CAVANARO CONSULTING

• Land Use Planning
• Civil Engineering
• Construction Permitting

January 7, 2022

Douglas Golemme, Chair
Rockland Conservation Commission
242 Union Street
Rockland, MA 02301

RE: **Concord Meadows – Proposed Planned Unit Development 365 Concord Street**
Notice of Intent Peer Review MassDEP File No. SE 273-0416

Dear Mr. Golemme:

The purpose of this letter is to address comments received from Mr. Jonathan Niro and Mr. Gary James, P.E. of BETA dated 12/14/21 and via email on 12/24/21.

Below is a copy of the review comments in normal font followed by our responses in ***bold italics***:

Comments from BETA, dated 12/14/21

ADMINISTRATIVE AND PLAN COMMENTS:

A1. MassDEP has not issued technical comments on this filing as of this writing.

Response: MassDEP has issued a DEP File No. SE 273-0416 on 7/26/21 with no further comments.

A2. The Applicant submitted a fee under both Category 3 (subdivision roadway) and Category 2 (single-family residence) per the WPA fee schedule. However, only seven (7) activities were included under the Category 2 (single-family residence) fee. Eleven (11) single-family homes are located within Buffer Zone to BVW. Provide an updated fee transmittal form and confirm that the Rockland Conservation Commission and the Massachusetts Department of Environmental Protection (MassDEP) receive the remaining owed fees of $1,012.50 and $987.50, respectively.

Response: The applicant submitted a revised fee transmittal form and additional fees to MassDEP and the Rockland Conservation Commission. A copy of the Transmittal Form is enclosed.

A3. The Applicant did not provide the fees required under the Bylaw. The appropriate fees ($1,925.00)should be submitted in accordance with the attached Rockland Conservation Commission fee schedule.

Response: The applicant submitted the additional fee to the Rockland Conservation Commission. A copy of the additional fee checks submitted on 9/24/21 is enclosed.

A4. Provide information on the source of the survey, including the dates and methods used. Indicate the

horizontal and vertical datums used and how they were established.

Resolved

A5. Provide survey benchmarks.

Resolved

A6. Abutting properties have been labeled with Assessor references; however, labels withnow/formerly owner names should also be included.

Resolved

A7. Provide the Conservation Commission with a summary of where the Project stands in relation tothe Planning Board PUD review process.

Acknowledged

A8. Provide the Conservation Commission with proof of abutter notification.

Resolved

WETLAND RESOURCE AREAS AND REGULATORY REVIEW
RESOURCE AREA BOUNDARY COMMENTS AND RECOMMENDATIONS

W1. As noted by the Applicant, the intermittent tributary to French Stream that bisects the Site is associated with FEMA Zone AE and Zone A flood hazards. The Applicant should clarify the boundary of the Zone AE, as the noted base flood elevation (BFE) does not appear to correlate with the topography shown.

Addressed

W2. Determine a BFE for the onsite Zone A to establish an accurate BLSF boundary.

Resolved

W3. Provide justification for the Vernal Pool (CVP #2682) boundary depicted on the plans. During a Site visit on August 25, 2021, BETA observed conditions throughout the entirety of the center of the C Series BVW similar to conditions within the area depicted as a Vernal Pool on the plans. This includes ponding over one (1) foot in depth, a topographic break in slope, water-staining on leaves, and potential attachment sites for Vernal Pool wildlife. An accurate boundary of the Vernal Pool must be established in order to determine the extent of the Bylaw VPRA at the Site.

Response: The intermittent stream that connects of the Certified vernal pool and the Potential vernal pool have been shown on the Plans.

W4. 100 foot buffer associated with B series is no longer depicted. Provide the 100 foot buffer on all plan

sheets.

Resolved

CONSTRUCTION COMMENTS AND RECOMMENDATIONS

W5. Remove all references to hay bales in the construction sequencing narrative and erosion control details.

Resolved

W6. Remove references to the Town of Hingham in the construction sequencing narrative.

Resolved

W7. Provide distances between stakes and overlap length on the compost filter tube detail and includesiltation fencing embedded to a minimum depth of six (6) inches.

Response: No siltation fencing is proposed; therefore no detail for a silt fence is shown.

W8. Section 2 of the construction sequencing plans discusses the potential for vegetation to be mulched onsite. A dense stand of Japanese knotweed (*Fallopia japonica*) was observed adjacent to the existing driveway. Provide an invasive species control plan for the Site.

Response: A standalone invasive species management has been prepared for the project and is attached with this response.

W9. Remove the stockpile/staging area depicted within Buffer Zone per Section 3 of the construction sequencing plan.

Resolved

W10. Section 7 of the construction sequencing narrative indicates that home sites will be constructed in phases to *"control construction impacts to the Site and also consider current market demands for home sales"*. BETA recommends that the Applicant provide a phasing plan for clearing as well to keep exposed surfaces to a minimum during the construction process.

Response: Three clearing phases have been added to the Erosion Control sheet and the Construction Sequencing note on Detail Sheet DT4 has been revised to include limit of each clearing phase.

W11. Provide a seed mixture for the stabilization of the Site.

Response: All disturbed soil areas subject to the Conservation Commission's jurisdiction will be stabilized with a New England Erosion Control / Restoration seed mix. The two additional seed mixes previously identified will not be used on the project. Seed mix locations have been added to the plans on the Layout and Grading Plan.

W12. The erosion control plans state that the areas of proposed stormwater basins will not be traversed by heavy

machinery before or after construction. Provide a method for ensuring that this is adhered to.

Resolved

W13. Provide a plan depicting construction-period stormwater controls.

Response: The Erosion Control Plan has been updated to include dewatering and stockpiling erosion control notes.

W14. Provide a detail for the stockpile/staging areas that depicts perimeter erosion controls around thestockpiles.

Response: Perimeter siltation barriers have been added to the Erosion Control Plan.

W15. Grading at the Site presents the potential for erosion of steep slopes – for example, the proposed1.5H:1V slope at the north side of the Site entrance. Provide interim stabilization measures for steep slopes.

Resolved

W16. The Applicant should provide a dewatering detail that includes potential upland discharge locations.

Response: A sediment filtering bag has been added to the dewatering detail.

W17. Provide details for the development activities associated with the construction of the roadway at the north end of the C Series BVW. Include detail drawings for the retaining wall and revise all profiles and construction narratives to consider the 12-inch CPP observed in the field.

Response: The applicant proposes to replace the 12" CPP within the roadway and retaining wall limits.

MITIGATION COMMENTS AND RECOMMENDATIONS

W18. The MassDEP Wetlands Change data layer depicts approximately 7,500 square feet of altered BVW west of the existing dwelling (WC2-251-34). BETA strongly recommends that the Rockland Conservation Commission require full restoration of this area as part of the Project.

Response: The Applicant is amenable to restoration of the historic wetland area even though it is not associated with the project. Should the Conservation Commission vote to approve the project through issuance of an Order of Conditions, we would respectfully request a special condition stating that a wetland restoration plan be submitted to the Conservation Commission for review and approval prior to the commencement of any project-related activities.

W19. BETA understands that a component of the Planning Board PUD review process is to integrate useable open space into the development. A significant portion of the proposed open space consists of Resource Areas including BVW, Bank, and BLSF. Describe the anticipated use and long-term management goals for these open space areas. Common open space should be cited within upland areas to prevent long-term impacts to Resource Areas.

Response: A separate Plan sheet has been provided, Overall Open Space Sheet 13 of 13, describing all the land uses and open space requirements. All areas labeled "wetlands" include Riverfront area and all FEMA Floodplains. This plan also depicts two walking footbridge wetland crossings and approximately 0.4 miles of

natural walking trails.

W20. The Project does not describe any Buffer Zone mitigation for the proposed development, such as a planting plan. Provide a planting plan consisting of native species and the rationale for their selection for the Conservation Commission's review.

Response: The Applicant is amenable to a special condition requiring submittal of a restoration plan for areas within the 25-foot No Disturb Zone for review and approval by the Conservation Commission prior to the commencement of any project-related activities. The Applicant is also amenable to a special condition stating that landscape trees located within areas subject to the Conservation Commission's jurisdiction be native species only and that ornamental or non-native species are prohibited. At this stage of project development, final landscape design has not been completed, therefore this type of special condition would allow for flexibility on the types of plant used while protecting the Conservation Commission's interests. Within lots containing the 25-foot No Disturb Buffer, the Applicant proposes to install 4"x4" cedar posts along the limit of the 25-foot No Disturb Buffer with Conservation Markers to ensure that lawn areas are not expanded into the No Disturb Buffer in the future.

WPA PERFORMANCE STANDARDS COMMENTS AND RECOMMENDATIONS

Bordering Vegetated Wetland (310 CMR 10.55)

W21. The proposed roadway construction at the north end of the C Series BVW is likely to involve BVW impacts based on the information provided. Both erosion controls and the footprint of the proposed retaining wall are depicted directly over the BVW boundary. It is presumed that at the least, temporary impacts to BVW will be required in order to construct this wall. Provide the details requested in Comment W16 and demonstrate compliance with 310 CMR 10.55(4)(a)[1].

Resolved

W22. The 12-inch CPP appears to potentially serve as a hydrologic connection between the C Series BVW and BVW complexes to the north. As noted in Comment W16, this pipe has not been considered in the roadway design and it is therefore assumed that the Project has the potential to alter[2] the BVWs associated with the CPP. The presumption of 310 CMR 10.55(3)[3] has not been overcome; therefore, the requested construction details should be provided and compliance with310 CMR 10.55(4)(a)-(b) should be demonstrated.

Response: The applicant proposes to replace the 12"CPP under the roadway and retaining wall limits under this

[1] 310 CMR 10.55(4)(a): Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.
[2] 310 CMR 10.04 states that the definition of Alter is to change the condition of any Area Subject to Protection under M.G.L. c. 131, § 40. Examples of alterations include, but are not limited to, the following: (a) the changing of pre- existing drainage characteristics, flushing characteristics, salinity distribution, sedimentation patterns, flow patterns and flood retention areas; (b) the lowering of the water level or water table; (c) the destruction of vegetation; (d) the changing of water temperature, biochemical oxygen demand (BOD), and other physical, biological or chemical characteristics of the receiving water
[3] 310 CMR 10.55(3): Where a proposed activity involves the removing, filling, dredging or altering of a Bordering Vegetated Wetland, the issuing authority shall presume that such area is significant to the interests specified in 310 CMR 10.55(1).

NOI application.

Bordering Land Subject to Flooding (310 CMR 10.57)

W23. The NOI application does not discuss impacts to BLSF; however, one (1) area of clearing totaling approximately 155 square feet is proposed. As discussed in Comments W1 and W2, an accurate boundary of BLSF should be determined and any work within BLSF should be qualified and quantified to demonstrate compliance with the Performance Standards at 310 CMR 10.57(4).

Resolved

BYLAW REGULATORY COMMENTS AND RECOMMENDATIONS

W24. Section 5C. of the Bylaw requires that a No Disturb Zone with a minimum width of 25 feet be maintained around all Resource Areas[4]. Work currently proposed within the 25-foot No Disturb Zone includes grading establishment of backyards, construction of impervious surfaces, and construction of stormwater management features. Provide a No Disturb Zone with a minimum of 25 feet in width as required by the Bylaw.

In accordance with the Town of Rockland Wetlands Protection Bylaw (Bylaw) (Chapter 407-5C), the Applicant respectfully requests a limited waiver from the performance standard which requires that a 25-foot undisturbed vegetated buffer (No Disturb Buffer) be provided from the bordering and isolated vegetated wetlands within the property. As you are aware, the project has been designed in a clustered manner to meet the PUD requirements and to minimize activities within areas subject to the Conservation Commission's jurisdiction. Access into the subject property is gained via Concord Street along an existing driveway that extends between the property boundary and a bordering vegetated wetland. The existing crossing is currently located within and affects approximately 7,880 square feet of the No Disturb Buffer. This represents the sole means of access into the portions of the property located outside of the No Disturb Buffer (similar to a limited project crossing pursuant to the MA Wetlands Protection Act Regulations). The proposed access road for the project uses the same general layout of the driveway and minimizes additional work within the No Disturbance Buffer (2,200 square feet) to the extent practicable to meet stormwater management and planning board requirements. The Commission has previously permitted work associated with the existing driveway without the issuance of a waiver. With no other viable access into the subject property, the only feasible alternative is to use the existing driveway layout for the proposed access road.

The project, as currently designed, not only protects the interests of the wetland resource areas subject to protection under the Bylaw by avoiding the entire No Disturb Buffer aside from the access roadway crossing, it also serves to provide a significant and substantial benefit by protecting approximately 13.7 acres of the property in perpetuity. This includes not only wetlands and associated buffer zones, but also areas of undisturbed forested upland located outside of the Conservation Commission's jurisdiction. The dedicated open space, to be accessible to the public, ensures permanent protection of areas that could otherwise be developed in the future and provides undisturbed habitat and riparian corridor along French Stream. In addition to the open space, the Applicant is proposing to restore approximately 6,300 square feet of No Disturb Buffer that has been historically altered through development of the subject property for the existing single-family residence and associated appurtenances. Therefore, the total area of existing disturbed No Disturb Buffer will be reduced by

[4] In order to protect such areas, there shall be a strip of continuous, undisturbed vegetative cover within 25 feet of the specified resource areas shall not be disturbed and treated as a no disturbance area. The Commission therefore may also require that the applicant maintain a strip of continuous, undisturbed vegetative cover within the aforementioned 100-foot or 200-foot area, unless the applicant convinces the Commission that the area or part of it may be disturbed without harm to the values protected by this chapter.

4,100 SF (from 7,880 square feet to 3,780 square feet). The benefits associated with the permanent open space protection and the restoration of portions of the No Disturb Buffer far outweigh the limited disturbance associated with the access roadway and will ensure the continued protection of the wetland resource areas and their associated values.

W25. As discussed in Comment W3, an accurate boundary of the onsite Vernal Pool should be determined. Should the onsite VPRA increase in size due to a modification of this boundary, BETAstrongly recommends that the Conservation Commission either prohibit or strongly limit development within the VPRA in order to maintain transitional upland areas that likely serve as wildlife corridors.

Resolved

W25. The plans do not currently reflect the Bylaw Buffer Zone associated with BLSF. BETA recommends addressing comments related to the BLSF boundary prior to revising the Buffer Zones.

Resolved

STORMWATER MANAGEMENT REVIEW

The revised Project proposes to use two (2) infiltration basins to treat and attenuate stormwater flows generated at the Site. Runoff from the proposed roadways and driveways will be collected by six (6) catch basins in the roadway. That portion of the Site where the development of the homes will occur will discharge stormwater to four (4) catch basins and direct it to an infiltration basin. The outlet from this basin will ultimately discharge towards areas tributary to French Stream. Basin 1 will be located adjacent to the Site entrance at Concord Street and will discharge towards the C Series BVW and the Potential Vernal Pool. Due to the presence of a Certified Vernal Pool and the fact that the Site drains towards a tributary to a public water supply, BVW at this Site is considered an Outstanding Resource Water (ORW).

The design of the development has been modified significantly. Accordingly, nearly all the prior comments relative to the development are no longer applicable and will therefore not be continued in this review. All comments listed below are specific to the revised submission only.

GENERAL COMMENTS AND RECOMMENDATIONS

G1. Infiltration Basin 1 is located within 50 feet of the C Series BVW, which is considered an ORW. This is not in compliance with design standards pursuant to the Massachusetts Stormwater Handbook (the Handbook).

Response: The proposed infiltration basins have been replaced with subsurface infiltration structures. The outer wall of the stone is located at least 50' away from the limit of the wetland.

G2. In accordance with Volume 2, Chapter 2 of the Handbook, the basins will require monitoring wells; a means of emergency dewatering; and an emergency spillway. Provide details for each of these features including the embankment itself and show water surface elevations required to demonstrate compliance with the Standards.

Response: The proposed infiltration basins have been replaced with subsurface infiltration structures with observation ports.

G3. The Water Quality Volume (WQV) used for the design of the roof infiltration structures on the east side of the roadway should be 1 inch based upon their proximity to BVW complex associated with the Vernal Pool, which

is considered an ORW. In addition, the proposed roof infiltration structures are proposed to provide 71 cubic feet of storage; however, BETA calculates only 45 cubic feet. Provide calculations required to demonstrate the required volume.

Response: The calculation for water quality volume for the roof infiltration has been revised to include 1 inch of runoff. Stage storage sheets have been included to show compliance with the required water quality volume for the single home infiltration structures.

G4. As shown on sheet 5, the grade in the back yards of all of the proposed dwellings is six (6) to seven (7) feet lower than at the front. Show a typical detail on how the roof leader in the back yard will connect with the infiltration unit in the front of the house or provide infiltration structures in the backyards.

Response: A detail has been added to sheet DT4 to show how roof leaders will be directed towards the front of the dwellings.

G5. The Vernal Pool and associated BVW at the Site qualify as an Outstanding Resource Water as defined by 314 CMR 4.0. Stormwater discharges will drain to ORW under proposed conditions. Accordingly, the statement asserting that Standard 6 does not apply is incorrect.

Response: Response to Standard 6 has been revised to show compliance with requirements.

G6. The mounding analysis for Basin 1 is incorrect. The application rate should match the design Rawl's Rate, and the duration of the infiltration period should be more than 0.05 days.

Response: Revised mounding analyses are enclosed with this response. Revised input information is as follows:

Recharge Rate (R): The soils found under the subsurface infiltration systems consist of sand with a Rawl's Rate of 8.27 in/min (16.4 ft/day)

Specific Yield (Sy): Medium Sand (TP-1) and Coarse Sand (TP-1A) were found around System 1. The following soils were found in the three test pits located in the vicinity of System 2: Loamy Sand (TP-2), Coarse Sand (TP-2A) and Coarse Sand (TP-2B). Ranges for Specific Yield are listed below and were obtained from "Representative Values of Hydraulic Properties" by Glenn M. Duffield, President, HydroSOLVE, Inc.; http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm and "Summary of Hydrologic and Physical Properties of Rock and Soil Materials, as Analyzed by the Hydrologic Laboratory of the J.S. Geological Survey 1948-60" by D. A. Morris and A. I. Johnson; https://pubs.usgs.gov/wsp/1839d/report.pdf . We used a Sy of 0.28 for Pond 1 and a Sy of 0.26 at Pond 2.

Horizontal Hydraulic Conductivity (K): Using the table below obtained from "Representative Values of Hydraulic Properties" by Glenn M. Duffield, President, HydroSOLVE, Inc.; http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm and "Summary of Hydrologic and Physical Properties of Rock and Soil Materials, as Analyzed by the Hydrologic Laboratory of the J.S. Geological Survey 1948-60" by D. A. Morris and A. I. Johnson; https://pubs.usgs.gov/wsp/1839d/report.pdf . and based on the soil information referenced above we

used a value of 800 for K at Infiltration Systems 1 and 2 (just under Ksat average for Coarse Sand).

Material	Ksat (Low)		Ksat (High)		Range Specific Yield
	m/s	ft/day	m/s	ft/day	
Fine Sand	0.0000002	0.0566784	0.0002	56.6784	0.20-0.30
Medium Sand	0.0000009	0.2550528	0.0005	141.6960	0.26-0.30
Coarse Sand	0.0000009	0.2550528	0.0060	1,700.3520	0.26-0.30
Gravel	0.0003000	85.0176000	0.0300	8,501.7600	0.21-0.28

Half Length and Width of Basin (x and y): We used half the length and width of the Subsurface Infiltration Systems 1 and 2 or 44.2'x5.2' for System 1 and 50.85'x17.4' for System 2.

Duration of Infiltration Period (t): We used the time of exfiltration during the 100-year design storm. Per our HydroCAD model, exfiltration commences at hour 4 and ends at hour 15 for System 1 and commences at hour 5 and ends at hour 24 for System 2. Therefore, t was calculated to be 0.5 days for System 1 and 0.83 days for System 2.

Initial Thickness of Saturated Zone (h_0): We found three well reports for addresses in the vicinity (200, 268 and 308 Rockland Street). Depth to bedrock was found to be 30', 30' and 25' respectively. Therefore, the average depth to bedrock was determined to be 28.3'. The average depth to groundwater in the vicinity of System 1 was found to be 2.9' and it was found to be 4.9' for System 2. Therefore, h_0 was calculated to be 25.4' at System 1 and 23.4' at System 2.

Mounding calculations resulted in an expected groundwater mound of 0.245' at System 1 and 0.992 at System 2 which occur within the 2' separation proposed. Therefore, groundwater does not break into the proposed infiltration basins during any design storm event.

G7. The Applicant has requested a waiver from the Planning Board regulations to provide 2H:1V side slopes for Basin 1, which is contrary to the Handbook requirement of 3H:1V.

Response: The proposed infiltration basins have been replaced with subsurface infiltration structures. This comment is no longer applicable.

G8. There are no easements provided around Basin 2, the piping from the roadway into the basin, or access from the roadway to the basin. A portion of the basin is located within the proposed lot that will be associated with the exiting dwelling.

Response: Easements have been added to the Planned Unit Development sheet.

G9. The watershed subcatchment numbers on Drawing No. PCSA do not match the HYDRO-CAD analysis.

Response: The Proposed subcatchment area Plan has been revised to reflect the Hydro CAD analysis.

DEP STORMWATER STANDARDS

The Project was reviewed as it relates to MassDEP's Stormwater Management Standards; BETA offers the following comments:

NO UNTREATED STORMWATER (STANDARD NUMBER 1): No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. The design proposes to use three (3) infiltration basins to treat the runoff associated with the roadway and a portion of the driveways.

SW1. There are no BMPs provided for the runoff associated with the existing dwelling area. See Standard 7 comments.

SW2. Provide rip-rap sizing calculations at the outlets.

Response: See updated Stormwater Report.

POST-DEVELOPMENT PEAK DISCHARGE RATES (STANDARD NUMBER 2): Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre- development peak discharge rates. The project proposes to mitigate increase to runoff rates through the installation of gravel wetland and detention basins. The Project proposes an overall decrease of peak flow rates in post-development conditions in comparison to the pre-development conditions.

SW3. The runoff calculations for the roof runoff is identified as a link; however, there is no information presented in the calculations which demonstrate how this data was developed.

Response: The Hydro CAD link for the single family homes has been provided in the Hydro CAD report.

RECHARGE TO GROUNDWATER (STANDARD NUMBER 3): Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to maximum extent practicable. As shown on the Natural Resource Conservation Service (NRCS) web site, the soils at the Site are Hydrologic Soil Group "C". Test pits conducted onsite indicate that there are layers of higher-class soils which will allow the Site to maintain compliance with this standard.

SW4. The static storage provided by the two (2) basins is adequate to meet the Standard; however, the analysis only accounts for the increase in pavement surface area. The Applicant should account for all of the impervious surface area tributary to the infiltration structures and show the amount of impervious outside of the treatment that will be maintained as untreated.

Response: See updated Stormwater Report. All impervious areas have been included in the recharge calculation.

SW5. It appears that all the test pits conducted for Basin 2 are now located outside of the storage area associated with the basin. BETA recommends that additional testing be conducted to establish a minimum of two (2) test pits in the basin location as required by the Standards.

Response: While the test pits do not lie within the footprint of Subsurface Infiltration System 2, there are 3 test pits within the vicinity of the proposed system.

SW6. The sediment forebay sizing calculations are not included in the submission.

Response: The proposed infiltration basins have been replaced with subsurface infiltration structures. Therefore, this comment is no longer applicable.

SW7. The storage volume in the forebay below the crest of the check dam cannot be used in the calculations for the HydroCAD analysis of the basin. In addition, infiltration through the bottom of the forebay cannot be used. Calculate the infiltration through the basin floor beyond the forebay only and enter it into the calculations as a steady flow rate.

Response: The proposed infiltration basins have been replaced with subsurface infiltration structures. Therefore, this comment is no longer applicable.

SW8. The mounding analysis for Basin 1 is incorrect; see comment G6 above.

Response: Revised mounding calculations have been provided for both subsurface infiltration systems.

TOTAL SUSPENDED SOLIDS (STANDARD NUMBER 4): For new development, stormwater management systems must be designed to remove 80% of the annual load of Total Suspended Solids (TSS). The proposed design includes the installation of deep sump catch basin, sediment forebay, and pocket wetland.

SW9. The area tributary to the Vernal Pools qualifies as a Critical Area; therefore, the WQV should be one (1) inch for the subsurface infiltration structures for the roof areas for Lots 1-7.

Response: One inch of runoff was used to calculate WQV for the drywells proposed in Lots 1-7.

SW10. The forebay storage volume cannot be used to satisfy the WQV storage requirement.

Response: See updated Stormwater Report. Roof areas with runoff tributary to the Vernal pool has been revised to 1" for calculating WQV. Forebay volume has been calculated and not used in the storage calculations.

HIGHER POTENTIAL POLLUTANT LOADS (STANDARD NUMBER 5): Stormwater discharges from Land Uses with Higher Potential Pollutant Loads (LUHPPLs) require the use of specific stormwater management BMPs. The Project does not propose new LUHPPLs. **This standard is not applicable.**

No Response

CRITICAL AREAS (STANDARD NUMBER 6): Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas. Stormwater discharges towards the wetlands around the Vernal Pool, which are considered Critical Areas; treatment should be provided as required by the standards.

Response: See updated Stormwater Report.

REDEVELOPMENT (STANDARD NUMBER 7): Redevelopment of previously developed sites must meet certain Stormwater Management Standards to the maximum extent practicable. This is defined in Volume 1, Chapter 1 of the standards as:

Standard 7: *A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best*

management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

SW11. BETA3: Document that compliance with Standards 1 and 4 has been achieved to the maximum extent practicable for existing impervious outside of the areas tributary to BMPs**.**

Response: See updated Stormwater Report.

EROSION AND SEDIMENT CONTROLS (STANDARD NUMBER 8): Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities. The Project exceeds one (1) acre of disturbance and will require the filing of a NOI with the Environmental Protection Agency (EPA), which includes the preparation of a Stormwater Pollution Prevention Plan (SWPPP). The erosion control plan with details provided is adequate for the preliminary roadway development. The SWPPP should address erosion control measures as they relate to the development of the houses, driveways, and stormwater improvements.

SW12. The SWPPP report should be submitted to the Commission for review prior to the start of construction.

Response: A SWPPP shall be submitted for review prior to start of Construction.

OPERATIONS/MAINTENANCE PLAN (STANDARD NUMBER 9): A Long-Term Operation and Maintenance Plan shall be developed and implemented to ensure that stormwater management systems function as designed. This plan should be a stand-alone document that can be part of the Association/Condo document.

SW13. The Operation and Maintenance plan was not included in the submission.

Response: The Operation and Maintenance Plan has been submitted.

ILLICIT DISCHARGES (STANDARD NUMBER 10): All illicit discharges to the stormwater management system are prohibited. An unsigned Illicit Discharge Compliance Statement was included in the Stormwater Drainage Report**.**

SW14. No illicit Discharge Statement was included in the submission.

Response: An illicit discharge statement has been included.

We appreciate BETA's thoughtful comments and look forward to presenting these revised materials to you and the Commission at our hearing scheduled on 1/11/22. If any questions arise, please do not hesitate to contact us.

Sincerely,

Cavanaro Consulting, Inc.

John C. Cavanaro, P.E.
Managing Principal

Enclosures

cc: M. Dacey
W. Sullivan
File 19.103

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A. Applicant Information

1. Location of Project:

365 Concord Street	Rockland
a. Street Address	b. City/Town
7397 & 7461	$3,262.50
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Matthew		Dacey
a. First Name		b. Last Name
Conrock LLC		
c. Organization		
PO Box 1414		
d. Mailing Address		
Duxbury	MA	02331
e. City/Town	f. State	g. Zip Code
781-424-5290		mdacey@championbuilders.com
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

Daniel		Delprete
a. First Name		b. Last Name
Delprete Realty Corp.		
c. Organization		
365 Concord Street		
d. Mailing Address		
Rockland	MA	02370
e. City/Town	f. State	g. Zip Code
h. Phone Number	i. Fax Number	j. Email Address

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Subdivision Roadway - Category 3	1	$1,050.00	$1,050.00
Single-Family Residence - Cat. 2	11	$500.00	$5,500.00

Step 5/Total Project Fee: $6,550.00

Step 6/Fee Payments:

Total Project Fee:	$6,550.00 (a. Total Fee from Step 5)
State share of filing Fee:	$3,262.50 (b. 1/2 Total Fee **less $**12.50)
City/Town share of filling Fee:	$3,287.50 (c. 1/2 Total Fee **plus** $12.50)

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

SECURITY FEATURES INCLUDE TRUE WATERMARK PAPER, HEAT SENSITIVE ICON AND FOIL HOLOGRAM

CHAMPION BUILDERS INC.
800-784-7400
P.O BOX 1414
DUXBURY, MA 02331

7460

53-447/113
955

DATE 9/1/21

PAY TO THE ORDER OF Town of Rockland $ 1012.50

One Thousand Twelve Dollars 50/xx DOLLARS

ROCKLAND TRUST

FOR 365 Concord St W&A Fee

RECEIVED
SEP 24 2021
Town Clerk
Rockland, MA

"007460" :011304478: 295501152971

Details on Back. Security Features Included. CHECK ARMOR FRAUD PROTECTION

SECURITY FEATURES INCLUDE TRUE WATERMARK PAPER, HEAT SENSITIVE ICON AND FOIL HOLOGRAM

CHAMPION BUILDERS INC.
800-784-7400
P.O BOX 1414
DUXBURY, MA 02331

7461

53-447/113
955

DATE 9/1/21

PAY TO THE ORDER OF Commonwealth of Mass $ 987.50/xx

Nine Hundred Eighty Seven 50/xx DOLLARS

ROCKLAND TRUST

FOR 365 Concord St Rockland W&A Fee

"007461" :011304478: 295501152971

Details on Back. Security Features Included. CHECK ARMOR FRAUD PROTECTION

SECURITY FEATURES INCLUDE TRUE WATERMARK PAPER, HEAT SENSITIVE ICON AND FOIL HOLOGRAM

CHAMPION BUILDERS INC.
800-784-7400
P.O BOX 1414
DUXBURY, MA 02331

7462

53-447/113
955

DATE 9/1/21

PAY TO THE ORDER OF Town of Rockland $ 1925.00/xx

Nineteen Hundred Twenty Five 00/xx DOLLARS

ROCKLAND TRUST

FOR Rockland Bylaw Fee

RECEIVED
SEP 24 2021
Town Clerk
Rockland, MA

"007462" :011304478: 295501152971

Details on Back. Security Features Included. CHECK ARMOR FRAUD PROTECTION

File #19.103

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

7021 1970 0001 1714 0476

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $ _____
- ☐ Return Receipt (electronic) $ _____
- ☐ Certified Mail Restricted Delivery $ _____
- ☐ Adult Signature Required $ _____
- ☐ Adult Signature Restricted Delivery $ _____

Postage
$

Total Postage and Fees
$

Postmark Here
NORWELL MA 02061
APR 28 2021
USPS

Sent To
Street and Apt. No
City, State, ZIP+4
DEP
P.O. Box 4062
Boston, MA 02211

PS Form 3800, April 2015 PSN 7530-02-000-9047 — See Reverse for Instructions

File #19.103

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

DEP
P.O. Box 4062
Boston, MA 02211

9590 9402 6905 1104 6584 52

2. Article Number *(Transfer from service label)*
7021 1970 0001 1714 0476

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☒ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

...Mail
...Mail Restricted Delivery
...0)

PS Form 3811, July 2020 PSN 7530-02-000-9053 — Domestic Return Receipt

SOUTH RIVER ENVIRONMENTAL
61 Meetinghouse Lane, Marshfield, MA 02050 Phone: 978-697-0854

December 23, 2021

Rockland Conservation Commission
Rockland Town Hall
242 Union Street
Rockland, MA 02301

Re: Concord Meadows – DEP File No. 273-0416
Invasive Species Management Plan

Dear Commission Members:

In response to the review comments provided by the Rockland Conservation Commission's third-party review consultant (Beta Group, Inc.), South River Environmental has prepared a standalone Invasive Species Management Plan for the removal of non-native plants within areas subject to Conservation Commission jurisdiction associated with the above-referenced project located at 365 Concord Street in Rockland, MA.

Invasive species management will occur within the entire extent of the proposed restoration area. Invasive species present within the property include the following species:

- Locust – *Robinia pseudoacacia*
- Multiflora Rose – *Rosa multiflora*
- Oriental Bittersweet – *Celastrus orbiculata*
- Glossy Buckthorn – *Rhamnus frangula*

Efforts will be made to conduct management activities in the appropriate timeframes to prevent invasive species from going to seed. The general flowering / seeding schedule is applicable:

- Locust – fruits mature in the fall
- Multiflora Rose – flowers in May/June – fruits mature in mid-summer
- Oriental Bittersweet – Fruits mature in late summer
- Glossy Buckthorn – Fruits mature in mid to late summer

The objective of the invasive species management plan (ISMP) will be to control the presence / spread of invasive species within the restoration area as well as portions of the 100-foot buffer zone that are subject to protection under the Wetlands Protection Act and Town of Rockland Wetlands Protection Bylaw.

The following procedures will be implemented:

First Growing Season Post-Construction

- Concurrent with or immediately after the removal of the cut vegetation associated with the project, existing stands / stems of invasive species (including but not limited to the species identified above) located within the project area will be cut to ground surface, bagged and removed from the site. Invasive species removed from the site will be disposed of at a landfill or transfer station.
    - This process will be overseen by the supervising botanist or wetland scientist.
- Immediately after and concurrent with cutting of invasive vegetation, herbicide (glyphosate, triclopyr or equivalent) will be applied by a licensed professional directly to the cut stems / stalks. Herbicide application rates will be in accordance with the product labels / MSDS sheets

and is anticipated to be approximately 1.5 ounces of herbicide per gallon. The name and license number of the individual applicator(s) will be provided to the Conservation Commission a minimum of 72 hours prior to the commencement of treatment activities.

- There will be no broadcast application of herbicide anywhere within the property. Applications will be made using a backpack sprayer or via hand application with a spray bottle to target individual stems. Herbicide applications will not occur within one hour of a forecasted precipitation event. Should a rain event occur while application is being conducted, it will be stopped immediately and will not resume until a minimum of one hour following the completion of the rain event.
- If treatment is required within the 25-foot No Disturb Buffer, it will be conducted using a spray bottle or direct brush to stem application.
- Monthly field reviews will be conducted within the property from July through September to identify additional growth of invasive species within the property. If additional treatments are necessary during the first growing season post-construction, the Conservation Commission will be notified a minimum of 72 hours prior to the field review / treatments. These treatments will be documented within a monitoring report to be submitted by December 15 of the first growing season post-construction.

Second and Third Growing Seasons

- Two field reviews / treatments will be conducted each year in May and September using the same protocols / methods as previously described. If requested, the Conservation Commission will be notified a minimum of 72 hours prior to the field review / treatments. Results of the field reviews will be documented within the respective annual monitoring reports.
- The need for additional monitoring / treatment beyond the third growing season will be reviewed with the Conservation Commission prior to implementation.

Should you have any questions regarding this request or wish to discuss the proposed invasive species management plan, please do not hesitate to contact me at 978-697-0854 or via email at southriverenvironmental@gmail.com.

Sincerely,
South River Environmental

John Zimmer
Wildlife Biologist / Wetland Scientist

Cc: Cavanaro Consulting, Inc.

STORMWATER DRAINAGE CALULATIONS

Proposed Residential Development
365 Concord Street
Rockland, MA 02370

APPLICANT:
Conrock LLC
P.O. Box 1414
Duxbury, MA 02331

SUBMITTED TO:
Town of Rockland
Planning Board
242 Union Street
Rockland, MA 02370

PREPARED BY:
Cavanaro Consulting, Inc.
687 Main Street
Norwell, MA 02061

REVISED 1/7/22

CAVANARO CONSULTING

Table of Contents

SECTION I

STORMWATER REPORT

Existing & Proposed conditions:

The locus property is approximately 21.3 acres and contains one single family home. Approximately 16.9 acres is upland and 4.4 is wetlands. The property is bordered to the west by the French Stream and an intermittent stream bisects the property. The property is bordered to the north and south by private property and to the east by approximately 100' of frontage on Concord Street and the remainder by private property.

The proposed development consists of 19 new single-family homes and maintaining the existing single family home. The development will only utilize the front portion of the property and not involve a wetland crossing to get to the remainder upland located on the east side of the intermittent stream. The total length of roadway is approximately 980 L.F. and will be constructed with full utilities and a sidewalk on one side. The site is relatively flat with a maximum change in grade of 6± feet and only a 4± foot differential within the area of the development.

1.0 METHODOLOGY

The adequacy of drainage structures and their ability to function properly must be analyzed to minimize detrimental effects due to flooding conditions. The impacts of storm water are mitigated through several mechanisms such as infiltration, transportation and evaporation. The remaining runoff, can be quantified through developed and accepted methods. By determining the characteristics of site specific storm water conditions, mitigating efforts can be taken to avoid floodwater damage by constructing control devices. Designing and analyzing these facilities requires the acquisition of site data through observations, computer modeling the watershed, and the interpretation and application of the calculated values.

2.0 OVERVIEW

Cavanaro Consulting (CC) has analyzed the existing structures on and adjacent to the site utilizing the HydroCad 10.0 Stormwater modeling program. Storm rainfall, run-off curve numbers, and other site characteristics are input into the program. The results of calculations are output into tables and graphs for each area and control structure. The complete calculations are presented in Section IV of this report.

3.0 DESIGN STORMS

CC has computed storm water run-off calculations for the proposed subdivision site, for a 2, 10, 25, and 100 year, Type III, 24-hour storm events. This results in 3.2", 4.6", 5.5", and a 7.0" of rainfall respectively for each storm event.

4.0 EXISTING DRAINAGE AREAS

The existing site is currently divided into four (4) drainage areas: One that flows to the west towards the wetlands associated with the intermittent stream; another flows easterly toward a wetland system which is primarily on adjacent property but also has a portion onsite; the third is a

small area of existing driveway and lawn that discharges easterly into Concord Street; and the fourth flows to the north into a wetland area that is mostly located offsite.

5.0 PROPOSED SUBCATCHMENT AREAS

The proposed site was divided into subcatchment areas as shown on the accompanying plan. Four design control points were established to compare the existing with the proposed conditions. The design control points were chosen at the down slope side of the four existing subcatchment areas as shown on the plan.

6.0 SOIL CONDITIONS

The soil type used to model the entire site was determined using U.S. Conservation Service online data and through soil evaluations. Site soil was modeled as C soils as mapped and confirmed by in situ soil tests. Localized soil data in the vicinity of the proposed subsurface infiltration systems was obtained by conducting in-situ soil tests. Sand (Hydrologic Soil Group A soil) with a corresponding Rawls Rate of 8.27 in/hr was found in the area of the infiltration systems and was used in their design.

7.0 COMPLIANCE WITH STORMWATER STANDARDS

The project is a mix of redevelopment and new development. The new development complies with all Stormwater Standards and the redevelopment complies with the Standards to the maximum extent practicable.

Standard 1: No New Stormwater Conveyances of Untreated Stormwater or Erosion Offsite

All proposed road and sidewalk runoff will receive 44% TSS removal for pretreatment and 80% total TSS removal. All new roof runoff will be disconnected from the street runoff and will receive 80% TSS removal. Driveways serving the existing dwelling and detached garage that are presently untreated will be reduced from 23,861 SF to 8,919 SF. Therefore, this Standard is met.

Rip Rap sizing:

The size, slope, and invert elevations of the overflow pipe and a detail of the crushed stone pad have been added to the revised Site Plan. The Isbash formula [$D = V^2 / 2gC^2 (G - 1)$] was used to size the stone for the splash pad:

D = Median stone size (ft)
V = velocity
C = constant – 0.86 for high turbulence
g = 32.2 Ft/ sec.
G = Specific gravity of stone – 2.86

The outlet with the highest velocity was chosen for design, which is the inlet to Pond No. 2, this results in a design stone of 4.5 inches, therefore a 4"-6" stone has been specified for all outlet structures

$(5.83)^2 / 2(32.2)\ (0.86)^2\ (2.86 - 1) = 0.38$ feet or 4.5 inches

Standard 2: Peak Rate Attenuation

All proposed runoff rates and volumes will be reduced from existing conditions during all design storm events as noted below. The proposed improvements are expected to improve offsite drainage conditions.

Runoff to Stream – Design Control Point (DCP 1) – To Stream

Storm	Existing (Reach 1E)		Post-development (Reach 1P)	
	Peak Rate	Volume	Peak Rate	Volume
2–Year-24Hour (3.2")	4.12 cfs	0.622 af	3.71 cfs	0.548 af
10–Year-24Hour (4.6")	7.72 cfs	1.145 af	7.09 cfs	0.991 af
25–Year-24Hour (5.5")	10.18 cfs	1.506 af	9.71 cfs	1.328 af
100–Year-24Hour (7.0")	14.37 cfs	2.133 af	13.86 cfs	1.906 af

Runoff to East Wetland – Design Control Point (DCP 2) – To East Wetland

Storm	Existing (Reach 2E)		Post-development (Reach 2P)	
	Peak Rate	Volume	Peak Rate	Volume
2–Year-24Hour (3.2")	2.27 cfs	0.327 af	2.19 cfs	0.327 af
10–Year-24Hour (4.6")	4.50 cfs	0.628 af	4.37 cfs	0.623 af
25–Year-24Hour (5.5")	6.04 cfs	0.839 af	5.93 cfs	0.837 af
100–Year-24Hour (7.0")	8.70 cfs	1.210 af	8.59 cfs	1.203af

Runoff to Concord Street – Design Control Point (DCP 3) – To Street

Storm	Existing (Reach 3E)		Post-development (Reach 3P)	
	Peak Rate	Volume	Peak Rate	Volume
2–Year-24Hour (3.2")	0.06 cfs	0.004 af	0.04 cfs	0.003 af
10–Year-24Hour (4.6")	0.10 cfs	0.007 af	0.06 cfs	0.004 af

25–Year-24Hour (5.5”)	0.13 cfs	0.009 af	0.07 cfs	0.005 af
100–Year-24Hour (7.0”)	0.17 cfs	0.012 af	0.09 cfs	0.007 af

Runoff to North Wetland – Design Control Point (DCP 4) – To North Wetland

Storm	**Existing (Reach 4E)**		**Post-development (Reach 4P)**	
	Peak Rate	**Volume**	**Peak Rate**	**Volume**
2–Year-24Hour (3.2”)	0.64 cfs	0.098 af	0.53 cfs	0.073 af
10–Year-24Hour (4.6”)	1.24 cfs	0.186 af	1.06 cfs	0.140 af
25–Year-24Hour (5.5”)	1.66 cfs	0.247 af	1.42 cfs	0.187 af
100–Year-24Hour (7.0”)	2.37 cfs	0.355 af	2.05 cfs	0.270 af

Standard 3: Recharge

Recharge will be increased by minimizing the impervious areas discharging directly over ground. The minimum required recharge volume is calculated as follows:

Existing Impervious Area = 33,166 SF Proposed Impervious Area = 97,256 SF

Total Increase in Impervious Area = 64,090 SF

(0.25”/12 x 64,090 SF) = 1,335 CF

The storage capacity of each infiltration BMP is listed below:

Drywells for Houses 1-19:

Volume below outlet elevation=89 CF X 19=1,691 CF

Infiltration System.1:

Volume below outlet elevation = 898 CF

Infiltration System 2:

Volume below outlet elevation = 4,141 CF

Total recharge volume provided:

1,691 CF+184 CF+4,141 CF = 6,016 CF >>> 1,335 CF; therefore, this requirement is met.

In order to confirm that the infiltration systems will drain in 72 hours, the volume under the lowest outlet pipe must be divided by the bottom area of the infiltration system and the infiltration rate as follows:

System 1:

$$\frac{\left[\frac{(898\ ft^3)}{1,230\ ft^2}\right]}{\left(8.27\frac{in}{hr}\right)\left(\frac{1\ ft}{12\ in}\right)} = 1.1\ hours$$

1.1 hours << 72 hours; therefore, this requirement is met for this infiltration system.

System 2:

$$\frac{\left[\frac{(4,141 ft^3)}{4,088\ ft^2}\right]}{\left(8.27\frac{in}{hr}\right)\left(\frac{1\ ft}{12\ in}\right)} = 1.5\ hours$$

1.5 hours << 72 hours; therefore, this requirement is met for this infiltration system.

Bottom of Basin Floor steady flow rate calculation.

System 1 bottom infiltration calculation:

8.27 In/Hr.(1Hr/ 3600 sec.)1ft / 12 in (1,230 SF -bottom area of pond) = 0.23 CFS

System 2 bottom infiltration calculation:

8.27 In/Hr.(1Hr/ 3600 sec.)1ft / 12 in (4,088 SF -bottom area of pond) = 0.78 CFS

Standard 4: Water Quality

Water quality requirements are met for work in critical areas; namely, rapid infiltration soils under the proposed infiltration systems and discharging near a potential vernal pool for System 1 per BETA's request. Pretreatment consists of deep sump catch basins and Stormceptors prior to exfiltration at each infiltration basin. The proposed pretreatment will remove in excess of the required 44% of TSS while the subsurface infiltration systems will provide a total 80% TSS removal with pretreatment. Roof runoff does not require pretreatment. Drywells are proposed to provide 80% TSS removal for each new dwelling.

The WQV required and provided at each infiltration basin is as follows:

System 1:

Impervious area directed to System 1=10,533 SF

(1"/12"per ft)(10,533) = 878 CF

System 1 has a capacity of 898 CF below the lowest outlet elevation. Therefore, this requirement is met.

System 2:

Impervious area directed to System 2=38,056 SF

(1"/12"per ft)(38,056 ft^2) = 3,171 ft^3

System 2 has a capacity of 4,141 CF below the lowest outlet elevation. Therefore, this requirement is met.

Drywells are proposed for House lots 1-19:

Proposed House Lots 1 thru 7 are tributary to a certified vernal pool therefore water Quality Volume is based on 1.0" of runoff.

C soils are expected for the entire site aside from the location of the proposed subsurface in infiltration system locations. Thus, the required WQV for the proposed dwellings is as follows:

Proposed roof areas directed to drywells lots 1 thru 7 =(6 houses x 1,550 SF/house) + (1 house x 1,200 SF/house)=10,500 SF.

Required WQV=(1.0"/12"per ft)(10,500 SF) = 875 CF

Proposed roof areas directed to drywells lots 8 thru 19 =(10 houses x 1,550 SF/house) + (2 houses x 1,200 SF/house)=17,900 SF

Required WQV=(0.5"/12"per ft)(17,900 SF) = 746 CF

875 +746 = 1,621 CF

Volume capacity provided below outlet elevation=89 CF x 19=1,691 CF

1,691 CF > 1,621 CF. Therefore, this standard is met.

Deep Sump Catch Basins:

To obtain 25% TSS removal pre-treatment credit, catch basins may treat up to ¼ acre of impervious areas. The total impervious area treated by each catch basin is as follows:

Catch Basin 1: 5,266 SF (0.12 Acres)

Catch Basin 2: 5,267 SF (0.12 Acres)

Catch Basin 3: 6,841 SF (0.16 Acres)

Catch Basin 4: 9,564 SF (0.22 Acres)

Catch Basin 5: 10,856 SF (0.25 Acres)

Catch Basin 6: 10,795 SF (0.25 Acres)

Stormceptors:

WQU #1 – 0.24 acres 100% impervious –will generate a WQF of 0.30 CFS for the 1-inch WQ storm. STC model 450i which provides 80% TSS removal for up to 1.0 CFS is proposed.

WQU #2 – 0.87 acres 100% impervious – will generate a WQF of 1.09 CFS for the 1-inch WQ storm. CDS model 2015-4 which provides 80% TSS removal for up to 1.4 CFS is proposed.

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

The proposed use of the site for single family homes, does not constitute a higher potential pollutant load, therefore this standard does not apply.

Standard 6: Critical Areas

A portion of the locus does fall within a critical area and since the infiltration rate for the subsurface infiltration basins is greater than 2.4 inches per hour 44% of pretreatment is provided prior to infiltration in both proposed systems.

Standard 7: Redevelopment

This project is a combination of redevelopment and new development. All new impervious areas have been treated and infiltrated as per the Stormwater Management Standards. The existing pavement areas without treatment have been reduced from 23,861 square feet to 8,919 square feet. The existing paved driveway serving the detached garage will be reduced and moved further away from the wetland from approximately 0’ to over 25’. The existing dwelling is only partially within Commission’s jurisdiction. The downspout closest to the nearest wetlands daylights approximately 75’ from the wetland and travels over lawn before reaching the resource area which should provide ample treatment. Additionally, the total area of disturbed 25’ buffer will be reduced from 7,880 SF to 3,780 SF; thus enhancing the buffer immediately upstream the resource areas. This buffer enhancement will improve water quality by providing some treatment to existing untreated pavement runoff. Therefore, we believe this requirement has been met to the maximum extent practicable for the redevelopment portion of the project.

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

The Operation and Maintenance Plan included with this submittal will ensure proper maintenance of the proposed pollution, erosion and sedimentation measures proposed during construction.

Standard 9: Long Term Operation and Maintenance Plan

The Long Term Operation and Maintenance Plan is included within the Operation and Maintenance Plan enclosed in this submittal to ensure the proposed drainage improvements are maintained as intended.

Standard 10: Prohibition of Illicit Discharges

Routine visual inspections are scheduled as part of the Operations and Maintenance Plan to prevent illicit discharges into the stormwater system. Furthermore, an Illicit Compliance Statement is included in this submittal.

Improvement Over Existing Conditions

Existing conditions will be improved by reducing peak rate of runoff and volume during all design storm events, improving water quality from existing conditions for the redevelopment portion of the project and restoring disturbed portions of the 25' Buffer Zone.

Low Impact Measures Used:

The design of the proposed development has incorporated the following low impact development measures:

- Utilizes the natural hydrology to manage Stormwater.
- Treats Stormwater through a combination of stormwater controls.
- Uses natural topography for drainage ways and storage areas.

SECTION II

STORMWATER OPERATION
AND MAINTENANCE PLAN

Construction Period Erosion, Sedimentation, and Pollution Prevention Plan

Proposed Residential Development
"Concord Meadows"
PUD Subdivision – Rockland, MA 02370
Stormwater Management System's Owner: Conrock LLC
System Owner's Address: 365 Concord Street
Party responsible for Operations and Maintenance: Owners of Concord Meadows

It is most important for a drainage system to be maintained in order for it to work properly. The following is an Operation and Maintenance plan to upkeep the existing non-structural and structural best performance practices as outlined in the Massachusetts Department of Environmental Protection's Stormwater Management Policy.

Construction Sequencing:

The following section provides construction details and highlights the construction sequence and timing of earth moving activities.

1 Installation of Erosion Controls

Erosion and sedimentation controls (silt fence and hay bales) will be installed where needed and inspected at the limits of the work area prior to the commencement of earth moving activities.

2 Clearing

The project area will be cleared of debris and boulders. Materials removed from the site will be transported to an appropriate facility or will be disposed of properly. No large boulders will be buried on the site. All cleared vegetation will be removed from the project site or mulched and stockpiled for future use on the site.

3 Rough Grading

During this phase of construction, rough grades will be established for the project site. If suitable topsoil is found, it will be removed and stockpiled in an upland area outside of the zone of identified wetlands. The stockpiled topsoil will be stored until ready for re-use on site.

4 Drainage System Construction

After rough grading is complete, the drainage collection, conveyance and discharge areas will be installed. The drainage system design and structures for the proposed development will follow the Department of Environmental Protection's Best Management Practice standards.

5 Utility Installation

In this phase of construction, underground utilities including water, sewer, gas, power, telecommunications, etc. will be installed.

6 Roadway Paving

During this phase of construction, the entrance and exit roadways for the development will be paved to binder course only. Final paving will be done after most of the home sites are developed at the discretion of the developer.

7 Foundation and Structure Construction

This phase of construction consists of installation of the foundations and construction of the buildings. The home sites will be made available for construction and occupancy in phases. The phasing will be designed primarily to control construction impacts to the site and also consider current market demand for home sales.

8 Installation of Amenities

Amenities such as signage and landscaping will be installed or completed as required for safety and as the homes become occupied.

9 Site Stabilization

The final phase of the project is the restoration and stabilization of all exposed surfaces. Disturbed areas will be landscaped or seeded as necessary with an erosion control seed mix. Much of the disturbed area is to be rough graded with topsoil and allowed to revegetate with indigenous species and kept thereafter in a natural state as habitat. Permanent restoration and revegetation measures serve to provide additional habitat and to control erosion and sedimentation by establishing a vegetative cover. In the event that weather conditions prevent final restoration, temporary erosion and sedimentation measures will be employed until the weather is suitable for final cleanup. A final inspection will ensure that the project site is cleared of all project debris and that erosion and sedimentation controls are functioning properly. Haybales and silt fencing will not be removed until the site is stabilized and the final inspection is complete.

Operation and Maintenance Plan during Construction:

Sediment and Erosion Control

- Siltation barriers shall be inspected at least once a week and after each rainfall event. Make any required repairs immediately. Repair scoured areas on the back side of fence at this time to prevent future problems.

- Should the fabric of the silt fence tear, decompose or otherwise become ineffective, replace it within 24 hours of discovery.

- Remove silt deposits once they reach 15-30 percent of the height of the silt fence to provide adequate storage volume for the next rain event and to reduce pressure on the fence. Care should be taken to avoid undermining the fence during cleanout process.

- Siltation barriers are to be removed upon stabilization of the contributing drainage area. Accumulated sediment may be spread to form a surface for turf or other vegetation establishment, or disposed of elsewhere. The area should be reshaped to permit natural drainage.

- Crushed stone construction entrances shall be inspected and maintained on a daily basis. Any buildup of material within the apron shall be removed offsite and replaced with clean crushed stone as needed.

- Also at the Construction entrances any sediment tracked onto the public road during the construction process shall be removed immediately and any adjustment of the entrance to prevent additional sediment tracking.

Subsurface Infiltration Systems and Drywells

All infiltration areas shall be excavated and installed after the construction of the foundation. No heavy equipment shall traverse the proposed infiltration areas after installation.

Per MA DEP Stormwater Guidelines the following work shall be done to stabilize the site prior to installing the infiltration systems:

- Do not allow runoff from any disturbed areas on the site to flow to the proposed location of the infiltration systems.
- Rope off the area where the infiltration systems are to be placed.
- Accomplish any required excavation with equipment placed just outside the area. If the size of the area intended for exfiltration is too large to accommodate this approach, use trucks with low-pressure tires to minimize compaction. Do not allow any other vehicles within the area to be excavated.
- Keep the area above and immediately surrounding the infiltration systems roped off to all construction vehicles until the final top surface is installed.
- At no time shall the area for the infiltration systems be used as a temporary sediment basin. Stockpiles shall be placed away from the infiltration systems and

sedimentation fences shall be placed around the perimeter of the infiltration area to prevent the accumulation of sediment within the native soils.

Dust Control: Sprinkle water as necessary to control dust during construction.

Material Stockpiling: Stockpiles of material must be placed outside all wetland resource areas and their buffer zones. If left overnight, material stockpiling must be protected from the weather.

Good housekeeping:
The following good housekeeping BMP's will be implemented in order to prevent pollution during construction:

- Petroleum products will be stored in tightly sealed containers which are clearly labeled.
- Any asphalt substances used onsite will be applied according to the manufacturer's specifications.
- If portable sanitary units are used, sanitary waste will be removed as necessary to avoid overfilling.
- All paint and other hazardous waste materials will be tightly sealed and stored when not in use. Excess material will not be discharged into the public stormwater system, but will be properly disposed of according to the manufacturer's specifications.
- If spray guns are used, they will be cleaned on a removable tarp.

Temporary Sediment Traps & Basins

Sediment traps and/or basins shall be constructed as shown on the approved plans and as necessitated by field conditions. Sediment traps/basins should be readily accessible for maintenance and sediment removal, and should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place. Remove basin after drainage area has been permanently stabilized, inspected, and approved. Before removing dam, drain water and remove sediment; place waste material in designated disposal areas. Smooth site to blend with surrounding area and stabilize.

Track out controls at Construction Entrance

A stabilized stone apron construction entrance shall be at all construction entrances to help prevent vehicle tracking of sediments. All vehicles shall enter and exit the sit via the stabilized construction entrance. The contractor shall inspect the construction entrance daily and after heavy use. If mud and soil clogs the voids in the crushed stone reducing the effectiveness, the pad shall be top dressed with new, clean stone. If the pad becomes completely clogged, replacement of the entire pad may be necessary Dump trucks hauling material from the construction site will be covered with a tarpaulin.

Long Term Stormwater Operation and Maintenance Plan and Illicit Discharge Statement

Proposed Residential Development
"Concord Meadows"
PUD Subdivision – Rockland, MA 02370
Stormwater Management System's Owner: Conrock LLC
System Owner's Address: 365 Concord Street
Party responsible for Operations and Maintenance: Owners of Concord Meadows

It is most important for a drainage system to be maintained in order for it to work properly. The following is an Operation and Maintenance plan to upkeep the existing non-structural and structural best performance practices as outlined in the Massachusetts Department of Environmental Protection's Stormwater Management Policy.

Operation and Maintenance Plan After Construction:

Good housekeeping:

General trash and litter cleanup of the site, inspect all vehicles on a regular basis for detention of leaking oil, gas and other fluids, provide routine visual inspections of potential pollution sources, and maintain an inventory of potential pollution sources stored on site. Initiate and maintain record keeping of activity with regard to the contents of this plan.

Spill prevention and response:

In the event of a spill, immediately initiate containment and cleanup procedures appropriate for the material and notify the proper authorities. All attempts must be made to prevent spilled material from entering the drainage system or infiltrating into the ground.

Landscape Maintenance:

Maintenance of lawns and landscaped areas: Regularly mow lawn areas and weed landscaped areas.

Pipes:

Drainage pipes (inlets and outlets) shall be inspected to ensure that they are free of all obstructions and that they are structurally sound during every catch basin inspection.

Street Sweeping:

Sweeping of the parking lots and driveways should be done at least 2 times annually, namely in the spring and fall. It is imperative that sweeping take place immediately following final winter snowmelt to remove winter sand. All sediments containing hydrocarbons shall be handled properly and disposed of in accordance with local, state and federal guidelines and regulations.

Catch Basin Cleaning:

Catch basins shall be inspected and sediment removed at least two times per year and at the end of the foliage and snow removal seasons. Sediment must be removed at the required interval or whenever the depth of deposits is greater than or equal to one half the depth of the sump (2 feet). Care must be exercised to not damage the outlet hood when using a clamshell type cleaning bucket. A damaged or dislodged hood must be repaired or replaced immediately.

Culverts. pipes. and manholes:

All culverts, pipes, and manholes shall be inspected two times per year and cleaned when drainage impediments are discovered. Flushing of pipes may be required to remove accumulated sediment.

Riprap Drain Outfalls:

All riprap drain outfalls shall be inspected two times per year and repaired as necessary. Riprap shall be replaced/repaired as necessary, debris and accumulated sediment removed, and any woody growth removed.

Subsurface Infiltration Systems and Drywells:

Inspect inspection port at least quarterly and after every major storm event during the first year. Inspections after every major storm event shall take notice of any water standing after 72 hours after the storm ended. After the first year, inspections must be done at least twice yearly. Remove any debris or sediment within reach that may be clogging the system.

The outlet structures should be inspected for evidence of clogging, structural integrity, outflow release velocities that are greater than design flow and sediment accumulation around the outlet. The surface over and around the infiltration systems shall be checked for potential subsidence, erosion, cracking and tree growth. Any necessary repairs should be made immediately. During inspections, changes vegetative cover or the contributing watershed should be noted.

The subsurface systems are designed to fully drain after a storm event therefore if standing water is observed above the outlet in the drainage manhole immediately upstream of the infiltration system beyond 24 hours since the cessation of inflow to the system from a rainstorm this may be indicatibe of clogging within the system and should be noted on the inspection log and further inspected for repairs. The Owner may need to contact a Registered Professional Engineer to evaluate the system in the event of major problems.

Pet Waste Management

All pet owners and keepers are required to immediately and properly dispose of their pet's solid waste deposited on any property, public or private, not owned or possessed by that person.

Snow Management

Place snow in pervious areas where it can slowly infiltrate however it should not be placed over any component of the site's stormwater management system, particularly the catch basins. Any sand and debris mixed with snow would block the inlet or be quickly introduced into the drainage system upon snowmelt. At no time shall the stormwater infiltration basins or wetlands be used for the stockpiling of snow.

Estimated Operation and Maintenance Budget:

Maintenance cost will be approximately $10,000.00 per year.

Illicit Discharges:

At no time will the owner or any other individual utilize the stormwater management system for any purpose other than its intended use. The stormwater management system as shown on the attached site plan at no time shall receive discharges other than stormwater, this includes "wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, raw materials, toxic pollutants, hazardous substances, oil or grease."

TO BE SIGNED PRIOR TO CONSTRUCTION	CONROCK LLC
Property Owner (Signature)	Property Owner (Print)

CONTECH®
ENGINEERED SOLUTIONS

CDS Guide
Operation, Design, Performance and Maintenance

CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

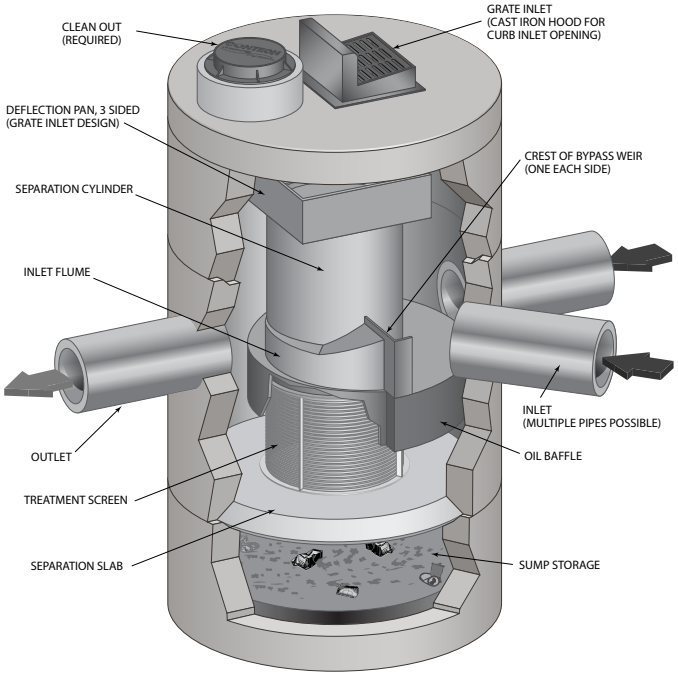
Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.



Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns (μm). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns (μm) or 50 microns (μm).

Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are

determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

Performance

Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 μm) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 μm) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

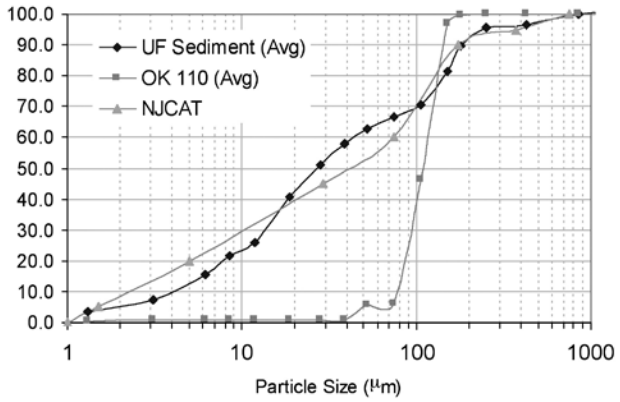


Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect

to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

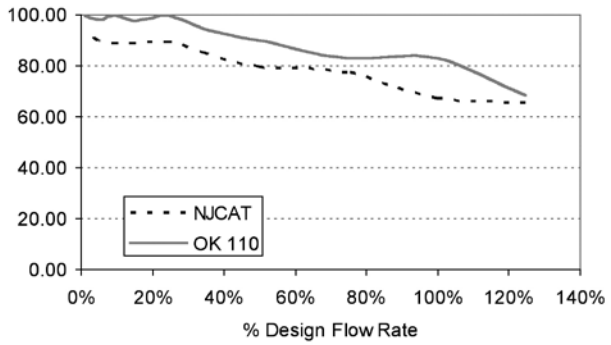


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 μm).

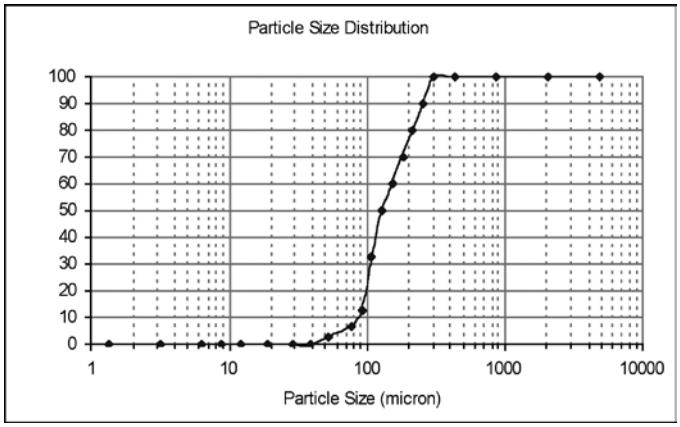


Figure 3. WASDOE PSD

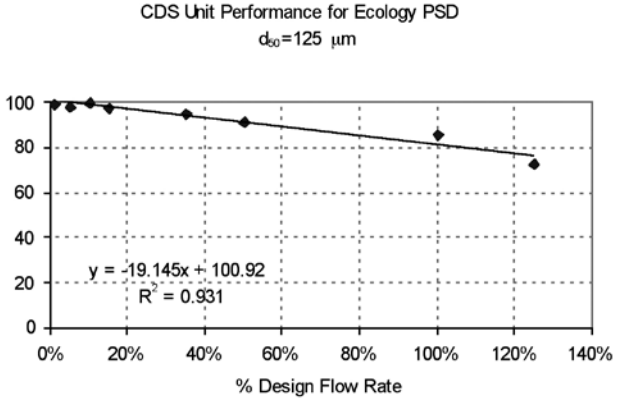


Figure 4. Modeled performance for WASDOE PSD.

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber 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 (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. 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.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down 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. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems 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 covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

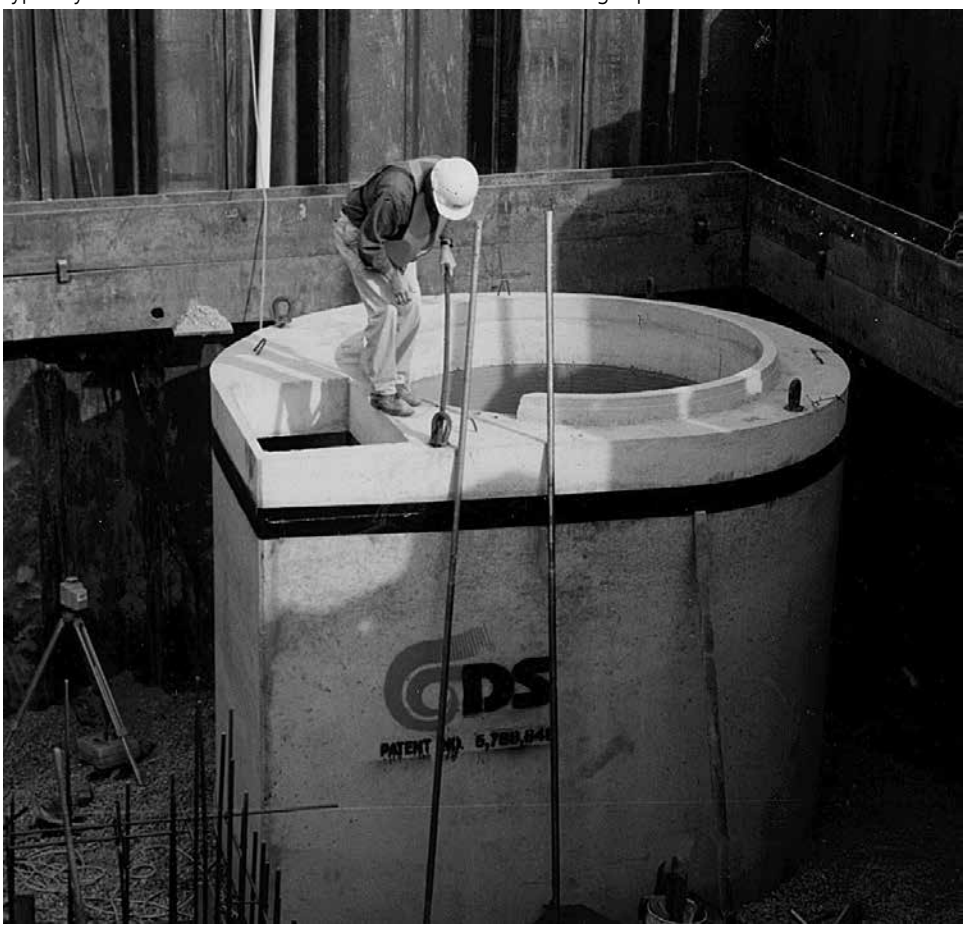
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should 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. The screen should be cleaned 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 also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **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
800-338-1122
www.ContechES.com

Contech Engineered Solutions provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, earth stabilization and stormwater treatment products. For information on other Contech division offerings, visit www.ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

cds_manual 3/17 PDF

CONTECH®
ENGINEERED SOLUTIONS

Stormceptor® STC
Owner's Manual

Stormceptor® STC

Table of Contents

For patent information, go to www.ContechES.com/ip.

Your selection of a Stormceptor® means that you have chosen the most recognized and efficient stormwater oil/sediment separator available for protecting the environment. Stormceptor is a pollution control device often referred to as a "Hydrodynamic Separator (HDS)" or an "Oil Grit Separator (OGS)", engineered to remove and retain pollutants from stormwater runoff to protect our lakes, rivers and streams from the harmful effects of non-point source pollution.

1 – Stormceptor Overview

Stormceptor is a patented stormwater quality structure most often utilized as a treatment component of the underground storm drain network for stormwater pollution prevention. Stormceptor is designed to remove sediment, total suspended solids (TSS), other pollutants attached to sediment, hydrocarbons and free oil from stormwater runoff. Collectively the Stormceptor provides spill protection and prevents non-point source pollution from entering downstream waterways.

Key benefits of Stormceptor include:

- Removes sediment, suspended solids, debris, nutrients, heavy metals, and hydrocarbons (oil and grease) from runoff and snowmelt.
- Will not scour or re-suspend trapped pollutants.
- Provides sediment and oil storage.
- Provides spill control for accidents, commercial and industrial developments.
- Easy to inspect and maintain (vacuum truck).
- "STORMCEPTOR" is clearly marked on the access cover (excluding inlet designs).
- Relatively small footprint.
- 3rd Party tested and independently verified.
- Dedicated team of experts available to provide support.

Model Types:

- STC (Standard)
- EOS (Extended Oil Storage)
- OSR (Oil and Sand Removal)
- MAX (Custom designed unit, specific to site)

Configuration Types:

- Inlet unit (accommodates inlet flow entry, and multi-pipe entry)
- In-Line (accommodates multi-pipe entry)
- Submerged Unit (accommodates the site's tailwater conditions)
- Series Unit (combines treatment in two systems)

PLEASE MAINTAIN YOUR STORMCEPTOR

To ensure long-term environmental protection through continued performance as originally designed for your site, Stormceptor must be maintained, as any stormwater treatment practice does. The need for maintenance is determined through inspection of the Stormceptor. Procedures for inspection are provided within this document. Maintenance of the Stormceptor is performed from the surface via vacuum truck.

If you require information about Stormceptor, or assistance in finding resources to facilitate inspections or maintenance of your Stormceptor please call Contech at 1-800-338-1122.

2 – Stormceptor Operation & Components

Stormceptor is a flexibly designed underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention using patented flow separation technology. Stormceptor creates a non-turbulent treatment environment below the insert platform within the system. The insert diverts water into the lower chamber, allowing free oils and debris to rise, and sediment to settle under relatively low velocity conditions. These pollutants are trapped and stored below the insert and protected from large runoff events for later removal during the maintenance procedure.

With thousands of units operating worldwide, Stormceptor delivers reliable protection every day, in every storm. The patented Stormceptor design prohibits the scour and release of captured pollutants, ensuring superior water quality treatment and protection during even the most extreme storm events. Stormceptor's proven performance is backed by the longest record of lab and field verification in the industry.

Stormceptor Schematic and Component Functions

Below are schematics of two common Stormceptor configurations with key components identified and their functions briefly described.

- **Manhole access cover** – provides access to the subsurface components
- **Precast reinforced concrete structure** – provides the vessel's watertight structural support
- **Fiberglass insert** – separates vessel into upper and lower chambers
- **Weir** – directs incoming stormwater and oil spills into the lower chamber
- **Orifice plate** – prevents scour of accumulated pollutants
- **Inlet drop tee** – conveys stormwater into the lower chamber
- **Fiberglass skirt** – provides double-wall containment of hydrocarbons
- **Outlet riser pipe** – conveys treated water to the upper chamber; primary vacuum line access port for sediment removal
- **Oil inspection port** – primary access for measuring oil depth and oil removal
- **Safety grate** – safety measure to cover riser pipe in the event of manned entry into vessel

Figure 1.

Inline Stormceptor

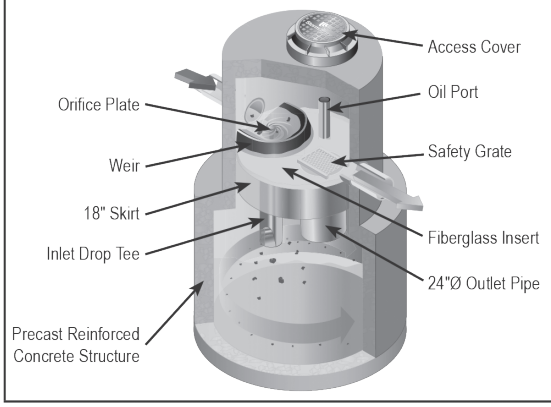
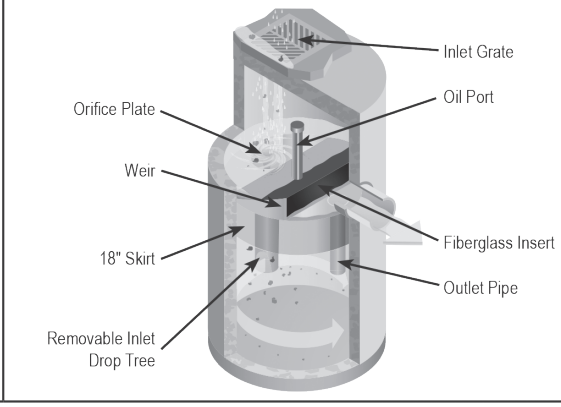


Figure 2.

Inlet Stormceptor



3 – Stormceptor Identification

Stormceptor is available in both precast concrete and fiberglass vessels, with precast concrete often being the dominant material of construction.

In the Stormceptor, a patented, engineered fiberglass insert separates the structure into an upper chamber and lower chamber. The lower chamber will remain full of water, as this is where the pollutants are sequestered for later removal. Multiple Stormceptor model (STC, OSR, EOS and MAX) configurations exist, each to be inspected and maintained in a similar fashion.

Each unit is easily identifiable as a Stormceptor by the trade name "Stormceptor" embossed on each access cover at the surface. To determine the location of "inlet" Stormceptor units with horizontal catch basin inlet, look down into the grate as the Stormceptor insert will be visible. The name "Stormceptor" is not embossed on inlet models due to the variability of inlet grates used/approved across North America.

Once the location of the Stormceptor is determined, the model number may be identified by comparing the measured depth from the fiberglass insert level at the outlet pipe's invert (water level) to the bottom of the tank using Table 1.

In addition, starting in 1996 a metal serial number tag containing the model number has been affixed to the inside of the unit, on the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the unit using depth measurements, please contact your local Contech Representative for assistance.

Sizes/Models

Typical general dimensions and capacities of the standard precast STC, EOS & OSR Stormceptor models are provided in Tables 1 and 2. Typical rim to invert measurements are provided later in this document. The total depth for cleaning will be the sum of the depth from outlet pipe invert (generally the water level) to rim (grade) and the depth from outlet pipe invert to the precast bottom of the unit. Note that depths and capacities may vary slightly between regions.

Table 1. Stormceptor Dimensions - Insert to Base of Structure

STC Model	Insert to Base (in.)
450	60
900	55
1200	71
1800	105
2400	94
3600	134
4800	128
6000	150
200	134
11000*	128
13000*	150
16000*	134

Notes:

1. Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.

**Consist of two chamber structures in series.*

Table 2. Storage Capacities

STC Model	Hydrocarbon Storage Capacity (gal)	Sediment Capacity (ft^3)
450	86	46
900	251	89
1200	251	127
1800	251	207
2400	840	205
3600	840	373
4800	909	543
6000	909	687
200	1059	839
11000*	2797	1089
13000*	2797	1374
16000*	3055	1677

Notes:

1. Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

**Consist of two chamber structures in series*

4 – Stormceptor Inspection & Maintenance

Regular inspection and maintenance is a proven, cost-effective way to maximize water resource protection for all stormwater pollution control practices, and is required to insure proper functioning of the Stormceptor. Both inspection and maintenance of the Stormceptor is easily performed from the surface. Stormceptor's patented technology has no moving parts, simplifying the inspection and maintenance process.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess the sediment accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

When is maintenance cleaning needed?

- For optimum performance, the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, which is approximately 15% of the unit's total storage capacity (see Table 3). The frequency should be adjusted based on historical inspection results due to variable site pollutant loading.
- Sediment removal is easier when removed on a regular basis at or prior to the recommended maintenance sediment depths, as sediment build-up can compact making removal more difficult.
- The unit should be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise Stormceptor performance?

- If construction sediment and debris is not removed prior to activating the Stormceptor unit, maintenance frequency may be reduced.
- If the system is not maintained regularly and fills with sediment and debris beyond the capacity as indicated in Table 2, pollutant removal efficiency may be reduced.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured.
- If debris clogs the inlet of the system, removal efficiency of sediment and hydrocarbons may be reduced.
- If a downstream blockage occurs, a backwater condition may occur for the Stormceptor and removal efficiency of sediment and hydrocarbons may be reduced.

What training is required?

The Stormceptor is to be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins.

For typical inspection and maintenance activities, no specific supplemental training is required

Recommended Stormceptor Inspection Procedure:

• Stormceptor is to be inspected from grade through a standard surface manhole access cover.

• Sediment and oil depth inspections are performed with a sediment probe and oil dipstick.

• Oil depth is measured through the oil inspection port, either a 4-inch or 6-inch diameter port.

• Sediment depth can be measured through the oil inspection port or the 24-inch diameter outlet riser pipe.

• Inspections also involve a visual inspection of the internal components of the system.

What equipment is typically required for maintenance?

• Vacuum truck equipped with water hose and jet nozzle

• Small pump and tubing for oil removal

• Manhole access cover lifting tool

• Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)

• Flashlight

• Camera

• Data log / Inspection Report

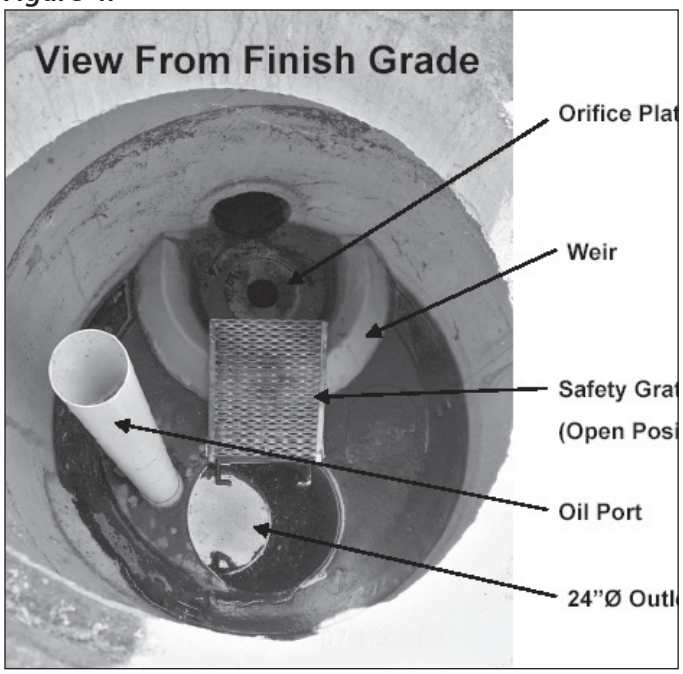
• Safety cones

• Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers

• Gas analyzer, respiratory gear, hoist and safety harness for specially trained personnel if confined space entry is required

Figure 3.

Figure 4.



Recommended Stormceptor Maintenance Procedure

Maintenance of Stormceptor is performed using a vacuum truck. No entry into the unit is required for maintenance. DO NOT ENTER THE STORMCEPTOR CHAMBER unless you have the proper personal safety equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (e.g. 29 CFR 1910.146). Without the proper equipment, training and permit, entry into confined spaces can result in serious bodily harm and potentially death. Consult local and/or state regulations to determine the requirements for confined space entry. Be aware, and take precaution that the Stormceptor fiberglass insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower chamber.

- Ideally maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is to be maintained through a standard surface manhole access cover.
- Insert the oil dipstick into the oil inspection port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing.
- Maintenance cleaning of accumulated sediment is performed with a vacuum truck.
  - » For 6-ft diameter models and larger, the vacuum hose is inserted into the lower chamber via the 24-inch outlet riser pipe (See Fig. 5).
  - » For 4-ft diameter model, the removable drop tee is lifted out, and the vacuum hose is inserted into the lower chamber via the 12-inch drop tee hole (See Fig. 6).

Figure 5.

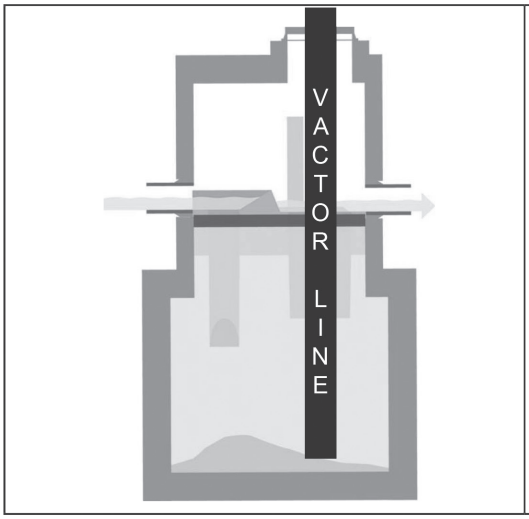
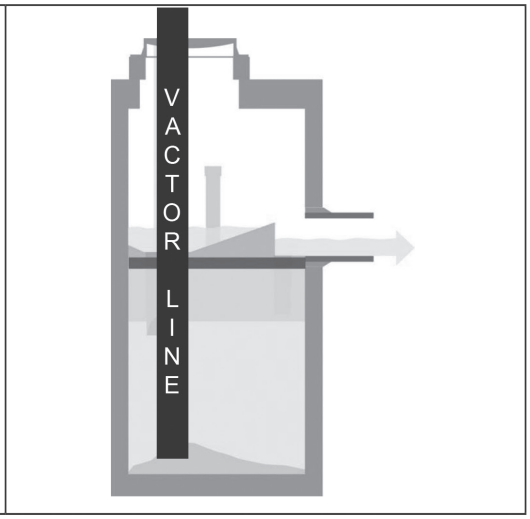


Figure 6.



- Using the vacuum hose, decant the water from the lower chamber into a separate containment tank or to the sanitary sewer, if permitted by the local regulating authority.
- Remove the sediment sludge from the bottom of the unit using the vacuum hose. For large Stormceptor units, a flexible hose is often connected to the primary vacuum line for ease of movement in the lower chamber.
- Units that have not been maintained regularly, have surpassed the maximum recommended sediment capacity, or contain damaged components may require manned entry by trained personnel using safe and proper confined space entry procedures.

What is required for proper disposal?

The requirements for the disposal of material removed from Stormceptor units are similar to that of any other stormwater treatment Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. This could be site and pollutant dependent. In some cases, approval from the disposal facility operator/agency may be required.

What about oil spills?

Stormceptor is often implemented in areas where there is high potential for oil, fuel or other hydrocarbon or chemical spills. Stormceptor units should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a hydrocarbon rainbow or sheen can be seen at very small oil concentrations ($<$ 10 ppm). Stormceptor is effective at removing 95% of free oil, and the appearance of a sheen at the outlet with high influent oil concentrations does not mean unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

What factors affect the costs involved with inspection/maintenance?

The Vacuum Service Industry for stormwater drainage and sewer systems is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean Stormceptor units will vary. Inspection and maintenance costs are most often based on unit size, the number of units on a site, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations.

What factors predict maintenance frequency?

Maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, site activity and use, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. If the sediment load is high from an unstable site or sediment loads transported from upstream catchments, maintenance may be required semi-annually. Conversely once a site has stabilized, maintenance may be required less frequently (for example: two to seven year, site and situation dependent). Maintenance should be performed immediately after an oil spill or once the sediment depth in Stormceptor reaches the value specified in Table 3 based on the unit size.

Table 3. Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment Depth (in)
450	8
900	8
1200	10
1800	15
2400	12
3600	17
4800	15
6000	18
200	15
11000*	17
13000*	20
16000*	17

Notes:

1. The values above are for typical standard units.

** Per structure.*

Replacement parts

Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. Therefore, inspection and maintenance activities are generally focused on pollutant removal. However, if replacements parts are necessary, they may be purchased by contacting your local Contech Representative or call 800-338-1122.

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to Stormceptor's long and effective service life.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Allowable Sediment Depth: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Other Comments: _____

5 – Contact Information

Questions regarding the Stormceptor can be addressed by contacting your local Contech representative or by calling 800-338-1122.

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

CONTECH ENGINEERED SOLUTIONS
800.925.5240
www.ContechES.com

SECTION III

FIGURES

National Flood Hazard Layer FIRMette

FEMA

70°54'44"W 42°7'2"N

70°54'7"W 42°6'36"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/8/2021 at 12:47 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

SECTION IV

DRAINAGE CALCULATIONS & SUPPLEMENTAL DRAINAGE INFORMATION

Project: Concord Meadows
Location: Rockland, MA
Prepared For: Cavanaro Consulting / Carmen Hudson

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (qu)\ (A)\ (WQV)$$

where:

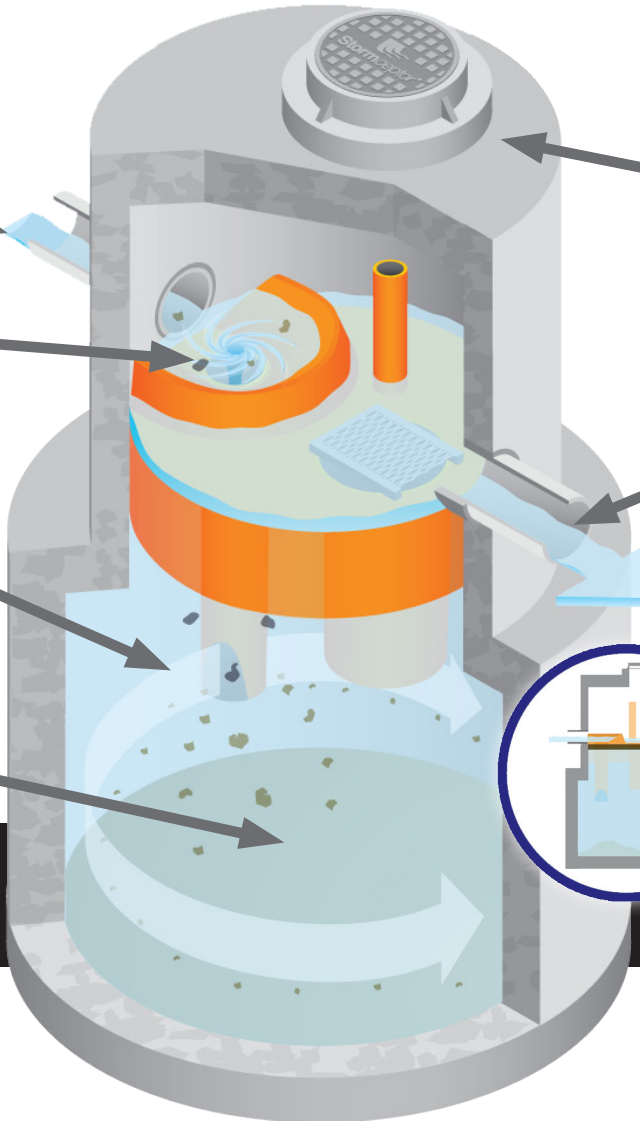
Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQU #1	0.24	0.0003766	5.0	0.083	1.00	795.00	0.30
WQU #2	0.87	0.0013650	5.0	0.083	1.00	795.00	1.09

Stormceptor®

Stormwater Treatment Made Simple!

TSS & Oil Removal ■ *Scour Prevention* ■ *Small Footprint*



Design Flexibility

Proven Performance

Environmentally Engineered Stormwater Solutions...
that exceed your client's needs!

A calm treatment environment

CONTECH® ENGINEERED SOLUTIONS

Stormceptor® STC

Stormceptor® is an underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention. With thousands of systems operating worldwide, Stormceptor delivers protection every day in every storm.

With patented technology, optimal treatment occurs by allowing free oil to rise and sediment to settle. The Stormceptor design prohibits scour and release of previously captured pollutants, ensuring superior treatment and protection during even the most extreme storm events.

Stormceptor is very easy to design and provides flexibility under varying site constraints such as tight right-of-ways, zero lot lines and retrofit projects. Design flexibility allows for a cost-effective approach to stormwater treatment. Stormceptor has proven performance backed by the longest record of lab and field verification in the industry.

Tested Performance

- Fine particle capture
- Prevents scour or release
- 95%+ Oil removal

Massachusetts – Water Quality (Q) Flow Rate

Stormceptor STC Model	Inside Diameter (ft)	Typical Depth Below Inlet Pipe Invert [1] (in)	Water Quality Flow Rate Q [2] (cfs)	Peak Conveyance Flow Rate [3] (cfs)	Hydrocarbon Capacity [4] (Gallons)	Maximum Sediment Capacity [4] (ft^3)
STC 450i	4	68	0.40	5.5	86	46
STC 900	6	63	0.89	22	251	89
STC 2400	8	104	1.58	22	840	205
STC 4800	10	140	2.47	22	909	543
STC 7200	12	148	3.56	22	1,059	839
STC 11000	2 x 10	142	4.94	48	2,792	1,086
STC 16000	2 x 12	148	7.12	48	3,055	1,677

[1] Depth Below Pipe Inlet Invert to the Bottom of Base Slab, and Maximum Sediment Capacity can vary to accommodate specific site designs and pollutant loads. Depths can vary to accommodate special designs or site conditions. Contact your local representative for assistance.
[2] Water Quality Flow Rate (Q) is based on 80% annual average TSS removal of the OK110 particle size distribution.
[3] Peak Conveyance Flow Rate is based upon ideal velocity of 3 feet per second and outlet pipe diameters of 18-inch, 36-inch, and 54-inch diameters.
[4] Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

CONCORD MEADOWS
ROCKLAND, MA

Area	**0.87 ac**	Unit Site Designation	**WQU #2**
Weighted C	**0.9**	Rainfall Station #	**69**
t_c	**5 min**		
CDS Model	**2015-4**	CDS Treatment Capacity	**1.4 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	10.2%	10.2%	0.02	0.02	10.2
0.04	9.6%	19.8%	0.03	0.03	9.6
0.06	9.4%	29.3%	0.05	0.05	9.4
0.08	7.7%	37.0%	0.06	0.06	7.7
0.10	8.6%	45.6%	0.08	0.08	8.5
0.12	6.3%	51.9%	0.09	0.09	6.2
0.14	4.7%	56.5%	0.11	0.11	4.6
0.16	4.6%	61.2%	0.13	0.13	4.5
0.18	3.5%	64.7%	0.14	0.14	3.4
0.20	4.3%	69.1%	0.16	0.16	4.2
0.25	8.0%	77.1%	0.20	0.20	7.6
0.30	5.6%	82.7%	0.24	0.24	5.2
0.35	4.4%	87.0%	0.28	0.28	4.0
0.40	2.5%	89.5%	0.31	0.31	2.3
0.45	2.5%	92.1%	0.35	0.35	2.3
0.50	1.4%	93.5%	0.39	0.39	1.2
0.75	5.0%	98.5%	0.59	0.59	4.1
1.00	1.0%	99.5%	0.79	0.79	0.8
1.50	0.0%	99.5%	1.18	1.18	0.0
2.00	0.0%	99.5%	1.57	1.40	0.0
3.00	0.5%	100.0%	2.36	1.40	0.2
					95.8
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.3%
				Predicted Net Annual Load Removal Efficiency =	**89.4%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Stage-Area-Storage for Pond P1: POND SC 310

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
86.50	0	87.56	776	88.62	1,468
86.52	10	87.58	794	88.64	1,477
86.54	20	87.60	811	88.66	1,487
86.56	30	87.62	829	88.68	1,497
86.58	39	87.64	846	88.70	1,507
86.60	49	87.66	863	88.72	1,517
86.62	59	87.68	881	88.74	1,527
86.64	69	87.70	898	88.76	1,536
86.66	79	87.72	914	88.78	1,546
86.68	89	87.74	931	88.80	**1,556**
86.70	98	87.76	948		
86.72	108	87.78	964		
86.74	118	87.80	980		
86.76	128	87.82	996		
86.78	138	87.84	1,012		
86.80	148	87.86	1,028		
86.82	157	87.88	1,044		
86.84	167	87.90	1,059		
86.86	177	87.92	1,074		
86.88	187	87.94	1,089		
86.90	197	87.96	1,104		
86.92	207	87.98	1,118		
86.94	216	88.00	1,133		
86.96	226	88.02	1,147		
86.98	236	88.04	1,160		
87.00	246	88.06	1,173		
87.02	266	88.08	1,186		
87.04	285	88.10	1,199		
87.06	305	88.12	1,211		
87.08	325	88.14	1,223		
87.10	344	88.16	1,235		
87.12	364	88.18	1,246		
87.14	383	88.20	1,257		
87.16	403	88.22	1,268		
87.18	422	88.24	1,279		
87.20	442	88.26	1,289		
87.22	461	88.28	1,300		
87.24	480	88.30	1,310		
87.26	499	88.32	1,320		
87.28	518	88.34	1,330		
87.30	537	88.36	1,340		
87.32	556	88.38	1,350		
87.34	575	88.40	1,359		
87.36	594	88.42	1,369		
87.38	612	88.44	1,379		
87.40	631	88.46	1,389		
87.42	649	88.48	1,399		
87.44	668	88.50	1,409		
87.46	686	88.52	1,418		
87.48	704	88.54	1,428		
87.50	722	88.56	1,438		
87.52	740	88.58	1,448		
87.54	758	88.60	1,458		

Stage-Area-Storage for Pond P2: POND 2 SC 740

Elevation (feet)	Storage (cubic-feet)
85.00	0
85.05	82
85.10	164
85.15	245
85.20	327
85.25	409
85.30	491
85.35	572
85.40	654
85.45	736
85.50	818
85.55	989
85.60	1,161
85.65	1,332
85.70	1,502
85.75	1,673
85.80	1,842
85.85	2,011
85.90	2,180
85.95	2,348
86.00	2,515
86.05	2,681
86.10	2,847
86.15	3,011
86.20	3,175
86.25	3,339
86.30	3,501
86.35	3,662
86.40	3,823
86.45	3,982
86.50	4,141
86.55	4,298
86.60	4,455
86.65	4,610
86.70	4,764
86.75	4,916
86.80	5,068
86.85	5,218
86.90	5,366
86.95	5,513
87.00	5,659
87.05	5,803
87.10	5,946
87.15	6,086
87.20	6,225
87.25	6,361
87.30	6,495
87.35	6,627
87.40	6,756
87.45	6,884
87.50	7,008
87.55	7,129
87.60	7,247
87.65	7,361
87.70	7,471
87.75	7,574
87.80	7,671
87.85	7,763
87.90	7,851
87.95	7,937
88.00	8,020
88.05	8,102
88.10	8,184
88.15	8,266
88.20	8,347
88.25	8,429
88.30	8,511
88.35	8,593
88.40	8,674
88.45	8,756
88.50	**8,838**

Hydrograph for Pond P1: POND SC 310

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	86.50	0.00	0.00	0.00
1.00	0.00	0	86.50	0.00	0.00	0.00
2.00	0.00	0	86.50	0.00	0.00	0.00
3.00	0.00	0	86.50	0.00	0.00	0.00
4.00	0.01	0	86.50	0.01	0.01	0.00
5.00	0.01	0	86.50	0.01	0.01	0.00
6.00	0.02	0	86.50	0.02	0.02	0.00
7.00	0.02	0	86.50	0.02	0.02	0.00
8.00	0.04	0	86.50	0.04	0.04	0.00
9.00	0.06	0	86.50	0.06	0.06	0.00
10.00	0.09	0	86.50	0.09	0.09	0.00
11.00	0.14	0	86.50	0.14	**0.14**	0.00
12.00	**1.52**	**698**	**87.47**	**0.23**	**0.23**	**0.00**
13.00	**0.18**	**904**	**87.71**	**0.23**	0.23	**0.00**
14.00	0.12	601	87.37	0.23	0.23	0.00
15.00	0.09	141	86.79	0.23	0.23	0.00
16.00	0.06	0	86.50	0.00	0.00	0.00
17.00	0.05	0	86.50	0.00	0.00	0.00
18.00	0.04	0	86.50	0.00	0.00	0.00
19.00	0.03	0	86.50	0.00	0.00	0.00
20.00	0.03	0	86.50	0.00	0.00	0.00
21.00	0.03	0	86.50	0.00	0.00	0.00
22.00	0.03	0	86.50	0.00	0.00	0.00
23.00	0.02	0	86.50	0.00	0.00	0.00
24.00	0.02	0	86.50	0.00	0.00	0.00
25.00	0.00	0	86.50	0.00	0.00	0.00
26.00	0.00	0	86.50	0.00	0.00	0.00
27.00	0.00	0	86.50	0.00	0.00	0.00
28.00	0.00	0	86.50	0.00	0.00	0.00
29.00	0.00	0	86.50	0.00	0.00	0.00
30.00	0.00	0	86.50	0.00	0.00	0.00
31.00	0.00	0	86.50	0.00	0.00	0.00
32.00	0.00	0	86.50	0.00	0.00	0.00
33.00	0.00	0	86.50	0.00	0.00	0.00
34.00	0.00	0	86.50	0.00	0.00	0.00
35.00	0.00	0	86.50	0.00	0.00	0.00

Hydrograph for Pond P2: POND 2 SC 740

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	85.00	0.00	0.00	0.00
1.00	0.00	0	85.00	0.00	0.00	0.00
2.00	0.00	0	85.00	0.00	0.00	0.00
3.00	0.00	0	85.00	0.00	0.00	0.00
4.00	0.00	0	85.00	0.00	0.00	0.00
5.00	0.02	0	85.00	0.02	0.02	0.00
6.00	0.04	0	85.00	0.04	0.04	0.00
7.00	0.08	0	85.00	0.08	0.08	0.00
8.00	0.13	0	85.00	0.13	0.13	0.00
9.00	0.23	0	85.00	0.23	0.23	0.00
10.00	0.35	0	85.00	0.35	0.35	0.00
11.00	0.60	0	85.00	0.60	**0.60**	0.00
12.00	**6.97**	**3,700**	**86.36**	**0.78**	**0.78**	**0.00**
13.00	**0.88**	**6,017**	**87.13**	**1.84**	0.78	**1.06**
14.00	0.56	4,475	86.61	0.82	0.78	0.04
15.00	0.43	3,417	86.27	0.78	0.78	0.00
16.00	0.30	1,920	85.82	0.78	0.78	0.00
17.00	0.24	74	85.05	0.78	0.78	0.00
18.00	0.18	0	85.00	0.37	0.37	0.00
19.00	0.16	0	85.00	0.33	0.33	0.00
20.00	0.15	0	85.00	0.29	0.29	0.00
21.00	0.13	0	85.00	0.27	0.27	0.00
22.00	0.12	0	85.00	0.24	0.24	0.00
23.00	0.11	0	85.00	0.22	0.22	0.00
24.00	0.10	0	85.00	0.19	0.19	0.00
25.00	0.00	0	85.00	0.00	0.00	0.00
26.00	0.00	0	85.00	0.00	0.00	0.00
27.00	0.00	0	85.00	0.00	0.00	0.00
28.00	0.00	0	85.00	0.00	0.00	0.00
29.00	0.00	0	85.00	0.00	0.00	0.00
30.00	0.00	0	85.00	0.00	0.00	0.00
31.00	0.00	0	85.00	0.00	0.00	0.00
32.00	0.00	0	85.00	0.00	0.00	0.00
33.00	0.00	0	85.00	0.00	0.00	0.00
34.00	0.00	0	85.00	0.00	0.00	0.00
35.00	0.00	0	85.00	0.00	0.00	0.00

SUBSURFACE INFILTRATION SYSTEM 1

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.

Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
16.4000	***R***	**Recharge (infiltration) rate (feet/day)**
0.280	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
800.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
44.200	**x**	**1/2 length of basin (x direction, in feet)**
5.200	**y**	**1/2 width of basin (y direction, in feet)**
0.500	**t**	**duration of infiltration period (days)**
25.400	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

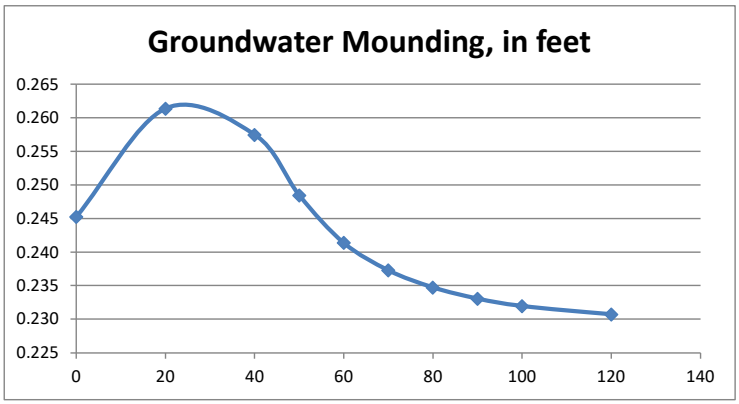
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

25.645	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
0.245	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
0.245	0
0.261	20
0.257	40
0.248	50
0.241	60
0.237	70
0.235	80
0.233	90
0.232	100
0.231	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

SUBSURFACE INFILTRATION SYSTEM 2

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.

Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values

16.4000	*R*	**Recharge (infiltration) rate (feet/day)**
0.260	Sy	**Specific yield, Sy (dimensionless, between 0 and 1)**
800.00	K	**Horizontal hydraulic conductivity, Kh (feet/day)***
50.850	x	**1/2 length of basin (x direction, in feet)**
17.400	y	**1/2 width of basin (y direction, in feet)**
0.830	t	**duration of infiltration period (days)**
23.400	hi(0)	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

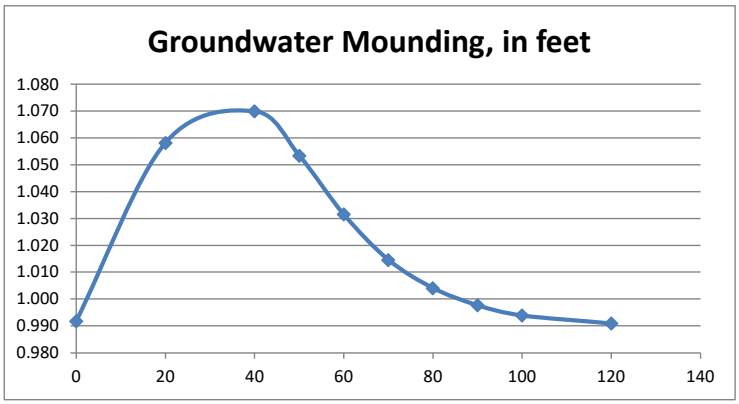
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

24.392	h(max)	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
0.992	Δh(max)	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

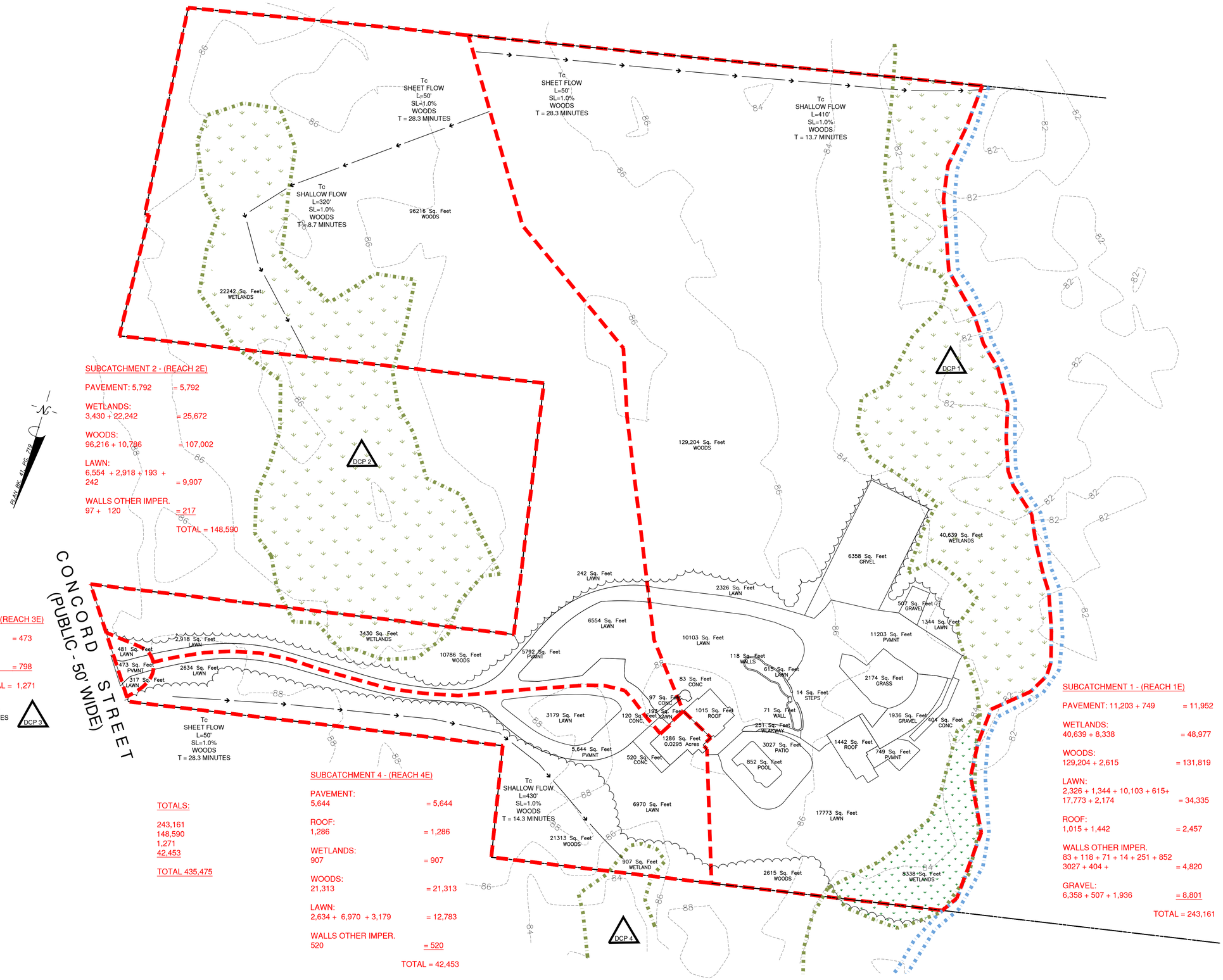
Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
0.992	0
1.058	20
1.070	40
1.053	50
1.032	60
1.015	70
1.004	80
0.998	90
0.994	100
0.991	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.



SUBCATCHMENT 2 - (REACH 2E)

PAVEMENT: 5,792 = 5,792

WETLANDS:
3,430 + 22,242 = 25,672

WOODS:
96,216 + 10,786 = 107,002

LAWN:
6,554 + 2,918 + 193 + 242 = 9,907

WALLS OTHER IMPER.
97 + 120 = 217

TOTAL = 148,590

SUBCATCHMENT 3 - (REACH 3E)

PAVEMENT: 473 = 473

LAWN:
481 + 317 = 798

TOTAL = 1,271

Tc
ASSUMED
T = 5.0 MINUTES

SUBCATCHMENT 4 - (REACH 4E)

PAVEMENT:
5,644 = 5,644

ROOF:
1,286 = 1,286

WETLANDS:
907 = 907

WOODS:
21,313 = 21,313

LAWN:
2,634 + 6,970 + 3,179 = 12,783

WALLS OTHER IMPER.
520 = 520

TOTAL = 42,453

TOTALS:

243,161
148,590
1,271
42,453

TOTAL 435,475

SUBCATCHMENT 1 - (REACH 1E)

PAVEMENT: 11,203 + 749 = 11,952

WETLANDS:
40,639 + 8,338 = 48,977

WOODS:
129,204 + 2,615 = 131,819

LAWN:
2,326 + 1,344 + 10,103 + 615 + 17,773 + 2,174 = 34,335

ROOF:
1,015 + 1,442 = 2,457

WALLS OTHER IMPER.
83 + 118 + 71 + 14 + 251 + 852 3027 + 404 + = 4,820

GRAVEL:
6,358 + 507 + 1,936 = 8,801

TOTAL = 243,161

DRAWING REVISIONS

ACTION	DATE	DESCRIPTION
1	9/22/21	CONSERVATION COMMENTS

SURVEY NOTES:

1. ALL RESOURCE AREAS SHOWN HEREON WERE FIELD LOCATED BY CAVANARO CONSULTING IN JANUARY, 2018.

2. RESOURCE AREAS WERE FLAGGED BY SOUTH RIVER ENVIRONMENTAL DECEMBER 2017 AND REVISED BY SAME ON OCTOBER 9, 2018.

3. LOCUS LIES IN F.I.R.M. ZONE A, AE AND X AS SHOWN ON COMMUNITY PANEL NO. 25023C0181J DATED JULY 17, 2012. LOCATION OF ZONE AE TO BE CONFIRMED BY ADDITIONAL TOPOGRAPHY.

WETLANDS NOTES:

1. WETLAND DELINEATION AREAS SHOWN HEREON ARE BASED ON ORDER OF RESOURCE AREA DELINEATION SE 273-0400 ISSUED BY THE TOWN OF ROCKLAND ON JANUARY 11, 2019.

OWNERS OF RECORD:

DANIEL G. & CHRISTINE M. DELPRETE
365 CONCORD STREET
ROCKLAND, MA 02370
ASSESSOR'S PARCEL: 62-35
DEED BOOK:16754, PAGE: 267

DELPRETE REALTY CORP.
365 CONCORD STREET
ROCKLAND, MA 02370
ASSESSOR'S PARCEL: 62-46
BOOK: 28919, PAGE: 257
ASSESSOR'S PARCEL: 62-36
DEED BOOK: 28919, PAGE: 245

DANIEL DELPRETE
365 CONCORD STREET
ROCKLAND, MA 02370
ASSESSOR'S PARCEL: 62-41&42
BOOK: 48716, PAGE: 32
ASSESSOR'S PARCEL: 62-43&44
BOOK: 37548, PAGE: 217

SCALE: 1" = 40'

0' 20' 40' 80' 120'

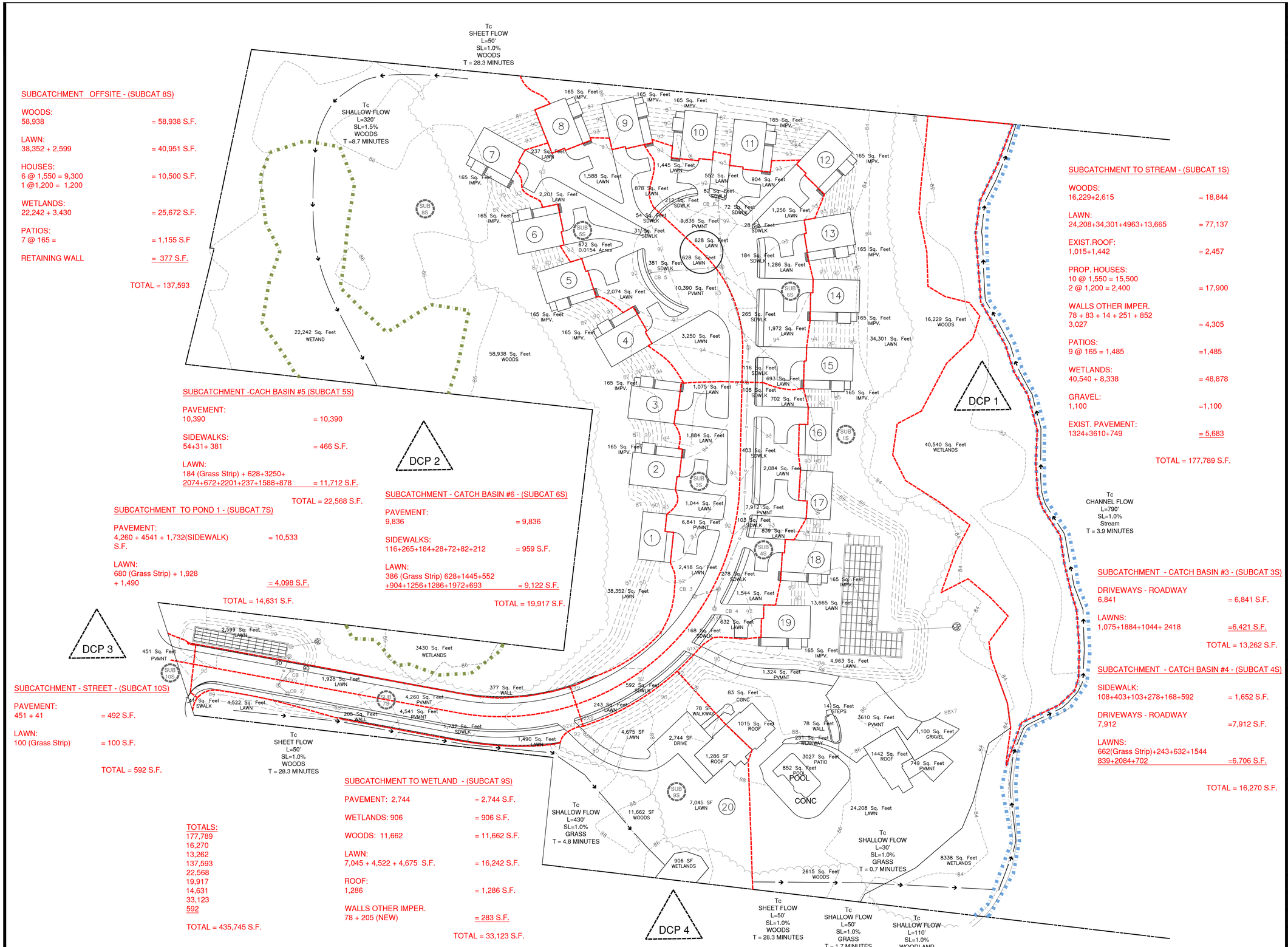
EXISTING CONDITIONS SUBCATCHMENT AREAS

CAVANARO CONSULTING
687 MAIN STREET
P.O. BOX 5175
NORWELL, MASSACHUSETTS 02061
PHONE: 781.659.8187
FAX: 781.659.8186

CONCORD MEADOWS EXISTING CONDITIONS
365 CONCORD STREET
ROCKLAND, MA 02370

PREPARED FOR:
CONROCK LLC
P.O. BOX 1414
DUXBURY, MA 02331

PROJECT NO. : 19.103	DRAWING NO. ECSA
SCALE : AS SHOWN	
DATE : 6/1/21	
DELINEATED BY : JZ	
DRAWN BY : DB/CR	SHEET NO. 1 OF 2
CHECKED BY : BPS	FILENAME: X:\PR\2011\19.103\DWG\2019\PRELIM 2/18/21



SUBCATCHMENT OFFSITE - (SUBCAT 8S)

WOODS:
58,938 = 58,938 S.F.

LAWN:
38,352 + 2,599 = 40,951 S.F.

HOUSES:
6 @ 1,550 = 9,300 = 10,500 S.F.
1 @1,200 = 1,200

WETLANDS:
22,242 + 3,430 = 25,672 S.F.

PATIOS:
7 @ 165 = = 1,155 S.F

RETAINING WALL = 377 S.F.

TOTAL = 137,593

SUBCATCHMENT -CACH BASIN #5 (SUBCAT 5S)

PAVEMENT:
10,390 = 10,390

SIDEWALKS:
54+31+ 381 = 466 S.F.

LAWN:
184 (Grass Strip) + 628+3250+
2074+672+2201+237+1588+878 = 11,712 S.F.

TOTAL = 22,568 S.F.

SUBCATCHMENT TO POND 1 - (SUBCAT 7S)

PAVEMENT:
4,260 + 4541 + 1,732(SIDEWALK) = 10,533 S.F.

LAWN:
680 (Grass Strip) + 1,928
+ 1,490 = 4,098 S.F.

TOTAL = 14,631 S.F.

SUBCATCHMENT - CATCH BASIN #6 - (SUBCAT 6S)

PAVEMENT:
9,836 = 9,836

SIDEWALKS:
116+265+184+28+72+82+212 = 959 S.F.

LAWN:
386 (Grass Strip) 628+1445+552
+904+1256+1286+1972+693 = 9,122 S.F.

TOTAL = 19,917 S.F.

SUBCATCHMENT - STREET - (SUBCAT 10S)

PAVEMENT:
451 + 41 = 492 S.F.

LAWN:
100 (Grass Strip) = 100 S.F.

TOTAL = 592 S.F.

SUBCATCHMENT TO WETLAND - (SUBCAT 9S)

PAVEMENT: 2,744 = 2,744 S.F.

WETLANDS: 906 = 906 S.F.

WOODS: 11,662 = 11,662 S.F.

LAWN:
7,045 + 4,522 + 4,675 S.F. = 16,242 S.F.

ROOF:
1,286 = 1,286 S.F.

WALLS OTHER IMPER.
78 + 205 (NEW) = 283 S.F.

TOTAL = 33,123 S.F.

TOTALS:
177,789
16,270
13,262
137,593
22,568
19,917
14,631
33,123
592

TOTAL = 435,745 S.F.

SUBCATCHMENT TO STREAM - (SUBCAT 1S)

WOODS:
16,229+2,615 = 18,844

LAWN:
24,208+34,301+4963+13,665 = 77,137

EXIST.ROOF:
1,015+1,442 = 2,457

PROP. HOUSES:
10 @ 1,550 = 15,500
2 @ 1,200 = 2,400 = 17,900

WALLS OTHER IMPER.
78 + 83 + 14 + 251 + 852
3,027 = 4,305

PATIOS:
9 @ 165 = 1,485 =1,485

WETLANDS:
40,540 + 8,338 = 48,878

GRAVEL:
1,100 =1,100

EXIST. PAVEMENT:
1324+3610+749 = 5,683

TOTAL = 177,789 S.F.

Tc
CHANNEL FLOW
L=790'
SL=1.0%
Stream
T = 3.9 MINUTES

SUBCATCHMENT - CATCH BASIN #3 - (SUBCAT 3S)

DRIVEWAYS - ROADWAY
6,841 = 6,841 S.F.

LAWNS:
1,075+1884+1044+ 2418 =6,421 S.F.

TOTAL = 13,262 S.F.

SUBCATCHMENT - CATCH BASIN #4 - (SUBCAT 4S)

SIDEWALK:
108+403+103+278+168+592 = 1,652 S.F.

DRIVEWAYS - ROADWAY
7,912 =7,912 S.F.

LAWNS:
662(Grass Strip)+243+632+1544
839+2084+702 =6,706 S.F.

TOTAL = 16,270 S.F.

SCALE: 1" = 40'
0' 20' 40' 80' 120'

DRAWING REVISIONS

ACTION	DATE	DESCRIPTION
4	1/7/22	CONSERVATION COMMENTS
3	12/23/21	CONSERVATION COMMENTS
2	11/30/21	CONSERVATION COMMENTS
1	9/22/21	CONSERVATION COMMENTS

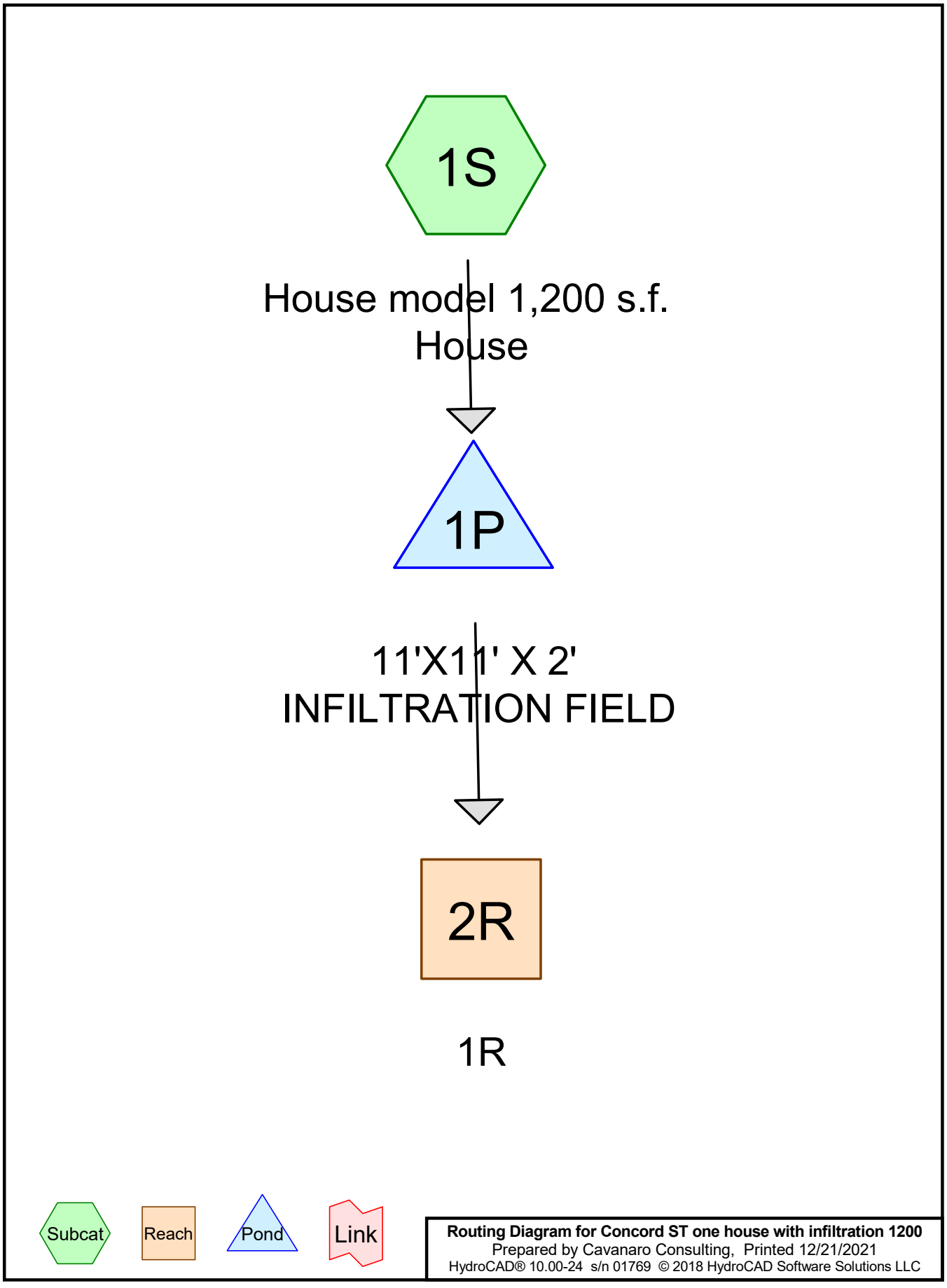
PROPOSED CONDITIONS SUBCATCHMENT AREAS

CAVANARO CONSULTING
687 MAIN STREET
P.O. BOX 5175
NORWELL, MASSACHUSETTS 02061
PHONE: 781.659.8187
FAX: 781.659.8186

CONCORD MEADOWS
SUBCATCHMENT AREAS
365 CONCORD STREET
ROCKLAND, MA 02370

PREPARED FOR:
CONROCK LLC
P.O. BOX 1414
DUXBURY, MA 02331

PROJECT NO. : 19.103	DRAWING NO. PCSA
SCALE : AS SHOWN	
DATE : 6/1/21	
DELINEATED BY : JZ	
DRAWN BY : DB/CR	SHEET NO. 2 OF 2
CHECKED BY : BPS	FILENAME: X:\PR\2011\19.103\DWG\2019\PRELIM 2/18/21



Routing Diagram for Concord ST one house with infiltration 1200
Prepared by Cavanaro Consulting, Printed 12/21/2021

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,200 s.f. Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.09 cfs 297 cf

Reach 2R: 1R Inflow=0.08 cfs 134 cf
Outflow=0.08 cfs 134 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.70' Storage=99 cf Inflow=0.09 cfs 297 cf
Discarded=0.00 cfs 118 cf Primary=0.08 cfs 134 cf Outflow=0.08 cfs 252 cf

Total Runoff Area = 1,200 sf Runoff Volume = 297 cf Average Runoff Depth = 2.97"
0.00% Pervious = 0 sf 100.00% Impervious = 1,200 sf

Summary for Subcatchment 1S: House model 1,200 s.f. House

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 297 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	1,200	98	
	1,200		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 1.34" for 2 Year Event event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 134 cf
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 134 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 Year Event event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 297 cf
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 252 cf, Atten= 4%, Lag= 1.4 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 118 cf
Primary = 0.08 cfs @ 12.09 hrs, Volume= 134 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.70' @ 12.09 hrs Surf.Area= 121 sf Storage= 99 cf

Plug-Flow detention time= 281.2 min calculated for 252 cf (85% of inflow)
Center-of-Mass det. time= 216.3 min (971.8 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.70' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.08 cfs @ 12.09 hrs HW=99.70' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.52 fps)

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,200 s.f. Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.13 cfs 436 cf

Reach 2R: 1R Inflow=0.12 cfs 265 cf
Outflow=0.12 cfs 265 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.76' Storage=102 cf Inflow=0.13 cfs 436 cf
Discarded=0.00 cfs 124 cf Primary=0.12 cfs 265 cf Outflow=0.12 cfs 389 cf

Total Runoff Area = 1,200 sf Runoff Volume = 436 cf Average Runoff Depth = 4.36"
0.00% Pervious = 0 sf 100.00% Impervious = 1,200 sf

Summary for Subcatchment 1S: House model 1,200 s.f. House

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 436 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	1,200	98	
	1,200		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 2.65" for 10 Year Event event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 265 cf
Outflow = 0.12 cfs @ 12.09 hrs, Volume= 265 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 4.36" for 10 Year Event event
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 436 cf
Outflow = 0.12 cfs @ 12.09 hrs, Volume= 389 cf, Atten= 3%, Lag= 1.1 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 124 cf
Primary = 0.12 cfs @ 12.09 hrs, Volume= 265 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.76' @ 12.09 hrs Surf.Area= 121 sf Storage= 102 cf

Plug-Flow detention time= 205.6 min calculated for 389 cf (89% of inflow)
Center-of-Mass det. time= 152.9 min (901.4 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.76' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.12 cfs @ 12.09 hrs HW=99.76' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 1.72 fps)

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,200 s.f. Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=5.36"
Tc=5.0 min CN=98 Runoff=0.16 cfs 536 cf

Reach 2R: 1R Inflow=0.15 cfs 362 cf
Outflow=0.15 cfs 362 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.79' Storage=104 cf Inflow=0.16 cfs 536 cf
Discarded=0.00 cfs 126 cf Primary=0.15 cfs 362 cf Outflow=0.15 cfs 489 cf

Total Runoff Area = 1,200 sf Runoff Volume = 536 cf Average Runoff Depth = 5.36"
0.00% Pervious = 0 sf 100.00% Impervious = 1,200 sf

Summary for Subcatchment 1S: House model 1,200 s.f. House

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 536 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.60"

	Area (sf)	CN	Description
*	1,200	98	
	1,200		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 3.62" for 25 Year Event event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 362 cf
Outflow = 0.15 cfs @ 12.09 hrs, Volume= 362 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 5.36" for 25 Year Event event
Inflow = 0.16 cfs @ 12.07 hrs, Volume= 536 cf
Outflow = 0.15 cfs @ 12.09 hrs, Volume= 489 cf, Atten= 3%, Lag= 1.1 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 126 cf
Primary = 0.15 cfs @ 12.09 hrs, Volume= 362 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.79' @ 12.09 hrs Surf.Area= 121 sf Storage= 104 cf

Plug-Flow detention time= 176.5 min calculated for 489 cf (91% of inflow)
Center-of-Mass det. time= 130.6 min (875.9 - 745.3)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.79' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.15 cfs @ 12.09 hrs HW=99.79' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.85 fps)

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,200 s.f. Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.76"
Tc=5.0 min CN=98 Runoff=0.20 cfs 676 cf

Reach 2R: 1R Inflow=0.19 cfs 499 cf
Outflow=0.19 cfs 499 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.86' Storage=107 cf Inflow=0.20 cfs 676 cf
Discarded=0.00 cfs 129 cf Primary=0.19 cfs 499 cf Outflow=0.19 cfs 628 cf

Total Runoff Area = 1,200 sf Runoff Volume = 676 cf Average Runoff Depth = 6.76"
0.00% Pervious = 0 sf 100.00% Impervious = 1,200 sf

Summary for Subcatchment 1S: House model 1,200 s.f. House

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 676 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	1,200	98	
	1,200		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 4.99" for 100 Year Event event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 499 cf
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 499 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,200 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 Year Event event
Inflow = 0.20 cfs @ 12.07 hrs, Volume= 676 cf
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 628 cf, Atten= 4%, Lag= 1.4 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 129 cf
Primary = 0.19 cfs @ 12.09 hrs, Volume= 499 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.86' @ 12.09 hrs Surf.Area= 121 sf Storage= 107 cf

Plug-Flow detention time= 148.8 min calculated for 628 cf (93% of inflow)
Center-of-Mass det. time= 110.1 min (852.1 - 742.0)

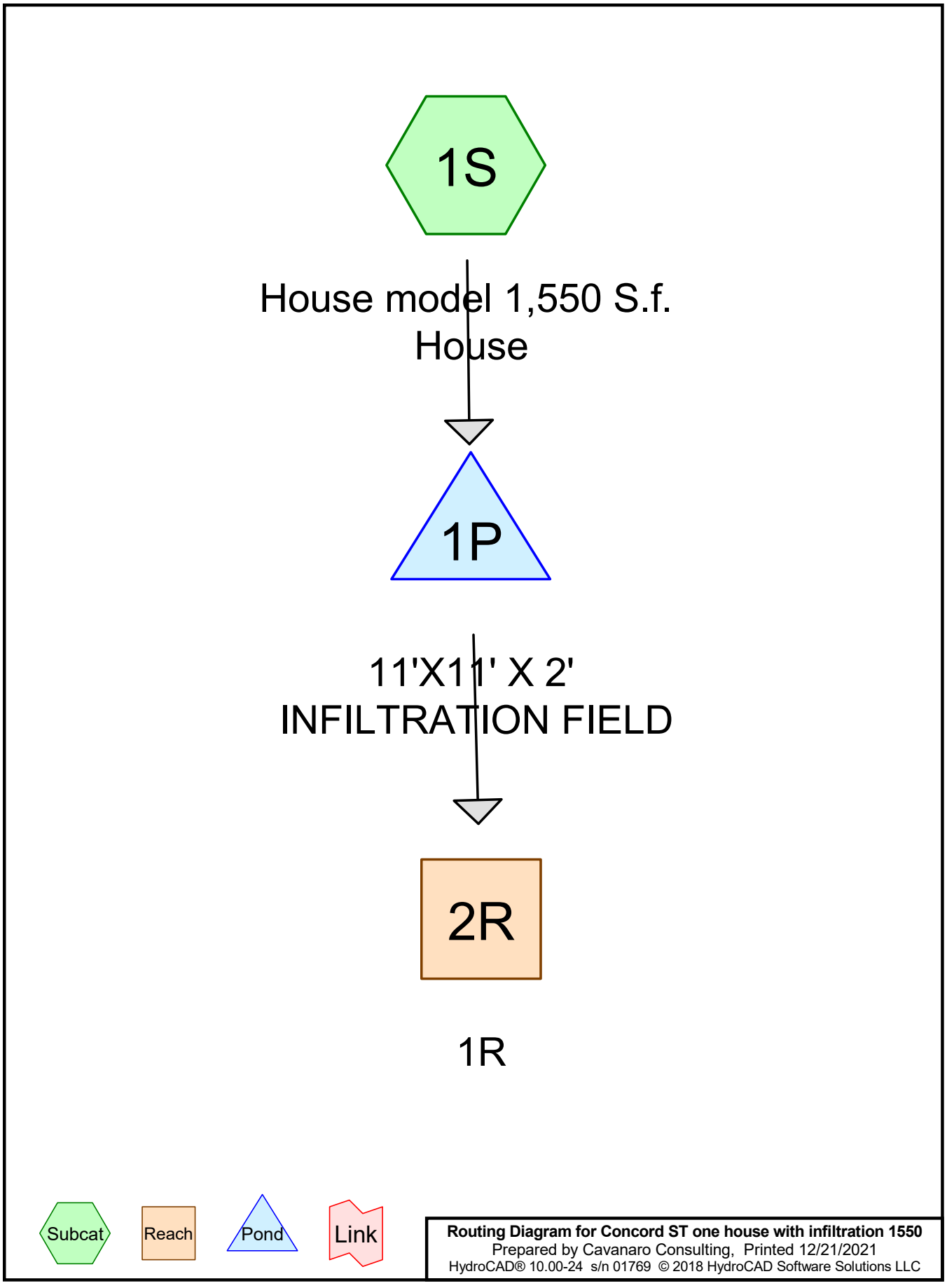
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.86' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.19 cfs @ 12.09 hrs HW=99.86' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.13 fps)



Routing Diagram for Concord ST one house with infiltration 1550
Prepared by Cavanaro Consulting, Printed 12/21/2021

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,550 S.f. Runoff Area=1,550 sf 100.00% Impervious Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.11 cfs 383 cf

Reach 2R: 1R Inflow=0.11 cfs 216 cf
Outflow=0.11 cfs 216 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.74' Storage=101 cf Inflow=0.11 cfs 383 cf
Discarded=0.00 cfs 121 cf Primary=0.11 cfs 216 cf Outflow=0.11 cfs 336 cf

Total Runoff Area = 1,550 sf Runoff Volume = 383 cf Average Runoff Depth = 2.97"
0.00% Pervious = 0 sf 100.00% Impervious = 1,550 sf

Summary for Subcatchment 1S: House model 1,550 S.f. House

Runoff = 0.11 cfs @ 12.07 hrs, Volume= 383 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	1,550	98	
	1,550		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 1.67" for 2 Year Event event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 216 cf
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 216 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 Year Event event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 383 cf
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 336 cf, Atten= 3%, Lag= 1.1 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 121 cf
Primary = 0.11 cfs @ 12.09 hrs, Volume= 216 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.74' @ 12.09 hrs Surf.Area= 121 sf Storage= 101 cf

Plug-Flow detention time= 225.3 min calculated for 336 cf (88% of inflow)
Center-of-Mass det. time= 168.8 min (924.2 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.74' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.11 cfs @ 12.09 hrs HW=99.74' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 1.66 fps)

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,550 S.f. Runoff Area=1,550 sf 100.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=98 Runoff=0.17 cfs 564 cf

Reach 2R: 1R Inflow=0.16 cfs 390 cf
Outflow=0.16 cfs 390 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.81' Storage=104 cf Inflow=0.17 cfs 564 cf
Discarded=0.00 cfs 126 cf Primary=0.16 cfs 390 cf Outflow=0.16 cfs 516 cf

Total Runoff Area = 1,550 sf Runoff Volume = 564 cf Average Runoff Depth = 4.36"
0.00% Pervious = 0 sf 100.00% Impervious = 1,550 sf

Summary for Subcatchment 1S: House model 1,550 S.f. House

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 564 cf, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	1,550	98	
	1,550		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 3.02" for 10 Year Event event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 390 cf
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 390 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 4.36" for 10 Year Event event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 564 cf
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 516 cf, Atten= 3%, Lag= 1.2 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 126 cf
Primary = 0.16 cfs @ 12.09 hrs, Volume= 390 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.81' @ 12.09 hrs Surf.Area= 121 sf Storage= 104 cf

Plug-Flow detention time= 168.2 min calculated for 516 cf (92% of inflow)
Center-of-Mass det. time= 124.3 min (872.8 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.81' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.16 cfs @ 12.09 hrs HW=99.81' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.89 fps)

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,550 S.f. Runoff Area=1,550 sf 100.00% Impervious Runoff Depth=5.36"
Tc=5.0 min CN=98 Runoff=0.20 cfs 693 cf

Reach 2R: 1R Inflow=0.19 cfs 516 cf
Outflow=0.19 cfs 516 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.87' Storage=107 cf Inflow=0.20 cfs 693 cf
Discarded=0.00 cfs 128 cf Primary=0.19 cfs 516 cf Outflow=0.19 cfs 645 cf

Total Runoff Area = 1,550 sf Runoff Volume = 693 cf Average Runoff Depth = 5.36"
0.00% Pervious = 0 sf 100.00% Impervious = 1,550 sf

Summary for Subcatchment 1S: House model 1,550 S.f. House

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 693 cf, Depth= 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.60"

	Area (sf)	CN	Description
*	1,550	98	
	1,550		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 4.00" for 25 Year Event event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 516 cf
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 516 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 5.36" for 25 Year Event event
Inflow = 0.20 cfs @ 12.07 hrs, Volume= 693 cf
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 645 cf, Atten= 5%, Lag= 1.4 min
Discarded = 0.00 cfs @ 12.09 hrs, Volume= 128 cf
Primary = 0.19 cfs @ 12.09 hrs, Volume= 516 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.87' @ 12.09 hrs Surf.Area= 121 sf Storage= 107 cf

Plug-Flow detention time= 144.5 min calculated for 645 cf (93% of inflow)
Center-of-Mass det. time= 106.7 min (852.0 - 745.3)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=99.87' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.19 cfs @ 12.09 hrs HW=99.87' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.19 fps)

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: House model 1,550 S.f. Runoff Area=1,550 sf 100.00% Impervious Runoff Depth=6.76"
Tc=5.0 min CN=98 Runoff=0.25 cfs 873 cf

Reach 2R: 1R Inflow=0.24 cfs 694 cf
Outflow=0.24 cfs 694 cf

Pond 1P: 11'X11' X 2' INFILTRATION FIELD Peak Elev=99.98' Storage=113 cf Inflow=0.25 cfs 873 cf
Discarded=0.00 cfs 131 cf Primary=0.24 cfs 694 cf Outflow=0.24 cfs 825 cf

Total Runoff Area = 1,550 sf Runoff Volume = 873 cf Average Runoff Depth = 6.76"
0.00% Pervious = 0 sf 100.00% Impervious = 1,550 sf

Summary for Subcatchment 1S: House model 1,550 S.f. House

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 873 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	1,550	98	
	1,550		100.00% Impervious Area

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

Summary for Reach 2R: 1R

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 5.38" for 100 Year Event event
Inflow = 0.24 cfs @ 12.10 hrs, Volume= 694 cf
Outflow = 0.24 cfs @ 12.10 hrs, Volume= 694 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: 11'X11' X 2' INFILTRATION FIELD

Inflow Area = 1,550 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 Year Event event
Inflow = 0.25 cfs @ 12.07 hrs, Volume= 873 cf
Outflow = 0.24 cfs @ 12.10 hrs, Volume= 825 cf, Atten= 6%, Lag= 1.7 min
Discarded = 0.00 cfs @ 12.10 hrs, Volume= 131 cf
Primary = 0.24 cfs @ 12.10 hrs, Volume= 694 cf

Routing by Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 99.98' @ 12.10 hrs Surf.Area= 121 sf Storage= 113 cf

Plug-Flow detention time= 121.9 min calculated for 825 cf (95% of inflow)
Center-of-Mass det. time= 90.1 min (832.1 - 742.0)

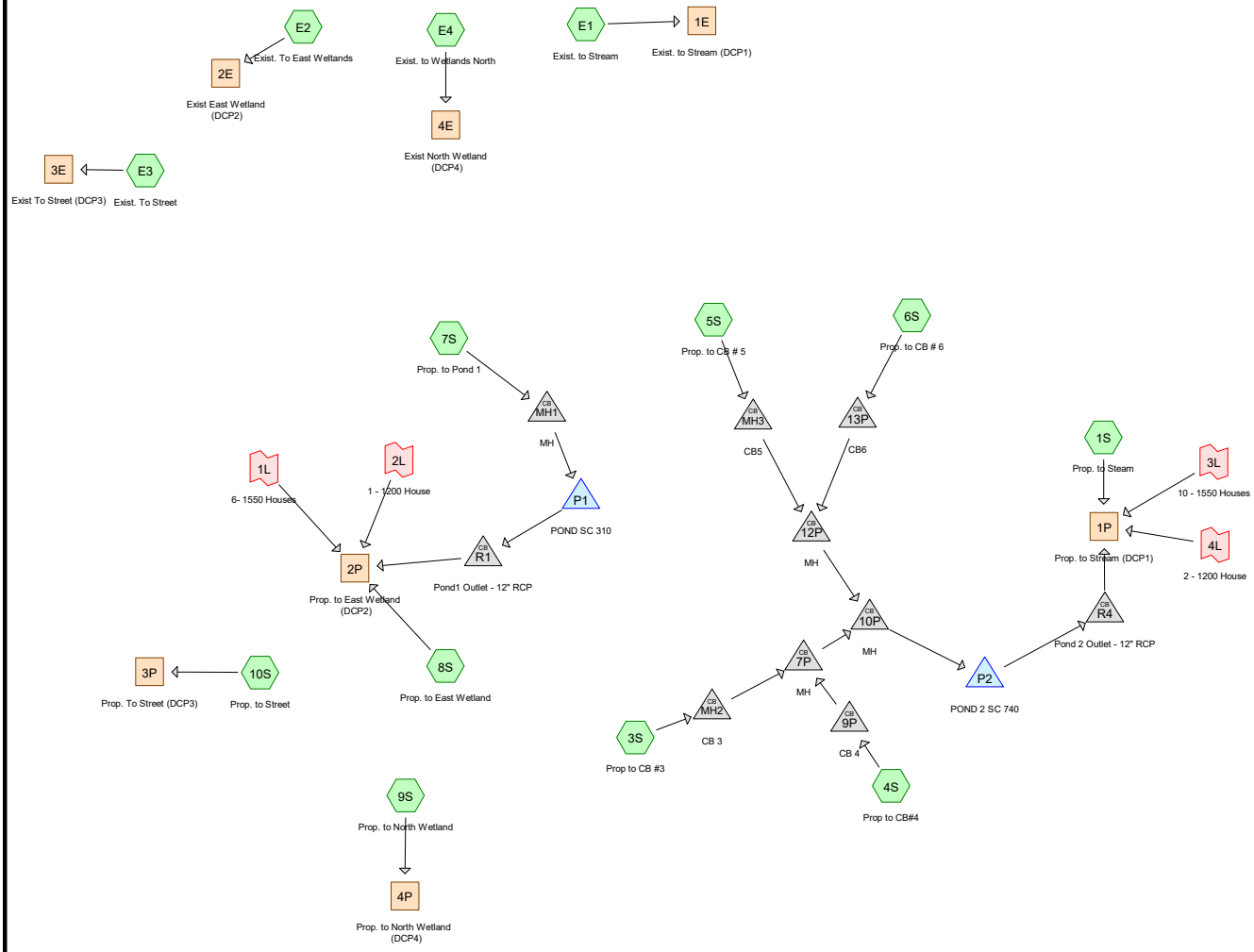
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	86 cf	**Custom Stage Data (Irregular)** Listed below 242 cf Overall - 28 cf Embedded = 214 cf x 40.0% Voids
#2	98.50'	28 cf	**Cultec C-100** x 2 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
		114 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
98.00	121	44.0	0	0	121
100.00	121	44.0	242	242	209

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	99.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 12.10 hrs HW=99.98' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.24 cfs @ 12.10 hrs HW=99.98' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 2.71 fps)



Subcat Reach Pond Link

Routing Diagram for Concord ST - Rockland REV 1-4-21
Prepared by Cavanaro Consulting, Printed 1/6/2022
HydroCAD® 10.00-24 s/n 01769 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
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 1S: Prop. to Steam Runoff Area=159,889 sf 38.35% Impervious Runoff Depth=1.61"
Flow Length=1,030' Slope=0.0100 '/' Tc=38.3 min CN=83 Runoff=3.48 cfs 0.492 af

Subcatchment 3S: Prop to CB #3 Runoff Area=13,262 sf 51.58% Impervious Runoff Depth=1.84"
Tc=5.0 min CN=86 Runoff=0.68 cfs 0.047 af

Subcatchment 4S: Prop to CB#4 Runoff Area=16,270 sf 58.78% Impervious Runoff Depth=2.00"
Tc=5.0 min CN=88 Runoff=0.90 cfs 0.062 af

Subcatchment 5S: Prop. to CB # 5 Runoff Area=22,568 sf 48.10% Impervious Runoff Depth=1.84"
Tc=5.0 min CN=86 Runoff=1.16 cfs 0.079 af

Subcatchment 6S: Prop. to CB # 6 Runoff Area=19,917 sf 54.20% Impervious Runoff Depth=1.91"
Tc=5.0 min CN=87 Runoff=1.06 cfs 0.073 af

Subcatchment 7S: Prop. to Pond 1 Runoff Area=14,631 sf 71.99% Impervious Runoff Depth=2.26"
Tc=5.0 min CN=91 Runoff=0.91 cfs 0.063 af

Subcatchment 8S: Prop. to East Wetland Runoff Area=127,093 sf 20.50% Impervious Runoff Depth=1.21"
Flow Length=370' Tc=37.0 min CN=77 Runoff=2.06 cfs 0.295 af

Subcatchment 9S: Prop. to North Wetland Runoff Area=33,123 sf 15.76% Impervious Runoff Depth=1.15"
Flow Length=480' Slope=0.0100 '/' Tc=33.1 min CN=76 Runoff=0.53 cfs 0.073 af

Subcatchment 10S: Prop. to Street Runoff Area=592 sf 83.11% Impervious Runoff Depth=2.54"
Tc=5.0 min CN=94 Runoff=0.04 cfs 0.003 af

Subcatchment E1: Exist. to Stream Runoff Area=243,161 sf 28.05% Impervious Runoff Depth=1.34"
Flow Length=460' Slope=0.0100 '/' Tc=42.0 min CN=79 Runoff=4.12 cfs 0.622 af

Subcatchment E2: Exist. To East Runoff Area=148,590 sf 21.32% Impervious Runoff Depth=1.15"
Flow Length=370' Tc=37.0 min CN=76 Runoff=2.27 cfs 0.327 af

Subcatchment E3: Exist. To Street Runoff Area=1,271 sf 37.21% Impervious Runoff Depth=1.61"
Tc=5.0 min CN=83 Runoff=0.06 cfs 0.004 af

Subcatchment E4: Exist. to Wetlands North Runoff Area=42,453 sf 19.69% Impervious Runoff Depth=1.21"
Flow Length=480' Slope=0.0100 '/' Tc=42.6 min CN=77 Runoff=0.64 cfs 0.098 af

Reach 1E: Exist. to Stream (DCP1) Inflow=4.12 cfs 0.622 af
Outflow=4.12 cfs 0.622 af

Reach 1P: Prop. to Stream (DCP1) Inflow=3.71 cfs 0.548 af
Outflow=3.71 cfs 0.548 af

Reach 2E: Exist East Wetland (DCP2) Inflow=2.27 cfs 0.327 af
Outflow=2.27 cfs 0.327 af

Reach 2P: Prop. to East Wetland (DCP2) Inflow=2.19 cfs 0.327 af
Outflow=2.19 cfs 0.327 af

Reach 3E: Exist To Street (DCP3) Inflow=0.06 cfs 0.004 af
Outflow=0.06 cfs 0.004 af

Reach 3P: Prop. To Street (DCP3) Inflow=0.04 cfs 0.003 af
Outflow=0.04 cfs 0.003 af

Reach 4E: Exist North Wetland (DCP4) Inflow=0.64 cfs 0.098 af
Outflow=0.64 cfs 0.098 af

Reach 4P: Prop. to North Wetland (DCP4) Inflow=0.53 cfs 0.073 af
Outflow=0.53 cfs 0.073 af

Pond 7P: MH Peak Elev=88.17' Inflow=1.58 cfs 0.109 af
15.0" Round Culvert n=0.011 L=60.0' S=0.0100 '/' Outflow=1.58 cfs 0.109 af

Pond 9P: CB 4 Peak Elev=88.33' Inflow=0.90 cfs 0.062 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=0.90 cfs 0.062 af

Pond 10P: MH Peak Elev=87.78' Inflow=3.80 cfs 0.261 af
18.0" Round Culvert n=0.011 L=95.0' S=0.0142 '/' Outflow=3.80 cfs 0.261 af

Pond 12P: MH Peak Elev=89.39' Inflow=2.22 cfs 0.152 af
15.0" Round Culvert n=0.011 L=240.0' S=0.0075 '/' Outflow=2.22 cfs 0.152 af

Pond 13P: CB6 Peak Elev=89.81' Inflow=1.06 cfs 0.073 af
12.0" Round Culvert n=0.011 L=62.0' S=0.0089 '/' Outflow=1.06 cfs 0.073 af

Pond MH1: MH Peak Elev=87.56' Inflow=0.91 cfs 0.063 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0050 '/' Outflow=0.91 cfs 0.063 af

Pond MH2: CB 3 Peak Elev=88.29' Inflow=0.68 cfs 0.047 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=0.68 cfs 0.047 af

Pond MH3: CB5 Peak Elev=89.84' Inflow=1.16 cfs 0.079 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0085 '/' Outflow=1.16 cfs 0.079 af

Pond P1: POND SC 310 Peak Elev=87.30' Storage=534 cf Inflow=0.91 cfs 0.063 af
Discarded=0.23 cfs 0.063 af Primary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.063 af

Pond P2: POND 2 SC 740 Peak Elev=86.06' Storage=2,709 cf Inflow=3.80 cfs 0.261 af
Discarded=0.78 cfs 0.261 af Primary=0.00 cfs 0.000 af Outflow=0.78 cfs 0.261 af

Pond R1: Pond1 Outlet - 12" RCP Peak Elev=86.50' Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0120 '/' Outflow=0.00 cfs 0.000 af

Pond R4: Pond 2 Outlet - 12" RCP Peak Elev=85.00' Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=35.0' S=0.0143 '/' Outflow=0.00 cfs 0.000 af

Link 2 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 6.00 Inflow=0.11 cfs 0.005 af
Area= 0.036 ac 100.00% Imperv. Primary=0.66 cfs 0.030 af

Link 2L: 1 - 2 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce Inflow=0.08 cfs 0.003 af
Area= 0.028 ac 100.00% Imperv. Primary=0.08 cfs 0.003 af

Link 2 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 10.00 Inflow=0.11 cfs 0.005 af
Area= 0.036 ac 100.00% Imperv. Primary=1.10 cfs 0.050 af

Link 2 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce x 2.00 Inflow=0.08 cfs 0.003 af
Area= 0.028 ac 100.00% Imperv. Primary=0.17 cfs 0.006 af

Total Runoff Area = 19.348 ac Runoff Volume = 2.238 af Average Runoff Depth = 1.39"
70.29% Pervious = 13.600 ac 29.71% Impervious = 5.748 ac

Summary for Subcatchment 1S: Prop. to Steam

Runoff = 3.48 cfs @ 12.55 hrs, Volume= 0.492 af, Depth= 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	48,878	98	Water Surface Wetlands, HSG C
	77,137	74	>75% Grass cover, Good, HSG C
*	4,305	98	walls othe rimp.
	1,100	87	Dirt roads, HSG C
	18,844	70	Woods, Good, HSG C
*	2,457	98	Exisit,. Roof
*	5,683	98	Exisit. Pavement
*	1,485	74	Prop. Patios
	159,889	83	Weighted Average
	98,566		61.65% Pervious Area
	61,323		38.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	110	0.0100	0.50		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
3.9	790	0.0100	3.35	20.11	**Channel Flow, Stream** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.040 Earth, cobble bottom, clean sides
38.3	1,030	Total			

Summary for Subcatchment 3S: Prop to CB #3

Runoff = 0.68 cfs @ 12.07 hrs, Volume= 0.047 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

Area (sf)	CN	Description
6,841	98	Paved parking, HSG C
6,421	74	>75% Grass cover, Good, HSG C
13,262	86	Weighted Average
6,421		48.42% Pervious Area
6,841		51.58% Impervious Area

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

Summary for Subcatchment 4S: Prop to CB#4

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 0.062 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	1,652	98	Paved parking, HSG C-Sidewalk
	7,912	98	Paved parking, HSG C
	6,706	74	>75% Grass cover, Good, HSG C
	16,270	88	Weighted Average
	6,706		41.22% Pervious Area
	9,564		58.78% Impervious Area

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

Summary for Subcatchment 5S: Prop. to CB # 5

Runoff = 1.16 cfs @ 12.07 hrs, Volume= 0.079 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	466	98	Paved parking, HSG C - Sidewalk
*	10,390	98	Paved parking, HSG C - rroad-drives
	11,712	74	>75% Grass cover, Good, HSG C
	22,568	86	Weighted Average
	11,712		51.90% Pervious Area
	10,856		48.10% Impervious Area

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

Summary for Subcatchment 6S: Prop. to CB # 6

Runoff = 1.06 cfs @ 12.07 hrs, Volume= 0.073 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	959	98	Paved parking, HSG C - Sidewalk
*	9,836	98	Paved parking, HSG C - rroad-drives
	9,122	74	>75% Grass cover, Good, HSG C
	19,917	87	Weighted Average
	9,122		45.80% Pervious Area
	10,795		54.20% Impervious Area

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

Summary for Subcatchment 7S: Prop. to Pond 1

Runoff = 0.91 cfs @ 12.07 hrs, Volume= 0.063 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
	10,533	98	Paved parking, HSG C
	4,098	74	>75% Grass cover, Good, HSG C
	14,631	91	Weighted Average
	4,098		28.01% Pervious Area
	10,533		71.99% Impervious Area

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

Summary for Subcatchment 8S: Prop. to East Wetland

Runoff = 2.06 cfs @ 12.54 hrs, Volume= 0.295 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	40,951	74	>75% Grass cover, Good, HSG C
	58,938	70	Woods, Good, HSG C
*	1,155	74	Patio
*	377	98	ret wall
	127,093	77	Weighted Average
	101,044		79.50% Pervious Area
	26,049		20.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment 9S: Prop. to North Wetland

Runoff = 0.53 cfs @ 12.48 hrs, Volume= 0.073 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	906	98	Water Surface Wetlands, HSG C
	2,744	98	Paved parking, HSG C
	16,242	74	>75% Grass cover, Good, HSG C
	1,286	98	Roofs, HSG C - infiltrated
*	283	98	walls othe rimp.
	11,662	70	Woods, Good, HSG C
	33,123	76	Weighted Average
	27,904		84.24% Pervious Area
	5,219		15.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
4.8	430	0.0100	1.50		**Shallow Concentrated Flow, shallow** Grassed Waterway Kv= 15.0 fps
33.1	480	Total			

Summary for Subcatchment 10S: Prop. to Street

Runoff = 0.04 cfs @ 12.07 hrs, Volume= 0.003 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

Area (sf)	CN	Description
492	98	Paved parking, HSG C
100	74	>75% Grass cover, Good, HSG C
592	94	Weighted Average
100		16.89% Pervious Area
492		83.11% Impervious Area

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

Summary for Subcatchment E1: Exist. to Stream

Runoff = 4.12 cfs @ 12.60 hrs, Volume= 0.622 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	48,977	98	Water Surface Wetlands, HSG C
	11,952	98	Paved parking, HSG C
	34,335	74	>75% Grass cover, Good, HSG C
	2,457	98	Roofs, HSG C
*	4,820	98	walls othe rimp.
	8,801	87	Dirt roads, HSG C
	131,819	70	Woods, Good, HSG C
	243,161	79	Weighted Average
	174,955		71.95% Pervious Area
	68,206		28.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
13.7	410	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.0	460	Total			

Summary for Subcatchment E2: Exist. To East Weltands

Runoff = 2.27 cfs @ 12.54 hrs, Volume= 0.327 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	5,792	98	Paved parking, HSG C
	9,907	74	>75% Grass cover, Good, HSG C
*	217	98	walls othe rimp.
	107,002	70	Woods, Good, HSG C
	148,590	76	Weighted Average
	116,909		78.68% Pervious Area
	31,681		21.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment E3: Exist. To Street

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Depth= 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

Area (sf)	CN	Description
473	98	Paved parking, HSG C
798	74	>75% Grass cover, Good, HSG C
1,271	83	Weighted Average
798		62.79% Pervious Area
473		37.21% Impervious Area

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

Summary for Subcatchment E4: Exist. to Wetlands North

Runoff = 0.64 cfs @ 12.63 hrs, Volume= 0.098 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Event Rainfall=3.20"

	Area (sf)	CN	Description
*	907	98	Water Surface Wetlands, HSG C
	5,644	98	Paved parking, HSG C
	12,783	74	>75% Grass cover, Good, HSG C
*	520	98	walls othe rimp.
	21,313	70	Woods, Good, HSG C
	1,286	98	Roofs, HSG C
	42,453	77	Weighted Average
	34,096		80.31% Pervious Area
	8,357		19.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
14.3	430	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.6	480	Total			

Summary for Reach 1E: Exist. to Stream (DCP1)

Inflow Area = 5.582 ac, 28.05% Impervious, Inflow Depth = 1.34" for 2 Year Event event
Inflow = 4.12 cfs @ 12.60 hrs, Volume= 0.622 af
Outflow = 4.12 cfs @ 12.60 hrs, Volume= 0.622 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 1P: Prop. to Stream (DCP1)

Inflow Area = 5.387 ac, 43.52% Impervious, Inflow Depth = 1.22" for 2 Year Event event
Inflow = 3.71 cfs @ 12.51 hrs, Volume= 0.548 af
Outflow = 3.71 cfs @ 12.51 hrs, Volume= 0.548 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2E: Exist East Wetland (DCP2)

Inflow Area = 3.411 ac, 21.32% Impervious, Inflow Depth = 1.15" for 2 Year Event event
Inflow = 2.27 cfs @ 12.54 hrs, Volume= 0.327 af
Outflow = 2.27 cfs @ 12.54 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2P: Prop. to East Wetland (DCP2)

Inflow Area = 3.317 ac, 27.22% Impervious, Inflow Depth = 1.18" for 2 Year Event event
Inflow = 2.19 cfs @ 12.53 hrs, Volume= 0.327 af
Outflow = 2.19 cfs @ 12.53 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3E: Exist To Street (DCP3)

Inflow Area = 0.029 ac, 37.21% Impervious, Inflow Depth = 1.61" for 2 Year Event event
Inflow = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3P: Prop. To Street (DCP3)

Inflow Area = 0.014 ac, 83.11% Impervious, Inflow Depth = 2.54" for 2 Year Event event
Inflow = 0.04 cfs @ 12.07 hrs, Volume= 0.003 af
Outflow = 0.04 cfs @ 12.07 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4E: Exist North Wetland (DCP4)

Inflow Area = 0.975 ac, 19.69% Impervious, Inflow Depth = 1.21" for 2 Year Event event
Inflow = 0.64 cfs @ 12.63 hrs, Volume= 0.098 af
Outflow = 0.64 cfs @ 12.63 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4P: Prop. to North Wetland (DCP4)

Inflow Area = 0.760 ac, 15.76% Impervious, Inflow Depth = 1.15" for 2 Year Event event
Inflow = 0.53 cfs @ 12.48 hrs, Volume= 0.073 af
Outflow = 0.53 cfs @ 12.48 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 7P: MH

Inflow Area = 0.678 ac, 55.55% Impervious, Inflow Depth = 1.92" for 2 Year Event event
Inflow = 1.58 cfs @ 12.07 hrs, Volume= 0.109 af
Outflow = 1.58 cfs @ 12.07 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary = 1.58 cfs @ 12.07 hrs, Volume= 0.109 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.17' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.45'	**15.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 87.45' / 86.85' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.57 cfs @ 12.07 hrs HW=88.17' TW=87.78' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.57 cfs @ 3.08 fps)

Summary for Pond 9P: CB 4

Inflow Area = 0.374 ac, 58.78% Impervious, Inflow Depth = 2.00" for 2 Year Event event
Inflow = 0.90 cfs @ 12.07 hrs, Volume= 0.062 af
Outflow = 0.90 cfs @ 12.07 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 12.07 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Peak Elev= 88.33' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.88 cfs @ 12.07 hrs HW=88.33' TW=88.17' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.88 cfs @ 2.26 fps)

Summary for Pond 10P: MH

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 1.89" for 2 Year Event event
Inflow = 3.80 cfs @ 12.07 hrs, Volume= 0.261 af
Outflow = 3.80 cfs @ 12.07 hrs, Volume= 0.261 af, Atten= 0%, Lag= 0.0 min
Primary = 3.80 cfs @ 12.07 hrs, Volume= 0.261 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 87.78' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.85'	**18.0" Round Culvert** L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 86.85' / 85.50' S= 0.0142 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=3.79 cfs @ 12.07 hrs HW=87.78' TW=85.59' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.79 cfs @ 3.29 fps)

Summary for Pond 12P: MH

Inflow Area = 0.975 ac, 50.96% Impervious, Inflow Depth = 1.87" for 2 Year Event event
Inflow = 2.22 cfs @ 12.07 hrs, Volume= 0.152 af
Outflow = 2.22 cfs @ 12.07 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.07 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.39' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	88.65'	**15.0" Round Culvert** L= 240.0' Ke= 0.500 Inlet / Outlet Invert= 88.65' / 86.85' S= 0.0075 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=2.21 cfs @ 12.07 hrs HW=89.39' TW=87.78' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.21 cfs @ 4.18 fps)

Summary for Pond 13P: CB6

Inflow Area = 0.457 ac, 54.20% Impervious, Inflow Depth = 1.91" for 2 Year Event event
Inflow = 1.06 cfs @ 12.07 hrs, Volume= 0.073 af
Outflow = 1.06 cfs @ 12.07 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 1.06 cfs @ 12.07 hrs, Volume= 0.073 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.81' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0089 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 12.07 hrs HW=89.81' TW=89.39' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.05 cfs @ 3.00 fps)

Summary for Pond MH1: MH

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 2.26" for 2 Year Event event
Inflow = 0.91 cfs @ 12.07 hrs, Volume= 0.063 af
Outflow = 0.91 cfs @ 12.07 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.07 hrs, Volume= 0.063 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 87.56' @ 12.07 hrs
Flood Elev= 89.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	87.00'	**12.0" Round Culvert** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 87.00' / 86.80' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.91 cfs @ 12.07 hrs HW=87.56' TW=86.97' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.91 cfs @ 2.92 fps)

Summary for Pond MH2: CB 3

Inflow Area = 0.304 ac, 51.58% Impervious, Inflow Depth = 1.84" for 2 Year Event event
Inflow = 0.68 cfs @ 12.07 hrs, Volume= 0.047 af
Outflow = 0.68 cfs @ 12.07 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.07 hrs, Volume= 0.047 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.29' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 12.07 hrs HW=88.28' TW=88.17' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.65 cfs @ 1.86 fps)

Summary for Pond MH3: CB5

Inflow Area = 0.518 ac, 48.10% Impervious, Inflow Depth = 1.84" for 2 Year Event event
Inflow = 1.16 cfs @ 12.07 hrs, Volume= 0.079 af
Outflow = 1.16 cfs @ 12.07 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 1.16 cfs @ 12.07 hrs, Volume= 0.079 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.84' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0085 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.15 cfs @ 12.07 hrs HW=89.84' TW=89.39' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.15 cfs @ 3.08 fps)

Summary for Pond P1: POND SC 310

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 2.26" for 2 Year Event event
Inflow = 0.91 cfs @ 12.07 hrs, Volume= 0.063 af
Outflow = 0.23 cfs @ 11.87 hrs, Volume= 0.063 af, Atten= 75%, Lag= 0.0 min
Discarded = 0.23 cfs @ 11.87 hrs, Volume= 0.063 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 87.30' @ 12.44 hrs Surf.Area= 1,230 sf Storage= 534 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.2 min (812.8 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1	86.50'	849 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 2,829 cf Overall - 708 cf Embedded = 2,121 cf x 40.0% Voids
#2	87.00'	708 cf	**ADS_StormTech SC-310 +Cap** x 48 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 4 Rows
		1,556 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
86.50	1,230	203.0	0	0	1,230
88.80	1,230	203.0	2,829	2,829	1,697

Device	Routing	Invert	Outlet Devices
#1	Primary	87.70'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	86.50'	**0.23 cfs Exfiltration when above 86.50'**

Discarded OutFlow Max=0.23 cfs @ 11.87 hrs HW=86.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=86.50' TW=86.50' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond P2: POND 2 SC 740

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 1.89" for 2 Year Event event
Inflow = 3.80 cfs @ 12.07 hrs, Volume= 0.261 af
Outflow = 0.78 cfs @ 11.85 hrs, Volume= 0.261 af, Atten= 79%, Lag= 0.0 min
Discarded = 0.78 cfs @ 11.85 hrs, Volume= 0.261 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 86.06' @ 12.50 hrs Surf.Area= 4,088 sf Storage= 2,709 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 19.1 min (837.9 - 818.8)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	3,647 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 14,308 cf Overall - 5,191 cf Embedded = 9,117 cf x 40.0% Voids
#2	85.50'	5,191 cf	**ADS_StormTech SC-740 +Cap** x 113 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 113 Chambers in 12 Rows
		8,838 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.00	4,088	320.0	0	0	4,088
88.50	4,088	320.0	14,308	14,308	5,208

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**9.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	85.00'	**0.78 cfs Exfiltration when above 85.00'**

Discarded OutFlow Max=0.78 cfs @ 11.85 hrs HW=85.04' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.78 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00' TW=85.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond R1: Pond1 Outlet - 12" RCP

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 0.00" for 2 Year Event event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 86.50' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**12.0" Round Culvert** L= 25.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 86.50' / 86.20' S= 0.0120 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=86.50' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Summary for Pond R4: Pond 2 Outlet - 12" RCP

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 0.00" for 2 Year Event event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 85.00' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0143 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.00' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Summary for Link 1L: 6- 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 1.67" for 2 Year Event event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.005 af
Primary = 0.66 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 6.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

2 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 2L: 1 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 1.34" for 2 Year Event event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.003 af
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

2 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Summary for Link 3L: 10 - 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 1.67" for 2 Year Event event
Inflow = 0.11 cfs @ 12.09 hrs, Volume= 0.005 af
Primary = 1.10 cfs @ 12.09 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 10.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

2 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 4L: 2 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 1.34" for 2 Year Event event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.003 af
Primary = 0.17 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 2.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

2 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
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 1S: Prop. to Steam Runoff Area=159,889 sf 38.35% Impervious Runoff Depth=2.81"
Flow Length=1,030' Slope=0.0100 '/' Tc=38.3 min CN=83 Runoff=6.09 cfs 0.861 af

Subcatchment 3S: Prop to CB #3 Runoff Area=13,262 sf 51.58% Impervious Runoff Depth=3.10"
Tc=5.0 min CN=86 Runoff=1.13 cfs 0.079 af

Subcatchment 4S: Prop to CB#4 Runoff Area=16,270 sf 58.78% Impervious Runoff Depth=3.29"
Tc=5.0 min CN=88 Runoff=1.47 cfs 0.102 af

Subcatchment 5S: Prop. to CB # 5 Runoff Area=22,568 sf 48.10% Impervious Runoff Depth=3.10"
Tc=5.0 min CN=86 Runoff=1.93 cfs 0.134 af

Subcatchment 6S: Prop. to CB # 6 Runoff Area=19,917 sf 54.20% Impervious Runoff Depth=3.19"
Tc=5.0 min CN=87 Runoff=1.75 cfs 0.122 af

Subcatchment 7S: Prop. to Pond 1 Runoff Area=14,631 sf 71.99% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=91 Runoff=1.41 cfs 0.101 af

Subcatchment 8S: Prop. to East Wetland Runoff Area=127,093 sf 20.50% Impervious Runoff Depth=2.29"
Flow Length=370' Tc=37.0 min CN=77 Runoff=4.00 cfs 0.557 af

Subcatchment 9S: Prop. to North Wetland Runoff Area=33,123 sf 15.76% Impervious Runoff Depth=2.21"
Flow Length=480' Slope=0.0100 '/' Tc=33.1 min CN=76 Runoff=1.06 cfs 0.140 af

Subcatchment 10S: Prop. to Street Runoff Area=592 sf 83.11% Impervious Runoff Depth=3.91"
Tc=5.0 min CN=94 Runoff=0.06 cfs 0.004 af

Subcatchment E1: Exist. to Stream Runoff Area=243,161 sf 28.05% Impervious Runoff Depth=2.46"
Flow Length=460' Slope=0.0100 '/' Tc=42.0 min CN=79 Runoff=7.72 cfs 1.145 af

Subcatchment E2: Exist. To East Runoff Area=148,590 sf 21.32% Impervious Runoff Depth=2.21"
Flow Length=370' Tc=37.0 min CN=76 Runoff=4.50 cfs 0.628 af

Subcatchment E3: Exist. To Street Runoff Area=1,271 sf 37.21% Impervious Runoff Depth=2.81"
Tc=5.0 min CN=83 Runoff=0.10 cfs 0.007 af

Subcatchment E4: Exist. to Wetlands North Runoff Area=42,453 sf 19.69% Impervious Runoff Depth=2.29"
Flow Length=480' Slope=0.0100 '/' Tc=42.6 min CN=77 Runoff=1.24 cfs 0.186 af

Reach 1E: Exist. to Stream (DCP1) Inflow=7.72 cfs 1.145 af
Outflow=7.72 cfs 1.145 af

Reach 1P: Prop. to Stream (DCP1) Inflow=7.09 cfs 0.991 af
Outflow=7.09 cfs 0.991 af

Reach 2E: Exist East Wetland (DCP2) Inflow=4.50 cfs 0.628 af
Outflow=4.50 cfs 0.628 af

Reach 2P: Prop. to East Wetland (DCP2) Inflow=4.37 cfs 0.623 af
Outflow=4.37 cfs 0.623 af

Reach 3E: Exist To Street (DCP3) Inflow=0.10 cfs 0.007 af
Outflow=0.10 cfs 0.007 af

Reach 3P: Prop. To Street (DCP3) Inflow=0.06 cfs 0.004 af
Outflow=0.06 cfs 0.004 af

Reach 4E: Exist North Wetland (DCP4) Inflow=1.24 cfs 0.186 af
Outflow=1.24 cfs 0.186 af

Reach 4P: Prop. to North Wetland (DCP4) Inflow=1.06 cfs 0.140 af
Outflow=1.06 cfs 0.140 af

Pond 7P: MH Peak Elev=88.51' Inflow=2.60 cfs 0.181 af
15.0" Round Culvert n=0.011 L=60.0' S=0.0100 '/' Outflow=2.60 cfs 0.181 af

Pond 9P: CB 4 Peak Elev=88.66' Inflow=1.47 cfs 0.102 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=1.47 cfs 0.102 af

Pond 10P: MH Peak Elev=88.14' Inflow=6.28 cfs 0.436 af
18.0" Round Culvert n=0.011 L=95.0' S=0.0142 '/' Outflow=6.28 cfs 0.436 af

Pond 12P: MH Peak Elev=89.70' Inflow=3.68 cfs 0.255 af
15.0" Round Culvert n=0.011 L=240.0' S=0.0075 '/' Outflow=3.68 cfs 0.255 af

Pond 13P: CB6 Peak Elev=90.09' Inflow=1.75 cfs 0.122 af
12.0" Round Culvert n=0.011 L=62.0' S=0.0089 '/' Outflow=1.75 cfs 0.122 af

Pond MH1: MH Peak Elev=87.86' Inflow=1.41 cfs 0.101 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0050 '/' Outflow=1.41 cfs 0.101 af

Pond MH2: CB 3 Peak Elev=88.61' Inflow=1.13 cfs 0.079 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=1.13 cfs 0.079 af

Pond MH3: CB5 Peak Elev=90.14' Inflow=1.93 cfs 0.134 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0085 '/' Outflow=1.93 cfs 0.134 af

Pond P1: POND SC 310 Peak Elev=87.84' Storage=1,009 cf Inflow=1.41 cfs 0.101 af
Discarded=0.23 cfs 0.095 af Primary=0.26 cfs 0.006 af Outflow=0.49 cfs 0.101 af

Pond P2: POND 2 SC 740 Peak Elev=86.95' Storage=5,527 cf Inflow=6.28 cfs 0.436 af
Discarded=0.78 cfs 0.408 af Primary=0.64 cfs 0.028 af Outflow=1.42 cfs 0.436 af

Pond R1: Pond1 Outlet - 12" RCP Peak Elev=86.75' Inflow=0.26 cfs 0.006 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0120 '/' Outflow=0.26 cfs 0.006 af

Pond R4: Pond 2 Outlet - 12" RCP Peak Elev=85.40' Inflow=0.64 cfs 0.028 af
12.0" Round Culvert n=0.011 L=35.0' S=0.0143 '/' Outflow=0.64 cfs 0.028 af

Link 10 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 6.00 Inflow=0.16 cfs 0.009 af
Area= 0.036 ac 100.00% Imperv. Primary=0.95 cfs 0.054 af

Link 2L: 1 - 10 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce Inflow=0.12 cfs 0.006 af
Area= 0.028 ac 100.00% Imperv. Primary=0.12 cfs 0.006 af

Link 10 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 10.00 Inflow=0.16 cfs 0.009 af
Area= 0.036 ac 100.00% Imperv. Primary=1.59 cfs 0.090 af

Link 10 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce x 2.00 Inflow=0.12 cfs 0.006 af
Area= 0.028 ac 100.00% Imperv. Primary=0.25 cfs 0.012 af

Total Runoff Area = 19.348 ac Runoff Volume = 4.065 af Average Runoff Depth = 2.52"
70.29% Pervious = 13.600 ac 29.71% Impervious = 5.748 ac

Summary for Subcatchment 1S: Prop. to Steam

Runoff = 6.09 cfs @ 12.55 hrs, Volume= 0.861 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	48,878	98	Water Surface Wetlands, HSG C
	77,137	74	>75% Grass cover, Good, HSG C
*	4,305	98	walls othe rimp.
	1,100	87	Dirt roads, HSG C
	18,844	70	Woods, Good, HSG C
*	2,457	98	Exisit,. Roof
*	5,683	98	Exisit. Pavement
*	1,485	74	Prop. Patios
	159,889	83	Weighted Average
	98,566		61.65% Pervious Area
	61,323		38.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	110	0.0100	0.50		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
3.9	790	0.0100	3.35	20.11	**Channel Flow, Stream** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.040 Earth, cobble bottom, clean sides
38.3	1,030	Total			

Summary for Subcatchment 3S: Prop to CB #3

Runoff = 1.13 cfs @ 12.07 hrs, Volume= 0.079 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

Area (sf)	CN	Description
6,841	98	Paved parking, HSG C
6,421	74	>75% Grass cover, Good, HSG C
13,262	86	Weighted Average
6,421		48.42% Pervious Area
6,841		51.58% Impervious Area

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

Summary for Subcatchment 4S: Prop to CB#4

Runoff = 1.47 cfs @ 12.07 hrs, Volume= 0.102 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	1,652	98	Paved parking, HSG C-Sidewalk
	7,912	98	Paved parking, HSG C
	6,706	74	>75% Grass cover, Good, HSG C
	16,270	88	Weighted Average
	6,706		41.22% Pervious Area
	9,564		58.78% Impervious Area

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

Summary for Subcatchment 5S: Prop. to CB # 5

Runoff = 1.93 cfs @ 12.07 hrs, Volume= 0.134 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	466	98	Paved parking, HSG C - Sidewalk
*	10,390	98	Paved parking, HSG C - rroad-drives
	11,712	74	>75% Grass cover, Good, HSG C
	22,568	86	Weighted Average
	11,712		51.90% Pervious Area
	10,856		48.10% Impervious Area

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

Summary for Subcatchment 6S: Prop. to CB # 6

Runoff = 1.75 cfs @ 12.07 hrs, Volume= 0.122 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	959	98	Paved parking, HSG C - Sidewalk
*	9,836	98	Paved parking, HSG C - rroad-drives
	9,122	74	>75% Grass cover, Good, HSG C
	19,917	87	Weighted Average
	9,122		45.80% Pervious Area
	10,795		54.20% Impervious Area

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

Summary for Subcatchment 7S: Prop. to Pond 1

Runoff = 1.41 cfs @ 12.07 hrs, Volume= 0.101 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
	10,533	98	Paved parking, HSG C
	4,098	74	>75% Grass cover, Good, HSG C
	14,631	91	Weighted Average
	4,098		28.01% Pervious Area
	10,533		71.99% Impervious Area

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

Summary for Subcatchment 8S: Prop. to East Wetland

Runoff = 4.00 cfs @ 12.54 hrs, Volume= 0.557 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	40,951	74	>75% Grass cover, Good, HSG C
	58,938	70	Woods, Good, HSG C
*	1,155	74	Patio
*	377	98	ret wall
	127,093	77	Weighted Average
	101,044		79.50% Pervious Area
	26,049		20.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment 9S: Prop. to North Wetland

Runoff = 1.06 cfs @ 12.47 hrs, Volume= 0.140 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	906	98	Water Surface Wetlands, HSG C
	2,744	98	Paved parking, HSG C
	16,242	74	>75% Grass cover, Good, HSG C
	1,286	98	Roofs, HSG C - infiltrated
*	283	98	walls othe rimp.
	11,662	70	Woods, Good, HSG C
	33,123	76	Weighted Average
	27,904		84.24% Pervious Area
	5,219		15.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
4.8	430	0.0100	1.50		**Shallow Concentrated Flow, shallow** Grassed Waterway Kv= 15.0 fps
33.1	480	Total			

Summary for Subcatchment 10S: Prop. to Street

Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

Area (sf)	CN	Description
492	98	Paved parking, HSG C
100	74	>75% Grass cover, Good, HSG C
592	94	Weighted Average
100		16.89% Pervious Area
492		83.11% Impervious Area

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

Summary for Subcatchment E1: Exist. to Stream

Runoff = 7.72 cfs @ 12.56 hrs, Volume= 1.145 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	48,977	98	Water Surface Wetlands, HSG C
	11,952	98	Paved parking, HSG C
	34,335	74	>75% Grass cover, Good, HSG C
	2,457	98	Roofs, HSG C
*	4,820	98	walls othe rimp.
	8,801	87	Dirt roads, HSG C
	131,819	70	Woods, Good, HSG C
	243,161	79	Weighted Average
	174,955		71.95% Pervious Area
	68,206		28.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
13.7	410	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.0	460	Total			

Summary for Subcatchment E2: Exist. To East Weltands

Runoff = 4.50 cfs @ 12.54 hrs, Volume= 0.628 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	5,792	98	Paved parking, HSG C
	9,907	74	>75% Grass cover, Good, HSG C
*	217	98	walls othe rimp.
	107,002	70	Woods, Good, HSG C
	148,590	76	Weighted Average
	116,909		78.68% Pervious Area
	31,681		21.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment E3: Exist. To Street

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

Area (sf)	CN	Description
473	98	Paved parking, HSG C
798	74	>75% Grass cover, Good, HSG C
1,271	83	Weighted Average
798		62.79% Pervious Area
473		37.21% Impervious Area

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

Summary for Subcatchment E4: Exist. to Wetlands North

Runoff = 1.24 cfs @ 12.59 hrs, Volume= 0.186 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Event Rainfall=4.60"

	Area (sf)	CN	Description
*	907	98	Water Surface Wetlands, HSG C
	5,644	98	Paved parking, HSG C
	12,783	74	>75% Grass cover, Good, HSG C
*	520	98	walls othe rimp.
	21,313	70	Woods, Good, HSG C
	1,286	98	Roofs, HSG C
	42,453	77	Weighted Average
	34,096		80.31% Pervious Area
	8,357		19.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
14.3	430	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.6	480	Total			

Summary for Reach 1E: Exist. to Stream (DCP1)

Inflow Area = 5.582 ac, 28.05% Impervious, Inflow Depth = 2.46" for 10 Year Event event
Inflow = 7.72 cfs @ 12.56 hrs, Volume= 1.145 af
Outflow = 7.72 cfs @ 12.56 hrs, Volume= 1.145 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 1P: Prop. to Stream (DCP1)

Inflow Area = 5.387 ac, 43.52% Impervious, Inflow Depth = 2.21" for 10 Year Event event
Inflow = 7.09 cfs @ 12.48 hrs, Volume= 0.991 af
Outflow = 7.09 cfs @ 12.48 hrs, Volume= 0.991 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2E: Exist East Wetland (DCP2)

Inflow Area = 3.411 ac, 21.32% Impervious, Inflow Depth = 2.21" for 10 Year Event event
Inflow = 4.50 cfs @ 12.54 hrs, Volume= 0.628 af
Outflow = 4.50 cfs @ 12.54 hrs, Volume= 0.628 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2P: Prop. to East Wetland (DCP2)

Inflow Area = 3.317 ac, 27.22% Impervious, Inflow Depth = 2.25" for 10 Year Event event
Inflow = 4.37 cfs @ 12.46 hrs, Volume= 0.623 af
Outflow = 4.37 cfs @ 12.46 hrs, Volume= 0.623 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3E: Exist To Street (DCP3)

Inflow Area = 0.029 ac, 37.21% Impervious, Inflow Depth = 2.81" for 10 Year Event event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3P: Prop. To Street (DCP3)

Inflow Area = 0.014 ac, 83.11% Impervious, Inflow Depth = 3.91" for 10 Year Event event
Inflow = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4E: Exist North Wetland (DCP4)

Inflow Area = 0.975 ac, 19.69% Impervious, Inflow Depth = 2.29" for 10 Year Event event
Inflow = 1.24 cfs @ 12.59 hrs, Volume= 0.186 af
Outflow = 1.24 cfs @ 12.59 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4P: Prop. to North Wetland (DCP4)

Inflow Area = 0.760 ac, 15.76% Impervious, Inflow Depth = 2.21" for 10 Year Event event
Inflow = 1.06 cfs @ 12.47 hrs, Volume= 0.140 af
Outflow = 1.06 cfs @ 12.47 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 7P: MH

Inflow Area = 0.678 ac, 55.55% Impervious, Inflow Depth = 3.20" for 10 Year Event event
Inflow = 2.60 cfs @ 12.07 hrs, Volume= 0.181 af
Outflow = 2.60 cfs @ 12.07 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min
Primary = 2.60 cfs @ 12.07 hrs, Volume= 0.181 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.51' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.45'	**15.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 87.45' / 86.85' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=2.56 cfs @ 12.07 hrs HW=88.50' TW=88.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.56 cfs @ 3.14 fps)

Summary for Pond 9P: CB 4

Inflow Area = 0.374 ac, 58.78% Impervious, Inflow Depth = 3.29" for 10 Year Event event
Inflow = 1.47 cfs @ 12.07 hrs, Volume= 0.102 af
Outflow = 1.47 cfs @ 12.07 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Primary = 1.47 cfs @ 12.07 hrs, Volume= 0.102 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Peak Elev= 88.66' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.38 cfs @ 12.07 hrs HW=88.65' TW=88.50' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.38 cfs @ 2.24 fps)

Summary for Pond 10P: MH

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 3.17" for 10 Year Event event
Inflow = 6.28 cfs @ 12.07 hrs, Volume= 0.436 af
Outflow = 6.28 cfs @ 12.07 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min
Primary = 6.28 cfs @ 12.07 hrs, Volume= 0.436 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.14' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.85'	**18.0" Round Culvert** L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 86.85' / 85.50' S= 0.0142 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=6.27 cfs @ 12.07 hrs HW=88.14' TW=86.06' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.27 cfs @ 3.87 fps)

Summary for Pond 12P: MH

Inflow Area = 0.975 ac, 50.96% Impervious, Inflow Depth = 3.14" for 10 Year Event event
Inflow = 3.68 cfs @ 12.07 hrs, Volume= 0.255 af
Outflow = 3.68 cfs @ 12.07 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 3.68 cfs @ 12.07 hrs, Volume= 0.255 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.70' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	88.65'	**15.0" Round Culvert** L= 240.0' Ke= 0.500 Inlet / Outlet Invert= 88.65' / 86.85' S= 0.0075 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=3.66 cfs @ 12.07 hrs HW=89.69' TW=88.14' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.66 cfs @ 4.52 fps)

Summary for Pond 13P: CB6

Inflow Area = 0.457 ac, 54.20% Impervious, Inflow Depth = 3.19" for 10 Year Event event
Inflow = 1.75 cfs @ 12.07 hrs, Volume= 0.122 af
Outflow = 1.75 cfs @ 12.07 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.75 cfs @ 12.07 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 90.09' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0089 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.72 cfs @ 12.07 hrs HW=90.09' TW=89.69' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.72 cfs @ 3.10 fps)

Summary for Pond MH1: MH

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 3.59" for 10 Year Event event
Inflow = 1.41 cfs @ 12.07 hrs, Volume= 0.101 af
Outflow = 1.41 cfs @ 12.07 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min
Primary = 1.41 cfs @ 12.07 hrs, Volume= 0.101 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 87.86' @ 12.32 hrs
Flood Elev= 89.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	87.00'	**12.0" Round Culvert** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 87.00' / 86.80' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.41 cfs @ 12.07 hrs HW=87.72' TW=87.31' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.41 cfs @ 3.24 fps)

Summary for Pond MH2: CB 3

Inflow Area = 0.304 ac, 51.58% Impervious, Inflow Depth = 3.10" for 10 Year Event event
Inflow = 1.13 cfs @ 12.07 hrs, Volume= 0.079 af
Outflow = 1.13 cfs @ 12.07 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.07 hrs, Volume= 0.079 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.61' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 12.07 hrs HW=88.60' TW=88.50' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.04 cfs @ 1.79 fps)

Summary for Pond MH3: CB5

Inflow Area = 0.518 ac, 48.10% Impervious, Inflow Depth = 3.10" for 10 Year Event event
Inflow = 1.93 cfs @ 12.07 hrs, Volume= 0.134 af
Outflow = 1.93 cfs @ 12.07 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.07 hrs, Volume= 0.134 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 90.14' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0085 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.90 cfs @ 12.07 hrs HW=90.13' TW=89.69' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.90 cfs @ 3.25 fps)

Summary for Pond P1: POND SC 310

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 3.59" for 10 Year Event event
Inflow = 1.41 cfs @ 12.07 hrs, Volume= 0.101 af
Outflow = 0.49 cfs @ 12.33 hrs, Volume= 0.101 af, Atten= 66%, Lag= 15.6 min
Discarded = 0.23 cfs @ 11.73 hrs, Volume= 0.095 af
Primary = 0.26 cfs @ 12.33 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 87.84' @ 12.33 hrs Surf.Area= 1,230 sf Storage= 1,009 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 21.4 min (810.1 - 788.7)

Volume	Invert	Avail.Storage	Storage Description
#1	86.50'	849 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 2,829 cf Overall - 708 cf Embedded = 2,121 cf x 40.0% Voids
#2	87.00'	708 cf	**ADS_StormTech SC-310 +Cap** x 48 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 4 Rows
		1,556 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
86.50	1,230	203.0	0	0	1,230
88.80	1,230	203.0	2,829	2,829	1,697

Device	Routing	Invert	Outlet Devices
#1	Primary	87.70'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	86.50'	**0.23 cfs Exfiltration when above 86.50'**

Discarded OutFlow Max=0.23 cfs @ 11.73 hrs HW=86.53' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.26 cfs @ 12.33 hrs HW=87.84' TW=86.75' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Weir Controls 0.26 cfs @ 1.20 fps)

Summary for Pond P2: POND 2 SC 740

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 3.17" for 10 Year Event event
Inflow = 6.28 cfs @ 12.07 hrs, Volume= 0.436 af
Outflow = 1.42 cfs @ 12.47 hrs, Volume= 0.436 af, Atten= 77%, Lag= 24.0 min
Discarded = 0.78 cfs @ 11.70 hrs, Volume= 0.408 af
Primary = 0.64 cfs @ 12.47 hrs, Volume= 0.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 86.95' @ 12.47 hrs Surf.Area= 4,088 sf Storage= 5,527 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 39.5 min (843.7 - 804.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	3,647 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 14,308 cf Overall - 5,191 cf Embedded = 9,117 cf x 40.0% Voids
#2	85.50'	5,191 cf	**ADS_StormTech SC-740 +Cap** x 113 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 113 Chambers in 12 Rows
		8,838 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.00	4,088	320.0	0	0	4,088
88.50	4,088	320.0	14,308	14,308	5,208

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**9.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	85.00'	**0.78 cfs Exfiltration when above 85.00'**

Discarded OutFlow Max=0.78 cfs @ 11.70 hrs HW=85.04' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.78 cfs)

Primary OutFlow Max=0.64 cfs @ 12.47 hrs HW=86.95' TW=85.40' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Orifice Controls 0.64 cfs @ 2.30 fps)

Summary for Pond R1: Pond1 Outlet - 12" RCP

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 0.21" for 10 Year Event event
Inflow = 0.26 cfs @ 12.33 hrs, Volume= 0.006 af
Outflow = 0.26 cfs @ 12.33 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 12.33 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 86.75' @ 12.33 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**12.0" Round Culvert** L= 25.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 86.50' / 86.20' S= 0.0120 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.26 cfs @ 12.33 hrs HW=86.75' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.26 cfs @ 1.69 fps)

Summary for Pond R4: Pond 2 Outlet - 12" RCP

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 0.21" for 10 Year Event event
Inflow = 0.64 cfs @ 12.47 hrs, Volume= 0.028 af
Outflow = 0.64 cfs @ 12.47 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.64 cfs @ 12.47 hrs, Volume= 0.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 85.40' @ 12.47 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0143 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.64 cfs @ 12.47 hrs HW=85.40' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.64 cfs @ 2.16 fps)

Summary for Link 1L: 6- 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 3.02" for 10 Year Event event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.009 af
Primary = 0.95 cfs @ 12.09 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 6.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

10 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 2L: 1 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 2.65" for 10 Year Event event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.006 af
Primary = 0.12 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

10 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Summary for Link 3L: 10 - 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 3.02" for 10 Year Event event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.009 af
Primary = 1.59 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 10.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

10 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 4L: 2 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 2.65" for 10 Year Event event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.006 af
Primary = 0.25 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 2.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

10 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
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 1S: Prop. to Steam Runoff Area=159,889 sf 38.35% Impervious Runoff Depth=3.63"
Flow Length=1,030' Slope=0.0100 '/' Tc=38.3 min CN=83 Runoff=7.82 cfs 1.110 af

Subcatchment 3S: Prop to CB #3 Runoff Area=13,262 sf 51.58% Impervious Runoff Depth=3.94"
Tc=5.0 min CN=86 Runoff=1.43 cfs 0.100 af

Subcatchment 4S: Prop to CB#4 Runoff Area=16,270 sf 58.78% Impervious Runoff Depth=4.15"
Tc=5.0 min CN=88 Runoff=1.83 cfs 0.129 af

Subcatchment 5S: Prop. to CB # 5 Runoff Area=22,568 sf 48.10% Impervious Runoff Depth=3.94"
Tc=5.0 min CN=86 Runoff=2.43 cfs 0.170 af

Subcatchment 6S: Prop. to CB # 6 Runoff Area=19,917 sf 54.20% Impervious Runoff Depth=4.04"
Tc=5.0 min CN=87 Runoff=2.19 cfs 0.154 af

Subcatchment 7S: Prop. to Pond 1 Runoff Area=14,631 sf 71.99% Impervious Runoff Depth=4.47"
Tc=5.0 min CN=91 Runoff=1.73 cfs 0.125 af

Subcatchment 8S: Prop. to East Wetland Runoff Area=127,093 sf 20.50% Impervious Runoff Depth=3.05"
Flow Length=370' Tc=37.0 min CN=77 Runoff=5.33 cfs 0.741 af

Subcatchment 9S: Prop. to North Wetland Runoff Area=33,123 sf 15.76% Impervious Runoff Depth=2.95"
Flow Length=480' Slope=0.0100 '/' Tc=33.1 min CN=76 Runoff=1.42 cfs 0.187 af

Subcatchment 10S: Prop. to Street Runoff Area=592 sf 83.11% Impervious Runoff Depth=4.80"
Tc=5.0 min CN=94 Runoff=0.07 cfs 0.005 af

Subcatchment E1: Exist. to Stream Runoff Area=243,161 sf 28.05% Impervious Runoff Depth=3.24"
Flow Length=460' Slope=0.0100 '/' Tc=42.0 min CN=79 Runoff=10.18 cfs 1.506 af

Subcatchment E2: Exist. To East Runoff Area=148,590 sf 21.32% Impervious Runoff Depth=2.95"
Flow Length=370' Tc=37.0 min CN=76 Runoff=6.04 cfs 0.839 af

Subcatchment E3: Exist. To Street Runoff Area=1,271 sf 37.21% Impervious Runoff Depth=3.63"
Tc=5.0 min CN=83 Runoff=0.13 cfs 0.009 af

Subcatchment E4: Exist. to Wetlands North Runoff Area=42,453 sf 19.69% Impervious Runoff Depth=3.05"
Flow Length=480' Slope=0.0100 '/' Tc=42.6 min CN=77 Runoff=1.66 cfs 0.247 af

Reach 1E: Exist. to Stream (DCP1) Inflow=10.18 cfs 1.506 af
Outflow=10.18 cfs 1.506 af

Reach 1P: Prop. to Stream (DCP1) Inflow=9.71 cfs 1.328 af
Outflow=9.71 cfs 1.328 af

Reach 2E: Exist East Wetland (DCP2) Inflow=6.04 cfs 0.839 af
Outflow=6.04 cfs 0.839 af

Reach 2P: Prop. to East Wetland (DCP2) Inflow=5.93 cfs 0.837 af
Outflow=5.93 cfs 0.837 af

Reach 3E: Exist To Street (DCP3) Inflow=0.13 cfs 0.009 af
Outflow=0.13 cfs 0.009 af

Reach 3P: Prop. To Street (DCP3) Inflow=0.07 cfs 0.005 af
Outflow=0.07 cfs 0.005 af

Reach 4E: Exist North Wetland (DCP4) Inflow=1.66 cfs 0.247 af
Outflow=1.66 cfs 0.247 af

Reach 4P: Prop. to North Wetland (DCP4) Inflow=1.42 cfs 0.187 af
Outflow=1.42 cfs 0.187 af

Pond 7P: MH Peak Elev=88.79' Inflow=3.26 cfs 0.229 af
15.0" Round Culvert n=0.011 L=60.0' S=0.0100 '/' Outflow=3.26 cfs 0.229 af

Pond 9P: CB 4 Peak Elev=89.01' Inflow=1.83 cfs 0.129 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=1.83 cfs 0.129 af

Pond 10P: MH Peak Elev=88.46' Inflow=7.88 cfs 0.553 af
18.0" Round Culvert n=0.011 L=95.0' S=0.0142 '/' Outflow=7.88 cfs 0.553 af

Pond 12P: MH Peak Elev=89.93' Inflow=4.62 cfs 0.324 af
15.0" Round Culvert n=0.011 L=240.0' S=0.0075 '/' Outflow=4.62 cfs 0.324 af

Pond 13P: CB6 Peak Elev=90.32' Inflow=2.19 cfs 0.154 af
12.0" Round Culvert n=0.011 L=62.0' S=0.0089 '/' Outflow=2.19 cfs 0.154 af

Pond MH1: MH Peak Elev=88.05' Inflow=1.73 cfs 0.125 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0050 '/' Outflow=1.73 cfs 0.125 af

Pond MH2: CB 3 Peak Elev=88.93' Inflow=1.43 cfs 0.100 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=1.43 cfs 0.100 af

Pond MH3: CB5 Peak Elev=90.38' Inflow=2.43 cfs 0.170 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0085 '/' Outflow=2.43 cfs 0.170 af

Pond P1: POND SC 310 Peak Elev=88.00' Storage=1,135 cf Inflow=1.73 cfs 0.125 af
Discarded=0.23 cfs 0.109 af Primary=0.52 cfs 0.016 af Outflow=0.75 cfs 0.125 af

Pond P2: POND 2 SC 740 Peak Elev=87.35' Storage=6,639 cf Inflow=7.88 cfs 0.553 af
Discarded=0.78 cfs 0.470 af Primary=1.47 cfs 0.083 af Outflow=2.25 cfs 0.553 af

Pond R1: Pond1 Outlet - 12" RCP Peak Elev=86.86' Inflow=0.52 cfs 0.016 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0120 '/' Outflow=0.52 cfs 0.016 af

Pond R4: Pond 2 Outlet - 12" RCP Peak Elev=85.65' Inflow=1.47 cfs 0.083 af
12.0" Round Culvert n=0.011 L=35.0' S=0.0143 '/' Outflow=1.47 cfs 0.083 af

Link 2R: 25 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 6.00 Inflow=0.19 cfs 0.012 af
Area= 0.036 ac 100.00% Imperv. Primary=1.15 cfs 0.071 af

Link 2L: 1 - 25 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce Inflow=0.15 cfs 0.008 af
Area= 0.028 ac 100.00% Imperv. Primary=0.15 cfs 0.008 af

Link 2R: 25 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 10.00 Inflow=0.19 cfs 0.012 af
Area= 0.036 ac 100.00% Imperv. Primary=1.92 cfs 0.119 af

Link 25 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce x 2.00 Inflow=0.15 cfs 0.008 af
Area= 0.028 ac 100.00% Imperv. Primary=0.30 cfs 0.017 af

Total Runoff Area = 19.348 ac Runoff Volume = 5.323 af Average Runoff Depth = 3.30"
70.29% Pervious = 13.600 ac 29.71% Impervious = 5.748 ac

Summary for Subcatchment 1S: Prop. to Steam

Runoff = 7.82 cfs @ 12.52 hrs, Volume= 1.110 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	48,878	98	Water Surface Wetlands, HSG C
	77,137	74	>75% Grass cover, Good, HSG C
*	4,305	98	walls othe rimp.
	1,100	87	Dirt roads, HSG C
	18,844	70	Woods, Good, HSG C
*	2,457	98	Exisit,. Roof
*	5,683	98	Exisit. Pavement
*	1,485	74	Prop. Patios
	159,889	83	Weighted Average
	98,566		61.65% Pervious Area
	61,323		38.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	110	0.0100	0.50		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
3.9	790	0.0100	3.35	20.11	**Channel Flow, Stream** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.040 Earth, cobble bottom, clean sides
38.3	1,030	Total			

Summary for Subcatchment 3S: Prop to CB #3

Runoff = 1.43 cfs @ 12.07 hrs, Volume= 0.100 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

Area (sf)	CN	Description
6,841	98	Paved parking, HSG C
6,421	74	>75% Grass cover, Good, HSG C
13,262	86	Weighted Average
6,421		48.42% Pervious Area
6,841		51.58% Impervious Area

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

Summary for Subcatchment 4S: Prop to CB#4

Runoff = 1.83 cfs @ 12.07 hrs, Volume= 0.129 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	1,652	98	Paved parking, HSG C-Sidewalk
	7,912	98	Paved parking, HSG C
	6,706	74	>75% Grass cover, Good, HSG C
	16,270	88	Weighted Average
	6,706		41.22% Pervious Area
	9,564		58.78% Impervious Area

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

Summary for Subcatchment 5S: Prop. to CB # 5

Runoff = 2.43 cfs @ 12.07 hrs, Volume= 0.170 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	466	98	Paved parking, HSG C - Sidewalk
*	10,390	98	Paved parking, HSG C - rroad-drives
	11,712	74	>75% Grass cover, Good, HSG C
	22,568	86	Weighted Average
	11,712		51.90% Pervious Area
	10,856		48.10% Impervious Area

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

Summary for Subcatchment 6S: Prop. to CB # 6

Runoff = 2.19 cfs @ 12.07 hrs, Volume= 0.154 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	959	98	Paved parking, HSG C - Sidewalk
*	9,836	98	Paved parking, HSG C - rroad-drives
	9,122	74	>75% Grass cover, Good, HSG C
	19,917	87	Weighted Average
	9,122		45.80% Pervious Area
	10,795		54.20% Impervious Area

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

Summary for Subcatchment 7S: Prop. to Pond 1

Runoff = 1.73 cfs @ 12.07 hrs, Volume= 0.125 af, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
	10,533	98	Paved parking, HSG C
	4,098	74	>75% Grass cover, Good, HSG C
	14,631	91	Weighted Average
	4,098		28.01% Pervious Area
	10,533		71.99% Impervious Area

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

Summary for Subcatchment 8S: Prop. to East Wetland

Runoff = 5.33 cfs @ 12.53 hrs, Volume= 0.741 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	40,951	74	>75% Grass cover, Good, HSG C
	58,938	70	Woods, Good, HSG C
*	1,155	74	Patio
*	377	98	ret wall
	127,093	77	Weighted Average
	101,044		79.50% Pervious Area
	26,049		20.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment 9S: Prop. to North Wetland

Runoff = 1.42 cfs @ 12.47 hrs, Volume= 0.187 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	906	98	Water Surface Wetlands, HSG C
	2,744	98	Paved parking, HSG C
	16,242	74	>75% Grass cover, Good, HSG C
	1,286	98	Roofs, HSG C - infiltrated
*	283	98	walls othe rimp.
	11,662	70	Woods, Good, HSG C
	33,123	76	Weighted Average
	27,904		84.24% Pervious Area
	5,219		15.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
4.8	430	0.0100	1.50		**Shallow Concentrated Flow, shallow** Grassed Waterway Kv= 15.0 fps
33.1	480	Total			

Summary for Subcatchment 10S: Prop. to Street

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 0.005 af, Depth= 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

Area (sf)	CN	Description
492	98	Paved parking, HSG C
100	74	>75% Grass cover, Good, HSG C
592	94	Weighted Average
100		16.89% Pervious Area
492		83.11% Impervious Area

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

Summary for Subcatchment E1: Exist. to Stream

Runoff = 10.18 cfs @ 12.56 hrs, Volume= 1.506 af, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	48,977	98	Water Surface Wetlands, HSG C
	11,952	98	Paved parking, HSG C
	34,335	74	>75% Grass cover, Good, HSG C
	2,457	98	Roofs, HSG C
*	4,820	98	walls othe rimp.
	8,801	87	Dirt roads, HSG C
	131,819	70	Woods, Good, HSG C
	243,161	79	Weighted Average
	174,955		71.95% Pervious Area
	68,206		28.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
13.7	410	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.0	460	Total			

Summary for Subcatchment E2: Exist. To East Weltands

Runoff = 6.04 cfs @ 12.53 hrs, Volume= 0.839 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	5,792	98	Paved parking, HSG C
	9,907	74	>75% Grass cover, Good, HSG C
*	217	98	walls othe rimp.
	107,002	70	Woods, Good, HSG C
	148,590	76	Weighted Average
	116,909		78.68% Pervious Area
	31,681		21.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment E3: Exist. To Street

Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

Area (sf)	CN	Description
473	98	Paved parking, HSG C
798	74	>75% Grass cover, Good, HSG C
1,271	83	Weighted Average
798		62.79% Pervious Area
473		37.21% Impervious Area

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

Summary for Subcatchment E4: Exist. to Wetlands North

Runoff = 1.66 cfs @ 12.59 hrs, Volume= 0.247 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 Year Event Rainfall=5.50"

	Area (sf)	CN	Description
*	907	98	Water Surface Wetlands, HSG C
	5,644	98	Paved parking, HSG C
	12,783	74	>75% Grass cover, Good, HSG C
*	520	98	walls othe rimp.
	21,313	70	Woods, Good, HSG C
	1,286	98	Roofs, HSG C
	42,453	77	Weighted Average
	34,096		80.31% Pervious Area
	8,357		19.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
14.3	430	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.6	480	Total			

Summary for Reach 1E: Exist. to Stream (DCP1)

Inflow Area = 5.582 ac, 28.05% Impervious, Inflow Depth = 3.24" for 25 Year Event event
Inflow = 10.18 cfs @ 12.56 hrs, Volume= 1.506 af
Outflow = 10.18 cfs @ 12.56 hrs, Volume= 1.506 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 1P: Prop. to Stream (DCP1)

Inflow Area = 5.387 ac, 43.52% Impervious, Inflow Depth = 2.96" for 25 Year Event event
Inflow = 9.71 cfs @ 12.47 hrs, Volume= 1.328 af
Outflow = 9.71 cfs @ 12.47 hrs, Volume= 1.328 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2E: Exist East Wetland (DCP2)

Inflow Area = 3.411 ac, 21.32% Impervious, Inflow Depth = 2.95" for 25 Year Event event
Inflow = 6.04 cfs @ 12.53 hrs, Volume= 0.839 af
Outflow = 6.04 cfs @ 12.53 hrs, Volume= 0.839 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2P: Prop. to East Wetland (DCP2)

Inflow Area = 3.317 ac, 27.22% Impervious, Inflow Depth = 3.03" for 25 Year Event event
Inflow = 5.93 cfs @ 12.45 hrs, Volume= 0.837 af
Outflow = 5.93 cfs @ 12.45 hrs, Volume= 0.837 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3E: Exist To Street (DCP3)

Inflow Area = 0.029 ac, 37.21% Impervious, Inflow Depth = 3.63" for 25 Year Event event
Inflow = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af
Outflow = 0.13 cfs @ 12.07 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3P: Prop. To Street (DCP3)

Inflow Area = 0.014 ac, 83.11% Impervious, Inflow Depth = 4.80" for 25 Year Event event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 0.005 af
Outflow = 0.07 cfs @ 12.07 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4E: Exist North Wetland (DCP4)

Inflow Area = 0.975 ac, 19.69% Impervious, Inflow Depth = 3.05" for 25 Year Event event
Inflow = 1.66 cfs @ 12.59 hrs, Volume= 0.247 af
Outflow = 1.66 cfs @ 12.59 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4P: Prop. to North Wetland (DCP4)

Inflow Area = 0.760 ac, 15.76% Impervious, Inflow Depth = 2.95" for 25 Year Event event
Inflow = 1.42 cfs @ 12.47 hrs, Volume= 0.187 af
Outflow = 1.42 cfs @ 12.47 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 7P: MH

Inflow Area = 0.678 ac, 55.55% Impervious, Inflow Depth = 4.05" for 25 Year Event event
Inflow = 3.26 cfs @ 12.07 hrs, Volume= 0.229 af
Outflow = 3.26 cfs @ 12.07 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min
Primary = 3.26 cfs @ 12.07 hrs, Volume= 0.229 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.79' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.45'	**15.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 87.45' / 86.85' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=3.18 cfs @ 12.07 hrs HW=88.78' TW=88.46' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.18 cfs @ 3.03 fps)

Summary for Pond 9P: CB 4

Inflow Area = 0.374 ac, 58.78% Impervious, Inflow Depth = 4.15" for 25 Year Event event
Inflow = 1.83 cfs @ 12.07 hrs, Volume= 0.129 af
Outflow = 1.83 cfs @ 12.07 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.83 cfs @ 12.07 hrs, Volume= 0.129 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Peak Elev= 89.01' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.68 cfs @ 12.07 hrs HW=88.98' TW=88.78' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.68 cfs @ 2.14 fps)

Summary for Pond 10P: MH

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 4.01" for 25 Year Event event
Inflow = 7.88 cfs @ 12.07 hrs, Volume= 0.553 af
Outflow = 7.88 cfs @ 12.07 hrs, Volume= 0.553 af, Atten= 0%, Lag= 0.0 min
Primary = 7.88 cfs @ 12.07 hrs, Volume= 0.553 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.46' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.85'	**18.0" Round Culvert** L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 86.85' / 85.50' S= 0.0142 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=7.87 cfs @ 12.07 hrs HW=88.46' TW=86.40' (Dynamic Tailwater)
1=Culvert (Inlet Controls 7.87 cfs @ 4.45 fps)

Summary for Pond 12P: MH

Inflow Area = 0.975 ac, 50.96% Impervious, Inflow Depth = 3.98" for 25 Year Event event
Inflow = 4.62 cfs @ 12.07 hrs, Volume= 0.324 af
Outflow = 4.62 cfs @ 12.07 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.62 cfs @ 12.07 hrs, Volume= 0.324 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.93' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	88.65'	**15.0" Round Culvert** L= 240.0' Ke= 0.500 Inlet / Outlet Invert= 88.65' / 86.85' S= 0.0075 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.59 cfs @ 12.07 hrs HW=89.93' TW=88.46' (Dynamic Tailwater)
1=Culvert (Outlet Controls 4.59 cfs @ 4.54 fps)

Summary for Pond 13P: CB6

Inflow Area = 0.457 ac, 54.20% Impervious, Inflow Depth = 4.04" for 25 Year Event event
Inflow = 2.19 cfs @ 12.07 hrs, Volume= 0.154 af
Outflow = 2.19 cfs @ 12.07 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.0 min
Primary = 2.19 cfs @ 12.07 hrs, Volume= 0.154 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 90.32' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0089 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.13 cfs @ 12.07 hrs HW=90.30' TW=89.93' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.13 cfs @ 3.06 fps)

Summary for Pond MH1: MH

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 4.47" for 25 Year Event event
Inflow = 1.73 cfs @ 12.07 hrs, Volume= 0.125 af
Outflow = 1.73 cfs @ 12.07 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min
Primary = 1.73 cfs @ 12.07 hrs, Volume= 0.125 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.05' @ 12.23 hrs
Flood Elev= 89.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	87.00'	**12.0" Round Culvert** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 87.00' / 86.80' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.59 cfs @ 12.07 hrs HW=87.86' TW=87.55' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.59 cfs @ 2.98 fps)

Summary for Pond MH2: CB 3

Inflow Area = 0.304 ac, 51.58% Impervious, Inflow Depth = 3.94" for 25 Year Event event
Inflow = 1.43 cfs @ 12.07 hrs, Volume= 0.100 af
Outflow = 1.43 cfs @ 12.07 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.07 hrs, Volume= 0.100 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.93' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.25 cfs @ 12.07 hrs HW=88.89' TW=88.78' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.25 cfs @ 1.59 fps)

Summary for Pond MH3: CB5

Inflow Area = 0.518 ac, 48.10% Impervious, Inflow Depth = 3.94" for 25 Year Event event
Inflow = 2.43 cfs @ 12.07 hrs, Volume= 0.170 af
Outflow = 2.43 cfs @ 12.07 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min
Primary = 2.43 cfs @ 12.07 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 90.38' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0085 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.37 cfs @ 12.07 hrs HW=90.37' TW=89.93' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.37 cfs @ 3.26 fps)

Summary for Pond P1: POND SC 310

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 4.47" for 25 Year Event event
Inflow = 1.73 cfs @ 12.07 hrs, Volume= 0.125 af
Outflow = 0.75 cfs @ 12.24 hrs, Volume= 0.125 af, Atten= 57%, Lag= 10.2 min
Discarded = 0.23 cfs @ 11.68 hrs, Volume= 0.109 af
Primary = 0.52 cfs @ 12.24 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.00' @ 12.24 hrs Surf.Area= 1,230 sf Storage= 1,135 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 20.4 min (803.3 - 782.8)

Volume	Invert	Avail.Storage	Storage Description
#1	86.50'	849 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 2,829 cf Overall - 708 cf Embedded = 2,121 cf x 40.0% Voids
#2	87.00'	708 cf	**ADS_StormTech SC-310 +Cap** x 48 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 4 Rows
		1,556 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
86.50	1,230	203.0	0	0	1,230
88.80	1,230	203.0	2,829	2,829	1,697

Device	Routing	Invert	Outlet Devices
#1	Primary	87.70'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	86.50'	**0.23 cfs Exfiltration when above 86.50'**

Discarded OutFlow Max=0.23 cfs @ 11.68 hrs HW=86.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.52 cfs @ 12.24 hrs HW=88.00' TW=86.86' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.52 cfs @ 2.65 fps)

Summary for Pond P2: POND 2 SC 740

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 4.01" for 25 Year Event event
Inflow = 7.88 cfs @ 12.07 hrs, Volume= 0.553 af
Outflow = 2.25 cfs @ 12.40 hrs, Volume= 0.553 af, Atten= 71%, Lag= 19.8 min
Discarded = 0.78 cfs @ 11.65 hrs, Volume= 0.470 af
Primary = 1.47 cfs @ 12.40 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 87.35' @ 12.40 hrs Surf.Area= 4,088 sf Storage= 6,639 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 38.9 min (836.5 - 797.6)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	3,647 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 14,308 cf Overall - 5,191 cf Embedded = 9,117 cf x 40.0% Voids
#2	85.50'	5,191 cf	**ADS_StormTech SC-740 +Cap** x 113 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 113 Chambers in 12 Rows
		8,838 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.00	4,088	320.0	0	0	4,088
88.50	4,088	320.0	14,308	14,308	5,208

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**9.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	85.00'	**0.78 cfs Exfiltration when above 85.00'**

Discarded OutFlow Max=0.78 cfs @ 11.65 hrs HW=85.04' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.78 cfs)

Primary OutFlow Max=1.47 cfs @ 12.40 hrs HW=87.35' TW=85.65' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 1.47 cfs @ 3.33 fps)

Summary for Pond R1: Pond1 Outlet - 12" RCP

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 0.59" for 25 Year Event event
Inflow = 0.52 cfs @ 12.24 hrs, Volume= 0.016 af
Outflow = 0.52 cfs @ 12.24 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.24 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 86.86' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**12.0" Round Culvert** L= 25.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 86.50' / 86.20' S= 0.0120 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.24 hrs HW=86.86' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.52 cfs @ 2.04 fps)

Summary for Pond R4: Pond 2 Outlet - 12" RCP

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 0.60" for 25 Year Event event
Inflow = 1.47 cfs @ 12.40 hrs, Volume= 0.083 af
Outflow = 1.47 cfs @ 12.40 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min
Primary = 1.47 cfs @ 12.40 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 85.65' @ 12.40 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0143 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.47 cfs @ 12.40 hrs HW=85.65' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.47 cfs @ 2.74 fps)

Summary for Link 1L: 6- 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 4.00" for 25 Year Event event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.012 af
Primary = 1.15 cfs @ 12.09 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 6.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

25 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 2L: 1 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 3.62" for 25 Year Event event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.008 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

25 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Summary for Link 3L: 10 - 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 4.00" for 25 Year Event event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.012 af
Primary = 1.92 cfs @ 12.09 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 10.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

25 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 4L: 2 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 3.62" for 25 Year Event event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.008 af
Primary = 0.30 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 2.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

25 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Time span=0.00-35.00 hrs, dt=0.01 hrs, 3501 points
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 1S: Prop. to Steam Runoff Area=159,889 sf 38.35% Impervious Runoff Depth=5.03"
Flow Length=1,030' Slope=0.0100 '/' Tc=38.3 min CN=83 Runoff=10.73 cfs 1.538 af

Subcatchment 3S: Prop to CB #3 Runoff Area=13,262 sf 51.58% Impervious Runoff Depth=5.37"
Tc=5.0 min CN=86 Runoff=1.92 cfs 0.136 af

Subcatchment 4S: Prop to CB#4 Runoff Area=16,270 sf 58.78% Impervious Runoff Depth=5.59"
Tc=5.0 min CN=88 Runoff=2.43 cfs 0.174 af

Subcatchment 5S: Prop. to CB # 5 Runoff Area=22,568 sf 48.10% Impervious Runoff Depth=5.37"
Tc=5.0 min CN=86 Runoff=3.27 cfs 0.232 af

Subcatchment 6S: Prop. to CB # 6 Runoff Area=19,917 sf 54.20% Impervious Runoff Depth=5.48"
Tc=5.0 min CN=87 Runoff=2.93 cfs 0.209 af

Subcatchment 7S: Prop. to Pond 1 Runoff Area=14,631 sf 71.99% Impervious Runoff Depth=5.94"
Tc=5.0 min CN=91 Runoff=2.27 cfs 0.166 af

Subcatchment 8S: Prop. to East Wetland Runoff Area=127,093 sf 20.50% Impervious Runoff Depth=4.37"
Flow Length=370' Tc=37.0 min CN=77 Runoff=7.63 cfs 1.061 af

Subcatchment 9S: Prop. to North Wetland Runoff Area=33,123 sf 15.76% Impervious Runoff Depth=4.26"
Flow Length=480' Slope=0.0100 '/' Tc=33.1 min CN=76 Runoff=2.05 cfs 0.270 af

Subcatchment 10S: Prop. to Street Runoff Area=592 sf 83.11% Impervious Runoff Depth=6.29"
Tc=5.0 min CN=94 Runoff=0.09 cfs 0.007 af

Subcatchment E1: Exist. to Stream Runoff Area=243,161 sf 28.05% Impervious Runoff Depth=4.58"
Flow Length=460' Slope=0.0100 '/' Tc=42.0 min CN=79 Runoff=14.37 cfs 2.133 af

Subcatchment E2: Exist. To East Runoff Area=148,590 sf 21.32% Impervious Runoff Depth=4.26"
Flow Length=370' Tc=37.0 min CN=76 Runoff=8.70 cfs 1.210 af

Subcatchment E3: Exist. To Street Runoff Area=1,271 sf 37.21% Impervious Runoff Depth=5.03"
Tc=5.0 min CN=83 Runoff=0.17 cfs 0.012 af

Subcatchment E4: Exist. to Wetlands North Runoff Area=42,453 sf 19.69% Impervious Runoff Depth=4.37"
Flow Length=480' Slope=0.0100 '/' Tc=42.6 min CN=77 Runoff=2.37 cfs 0.355 af

Reach 1E: Exist. to Stream (DCP1) Inflow=14.37 cfs 2.133 af
Outflow=14.37 cfs 2.133 af

Reach 1P: Prop. to Stream (DCP1) Inflow=13.86 cfs 1.906 af
Outflow=13.86 cfs 1.906 af

Reach 2E: Exist East Wetland (DCP2) Inflow=8.70 cfs 1.210 af
Outflow=8.70 cfs 1.210 af

Reach 2P: Prop. to East Wetland (DCP2) Inflow=8.59 cfs 1.203 af
Outflow=8.59 cfs 1.203 af

Reach 3E: Exist To Street (DCP3) Inflow=0.17 cfs 0.012 af
Outflow=0.17 cfs 0.012 af

Reach 3P: Prop. To Street (DCP3) Inflow=0.09 cfs 0.007 af
Outflow=0.09 cfs 0.007 af

Reach 4E: Exist North Wetland (DCP4) Inflow=2.37 cfs 0.355 af
Outflow=2.37 cfs 0.355 af

Reach 4P: Prop. to North Wetland (DCP4) Inflow=2.05 cfs 0.270 af
Outflow=2.05 cfs 0.270 af

Pond 7P: MH Peak Elev=89.67' Inflow=4.35 cfs 0.310 af
15.0" Round Culvert n=0.011 L=60.0' S=0.0100 '/' Outflow=4.35 cfs 0.310 af

Pond 9P: CB 4 Peak Elev=90.06' Inflow=2.43 cfs 0.174 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=2.43 cfs 0.174 af

Pond 10P: MH Peak Elev=89.14' Inflow=10.54 cfs 0.751 af
18.0" Round Culvert n=0.011 L=95.0' S=0.0142 '/' Outflow=10.54 cfs 0.751 af

Pond 12P: MH Peak Elev=91.30' Inflow=6.20 cfs 0.440 af
15.0" Round Culvert n=0.011 L=240.0' S=0.0075 '/' Outflow=6.20 cfs 0.440 af

Pond 13P: CB6 Peak Elev=91.91' Inflow=2.93 cfs 0.209 af
12.0" Round Culvert n=0.011 L=62.0' S=0.0089 '/' Outflow=2.93 cfs 0.209 af

Pond MH1: MH Peak Elev=88.65' Inflow=2.27 cfs 0.166 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0050 '/' Outflow=2.27 cfs 0.166 af

Pond MH2: CB 3 Peak Elev=89.92' Inflow=1.92 cfs 0.136 af
12.0" Round Culvert n=0.011 L=22.0' S=0.0100 '/' Outflow=1.92 cfs 0.136 af

Pond MH3: CB5 Peak Elev=92.07' Inflow=3.27 cfs 0.232 af
12.0" Round Culvert n=0.011 L=65.0' S=0.0085 '/' Outflow=3.27 cfs 0.232 af

Pond P1: POND SC 310 Peak Elev=88.56' Storage=1,440 cf Inflow=2.27 cfs 0.166 af
Discarded=0.23 cfs 0.132 af Primary=0.88 cfs 0.035 af Outflow=1.11 cfs 0.166 af

Pond P2: POND 2 SC 740 Peak Elev=88.44' Storage=8,741 cf Inflow=10.54 cfs 0.751 af
Discarded=0.78 cfs 0.565 af Primary=2.66 cfs 0.186 af Outflow=3.44 cfs 0.751 af

Pond R1: Pond1 Outlet - 12" RCP Peak Elev=86.98' Inflow=0.88 cfs 0.035 af
12.0" Round Culvert n=0.011 L=25.0' S=0.0120 '/' Outflow=0.88 cfs 0.035 af

Pond R4: Pond 2 Outlet - 12" RCP Peak Elev=85.99' Inflow=2.66 cfs 0.186 af
12.0" Round Culvert n=0.011 L=35.0' S=0.0143 '/' Outflow=2.66 cfs 0.186 af

Link 1R: 100 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 6.00 Inflow=0.24 cfs 0.016 af
Area= 0.036 ac 100.00% Imperv. Primary=1.42 cfs 0.096 af

Link 2L: 1 100 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce Inflow=0.19 cfs 0.011 af
Area= 0.028 ac 100.00% Imperv. Primary=0.19 cfs 0.011 af

Link 1R: 100 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce x 10.00 Inflow=0.24 cfs 0.016 af
Area= 0.036 ac 100.00% Imperv. Primary=2.36 cfs 0.159 af

Link 100 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce x 2.00 Inflow=0.19 cfs 0.011 af
Area= 0.028 ac 100.00% Imperv. Primary=0.37 cfs 0.023 af

Total Runoff Area = 19.348 ac Runoff Volume = 7.503 af Average Runoff Depth = 4.65"
70.29% Pervious = 13.600 ac 29.71% Impervious = 5.748 ac

Summary for Subcatchment 1S: Prop. to Steam

Runoff = 10.73 cfs @ 12.51 hrs, Volume= 1.538 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	48,878	98	Water Surface Wetlands, HSG C
	77,137	74	>75% Grass cover, Good, HSG C
*	4,305	98	walls othe rimp.
	1,100	87	Dirt roads, HSG C
	18,844	70	Woods, Good, HSG C
*	2,457	98	Exisit,. Roof
*	5,683	98	Exisit. Pavement
*	1,485	74	Prop. Patios
	159,889	83	Weighted Average
	98,566		61.65% Pervious Area
	61,323		38.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	110	0.0100	0.50		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
3.9	790	0.0100	3.35	20.11	**Channel Flow, Stream** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.040 Earth, cobble bottom, clean sides
38.3	1,030	Total			

Summary for Subcatchment 3S: Prop to CB #3

Runoff = 1.92 cfs @ 12.07 hrs, Volume= 0.136 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

Area (sf)	CN	Description
6,841	98	Paved parking, HSG C
6,421	74	>75% Grass cover, Good, HSG C
13,262	86	Weighted Average
6,421		48.42% Pervious Area
6,841		51.58% Impervious Area

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

Summary for Subcatchment 4S: Prop to CB#4

Runoff = 2.43 cfs @ 12.07 hrs, Volume= 0.174 af, Depth= 5.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	1,652	98	Paved parking, HSG C-Sidewalk
	7,912	98	Paved parking, HSG C
	6,706	74	>75% Grass cover, Good, HSG C
	16,270	88	Weighted Average
	6,706		41.22% Pervious Area
	9,564		58.78% Impervious Area

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

Summary for Subcatchment 5S: Prop. to CB # 5

Runoff = 3.27 cfs @ 12.07 hrs, Volume= 0.232 af, Depth= 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	466	98	Paved parking, HSG C - Sidewalk
*	10,390	98	Paved parking, HSG C - rroad-drives
	11,712	74	>75% Grass cover, Good, HSG C
	22,568	86	Weighted Average
	11,712		51.90% Pervious Area
	10,856		48.10% Impervious Area

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

Summary for Subcatchment 6S: Prop. to CB # 6

Runoff = 2.93 cfs @ 12.07 hrs, Volume= 0.209 af, Depth= 5.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	959	98	Paved parking, HSG C - Sidewalk
*	9,836	98	Paved parking, HSG C - rroad-drives
	9,122	74	>75% Grass cover, Good, HSG C
	19,917	87	Weighted Average
	9,122		45.80% Pervious Area
	10,795		54.20% Impervious Area

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

Summary for Subcatchment 7S: Prop. to Pond 1

Runoff = 2.27 cfs @ 12.07 hrs, Volume= 0.166 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
	10,533	98	Paved parking, HSG C
	4,098	74	>75% Grass cover, Good, HSG C
	14,631	91	Weighted Average
	4,098		28.01% Pervious Area
	10,533		71.99% Impervious Area

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

Summary for Subcatchment 8S: Prop. to East Wetland

Runoff = 7.63 cfs @ 12.50 hrs, Volume= 1.061 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	40,951	74	>75% Grass cover, Good, HSG C
	58,938	70	Woods, Good, HSG C
*	1,155	74	Patio
*	377	98	ret wall
	127,093	77	Weighted Average
	101,044		79.50% Pervious Area
	26,049		20.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment 9S: Prop. to North Wetland

Runoff = 2.05 cfs @ 12.47 hrs, Volume= 0.270 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	906	98	Water Surface Wetlands, HSG C
	2,744	98	Paved parking, HSG C
	16,242	74	>75% Grass cover, Good, HSG C
	1,286	98	Roofs, HSG C - infiltrated
*	283	98	walls othe rimp.
	11,662	70	Woods, Good, HSG C
	33,123	76	Weighted Average
	27,904		84.24% Pervious Area
	5,219		15.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
4.8	430	0.0100	1.50		**Shallow Concentrated Flow, shallow** Grassed Waterway Kv= 15.0 fps
33.1	480	Total			

Summary for Subcatchment 10S: Prop. to Street

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 6.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

Area (sf)	CN	Description
492	98	Paved parking, HSG C
100	74	>75% Grass cover, Good, HSG C
592	94	Weighted Average
100		16.89% Pervious Area
492		83.11% Impervious Area

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

Summary for Subcatchment E1: Exist. to Stream

Runoff = 14.37 cfs @ 12.56 hrs, Volume= 2.133 af, Depth= 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	48,977	98	Water Surface Wetlands, HSG C
	11,952	98	Paved parking, HSG C
	34,335	74	>75% Grass cover, Good, HSG C
	2,457	98	Roofs, HSG C
*	4,820	98	walls othe rimp.
	8,801	87	Dirt roads, HSG C
	131,819	70	Woods, Good, HSG C
	243,161	79	Weighted Average
	174,955		71.95% Pervious Area
	68,206		28.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
13.7	410	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.0	460	Total			

Summary for Subcatchment E2: Exist. To East Weltands

Runoff = 8.70 cfs @ 12.50 hrs, Volume= 1.210 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	25,672	98	Water Surface Wetlands, HSG C
	5,792	98	Paved parking, HSG C
	9,907	74	>75% Grass cover, Good, HSG C
*	217	98	walls othe rimp.
	107,002	70	Woods, Good, HSG C
	148,590	76	Weighted Average
	116,909		78.68% Pervious Area
	31,681		21.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
8.7	320	0.0150	0.61		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
37.0	370	Total			

Summary for Subcatchment E3: Exist. To Street

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 5.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

Area (sf)	CN	Description
473	98	Paved parking, HSG C
798	74	>75% Grass cover, Good, HSG C
1,271	83	Weighted Average
798		62.79% Pervious Area
473		37.21% Impervious Area

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

Summary for Subcatchment E4: Exist. to Wetlands North

Runoff = 2.37 cfs @ 12.59 hrs, Volume= 0.355 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Event Rainfall=7.00"

	Area (sf)	CN	Description
*	907	98	Water Surface Wetlands, HSG C
	5,644	98	Paved parking, HSG C
	12,783	74	>75% Grass cover, Good, HSG C
*	520	98	walls othe rimp.
	21,313	70	Woods, Good, HSG C
	1,286	98	Roofs, HSG C
	42,453	77	Weighted Average
	34,096		80.31% Pervious Area
	8,357		19.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	50	0.0100	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.20"
14.3	430	0.0100	0.50		**Shallow Concentrated Flow, shallow - woods** Woodland Kv= 5.0 fps
42.6	480	Total			

Summary for Reach 1E: Exist. to Stream (DCP1)

Inflow Area = 5.582 ac, 28.05% Impervious, Inflow Depth = 4.58" for 100 Year Event event
Inflow = 14.37 cfs @ 12.56 hrs, Volume= 2.133 af
Outflow = 14.37 cfs @ 12.56 hrs, Volume= 2.133 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 1P: Prop. to Stream (DCP1)

Inflow Area = 5.387 ac, 43.52% Impervious, Inflow Depth = 4.25" for 100 Year Event event
Inflow = 13.86 cfs @ 12.47 hrs, Volume= 1.906 af
Outflow = 13.86 cfs @ 12.47 hrs, Volume= 1.906 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2E: Exist East Wetland (DCP2)

Inflow Area = 3.411 ac, 21.32% Impervious, Inflow Depth = 4.26" for 100 Year Event event
Inflow = 8.70 cfs @ 12.50 hrs, Volume= 1.210 af
Outflow = 8.70 cfs @ 12.50 hrs, Volume= 1.210 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 2P: Prop. to East Wetland (DCP2)

Inflow Area = 3.317 ac, 27.22% Impervious, Inflow Depth = 4.35" for 100 Year Event event
Inflow = 8.59 cfs @ 12.46 hrs, Volume= 1.203 af
Outflow = 8.59 cfs @ 12.46 hrs, Volume= 1.203 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3E: Exist To Street (DCP3)

Inflow Area = 0.029 ac, 37.21% Impervious, Inflow Depth = 5.03" for 100 Year Event event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 3P: Prop. To Street (DCP3)

Inflow Area = 0.014 ac, 83.11% Impervious, Inflow Depth = 6.29" for 100 Year Event event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4E: Exist North Wetland (DCP4)

Inflow Area = 0.975 ac, 19.69% Impervious, Inflow Depth = 4.37" for 100 Year Event event
Inflow = 2.37 cfs @ 12.59 hrs, Volume= 0.355 af
Outflow = 2.37 cfs @ 12.59 hrs, Volume= 0.355 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Reach 4P: Prop. to North Wetland (DCP4)

Inflow Area = 0.760 ac, 15.76% Impervious, Inflow Depth = 4.26" for 100 Year Event event
Inflow = 2.05 cfs @ 12.47 hrs, Volume= 0.270 af
Outflow = 2.05 cfs @ 12.47 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Summary for Pond 7P: MH

Inflow Area = 0.678 ac, 55.55% Impervious, Inflow Depth = 5.49" for 100 Year Event event
Inflow = 4.35 cfs @ 12.07 hrs, Volume= 0.310 af
Outflow = 4.35 cfs @ 12.07 hrs, Volume= 0.310 af, Atten= 0%, Lag= 0.0 min
Primary = 4.35 cfs @ 12.07 hrs, Volume= 0.310 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.67' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.45'	**15.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 87.45' / 86.85' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.23 cfs @ 12.07 hrs HW=89.64' TW=89.13' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.23 cfs @ 3.45 fps)

Summary for Pond 9P: CB 4

Inflow Area = 0.374 ac, 58.78% Impervious, Inflow Depth = 5.59" for 100 Year Event event
Inflow = 2.43 cfs @ 12.07 hrs, Volume= 0.174 af
Outflow = 2.43 cfs @ 12.07 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min
Primary = 2.43 cfs @ 12.07 hrs, Volume= 0.174 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

Peak Elev= 90.06' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.13 cfs @ 12.07 hrs HW=89.96' TW=89.64' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.13 cfs @ 2.71 fps)

Summary for Pond 10P: MH

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 5.45" for 100 Year Event event
Inflow = 10.54 cfs @ 12.07 hrs, Volume= 0.751 af
Outflow = 10.54 cfs @ 12.07 hrs, Volume= 0.751 af, Atten= 0%, Lag= 0.0 min
Primary = 10.54 cfs @ 12.07 hrs, Volume= 0.751 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.14' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.85'	**18.0" Round Culvert** L= 95.0' Ke= 0.500 Inlet / Outlet Invert= 86.85' / 85.50' S= 0.0142 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=10.53 cfs @ 12.07 hrs HW=89.13' TW=87.05' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 10.53 cfs @ 5.96 fps)

Summary for Pond 12P: MH

Inflow Area = 0.975 ac, 50.96% Impervious, Inflow Depth = 5.42" for 100 Year Event event
Inflow = 6.20 cfs @ 12.07 hrs, Volume= 0.440 af
Outflow = 6.20 cfs @ 12.07 hrs, Volume= 0.440 af, Atten= 0%, Lag= 0.0 min
Primary = 6.20 cfs @ 12.07 hrs, Volume= 0.440 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 91.30' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	88.65'	**15.0" Round Culvert** L= 240.0' Ke= 0.500 Inlet / Outlet Invert= 88.65' / 86.85' S= 0.0075 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=6.15 cfs @ 12.07 hrs HW=91.28' TW=89.13' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 6.15 cfs @ 5.01 fps)

Summary for Pond 13P: CB6

Inflow Area = 0.457 ac, 54.20% Impervious, Inflow Depth = 5.48" for 100 Year Event event
Inflow = 2.93 cfs @ 12.07 hrs, Volume= 0.209 af
Outflow = 2.93 cfs @ 12.07 hrs, Volume= 0.209 af, Atten= 0%, Lag= 0.0 min
Primary = 2.93 cfs @ 12.07 hrs, Volume= 0.209 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 91.91' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 62.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0089 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.62 cfs @ 12.07 hrs HW=91.78' TW=91.28' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.62 cfs @ 3.34 fps)

Summary for Pond MH1: MH

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 5.94" for 100 Year Event event
Inflow = 2.27 cfs @ 12.07 hrs, Volume= 0.166 af
Outflow = 2.27 cfs @ 12.07 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min
Primary = 2.27 cfs @ 12.07 hrs, Volume= 0.166 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.65' @ 12.19 hrs
Flood Elev= 89.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	87.00'	**12.0" Round Culvert** L= 40.0' Ke= 0.500 Inlet / Outlet Invert= 87.00' / 86.80' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.01 cfs @ 12.07 hrs HW=88.25' TW=87.97' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.01 cfs @ 2.56 fps)

Summary for Pond MH2: CB 3

Inflow Area = 0.304 ac, 51.58% Impervious, Inflow Depth = 5.37" for 100 Year Event event
Inflow = 1.92 cfs @ 12.07 hrs, Volume= 0.136 af
Outflow = 1.92 cfs @ 12.07 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 1.92 cfs @ 12.07 hrs, Volume= 0.136 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 89.92' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	87.67'	**12.0" Round Culvert** L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 87.67' / 87.45' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.54 cfs @ 12.07 hrs HW=89.81' TW=89.64' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.54 cfs @ 1.96 fps)

Summary for Pond MH3: CB5

Inflow Area = 0.518 ac, 48.10% Impervious, Inflow Depth = 5.37" for 100 Year Event event
Inflow = 3.27 cfs @ 12.07 hrs, Volume= 0.232 af
Outflow = 3.27 cfs @ 12.07 hrs, Volume= 0.232 af, Atten= 0%, Lag= 0.0 min
Primary = 3.27 cfs @ 12.07 hrs, Volume= 0.232 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 92.07' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	89.20'	**12.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 89.20' / 88.65' S= 0.0085 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.01 cfs @ 12.07 hrs HW=91.95' TW=91.28' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 3.01 cfs @ 3.83 fps)

Summary for Pond P1: POND SC 310

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 5.94" for 100 Year Event event
Inflow = 2.27 cfs @ 12.07 hrs, Volume= 0.166 af
Outflow = 1.11 cfs @ 12.20 hrs, Volume= 0.166 af, Atten= 51%, Lag= 7.9 min
Discarded = 0.23 cfs @ 11.61 hrs, Volume= 0.132 af
Primary = 0.88 cfs @ 12.20 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.56' @ 12.20 hrs Surf.Area= 1,230 sf Storage= 1,440 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 19.9 min (795.4 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1	86.50'	849 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 2,829 cf Overall - 708 cf Embedded = 2,121 cf x 40.0% Voids
#2	87.00'	708 cf	**ADS_StormTech SC-310 +Cap** x 48 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 48 Chambers in 4 Rows
		1,556 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
86.50	1,230	203.0	0	0	1,230
88.80	1,230	203.0	2,829	2,829	1,697

Device	Routing	Invert	Outlet Devices
#1	Primary	87.70'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	86.50'	**0.23 cfs Exfiltration when above 86.50'**

Discarded OutFlow Max=0.23 cfs @ 11.61 hrs HW=86.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.88 cfs @ 12.20 hrs HW=88.56' TW=86.98' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.88 cfs @ 4.47 fps)

Summary for Pond P2: POND 2 SC 740

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 5.45" for 100 Year Event event
Inflow = 10.54 cfs @ 12.07 hrs, Volume= 0.751 af
Outflow = 3.44 cfs @ 12.35 hrs, Volume= 0.751 af, Atten= 67%, Lag= 16.8 min
Discarded = 0.78 cfs @ 11.44 hrs, Volume= 0.565 af
Primary = 2.66 cfs @ 12.35 hrs, Volume= 0.186 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 88.44' @ 12.35 hrs Surf.Area= 4,088 sf Storage= 8,741 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 38.2 min (827.4 - 789.2)

Volume	Invert	Avail.Storage	Storage Description
#1	85.00'	3,647 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 14,308 cf Overall - 5,191 cf Embedded = 9,117 cf x 40.0% Voids
#2	85.50'	5,191 cf	**ADS_StormTech SC-740 +Cap** x 113 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 113 Chambers in 12 Rows
		8,838 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.00	4,088	320.0	0	0	4,088
88.50	4,088	320.0	14,308	14,308	5,208

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**9.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	85.00'	**0.78 cfs Exfiltration when above 85.00'**

Discarded OutFlow Max=0.78 cfs @ 11.44 hrs HW=85.04' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.78 cfs)

Primary OutFlow Max=2.66 cfs @ 12.35 hrs HW=88.44' TW=85.99' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 2.66 cfs @ 6.02 fps)

Summary for Pond R1: Pond1 Outlet - 12" RCP

Inflow Area = 0.336 ac, 71.99% Impervious, Inflow Depth = 1.24" for 100 Year Event event
Inflow = 0.88 cfs @ 12.20 hrs, Volume= 0.035 af
Outflow = 0.88 cfs @ 12.20 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.20 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 86.98' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	86.50'	**12.0" Round Culvert** L= 25.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 86.50' / 86.20' S= 0.0120 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.88 cfs @ 12.20 hrs HW=86.98' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.88 cfs @ 3.45 fps)

Summary for Pond R4: Pond 2 Outlet - 12" RCP

Inflow Area = 1.653 ac, 52.84% Impervious, Inflow Depth = 1.35" for 100 Year Event event
Inflow = 2.66 cfs @ 12.35 hrs, Volume= 0.186 af
Outflow = 2.66 cfs @ 12.35 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min
Primary = 2.66 cfs @ 12.35 hrs, Volume= 0.186 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs
Peak Elev= 85.99' @ 12.35 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	85.00'	**12.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 85.00' / 84.50' S= 0.0143 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.66 cfs @ 12.35 hrs HW=85.99' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.66 cfs @ 3.39 fps)

Summary for Link 1L: 6- 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 5.38" for 100 Year Event event
Inflow = 0.24 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 1.42 cfs @ 12.10 hrs, Volume= 0.096 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 6.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

100 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 2L: 1 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 4.99" for 100 Year Event event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.011 af
Primary = 0.19 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

100 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

Summary for Link 3L: 10 - 1550 Houses

Inflow Area = 0.036 ac,100.00% Impervious, Inflow Depth = 5.38" for 100 Year Event event
Inflow = 0.24 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 2.36 cfs @ 12.10 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 10.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

100 Year Event Outflow Imported from 1 house with inf. 1550~Reach 2R.hce

Summary for Link 4L: 2 - 1200 House

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 4.99" for 100 Year Event event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.011 af
Primary = 0.37 cfs @ 12.09 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow x 2.00, Time Span= 0.00-35.00 hrs, dt= 0.01 hrs

100 Year Event Outflow Imported from 1 house w inf. 1200~Reach 2R.hce

SECTION V

PROJECT PLANS
See Attached