ENGINEERING REPORT

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MODERN LIVING RENTALS
AFFORDABLE LUXURY

Modern Living Rentals
Town Homes - Town of Dryden, NY

802, 804, 810 & 812 Dryden Road (NYS Route 366)
Town of Dryden
Tompkins County
New York

June 19, 2017

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1.0 Introduction

This project proposes to demolish the existing structure(s), driveways, walkways, utilities, etc. to facilitate the construction of six (6) new town home buildings consisting of 2, 3 & 4 bedroom units with a total of 108 bedrooms. In addition, associated site grading, drainage, utility, access, lighting and landscaping improvements are also proposed

Currently, access to the parcel is via four (4) driveway entrances from Dryden Road (NYS Rt 366). As proposed, this project will eliminate all four (4) existing driveways and construct one (1) new full-access driveway to Dryden Road. This driveway removal and construction work will require commercial driveway permit review and approval by NYSDOT.

The project area spans two parcels having Tax ID numbers of (56.-2-5 & 56.-2-6). As part of the project, the two parcels will be combined to form one parcel.

2.0 Stormwater

A. Stormwater Management

The total site development (disturbance) area is approximately ±3.15 acres which exceeds the allowable site disturbance (1 acre) outlined in the New York State Department of Environmental Conservation's (NYSDEC) General Permit for Stormwater Pollutant Discharges. Therefore, a full Stormwater Pollution Prevention Plan (SWPPP) is required which includes Stormwater Quality and Quantity provisions. While a full SWPPP will be prepared separately, a brief narrative summary is provided in this Engineers Report for initial discussion & coordination with the Town of Dryden.

The entire site is located within the jurisdiction of the Town of Dryden, NY. The Town of Dryden is classified as a Municipal Separate Storm Sewer System (MS4) by NYSDEC. Such classification grants the Town of Dryden jurisdiction over stormwater discharges.

B. **Drainage Analysis Methodology**:

The Stormwater Management and drainage analysis enclosed was prepared per the requirements outlined in the New York State Department of Environmental Conservation's Stormwater Management Design Manual (SMDM). As outlined in the SMDM, the United States Department of Agriculture, Natural Resources Conservation Service's (NRCS) Urban Hydrology for Small Watersheds, Technical Release 55 (TR55) was used to analyze the runoff characteristics associated with the site's drainage basin.

Rainfall amounts for the 1, 10 & 100 year storm events were taken from Figures 4.2, 4.3 & 4.4 respectively provided in the January 2015 SMDM. Rainfall amounts for the other storm events

analyzed were taken from online data provided by http://precip.eas.cornell.edu/ "Extreme Precipitation in New York & New England.

One (1) analysis point (Analysis Point #1) was established to analyze the pre versus post stormwater runoff rates for the project site. Analysis Point #1 is located at the southeast corner of the site where surface runoff enters the existing NYSDOT drainage ditch located along the north side of Dryden Road. It should be noted that only runoff contributions associated with the project site and some upland areas flowing onto the subject parcel. The total runoff and drainage contributions of Dryden Road's drainage infrastructure was not evaluated.

C. **Pre-Development Stormwater Conditions**:
Under Pre-Development Conditions, the site was delineated into one (1) drainage area given the existing topography across the site. A description of these subareas is as follows:

Area #1: This drainage area is comprised of the existing site area. Ground cover consists of some impervious cover associated with the existing roof, walkways, gravel driveways, etc. as well as the existing lawn areas. In addition, some wooded/brush areas are located along the northern and northeastern perimeter locations. Runoff from Area #1 generally flows to the south/southeast via overland flow where it is collected via the existing NYSDOT drainage ditch located along the north side of Dryden Road.

Table 1 below provides a summary of Pre-Development runoff rates (CFS) at the chosen Analysis Points (APs).

Table 1

	Analysis Point #1 (Existing)
1 year	1.02
2 year	1.74
10 year	5.14
100 year	13.49

Refer to Appendix C for the associated HydroCAD drainage analysis.

D. **Post-Development Stormwater Conditions**:
Under Post-Development Conditions, the site was separated into six (6) subareas given the proposed topography across the site. A description of these subareas is as follows:

Area #1: This drainage area is comprised of impervious cover associated with the new parking area as well as the front half (±) of the proposed building roof areas (Buildings B, C, D, E and portions of A and F) as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts and piped to the face of curb where it will combine with surface runoff from the parking lot and ultimately discharge into Bioretention Area #1. Flows from Bioretention Area #1 then enters the new storm sewer system where it combines with the flow from Bioretention Area #2 which ultimately discharges to the proposed Detention Pond.

Area #2: This drainage area is comprised of impervious cover associated with rear half (±) of the proposed building roof areas (Buildings D and portions of F) as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts that will discharge to splash blocks which will combine with surface runoff from the grass areas and ultimately discharge into Bioretention Area #2. Flows from Bioretention Area #2 then enters the new storm sewer system where it combines with the flow from Bioretention Area #1 which ultimately discharges to the proposed Detention Pond.

Area #3A: This drainage area is comprised of impervious cover associated with the rear half (±) of the proposed building roof areas (Buildings E & F) as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts that will discharge to splash blocks which will combine with surface runoff from the grass areas and ultimately discharge into Bioretention Area #3A. Flows from Bioretention Area #3A then enters the new storm sewer system where it combines with the flow from Bioretention Area #1 & #2 which ultimately discharges to the proposed Detention Pond.

Area #3B: This drainage area is comprised of impervious cover associated portions of the front half (±) of the proposed building roof areas (Buildings A & F) as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts that will discharge to splash blocks which will combine with surface runoff from the grass areas and ultimately discharge into Bioretention Area #3B. Flows from Bioretention Area #3B then enters the new storm sewer system where it combines with the flow from Bioretention Area #1, #2 & #3A which ultimately discharges to the proposed Detention Pond.

Area #4: This drainage area is comprised of impervious cover associated with rear half (±) of the proposed building roof areas (Buildings C and portions of B) as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts that will discharge to splash blocks which will combine with surface runoff from the grass areas and ultimately discharge into Bioretention Area #4. Flows from Bioretention Area #4 then enters the new storm sewer system where it discharges to the proposed Detention Pond.

Area #5: This drainage area is comprised of impervious cover associated with rear half (±) of the proposed building roof areas (Buildings A and B) as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts that will discharge to splash blocks which will discharge into the proposed Detention Pond where it will combine with flows from Areas #1, #2, #3A, #3B & #4. Discharge from the Detention Pond flows into the NYSDOT road-side ditch along the north side of Dryden Road where it combines with runoff from Area #6. The combined flow ultimately reaches Analysis Point #1.

Area #7: This drainage area is comprised of the new driveway and portions of the lawn area along the project's frontage. Under proposed conditions, surface runoff is collected via the NYSDOT road-side ditch along the north side of Dryden Road where it combines with discharge from the Detention Pond. The combined flow ultimately reaches Analysis Point #1.

Table 2 below provides a summary of Post-Development runoff rates (CFS) at the chosen Analysis Points (APs).

Table 2

	Analysis Point #1 (Proposed)
1 year	0.52
2 year	0.68
10 year	3.74
100 year	12.44

Refer to Appendix C for the associated HydroCAD drainage analysis.

E. Storm Water Quality:

This project proposes both new impervious surfaces and the disturbance to existing impervious surfaces. Portions of this project (disturbance of existing impervious areas) qualifies as a "Redevelopment Project" as defined in Chapter 9 of the SMDM. However, the stormwater management practices for the new development portion of the project must be designed in accordance with Chapter 4 of the SMDM.

As outlined in the SMDM, for Redevelopment Projects that reconstruct existing impervious areas and construct new impervious areas, the WQv shall be calculated for 25% of the disturbed existing impervious area and 100% of the additional impervious area. A summary of the

accounting for existing and proposed impervious cover used in calculating the WQv is provided in Appendix C.

Existing impervious cover to be disturbed includes roof areas associated with the existing buildings, asphalt drives and parking areas as well as concrete walkways proposed to be demolished as part of this project. Approximately **0.46** acres of impervious cover exists within the project area to be disturbed and approximately **1.56** acres upon completion of the project.

Based on the above and the impervious cover accounting provided in Appendix C, a total of **±1.22 acres** of impervious cover is to be used in calculating the required WQv for the project site. Using the NYSDEC's Green Infrastructure Worksheets (10/02/15 version), the calculated total WQv to be provided is **±0.10 ac-ft.**

Per the NYSDEC SMDM, Storm Water Quality is addressed by capturing and treating 90% of the average annual stormwater runoff volume. This captured volume is considered the Water Quality Volume (WQv). WQv is directly related to the amount of impervious cover created/maintained on site.

To address Water Quality concerns, four (4) bioretention areas (Bioretention Area #1, #2, #3 and #4) are proposed to be used. Through the use of the bioretention area and RRv credits associated with this practice, the volume reduced and treated is equal to or greater than the WQv required.

Bioretention Areas:

The SMDM outlines required elements to be incorporated into the design for bioretention which includes: pretreatment, separation from water table, minimum planting soil media depth and surface mulch treatments.

Pretreatment: As noted above, the SMDM requires that a grass filter strip and/or a gravel diaphragm be used as pretreatment. All bioretention areas utilize a grass swale as pre-treatment.

Separation from Water Table: The SMDM requires that a 2' vertical separation be maintained between the bottom of bioretention practices and the groundwater. A geotechnical subsurface investigation has not been completed for this project site. According to the available NRCS Soil Survey information, groundwater may be encountered within 18-24" of the ground surface. With the proposed section depth of the bioretention areas and the anticipated depth to groundwater, it is unlikely that the 2' vertical separation criteria can be achieved. Therefore a 30 MIL poly-liner is proposed within all bioretention areas.

Minimum Planting Soil Media Depth: As outlined in the SMDM, the minimum bioretention soil media depth is 2.5' which equals the depth of soil media provided. The bioretention areas proposed all provide the required 2.5' minimum soil media depth.

Surface Mulch Treatments: The SMDM recommends that aged hardwood mulch be used as a surface treatment in the bioretention areas. However, in an effort to prolong the operational life of the bioretention area and possibly the introduction of additional phosphorus into the stormwater discharges, rolled river stone mulch on non-woven geotextile is proposed in lieu of hardwood bark mulch.

Maximum Ponding Depth: The SMDM recommends limiting the WQv ponding depth to no more than six (6) inches within the bioretention area. Flows in excess of the WQv would need to be discharged from the bioretention area(s) via a non-erosive outlet.

The Bioretention Areas proposed all provide the 6 inches of available ponding between the stone mulch surface and the overflow outlet. The overflow for all Bioretention Areas consists drainage inlets (catch basins) which is routed to the site storm sewer.

Stormwater Hotspot Concern: According to the NYSDEC Stormwater Management Design Manual (SMDM), a Stormwater Hotspot is defined as a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff, based on monitoring studies. Residential town home uses are not considered stormwater hotspots.

F. **Runoff Reduction Volume**:

The goal of Runoff Reduction Volume (RRv) as defined Chapter 4 of the NYSDEC SMDM is the 100% reduction of the Water Quality Volume (WQv) by the application of green infrastructure techniques and Stormwater Management Practices (SMPs) to replicate pre-development hydrology. However, projects may experience limitations which may prevent this design goal from being achieved.

According to the NYSDEC Green Infrastructure Worksheets, while using bioretention areas with underdrain(s) a project may receive a 40% credit toward the required Runoff Reduction Volume (RRv). The worksheets completed for this project are provided in Appendix E of this SWPPP. The Bioretention Areas were sized to provide a total RRv of **±0.034 ac-ft**.

The SMDM outlines minimum RRv criteria for sites which cannot reduce 100% of the WQv through the use of green infrastructure practices. Using the information presented in the SMDM, the minimum RRv which must be provided is **±0.027 ac-ft**. Therefore, while the goal to reduce 100% of the WQv through green infrastructure techniques could not be achieved, the provided RRv exceeds the minimum required therefore the RRv design criteria is satisfied.

G. Stormwater Water Quantity:

- Stream Channel Protection Volume, CPv:
  CPv is defined as the 24 hour extended detention of the post-development 1-year, 24-hour storm event. As discussed in the SMDM the CPv requirement does not apply where a reduction in the total CPv volume is achieved through Runoff Reduction practices. While this project proposes Runoff Reduction practices as noted above, a total reduction of the CPv is not feasible. The enclosed calculations provided in Appendix C illustrates the initial total required CPv is **±0.163 ac-ft**. As noted in the SMDM, volume reduction achieved through green infrastructure can be deducted from the required CPv. Therefore, using the provided RRv noted above, the adjusted total required CPv is **±0.129 ac-ft**. This volume is temporarily detained within the proposed Detention Pond. With the provided average head on the low flow outlet, a 1.6" diameter orifice would be required to discharge the required CPv over 24 hours. Given the clogging potential of such an orifice size, a 3" diameter orifice was chosen for the Detention Pond. Per the SMDM, for sites where the CPv orifice is considered too small, such a configuration from the calculated required orifice size is appropriate. Refer to Appendix C for CPv calculations for the Detention Pond.

- Overbank Flood Control, Qp (10 year storm event):
  Chapter 4 of the NYSDEC SMDM requires that Qp control be provided such that the peak discharge rate from the 10-year storm event under Post-Development Conditions be reduced so to not exceed the Pre-Development Conditions. As illustrated in Table 3 below, the 10-year storm event discharge rate under Post-Development Conditions is less than that of the Pre-Development conditions. Therefore, the Overbank Flood Control (Qp) requirement is satisfied.

- Extreme Flood Control Criteria, Qf (100 year storm event):
  Chapter 4 of the NYSDEC SMDM requires that Qf control be provided such that the peak discharge rate from the 100-year storm event under Post-Development Conditions be reduced so to not exceed the Pre-Development Conditions. As illustrated in Table 3 below, the 100-year storm event discharge rate under Post-Development Conditions is less than that of the Pre-Development conditions. Therefore, the Extreme Flood Control (Qf) requirement is met.

Table 3 below provides a comparison of Pre and Post Development runoff rates (CFS) at the chosen Analysis Points (APs) and respective peak flow reduction percentage.

Table 3

	AP #1 (Ex)	AP #1 (Pr)
1 year	1.02	0.52
2 year	1.74	0.68
10 year	5.14	3.74
100 year	13.49	12.44

In conclusion, this Project's proposed Bioretention Area and Stormwater Detention Ponds satisfies the Stormwater Quantity, Quality and Runoff Reduction requirements outlined in the NYSDEC SMDM and that required by the Town of Dryden.

H. Conveyance

The onsite stormwater runoff will be conveyed via surface drainage toward the existing stormwater infrastructure provided on Finn Road stormwater management practices. The onsite storm sewers were sized to convey runoff generated from the 10-year storm event. Refer to Appendix B for the Utility Plan and Appendix C for stormwater computations.

3.0 Flood Zone

According to the available FEMA FIRM Map (Map 01-06, Map Index, Town of Dryden, NY), the site is located within Flood Zone C, areas outside the 500 year flood plain.

4.0 Sanitary Sewage

According to the Boundary and Topographic Survey, there appears to be an 8" public sanitary sewer running east along the north side of Dryden Road.

As part of the project all existing sanitary sewer laterals will be removed, cut & capped at the existing sanitary sewer main in accordance with the Town of Dryden requirements.

A new 6" PVC sewer lateral is proposed to be extended from a new dog-house sanitary sewer manhole to be place on the existing sanitary sewer main. The new sanitary sewer lateral will extend up into the site. Each town home unit will have a 4" PVC lateral which will connect to the new 6" lateral.

Based on the Residential Onsite Wastewater Treatment Systems Design Handbook published by NYSDOH, an incremental sewage load rate of 110 gallons per day per dwelling unit (bedroom) should be used. Based on the proposed total of 108 bedrooms, the anticipated sanitary sewage load is 11,880 gallons per day.

Based on the anticipated average sewer load noted above, there appears to be sufficient capacity within the Town of Dryden's system to accommodate the proposed improvements.

5.0 Water Service

According to the Boundary and Topographic Survey, there appears to be a public watermain located along the south side of Dryden Road sewer running east along the north side of Dryden Road.

The locations of the existing water service laterals servicing the existing buildings is unknown. As part of the project, the Contractor will locate and decommission as well as cut and cap the existing water services at the water main.

Currently, a new 6" water service is proposed to be extended from the existing watermain up the proposed driveway and loop the parking lot. Each town home unit will have a 1" water service extending from the new 6" service lateral.

The proposed domestic water demand is anticipated to be equal to the anticipated sanitary sewer load noted above.

A Utility Work Permit from NYSDOT will be required to complete the water service connection work within their right-of-way. Installation of the service lateral under Dryden Road will be via horizontal directional drilling.

6.0 Lighting

As illustrated on the Lighting and Landscaping Plan provided in Appendix B, two (2) decorative light poles are proposed within the center portion of the parking area for this project. Cut sheets are included in Appendix D.

7.0 Traffic

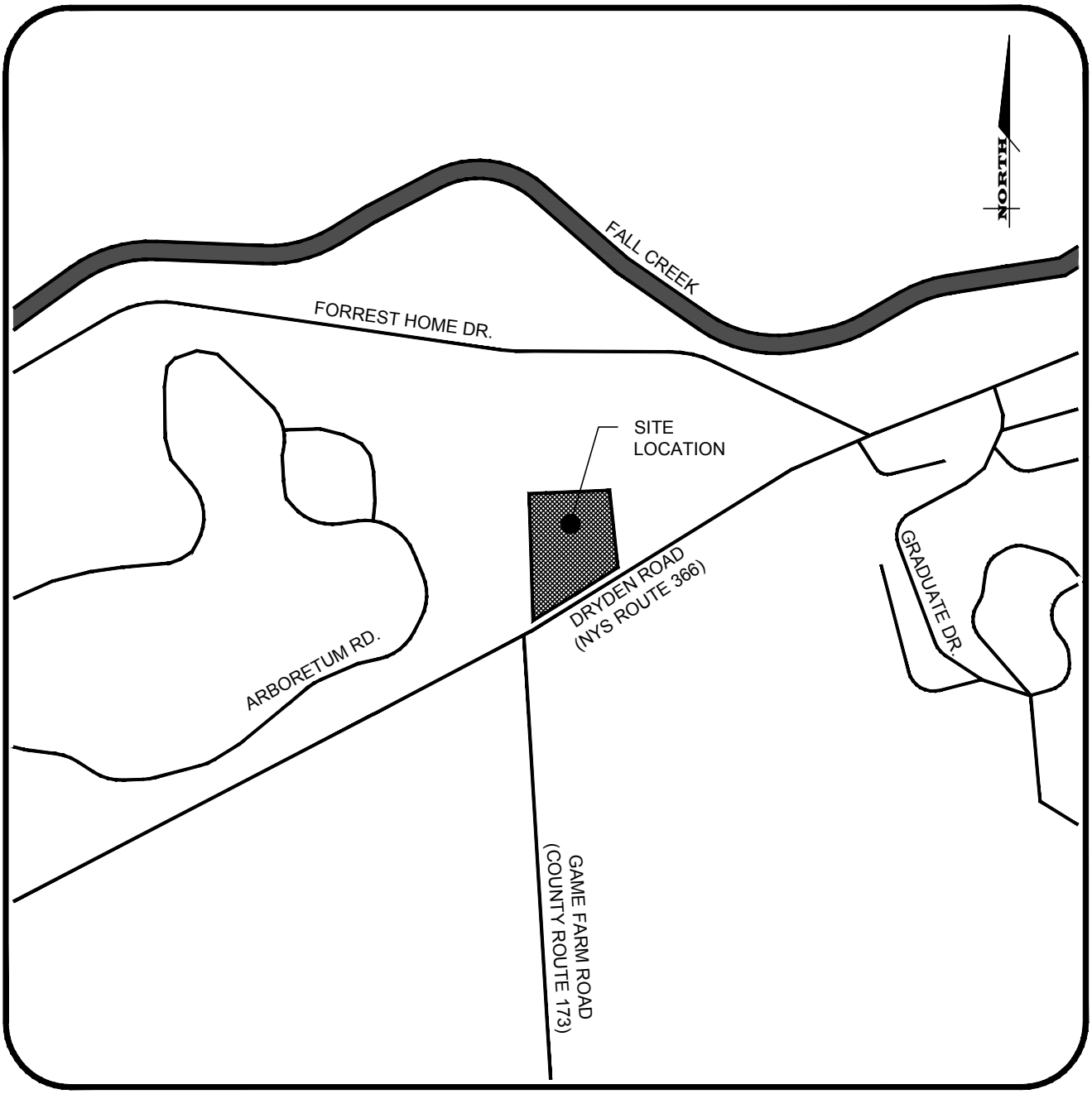
As noted above, the three (3) existing driveways will be removed and one (1) full-access driveway will be constructed.

According to NYSDOT's most recent traffic volume data available, the Average Annual Daily Traffic (AADT) is 7,592 along Dryden Road.

As noted in the Trip Generation Letter provided in Appendix E, the project is anticipated to generate 4 entering/22 exiting vehicle movements during the AM peak hour and 20 entering/10 exiting vehicle trips during the PM peak hour. Given the anticipated trip generation for this project (22 vehicles per hour or less), the project is not anticipated to have any potentially significant adverse impacts on traffic operations. No further traffic study is warranted or recommended at this time.

Appendix A

- SITE LOCATION MAP

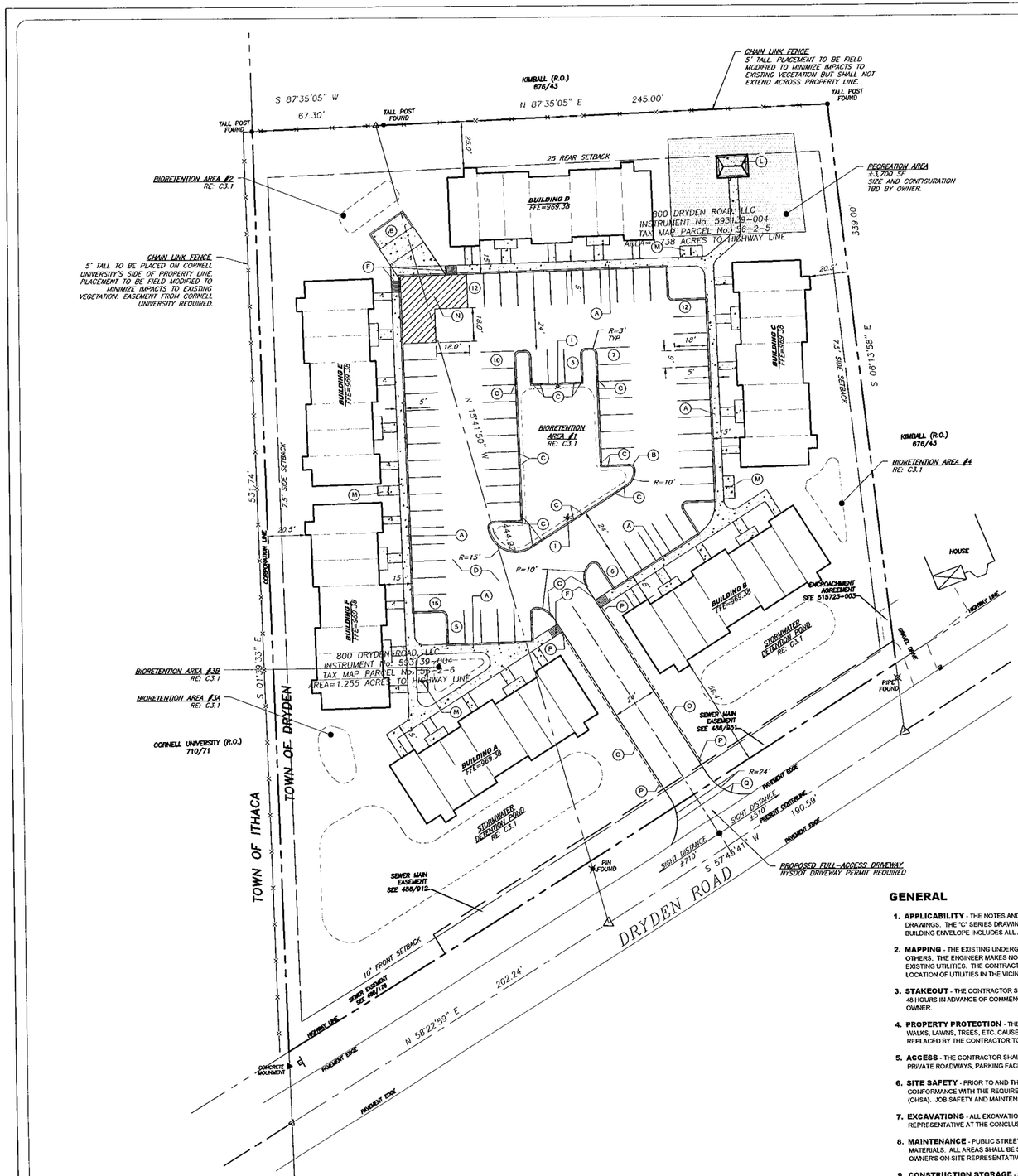


SITE LOCATION

N.T.S

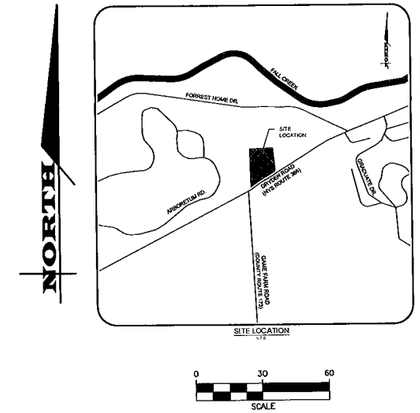
Appendix B

- Site Plan
- Grading, Drainage & Erosion Control Plan
- Utility Plan
- Landscaping and Lighting Plan



SITE KEYNOTES

- (A) RAISED SIDEWALK WITH INTEGRAL CURBING, WIDTH SHOWN ON PLAN, RE: DETAIL
- (B) 18" CONCRETE CURBING, RE: DETAIL
- (C) CURB TRANSITION, RE: DETAIL
- (D) ASPHALT PAVEMENT, RE: DETAIL
- (E) DUMPSTER ENCLOSURE, RE: DETAIL
- (F) ACCESSIBLE RAMP, RE: DETAIL
- (G) CONCRETE SIDEWALK, WIDTH SHOWN ON THE PLANS, RE: DETAIL
- (H) RESERVED
- (I) LIGHT FIXTURE WITH ASSOCIATED BASE AND POLE, RE: DETAIL
- (J) GAZEBO WITH CONCRETE PAD. TBD BY OWNER.
- (K) FREE STANDING SIGN, BY OTHERS
- (L) ELECTRIC TRANSFORMER, RE: UTILITY PLAN
- (M) BIKE RACK W/ 6'x12' CONCRETE PAD, RE: DETAIL
- (N) STRIPED AREA. EDGE LINES TO BE SWSL/4" AND STRIPES ARE TO BE SWSL/4" 2'-0" O.C. @ 45° TO THE EDGE LINES. SEE PLAN FOR DIMENSIONS
- (O) ASPHALT DIKE, RE: DETAIL
- (P) ASPHALT DIKE TAPER, RE: DETAIL
- (Q) EDGE OF PAVEMENT



SITE LOCATION
1:12

PROJECT STATISTICS

1. **GENERAL:**

   1.1 **PROPERTY OWNER** - *N/F WAYNE WOODWARD*

   1.2 **PROPERTY ADDRESS** - *802, 804, 810 & 812 DRYDEN ROAD TOWN OF DRYDEN, 14850*

   1.3 **TAX ACCOUNT** - *56.-2-5 & 56.-2-6*

2. **ZONING REGULATIONS:**

   2.1 **ZONING DISTRICT** - *VARNA HAMLET MIXED USE DISTRICT (VHMUD)*

   2.2 **CODE REQUIREMENTS** -

	REQUIRED	PROPOSED	VARIANCE REQ'D?
PARKING			
SPACE SIZE	--	9'x18'	NO
NUMBER OF SPACES			
STANDARD SPACES	--	71	--
TOTAL	--	71	NO
SETBACKS (BUILDING)			
FRONT	10'	>10'	NO
SIDE	7.5'	>7.5'	NO
REAR	25'	>25'	NO
NEW BUILDING			
HEIGHT	40'	>40'	NO
BUILDING COVERAGE	25% (MAX)	20%	NO
MAX SINGLE BUILDING FOOTPRINT	5,000 SF	>5,000 SF	NO
GREENSPACE	40% MIN.	>40%	NO
INTERIOR LANDSCAPING	15% MIN.	>15%	NO

3. **PARCEL STATISTICS:**

   3.1 **PARCEL AREA** - *±1.72 & ±1.31 TO BE COMBINED INTO ONE PARCEL TOTALING ±3.0 ACRES**

   3.2 **EXISTING CONDITIONS:** *RESIDENTIAL USE*

   3.3 **PROPOSED CONDITIONS:** *6 NEW TOWN HOME BUILDINGS , 2-STORIES, COMPRISED OF 2, 3 & 4 BEDROOM UNITS. 42 DWELLING UNITS PROPOSED, WITH A TOTAL OCCUPANCY OF 108 BEDROOMS.*

   LOT DENSITY SUMMARY:

BASE ZONING:	*10 DWELLING UNITS / ACRE = 30 UNITS*
GREEN DEVELOPMENT BONUS:	*2 DWELLING UNITS / ACRE = 6 UNITS*
REDEVELOPMENT BONUS:	*2 DWELLING UNITS / ACRE = 6 UNITS*
TOTAL	*42 DWELLING UNITS*

   3.4 **FLOOD ZONE DESIGNATION:**

   * *LOT COMBINATION APPROVAL REQUIRED BY THE TOWN OF DRYDEN PLANNING BOARD*

GENERAL

1. **APPLICABILITY** - THE NOTES AND INFORMATION PROVIDED ON THIS SHEET ARE APPLICABLE TO ALL "C" SERIES DRAWINGS. THE "C" SERIES DRAWINGS COVER SITE RELATED IMPROVEMENTS OUTSIDE THE BUILDING ENVELOPE. THE BUILDING ENVELOPE INCLUDES ALL AREA WITHIN 5' OUTSIDE OF THE BUILDING'S EXTERIOR WALL.

2. **MAPPING** - THE EXISTING UNDERGROUND UTILITIES WERE PLOTTED BASED ON RECORD MAPPING SUPPLIED BY OTHERS. THE ENGINEER MAKES NO WARRANTY AS TO THE LOCATION, SIZE, TYPE, ELEVATION, AND/OR NUMBER OF EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES IN THE VICINITY OF THE NEW INFRASTRUCTURE.

3. **STAKEOUT** - THE CONTRACTOR SHALL NOTIFY DIG SAFELY NEW YORK (1-800-962-7962) FOR A UTILITY STAKEOUT 48 HOURS IN ADVANCE OF COMMENCING WORK. STAKEOUT OF PRIVATE UTILITIES SHALL BE COORDINATED WITH THE OWNER.

4. **PROPERTY PROTECTION** - THE CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO EXISTING PAVEMENT, CURBS, WALKS, LAWNS, TREES, ETC. CAUSED BY THEIR CONSTRUCTION OPERATIONS. ALL DAMAGE SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR TO THE OWNER'S SATISFACTION AT NO ADDITIONAL EXPENSE.

5. **ACCESS** - THE CONTRACTOR SHALL PROVIDE SATISFACTORY VEHICULAR ACCESS TO ALL ADJOINING PROPERTIES, PRIVATE ROADWAYS, PARKING FACILITIES, AND PUBLIC STREETS DURING CONSTRUCTION.

6. **SITE SAFETY** - PRIOR TO AND THROUGHOUT CONSTRUCTION, THE CONTRACTOR SHALL POST SIGNAGE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LOCAL MUNICIPALITY AND OCCUPATIONAL HEALTH AND SAFETY ACT (OHSA). JOB SAFETY AND MAINTENANCE AND PROTECTION OF TRAFFIC IS THE RESPONSIBILITY OF THE CONTRACTOR.

7. **EXCAVATIONS** - ALL EXCAVATIONS SHALL BE BACKFILLED/BARRICADED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AT THE CONCLUSION OF EACH WORKING DAY.

8. **MAINTENANCE** - PUBLIC STREETS, PRIVATE DRIVES AND PARKING FACILITIES SHALL BE KEPT FREE OF FOREIGN MATERIALS. ALL AREAS SHALL BE SWEPT CLEAN AT THE END OF EACH WORKING DAY AND/OR AS DIRECTED BY THE OWNER'S ON-SITE REPRESENTATIVE.

9. **CONSTRUCTION STORAGE** - STORAGE OF EQUIPMENT AND MATERIALS SHALL BE WITHIN A SPECIFIED AND SECURED AREA AS DETERMINED IN CONTRACT DOCUMENTS OR AS SPECIFIED BY THE OWNER'S ON-SITE REPRESENTATIVE.

10. **PERMIT(S)** - PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN THE NECESSARY PERMITS FROM THE APPLICABLE MUNICIPALITY OR AGENCY. UNLESS SPECIFIED OTHERWISE, THE OWNER IS RESPONSIBLE FOR PERMIT FEES.

11. **SPECIFICATIONS** - TECHNICAL SPECIFICATIONS, IF SUPPLIED AS PART OF CONTRACT DOCUMENTS, ARE INTENDED TO AID AND HELP DEFINE THE CONTRACTOR'S WORK SCOPE. IF DISCREPANCIES OCCUR THE CONTRACTOR SHALL REQUEST A CLARIFICATION.

CONSTRUCTION

1. **STAKEOUT** - THE CONSTRUCTION STAKEOUT SHALL BE PERFORMED BY A LICENSED LAND SURVEYOR USING CONTROL PROVIDED ON THE "LAYOUT PLAN". THE BUILDING FOOTPRINT(S) ARE AS COORDINATED WITH MODERN LIVING RENTALS ON 06/09/17. DISCREPANCIES WITH BUILDING(S), CONTROL POINTS, AND/ OR TIE DIMENSIONS SHALL BE REPORTED TO THE DESIGN ENGINEER (PRIOR TO THE INSTALLATION OF IMPROVEMENTS) FOR COORDINATION AND CLARIFICATION.

2. **LAYOUT** - DIMENSIONS SHOWN, WHERE APPLICABLE, SHALL BE FROM THE FACE OF CURB UNLESS SPECIFICALLY CALLED OUT OTHERWISE.

3. **DEMOLITION** - CLEARING AND GRUBBING SHALL BE LIMITED TO THE SITE BOUNDARIES OR WITHIN THE "WORK LIMIT LINE" AS DEFINED ON THE PLAN. TREES AND OBJECTS DESIGNATED FOR REMOVAL SHALL BE COORDINATED AND FIELD VERIFIED WITH PROJECT ON-SITE REPRESENTATIVE. ALL MATERIALS SHALL BE LEGALLY DISPOSED OF OFF-SITE OR RETURNED TO OWNER AS DIRECTED BY CONTRACT DOCUMENTS. ALL ITEMS NOT SPECIFICALLY CALLED OUT TO BE REMOVED SHALL REMAIN.

4. **COORDINATION** - THE CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITY WORK WITH OTHER SITE UTILITIES (I.E. GAS, ELECTRIC, LIGHTING, COMMUNICATIONS) TO AVOID POTENTIAL INSTALLATION CONFLICTS.

5. **STAGING** - AS DEFINED BY THE CONTRACT DOCUMENTS THE CONTRACTOR SHALL CONSTRUCT A SECURE STAGING AREA FOR STORAGE OF EQUIPMENT, MATERIALS, EMPLOYEE PARKING AND OFFICE SPACE. IF THE AREA/METHOD IS NOT SPECIFICALLY DEFINED ON THE DOCUMENTS THEN IT SHALL BE COORDINATED WITH THE OWNER'S ON-SITE REPRESENTATIVE.

6. **CLOSE-OUT** - THE CONTRACTOR'S WORK SCOPE INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING AT PROJECT CLOSE-OUT TO THE SATISFACTION OF OWNER'S ON-SITE REPRESENTATIVE:
   - REMOVAL OF ANY CONSTRUCTION DEBRIS.
   - CLEANING PAVEMENT AND WALKWAY SURFACES.
   - RESTORATION OF ALL DISTURBED GRASS AND LANDSCAPED AREAS.
   - PROVIDING BONDS, GUARANTEES, CERTIFICATIONS, ETC. AS REQUIRED BY CONTRACT DOCUMENTS.
   - PROVIDING A RECORD DRAWING.
   - COMPLETION OF FINAL PUNCH LIST ITEMS.

MARATHON ENGINEERING
39 CASCADE DRIVE
ROCHESTER, NY 14614
PHONE 585-458-7770
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SITE DEVELOPMENT PLANS FOR MODERN LIVING RENTALS 802, 804, 810 & 812 DRYDEN ROAD

TOWN OF DRYDEN — COUNTY OF TOMPKINS — STATE OF NEW YORK

JOB NO:	0841-17
SCALE:	1"=30'
DRAWN:	AMF
DESIGNED:	AMF
DATE:	06/12/17

REVISIONS

DATE	BY	REVISION

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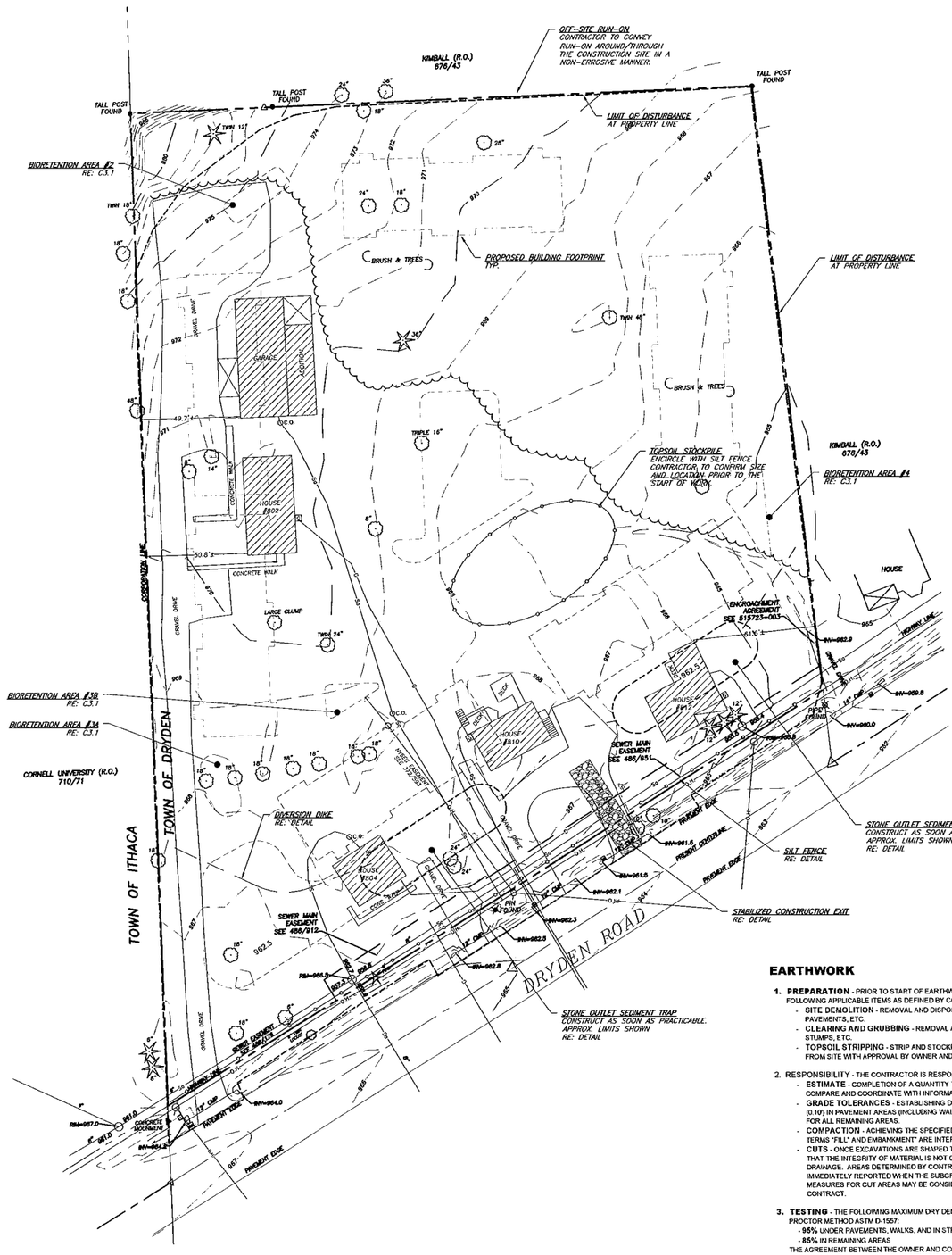
STATE OF NEW YORK — ADAM M. FISHEL — NO. 086648 — LICENSED PROFESSIONAL ENGINEER

DRAWING TITLE:
Site Plan

3 of 13 SHEET No:	C2.0
0841-17 JOB No:	DRAWING No:



DISTURBANCE SUMMARY:

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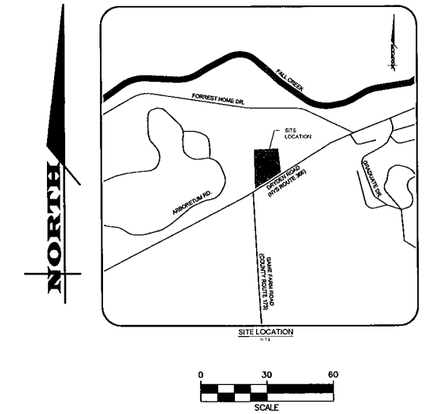
OFFSITE DISTURBED: ±0.15 ACRES
TOTAL DISTURBED:±3.10 ACRES
TOTAL PROJECT AREA: ±3.15 ACRES

EXISTING IMPERVIOUS: ±0.50 ACRES
EXISTING PERVIOUS: ±2.50 ACRES
PROPOSED IMPERVIOUS: ±1.60 ACRES
PROPOSED PERVIOUS: ±1.40 ACRES



EROSION CONTROL

1. **CERTIFICATION** - THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP), WHICH INCLUDES THE "GRADING PLAN", "EROSION CONTROL PLAN", "EROSION CONTROL NOTES", ALONG WITH THE "DRAINAGE REPORT", DEFINES AND MEETS THE REQUIREMENTS OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) PHASE II STORM WATER REGULATIONS.

2. **CONTRACTOR RESPONSIBILITY** - ALL CONTRACTORS AND SUB-CONTRACTORS SHALL CERTIFY WITHIN THE SWPPP THAT THEY WILL IMPLEMENT AND MAINTAIN STORM WATER MANAGEMENT PRACTICES.

3. **INSPECTION** - EROSION CONTROL (EC) MEASURES INSTALLED AND MAINTAINED BY THE SITE WORK CONTRACTOR ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE: MUNICIPALITY, DESIGN ENGINEER, NYSDEC, AND OWNER'S REPRESENTATIVE. IMMEDIATE ACTION BY THE CONTRACTOR SHALL BE TAKEN IF ADDITIONAL OR CORRECTIVE MEASURES ARE REQUIRED BY ANY ONE OF THESE CITED REVIEWERS. EROSION CONTROL MEASURES NOT SPECIFICALLY SHOWN ON CONTRACT DRAWINGS (I.E.,: ADDITIONAL SILT FENCE, COLLARS, FABRICS, ETC.) SHALL BE INSTALLED AS WARRANTED BY FIELD CONDITIONS, AND AS DIRECTED BY THE AFOREMENTIONED REVIEWERS.

4. **NOTIFICATION** - AS DESIGN ENGINEER, OUR OFFICE HAS NOTIFIED THE OWNER OF THE INSPECTION REQUIREMENTS UNDER GP-0-15-002. DISTURBANCES OF 1.0 ACRE OR GREATER REQUIRE THAT THE OWNER FILE A NOTICE OF INTENT (NOI) AND A SWPPP WITH THE NYSDEC UNDER STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) GENERAL PERMIT #GP-0-15-002. THE REGULATIONS REQUIRE THAT A LICENSED PROFESSIONAL COMPLETE A WEEKLY INSPECTION (THROUGHOUT THE PERIOD OF LAND DISTURBANCE).

5. **PRE-CONSTRUCTION** - THE APPROPRIATE EROSION CONTROL MEASURES AS DEFINED BY THE CONSTRUCTION DOCUMENTS SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES. A PRE-CONSTRUCTION MEETING WITH THE TOWN OF DRYDEN SHALL OCCUR PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.

6. **TOPSOIL** - UPON COMPLETION OF THE STOCKPILE STRIPPING OPERATION, STOCKPILES SHALL BE STABILIZED IN ACCORDANCE TO NYSDEC REGULATIONS.

7. **SLOPES** - UPON COMPLETION OF GRADING, SLOPES WITH A GRADIENT OF ONE FOOT VERTICAL TO THREE FEET HORIZONTAL (1 ON 3) OR GREATER SHALL BE: TOPSOILED, SEEDED, FERTILIZED AND STABILIZED WITH A ROLLED EROSION CONTROL BLANKET (ECB). ECB SHALL BE NORTH AMERICAN GREEN - BIONET PRODUCT #S150BN OR APPROVED EQUAL.

8. **DUST** - THE CONTRACTOR SHALL APPLY WATER AND/OR CALCIUM CHLORIDE, AS CONDITIONS WARRANT, TO CONTROL WIND BORN EROSION. THIS MEASURE APPLIES TO: HAUL ROADS, CUT AND FILL OPERATIONS, SUB-BASE AND ANY OTHER EXPOSED SURFACES.

9. **OPERATION & MAINTENANCE** - THROUGHOUT THE PERIOD OF CONSTRUCTION AND PRIOR TO ESTABLISHING FINAL GROUND COVER THE SITE CONTRACTOR IS RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE TEMPORARY EROSION CONTROL MEASURES. FOR EXAMPLE, THE SILTATION FACILITIES SHALL BE RE-EXCAVATED WHEN THE VOLUME (3600 CUBIC FEET/DISTURBED ACRE) IS REDUCED BY ONE-HALF OR MORE OF ITS SPECIFIED CAPACITY AND/OR THE MATERIAL IS WITHIN ONE FOOT OF THE DISCHARGE POINT.

10. **WORK STOPPAGE** - ALL DISTURBED AREAS NOT TO BE WORKED WITHIN 21 DAYS MUST BE SEEDED WITHIN 14 DAYS FROM THE LAST CONSTRUCTION ACTIVITY IN THAT AREA.

11. **SEQUENCE** - THE CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES IN THE FOLLOWING SEQUENCE UNLESS AUTHORIZED OTHERWISE AT PRE-CONSTRUCTION MEETING:
    - CONTRACTOR SHALL DENOTE THE LOCATION OF EQUIPMENT STORAGE/LAYDOWN, JOB TRAILERS, PORTA-POTTY, WASTE RECEPTACLES, ETC. ON THE CONSTRUCTION DRAWINGS PRIOR TO THE START OF WORK.
    - PROTECT EXISTING VEGETATION AND ENVIRONMENTAL FEATURES TO REMAIN.
    - INSTALL PERIMETER SEDIMENT CONTROLS.
    - INSTALL STABILIZED CONSTRUCTION ENTRANCE.
    - PROTECT VEGETATION TO REMAIN.
    - COMPLETE CLEARING AND GRUBBING.
    - STRIP TOPSOIL AND PLACE EROSION CONTROL MEASURES AROUND ALL TOPSOIL STOCKPILES. CONTRACTOR TO DENOTE LOCATION OF STOCKPILE(S) ON THE CONSTRUCTION DRAWINGS.
    - INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROLS ACCORDING TO PLAN.
    - GRADE SITE.
    - THE CONTRACTOR SHALL PROTECT THE FOOTPRINT OF THE TWO (2) UNDERGROUND STORMWATER DETENTION FACILITIES FROM HEAVY TRAFFIC TO THE MAXIMUM EXTENT PRACTICAL SO TO NOT OVER-COMPACT THE FLOOR AND REDUCE INFILTRATIVE CAPACITY OF THE FACILITIES. THE CONTRACTOR SHALL NOT ROUGH GRADE THE SITE WITHIN 3' OF THE BOTTOM OF EACH OF THE UNDERGROUND STORMWATER MANAGEMENT FACILITIES.
    - STABILIZE DENUDED AREAS AND STOCKPILES WITHIN 14 DAYS OF LAST CONSTRUCTION ACTIVITY IN EACH AREA.
    - INSTALL/PLACE CONCRETE WASHOUT AREA(S). CONTRACTOR TO DENOTE LOCATION OF CONCRETE WASHOUT AREA(S) ON THE CONSTRUCTION DRAWINGS.
    - INSTALL UTILITIES.
    - APPLY STONE TO ROADS AND PARKING AREAS.
    - COMPLETE GRADING AND CONSTRUCTION OF PERMANENT STORMWATER UNDERGROUND DETENTION FACILITIES, STABILIZE SIDE SLOPES, ETC. FINAL EXCAVATION TO THE FINISHED SUBGRADE ELEVATION OF THE FACILITIES SHOULD BE DEFERRED UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED OR PROTECTED. IT IS CRITICAL THAT ADEQUATE INLET PROTECTION BE PROVIDED AT ALL DRAINAGE INLETS, MANHOLES, ETC. WHICH COLLECT AND DIVERT RUNOFF TO THE UNDERGROUND DETENTION FACILITIES TO PREVENT SEDIMENT ACCUMULATION WITHIN THESE PRACTICES. THE UNDERGROUND DETENTION FACILITIES SHALL NOT BE USED AS TEMPORARY SEDIMENT TRAPPING DEVICES.
    - ONCE ALL AREAS DRAINING TO BIORETENTION AREA(S) HAVE ACHIEVED FINAL STABILIZATION, CONSTRUCT BIORETENTION AREA(S).
    - COMPLETE GRADING, REAPPLY TOPSOIL, AND PERFORM SOIL RESTORATION.
    - INSTALL PERMANENT SEEDING, FERTILIZER AND MULCH.
    - COMPLETE FINAL PAVING.
    - REMOVE ACCUMULATED SEDIMENT FROM BIORETENTION AREA(S), STORMWATER DETENTION FACILITIES, STORM SEWERS, STORM STRUCTURES, ETC.
    - REMOVE ALL TEMPORARY SEDIMENT CONTROL PRODUCTS AFTER SOILS ARE STABILIZED.

EARTHWORK

1. **PREPARATION** - PRIOR TO START OF EARTHWORK OPERATIONS THE CONTRACTOR SHALL COMPLETE THE FOLLOWING APPLICABLE ITEMS AS DEFINED BY CONTRACT DOCUMENTS:
    - **SITE DEMOLITION** - REMOVAL AND DISPOSAL OFF-SITE IN A LEGAL MANNER; STRUCTURES, UTILITIES, PAVEMENTS, ETC.
    - **CLEARING AND GRUBBING** - REMOVAL AND DISPOSAL OFF-SITE IN A LEGAL MANNER; TREES, BRUSH, STUMPS, ETC.
    - **TOPSOIL STRIPPING** - STRIP AND STOCKPILE TOPSOIL FOR REUSE. EXCESS TOPSOIL MAY BE REMOVED FROM SITE WITH APPROVAL BY OWNER AND MUNICIPALITY.

2. RESPONSIBILITY - THE CONTRACTOR IS RESPONSIBLE FOR:
    - **ESTIMATE** - COMPLETION OF A QUANTITY TAKEOFF TO DETERMINE THE VOLUME OF CUT, FILL, AND TOPSOIL COMPARE AND COORDINATE WITH INFORMATION PROVIDED BY THE DESIGN ENGINEER.
    - **GRADE TOLERANCES** - ESTABLISHING DESIGN SUBGRADE ELEVATIONS TO WITHIN ONE TENTH OF ONE FOOT (0.10') IN PAVEMENT AREAS (INCLUDING WALKS) AND TO WITHIN THIRTY-THREE HUNDREDTHS OF ONE FOOT (0.33') FOR ALL REMAINING AREAS.
    - **COMPACTION** - ACHIEVING THE SPECIFIED MINIMUM COMPACTION VALUES FOR EMBANKMENT/FILL AREAS. THE TERMS "FILL" AND EMBANKMENT" ARE INTERCHANGEABLE.
    - **CUTS** - ONCE EXCAVATIONS ARE SHAPED TO THE DESIGN GRADES THE AREAS SHALL BE PROTECTED TO ASSURE THAT THE INTEGRITY OF MATERIAL IS NOT COMPROMISED BY CONSTRUCTION VEHICLES AND/OR IMPROPER DRAINAGE. AREAS DETERMINED BY CONTRACTOR TO BE NOT SUITABLE FOR SUBGRADE PLACEMENT SHALL BE IMMEDIATELY REPORTED WHEN THE SUBGRADE IS ESTABLISHED TO OWNER'S REPRESENTATIVE. STABILIZATION MEASURES FOR CUT AREAS MAY BE CONSIDERED BY OWNER'S REPRESENTATIVE AS A CHANGE TO THE BASE CONTRACT.

3. **TESTING** - THE FOLLOWING MAXIMUM DRY DENSITIES SHALL BE ACHIEVED AS MEASURED BY THE MODIFIED PROCTOR METHOD ASTM D-1557:
    - **95%** UNDER PAVEMENTS, WALKS, AND IN STRUCTURAL FILL AREAS
    - **85%** IN REMAINING AREAS

    THE AGREEMENT BETWEEN THE OWNER AND CONTRACTOR SHALL DEFINE THE NUMBER OF TESTS AND RESPONSIBILITY. WE RECOMMEND IN EMBANKMENT AREAS ONE PER LIFT AND/OR ONE PER 1,000 CUBIC YARDS.

4. **LIFT THICKNESS** - THE MAXIMUM LIFT THICKNESS UNDER PAVEMENTS, WALKS, AND STRUCTURAL FILLS SHALL BE 12 INCHES. HAND OPERATED COMPACTION FILLS SHALL NOT EXCEED 6 INCHES.

5. **PROOF ROLLING** - THE OWNER'S REPRESENTATIVE MAY REQUEST A PROOF ROLL (I.E. LOADED TEN WHEELER) OF SUBGRADE AREAS PRIOR TO PLACEMENT OF SUBBASE MATERIALS. AREAS THAT "FAIL" SHALL BE REMOVED AND REPLACED TO ACHIEVE A PASSING SUBGRADE.

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TOWN OF DRYDEN — COUNTY OF TOMPKINS — STATE OF NEW YORK

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SCALE:	1"=30'
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REVISIONS

DATE	BY	REVISION

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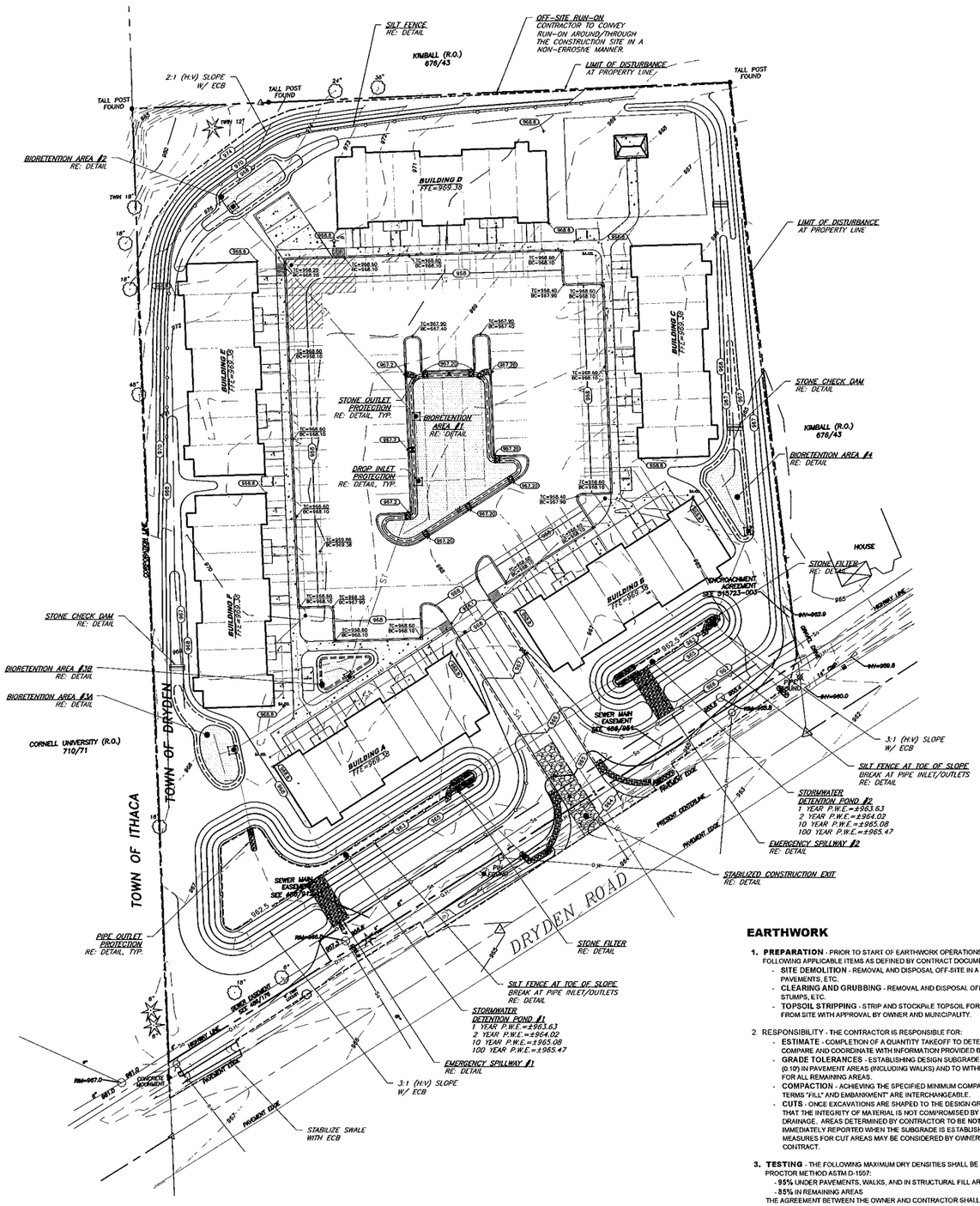
STATE OF NEW YORK — ADAM MICHAEL FISHEL — NO. 086648 — LICENSED PROFESSIONAL ENGINEER

ADAM M. FISHEL

DRAWING TITLE:
Grading, Drainage & Erosion Control Plan (1 of 2)

4 of 13 SHEET No:	C3.0
0841-17 JOB No:	DRAWING No:



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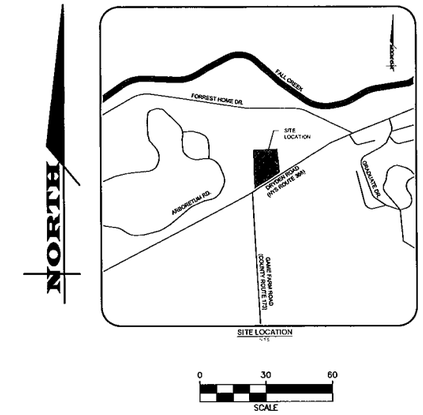

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STATE OF NEW YORK — ADAM M. FISHEL — NO. 085646 — LICENSED PROFESSIONAL ENGINEER

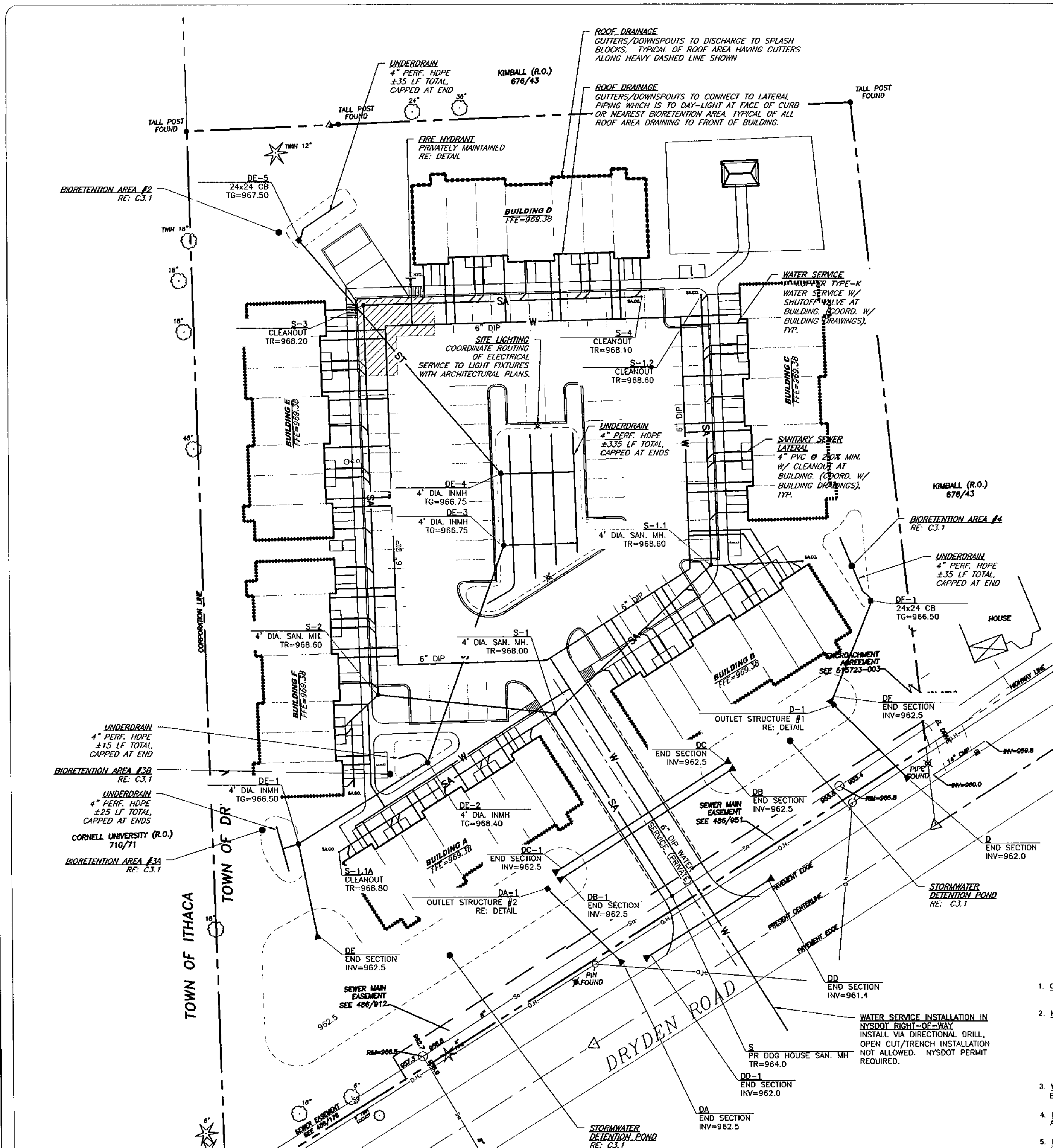
ADAM M. FISHEL

DRAWING TITLE:
Grading, Drainage & Erosion Control Plan (2 of 2)

5 of 13
SHEET No:

C3.1
DRAWING No.

0841-17
JOB No:



DRAINAGE SCHEDULE (D)

STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
OS#1	D-1	D				
TR	-					
INV=	962.50	962.00	12	HDPE	50	1.00%
ES	D	-				
INV=	962.00	-	-	-	-	-

DRAINAGE SCHEDULE (DA)

STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
OS#2	DA-1	DA				
TR	-					
INV=	963.00	962.50	12	HDPE	50	1.00%
ES	DA	-				
INV=	962.50	-	-	-	-	-

DRAINAGE SCHEDULE (DB)

STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
ES	DB-1	DB				
TR						
INV=	962.50	962.50	18	HDPE	92	0.00%
ES	DB	-				
INV=	962.50	-	-	-	-	-

DRAINAGE SCHEDULE (DC)

STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
ES	DB-1	DB				
TR						
INV=	962.50	962.50	18	HDPE	92	0.00%
ES	DB	-				
INV=	962.50	-	-	-	-	-

DRAINAGE SCHEDULE (DD)

STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
ES	DB-1	DB				
TR						
INV=	962.05	961.40	12	RCP	65	1.00%
ES	DB	-				
INV=	961.40	-	-	-	-	-

DRAINAGE SCHEDULE (DE)

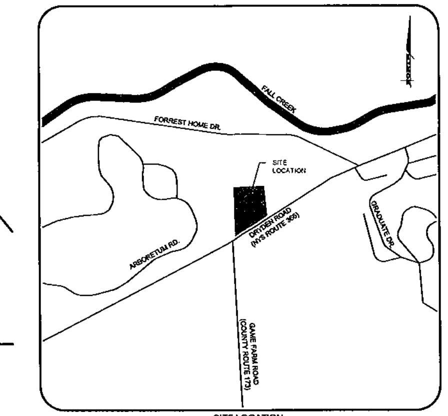
STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
24x24 CB	DE-5	DE-4				
TG	967.50					
INV=	962.90	962.76	12	HDPE	143	0.10%
INMH 4	DE-4	DE-3				
TG	966.75					
INV=	962.76	962.72	12	HDPE	34	0.10%
INMH 4	DE-3	DE-2				
TG	966.75					
INV=	962.72	962.62	18	HDPE	107	0.10%
INMH 4	DE-2	DE-1				
TG	968.40					
INV=	962.62	962.54	18	HDPE	72	0.10%
INMH 4	DE-1	DE				
TG	966.50					
INV=	962.54	962.50	18	HDPE	44	0.10%
ES	DE	-				
INV=	962.50	-	-	-	-	-

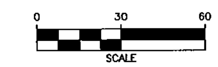
DRAINAGE SCHEDULE (DF)

STRUCTURE DESIGNATIONS

	FROM	TO	DIA. (IN)	PIPE MAT'L	LENGTH (FT)	SLOPE (%)
ES	DF-1	DF				
TG	966.50					
INV=	962.50	962.50	12	HDPE	47	0.00%
ES	DF	-				
INV=	962.50	-	-	-	-	-



SITE LOCATION



SANITARY SEWER SCHEDULE

STRUCTURE ID	STRUCTURE TYPE	TOP OF RIM	INVERT OUT	INVERT IN	LENGTH (FT)	PIPE DIA. & MAT'L	SLOPE (%)
S-1.1A S-1.1A TO S1	PROPOSED CLEANOUT	968.80	960.62	-	121	6" PVC.	1.00%
S-1.2 S-1.2 TO S1.1	PROPOSED CLEANOUT	968.60	961.77	961.87	125	6" PVC.	1.00%
S-1.1 S-1.1 TO S-1	PROPOSED 4' DIA. MANHOLE	968.60	960.42	960.52	101	6" PVC.	1.00%
S-4 S-4 TO S-3	PROPOSED CLEANOUT	968.10	963.57	-	130	6" PVC.	1.00%
S-3 S-3 TO S-2	PROPOSED 4' DIA. MANHOLE	968.20	962.17	962.27	182	6" PVC.	1.00%
S-2 S-2 TO S-1	PROPOSED 4' DIA. MANHOLE	968.60	960.25	960.35	84	6" PVC.	1.00%
S-1 S-1 TO S	PROPOSED 4' DIA. MANHOLE	968.00	959.31	959.41	101	6" PVC.	1.00%
S -	PROPOSED 4' DIA. DOGHOUSE	964.00	955.93	958.3 (6" LAT) 956.03 (8")	-	-	-

NOTES:

(1) INVERT ELEVATION OF EXISTING SANITARY SEWER SHOWN IS APPROXIMATE. CONTRACTOR TO CONFIRM PRIOR TO THE START OF WORK.

(2) CONSTRUCT DROP STRUCTURE ON/WITHIN EXISTING MANHOLE FOR LATERAL CONNECTION AS DIRECTED BY THE TOWN OF DRYDEN

SOUTHERN CAYUGA LAKE INTERMUNICIPAL WATER COMMISSION SPECIFICATIONS FOR WATER MAIN EXTENSIONS

1. COVER - WATER SERVICE LINES SHALL HAVE A MINIMUM OF 5 FEET OF COVER FROM FINISHED GRADE IN LAWN AREAS AND 6 FEET OF COVER FROM FINISHED GRADE IN PAVED AREAS.
2. HYDRANTS - CLOW-EDDY OR MUELLER WITH:
   - 5 FOOT BURY, OPEN LEFT, TRAFFIC TYPE GROUND FLANGE, 6 INCH INLET.
   - 1 - 4½ INCH NST STEAMER NOZZLE, 2 - 2½ INCH NST HOSE NOZZLE.
   - MECHANICAL JOINT CONNECTIONS, 5 INCH HYDRANT VALVE SEAT, PENTAGON OPERATING NUT.
   - MUST HAVE TWO FORMS OF RESTRAINT, ONE OF WHICH MUST BE A THRUST BLOCK. SECOND RESTRAINT CAN BE - 1) INTEGRALLY CAST RESTRAINT, 2) ¾ INCH STAINLESS STEEL THREADED ROD AND FRICTION CLAMPS, 3) RETAINER GLANDS.
3. WATER MAIN - CLASS 52 (GREATER THAN 350 PSI), DUCTILE IRON, CEMENT LINED, PUSH ON JOINT WITH POLY ENCASEMENT WRAP.
4. MAIN VALVES - MECHANICAL JOINT, RESILIENT SEAT, GATE, 2 INCH OPERATING NUT, OPEN LEFT, STAINLESS STEEL BONNET AND PACKING BOLTS.
5. MAIN FITTINGS - ALL UNDERGROUND FITTINGS ARE DUCTILE IRON, MECHANICAL JOINT (*INCLUDING TAPPING SLEEVES, UNLESS APPROVED BY MUNICIPALITY*). FITTINGS IN BUILDINGS OR PITS ARE TO BE DUCTILE IRON FLANGE JOINT.
6. MAIN VALVE BOXES - 5¼ INCH, SCREW TYPE, CAST IRON WITH LID MARKED "WATER".
7. SERVICE LINE FITTINGS - MUELLER OR FORD, COMPRESSION OR FLARED FITTINGS. CURB VALVES AND CORPORATION STOPS MUST BE" BALL TYPE - FULL PORT". STOP AND WASTE VALVES ARE NOT PERMITTED.
8. SERVICE LINES - "K" COPPER WITH ¾ INCH MINIMUM. 1 INCH MINIMUM WHERE SPRINKLER SYSTEMS ARE REQUIRED.
9. CURB BOXES - BUFFALO STYLE, SCREW TYPE, CAST IRON, LID MARKED "WATER" WITH PENTAGON NUT, OPERATING ROD AND CENTERING RING.
10. RESTRAINT - 2500 PSI, 30 DAY CONCRETE THRUST BLOCK - PLUS - ONE OF THE FOLLOWING -
    1) INTEGRALLY CAST RESTRAINT
    2) ¾ INCH STAINLESS STEEL THREADED ROD AND FRICTION CLAMPS
    3) RETAINER GLANDS
11. PRESSURE REDUCING VALVES - O.C.V MODEL 127, BERMAD OR ROSS VALVE
12. DEAD ENDS WITHOUT HYDRANTS
    - 2 INCH FLUSHING OR BLOW OFF HYDRANTS MUST BE INSTALLED.
    - 2½ INCH NST NOZZLE, 2 INCH IRON PIPE INLET, TRAFFIC BREAK AWAY FLANGE AND FULL DRAINING CAPABILITIES.
13. TESTING - WATER SERVICE LINES SIZED 4-INCHES OR GREATER SHALL BE:
    - PRESSURE TESTED IN ACCORDANCE WITH THE LATEST SPECIFICATIONS OF THE SOUTHERN CAUGA LAKE INERMUNICIPAL WATER COMMISSION (SCLIWC). **A SCLIWC AND A TOWN OF DRYDEN DEPARTMENT OF PUBLIC WORKS REPRESENTATIVE MUST WITNESS THIS TEST.**
    - DISINFECTED BY USING THE CONTINUOUS FEED METHOD ACCORDING TO AWWA STANDARD SPECIFICATIONS. AFTER FLUSHING AND DISINFECTING THE SERVICE LINE, WATER SAMPLES SHALL BE COLLECTED BY THE SCLIWC. APPROVAL AND NOTIFICATION BY THE SCLIWC MUST BE RECEIVED BEFORE THE LATERAL IS PLACED IN SERVICE.

UTILITIES

1. SANITARY

1.1 MATERIALS

- MAINS - PIPING SHALL BE POLYVINYL CHLORIDE (PVC) WITH ENDS SUITABLE FOR ELASTOMERIC GASKET JOINTS, AND A MINIMUM WALL THICKNESS OF SDR-35. PIPING AND FITTINGS SHALL MEET:
  ASTM D-3034 (4" THRU 15")
  ASTM F-679 (18" THRU 48")
- LATERALS - PIPING SHALL BE POLYVINYL CHLORIDE (PVC) WITH ENDS SUITABLE FOR ELASTOMERIC GASKET JOINTS, AND A MINIMUM WALL THICKNESS OF SDR-21. PIPING AND FITTINGS SHALL MEET ASTM D-2241.
- JOINTING MATERIALS - SHALL BE BELL-AND-SPIGOT WITH INTEGRAL PUSH ON TYPE ELASTOMERIC GASKET JOINTS, GASKET MATERIAL TO BE NEOPRENE MEETING ASTM D-3212.
- MANHOLES - SHALL BE PRECAST CONCRETE WITH NEOPRENE GASKETS MEETING ASTM C-478 & ASTM C-443.

1.2 INFILTRATION/ EXFILTRATION - MAXIMUM ALLOWABLE INFILTRATION OR EXFILTRATION SHALL NOT EXCEED 100 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER DAY FOR THE SANITARY SEWER. IF AN AIR TEST IS USED, THE TEST AS A MINIMUM SHALL CONFORM TO THE PROCEDURE DESCRIBED IN ASTM DESIGNATION C828-86 ENTITLED PRACTICE FOR LOW PRESSURE AIR TEST OF VITRIFIED CLAY PIPE LINES SANITARY MANHOLES SHALL BE VISUALLY INSPECTED AND TESTED FOR LEAKAGE BY EX FILTRATION OR VACUUM. VACUUM TESTING OF MANHOLES SHALL COMPLY WITH THE METHOD OUTLINED IN THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION TECHNICAL INFORMATION PAMPHLET (TIP) NO. 15 (REVISED).

1.3 FLOOR DRAINS - FLOOR DRAINS, IF CONSTRUCTED IN THE PROJECT, MUST BE CONNECTED TO THE SANITARY SEWER. **NOTE:** FLOOR DRAINS DO NOT INCLUDE FOUNDATION OR FOOTER DRAINS INSTALLED TO INTERCEPT UNCONTAMINATED GROUND WATER. ALL DISCHARGES FROM THE FLOOR DRAINS TO THE SANITARY SEWER MUST COMPLY WITH THE EFFLUENT LIMITS OF THE LOCAL AND/OR THE TOMPKINS COUNTY SEWER USE LAW.

1.4 TESTING - DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID BALL OR MANDREL. IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES.

1.5 SEPARATION - MINIMUM VERTICAL SEPARATION BETWEEN WATER MAINS AND SEWER LINES SHALL BE 18 INCHES MEASURED FROM THE OUTSIDE OF THE PIPES AT THE POINT OF CROSSING. ONE FULL STANDARD LAYING LENGTH OF WATER MAIN SHALL BE CENTERED UNDER OR OVER THE SEWER SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE. IN ADDITION, WHEN THE WATER MAIN PASSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT (COMPACTED SELECTED FILL) SHALL BE PROVIDED FOR THE SEWER TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING OF THE SEWER ON THE WATER MAIN. MINIMUM HORIZONTAL SEPARATION BETWEEN PARALLEL WATER MAINS AND SEWER PIPES (INCLUDING MANHOLES AND VAULTS) SHALL BE 10 FEET MEASURED FROM THE OUTSIDE OF THE PIPES. MANHOLES OR VAULTS.

3. STORM

3.1 REGULATIONS - STORM SEWERS AND APPURTENANCES SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE LATEST REGULATIONS OF THE MUNICIPALITY.

3.2 MATERIALS - THE CONTRACTOR MAY USE THE FOLLOWING PIPE MATERIAL FOR THE MAIN SEWER AS ALLOWED BY THE MUNICIPALITY, PROVIDING THAT THE ROUGHNESS COEFFICIENT ("N" FACTOR) IS 0.013 OR BETTER:

- REINFORCED CONCRETE PIPE (RCP), CLASS III
- CORRUGATED STEEL PIPE (CSP), 16 GAUGE
- HIGH DENSITY CORRUGATED POLYETHYLENE PIPE (PE), AASHTO M-29, TYPE S, ASTM D-3350.

3.3 ROOF DRAINAGE - ALL ROOF DRAINAGE SHALL BE COLLECTED BY GUTTERS WITH DOWNSPOUTS DISCHARGING TO SPLASH BLOCKS. REFER TO ARCHITECTURAL PLANS FOR DOWNSPOUT LOCATIONS.

3.4 TESTING - UPON COMPLETION OF SYSTEM INSTALLATION, THE MAIN SEWER SYSTEM AND LEADS TO STRUCTURES SHALL BE FLUSHED AND LAMPED TO THE SATISFACTION OF THE MUNICIPALITY.

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SITE DEVELOPMENT PLANS FOR MODERN LIVING RENTALS

802, 804, 810 & 812 DRYDEN ROAD

TOWN OF DRYDEN COUNTY OF TOMPKINS STATE OF NEW YORK

JOB NO:	0841-17
SCALE:	1"=30'
DRAWN:	AMF
DESIGNED:	AMF
DATE:	06/05/17

REVISIONS

DATE	BY	REVISION

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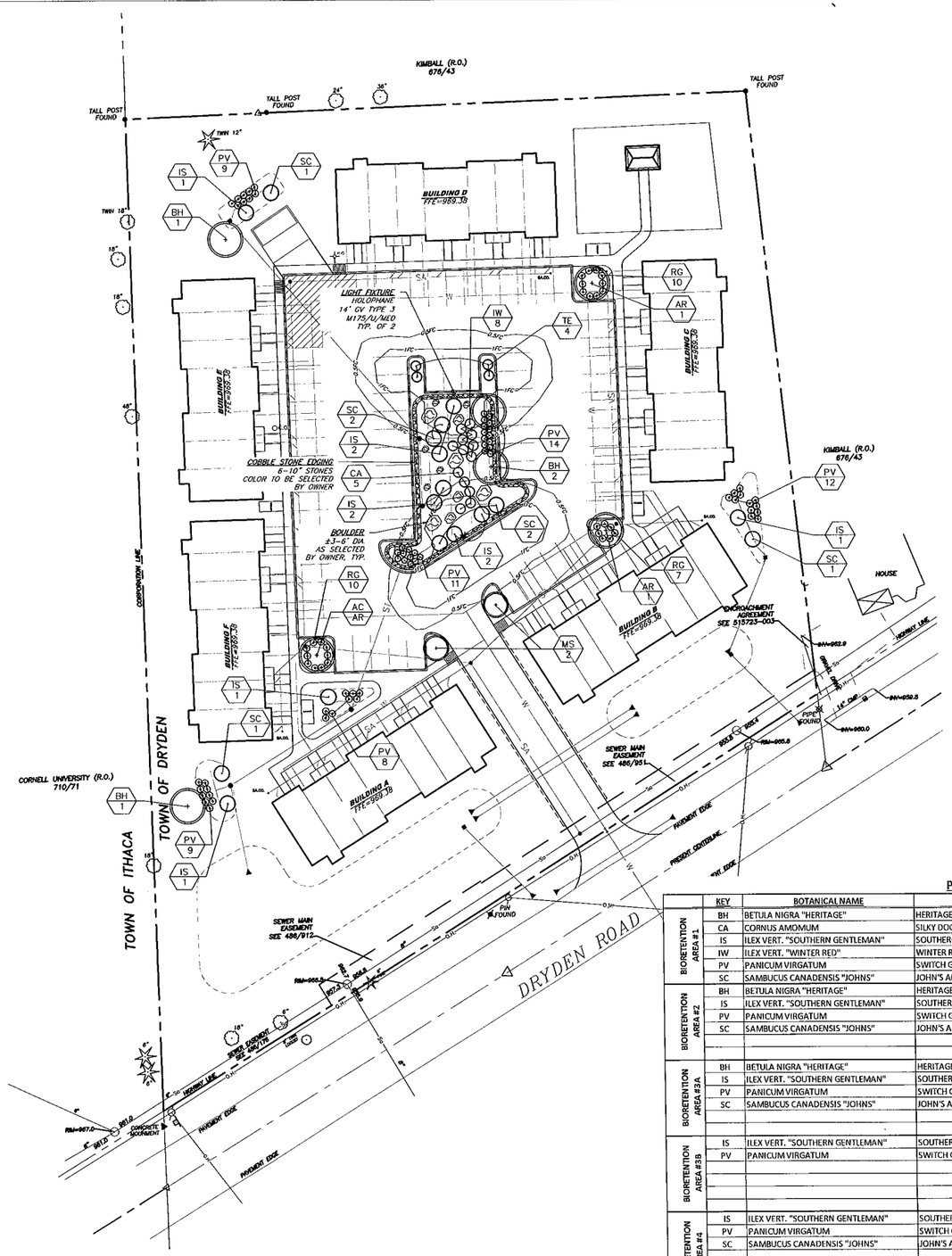
STATE OF NEW YORK · ADAM MCKINLEY FISHEL · NO. 086648 · LICENSED PROFESSIONAL ENGINEER

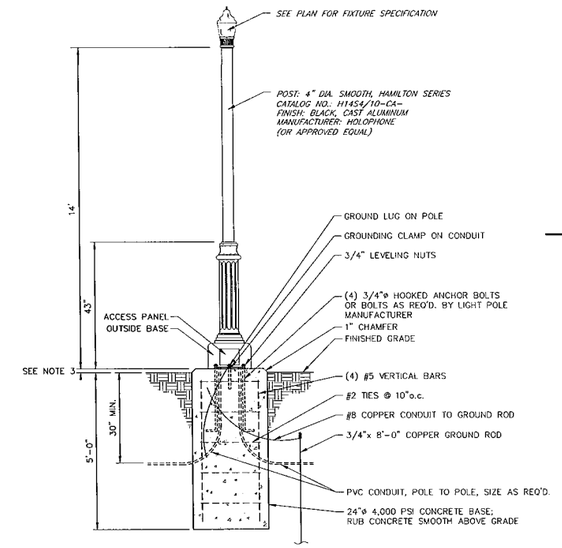
ADAM M. FISHEL

DRAWING TITLE: Utility Plan

6 of 13 SHEET No: C4.0 DRAWING No:

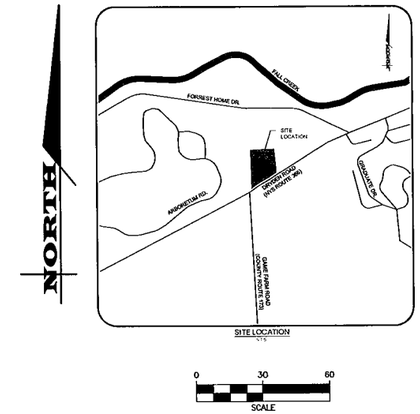
0841-17 JOB No:





NOTES:
1. POLE BASE MAY BE PRECAST BY LAKELANDS (LB24D)
2. LIGHT POLE MANUFACTURER TO SUPPLY ANCHOR BOLTS, OUTSIDE BASE, AND BOLT PATTERN TEMPLATES.
3. TOP OF FOUNDATION IS TO BE 1" ABOVE FINISHED GRADE.

1 LIGHT BASE



PLANT SCHEDULE

	KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE	ROOT	REMARKS
BIORETENTION AREA #1	BH	BETULA NIGRA "HERITAGE"	HERITAGE BIRCH	2	8-10' HT	B&B	CLUMP
	CA	CORNUS AMOMUM	SILKY DOGWOOD	5	36" HT	B&B	
	IS	ILEX VERT. "SOUTHERN GENTLEMAN"	SOUTHERN GENTLEMAN WINTER BERRY	6	36" HT	#3 CONT.	
	IW	ILEX VERT. "WINTER RED"	WINTER RED WINTERBERRY	8	36" HT	B&B	
	PV	PANICUM VIRGATUM	SWITCH GRASS	25	CLUMP	#2 CONT.	
	SC	SAMBUCUS CANADENSIS "JOHNS"	JOHN'S AMERICAN ELDERBERRY	4	36" HT	#3 CONT.	
BIORETENTION AREA #2	BH	BETULA NIGRA "HERITAGE"	HERITAGE BIRCH	1	8-10' HT	B&B	CLUMP
	IS	ILEX VERT. "SOUTHERN GENTLEMAN"	SOUTHERN GENTLEMAN WINTER BERRY	1	36" HT	#3 CONT.	
	PV	PANICUM VIRGATUM	SWITCH GRASS	9	CLUMP	#2 CONT.	
	SC	SAMBUCUS CANADENSIS "JOHNS"	JOHN'S AMERICAN ELDERBERRY	1	36" HT	#3 CONT.	
BIORETENTION AREA #3A	BH	BETULA NIGRA "HERITAGE"	HERITAGE BIRCH	1	8-10' HT	B&B	CLUMP
	IS	ILEX VERT. "SOUTHERN GENTLEMAN"	SOUTHERN GENTLEMAN WINTER BERRY	1	36" HT	#3 CONT.	
	PV	PANICUM VIRGATUM	SWITCH GRASS	9	CLUMP	#2 CONT.	
	SC	SAMBUCUS CANADENSIS "JOHNS"	JOHN'S AMERICAN ELDERBERRY	1	36" HT	#3 CONT.	
BIORETENTION AREA #3B	IS	ILEX VERT. "SOUTHERN GENTLEMAN"	SOUTHERN GENTLEMAN WINTER BERRY	1	36" HT	#3 CONT.	
	PV	PANICUM VIRGATUM	SWITCH GRASS	8	CLUMP	#2 CONT.	
BIORETENTION AREA #4	IS	ILEX VERT. "SOUTHERN GENTLEMAN"	SOUTHERN GENTLEMAN WINTER BERRY	1	36" HT	#3 CONT.	
	PV	PANICUM VIRGATUM	SWITCH GRASS	12	CLUMP	#2 CONT.	
	SC	SAMBUCUS CANADENSIS "JOHNS"	JOHN'S AMERICAN ELDERBERRY	1	36" HT	#3 CONT.	
	AR	ACER RUBRUM	RED SUNSET MAPLE	3	2-1/2-3" CAL	B&B	
	MS	MALUS "SENTINEL"	SENTINAL CRABAPPLE	2	2-2 1/2" CAL	B&B	
	RG	RHUS AROMATICA "GRO-LOW"	GROLOW SUMA	27	18" SPR	#3 CONT.	
	TE	TAXUS MEDIA "EVERLOW"	EVERLOW YEW	4	18" SPR	#3 CONT.	

RESTORATION AND LANDSCAPING

1. **GUARANTEE** - THE AGREEMENT BETWEEN THE OWNER AND CONTRACTOR SHALL DEFINE THE REQUIREMENTS, MAINTENANCE, AND TIME TO ESTABLISH NEW TURF AND LANDSCAPING ACCEPTANCE BY THE OWNER.
2. **TOPSOIL** - PLACE A MINIMUM OF 4 INCHES (REQUIRED) OF TOPSOIL ON ALL DISTURBED SURFACES. FINE GRADE TO ESTABLISH THE DESIGN ELEVATIONS AND DRAINAGE PATTERNS. OBTAIN OWNER'S REPRESENTATIVE APPROVAL PRIOR TO SEEDING.
3. **SEED** - LAWN AREAS SHALL BE HYDROSEEDED WITH AN APPROVED, SEED MIXTURE, MULCH, AND FERTILIZER. THE APPLICATION RATE SHALL BE DETERMINED BY CONTRACTOR TO ESTABLISH A "STAND" OF GRASS. THE CONTRACTOR SHALL SUBMIT MATERIAL AND APPLICATION SPECIFICATIONS TO THE OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO APPLICATION.
4. **PLANT STOCK** - PLANT MATERIALS SHALL BE IN ACCORDANCE WITH "AMERICAN STANDARD FOR NURSERY STOCK". THE CONTRACTOR SHALL SUBMIT PLANT MATERIAL SPECIFICATIONS TO THE OWNER'S ON-SITE REPRESENTATIVE FOR APPROVAL PRIOR TO DELIVERY TO THE SITE.
5. **PLANT LOCATIONS** - THE PLANT LOCATIONS DEPICTED ON THE PLAN MAY BE FIELD ADJUSTED (SO THEY DO NOT INTERFERE WITH UTILITIES) AND TO THE SATISFACTION OF OWNER'S REPRESENTATIVE.
6. **PLANTING BEDS** - PROVIDE TWELVE INCHES (12") OF TOPSOIL, WEED FABRIC (AS DIRECTED BY OWNER), AND THREE INCHES (3") OF MULCH AT PLANTING BEDS, UNLESS SPECIFIED OTHERWISE ON DRAWINGS.
7. **MAINTENANCE STRIP** - WHERE LAWN/GRASS AREAS ABUT THE PROPOSED BUILDING, THE CONTRACTOR SHALL PROVIDE AN 24" WIDE MAINTENANCE STRIP. MAINTENANCE STRIP SHALL BE A 3" (MIN.) THICK LAYER OF 2-3" ROLLED RIVER STONE PLACED UPON WEED BARRIER CLOTH.

SEED & MULCH

SEED MIX SHALL BE TOWN & COUNTRY SEED MIX
AS MANUFACTURED BY CROSSMAN SEED CORPORATION.
SEED MIX SHALL CONSIST OF:
30% CREEPING RED FESCUE
20% GATOR 3 PERENNIAL RYEGRASS
20% ALL STAR 3 PERENNIAL RYEGRASS
20% KEYSTONE 2 PERENNIAL RYEGRASS
10% KENTUCKY BLUEGRASS 98 / 85
SEEDING RATE SHALL BE 6LBS / 1000 S.F. OF PURE LIVE SEED.

MULCH: SHALL BE STRAW APPLIED AT 2 TONS/ACRE

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SITE DEVELOPMENT PLANS FOR MODERN LIVING RENTALS

802, 804, 810 & 812 DRYDEN ROAD

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REVISIONS

DATE	BY	REVISION

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STATE OF NEW YORK — ADAM MONKLEY FISHEL — NO. 086648 — LICENSED PROFESSIONAL ENGINEER

ADAM M. FISHEL

DRAWING TITLE:
Lighting and Landscaping Plan

7 of 13
SHEET No:

C5.0
DRAWING No.

0841-17
JOB No:

Appendix C

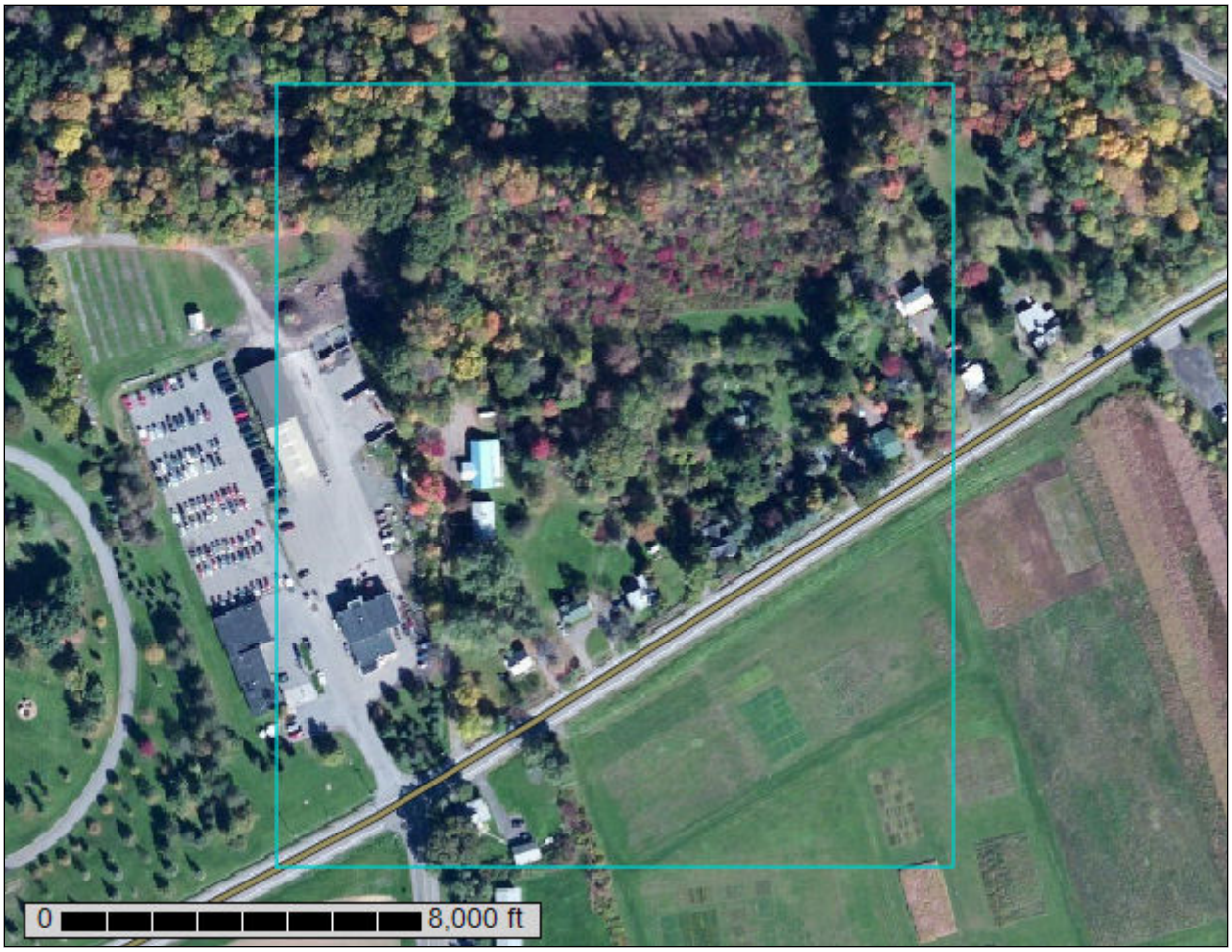
- STORMWATER MAPS AND COMPUTATIONS

United States Department of Agriculture

Natural Resources Conservation Service

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

Custom Soil Resource Report for Tompkins County, New York



May 26, 2017

Preface

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

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

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

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

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

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

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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

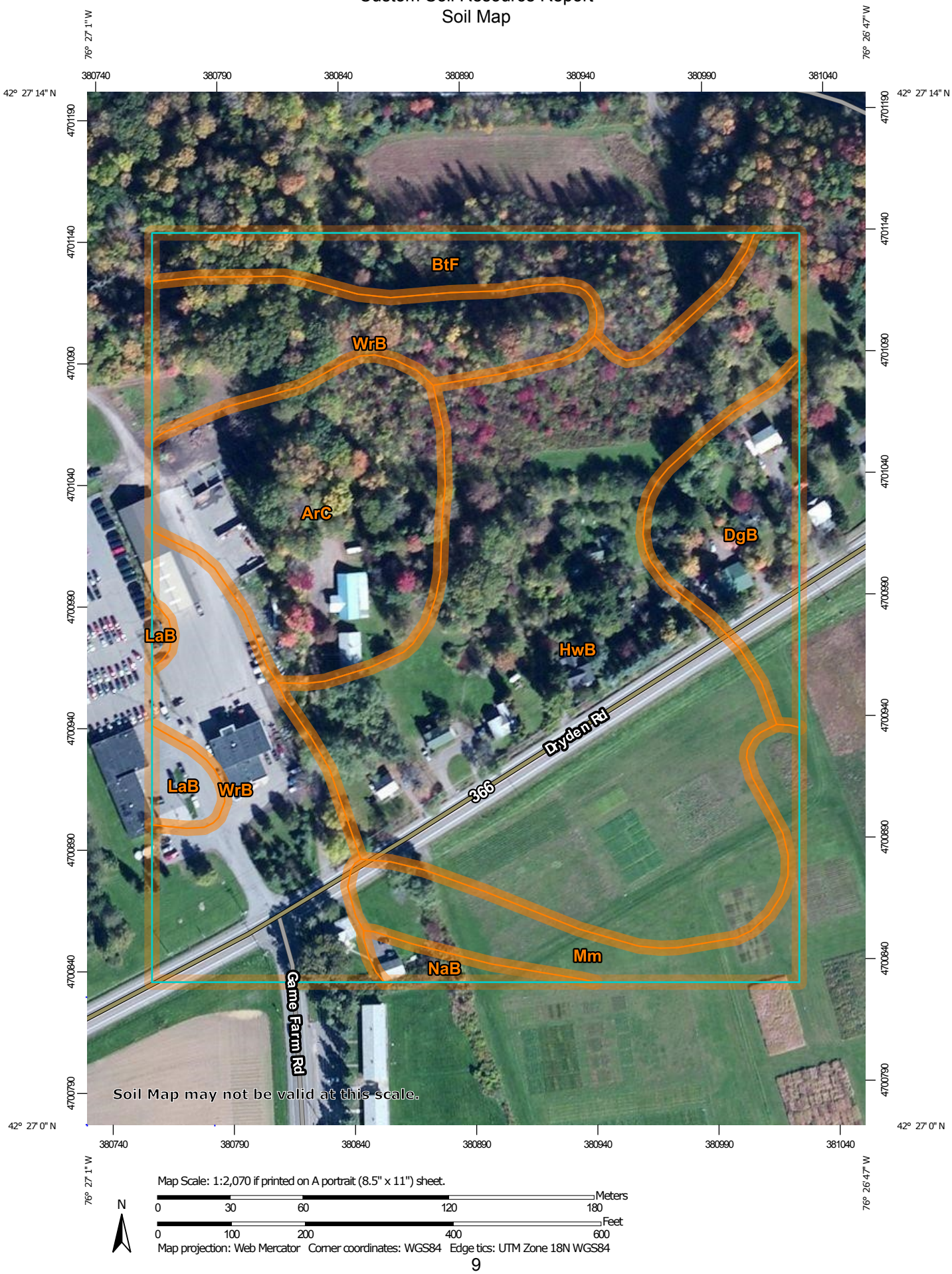
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,070 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Tompkins County, New York
Survey Area Data: Version 11, Sep 24, 2016

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

Date(s) aerial images were photographed: Jun 2, 2010—Oct 8, 2010

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

Map Unit Legend

Tompkins County, New York (NY109)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
ArC	Arkport fine sandy loam, 6 to 12 percent slopes	2.9	14.3%
BtF	Bath, Valois, and Lansing soils, 35 to 60 percent slopes	1.6	7.7%
DgB	Darien gravelly silt loam, 2 to 8 percent slopes	1.4	6.9%
HwB	Hudson and Collamer silt loams, 2 to 6 percent slopes	8.3	40.8%
LaB	Langford channery silt loam, 2 to 8 percent slopes	0.3	1.3%
Mm	Madalin mucky silty clay loam	1.3	6.4%
NaB	Niagara silt loam, 2 to 6 percent slopes	0.2	1.1%
WrB	Williamson very fine sandy loam, 2 to 6 percent slopes	4.4	21.5%
Totals for Area of Interest		**20.4**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a

given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Tompkins County, New York

ArC—Arkport fine sandy loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 9xkr
Elevation: 300 to 900 feet
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Arkport

Setting

Landform: Deltas on lake plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Glaciofluvial or deltaic deposits with a high content of fine and very fine sand

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 22 inches: fine sandy loam
H3 - 22 to 36 inches: loamy fine sand
H4 - 36 to 60 inches: stratified very fine sand to loamy fine sand to fine sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Dunkirk

Percent of map unit: 5 percent

Hydric soil rating: No

Collamer

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

Williamson

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

Howard

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

Chenango

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

BtF—Bath, Valois, and Lansing soils, 35 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2v32j
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 100 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Bath and similar soils: 30 percent
Valois and similar soils: 25 percent
Lansing and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bath

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

A - 0 to 4 inches: channery silt loam
Bw1 - 4 to 15 inches: channery silt loam
Bw2 - 15 to 25 inches: channery loam
E - 25 to 29 inches: channery loam
Bx - 29 to 52 inches: very channery silt loam

C - 52 to 72 inches: very channery silt loam

Properties and qualities

Slope: 35 to 60 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 26 to 38 inches to fragipan
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

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

Description of Valois

Setting

Landform: End moraines, lateral moraines, valley sides
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Typical profile

H1 - 0 to 2 inches: gravelly silt loam
H2 - 2 to 32 inches: gravelly silt loam
H3 - 32 to 49 inches: gravelly silt loam
H4 - 49 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: 24 to 36 inches to fragipan
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

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

Description of Lansing

Setting

Landform: Hills, drumlinoid ridges

Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loamy lodgment till derived from limestone, sandstone, and shale

Typical profile

A - 0 to 8 inches: gravelly silt loam
E - 8 to 13 inches: gravelly silt loam
Bt/E - 13 to 21 inches: gravelly silt loam
Bt1 - 21 to 28 inches: gravelly silt loam
Bt2 - 28 to 39 inches: gravelly silt loam
C - 39 to 79 inches: gravelly loam

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

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

Minor Components

Honeoye

Percent of map unit: 5 percent
Landform: Drumlins, till plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Darien

Percent of map unit: 5 percent
Landform: Hills, till plains, drumlinoid ridges
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Cayuga

Percent of map unit: 5 percent
Landform: Lake plains, till plains

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Mardin

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

Lordstown, very stony

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

DgB—Darien gravelly silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9xld
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Prime farmland if drained

Map Unit Composition

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

Description of Darien

Setting

Landform: Hills, till plains, drumlinoid ridges
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived predominantly from calcareous gray shale

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 13 inches: gravelly silt loam
H3 - 13 to 30 inches: gravelly silty clay loam
H4 - 30 to 60 inches: gravelly silty clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 15 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Erie

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

Rhinebeck

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

Ovid

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

Ilion

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

Lyons

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

HwB—Hudson and Collamer silt loams, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 9xmf

Elevation: 300 to 1,800 feet
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hudson and similar soils: 40 percent
Collamer and similar soils: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 36 inches: silty clay loam
H3 - 36 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Description of Collamer

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Silty and clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam

H2 - 8 to 11 inches: silt loam
H3 - 11 to 27 inches: silt loam
H4 - 27 to 48 inches: stratified very fine sand to silt

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 6 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Rhinebeck

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

Niagara

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

Dunkirk

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

Cayuga

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

LaB—Langford channery silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9xmm
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Langford and similar soils: 75 percent

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

Description of Langford

Setting

Landform: Hills, till plains, drumlinoid ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived from siltstone, sandstone, shale, and some limestone

Typical profile

H1 - 0 to 7 inches: channery silt loam
H2 - 7 to 22 inches: channery silt loam
H3 - 22 to 52 inches: channery silt loam
H4 - 52 to 60 inches: channery silt loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 15 to 28 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 15 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Erie

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

Volusia

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

Mardin

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

Kendaia

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

Valois

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

Mm—Madalin mucky silty clay loam

Map Unit Setting

National map unit symbol: 9xng
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Madalin

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: mucky silty clay loam
H2 - 8 to 26 inches: silty clay
H3 - 26 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

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

Minor Components

Canandaigua

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

Muck and peat

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

Rhinebeck

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

Ovid

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

Hudson

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

NaB—Niagara silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 9xnl
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Prime farmland if drained

Map Unit Composition

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

Description of Niagara

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty and clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 30 inches: silt loam

H3 - 30 to 60 inches: stratified very fine sand to silt

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Collamer

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

Williamson

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

Canandaigua

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

Lamson

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

Rhinebeck

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

WrB—Williamson very fine sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 9xpc
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Williamson

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Glaciolacustrine or eolian deposits with a high content of silt and very fine sand

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 16 inches: fine sandy loam
H3 - 16 to 26 inches: very fine sandy loam
H4 - 26 to 60 inches: stratified loamy fine sand to very fine sandy loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 15 to 24 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 23 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Niagara

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

Hudson

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

Cayuga

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

Collamer

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

Palmyra

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

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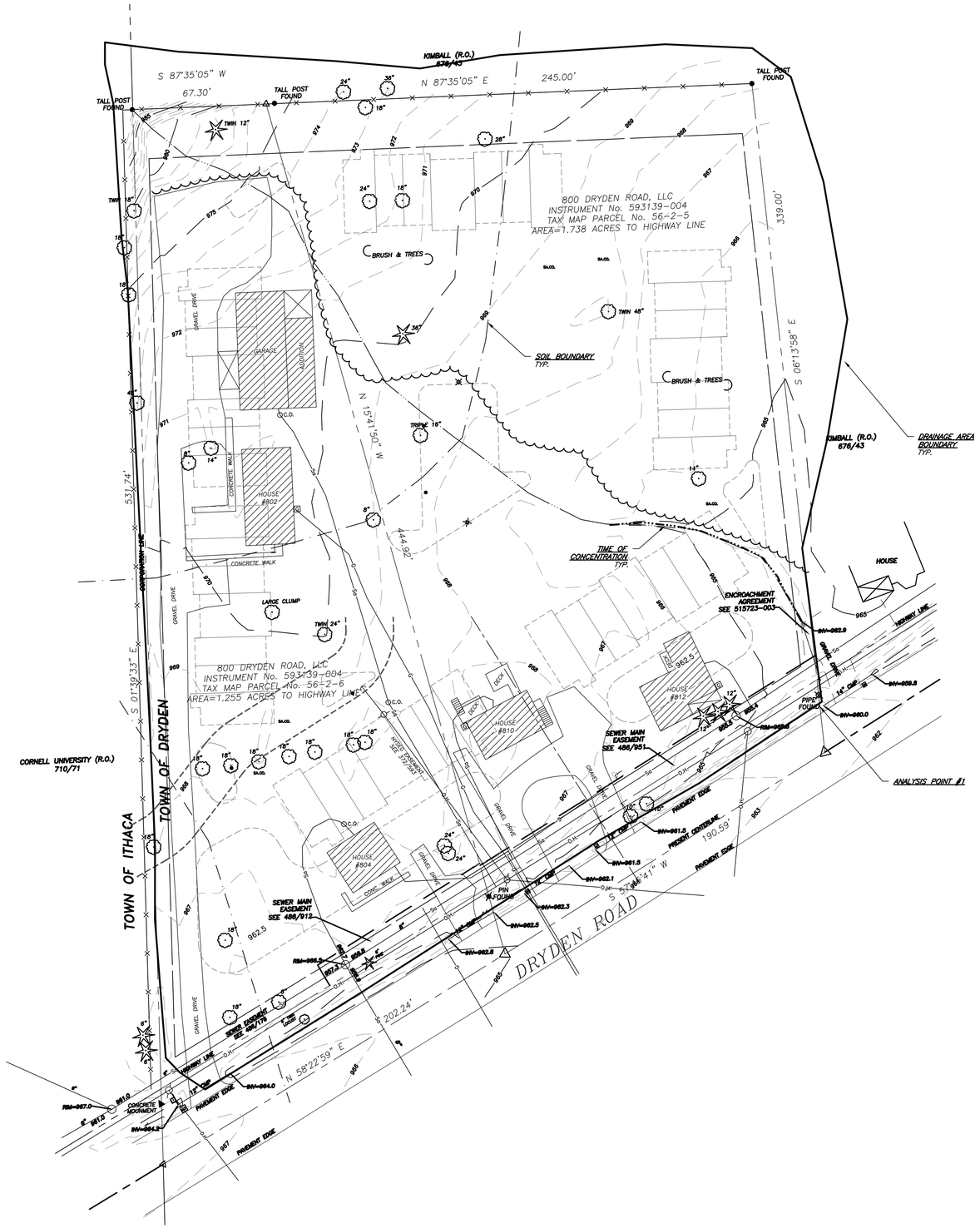

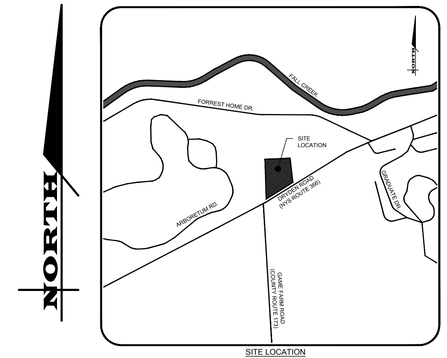

SITE LOCATION
NTS

MARATHON ENGINEERING
39 CASCADE DRIVE
ROCHESTER, NY 14614
PHONE 585-458-7770
www.marathoneng.com

SITE DEVELOPMENT PLANS FOR MODERN LIVING RENTALS

802, 804, 810 & 812 DRYDEN ROAD

TOWN OF DRYDEN — COUNTY OF TOMPKINS — STATE OF NEW YORK

JOB NO:	0841-17
SCALE:	1"=30'
DRAWN:	AMF
DESIGNED:	AMF
DATE:	06/05/17

REVISIONS

DATE	BY	REVISION

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STATE OF NEW YORK — ADAM MCKINLEY FISHEL — NO. 085648 — LICENSED PROFESSIONAL ENGINEER

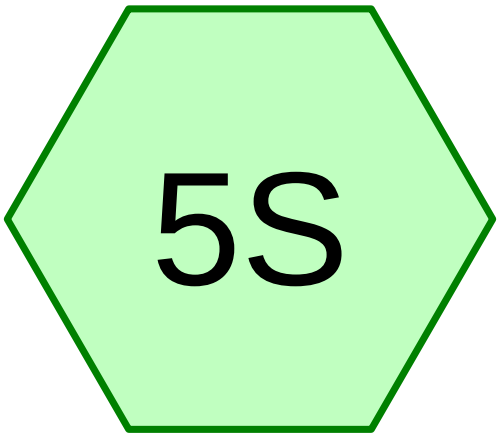
ADAM M. FISHEL

DRAWING TITLE:
Existing Drainage Conditions Map

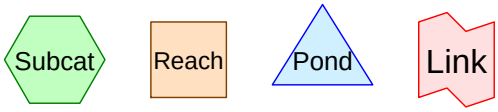
SHEET No: 1 of 2

JOB No: 0841-17

DRAWING No: DR-1



EX Area #1 (Analysis Point #1)



Drainage Diagram for 0841 Drainage Existing
Prepared by {enter your company name here}, Printed 6/19/2017
HydroCAD® 8.50 s/n 005610 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.490	36	Woods, Fair, HSG A (5S)
0.263	39	>75% Grass cover, Good, HSG A (5S)
0.862	79	Woods, Fair, HSG D (5S)
1.298	80	>75% Grass cover, Good, HSG D (5S)
0.466	98	Paved parking & roofs (5S)
3.379		**TOTAL AREA**

Summary for Subcatchment 5S: EX Area #1 (Analysis Point #1)

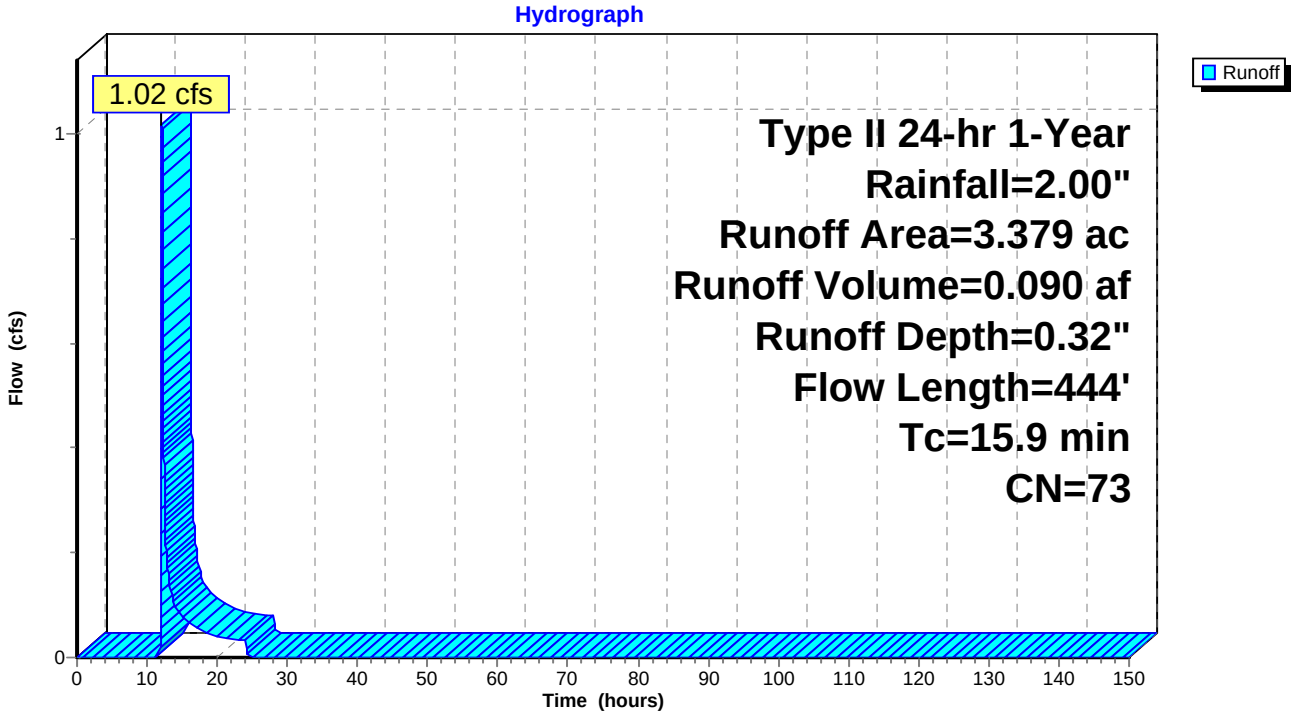
Runoff = 1.02 cfs @ 12.11 hrs, Volume= 0.090 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (ac)	CN	Description
0.862	79	Woods, Fair, HSG D
0.490	36	Woods, Fair, HSG A
0.466	98	Paved parking & roofs
0.263	39	>75% Grass cover, Good, HSG A
1.298	80	>75% Grass cover, Good, HSG D
3.379	73	Weighted Average
2.913		Pervious Area
0.466		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	13	0.5000	0.24		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
13.1	137	0.0700	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
1.9	294	0.0250	2.55		**Shallow Concentrated Flow, Shallow Conc.** Unpaved Kv= 16.1 fps
15.9	444	Total			

Subcatchment 5S: EX Area #1 (Analysis Point #1)



Summary for Subcatchment 5S: EX Area #1 (Analysis Point #1)

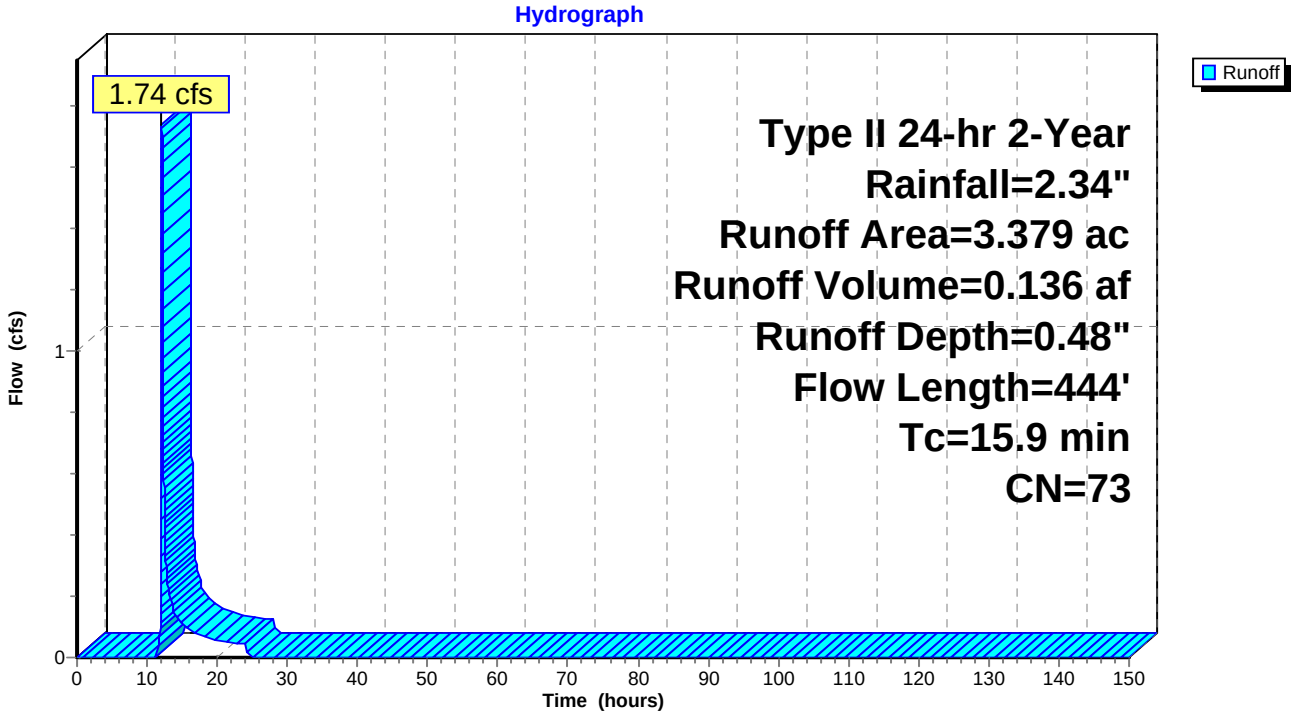
Runoff = 1.74 cfs @ 12.10 hrs, Volume= 0.136 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (ac)	CN	Description
0.862	79	Woods, Fair, HSG D
0.490	36	Woods, Fair, HSG A
0.466	98	Paved parking & roofs
0.263	39	>75% Grass cover, Good, HSG A
1.298	80	>75% Grass cover, Good, HSG D
3.379	73	Weighted Average
2.913		Pervious Area
0.466		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	13	0.5000	0.24		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
13.1	137	0.0700	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
1.9	294	0.0250	2.55		**Shallow Concentrated Flow, Shallow Conc.** Unpaved Kv= 16.1 fps
15.9	444	Total			

Subcatchment 5S: EX Area #1 (Analysis Point #1)



Summary for Subcatchment 5S: EX Area #1 (Analysis Point #1)

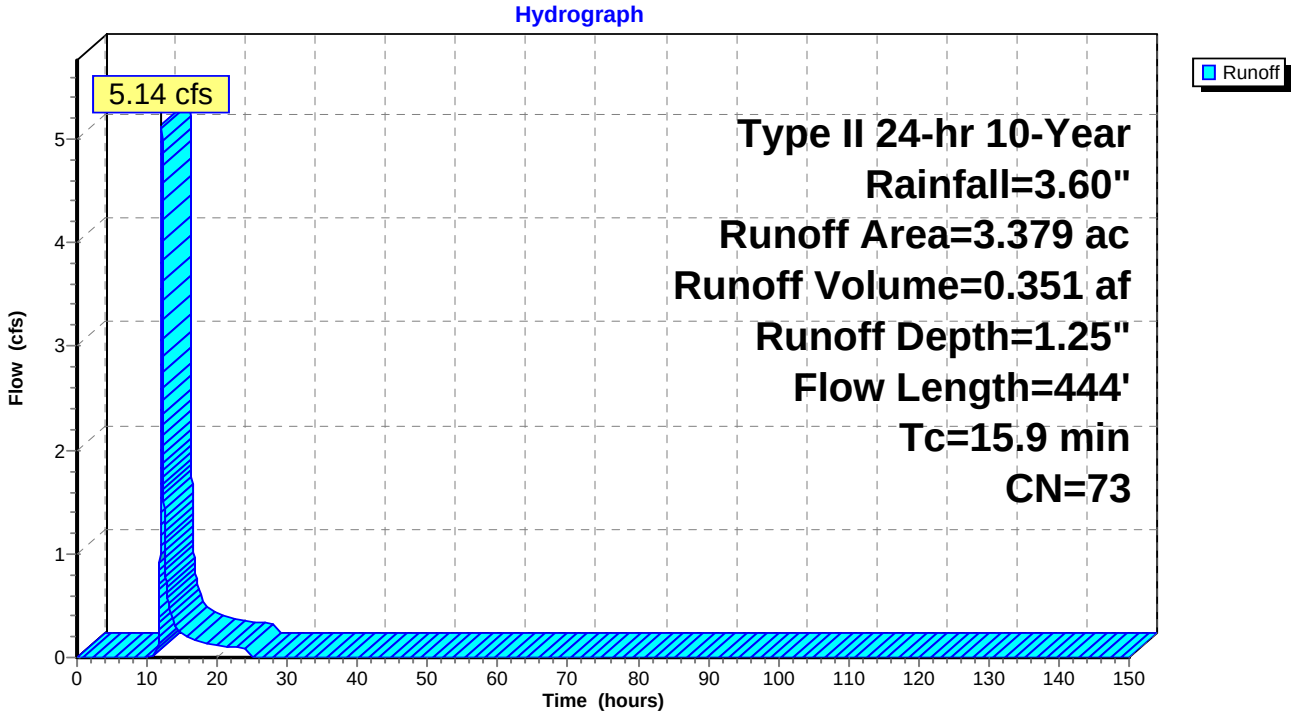
Runoff = 5.14 cfs @ 12.09 hrs, Volume= 0.351 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (ac)	CN	Description
0.862	79	Woods, Fair, HSG D
0.490	36	Woods, Fair, HSG A
0.466	98	Paved parking & roofs
0.263	39	>75% Grass cover, Good, HSG A
1.298	80	>75% Grass cover, Good, HSG D
3.379	73	Weighted Average
2.913		Pervious Area
0.466		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	13	0.5000	0.24		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
13.1	137	0.0700	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
1.9	294	0.0250	2.55		**Shallow Concentrated Flow, Shallow Conc.** Unpaved Kv= 16.1 fps
15.9	444	Total			

Subcatchment 5S: EX Area #1 (Analysis Point #1)



Summary for Subcatchment 5S: EX Area #1 (Analysis Point #1)

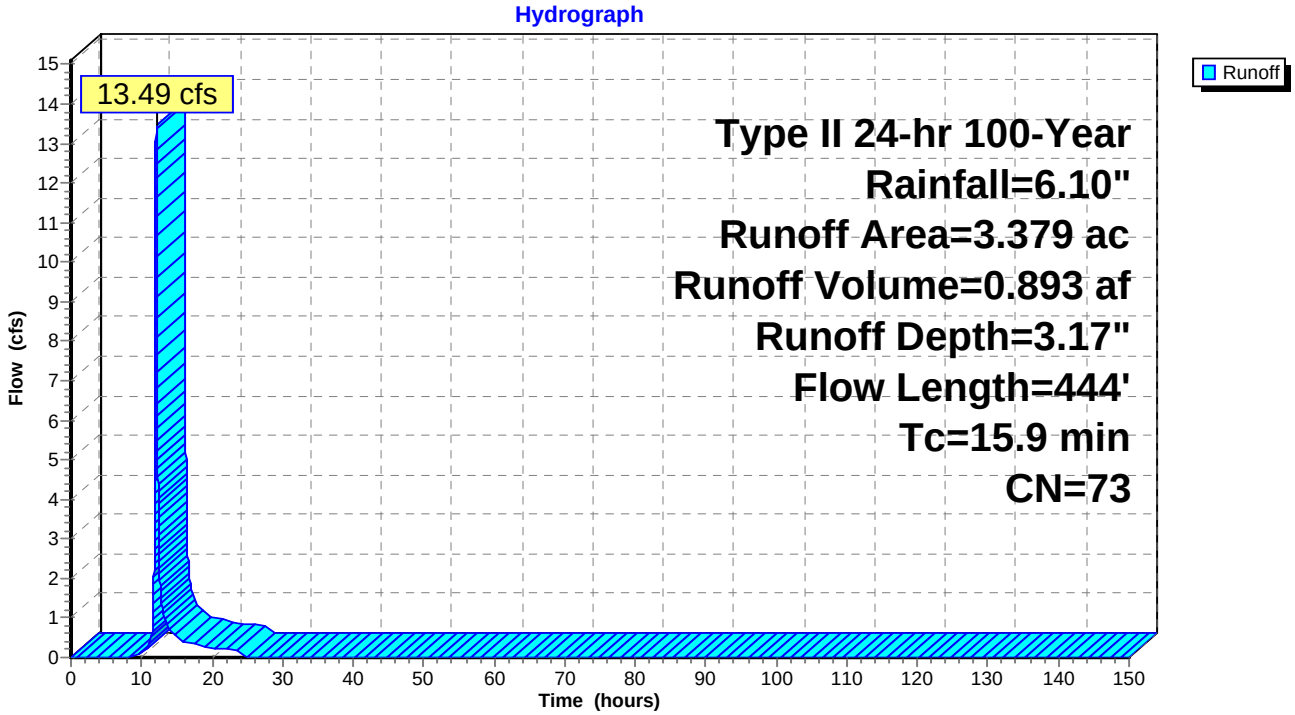
Runoff = 13.49 cfs @ 12.08 hrs, Volume= 0.893 af, Depth= 3.17"

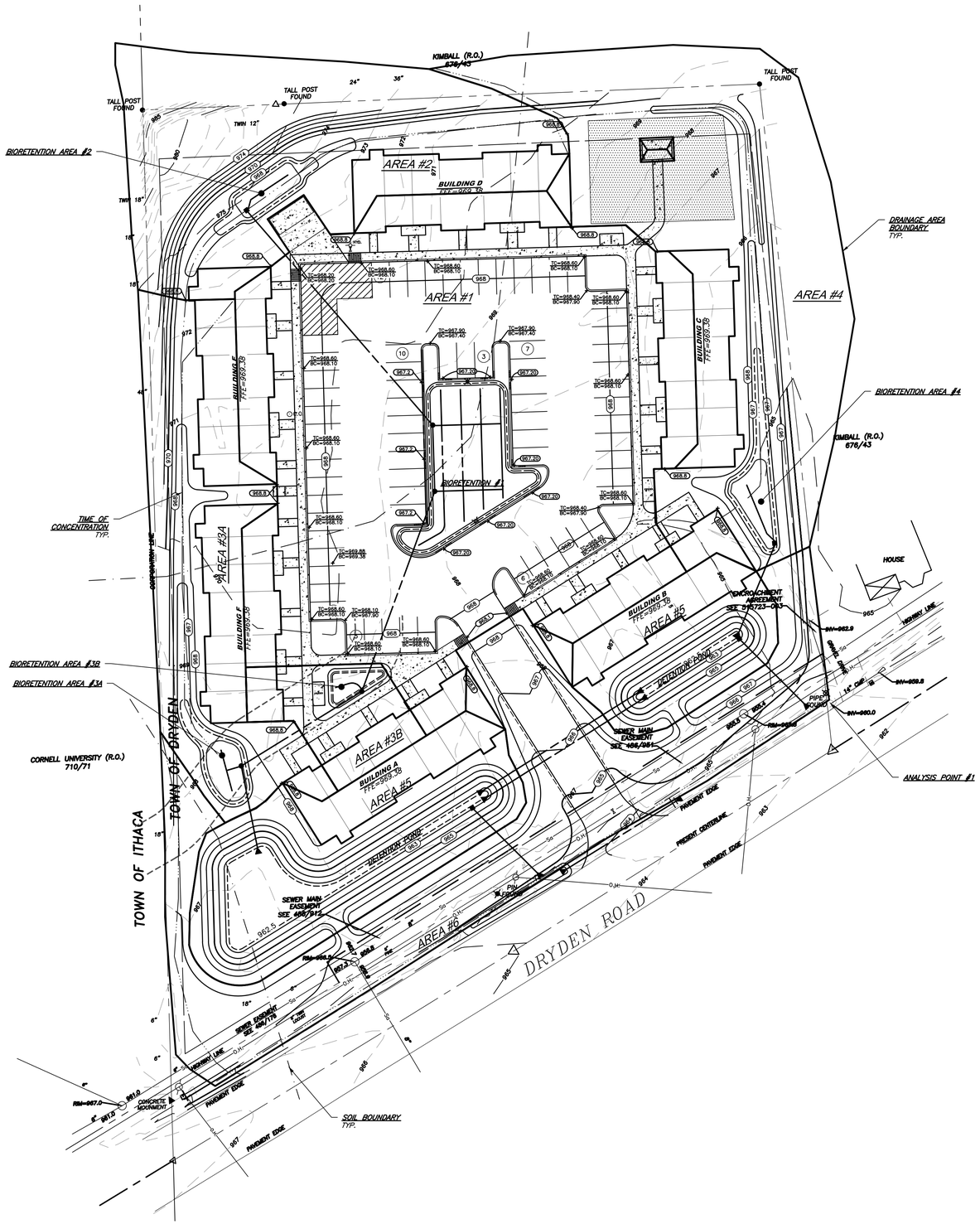
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

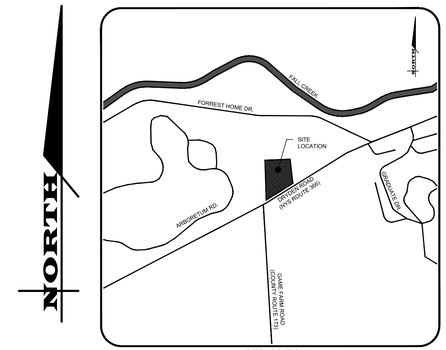
Area (ac)	CN	Description
0.862	79	Woods, Fair, HSG D
0.490	36	Woods, Fair, HSG A
0.466	98	Paved parking & roofs
0.263	39	>75% Grass cover, Good, HSG A
1.298	80	>75% Grass cover, Good, HSG D
3.379	73	Weighted Average
2.913		Pervious Area
0.466		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	13	0.5000	0.24		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
13.1	137	0.0700	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 2.30"
1.9	294	0.0250	2.55		**Shallow Concentrated Flow, Shallow Conc.** Unpaved Kv= 16.1 fps
15.9	444	Total			

Subcatchment 5S: EX Area #1 (Analysis Point #1)







SITE LOCATION
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SITE DEVELOPMENT PLANS
FOR
MODERN LIVING RENTALS
802, 804, 810 & 812 DRYDEN ROAD
TOWN OF DRYDEN
COUNTY OF TOMPKINS
STATE OF NEW YORK

JOB NO:	0841-17
SCALE:	1"=30'
DRAWN:	AMF
DESIGNED:	AMF
DATE:	06/05/17

REVISIONS

DATE	BY	REVISION

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STATE OF NEW YORK · ADAM MCKINLEY FISHEL · NO. 086646 · LICENSED PROFESSIONAL ENGINEER

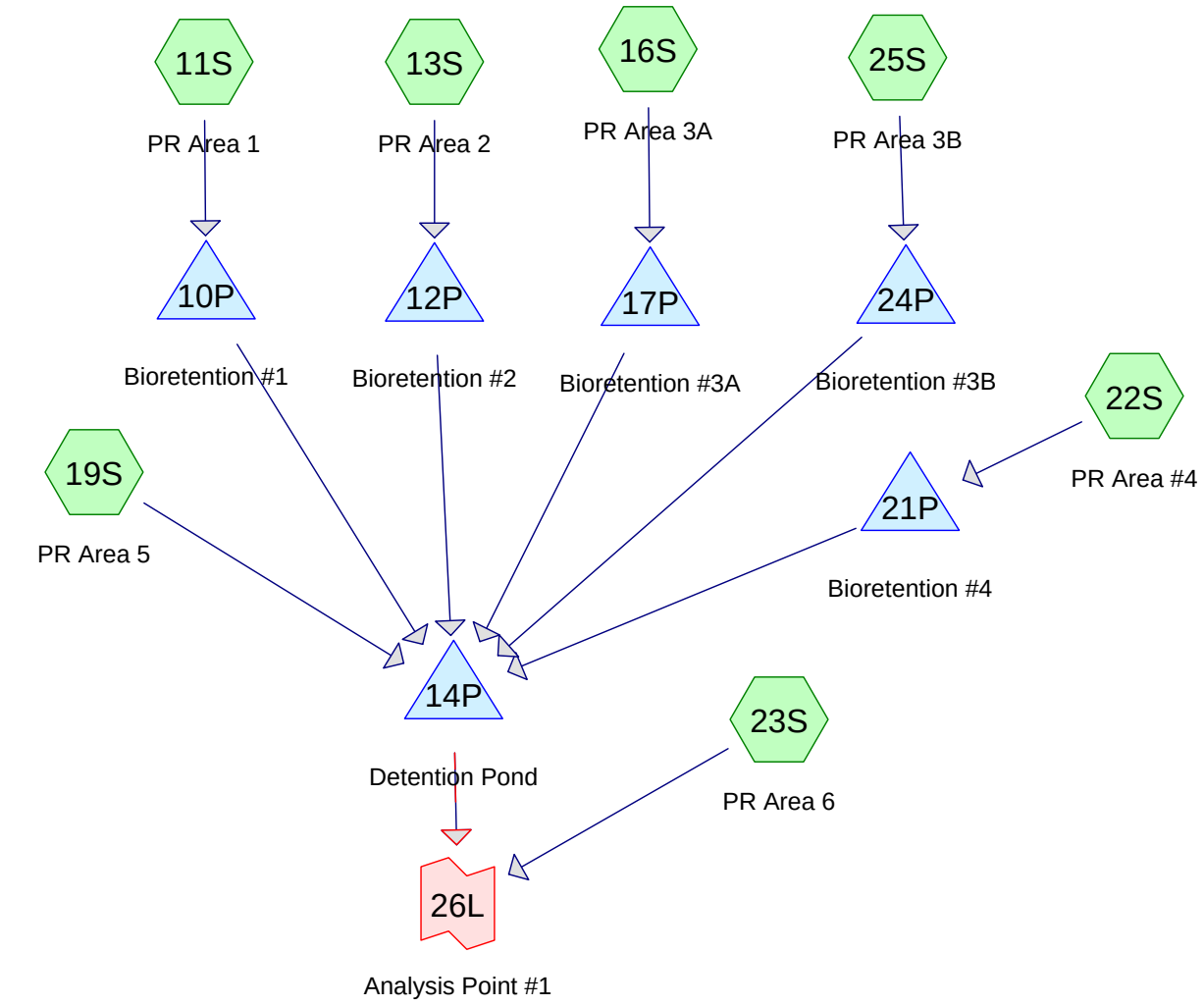
ADAM M. FISHEL

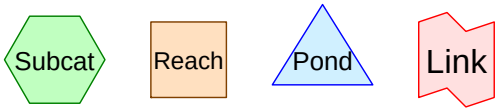
DRAWING TITLE:
Proposed Drainage Conditions Map

2 of 2
SHEET No:

DR-2
DRAWING No:

0841-17
JOB No:





Drainage Diagram for 0841 Drainage Proposed
Prepared by {enter your company name here}, Printed 6/19/2017
HydroCAD® 8.50 s/n 005610 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.320	39	>75% Grass cover, Good, HSG A (13S)
0.212	79	Woods, Fair, HSG D (22S)
1.332	80	>75% Grass cover, Good, HSG D (11S,16S,19S,22S,23S,25S)
1.516	98	Paved parking & roofs (11S,13S,16S,19S,22S,23S,25S)
3.380		**TOTAL AREA**

Summary for Subcatchment 11S: PR Area 1

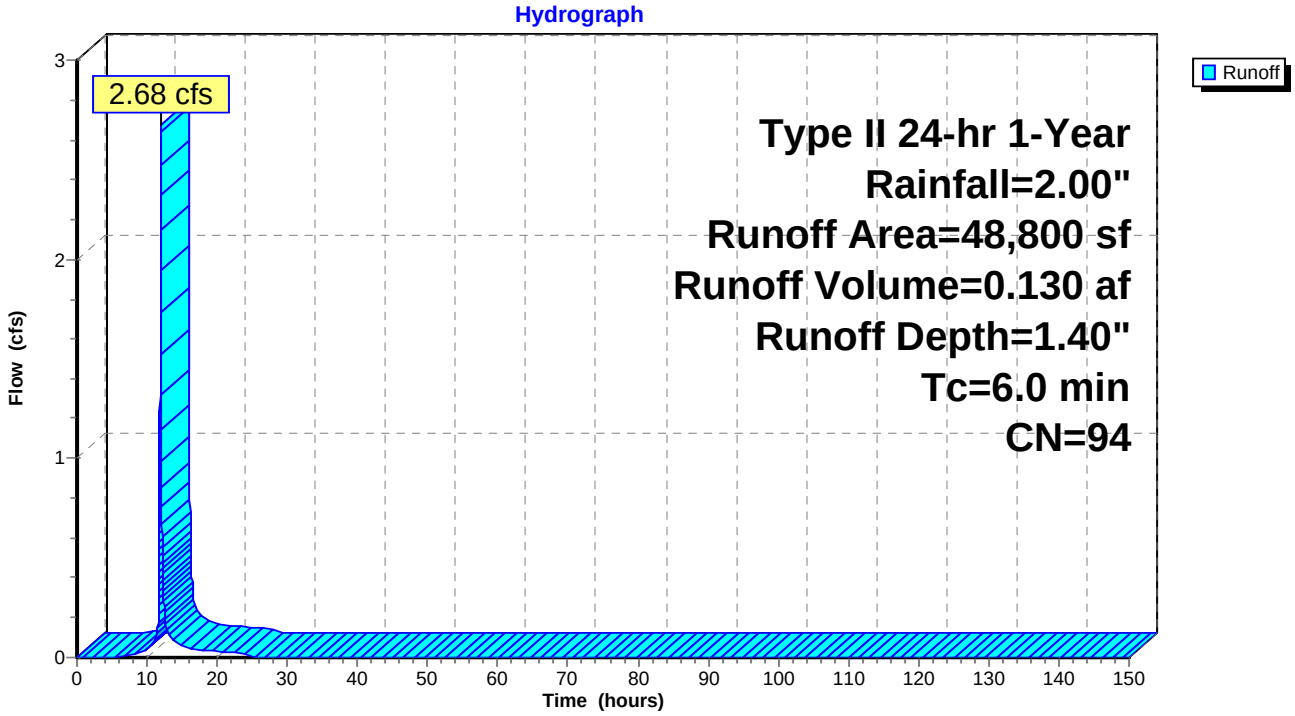
Runoff = 2.68 cfs @ 11.97 hrs, Volume= 0.130 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (sf)	CN	Description
38,651	98	Paved parking & roofs
10,149	80	>75% Grass cover, Good, HSG D
48,800	94	Weighted Average
10,149		Pervious Area
38,651		Impervious Area

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

Subcatchment 11S: PR Area 1



Summary for Subcatchment 13S: PR Area 2

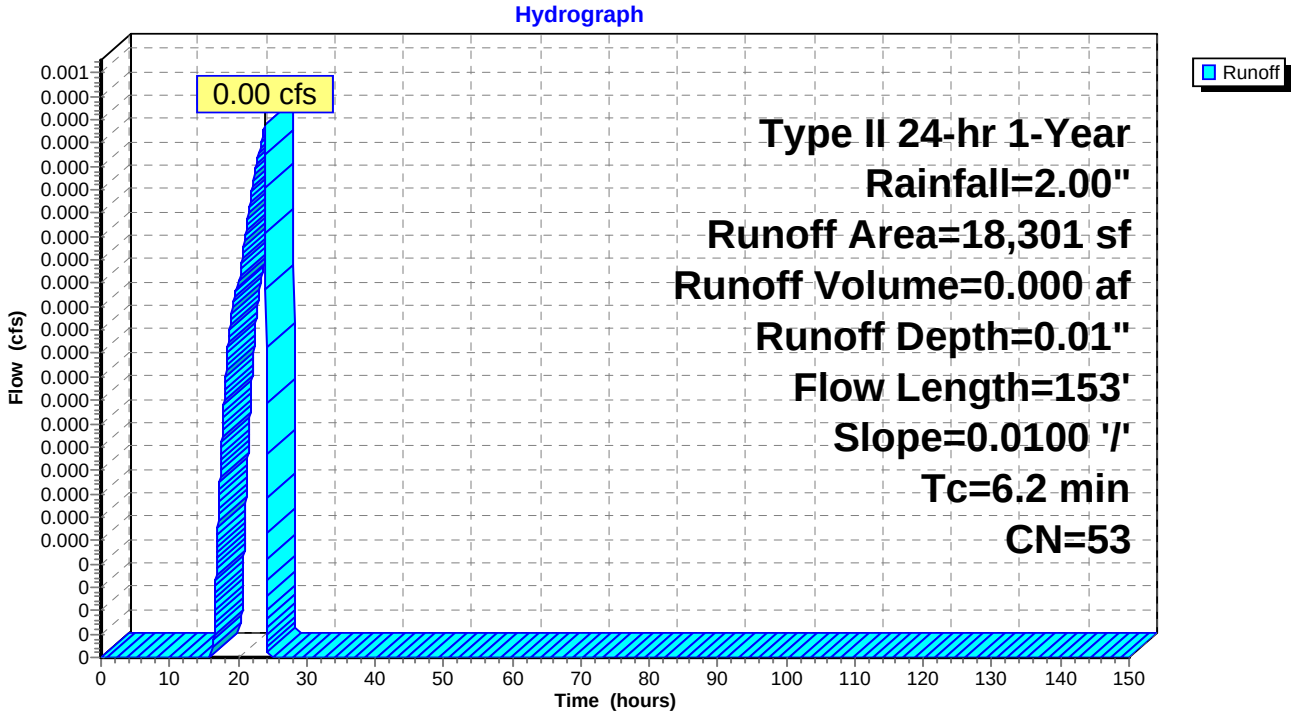
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
13,945	39	>75% Grass cover, Good, HSG A
18,301	53	Weighted Average
13,945		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	18	0.0100	0.05		**Sheet Flow, Sheet - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.6	135	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
6.2	153	Total			

Subcatchment 13S: PR Area 2



Summary for Subcatchment 16S: PR Area 3A

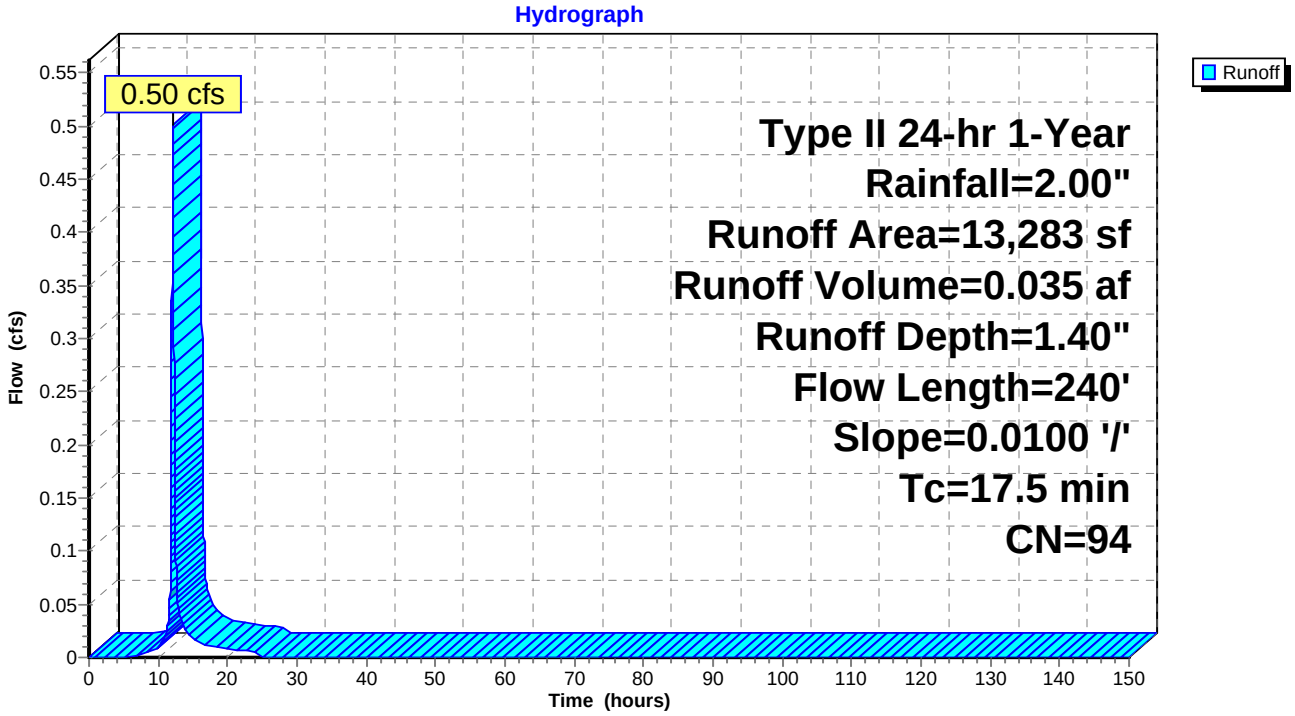
Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (sf)	CN	Description
10,234	98	Paved parking & roofs
3,049	80	>75% Grass cover, Good, HSG D
13,283	94	Weighted Average
3,049		Pervious Area
10,234		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	70	0.0100	0.07		**Sheet Flow, Sheet - grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	170	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
17.5	240	Total			

Subcatchment 16S: PR Area 3A



Summary for Subcatchment 19S: PR Area 5

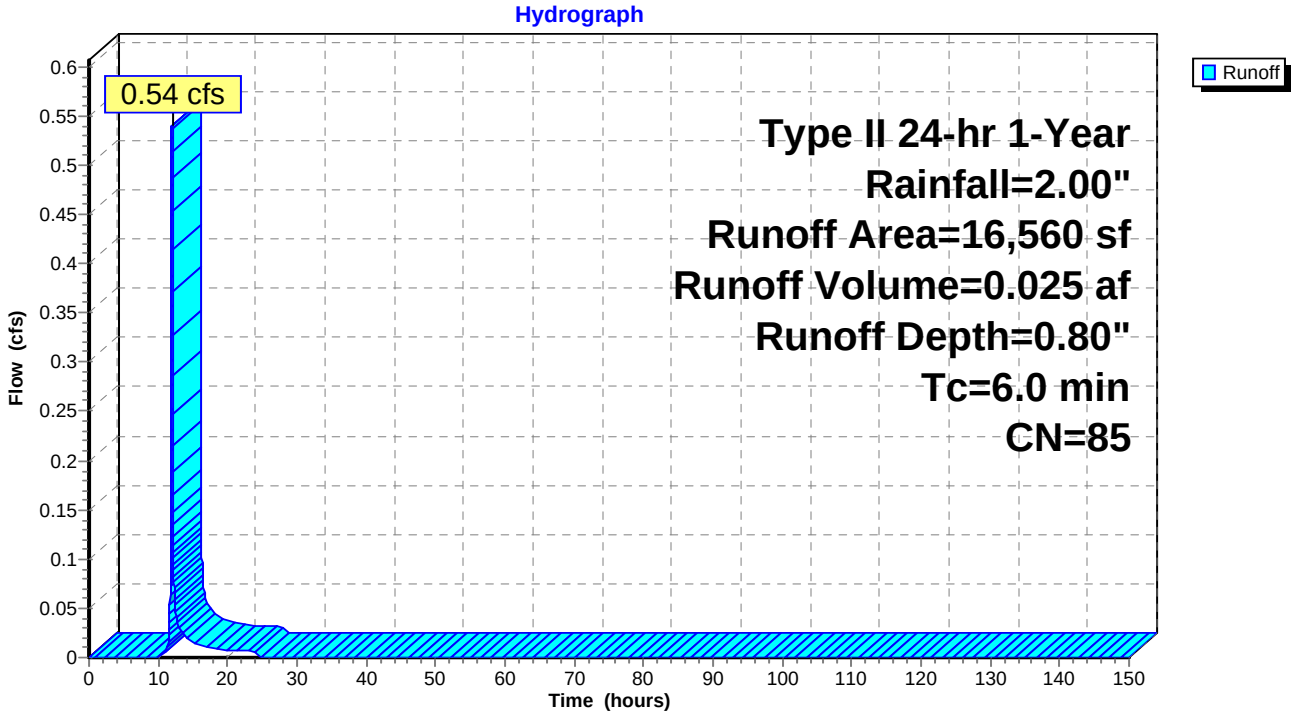
Runoff = 0.54 cfs @ 11.98 hrs, Volume= 0.025 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (sf)	CN	Description
4,180	98	Paved parking & roofs
12,380	80	>75% Grass cover, Good, HSG D
16,560	85	Weighted Average
12,380		Pervious Area
4,180		Impervious Area

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

Subcatchment 19S: PR Area 5



Summary for Subcatchment 22S: PR Area #4

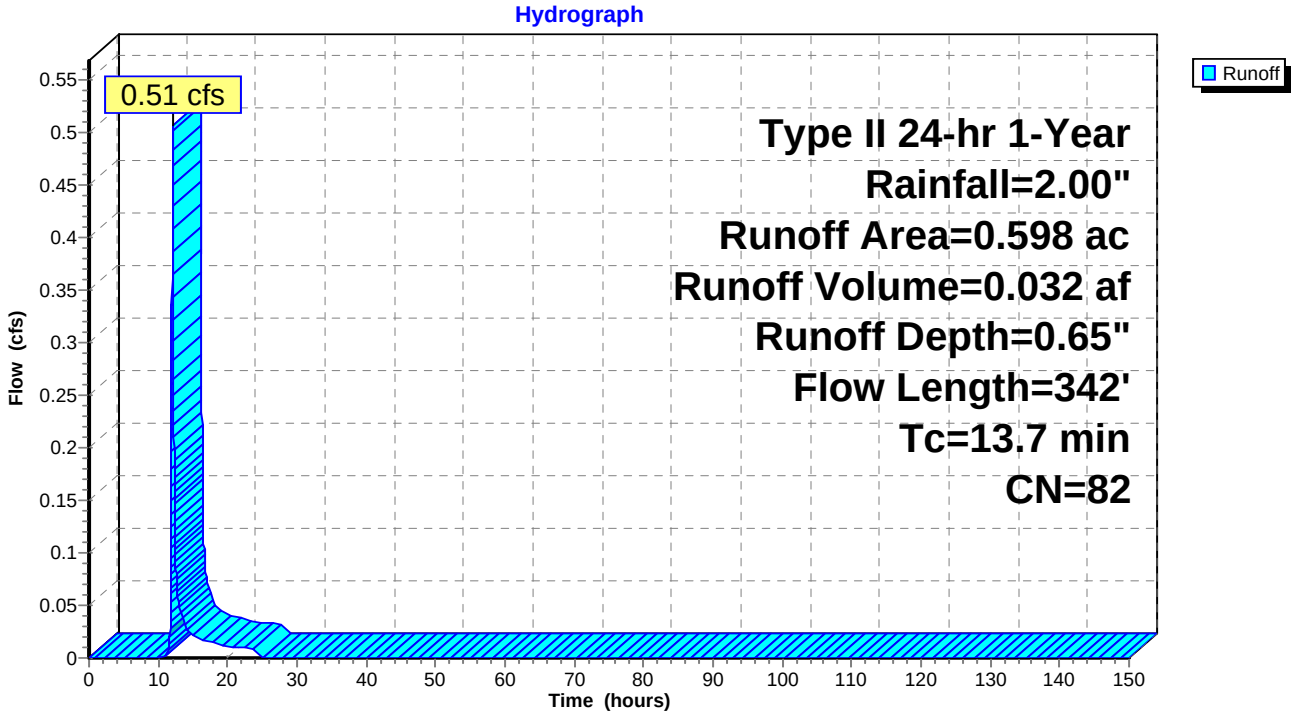
Runoff = 0.51 cfs @ 12.07 hrs, Volume= 0.032 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (ac)	CN	Description
0.212	79	Woods, Fair, HSG D
0.065	98	Paved parking & roofs
0.321	80	>75% Grass cover, Good, HSG D
0.598	82	Weighted Average
0.533		Pervious Area
0.065		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	69	0.0570	0.09		**Sheet Flow, Sheet Flow - Woods/Brush** Woods: Light underbrush n= 0.400 P2= 2.30"
1.3	273	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
13.7	342	Total			

Subcatchment 22S: PR Area #4



Summary for Subcatchment 23S: PR Area 6

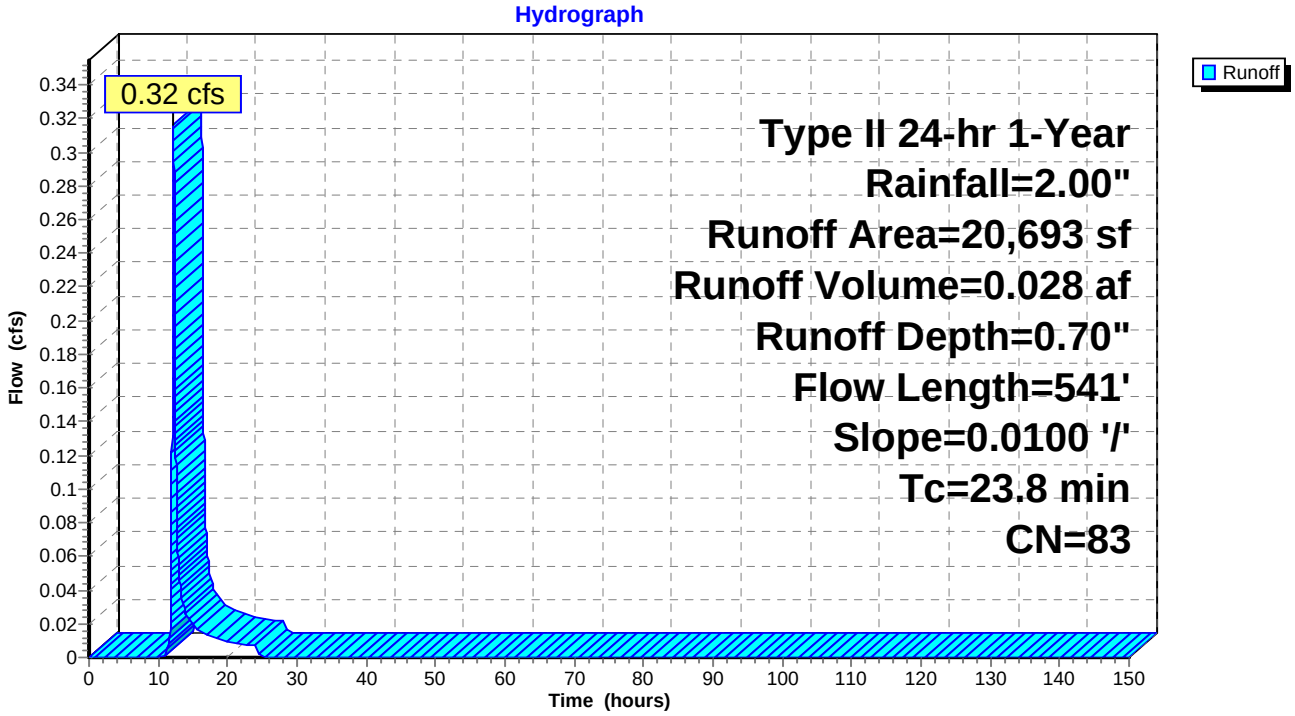
Runoff = 0.32 cfs @ 12.19 hrs, Volume= 0.028 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (sf)	CN	Description
3,500	98	Paved parking & roofs
17,193	80	>75% Grass cover, Good, HSG D
20,693	83	Weighted Average
17,193		Pervious Area
3,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	100	0.0100	0.08		**Sheet Flow, Sheet Flow - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	78	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc. - Grass** Unpaved Kv= 16.1 fps
0.8	363	0.0100	7.76	124.12	**Channel Flow, Roadside Ditch** Area= 16.0 sf Perim= 13.0' r= 1.23' n= 0.022 Earth, clean & straight
23.8	541	Total			

Subcatchment 23S: PR Area 6



Summary for Subcatchment 25S: PR Area 3B

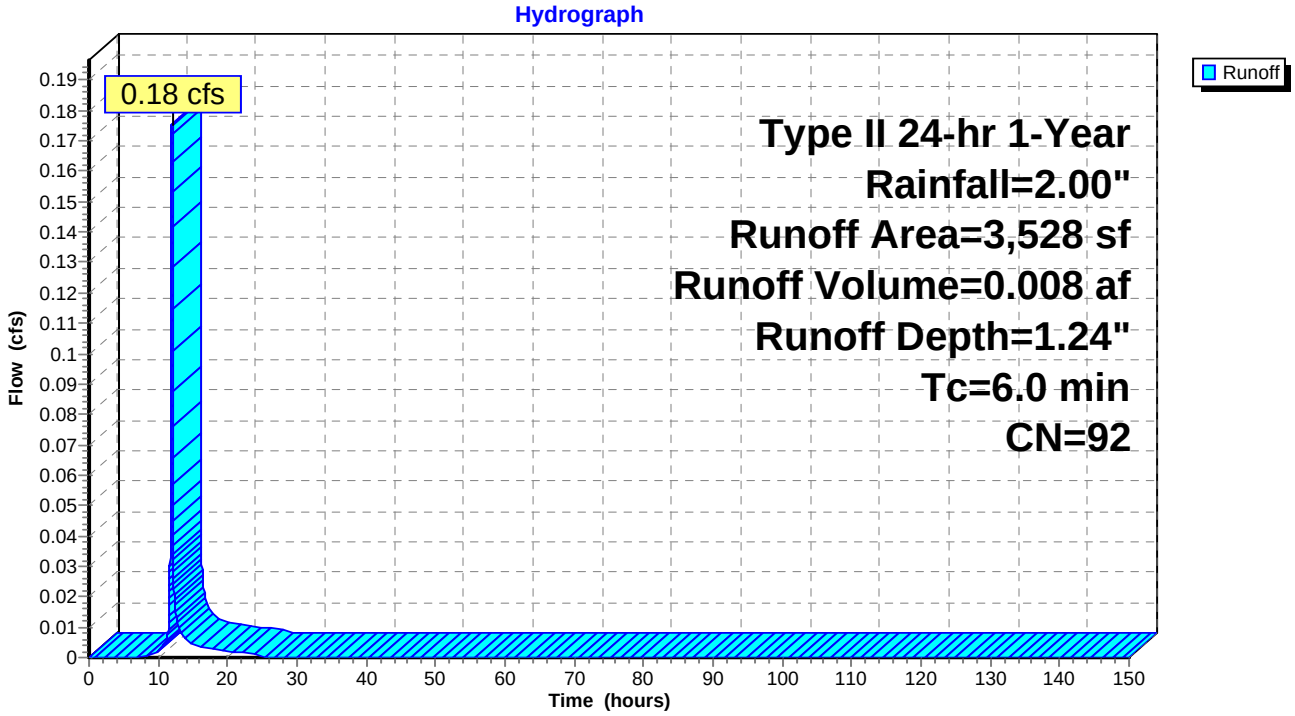
Runoff = 0.18 cfs @ 11.97 hrs, Volume= 0.008 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=2.00"

Area (sf)	CN	Description
2,265	98	Paved parking & roofs
1,263	80	>75% Grass cover, Good, HSG D
3,528	92	Weighted Average
1,263		Pervious Area
2,265		Impervious Area

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

Subcatchment 25S: PR Area 3B



Summary for Pond 10P: Bioretention #1

Inflow Area = 1.120 ac, 79.20% Impervious, Inflow Depth = 1.40" for 1-Year event
Inflow = 2.68 cfs @ 11.97 hrs, Volume= 0.130 af
Outflow = 2.11 cfs @ 12.02 hrs, Volume= 0.130 af, Atten= 21%, Lag= 3.1 min
Primary = 2.11 cfs @ 12.02 hrs, Volume= 0.130 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.84' @ 12.02 hrs Surf.Area= 3,198 sf Storage= 1,785 cf

Plug-Flow detention time= 149.2 min calculated for 0.130 af (100% of inflow)
Center-of-Mass det. time= 149.2 min (949.8 - 800.6)

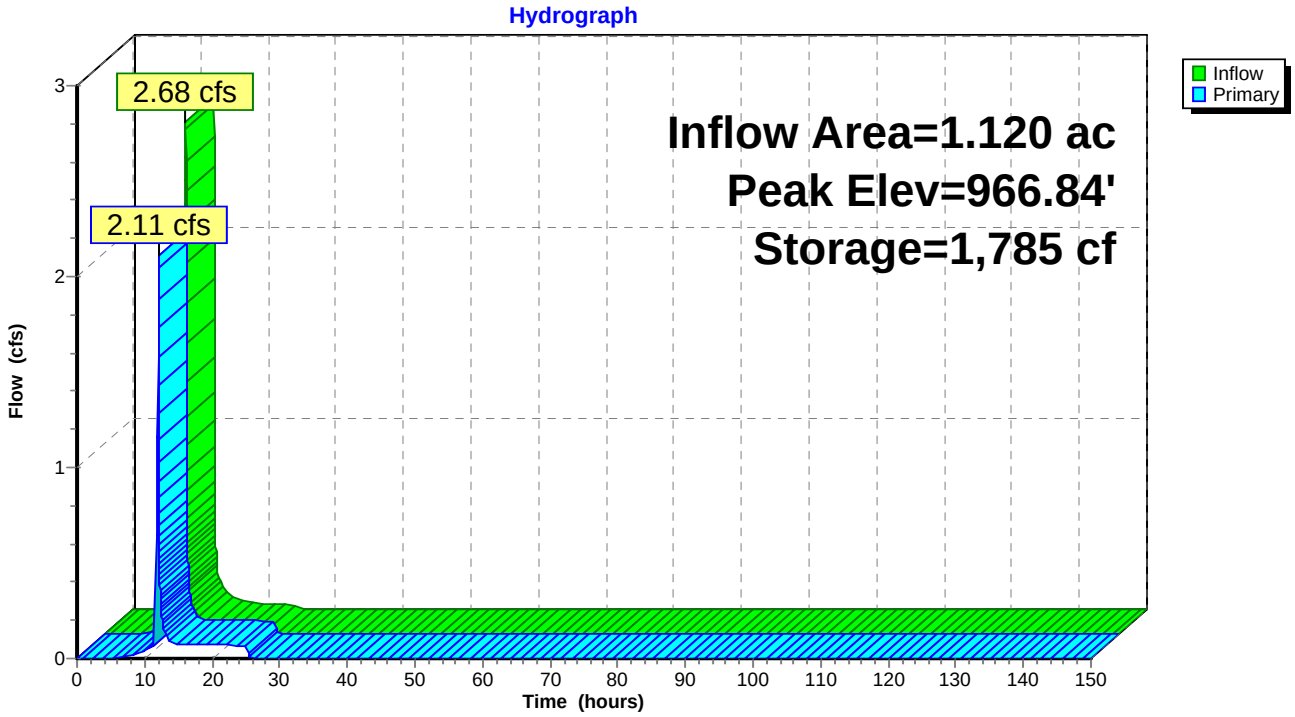
Volume	Invert	Avail.Storage	Storage Description
#1	966.25'	3,151 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.25	2,880	0	0
966.75	3,150	1,508	1,508
967.25	3,425	1,644	3,151

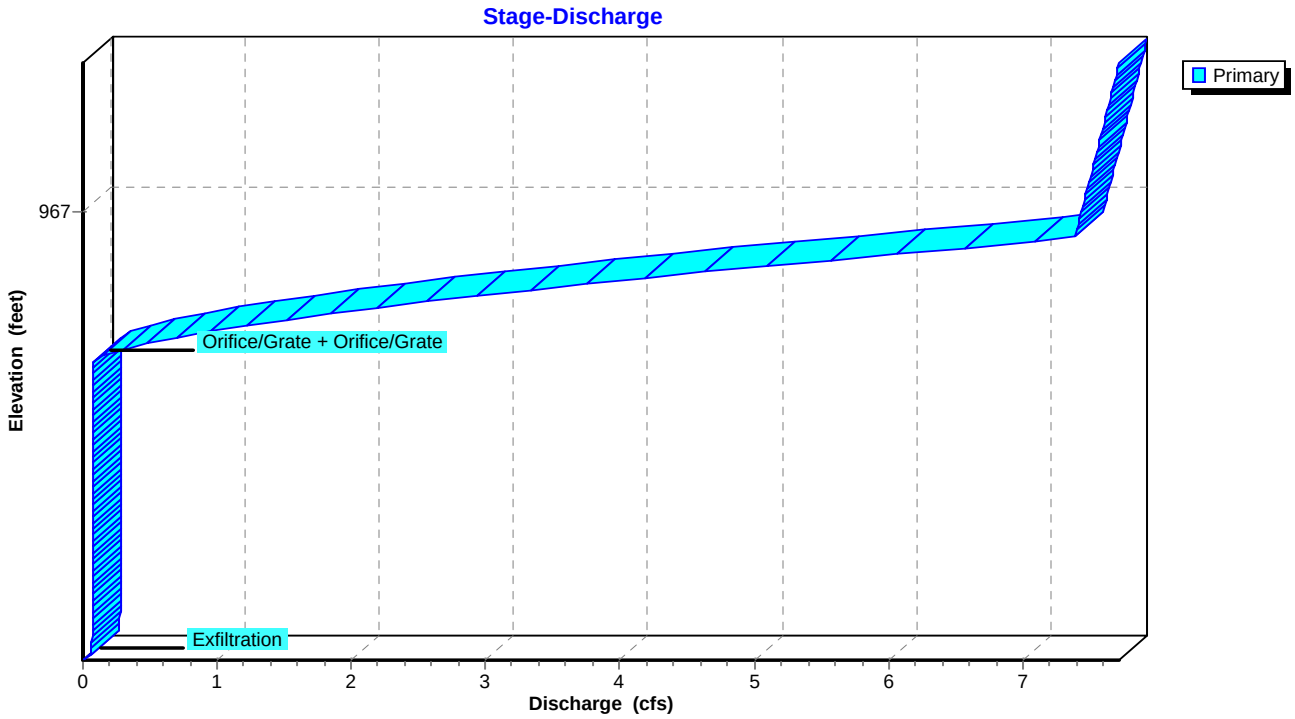
Device	Routing	Invert	Outlet Devices
#1	Primary	963.00'	**15.0" x 180.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.25'	**1.000 in/hr Exfiltration over Surface area**
#3	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=2.10 cfs @ 12.02 hrs HW=966.84' (Free Discharge)
└─**1=Culvert** (Passes 2.10 cfs of 7.25 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)
  ├─**3=Orifice/Grate** (Weir Controls 1.01 cfs @ 0.97 fps)
  └─**4=Orifice/Grate** (Weir Controls 1.01 cfs @ 0.97 fps)

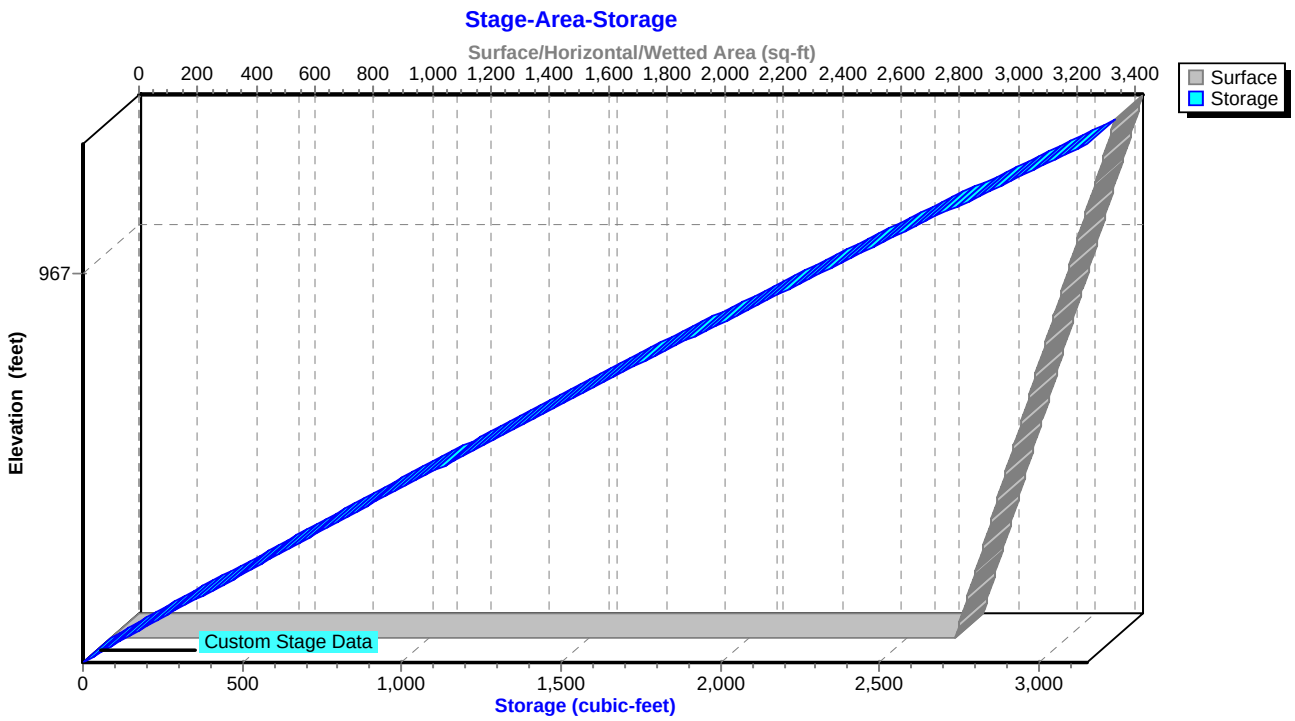
Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Summary for Pond 12P: Bioretention #2

Inflow Area = 0.420 ac, 23.80% Impervious, Inflow Depth = 0.01" for 1-Year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 3%, Lag= 1.2 min
Primary = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 967.00' @ 24.03 hrs Surf.Area= 413 sf Storage= 1 cf

Plug-Flow detention time= 28.6 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 28.6 min (1,290.5 - 1,261.9)

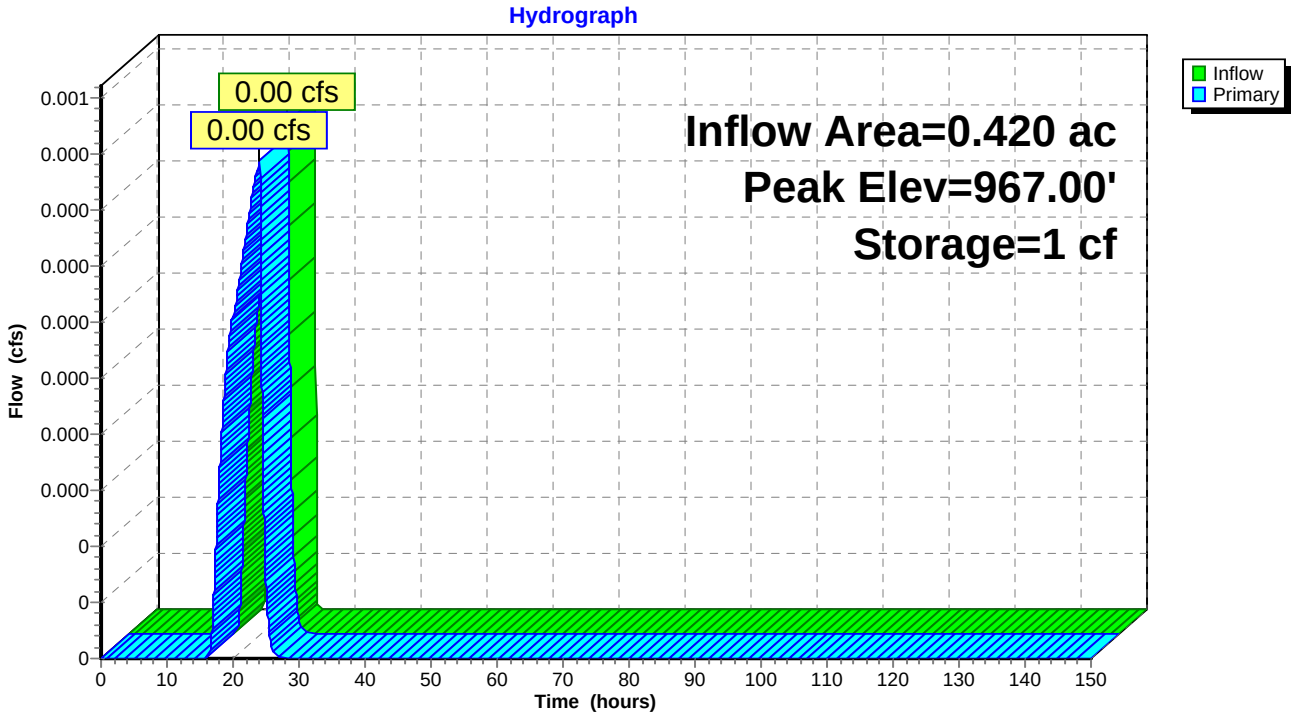
Volume	Invert	Avail.Storage	Storage Description
#1	967.00'	759 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.00	412	0	0
967.50	704	279	279
968.00	1,215	480	759

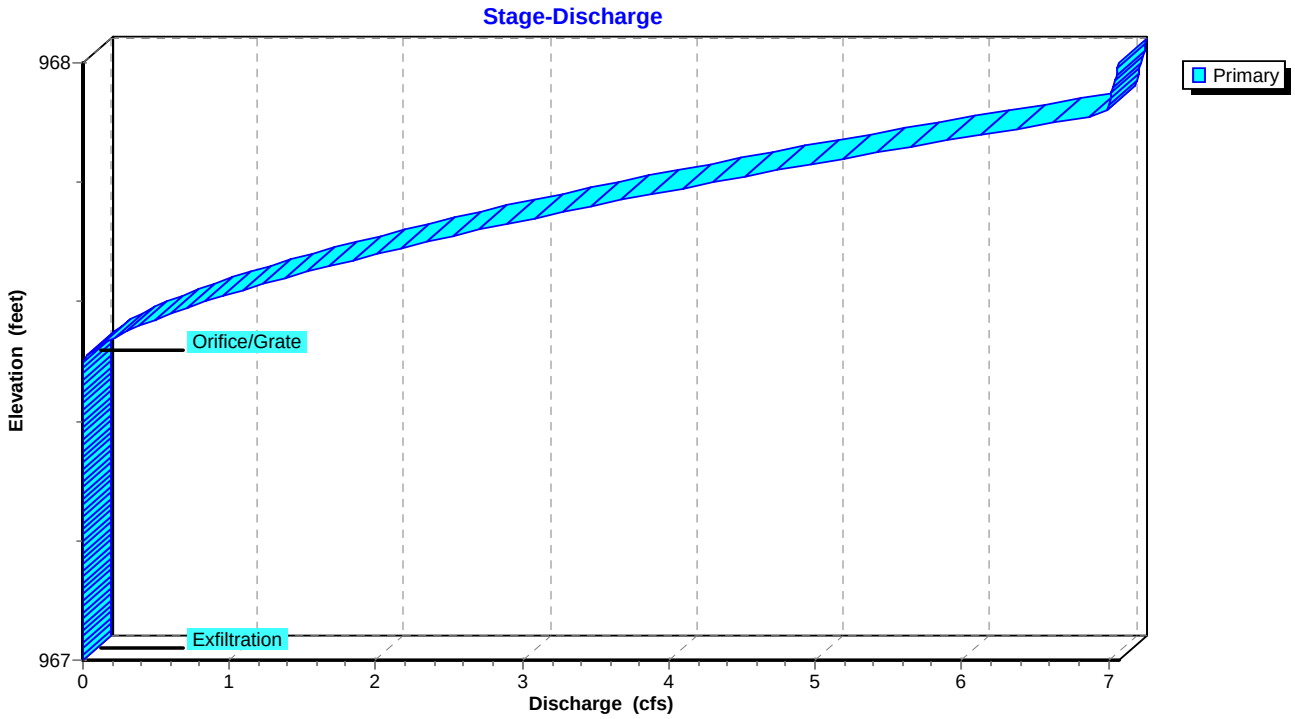
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	967.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.00 cfs @ 24.03 hrs HW=967.00' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 5.98 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

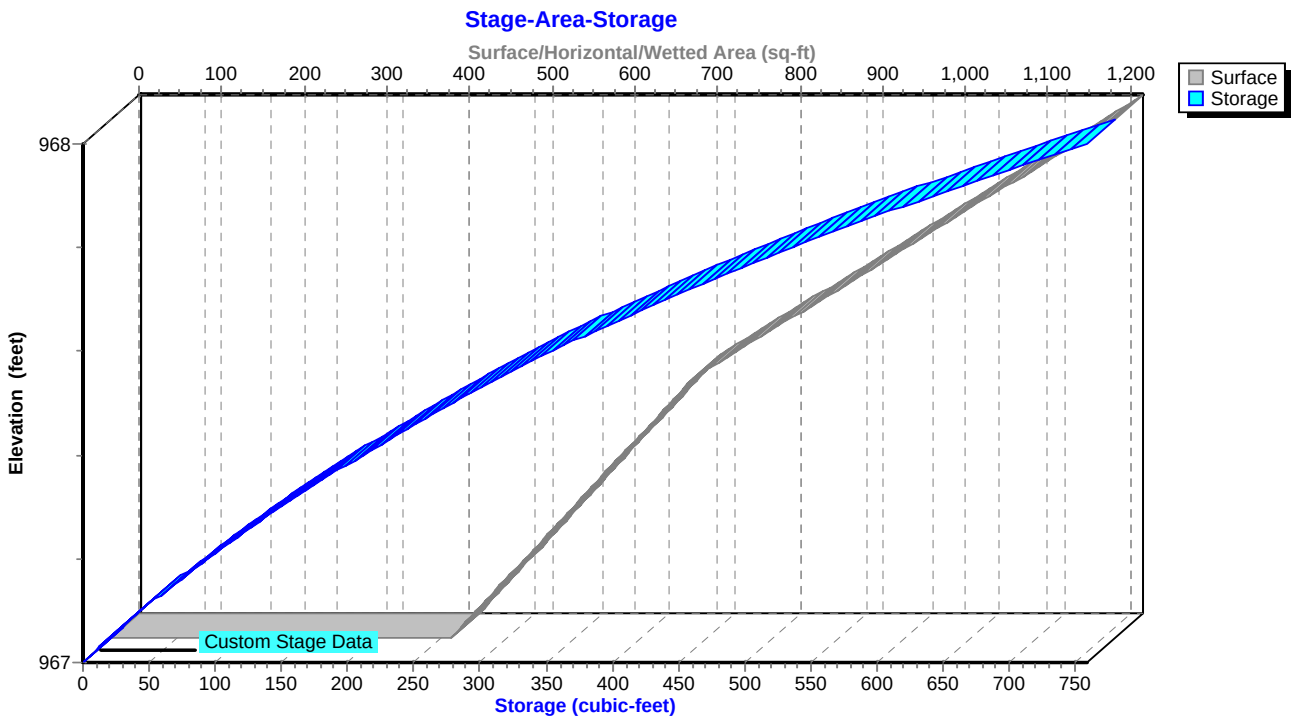
Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Summary for Pond 14P: Detention Pond

[79] Warning: Submerged Pond 10P Primary device # 1 INLET by 0.61'
[79] Warning: Submerged Pond 12P Primary device # 1 OUTLET by 0.61'
[79] Warning: Submerged Pond 17P Primary device # 1 OUTLET by 0.61'
[79] Warning: Submerged Pond 21P Primary device # 1 by 1.11'
[79] Warning: Submerged Pond 24P Primary device # 1 OUTLET by 0.61'

Inflow Area =	2.905 ac,	49.41% Impervious,	Inflow Depth =	0.96"	for 1-Year event
Inflow =	2.86 cfs @	12.02 hrs,	Volume=	0.232 af	
Outflow =	0.24 cfs @	13.27 hrs,	Volume=	0.232 af,	Atten= 92%, Lag= 74.7 min
Primary =	0.24 cfs @	13.27 hrs,	Volume=	0.232 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 963.61' @ 13.27 hrs Surf.Area= 3,642 sf Storage= 3,108 cf

Plug-Flow detention time= 171.7 min calculated for 0.232 af (100% of inflow)
Center-of-Mass det. time= 171.9 min (1,189.7 - 1,017.9)

Volume	Invert	Avail.Storage	Storage Description
#1	962.50'	19,563 cf	**Det. Pond #1 (Prismatic)**Listed below (Recalc)
#2	962.50'	3,380 cf	**Det. Pond #2 (Prismatic)**Listed below (Recalc)
		22,944 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	1,777	0	0
963.00	2,312	1,022	1,022
964.00	3,424	2,868	3,890
965.00	4,593	4,009	7,899
966.00	5,818	5,206	13,104
967.00	7,100	6,459	19,563

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	182	0	0
963.00	379	140	140
964.00	814	597	737
965.00	1,309	1,062	1,798
966.00	1,855	1,582	3,380

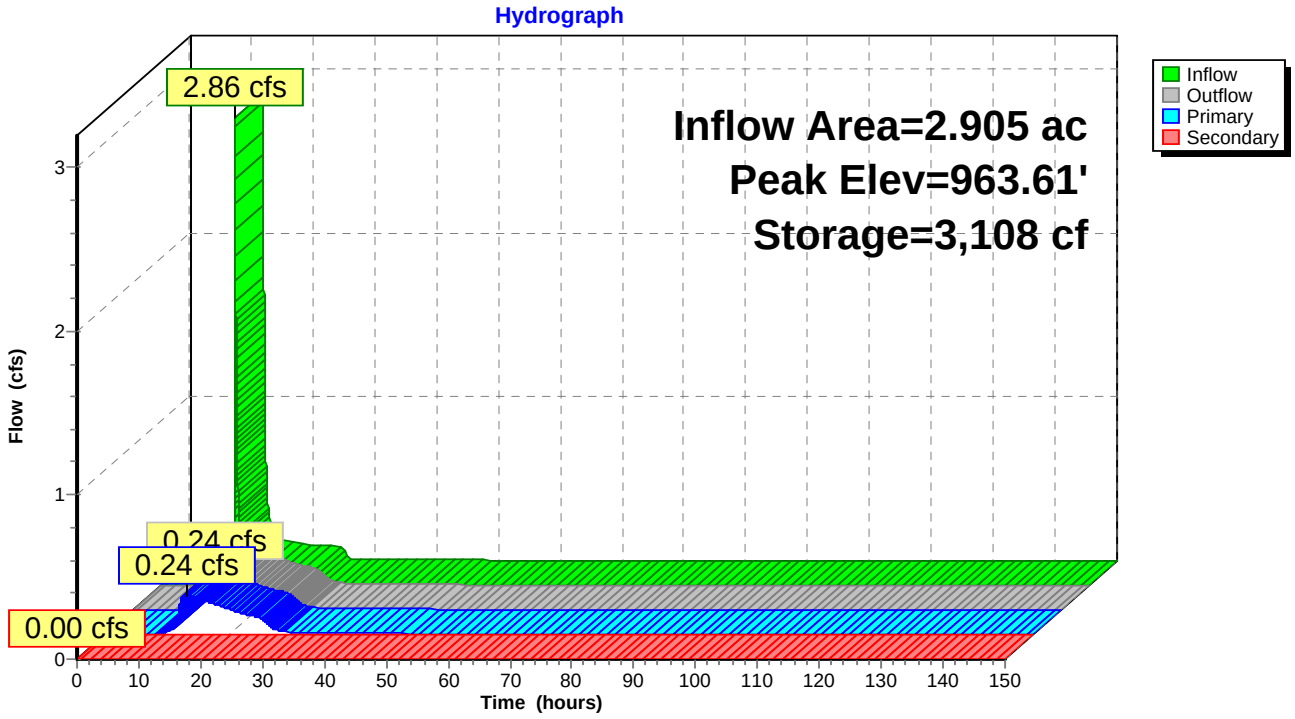
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	962.50'	**3.0" Vert. Low-Flow Orifice** C= 0.600
#3	Device 1	964.40'	**3.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#4	Device 1	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600
#5	Secondary	963.00'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0100 '/' Cc= 0.900

			n= 0.013 Corrugated PE, smooth interior
#6	Device 5	964.40'	**2.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#7	Device 5	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600

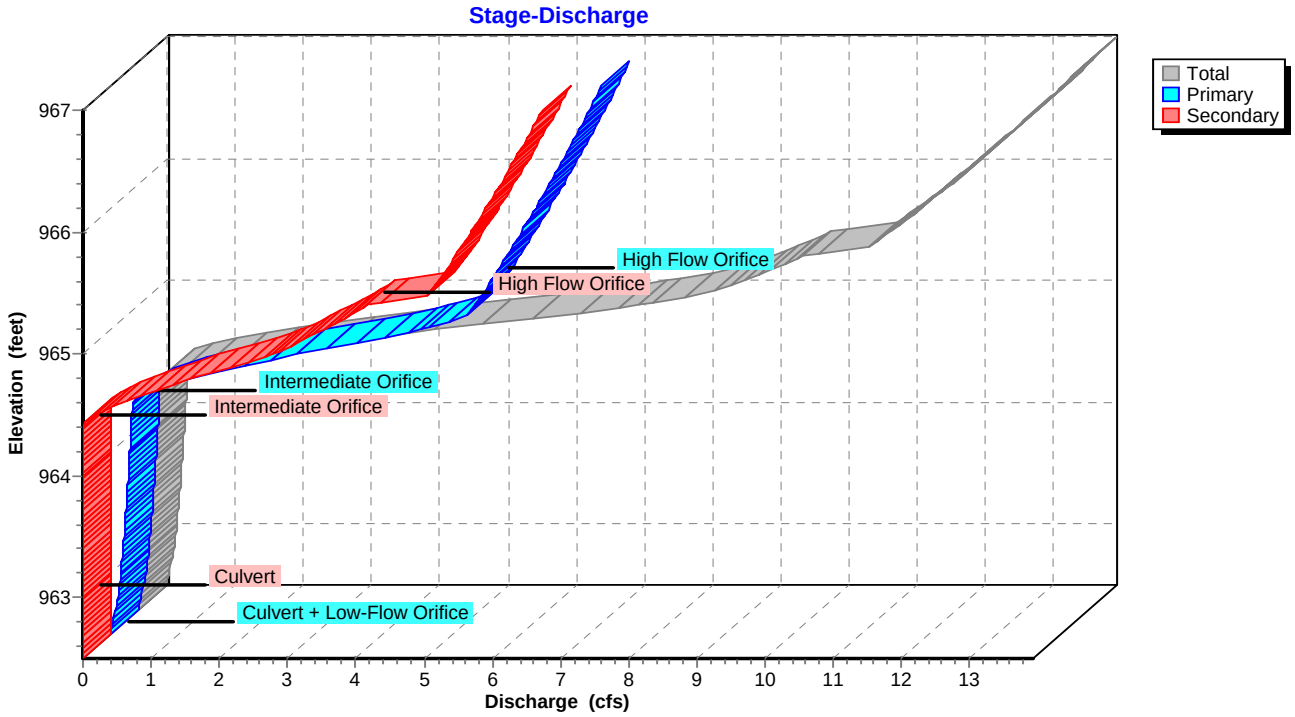
Primary OutFlow Max=0.24 cfs @ 13.27 hrs HW=963.61' (Free Discharge)
- **1=Culvert** (Passes 0.24 cfs of 2.96 cfs potential flow)
  - **2=Low-Flow Orifice** (Orifice Controls 0.24 cfs @ 4.79 fps)
  - **3=Intermediate Orifice** (Controls 0.00 cfs)
  - **4=High Flow Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=962.50' (Free Discharge)
- **5=Culvert** (Controls 0.00 cfs)
  - **6=Intermediate Orifice** (Controls 0.00 cfs)
  - **7=High Flow Orifice** (Controls 0.00 cfs)

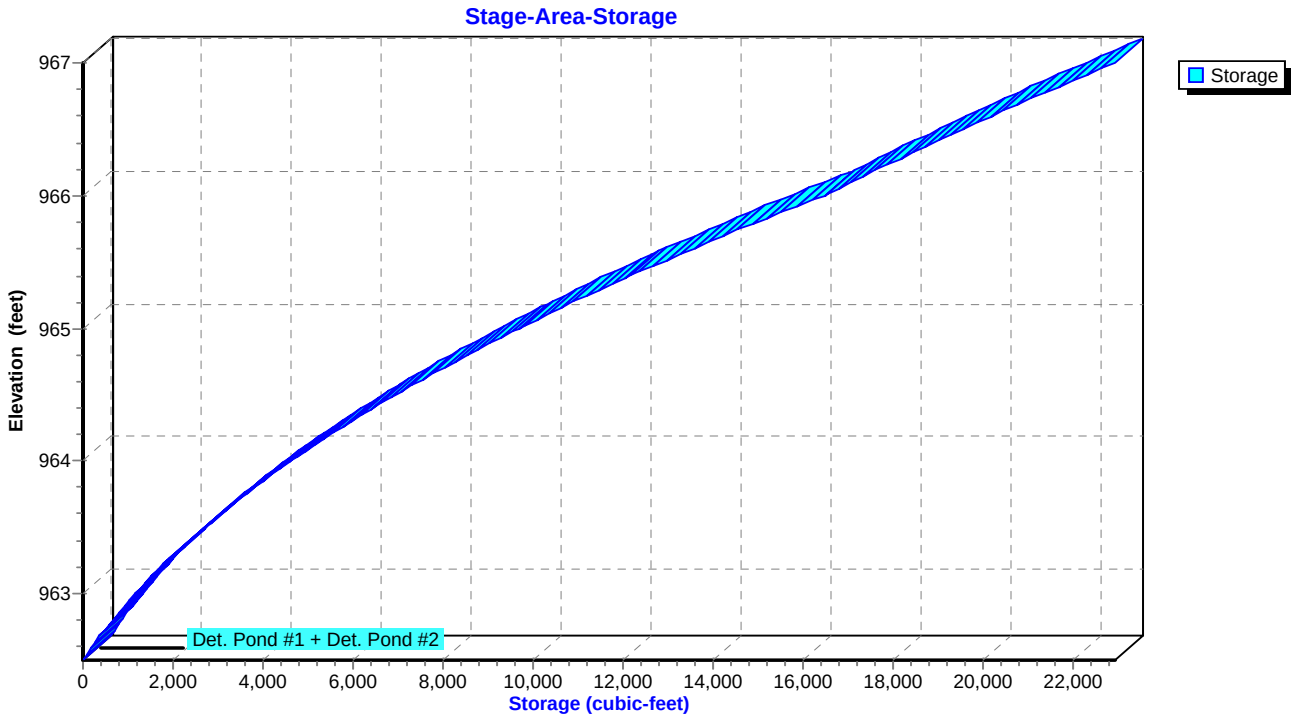
Pond 14P: Detention Pond



Pond 14P: Detention Pond



Pond 14P: Detention Pond



Summary for Pond 17P: Bioretention #3A

Inflow Area = 0.305 ac, 77.05% Impervious, Inflow Depth = 1.40" for 1-Year event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.49 cfs @ 12.12 hrs, Volume= 0.035 af, Atten= 2%, Lag= 1.5 min
Primary = 0.49 cfs @ 12.12 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.57' @ 12.12 hrs Surf.Area= 833 sf Storage= 360 cf

Plug-Flow detention time= 286.4 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 286.5 min (1,097.7 - 811.2)

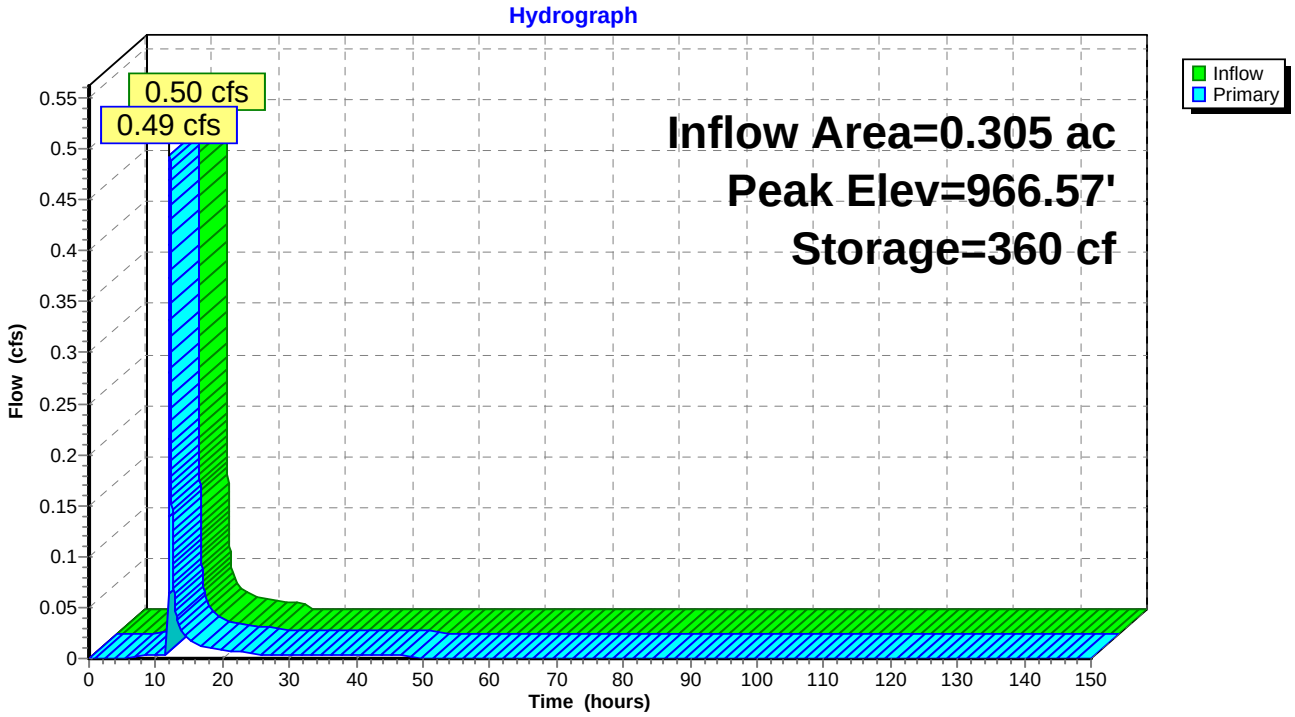
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	819 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	462	0	0
966.50	756	305	305
967.00	1,300	514	819

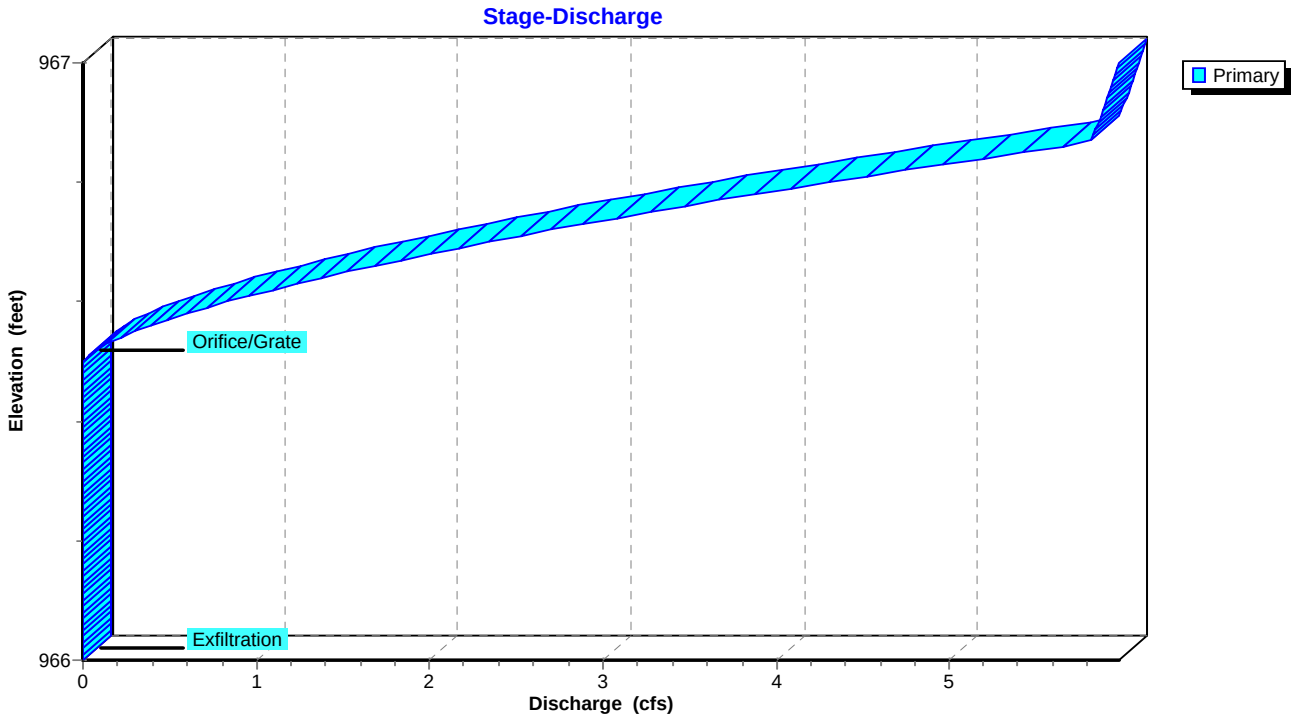
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.49 cfs @ 12.12 hrs HW=966.57' (Free Discharge)
└─**1=Culvert** (Passes 0.49 cfs of 5.44 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.49 cfs @ 0.87 fps)

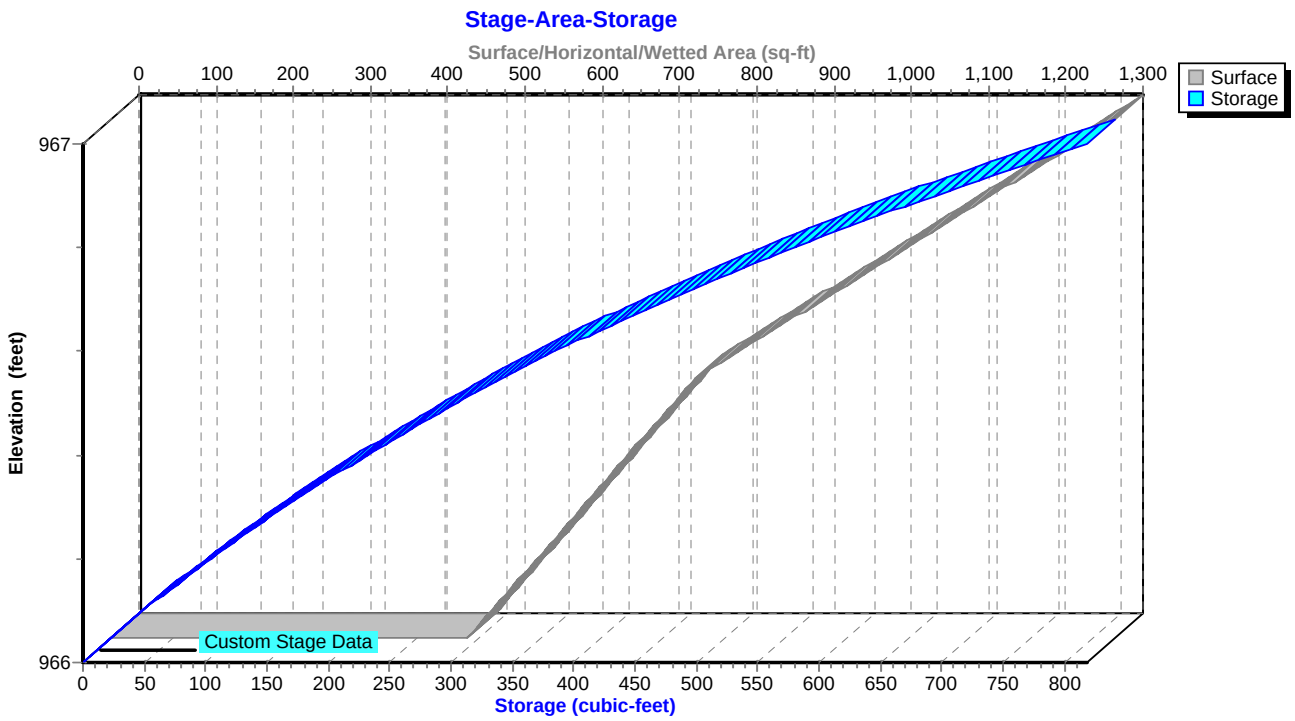
Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Summary for Pond 21P: Bioretention #4

Inflow Area = 0.598 ac, 10.87% Impervious, Inflow Depth = 0.65" for 1-Year event
Inflow = 0.51 cfs @ 12.07 hrs, Volume= 0.032 af
Outflow = 0.31 cfs @ 12.19 hrs, Volume= 0.032 af, Atten= 39%, Lag= 7.1 min
Primary = 0.31 cfs @ 12.19 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.55' @ 12.19 hrs Surf.Area= 994 sf Storage= 412 cf

Plug-Flow detention time= 361.2 min calculated for 0.032 af (100% of inflow)
Center-of-Mass det. time= 361.2 min (1,227.1 - 865.8)

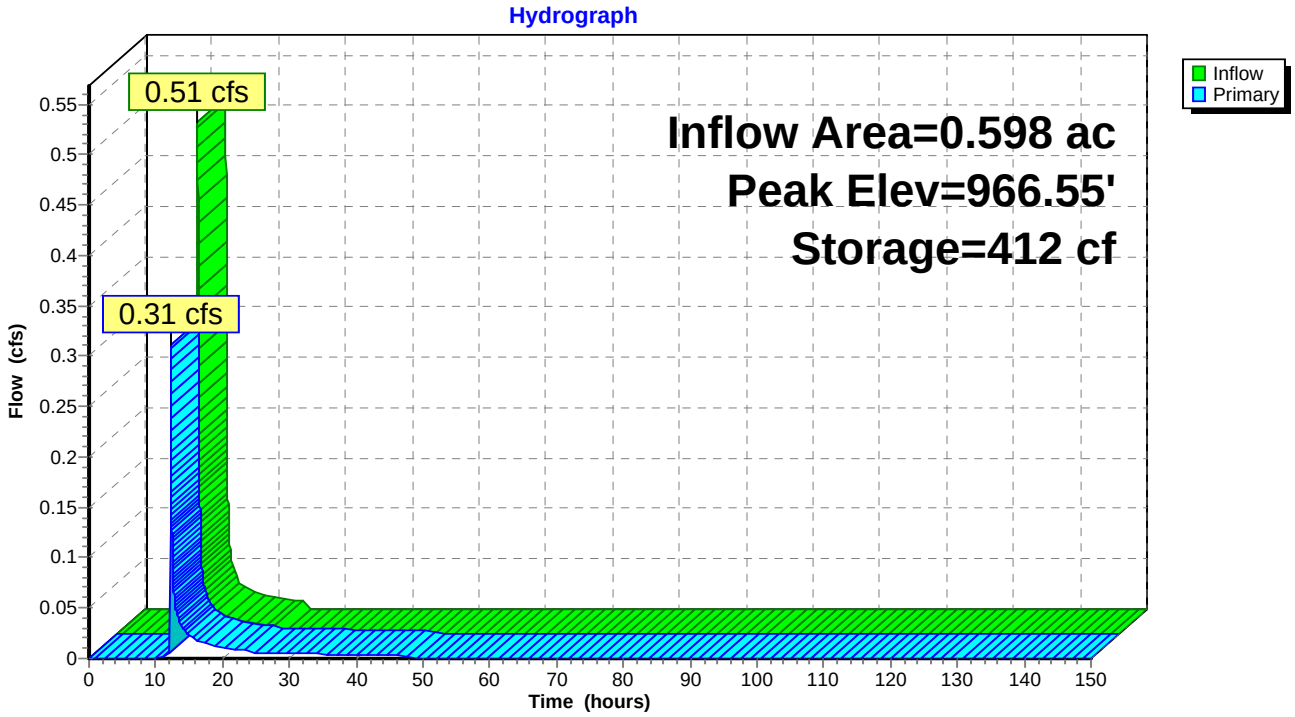
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	519	0	0
966.50	933	363	363
967.00	1,523	614	977

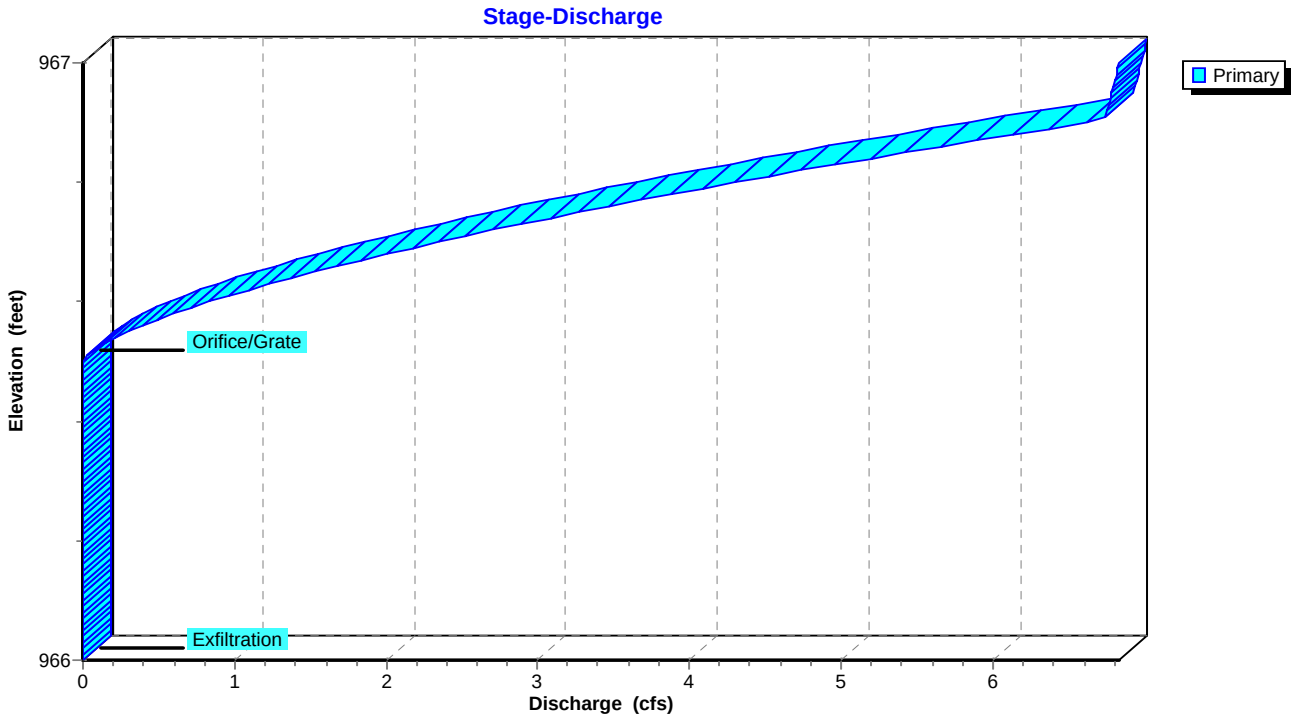
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 47.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.31 cfs @ 12.19 hrs HW=966.55' (Free Discharge)
└─**1=Culvert** (Passes 0.31 cfs of 6.38 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.30 cfs @ 0.74 fps)

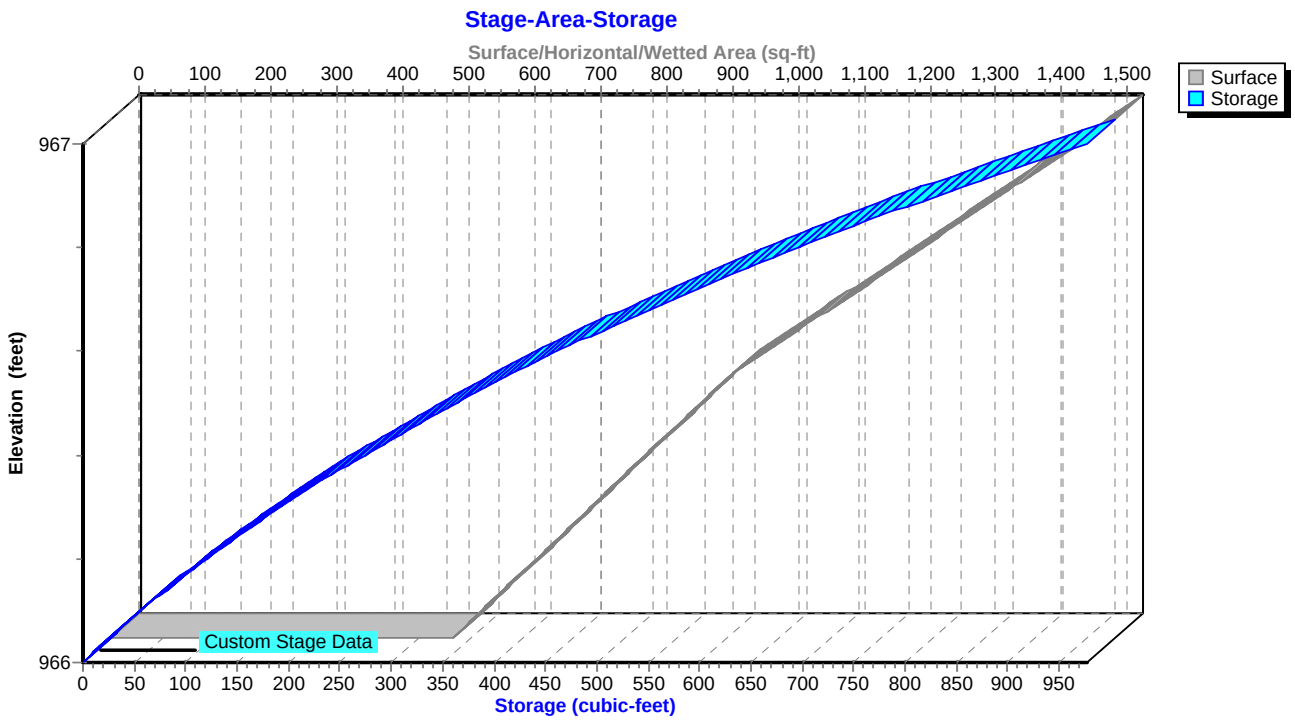
Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Summary for Pond 24P: Bioretention #3B

Inflow Area = 0.081 ac, 64.20% Impervious, Inflow Depth = 1.24" for 1-Year event
Inflow = 0.18 cfs @ 11.97 hrs, Volume= 0.008 af
Outflow = 0.06 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 68%, Lag= 7.2 min
Primary = 0.06 cfs @ 12.09 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 968.42' @ 12.09 hrs Surf.Area= 358 sf Storage= 165 cf

Plug-Flow detention time= 631.2 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 631.2 min (1,444.0 - 812.8)

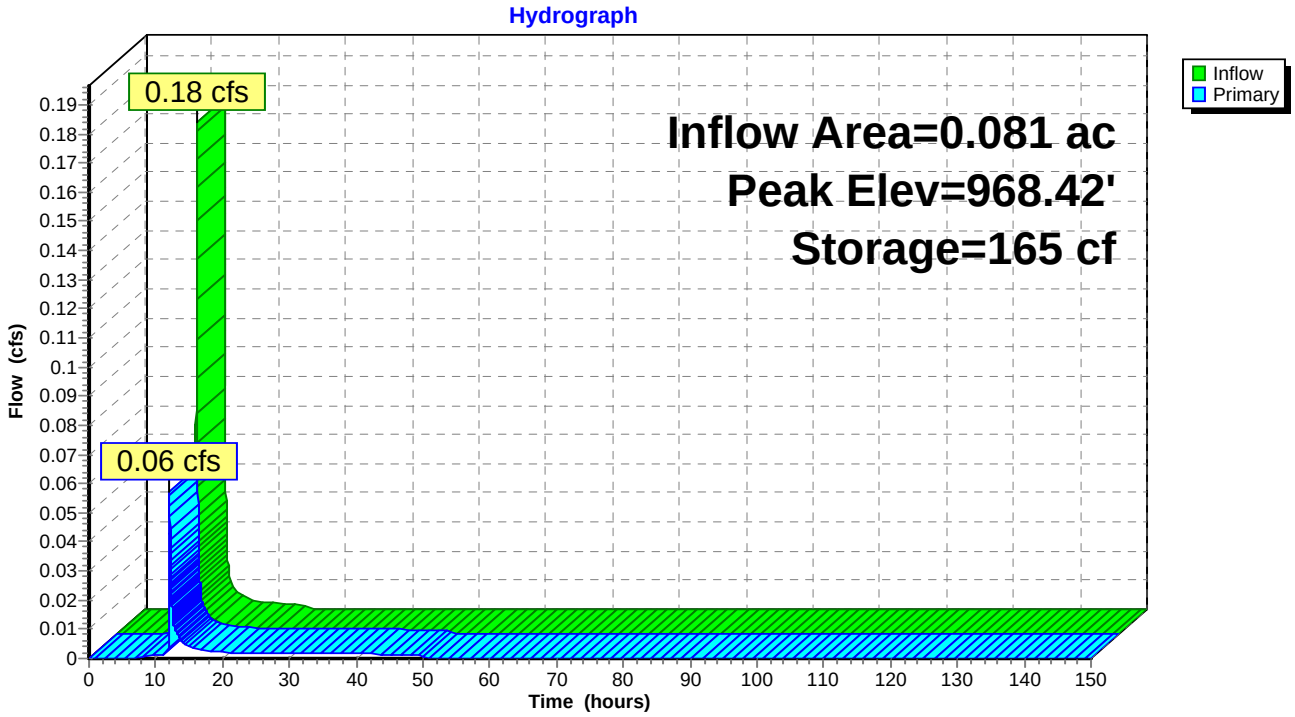
Volume	Invert	Avail.Storage	Storage Description
#1	967.85'	235 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.85	229	0	0
968.10	283	64	64
968.60	402	171	235

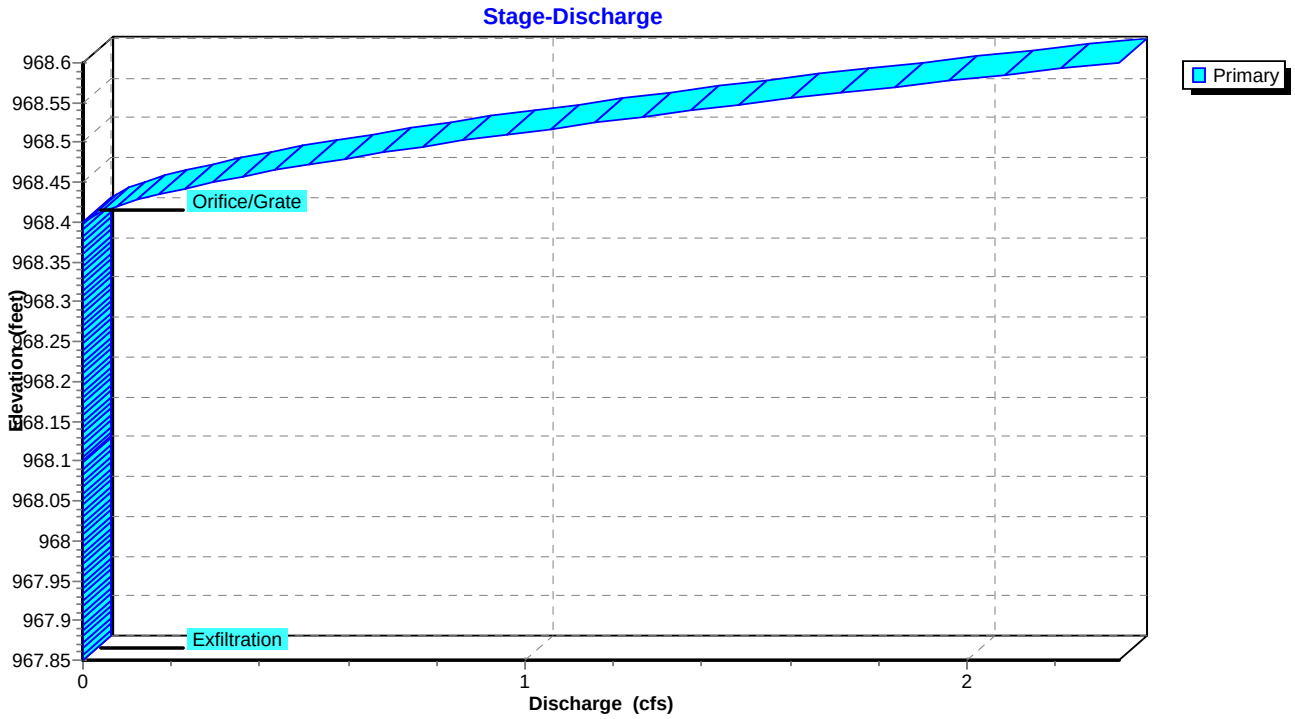
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.85'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	968.40'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.06 cfs @ 12.09 hrs HW=968.42' (Free Discharge)
└─**1=Culvert** (Passes 0.06 cfs of 7.48 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.41 fps)

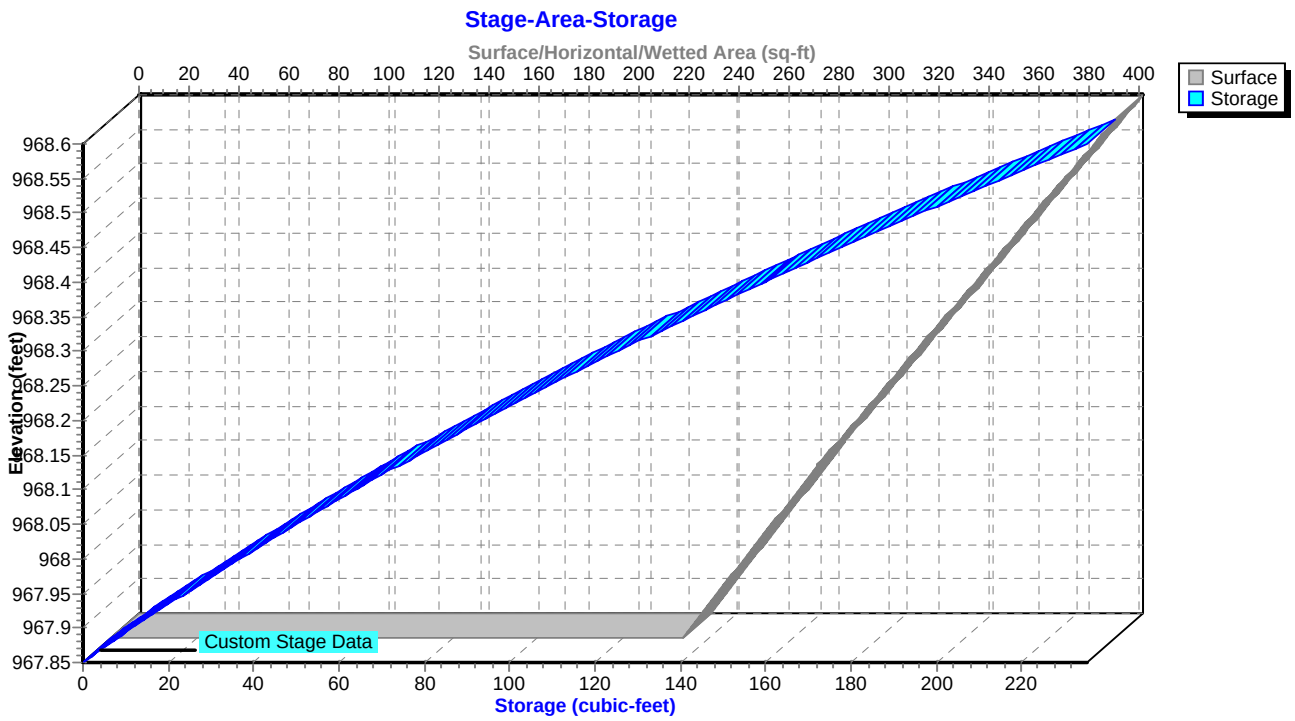
Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B

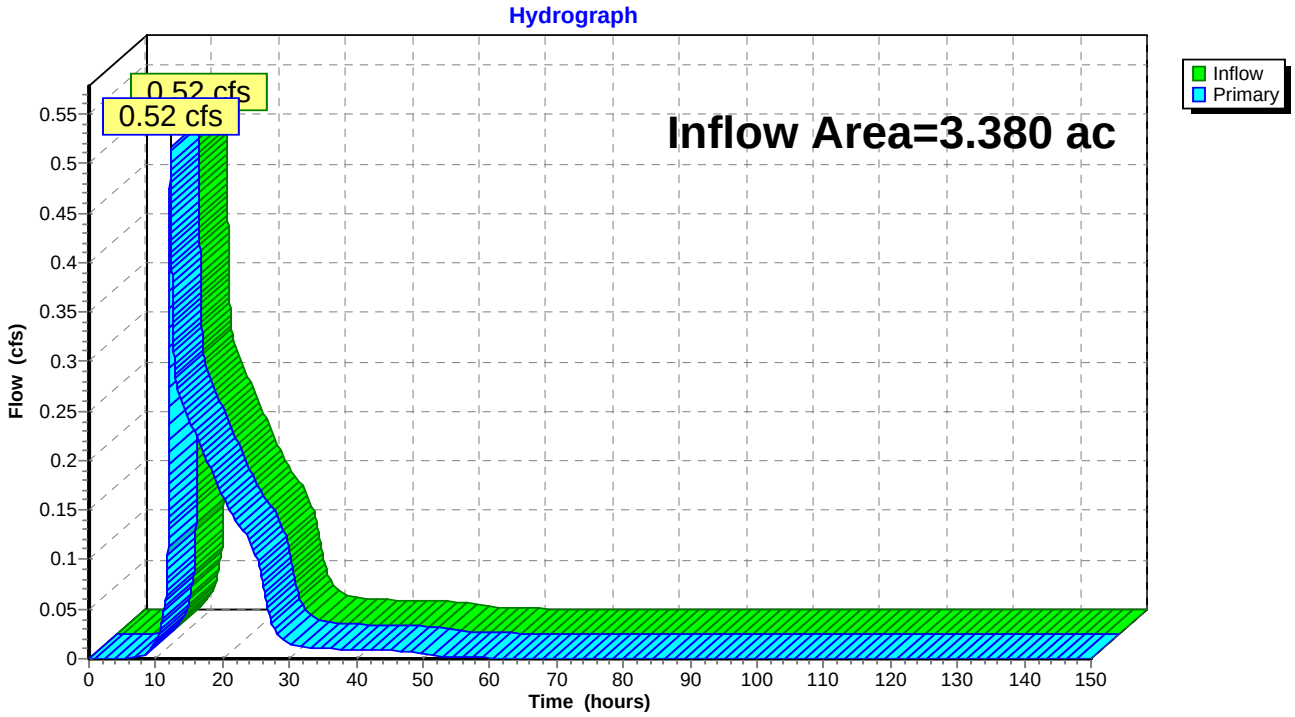


Summary for Link 26L: Analysis Point #1

Inflow Area = 3.380 ac, 44.84% Impervious, Inflow Depth = 0.92" for 1-Year event
Inflow = 0.52 cfs @ 12.19 hrs, Volume= 0.259 af
Primary = 0.52 cfs @ 12.19 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs

Link 26L: Analysis Point #1



Summary for Subcatchment 11S: PR Area 1

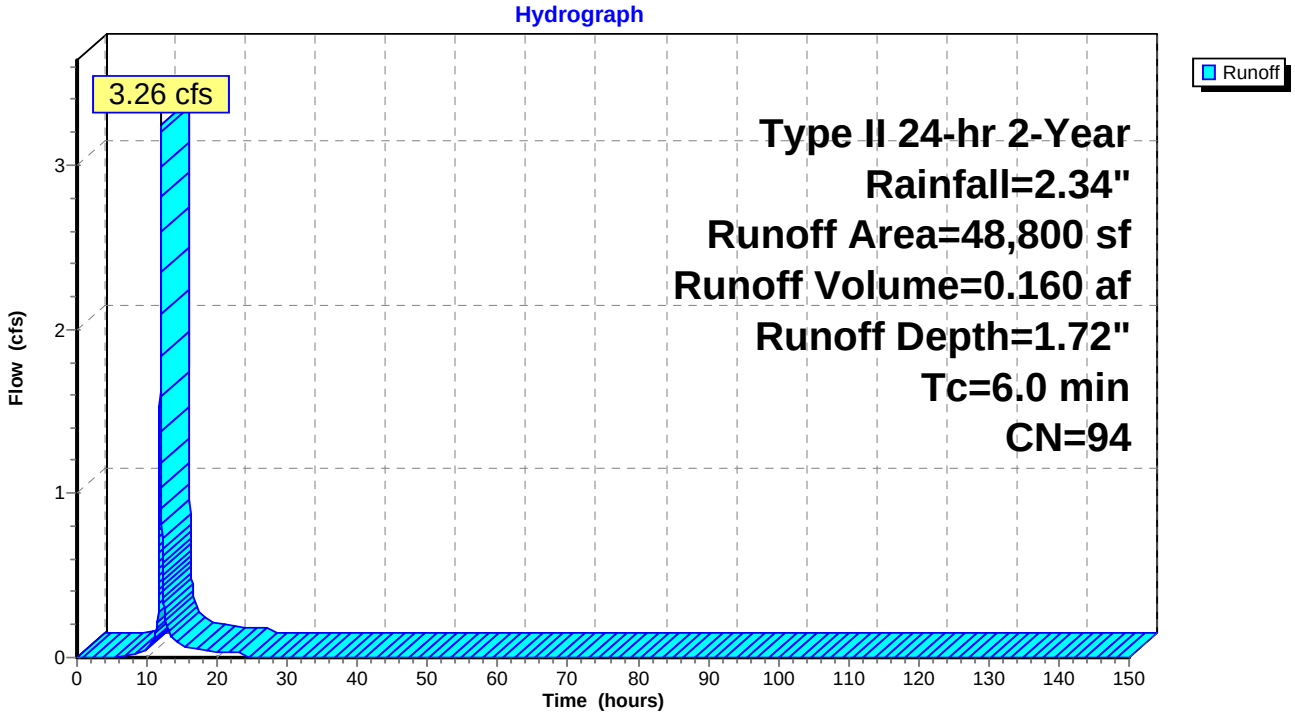
Runoff = 3.26 cfs @ 11.97 hrs, Volume= 0.160 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (sf)	CN	Description
38,651	98	Paved parking & roofs
10,149	80	>75% Grass cover, Good, HSG D
48,800	94	Weighted Average
10,149		Pervious Area
38,651		Impervious Area

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

Subcatchment 11S: PR Area 1



Summary for Subcatchment 13S: PR Area 2

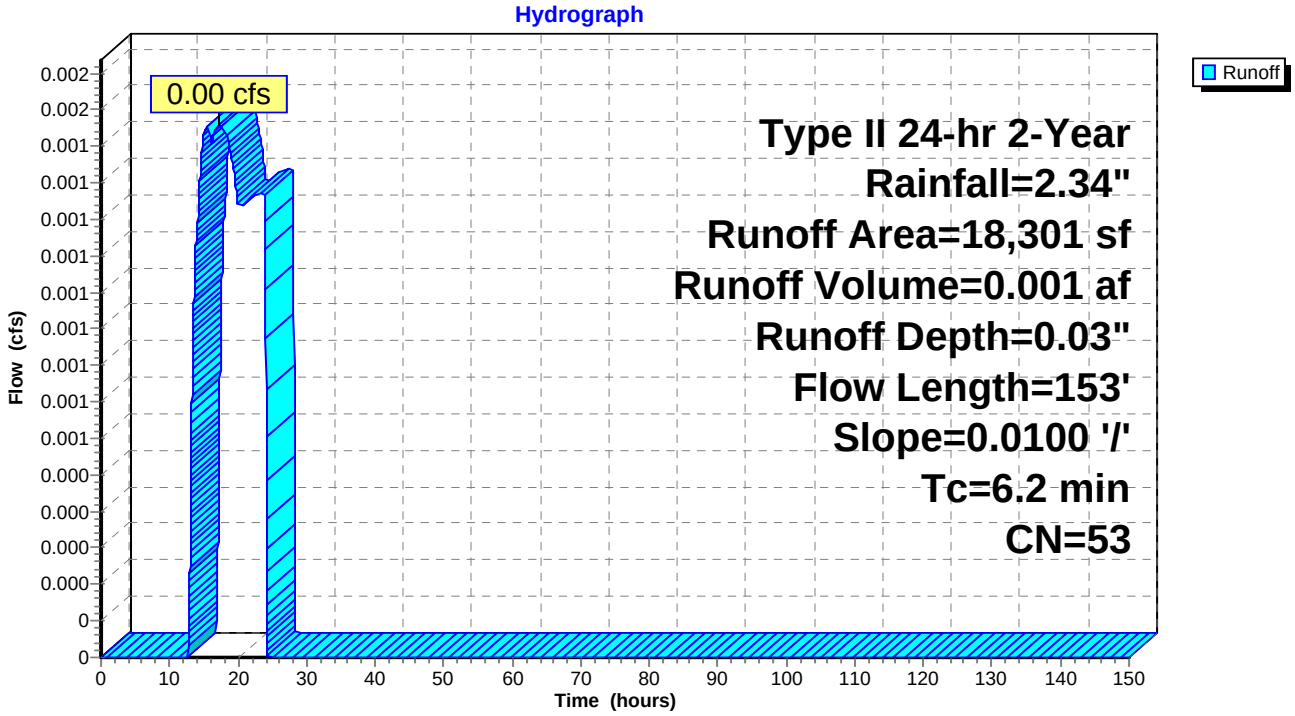
Runoff = 0.00 cfs @ 17.34 hrs, Volume= 0.001 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
13,945	39	>75% Grass cover, Good, HSG A
18,301	53	Weighted Average
13,945		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	18	0.0100	0.05		**Sheet Flow, Sheet - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.6	135	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
6.2	153	Total			

Subcatchment 13S: PR Area 2



Summary for Subcatchment 16S: PR Area 3A

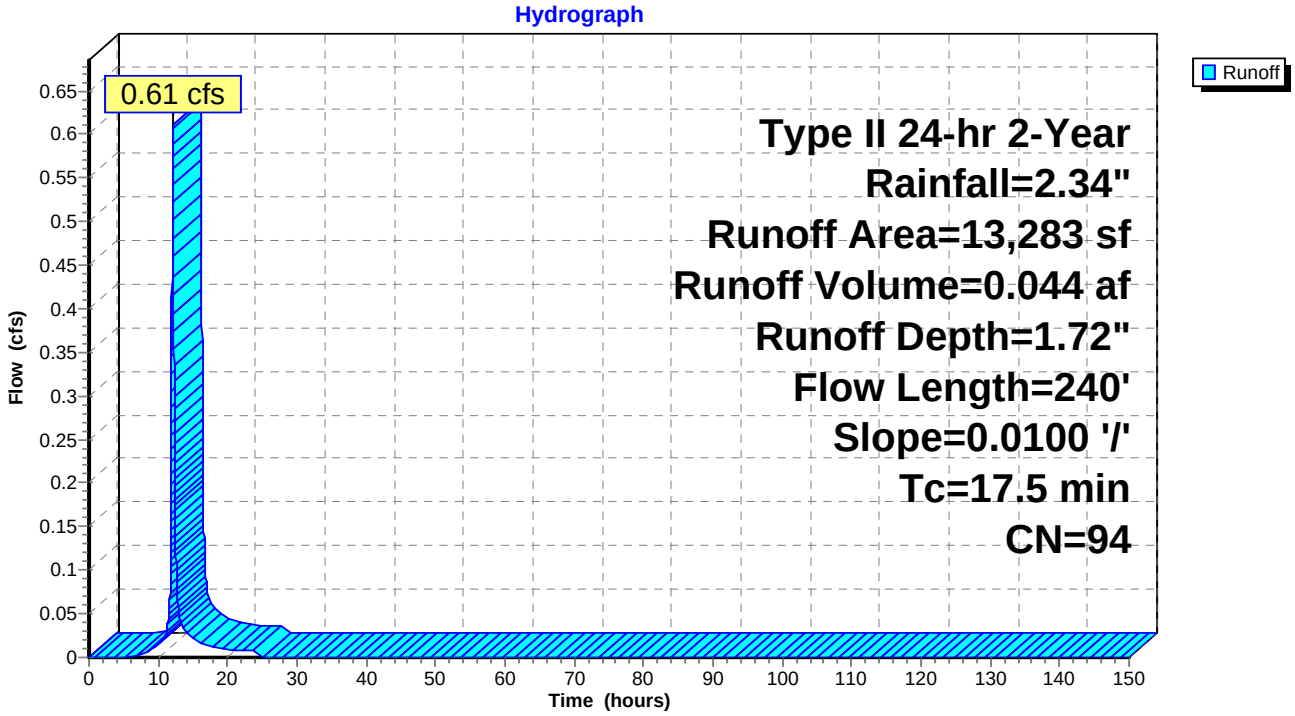
Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (sf)	CN	Description
10,234	98	Paved parking & roofs
3,049	80	>75% Grass cover, Good, HSG D
13,283	94	Weighted Average
3,049		Pervious Area
10,234		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	70	0.0100	0.07		**Sheet Flow, Sheet - grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	170	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
17.5	240	Total			

Subcatchment 16S: PR Area 3A



Summary for Subcatchment 19S: PR Area 5

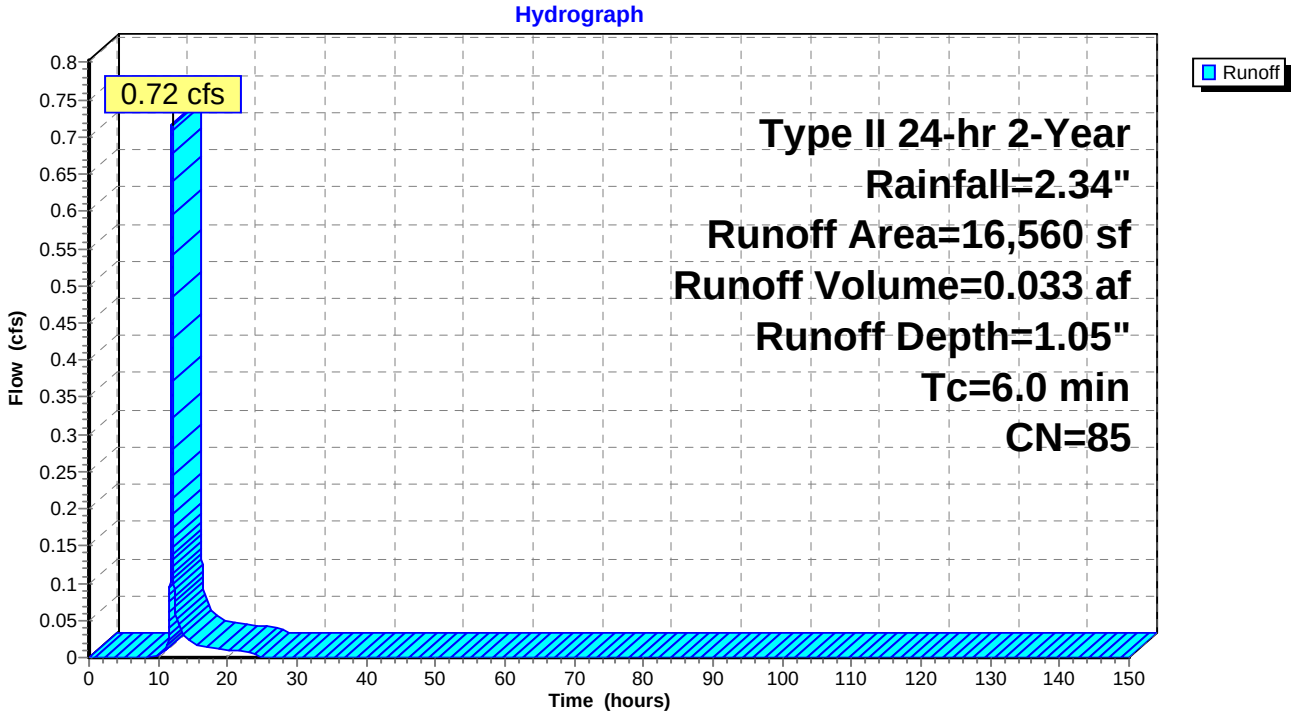
Runoff = 0.72 cfs @ 11.98 hrs, Volume= 0.033 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (sf)	CN	Description
4,180	98	Paved parking & roofs
12,380	80	>75% Grass cover, Good, HSG D
16,560	85	Weighted Average
12,380		Pervious Area
4,180		Impervious Area

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

Subcatchment 19S: PR Area 5



Summary for Subcatchment 22S: PR Area #4

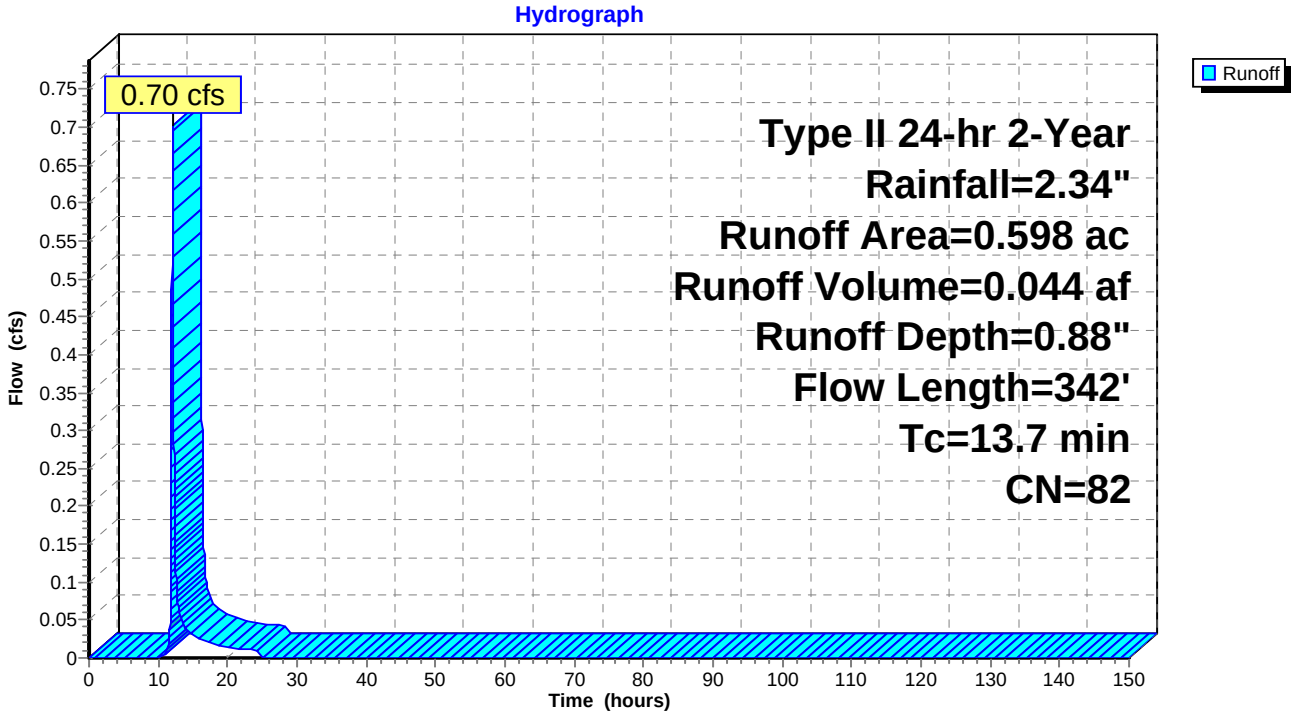
Runoff = 0.70 cfs @ 12.07 hrs, Volume= 0.044 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (ac)	CN	Description
0.212	79	Woods, Fair, HSG D
0.065	98	Paved parking & roofs
0.321	80	>75% Grass cover, Good, HSG D
0.598	82	Weighted Average
0.533		Pervious Area
0.065		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	69	0.0570	0.09		**Sheet Flow, Sheet Flow - Woods/Brush** Woods: Light underbrush n= 0.400 P2= 2.30"
1.3	273	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
13.7	342	Total			

Subcatchment 22S: PR Area #4



Summary for Subcatchment 23S: PR Area 6

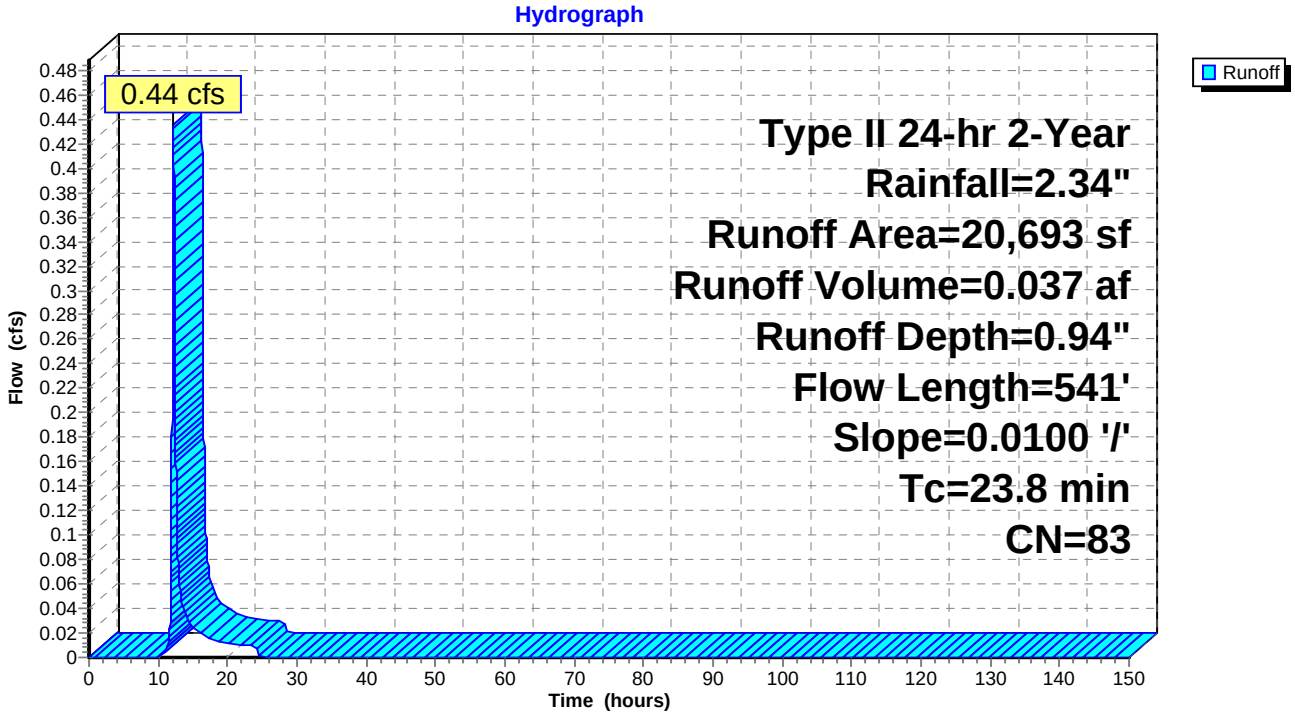
Runoff = 0.44 cfs @ 12.19 hrs, Volume= 0.037 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (sf)	CN	Description
3,500	98	Paved parking & roofs
17,193	80	>75% Grass cover, Good, HSG D
20,693	83	Weighted Average
17,193		Pervious Area
3,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	100	0.0100	0.08		**Sheet Flow, Sheet Flow - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	78	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc. - Grass** Unpaved Kv= 16.1 fps
0.8	363	0.0100	7.76	124.12	**Channel Flow, Roadside Ditch** Area= 16.0 sf Perim= 13.0' r= 1.23' n= 0.022 Earth, clean & straight
23.8	541	Total			

Subcatchment 23S: PR Area 6



Summary for Subcatchment 25S: PR Area 3B

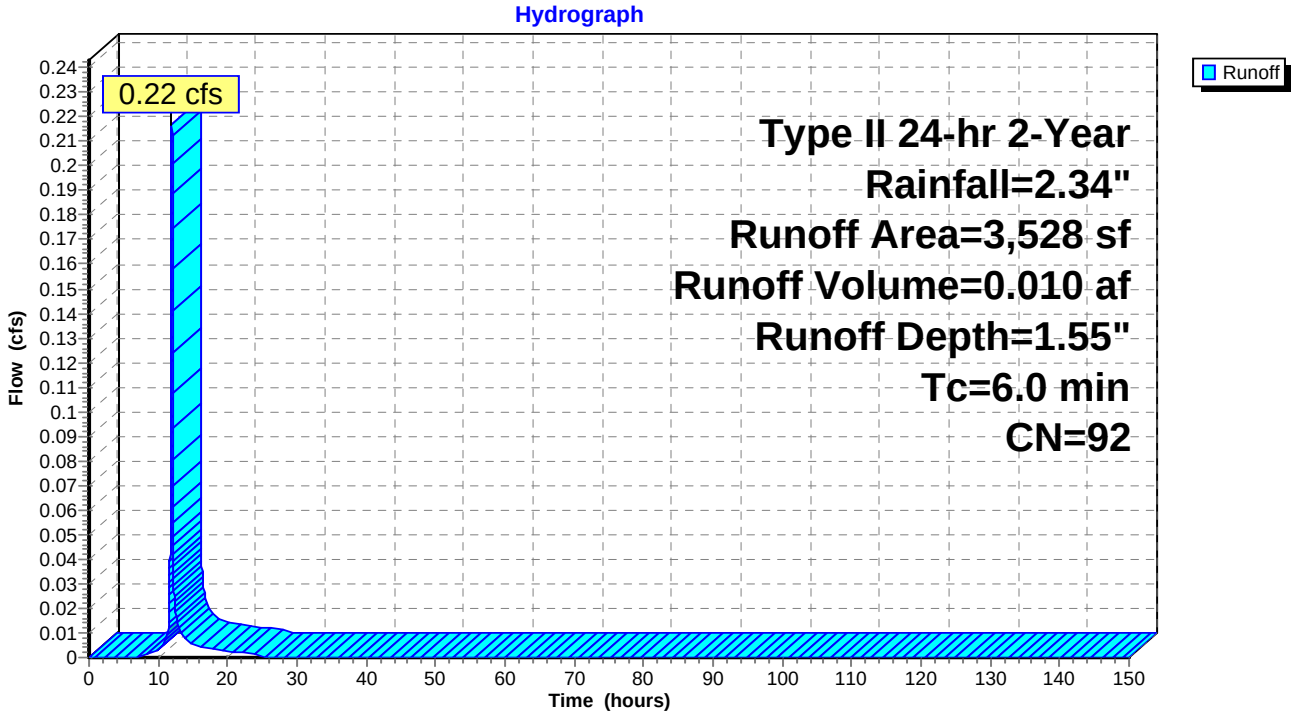
Runoff = 0.22 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=2.34"

Area (sf)	CN	Description
2,265	98	Paved parking & roofs
1,263	80	>75% Grass cover, Good, HSG D
3,528	92	Weighted Average
1,263		Pervious Area
2,265		Impervious Area

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

Subcatchment 25S: PR Area 3B



Summary for Pond 10P: Bioretention #1

Inflow Area = 1.120 ac, 79.20% Impervious, Inflow Depth = 1.72" for 2-Year event
Inflow = 3.26 cfs @ 11.97 hrs, Volume= 0.160 af
Outflow = 3.01 cfs @ 12.00 hrs, Volume= 0.160 af, Atten= 7%, Lag= 1.8 min
Primary = 3.01 cfs @ 12.00 hrs, Volume= 0.160 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.86' @ 12.00 hrs Surf.Area= 3,212 sf Storage= 1,863 cf

Plug-Flow detention time= 136.0 min calculated for 0.160 af (100% of inflow)
Center-of-Mass det. time= 136.0 min (930.8 - 794.7)

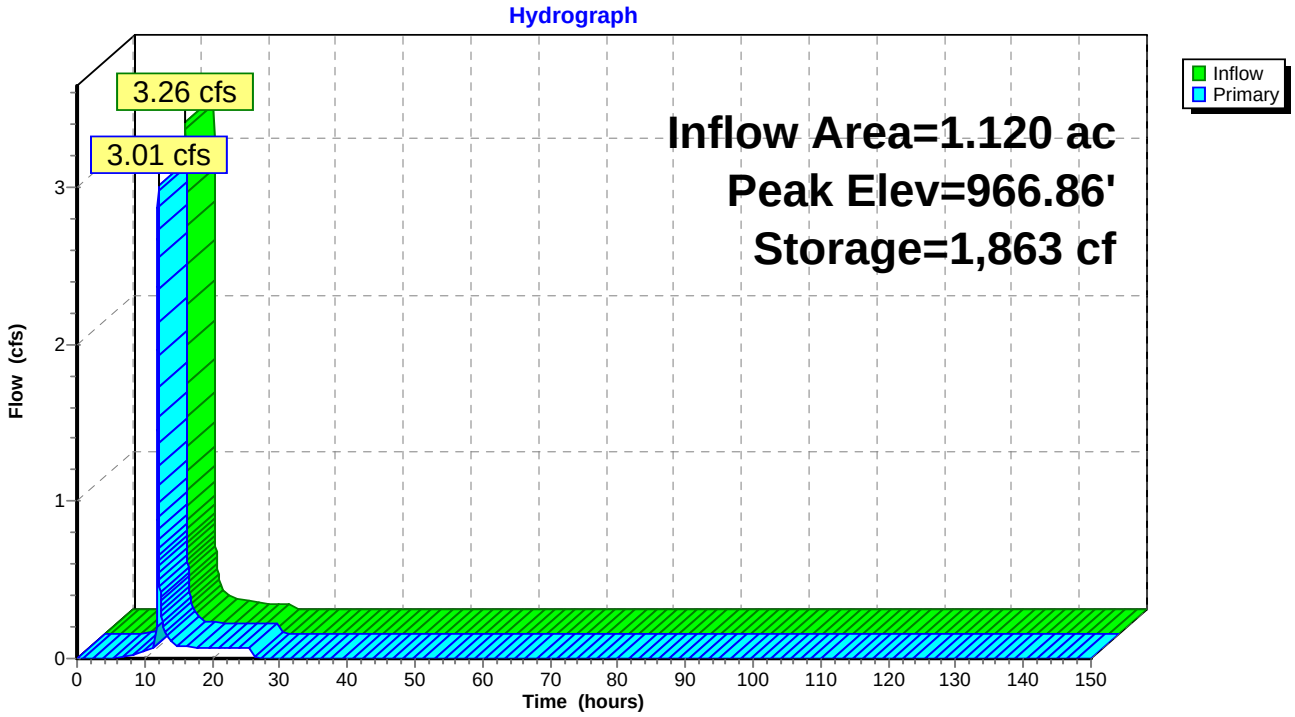
Volume	Invert	Avail.Storage	Storage Description
#1	966.25'	3,151 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.25	2,880	0	0
966.75	3,150	1,508	1,508
967.25	3,425	1,644	3,151

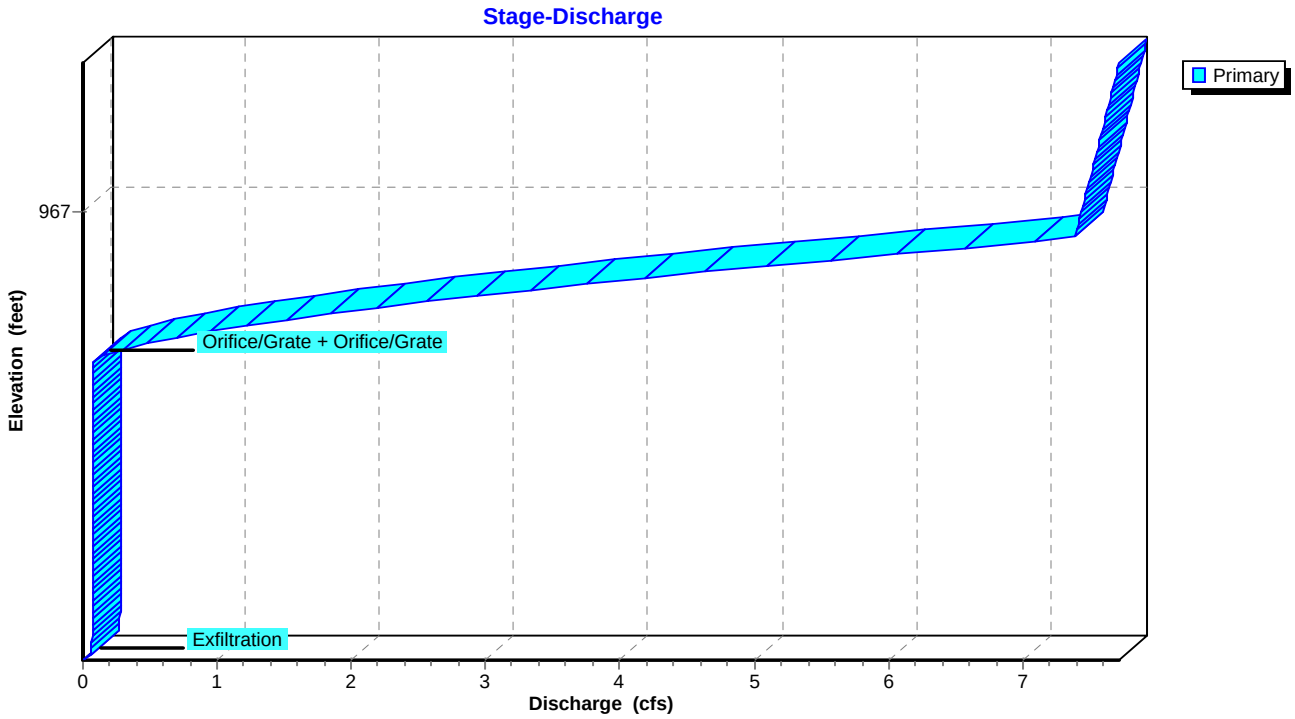
Device	Routing	Invert	Outlet Devices
#1	Primary	963.00'	**15.0" x 180.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.25'	**1.000 in/hr Exfiltration over Surface area**
#3	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=3.01 cfs @ 12.00 hrs HW=966.86' (Free Discharge)
└─**1=Culvert** (Passes 3.01 cfs of 7.28 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)
  ├─**3=Orifice/Grate** (Weir Controls 1.47 cfs @ 1.09 fps)
  └─**4=Orifice/Grate** (Weir Controls 1.47 cfs @ 1.09 fps)

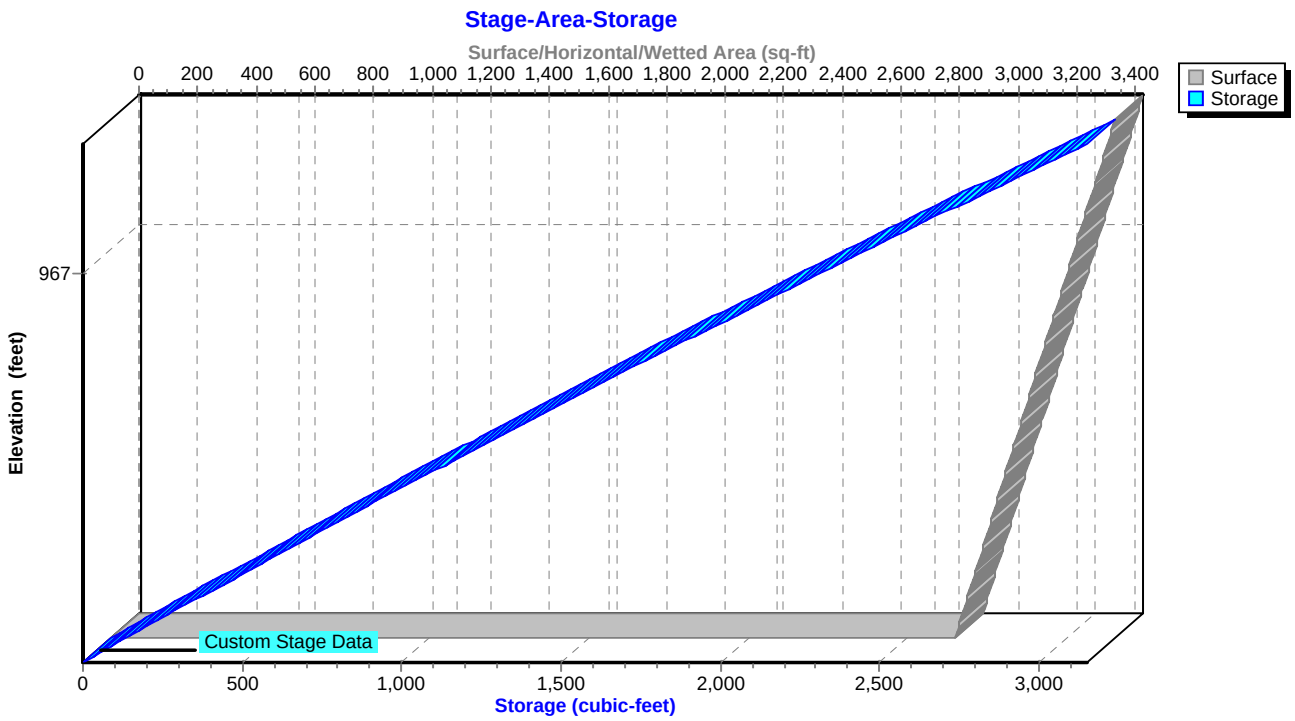
Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Summary for Pond 12P: Bioretention #2

Inflow Area = 0.420 ac, 23.80% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.00 cfs @ 17.34 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 17.76 hrs, Volume= 0.001 af, Atten= 0%, Lag= 25.1 min
Primary = 0.00 cfs @ 17.76 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 967.01' @ 17.76 hrs Surf.Area= 416 sf Storage= 2 cf

Plug-Flow detention time= 28.6 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 28.6 min (1,144.5 - 1,115.9)

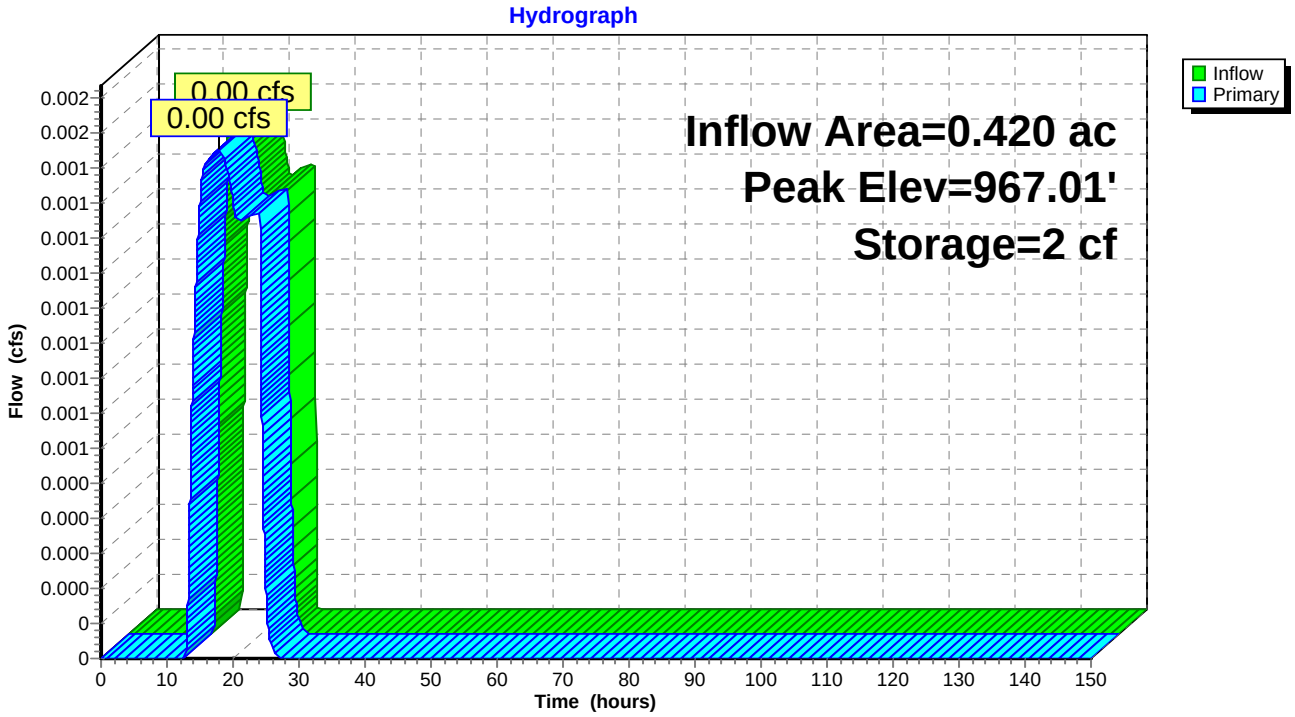
Volume	Invert	Avail.Storage	Storage Description
#1	967.00'	759 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.00	412	0	0
967.50	704	279	279
968.00	1,215	480	759

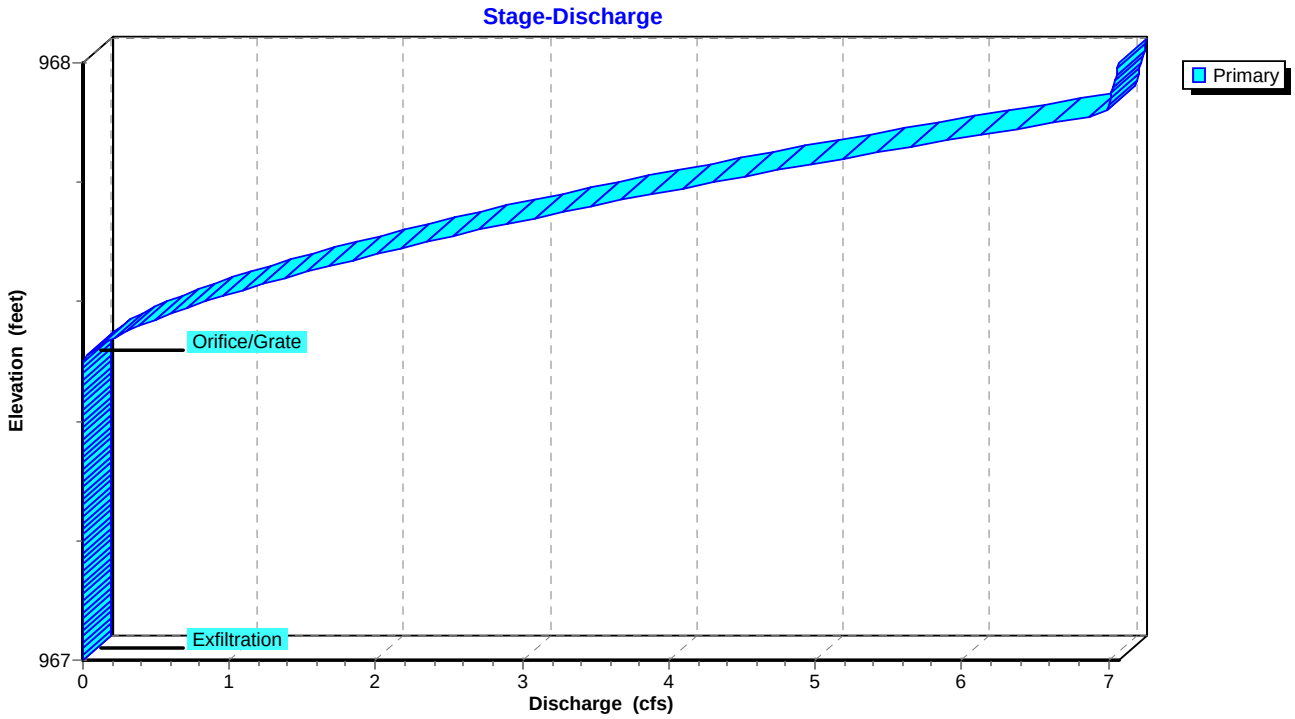
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	967.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.00 cfs @ 17.76 hrs HW=967.01' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 5.99 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

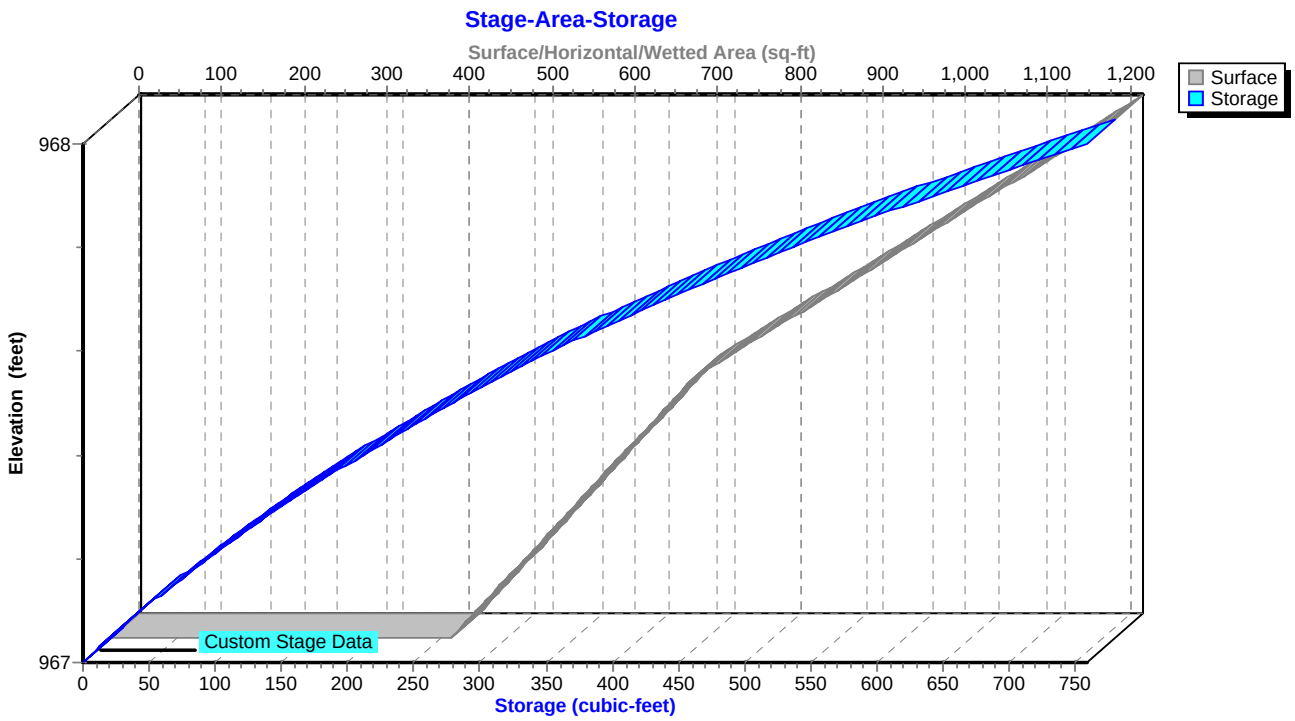
Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Summary for Pond 14P: Detention Pond

[79] Warning: Submerged Pond 10P Primary device # 1 INLET by 1.00'
[79] Warning: Submerged Pond 12P Primary device # 1 OUTLET by 1.00'
[79] Warning: Submerged Pond 17P Primary device # 1 OUTLET by 1.00'
[79] Warning: Submerged Pond 21P Primary device # 1 by 1.50'
[79] Warning: Submerged Pond 24P Primary device # 1 OUTLET by 1.00'

Inflow Area =	2.905 ac,	49.41% Impervious,	Inflow Depth =	1.21"	for 2-Year event
Inflow =	4.27 cfs @	12.00 hrs,	Volume=	0.293 af	
Outflow =	0.28 cfs @	13.33 hrs,	Volume=	0.293 af,	Atten= 94%, Lag= 79.8 min
Primary =	0.28 cfs @	13.33 hrs,	Volume=	0.293 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 964.00' @ 13.33 hrs Surf.Area= 4,244 sf Storage= 4,643 cf

Plug-Flow detention time= 204.3 min calculated for 0.293 af (100% of inflow)
Center-of-Mass det. time= 204.2 min (1,185.1 - 980.9)

Volume	Invert	Avail.Storage	Storage Description
#1	962.50'	19,563 cf	**Det. Pond #1 (Prismatic)**Listed below (Recalc)
#2	962.50'	3,380 cf	**Det. Pond #2 (Prismatic)**Listed below (Recalc)
		22,944 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	1,777	0	0
963.00	2,312	1,022	1,022
964.00	3,424	2,868	3,890
965.00	4,593	4,009	7,899
966.00	5,818	5,206	13,104
967.00	7,100	6,459	19,563

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	182	0	0
963.00	379	140	140
964.00	814	597	737
965.00	1,309	1,062	1,798
966.00	1,855	1,582	3,380

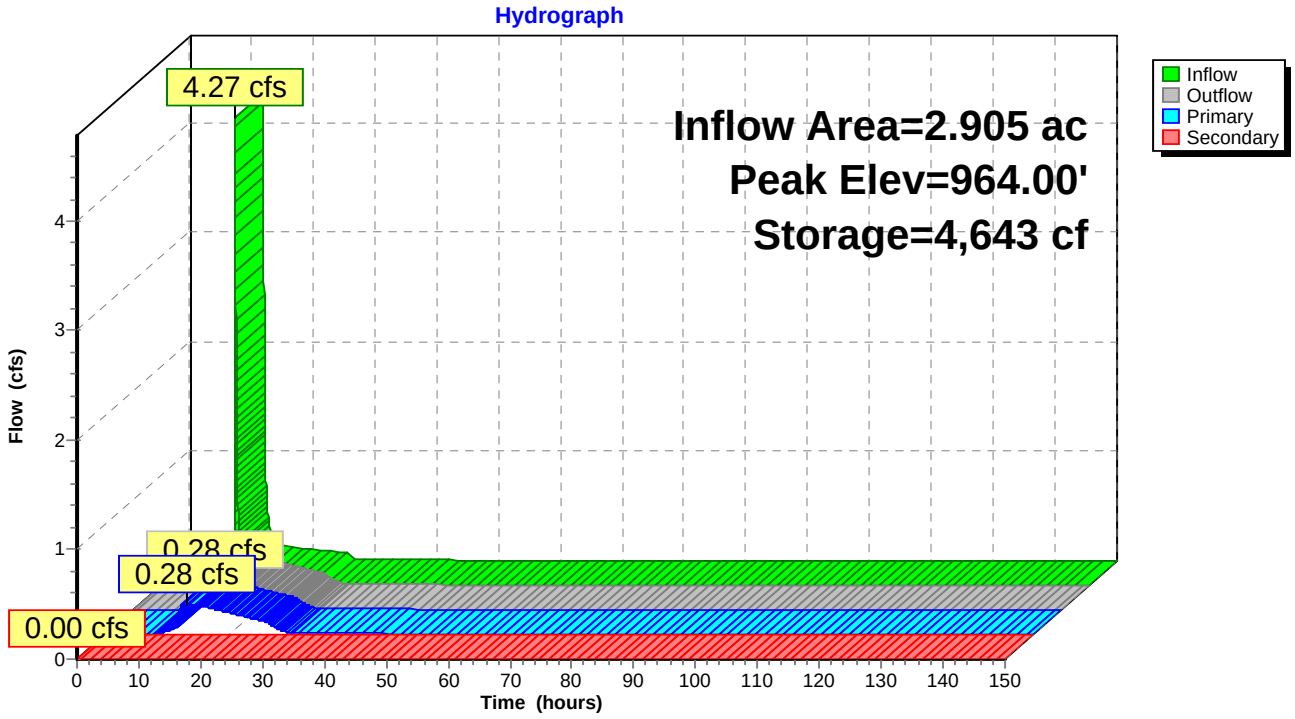
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	962.50'	**3.0" Vert. Low-Flow Orifice** C= 0.600
#3	Device 1	964.40'	**3.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#4	Device 1	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600
#5	Secondary	963.00'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0100 '/' Cc= 0.900

			n= 0.013 Corrugated PE, smooth interior
#6	Device 5	964.40'	**2.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#7	Device 5	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600

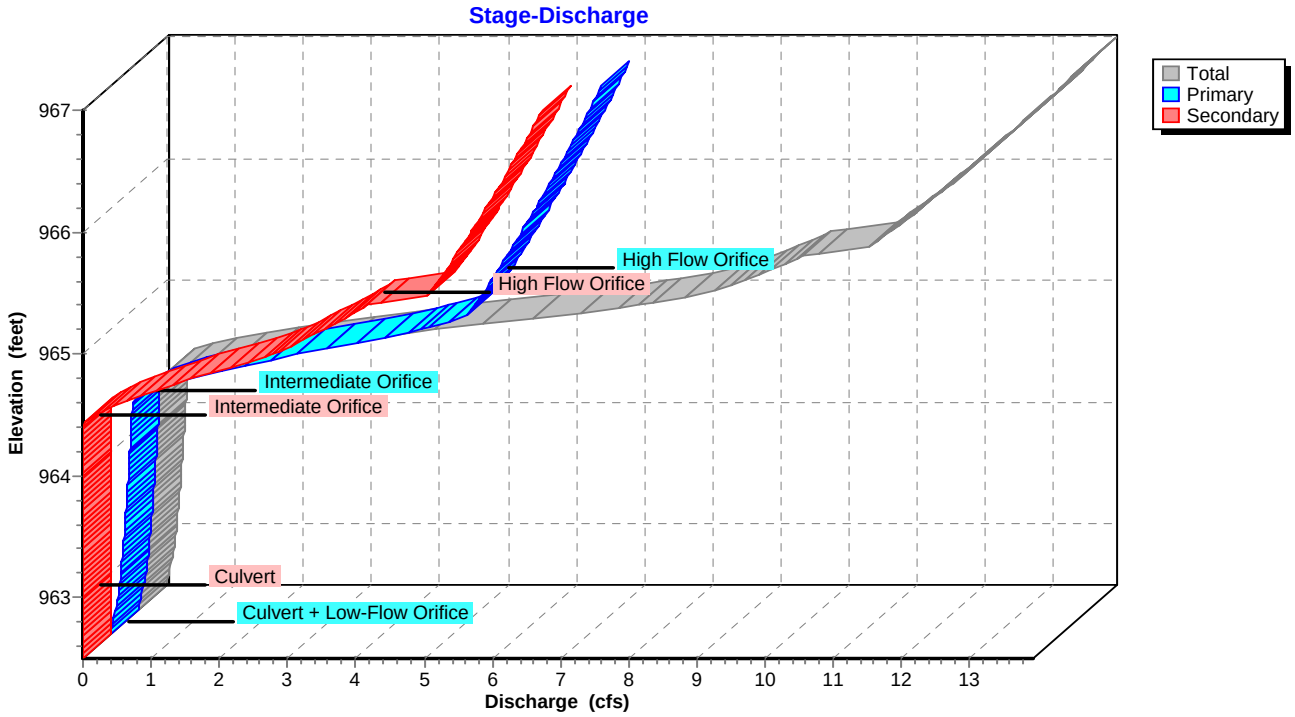
Primary OutFlow Max=0.28 cfs @ 13.33 hrs HW=964.00' (Free Discharge)
- **1=Culvert** (Passes 0.28 cfs of 3.60 cfs potential flow)
  - **2=Low-Flow Orifice** (Orifice Controls 0.28 cfs @ 5.65 fps)
  - **3=Intermediate Orifice** (Controls 0.00 cfs)
  - **4=High Flow Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=962.50' (Free Discharge)
- **5=Culvert** (Controls 0.00 cfs)
  - **6=Intermediate Orifice** (Controls 0.00 cfs)
  - **7=High Flow Orifice** (Controls 0.00 cfs)

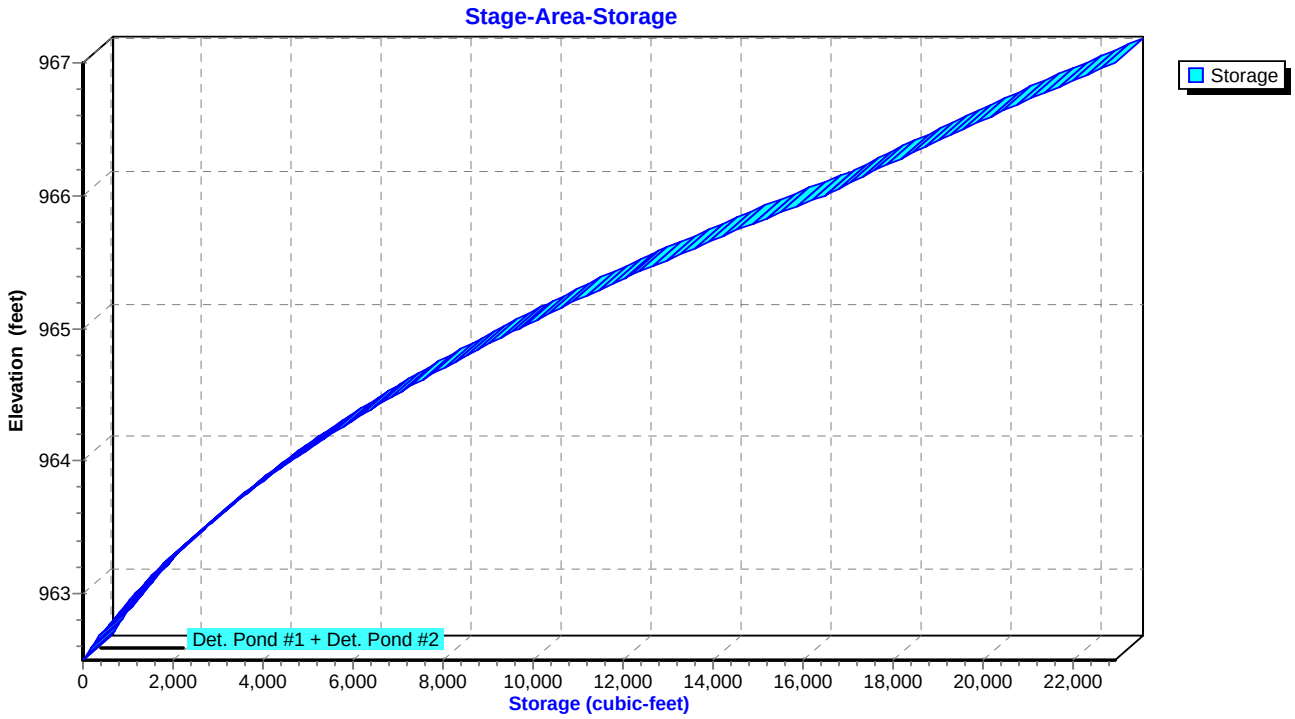
Pond 14P: Detention Pond



Pond 14P: Detention Pond



Pond 14P: Detention Pond



Summary for Pond 17P: Bioretention #3A

Inflow Area = 0.305 ac, 77.05% Impervious, Inflow Depth = 1.72" for 2-Year event
Inflow = 0.61 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.60 cfs @ 12.11 hrs, Volume= 0.044 af, Atten= 1%, Lag= 1.3 min
Primary = 0.60 cfs @ 12.11 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.58' @ 12.11 hrs Surf.Area= 844 sf Storage= 369 cf

Plug-Flow detention time= 237.1 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 237.2 min (1,042.6 - 805.4)

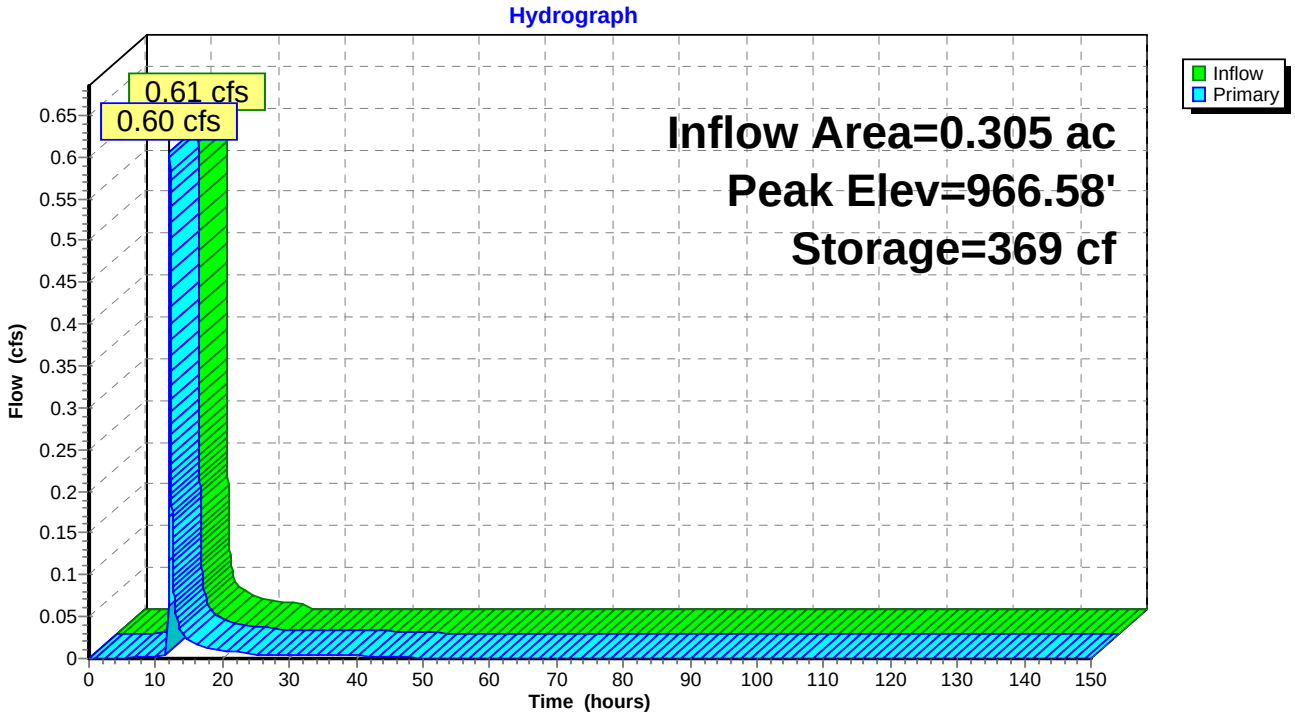
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	819 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	462	0	0
966.50	756	305	305
967.00	1,300	514	819

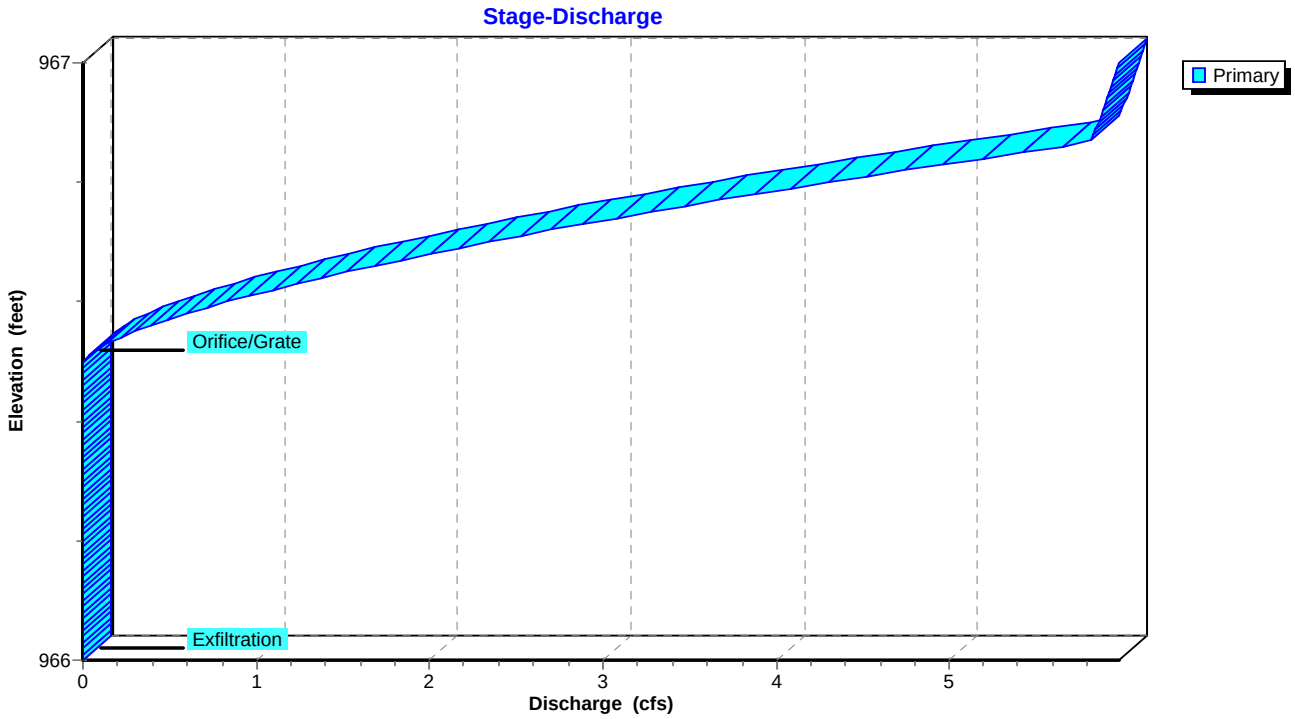
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.60 cfs @ 12.11 hrs HW=966.58' (Free Discharge)
└─**1=Culvert** (Passes 0.60 cfs of 5.45 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.60 cfs @ 0.93 fps)

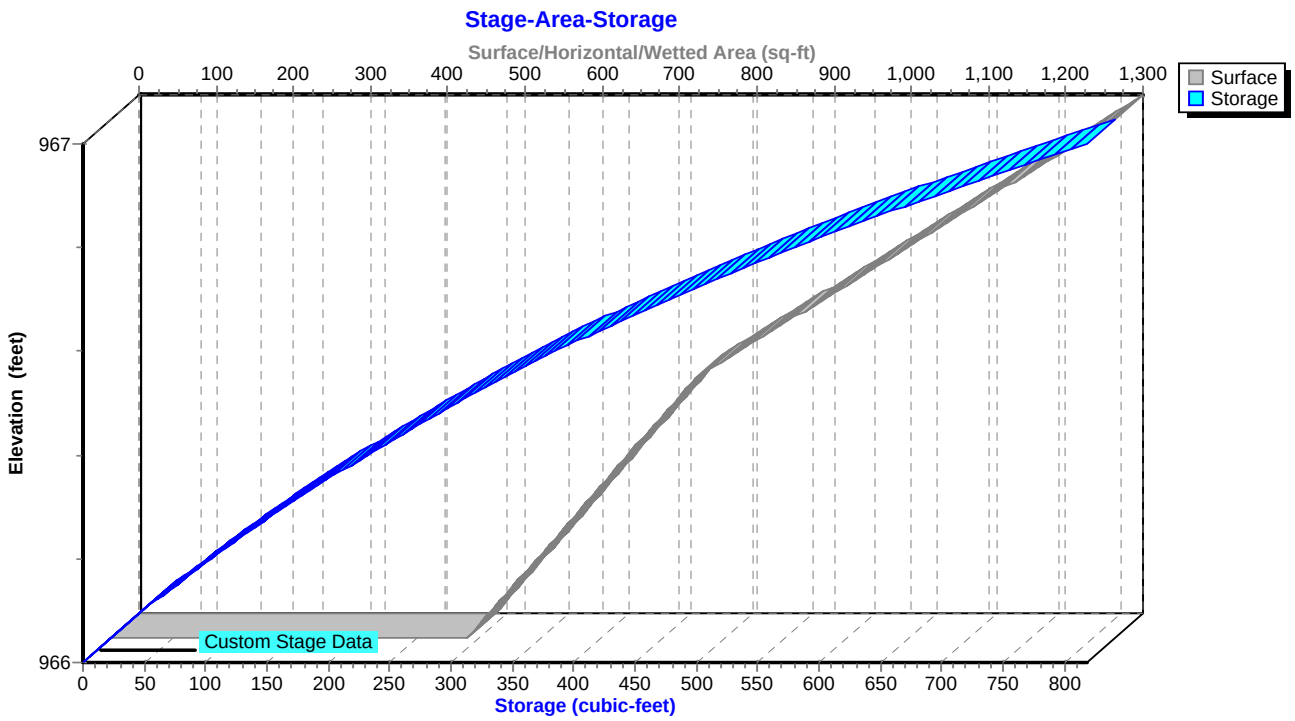
Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Summary for Pond 21P: Bioretention #4

Inflow Area = 0.598 ac, 10.87% Impervious, Inflow Depth = 0.88" for 2-Year event
Inflow = 0.70 cfs @ 12.07 hrs, Volume= 0.044 af
Outflow = 0.62 cfs @ 12.12 hrs, Volume= 0.044 af, Atten= 12%, Lag= 3.2 min
Primary = 0.62 cfs @ 12.12 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.58' @ 12.12 hrs Surf.Area= 1,030 sf Storage= 443 cf

Plug-Flow detention time= 267.8 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 267.9 min (1,124.4 - 856.4)

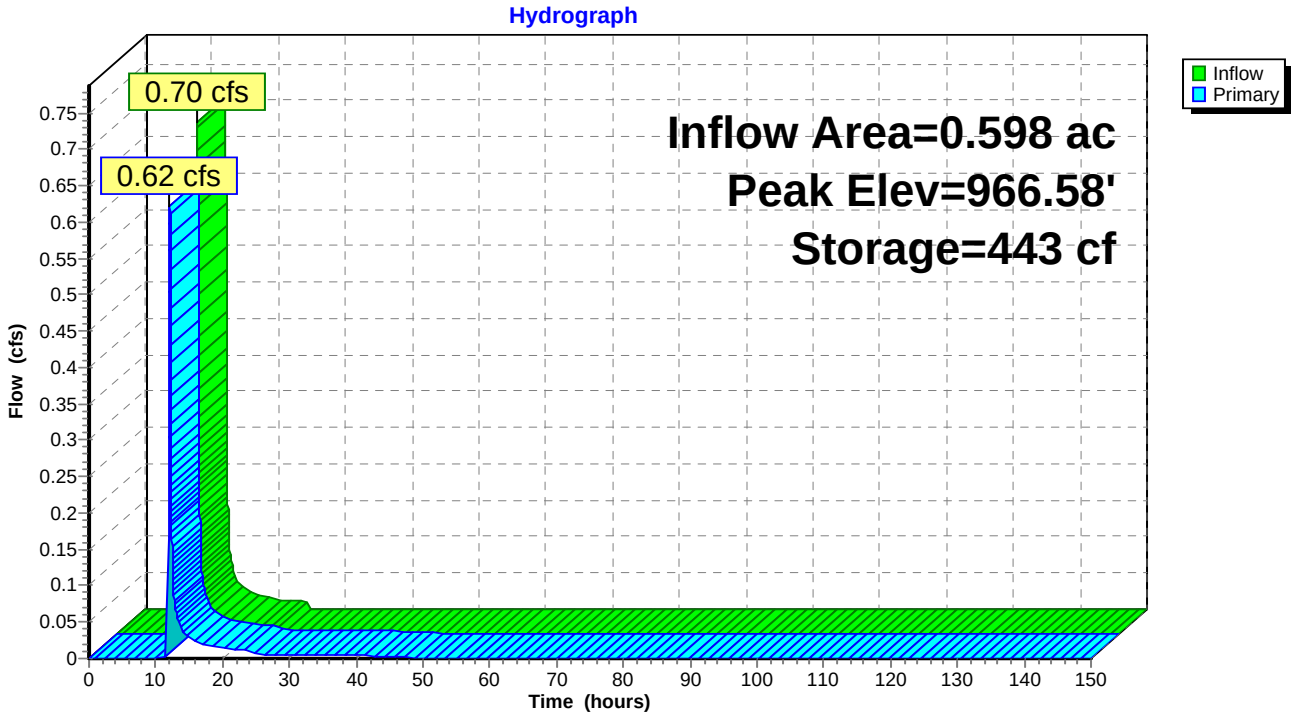
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	519	0	0
966.50	933	363	363
967.00	1,523	614	977

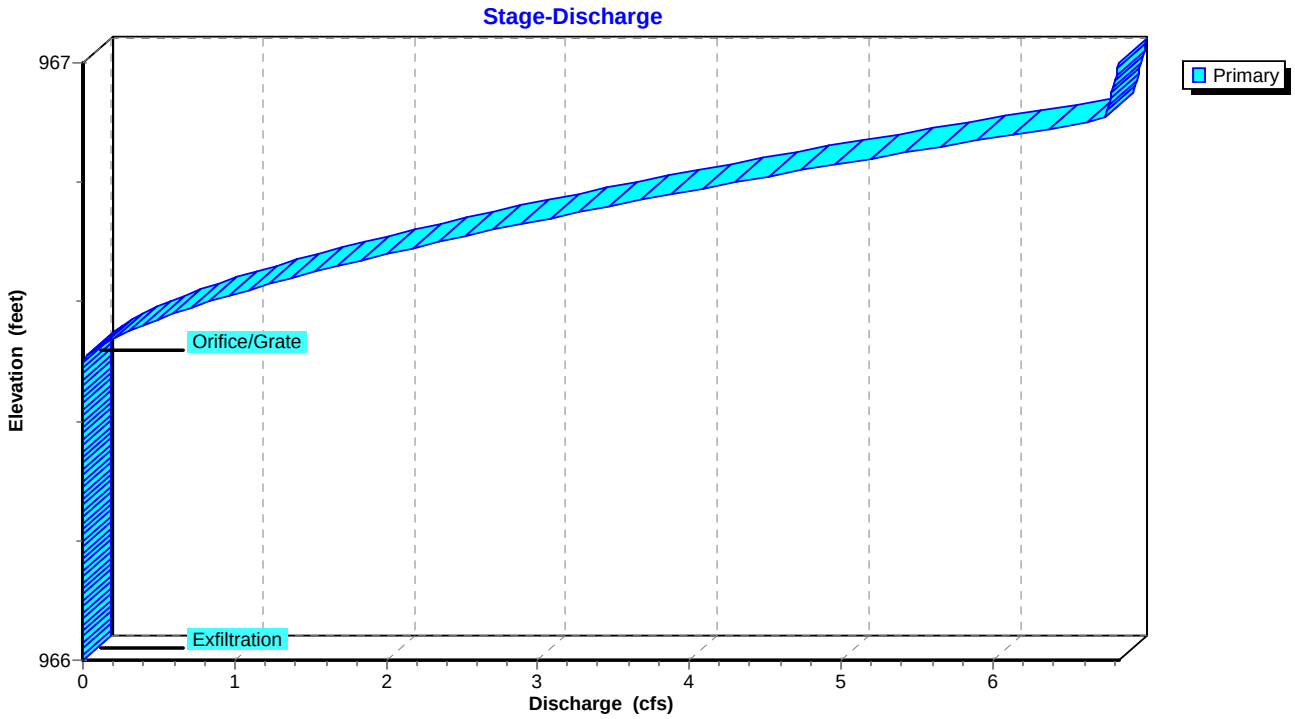
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 47.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.62 cfs @ 12.12 hrs HW=966.58' (Free Discharge)
└─**1=Culvert** (Passes 0.62 cfs of 6.41 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.61 cfs @ 0.94 fps)

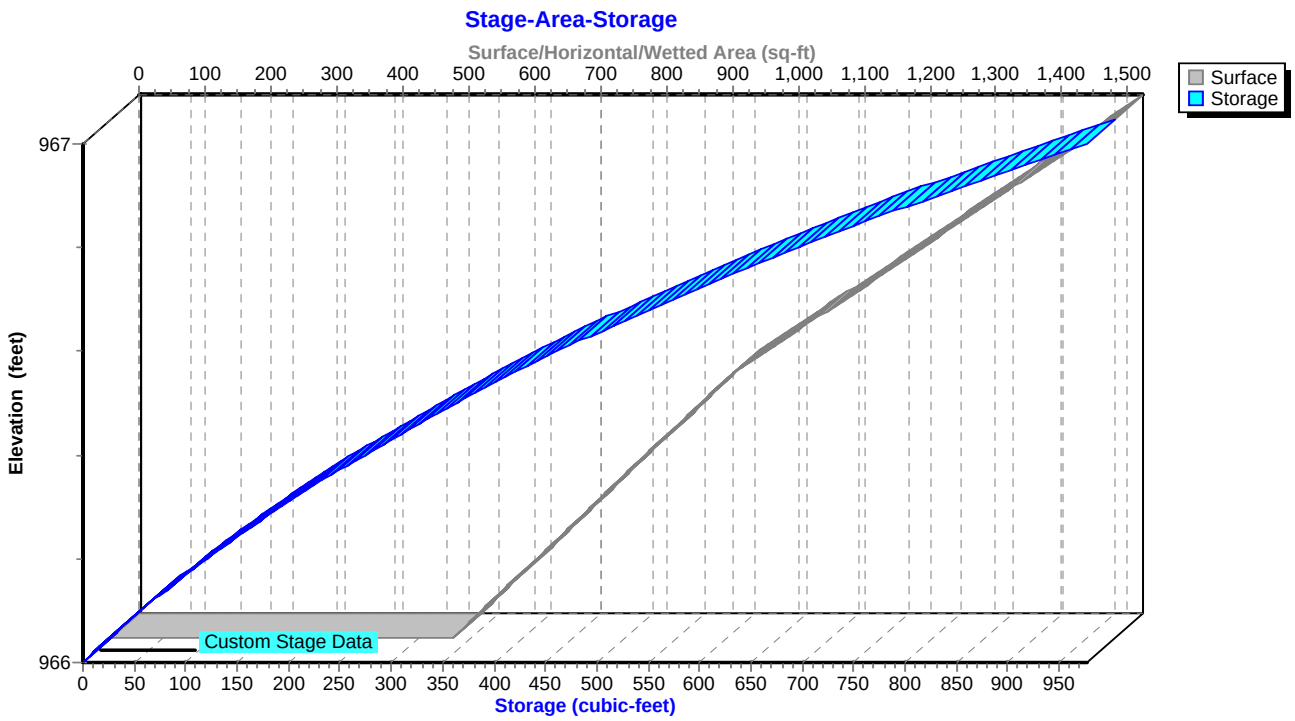
Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Summary for Pond 24P: Bioretention #3B

Inflow Area = 0.081 ac, 64.20% Impervious, Inflow Depth = 1.55" for 2-Year event
Inflow = 0.22 cfs @ 11.97 hrs, Volume= 0.010 af
Outflow = 0.18 cfs @ 12.02 hrs, Volume= 0.010 af, Atten= 18%, Lag= 2.9 min
Primary = 0.18 cfs @ 12.02 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 968.44' @ 12.02 hrs Surf.Area= 363 sf Storage= 172 cf

Plug-Flow detention time= 520.8 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 520.9 min (1,327.4 - 806.5)

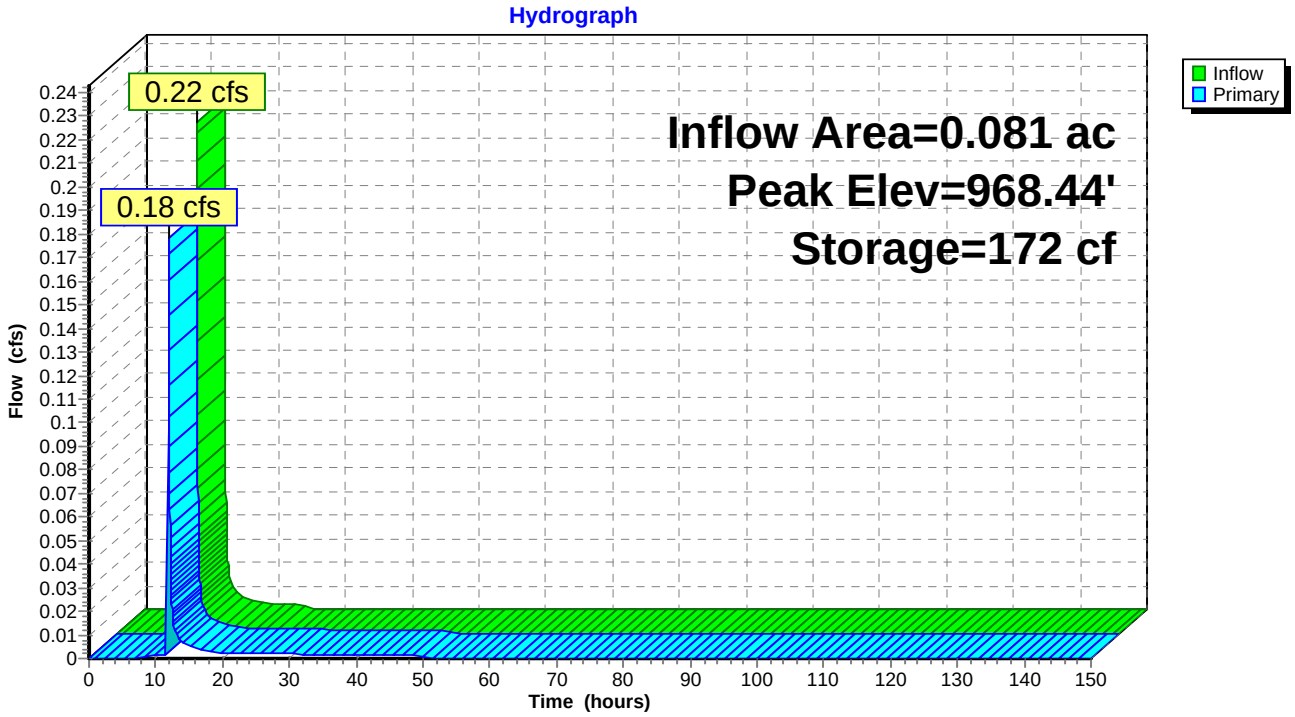
Volume	Invert	Avail.Storage	Storage Description
#1	967.85'	235 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.85	229	0	0
968.10	283	64	64
968.60	402	171	235

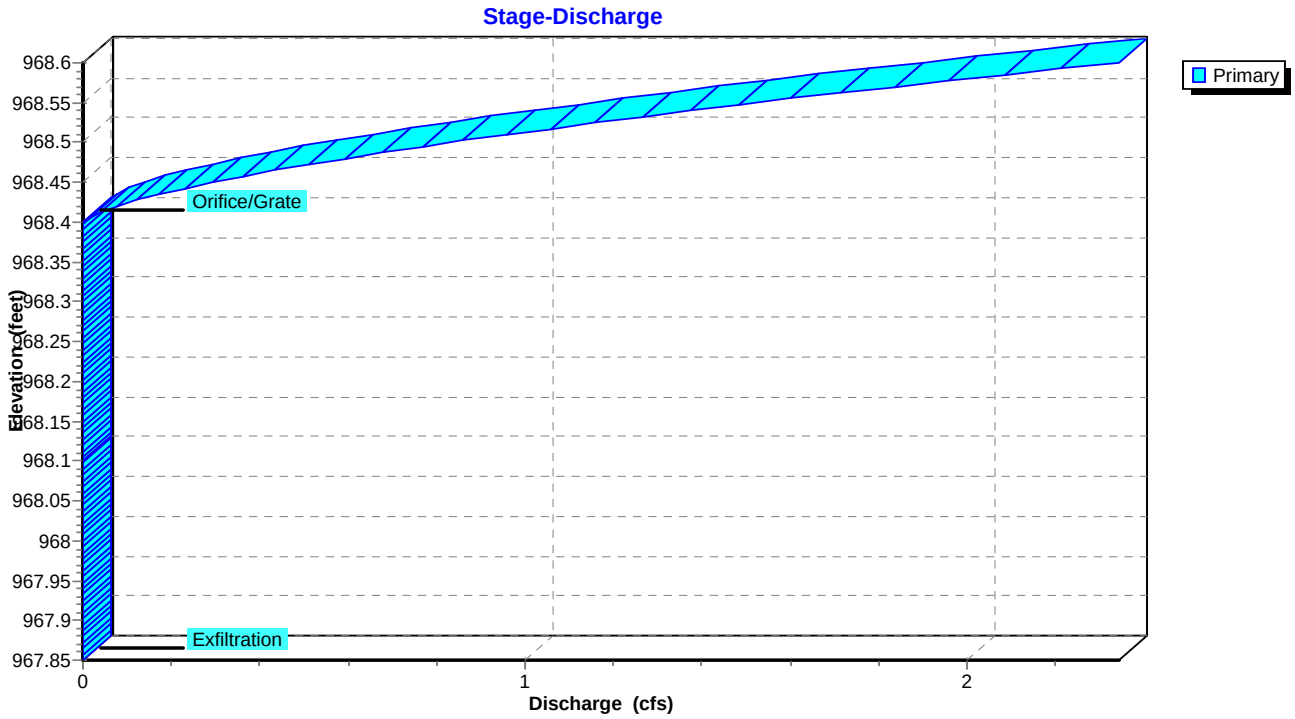
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.85'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	968.40'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.18 cfs @ 12.02 hrs HW=968.44' (Free Discharge)
└─**1=Culvert** (Passes 0.18 cfs of 7.50 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.18 cfs @ 0.62 fps)

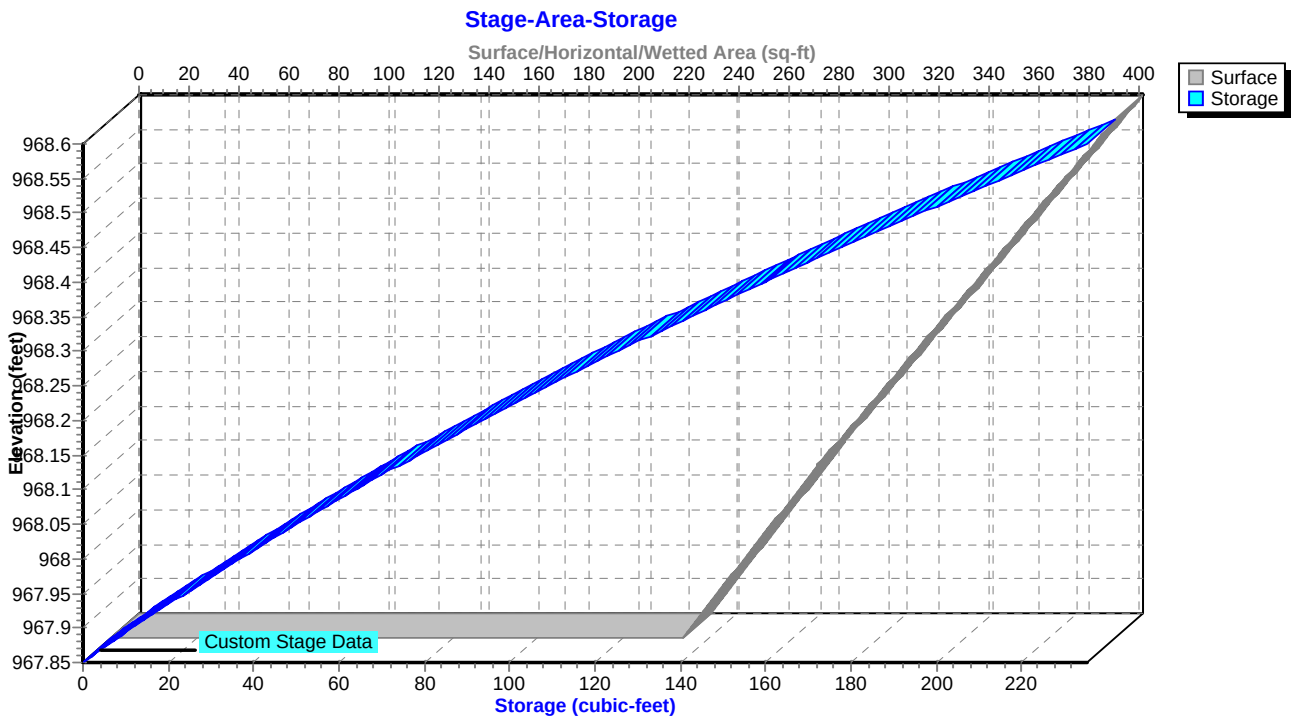
Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B

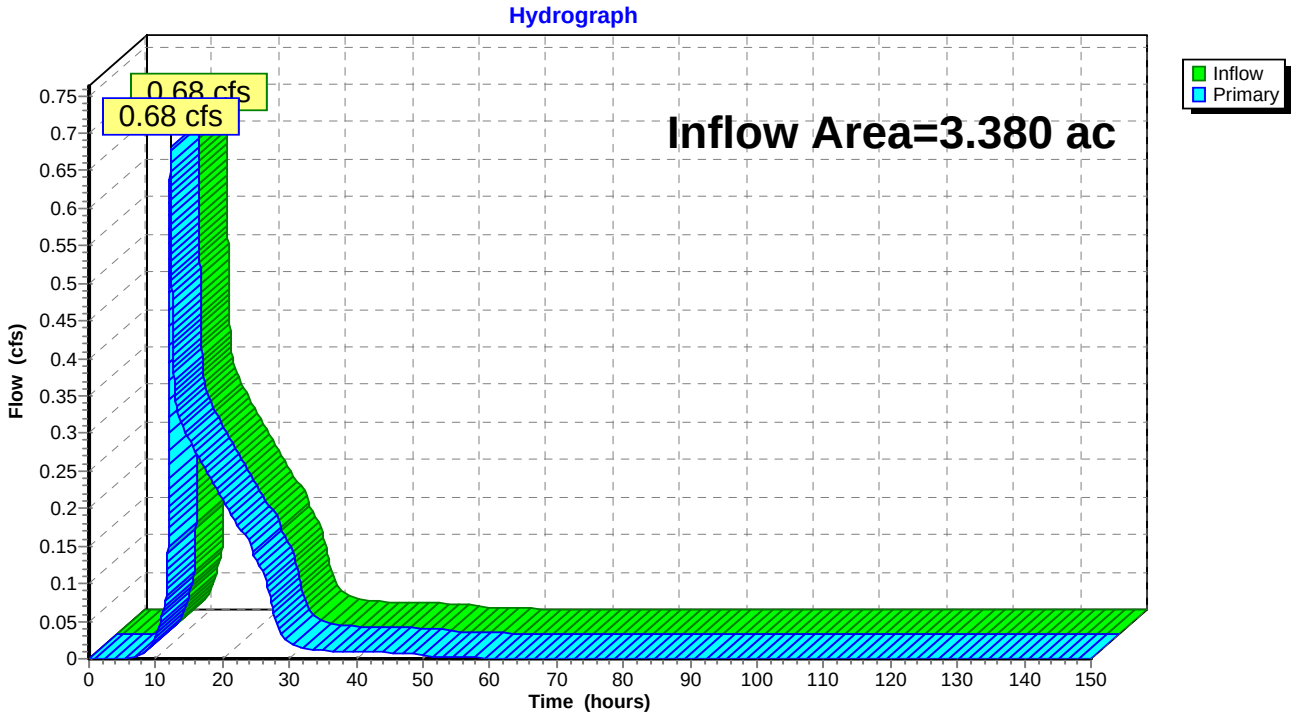


Summary for Link 26L: Analysis Point #1

Inflow Area = 3.380 ac, 44.84% Impervious, Inflow Depth = 1.17" for 2-Year event
Inflow = 0.68 cfs @ 12.19 hrs, Volume= 0.330 af
Primary = 0.68 cfs @ 12.19 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs

Link 26L: Analysis Point #1



Summary for Subcatchment 11S: PR Area 1

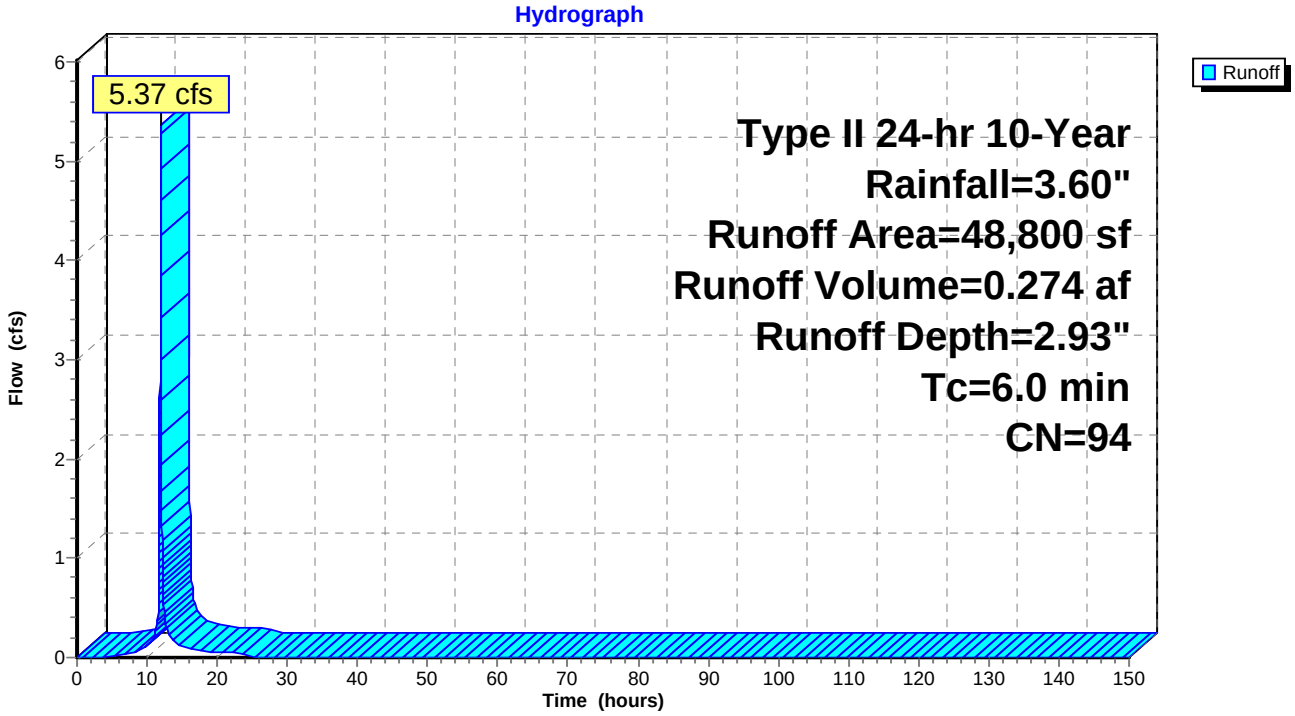
Runoff = 5.37 cfs @ 11.97 hrs, Volume= 0.274 af, Depth= 2.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (sf)	CN	Description
38,651	98	Paved parking & roofs
10,149	80	>75% Grass cover, Good, HSG D
48,800	94	Weighted Average
10,149		Pervious Area
38,651		Impervious Area

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

Subcatchment 11S: PR Area 1



Summary for Subcatchment 13S: PR Area 2

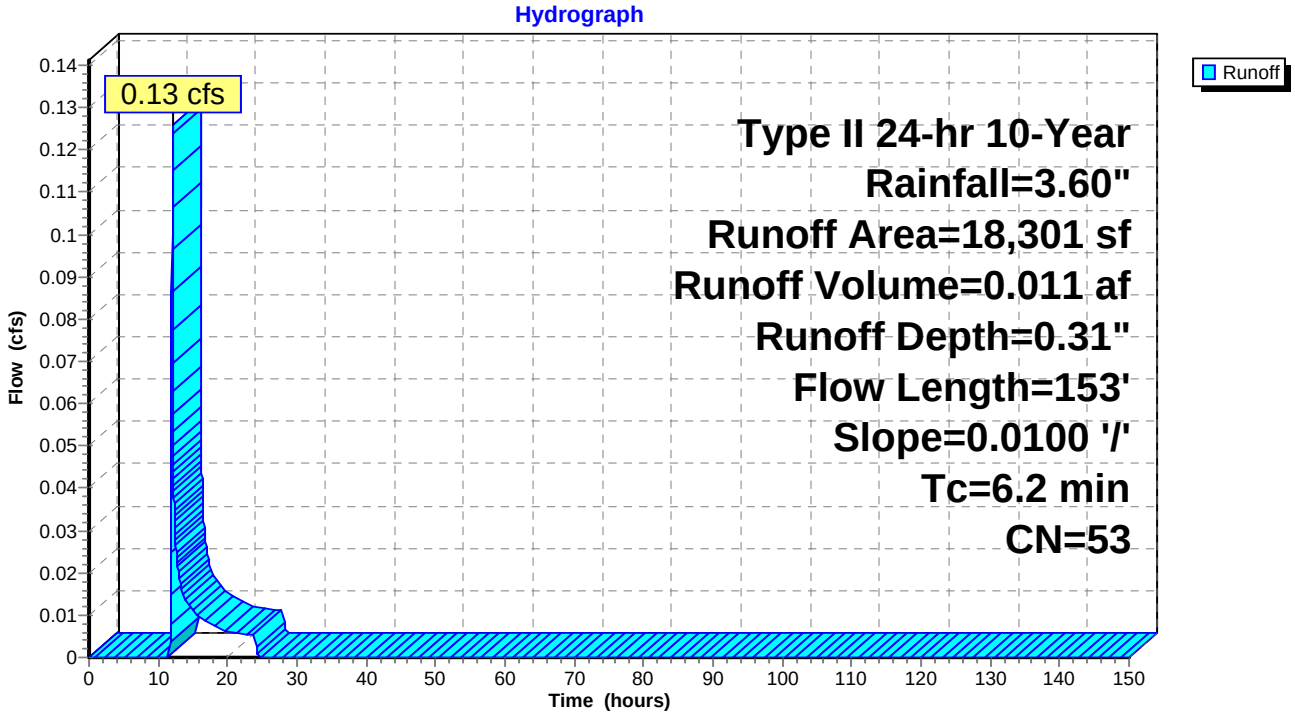
Runoff = 0.13 cfs @ 12.02 hrs, Volume= 0.011 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
13,945	39	>75% Grass cover, Good, HSG A
18,301	53	Weighted Average
13,945		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	18	0.0100	0.05		**Sheet Flow, Sheet - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.6	135	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
6.2	153	Total			

Subcatchment 13S: PR Area 2



Summary for Subcatchment 16S: PR Area 3A

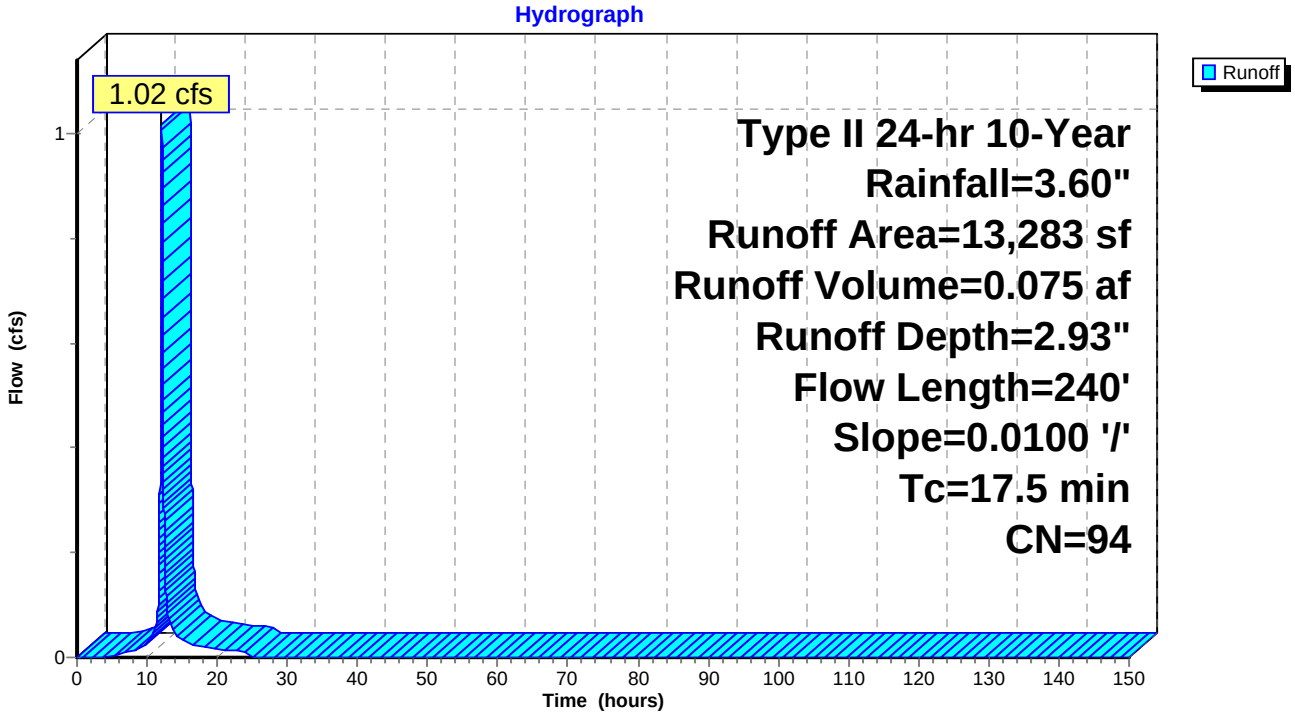
Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 2.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (sf)	CN	Description
10,234	98	Paved parking & roofs
3,049	80	>75% Grass cover, Good, HSG D
13,283	94	Weighted Average
3,049		Pervious Area
10,234		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	70	0.0100	0.07		**Sheet Flow, Sheet - grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	170	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
17.5	240	Total			

Subcatchment 16S: PR Area 3A



Summary for Subcatchment 19S: PR Area 5

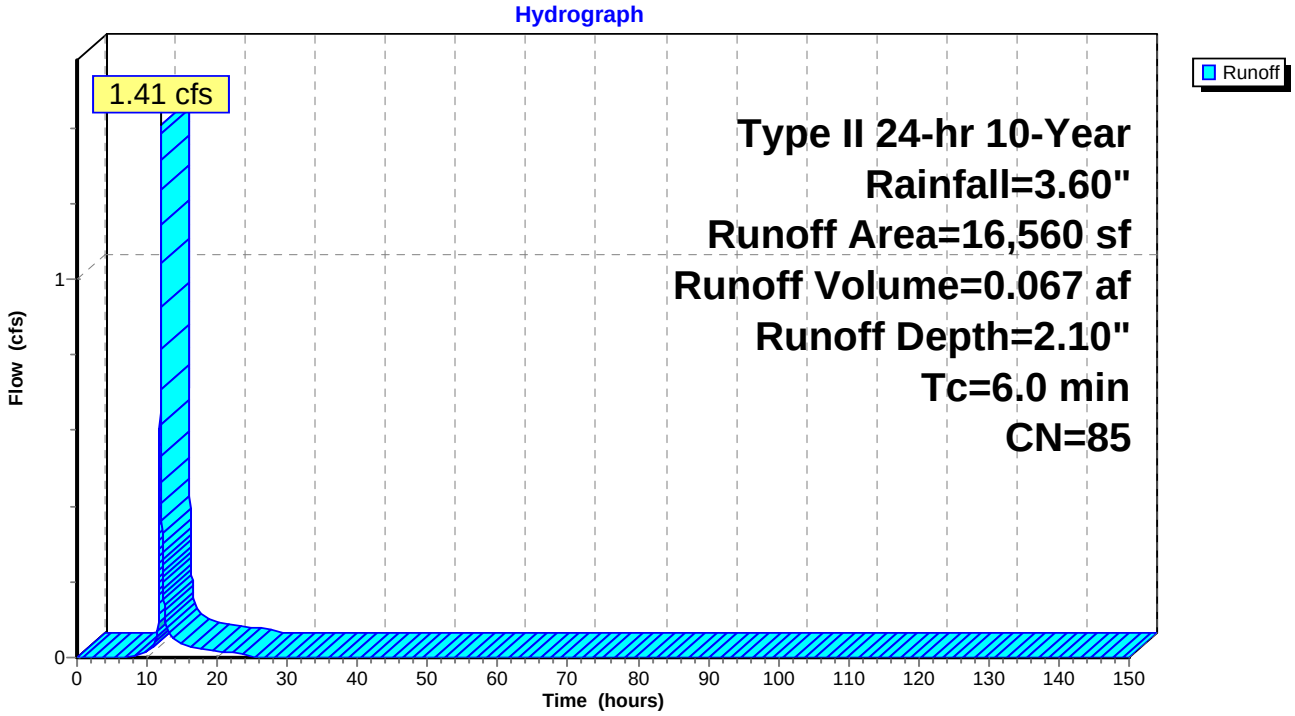
Runoff = 1.41 cfs @ 11.97 hrs, Volume= 0.067 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (sf)	CN	Description
4,180	98	Paved parking & roofs
12,380	80	>75% Grass cover, Good, HSG D
16,560	85	Weighted Average
12,380		Pervious Area
4,180		Impervious Area

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

Subcatchment 19S: PR Area 5



Summary for Subcatchment 22S: PR Area #4

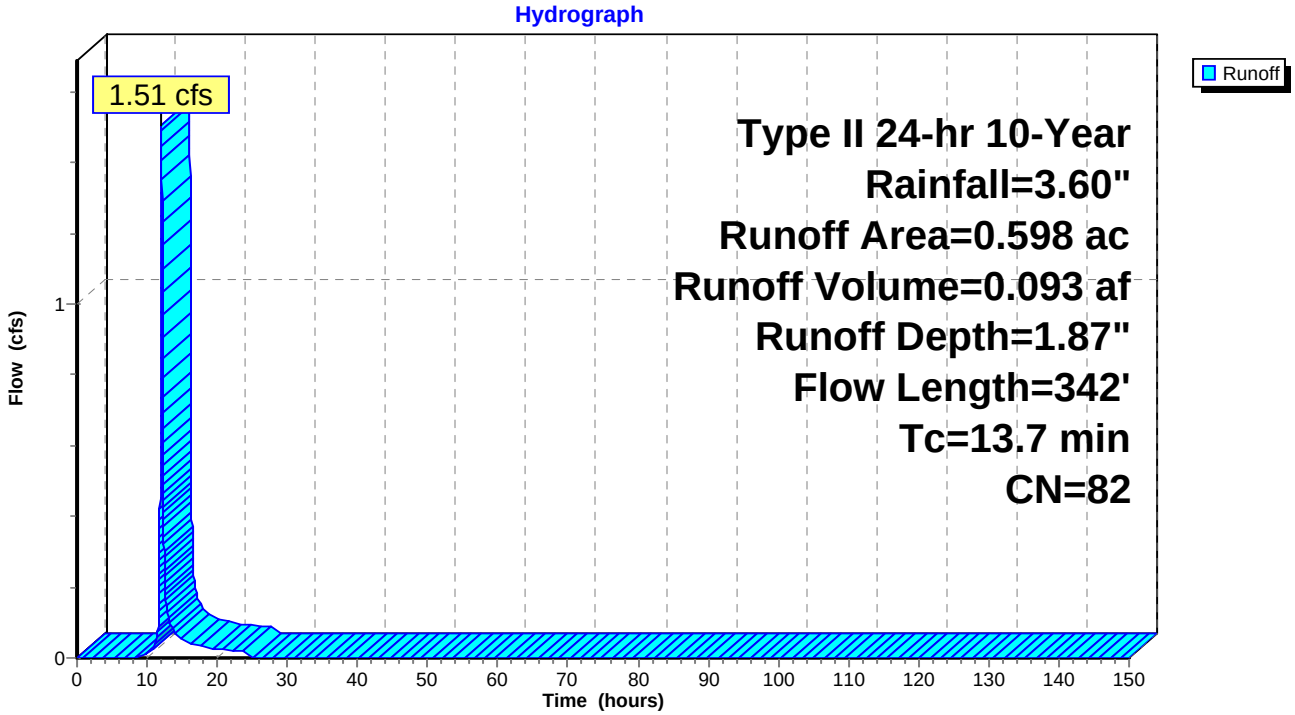
Runoff = 1.51 cfs @ 12.06 hrs, Volume= 0.093 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (ac)	CN	Description
0.212	79	Woods, Fair, HSG D
0.065	98	Paved parking & roofs
0.321	80	>75% Grass cover, Good, HSG D
0.598	82	Weighted Average
0.533		Pervious Area
0.065		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	69	0.0570	0.09		**Sheet Flow, Sheet Flow - Woods/Brush** Woods: Light underbrush n= 0.400 P2= 2.30"
1.3	273	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
13.7	342	Total			

Subcatchment 22S: PR Area #4



Summary for Subcatchment 23S: PR Area 6

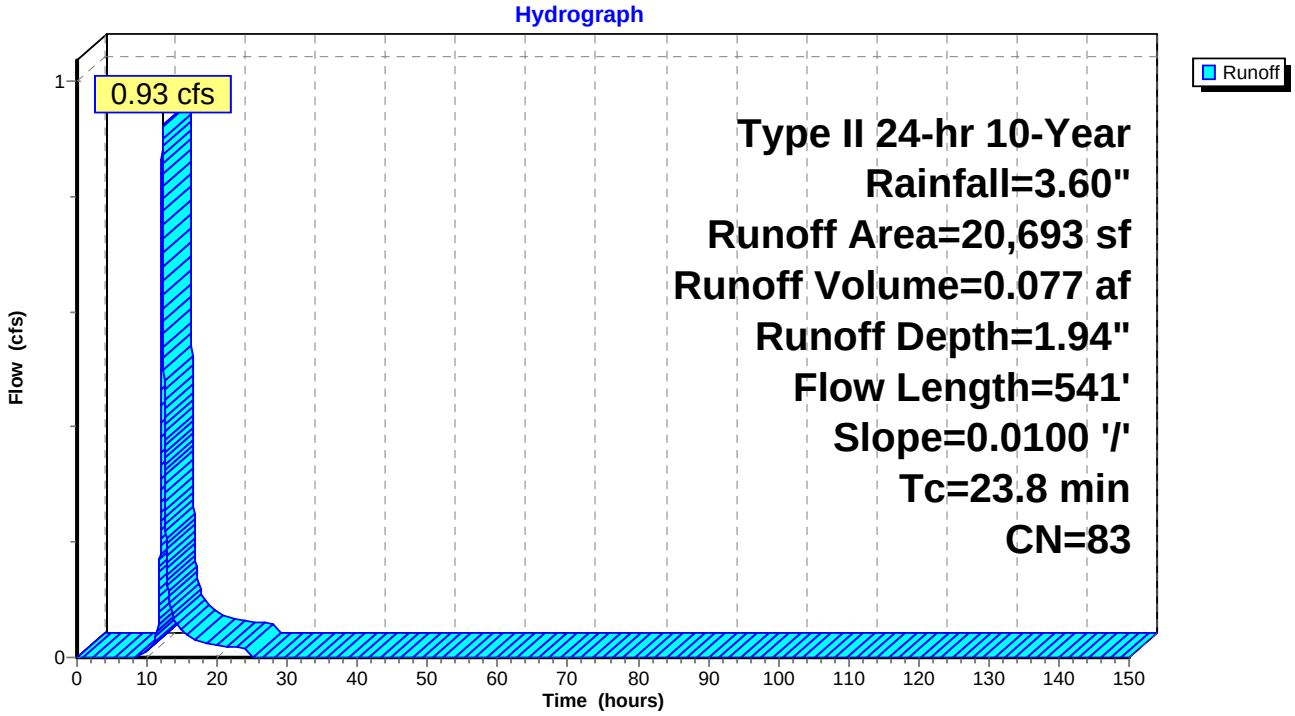
Runoff = 0.93 cfs @ 12.17 hrs, Volume= 0.077 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (sf)	CN	Description
3,500	98	Paved parking & roofs
17,193	80	>75% Grass cover, Good, HSG D
20,693	83	Weighted Average
17,193		Pervious Area
3,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	100	0.0100	0.08		**Sheet Flow, Sheet Flow - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	78	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc. - Grass** Unpaved Kv= 16.1 fps
0.8	363	0.0100	7.76	124.12	**Channel Flow, Roadside Ditch** Area= 16.0 sf Perim= 13.0' r= 1.23' n= 0.022 Earth, clean & straight
23.8	541	Total			

Subcatchment 23S: PR Area 6



Summary for Subcatchment 25S: PR Area 3B

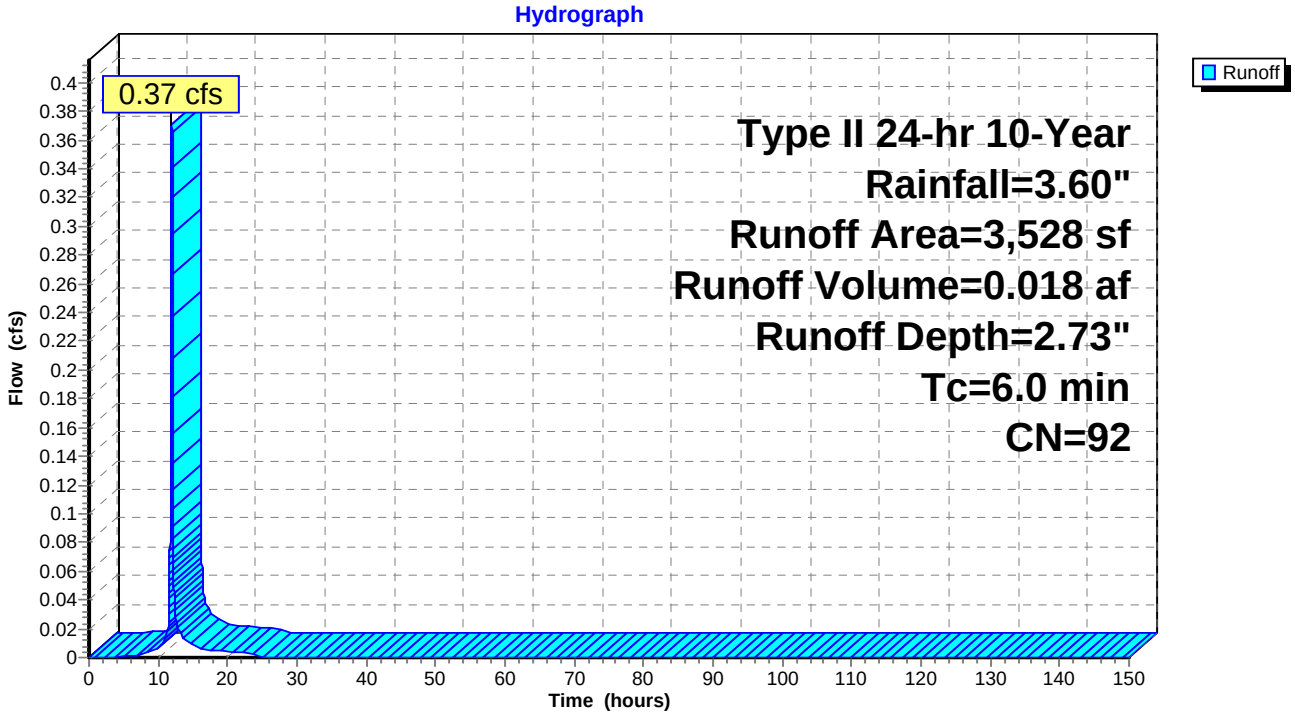
Runoff = 0.37 cfs @ 11.97 hrs, Volume= 0.018 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.60"

Area (sf)	CN	Description
2,265	98	Paved parking & roofs
1,263	80	>75% Grass cover, Good, HSG D
3,528	92	Weighted Average
1,263		Pervious Area
2,265		Impervious Area

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

Subcatchment 25S: PR Area 3B



Summary for Pond 10P: Bioretention #1

Inflow Area = 1.120 ac, 79.20% Impervious, Inflow Depth = 2.93" for 10-Year event
Inflow = 5.37 cfs @ 11.97 hrs, Volume= 0.274 af
Outflow = 5.24 cfs @ 11.99 hrs, Volume= 0.274 af, Atten= 2%, Lag= 1.0 min
Primary = 5.24 cfs @ 11.99 hrs, Volume= 0.274 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.91' @ 11.99 hrs Surf.Area= 3,240 sf Storage= 2,028 cf

Plug-Flow detention time= 106.0 min calculated for 0.274 af (100% of inflow)
Center-of-Mass det. time= 106.0 min (886.0 - 780.0)

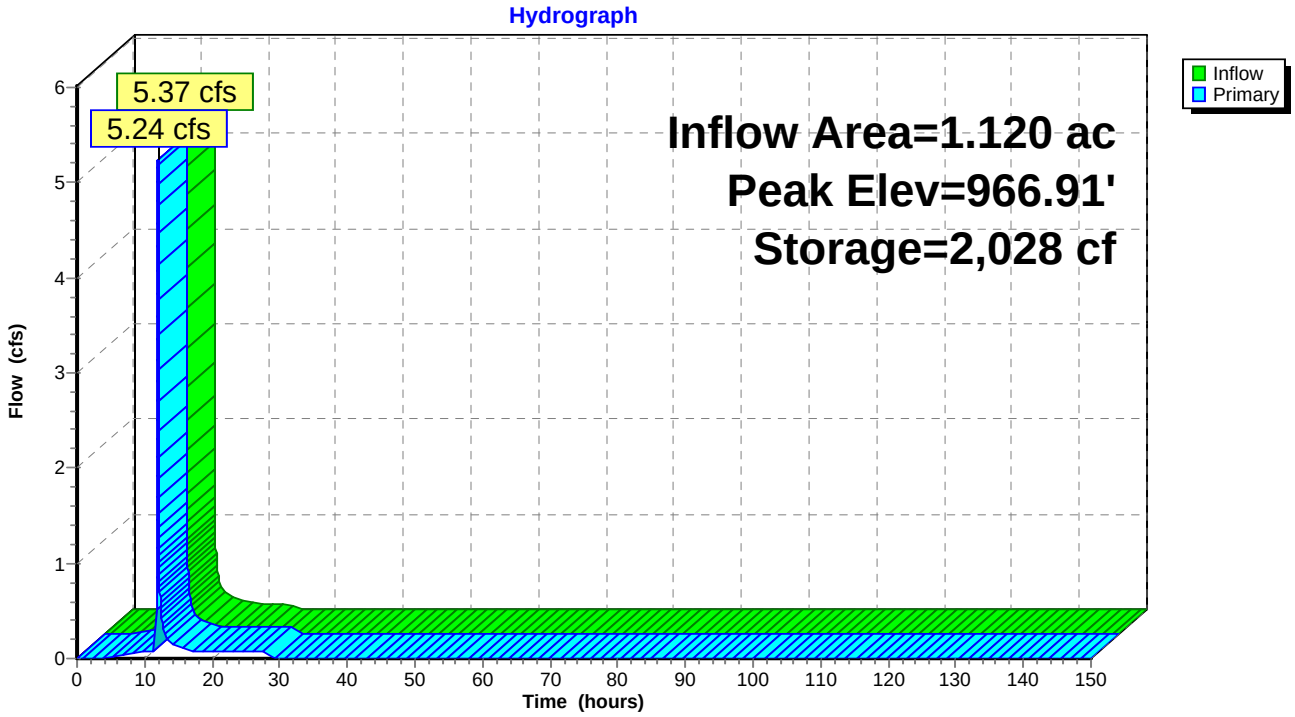
Volume	Invert	Avail.Storage	Storage Description
#1	966.25'	3,151 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.25	2,880	0	0
966.75	3,150	1,508	1,508
967.25	3,425	1,644	3,151

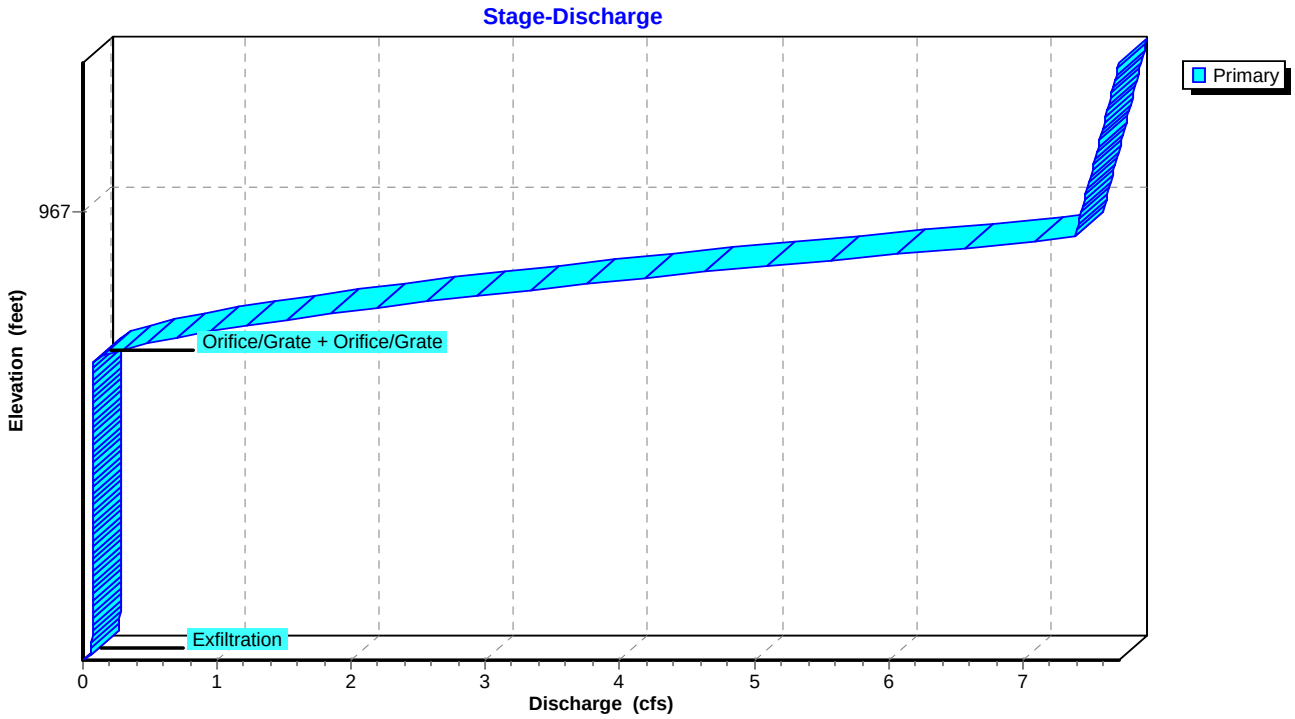
Device	Routing	Invert	Outlet Devices
#1	Primary	963.00'	**15.0" x 180.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.25'	**1.000 in/hr Exfiltration over Surface area**
#3	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=5.23 cfs @ 11.99 hrs HW=966.91' (Free Discharge)
└─**1=Culvert** (Passes 5.23 cfs of 7.34 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.07 cfs)
  ├─**3=Orifice/Grate** (Weir Controls 2.58 cfs @ 1.32 fps)
  └─**4=Orifice/Grate** (Weir Controls 2.58 cfs @ 1.32 fps)

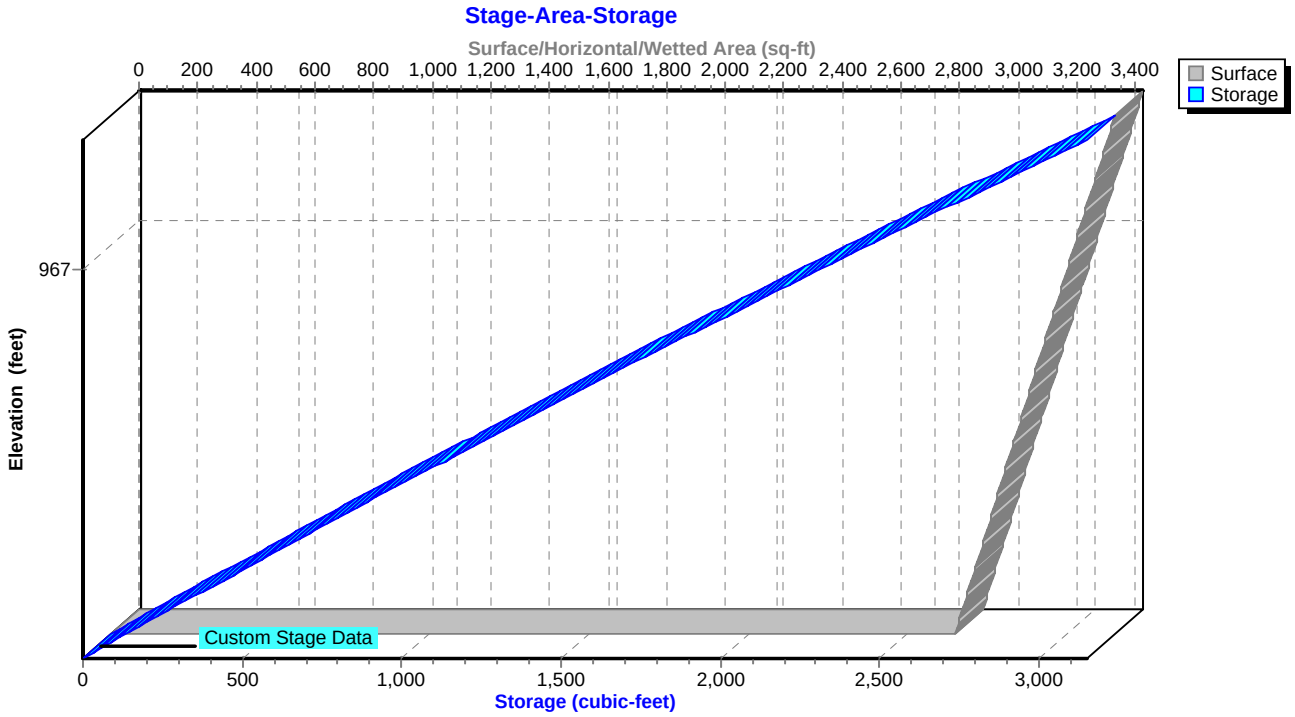
Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Summary for Pond 12P: Bioretention #2

Inflow Area = 0.420 ac, 23.80% Impervious, Inflow Depth = 0.31" for 10-Year event
Inflow = 0.13 cfs @ 12.02 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 19.41 hrs, Volume= 0.011 af, Atten= 95%, Lag= 443.8 min
Primary = 0.01 cfs @ 19.41 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 967.50' @ 19.41 hrs Surf.Area= 705 sf Storage= 280 cf

Plug-Flow detention time= 750.0 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 750.0 min (1,698.6 - 948.7)

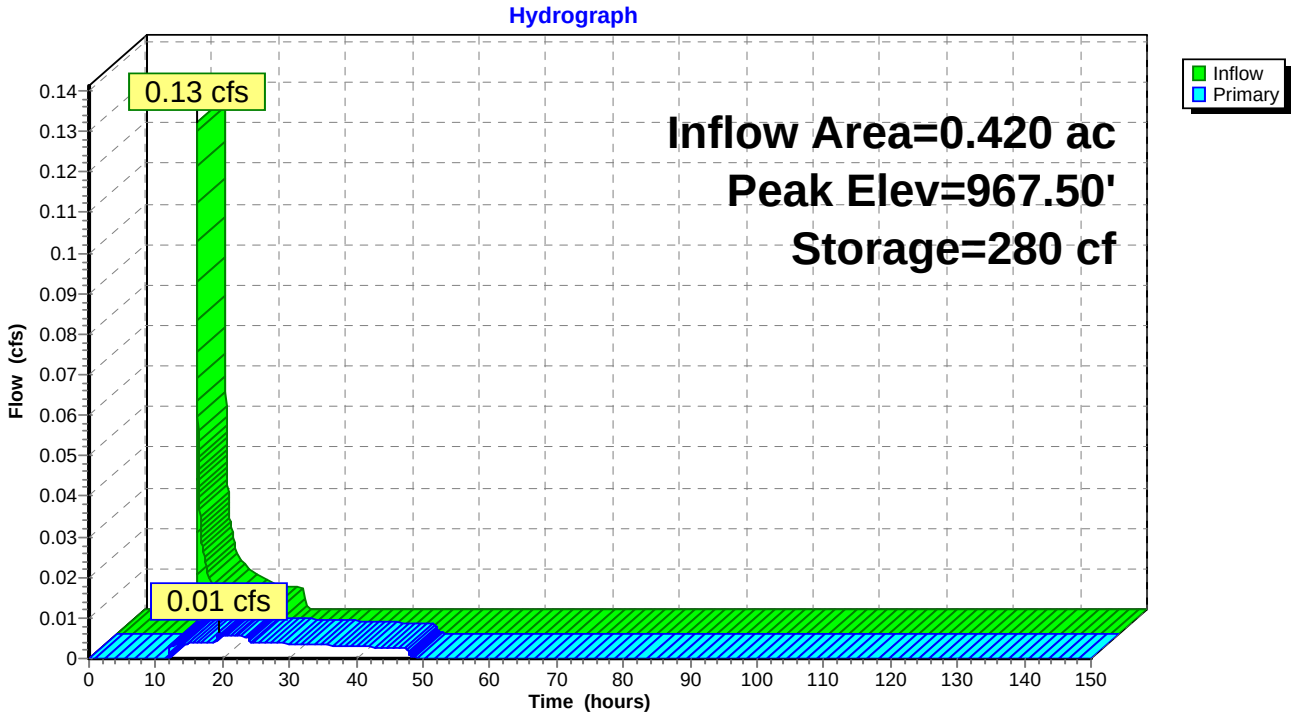
Volume	Invert	Avail.Storage	Storage Description
#1	967.00'	759 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.00	412	0	0
967.50	704	279	279
968.00	1,215	480	759

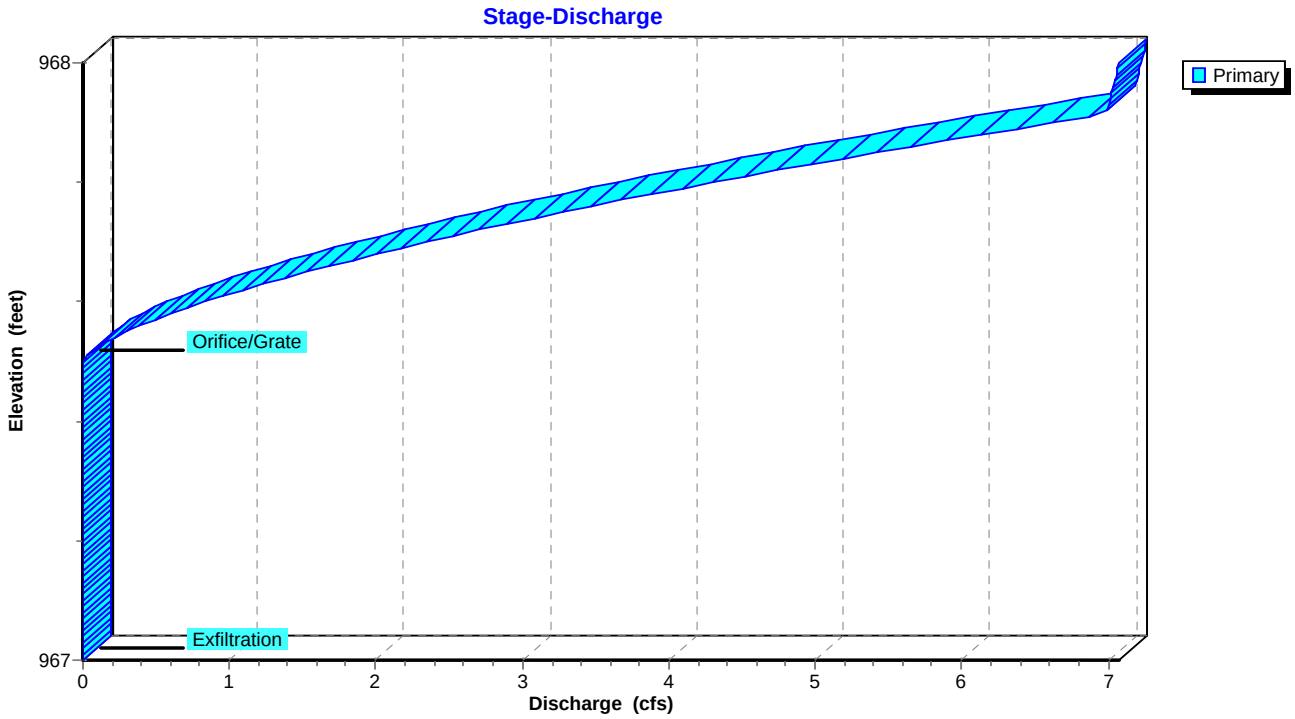
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	967.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.00 cfs @ 19.41 hrs HW=967.50' (Free Discharge)
└─**1=Culvert** (Passes 0.00 cfs of 6.55 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.10 fps)

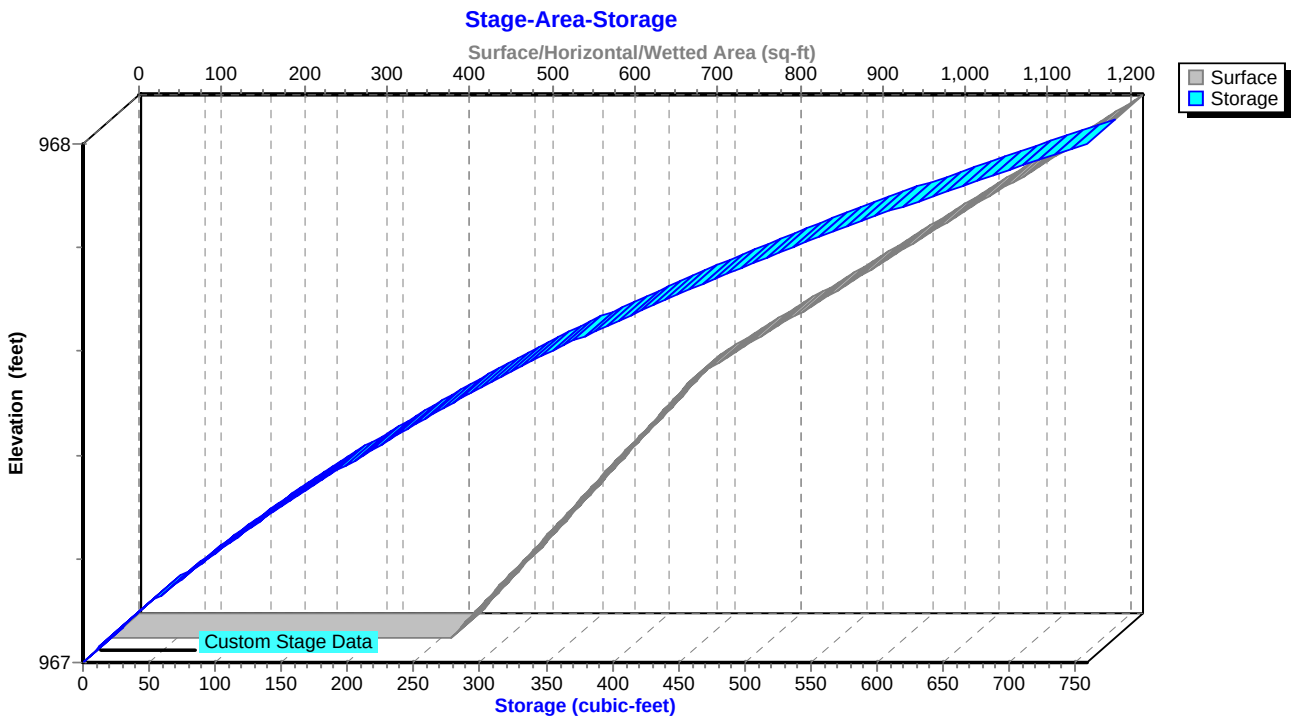
Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Summary for Pond 14P: Detention Pond

[79] Warning: Submerged Pond 10P Primary device # 1 INLET by 1.69'
[79] Warning: Submerged Pond 12P Primary device # 1 INLET by 0.69'
[79] Warning: Submerged Pond 17P Primary device # 1 INLET by 0.69'
[79] Warning: Submerged Pond 21P Primary device # 1 by 2.19'
[79] Warning: Submerged Pond 24P Primary device # 1 INLET by 0.69'

Inflow Area =	2.905 ac,	49.41% Impervious,	Inflow Depth =	2.22"	for 10-Year event
Inflow =	8.77 cfs @	11.99 hrs,	Volume=	0.537 af	
Outflow =	2.83 cfs @	12.21 hrs,	Volume=	0.537 af,	Atten= 68%, Lag= 12.9 min
Primary =	1.83 cfs @	12.21 hrs,	Volume=	0.491 af	
Secondary =	1.00 cfs @	12.21 hrs,	Volume=	0.046 af	

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 964.69' @ 12.21 hrs Surf.Area= 5,383 sf Storage= 7,938 cf

Plug-Flow detention time= 198.9 min calculated for 0.537 af (100% of inflow)
Center-of-Mass det. time= 198.8 min (1,121.4 - 922.6)

Volume	Invert	Avail.Storage	Storage Description
#1	962.50'	19,563 cf	**Det. Pond #1 (Prismatic)**Listed below (Recalc)
#2	962.50'	3,380 cf	**Det. Pond #2 (Prismatic)**Listed below (Recalc)
		22,944 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	1,777	0	0
963.00	2,312	1,022	1,022
964.00	3,424	2,868	3,890
965.00	4,593	4,009	7,899
966.00	5,818	5,206	13,104
967.00	7,100	6,459	19,563

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	182	0	0
963.00	379	140	140
964.00	814	597	737
965.00	1,309	1,062	1,798
966.00	1,855	1,582	3,380

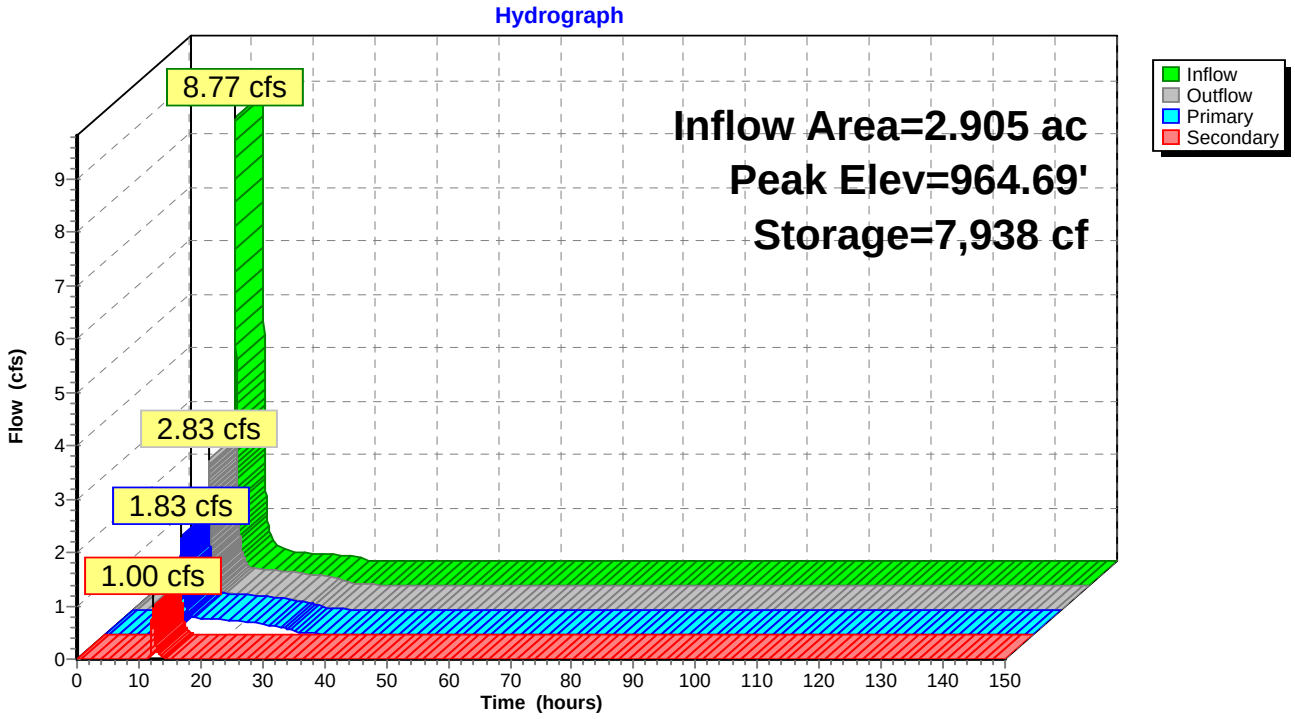
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	962.50'	**3.0" Vert. Low-Flow Orifice** C= 0.600
#3	Device 1	964.40'	**3.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#4	Device 1	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600
#5	Secondary	963.00'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0100 '/' Cc= 0.900

			n= 0.013 Corrugated PE, smooth interior
#6	Device 5	964.40'	**2.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#7	Device 5	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600

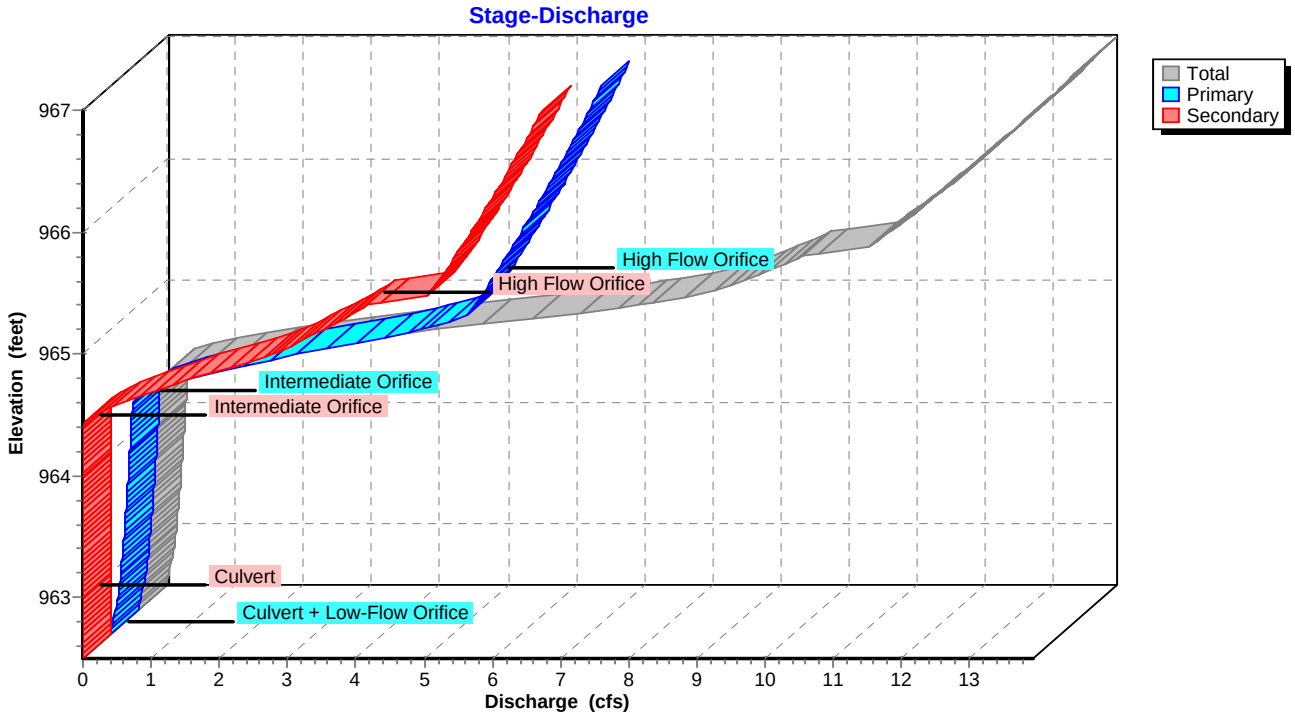
Primary OutFlow Max=1.83 cfs @ 12.21 hrs HW=964.69' (Free Discharge)
- **1=Culvert** (Passes 1.83 cfs of 4.67 cfs potential flow)
  - **2=Low-Flow Orifice** (Orifice Controls 0.34 cfs @ 6.92 fps)
  - **3=Intermediate Orifice** (Orifice Controls 1.49 cfs @ 1.72 fps)
  - **4=High Flow Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.99 cfs @ 12.21 hrs HW=964.69' (Free Discharge)
- **5=Culvert** (Passes 0.99 cfs of 3.92 cfs potential flow)
  - **6=Intermediate Orifice** (Orifice Controls 0.99 cfs @ 1.72 fps)
  - **7=High Flow Orifice** (Controls 0.00 cfs)

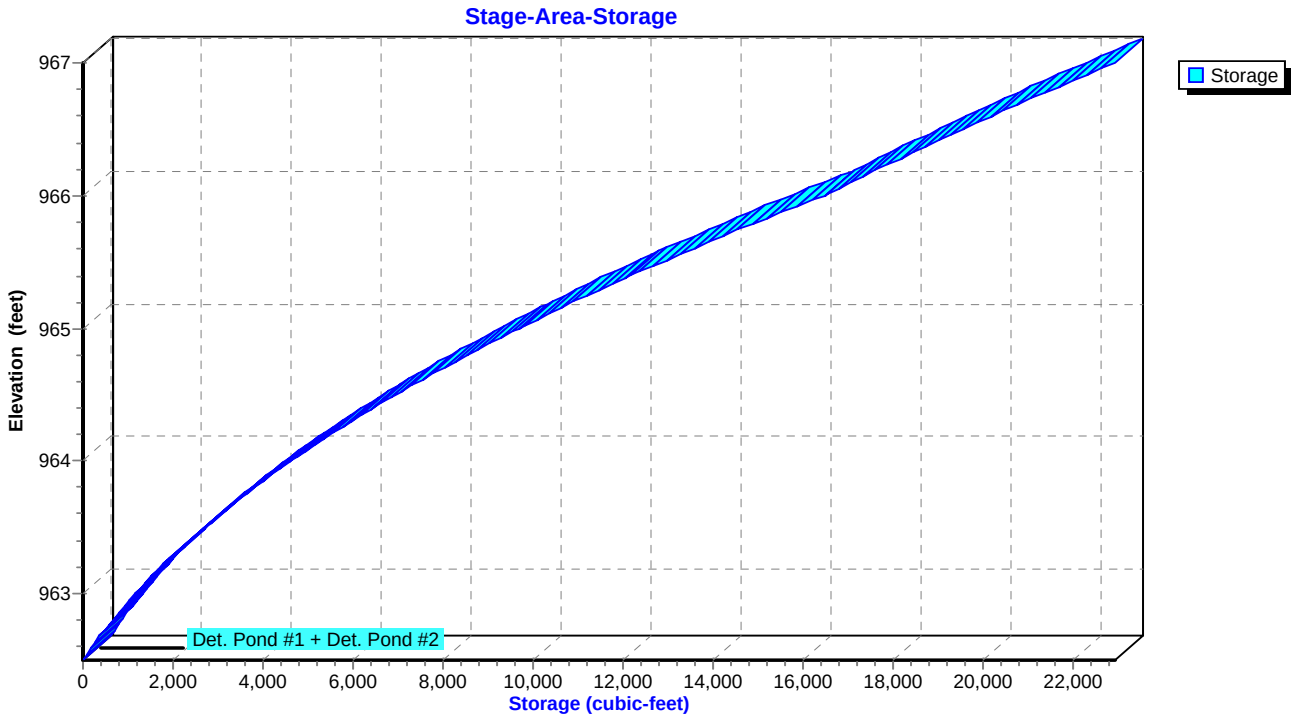
Pond 14P: Detention Pond



Pond 14P: Detention Pond



Pond 14P: Detention Pond



Summary for Pond 17P: Bioretention #3A

Inflow Area = 0.305 ac, 77.05% Impervious, Inflow Depth = 2.93" for 10-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 1.01 cfs @ 12.11 hrs, Volume= 0.075 af, Atten= 1%, Lag= 1.2 min
Primary = 1.01 cfs @ 12.11 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.61' @ 12.11 hrs Surf.Area= 880 sf Storage= 397 cf

Plug-Flow detention time= 149.5 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 149.5 min (940.1 - 790.7)

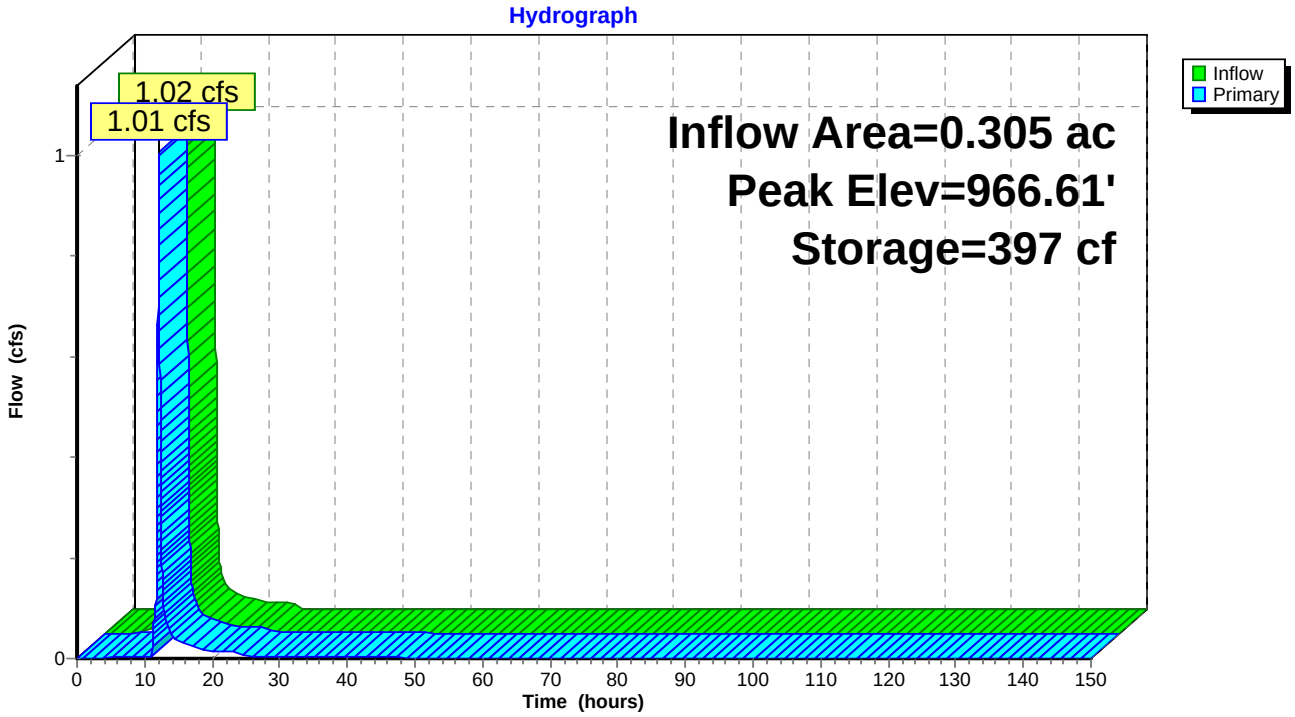
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	819 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	462	0	0
966.50	756	305	305
967.00	1,300	514	819

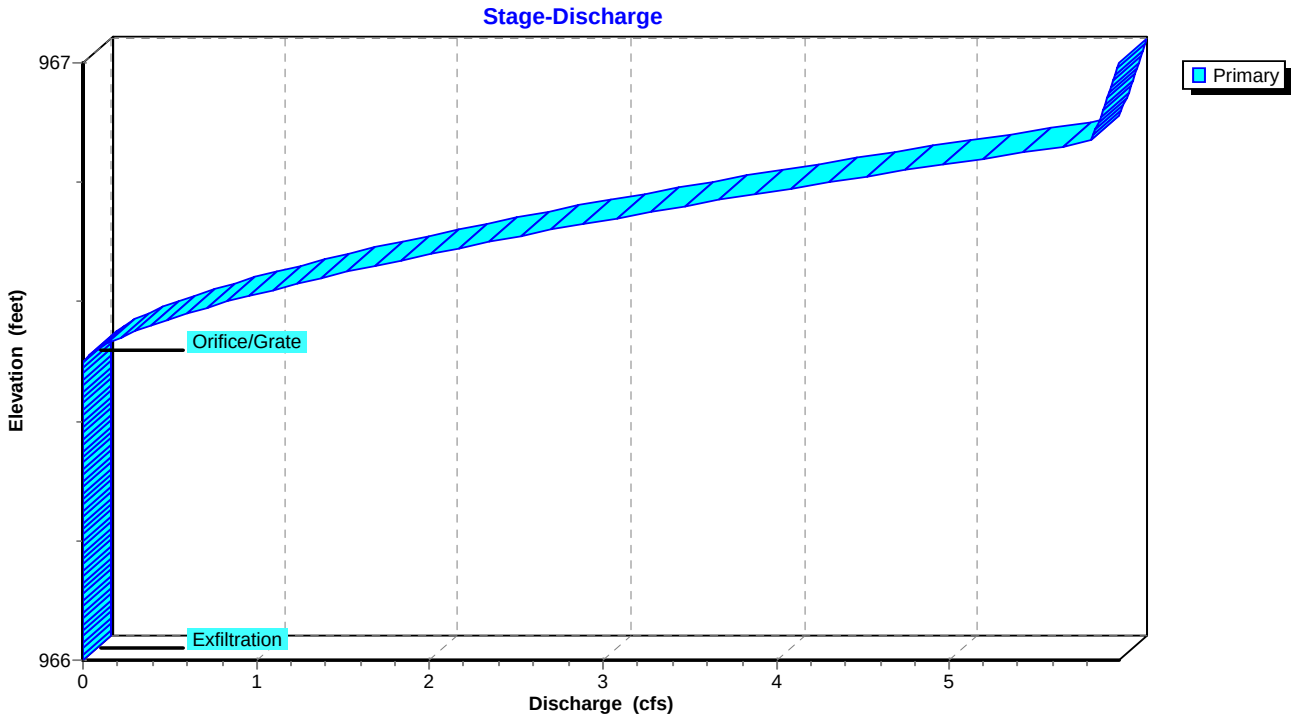
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=1.01 cfs @ 12.11 hrs HW=966.61' (Free Discharge)
└─**1=Culvert** (Passes 1.01 cfs of 5.50 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └─**3=Orifice/Grate** (Weir Controls 1.00 cfs @ 1.10 fps)

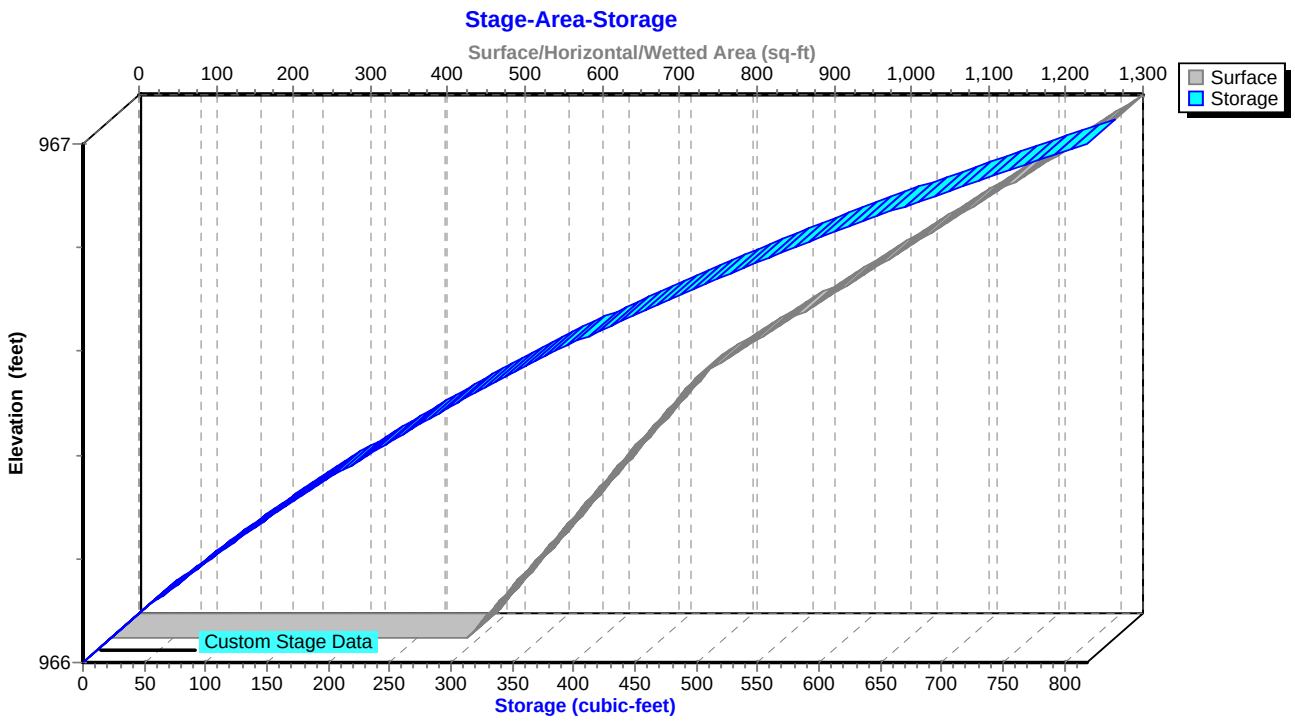
Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Summary for Pond 21P: Bioretention #4

Inflow Area = 0.598 ac, 10.87% Impervious, Inflow Depth = 1.87" for 10-Year event
Inflow = 1.51 cfs @ 12.06 hrs, Volume= 0.093 af
Outflow = 1.49 cfs @ 12.08 hrs, Volume= 0.093 af, Atten= 2%, Lag= 1.1 min
Primary = 1.49 cfs @ 12.08 hrs, Volume= 0.093 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.65' @ 12.08 hrs Surf.Area= 1,107 sf Storage= 513 cf

Plug-Flow detention time= 131.5 min calculated for 0.093 af (100% of inflow)
Center-of-Mass det. time= 131.6 min (966.3 - 834.6)

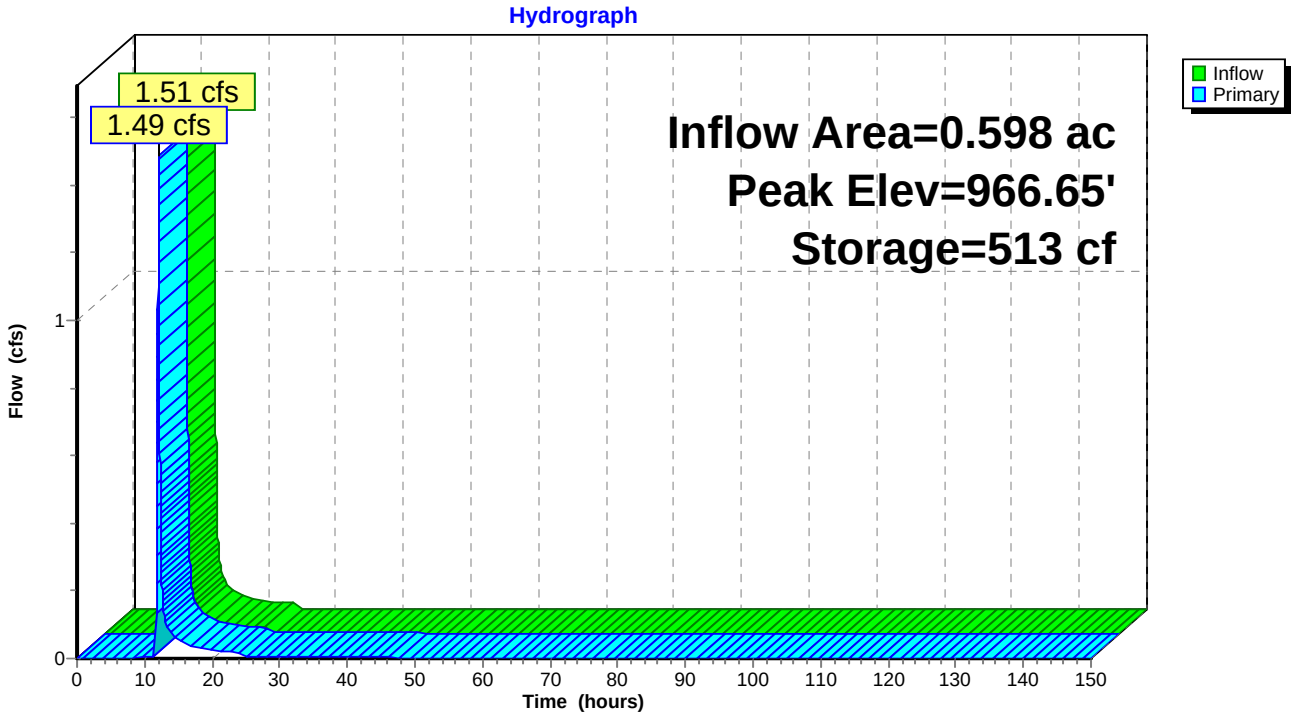
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	519	0	0
966.50	933	363	363
967.00	1,523	614	977

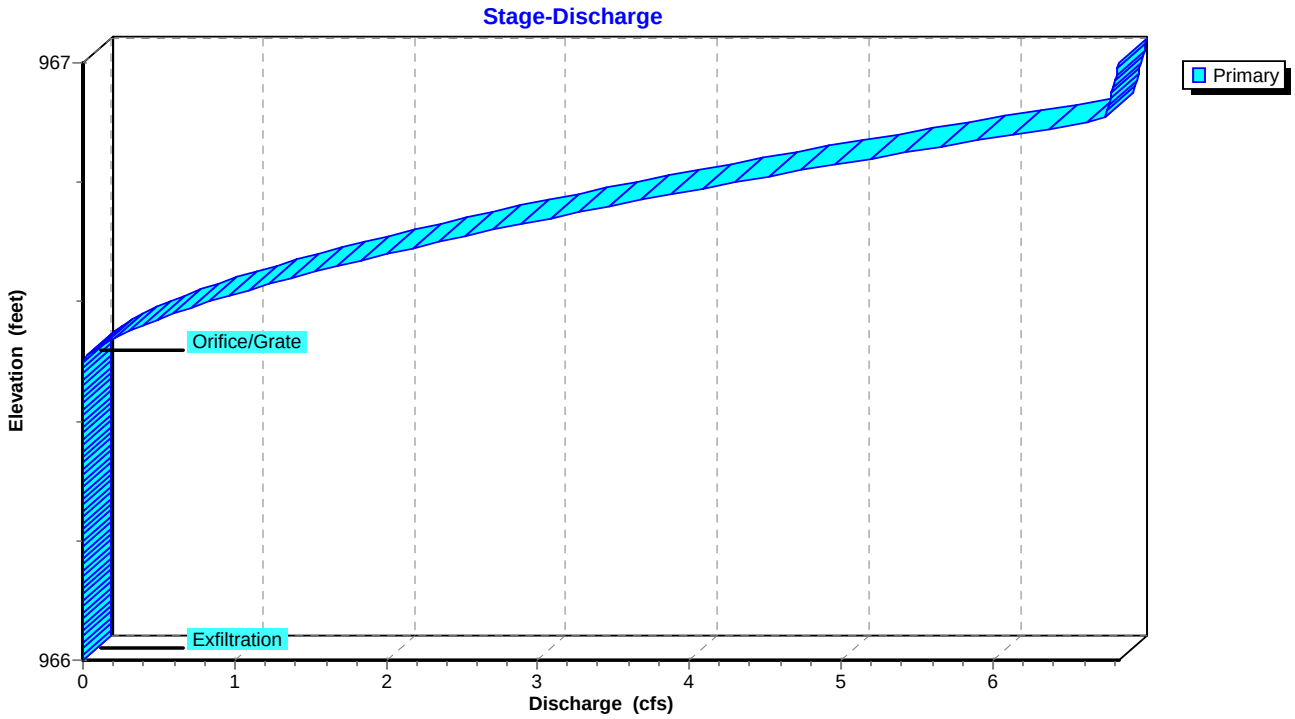
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 47.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=1.48 cfs @ 12.08 hrs HW=966.65' (Free Discharge)
└─**1=Culvert** (Passes 1.48 cfs of 6.48 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └─**3=Orifice/Grate** (Weir Controls 1.48 cfs @ 1.25 fps)

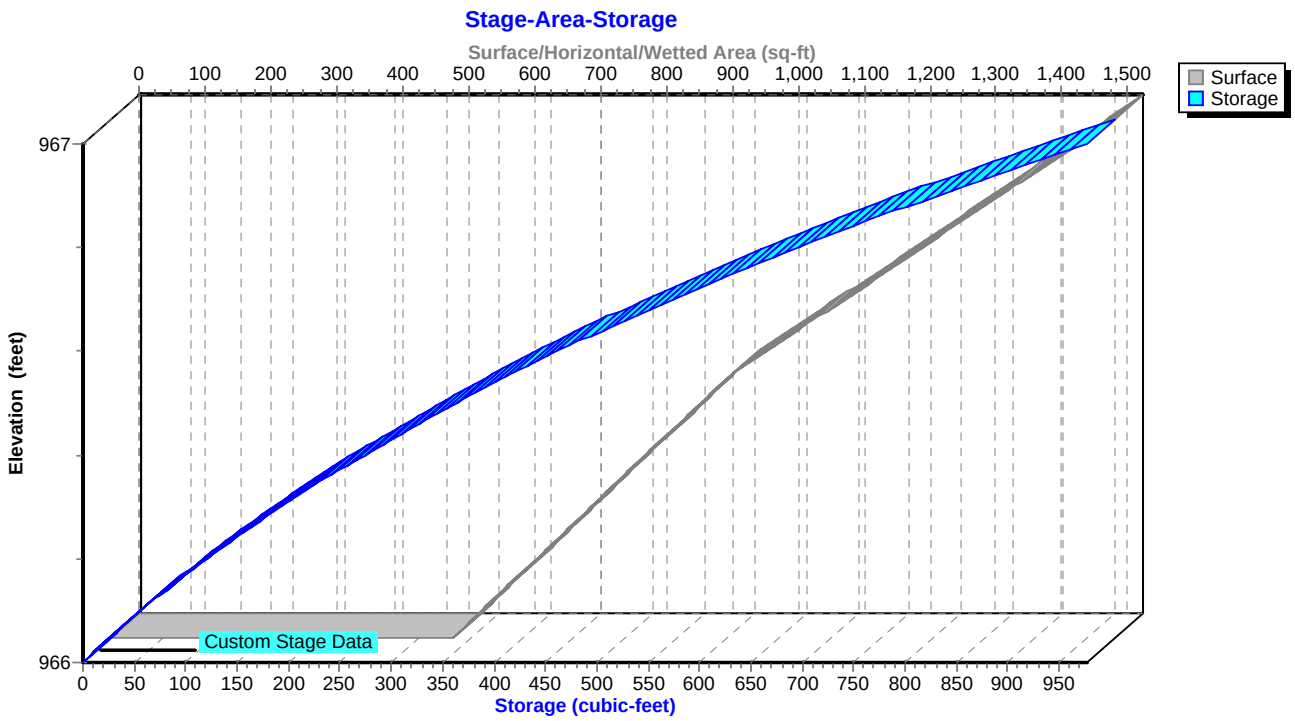
Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Summary for Pond 24P: Bioretention #3B

Inflow Area = 0.081 ac, 64.20% Impervious, Inflow Depth = 2.73" for 10-Year event
Inflow = 0.37 cfs @ 11.97 hrs, Volume= 0.018 af
Outflow = 0.37 cfs @ 11.98 hrs, Volume= 0.018 af, Atten= 1%, Lag= 0.6 min
Primary = 0.37 cfs @ 11.98 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 968.46' @ 11.98 hrs Surf.Area= 368 sf Storage= 181 cf

Plug-Flow detention time= 304.3 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 304.4 min (1,094.8 - 790.4)

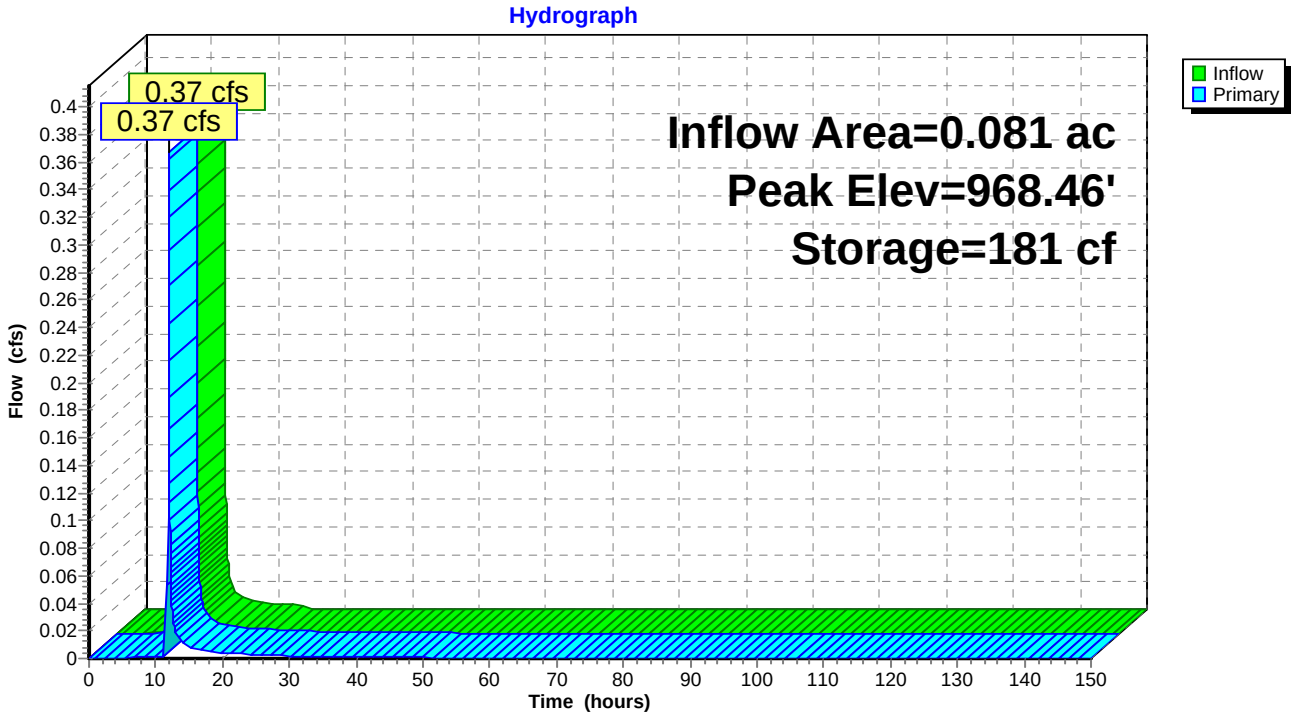
Volume	Invert	Avail.Storage	Storage Description
#1	967.85'	235 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.85	229	0	0
968.10	283	64	64
968.60	402	171	235

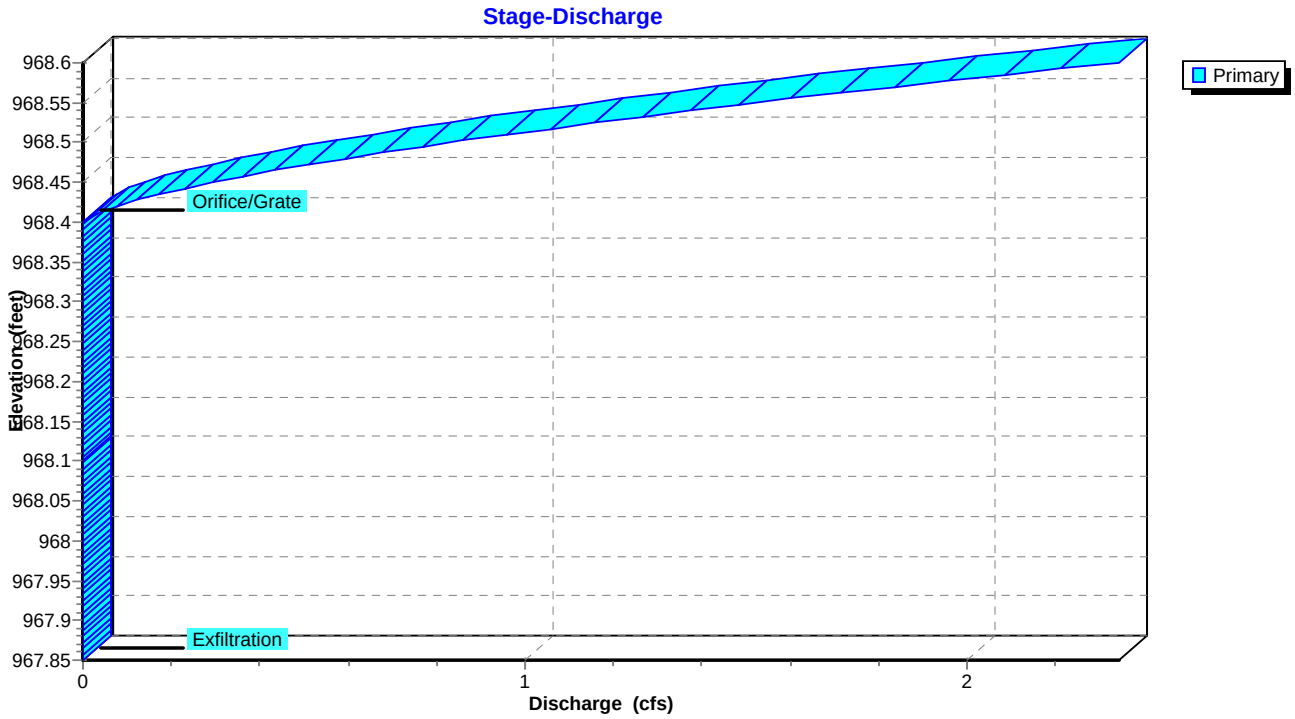
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.85'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	968.40'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.37 cfs @ 11.98 hrs HW=968.46' (Free Discharge)
└─**1=Culvert** (Passes 0.37 cfs of 7.52 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.37 cfs @ 0.79 fps)

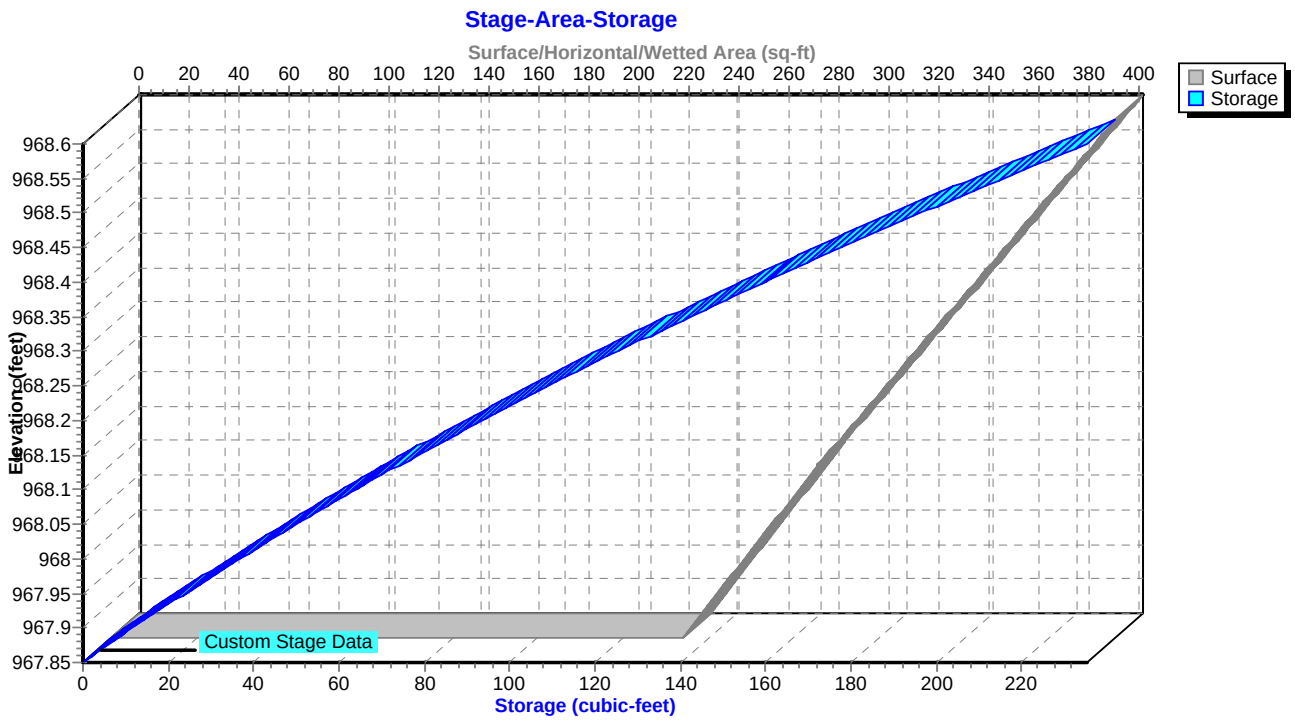
Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B

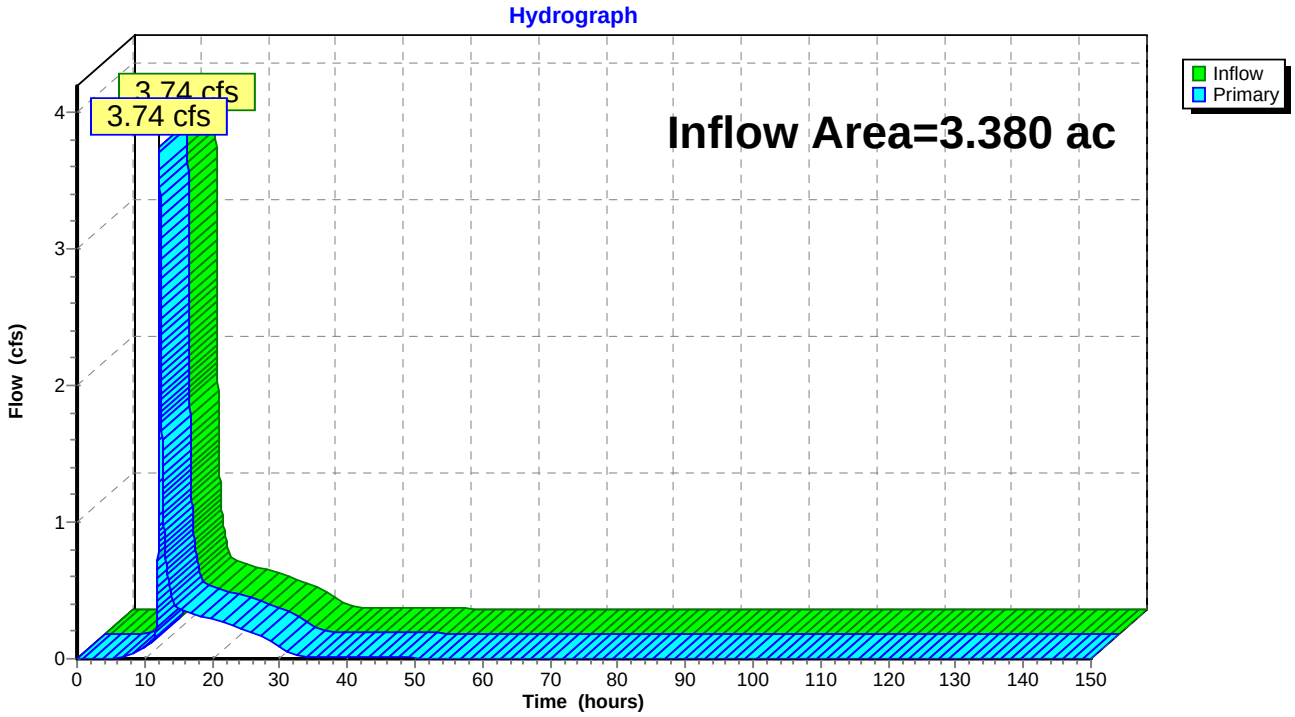


Summary for Link 26L: Analysis Point #1

Inflow Area = 3.380 ac, 44.84% Impervious, Inflow Depth = 2.18" for 10-Year event
Inflow = 3.74 cfs @ 12.20 hrs, Volume= 0.614 af
Primary = 3.74 cfs @ 12.20 hrs, Volume= 0.614 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs

Link 26L: Analysis Point #1



Summary for Subcatchment 11S: PR Area 1

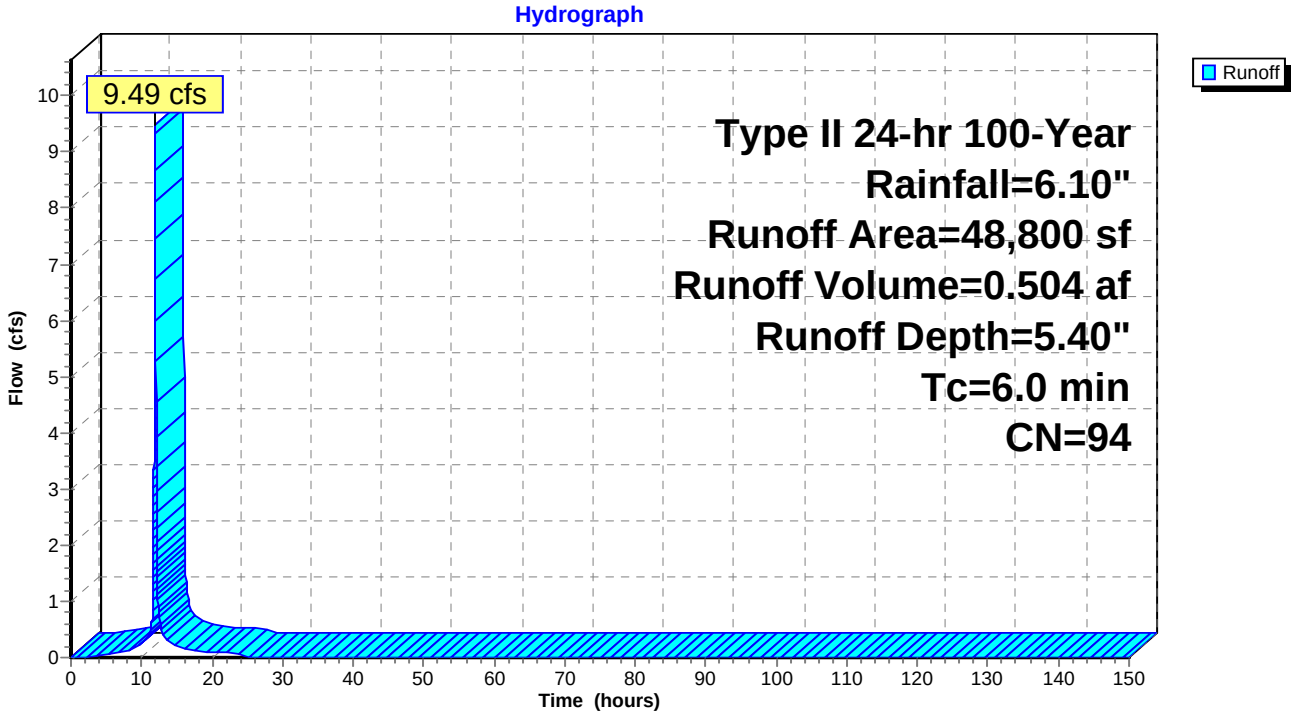
Runoff = 9.49 cfs @ 11.97 hrs, Volume= 0.504 af, Depth= 5.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (sf)	CN	Description
38,651	98	Paved parking & roofs
10,149	80	>75% Grass cover, Good, HSG D
48,800	94	Weighted Average
10,149		Pervious Area
38,651		Impervious Area

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

Subcatchment 11S: PR Area 1



Summary for Subcatchment 13S: PR Area 2

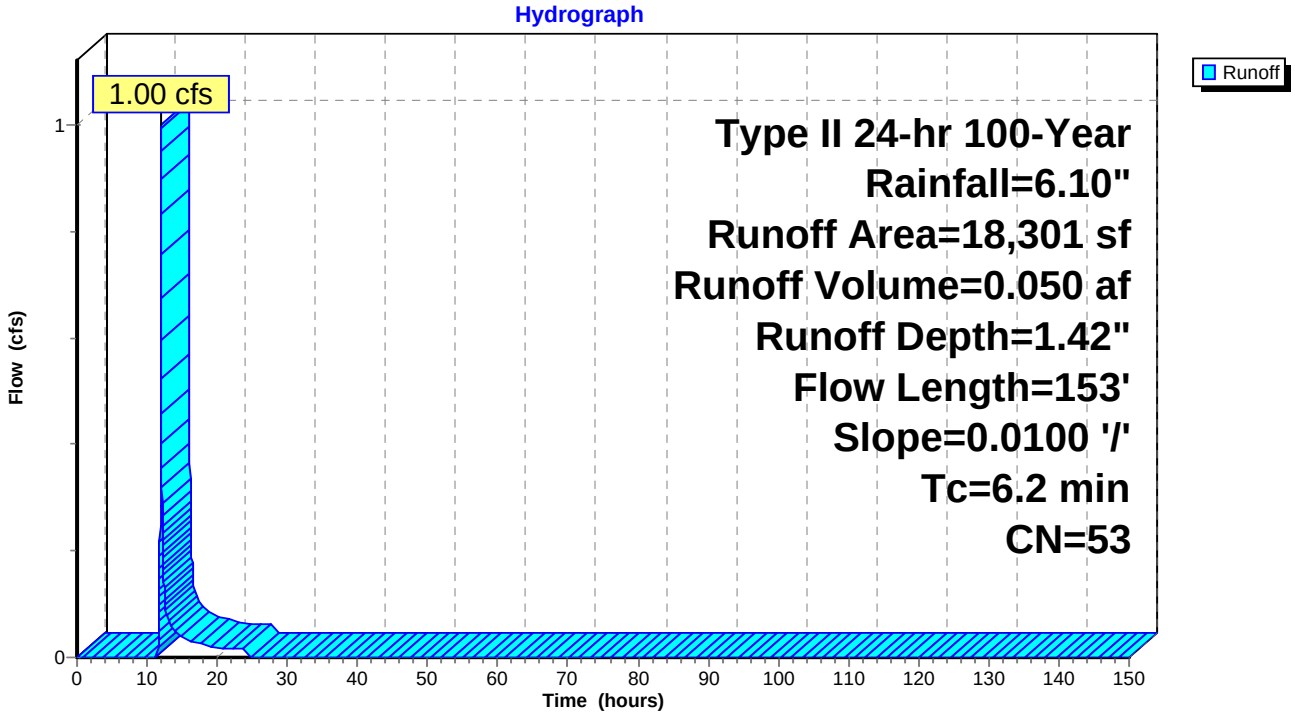
Runoff = 1.00 cfs @ 11.99 hrs, Volume= 0.050 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
13,945	39	>75% Grass cover, Good, HSG A
18,301	53	Weighted Average
13,945		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	18	0.0100	0.05		**Sheet Flow, Sheet - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.6	135	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
6.2	153	Total			

Subcatchment 13S: PR Area 2



Summary for Subcatchment 16S: PR Area 3A

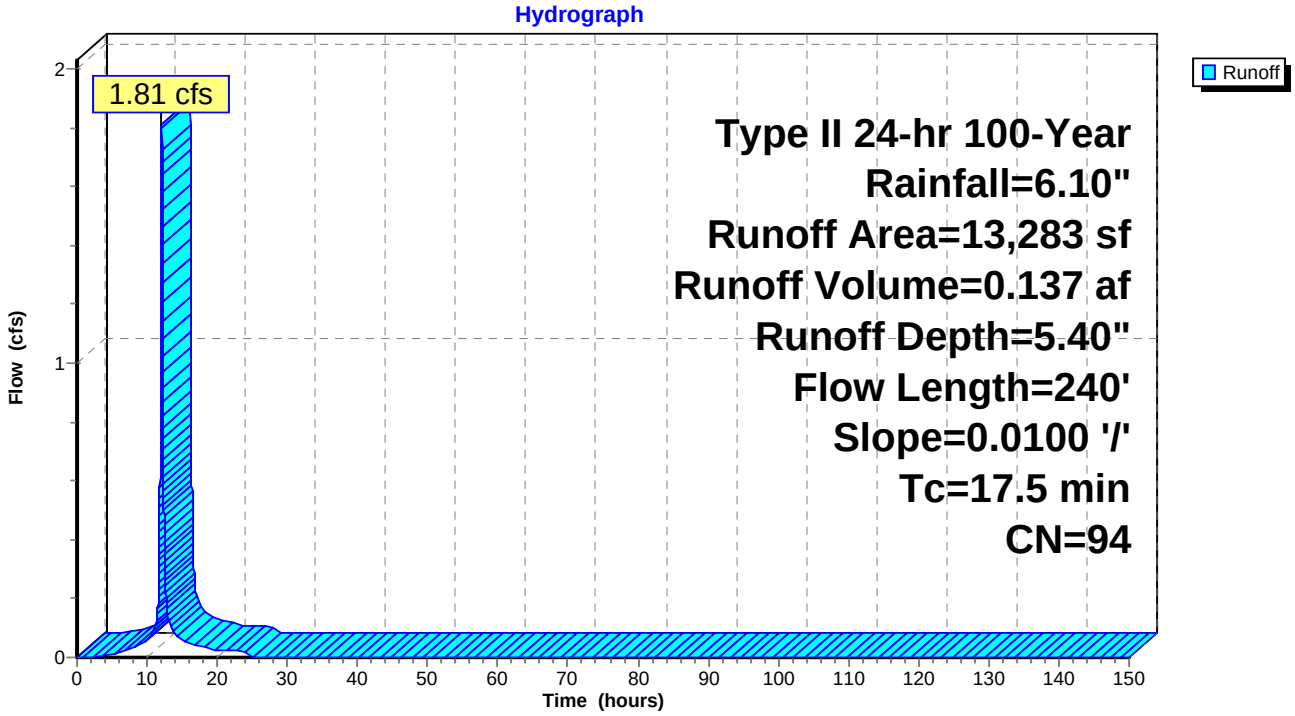
Runoff = 1.81 cfs @ 12.09 hrs, Volume= 0.137 af, Depth= 5.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (sf)	CN	Description
10,234	98	Paved parking & roofs
3,049	80	>75% Grass cover, Good, HSG D
13,283	94	Weighted Average
3,049		Pervious Area
10,234		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	70	0.0100	0.07		**Sheet Flow, Sheet - grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	170	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
17.5	240	Total			

Subcatchment 16S: PR Area 3A



Summary for Subcatchment 19S: PR Area 5

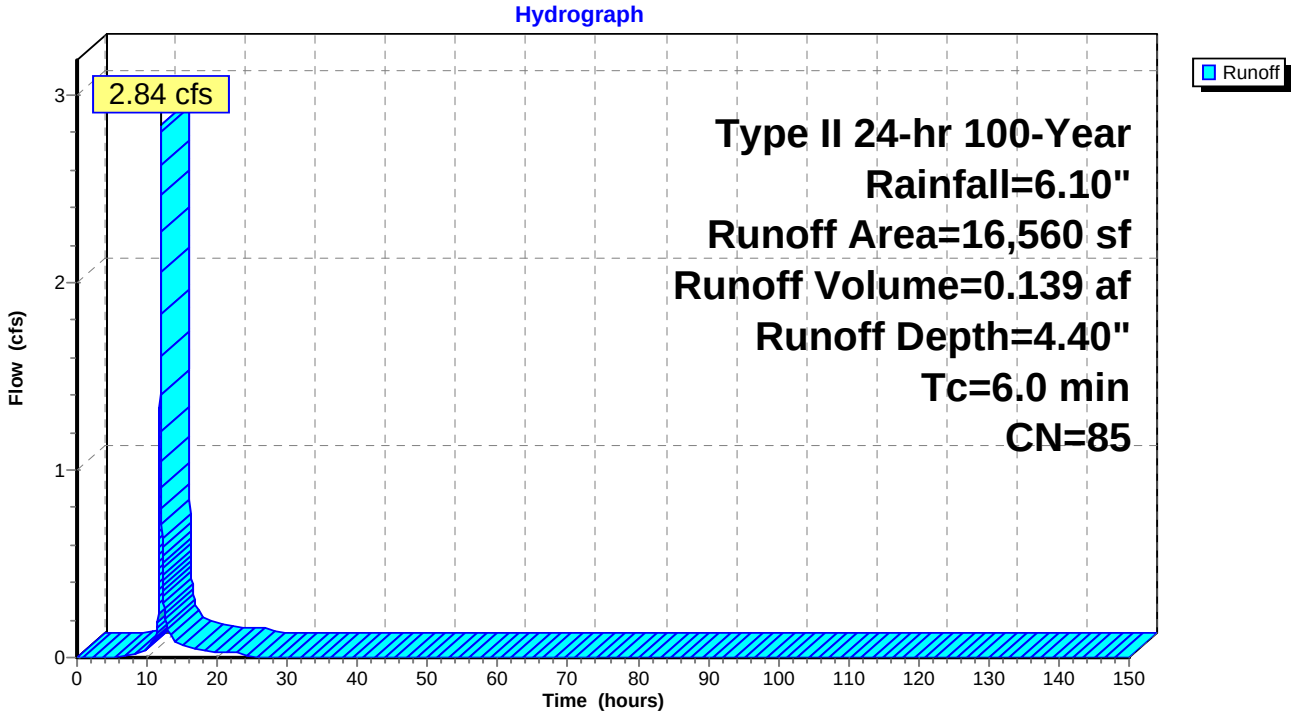
Runoff = 2.84 cfs @ 11.97 hrs, Volume= 0.139 af, Depth= 4.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (sf)	CN	Description
4,180	98	Paved parking & roofs
12,380	80	>75% Grass cover, Good, HSG D
16,560	85	Weighted Average
12,380		Pervious Area
4,180		Impervious Area

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

Subcatchment 19S: PR Area 5



Summary for Subcatchment 22S: PR Area #4

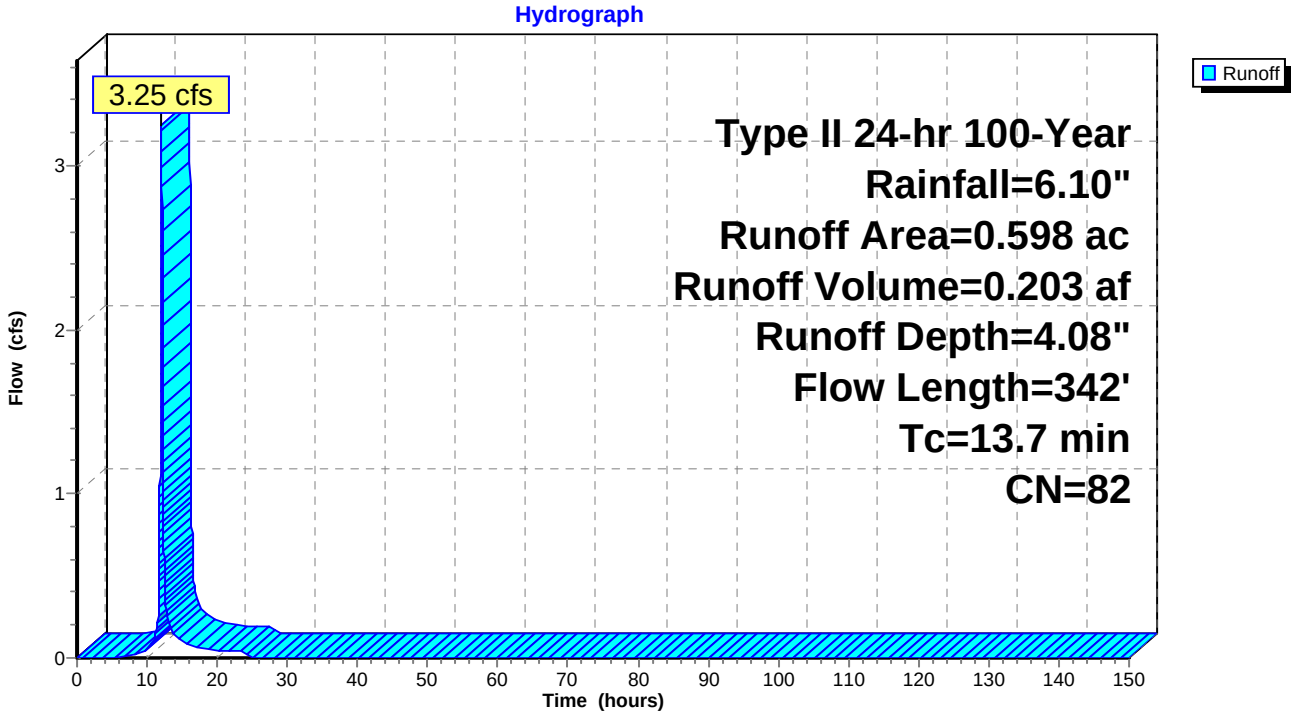
Runoff = 3.25 cfs @ 12.05 hrs, Volume= 0.203 af, Depth= 4.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (ac)	CN	Description
0.212	79	Woods, Fair, HSG D
0.065	98	Paved parking & roofs
0.321	80	>75% Grass cover, Good, HSG D
0.598	82	Weighted Average
0.533		Pervious Area
0.065		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	69	0.0570	0.09		**Sheet Flow, Sheet Flow - Woods/Brush** Woods: Light underbrush n= 0.400 P2= 2.30"
1.3	273	0.0100	3.57	7.14	**Channel Flow, Grass Channel** Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.022 Earth, clean & straight
13.7	342	Total			

Subcatchment 22S: PR Area #4



Summary for Subcatchment 23S: PR Area 6

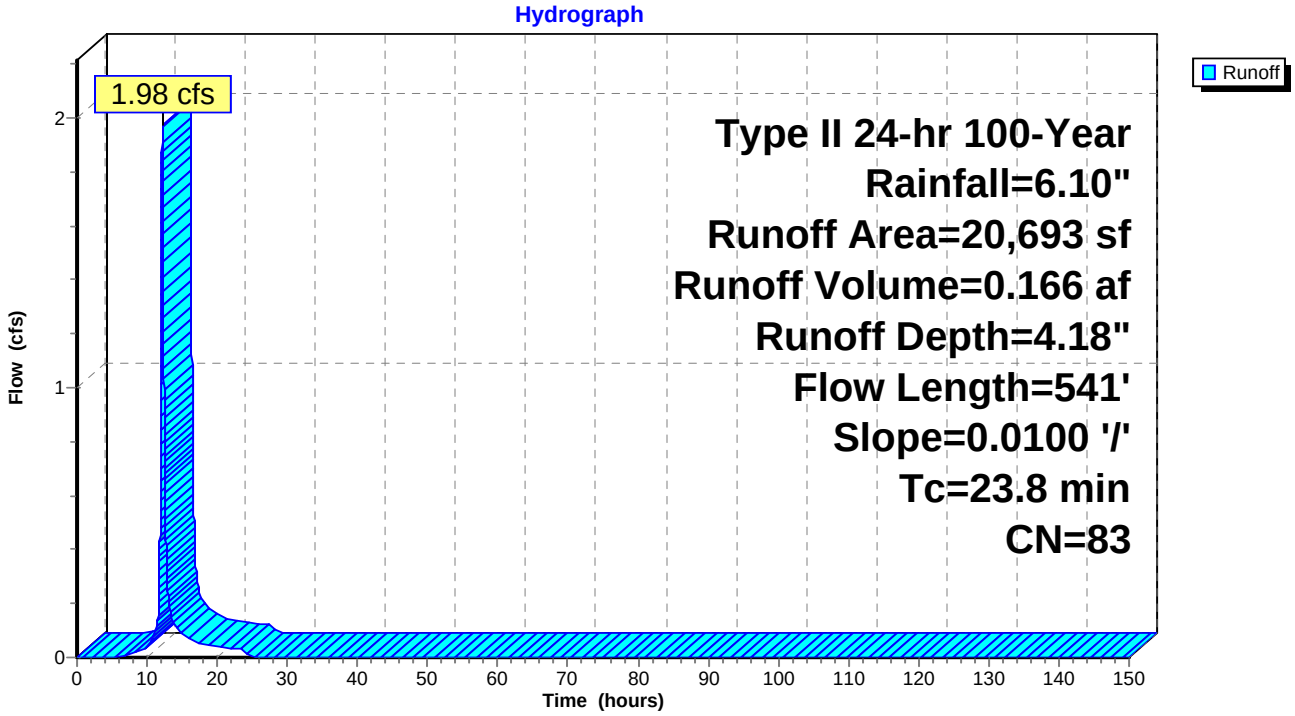
Runoff = 1.98 cfs @ 12.16 hrs, Volume= 0.166 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (sf)	CN	Description
3,500	98	Paved parking & roofs
17,193	80	>75% Grass cover, Good, HSG D
20,693	83	Weighted Average
17,193		Pervious Area
3,500		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	100	0.0100	0.08		**Sheet Flow, Sheet Flow - Grass** Grass: Dense n= 0.240 P2= 2.30"
0.8	78	0.0100	1.61		**Shallow Concentrated Flow, Shallow Conc. - Grass** Unpaved Kv= 16.1 fps
0.8	363	0.0100	7.76	124.12	**Channel Flow, Roadside Ditch** Area= 16.0 sf Perim= 13.0' r= 1.23' n= 0.022 Earth, clean & straight
23.8	541	Total			

Subcatchment 23S: PR Area 6



Summary for Subcatchment 25S: PR Area 3B

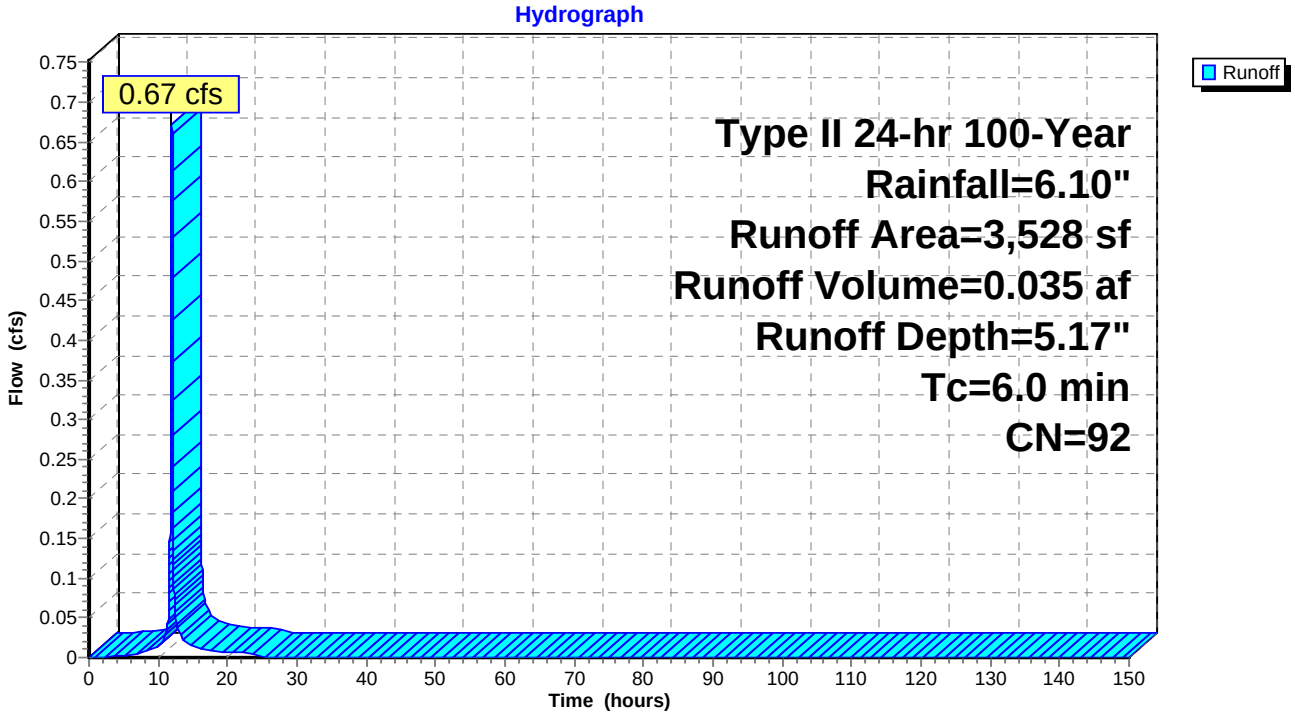
Runoff = 0.67 cfs @ 11.97 hrs, Volume= 0.035 af, Depth= 5.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=6.10"

Area (sf)	CN	Description
2,265	98	Paved parking & roofs
1,263	80	>75% Grass cover, Good, HSG D
3,528	92	Weighted Average
1,263		Pervious Area
2,265		Impervious Area

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

Subcatchment 25S: PR Area 3B



Summary for Pond 10P: Bioretention #1

Inflow Area = 1.120 ac, 79.20% Impervious, Inflow Depth = 5.40" for 100-Year event
Inflow = 9.49 cfs @ 11.97 hrs, Volume= 0.504 af
Outflow = 7.56 cfs @ 12.02 hrs, Volume= 0.504 af, Atten= 20%, Lag= 3.0 min
Primary = 7.56 cfs @ 12.02 hrs, Volume= 0.504 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 967.11' @ 12.02 hrs Surf.Area= 3,348 sf Storage= 2,677 cf

Plug-Flow detention time= 74.8 min calculated for 0.504 af (100% of inflow)
Center-of-Mass det. time= 74.9 min (839.3 - 764.4)

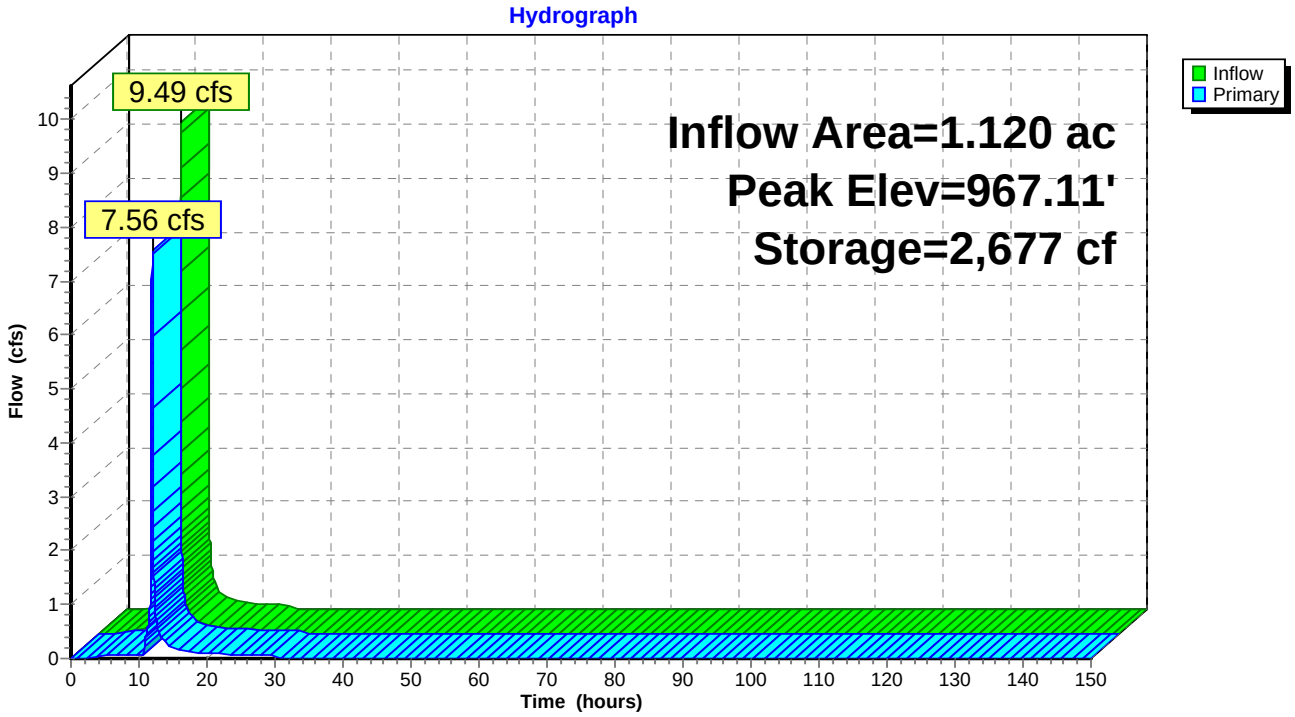
Volume	Invert	Avail.Storage	Storage Description
#1	966.25'	3,151 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.25	2,880	0	0
966.75	3,150	1,508	1,508
967.25	3,425	1,644	3,151

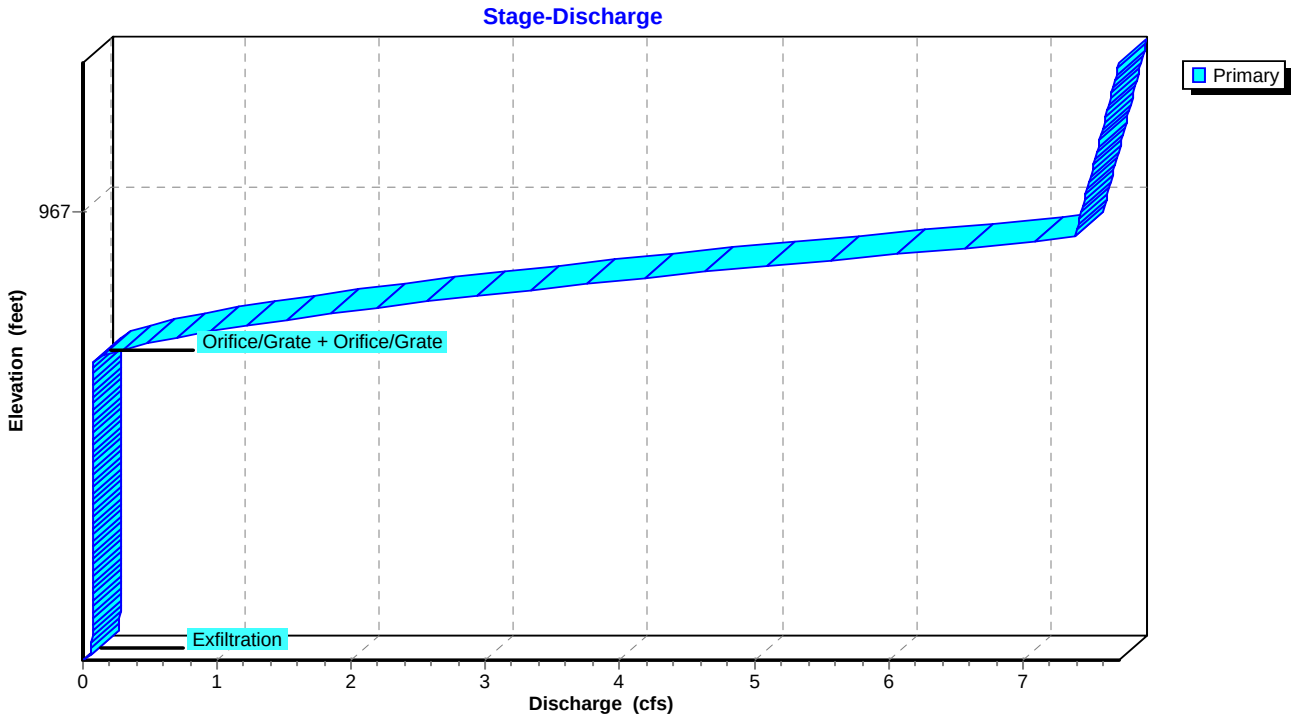
Device	Routing	Invert	Outlet Devices
#1	Primary	963.00'	**15.0" x 180.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.25'	**1.000 in/hr Exfiltration over Surface area**
#3	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	966.75'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=7.56 cfs @ 12.02 hrs HW=967.11' (Free Discharge)
└─**1=Culvert** (Barrel Controls 7.56 cfs @ 6.16 fps)
  ├─**2=Exfiltration** (Passes < 0.08 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 8.45 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 8.45 cfs potential flow)

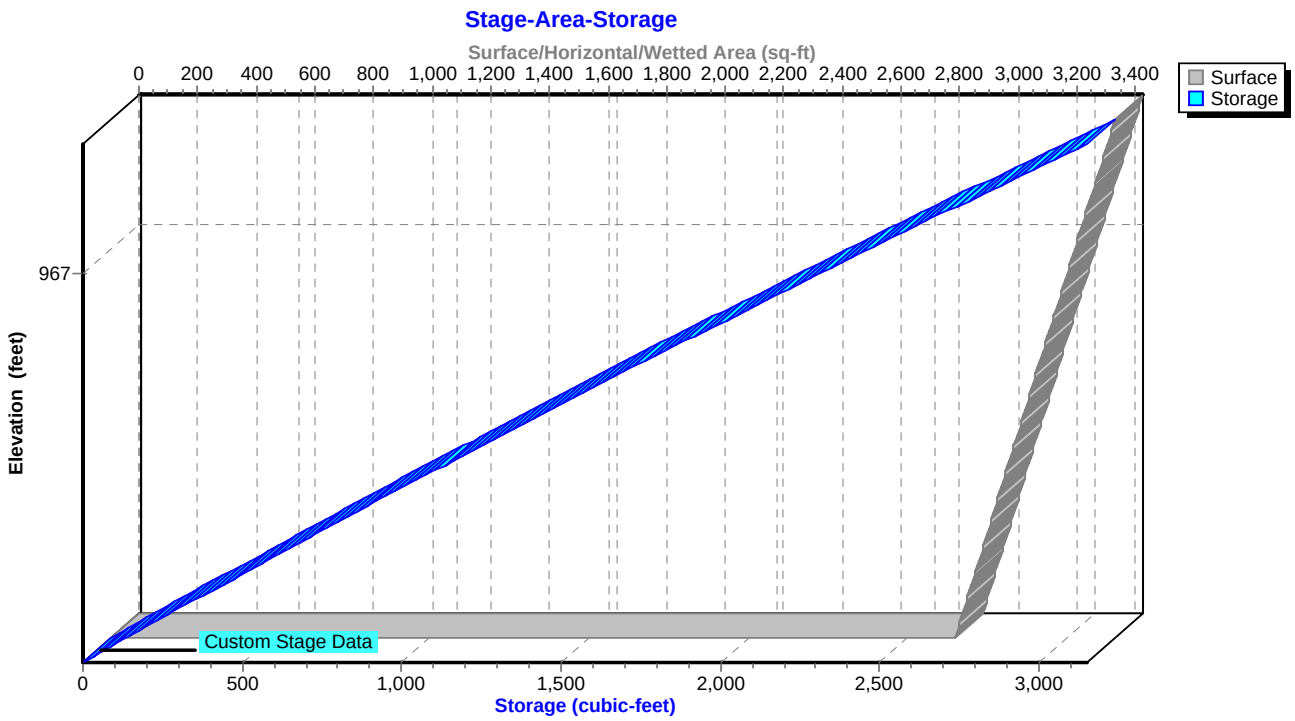
Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Pond 10P: Bioretention #1



Summary for Pond 12P: Bioretention #2

Inflow Area = 0.420 ac, 23.80% Impervious, Inflow Depth = 1.42" for 100-Year event
Inflow = 1.00 cfs @ 11.99 hrs, Volume= 0.050 af
Outflow = 0.92 cfs @ 12.02 hrs, Volume= 0.050 af, Atten= 8%, Lag= 1.8 min
Primary = 0.92 cfs @ 12.02 hrs, Volume= 0.050 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 967.61' @ 12.02 hrs Surf.Area= 813 sf Storage= 360 cf

Plug-Flow detention time= 182.6 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 182.7 min (1,062.2 - 879.4)

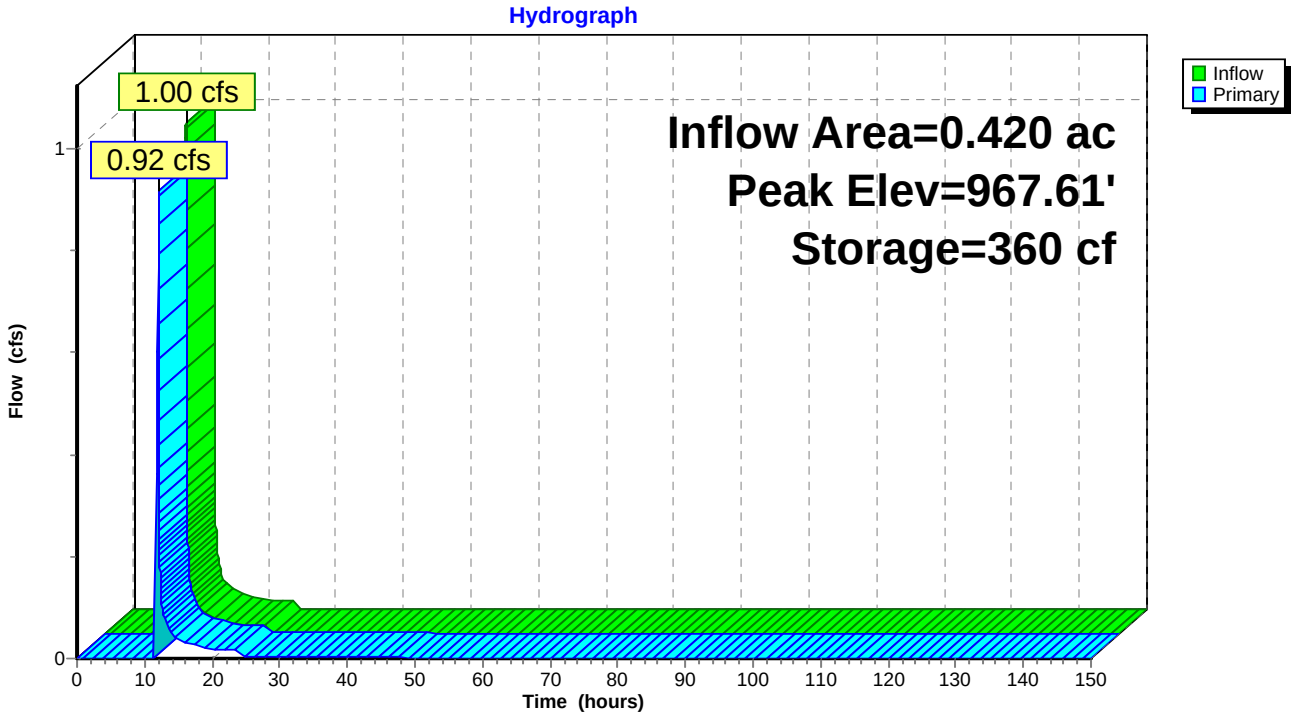
Volume	Invert	Avail.Storage	Storage Description
#1	967.00'	759 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.00	412	0	0
967.50	704	279	279
968.00	1,215	480	759

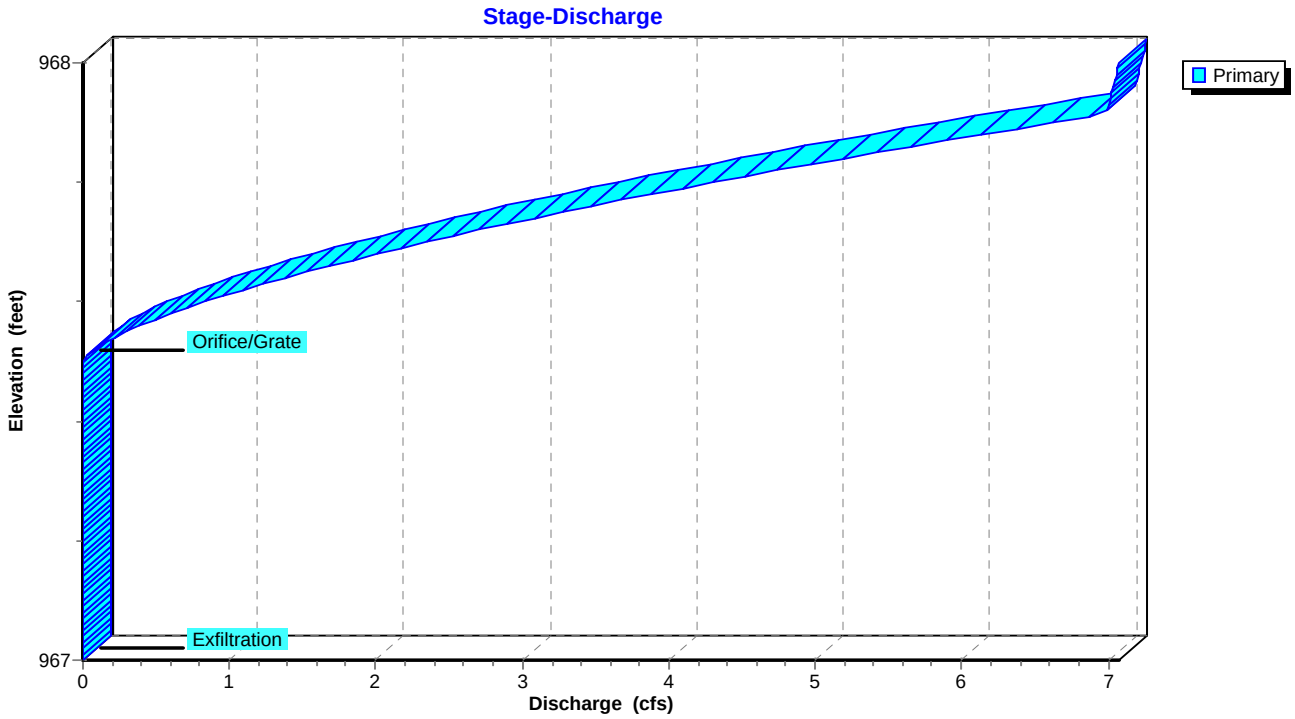
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	967.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.91 cfs @ 12.02 hrs HW=967.61' (Free Discharge)
└─**1=Culvert** (Passes 0.91 cfs of 6.67 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.91 cfs @ 1.07 fps)

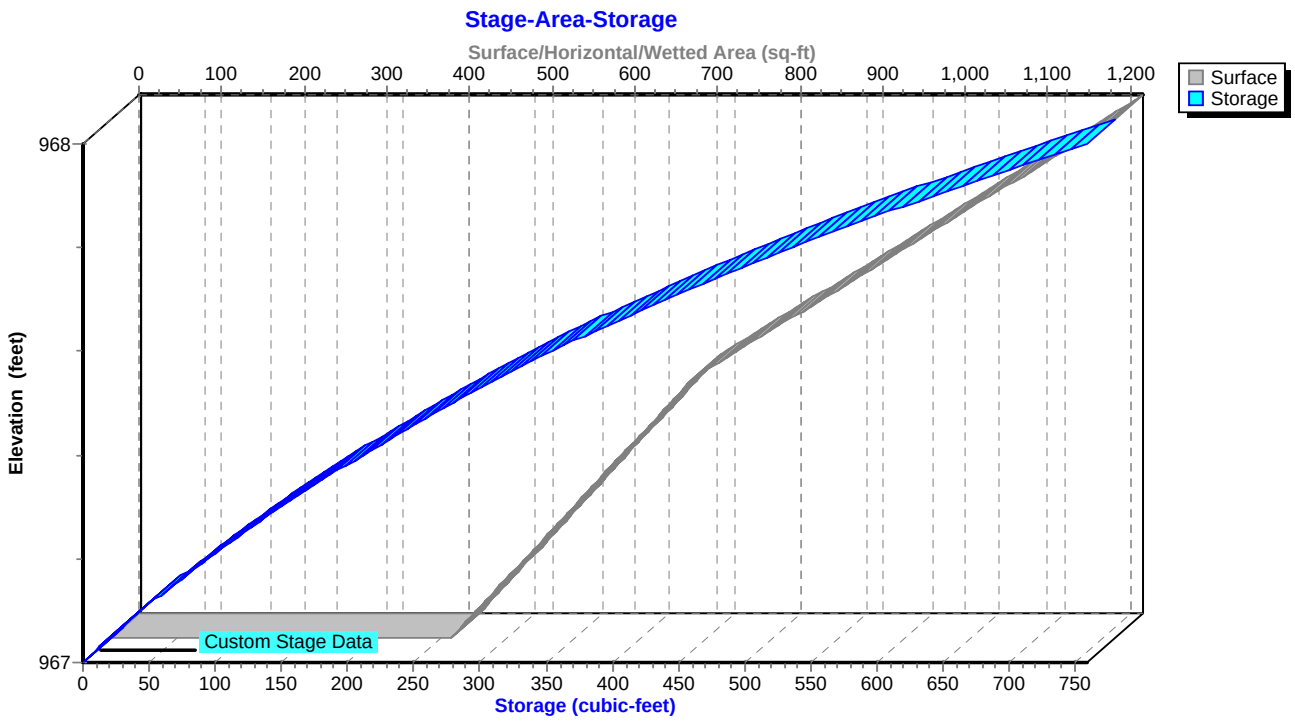
Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Pond 12P: Bioretention #2



Summary for Pond 14P: Detention Pond

[79] Warning: Submerged Pond 10P Primary device # 1 INLET by 2.46'
[79] Warning: Submerged Pond 12P Primary device # 1 INLET by 1.46'
[79] Warning: Submerged Pond 17P Primary device # 1 INLET by 1.46'
[79] Warning: Submerged Pond 21P Primary device # 1 by 2.96'
[79] Warning: Submerged Pond 24P Primary device # 1 INLET by 1.46'

Inflow Area =	2.905 ac,	49.41% Impervious,	Inflow Depth =	4.41"	for 100-Year event
Inflow =	15.75 cfs @	12.01 hrs,	Volume=	1.068 af	
Outflow =	10.59 cfs @	12.10 hrs,	Volume=	1.068 af,	Atten= 33%, Lag= 5.6 min
Primary =	5.65 cfs @	12.10 hrs,	Volume=	0.847 af	
Secondary =	4.94 cfs @	12.10 hrs,	Volume=	0.221 af	

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 965.46' @ 12.10 hrs Surf.Area= 6,722 sf Storage= 12,619 cf

Plug-Flow detention time= 139.9 min calculated for 1.068 af (100% of inflow)
Center-of-Mass det. time= 139.7 min (998.3 - 858.6)

Volume	Invert	Avail.Storage	Storage Description
#1	962.50'	19,563 cf	**Det. Pond #1 (Prismatic)**Listed below (Recalc)
#2	962.50'	3,380 cf	**Det. Pond #2 (Prismatic)**Listed below (Recalc)
		22,944 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	1,777	0	0
963.00	2,312	1,022	1,022
964.00	3,424	2,868	3,890
965.00	4,593	4,009	7,899
966.00	5,818	5,206	13,104
967.00	7,100	6,459	19,563

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
962.50	182	0	0
963.00	379	140	140
964.00	814	597	737
965.00	1,309	1,062	1,798
966.00	1,855	1,582	3,380

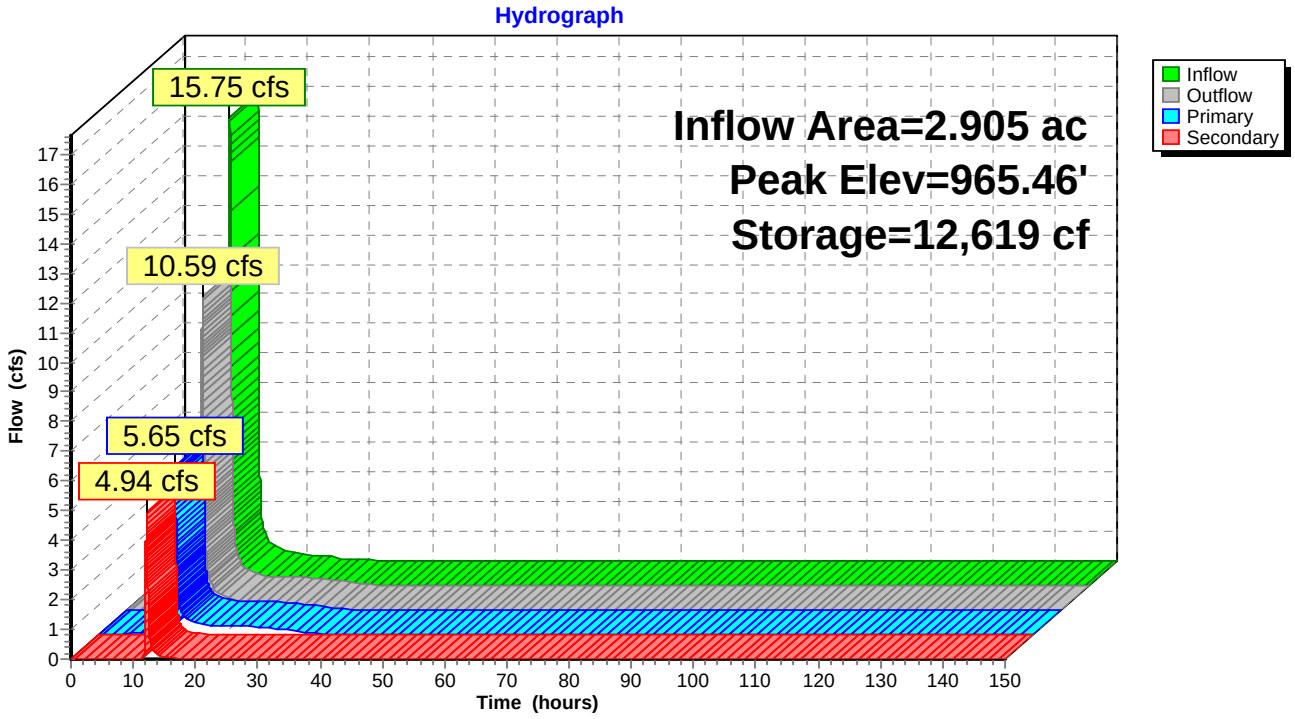
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	962.50'	**3.0" Vert. Low-Flow Orifice** C= 0.600
#3	Device 1	964.40'	**3.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#4	Device 1	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600
#5	Secondary	963.00'	**12.0" x 50.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0100 '/' Cc= 0.900

			n= 0.013 Corrugated PE, smooth interior
#6	Device 5	964.40'	**2.00' W x 0.50' H Vert. Intermediate Orifice** C= 0.600
#7	Device 5	965.40'	**3.00' x 3.00' Horiz. High Flow Orifice** Limited to weir flow C= 0.600

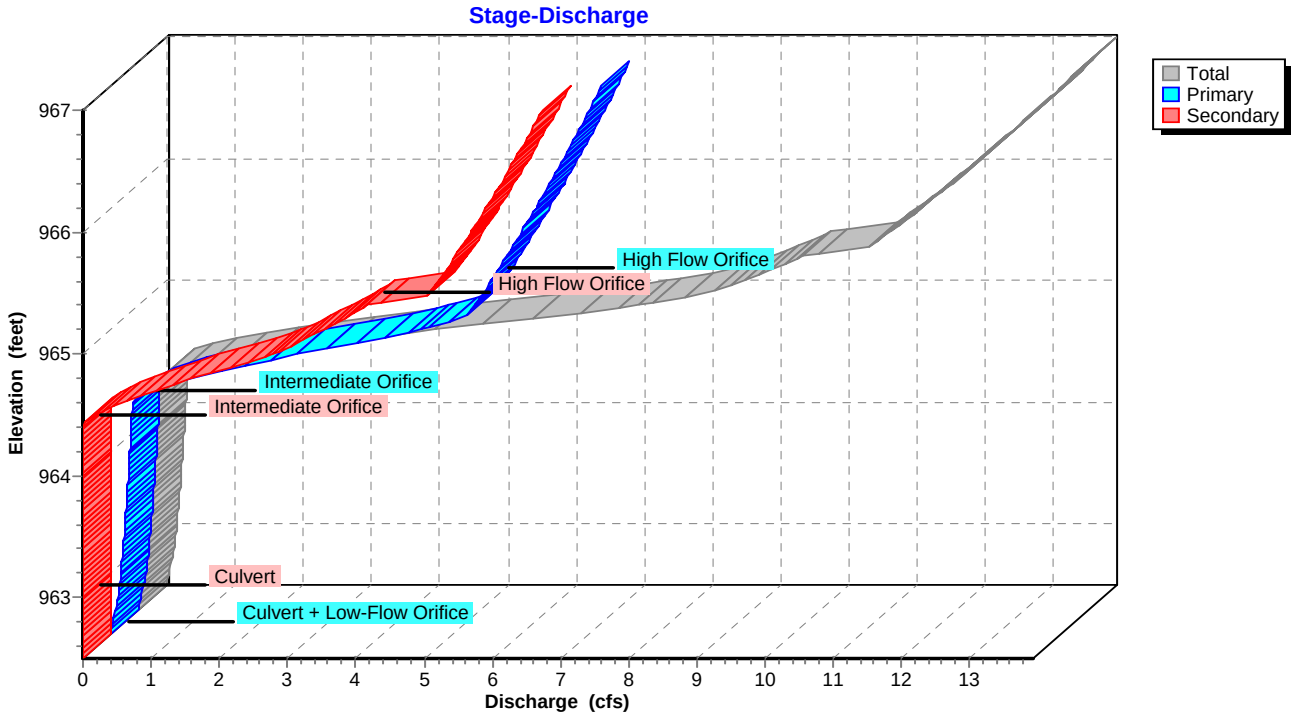
Primary OutFlow Max=5.64 cfs @ 12.10 hrs HW=965.46' (Free Discharge)
- **1=Culvert** (Barrel Controls 5.64 cfs @ 7.19 fps)
  - **2=Low-Flow Orifice** (Passes < 0.40 cfs potential flow)
  - **3=Intermediate Orifice** (Passes < 6.48 cfs potential flow)
  - **4=High Flow Orifice** (Passes < 0.61 cfs potential flow)

Secondary OutFlow Max=4.93 cfs @ 12.10 hrs HW=965.46' (Free Discharge)
- **5=Culvert** (Passes 4.93 cfs of 5.04 cfs potential flow)
  - **6=Intermediate Orifice** (Orifice Controls 4.32 cfs @ 4.32 fps)
  - **7=High Flow Orifice** (Weir Controls 0.61 cfs @ 0.81 fps)

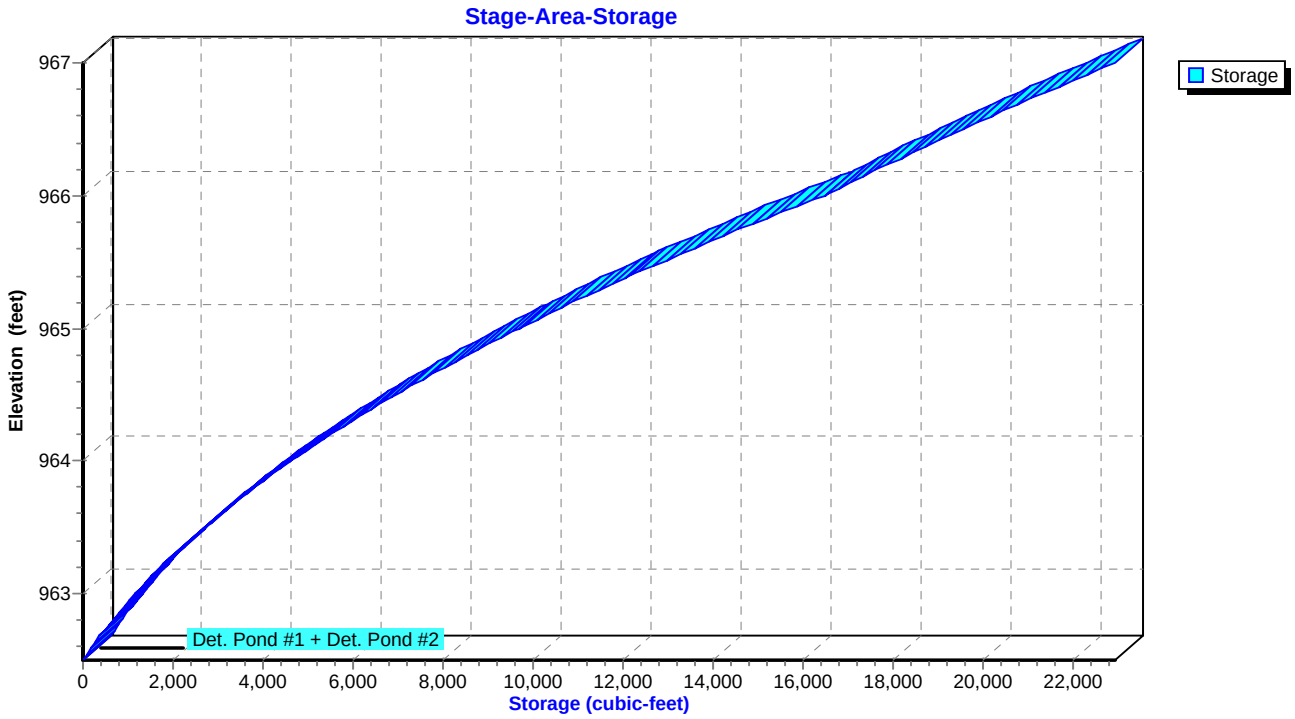
Pond 14P: Detention Pond



Pond 14P: Detention Pond



Pond 14P: Detention Pond



Summary for Pond 17P: Bioretention #3A

Inflow Area = 0.305 ac, 77.05% Impervious, Inflow Depth = 5.40" for 100-Year event
Inflow = 1.81 cfs @ 12.09 hrs, Volume= 0.137 af
Outflow = 1.80 cfs @ 12.11 hrs, Volume= 0.137 af, Atten= 1%, Lag= 1.1 min
Primary = 1.80 cfs @ 12.11 hrs, Volume= 0.137 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.67' @ 12.11 hrs Surf.Area= 938 sf Storage= 446 cf

Plug-Flow detention time= 90.5 min calculated for 0.137 af (100% of inflow)
Center-of-Mass det. time= 90.5 min (865.6 - 775.1)

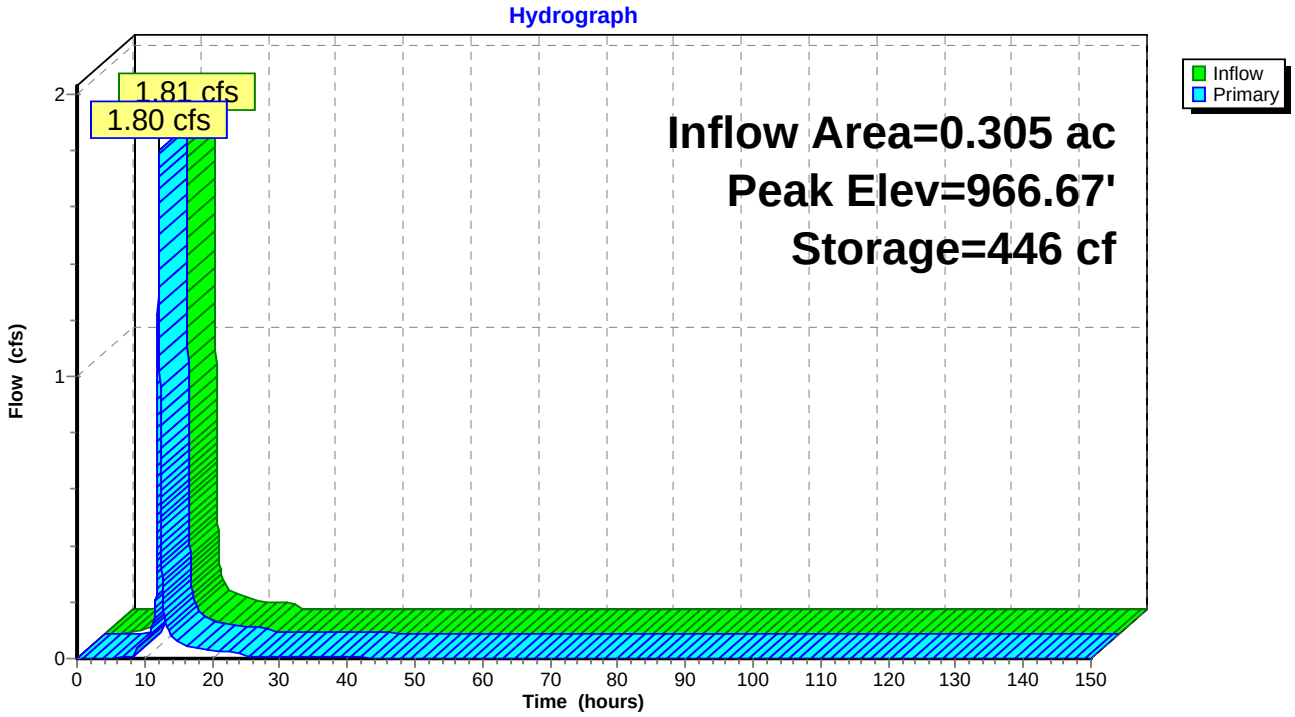
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	819 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	462	0	0
966.50	756	305	305
967.00	1,300	514	819

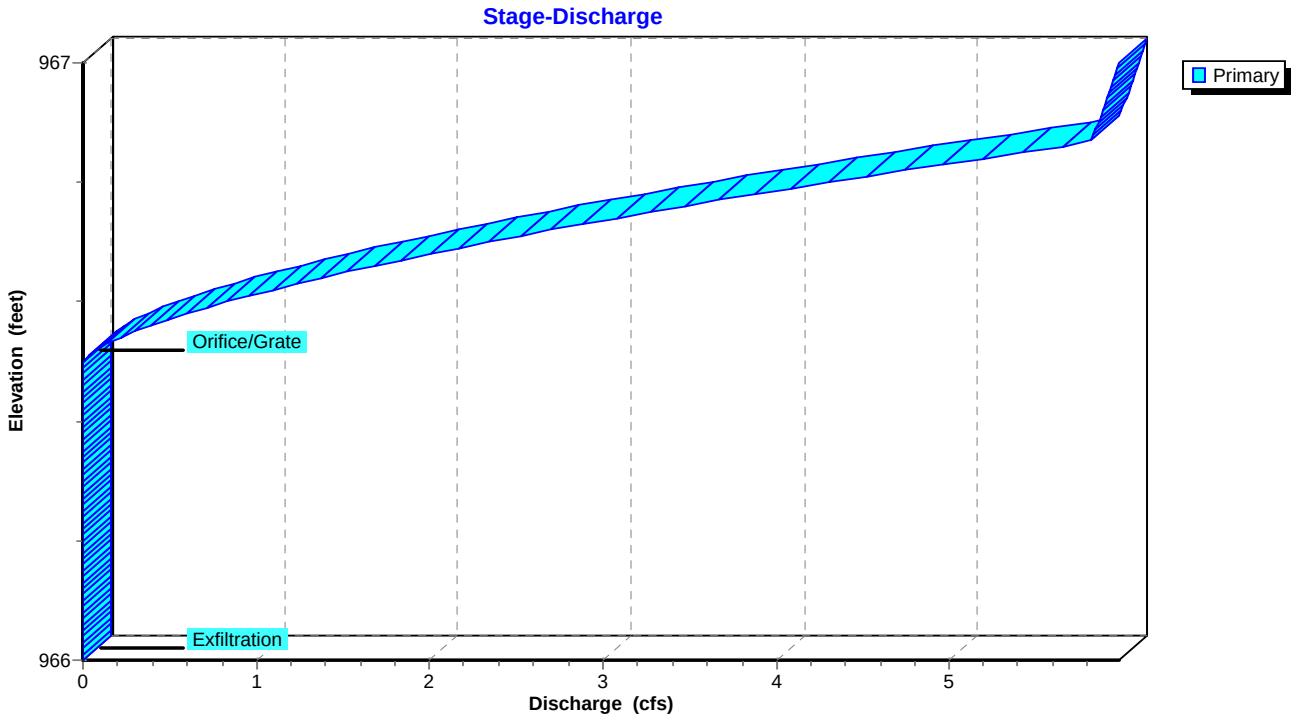
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=1.80 cfs @ 12.11 hrs HW=966.67' (Free Discharge)
└─**1=Culvert** (Passes 1.80 cfs of 5.57 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └─**3=Orifice/Grate** (Weir Controls 1.79 cfs @ 1.34 fps)

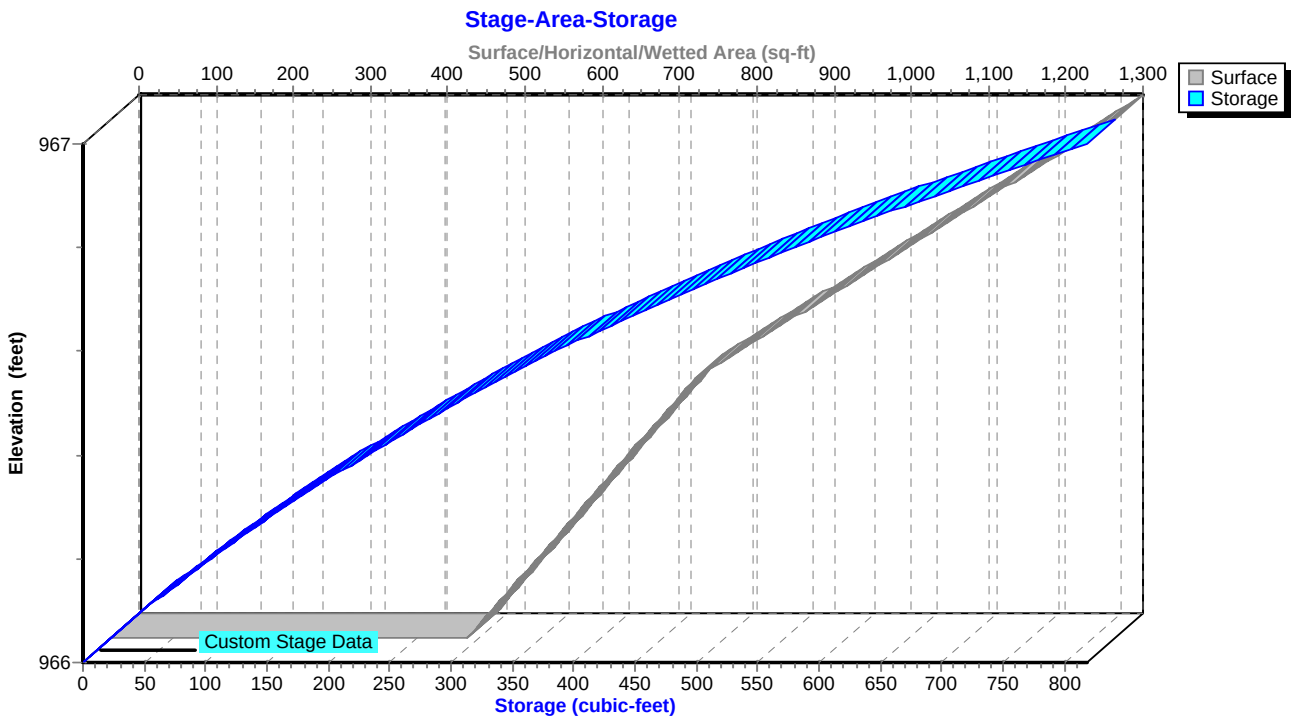
Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Pond 17P: Bioretention #3A



Summary for Pond 21P: Bioretention #4

Inflow Area = 0.598 ac, 10.87% Impervious, Inflow Depth = 4.08" for 100-Year event
Inflow = 3.25 cfs @ 12.05 hrs, Volume= 0.203 af
Outflow = 3.21 cfs @ 12.07 hrs, Volume= 0.203 af, Atten= 1%, Lag= 1.1 min
Primary = 3.21 cfs @ 12.07 hrs, Volume= 0.203 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 966.75' @ 12.07 hrs Surf.Area= 1,224 sf Storage= 629 cf

Plug-Flow detention time= 66.3 min calculated for 0.203 af (100% of inflow)
Center-of-Mass det. time= 66.4 min (878.8 - 812.3)

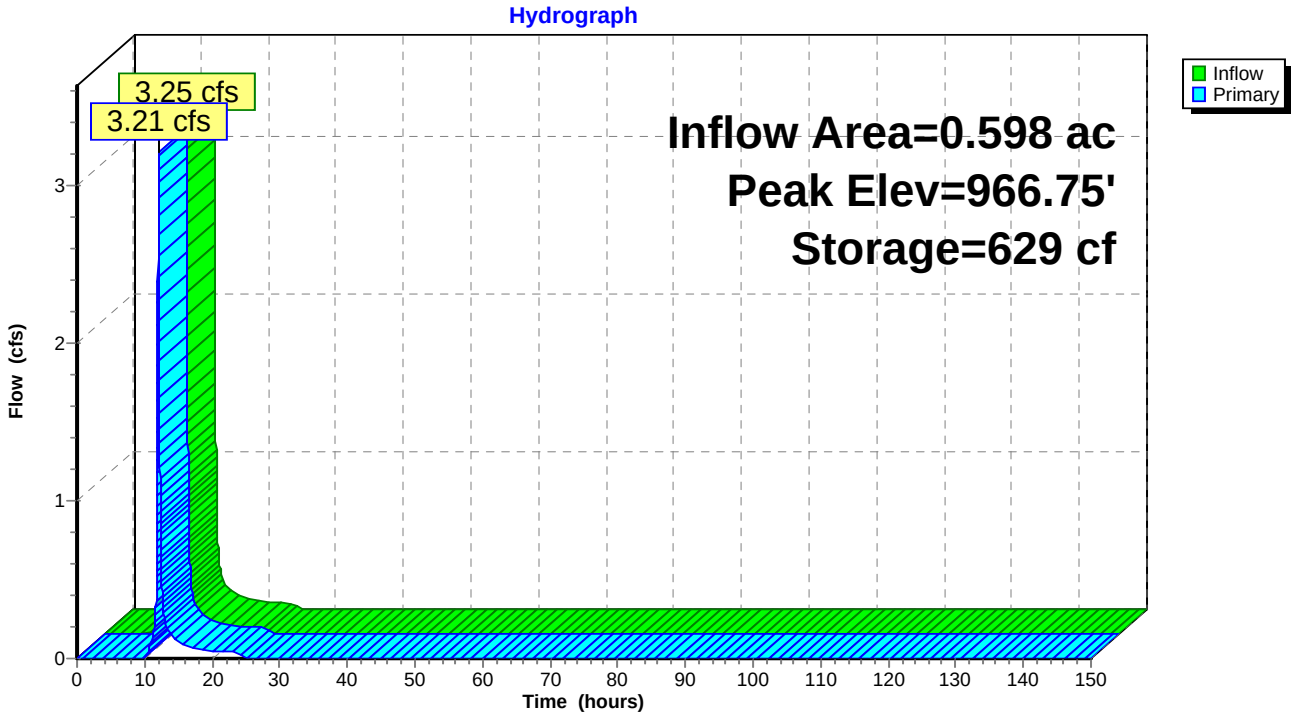
Volume	Invert	Avail.Storage	Storage Description
#1	966.00'	977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
966.00	519	0	0
966.50	933	363	363
967.00	1,523	614	977

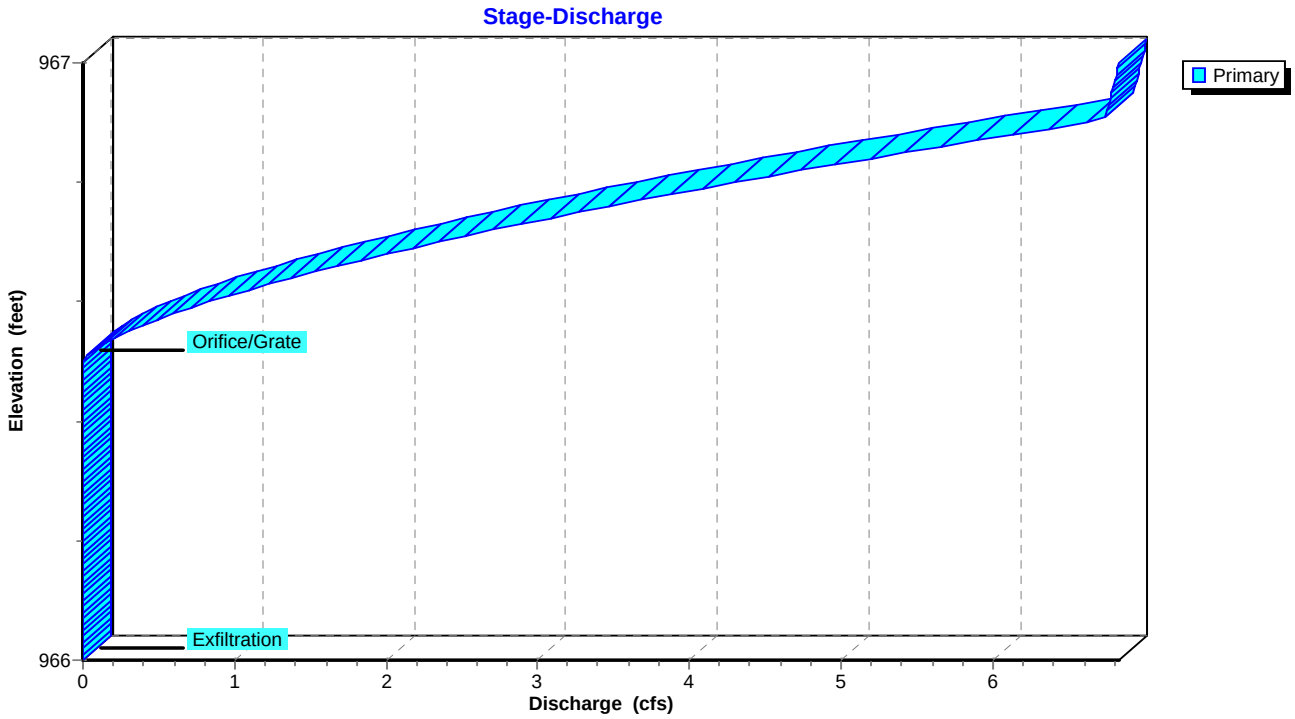
Device	Routing	Invert	Outlet Devices
#1	Primary	962.50'	**12.0" x 47.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 962.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	966.00'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	966.50'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=3.21 cfs @ 12.07 hrs HW=966.75' (Free Discharge)
└─**1=Culvert** (Passes 3.21 cfs of 6.58 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  └─**3=Orifice/Grate** (Weir Controls 3.21 cfs @ 1.62 fps)

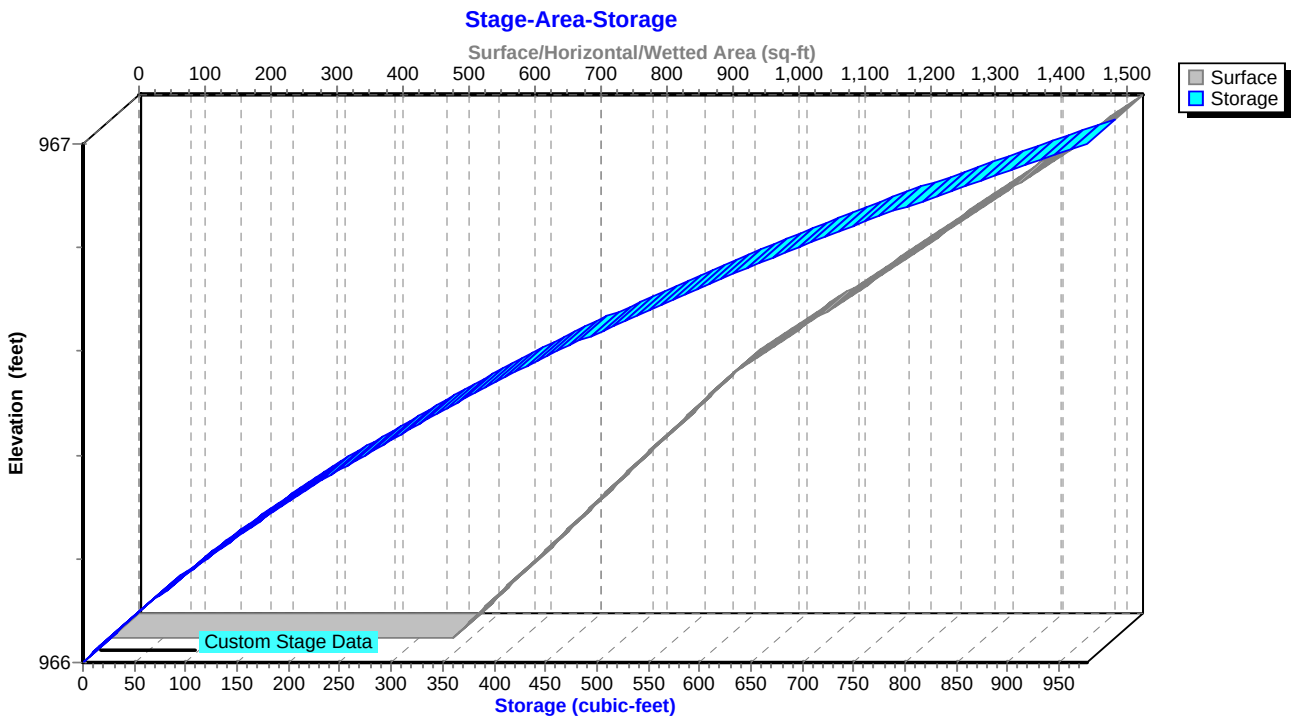
Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Pond 21P: Bioretention #4



Summary for Pond 24P: Bioretention #3B

Inflow Area = 0.081 ac, 64.20% Impervious, Inflow Depth = 5.17" for 100-Year event
Inflow = 0.67 cfs @ 11.97 hrs, Volume= 0.035 af
Outflow = 0.67 cfs @ 11.98 hrs, Volume= 0.035 af, Atten= 1%, Lag= 0.5 min
Primary = 0.67 cfs @ 11.98 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs
Peak Elev= 968.49' @ 11.98 hrs Surf.Area= 375 sf Storage= 191 cf

Plug-Flow detention time= 174.2 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 174.2 min (947.4 - 773.2)

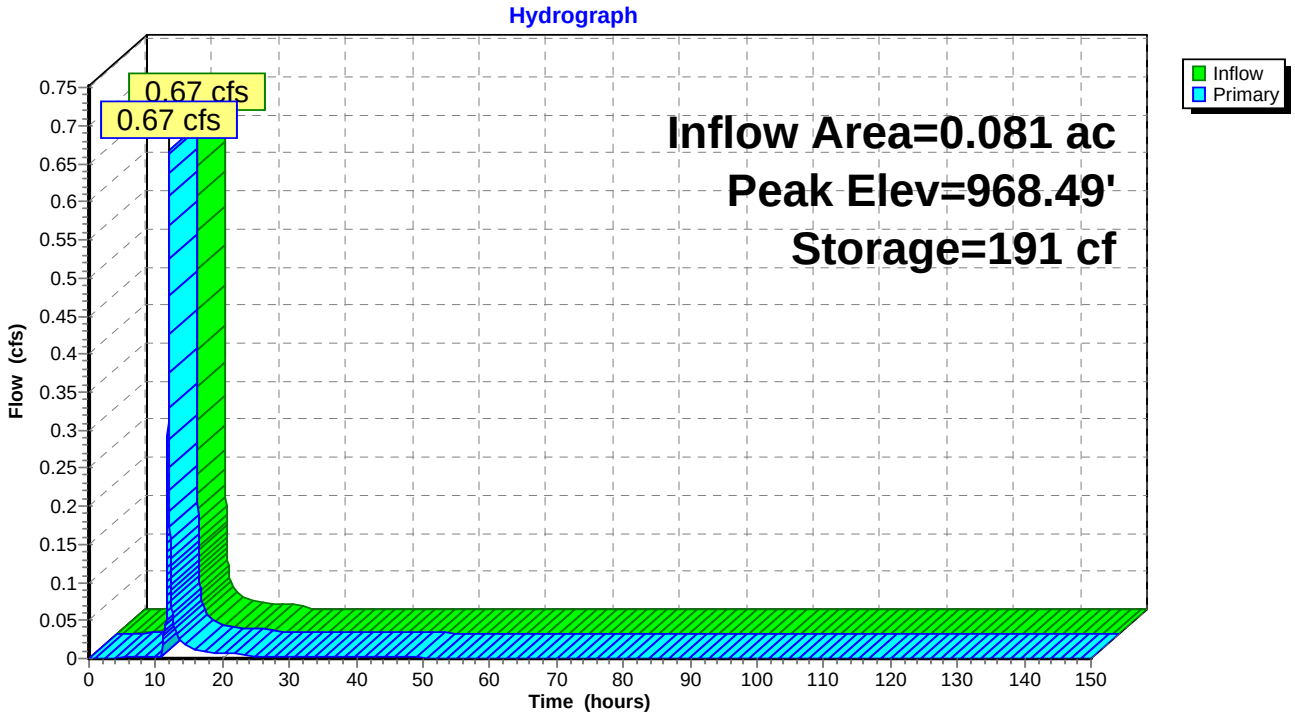
Volume	Invert	Avail.Storage	Storage Description
#1	967.85'	235 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
967.85	229	0	0
968.10	283	64	64
968.60	402	171	235

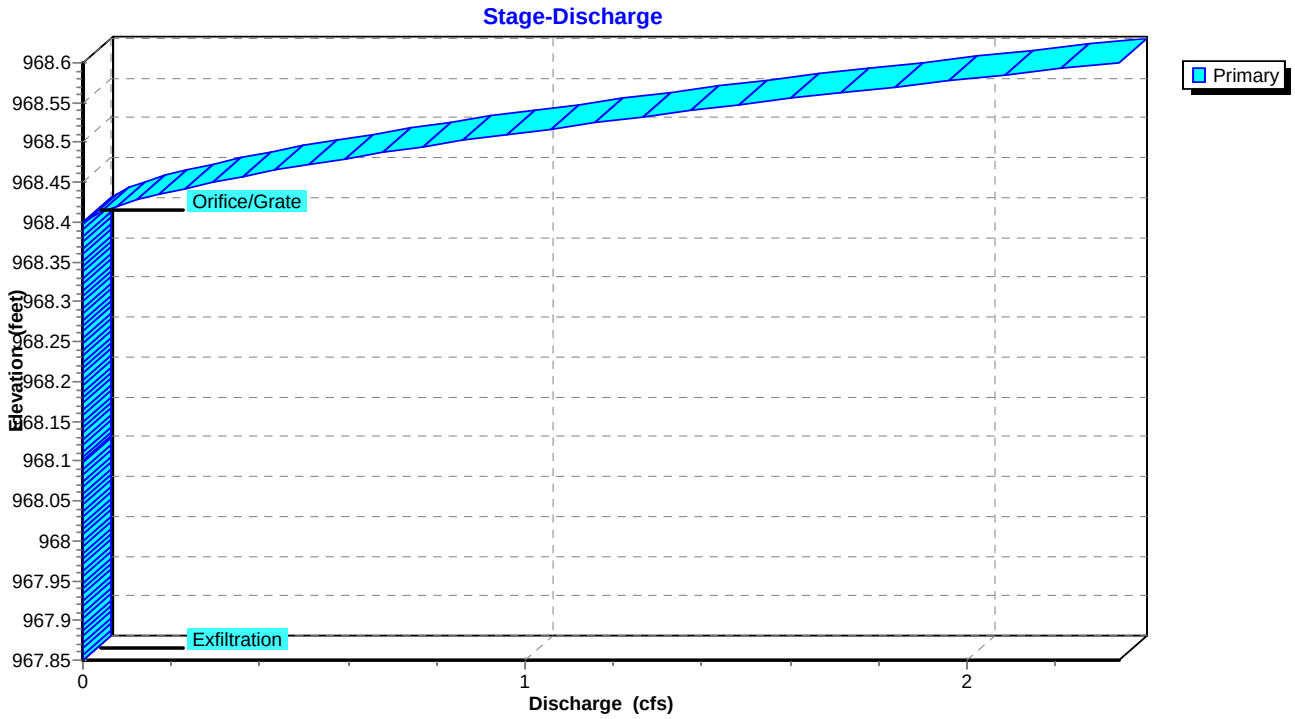
Device	Routing	Invert	Outlet Devices
#1	Primary	964.00'	**12.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 963.00' S= 0.0667 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	967.85'	**0.250 in/hr Exfiltration over Surface area**
#3	Device 1	968.40'	**2.00' x 2.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=0.67 cfs @ 11.98 hrs HW=968.49' (Free Discharge)
└─**1=Culvert** (Passes 0.67 cfs of 7.55 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Weir Controls 0.66 cfs @ 0.96 fps)

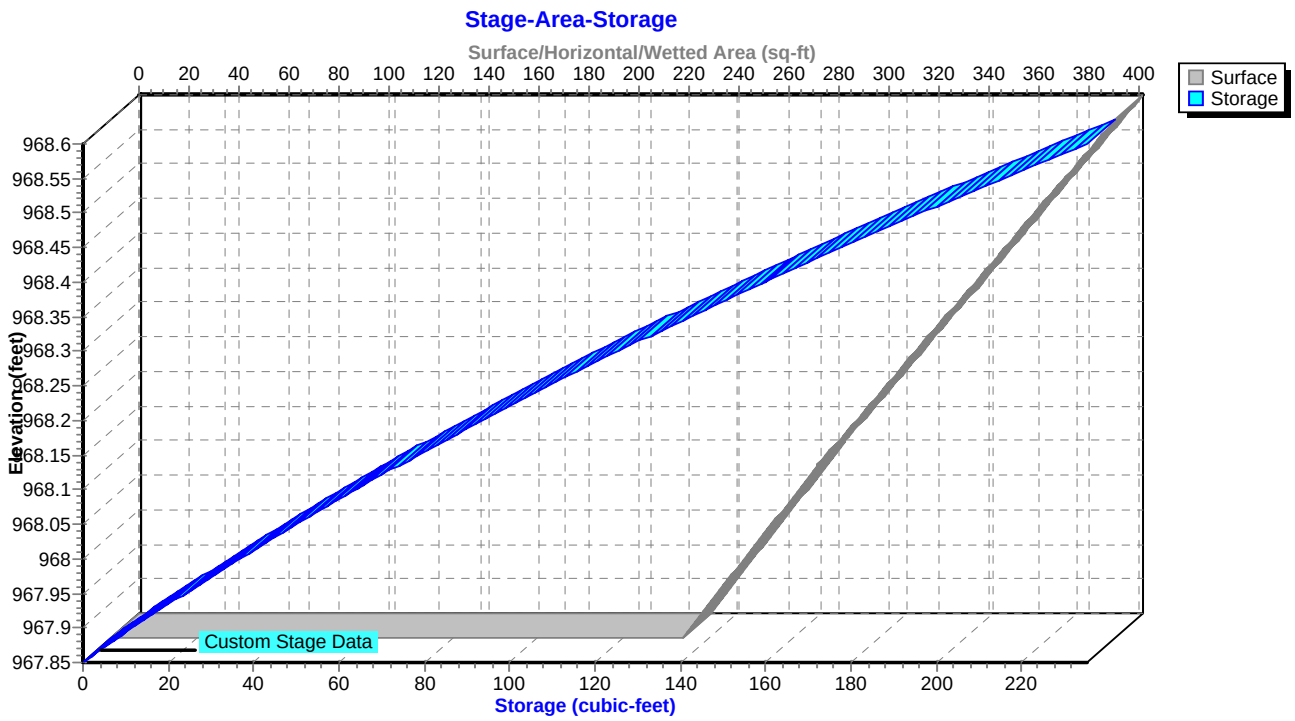
Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B



Pond 24P: Bioretention #3B

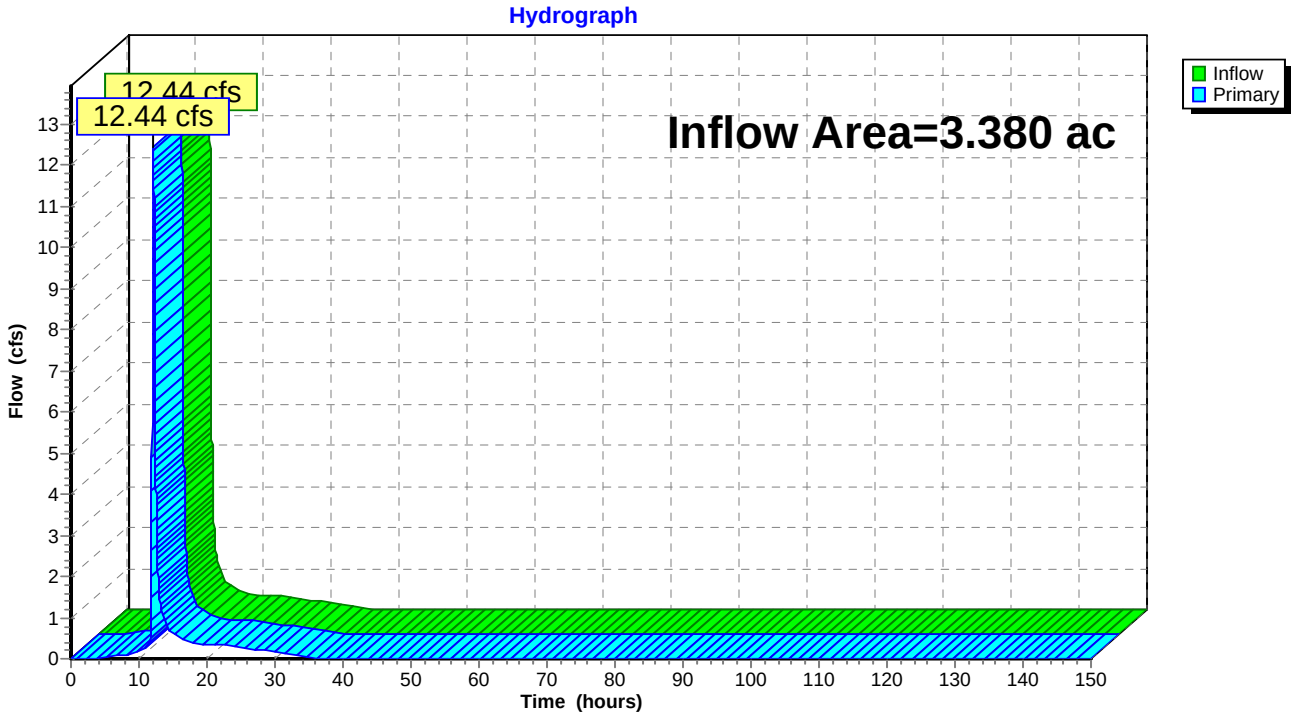


Summary for Link 26L: Analysis Point #1

Inflow Area = 3.380 ac, 44.84% Impervious, Inflow Depth = 4.38" for 100-Year event
Inflow = 12.44 cfs @ 12.11 hrs, Volume= 1.234 af
Primary = 12.44 cfs @ 12.11 hrs, Volume= 1.234 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-150.00 hrs, dt= 0.01 hrs

Link 26L: Analysis Point #1



MARATHON ENGINEERING
39 Cascade Drive / Rochester, NY 14614 / Phone (585) 458-7770

Project: **802-812 Dryden Road**
Project No.: **0841-17**
By: **AMF**
Date: **6/13/2017**

Channel Protection Volume (CP_V) -

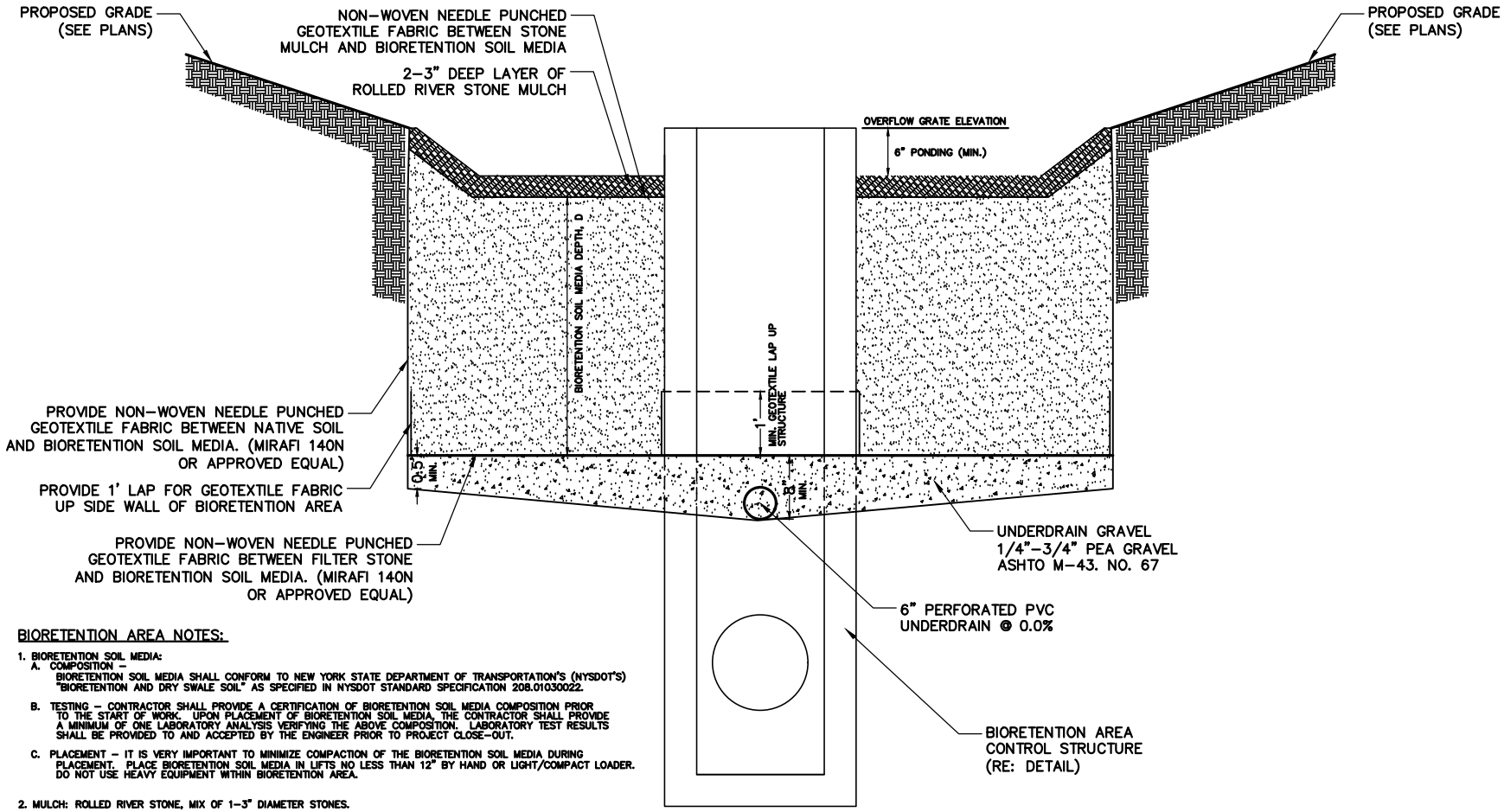
Provide 24-hour detention for the runoff from the 1-year design storm:

* The "Short-cut" sizing technique presented in Appendix B of NYSDEC's SMDM is used.

Total Area =	2.90	ac
Composite CN =	89.00	
T_c =	0.100	hrs
I_a =	0.247	in (per Table 4-1 in TR-55)
P =	2	in (per Figure 4.2 in SMDM)
I_a/P =	0.12	
Therefore, q_u =	1000	csm/in (per Exhibit 4-II in TR-55)
T (extended detention time) =	24	hrs
q_o/q_I (ratio of outflow to inflow) =	0.025	(per Figure B.1 in SMDM)
V_s/V_r (ratio of req. stor. Vol. to runoff vol.) =	0.647	(per Eq. (2.1.16) in SMDM)
Q_d (post dev. Runoff for 1yr storm) =	1.041	in (per Table 2-1 in TR-55)
Therefore, V_S =	0.163	ac-ft (per Eq. (2.1.17) in SMDM)
WQ_v Detention =	0.000	ac-ft
Net Required Volume =	0.163	ac-ft
Provided RRv=	0.034	
Adjusted CPv=	**0.129**	

Discharge Orifice Size

Rate =
Net Required CP_V/24 hrs.
= 0.06 cfs
Average Head = (CP_v P.W.S. - N.W.S.)/2
= 1.00 ft
Orifice Discharge
Q = $Cd*A*(2gh)^{1/2}$
Q = Discharge (cfs)
Cd = Coefficient of Discharge (sharp edged orifice = 0.60)
g = gravity (32.2)
h = Head (ft)
A = Open area of orifice (ft^2)
= $Q/(Cd(2gh)^{1/2})$
= 0.013 ft^2
Diameter = 1.6 in



BIORETENTION AREA NOTES:

1. BIORETENTION SOIL MEDIA:
   A. COMPOSITION – BIORETENTION SOIL MEDIA SHALL CONFORM TO NEW YORK STATE DEPARTMENT OF TRANSPORTATION'S (NYSDOT'S) "BIORETENTION AND DRY SWALE SOIL" AS SPECIFIED IN NYSDOT STANDARD SPECIFICATION 208.01030022.
   B. TESTING – CONTRACTOR SHALL PROVIDE A CERTIFICATION OF BIORETENTION SOIL MEDIA COMPOSITION PRIOR TO THE START OF WORK. UPON PLACEMENT OF BIORETENTION SOIL MEDIA, THE CONTRACTOR SHALL PROVIDE A MINIMUM OF ONE LABORATORY ANALYSIS VERIFYING THE ABOVE COMPOSITION. LABORATORY TEST RESULTS SHALL BE PROVIDED TO AND ACCEPTED BY THE ENGINEER PRIOR TO PROJECT CLOSE-OUT.
   C. PLACEMENT – IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF THE BIORETENTION SOIL MEDIA DURING PLACEMENT. PLACE BIORETENTION SOIL MEDIA IN LIFTS NO LESS THAN 12" BY HAND OR LIGHT/COMPACT LOADER. DO NOT USE HEAVY EQUIPMENT WITHIN BIORETENTION AREA.
2. MULCH: ROLLED RIVER STONE, MIX OF 1-3" DIAMETER STONES.
3. CONSTRUCTION SEQUENCE: THE BIORETENTION AREA MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA(S) HAVE BEEN STABILIZED.
4. LANDSCAPING: REFER TO LANDSCAPING PLAN FOR PLANTINGS WITHIN THE BIORETENTION AREA.

BIORETENTION DESIGN SUMMARY:

AREA DESIGNATION	AREA #1	AREA #2	AREA #3A	AREA #3B	AREA #4
SURFACE AREA	2880 SF	412 SF	462 SF	283 SF	520 SF
SOIL MEDIA DEPTH, D	2.5'	2.5'	2.5'	2.5'	2.5'
UNDERDRAIN ELEVATION	962.75	963.75	962.50	964.40	962.50
OVERFLOW ELEVATION	966.75	967.50	966.50	968.40	966.50
STONE MULCH ELEVATION (TOP OF STONE)	966.25	967.00	966.0	967.90	966.00

4 BIORETENTION AREA

SCALE: N.T.S

MARATHON ENGINEERING
39 Cascade Drive / Rochester, NY 14614 / Phone (585) 458-7770

Project: **802-812 Dryden Road**
Project No.: **0841-17**
By: **AMF**
Date: **6/7/2017**

Existing / Proposed Impervious Cover Summary

Breakdown of Watersheds:

Existing Conditions

Analysis Point ID	Impervious Area (acres)	Area Description
1	0.46	
Total Analysis Pt #1	0.46	

Proposed Conditions

Analysis Point ID	Impervious Area (acres)	Area Description
1	1.56	
Total Analysis Pt #1	1.56	

1.22 Total Impervious Area used in WQv Calculations for Bioretention Area #1, acres [1, 2,]

[1] Existing Impervious Areas accounted for above were only calculated in areas proposed to be physically disturbed.
2 Per Chapter 9 of the SMDM under the "Redevelopment Criteria" 25% of the existing impervious area disturbed and 100% of the new impervious cover is to be included in the calculating the impervious coverage used in determining total WQv to be treated in the respective Water Quality Practice.

ITEM 208.01030022 BIORETENTION AND DRY SWALE SOIL
ITEM 208.01040022 LABORATORY TESTING FOR SOIL PHOSPHORUS CONCENTRATION

DESCRIPTION

This work shall consist of installing Bioretention and Dry Swale Soil in accordance with the contract documents and as directed by the Engineer.

The work shall also consist of having the Bioretention and Dry Swale Soil tested for total soil phosphorus concentration at a qualified laboratory. A qualified laboratory shall be defined as a laboratory that is certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) to test soil for total soil phosphorous.

MATERIALS

The following sections of the standard specifications apply:

§703-07	Concrete Sand
§713-01	Topsoil, Type A (see exceptions below)

The soil for Bioretention areas and Dry Swales shall be a uniform mix, free of stones, stumps, roots or other objects larger than two inches (2") in diameter. The Bioretention and Dry Swale soil shall be visibly free of noxious weeds.

Bioretention and Dry Swale Soil shall be a well blended mixture of three (3) parts sand and one (1) part topsoil, by volume. The Bioretention and Dry Swale Soil shall have a pH range of 5.2 to 7.6, and an organic content of 3-7%.

Sand shall meet the requirements of §703-07 *Concrete Sand*.

Topsoil shall be in accordance with the requirements of §713-01 *Topsoil* for Topsoil Type A, except as follows:

- All topsoil shall be sampled and tested, regardless of the source.
- Sampling of topsoil, amended topsoil, and the Bioretention and Dry Swale Soil shall be done by the Contractor/Supplier. Sampling protocol shall be in accordance with §713-01 *Topsoil*.

Soil amendments to increase organic content shall be peat moss. Peat moss shall be commercially produced and shall be composed of the partly decomposed stems and leaves of any or several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue, and other foreign matter. It shall have a pH range between 3.5 pH - 5.5 pH as determined in accordance with the Association of Official Agricultural Chemists' testing methods. It's water-absorbing ability shall be a minimum of 1100% by weight on an oven-dry basis.

Acceptance of Bioretention and Dry Swale soil will be based upon a material certification that the

material conforms to the above requirements. The Contractor/Supplier shall provide to the Engineer copies of testing results of the sand gradation, topsoil gradation, organic content percentage of the Bioretention and Dry Swale Soil, and pH of the Bioretention and Dry Swale Soil. These tests are to be paid under the Bioretention and Dry Swale Soil item.

The Contractor shall provide to the Engineer copies of testing results for Soil Phosphorus Concentration. Samples to be submitted to the qualified laboratory shall be obtained in accordance with §713-01 *Topsoil*. Sampling shall be paid under the pay item for Bioretention and Dry Swale Soil. The results of the Soil Phosphorus analysis shall not be used as the basis for material acceptance.

Sampling frequency for total phosphorous shall be one composite sample for the first 100 to 500 cubic yards of soil, and an additional composite sample for each additional 500 cubic yards, or portion thereof. No samples are required for stockpiles of less than 100 cubic yards.

CONSTRUCTION DETAILS

Bioretention and Dry Swale Soil shall be installed at the locations and to the depth(s) as shown in the contract documents. Placement of Bioretention and Dry Swale Soil shall be done in lifts of 12 inches to 18 inches. The soil shall be loosely compacted, such as by tamping lightly with a dozer or backhoe bucket. No other materials or substances shall be mixed or dumped within the Bioretention area and Dry Swale that may be harmful to plant growth, or prove a hindrance to planting or maintenance operations.

METHOD OF MEASUREMENT

Bioretention and Dry Swale Soil

The work will be measured as the number of cubic yards of Bioretention and Dry Swale Soil installed, computed from payment lines shown in the contract documents.

Laboratory Testing for Soil Phosphorus Concentration

The work will be measured by the number of soil samples analyzed for Soil Phosphorus Concentration by a qualified laboratory.

BASIS OF PAYMENT

The unit price bid for a cubic yard of Bioretention and Dry Swale Soil shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including costs for testing.

The unit price bid for Laboratory Testing for Soil Phosphorus Concentration, shall include the receipted costs of testing, including the cost of the laboratory test(s) and all labor, materials and equipment required to obtain and deliver soil sample(s) to the qualified laboratory plus 5% for profit

and overhead.

Version 1.7
Last Updated: 10/02/2015

Total Water Quality Volume Calculation
WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	1	
P=	1.00	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description		
1	1.14	0.89	78%	0.75	3,115	Bio. Ret #1		
2	0.42	0.10	24%	0.26	403	Bio. Ret #2		
3	0.40	0.15	38%	0.39	563	Bio. Ret #3		
4	0.60	0.08	13%	0.17	370	Bio. Ret #4		
5								
6								
7								
8								
9								
10								
Subtotal (1-30)	2.56	1.22	48%	0.48	**4,450**	**Subtotal 1**		
Total	2.56	1.22	48%	0.48	**4,450**	**Initial WQv**	**0.10**	**af**

Identify Runoff Reduction Techniques By Area

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

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*		
"<<Initial WQv"	2.56	1.22	48%	0.48	4,450		
Subtract Area	0.00	0.00					
WQv adjusted after Area Reductions	**2.56**	**1.22**	48%	0.48	4,450		
Disconnection of Rooftops		0.00					
Adjusted WQv after Area Reduction and Rooftop Disconnect	2.56	1.22	48%	0.48	**4,450**	**0.10**	**af**
WQv reduced by Area Reduction techniques					0	**0.00**	**af**

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

All Subcatchments						
Catchment	**Total Area** *(Acres)*	**Impervious Cover** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient** *Rv*	**WQv** *(ft^3)*	**Description**
1	1.14	0.89	0.78	0.75	3114.54	Bio. Ret #1
2	0.42	0.10	0.24	0.26	403	Bio. Ret #2
3	0.40	0.15	0.38	0.39	562.65	Bio. Ret #3
4	0.60	0.08	0.13	0.17	370.26	Bio. Ret #4
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**cf**	**cf**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00			
	Bioretention & Infiltration Bioretention	F-5	2.56	1.22	1492	2959
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction		→	0.00	0.00	0	
Totals by Volume Reduction		→	0.00	0.00	0	
Totals by Standard SMP w/RRV		→	2.56	1.22	1492	2959
Totals by Standard SMP		→	0.00	0.00		0
Totals (Area + Volume + all SMPs)		→	2.56	1.22	1,492	2,959
	Impervious Cover √	okay				
	Total Area √	okay				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A	0.75	55%
B		40%
C		30%
D	**2.55**	20%
Total Area	3.3	
Calculate the Minimum RRv		
S =	**0.28**	
Impervious =	1.22	*acre*
Precipitation	1	*in*
Rv	0.95	
Minimum RRv	**1,176**	***ft3***
	0.03	af

NOI QUESTIONS

#	NOI Question	Reported Value		
		cf	af	
28	Total Water Quality Volume (WQv) Required	4450	*0.102*	
30	Total RRV Provided	1492	*0.034*	
31	Is RRv Provided ≥WQv Required?	No		
32	Minimum RRv	1176	*0.027*	
32a	Is RRv Provided ≥ Minimum RRv Required?	Yes		
33a	Total WQv Treated	2959	*0.068*	
34	Sum of Volume Reduced & Treated	4450	*0.102*	33.52%
34	Sum of Volume Reduced and Treated	4450	*0.102*	
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	Yes		

Apply Peak Flow Attenuation			
36	Channel Protection	*Cpv*	
37	Overbank	*Qp*	
37	Extreme Flood Control	*Qf*	
	Are Quantity Control requirements met?		

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**1**						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	1.14	0.89	0.78	0.75	3114.54	1.00	Bio. Ret #1
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	78%	0.75	3,115	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	
Soil Information							
Soil Group		D					
Soil Infiltration Rate		0.00	*in/hour*	*Okay*			
Using Underdrains?		Yes	*Okay*				
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				3,115	*ft^3*		
Enter Depth of Soil Media			*df*	2.5	*ft*	*2.5-4 ft*	
Enter Hydraulic Conductivity			*k*	0.5	*ft/day*		
Enter Average Height of Ponding			*hf*	0.25	*ft*	*6 inches max.*	
Enter Filter Time			*tf*	2	*days*		
Required Filter Area			***Af***	**2831**	***ft^2***		
Determine Actual Bio-Retention Area							
Filter Width		19.5	*ft*				
Filter Length		100	*ft*				
Filter Area		1950	*ft^2*				
Actual Volume Provided		2145	*ft^3*				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?				Select Practice			
RRv		858					
RRv applied		**858**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***			
Volume Treated		2,257	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*			
Volume Directed		0	*ft^3*	This volume is directed another practice			
Sizing √		Error		*Check to be sure Area provided ≥ Af*			

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor & Schueler, 1996)

Design Point:	**1**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	0.42	0.10	0.24	0.26	402.93	1.00	Bio. Ret #2
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	24%	0.26	403	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	

Soil Information			
Soil Group	A		
Soil Infiltration Rate	0.00	*in/hour*	*Okay*
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		403	*ft^3*	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.25	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**366**	***ft^2***	

Determine Actual Bio-Retention Area			
Filter Width	10	*ft*	
Filter Length	40	*ft*	
Filter Area	400	*ft^2*	
Actual Volume Provided	440	*ft^3*	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?			Select Practice	
RRv	176			
RRv applied	**176**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	227	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	*ft^3*	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**1**						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	0.40	0.15	0.38	0.39	562.65	1.00	Bio. Ret #3
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	38%	0.39	563	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	
Soil Information							
Soil Group		A					
Soil Infiltration Rate		0.00	*in/hour*	*Okay*			
Using Underdrains?		Yes	*Okay*				
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				563	*ft^3*		
Enter Depth of Soil Media			*df*	2.5	*ft*	*2.5-4 ft*	
Enter Hydraulic Conductivity			*k*	0.5	*ft/day*		
Enter Average Height of Ponding			*hf*	0.25	*ft*	*6 inches max.*	
Enter Filter Time			*tf*	2	*days*		
Required Filter Area			***Af***	**512**	***ft^2***		
Determine Actual Bio-Retention Area							
Filter Width		10	*ft*				
Filter Length		69	*ft*				
Filter Area		690	*ft^2*				
Actual Volume Provided		759	*ft^3*				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?				Select Practice			
RRv		304					
RRv applied		**304**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***			
Volume Treated		259	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*			
Volume Directed		0	*ft^3*	This volume is directed another practice			
Sizing √		OK		*Check to be sure Area provided ≥ Af*			

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**1**						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
4	0.60	0.08	0.13	0.17	370.26	1.00	Bio. Ret #4
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	13%	0.17	370	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	
Soil Information							
Soil Group		A					
Soil Infiltration Rate		0.00	*in/hour*	*Okay*			
Using Underdrains?		Yes	*Okay*				
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				370	*ft^3*		
Enter Depth of Soil Media			*df*	2.5	*ft*	*2.5-4 ft*	
Enter Hydraulic Conductivity			*k*	0.5	*ft/day*		
Enter Average Height of Ponding			*hf*	0.25	*ft*	*6 inches max.*	
Enter Filter Time			*tf*	2	*days*		
Required Filter Area			***Af***	**337**	***ft^2***		
Determine Actual Bio-Retention Area							
Filter Width		35	*ft*				
Filter Length		10	*ft*				
Filter Area		350	*ft^2*				
Actual Volume Provided		385	*ft^3*				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?				Select Practice			
RRv		154					
RRv applied		**154**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***			
Volume Treated		216	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*			
Volume Directed		0	*ft^3*	This volume is directed another practice			
Sizing √		OK		*Check to be sure Area provided ≥ Af*			

Bioretention Worksheet

Total RRv Applied	1,491.60
Total Area	2.56
Total Impervious Area	1.22
Total Volume Treated	2,958.78
Rooftop Disconnect Impervious Area Total	0.00

MARATHON ENGINEERING
39 Cascade Drive / Rochester, NY 14614 / Phone (585) 458-7770

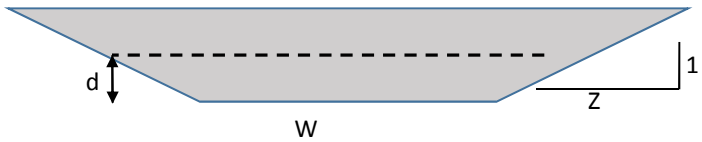
Project: **802-812 Dryden Road**
Project No.: **0841-17**
By: **AMF**
Date: **6/13/2017**

DETENTION POND EMERGENCY SPILLWAY

Design Storm:	100 year	
Design Storm Discharge (cfs):	16	
Swale Side Slope, Z:1 (H:V)	2	
Swale Slope (ft/ft)	0.007	
Manning's Coeff, n	0.025	
Design Flow Depth, d (ft)	0.5	
Channel Width, w (ft)	5	
Wetted Peritmeter, P (ft)	7.24	
Flow Area X-Section, A (sf)	3.00	
Hydraulic Radius, R (ft)	0.415	=(A/P)
Flow Velocity, V (ft/sec)	2.77	
Channel Capacity, Q (cf/sec)	8.30	=A x V

$$V = \frac{1.486}{n} * R^{2/3} * S$$

Q = V x A



MARATHON ENGINEERING
39 Cascade Drive / Rochester, NY 14614 / Phone (585) 458-7770

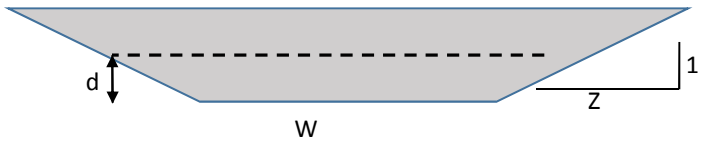
Project: **802-812 Dryden Road**
Project No.: **0841-17**
By: **AMF**
Date: **6/13/2017**

GRASS SWALE

Design Storm:	10 year	
Design Storm Discharge (cfs):	2	
Swale Side Slope, Z:1 (H:V)	2	
Swale Slope (ft/ft)	0.010	
Manning's Coeff, n	0.022	
Design Flow Depth, d (ft)	0.25	
Channel Width, w (ft)	3	
Wetted Peritmeter, P (ft)	4.12	
Flow Area X-Section, A (sf)	0.88	
Hydraulic Radius, R (ft)	0.212	=(A/P)
Flow Velocity, V (ft/sec)	2.41	
Channel Capacity, Q (cf/sec)	2.10	=A x V

$$V = \frac{1.486}{n} * R^{2/3} * S$$

Q = V x A



Appendix D

- Lighting

Ordering Information

HOLOPHANE outdoor lighting

DECORATIVE
Product Catalog

How to Construct a Catalog Number

Example:

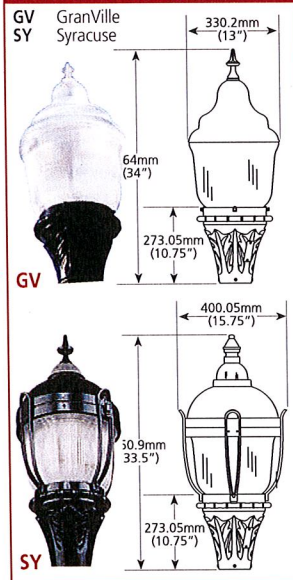
GV	050HP	12	S	B	3	N	C	B	F1
1	2	3	4	5	6	7	8	9	10
LUMINAIRE	WATTAGE	VOLTAGE	HOUSING	COLOR	OPTICS	TRIM	FINIAL	TRIM FINISH	OPTIONS/ACCESSORIES
GV	050HP	12	A	A	3	N	B	A	DTLPR12X
SY	055QL	20	C	B	4	R	C	B	DTLPR20/24/27X
	085QL	24	F	N	5		E	G	DTLPR34X
	35DHP	27	L	Z	6		F	N	FCVRX
	50DHP	34	M		7		N	U	F1
	070HP	48	S		8		P	Z	F2
	70DHP	MT					R		GV1A73X
	70DMH						S		GVBANDX
	100HP								MCVRX
	10DHP								P
	10DMH								WHS090
	15AHP								WHS120
	15DHP								WHS180
	15DMH								WHSL090
	175MH								WHSL120
	17DMH								WHSL180
	20DIN								

Catalog Number Information

c UL US LISTED

STEP 1: LUMINAIRE

GV GranVille
SY Syracuse



STEP 2: SOURCE AND WATTAGE

Mogul Base

050HP	50W HPS
070HP	70W HPS
100HP	100W HPS
15AHP	150W/55V HPS
175MH	175W MH

Medium Base

35DHP[1]	35W HPS
50DHP	50W HPS
70DHP	70W HPS
10DHP	100W HPS
15DHP	150W/55V HPS
70DMH[2]	70W MH
10DMH[2]	100W MH
15DMH[2]	150W MH
17DMH	175W MH
20DIN	200W Inc

INDUCTION

055QL[1]	55W Ind.
085QL[1]	85W Ind.

1 120V only
2 "MT" only

STEP 3: VOLTAGE

12	120V
20	208V
24	240V
27	277V
34	347V
48	480V
MT	Multi-tap

STEP 4: HOUSING

A[2]	Arcadian
C[2]	Convex Octagonal
F[2]	Fluted
L	Leaf
M	Modern Fluted Swing Open Design
S[1]	Simple

1 Casting for 3" tenon
2 Casting for 7" crown

STEP 5: COLOR

B	Black
Z	Bronze
N	Green
A	As specified

STEP 6: OPTICS

Asymmetric

3	Type III
4	Type IV
6	Type II – Lunar Optics
7	Type III – Lunar Optics

Symmetric

5	Type V
8	Type V – Lunar Optics

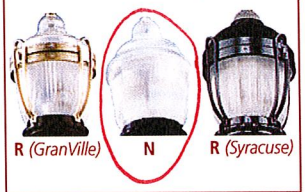
STEP 7: TRIM

GV

R	Hinged Top with Ribs and Bands
N	No Ribs or Bands

SY

R	Ribs, Bands and Spun Cover



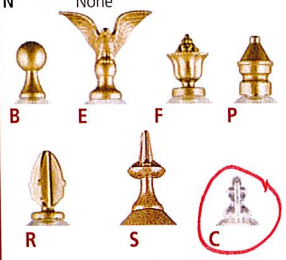
STEP 8: FINIAL

Painted Cast Aluminum

B	Ball
E	Eagle
F	Flower
P	Pawn
R	Cross
S	Standard

Other

C	Clear Acrylic, 3"
N	None



STEP 9: TRIM FINISH

B	Black
G	Gold
N	Green
Z	Bronze
U	No Trim Necessary
A	As Specified

STEP 10: OPTIONS/ACCESSORIES

FCVRX[1]	Full Decorative Aluminum Cover for "GV" (Finial required)
MCVRX[1]	Mayfield Decorative Aluminum Cover for "GV" (Covers 2/3 of the reflector and requires a finial)
P	Protected Starter for HPS Units
F1[2]	Single Fusing for 120, 240 and 277V Units. Ships Separate
F2[2]	Double Fusing for 208 and 240V Units. Ships Separate
GV1A73X[3]	3" to 7" Post Capital. Converts 3" Post Top Tenon to Flared 7" Post Capital. Use Only with "A", "F", or "C" Housings
GVBANDX[3]	Optional Decorative Band Kit Added to Glass Assembly for "GV" (Field installed)

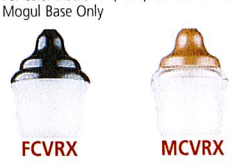
Photocontrol Kit for "L" and "S" Housing Style only

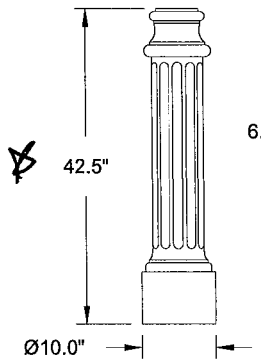
DTLPR12X[3]	120V, GV1A73 Post Capital
DTLPR20/24/27X[3]	208, 240 or 277V, GV1A73 Post Capital
DTLPR34X[3]	347V, GV1A73 Post Capital

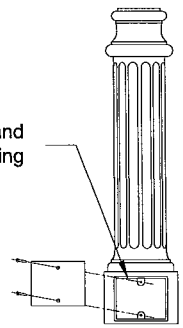
Internal House Side Shield

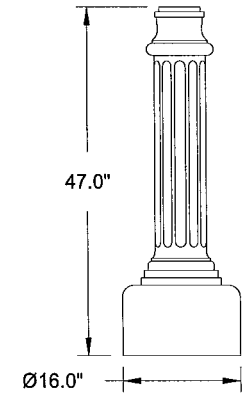
WHS090[4]	90°
WHS120[4]	120°
WHS180[4]	180°
WHSL090[4]	With Lunar Optics, 90°
WHSL120[4]	With Lunar Optics, 120°
WHSL180[4]	With Lunar Optics, 180°

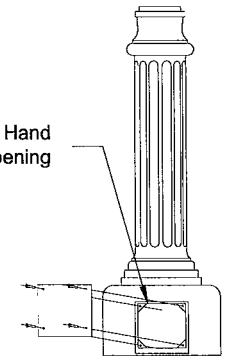
1 For color insert "B", "G", "N", "Z" or "A" for "X"
2 Fusing not available for 480V and 200W Incandescent
3 For color insert "B", "Z", "N" or "A" for "X"
4 Mogul Base Only



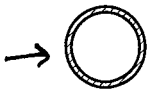


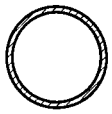




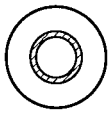


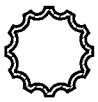
Shaft Style

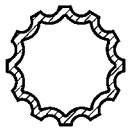

4" Dia. Smooth
S4C & S4J


5" Dia. Smooth
S5J

3"-4" Dia. Tapered
T4C


3"-5" Dia. Tapered
T5C


4" Dia. Fluted
F4C & F4J


5" Dia. Fluted
F5J

SiteLink 4.5" Fluted
L4E

Fluted Tapered
FTJ

HAMILTON™ Aluminum Pole

Architectural Outdoor

HOLOPHANE®
LEADER IN LIGHTING SOLUTIONS
An AcuityBrandsCompany

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ORDERING INFORMATION:

Post: HL

HL = Hamilton

Material: A

A = Aluminum

Height:

08 = 8'
10 = 10'
12 = 12'
14 = 14'
16 = 16'
18 = 18' - (L4E Only)

Shaft Style:

FTJ = Fluted Tapered (Cast), .25 Wall
F4C = 4" DIA. Fluted, .125 Wall
F4J = 4" DIA. Fluted, .25 Wall
F5J = 5" DIA. Fluted, .25 Wall
L4E = SiteLink 4.5" Fluted, .156 Wall (10" Base Only)
S4C = 4" DIA. Smooth, .125 Wall
S4J = 4" DIA. Smooth, .25 Wall
S5J = 5" DIA. Smooth, .25 Wall
T4C = 3" to 4" DIA. Tapered, .125 Wall
T5C = 3" to 5" DIA. Tapered, .125 Wall

Base:

10 = 10" Round (TMP-58) (L4E = TMP40005)
16 = 16" Round (TMP-81)

Tenon:

P01 = POLE CAP
P05 = 3" O.D. X 4" LG.
P07 = 3" O.D. X 3" LG.
P08 = 3" O.D. X 5" LG.
P09 = 3" O.D. X 6" LG.
P10 = 3" O.D. X 9" LG.
P11 = 4.38 O.D. x 12" LG.
(3" O.D. = ACTUAL SIZE IS 2.88" O.D.)
P12 = 3" O.D. X 12" LG.
P13 = 3" O.D. X 8" LG.
P14 = 3" O.D. X 14" LG.
P15 = 3.5" O.D. X 8" LG.
P16 = 4.5" O.D. X 10" LG.
PT1 = VGC Plate

Mounting:

ABG = Anchor Bolts Galvanized Steel
LAB = Less Anchor Bolts
DBB = Direct Burial Base Galvanized Steel
(10" Base = ADBB1R1)
(16" Base = ADBB1R4)

Finish:

BK = Black
BD = Dark Blue
BZ = Bronze
GH = Graphite
GN = Green
GR = Gray
PP = Prime Painted
SL = Silver
WH = White

Options

EXXXY² = Provision for eye bolt.
LXXXY² = Large provision.
RXXXY² = Receptacle provision.
SXXXY² = Small provision.

SPECIFICATIONS

DESCRIPTION
The lighting post shall be all aluminum, one-piece construction, with a classic tapered and fluted base design.

MATERIALS
The base and fluted tapered cast shaft shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The straight shafts shall be extruded from aluminum, ASTM 6061 alloy, heat treated to a T6 temper. The tapered shaft shall be extruded from aluminum, ASTM 6063 alloy, spun to a tapered shape, then heat treated to a T6 temper. All hardware shall be tamper resistant stainless steel. Anchor bolts to be completely hot dip galvanized.

CONSTRUCTION
The shaft shall be double welded to the base casting and shipped as one piece for maximum structural integrity. The shaft shall be welded inside the base casting at the top of the access door, and externally where the shaft exits the base. All welding shall be per ANSI/AWS

DIMENSIONS
The post shall be X'- XX" in height with a 10" or 16" diameter base. The shaft diameter shall be XX". At the top of the post, an integral tenon with a transitional donut shall be provided for luminaire mounting.

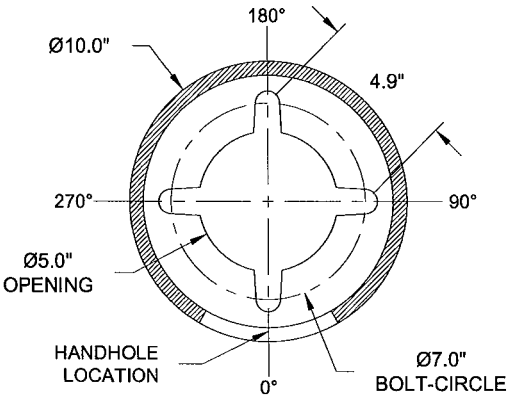
INSTALLATION
The post shall be provided with four, hot dip galvanized L-type anchor bolts. A door shall be provided in the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite the door.

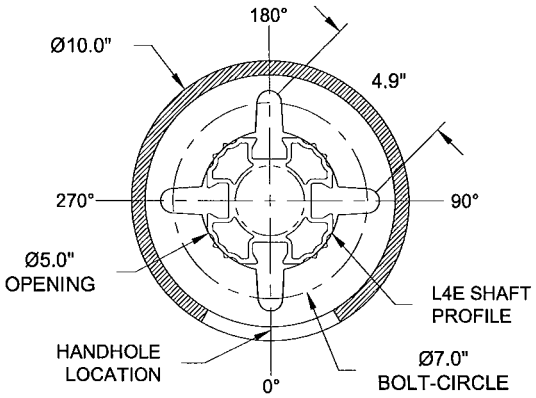
² - Replace "XXX" with height from grade (inches), can be up to 3 digits. Must use whole numbers. Leading zeros are not used. Replace Y with orientation from hand hole (A=0, B=90, C=180, D=270). Add multiple provisions as necessary to cover each location. Must validate EPA restrictions for banners.

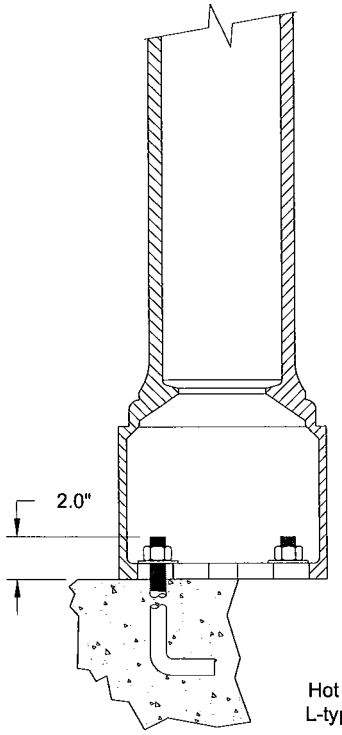
THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE ON THE ORDER NOTED ABOVE. A UNIT OF SIMILAR DESIGN MAY BE SUPPLIED, BUT ONLY AFTER APPROVAL BY THE CUSTOMER IN WRITING. ON POLE ORDERS AN ANCHOR BOLT TEMPLATE PRINT WILL BE SUPPLIED. THIS PRINT IS TO BE USED TO LAY OUT THE POLE FOUNDATION. THE PRINT IS THE PROPERTY OF HOLOPHANE AND IS LOANED SUBJECT TO RETURN UPON DEMAND AND UPON EXPRESS CONDITION THAT IT WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO OUR INTERESTS, AND ONLY IN CONNECTION WITH MATERIAL FURNISHED BY HOLOPHANE.

ORDER #:
TYPE:
DRAWN: ACH
DATE: 03/22/11
DWG #: POL_HLA

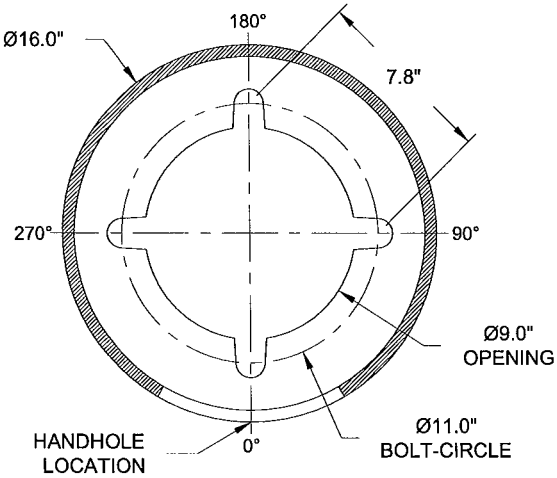
ANCHORAGE GUIDE

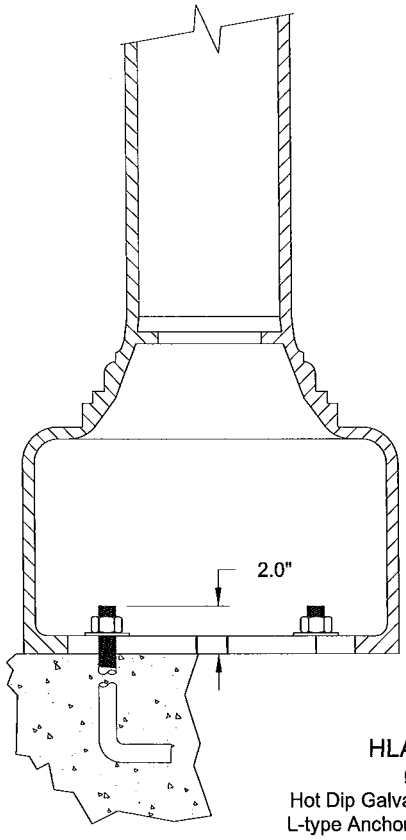






HLA 10"
Ø 3/4"
Hot Dip Galvanized
L-type Anchor Bolts
(4 per Post)





HLA 16"
Ø 3/4"
Hot Dip Galvanized
L-type Anchor Bolts
(4 per Post)

HAMILTON™
Aluminum Pole

Architectural
Outdoor

HOLOPHANE®
LEADER IN LIGHTING SOLUTIONS
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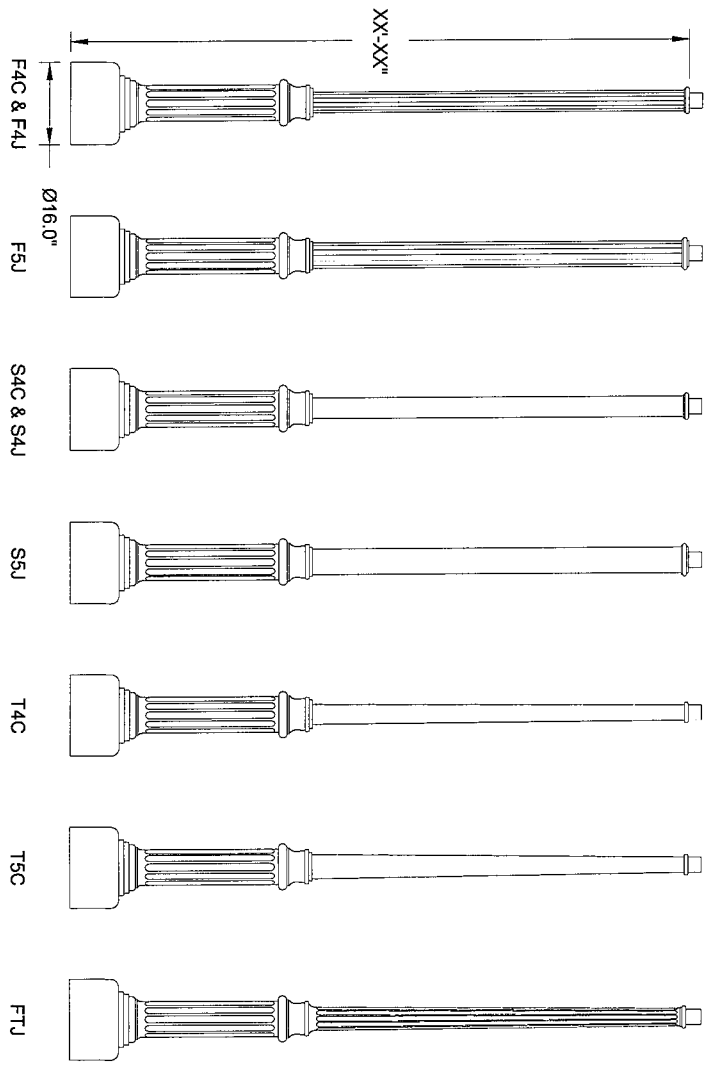

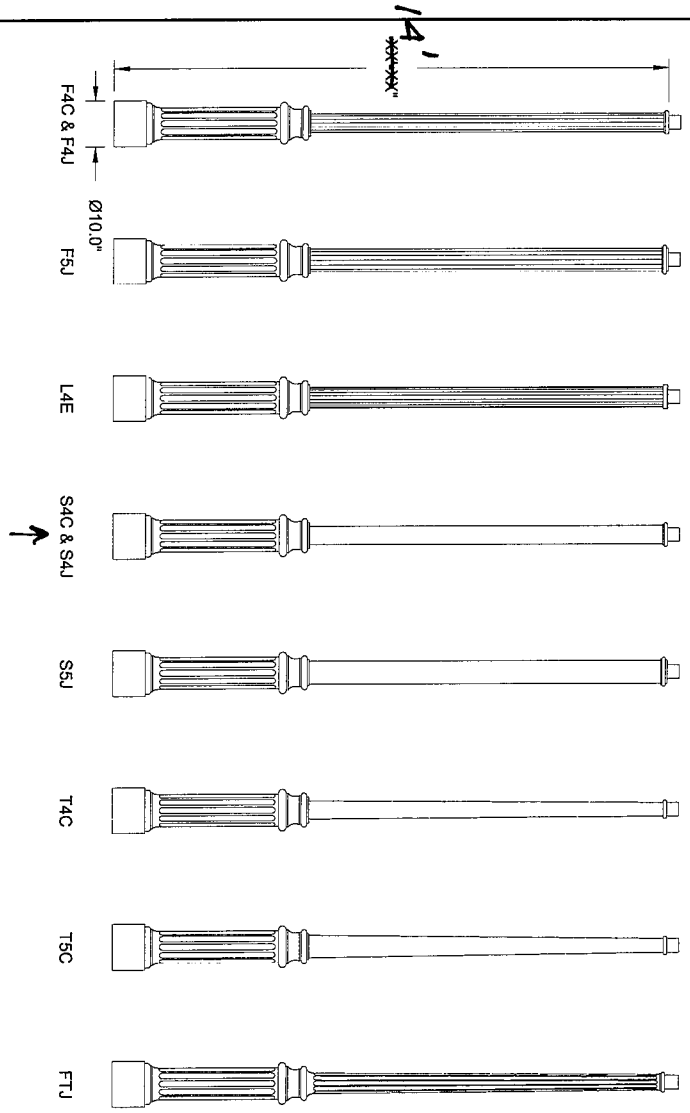

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Architectural Outdoor

HAMILTON™

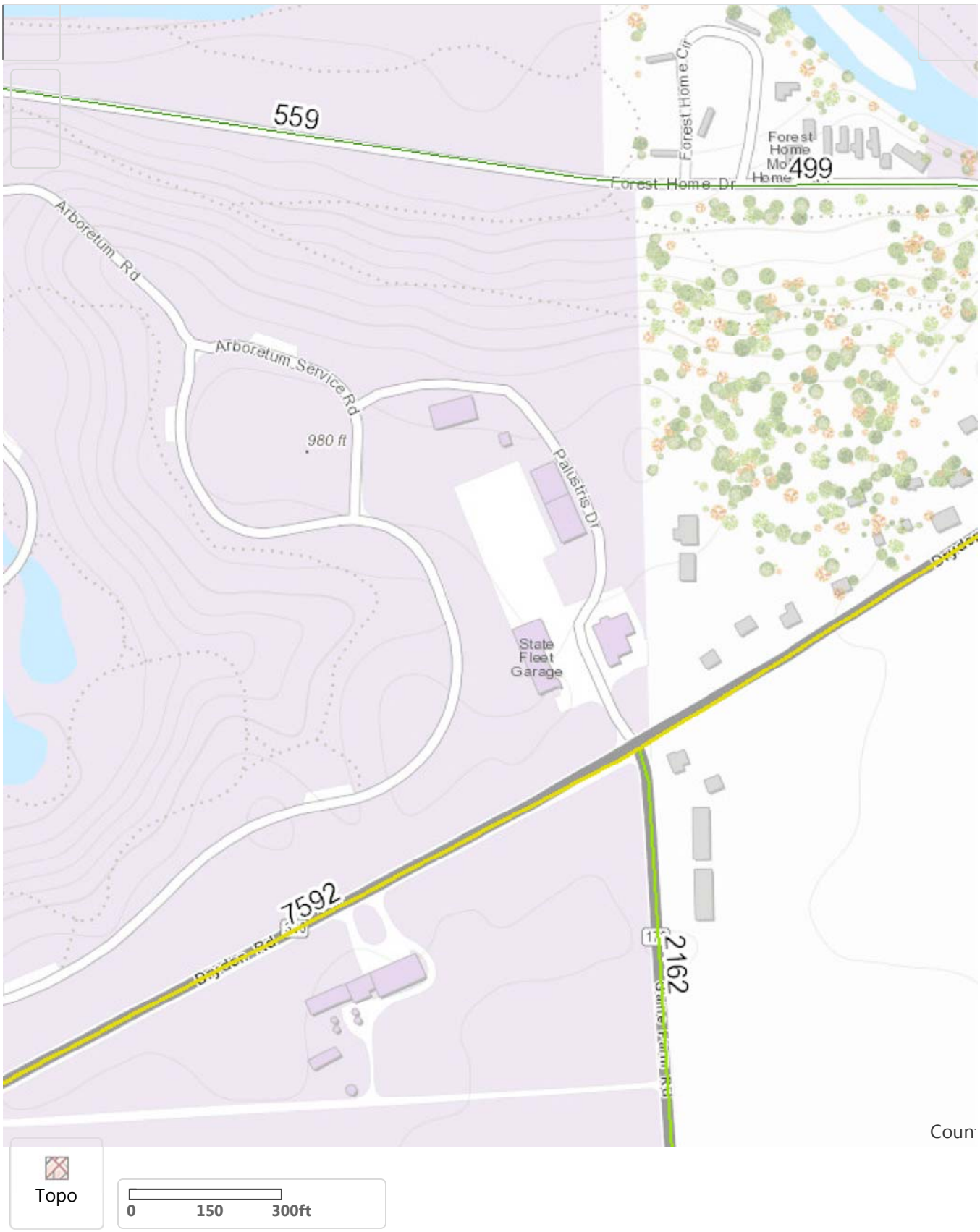
Aluminum Pole

Appendix E

- TRAFFIC

Map Changed. Center latitude: 42.4519 ° North. Center longitude: 76.4474 ° West. Visible Features: 5 features visible on AADT.

NYS Traffic Data Viewer.



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June 19, 2017

Marathon Engineering
840 Hanshaw Road, Suite 12
Ithaca, NY 14850
Attn: Adam Fishel

RE: Dryden Road Apartments, Hamlet of Varna, NY
Trip Generation Letter

Dear Mr. Fishel:

The purpose of this letter is to provide a trip generation assessment related to the proposed residential development located at 802-812 Dryden Road in the Hamlet of Varna, New York, as outlined in the site materials provided to us. This letter details projected trip generation volume estimates generated and discusses the thresholds for completing a Traffic Impact Study (TIS). Outlined below are the results of the study.

Proposed Development

The proposed development includes approximately 42 units of townhouses located as detailed in the attached site plan. Data contained in Trip Generation, 9th Edition, published by the Institute of Transportation Engineers (ITE) in 2012 was used to project the volume of traffic generated by the proposed development. Data published by the ITE is the nationally accepted standard for generating trips for new uses. **Table I** summarizes the volume of projected site trips during the weekday AM and PM peak hours.

TABLE I: SITE GENERATED DRIVEWAY VOLUMES

LAND USE	SIZE	AM PEAK HOUR		PM PEAK HOUR	
		ENTER	EXIT	ENTER	EXIT
Residential Condominium/Townhouse (230)	42 Units	4	22	20	10

The proposed development is expected to generate 4 entering/22 exiting vehicle trips during the AM peak hour and 20 entering/10 exiting vehicle trips during the PM peak hour.

Thresholds for the Requirement of a Traffic Impact Study

Reviewing agencies – including the New York State Department of Transportation (NYSDOT) – use a guideline in determining whether a project warrants the preparation of a traffic assessment report. The applicable guideline is that if a proposed project is projected to add 100 vehicles per hour (vph) or more to an intersection, then that intersection should be studied for potential traffic impacts. Given that the proposed apartments are anticipated to generate an increase of 22 vph or less entering

and exiting the project site during both peak hours for any one approach, the adjacent intersections and surrounding roadway network are unlikely to experience any significant adverse traffic impacts and will not warrant a traffic impact study.

Conclusions

Given the volume of projected site generated traffic (22 vph or less entering and exiting the project site during both peak hours for any one approach), it is our firm's professional opinion that the proposed project will not have any potentially significant adverse impact on traffic operations within the study area. No further study is warranted or recommended.

If you have any questions or are in need of additional information, please do not hesitate to contact our office.

Very truly yours,
SRF & Associates

Amy C. Dake, P.E., PTOE
Senior Traffic Engineer

S:\Projects\2017\37046 802 Dryden Rd Apts\802 Dryden Road Apts Trip Gen 06-19-17.docx

Project Information	
Project Name:	802 Dryden Road Apts
No:	
Date:	6/19/2017
City:	
State/Province:	
Zip/Postal Code:	
Country:	
Client Name:	
Analyst's Name:	
Edition:	ITE-TGM 9th Edition

Land Use	Size	Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.		Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.	
		Entry	Exit	Entry	Exit
230 - Residential Condominium/Townhouse	42 Dwelling Units	4	22	20	10
Reduction		0	0	0	0
Internal		0	0	0	0
Pass-by		0	0	0	0
Non-pass-by		4	22	20	10
Total		4	22	20	10
Total Reduction		0	0	0	0
Total Internal		0	0	0	0
Total Pass-by		0	0	0	0
Total Non-pass-by		4	22	20	10