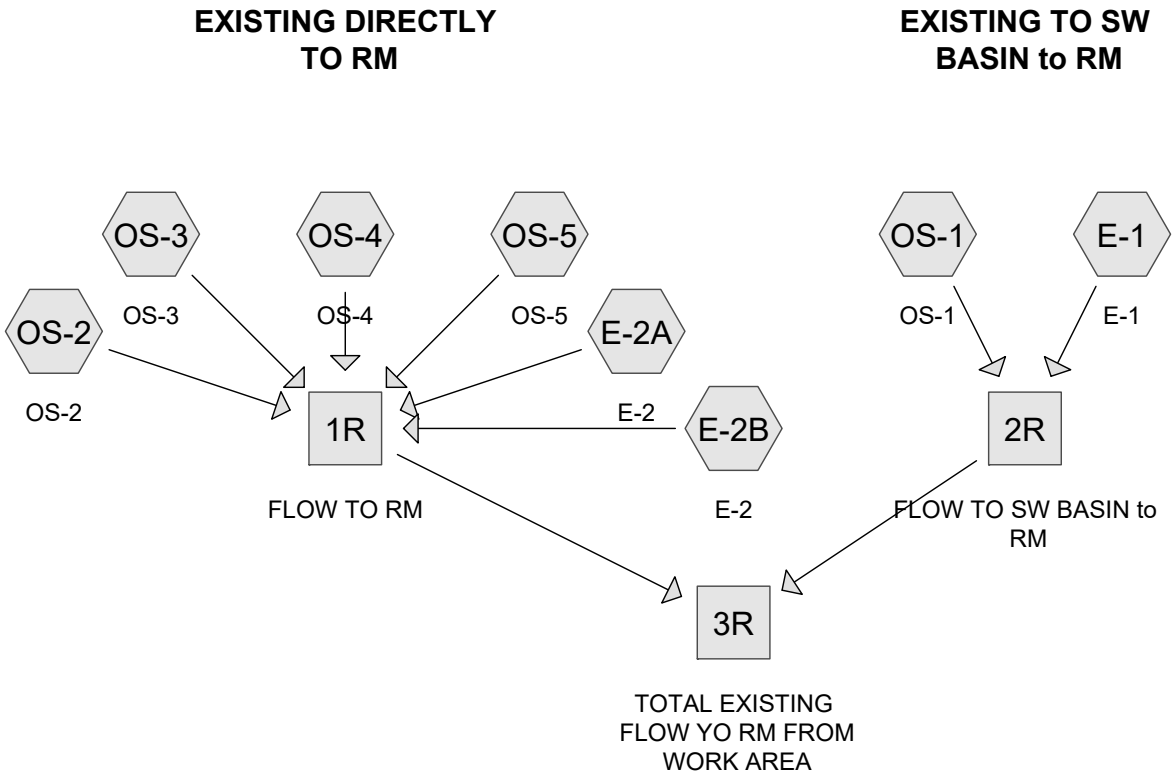
EXISTING
WATERSHED MAP
LINDEN ENGINEERING PARTNERS, LLC
SCALE: 1"=80'
AUGUST 31, 2023



Subcat Reach Pond Link

Routing Diagram for KRAIL-EX2
Prepared by Linden Engineering Partners, LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100 year	Type III 24-hr		Default	24.00	1	6.50	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.932	61	>75% Grass cover, Good, HSG B (E-1, E-2A, OS-1, OS-2, OS-3, OS-4, OS-5)
0.103	56	Brush, Fair, HSG B (E-2A)
0.793	96	Gravel surface, HSG B (E-1, E-2B)
0.229	58	Meadow, non-grazed, HSG B (E-2A)
0.076	98	Paved parking, HSG B (E-1, E-2A, OS-3, OS-4)
3.133	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.133	HSG B	E-1, E-2A, E-2B, OS-1, OS-2, OS-3, OS-4, OS-5
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.133		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.932	0.000	0.000	0.000	1.932	>75% Grass cover, Good	E-1, E-2A, OS-1, OS-2, OS-3, OS-4, OS-5
0.000	0.103	0.000	0.000	0.000	0.103	Brush, Fair	E-2A
0.000	0.793	0.000	0.000	0.000	0.793	Gravel surface	E-1, E-2B
0.000	0.229	0.000	0.000	0.000	0.229	Meadow, non-grazed	E-2A
0.000	0.076	0.000	0.000	0.000	0.076	Paved parking	E-1, E-2A, OS-3, OS-4
0.000	**3.133**	**0.000**	**0.000**	**0.000**	**3.133**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: E-1 Runoff Area=11,511 sf 5.64% Impervious Runoff Depth=3.51"
Flow Length=183' Tc=6.0 min CN=73 Runoff=1.09 cfs 0.077 af

Subcatchment E-2A: E-2 Runoff Area=66,706 sf 2.17% Impervious Runoff Depth=2.35"
Flow Length=661' Tc=22.9 min CN=61 Runoff=2.58 cfs 0.300 af

Subcatchment E-2B: E-2 Runoff Area=31,300 sf 0.00% Impervious Runoff Depth=6.03"
Tc=6.0 min CN=96 Runoff=4.53 cfs 0.361 af

Subcatchment OS-1: OS-1 Runoff Area=2,710 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=75' Tc=6.3 min CN=61 Runoff=0.16 cfs 0.012 af

Subcatchment OS-2: OS-2 Runoff Area=2,641 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=40' Slope=0.0500 '/' Tc=6.0 min CN=61 Runoff=0.16 cfs 0.012 af

Subcatchment OS-3: OS-3 Runoff Area=8,426 sf 5.93% Impervious Runoff Depth=2.53"
Flow Length=50' Slope=0.1100 '/' Tc=6.0 min CN=63 Runoff=0.56 cfs 0.041 af

Subcatchment OS-4: OS-4 Runoff Area=8,385 sf 8.35% Impervious Runoff Depth=2.63"
Flow Length=44' Slope=0.0400 '/' Tc=6.0 min CN=64 Runoff=0.58 cfs 0.042 af

Subcatchment OS-5: OS-5 Runoff Area=4,795 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=46' Slope=0.0400 '/' Tc=6.0 min CN=61 Runoff=0.29 cfs 0.022 af

Reach 1R: FLOW TO RM Inflow=7.23 cfs 0.777 af
Outflow=7.23 cfs 0.777 af

Reach 2R: FLOW TO SW BASIN to RM Inflow=1.25 cfs 0.089 af
Outflow=1.25 cfs 0.089 af

Reach 3R: TOTAL EXISTING FLOW YO RM FROM WORK AREA Inflow=8.48 cfs 0.866 af
Outflow=8.48 cfs 0.866 af

Total Runoff Area = 3.133 ac Runoff Volume = 0.866 af Average Runoff Depth = 3.32"
97.58% Pervious = 3.057 ac 2.42% Impervious = 0.076 ac

Summary for Subcatchment E-1: E-1

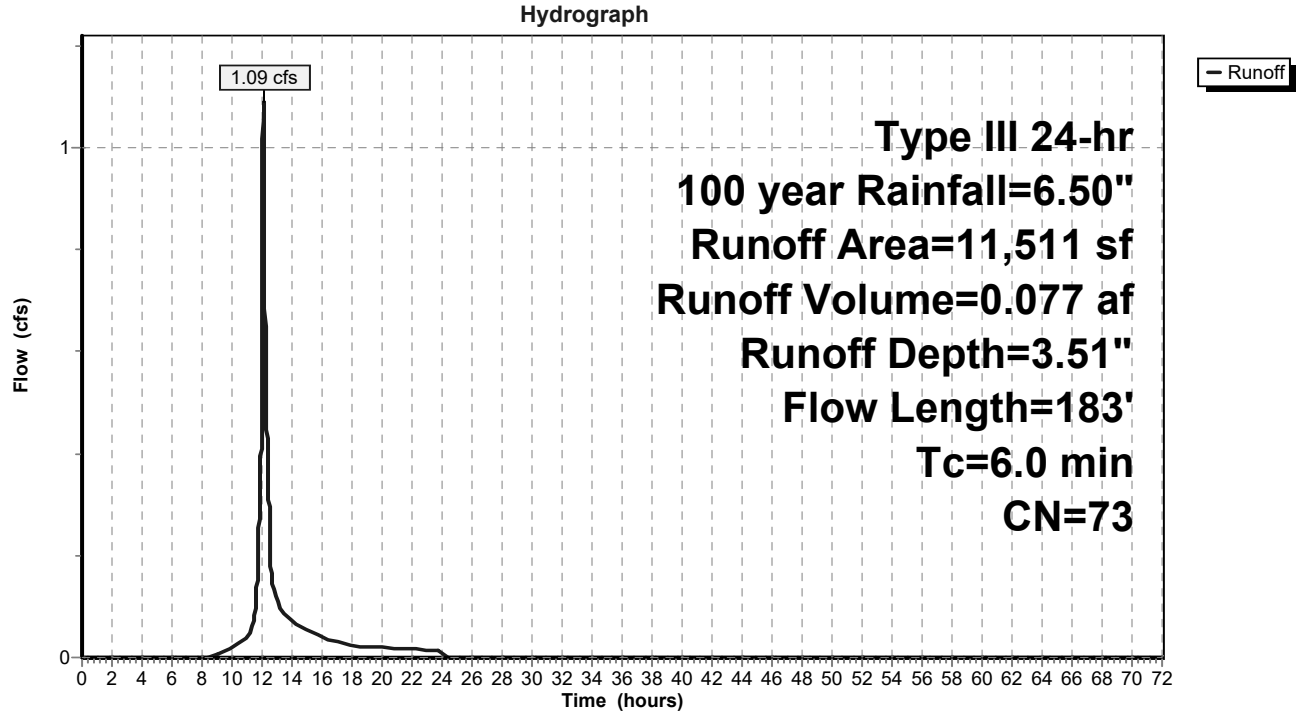
Runoff = 1.09 cfs @ 12.09 hrs, Volume= 0.077 af, Depth= 3.51"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
649	98	Paved parking, HSG B
3,250	96	Gravel surface, HSG B
7,612	61	>75% Grass cover, Good, HSG B
11,511	73	Weighted Average
10,862		94.36% Pervious Area
649		5.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0800	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.6	133	0.0480	3.53		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.3	183	Total, Increased to minimum Tc = 6.0 min			

Subcatchment E-1: E-1



Summary for Subcatchment E-2A: E-2

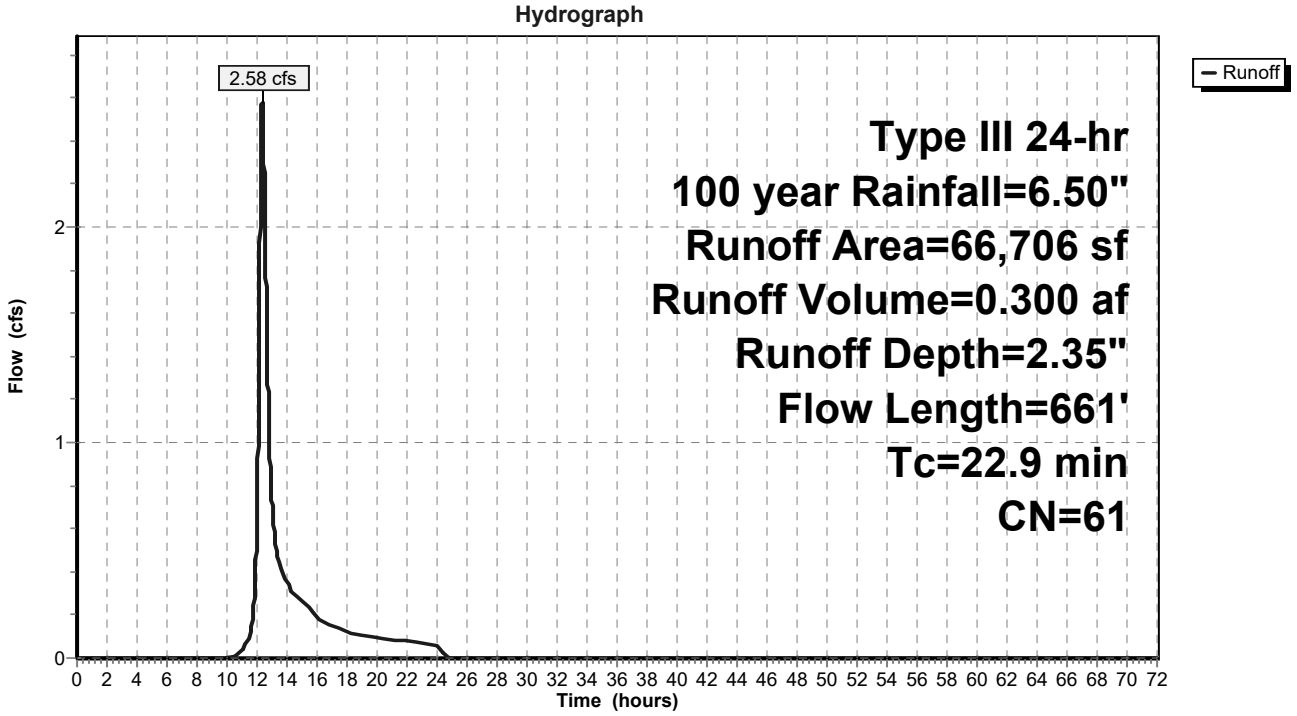
Runoff = 2.58 cfs @ 12.34 hrs, Volume= 0.300 af, Depth= 2.35"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
1,450	98	Paved parking, HSG B
4,500	56	Brush, Fair, HSG B
9,970	58	Meadow, non-grazed, HSG B
50,786	61	>75% Grass cover, Good, HSG B
66,706	61	Weighted Average
65,256		97.83% Pervious Area
1,450		2.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.7	147	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
22.9	661	Total			

Subcatchment E-2A: E-2



Summary for Subcatchment E-2B: E-2

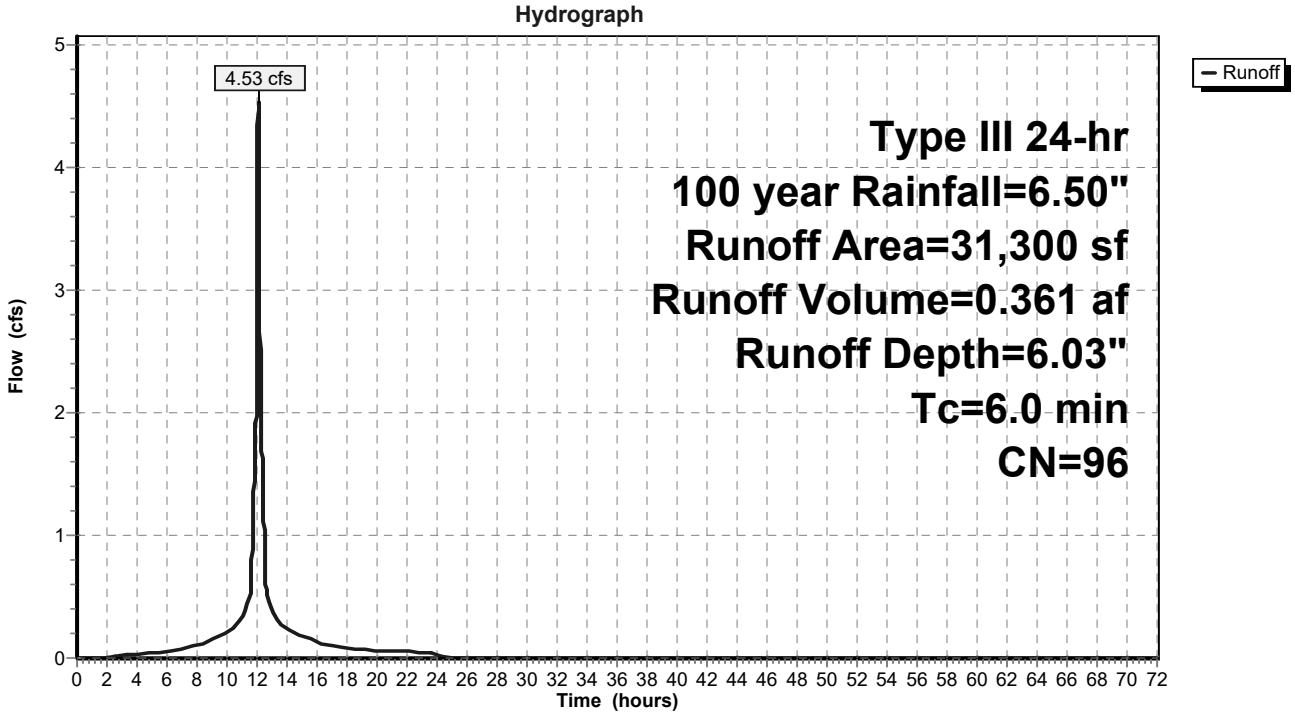
Runoff = 4.53 cfs @ 12.08 hrs, Volume= 0.361 af, Depth= 6.03"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
31,300	96	Gravel surface, HSG B
31,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment E-2B: E-2



Summary for Subcatchment OS-1: OS-1

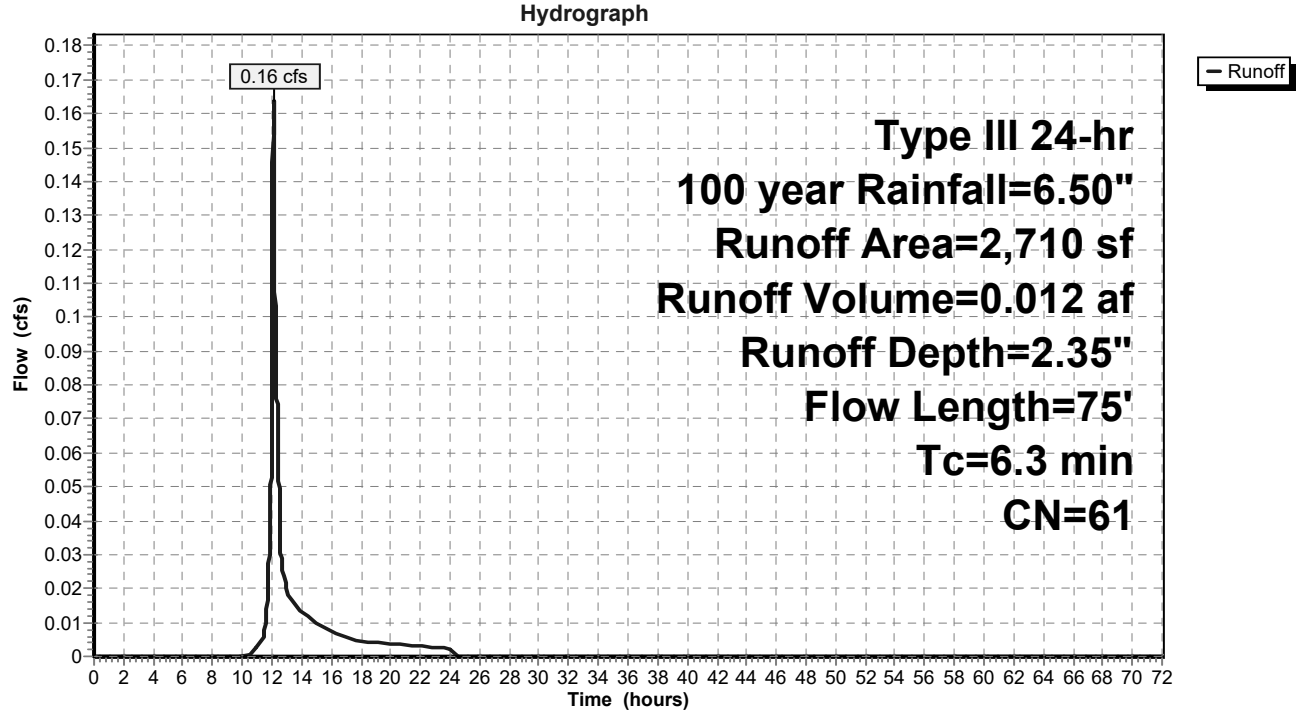
Runoff = 0.16 cfs @ 12.10 hrs, Volume= 0.012 af, Depth= 2.35"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
2,710	61	>75% Grass cover, Good, HSG B
2,710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0472	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.5	25	0.0200	0.85		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	75	Total			

Subcatchment OS-1: OS-1



Summary for Subcatchment OS-2: OS-2

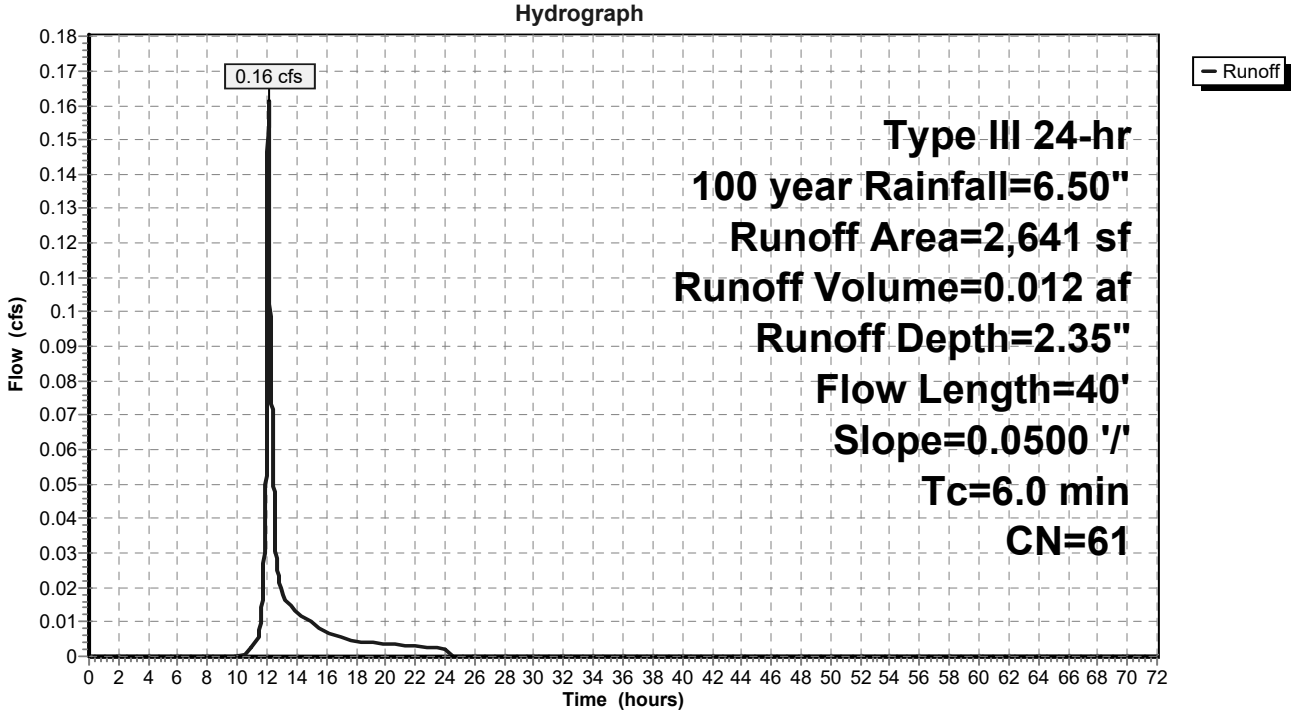
Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 2.35"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-2: OS-2



Summary for Subcatchment OS-3: OS-3

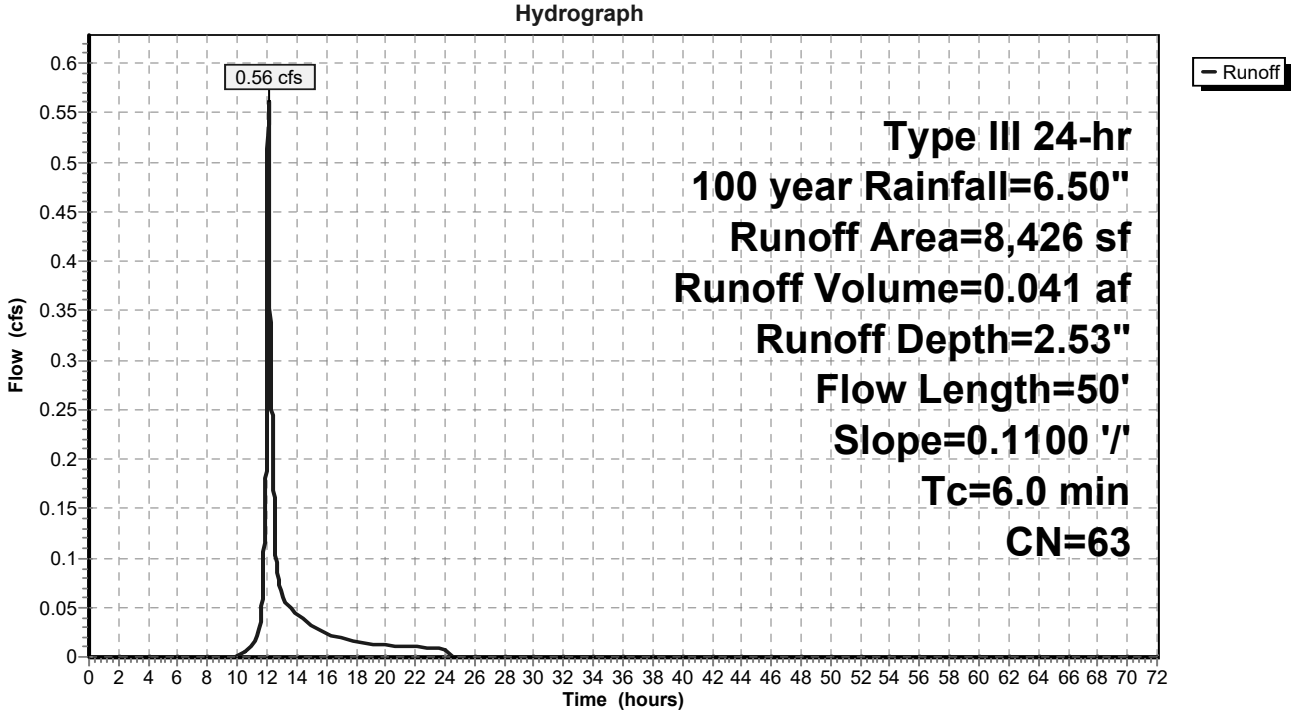
Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 2.53"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-3: OS-3



Summary for Subcatchment OS-4: OS-4

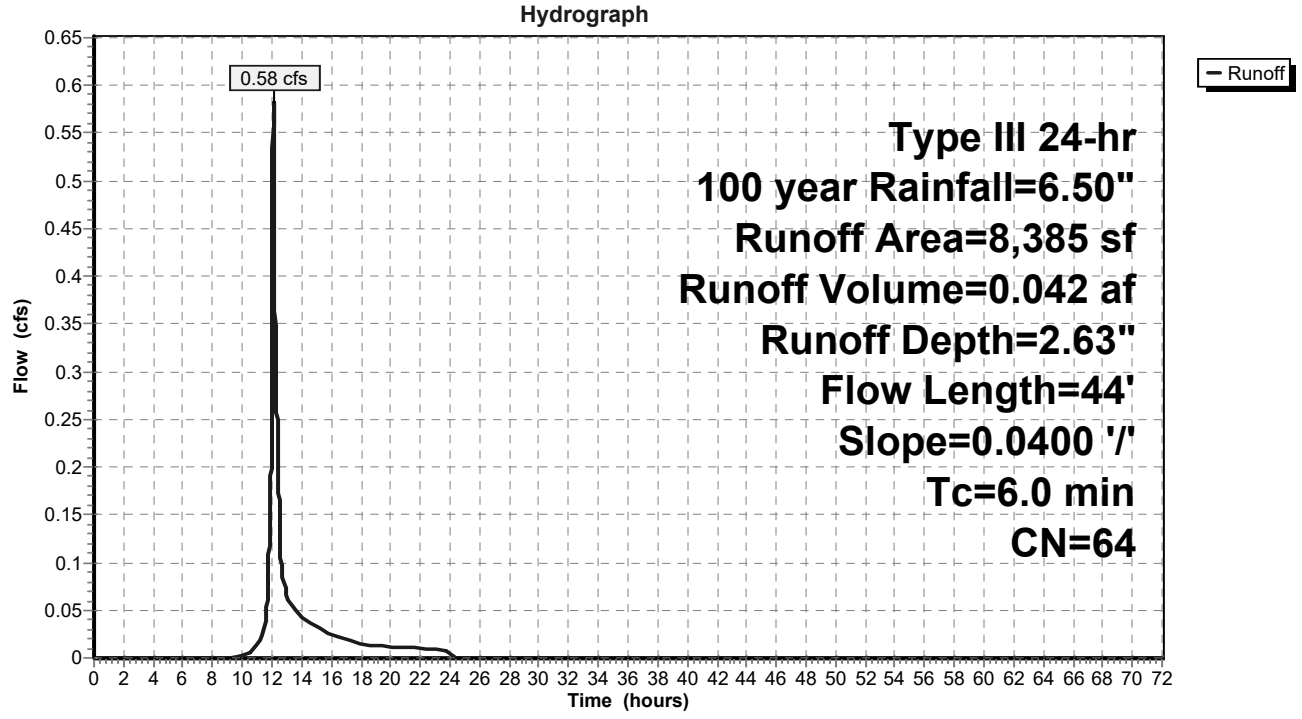
Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 2.63"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-4: OS-4



Summary for Subcatchment OS-5: OS-5

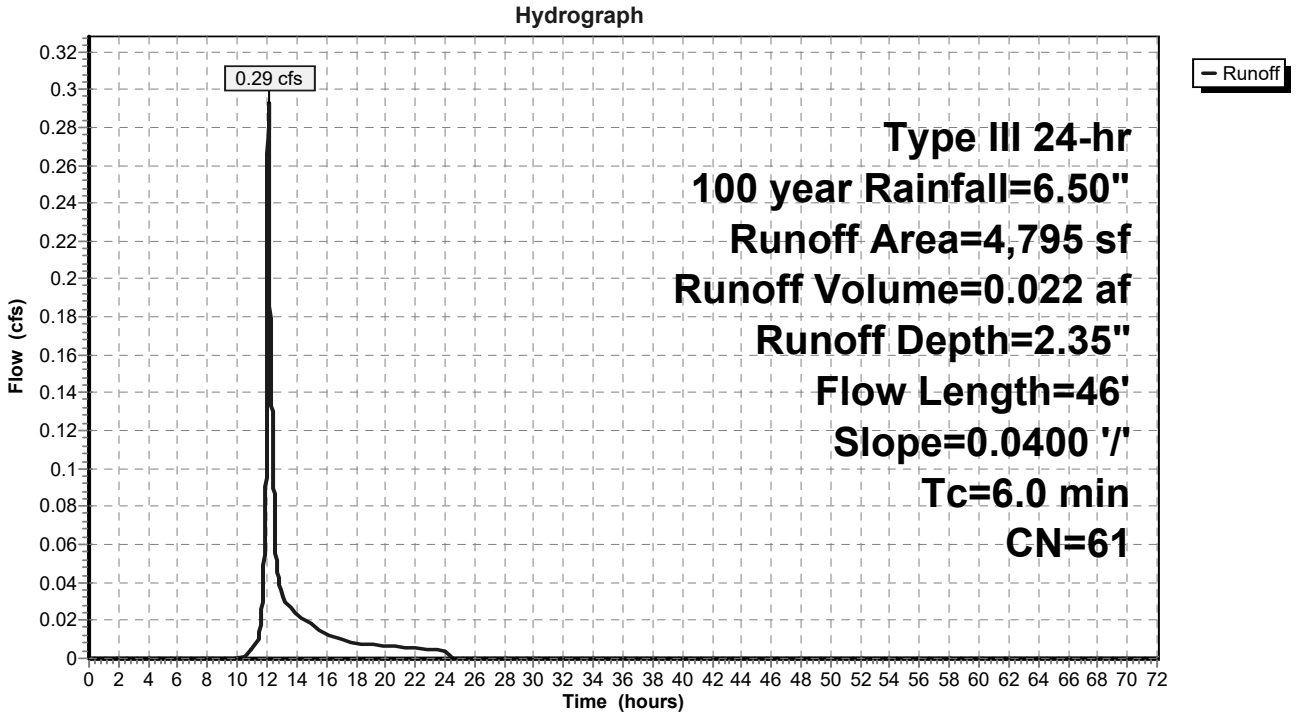
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 2.35"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-5: OS-5

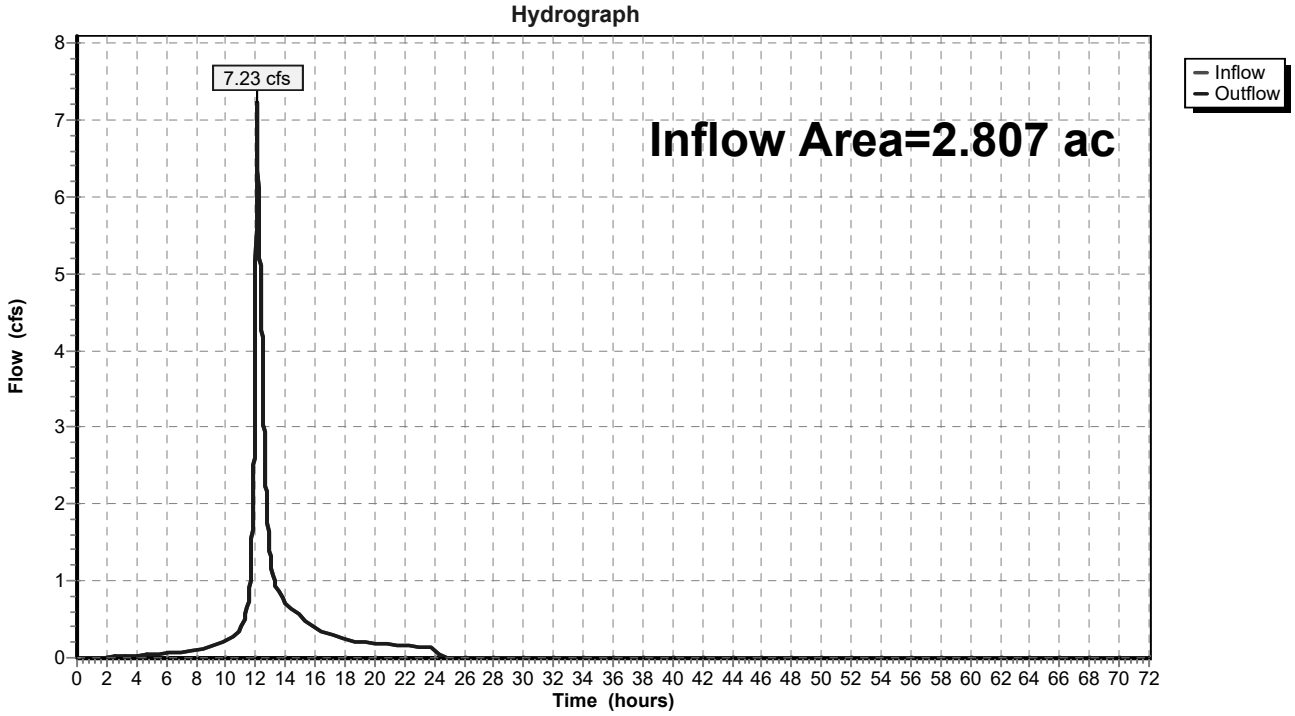


Summary for Reach 1R: FLOW TO RM

Inflow Area = 2.807 ac, 2.17% Impervious, Inflow Depth = 3.32" for 100 year event
Inflow = 7.23 cfs @ 12.09 hrs, Volume= 0.777 af
Outflow = 7.23 cfs @ 12.09 hrs, Volume= 0.777 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 1R: FLOW TO RM

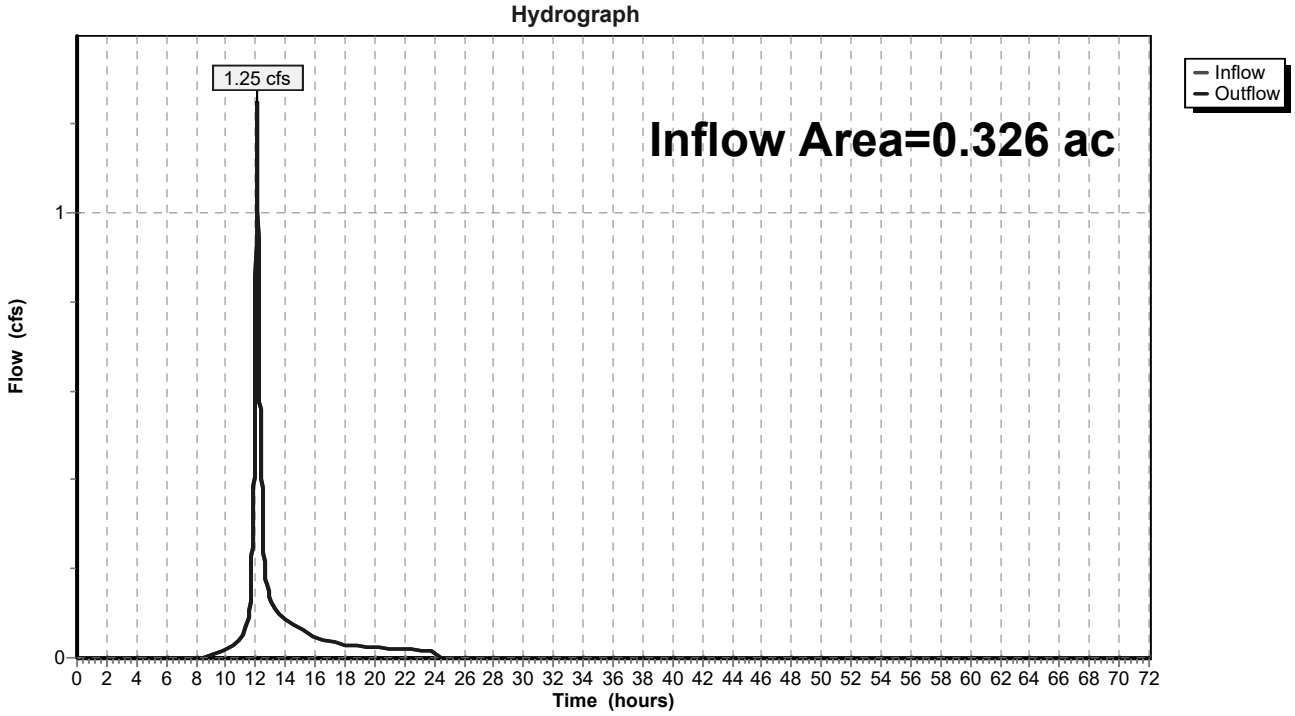


Summary for Reach 2R: FLOW TO SW BASIN to RM

Inflow Area = 0.326 ac, 4.56% Impervious, Inflow Depth = 3.29" for 100 year event
Inflow = 1.25 cfs @ 12.09 hrs, Volume= 0.089 af
Outflow = 1.25 cfs @ 12.09 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 2R: FLOW TO SW BASIN to RM

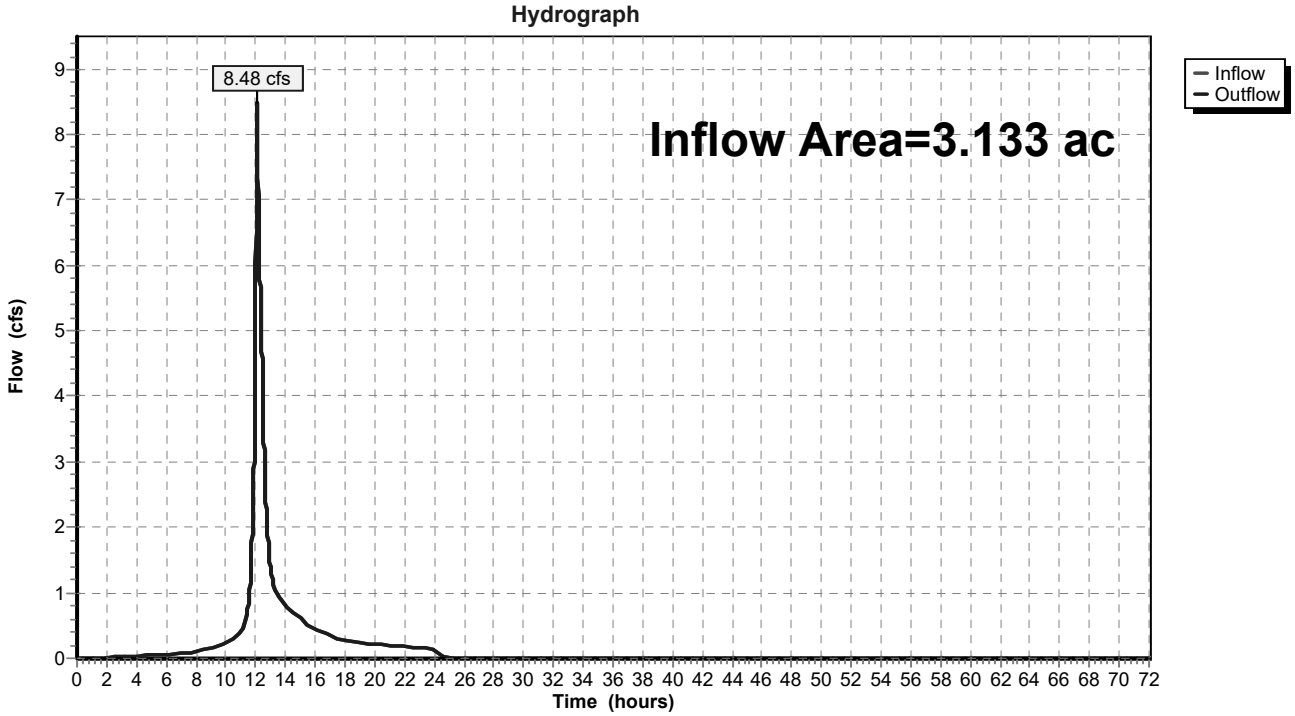


Summary for Reach 3R: TOTAL EXISTING FLOW YO RM FROM WORK AREA

Inflow Area = 3.133 ac, 2.42% Impervious, Inflow Depth = 3.32" for 100 year event
Inflow = 8.48 cfs @ 12.09 hrs, Volume= 0.866 af
Outflow = 8.48 cfs @ 12.09 hrs, Volume= 0.866 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 3R: TOTAL EXISTING FLOW YO RM FROM WORK AREA



Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 year	Type III 24-hr		Default	24.00	1	3.10	2
2	10 year	Type III 24-hr		Default	24.00	1	4.55	2
3	25 year	Type III 24-hr		Default	24.00	1	5.45	2

Summary for Subcatchment E-1: E-1

Runoff = 0.26 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 0.92"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
649	98	Paved parking, HSG B
3,250	96	Gravel surface, HSG B
7,612	61	>75% Grass cover, Good, HSG B
11,511	73	Weighted Average
10,862		94.36% Pervious Area
649		5.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0800	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.6	133	0.0480	3.53		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.3	183	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment E-2A: E-2

Runoff = 0.30 cfs @ 12.46 hrs, Volume= 0.052 af, Depth= 0.40"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
1,450	98	Paved parking, HSG B
4,500	56	Brush, Fair, HSG B
9,970	58	Meadow, non-grazed, HSG B
50,786	61	>75% Grass cover, Good, HSG B
66,706	61	Weighted Average
65,256		97.83% Pervious Area
1,450		2.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.7	147	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
22.9	661	Total			

Summary for Subcatchment E-2B: E-2

Runoff = 2.08 cfs @ 12.08 hrs, Volume= 0.159 af, Depth= 2.65"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
31,300	96	Gravel surface, HSG B
31,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment OS-1: OS-1

Runoff = 0.02 cfs @ 12.13 hrs, Volume= 0.002 af, Depth= 0.40"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
2,710	61	>75% Grass cover, Good, HSG B
2,710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0472	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.5	25	0.0200	0.85		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	75	Total			

Summary for Subcatchment OS-2: OS-2

Runoff = 0.02 cfs @ 12.13 hrs, Volume= 0.002 af, Depth= 0.40"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.07 cfs @ 12.12 hrs, Volume= 0.008 af, Depth= 0.48"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.08 cfs @ 12.11 hrs, Volume= 0.008 af, Depth= 0.51"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 0.40"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: FLOW TO RM

Inflow Area = 2.807 ac, 2.17% Impervious, Inflow Depth = 0.99" for 2 year event
Inflow = 2.29 cfs @ 12.09 hrs, Volume= 0.232 af
Outflow = 2.29 cfs @ 12.09 hrs, Volume= 0.232 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 2R: FLOW TO SW BASIN to RM

Inflow Area = 0.326 ac, 4.56% Impervious, Inflow Depth = 0.82" for 2 year event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3R: TOTAL EXISTING FLOW YO RM FROM WORK AREA

Inflow Area = 3.133 ac, 2.42% Impervious, Inflow Depth = 0.97" for 2 year event
Inflow = 2.57 cfs @ 12.09 hrs, Volume= 0.254 af
Outflow = 2.57 cfs @ 12.09 hrs, Volume= 0.254 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Subcatchment E-1: E-1

Runoff = 0.59 cfs @ 12.09 hrs, Volume= 0.043 af, Depth= 1.93"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
649	98	Paved parking, HSG B
3,250	96	Gravel surface, HSG B
7,612	61	>75% Grass cover, Good, HSG B
11,511	73	Weighted Average
10,862		94.36% Pervious Area
649		5.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0800	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.6	133	0.0480	3.53		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.3	183	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment E-2A: E-2

Runoff = 1.10 cfs @ 12.37 hrs, Volume= 0.141 af, Depth= 1.11"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
1,450	98	Paved parking, HSG B
4,500	56	Brush, Fair, HSG B
9,970	58	Meadow, non-grazed, HSG B
50,786	61	>75% Grass cover, Good, HSG B
66,706	61	Weighted Average
65,256		97.83% Pervious Area
1,450		2.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.7	147	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
22.9	661	Total			

Summary for Subcatchment E-2B: E-2

Runoff = 3.13 cfs @ 12.08 hrs, Volume= 0.245 af, Depth= 4.09"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
31,300	96	Gravel surface, HSG B
31,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment OS-1: OS-1

Runoff = 0.07 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 1.11"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
2,710	61	>75% Grass cover, Good, HSG B
2,710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0472	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.5	25	0.0200	0.85		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	75	Total			

Summary for Subcatchment OS-2: OS-2

Runoff = 0.07 cfs @ 12.10 hrs, Volume= 0.006 af, Depth= 1.11"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 1.23"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 1.30"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 1.11"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: FLOW TO RM

Inflow Area = 2.807 ac, 2.17% Impervious, Inflow Depth = 1.89" for 10 year event
Inflow = 4.19 cfs @ 12.09 hrs, Volume= 0.442 af
Outflow = 4.19 cfs @ 12.09 hrs, Volume= 0.442 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 2R: FLOW TO SW BASIN to RM

Inflow Area = 0.326 ac, 4.56% Impervious, Inflow Depth = 1.78" for 10 year event
Inflow = 0.66 cfs @ 12.09 hrs, Volume= 0.048 af
Outflow = 0.66 cfs @ 12.09 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3R: TOTAL EXISTING FLOW YO RM FROM WORK AREA

Inflow Area = 3.133 ac, 2.42% Impervious, Inflow Depth = 1.88" for 10 year event
Inflow = 4.85 cfs @ 12.09 hrs, Volume= 0.491 af
Outflow = 4.85 cfs @ 12.09 hrs, Volume= 0.491 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Subcatchment E-1: E-1

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.058 af, Depth= 2.64"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
649	98	Paved parking, HSG B
3,250	96	Gravel surface, HSG B
7,612	61	>75% Grass cover, Good, HSG B
11,511	73	Weighted Average
10,862		94.36% Pervious Area
649		5.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	50	0.0800	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.6	133	0.0480	3.53		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.3	183	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment E-2A: E-2

Runoff = 1.75 cfs @ 12.34 hrs, Volume= 0.210 af, Depth= 1.65"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
1,450	98	Paved parking, HSG B
4,500	56	Brush, Fair, HSG B
9,970	58	Meadow, non-grazed, HSG B
50,786	61	>75% Grass cover, Good, HSG B
66,706	61	Weighted Average
65,256		97.83% Pervious Area
1,450		2.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.7	147	0.0050	1.44		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
22.9	661	Total			

Summary for Subcatchment E-2B: E-2

Runoff = 3.78 cfs @ 12.08 hrs, Volume= 0.298 af, Depth= 4.98"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
31,300	96	Gravel surface, HSG B
31,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment OS-1: OS-1

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af, Depth= 1.65"
Routed to Reach 2R : FLOW TO SW BASIN to RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
2,710	61	>75% Grass cover, Good, HSG B
2,710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0472	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.5	25	0.0200	0.85		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	75	Total			

Summary for Subcatchment OS-2: OS-2

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af, Depth= 1.65"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.39 cfs @ 12.10 hrs, Volume= 0.029 af, Depth= 1.80"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 1.88"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.20 cfs @ 12.10 hrs, Volume= 0.015 af, Depth= 1.65"
Routed to Reach 1R : FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: FLOW TO RM

Inflow Area = 2.807 ac, 2.17% Impervious, Inflow Depth = 2.53" for 25 year event
Inflow = 5.55 cfs @ 12.09 hrs, Volume= 0.591 af
Outflow = 5.55 cfs @ 12.09 hrs, Volume= 0.591 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 2R: FLOW TO SW BASIN to RM

Inflow Area = 0.326 ac, 4.56% Impervious, Inflow Depth = 2.45" for 25 year event
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 0.067 af
Outflow = 0.93 cfs @ 12.09 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3R : TOTAL EXISTING FLOW YO RM FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3R: TOTAL EXISTING FLOW YO RM FROM WORK AREA

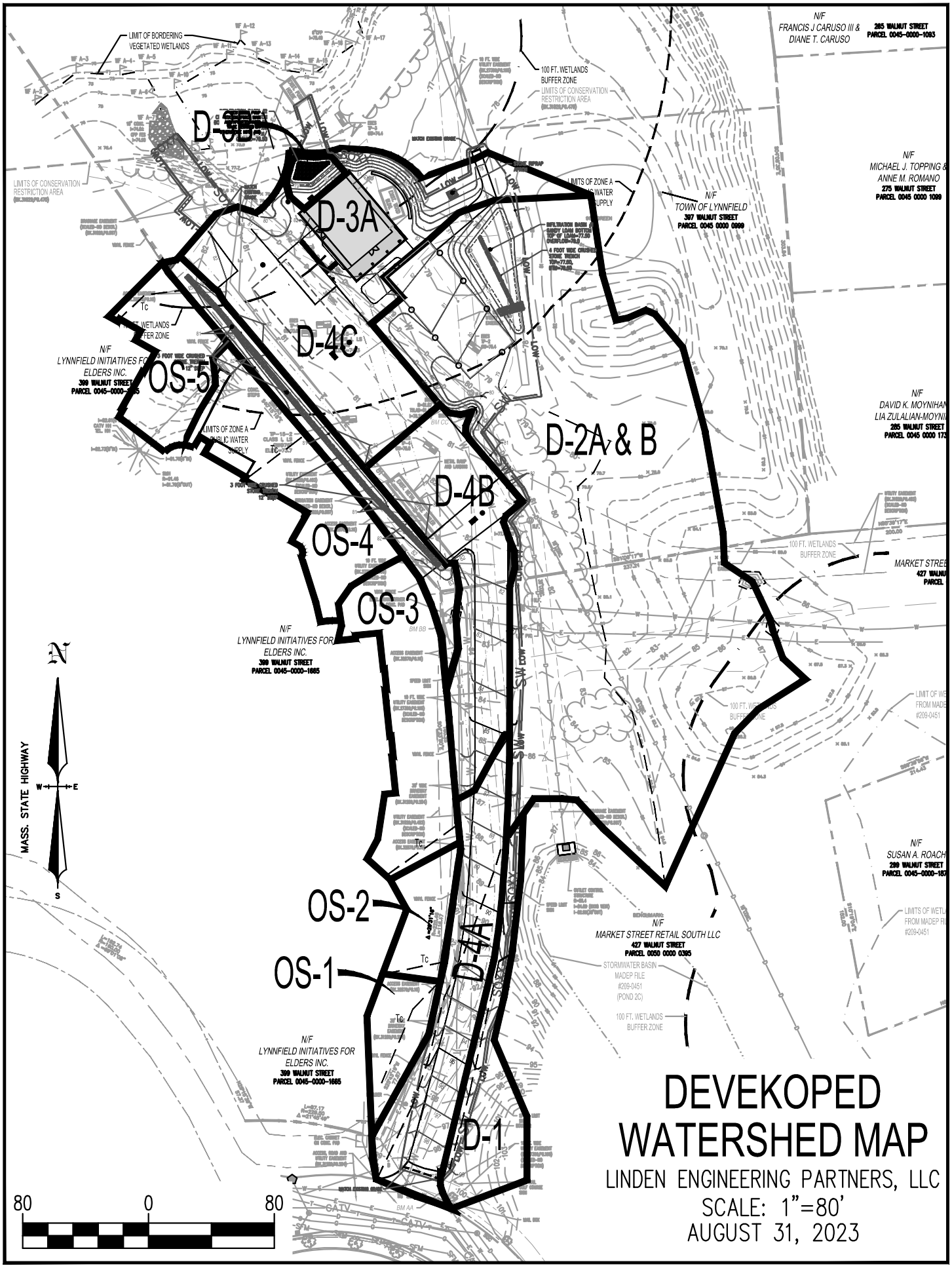
Inflow Area = 3.133 ac, 2.42% Impervious, Inflow Depth = 2.52" for 25 year event
Inflow = 6.47 cfs @ 12.09 hrs, Volume= 0.658 af
Outflow = 6.47 cfs @ 12.09 hrs, Volume= 0.658 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

STORMWATER REPORT
KING RAIL RESERVE GOLF COURSE CLUBHOUSE
397 WALNUT STREET aka 1 KING RAIL DRIVE
LYNNFIELD, MA

PROPOSED CONDITIONS RUNOFF CALCULATIONS

(2, 10. 25 & 100 YEAR STORMS)

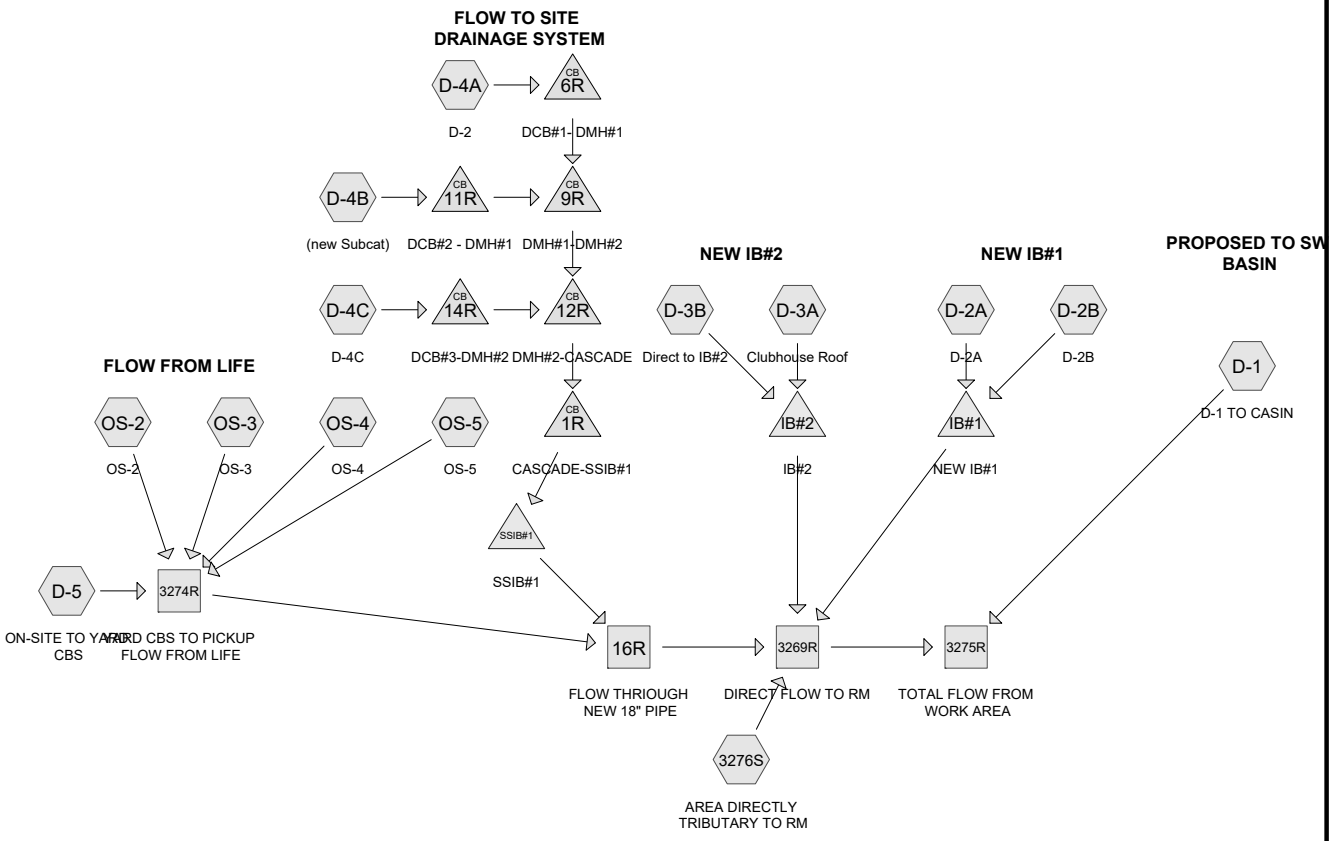


DEVEKOPED WATERSHED MAP

LINDEN ENGINEERING PARTNERS, LLC

SCALE: 1"=80'

AUGUST 31, 2023



Routing Diagram for KRAIL-DEV2
Prepared by Linden Engineering Partners, LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100 year	Type III 24-hr		Default	24.00	1	6.50	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.004	79	<50% Grass cover, Poor, HSG B (D-3B)
1.391	61	>75% Grass cover, Good, HSG B (3276S, D-1, D-2A, D-3B, D-4A, D-4B, D-4C, D-5, OS-2, OS-3, OS-4, OS-5)
0.096	56	Brush, Fair, HSG B (D-2A)
0.258	96	Gravel surface, HSG B (D-2B)
0.703	58	Meadow, non-grazed, HSG B (D-2A)
0.380	98	Paved parking, HSG B (3276S, D-4A, D-4B, OS-3, OS-4)
0.250	98	Paved roads w/curbs & sewers, HSG B (3276S, D-4C)
0.054	98	Roofs, HSG B (D-3A)
0.004	98	Water Surface, HSG B (3276S)
3.141	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.141	HSG B	3276S, D-1, D-2A, D-2B, D-3A, D-3B, D-4A, D-4B, D-4C, D-5, OS-2, OS-3, OS-4, OS-5
0.000	HSG C	
0.000	HSG D	
0.000	Other	
3.141		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.004	0.000	0.000	0.000	0.004	<50% Grass cover, Poor	D-3B
0.000	1.391	0.000	0.000	0.000	1.391	>75% Grass cover, Good	3276S, D-1, D-2A, D-3B, D-4A, D-4B, D-4C, D-5, OS-2, OS-3, OS-4, OS-5
0.000	0.096	0.000	0.000	0.000	0.096	Brush, Fair	D-2A
0.000	0.258	0.000	0.000	0.000	0.258	Gravel surface	D-2B
0.000	0.703	0.000	0.000	0.000	0.703	Meadow, non-grazed	D-2A
0.000	0.380	0.000	0.000	0.000	0.380	Paved parking	3276S, D-4A, D-4B, OS-3, OS-4

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.250	0.000	0.000	0.000	0.250	Paved roads w/curbs & sewers	327 6S, D-4 C
0.000	0.054	0.000	0.000	0.000	0.054	Roofs	D-3 A
0.000	0.004	0.000	0.000	0.000	0.004	Water Surface	327 6S
0.000	**3.141**	**0.000**	**0.000**	**0.000**	**3.141**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1R	77.23	77.20	8.0	0.0038	0.010	0.0	18.0	0.0	
2	6R	81.00	78.20	140.0	0.0200	0.010	0.0	12.0	0.0	
3	9R	78.20	77.55	135.0	0.0048	0.010	0.0	12.0	0.0	
4	11R	78.25	78.20	3.0	0.0167	0.010	0.0	12.0	0.0	
5	12R	77.33	77.30	3.0	0.0100	0.010	0.0	15.0	0.0	
6	14R	77.58	77.55	3.0	0.0100	0.010	0.0	12.0	0.0	
7	IB#1	78.00	77.50	30.0	0.0167	0.010	0.0	8.0	0.0	
8	SSIB#1	78.30	78.19	11.0	0.0100	0.010	0.0	8.0	0.0	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3276S: AREA DIRECTLY Runoff Area=6,924 sf 18.41% Impervious Runoff Depth=3.01"
Flow Length=45' Slope=0.0100 '/' Tc=9.9 min CN=68 Runoff=0.49 cfs 0.040 af

Subcatchment D-1: D-1 TO CASIN Runoff Area=5,387 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=145' Tc=6.3 min CN=61 Runoff=0.33 cfs 0.024 af

Subcatchment D-2A: D-2A Runoff Area=47,415 sf 0.00% Impervious Runoff Depth=2.17"
Flow Length=661' Tc=23.5 min CN=59 Runoff=1.65 cfs 0.196 af

Subcatchment D-2B: D-2B Runoff Area=11,225 sf 0.00% Impervious Runoff Depth=6.03"
Tc=6.0 min CN=96 Runoff=1.63 cfs 0.129 af

Subcatchment D-3A: Clubhouse Roof Runoff Area=2,360 sf 100.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=98 Runoff=0.35 cfs 0.028 af

Subcatchment D-3B: Direct to IB#2 Runoff Area=810 sf 0.00% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=65 Runoff=0.06 cfs 0.004 af

Subcatchment D-4A: D-2 Runoff Area=9,415 sf 68.88% Impervious Runoff Depth=4.89"
Flow Length=294' Slope=0.0600 '/' Tc=6.8 min CN=86 Runoff=1.17 cfs 0.088 af

Subcatchment D-4B: (new Subcat) Runoff Area=10,865 sf 76.99% Impervious Runoff Depth=5.22"
Tc=0.0 min CN=89 Runoff=1.78 cfs 0.109 af

Subcatchment D-4C: D-4C Runoff Area=13,300 sf 77.44% Impervious Runoff Depth=5.33"
Tc=0.0 min CN=90 Runoff=2.21 cfs 0.136 af

Subcatchment D-5: ON-SITE TO YARD CBS Runoff Area=4,875 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=50' Slope=0.0050 '/' Tc=14.3 min CN=61 Runoff=0.23 cfs 0.022 af

Subcatchment OS-2: OS-2 Runoff Area=2,641 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=40' Slope=0.0500 '/' Tc=6.0 min CN=61 Runoff=0.16 cfs 0.012 af

Subcatchment OS-3: OS-3 Runoff Area=8,426 sf 5.93% Impervious Runoff Depth=2.53"
Flow Length=50' Slope=0.1100 '/' Tc=6.0 min CN=63 Runoff=0.56 cfs 0.041 af

Subcatchment OS-4: OS-4 Runoff Area=8,385 sf 8.35% Impervious Runoff Depth=2.63"
Flow Length=44' Slope=0.0400 '/' Tc=6.0 min CN=64 Runoff=0.58 cfs 0.042 af

Subcatchment OS-5: OS-5 Runoff Area=4,795 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=46' Slope=0.0400 '/' Tc=6.0 min CN=61 Runoff=0.29 cfs 0.022 af

Reach 16R: FLOW THRIOUGH NEW 18" PIPE Inflow=5.50 cfs 0.422 af
Outflow=5.50 cfs 0.422 af

Reach 3269R: DIRECT FLOW TO RM Inflow=7.59 cfs 0.807 af
Outflow=7.59 cfs 0.807 af

Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE Inflow=1.75 cfs 0.138 af
Outflow=1.75 cfs 0.138 af

Reach 3275R: TOTAL FLOW FROM WORK AREA Inflow=7.91 cfs 0.831 af
Outflow=7.91 cfs 0.831 af

Pond 1R: CASCADE-SSIB#1 Peak Elev=79.41' Inflow=4.68 cfs 0.332 af
18.0" Round Culvert n=0.010 L=8.0' S=0.0038 '/' Outflow=4.68 cfs 0.332 af

Pond 6R: DCB#1- DMH#1 Peak Elev=81.56' Inflow=1.17 cfs 0.088 af
12.0" Round Culvert n=0.010 L=140.0' S=0.0200 '/' Outflow=1.17 cfs 0.088 af

Pond 9R: DMH#1-DMH#2 Peak Elev=80.56' Inflow=2.47 cfs 0.197 af
12.0" Round Culvert n=0.010 L=135.0' S=0.0048 '/' Outflow=2.47 cfs 0.197 af

Pond 11R: DCB#2 - DMH#1 Peak Elev=80.76' Inflow=1.78 cfs 0.109 af
12.0" Round Culvert n=0.010 L=3.0' S=0.0167 '/' Outflow=1.78 cfs 0.109 af

Pond 12R: DMH#2-CASCADE Peak Elev=79.99' Inflow=4.68 cfs 0.332 af
15.0" Round Culvert n=0.010 L=3.0' S=0.0100 '/' Outflow=4.68 cfs 0.332 af

Pond 14R: DCB#3-DMH#2 Peak Elev=80.29' Inflow=2.21 cfs 0.136 af
12.0" Round Culvert n=0.010 L=3.0' S=0.0100 '/' Outflow=2.21 cfs 0.136 af

Pond IB#1: NEW IB#1 Peak Elev=78.88' Storage=1,993 cf Inflow=2.30 cfs 0.326 af
8.0" Round Culvert x 2.00 n=0.010 L=30.0' S=0.0167 '/' Outflow=1.96 cfs 0.313 af

Pond IB#2: IB#2 Peak Elev=77.00' Storage=0 cf Inflow=0.40 cfs 0.032 af
Outflow=0.40 cfs 0.032 af

Pond SSIB#1: SSIB#1 Peak Elev=79.18' Storage=3,019 cf Inflow=4.68 cfs 0.332 af
8.0" Round Culvert x 4.00 n=0.010 L=11.0' S=0.0100 '/' Outflow=3.93 cfs 0.284 af

Total Runoff Area = 3.141 ac Runoff Volume = 0.893 af Average Runoff Depth = 3.41"
78.08% Pervious = 2.453 ac 21.92% Impervious = 0.688 ac

Summary for Subcatchment 3276S: AREA DIRECTLY TRIBUTARY TO RM

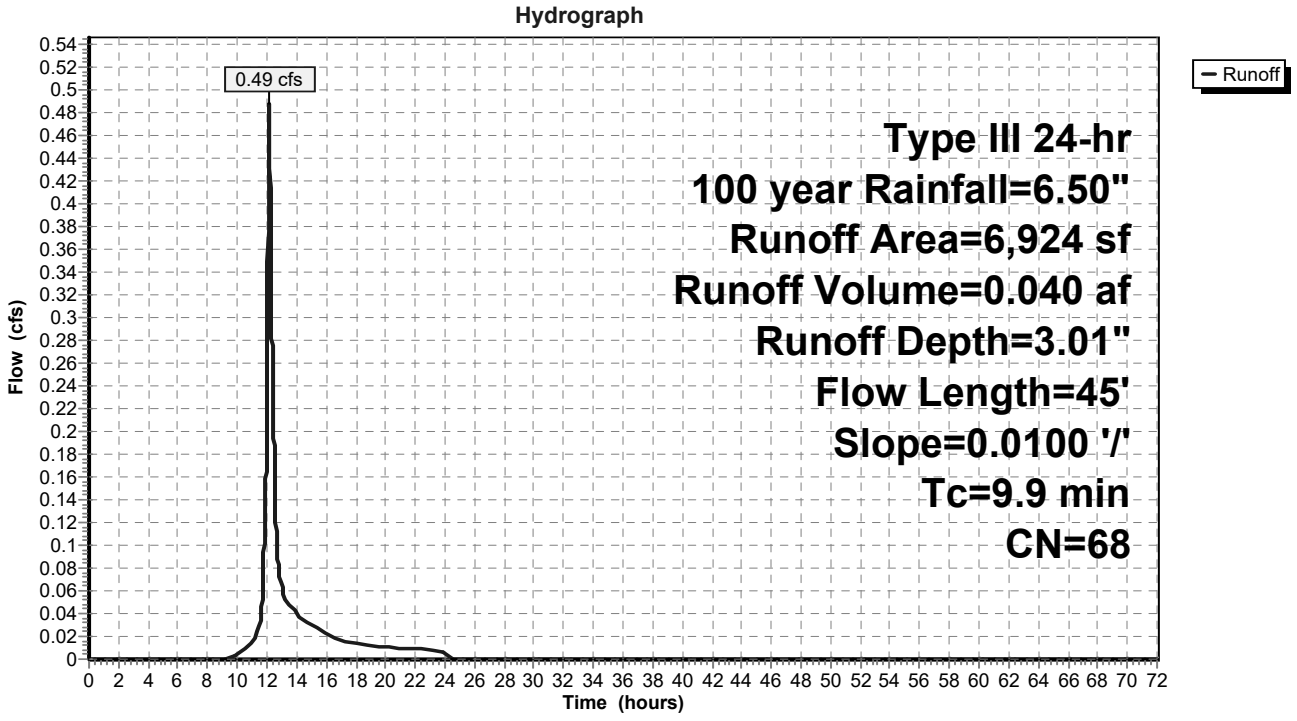
Runoff = 0.49 cfs @ 12.14 hrs, Volume= 0.040 af, Depth= 3.01"
Routed to Reach 3269R : DIRECT FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
5,649	61	>75% Grass cover, Good, HSG B
600	98	Paved roads w/curbs & sewers, HSG B
175	98	Water Surface, HSG B
500	98	Paved parking, HSG B
6,924	68	Weighted Average
5,649		81.59% Pervious Area
1,275		18.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	45	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Subcatchment 3276S: AREA DIRECTLY TRIBUTARY TO RM



Summary for Subcatchment D-1: D-1 TO CASIN

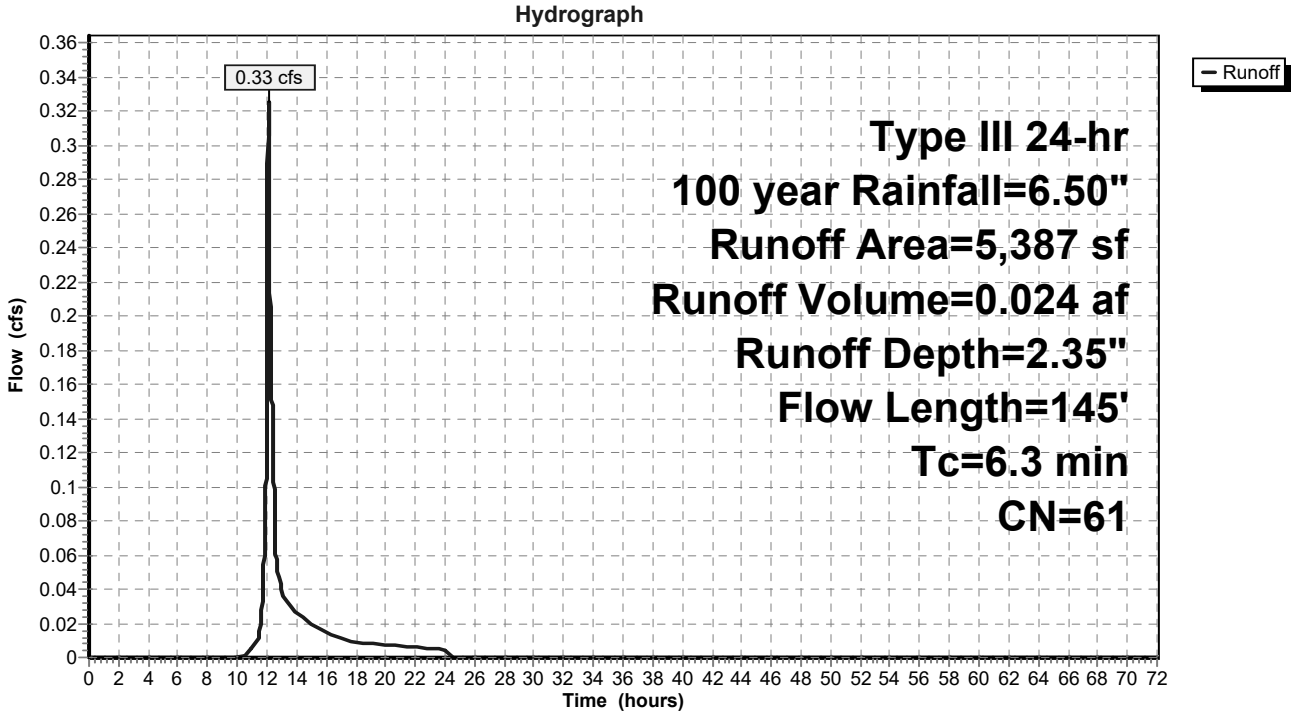
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.024 af, Depth= 2.35"
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
5,387	61	>75% Grass cover, Good, HSG B
5,387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.20"
1.0	87	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.0	8	0.5000	4.24		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	145	Total			

Subcatchment D-1: D-1 TO CASIN



Summary for Subcatchment D-2A: D-2A

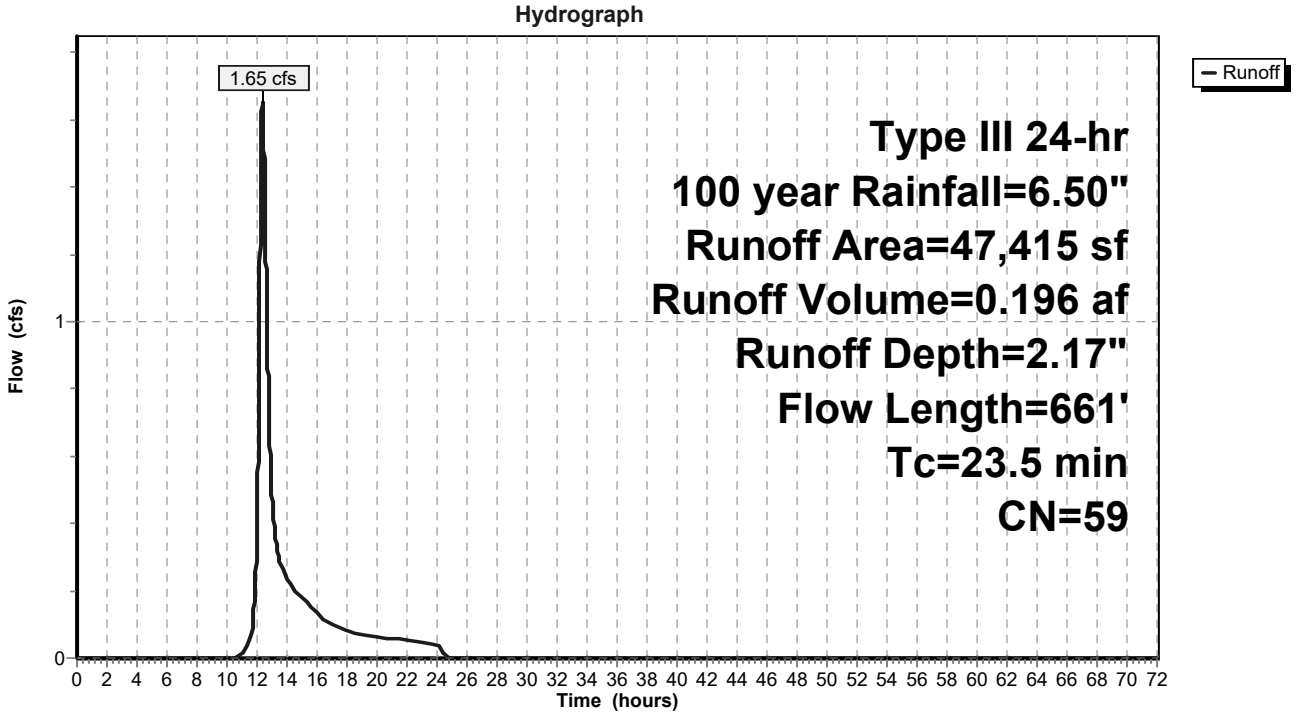
Runoff = 1.65 cfs @ 12.35 hrs, Volume= 0.196 af, Depth= 2.17"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,200	56	Brush, Fair, HSG B
30,622	58	Meadow, non-grazed, HSG B
12,593	61	>75% Grass cover, Good, HSG B
47,415	59	Weighted Average
47,415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
2.3	147	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
23.5	661	Total			

Subcatchment D-2A: D-2A



Summary for Subcatchment D-2B: D-2B

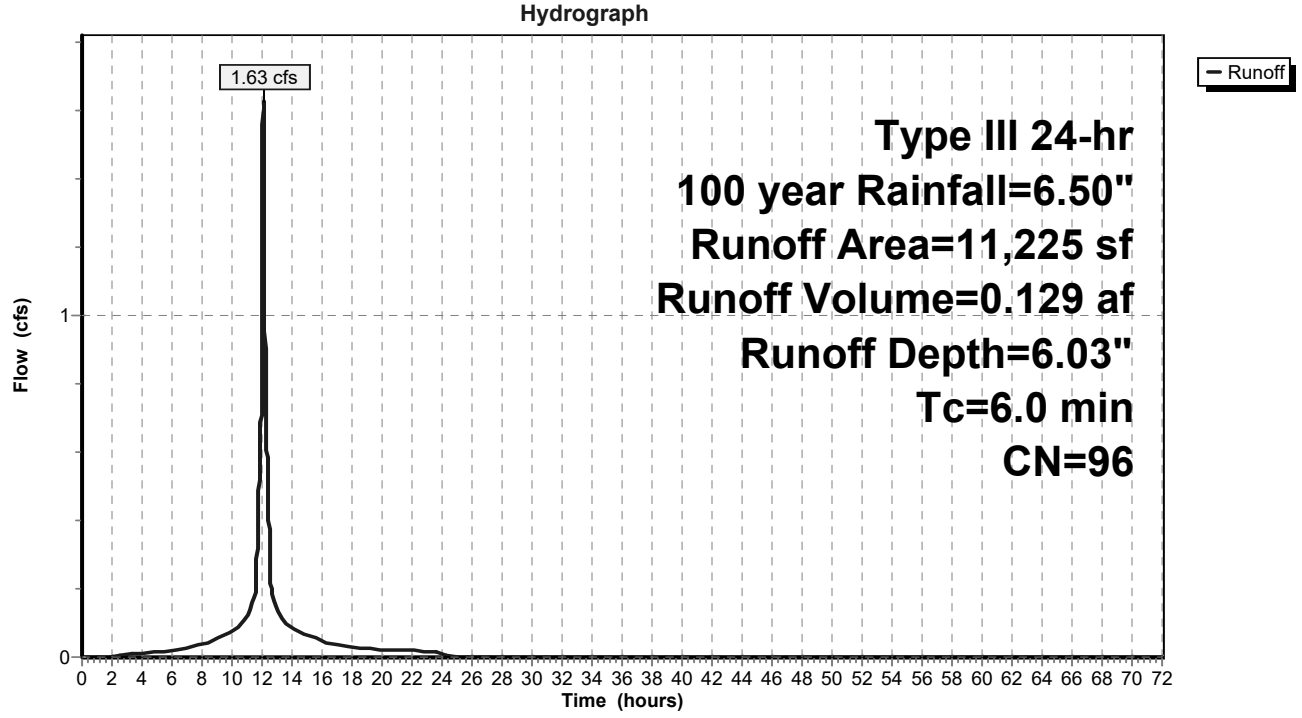
Runoff = 1.63 cfs @ 12.08 hrs, Volume= 0.129 af, Depth= 6.03"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
8,200	96	Gravel surface, HSG B
3,025	96	Gravel surface, HSG B
11,225	96	Weighted Average
11,225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment D-2B: D-2B



Summary for Subcatchment D-3A: Clubhouse Roof

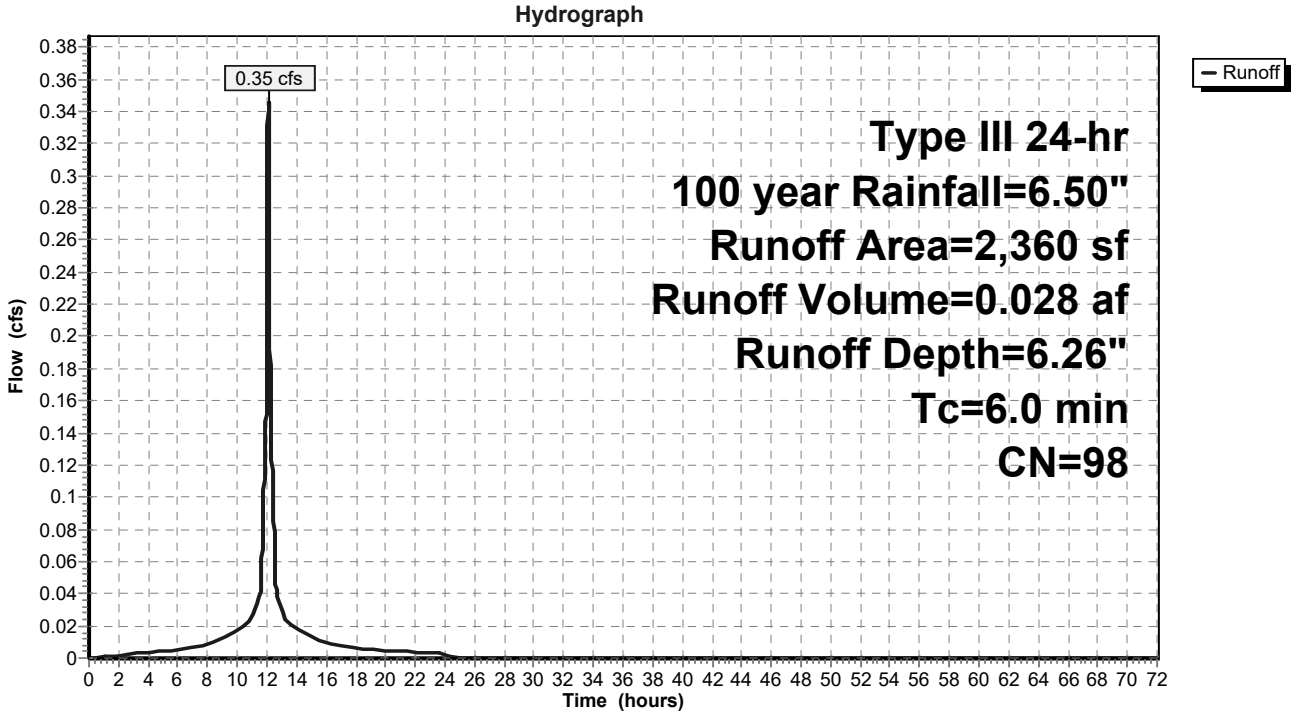
Runoff = 0.35 cfs @ 12.08 hrs, Volume= 0.028 af, Depth= 6.26"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
2,360	98	Roofs, HSG B
2,360		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment D-3A: Clubhouse Roof



Summary for Subcatchment D-3B: Direct to IB#2

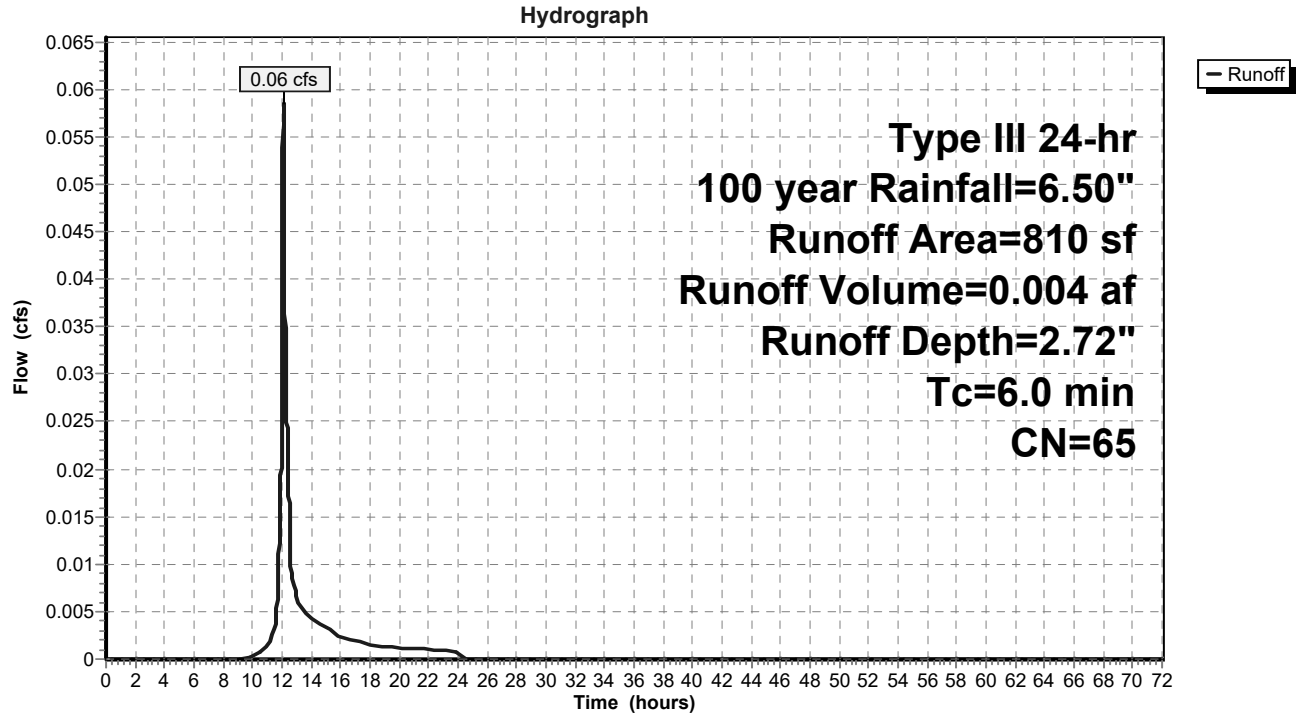
Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 2.72"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
180	79	<50% Grass cover, Poor, HSG B
630	61	>75% Grass cover, Good, HSG B
810	65	Weighted Average
810		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment D-3B: Direct to IB#2



Summary for Subcatchment D-4A: D-2

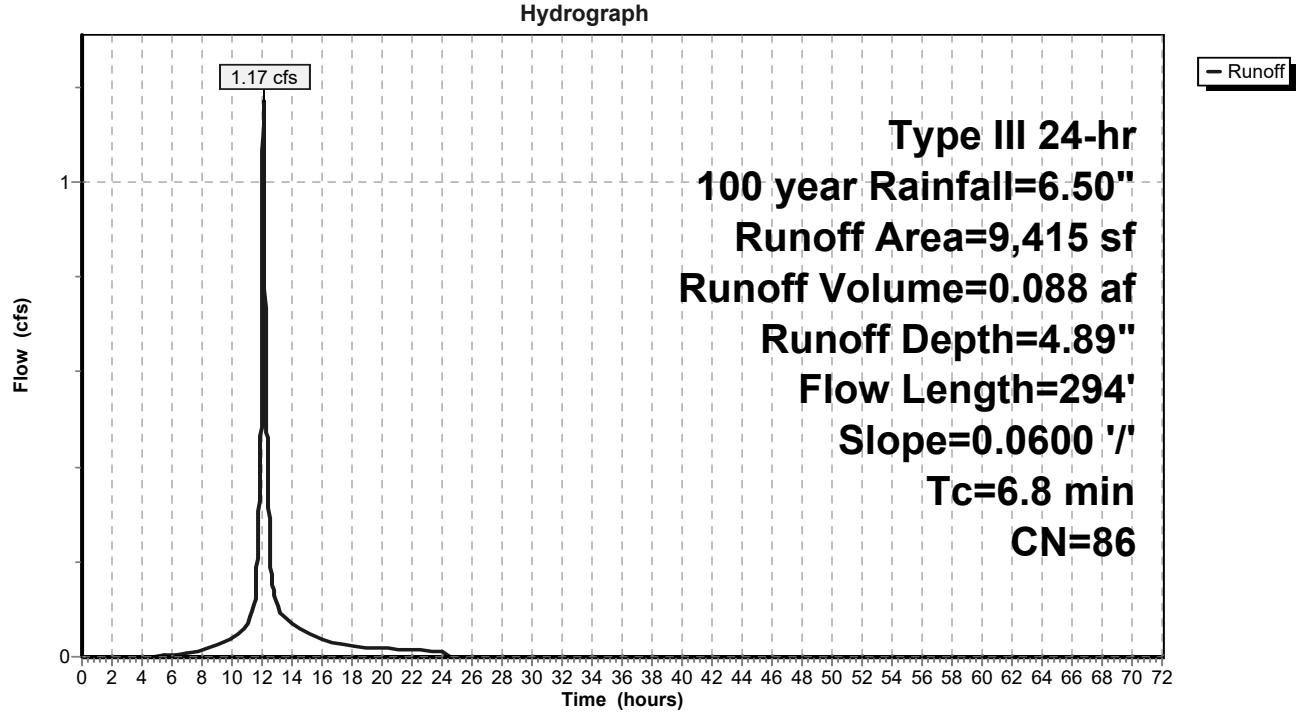
Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af, Depth= 4.89"
Routed to Pond 6R : DCB#1- DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
6,485	98	Paved parking, HSG B
2,930	61	>75% Grass cover, Good, HSG B
9,415	86	Weighted Average
2,930		31.12% Pervious Area
6,485		68.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.0	90	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.5	154	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	294	Total			

Subcatchment D-4A: D-2



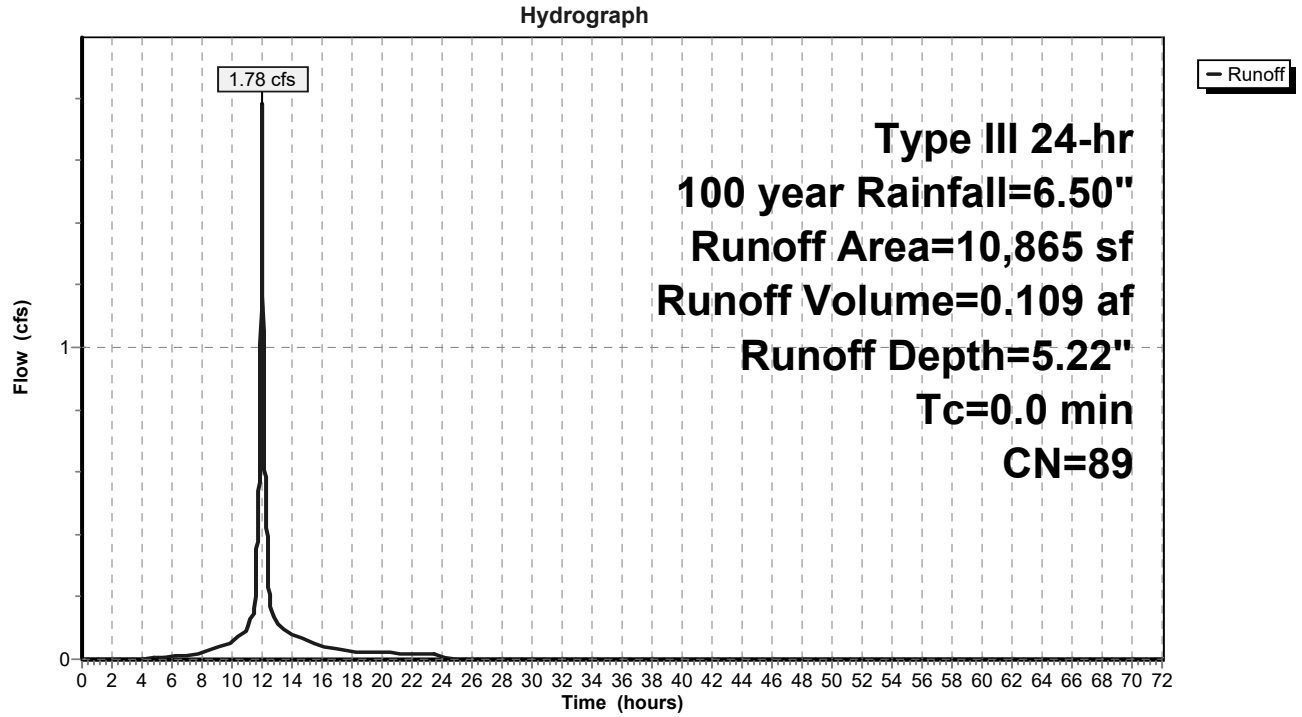
Summary for Subcatchment D-4B: (new Subcat)

Runoff = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af, Depth= 5.22"
Routed to Pond 11R : DCB#2 - DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
8,365	98	Paved parking, HSG B
2,500	61	>75% Grass cover, Good, HSG B
10,865	89	Weighted Average
2,500		23.01% Pervious Area
8,365		76.99% Impervious Area

Subcatchment D-4B: (new Subcat)



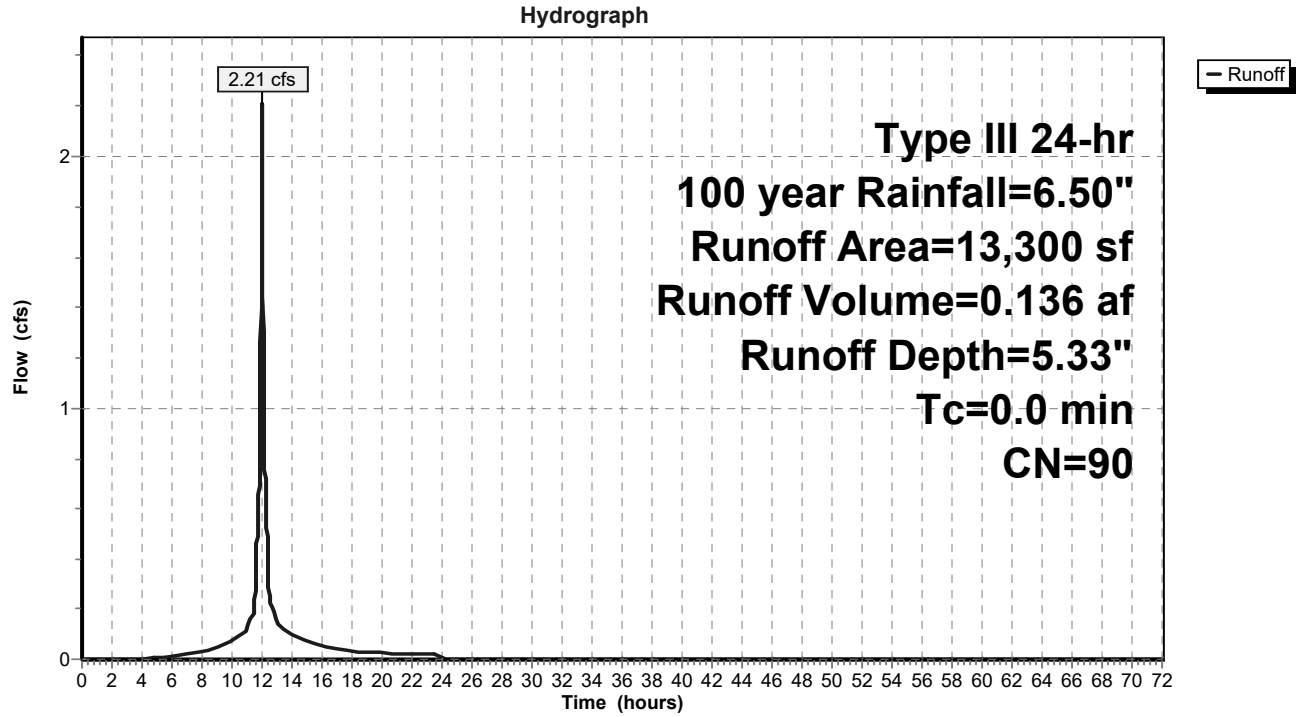
Summary for Subcatchment D-4C: D-4C

Runoff = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af, Depth= 5.33"
Routed to Pond 14R : DCB#3-DMH#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
10,300	98	Paved roads w/curbs & sewers, HSG B
3,000	61	>75% Grass cover, Good, HSG B
13,300	90	Weighted Average
3,000		22.56% Pervious Area
10,300		77.44% Impervious Area

Subcatchment D-4C: D-4C



Summary for Subcatchment D-5: ON-SITE TO YARD CBS

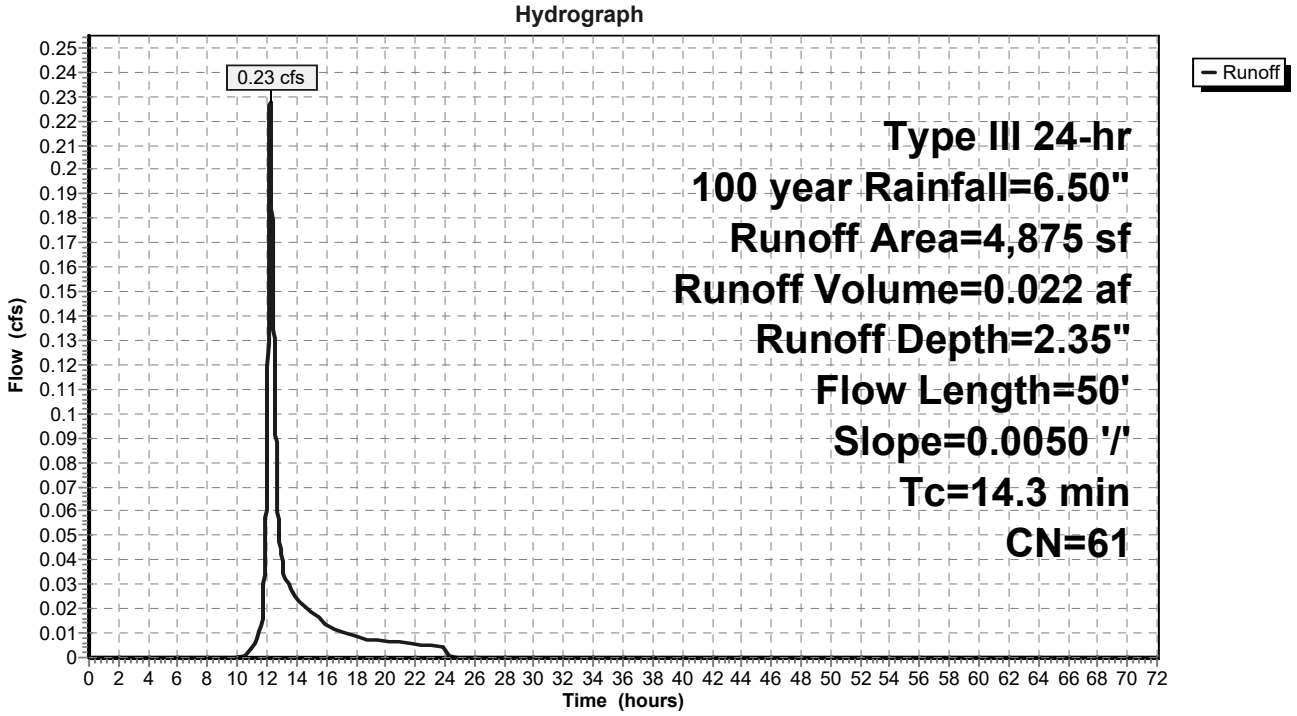
Runoff = 0.23 cfs @ 12.21 hrs, Volume= 0.022 af, Depth= 2.35"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,875	61	>75% Grass cover, Good, HSG B
4,875		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Subcatchment D-5: ON-SITE TO YARD CBS



Summary for Subcatchment OS-2: OS-2

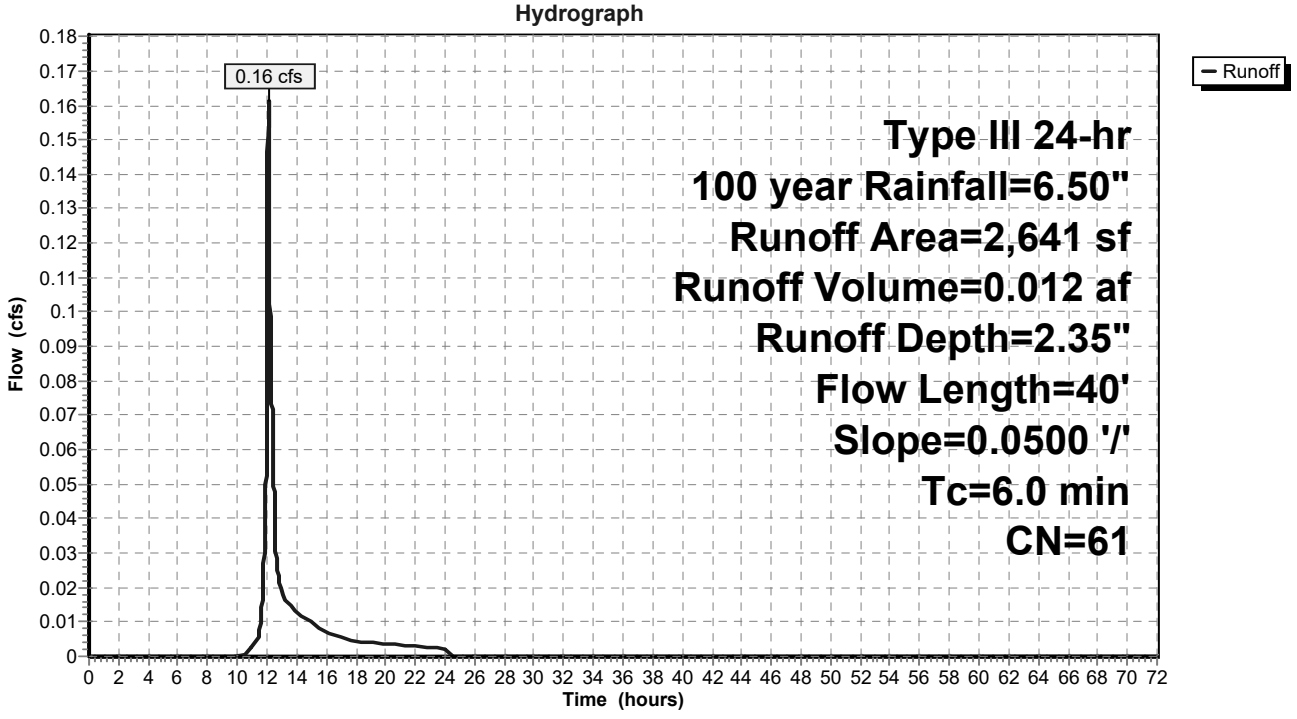
Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 2.35"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-2: OS-2



Summary for Subcatchment OS-3: OS-3

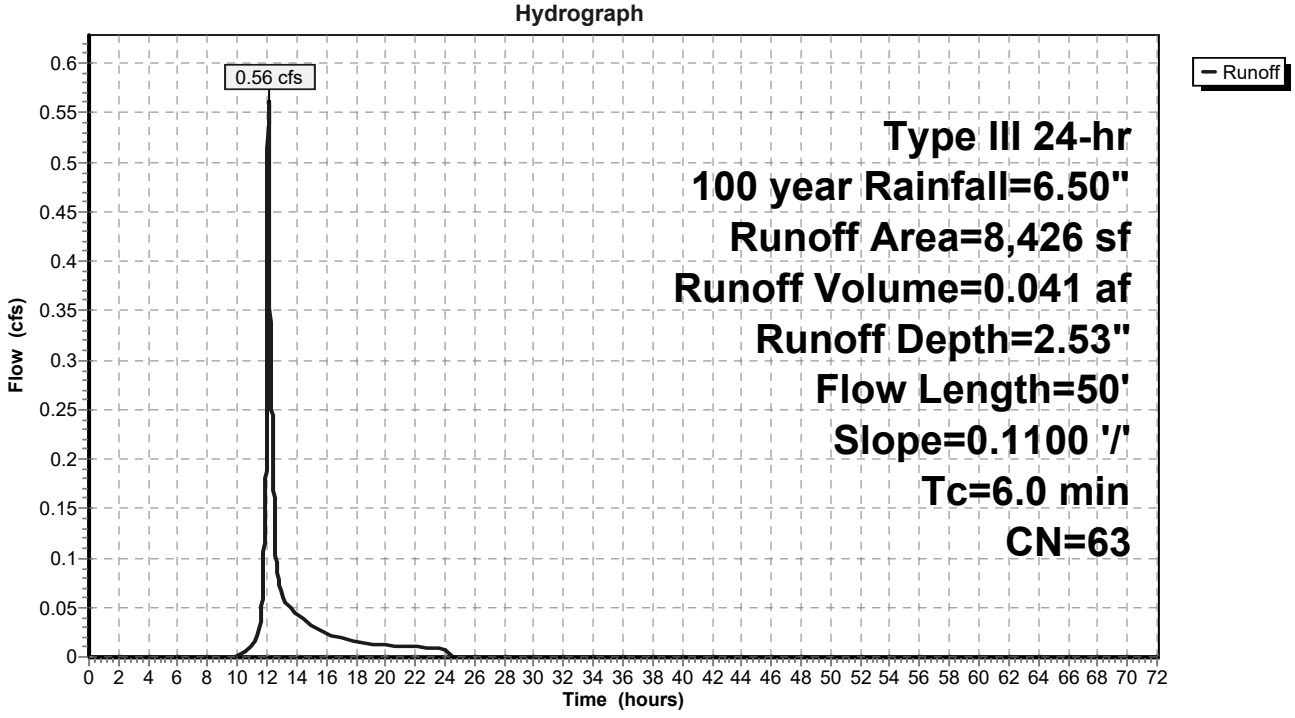
Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 2.53"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-3: OS-3



Summary for Subcatchment OS-4: OS-4

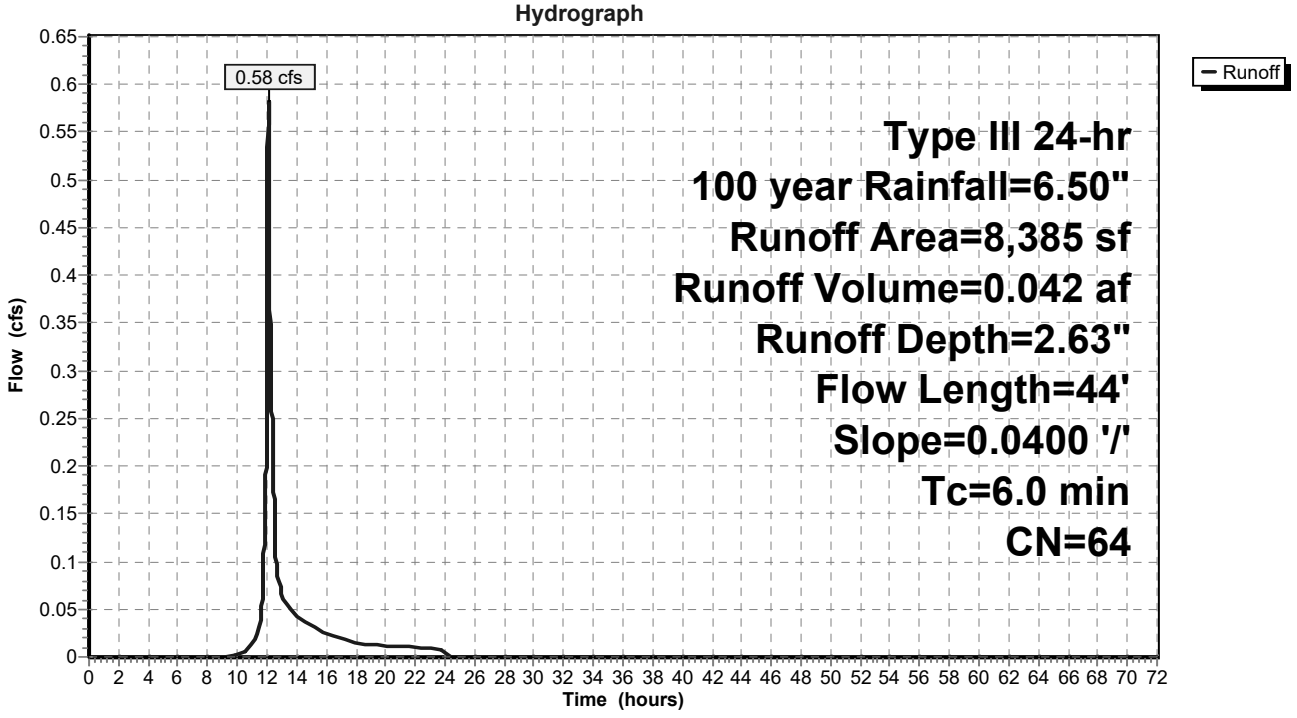
Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 2.63"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-4: OS-4



Summary for Subcatchment OS-5: OS-5

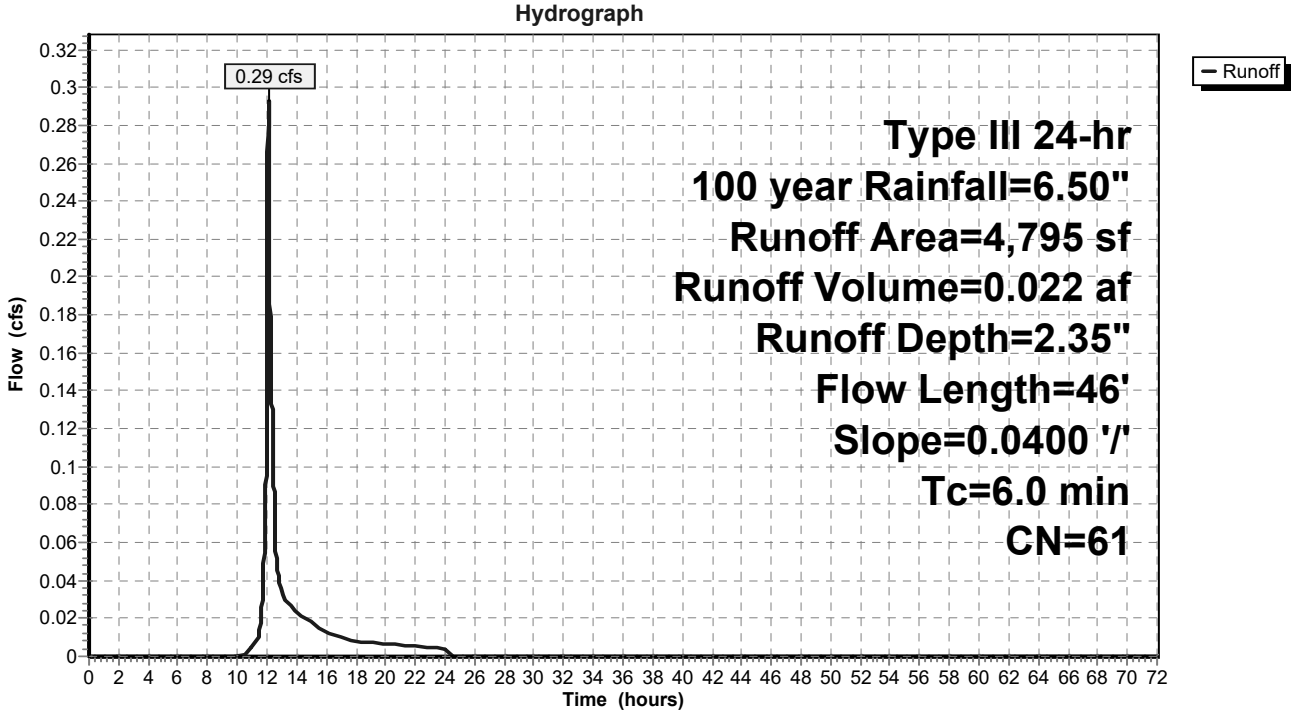
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 2.35"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Subcatchment OS-5: OS-5

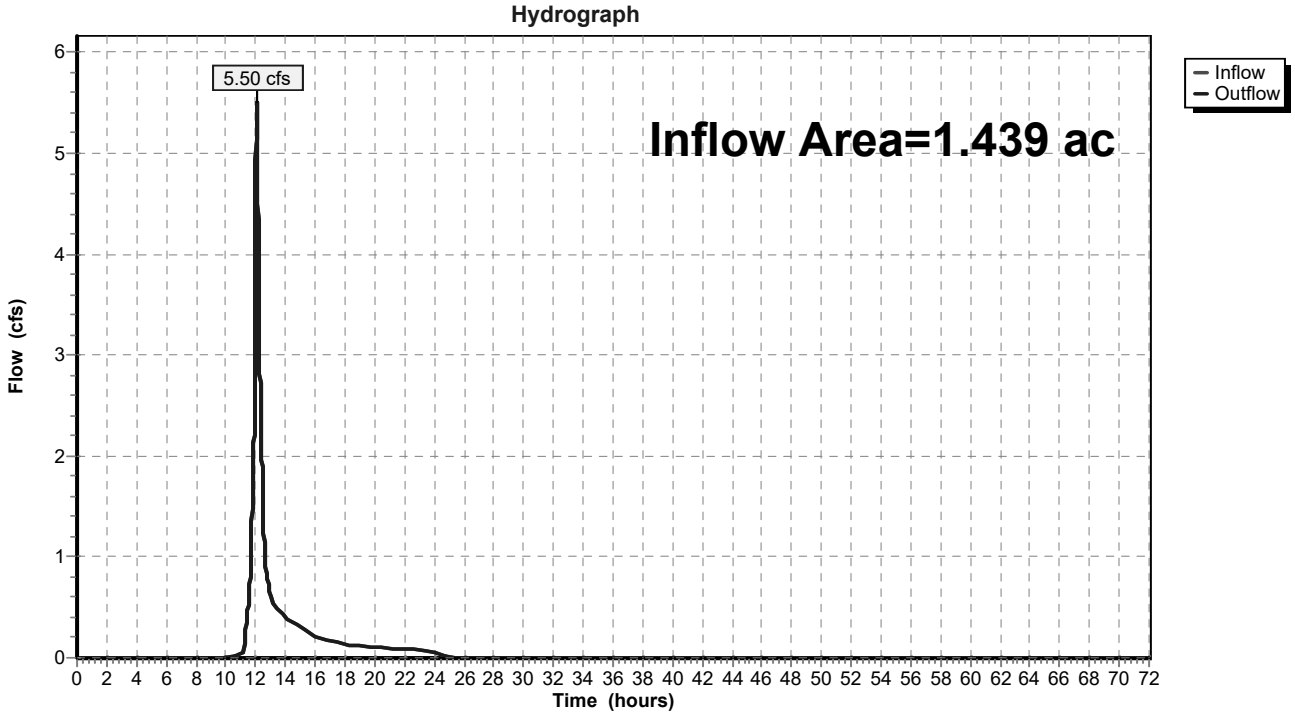


Summary for Reach 16R: FLOW THRIOUGH NEW 18" PIPE

Inflow Area = 1.439 ac, 42.02% Impervious, Inflow Depth = 3.52" for 100 year event
Inflow = 5.50 cfs @ 12.07 hrs, Volume= 0.422 af
Outflow = 5.50 cfs @ 12.07 hrs, Volume= 0.422 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 16R: FLOW THRIOUGH NEW 18" PIPE

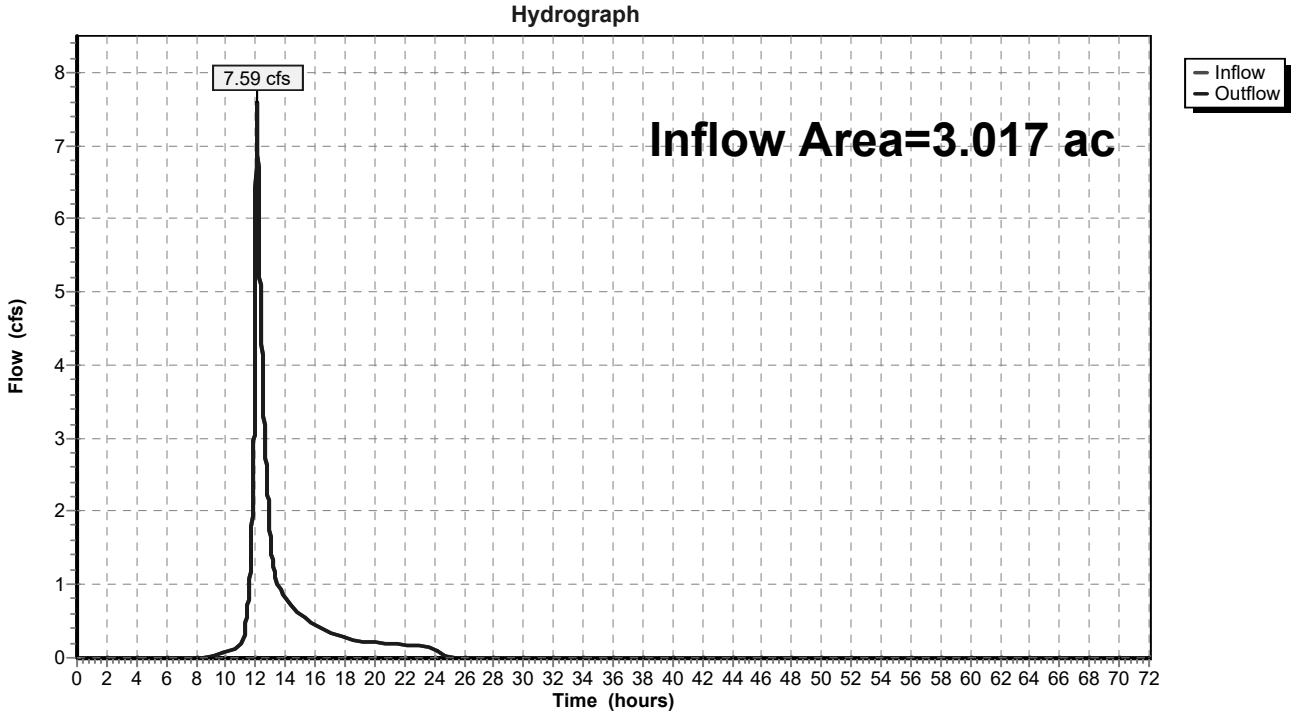


Summary for Reach 3269R: DIRECT FLOW TO RM

Inflow Area = 3.017 ac, 22.81% Impervious, Inflow Depth = 3.21" for 100 year event
Inflow = 7.59 cfs @ 12.09 hrs, Volume= 0.807 af
Outflow = 7.59 cfs @ 12.09 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 3269R: DIRECT FLOW TO RM

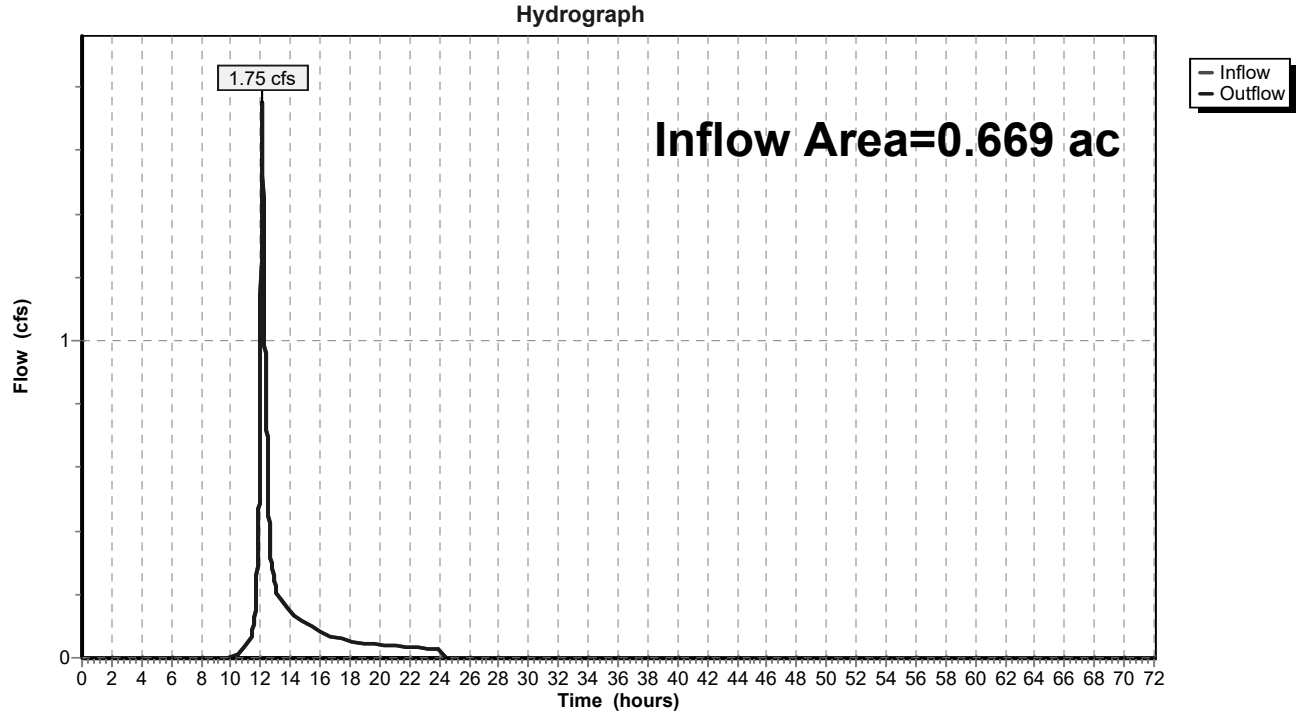


Summary for Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE

Inflow Area = 0.669 ac, 4.12% Impervious, Inflow Depth = 2.48" for 100 year event
Inflow = 1.75 cfs @ 12.10 hrs, Volume= 0.138 af
Outflow = 1.75 cfs @ 12.10 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE

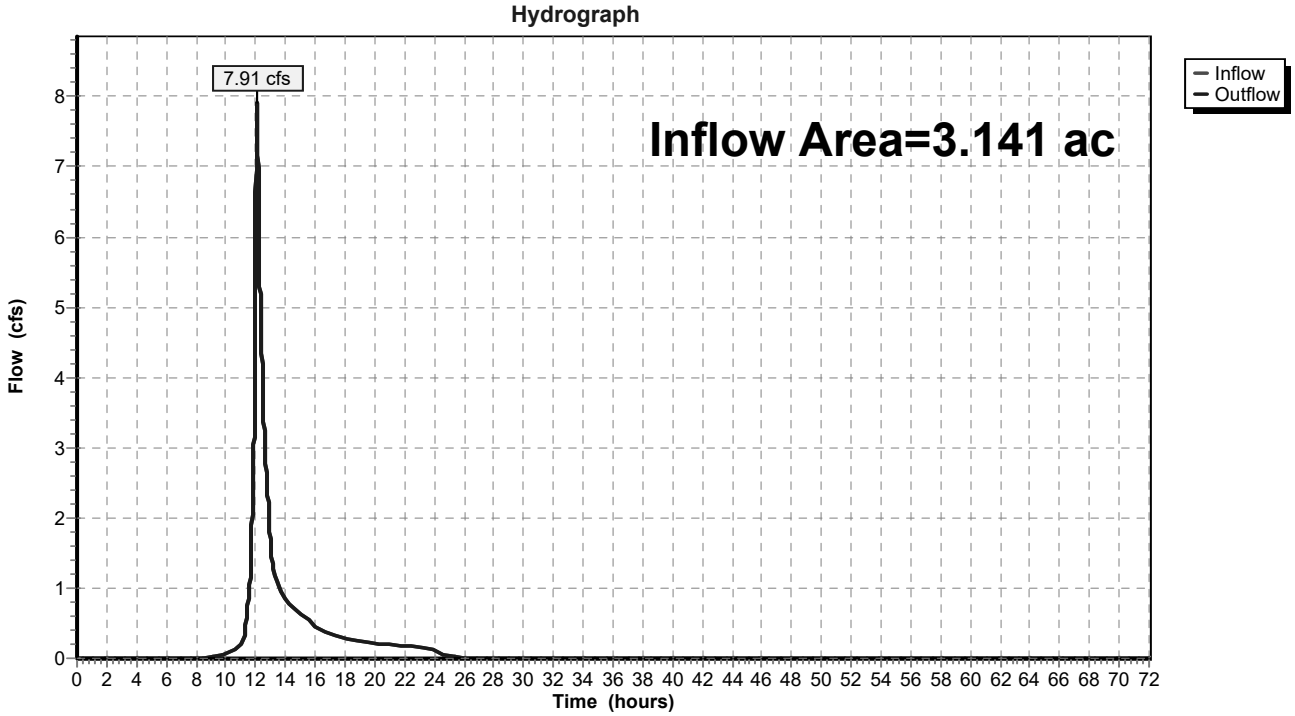


Summary for Reach 3275R: TOTAL FLOW FROM WORK AREA

Inflow Area = 3.141 ac, 21.92% Impervious, Inflow Depth = 3.18" for 100 year event
Inflow = 7.91 cfs @ 12.09 hrs, Volume= 0.831 af
Outflow = 7.91 cfs @ 12.09 hrs, Volume= 0.831 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach 3275R: TOTAL FLOW FROM WORK AREA



Summary for Pond 1R: CASCADE-SSIB#1

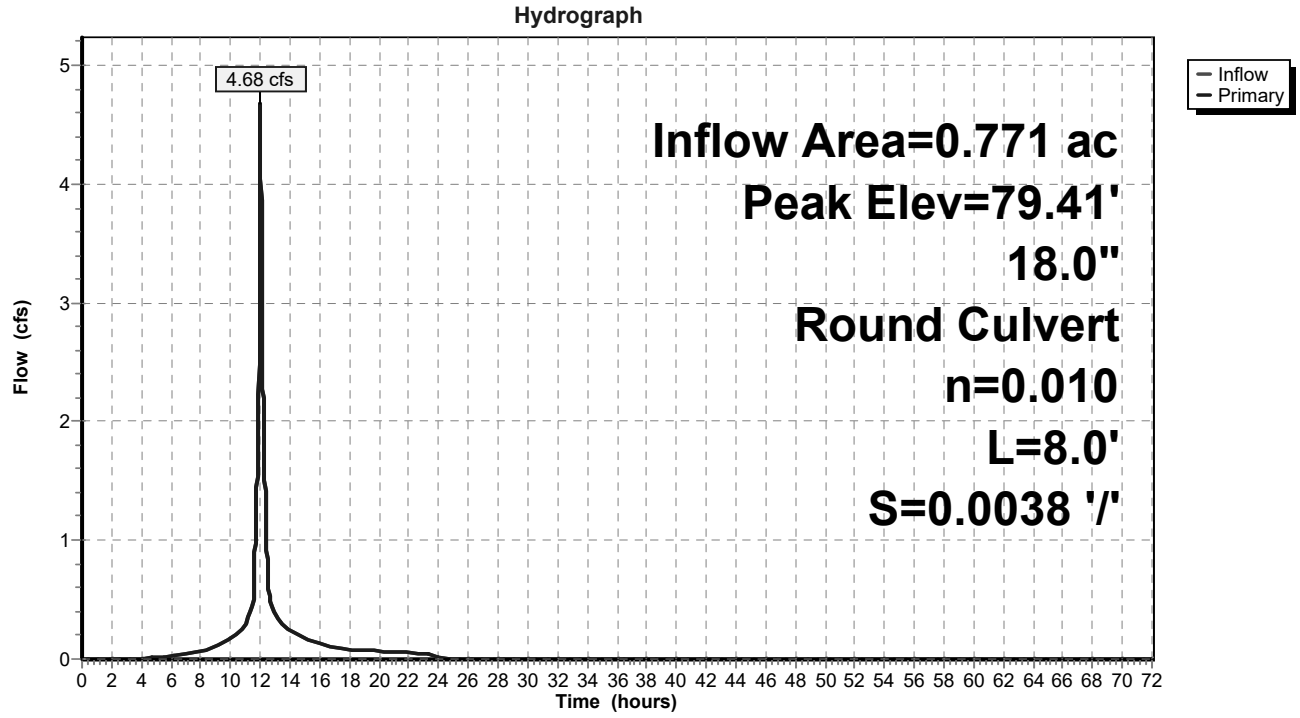
Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 5.17" for 100 year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Outflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Routed to Pond SSIB#1 : SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.41' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.23'	**18.0" Round Culvert** L= 8.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.23' / 77.20' S= 0.0038 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=4.65 cfs @ 12.00 hrs HW=79.36' TW=79.07' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.65 cfs @ 2.63 fps)

Pond 1R: CASCADE-SSIB#1



Stage-Discharge for Pond 1R: CASCADE-SSIB#1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
77.23	0.00	78.27	3.19	79.31	8.79
77.25	0.00	78.29	3.30	79.33	8.94
77.27	0.01	78.31	3.40	79.35	9.08
77.29	0.01	78.33	3.51	79.37	9.22
77.31	0.02	78.35	3.62	79.39	9.35
77.33	0.04	78.37	3.73	79.41	**9.49**
77.35	0.05	78.39	3.84		
77.37	0.07	78.41	3.95		
77.39	0.09	78.43	4.07		
77.41	0.12	78.45	4.18		
77.43	0.15	78.47	4.29		
77.45	0.18	78.49	4.41		
77.47	0.21	78.51	4.52		
77.49	0.24	78.53	4.64		
77.51	0.28	78.55	4.75		
77.53	0.32	78.57	4.87		
77.55	0.36	78.59	4.99		
77.57	0.41	78.61	5.10		
77.59	0.45	78.63	5.22		
77.61	0.50	78.65	5.33		
77.63	0.55	78.67	5.45		
77.65	0.61	78.69	5.57		
77.67	0.66	78.71	5.68		
77.69	0.72	78.73	5.80		
77.71	0.78	78.75	5.91		
77.73	0.84	78.77	6.03		
77.75	0.91	78.79	6.14		
77.77	0.97	78.81	6.26		
77.79	1.04	78.83	6.37		
77.81	1.11	78.85	6.48		
77.83	1.18	78.87	6.60		
77.85	1.26	78.89	6.71		
77.87	1.33	78.91	6.82		
77.89	1.41	78.93	6.92		
77.91	1.49	78.95	7.03		
77.93	1.57	78.97	7.13		
77.95	1.66	78.99	7.24		
77.97	1.74	79.01	7.34		
77.99	1.83	79.03	7.44		
78.01	1.91	79.05	7.53		
78.03	2.00	79.07	7.63		
78.05	2.10	79.09	7.72		
78.07	2.19	79.11	7.80		
78.09	2.28	79.13	7.89		
78.11	2.38	79.15	7.97		
78.13	2.47	79.17	8.04		
78.15	2.57	79.19	8.10		
78.17	2.67	79.21	8.16		
78.19	2.77	79.23	8.20		
78.21	2.88	79.25	8.35		
78.23	2.98	79.27	8.50		
78.25	3.08	79.29	8.65		

Stage-Area-Storage for Pond 1R: CASCADE-SSIB#1

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
77.23	**0.000**	78.27	0.000	79.31	0.000
77.25	0.000	78.29	0.000	79.33	0.000
77.27	0.000	78.31	0.000	79.35	0.000
77.29	0.000	78.33	0.000	79.37	0.000
77.31	0.000	78.35	0.000	79.39	0.000
77.33	0.000	78.37	0.000	79.41	0.000
77.35	0.000	78.39	0.000		
77.37	0.000	78.41	0.000		
77.39	0.000	78.43	0.000		
77.41	0.000	78.45	0.000		
77.43	0.000	78.47	0.000		
77.45	0.000	78.49	0.000		
77.47	0.000	78.51	0.000		
77.49	0.000	78.53	0.000		
77.51	0.000	78.55	0.000		
77.53	0.000	78.57	0.000		
77.55	0.000	78.59	0.000		
77.57	0.000	78.61	0.000		
77.59	0.000	78.63	0.000		
77.61	0.000	78.65	0.000		
77.63	0.000	78.67	0.000		
77.65	0.000	78.69	0.000		
77.67	0.000	78.71	0.000		
77.69	0.000	78.73	0.000		
77.71	0.000	78.75	0.000		
77.73	0.000	78.77	0.000		
77.75	0.000	78.79	0.000		
77.77	0.000	78.81	0.000		
77.79	0.000	78.83	0.000		
77.81	0.000	78.85	0.000		
77.83	0.000	78.87	0.000		
77.85	0.000	78.89	0.000		
77.87	0.000	78.91	0.000		
77.89	0.000	78.93	0.000		
77.91	0.000	78.95	0.000		
77.93	0.000	78.97	0.000		
77.95	0.000	78.99	0.000		
77.97	0.000	79.01	0.000		
77.99	0.000	79.03	0.000		
78.01	0.000	79.05	0.000		
78.03	0.000	79.07	0.000		
78.05	0.000	79.09	0.000		
78.07	0.000	79.11	0.000		
78.09	0.000	79.13	0.000		
78.11	0.000	79.15	0.000		
78.13	0.000	79.17	0.000		
78.15	0.000	79.19	0.000		
78.17	0.000	79.21	0.000		
78.19	0.000	79.23	0.000		
78.21	0.000	79.25	0.000		
78.23	0.000	79.27	0.000		
78.25	0.000	79.29	0.000		

Summary for Pond 6R: DCB#1- DMH#1

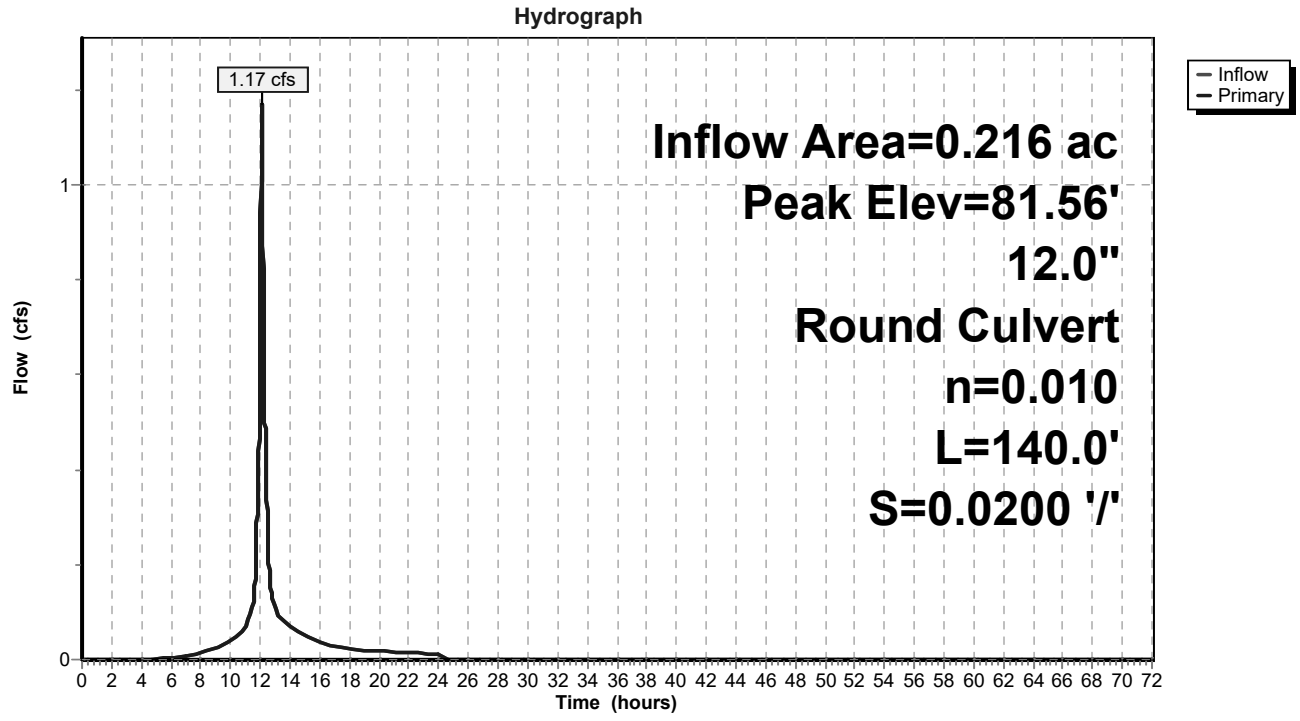
Inflow Area = 0.216 ac, 68.88% Impervious, Inflow Depth = 4.89" for 100 year event
Inflow = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.56' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	81.00'	**12.0" Round Culvert** L= 140.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 81.00' / 78.20' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.10 hrs HW=81.56' TW=79.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.17 cfs @ 2.56 fps)

Pond 6R: DCB#1- DMH#1



Stage-Discharge for Pond 6R: DCB#1- DMH#1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
81.00	0.00	81.52	1.01
81.01	0.00	81.53	1.05
81.02	0.00	81.54	1.08
81.03	0.00	81.55	1.12
81.04	0.01	81.56	1.15
81.05	0.01	81.57	1.19
81.06	0.02	81.58	1.22
81.07	0.02	81.59	1.26
81.08	0.03	81.60	1.30
81.09	0.04	81.61	1.33
81.10	0.04	81.62	1.37
81.11	0.05	81.63	1.41
81.12	0.06	81.64	1.45
81.13	0.07	81.65	1.48
81.14	0.09	81.66	1.52
81.15	0.10	81.67	1.56
81.16	0.11	81.68	1.60
81.17	0.12	81.69	1.63
81.18	0.14	81.70	1.67
81.19	0.15	81.71	1.71
81.20	0.17	81.72	1.75
81.21	0.19	81.73	1.79
81.22	0.20	81.74	1.83
81.23	0.22	81.75	1.86
81.24	0.24	81.76	1.90
81.25	0.26	81.77	1.94
81.26	0.28	81.78	1.98
81.27	0.30	81.79	2.01
81.28	0.32	81.80	2.05
81.29	0.35	81.81	2.09
81.30	0.37	81.82	2.13
81.31	0.39	81.83	2.16
81.32	0.42	81.84	2.20
81.33	0.44	81.85	2.23
81.34	0.47	81.86	2.27
81.35	0.49	81.87	2.30
81.36	0.52	81.88	2.34
81.37	0.55	81.89	2.37
81.38	0.57	81.90	2.40
81.39	0.60	81.91	2.44
81.40	0.63	81.92	2.47
81.41	0.66	81.93	2.50
81.42	0.69	81.94	2.53
81.43	0.72	81.95	2.56
81.44	0.75	81.96	2.58
81.45	0.78	81.97	2.61
81.46	0.81	81.98	2.63
81.47	0.85	81.99	2.66
81.48	0.88	82.00	**2.67**
81.49	0.91		
81.50	0.95		
81.51	0.98		

Stage-Area-Storage for Pond 6R: DCB#1- DMH#1

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
81.00	**0.000**	81.52	0.000
81.01	0.000	81.53	0.000
81.02	0.000	81.54	0.000
81.03	0.000	81.55	0.000
81.04	0.000	81.56	0.000
81.05	0.000	81.57	0.000
81.06	0.000	81.58	0.000
81.07	0.000	81.59	0.000
81.08	0.000	81.60	0.000
81.09	0.000	81.61	0.000
81.10	0.000	81.62	0.000
81.11	0.000	81.63	0.000
81.12	0.000	81.64	0.000
81.13	0.000	81.65	0.000
81.14	0.000	81.66	0.000
81.15	0.000	81.67	0.000
81.16	0.000	81.68	0.000
81.17	0.000	81.69	0.000
81.18	0.000	81.70	0.000
81.19	0.000	81.71	0.000
81.20	0.000	81.72	0.000
81.21	0.000	81.73	0.000
81.22	0.000	81.74	0.000
81.23	0.000	81.75	0.000
81.24	0.000	81.76	0.000
81.25	0.000	81.77	0.000
81.26	0.000	81.78	0.000
81.27	0.000	81.79	0.000
81.28	0.000	81.80	0.000
81.29	0.000	81.81	0.000
81.30	0.000	81.82	0.000
81.31	0.000	81.83	0.000
81.32	0.000	81.84	0.000
81.33	0.000	81.85	0.000
81.34	0.000	81.86	0.000
81.35	0.000	81.87	0.000
81.36	0.000	81.88	0.000
81.37	0.000	81.89	0.000
81.38	0.000	81.90	0.000
81.39	0.000	81.91	0.000
81.40	0.000	81.92	0.000
81.41	0.000	81.93	0.000
81.42	0.000	81.94	0.000
81.43	0.000	81.95	0.000
81.44	0.000	81.96	0.000
81.45	0.000	81.97	0.000
81.46	0.000	81.98	0.000
81.47	0.000	81.99	0.000
81.48	0.000	82.00	0.000
81.49	0.000		
81.50	0.000		
81.51	0.000		

Summary for Pond 9R: DMH#1-DMH#2

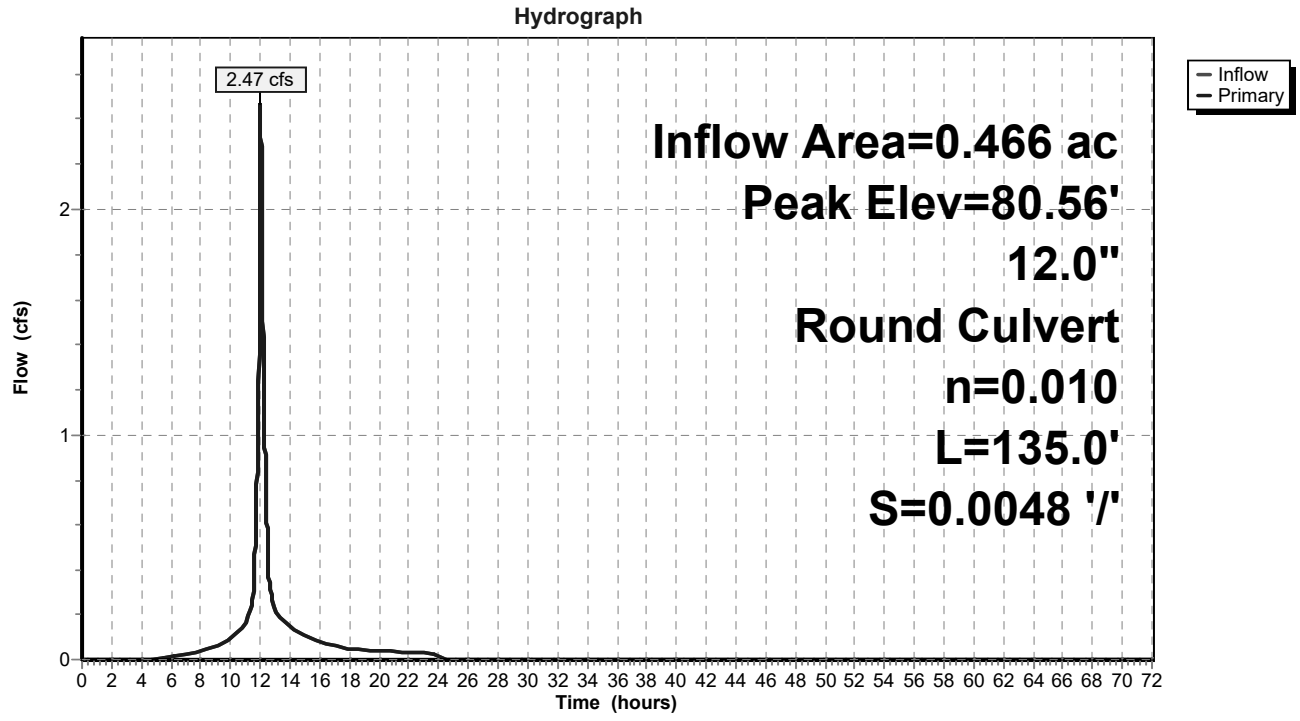
Inflow Area = 0.466 ac, 73.22% Impervious, Inflow Depth = 5.07" for 100 year event
Inflow = 2.47 cfs @ 12.00 hrs, Volume= 0.197 af
Outflow = 2.47 cfs @ 12.00 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min
Primary = 2.47 cfs @ 12.00 hrs, Volume= 0.197 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 80.56' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.20'	**12.0" Round Culvert** L= 135.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.20' / 77.55' S= 0.0048 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.34 cfs @ 12.00 hrs HW=80.54' TW=79.98' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.34 cfs @ 2.98 fps)

Pond 9R: DMH#1-DMH#2



Stage-Discharge for Pond 9R: DMH#1-DMH#2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
78.20	0.00	79.24	2.71	80.28	4.14
78.22	0.00	79.26	2.77	80.30	4.16
78.24	0.01	79.28	2.83	80.32	4.19
78.26	0.01	79.30	2.89	80.34	4.21
78.28	0.02	79.32	2.94	80.36	4.24
78.30	0.04	79.34	2.99	80.38	4.26
78.32	0.05	79.36	3.04	80.40	4.28
78.34	0.07	79.38	3.08	80.42	4.31
78.36	0.10	79.40	3.12	80.44	4.33
78.38	0.12	79.42	3.15	80.46	4.35
78.40	0.15	79.44	3.18	80.48	4.37
78.42	0.18	79.46	3.20	80.50	4.40
78.44	0.22	79.48	3.22	80.52	4.42
78.46	0.25	79.50	3.22	80.54	4.44
78.48	0.29	79.52	3.19	80.56	4.46
78.50	0.34	79.54	3.13	80.58	4.49
78.52	0.38	79.56	3.16	80.60	**4.51**
78.54	0.43	79.58	3.20		
78.56	0.48	79.60	3.23		
78.58	0.53	79.62	3.26		
78.60	0.58	79.64	3.29		
78.62	0.63	79.66	3.32		
78.64	0.69	79.68	3.35		
78.66	0.75	79.70	3.38		
78.68	0.81	79.72	3.41		
78.70	0.87	79.74	3.43		
78.72	0.93	79.76	3.46		
78.74	0.99	79.78	3.49		
78.76	1.06	79.80	3.52		
78.78	1.13	79.82	3.55		
78.80	1.19	79.84	3.58		
78.82	1.26	79.86	3.60		
78.84	1.33	79.88	3.63		
78.86	1.40	79.90	3.66		
78.88	1.47	79.92	3.68		
78.90	1.54	79.94	3.71		
78.92	1.61	79.96	3.74		
78.94	1.68	79.98	3.76		
78.96	1.75	80.00	3.79		
78.98	1.83	80.02	3.82		
79.00	1.90	80.04	3.84		
79.02	1.97	80.06	3.87		
79.04	2.04	80.08	3.89		
79.06	2.11	80.10	3.92		
79.08	2.18	80.12	3.94		
79.10	2.25	80.14	3.97		
79.12	2.32	80.16	3.99		
79.14	2.39	80.18	4.02		
79.16	2.46	80.20	4.04		
79.18	2.52	80.22	4.07		
79.20	2.59	80.24	4.09		
79.22	2.65	80.26	4.12		

Stage-Area-Storage for Pond 9R: DMH#1-DMH#2

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
78.20	**0.000**	79.24	0.000	80.28	0.000
78.22	0.000	79.26	0.000	80.30	0.000
78.24	0.000	79.28	0.000	80.32	0.000
78.26	0.000	79.30	0.000	80.34	0.000
78.28	0.000	79.32	0.000	80.36	0.000
78.30	0.000	79.34	0.000	80.38	0.000
78.32	0.000	79.36	0.000	80.40	0.000
78.34	0.000	79.38	0.000	80.42	0.000
78.36	0.000	79.40	0.000	80.44	0.000
78.38	0.000	79.42	0.000	80.46	0.000
78.40	0.000	79.44	0.000	80.48	0.000
78.42	0.000	79.46	0.000	80.50	0.000
78.44	0.000	79.48	0.000	80.52	0.000
78.46	0.000	79.50	0.000	80.54	0.000
78.48	0.000	79.52	0.000	80.56	0.000
78.50	0.000	79.54	0.000	80.58	0.000
78.52	0.000	79.56	0.000	80.60	0.000
78.54	0.000	79.58	0.000		
78.56	0.000	79.60	0.000		
78.58	0.000	79.62	0.000		
78.60	0.000	79.64	0.000		
78.62	0.000	79.66	0.000		
78.64	0.000	79.68	0.000		
78.66	0.000	79.70	0.000		
78.68	0.000	79.72	0.000		
78.70	0.000	79.74	0.000		
78.72	0.000	79.76	0.000		
78.74	0.000	79.78	0.000		
78.76	0.000	79.80	0.000		
78.78	0.000	79.82	0.000		
78.80	0.000	79.84	0.000		
78.82	0.000	79.86	0.000		
78.84	0.000	79.88	0.000		
78.86	0.000	79.90	0.000		
78.88	0.000	79.92	0.000		
78.90	0.000	79.94	0.000		
78.92	0.000	79.96	0.000		
78.94	0.000	79.98	0.000		
78.96	0.000	80.00	0.000		
78.98	0.000	80.02	0.000		
79.00	0.000	80.04	0.000		
79.02	0.000	80.06	0.000		
79.04	0.000	80.08	0.000		
79.06	0.000	80.10	0.000		
79.08	0.000	80.12	0.000		
79.10	0.000	80.14	0.000		
79.12	0.000	80.16	0.000		
79.14	0.000	80.18	0.000		
79.16	0.000	80.20	0.000		
79.18	0.000	80.22	0.000		
79.20	0.000	80.24	0.000		
79.22	0.000	80.26	0.000		

Summary for Pond 11R: DCB#2 - DMH#1

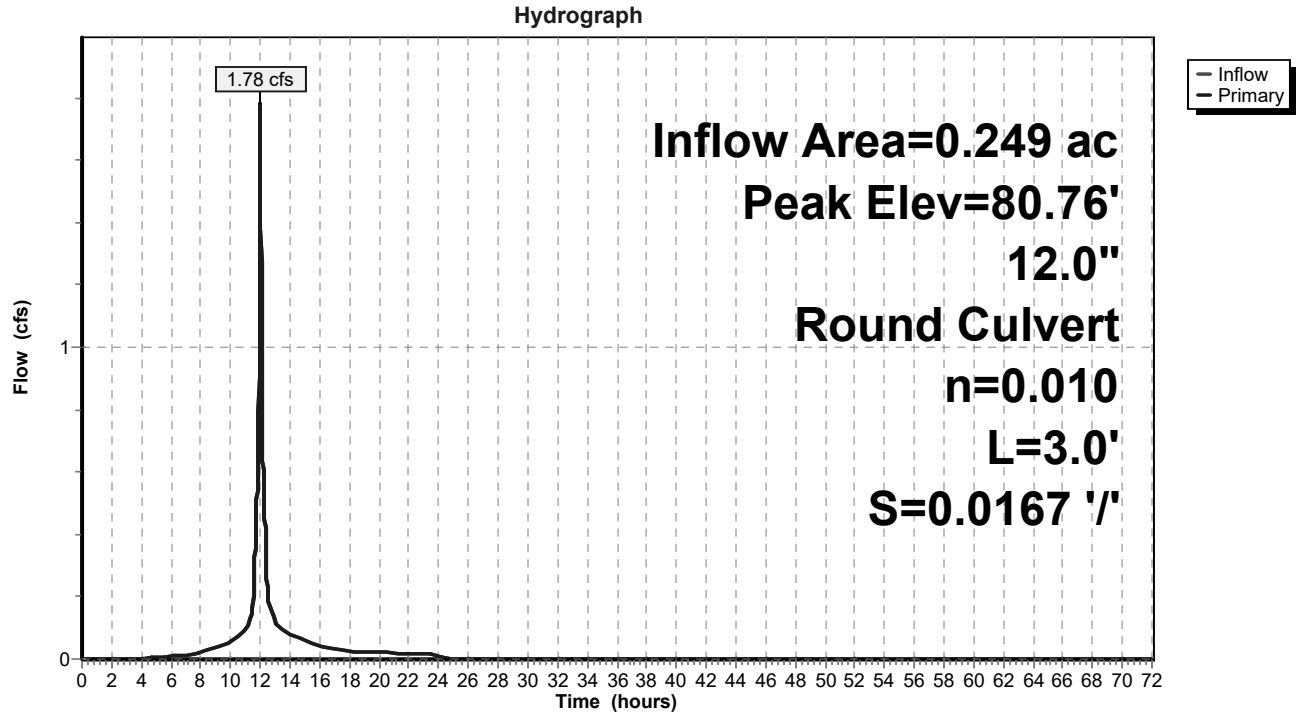
Inflow Area = 0.249 ac, 76.99% Impervious, Inflow Depth = 5.22" for 100 year event
Inflow = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af
Outflow = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 80.76' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.25' / 78.20' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.65 cfs @ 12.00 hrs HW=80.73' TW=80.54' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.65 cfs @ 2.11 fps)

Pond 11R: DCB#2 - DMH#1



Stage-Discharge for Pond 11R: DCB#2 - DMH#1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
78.25	0.00	79.29	2.36	80.33	4.75
78.27	0.00	79.31	2.43	80.35	4.78
78.29	0.01	79.33	2.49	80.37	4.81
78.31	0.02	79.35	2.55	80.39	4.84
78.33	0.03	79.37	2.61	80.41	4.87
78.35	0.04	79.39	2.67	80.43	4.90
78.37	0.06	79.41	2.73	80.45	4.93
78.39	0.08	79.43	2.79	80.47	4.96
78.41	0.10	79.45	2.84	80.49	4.99
78.43	0.12	79.47	2.90	80.51	5.02
78.45	0.14	79.49	2.95	80.53	5.05
78.47	0.17	79.51	3.00	80.55	5.07
78.49	0.20	79.53	3.04	80.57	5.10
78.51	0.23	79.55	3.08	80.59	5.13
78.53	0.26	79.57	3.11	80.61	5.16
78.55	0.29	79.59	3.16	80.63	5.19
78.57	0.33	79.61	3.24	80.65	5.21
78.59	0.37	79.63	3.31	80.67	5.24
78.61	0.41	79.65	3.39	80.69	5.27
78.63	0.45	79.67	3.46	80.71	5.29
78.65	0.49	79.69	3.54	80.73	5.32
78.67	0.53	79.71	3.61	80.75	5.35
78.69	0.58	79.73	3.68	80.77	5.37
78.71	0.62	79.75	3.75	80.79	**5.40**
78.73	0.67	79.77	3.82		
78.75	0.72	79.79	3.86		
78.77	0.77	79.81	3.89		
78.79	0.82	79.83	3.93		
78.81	0.88	79.85	3.97		
78.83	0.93	79.87	4.00		
78.85	0.98	79.89	4.04		
78.87	1.04	79.91	4.07		
78.89	1.10	79.93	4.11		
78.91	1.16	79.95	4.14		
78.93	1.22	79.97	4.18		
78.95	1.28	79.99	4.21		
78.97	1.34	80.01	4.24		
78.99	1.40	80.03	4.28		
79.01	1.46	80.05	4.31		
79.03	1.52	80.07	4.34		
79.05	1.59	80.09	4.38		
79.07	1.65	80.11	4.41		
79.09	1.71	80.13	4.44		
79.11	1.78	80.15	4.47		
79.13	1.84	80.17	4.51		
79.15	1.91	80.19	4.54		
79.17	1.97	80.21	4.57		
79.19	2.04	80.23	4.60		
79.21	2.11	80.25	4.63		
79.23	2.17	80.27	4.66		
79.25	2.24	80.29	4.69		
79.27	2.30	80.31	4.72		

Stage-Area-Storage for Pond 11R: DCB#2 - DMH#1

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
78.25	**0.000**	79.29	0.000	80.33	0.000
78.27	0.000	79.31	0.000	80.35	0.000
78.29	0.000	79.33	0.000	80.37	0.000
78.31	0.000	79.35	0.000	80.39	0.000
78.33	0.000	79.37	0.000	80.41	0.000
78.35	0.000	79.39	0.000	80.43	0.000
78.37	0.000	79.41	0.000	80.45	0.000
78.39	0.000	79.43	0.000	80.47	0.000
78.41	0.000	79.45	0.000	80.49	0.000
78.43	0.000	79.47	0.000	80.51	0.000
78.45	0.000	79.49	0.000	80.53	0.000
78.47	0.000	79.51	0.000	80.55	0.000
78.49	0.000	79.53	0.000	80.57	0.000
78.51	0.000	79.55	0.000	80.59	0.000
78.53	0.000	79.57	0.000	80.61	0.000
78.55	0.000	79.59	0.000	80.63	0.000
78.57	0.000	79.61	0.000	80.65	0.000
78.59	0.000	79.63	0.000	80.67	0.000
78.61	0.000	79.65	0.000	80.69	0.000
78.63	0.000	79.67	0.000	80.71	0.000
78.65	0.000	79.69	0.000	80.73	0.000
78.67	0.000	79.71	0.000	80.75	0.000
78.69	0.000	79.73	0.000	80.77	0.000
78.71	0.000	79.75	0.000	80.79	0.000
78.73	0.000	79.77	0.000		
78.75	0.000	79.79	0.000		
78.77	0.000	79.81	0.000		
78.79	0.000	79.83	0.000		
78.81	0.000	79.85	0.000		
78.83	0.000	79.87	0.000		
78.85	0.000	79.89	0.000		
78.87	0.000	79.91	0.000		
78.89	0.000	79.93	0.000		
78.91	0.000	79.95	0.000		
78.93	0.000	79.97	0.000		
78.95	0.000	79.99	0.000		
78.97	0.000	80.01	0.000		
78.99	0.000	80.03	0.000		
79.01	0.000	80.05	0.000		
79.03	0.000	80.07	0.000		
79.05	0.000	80.09	0.000		
79.07	0.000	80.11	0.000		
79.09	0.000	80.13	0.000		
79.11	0.000	80.15	0.000		
79.13	0.000	80.17	0.000		
79.15	0.000	80.19	0.000		
79.17	0.000	80.21	0.000		
79.19	0.000	80.23	0.000		
79.21	0.000	80.25	0.000		
79.23	0.000	80.27	0.000		
79.25	0.000	80.29	0.000		
79.27	0.000	80.31	0.000		

Summary for Pond 12R: DMH#2-CASCADE

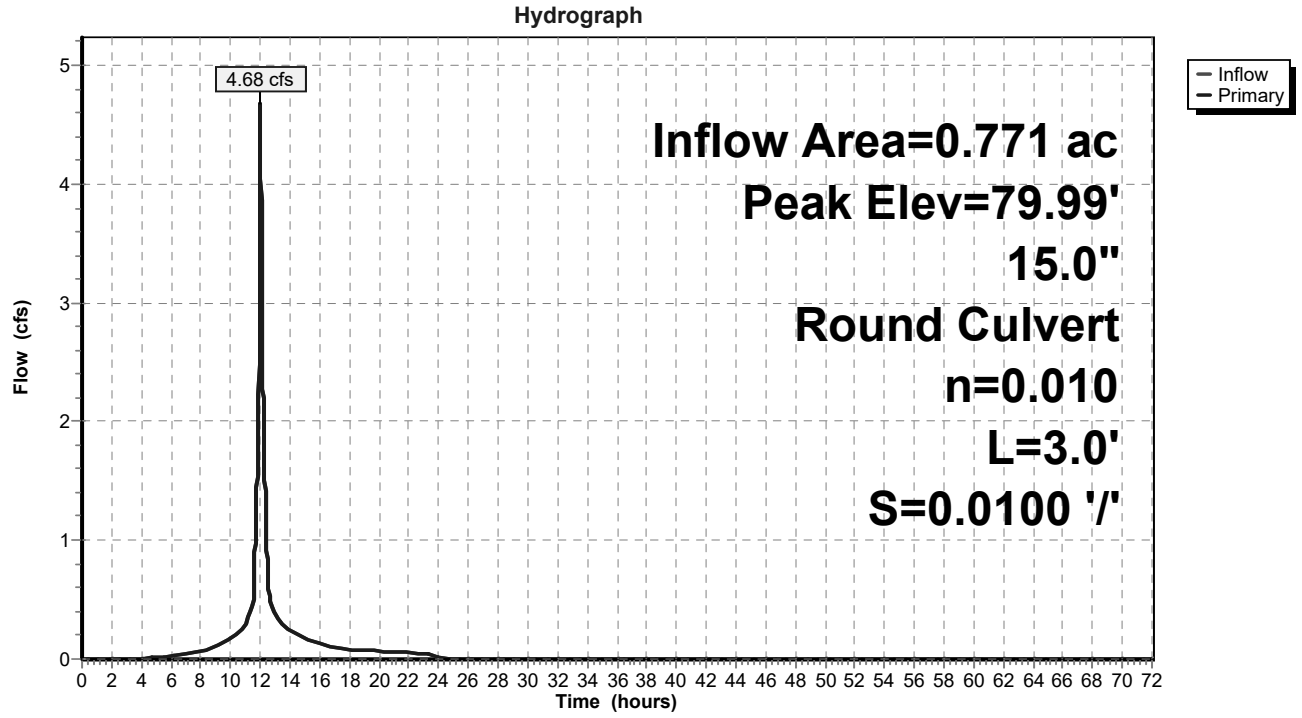
Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 5.17" for 100 year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Outflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Routed to Pond 1R : CASCADE-SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.99' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.33'	**15.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.33' / 77.30' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=4.65 cfs @ 12.00 hrs HW=79.98' TW=79.36' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.65 cfs @ 3.79 fps)

Pond 12R: DMH#2-CASCADE



Stage-Discharge for Pond 12R: DMH#2-CASCADE

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
77.33	0.00	78.37	2.81	79.41	7.13
77.35	0.00	78.39	2.90	79.43	7.18
77.37	0.01	78.41	2.99	79.45	7.22
77.39	0.02	78.43	3.07	79.47	7.27
77.41	0.03	78.45	3.16	79.49	7.32
77.43	0.04	78.47	3.25	79.51	7.37
77.45	0.06	78.49	3.34	79.53	7.42
77.47	0.07	78.51	3.43	79.55	7.46
77.49	0.10	78.53	3.52	79.57	7.51
77.51	0.12	78.55	3.61	79.59	7.56
77.53	0.15	78.57	3.70	79.61	7.60
77.55	0.17	78.59	3.79	79.63	7.65
77.57	0.20	78.61	3.88	79.65	7.69
77.59	0.24	78.63	3.97	79.67	7.74
77.61	0.27	78.65	4.06	79.69	7.78
77.63	0.31	78.67	4.14	79.71	7.83
77.65	0.35	78.69	4.23	79.73	7.87
77.67	0.39	78.71	4.31	79.75	7.92
77.69	0.43	78.73	4.40	79.77	7.96
77.71	0.47	78.75	4.48	79.79	8.00
77.73	0.52	78.77	4.56	79.81	8.05
77.75	0.57	78.79	4.64	79.83	8.09
77.77	0.62	78.81	4.72	79.85	8.13
77.79	0.67	78.83	4.80	79.87	8.18
77.81	0.73	78.85	4.87	79.89	8.22
77.83	0.78	78.87	4.95	79.91	8.26
77.85	0.84	78.89	5.01	79.93	8.30
77.87	0.90	78.91	5.08	79.95	8.35
77.89	0.96	78.93	5.14	79.97	8.39
77.91	1.02	78.95	5.20	79.99	8.43
77.93	1.09	78.97	5.25	80.01	**8.47**
77.95	1.15	78.99	5.29		
77.97	1.22	79.01	5.38		
77.99	1.29	79.03	5.50		
78.01	1.36	79.05	5.61		
78.03	1.43	79.07	5.72		
78.05	1.50	79.09	5.83		
78.07	1.57	79.11	5.94		
78.09	1.65	79.13	6.04		
78.11	1.73	79.15	6.14		
78.13	1.80	79.17	6.25		
78.15	1.88	79.19	6.35		
78.17	1.96	79.21	6.44		
78.19	2.04	79.23	6.54		
78.21	2.13	79.25	6.64		
78.23	2.21	79.27	6.73		
78.25	2.29	79.29	6.82		
78.27	2.38	79.31	6.88		
78.29	2.46	79.33	6.93		
78.31	2.55	79.35	6.98		
78.33	2.63	79.37	7.03		
78.35	2.72	79.39	7.08		

Stage-Area-Storage for Pond 12R: DMH#2-CASCADE

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
77.33	**0.000**	78.37	0.000	79.41	0.000
77.35	0.000	78.39	0.000	79.43	0.000
77.37	0.000	78.41	0.000	79.45	0.000
77.39	0.000	78.43	0.000	79.47	0.000
77.41	0.000	78.45	0.000	79.49	0.000
77.43	0.000	78.47	0.000	79.51	0.000
77.45	0.000	78.49	0.000	79.53	0.000
77.47	0.000	78.51	0.000	79.55	0.000
77.49	0.000	78.53	0.000	79.57	0.000
77.51	0.000	78.55	0.000	79.59	0.000
77.53	0.000	78.57	0.000	79.61	0.000
77.55	0.000	78.59	0.000	79.63	0.000
77.57	0.000	78.61	0.000	79.65	0.000
77.59	0.000	78.63	0.000	79.67	0.000
77.61	0.000	78.65	0.000	79.69	0.000
77.63	0.000	78.67	0.000	79.71	0.000
77.65	0.000	78.69	0.000	79.73	0.000
77.67	0.000	78.71	0.000	79.75	0.000
77.69	0.000	78.73	0.000	79.77	0.000
77.71	0.000	78.75	0.000	79.79	0.000
77.73	0.000	78.77	0.000	79.81	0.000
77.75	0.000	78.79	0.000	79.83	0.000
77.77	0.000	78.81	0.000	79.85	0.000
77.79	0.000	78.83	0.000	79.87	0.000
77.81	0.000	78.85	0.000	79.89	0.000
77.83	0.000	78.87	0.000	79.91	0.000
77.85	0.000	78.89	0.000	79.93	0.000
77.87	0.000	78.91	0.000	79.95	0.000
77.89	0.000	78.93	0.000	79.97	0.000
77.91	0.000	78.95	0.000	79.99	0.000
77.93	0.000	78.97	0.000	80.01	0.000
77.95	0.000	78.99	0.000		
77.97	0.000	79.01	0.000		
77.99	0.000	79.03	0.000		
78.01	0.000	79.05	0.000		
78.03	0.000	79.07	0.000		
78.05	0.000	79.09	0.000		
78.07	0.000	79.11	0.000		
78.09	0.000	79.13	0.000		
78.11	0.000	79.15	0.000		
78.13	0.000	79.17	0.000		
78.15	0.000	79.19	0.000		
78.17	0.000	79.21	0.000		
78.19	0.000	79.23	0.000		
78.21	0.000	79.25	0.000		
78.23	0.000	79.27	0.000		
78.25	0.000	79.29	0.000		
78.27	0.000	79.31	0.000		
78.29	0.000	79.33	0.000		
78.31	0.000	79.35	0.000		
78.33	0.000	79.37	0.000		
78.35	0.000	79.39	0.000		

Summary for Pond 14R: DCB#3-DMH#2

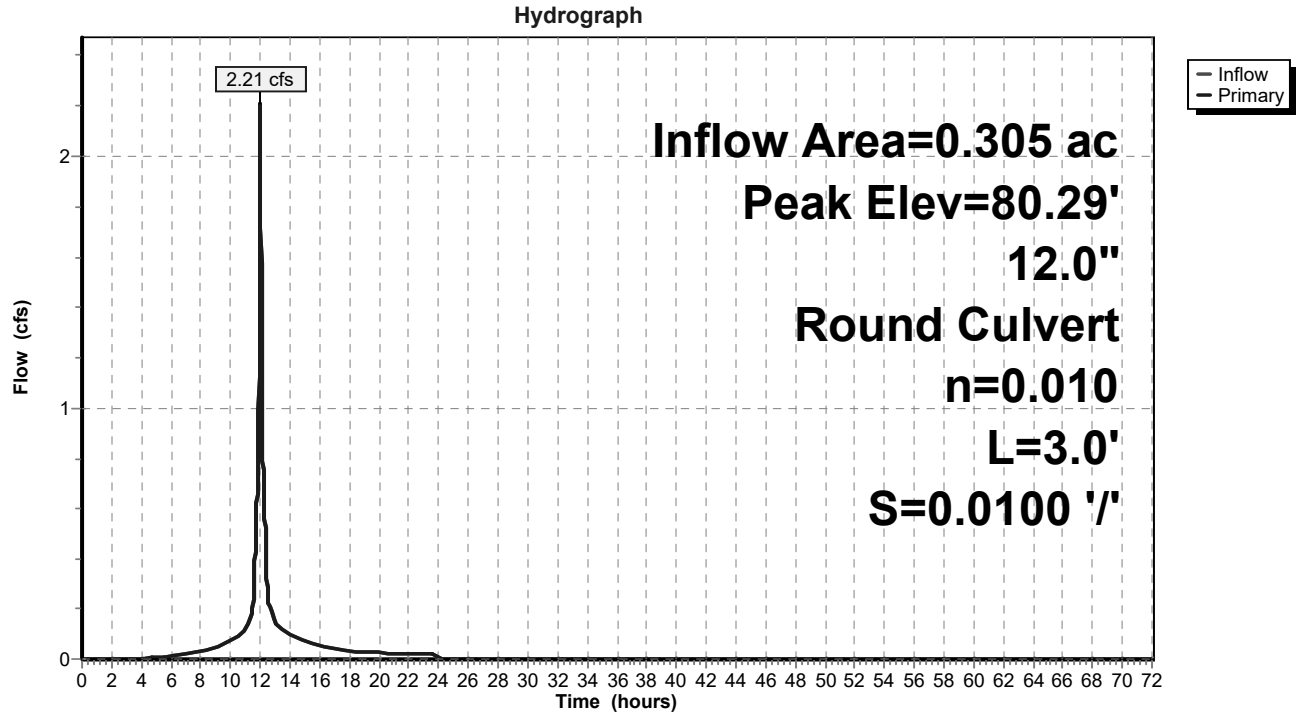
Inflow Area = 0.305 ac, 77.44% Impervious, Inflow Depth = 5.33" for 100 year event
Inflow = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af
Outflow = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 80.29' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.58' / 77.55' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.03 cfs @ 12.00 hrs HW=80.27' TW=79.98' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.03 cfs @ 2.58 fps)

Pond 14R: DCB#3-DMH#2



Stage-Discharge for Pond 14R: DCB#3-DMH#2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
77.58	0.00	78.62	2.29	79.66	4.75
77.60	0.00	78.64	2.35	79.68	4.78
77.62	0.01	78.66	2.41	79.70	4.81
77.64	0.01	78.68	2.47	79.72	4.84
77.66	0.02	78.70	2.53	79.74	4.87
77.68	0.04	78.72	2.59	79.76	4.90
77.70	0.05	78.74	2.65	79.78	4.93
77.72	0.07	78.76	2.71	79.80	4.96
77.74	0.09	78.78	2.76	79.82	4.99
77.76	0.11	78.80	2.81	79.84	5.02
77.78	0.13	78.82	2.87	79.86	5.05
77.80	0.15	78.84	2.91	79.88	5.07
77.82	0.18	78.86	2.96	79.90	5.10
77.84	0.21	78.88	3.00	79.92	5.13
77.86	0.24	78.90	3.03	79.94	5.16
77.88	0.27	78.92	3.07	79.96	5.19
77.90	0.30	78.94	3.16	79.98	5.21
77.92	0.34	78.96	3.24	80.00	5.24
77.94	0.38	78.98	3.31	80.02	5.27
77.96	0.41	79.00	3.39	80.04	5.29
77.98	0.45	79.02	3.46	80.06	5.32
78.00	0.50	79.04	3.54	80.08	5.35
78.02	0.54	79.06	3.61	80.10	5.37
78.04	0.58	79.08	3.68	80.12	5.40
78.06	0.63	79.10	3.75	80.14	5.43
78.08	0.68	79.12	3.82	80.16	5.45
78.10	0.73	79.14	3.88	80.18	5.48
78.12	0.78	79.16	3.93	80.20	5.51
78.14	0.83	79.18	3.97	80.22	5.53
78.16	0.88	79.20	4.00	80.24	5.56
78.18	0.93	79.22	4.04	80.26	5.58
78.20	0.99	79.24	4.07	80.28	5.61
78.22	1.04	79.26	4.11	80.30	**5.63**
78.24	1.10	79.28	4.14		
78.26	1.16	79.30	4.18		
78.28	1.22	79.32	4.21		
78.30	1.28	79.34	4.24		
78.32	1.34	79.36	4.28		
78.34	1.40	79.38	4.31		
78.36	1.46	79.40	4.34		
78.38	1.52	79.42	4.38		
78.40	1.58	79.44	4.41		
78.42	1.65	79.46	4.44		
78.44	1.71	79.48	4.47		
78.46	1.77	79.50	4.51		
78.48	1.84	79.52	4.54		
78.50	1.90	79.54	4.57		
78.52	1.97	79.56	4.60		
78.54	2.03	79.58	4.63		
78.56	2.10	79.60	4.66		
78.58	2.16	79.62	4.69		
78.60	2.22	79.64	4.72		

Stage-Area-Storage for Pond 14R: DCB#3-DMH#2

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
77.58	**0.000**	78.62	0.000	79.66	0.000
77.60	0.000	78.64	0.000	79.68	0.000
77.62	0.000	78.66	0.000	79.70	0.000
77.64	0.000	78.68	0.000	79.72	0.000
77.66	0.000	78.70	0.000	79.74	0.000
77.68	0.000	78.72	0.000	79.76	0.000
77.70	0.000	78.74	0.000	79.78	0.000
77.72	0.000	78.76	0.000	79.80	0.000
77.74	0.000	78.78	0.000	79.82	0.000
77.76	0.000	78.80	0.000	79.84	0.000
77.78	0.000	78.82	0.000	79.86	0.000
77.80	0.000	78.84	0.000	79.88	0.000
77.82	0.000	78.86	0.000	79.90	0.000
77.84	0.000	78.88	0.000	79.92	0.000
77.86	0.000	78.90	0.000	79.94	0.000
77.88	0.000	78.92	0.000	79.96	0.000
77.90	0.000	78.94	0.000	79.98	0.000
77.92	0.000	78.96	0.000	80.00	0.000
77.94	0.000	78.98	0.000	80.02	0.000
77.96	0.000	79.00	0.000	80.04	0.000
77.98	0.000	79.02	0.000	80.06	0.000
78.00	0.000	79.04	0.000	80.08	0.000
78.02	0.000	79.06	0.000	80.10	0.000
78.04	0.000	79.08	0.000	80.12	0.000
78.06	0.000	79.10	0.000	80.14	0.000
78.08	0.000	79.12	0.000	80.16	0.000
78.10	0.000	79.14	0.000	80.18	0.000
78.12	0.000	79.16	0.000	80.20	0.000
78.14	0.000	79.18	0.000	80.22	0.000
78.16	0.000	79.20	0.000	80.24	0.000
78.18	0.000	79.22	0.000	80.26	0.000
78.20	0.000	79.24	0.000	80.28	0.000
78.22	0.000	79.26	0.000	80.30	0.000
78.24	0.000	79.28	0.000		
78.26	0.000	79.30	0.000		
78.28	0.000	79.32	0.000		
78.30	0.000	79.34	0.000		
78.32	0.000	79.36	0.000		
78.34	0.000	79.38	0.000		
78.36	0.000	79.40	0.000		
78.38	0.000	79.42	0.000		
78.40	0.000	79.44	0.000		
78.42	0.000	79.46	0.000		
78.44	0.000	79.48	0.000		
78.46	0.000	79.50	0.000		
78.48	0.000	79.52	0.000		
78.50	0.000	79.54	0.000		
78.52	0.000	79.56	0.000		
78.54	0.000	79.58	0.000		
78.56	0.000	79.60	0.000		
78.58	0.000	79.62	0.000		
78.60	0.000	79.64	0.000		

Summary for Pond IB#1: NEW IB#1

Inflow Area = 1.346 ac, 0.00% Impervious, Inflow Depth = 2.90" for 100 year event
Inflow = 2.30 cfs @ 12.10 hrs, Volume= 0.326 af
Outflow = 1.96 cfs @ 12.44 hrs, Volume= 0.313 af, Atten= 15%, Lag= 20.4 min
Primary = 1.96 cfs @ 12.44 hrs, Volume= 0.313 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.88' @ 12.44 hrs Surf.Area= 1,928 sf Storage= 1,993 cf

Plug-Flow detention time= 59.6 min calculated for 0.313 af (96% of inflow)
Center-of-Mass det. time= 36.8 min (865.8 - 828.9)

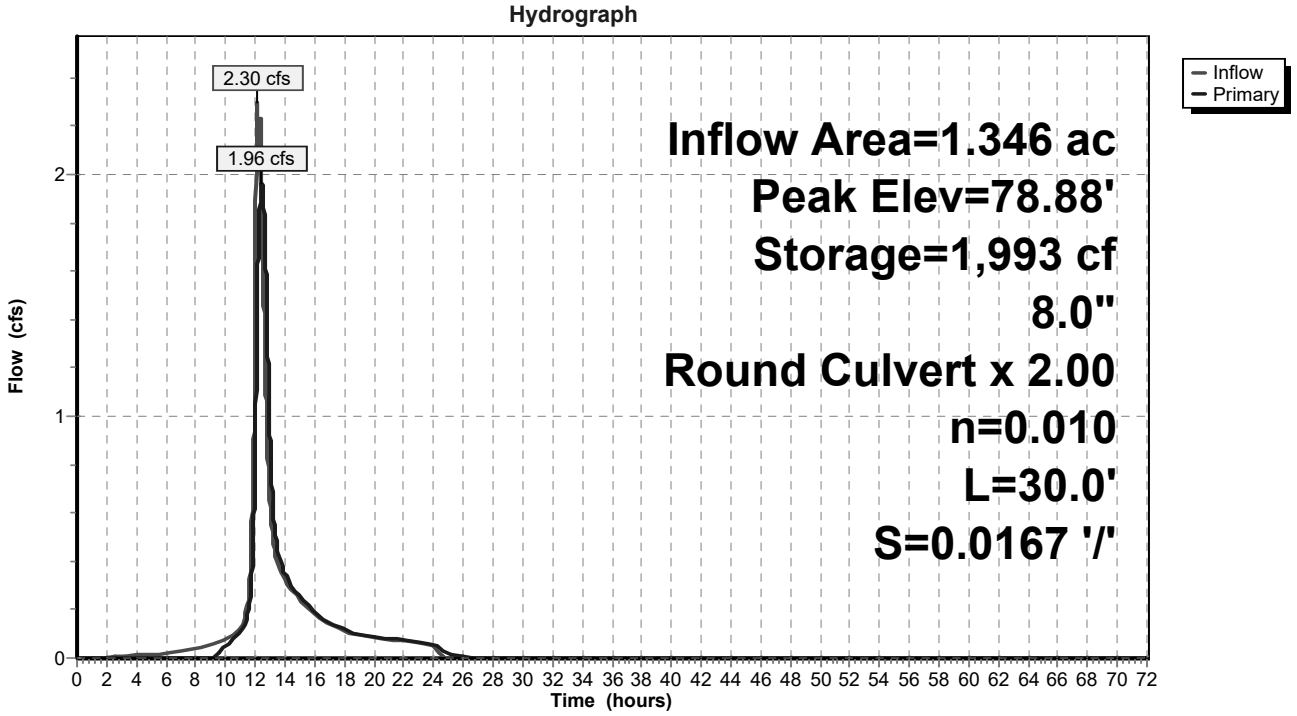
Volume	Invert	Avail.Storage	Storage Description
#1	77.50'	2,229 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.50	976	0	0
78.00	1,304	570	570
79.00	2,013	1,659	2,229

Device	Routing	Invert	Outlet Devices
#1	Primary	78.00'	**8.0" Round Culvert X 2.00** L= 30.0' Ke= 0.900 Inlet / Outlet Invert= 78.00' / 77.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=1.96 cfs @ 12.44 hrs HW=78.88' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.96 cfs @ 2.81 fps)

Pond IB#1: NEW IB#1



Stage-Discharge for Pond IB#1: NEW IB#1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
77.50	0.00	78.02	0.00	78.54	1.20
77.51	0.00	78.03	0.01	78.55	1.23
77.52	0.00	78.04	0.01	78.56	1.26
77.53	0.00	78.05	0.01	78.57	1.29
77.54	0.00	78.06	0.02	78.58	1.32
77.55	0.00	78.07	0.03	78.59	1.35
77.56	0.00	78.08	0.04	78.60	1.38
77.57	0.00	78.09	0.05	78.61	1.41
77.58	0.00	78.10	0.06	78.62	1.43
77.59	0.00	78.11	0.07	78.63	1.46
77.60	0.00	78.12	0.08	78.64	1.48
77.61	0.00	78.13	0.09	78.65	1.50
77.62	0.00	78.14	0.11	78.66	1.52
77.63	0.00	78.15	0.12	78.67	1.54
77.64	0.00	78.16	0.14	78.68	1.56
77.65	0.00	78.17	0.16	78.69	1.58
77.66	0.00	78.18	0.17	78.70	1.61
77.67	0.00	78.19	0.19	78.71	1.63
77.68	0.00	78.20	0.21	78.72	1.65
77.69	0.00	78.21	0.23	78.73	1.67
77.70	0.00	78.22	0.25	78.74	1.69
77.71	0.00	78.23	0.28	78.75	1.71
77.72	0.00	78.24	0.30	78.76	1.73
77.73	0.00	78.25	0.32	78.77	1.75
77.74	0.00	78.26	0.35	78.78	1.77
77.75	0.00	78.27	0.37	78.79	1.79
77.76	0.00	78.28	0.40	78.80	1.81
77.77	0.00	78.29	0.42	78.81	1.83
77.78	0.00	78.30	0.45	78.82	1.85
77.79	0.00	78.31	0.48	78.83	1.87
77.80	0.00	78.32	0.50	78.84	1.89
77.81	0.00	78.33	0.53	78.85	1.91
77.82	0.00	78.34	0.56	78.86	1.93
77.83	0.00	78.35	0.59	78.87	1.94
77.84	0.00	78.36	0.62	78.88	1.96
77.85	0.00	78.37	0.65	78.89	1.98
77.86	0.00	78.38	0.68	78.90	2.00
77.87	0.00	78.39	0.71	78.91	2.02
77.88	0.00	78.40	0.74	78.92	2.03
77.89	0.00	78.41	0.78	78.93	2.05
77.90	0.00	78.42	0.81	78.94	2.07
77.91	0.00	78.43	0.84	78.95	2.08
77.92	0.00	78.44	0.87	78.96	2.10
77.93	0.00	78.45	0.90	78.97	2.12
77.94	0.00	78.46	0.94	78.98	2.13
77.95	0.00	78.47	0.97	78.99	2.15
77.96	0.00	78.48	1.00	79.00	**2.17**
77.97	0.00	78.49	1.03		
77.98	0.00	78.50	1.07		
77.99	0.00	78.51	1.10		
78.00	0.00	78.52	1.13		
78.01	0.00	78.53	1.16		

Stage-Area-Storage for Pond IB#1: NEW IB#1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
77.50	976	0
77.52	989	20
77.54	1,002	40
77.56	1,015	60
77.58	1,028	80
77.60	1,042	101
77.62	1,055	122
77.64	1,068	143
77.66	1,081	165
77.68	1,094	186
77.70	1,107	208
77.72	1,120	231
77.74	1,133	253
77.76	1,147	276
77.78	1,160	299
77.80	1,173	322
77.82	1,186	346
77.84	1,199	370
77.86	1,212	394
77.88	1,225	418
77.90	1,238	443
77.92	1,252	468
77.94	1,265	493
77.96	1,278	518
77.98	1,291	544
78.00	1,304	570
78.02	1,318	596
78.04	1,332	623
78.06	1,347	650
78.08	1,361	677
78.10	1,375	704
78.12	1,389	732
78.14	1,403	760
78.16	1,417	788
78.18	1,432	816
78.20	1,446	845
78.22	1,460	874
78.24	1,474	903
78.26	1,488	933
78.28	1,503	963
78.30	1,517	993
78.32	1,531	1,024
78.34	1,545	1,054
78.36	1,559	1,085
78.38	1,573	1,117
78.40	1,588	1,148
78.42	1,602	1,180
78.44	1,616	1,212
78.46	1,630	1,245
78.48	1,644	1,278
78.50	1,659	1,311
78.52	1,673	1,344
78.54	1,687	1,378
78.56	1,701	1,411
78.58	1,715	1,446
78.60	1,729	1,480
78.62	1,744	1,515
78.64	1,758	1,550
78.66	1,772	1,585
78.68	1,786	1,621
78.70	1,800	1,657
78.72	1,814	1,693
78.74	1,829	1,729
78.76	1,843	1,766
78.78	1,857	1,803
78.80	1,871	1,840
78.82	1,885	1,878
78.84	1,900	1,915
78.86	1,914	1,954
78.88	1,928	1,992
78.90	1,942	2,031
78.92	1,956	2,070
78.94	1,970	2,109
78.96	1,985	2,149
78.98	1,999	2,188
79.00	**2,013**	**2,229**

Summary for Pond IB#2: IB#2

Inflow Area = 0.073 ac, 74.45% Impervious, Inflow Depth = 5.36" for 100 year event
Inflow = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af
Outflow = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.00' @ 0.00 hrs Surf.Area= 180 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (757.2 - 757.2)

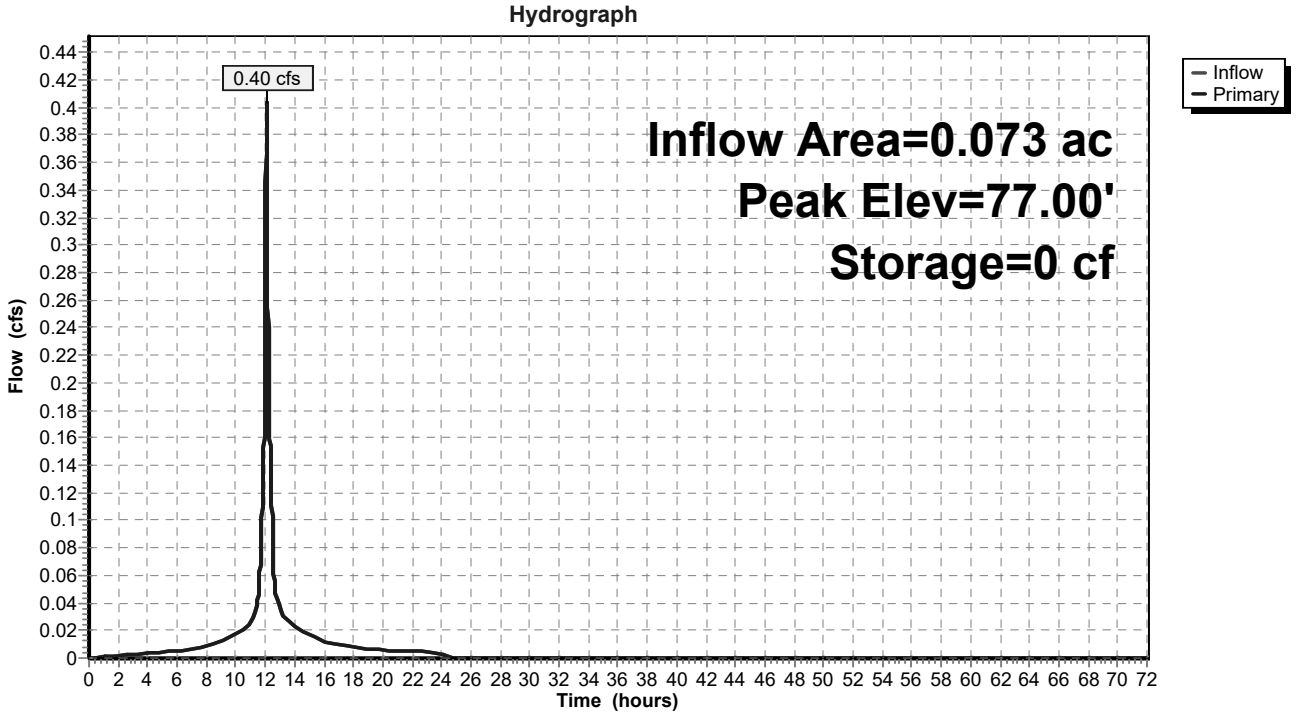
Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	630 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	180	0	0
78.00	310	245	245
78.50	378	172	417
79.00	475	213	630

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=77.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Passes 0.00 cfs of 13,973.49 cfs potential flow)

Pond IB#2: IB#2


Hydrograph
0.40 cfs
Inflow Area=0.073 ac
Peak Elev=77.00'
Storage=0 cf
Inflow
Primary
Flow (cfs)
Time (hours)
0 0.02 0.04 0.06 0.08 0.1 0.12 0.14 0.16 0.18 0.2 0.22 0.24 0.26 0.28 0.3 0.32 0.34 0.36 0.38 0.4 0.42 0.44
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72

Stage-Discharge for Pond IB#2: IB#2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
77.00	0.00	77.52	14,379.11	78.04	14,788.58	78.56	15,201.86
77.01	13,981.26	77.53	14,386.95	78.05	14,796.49	78.57	15,209.84
77.02	13,989.02	77.54	14,394.79	78.06	14,804.40	78.58	15,217.83
77.03	13,996.79	77.55	14,402.63	78.07	14,812.32	78.59	15,225.82
77.04	14,004.56	77.56	14,410.47	78.08	14,820.23	78.60	15,233.80
77.05	14,012.33	77.57	14,418.31	78.09	14,828.15	78.61	15,241.80
77.06	14,020.10	77.58	14,426.16	78.10	14,836.07	78.62	15,249.79
77.07	14,027.87	77.59	14,434.01	78.11	14,843.99	78.63	15,257.78
77.08	14,035.64	77.60	14,441.85	78.12	14,851.91	78.64	15,265.78
77.09	14,043.42	77.61	14,449.70	78.13	14,859.83	78.65	15,273.77
77.10	14,051.20	77.62	14,457.55	78.14	14,867.76	78.66	15,281.77
77.11	14,058.97	77.63	14,465.41	78.15	14,875.68	78.67	15,289.77
77.12	14,066.75	77.64	14,473.26	78.16	14,883.61	78.68	15,297.77
77.13	14,074.53	77.65	14,481.12	78.17	14,891.54	78.69	15,305.77
77.14	14,082.32	77.66	14,488.97	78.18	14,899.47	78.70	15,313.77
77.15	14,090.10	77.67	14,496.83	78.19	14,907.40	78.71	15,321.78
77.16	14,097.89	77.68	14,504.69	78.20	14,915.33	78.72	15,329.78
77.17	14,105.67	77.69	14,512.55	78.21	14,923.27	78.73	15,337.79
77.18	14,113.46	77.70	14,520.41	78.22	14,931.20	78.74	15,345.80
77.19	14,121.25	77.71	14,528.28	78.23	14,939.14	78.75	15,353.81
77.20	14,129.04	77.72	14,536.14	78.24	14,947.08	78.76	15,361.82
77.21	14,136.83	77.73	14,544.01	78.25	14,955.02	78.77	15,369.83
77.22	14,144.63	77.74	14,551.88	78.26	14,962.96	78.78	15,377.85
77.23	14,152.42	77.75	14,559.75	78.27	14,970.90	78.79	15,385.86
77.24	14,160.22	77.76	14,567.62	78.28	14,978.85	78.80	15,393.88
77.25	14,168.02	77.77	14,575.49	78.29	14,986.79	78.81	15,401.90
77.26	14,175.82	77.78	14,583.36	78.30	14,994.74	78.82	15,409.92
77.27	14,183.62	77.79	14,591.24	78.31	15,002.69	78.83	15,417.94
77.28	14,191.42	77.80	14,599.12	78.32	15,010.64	78.84	15,425.96
77.29	14,199.23	77.81	14,606.99	78.33	15,018.59	78.85	15,433.98
77.30	14,207.03	77.82	14,614.87	78.34	15,026.54	78.86	15,442.01
77.31	14,214.84	77.83	14,622.75	78.35	15,034.50	78.87	15,450.04
77.32	14,222.65	77.84	14,630.64	78.36	15,042.45	78.88	15,458.06
77.33	14,230.45	77.85	14,638.52	78.37	15,050.41	78.89	15,466.09
77.34	14,238.27	77.86	14,646.40	78.38	15,058.37	78.90	15,474.13
77.35	14,246.08	77.87	14,654.29	78.39	15,066.33	78.91	15,482.16
77.36	14,253.89	77.88	14,662.18	78.40	15,074.29	78.92	15,490.19
77.37	14,261.71	77.89	14,670.07	78.41	15,082.25	78.93	15,498.23
77.38	14,269.52	77.90	14,677.96	78.42	15,090.22	78.94	15,506.26
77.39	14,277.34	77.91	14,685.85	78.43	15,098.18	78.95	15,514.30
77.40	14,285.16	77.92	14,693.74	78.44	15,106.15	78.96	15,522.34
77.41	14,292.98	77.93	14,701.64	78.45	15,114.12	78.97	15,530.38
77.42	14,300.81	77.94	14,709.53	78.46	15,122.09	78.98	15,538.42
77.43	14,308.63	77.95	14,717.43	78.47	15,130.06	78.99	15,546.47
77.44	14,316.46	77.96	14,725.33	78.48	15,138.03	79.00	**15,554.51**
77.45	14,324.28	77.97	14,733.23	78.49	15,146.00		
77.46	14,332.11	77.98	14,741.13	78.50	15,153.98		
77.47	14,339.94	77.99	14,749.04	78.51	15,161.95		
77.48	14,347.77	78.00	14,756.94	78.52	15,169.93		
77.49	14,355.60	78.01	14,764.85	78.53	15,177.91		
77.50	14,363.44	78.02	14,772.76	78.54	15,185.89		
77.51	14,371.27	78.03	14,780.67	78.55	15,193.87		

Stage-Area-Storage for Pond IB#2: IB#2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
77.00	180	0
77.02	183	4
77.04	185	7
77.06	188	11
77.08	190	15
77.10	193	19
77.12	196	23
77.14	198	26
77.16	201	30
77.18	203	35
77.20	206	39
77.22	209	43
77.24	211	47
77.26	214	51
77.28	216	55
77.30	219	60
77.32	222	64
77.34	224	69
77.36	227	73
77.38	229	78
77.40	232	82
77.42	235	87
77.44	237	92
77.46	240	97
77.48	242	101
77.50	245	106
77.52	248	111
77.54	250	116
77.56	253	121
77.58	255	126
77.60	258	131
77.62	261	137
77.64	263	142
77.66	266	147
77.68	268	152
77.70	271	158
77.72	274	163
77.74	276	169
77.76	279	174
77.78	281	180
77.80	284	186
77.82	287	191
77.84	289	197
77.86	292	203
77.88	294	209
77.90	297	215
77.92	300	221
77.94	302	227
77.96	305	233
77.98	307	239
78.00	310	245
78.02	313	251
78.04	315	258
78.06	318	264
78.08	321	270
78.10	324	277
78.12	326	283
78.14	329	290
78.16	332	296
78.18	334	303
78.20	337	310
78.22	340	316
78.24	343	323
78.26	345	330
78.28	348	337
78.30	351	344
78.32	354	351
78.34	356	358
78.36	359	365
78.38	362	373
78.40	364	380
78.42	367	387
78.44	370	395
78.46	373	402
78.48	375	409
78.50	378	417
78.52	382	425
78.54	386	432
78.56	390	440
78.58	394	448
78.60	397	456
78.62	401	464
78.64	405	472
78.66	409	480
78.68	413	488
78.70	417	496
78.72	421	505
78.74	425	513
78.76	428	522
78.78	432	530
78.80	436	539
78.82	440	548
78.84	444	557
78.86	448	566
78.88	452	575
78.90	456	584
78.92	459	593
78.94	463	602
78.96	467	611
78.98	471	621
79.00	**475**	**630**

Summary for Pond SSIB#1: SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 5.17" for 100 year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Outflow = 3.93 cfs @ 12.05 hrs, Volume= 0.284 af, Atten= 16%, Lag= 2.7 min
Primary = 3.93 cfs @ 12.05 hrs, Volume= 0.284 af
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.18' @ 12.05 hrs Surf.Area= 1,652 sf Storage= 3,019 cf

Plug-Flow detention time= 110.7 min calculated for 0.284 af (85% of inflow)
Center-of-Mass det. time= 47.9 min (830.7 - 782.7)

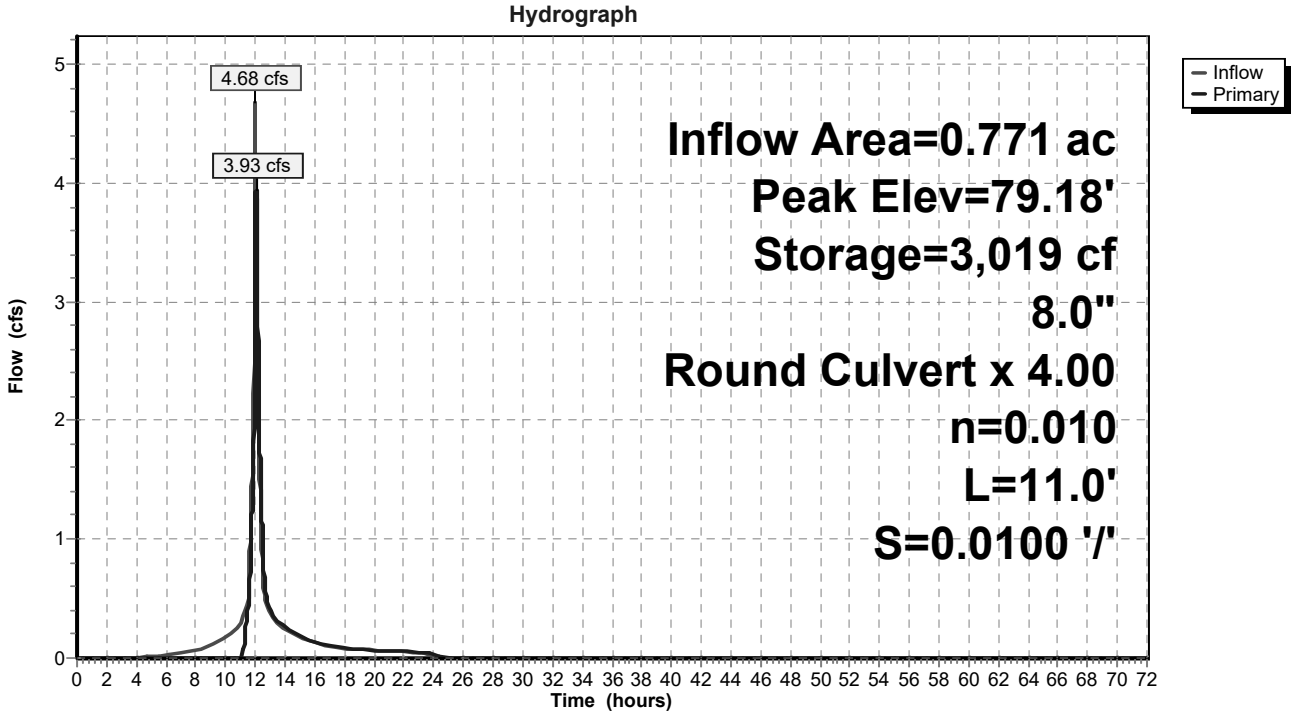
Volume	Invert	Avail.Storage	Storage Description
#1A	76.50'	1,289 cf	**28.00'W x 59.00'L x 3.21'H Field A** 5,300 cf Overall - 2,077 cf Embedded = 3,224 cf x 40.0% Voids
#2A	77.00'	2,077 cf	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		3,366 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	78.30'	**8.0" Round Culvert X 4.00** L= 11.0' Ke= 0.900 Inlet / Outlet Invert= 78.30' / 78.19' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=3.93 cfs @ 12.05 hrs HW=79.18' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.93 cfs @ 2.82 fps)

Pond SSIB#1: SSIB#1



Stage-Discharge for Pond SSIB#1: SSIB#1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
76.50	0.00	77.54	0.00	78.58	0.79	79.62	5.27
76.52	0.00	77.56	0.00	78.60	0.90	79.64	5.33
76.54	0.00	77.58	0.00	78.62	1.01	79.66	5.38
76.56	0.00	77.60	0.00	78.64	1.12	79.68	5.43
76.58	0.00	77.62	0.00	78.66	1.24	79.70	**5.48**
76.60	0.00	77.64	0.00	78.68	1.36		
76.62	0.00	77.66	0.00	78.70	1.48		
76.64	0.00	77.68	0.00	78.72	1.60		
76.66	0.00	77.70	0.00	78.74	1.73		
76.68	0.00	77.72	0.00	78.76	1.85		
76.70	0.00	77.74	0.00	78.78	1.98		
76.72	0.00	77.76	0.00	78.80	2.11		
76.74	0.00	77.78	0.00	78.82	2.24		
76.76	0.00	77.80	0.00	78.84	2.38		
76.78	0.00	77.82	0.00	78.86	2.51		
76.80	0.00	77.84	0.00	78.88	2.64		
76.82	0.00	77.86	0.00	78.90	2.76		
76.84	0.00	77.88	0.00	78.92	2.86		
76.86	0.00	77.90	0.00	78.94	2.96		
76.88	0.00	77.92	0.00	78.96	3.04		
76.90	0.00	77.94	0.00	78.98	3.13		
76.92	0.00	77.96	0.00	79.00	3.21		
76.94	0.00	77.98	0.00	79.02	3.30		
76.96	0.00	78.00	0.00	79.04	3.38		
76.98	0.00	78.02	0.00	79.06	3.47		
77.00	0.00	78.04	0.00	79.08	3.55		
77.02	0.00	78.06	0.00	79.10	3.63		
77.04	0.00	78.08	0.00	79.12	3.70		
77.06	0.00	78.10	0.00	79.14	3.78		
77.08	0.00	78.12	0.00	79.16	3.85		
77.10	0.00	78.14	0.00	79.18	3.92		
77.12	0.00	78.16	0.00	79.20	4.00		
77.14	0.00	78.18	0.00	79.22	4.07		
77.16	0.00	78.20	0.00	79.24	4.13		
77.18	0.00	78.22	0.00	79.26	4.20		
77.20	0.00	78.24	0.00	79.28	4.27		
77.22	0.00	78.26	0.00	79.30	4.33		
77.24	0.00	78.28	0.00	79.32	4.40		
77.26	0.00	78.30	0.00	79.34	4.46		
77.28	0.00	78.32	0.00	79.36	4.52		
77.30	0.00	78.34	0.02	79.38	4.59		
77.32	0.00	78.36	0.04	79.40	4.65		
77.34	0.00	78.38	0.07	79.42	4.71		
77.36	0.00	78.40	0.11	79.44	4.77		
77.38	0.00	78.42	0.16	79.46	4.83		
77.40	0.00	78.44	0.21	79.48	4.88		
77.42	0.00	78.46	0.28	79.50	4.94		
77.44	0.00	78.48	0.35	79.52	5.00		
77.46	0.00	78.50	0.42	79.54	5.05		
77.48	0.00	78.52	0.51	79.56	5.11		
77.50	0.00	78.54	0.60	79.58	5.16		
77.52	0.00	78.56	0.69	79.60	5.22		

Stage-Area-Storage for Pond SSIB#1: SSIB#1

Elevation (feet)	Storage (cubic-feet)
76.50	0
76.55	33
76.60	66
76.65	99
76.70	132
76.75	165
76.80	198
76.85	231
76.90	264
76.95	297
77.00	330
77.05	403
77.10	476
77.15	548
77.20	619
77.25	690
77.30	761
77.35	832
77.40	903
77.45	973
77.50	1,043
77.55	1,113
77.60	1,182
77.65	1,251
77.70	1,320
77.75	1,388
77.80	1,455
77.85	1,523
77.90	1,590
77.95	1,656
78.00	1,723
78.05	1,789
78.10	1,854
78.15	1,919
78.20	1,984
78.25	2,047
78.30	2,110
78.35	2,173
78.40	2,234
78.45	2,295
78.50	2,355
78.55	2,414
78.60	2,472
78.65	2,529
78.70	2,585
78.75	2,639
78.80	2,692
78.85	2,744
78.90	2,793
78.95	2,840
79.00	2,883
79.05	2,924
79.10	2,962
79.15	2,997
79.20	3,030
79.25	3,063
79.30	3,096
79.35	3,129
79.40	3,162
79.45	3,195
79.50	3,228
79.55	3,261
79.60	3,294
79.65	3,327
79.70	**3,360**

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 year	Type III 24-hr		Default	24.00	1	3.10	2
2	10 year	Type III 24-hr		Default	24.00	1	4.55	2
3	25 year	Type III 24-hr		Default	24.00	1	5.45	2
4	100 year	Type III 24-hr		Default	24.00	1	6.50	2

Summary for Subcatchment 3276S: AREA DIRECTLY TRIBUTARY TO RM

Runoff = 0.09 cfs @ 12.16 hrs, Volume= 0.009 af, Depth= 0.68"
Routed to Reach 3269R : DIRECT FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
5,649	61	>75% Grass cover, Good, HSG B
600	98	Paved roads w/curbs & sewers, HSG B
175	98	Water Surface, HSG B
500	98	Paved parking, HSG B
6,924	68	Weighted Average
5,649		81.59% Pervious Area
1,275		18.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	45	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment D-1: D-1 TO CASIN

Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 0.40"
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
5,387	61	>75% Grass cover, Good, HSG B
5,387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.20"
1.0	87	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.0	8	0.5000	4.24		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	145	Total			

Summary for Subcatchment D-2A: D-2A

Runoff = 0.16 cfs @ 12.51 hrs, Volume= 0.031 af, Depth= 0.34"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
4,200	56	Brush, Fair, HSG B
30,622	58	Meadow, non-grazed, HSG B
12,593	61	>75% Grass cover, Good, HSG B
47,415	59	Weighted Average
47,415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
2.3	147	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
23.5	661	Total			

Summary for Subcatchment D-2B: D-2B

Runoff = 0.75 cfs @ 12.08 hrs, Volume= 0.057 af, Depth= 2.65"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
8,200	96	Gravel surface, HSG B
3,025	96	Gravel surface, HSG B
11,225	96	Weighted Average
11,225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3A: Clubhouse Roof

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 2.87"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
2,360	98	Roofs, HSG B
2,360		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3B: Direct to IB#2

Runoff = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Depth= 0.55"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
180	79	<50% Grass cover, Poor, HSG B
630	61	>75% Grass cover, Good, HSG B
810	65	Weighted Average
810		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-4A: D-2

Runoff = 0.43 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 1.75"
Routed to Pond 6R : DCB#1- DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
6,485	98	Paved parking, HSG B
2,930	61	>75% Grass cover, Good, HSG B
9,415	86	Weighted Average
2,930		31.12% Pervious Area
6,485		68.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.0	90	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.5	154	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	294	Total			

Summary for Subcatchment D-4B: (new Subcat)

Runoff = 0.71 cfs @ 12.00 hrs, Volume= 0.041 af, Depth= 1.99"
Routed to Pond 11R : DCB#2 - DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
8,365	98	Paved parking, HSG B
2,500	61	>75% Grass cover, Good, HSG B
10,865	89	Weighted Average
2,500		23.01% Pervious Area
8,365		76.99% Impervious Area

Summary for Subcatchment D-4C: D-4C

Runoff = 0.90 cfs @ 12.00 hrs, Volume= 0.053 af, Depth= 2.08"
Routed to Pond 14R : DCB#3-DMH#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
10,300	98	Paved roads w/curbs & sewers, HSG B
3,000	61	>75% Grass cover, Good, HSG B
13,300	90	Weighted Average
3,000		22.56% Pervious Area
10,300		77.44% Impervious Area

Summary for Subcatchment D-5: ON-SITE TO YARD CBS

Runoff = 0.02 cfs @ 12.30 hrs, Volume= 0.004 af, Depth= 0.40"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
4,875	61	>75% Grass cover, Good, HSG B
4,875		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment OS-2: OS-2

Runoff = 0.02 cfs @ 12.13 hrs, Volume= 0.002 af, Depth= 0.40"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.07 cfs @ 12.12 hrs, Volume= 0.008 af, Depth= 0.48"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.08 cfs @ 12.11 hrs, Volume= 0.008 af, Depth= 0.51"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 0.40"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 year Rainfall=3.10"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 16R: FLOW THRIOUGH NEW 18" PIPE

Inflow Area = 1.439 ac, 42.02% Impervious, Inflow Depth = 0.86" for 2 year event
Inflow = 0.91 cfs @ 12.24 hrs, Volume= 0.103 af
Outflow = 0.91 cfs @ 12.24 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3269R: DIRECT FLOW TO RM

Inflow Area = 3.017 ac, 22.81% Impervious, Inflow Depth = 0.79" for 2 year event
Inflow = 1.54 cfs @ 12.22 hrs, Volume= 0.200 af
Outflow = 1.54 cfs @ 12.22 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE

Inflow Area = 0.669 ac, 4.12% Impervious, Inflow Depth = 0.46" for 2 year event
Inflow = 0.21 cfs @ 12.12 hrs, Volume= 0.025 af
Outflow = 0.21 cfs @ 12.12 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3275R: TOTAL FLOW FROM WORK AREA

Inflow Area = 3.141 ac, 21.92% Impervious, Inflow Depth = 0.78" for 2 year event
Inflow = 1.56 cfs @ 12.22 hrs, Volume= 0.204 af
Outflow = 1.56 cfs @ 12.22 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1R: CASCADE-SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 1.96" for 2 year event
Inflow = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af
Outflow = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af
Routed to Pond SSIB#1 : SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.58' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.23'	**18.0" Round Culvert** L= 8.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.23' / 77.20' S= 0.0038 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=1.84 cfs @ 12.00 hrs HW=78.13' TW=77.99' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.84 cfs @ 2.39 fps)

Summary for Pond 6R: DCB#1- DMH#1

Inflow Area = 0.216 ac, 68.88% Impervious, Inflow Depth = 1.75" for 2 year event
Inflow = 0.43 cfs @ 12.10 hrs, Volume= 0.031 af
Outflow = 0.43 cfs @ 12.10 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.10 hrs, Volume= 0.031 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.33' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	81.00'	**12.0" Round Culvert** L= 140.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 81.00' / 78.20' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.10 hrs HW=81.33' TW=78.78' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.43 cfs @ 1.94 fps)

Summary for Pond 9R: DMH#1-DMH#2

Inflow Area = 0.466 ac, 73.22% Impervious, Inflow Depth = 1.88" for 2 year event
Inflow = 0.95 cfs @ 12.00 hrs, Volume= 0.073 af
Outflow = 0.95 cfs @ 12.00 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 0.95 cfs @ 12.00 hrs, Volume= 0.073 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.79' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.20'	**12.0" Round Culvert** L= 135.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.20' / 77.55' S= 0.0048 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.92 cfs @ 12.00 hrs HW=78.79' TW=78.29' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.92 cfs @ 2.75 fps)

Summary for Pond 11R: DCB#2 - DMH#1

Inflow Area = 0.249 ac, 76.99% Impervious, Inflow Depth = 1.99" for 2 year event
Inflow = 0.71 cfs @ 12.00 hrs, Volume= 0.041 af
Outflow = 0.71 cfs @ 12.00 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.71 cfs @ 12.00 hrs, Volume= 0.041 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 78.88' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.25' / 78.20' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.70 cfs @ 12.00 hrs HW=78.88' TW=78.79' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.70 cfs @ 1.92 fps)

Summary for Pond 12R: DMH#2-CASCADE

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 1.96" for 2 year event
Inflow = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af
Outflow = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af
Routed to Pond 1R : CASCADE-SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.59' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.33'	**15.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.33' / 77.30' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=1.84 cfs @ 12.00 hrs HW=78.28' TW=78.13' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.84 cfs @ 2.54 fps)

Summary for Pond 14R: DCB#3-DMH#2

Inflow Area = 0.305 ac, 77.44% Impervious, Inflow Depth = 2.08" for 2 year event
Inflow = 0.90 cfs @ 12.00 hrs, Volume= 0.053 af
Outflow = 0.90 cfs @ 12.00 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 12.00 hrs, Volume= 0.053 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.60' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.58' / 77.55' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.77 cfs @ 12.00 hrs HW=78.34' TW=78.28' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.77 cfs @ 1.65 fps)

Summary for Pond IB#1: NEW IB#1

Inflow Area = 1.346 ac, 0.00% Impervious, Inflow Depth = 0.78" for 2 year event
Inflow = 0.75 cfs @ 12.09 hrs, Volume= 0.088 af
Outflow = 0.47 cfs @ 12.20 hrs, Volume= 0.074 af, Atten= 38%, Lag= 6.6 min
Primary = 0.47 cfs @ 12.20 hrs, Volume= 0.074 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.31' @ 12.20 hrs Surf.Area= 1,522 sf Storage= 1,004 cf

Plug-Flow detention time= 150.3 min calculated for 0.074 af (85% of inflow)
Center-of-Mass det. time= 79.4 min (914.7 - 835.3)

Volume	Invert	Avail.Storage	Storage Description
#1	77.50'	2,229 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.50	976	0	0
78.00	1,304	570	570
79.00	2,013	1,659	2,229

Device	Routing	Invert	Outlet Devices
#1	Primary	78.00'	**8.0" Round Culvert X 2.00** L= 30.0' Ke= 0.900 Inlet / Outlet Invert= 78.00' / 77.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.47 cfs @ 12.20 hrs HW=78.31' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.47 cfs @ 1.49 fps)

Summary for Pond IB#2: IB#2

Inflow Area = 0.073 ac, 74.45% Impervious, Inflow Depth = 2.28" for 2 year event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.00' @ 0.00 hrs Surf.Area= 180 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (765.8 - 765.8)

Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	630 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	180	0	0
78.00	310	245	245
78.50	378	172	417
79.00	475	213	630

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=77.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Passes 0.00 cfs of 13,973.49 cfs potential flow)

Summary for Pond SSIB#1: SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 1.96" for 2 year event
Inflow = 1.85 cfs @ 12.00 hrs, Volume= 0.126 af
Outflow = 0.73 cfs @ 12.25 hrs, Volume= 0.077 af, Atten= 60%, Lag= 14.7 min
Primary = 0.73 cfs @ 12.25 hrs, Volume= 0.077 af
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.57' @ 12.25 hrs Surf.Area= 1,652 sf Storage= 2,435 cf

Plug-Flow detention time= 203.0 min calculated for 0.077 af (61% of inflow)
Center-of-Mass det. time= 98.9 min (908.4 - 809.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	76.50'	1,289 cf	**28.00'W x 59.00'L x 3.21'H Field A** 5,300 cf Overall - 2,077 cf Embedded = 3,224 cf x 40.0% Voids
#2A	77.00'	2,077 cf	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		3,366 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	78.30'	**8.0" Round Culvert X 4.00** L= 11.0' Ke= 0.900 Inlet / Outlet Invert= 78.30' / 78.19' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=0.73 cfs @ 12.25 hrs HW=78.57' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.73 cfs @ 1.39 fps)

Summary for Subcatchment 3276S: AREA DIRECTLY TRIBUTARY TO RM

Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.021 af, Depth= 1.57"
Routed to Reach 3269R : DIRECT FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
5,649	61	>75% Grass cover, Good, HSG B
600	98	Paved roads w/curbs & sewers, HSG B
175	98	Water Surface, HSG B
500	98	Paved parking, HSG B
6,924	68	Weighted Average
5,649		81.59% Pervious Area
1,275		18.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	45	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment D-1: D-1 TO CASIN

Runoff = 0.14 cfs @ 12.11 hrs, Volume= 0.011 af, Depth= 1.11"
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
5,387	61	>75% Grass cover, Good, HSG B
5,387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.20"
1.0	87	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.0	8	0.5000	4.24		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	145	Total			

Summary for Subcatchment D-2A: D-2A

Runoff = 0.67 cfs @ 12.40 hrs, Volume= 0.090 af, Depth= 0.99"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
4,200	56	Brush, Fair, HSG B
30,622	58	Meadow, non-grazed, HSG B
12,593	61	>75% Grass cover, Good, HSG B
47,415	59	Weighted Average
47,415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
2.3	147	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
23.5	661	Total			

Summary for Subcatchment D-2B: D-2B

Runoff = 1.12 cfs @ 12.08 hrs, Volume= 0.088 af, Depth= 4.09"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
8,200	96	Gravel surface, HSG B
3,025	96	Gravel surface, HSG B
11,225	96	Weighted Average
11,225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3A: Clubhouse Roof

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 4.31"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
2,360	98	Roofs, HSG B
2,360		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3B: Direct to IB#2

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth= 1.36"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
180	79	<50% Grass cover, Poor, HSG B
630	61	>75% Grass cover, Good, HSG B
810	65	Weighted Average
810		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-4A: D-2

Runoff = 0.74 cfs @ 12.10 hrs, Volume= 0.055 af, Depth= 3.05"
Routed to Pond 6R : DCB#1- DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
6,485	98	Paved parking, HSG B
2,930	61	>75% Grass cover, Good, HSG B
9,415	86	Weighted Average
2,930		31.12% Pervious Area
6,485		68.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.0	90	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.5	154	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	294	Total			

Summary for Subcatchment D-4B: (new Subcat)

Runoff = 1.17 cfs @ 12.00 hrs, Volume= 0.069 af, Depth= 3.34"
Routed to Pond 11R : DCB#2 - DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
8,365	98	Paved parking, HSG B
2,500	61	>75% Grass cover, Good, HSG B
10,865	89	Weighted Average
2,500		23.01% Pervious Area
8,365		76.99% Impervious Area

Summary for Subcatchment D-4C: D-4C

Runoff = 1.46 cfs @ 12.00 hrs, Volume= 0.088 af, Depth= 3.44"
Routed to Pond 14R : DCB#3-DMH#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
10,300	98	Paved roads w/curbs & sewers, HSG B
3,000	61	>75% Grass cover, Good, HSG B
13,300	90	Weighted Average
3,000		22.56% Pervious Area
10,300		77.44% Impervious Area

Summary for Subcatchment D-5: ON-SITE TO YARD CBS

Runoff = 0.10 cfs @ 12.22 hrs, Volume= 0.010 af, Depth= 1.11"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
4,875	61	>75% Grass cover, Good, HSG B
4,875		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment OS-2: OS-2

Runoff = 0.07 cfs @ 12.10 hrs, Volume= 0.006 af, Depth= 1.11"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 1.23"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 1.30"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 1.11"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year Rainfall=4.55"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 16R: FLOW THRIOUGH NEW 18" PIPE

Inflow Area = 1.439 ac, 42.02% Impervious, Inflow Depth = 1.92" for 10 year event
Inflow = 3.23 cfs @ 12.06 hrs, Volume= 0.230 af
Outflow = 3.23 cfs @ 12.06 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3269R: DIRECT FLOW TO RM

Inflow Area = 3.017 ac, 22.81% Impervious, Inflow Depth = 1.74" for 10 year event
Inflow = 4.35 cfs @ 12.08 hrs, Volume= 0.437 af
Outflow = 4.35 cfs @ 12.08 hrs, Volume= 0.437 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE

Inflow Area = 0.669 ac, 4.12% Impervious, Inflow Depth = 1.20" for 10 year event
Inflow = 0.78 cfs @ 12.10 hrs, Volume= 0.067 af
Outflow = 0.78 cfs @ 12.10 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3275R: TOTAL FLOW FROM WORK AREA

Inflow Area = 3.141 ac, 21.92% Impervious, Inflow Depth = 1.71" for 10 year event
Inflow = 4.48 cfs @ 12.08 hrs, Volume= 0.448 af
Outflow = 4.48 cfs @ 12.08 hrs, Volume= 0.448 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1R: CASCADE-SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 3.30" for 10 year event
Inflow = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af
Outflow = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.0 min
Primary = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af
Routed to Pond SSIB#1 : SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.97' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.23'	**18.0" Round Culvert** L= 8.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.23' / 77.20' S= 0.0038 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=3.04 cfs @ 12.00 hrs HW=78.94' TW=78.81' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.04 cfs @ 1.72 fps)

Summary for Pond 6R: DCB#1- DMH#1

Inflow Area = 0.216 ac, 68.88% Impervious, Inflow Depth = 3.05" for 10 year event
Inflow = 0.74 cfs @ 12.10 hrs, Volume= 0.055 af
Outflow = 0.74 cfs @ 12.10 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min
Primary = 0.74 cfs @ 12.10 hrs, Volume= 0.055 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.44' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	81.00'	**12.0" Round Culvert** L= 140.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 81.00' / 78.20' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.74 cfs @ 12.10 hrs HW=81.44' TW=79.20' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.74 cfs @ 2.25 fps)

Summary for Pond 9R: DMH#1-DMH#2

Inflow Area = 0.466 ac, 73.22% Impervious, Inflow Depth = 3.21" for 10 year event
Inflow = 1.60 cfs @ 12.00 hrs, Volume= 0.124 af
Outflow = 1.60 cfs @ 12.00 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min
Primary = 1.60 cfs @ 12.00 hrs, Volume= 0.124 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.42' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.20'	**12.0" Round Culvert** L= 135.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.20' / 77.55' S= 0.0048 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.49 cfs @ 12.00 hrs HW=79.42' TW=79.21' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.49 cfs @ 1.97 fps)

Summary for Pond 11R: DCB#2 - DMH#1

Inflow Area = 0.249 ac, 76.99% Impervious, Inflow Depth = 3.34" for 10 year event
Inflow = 1.17 cfs @ 12.00 hrs, Volume= 0.069 af
Outflow = 1.17 cfs @ 12.00 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.00 hrs, Volume= 0.069 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 79.52' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.25' / 78.20' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.10 cfs @ 12.00 hrs HW=79.50' TW=79.42' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.10 cfs @ 1.40 fps)

Summary for Pond 12R: DMH#2-CASCADE

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 3.30" for 10 year event
Inflow = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af
Outflow = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.0 min
Primary = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af
Routed to Pond 1R : CASCADE-SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.21' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.33'	**15.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.33' / 77.30' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=3.04 cfs @ 12.00 hrs HW=79.21' TW=78.94' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.04 cfs @ 2.47 fps)

Summary for Pond 14R: DCB#3-DMH#2

Inflow Area = 0.305 ac, 77.44% Impervious, Inflow Depth = 3.44" for 10 year event
Inflow = 1.46 cfs @ 12.00 hrs, Volume= 0.088 af
Outflow = 1.46 cfs @ 12.00 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.46 cfs @ 12.00 hrs, Volume= 0.088 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.33' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.58' / 77.55' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.30 cfs @ 12.00 hrs HW=79.32' TW=79.20' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.30 cfs @ 1.66 fps)

Summary for Pond IB#1: NEW IB#1

Inflow Area = 1.346 ac, 0.00% Impervious, Inflow Depth = 1.58" for 10 year event
Inflow = 1.30 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 1.03 cfs @ 12.38 hrs, Volume= 0.164 af, Atten= 21%, Lag= 16.9 min
Primary = 1.03 cfs @ 12.38 hrs, Volume= 0.164 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.49' @ 12.38 hrs Surf.Area= 1,649 sf Storage= 1,289 cf

Plug-Flow detention time= 91.1 min calculated for 0.164 af (93% of inflow)
Center-of-Mass det. time= 51.4 min (885.7 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1	77.50'	2,229 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.50	976	0	0
78.00	1,304	570	570
79.00	2,013	1,659	2,229

Device	Routing	Invert	Outlet Devices
#1	Primary	78.00'	**8.0" Round Culvert X 2.00** L= 30.0' Ke= 0.900 Inlet / Outlet Invert= 78.00' / 77.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=1.03 cfs @ 12.38 hrs HW=78.49' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.03 cfs @ 1.88 fps)

Summary for Pond IB#2: IB#2

Inflow Area = 0.073 ac, 74.45% Impervious, Inflow Depth = 3.56" for 10 year event
Inflow = 0.27 cfs @ 12.08 hrs, Volume= 0.022 af
Outflow = 0.27 cfs @ 12.08 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Primary = 0.27 cfs @ 12.08 hrs, Volume= 0.022 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.00' @ 0.00 hrs Surf.Area= 180 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (761.1 - 761.1)

Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	630 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	180	0	0
78.00	310	245	245
78.50	378	172	417
79.00	475	213	630

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=77.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Passes 0.00 cfs of 13,973.49 cfs potential flow)

Summary for Pond SSIB#1: SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 3.30" for 10 year event
Inflow = 3.06 cfs @ 12.00 hrs, Volume= 0.212 af
Outflow = 2.58 cfs @ 12.05 hrs, Volume= 0.164 af, Atten= 16%, Lag= 2.6 min
Primary = 2.58 cfs @ 12.05 hrs, Volume= 0.164 af
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.87' @ 12.05 hrs Surf.Area= 1,652 sf Storage= 2,764 cf

Plug-Flow detention time= 142.2 min calculated for 0.164 af (77% of inflow)
Center-of-Mass det. time= 60.7 min (855.6 - 794.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	76.50'	1,289 cf	**28.00'W x 59.00'L x 3.21'H Field A** 5,300 cf Overall - 2,077 cf Embedded = 3,224 cf x 40.0% Voids
#2A	77.00'	2,077 cf	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		3,366 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	78.30'	**8.0" Round Culvert X 4.00** L= 11.0' Ke= 0.900 Inlet / Outlet Invert= 78.30' / 78.19' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=2.58 cfs @ 12.05 hrs HW=78.87' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 2.58 cfs @ 2.72 fps)

Summary for Subcatchment 3276S: AREA DIRECTLY TRIBUTARY TO RM

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.029 af, Depth= 2.21"
Routed to Reach 3269R : DIRECT FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
5,649	61	>75% Grass cover, Good, HSG B
600	98	Paved roads w/curbs & sewers, HSG B
175	98	Water Surface, HSG B
500	98	Paved parking, HSG B
6,924	68	Weighted Average
5,649		81.59% Pervious Area
1,275		18.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	45	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment D-1: D-1 TO CASIN

Runoff = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 1.65"
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
5,387	61	>75% Grass cover, Good, HSG B
5,387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.20"
1.0	87	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.0	8	0.5000	4.24		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	145	Total			

Summary for Subcatchment D-2A: D-2A

Runoff = 1.09 cfs @ 12.36 hrs, Volume= 0.136 af, Depth= 1.50"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
4,200	56	Brush, Fair, HSG B
30,622	58	Meadow, non-grazed, HSG B
12,593	61	>75% Grass cover, Good, HSG B
47,415	59	Weighted Average
47,415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
2.3	147	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
23.5	661	Total			

Summary for Subcatchment D-2B: D-2B

Runoff = 1.36 cfs @ 12.08 hrs, Volume= 0.107 af, Depth= 4.98"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
8,200	96	Gravel surface, HSG B
3,025	96	Gravel surface, HSG B
11,225	96	Weighted Average
11,225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3A: Clubhouse Roof

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 0.024 af, Depth= 5.21"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
2,360	98	Roofs, HSG B
2,360		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3B: Direct to IB#2

Runoff = 0.04 cfs @ 12.09 hrs, Volume= 0.003 af, Depth= 1.96"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
180	79	<50% Grass cover, Poor, HSG B
630	61	>75% Grass cover, Good, HSG B
810	65	Weighted Average
810		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-4A: D-2

Runoff = 0.94 cfs @ 12.10 hrs, Volume= 0.070 af, Depth= 3.89"
Routed to Pond 6R : DCB#1- DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
6,485	98	Paved parking, HSG B
2,930	61	>75% Grass cover, Good, HSG B
9,415	86	Weighted Average
2,930		31.12% Pervious Area
6,485		68.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.0	90	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.5	154	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	294	Total			

Summary for Subcatchment D-4B: (new Subcat)

Runoff = 1.45 cfs @ 12.00 hrs, Volume= 0.087 af, Depth= 4.20"
Routed to Pond 11R : DCB#2 - DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
8,365	98	Paved parking, HSG B
2,500	61	>75% Grass cover, Good, HSG B
10,865	89	Weighted Average
2,500		23.01% Pervious Area
8,365		76.99% Impervious Area

Summary for Subcatchment D-4C: D-4C

Runoff = 1.81 cfs @ 12.00 hrs, Volume= 0.110 af, Depth= 4.31"
Routed to Pond 14R : DCB#3-DMH#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
10,300	98	Paved roads w/curbs & sewers, HSG B
3,000	61	>75% Grass cover, Good, HSG B
13,300	90	Weighted Average
3,000		22.56% Pervious Area
10,300		77.44% Impervious Area

Summary for Subcatchment D-5: ON-SITE TO YARD CBS

Runoff = 0.15 cfs @ 12.22 hrs, Volume= 0.015 af, Depth= 1.65"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
4,875	61	>75% Grass cover, Good, HSG B
4,875		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment OS-2: OS-2

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af, Depth= 1.65"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.39 cfs @ 12.10 hrs, Volume= 0.029 af, Depth= 1.80"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 1.88"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.20 cfs @ 12.10 hrs, Volume= 0.015 af, Depth= 1.65"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year Rainfall=5.45"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 16R: FLOW THRIOUGH NEW 18" PIPE

Inflow Area = 1.439 ac, 42.02% Impervious, Inflow Depth = 2.64" for 25 year event
Inflow = 4.27 cfs @ 12.07 hrs, Volume= 0.317 af
Outflow = 4.27 cfs @ 12.07 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3269R: DIRECT FLOW TO RM

Inflow Area = 3.017 ac, 22.81% Impervious, Inflow Depth = 2.39" for 25 year event
Inflow = 5.85 cfs @ 12.09 hrs, Volume= 0.602 af
Outflow = 5.85 cfs @ 12.09 hrs, Volume= 0.602 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE

Inflow Area = 0.669 ac, 4.12% Impervious, Inflow Depth = 1.76" for 25 year event
Inflow = 1.20 cfs @ 12.10 hrs, Volume= 0.098 af
Outflow = 1.20 cfs @ 12.10 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3275R: TOTAL FLOW FROM WORK AREA

Inflow Area = 3.141 ac, 21.92% Impervious, Inflow Depth = 2.37" for 25 year event
Inflow = 6.07 cfs @ 12.09 hrs, Volume= 0.619 af
Outflow = 6.07 cfs @ 12.09 hrs, Volume= 0.619 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1R: CASCADE-SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 4.16" for 25 year event
Inflow = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af
Outflow = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af
Routed to Pond SSIB#1 : SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.15' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.23'	**18.0" Round Culvert** L= 8.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.23' / 77.20' S= 0.0038 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=3.78 cfs @ 12.00 hrs HW=79.13' TW=78.93' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.78 cfs @ 2.14 fps)

Summary for Pond 6R: DCB#1- DMH#1

Inflow Area = 0.216 ac, 68.88% Impervious, Inflow Depth = 3.89" for 25 year event
Inflow = 0.94 cfs @ 12.10 hrs, Volume= 0.070 af
Outflow = 0.94 cfs @ 12.10 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.94 cfs @ 12.10 hrs, Volume= 0.070 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.50' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	81.00'	**12.0" Round Culvert** L= 140.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 81.00' / 78.20' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.94 cfs @ 12.10 hrs HW=81.50' TW=79.43' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.94 cfs @ 2.40 fps)

Summary for Pond 9R: DMH#1-DMH#2

Inflow Area = 0.466 ac, 73.22% Impervious, Inflow Depth = 4.06" for 25 year event
Inflow = 2.00 cfs @ 12.00 hrs, Volume= 0.157 af
Outflow = 2.00 cfs @ 12.00 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.00 hrs, Volume= 0.157 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.92' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.20'	**12.0" Round Culvert** L= 135.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.20' / 77.55' S= 0.0048 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.90 cfs @ 12.00 hrs HW=79.90' TW=79.54' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.90 cfs @ 2.42 fps)

Summary for Pond 11R: DCB#2 - DMH#1

Inflow Area = 0.249 ac, 76.99% Impervious, Inflow Depth = 4.20" for 25 year event
Inflow = 1.45 cfs @ 12.00 hrs, Volume= 0.087 af
Outflow = 1.45 cfs @ 12.00 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 12.00 hrs, Volume= 0.087 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 80.04' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.25' / 78.20' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.35 cfs @ 12.00 hrs HW=80.03' TW=79.90' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.35 cfs @ 1.72 fps)

Summary for Pond 12R: DMH#2-CASCADE

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 4.16" for 25 year event
Inflow = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af
Outflow = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min
Primary = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af
Routed to Pond 1R : CASCADE-SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.54' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.33'	**15.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.33' / 77.30' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=3.78 cfs @ 12.00 hrs HW=79.53' TW=79.13' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.78 cfs @ 3.08 fps)

Summary for Pond 14R: DCB#3-DMH#2

Inflow Area = 0.305 ac, 77.44% Impervious, Inflow Depth = 4.31" for 25 year event
Inflow = 1.81 cfs @ 12.00 hrs, Volume= 0.110 af
Outflow = 1.81 cfs @ 12.00 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.00 hrs, Volume= 0.110 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.74' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.58' / 77.55' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.66 cfs @ 12.00 hrs HW=79.73' TW=79.53' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.66 cfs @ 2.12 fps)

Summary for Pond IB#1: NEW IB#1

Inflow Area = 1.346 ac, 0.00% Impervious, Inflow Depth = 2.16" for 25 year event
Inflow = 1.74 cfs @ 12.10 hrs, Volume= 0.243 af
Outflow = 1.47 cfs @ 12.40 hrs, Volume= 0.230 af, Atten= 15%, Lag= 18.4 min
Primary = 1.47 cfs @ 12.40 hrs, Volume= 0.230 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.64' @ 12.40 hrs Surf.Area= 1,756 sf Storage= 1,545 cf

Plug-Flow detention time= 73.0 min calculated for 0.230 af (95% of inflow)
Center-of-Mass det. time= 42.9 min (874.9 - 832.0)

Volume	Invert	Avail.Storage	Storage Description
#1	77.50'	2,229 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.50	976	0	0
78.00	1,304	570	570
79.00	2,013	1,659	2,229

Device	Routing	Invert	Outlet Devices
#1	Primary	78.00'	**8.0" Round Culvert X 2.00** L= 30.0' Ke= 0.900 Inlet / Outlet Invert= 78.00' / 77.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=1.47 cfs @ 12.40 hrs HW=78.64' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.47 cfs @ 2.15 fps)

Summary for Pond IB#2: IB#2

Inflow Area = 0.073 ac, 74.45% Impervious, Inflow Depth = 4.38" for 25 year event
Inflow = 0.33 cfs @ 12.08 hrs, Volume= 0.027 af
Outflow = 0.33 cfs @ 12.08 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.08 hrs, Volume= 0.027 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.00' @ 0.00 hrs Surf.Area= 180 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (759.1 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	630 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	180	0	0
78.00	310	245	245
78.50	378	172	417
79.00	475	213	630

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=77.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Passes 0.00 cfs of 13,973.49 cfs potential flow)

Summary for Pond SSIB#1: SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 4.16" for 25 year event
Inflow = 3.81 cfs @ 12.00 hrs, Volume= 0.267 af
Outflow = 3.21 cfs @ 12.05 hrs, Volume= 0.219 af, Atten= 16%, Lag= 2.6 min
Primary = 3.21 cfs @ 12.05 hrs, Volume= 0.219 af
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.00' @ 12.05 hrs Surf.Area= 1,652 sf Storage= 2,883 cf

Plug-Flow detention time= 124.3 min calculated for 0.219 af (82% of inflow)
Center-of-Mass det. time= 53.1 min (841.7 - 788.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	76.50'	1,289 cf	**28.00'W x 59.00'L x 3.21'H Field A** 5,300 cf Overall - 2,077 cf Embedded = 3,224 cf x 40.0% Voids
#2A	77.00'	2,077 cf	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		3,366 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	78.30'	**8.0" Round Culvert X 4.00** L= 11.0' Ke= 0.900 Inlet / Outlet Invert= 78.30' / 78.19' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=3.21 cfs @ 12.05 hrs HW=79.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.21 cfs @ 2.30 fps)

Summary for Subcatchment 3276S: AREA DIRECTLY TRIBUTARY TO RM

Runoff = 0.49 cfs @ 12.14 hrs, Volume= 0.040 af, Depth= 3.01"
Routed to Reach 3269R : DIRECT FLOW TO RM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
5,649	61	>75% Grass cover, Good, HSG B
600	98	Paved roads w/curbs & sewers, HSG B
175	98	Water Surface, HSG B
500	98	Paved parking, HSG B
6,924	68	Weighted Average
5,649		81.59% Pervious Area
1,275		18.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	45	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment D-1: D-1 TO CASIN

Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.024 af, Depth= 2.35"
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
5,387	61	>75% Grass cover, Good, HSG B
5,387		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow, 50** Grass: Dense n= 0.240 P2= 3.20"
1.0	87	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.0	8	0.5000	4.24		**Shallow Concentrated Flow,** Kv= 6.0 fps
6.3	145	Total			

Summary for Subcatchment D-2A: D-2A

Runoff = 1.65 cfs @ 12.35 hrs, Volume= 0.196 af, Depth= 2.17"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,200	56	Brush, Fair, HSG B
30,622	58	Meadow, non-grazed, HSG B
12,593	61	>75% Grass cover, Good, HSG B
47,415	59	Weighted Average
47,415		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
2.4	150	0.0300	1.04		**Shallow Concentrated Flow,** Kv= 6.0 fps
1.4	50	0.0100	0.60		**Shallow Concentrated Flow,** Kv= 6.0 fps
10.4	264	0.0050	0.42		**Shallow Concentrated Flow,** Kv= 6.0 fps
2.3	147	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
23.5	661	Total			

Summary for Subcatchment D-2B: D-2B

Runoff = 1.63 cfs @ 12.08 hrs, Volume= 0.129 af, Depth= 6.03"
Routed to Pond IB#1 : NEW IB#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
8,200	96	Gravel surface, HSG B
3,025	96	Gravel surface, HSG B
11,225	96	Weighted Average
11,225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3A: Clubhouse Roof

Runoff = 0.35 cfs @ 12.08 hrs, Volume= 0.028 af, Depth= 6.26"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
2,360	98	Roofs, HSG B
2,360		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-3B: Direct to IB#2

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 2.72"
Routed to Pond IB#2 : IB#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
180	79	<50% Grass cover, Poor, HSG B
630	61	>75% Grass cover, Good, HSG B
810	65	Weighted Average
810		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Subcatchment D-4A: D-2

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af, Depth= 4.89"
Routed to Pond 6R : DCB#1- DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
6,485	98	Paved parking, HSG B
2,930	61	>75% Grass cover, Good, HSG B
9,415	86	Weighted Average
2,930		31.12% Pervious Area
6,485		68.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
1.0	90	0.0600	1.47		**Shallow Concentrated Flow,** Kv= 6.0 fps
0.5	154	0.0600	4.97		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.8	294	Total			

Summary for Subcatchment D-4B: (new Subcat)

Runoff = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af, Depth= 5.22"
Routed to Pond 11R : DCB#2 - DMH#1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
8,365	98	Paved parking, HSG B
2,500	61	>75% Grass cover, Good, HSG B
10,865	89	Weighted Average
2,500		23.01% Pervious Area
8,365		76.99% Impervious Area

Summary for Subcatchment D-4C: D-4C

Runoff = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af, Depth= 5.33"
Routed to Pond 14R : DCB#3-DMH#2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
10,300	98	Paved roads w/curbs & sewers, HSG B
3,000	61	>75% Grass cover, Good, HSG B
13,300	90	Weighted Average
3,000		22.56% Pervious Area
10,300		77.44% Impervious Area

Summary for Subcatchment D-5: ON-SITE TO YARD CBS

Runoff = 0.23 cfs @ 12.21 hrs, Volume= 0.022 af, Depth= 2.35"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,875	61	>75% Grass cover, Good, HSG B
4,875		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"

Summary for Subcatchment OS-2: OS-2

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 2.35"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
2,641	61	>75% Grass cover, Good, HSG B
2,641		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	40	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.8	40	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-3: OS-3

Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 2.53"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
500	98	Paved parking, HSG B
7,926	61	>75% Grass cover, Good, HSG B
8,426	63	Weighted Average
7,926		94.07% Pervious Area
500		5.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1100	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
4.1	50	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-4: OS-4

Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 2.63"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
700	98	Paved parking, HSG B
7,685	61	>75% Grass cover, Good, HSG B
8,385	64	Weighted Average
7,685		91.65% Pervious Area
700		8.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.6	44	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment OS-5: OS-5

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 2.35"
Routed to Reach 3274R : YARD CBS TO PICKUP FLOW FROM LIFE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year Rainfall=6.50"

Area (sf)	CN	Description
4,795	61	>75% Grass cover, Good, HSG B
4,795		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0400	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
5.8	46	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 16R: FLOW THRIOUGH NEW 18" PIPE

Inflow Area = 1.439 ac, 42.02% Impervious, Inflow Depth = 3.52" for 100 year event
Inflow = 5.50 cfs @ 12.07 hrs, Volume= 0.422 af
Outflow = 5.50 cfs @ 12.07 hrs, Volume= 0.422 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3269R: DIRECT FLOW TO RM

Inflow Area = 3.017 ac, 22.81% Impervious, Inflow Depth = 3.21" for 100 year event
Inflow = 7.59 cfs @ 12.09 hrs, Volume= 0.807 af
Outflow = 7.59 cfs @ 12.09 hrs, Volume= 0.807 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 3275R : TOTAL FLOW FROM WORK AREA

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3274R: YARD CBS TO PICKUP FLOW FROM LIFE

Inflow Area = 0.669 ac, 4.12% Impervious, Inflow Depth = 2.48" for 100 year event
Inflow = 1.75 cfs @ 12.10 hrs, Volume= 0.138 af
Outflow = 1.75 cfs @ 12.10 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach 3275R: TOTAL FLOW FROM WORK AREA

Inflow Area = 3.141 ac, 21.92% Impervious, Inflow Depth = 3.18" for 100 year event
Inflow = 7.91 cfs @ 12.09 hrs, Volume= 0.831 af
Outflow = 7.91 cfs @ 12.09 hrs, Volume= 0.831 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1R: CASCADE-SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 5.17" for 100 year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Outflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Routed to Pond SSIB#1 : SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.41' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.23'	**18.0" Round Culvert** L= 8.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.23' / 77.20' S= 0.0038 '/' Cc= 0.900 n= 0.010, Flow Area= 1.77 sf

Primary OutFlow Max=4.65 cfs @ 12.00 hrs HW=79.36' TW=79.07' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.65 cfs @ 2.63 fps)

Summary for Pond 6R: DCB#1- DMH#1

Inflow Area = 0.216 ac, 68.88% Impervious, Inflow Depth = 4.89" for 100 year event
Inflow = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 1.17 cfs @ 12.10 hrs, Volume= 0.088 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.56' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	81.00'	**12.0" Round Culvert** L= 140.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 81.00' / 78.20' S= 0.0200 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.10 hrs HW=81.56' TW=79.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.17 cfs @ 2.56 fps)

Summary for Pond 9R: DMH#1-DMH#2

Inflow Area = 0.466 ac, 73.22% Impervious, Inflow Depth = 5.07" for 100 year event
Inflow = 2.47 cfs @ 12.00 hrs, Volume= 0.197 af
Outflow = 2.47 cfs @ 12.00 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min
Primary = 2.47 cfs @ 12.00 hrs, Volume= 0.197 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 80.56' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.20'	**12.0" Round Culvert** L= 135.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.20' / 77.55' S= 0.0048 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.34 cfs @ 12.00 hrs HW=80.54' TW=79.98' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.34 cfs @ 2.98 fps)

Summary for Pond 11R: DCB#2 - DMH#1

Inflow Area = 0.249 ac, 76.99% Impervious, Inflow Depth = 5.22" for 100 year event
Inflow = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af
Outflow = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary = 1.78 cfs @ 12.00 hrs, Volume= 0.109 af
Routed to Pond 9R : DMH#1-DMH#2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 80.76' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	78.25'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 78.25' / 78.20' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.65 cfs @ 12.00 hrs HW=80.73' TW=80.54' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.65 cfs @ 2.11 fps)

Summary for Pond 12R: DMH#2-CASCADE

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 5.17" for 100 year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Outflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af, Atten= 0%, Lag= 0.0 min
Primary = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Routed to Pond 1R : CASCADE-SSIB#1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.99' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.33'	**15.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.33' / 77.30' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=4.65 cfs @ 12.00 hrs HW=79.98' TW=79.36' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.65 cfs @ 3.79 fps)

Summary for Pond 14R: DCB#3-DMH#2

Inflow Area = 0.305 ac, 77.44% Impervious, Inflow Depth = 5.33" for 100 year event
Inflow = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af
Outflow = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 2.21 cfs @ 12.00 hrs, Volume= 0.136 af
Routed to Pond 12R : DMH#2-CASCADE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 80.29' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	77.58'	**12.0" Round Culvert** L= 3.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 77.58' / 77.55' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.03 cfs @ 12.00 hrs HW=80.27' TW=79.98' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.03 cfs @ 2.58 fps)

Summary for Pond IB#1: NEW IB#1

Inflow Area = 1.346 ac, 0.00% Impervious, Inflow Depth = 2.90" for 100 year event
Inflow = 2.30 cfs @ 12.10 hrs, Volume= 0.326 af
Outflow = 1.96 cfs @ 12.44 hrs, Volume= 0.313 af, Atten= 15%, Lag= 20.4 min
Primary = 1.96 cfs @ 12.44 hrs, Volume= 0.313 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.88' @ 12.44 hrs Surf.Area= 1,928 sf Storage= 1,993 cf

Plug-Flow detention time= 59.6 min calculated for 0.313 af (96% of inflow)
Center-of-Mass det. time= 36.8 min (865.8 - 828.9)

Volume	Invert	Avail.Storage	Storage Description
#1	77.50'	2,229 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.50	976	0	0
78.00	1,304	570	570
79.00	2,013	1,659	2,229

Device	Routing	Invert	Outlet Devices
#1	Primary	78.00'	**8.0" Round Culvert X 2.00** L= 30.0' Ke= 0.900 Inlet / Outlet Invert= 78.00' / 77.50' S= 0.0167 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=1.96 cfs @ 12.44 hrs HW=78.88' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.96 cfs @ 2.81 fps)

Summary for Pond IB#2: IB#2

Inflow Area = 0.073 ac, 74.45% Impervious, Inflow Depth = 5.36" for 100 year event
Inflow = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af
Outflow = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.08 hrs, Volume= 0.032 af
Routed to Reach 3269R : DIRECT FLOW TO RM

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.00' @ 0.00 hrs Surf.Area= 180 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (757.2 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	630 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	180	0	0
78.00	310	245	245
78.50	378	172	417
79.00	475	213	630

Device	Routing	Invert	Outlet Devices
#1	Primary	50.00'	**30.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=77.00' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Passes 0.00 cfs of 13,973.49 cfs potential flow)

Summary for Pond SSIB#1: SSIB#1

Inflow Area = 0.771 ac, 74.90% Impervious, Inflow Depth = 5.17" for 100 year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.332 af
Outflow = 3.93 cfs @ 12.05 hrs, Volume= 0.284 af, Atten= 16%, Lag= 2.7 min
Primary = 3.93 cfs @ 12.05 hrs, Volume= 0.284 af
Routed to Reach 16R : FLOW THRIOUGH NEW 18" PIPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.18' @ 12.05 hrs Surf.Area= 1,652 sf Storage= 3,019 cf

Plug-Flow detention time= 110.7 min calculated for 0.284 af (85% of inflow)
Center-of-Mass det. time= 47.9 min (830.7 - 782.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	76.50'	1,289 cf	**28.00'W x 59.00'L x 3.21'H Field A** 5,300 cf Overall - 2,077 cf Embedded = 3,224 cf x 40.0% Voids
#2A	77.00'	2,077 cf	**Cultec R-280HD** x 48 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 6 rows
		3,366 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	78.30'	**8.0" Round Culvert X 4.00** L= 11.0' Ke= 0.900 Inlet / Outlet Invert= 78.30' / 78.19' S= 0.0100 '/' Cc= 0.900 n= 0.010, Flow Area= 0.35 sf

Primary OutFlow Max=3.93 cfs @ 12.05 hrs HW=79.18' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.93 cfs @ 2.82 fps)

STORMWATER REPORT
KING RAIL RESERVE GOLF COURSE CLUBHOUSE
397 WALNUT STREET aka 1 KING RAIL DRIVE
LYNNFIELD, MA

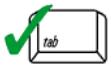
MADEP CHECKLIST FOR STORMWATER REPORT

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

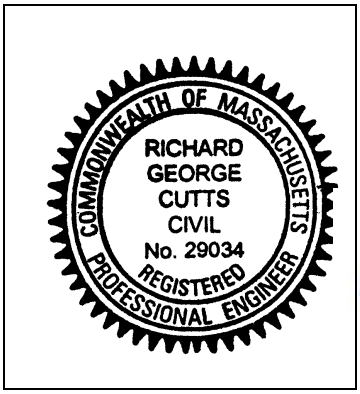
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Aug. 31, 2023

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☒ Use of “country drainage” versus curb and gutter conveyance and pipe (for 600 s.f. of impervious_
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges (Project uses recently approved outlet with reduced flow)
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or **1"** Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☒ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

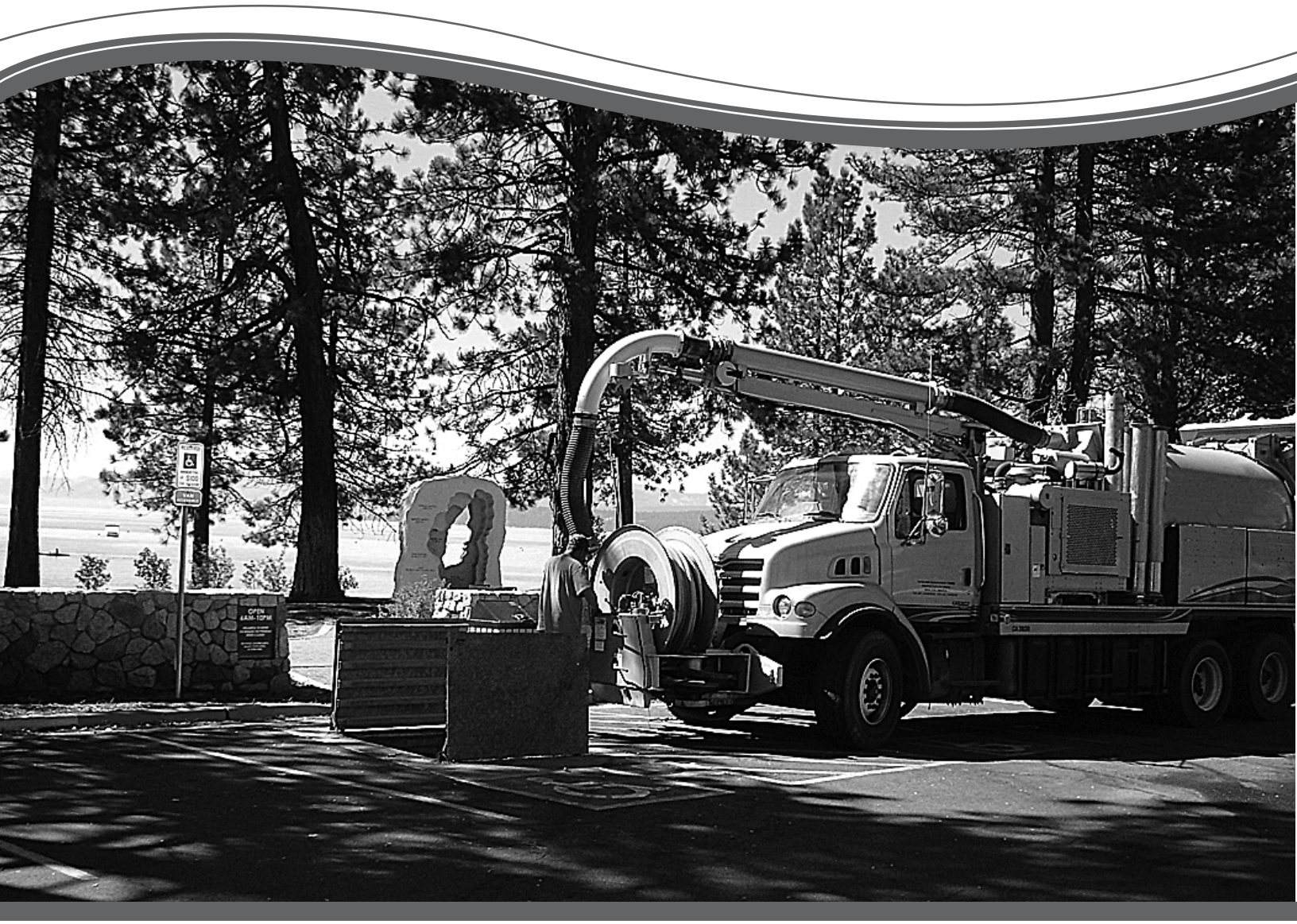
☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

STORMWATER REPORT
KING RAIL RESERVE GOLF COURSE CLUBHOUSE
397 WALNUT STREET aka 1 KING RAIL DRIVE
LYNNFIELD, MA

MANUFACTURER'S PERFORMANCE DATA FOR CONTECH CASCADE UNIT

CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator® Inspection and Maintenance Guide



CASCADE
separator®

Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

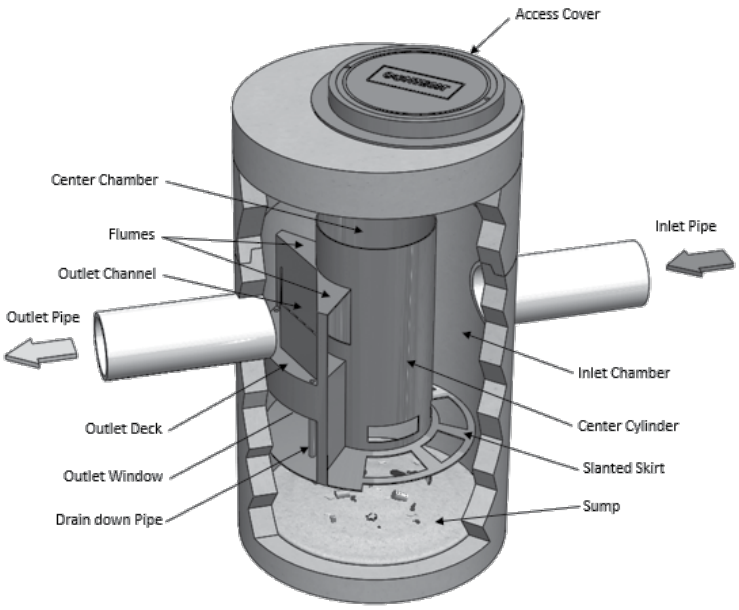
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.

A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

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