
STORMWATER MANAGEMENT REPORT

for

COOPER UNIVERSITY HOSPITAL TOWER A CAMDEN, NEW JERSEY

Prepared For:

Cooper University Health Care

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This report summarizes the stormwater drainage analysis for the proposed Cooper University Hospital Tower A project in Camden, New Jersey.

SITE INFORMATION AND HISTORY

For the purpose of this report, “site” refers to the portion of Cooper University Healthcare main hospital campus area associated with proposed Tower A, which is proposed near the intersection of Dr Martin Luther King (MLK) Boulevard and Haddon Avenue. All improvements are within Block 1402 Lot 1.

Cooper University Health Care (CUHC) is proposing to improve the Cooper University Hospital located in Camden, New Jersey. The initial phase of this project entails the construction of “Tower A.” CUHC continues to evaluate future phases the CUHC will submit as part of any separate application. The proposed Tower A will be a 10-story hospital-building expansion with a footprint of approximate 35,570-square-feet. Cooper intends that the Tower A expansion will better serve patients and the community by upgrading CUHC’s aging facilities with a new, state-of-the-art healthcare space.

DESIGN REQUIREMENTS

The project will disturb approximately 1.34 acres. The project will create more than one-quarter acre of “regulated impervious surface” because there is a net increase of 0.92 acres of impervious surface; and thus the project is considered a major development as defined in N.J.A.C. 7:8-1.2 (July 2023). Therefore, the project is subject to the New Jersey Stormwater requirements outlined in N.J.A.C. 7:8 and the City of Camden Stormwater Ordinance. Stormwater management is proposed for the project to meet the requirements of N.J.A.C. 7:8 (July 2023).

In accordance with groundwater recharge standards set forth in N.J.A.C. 7:8-5.4(b)2 and city requirements, the groundwater recharge requirements do not apply to the project because the project is in an Urban Redevelopment Area.

In accordance with the stormwater runoff quality standards set forth in N.J.A.C 7:8-5.5(a) and city requirements, the water quality standards are not applicable because the major development does not result in an increase of one-quarter acre or more of regulated motor vehicle surface. All proposed increase in impervious surface is roof and non-vehicular walkway.

In accordance with the stormwater runoff quantity standards set forth in N.J.A.C. 7:8-5.6(b)2 and city requirements, there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the current and projected two-, 10-, and 100-year storm events. Any increased volume, change in timing, or increased rate of stormwater runoff will not result in additional flood damage below the point of discharge of the project.

Additionally, the City of Camden requires that the 25-year storm post development peak rate be reduced to less than or equal to the pre-development peak rate. This criterion has been satisfied.

In accordance with the green infrastructure standards set forth in N.J.A.C. 7:8-5.3(d) and city requirements, a variance from strict compliance in accordance with N.J.A.C. 7:8-4.6 is requested to utilize a BMP from Table 5-3 (extended detention basin) to meet the stormwater runoff quantity standards of N.J.A.C. 7:8-5.6. As noted previously, the groundwater recharge and stormwater runoff quality requirements are not applicable. Due to safety concerns of green stormwater infrastructure in an urban setting and the size constraints of the site, it is technically impractical to satisfy the stormwater runoff quantity requirements with a Green Infrastructure BMP. The stormwater runoff quantity requirements are met with the underground extended detention basin. The design implements low impact design to the extent possible, which is demonstrated on the Low Impact Design Checklist provided in Appendix A.

The proposed detention basin is integrated into the design of the Tower A basement. A pump and outlet control structure will control the flow before gravity-draining to the existing 24-inch brick city sewer in MLK Boulevard. Due to the proximity of the detention basin and basement walls, both the basin and basement will be waterproofed to prevent infiltration of groundwater into the system and exfiltration of collected stormwater runoff.

The city of Camden has previously required that stormwater conveyance systems be designed for the 25-year storm event. The proposed outlet pipe from the new detention system was sized based on the outflow from the basin, which is designed for up to and including the 100-year (current and projected) managed rate, so the system is more than adequate to convey the 25-year storm. No point-discharges to the ground surface are proposed, and the existing discharge points will be maintained.

STORMWATER MANAGEMENT APPROACH

Low-Impact Development

The proposed stormwater management approach for the project includes low-impact development strategies listed below, in accordance with N.J.A.C. 7:8-5.3. A Low-Impact Development Checklist for the project is provided as Appendix A.

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
2. Minimize land disturbance including clearing and grading, by redeveloping the existing hospital campus rather than a new “greenfield” elsewhere.
3. Minimize soil compaction, by redeveloping the existing hospital campus rather than a new “greenfield” elsewhere.
4. Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.
5. Provide preventative source controls.

Drainage Areas

The pre-development condition of the site is composed of one drainage area as described below (see Figure 3 for Pre-Development Drainage Area Map):

- EXDA-1 drains to point of interest POI-1, which is understood to be in the existing 24-inch brick city sewer in MLK Boulevard. The point of interest is approximately 75 feet west of the western crosswalk at the intersection with Haddon Avenue.

The post-development condition of the site is composed of one drainage area as described below (see Figure 4 for Post-Development Drainage Area Map):

- PRDA-1 drains to POI-1, which is understood to be in the existing 24-inch brick city sewer in MLK Boulevard. The point of interest is approximately 75 feet west of the western crosswalk at the intersection with Haddon Avenue. This area makes up the entire Tower A project area and is divided into the following subareas:
 - Proposed Tower A roof runoff is routed to proposed BMP-1, which is an underground extended detention basin. The proposed basin is integrated into the design of the Tower A basement. A pump and outlet control structure will control the flow before gravity-draining to the existing 24-inch brick city sewer in MLK Boulevard.
 - Site runoff along the eastern side of Tower A flows to Haddon Ave then enters the city sewer that connects to the 24-inch brick city sewer in MLK Boulevard.
 - Site runoff along the northern and western sides of Tower A flows to MLK Boulevard then enters existing inlets that tie into the 24-inch brick city sewer in MLK Boulevard.

The stormwater management design for the project accounts for the uncontrolled ground-level areas by over-detaining stormwater in the BMP to make up for the bypass volumes and rates.

NRCS Methodology

In accordance with N.J.A.C. 7:8-5.7, stormwater runoff is calculated using the USDA Natural Resources Conservation Service (NRCS) methodology, which is described in Technical Release 55—Urban Hydrology for Small Watersheds (TR-55), dated June 1986. Pre-development and post-development hydrographs are developed for each of the drainage areas described in the previous section using an area, hydrologic soil group (HSG), land cover, rainfall depth, and time of concentration. A table summarizing the area, HSG, and land cover with curve numbers for the pre-development condition is provided in Appendix B, and for the post-development condition in Appendix C.

Time of concentration is calculated using the velocity method for each drainage area described in the previous section. See Appendix D for calculations and Figure 3 for pre-development flow path and Figure 4 for post-development flow path used in the calculations.

In accordance with N.J.A.C. 7:8-5.6, stormwater analysis must be performed for current and projected storm events, as defined and determined pursuant of N.J.A.C. 7:8-5.7(c) and (d). We are using the county-specific, New Jersey 24-hour rainfall frequency data for Camden County as provided in Table 5-1 of the New Jersey Stormwater Best Management Practices Manual (July 2023) because it has larger depths than site-specific rainfall data from NOAA Atlas 14 and, therefore, results in a more conservative design. The rainfall depths are provided in the table below with design current and future rainfall depths in bold.

Design Rainfall Depths

| Design Storm Event | Site-Specific Rainfall Depth [NOAA Atlas 14, Vol2, Ver3] (in.) | Table 5-1: County Specific Rainfall (in.), Camden | Current Adj. Factor, Camden | Current Rainfall (in.) | Future Adj. Factor, Camden | Future Rainfall (in.) |
|--------------------|--|---|-----------------------------|------------------------|----------------------------|-----------------------|
| 2-yr | 3.28 | 3.31 | 1.03 | 3.41 | 1.18 | 3.91 |
| 10-yr | 4.89 | 5.06 | 1.04 | 5.26 | 1.22 | 6.17 |
| 25-yr | 5.98 | 6.28 | 1.00 | 6.28 | 1.00 | 6.28 |
| 100-yr | 7.92 | 8.52 | 1.05 | 8.95 | 1.39 | 11.84 |

The hydrograph summaries calculated with the NRCS methodology are provided in Appendix B for the pre-development condition and Appendix C for the post-development condition.

Stormwater Runoff Quantity

The table below shows a comparison of peak flow for pre-construction and post-construction at POI-1. The post-construction peak rates for the current and projected two-, 10-, and 100-year storm events do not exceed that of the pre-construction peak rates. Therefore, the project complies with N.J.A.C. 7:8-5.6(b)4 and city requirements.

CURRENT RAINFALL

| POI-1 | | | |
|-------------|-------------------------|------------|---------------|
| STORM EVENT | PRE-DEVELOPED DISTURBED | REGULATION | PROVIDED RATE |
| 2-YR | 1.33 | 1.33 | 1.32 |
| 10-YR | 2.71 | 2.71 | 2.67 |
| 25-YR | 3.55 | 3.55 | 2.87 |
| 100-YR | 5.83 | 5.83 | 5.81 |

PROJECTED RAINFALL

| POI-1 | | | |
|-------------|-------------------------|------------|---------------|
| STORM EVENT | PRE-DEVELOPED DISTURBED | REGULATION | PROVIDED RATE |
| 2-YR | 1.66 | 1.66 | 1.42 |
| 10-YR | 3.45 | 3.45 | 2.86 |
| 25-YR | 3.55 | 3.55 | 2.88 |
| 100-YR | 8.32 | 8.32 | 6.38 |

STORMWATER CONVEYANCE SYSTEM

The proposed stormwater conveyance system only includes the outlet from the proposed extended detention vault. That outlet is designed to convey the peak rates from the proposed site for up to and including the 100-year (current and projected) storm. Therefore, the designed capacity is more than adequate to convey the projected flow from the 25-year storm in accordance with City of Camden requirements. All proposed storm pipes tie-in to proposed drainage structures. No point-discharges to the ground surface are proposed, as shown on the Proposed Drainage Area Map (Figure 2). Runoff coefficient and pipe conveyance calculations are provided in Appendix E.

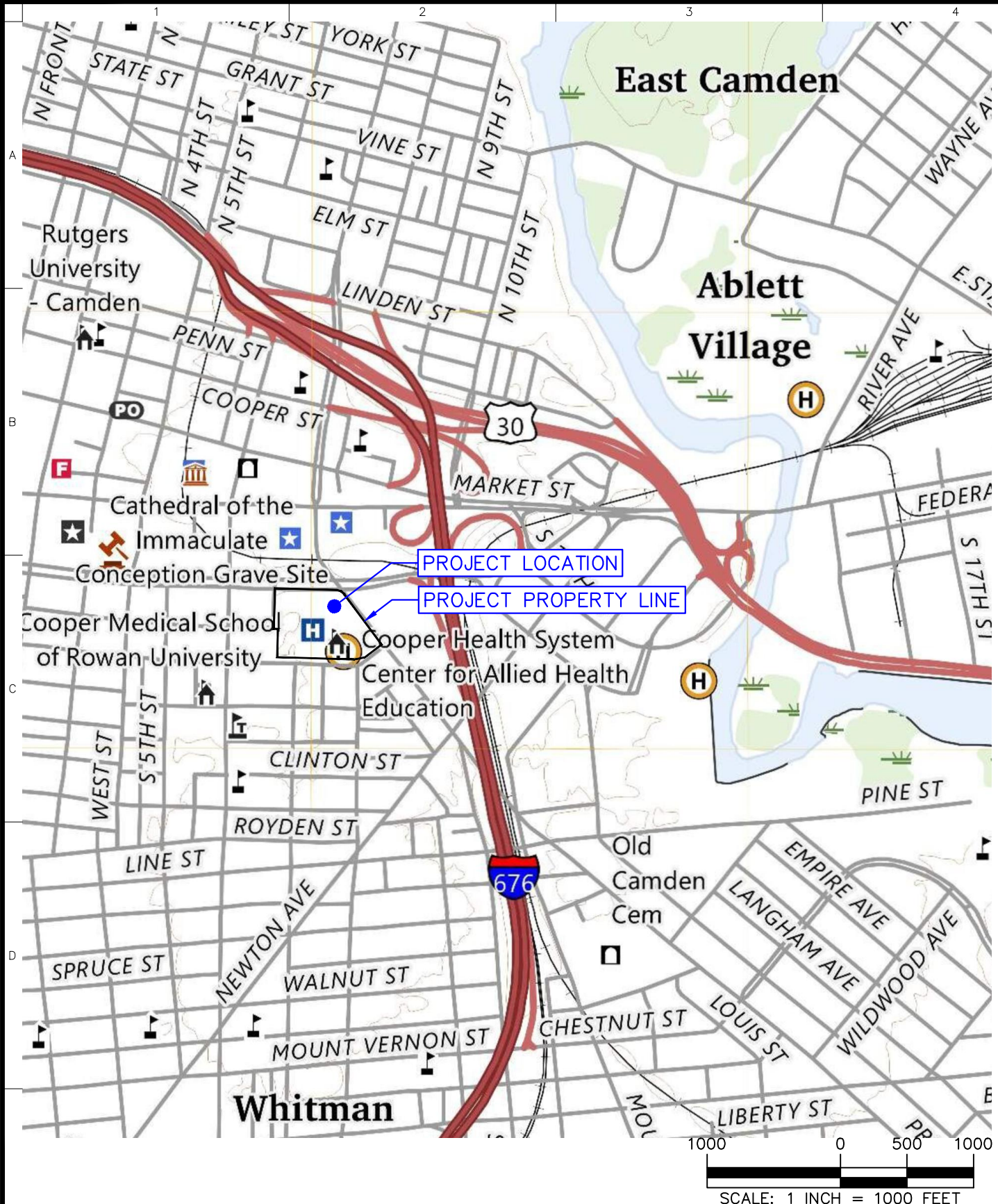
CONCLUSION

The proposed stormwater management approach meets the requirements of N.J.A.C. 7:8 that were applicable at the time of the initial application, and the City of Camden requirements by managing the post-development peak discharge rates to not exceed the pre-development peak discharge rates leaving the site for all drainage areas and the entire site as documented in this report. Because the project discharges to an existing sewer that discharges to a tidal water body, any increased volume or change in timing will not increase downstream flooding or flood damages below the point of discharge.

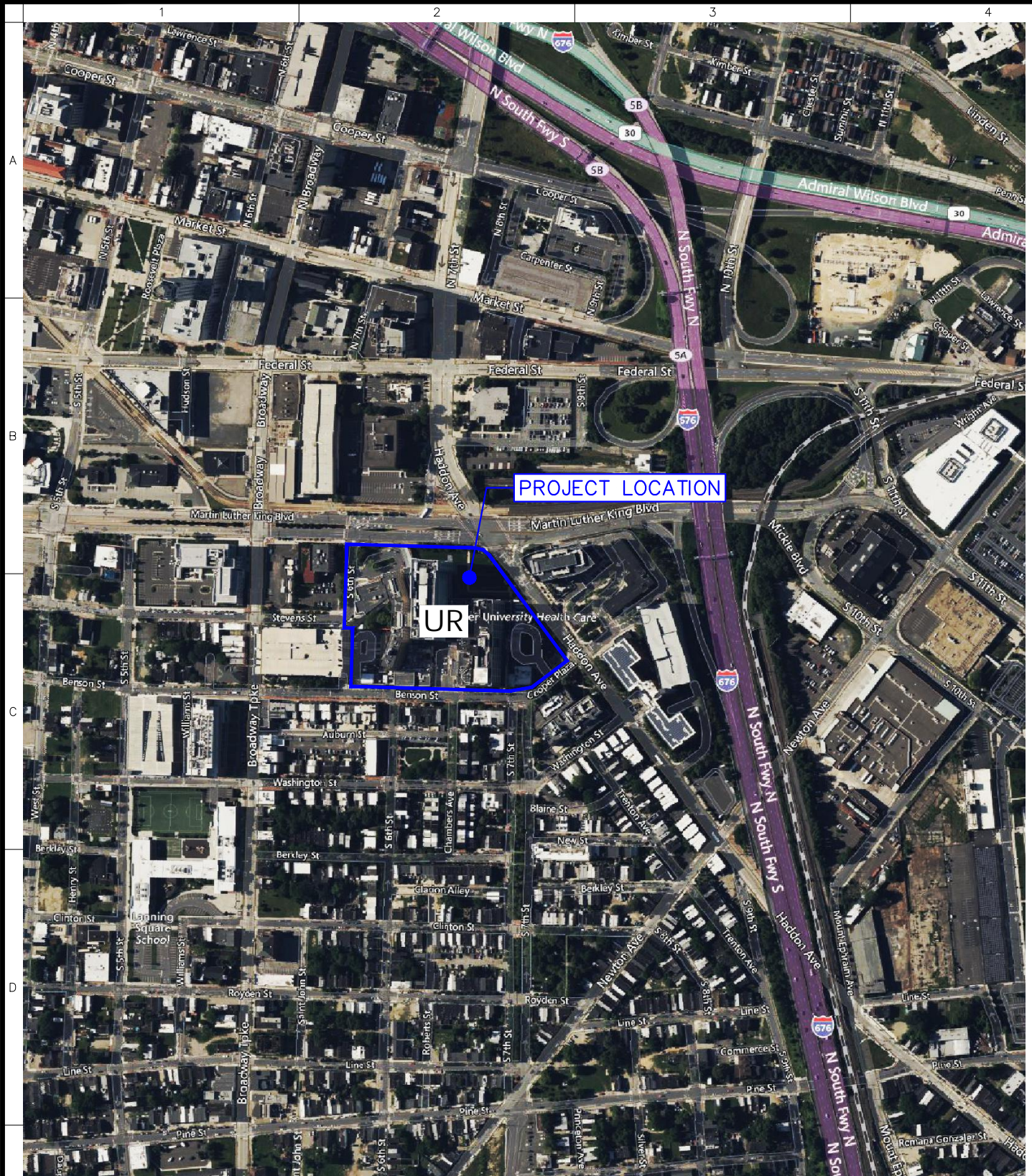
The proposed storm conveyance system has been designed to convey the peak rates from the proposed site for up to and including the 100-year storm (current and projected) because the pipe is an outflow from a stormwater vault. As such, the designed capacity is more than adequate to convey the projected flow from the 25-year storm in accordance with City of Camden requirements.

As a result, the proposed site redevelopment meets the intent of the state and city requirements and will have no adverse impact on the existing stormwater conveyance system that services the site and adjacent properties.

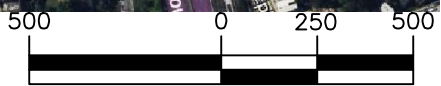
FIGURES



| | | | | |
|--|---|---|---------------------------------|-------------------------|
| LANGAN Langan Engineering and Environmental Services, Inc. 1818 Market Street, Suite 3300 Philadelphia, PA 19103 T: 215.845.8900 F: 215.845.8901 www.langan.com NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400 | Project COOPER UNIV MASTER CAMPUS PLAN-SITE CAMDEN COUNTY NEW JERSEY | Drawing Title USGS LOCATION MAP | Project No. 220187001 | Drawing No. 1 |
| | | | Date 2024-02-15 | |
| | | | Drawn By JIL | |
| | | | Checked By MXK | |

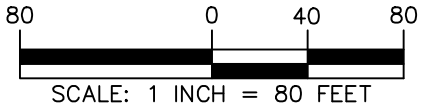
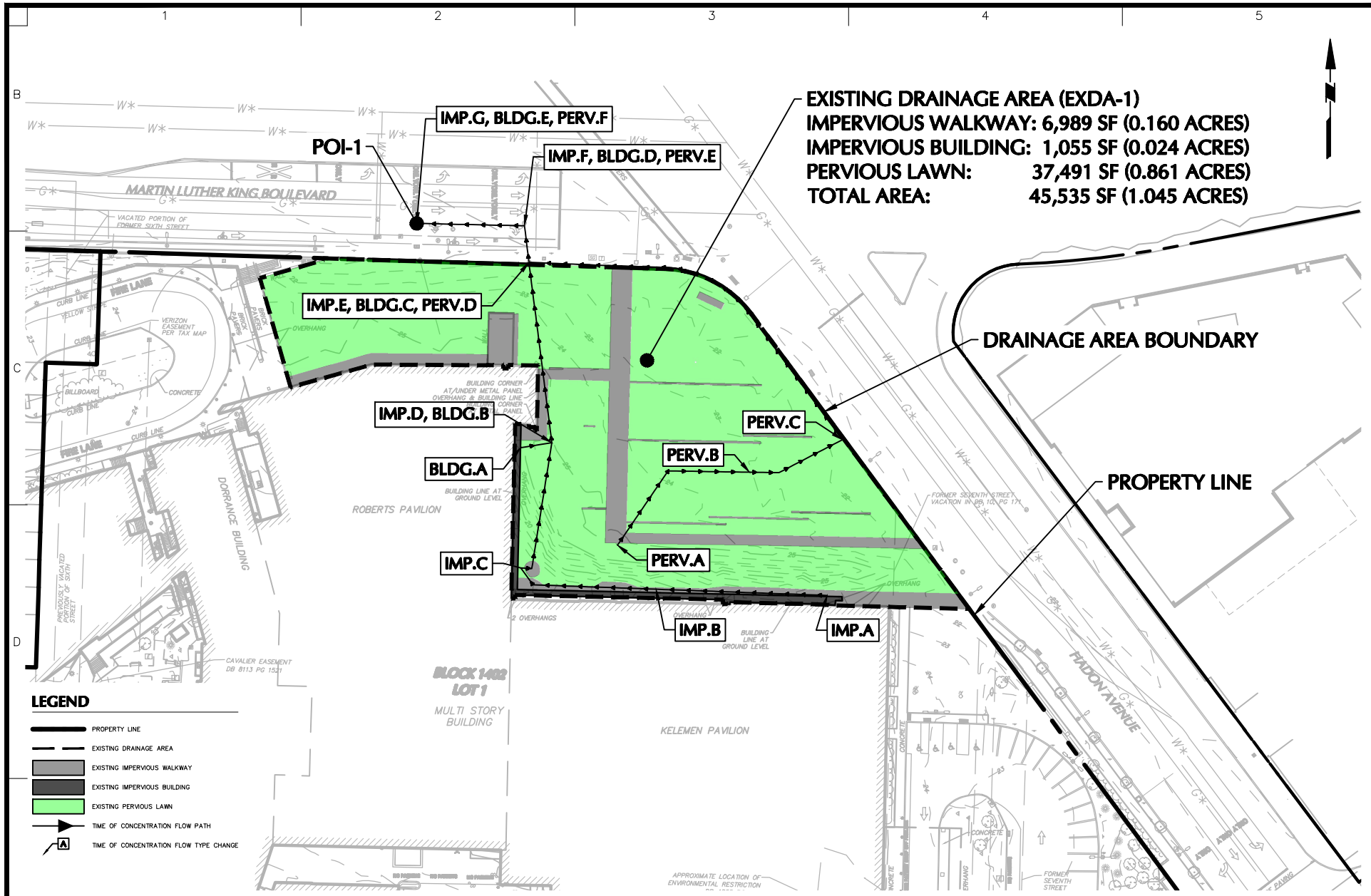


UR - Urban land



SCALE: 1 INCH = 500 FEET

| | | | | |
|---|---|---------------|--------------------------------------|-------------|
| <p>LANGAN Langan Engineering and Environmental Services, Inc. 1818 Market Street, Suite 3300 Philadelphia, PA 19103 T: 215.845.8900 F: 215.845.8901 www.langan.com NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400</p> | Project | Drawing Title | Project No. | Drawing No. |
| | COOPER UNIV MASTER CAMPUS PLAN-SITE | SOIL MAP | 220187001 | 2 |
| | CAMDEN NEW JERSEY | | Date 2024-02-15 | |
| | | | Drawn By JIL Checked By MXK | |



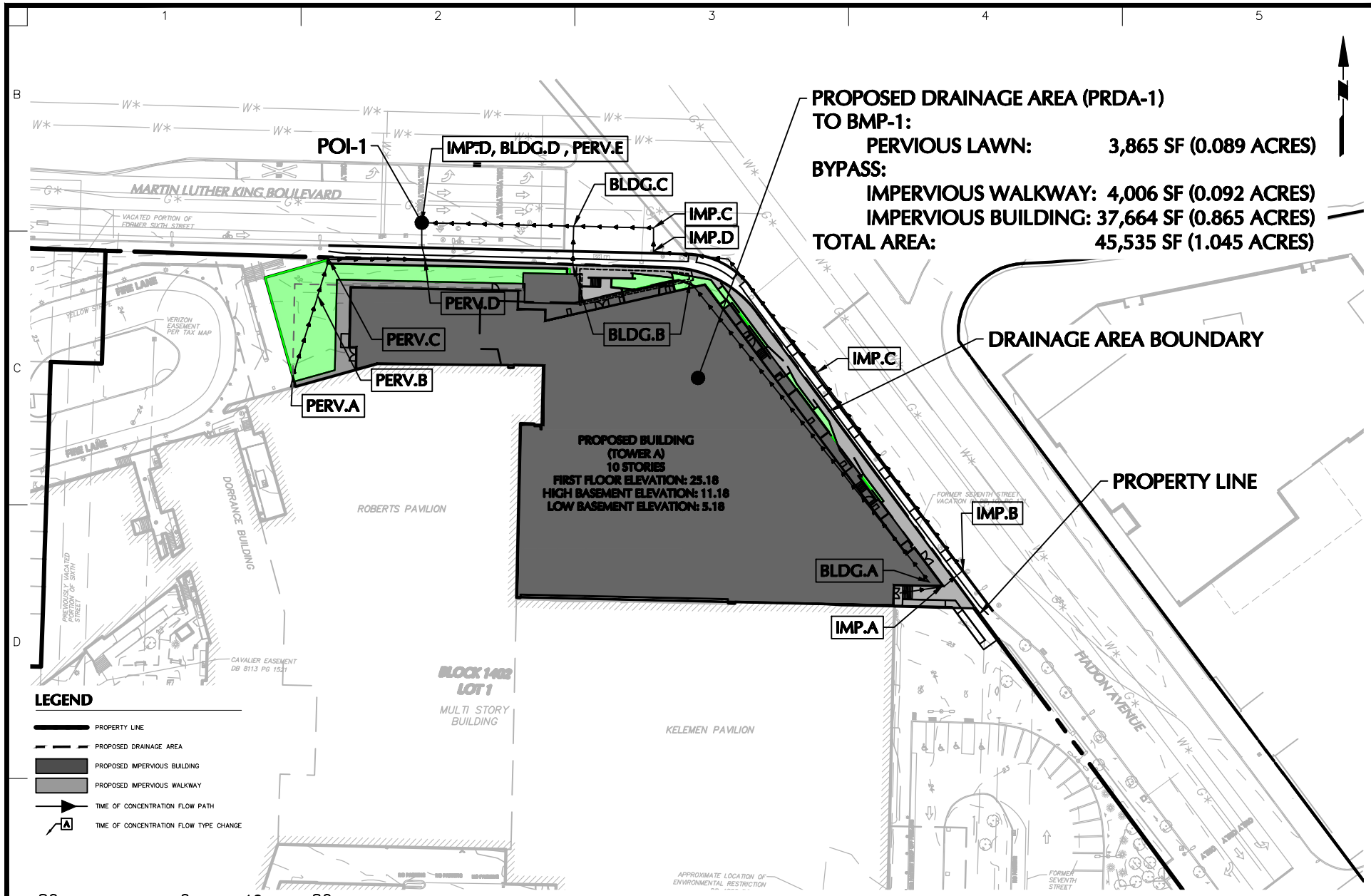
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 NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400

Project **COOPER UNIV MASTER CAMPUS PLAN-SITE**
 CAMDEN COUNTY CAMDEN NEW JERSEY

Drawing Title **PREDEVELOPMENT DRAINAGE AREA MAP**

Project No. **220187001**
 Date **3/20/2024**
 Drawn By **MXK**
 Checked By **KJM**

Drawing No. **FIG. 3**
 Sheet **3** of **4**



| | | | | |
|---|---|--|---|--------------------------------------|
| <p>LANGAN Langan Engineering and Environmental Services, Inc. 1 University Square Drive, Suite 110 Princeton, NJ 08540 T: 609.282.8000 F: 609.282.8001 www.langan.com NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27996400</p> | <p>Project COOPER UNIV MASTER CAMPUS PLAN-SITE CAMDEN COUNTY CAMDEN NEW JERSEY</p> | <p>Drawing Title POST-DEVELOPMENT DRAINAGE AREA MAP</p> | <p>Project No. 220187001</p> | <p>Drawing No. FIG. 4</p> |
| | | | <p>Date 3/20/2024</p> | <p>Sheet 4 of 4</p> |

DRAWINGS

CITY OF CAMDEN REGULATORY REQUIREMENT NOTES

- ALL TELEPHONE, ELECTRIC, TELEVISION, AND OTHER COMMUNICATION SERVICE FACILITIES, BOTH MAIN AND SERVICE LINES, ARE TO BE INSTALLED UNDERGROUND.
- THE OWNER OR THEIR REPRESENTATIVE IS TO DESIGNATE AN INDIVIDUAL RESPONSIBLE FOR CONSTRUCTION SITE SAFETY DURING THE COURSE OF THE SITE IMPROVEMENTS PURSUANT TO N.J.A.C. 5:23-2.21 (a) OF THE N.J. UNIFORM CONSTRUCTION CODE AND CFR 1926.32 (f) (OSHA COMPETENT PERSON).
- ALL SITE WORK CONSTRUCTION AND DETAILS MUST CONFORM TO THE STANDARDS OF THE CITY OF CAMDEN.
- THE CONTRACTOR (NOT CITY) SHALL BE RESPONSIBLE FOR ANY AND ALL COST (LABOR, MATERIAL, AND EQUIPMENT) RELATED TO ANY WATER MAIN ISOLATION AND BY-PASSING OF THE SEWER TO MAKE A PROPOSED CONNECTION.
- THE CITY ENGINEER AND AMERICAN WATER ENTERPRISES MUST BE GIVEN 48 HOURS ADVANCE NOTICE OF SANITARY SEWER/WATERMAIN WORK, AND THE REPRESENTATIVES MUST WITNESS THE WORK AND CONNECTION.
- THE APPLICANT AND CONTRACTOR (NOT CITY) ARE RESPONSIBLE FOR THE PROPER ABANDONMENT OF ALL WATER/SEWER LATERAL DISCOVERED IN THE FIELD/SITE. ALL EXISTING WATER SERVICE LINES TO BE ABANDONED SHALL BE CUT AND CAPPED AT THE MAIN IN ACCORDANCE WITH CAPITAL IMPROVEMENTS AND PROJECT MANAGEMENT (CIP) STANDARDS, AND INSPECTED WITHIN 24 HOURS AFTER INSTALLATION OF NEW TAP. THE MAXIMUM OF ONE (1) TAP SHALL BE MADE FOR BOTH DOMESTIC AND FIRE SERVICE PER FACILITY. THE TAP SHALL BE THE MAXIMUM OF ONE (1) SIZE SMALLER THAN THE CITY'S WATER MAIN.
- THE INSTALLATION OF ALL WATER AND SEWER MAINS SHALL COMPLY WITH CITY ORDINANCES.
- ALL WATER/SEWER MAIN INSTALLATIONS AND TESTING SHALL BE WITNESSED/OBSERVED BY AN INSPECTOR OF THE CITY ENGINEER OR AMERICAN WATER, OR PLANNING BOARD ENGINEER.
- ALL WATER/SEWER SERVICES SHALL BE INSTALLED ON APPLICANT'S PROPERTY (AND NOT WITHIN CITY RIGHT-OF-WAY), EXCEPT WHEN MAKING CONNECTIONS TO THE EXISTING WATER AND/OR SEWER MAIN FROM THE VALVE BOX AND SEWER CLEANOUT RESPECTIVELY.
- THE OWNER/APPLICANT SHALL OWN, OPERATE AND MAINTAIN ALL WATER, SANITARY AND STORM SEWER MAINS AND APPURTENANCES OUTSIDE OF THE CITY RIGHT-OF-WAY.
- ALL WATER PIPES, FITTINGS AND VALVES SHALL BE TESTED AND DISINFECTED IN ACCORDANCE WITH AWWA REQUIREMENTS.
- THRUST BLOCKS AND RESTRAINTS SHALL BE INSTALLED AT ALL BENDS AND FITTINGS. THRUST BLOCKS SHALL HAVE A 28-DAY STRENGTH OF 4,500 PSI.
- AIR RELEASE VALVES SHALL BE INSTALLED AT HIGH POINTS IN THE WATER MAIN.
- A SOLID DUCTILE IRON TAPPING SLEEVE SUCH AS MUELLER H-615 SLEEVE OR APPROVED EQUAL SHALL BE UTILIZED FOR TAPS 2" AND LARGER. THE TAPPING SLEEVE SHALL PASS PRESSURE TESTING BASED ON AWWA STANDARDS BEFORE TAP IS MADE.
- FOR ALL SERVICES INCLUDED HEREIN, TWO (2) GATE VALVES ARE REQUIRED THAT ARE TO BE INSTALLED BY THE APPLICANT. A TAPPING VALVE LOCATED AT THE TAP, AND A CURB VALVE LOCATED IN THE SIDEWALK BEFORE THE METER. TAPPING GATES SHALL BE FURNISHED OPENED RIGHT, ALL TAPPING AND CURB VALVES SHALL BE DOUBLE DISC GATE VALVES AND MEET AWWA STANDARDS.
- FOR TAPS OFF MAINS 2-INCHES AND LARGER, THE APPLICANT SHALL FURNISH AND INSTALL AN ADDITIONAL GATE VALVE ADJACENT TO THE TAPPING VALVE. NO TAPS SHALL BE PERMITTED ON MAINS LARGER THAN 20-INCHES UNLESS THERE IS NO ALTERNATIVE WATER SOURCE, AND A SPECIAL WRITTEN APPROVAL IS ISSUED BY THE CIP.
- VALVE BOX PARTS FOR ALL VALVES SHALL BE PROVIDED BY THE CONTRACTOR (NOT CITY). ALL TAPPING GATE VALVES LARGER THAN 2-INCHES AND ALL CURB VALVES/STOPS REGARDLESS OF SIZE REQUIRE A VALVE BOX WITH THE WORDS "CAST IN THE COVER. BURIED CORPORATION VALVES/STOPS SHALL BE USED AT THE TAP FOR CLASS K COPPER SERVICES 2-INCHES AND SMALLER.
- ALL METERS SIZES 2 INCHES THROUGH 6 INCHES SHALL BE SINGLE COMPOUND METERS AND ALL METERS 8 INCHES AND LARGER SHALL BE DUPLEX COMPOUND MANHOLE METERS.
- ALL METERS SHALL BE ADEQUATELY RESTRAINED WITH METAL BRACKETS FASTENED TO THE FLOOR OR WALL OF OTHER ADJACENT METERS. SUCH AS UNFLANGES WHERE INTERNAL PIPE PRESSURE AND FLOW WARRANT. SUCH RESTRAINTS SHALL BE SEATED ON CONCRETE BLOCK, AND TAPERED SHIMS TO PROVIDE ADEQUATE SUPPORT. METERS SHALL BE INSTALLED APPROXIMATELY 36" ABOVE FLOOR GRADE.
- ALL METER INSTALLATIONS IN METER PIT OR VAULT SHALL BE PRE-APPROVED BY CIP AND HAVE PROPER ACCESS OPENINGS FOR METER READING AND REPLACEMENT.

GRADING AND DRAINAGE NOTES

- THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO THEIR SATISFACTION PRIOR TO THE EXECUTION OF CONTRACTS OR COMMENCING WORK. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER OF RECORD.
- BOUNDARY INFORMATION AND EXISTING FEATURES SHOWN HEREON ARE BASED ON "TOPOGRAPHIC SURVEY (SHOWING UTILITIES)" DTD 09/08/2023 PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
- THE MERIDIAN OF THE PLAN IS REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 83) 2011 DERIVED USING SURVEY-GRADE GNSS EQUIPMENT.
- TOPOGRAPHIC INFORMATION SHOWN HEREON HAS BEEN OBTAINED FROM GROUND SURVEYS BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. DURING JULY 2023.
- ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) DERIVED USING SURVEY-GRADE GNSS EQUIPMENT.
- CONVERSION FROM NAVD 1988 TO NVD IS AS FOLLOWS: EL. 17.00 (NAVD 88) + 1.09 = EL. 18.09 (NVD 22)
- AS PER THE NATIONAL FLOOD INSURANCE PROGRAM FIRM MAPS TITLED, CAMDEN COUNTY, NEW JERSEY, COMMUNITY PANEL 28 OF 305, MAP NUMBER 340020008, LAST REVISED 08/17/2016, THE PROPERTY PRIMARILY LIES IN "OTHER AREAS" NOT WITHIN FLOOD AREA.
- EXISTING FRAMES, COVERS, AND GRATES IN AREAS WHERE GRADES WILL BE REVISED BY FILLING OR CUTTING, OR PAVEMENT OVERLAY, MUST BE RESET TO MATCH FINAL GRADE (THIS INCLUDES MANHOLES, HANDHOLES, VALVE BOXES, INLETS, ETC.) IN AREAS OF CUT. CONTRACTOR SHALL PROVIDE REQUIRED COVERAGE OF UTILITY AND STORMWATER LINES AS SPECIFIED BY THE UTILITY PURVEYOR.
- PROPOSED STORMWATER PIPING TRENCHES MAY REQUIRE OVER EXCAVATION IN AREAS NOT CAPABLE OF SUPPORTING THE PROPOSED SYSTEMS. STABILIZATION WITH APPROVED BEDDING MATERIALS WILL BE REQUIRED. OWNERS GEOTECHNICAL ENGINEER MUST APPROVE BEDDING MATERIALS USED FOR STABILIZATION AND THE DEPTH OF THE OVER EXCAVATION.
- CONTRACTOR IS RESPONSIBLE FOR LOCATING UTILITY CROSSINGS AND PROVIDING UTILITY DROPS AS REQUIRED. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF CROSSING CONFLICT OCCURS.
- GRADING FOR ADA ACCESSIBLE ROUTES, RAMPS, PARKING AND LOADING SHALL BE IN ACCORDANCE WITH THE NEW JERSEY AMERICAN WITH DISABILITIES ACT ARCHITECTURAL BARRIER REMOVAL AND COMPLIANCE MANUAL. MAXIMUM SLOPES INCLUDE (1) RAMPS = 1:12, (2) (3) ROUTES CROSS-SLOPE = 1:50 AND (4) PARKING AND LOADING AREAS = 1:50.
- TEST PITS WILL BE REQUIRED TO CONFIRM ADEQUATE CLEAR DISTANCES BETWEEN PROPOSED AND EXISTING UTILITIES. TEST PITS SHALL BE PERFORMED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
- UPON COMPLETION OF ALL WATER/SEWER INSTALLATION, THREE (3) SETS OF "AS-BUILT" DRAWINGS SHALL BE SUBMITTED TO THE CIP AND AMERICAN WATER ENTERPRISES. THE CIP WILL AUTHORIZE SUPPLY WATER UPON ACCEPTANCE OF THE AS-BUILT DRAWINGS. SUBMISSION OF RECORD DRAWINGS IS REQUIRED IN ACCORDANCE WITH CITY ORDINANCE FOR WATER SERVICES LINES AND SEWER LATERALS. "AS-BUILT" PLANS SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL BE PROVIDED BY A NEW JERSEY LICENSED PROFESSIONAL LAND SURVEYOR IN ELECTRONIC FORMAT OF THE SAME IN COMPLIANCE WITH THE CITY ORDINANCE SHALL BE ALSO SUBMITTED.
- ALL SEWER INSTALLATION SHALL CONFORM TO THE REQUIREMENT OF THE PROCEDURE MANUAL OF THE CITY OF CAMDEN.
- ALL NECESSARY REPAIRS TO EXISTING MANHOLE AT SEWER CONNECTION AND RELINING OF THE MANHOLE WITH A LINER BY TERRES HILL COMPOSITE OR APPROVED EQUAL SHALL BE COMPLETED BY THE CONTRACTOR.
- IT SHALL BE THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR TO RELOCATE ALL IMPACTED UTILITIES AT NO COST TO THE CITY.
- TELEVISION INSPECTION OF THE NEW OFF-SITE AND ON-SITE STORM SYSTEM IS REQUIRED PRIOR TO FINAL ACCEPTANCE BY THE CITY.
- A CCTV OF THE SANITARY/STORM SEWER ON DR MARTIN LUTHER KING BLVD AND HADDON AVE SHALL BE PERFORMED AND SUBMITTED TO THE CITY ENGINEER FOR REVIEW PRIOR TO ISSUING APPROVALS TO CONNECT TO THE CAMDEN CITY WATER AND SEWER SYSTEM.
- VIDEO SEWER INSPECTIONS, INFILTRATION/EXFILTRATION TESTING AND PIPE ALIGNMENT TESTING SHALL BE PERFORMED IN ACCORDANCE WITH THE CITY SEWER MANUAL ON ALL NEW PUBLIC SEWERS (PVC AND RCP) AT THE COMPLETION OF THE PROJECT, BUT PRIOR TO ACCEPTANCE AND/OR DEDICATION OF THE SAME TO THE CITY. THE MAXIMUM RATE OF INFILTRATION/EXFILTRATION SHALL NOT EXCEED THE ORDINANCE REQUIREMENT.
- SELECT FILL FOR WATER/SEWER TRENCH INSTALLATION WITHIN THE CITY RIGHT OF WAY SHALL BE DENSE GRADED AGGREGATE 1-1.5" IN ACCORDANCE WITH THE SPECIFICATION SUBSECTION 901.08 OF THE NDOT STANDARD SPECIFICATION AND CONFORM TO THE TABLE A SECTION 077-229.2 OF THE ORDINANCE.
- ALL PROPOSED PVC FOR SANITARY SEWER SHALL HAVE AN SDR CLASSIFICATION OF 35.
- ALL CONCRETE STORMWATER PIPE SHALL BE MANUFACTURED AND SUPPLIED WITHOUT LIFTING HOLES.
- ALL RCP FROM 24 INCHES UP TO AND INCLUDING 72 INCHES DIAMETER SHALL CONFORM TO ASTM C76, MINIMUM PIPE CLASS IV, WALL B (SECTION 577-229).
- ALL PUBLIC CONCRETE STORM DRAIN PIPE IS TO EITHER HAVE RUBBER GASKETED OR BUTYL TAPED JOINTS. ALL LIFT HOLES AND BUTYL TAPED JOINTS SHALL BE WRAPPED AND MORTARED ON THE OUTSIDE.
- EACH MANHOLE BASE AND INLET SHALL BE PROVIDED WITH CIRCULAR OPENINGS AT THE REQUIRED LOCATIONS AND ELEVATIONS FOR PROPER CONNECTION OF THE PIPES. THE FLEXIBLE CONNECTION SHALL BE A-LOK FLEXIBLE CONNECTOR, APPROVED EQUAL, AND SHALL BE CAST INTEGRALLY IN THE MANHOLE/INLET WALL FOR PIPE CONNECTIONS. NO PIPE PENETRATIONS SHALL BE LOCATED WITHIN 12" OF A JOINT.
- NEW MANHOLES AND CATCH BASINS SHALL HAVE AN EXTERIOR COATING OF CARBAMIDE TAR EPOXY JOOM, OR APPROVED EQUAL. TWO COATS. ALL REINFORCED CONCRETE PIPES SHALL BE LINED ON THE INTERIOR WITH A COAT OF TAR EPOXY SEAL WITH A MINIMUM OF 4 MIL IN THICKNESS (DFT) (SECTION 577-229).
- ALL STORM INLETS WHICH ARE CONNECTED TO THE CITY COMBINED SEWER SHALL BE FURNISHED WITH A SUMP AND TRAP PER CITY STANDARDS.
- PROPOSED MANHOLES CONSTRUCTED IN THE PUBLIC RIGHT-OF-WAY ON EXISTING OR PROPOSED CITY SEWERS SHALL BE FURNISHED WITH CONCENTRIC MANHOLES APPROVED BY THE CITY.
- MANHOLE FRAMES AND COVERS ARE TO PROVIDE FOR A MINIMUM OF THIRTY (30) INCH CLEAR OPENING AT THE COVER IN ORDER TO ALLOW EASY ACCESS UNDER CONFINED SPACE ENTRY REQUIREMENTS. CAMPBELL FOUNDRY PATTERN NUMBER 1012B OR NDOT APPROVED EQUAL. THE MINIMUM DIAMETER MANHOLE SHALL BE 48-INCHES. A MINIMUM ACCESS DIAMETER OF 30-INCHES SHALL BE PROVIDED.
- MANHOLE COVERS SHALL BE A SOLID TYPE MARKED WITH SEWER.
- A DROP MANHOLE CONNECTION SHALL BE USED WHERE THERE IS A DIFFERENCE IN ELEVATION OF TWO FEET OR GREATER BETWEEN THE PIPE INVERT AND THE MANHOLE INVERT ELEVATION. REFER TO CITY DETAILS.
- ALL CONCRETE SHALL BE 4,500 PSI MINIMUM DESIGN MIX.

STORMWATER MAINTENANCE NOTES

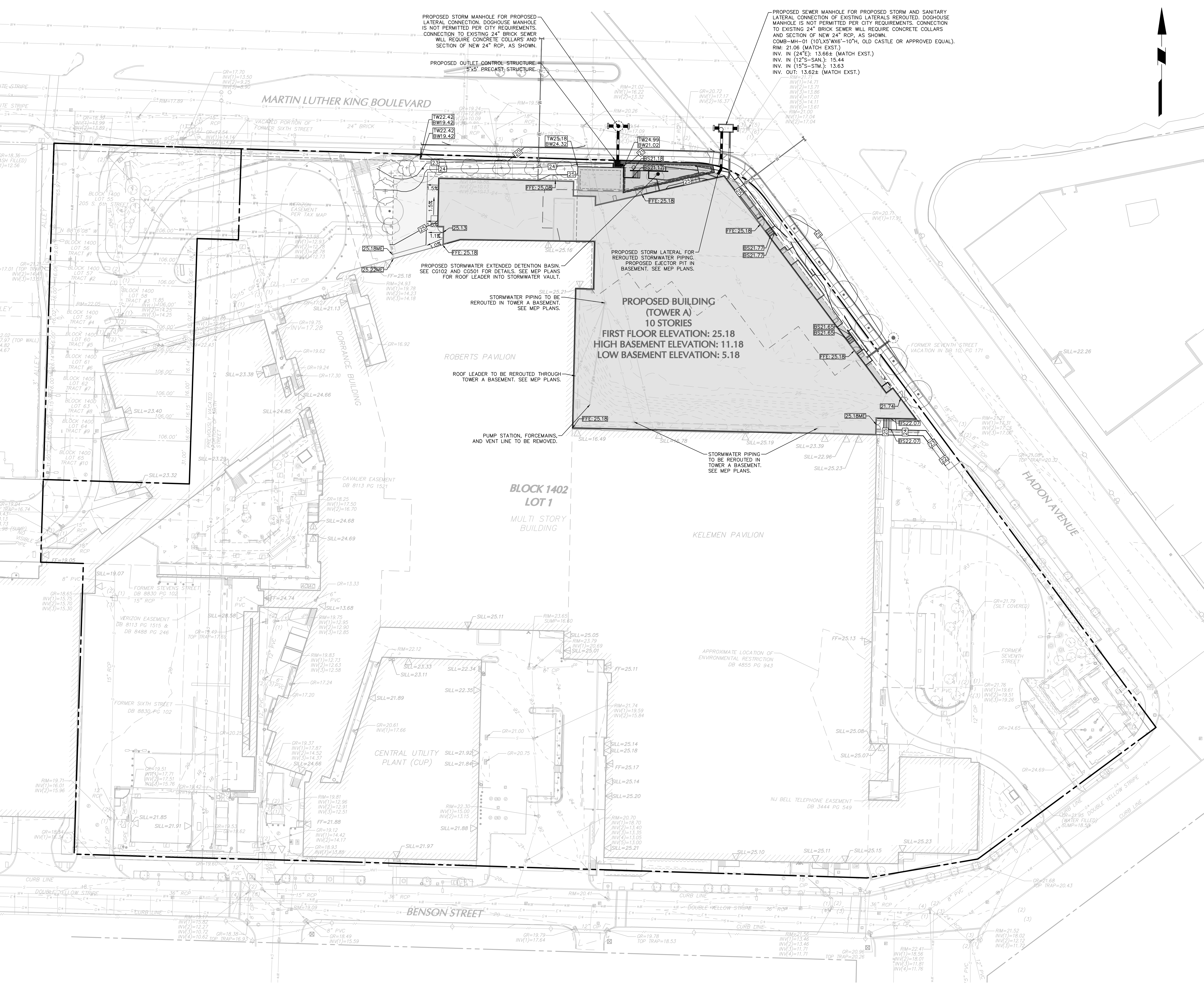
- TO THE EXTENT PERMITTED BY LAW, THE CITY WILL AT ALL REASONABLE TIMES HAVE A RIGHT OF INGRESS AND EGRESS OVER THE EASEMENT AREA AND THE RIGHT TO ENTER THE EASEMENT AREA VIA ANY ROAD OR PARKING LOT LOCATED WITHIN ANY COMMON AREA OWNED BY THE GRANITOR TO INSPECT THE SYSTEM LOCATED IN THE EASEMENT AREA.
- EXCEPT IN THE CASE OF AN EMERGENCY, THE CITY WILL PROVIDE NOT LESS THAN SEVEN (7) DAYS PRIOR NOTICE TO THE PERFORMING ANY INSPECTION OR MONITOR OF THE SYSTEM IN ACCORDANCE WITH APPROVED PLAN. THE APPLICANT AGREES THAT THE FAILURE TO TIMELY OBJECT AFTER RECEIVING NOTICE FROM THE CITY CONSTITUTES CONSENT TO INSPECTION OF THE PROPERTY WITHIN THE TIMEFRAME SPECIFIED IN THE NOTICE.
- AFTER REASONABLE NOTICE BY THE CITY, THE APPLICANT FAILS TO MAINTAIN THE SYSTEM IN ACCORDANCE WITH THE APPROVED MANUAL AND THE MAINTENANCE PLAN, THE CITY MAY PERFORM ANY MAINTENANCE NEEDED TO CORRECT A CONDITION THAT IMPACTS THE EFFECTIVENESS OF ROUTINE MAINTENANCE AND OPERATIONS OF THE SYSTEM AND COLLECT ANY COSTS INCURRED AS A RESULT FROM EACH OWNER OF THE SYSTEM AND IN THE SAME MANNER AS REAL PROPERTY TAXES ARE COLLECTED. IN ADDITION, THE CITY MAY SEEK REIMBURSEMENT FOR ANY OTHER METHOD LEGALLY AVAILABLE TO COLLECT DEBTS OWED.
- THE APPLICANT AGREES TO INDEMNIFY AND SAVE THE CITY HARMLESS FROM ANY AND ALL CLAIMS FOR DIRECT DAMAGES TO PERSONS OR PROPERTY ARISING FROM INSPECTIONS PERFORMED BY THE CITY.

CALL BEFORE YOU DIG
 811 OR 1-800-272-1000
 FOR FREE SERVICE TO LOCATE UNDERGROUND UTILITIES

IT'S THE LAW
 CALL BEFORE YOU DIG
 GARDEN STATE UNDERGROUND
 PLANT LOCATION SERVICE, INC.

CONTRACTOR TO COORDINATE WITH OWNER (BARRIERS) AND
 GEOTECHNICAL ENGINEER REGARDING SLOPE REQUIREMENTS FOR
 CATCH BASIN, OUTLET AND INLET REQUIREMENTS AND COMPLIANCE.

CALL BEFORE YOU DIG



LEGEND

- PROPERTY LINE
- - - - - LIMIT OF DISTURBANCE/MPDES BOUNDARY
- - - - - PROPOSED UNDERGROUND STORM PIPE
- ○ ○ ○ ○ PROPOSED DRAINAGE STRUCTURES
- ○ ○ ○ ○ PROPOSED UNDERGROUND STORMWATER
- ○ ○ ○ ○ PROPOSED SPOT ELEVATION
- x x x x x PROPOSED SLOPE
- 25 PROPOSED 1 FOOT CONTOUR LINE

NOTE: SEE C6102 FOR DETAILED GRADING AND DRAINAGE DESIGN.

SCALE: 1" = 30' FEET

DATE: 3/19/2024 Time: 10:25 User: mko2ub Style: Table: Langan.stb Layout: CG101 Document Code: 220187001-0301-CG101-010

RESERVE FOR DCA STAMP

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 JENSEN HUGHES
 30 S 15TH STREET, FLOOR 15
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COOPER University Health Care
COOPER UNIVERSITY HOSPITAL - TOWER A

PROJECT ADDRESS: 1 COOPER PLAZA CAMDEN, NJ 08103

OWNER
 COOPER UNIVERSITY HEALTHCARE
 1 COOPER PLAZA
 CAMDEN, NJ 08103

PROJECT MANAGER
 HAMMES
 2700 S. QUINCY STREET, SUITE 540
 ARLINGTON, VA 22206

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 LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, INC.
 1 UNIVERSITY SQUARE DRIVE, SUITE 100
 PRINCETON, NJ 08540
 NJ CERTIFICATE OF AUTHORIZATION NO. 24GA2798040

KEY PLAN

REVISION

| NO. | DESCRIPTION | DATE |
|-----|-------------|------|
| | | |

HKS PROJECT NUMBER

DATE
20 MARCH, 2024

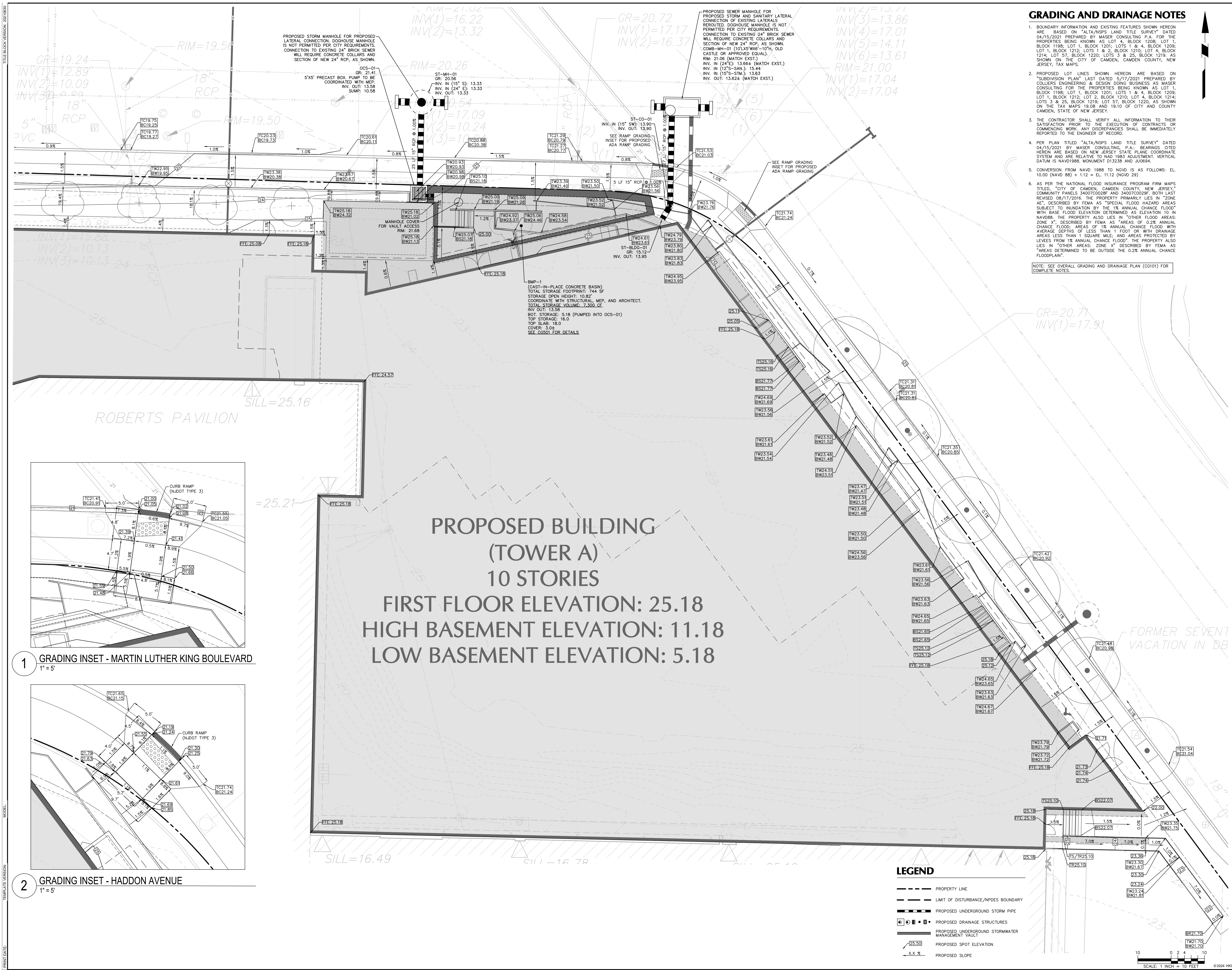
ISSUE

SHEET TITLE
OVERALL GRADING AND DRAINAGE PLAN

SHEET NO.
CG101

41111

TITLE BLOCK VERSION: 20210820
MATERIAL
PRINT DATE



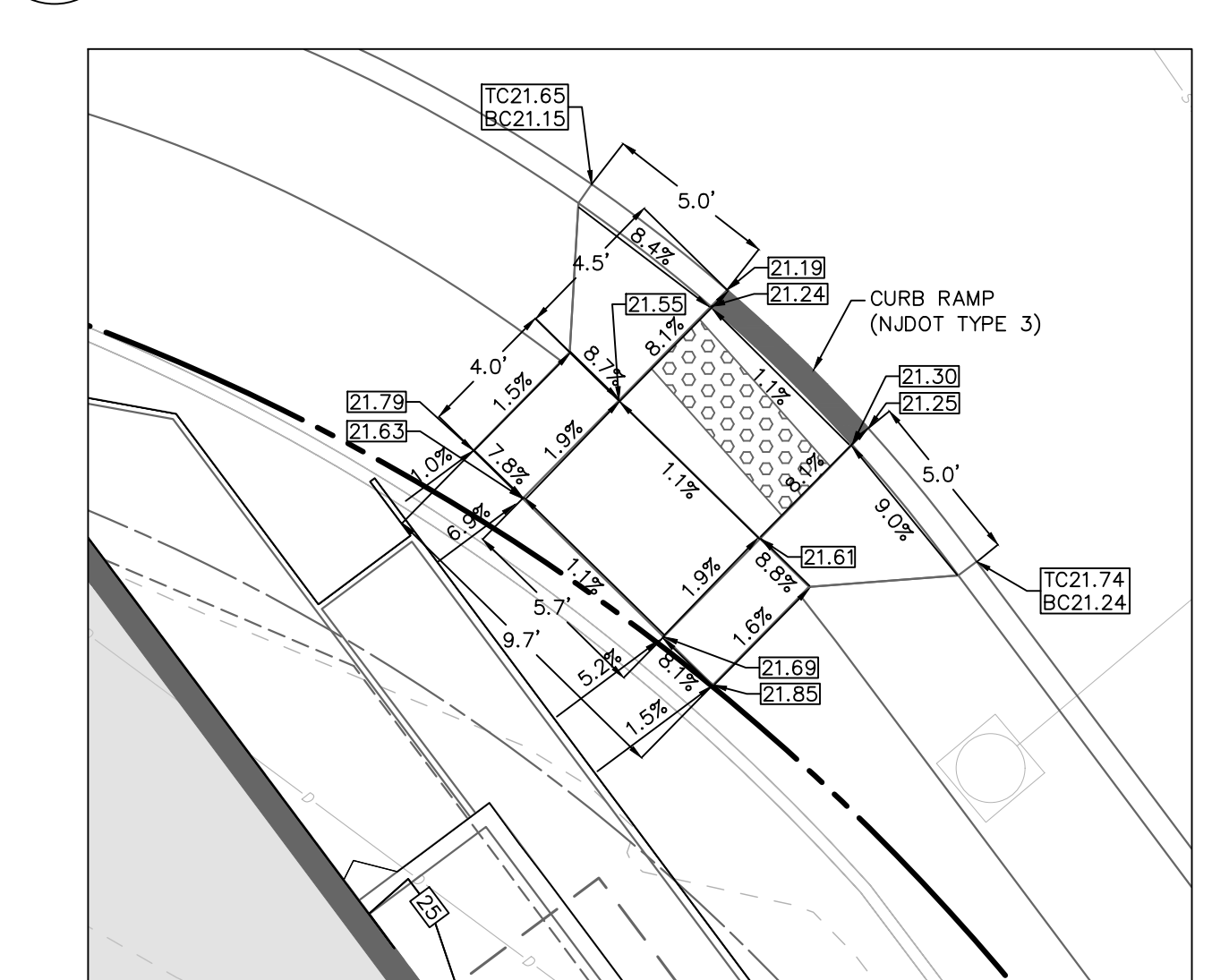
GRADING AND DRAINAGE NOTES

- BOUNDARY INFORMATION AND EXISTING FEATURES SHOWN HEREON ARE BASED ON "ALTA/NSPS LAND TITLE SURVEY" DATED 04/15/2021 PREPARED BY MASER CONSULTING, P.A. FOR THE PROPERTIES BEING KNOWN AS LOT 4, BLOCK 1208; LOT 1, BLOCK 1198; LOT 1, BLOCK 1201; LOTS 1 & 4, BLOCK 1209; LOT 1, BLOCK 1212; LOTS 1 & 2, BLOCK 1210; LOT 4, BLOCK 1214; LOT 57, BLOCK 1220; LOTS 3 & 25, BLOCK 1219. AS SHOWN ON THE CITY OF CAMDEN, CAMDEN COUNTY, NEW JERSEY, TAX MAPS.
- PROPOSED LOT LINES SHOWN HEREON ARE BASED ON "SUBDIVISION PLAN" LAST DATED 5/17/2021 PREPARED BY COLLIER ENGINEERING & DESIGN DOING BUSINESS AS MASER CONSULTING FOR THE PROPERTIES BEING KNOWN AS LOT 1, BLOCK 1198; LOT 1, BLOCK 1201; LOTS 1 & 4, BLOCK 1209; LOT 1, BLOCK 1212; LOT 2, BLOCK 1210; LOT 4, BLOCK 1214; LOTS 3 & 25, BLOCK 1219; LOT 57, BLOCK 1220. AS SHOWN ON THE TAX MAPS 19/08 AND 19/10 OF CITY AND COUNTY CAMDEN, STATE OF NEW JERSEY.
- THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO THEIR SATISFACTION PRIOR TO THE EXECUTION OF CONTRACTS OR COMMENCING WORK. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER OF RECORD.
- PER PLAN TITLED "ALTA/NSPS LAND TITLE SURVEY" DATED 04/15/2021 BY MASER CONSULTING, P.A.; BEARINGS CITED HEREIN ARE BASED ON NEW JERSEY STATE PLANE COORDINATE SYSTEM AND ARE RELATIVE TO NAD 1983 ADJUSTMENT. VERTICAL DATUM IS NAVD988. MONUMENT D13238 AND J0694.
- CONVERSION FROM NAVD 1988 TO NGVD IS AS FOLLOWS: EL. 10.00 (NAVD 88) + 1.12 = EL. 11.12 (NGVD 29)
- AS PER THE NATIONAL FLOOD INSURANCE PROGRAM FIRM MAPS TITLED "CITY OF CAMDEN, CAMDEN COUNTY, NEW JERSEY" COMMUNITY PANELS 340070028F AND 340070029F, BOTH LAST REVISED 08/17/2016, THE PROPERTY PRIMARILY LIES IN "ZONE X", DESCRIBED BY FEMA AS "SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD" WITH BASE FLOOD ELEVATION DETERMINED AS ELEVATION 10 IN NAVD88. THE PROPERTY ALSO LIES IN "OTHER FLOOD AREAS: ZONE X", DESCRIBED BY FEMA AS "AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE, AND AREAS PROTECTED BY LEAVES FROM 1% ANNUAL CHANCE FLOOD". THE PROPERTY ALSO LIES IN "OTHER AREAS: ZONE X" DESCRIBED BY FEMA AS "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN".

NOTE: SEE OVERALL GRADING AND DRAINAGE PLAN (CG101) FOR COMPLETE NOTES.

PROPOSED BUILDING (TOWER A)
10 STORIES
FIRST FLOOR ELEVATION: 25.18
HIGH BASEMENT ELEVATION: 11.18
LOW BASEMENT ELEVATION: 5.18

1 GRADING INSET - MARTIN LUTHER KING BOULEVARD
1" = 5'

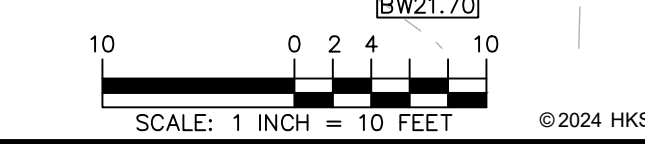


2 GRADING INSET - HADDON AVENUE
1" = 5'



LEGEND

- PROPERTY LINE
- - - LIMIT OF DISTURBANCE/NPDES BOUNDARY
- PROPOSED UNDERGROUND STORM PIPE
- PROPOSED DRAINAGE STRUCTURES
- PROPOSED UNDERGROUND STORMWATER MANAGEMENT VAULT
- PROPOSED SPOT ELEVATION
- PROPOSED SLOPE



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PHILADELPHIA, PA 19102

ELEVATOR CONSULTANT
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YORK, PA 17402

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COOPER UNIVERSITY HOSPITAL - TOWER A

PROJECT ADDRESS: 1 COOPER PLAZA CAMDEN, NJ 08103

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1 COOPER PLAZA
CAMDEN, NJ 08103

PROJECT MANAGER
HAMMES
2700 S. QUINCY STREET, SUITE 540
ARLINGTON, VA 22206

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1 UNIVERSITY SQUARE DRIVE, SUITE 100
PRINCETON, NJ 08540
NJ CERTIFICATE OF AUTHORIZATION NO. 24GA2798400

KEY PLAN

REVISION

| NO. | DESCRIPTION | DATE |
|-----|-------------|------|
| | | |

HKS PROJECT NUMBER

DATE: **20 MARCH, 2024**

ISSUE

SHEET TITLE: **DETAILED GRADING AND DRAINAGE PLAN**

SHEET NO.: **CG102**

DATE: 3/19/2024 Time: 10:26 User: mkozub Style Table: Langan.stb Layout: CG102 Document Code: 220187001-0301-CG101-0102

Appendix A
Low-Impact Development Checklist

New Jersey Stormwater Best Management Practices Manual

February 2004

<http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>

A P P E N D I X A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: City of Camden

County: Camden Date: 03/20/2024

Review board or agency: City of Camden Planning Board

Proposed land development name: Cooper University Hospital – Tower A

Lot(s): 1 Block(s): 1402

Lot(s): Block(s):

Project or application number: TBD

Applicant's name: _____

Applicant's address: _____

Telephone: _____ Fax: _____

Email address: _____

Designer's name: Kyle MacGeorge

Designer's address: 1 University Square Drive, Suite 110, Princeton, NJ 08540

Telephone: 609-282-8000 Fax: 609-282-8001

Email address: kmacgeorge@langan.com

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

The proposed stormwater management approach for the project includes low-impact development strategies listed below, in accordance with N.J.A.C. 7:8-5.3.

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
2. Minimize land disturbance including clearing and grading, by redeveloping the existing hospital campus rather than a new "greenfield" elsewhere.
3. Minimize soil compaction, by redeveloping the existing hospital campus rather than a new "greenfield" elsewhere.
4. Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.
5. Provide preventative source controls.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

City of Camden Zoning and Land Use and Stormwater Control and Management Code; N.J.A.C. 7:8 (July 2023)

Do regulations include nonstructural requirements?

Yes: No:

If yes, briefly describe: Nonstructural requirements in the city ordinance are consistent with the N.J.A.C. code requirements, which include evaluating nonstructural strategies as part of the stormwater management plan to reduce the need for structural requirements.

List LID-BMPs prohibited by local regulations: N/A

Pre-design meeting held? Yes: Date: 6/2023 No:

Meeting held with: Langan, HKS, Hammes, CUHC

Pre-design site walk held? Yes: Date: 6/7/2023 No:

Site walk held with: Langan

Other agencies with stormwater review jurisdiction:

Name: Camden County Soil Conservation District

Required approval: NJPDES Approval

Name: _____

Required approval: _____

Name: _____

Required approval: _____

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed?
Yes: _____ No: X

If yes, was this inventory a factor in the site's layout and design? Yes: _____ No: X

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: X (N/A)
If yes, specify % of site: _____

Native ground cover? Yes: _____ No: X (N/A)
If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: X
If yes, specify % of site: _____

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: X
If yes, specify % of site: _____

Native ground cover? Yes: _____ No: X
If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: X
If yes, specify % of site: _____

D. If vegetated filter strips or buffers are utilized, specify their functions: N/A

Reduce runoff volume increases through lower runoff coefficient:
Yes: _____ No: _____

Reduce runoff pollutant loads through runoff treatment:
Yes: _____ No: _____

Maintain groundwater recharge by preserving natural areas:
Yes: _____ No: _____

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed?
Yes: No:

If yes, were these inventories factors in the site's layout and design? Yes: No:

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners?

Yes: No:

If yes, how: _____

Restrict temporary site disturbance during construction?

Yes: No:

If yes, how: _____

Consider soils and slopes in selecting disturbance limits?

Yes: No:

If yes, how: No steep slopes exist on-site pre-construction. All soils on-site are urban fill.

C. Specify percentage of site to be cleared: 100% Regraded: 100%

D. Specify percentage of cleared areas done so for buildings: 100%

For driveways and parking: 0% For roadways: 0%

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above? Nothing can be changed to reduce the percentages in C and D above because the majority of the site is building area, which requires regrading around it.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: _____ HSG B: _____ HSG C: 100% HSG D:

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: _____ HSG C: 100% HSG D:

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

None, entire site is urban fill with HSG D.

I. Does the site include Karst topography?

Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 81% Proposed: 91%

B. Specify maximum site impervious coverage allowed by regulations: 90%

C. Compare proposed street cartway widths with those required by regulations: N/A

| Type of Street | Proposed Cartway Width (feet) | Required Cartway Width (feet) |
|---|-------------------------------|-------------------------------|
| Residential access – low intensity | | |
| Residential access – medium intensity | | |
| Residential access – high intensity with parking | | |
| Residential access – high intensity without parking | | |
| Neighborhood | | |
| Minor collector – low intensity without parking | | |
| Minor collector – with one parking lane | | |
| Minor collector – with two parking lanes | | |
| Minor collector – without parking | | |
| Major collector | | |

D. Compare proposed parking space dimensions with those required by regulations: N/A

Proposed: _____ Regulations: _____

E. Compare proposed number of parking spaces with those required by regulations: N/A

Proposed: _____ Regulations: _____

F. Specify percentage of total site impervious cover created by buildings: 80%

By driveways and parking: 0% By roadways: 0%

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

None, the building footprint cannot be reduced because of project requirements.

H. Specify percentage of total impervious area that will be unconnected:

Total site: 0% Buildings: _____ Driveways and parking: _____ Roads: _____

I. Specify percentage of total impervious area that will be porous:

Total site: 0% Buildings: _____ Driveways and parking: _____ Roads: _____

J. Specify percentage of total building roof area that will be vegetated: 0%

K. Specify percentage of total parking area located beneath buildings: 0%

L. Specify percentage of total parking located within multi-level parking deck: 0%

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 34% Vegetated swale: N/A – urban site Natural channel: N/A – urban site

Stormwater management facility: 2% Other: _____

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

This is not possible in an urban setting like this one.

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: *This is not possible in an urban setting like this one.*

Increase overland flow roughness: *This is not possible in an urban setting like this one.*

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: 0

Specify the spacing between the trash receptacles: N/A

Compare trash receptacles proposed with those required by regulations:

Proposed: 0 Regulations: N/A

B. Pet Waste Stations

Specify the number of pet waste stations provided: 0

Specify the spacing between the pet waste stations: N/A

Compare pet waste stations proposed with those required by regulations:

Proposed: 0 Regulations: N/A

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 100% of downstream inlets

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: 0 Regulations: N/A

Litter collection: Proposed: 0 Regulations: N/A

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

Sumps and traps are provided in all downstream inlets before discharging to BMPs.

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: N/A Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: _____

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: _____

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

| No. | Nonstructural Strategy | Yes | No |
|-----|--|-----|----|
| 1. | Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss. | X | |
| 2. | Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces. | | X |
| 3. | Maximize the protection of natural drainage features and vegetation. | X | |
| 4. | Minimize the decrease in the pre-construction time of concentration. | | X |
| 5. | Minimize land disturbance including clearing and grading. | X | |
| 6. | Minimize soil compaction. | X | |
| 7. | Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides. | X | |
| 8. | Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas. | | X |
| 9. | Provide preventative source controls. | X | |

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

The time of concentration will decrease due to decreased ground-level open space and added stormwater conveyance systems. However, runoff will be managed by BMPs and the peak runoff rates leaving the site are lower than the pre-construction conditions.

There is limited space to fit vegetated open-channel conveyance. Therefore, storm piping is proposed to convey runoff. As noted above, this runoff is directed to BMPs for management of quantity and rate per NJDEP and City of Camden requirements.

Appendix B
Pre-Development Drainage Area and Land Cover Summary /
Runoff Hydrographs

STORMWATER ANALYSIS

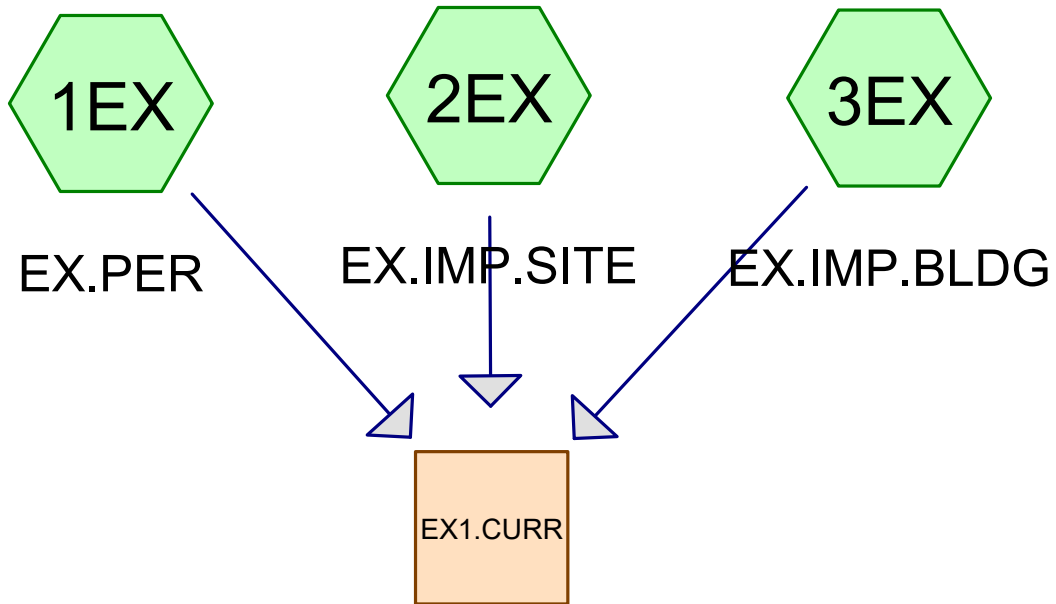
PROJECT: Cooper University Hospital - Tower A
LOCATION: Camden, New Jersey
JOB #: 220187001
DATE: 20 March 2024

LAND COVER SUMMARY - PRE-DEVELOPED CONDITIONS

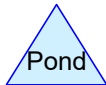
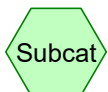
| DRAINAGE AREA | LAND COVER | HYDROLOGIC SOIL GROUP | AREA | | CN | Tc | |
|-------------------|----------------------------|-----------------------|---------------|--------------|----|---------|-----------|
| | | | SF | ACRES | | Current | Projected |
| EXDA-1 (POI-1) | Impervious Building (Roof) | C | 1,055 | 0.024 | 98 | 0.4 | 0.4 |
| | Impervious Site (Ground) | C | 6,989 | 0.160 | 98 | 1.8 | 1.7 |
| | Lawn | C | 37,491 | 0.861 | 74 | 12.0 | 12.0 |
| | TOTAL | | 45,535 | 1.045 | | | |

EXISTING

Current Rainfall



POI-1 for EXDA-1
(current)



2024-03-18 - Stormwater Analysis Concept - Cooper Tower A_city submission1 PRINT

Prepared by Langan Engineering

Printed 3/18/2024

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Page 2

Area Listing (selected nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|----|---------------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C (1EX) |
| 6,989 | 98 | Paved parking, HSG D (2EX) |
| 1,055 | 98 | Roofs, HSG D (3EX) |

2024-03-18 - Stormwater Analysis Concept - Coo NOAA 24-hr C 2-yr, Current Rainfall=3.41"

Prepared by Langan Engineering

Printed 3/18/2024

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Page 3

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1EX: EX.PER

Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=1.18"
Tc=12.0 min CN=74 Runoff=1.03 cfs 3,681 cf

Subcatchment 2EX: EX.IMP.SITE

Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=3.18"
Tc=1.8 min CN=98 Runoff=0.65 cfs 1,850 cf

Subcatchment 3EX: EX.IMP.BLDG

Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=3.18"
Tc=0.4 min CN=98 Runoff=0.10 cfs 279 cf

Reach EX1.CURR: POI-1 for EXDA-1 (current)

Inflow=1.33 cfs 5,811 cf
Outflow=1.33 cfs 5,811 cf

Summary for Subcatchment 1EX: EX.PER

Runoff = 1.03 cfs @ 12.21 hrs, Volume= 3,681 cf, Depth= 1.18"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

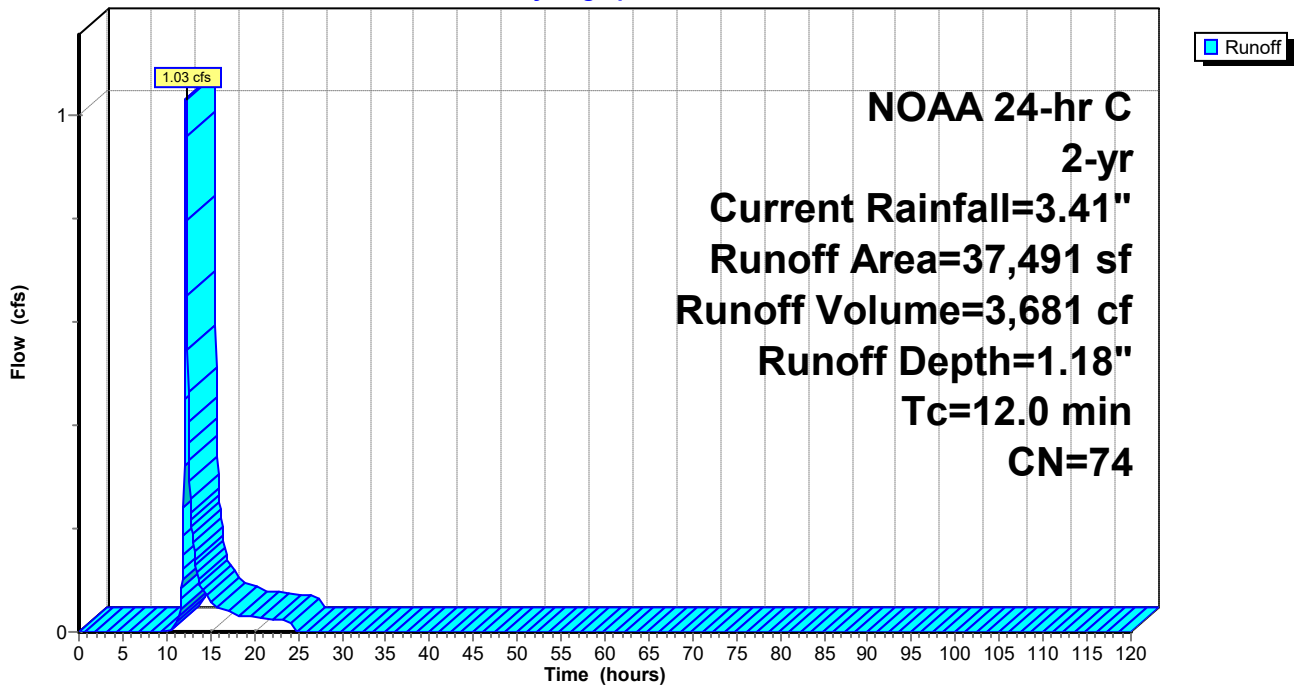
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Current Rainfall=3.41"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 1EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 1EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.10 | 0.00 | 0.00 |
| 5.00 | 0.22 | 0.00 | 0.00 |
| 7.50 | 0.37 | 0.00 | 0.00 |
| 10.00 | 0.62 | 0.00 | 0.00 |
| 12.50 | 2.40 | 0.55 | 0.40 |
| 15.00 | 2.91 | 0.85 | 0.06 |
| 17.50 | 3.11 | 0.98 | 0.04 |
| 20.00 | 3.24 | 1.07 | 0.03 |
| 22.50 | 3.35 | 1.14 | 0.02 |
| 25.00 | 3.41 | 1.18 | 0.00 |
| 27.50 | 3.41 | 1.18 | 0.00 |
| 30.00 | 3.41 | 1.18 | 0.00 |
| 32.50 | 3.41 | 1.18 | 0.00 |
| 35.00 | 3.41 | 1.18 | 0.00 |
| 37.50 | 3.41 | 1.18 | 0.00 |
| 40.00 | 3.41 | 1.18 | 0.00 |
| 42.50 | 3.41 | 1.18 | 0.00 |
| 45.00 | 3.41 | 1.18 | 0.00 |
| 47.50 | 3.41 | 1.18 | 0.00 |
| 50.00 | 3.41 | 1.18 | 0.00 |
| 52.50 | 3.41 | 1.18 | 0.00 |
| 55.00 | 3.41 | 1.18 | 0.00 |
| 57.50 | 3.41 | 1.18 | 0.00 |
| 60.00 | 3.41 | 1.18 | 0.00 |
| 62.50 | 3.41 | 1.18 | 0.00 |
| 65.00 | 3.41 | 1.18 | 0.00 |
| 67.50 | 3.41 | 1.18 | 0.00 |
| 70.00 | 3.41 | 1.18 | 0.00 |
| 72.50 | 3.41 | 1.18 | 0.00 |
| 75.00 | 3.41 | 1.18 | 0.00 |
| 77.50 | 3.41 | 1.18 | 0.00 |
| 80.00 | 3.41 | 1.18 | 0.00 |
| 82.50 | 3.41 | 1.18 | 0.00 |
| 85.00 | 3.41 | 1.18 | 0.00 |
| 87.50 | 3.41 | 1.18 | 0.00 |
| 90.00 | 3.41 | 1.18 | 0.00 |
| 92.50 | 3.41 | 1.18 | 0.00 |
| 95.00 | 3.41 | 1.18 | 0.00 |
| 97.50 | 3.41 | 1.18 | 0.00 |
| 100.00 | 3.41 | 1.18 | 0.00 |
| 102.50 | 3.41 | 1.18 | 0.00 |
| 105.00 | 3.41 | 1.18 | 0.00 |
| 107.50 | 3.41 | 1.18 | 0.00 |
| 110.00 | 3.41 | 1.18 | 0.00 |
| 112.50 | 3.41 | 1.18 | 0.00 |
| 115.00 | 3.41 | 1.18 | 0.00 |
| 117.50 | 3.41 | 1.18 | 0.00 |
| 120.00 | 3.41 | 1.18 | 0.00 |

Summary for Subcatchment 2EX: EX.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.65 cfs @ 12.08 hrs, Volume= 1,850 cf, Depth= 3.18"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

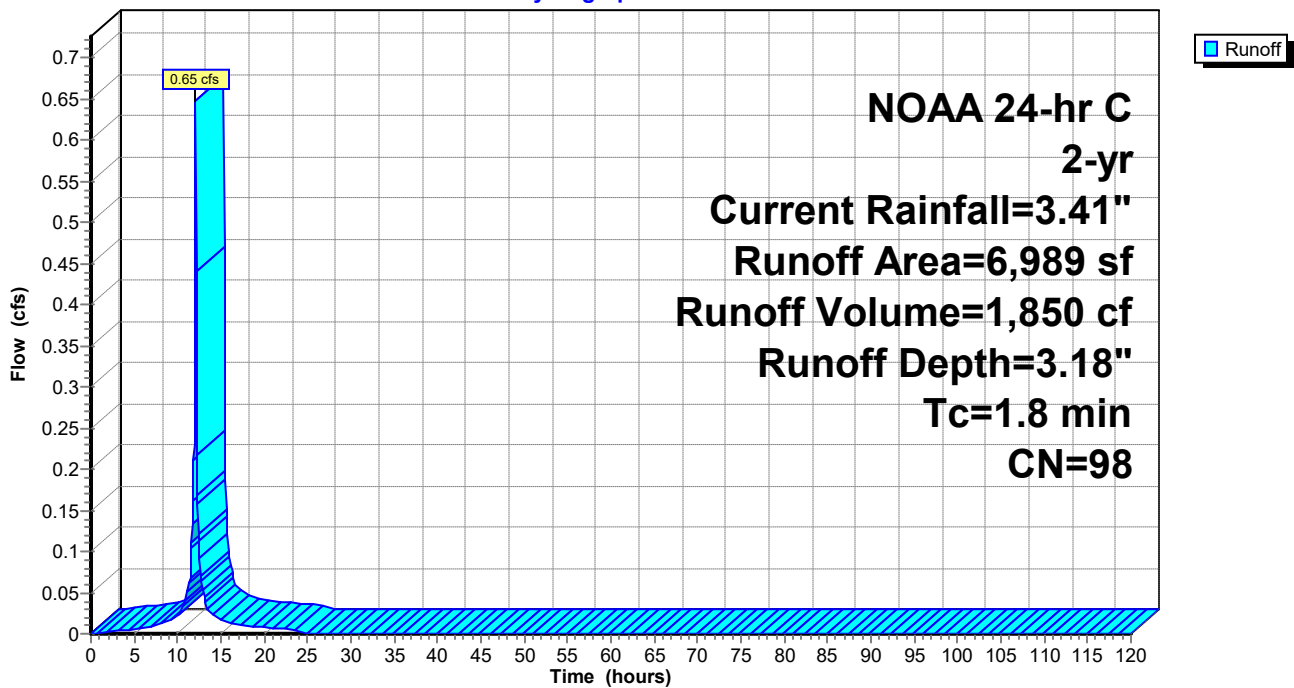
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Current Rainfall=3.41"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment 2EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 2EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.10 | 0.01 | 0.00 |
| 5.00 | 0.22 | 0.08 | 0.01 |
| 7.50 | 0.37 | 0.20 | 0.01 |
| 10.00 | 0.62 | 0.43 | 0.02 |
| 12.50 | 2.40 | 2.17 | 0.11 |
| 15.00 | 2.91 | 2.68 | 0.02 |
| 17.50 | 3.11 | 2.88 | 0.01 |
| 20.00 | 3.24 | 3.01 | 0.01 |
| 22.50 | 3.35 | 3.12 | 0.01 |
| 25.00 | 3.41 | 3.18 | 0.00 |
| 27.50 | 3.41 | 3.18 | 0.00 |
| 30.00 | 3.41 | 3.18 | 0.00 |
| 32.50 | 3.41 | 3.18 | 0.00 |
| 35.00 | 3.41 | 3.18 | 0.00 |
| 37.50 | 3.41 | 3.18 | 0.00 |
| 40.00 | 3.41 | 3.18 | 0.00 |
| 42.50 | 3.41 | 3.18 | 0.00 |
| 45.00 | 3.41 | 3.18 | 0.00 |
| 47.50 | 3.41 | 3.18 | 0.00 |
| 50.00 | 3.41 | 3.18 | 0.00 |
| 52.50 | 3.41 | 3.18 | 0.00 |
| 55.00 | 3.41 | 3.18 | 0.00 |
| 57.50 | 3.41 | 3.18 | 0.00 |
| 60.00 | 3.41 | 3.18 | 0.00 |
| 62.50 | 3.41 | 3.18 | 0.00 |
| 65.00 | 3.41 | 3.18 | 0.00 |
| 67.50 | 3.41 | 3.18 | 0.00 |
| 70.00 | 3.41 | 3.18 | 0.00 |
| 72.50 | 3.41 | 3.18 | 0.00 |
| 75.00 | 3.41 | 3.18 | 0.00 |
| 77.50 | 3.41 | 3.18 | 0.00 |
| 80.00 | 3.41 | 3.18 | 0.00 |
| 82.50 | 3.41 | 3.18 | 0.00 |
| 85.00 | 3.41 | 3.18 | 0.00 |
| 87.50 | 3.41 | 3.18 | 0.00 |
| 90.00 | 3.41 | 3.18 | 0.00 |
| 92.50 | 3.41 | 3.18 | 0.00 |
| 95.00 | 3.41 | 3.18 | 0.00 |
| 97.50 | 3.41 | 3.18 | 0.00 |
| 100.00 | 3.41 | 3.18 | 0.00 |
| 102.50 | 3.41 | 3.18 | 0.00 |
| 105.00 | 3.41 | 3.18 | 0.00 |
| 107.50 | 3.41 | 3.18 | 0.00 |
| 110.00 | 3.41 | 3.18 | 0.00 |
| 112.50 | 3.41 | 3.18 | 0.00 |
| 115.00 | 3.41 | 3.18 | 0.00 |
| 117.50 | 3.41 | 3.18 | 0.00 |
| 120.00 | 3.41 | 3.18 | 0.00 |

Summary for Subcatchment 3EX: EX.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.10 cfs @ 12.05 hrs, Volume= 279 cf, Depth= 3.18"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

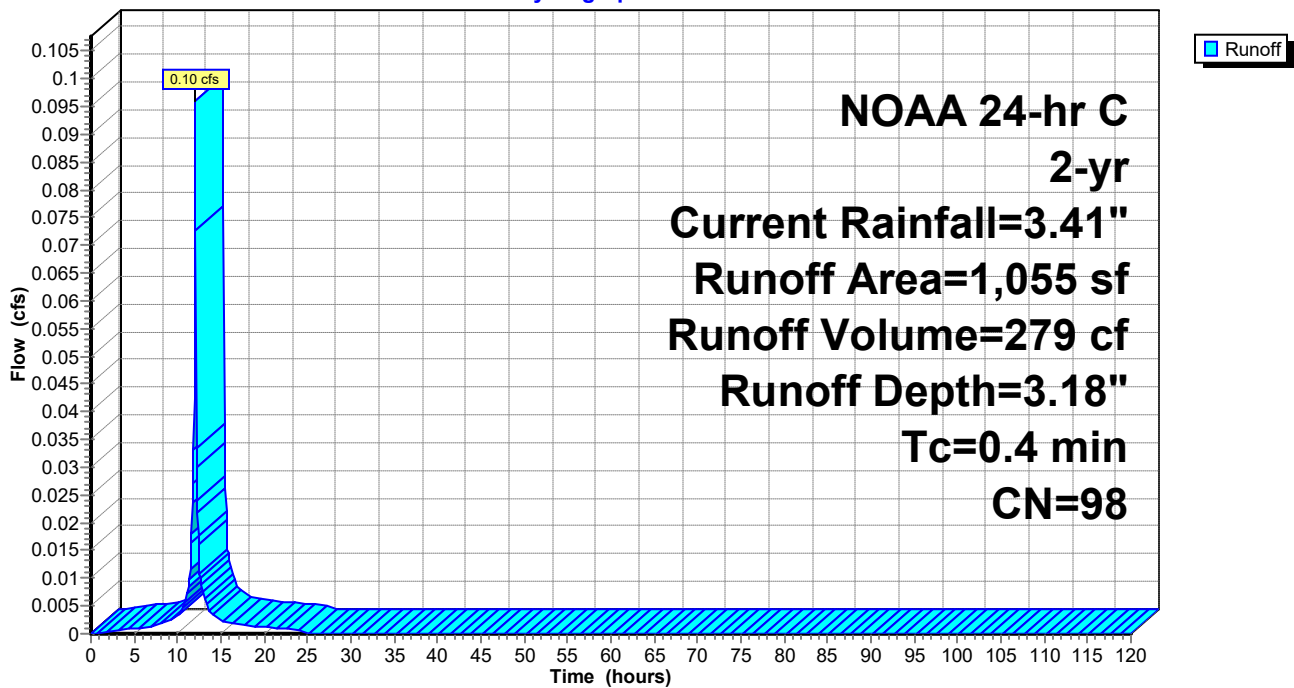
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Current Rainfall=3.41"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 3EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 3EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.10 | 0.01 | 0.00 |
| 5.00 | 0.22 | 0.08 | 0.00 |
| 7.50 | 0.37 | 0.20 | 0.00 |
| 10.00 | 0.62 | 0.43 | 0.00 |
| 12.50 | 2.40 | 2.17 | 0.01 |
| 15.00 | 2.91 | 2.68 | 0.00 |
| 17.50 | 3.11 | 2.88 | 0.00 |
| 20.00 | 3.24 | 3.01 | 0.00 |
| 22.50 | 3.35 | 3.12 | 0.00 |
| 25.00 | 3.41 | 3.18 | 0.00 |
| 27.50 | 3.41 | 3.18 | 0.00 |
| 30.00 | 3.41 | 3.18 | 0.00 |
| 32.50 | 3.41 | 3.18 | 0.00 |
| 35.00 | 3.41 | 3.18 | 0.00 |
| 37.50 | 3.41 | 3.18 | 0.00 |
| 40.00 | 3.41 | 3.18 | 0.00 |
| 42.50 | 3.41 | 3.18 | 0.00 |
| 45.00 | 3.41 | 3.18 | 0.00 |
| 47.50 | 3.41 | 3.18 | 0.00 |
| 50.00 | 3.41 | 3.18 | 0.00 |
| 52.50 | 3.41 | 3.18 | 0.00 |
| 55.00 | 3.41 | 3.18 | 0.00 |
| 57.50 | 3.41 | 3.18 | 0.00 |
| 60.00 | 3.41 | 3.18 | 0.00 |
| 62.50 | 3.41 | 3.18 | 0.00 |
| 65.00 | 3.41 | 3.18 | 0.00 |
| 67.50 | 3.41 | 3.18 | 0.00 |
| 70.00 | 3.41 | 3.18 | 0.00 |
| 72.50 | 3.41 | 3.18 | 0.00 |
| 75.00 | 3.41 | 3.18 | 0.00 |
| 77.50 | 3.41 | 3.18 | 0.00 |
| 80.00 | 3.41 | 3.18 | 0.00 |
| 82.50 | 3.41 | 3.18 | 0.00 |
| 85.00 | 3.41 | 3.18 | 0.00 |
| 87.50 | 3.41 | 3.18 | 0.00 |
| 90.00 | 3.41 | 3.18 | 0.00 |
| 92.50 | 3.41 | 3.18 | 0.00 |
| 95.00 | 3.41 | 3.18 | 0.00 |
| 97.50 | 3.41 | 3.18 | 0.00 |
| 100.00 | 3.41 | 3.18 | 0.00 |
| 102.50 | 3.41 | 3.18 | 0.00 |
| 105.00 | 3.41 | 3.18 | 0.00 |
| 107.50 | 3.41 | 3.18 | 0.00 |
| 110.00 | 3.41 | 3.18 | 0.00 |
| 112.50 | 3.41 | 3.18 | 0.00 |
| 115.00 | 3.41 | 3.18 | 0.00 |
| 117.50 | 3.41 | 3.18 | 0.00 |
| 120.00 | 3.41 | 3.18 | 0.00 |

Summary for Reach EX1.CURR: POI-1 for EXDA-1 (current)

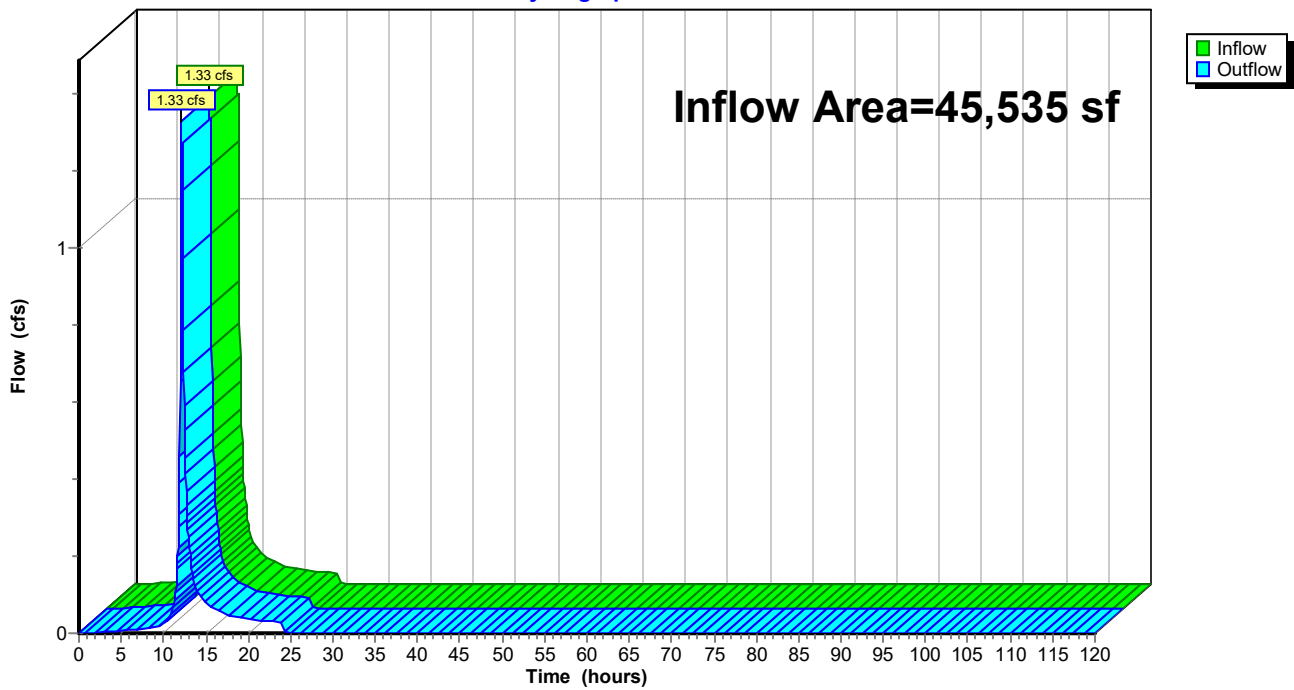
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 1.53" for 2-yr, Current event
Inflow = 1.33 cfs @ 12.10 hrs, Volume= 5,811 cf
Outflow = 1.33 cfs @ 12.10 hrs, Volume= 5,811 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.CURR: POI-1 for EXDA-1 (current)

Hydrograph



Hydrograph for Reach EX1.CURR: POI-1 for EXDA-1 (current)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.00 | | 0.00 |
| 5.00 | 0.01 | | 0.01 |
| 7.50 | 0.01 | | 0.01 |
| 10.00 | 0.03 | | 0.03 |
| 12.50 | 0.53 | | 0.53 |
| 15.00 | 0.08 | | 0.08 |
| 17.50 | 0.05 | | 0.05 |
| 20.00 | 0.04 | | 0.04 |
| 22.50 | 0.03 | | 0.03 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1EX: EX.PER Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=2.57"
Tc=12.0 min CN=74 Runoff=2.32 cfs 8,040 cf

Subcatchment 2EX: EX.IMP.SITE Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=5.02"
Tc=1.8 min CN=98 Runoff=1.01 cfs 2,925 cf

Subcatchment 3EX: EX.IMP.BLDG Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=5.02"
Tc=0.4 min CN=98 Runoff=0.15 cfs 442 cf

Reach EX1.CURR: POI-1 for EXDA-1 (current) Inflow=2.71 cfs 11,407 cf
Outflow=2.71 cfs 11,407 cf

Summary for Subcatchment 1EX: EX.PER

Runoff = 2.32 cfs @ 12.20 hrs, Volume= 8,040 cf, Depth= 2.57"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

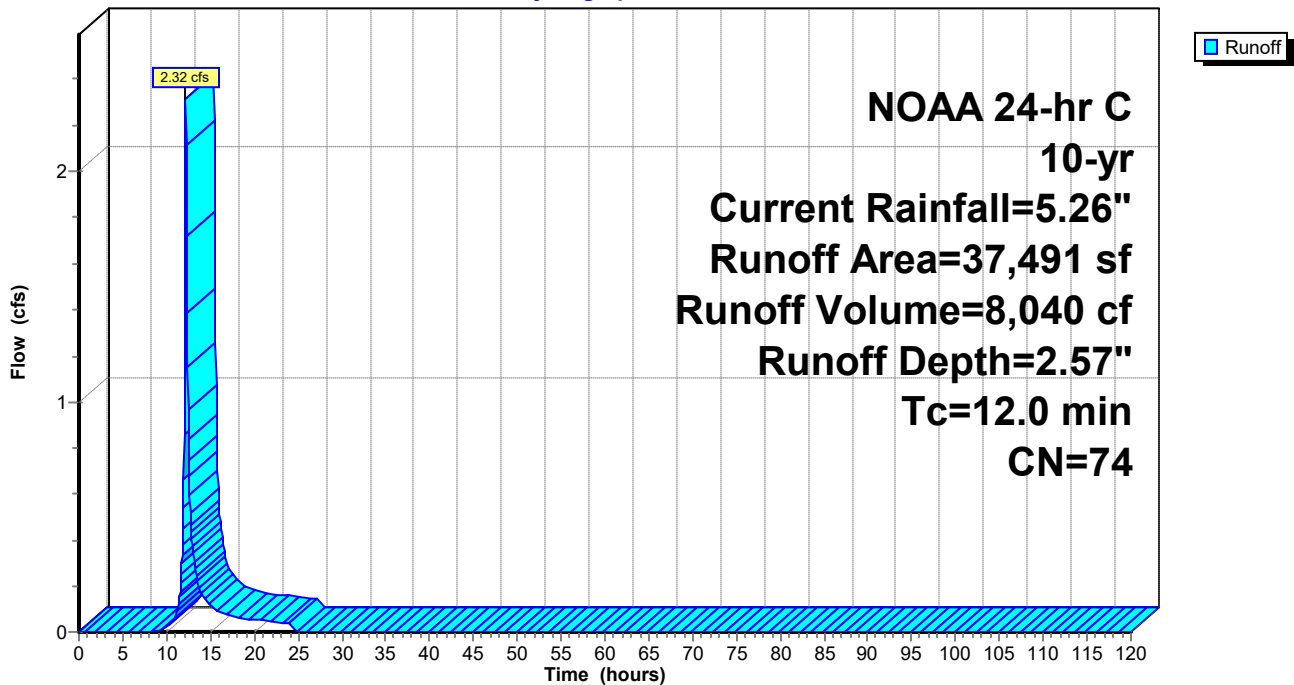
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Current Rainfall=5.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 1EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 1EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.15 | 0.00 | 0.00 |
| 5.00 | 0.33 | 0.00 | 0.00 |
| 7.50 | 0.57 | 0.00 | 0.00 |
| 10.00 | 0.96 | 0.02 | 0.02 |
| 12.50 | 3.71 | 1.38 | 0.83 |
| 15.00 | 4.49 | 1.97 | 0.11 |
| 17.50 | 4.80 | 2.20 | 0.07 |
| 20.00 | 5.00 | 2.37 | 0.05 |
| 22.50 | 5.17 | 2.50 | 0.04 |
| 25.00 | 5.26 | 2.57 | 0.00 |
| 27.50 | 5.26 | 2.57 | 0.00 |
| 30.00 | 5.26 | 2.57 | 0.00 |
| 32.50 | 5.26 | 2.57 | 0.00 |
| 35.00 | 5.26 | 2.57 | 0.00 |
| 37.50 | 5.26 | 2.57 | 0.00 |
| 40.00 | 5.26 | 2.57 | 0.00 |
| 42.50 | 5.26 | 2.57 | 0.00 |
| 45.00 | 5.26 | 2.57 | 0.00 |
| 47.50 | 5.26 | 2.57 | 0.00 |
| 50.00 | 5.26 | 2.57 | 0.00 |
| 52.50 | 5.26 | 2.57 | 0.00 |
| 55.00 | 5.26 | 2.57 | 0.00 |
| 57.50 | 5.26 | 2.57 | 0.00 |
| 60.00 | 5.26 | 2.57 | 0.00 |
| 62.50 | 5.26 | 2.57 | 0.00 |
| 65.00 | 5.26 | 2.57 | 0.00 |
| 67.50 | 5.26 | 2.57 | 0.00 |
| 70.00 | 5.26 | 2.57 | 0.00 |
| 72.50 | 5.26 | 2.57 | 0.00 |
| 75.00 | 5.26 | 2.57 | 0.00 |
| 77.50 | 5.26 | 2.57 | 0.00 |
| 80.00 | 5.26 | 2.57 | 0.00 |
| 82.50 | 5.26 | 2.57 | 0.00 |
| 85.00 | 5.26 | 2.57 | 0.00 |
| 87.50 | 5.26 | 2.57 | 0.00 |
| 90.00 | 5.26 | 2.57 | 0.00 |
| 92.50 | 5.26 | 2.57 | 0.00 |
| 95.00 | 5.26 | 2.57 | 0.00 |
| 97.50 | 5.26 | 2.57 | 0.00 |
| 100.00 | 5.26 | 2.57 | 0.00 |
| 102.50 | 5.26 | 2.57 | 0.00 |
| 105.00 | 5.26 | 2.57 | 0.00 |
| 107.50 | 5.26 | 2.57 | 0.00 |
| 110.00 | 5.26 | 2.57 | 0.00 |
| 112.50 | 5.26 | 2.57 | 0.00 |
| 115.00 | 5.26 | 2.57 | 0.00 |
| 117.50 | 5.26 | 2.57 | 0.00 |
| 120.00 | 5.26 | 2.57 | 0.00 |

Summary for Subcatchment 2EX: EX.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.01 cfs @ 12.08 hrs, Volume= 2,925 cf, Depth= 5.02"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

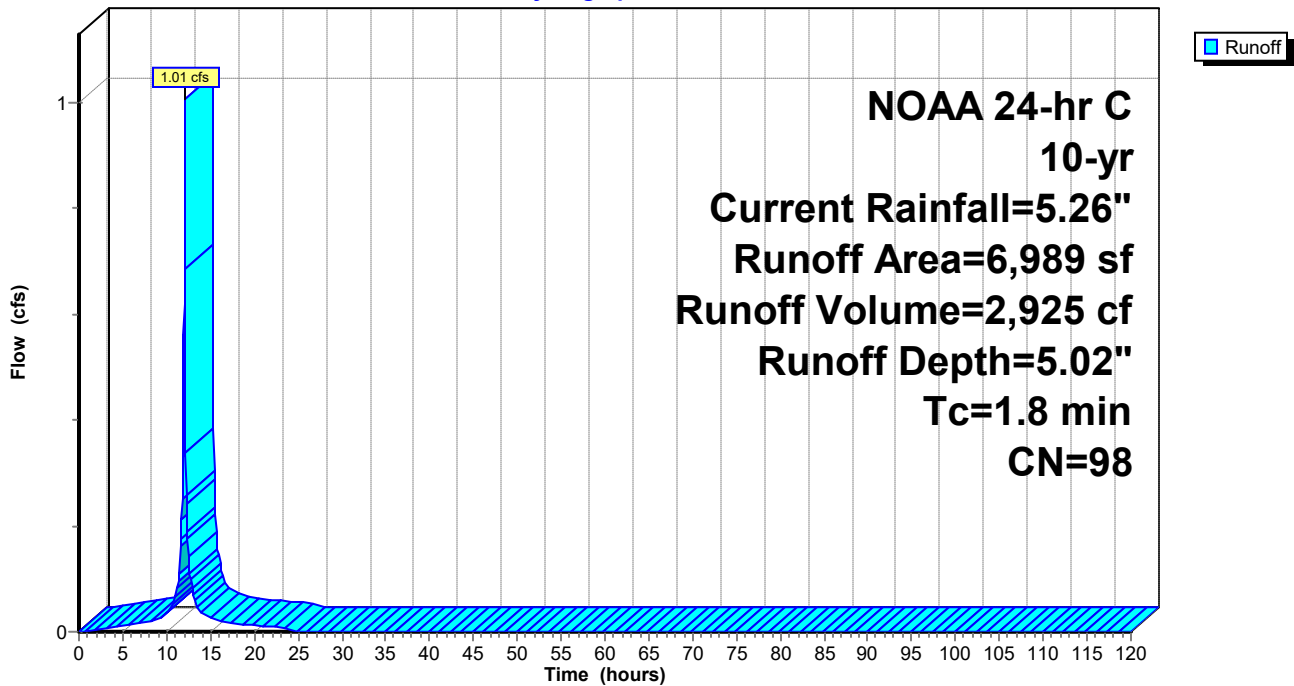
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Current Rainfall=5.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment 2EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 2EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.15 | 0.04 | 0.01 |
| 5.00 | 0.33 | 0.17 | 0.01 |
| 7.50 | 0.57 | 0.38 | 0.02 |
| 10.00 | 0.96 | 0.75 | 0.04 |
| 12.50 | 3.71 | 3.47 | 0.17 |
| 15.00 | 4.49 | 4.26 | 0.02 |
| 17.50 | 4.80 | 4.56 | 0.02 |
| 20.00 | 5.00 | 4.77 | 0.01 |
| 22.50 | 5.17 | 4.94 | 0.01 |
| 25.00 | 5.26 | 5.02 | 0.00 |
| 27.50 | 5.26 | 5.02 | 0.00 |
| 30.00 | 5.26 | 5.02 | 0.00 |
| 32.50 | 5.26 | 5.02 | 0.00 |
| 35.00 | 5.26 | 5.02 | 0.00 |
| 37.50 | 5.26 | 5.02 | 0.00 |
| 40.00 | 5.26 | 5.02 | 0.00 |
| 42.50 | 5.26 | 5.02 | 0.00 |
| 45.00 | 5.26 | 5.02 | 0.00 |
| 47.50 | 5.26 | 5.02 | 0.00 |
| 50.00 | 5.26 | 5.02 | 0.00 |
| 52.50 | 5.26 | 5.02 | 0.00 |
| 55.00 | 5.26 | 5.02 | 0.00 |
| 57.50 | 5.26 | 5.02 | 0.00 |
| 60.00 | 5.26 | 5.02 | 0.00 |
| 62.50 | 5.26 | 5.02 | 0.00 |
| 65.00 | 5.26 | 5.02 | 0.00 |
| 67.50 | 5.26 | 5.02 | 0.00 |
| 70.00 | 5.26 | 5.02 | 0.00 |
| 72.50 | 5.26 | 5.02 | 0.00 |
| 75.00 | 5.26 | 5.02 | 0.00 |
| 77.50 | 5.26 | 5.02 | 0.00 |
| 80.00 | 5.26 | 5.02 | 0.00 |
| 82.50 | 5.26 | 5.02 | 0.00 |
| 85.00 | 5.26 | 5.02 | 0.00 |
| 87.50 | 5.26 | 5.02 | 0.00 |
| 90.00 | 5.26 | 5.02 | 0.00 |
| 92.50 | 5.26 | 5.02 | 0.00 |
| 95.00 | 5.26 | 5.02 | 0.00 |
| 97.50 | 5.26 | 5.02 | 0.00 |
| 100.00 | 5.26 | 5.02 | 0.00 |
| 102.50 | 5.26 | 5.02 | 0.00 |
| 105.00 | 5.26 | 5.02 | 0.00 |
| 107.50 | 5.26 | 5.02 | 0.00 |
| 110.00 | 5.26 | 5.02 | 0.00 |
| 112.50 | 5.26 | 5.02 | 0.00 |
| 115.00 | 5.26 | 5.02 | 0.00 |
| 117.50 | 5.26 | 5.02 | 0.00 |
| 120.00 | 5.26 | 5.02 | 0.00 |

Summary for Subcatchment 3EX: EX.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.15 cfs @ 12.05 hrs, Volume= 442 cf, Depth= 5.02"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

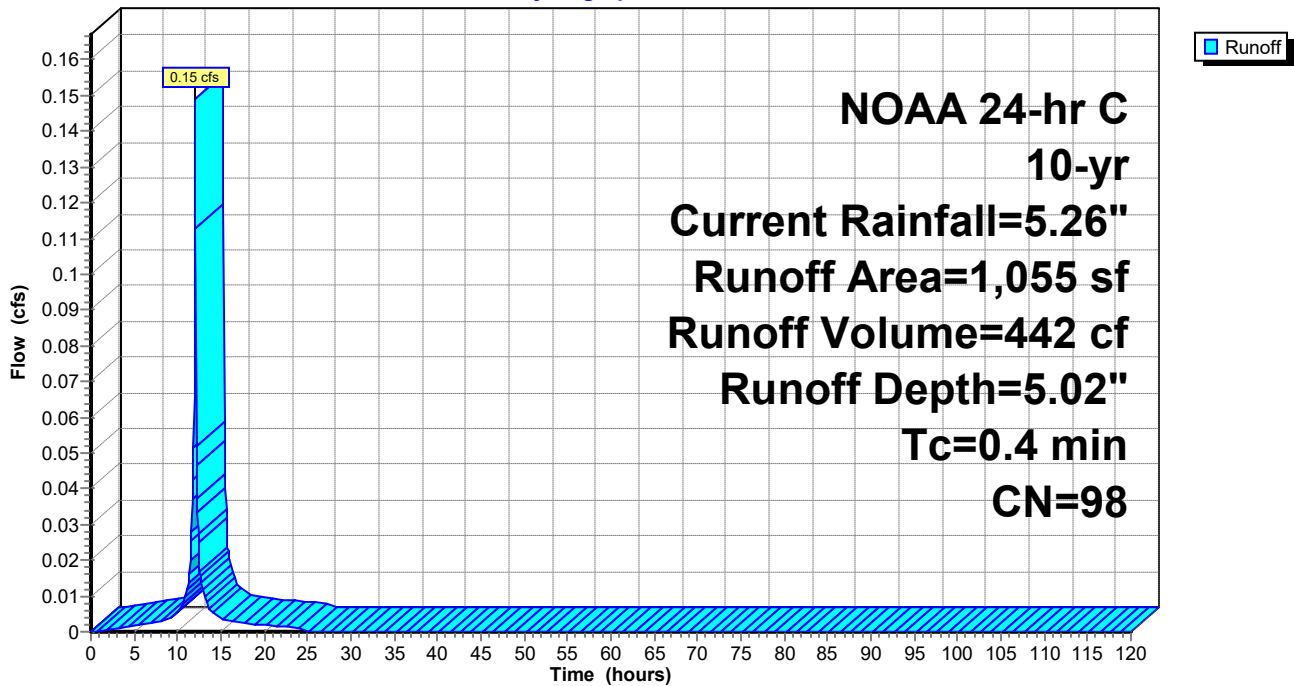
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Current Rainfall=5.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 3EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 3EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.15 | 0.04 | 0.00 |
| 5.00 | 0.33 | 0.17 | 0.00 |
| 7.50 | 0.57 | 0.38 | 0.00 |
| 10.00 | 0.96 | 0.75 | 0.01 |
| 12.50 | 3.71 | 3.47 | 0.02 |
| 15.00 | 4.49 | 4.26 | 0.00 |
| 17.50 | 4.80 | 4.56 | 0.00 |
| 20.00 | 5.00 | 4.77 | 0.00 |
| 22.50 | 5.17 | 4.94 | 0.00 |
| 25.00 | 5.26 | 5.02 | 0.00 |
| 27.50 | 5.26 | 5.02 | 0.00 |
| 30.00 | 5.26 | 5.02 | 0.00 |
| 32.50 | 5.26 | 5.02 | 0.00 |
| 35.00 | 5.26 | 5.02 | 0.00 |
| 37.50 | 5.26 | 5.02 | 0.00 |
| 40.00 | 5.26 | 5.02 | 0.00 |
| 42.50 | 5.26 | 5.02 | 0.00 |
| 45.00 | 5.26 | 5.02 | 0.00 |
| 47.50 | 5.26 | 5.02 | 0.00 |
| 50.00 | 5.26 | 5.02 | 0.00 |
| 52.50 | 5.26 | 5.02 | 0.00 |
| 55.00 | 5.26 | 5.02 | 0.00 |
| 57.50 | 5.26 | 5.02 | 0.00 |
| 60.00 | 5.26 | 5.02 | 0.00 |
| 62.50 | 5.26 | 5.02 | 0.00 |
| 65.00 | 5.26 | 5.02 | 0.00 |
| 67.50 | 5.26 | 5.02 | 0.00 |
| 70.00 | 5.26 | 5.02 | 0.00 |
| 72.50 | 5.26 | 5.02 | 0.00 |
| 75.00 | 5.26 | 5.02 | 0.00 |
| 77.50 | 5.26 | 5.02 | 0.00 |
| 80.00 | 5.26 | 5.02 | 0.00 |
| 82.50 | 5.26 | 5.02 | 0.00 |
| 85.00 | 5.26 | 5.02 | 0.00 |
| 87.50 | 5.26 | 5.02 | 0.00 |
| 90.00 | 5.26 | 5.02 | 0.00 |
| 92.50 | 5.26 | 5.02 | 0.00 |
| 95.00 | 5.26 | 5.02 | 0.00 |
| 97.50 | 5.26 | 5.02 | 0.00 |
| 100.00 | 5.26 | 5.02 | 0.00 |
| 102.50 | 5.26 | 5.02 | 0.00 |
| 105.00 | 5.26 | 5.02 | 0.00 |
| 107.50 | 5.26 | 5.02 | 0.00 |
| 110.00 | 5.26 | 5.02 | 0.00 |
| 112.50 | 5.26 | 5.02 | 0.00 |
| 115.00 | 5.26 | 5.02 | 0.00 |
| 117.50 | 5.26 | 5.02 | 0.00 |
| 120.00 | 5.26 | 5.02 | 0.00 |

Summary for Reach EX1.CURR: POI-1 for EXDA-1 (current)

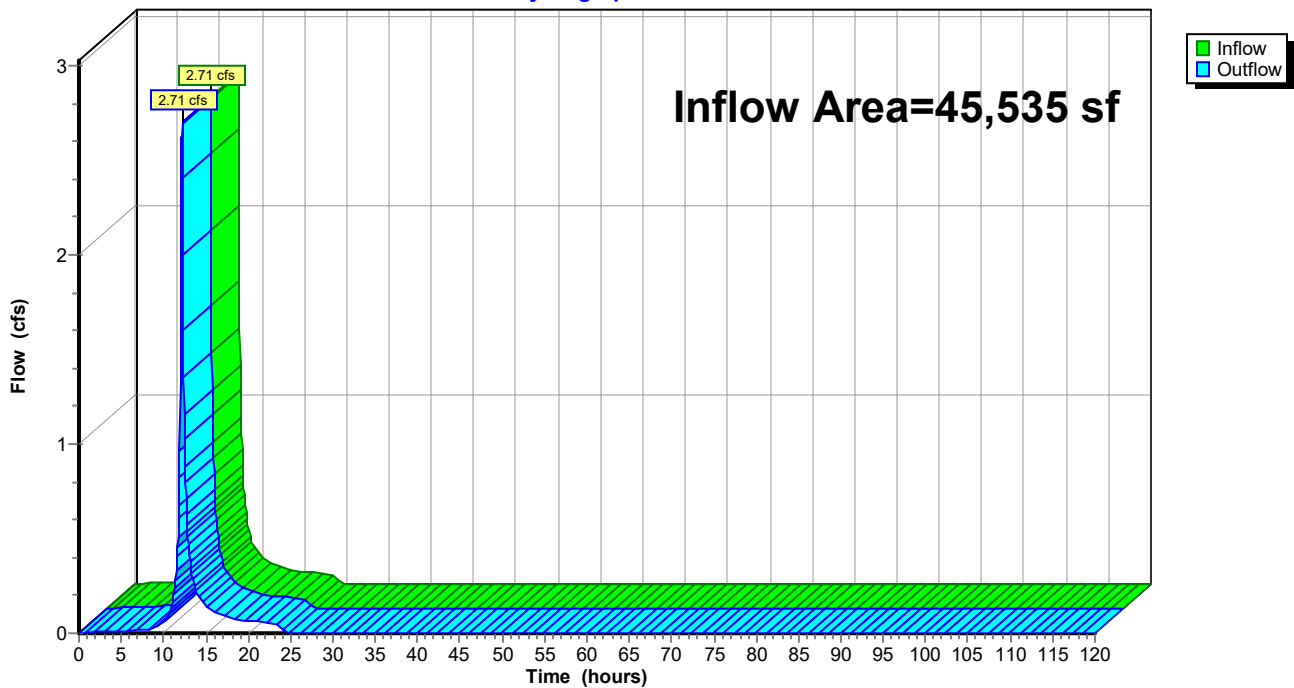
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 3.01" for 10-yr, Current event
Inflow = 2.71 cfs @ 12.19 hrs, Volume= 11,407 cf
Outflow = 2.71 cfs @ 12.19 hrs, Volume= 11,407 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.CURR: POI-1 for EXDA-1 (current)

Hydrograph



Hydrograph for Reach EX1.CURR: POI-1 for EXDA-1 (current)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.01 | | 0.01 |
| 5.00 | 0.01 | | 0.01 |
| 7.50 | 0.02 | | 0.02 |
| 10.00 | 0.06 | | 0.06 |
| 12.50 | 1.02 | | 1.02 |
| 15.00 | 0.14 | | 0.14 |
| 17.50 | 0.09 | | 0.09 |
| 20.00 | 0.07 | | 0.07 |
| 22.50 | 0.06 | | 0.06 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1EX: EX.PER Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=3.42"
Tc=12.0 min CN=74 Runoff=3.08 cfs 10,690 cf

Subcatchment 2EX: EX.IMP.SITE Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=6.04"
Tc=1.8 min CN=98 Runoff=1.20 cfs 3,519 cf

Subcatchment 3EX: EX.IMP.BLDG Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=6.04"
Tc=0.4 min CN=98 Runoff=0.18 cfs 531 cf

Reach EX1.CURR: POI-1 for EXDA-1 (current) Inflow=3.55 cfs 14,740 cf
Outflow=3.55 cfs 14,740 cf

Summary for Subcatchment 1EX: EX.PER

Runoff = 3.08 cfs @ 12.20 hrs, Volume= 10,690 cf, Depth= 3.42"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

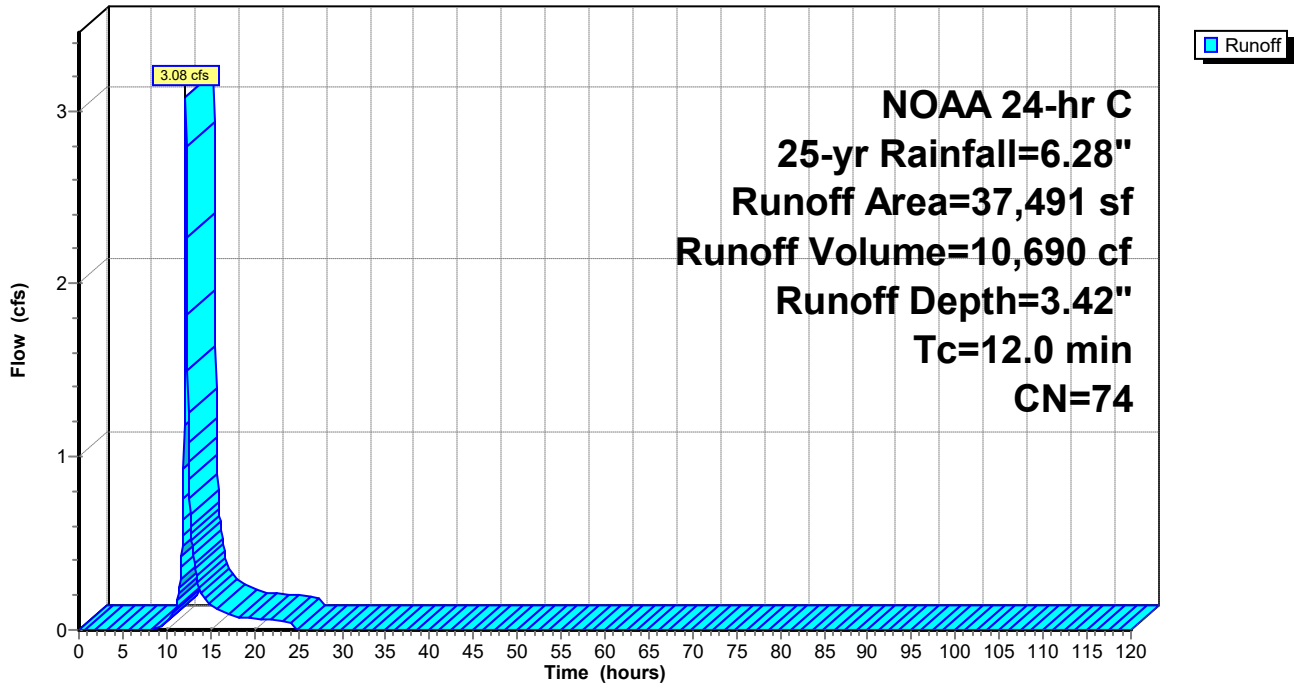
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 1EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 1EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.00 | 0.00 |
| 5.00 | 0.40 | 0.00 | 0.00 |
| 7.50 | 0.68 | 0.00 | 0.00 |
| 10.00 | 1.15 | 0.05 | 0.04 |
| 12.50 | 4.42 | 1.91 | 1.08 |
| 15.00 | 5.36 | 2.66 | 0.14 |
| 17.50 | 5.73 | 2.96 | 0.09 |
| 20.00 | 5.97 | 3.16 | 0.07 |
| 22.50 | 6.18 | 3.33 | 0.05 |
| 25.00 | 6.28 | 3.42 | 0.00 |
| 27.50 | 6.28 | 3.42 | 0.00 |
| 30.00 | 6.28 | 3.42 | 0.00 |
| 32.50 | 6.28 | 3.42 | 0.00 |
| 35.00 | 6.28 | 3.42 | 0.00 |
| 37.50 | 6.28 | 3.42 | 0.00 |
| 40.00 | 6.28 | 3.42 | 0.00 |
| 42.50 | 6.28 | 3.42 | 0.00 |
| 45.00 | 6.28 | 3.42 | 0.00 |
| 47.50 | 6.28 | 3.42 | 0.00 |
| 50.00 | 6.28 | 3.42 | 0.00 |
| 52.50 | 6.28 | 3.42 | 0.00 |
| 55.00 | 6.28 | 3.42 | 0.00 |
| 57.50 | 6.28 | 3.42 | 0.00 |
| 60.00 | 6.28 | 3.42 | 0.00 |
| 62.50 | 6.28 | 3.42 | 0.00 |
| 65.00 | 6.28 | 3.42 | 0.00 |
| 67.50 | 6.28 | 3.42 | 0.00 |
| 70.00 | 6.28 | 3.42 | 0.00 |
| 72.50 | 6.28 | 3.42 | 0.00 |
| 75.00 | 6.28 | 3.42 | 0.00 |
| 77.50 | 6.28 | 3.42 | 0.00 |
| 80.00 | 6.28 | 3.42 | 0.00 |
| 82.50 | 6.28 | 3.42 | 0.00 |
| 85.00 | 6.28 | 3.42 | 0.00 |
| 87.50 | 6.28 | 3.42 | 0.00 |
| 90.00 | 6.28 | 3.42 | 0.00 |
| 92.50 | 6.28 | 3.42 | 0.00 |
| 95.00 | 6.28 | 3.42 | 0.00 |
| 97.50 | 6.28 | 3.42 | 0.00 |
| 100.00 | 6.28 | 3.42 | 0.00 |
| 102.50 | 6.28 | 3.42 | 0.00 |
| 105.00 | 6.28 | 3.42 | 0.00 |
| 107.50 | 6.28 | 3.42 | 0.00 |
| 110.00 | 6.28 | 3.42 | 0.00 |
| 112.50 | 6.28 | 3.42 | 0.00 |
| 115.00 | 6.28 | 3.42 | 0.00 |
| 117.50 | 6.28 | 3.42 | 0.00 |
| 120.00 | 6.28 | 3.42 | 0.00 |

Summary for Subcatchment 2EX: EX.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.20 cfs @ 12.08 hrs, Volume= 3,519 cf, Depth= 6.04"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

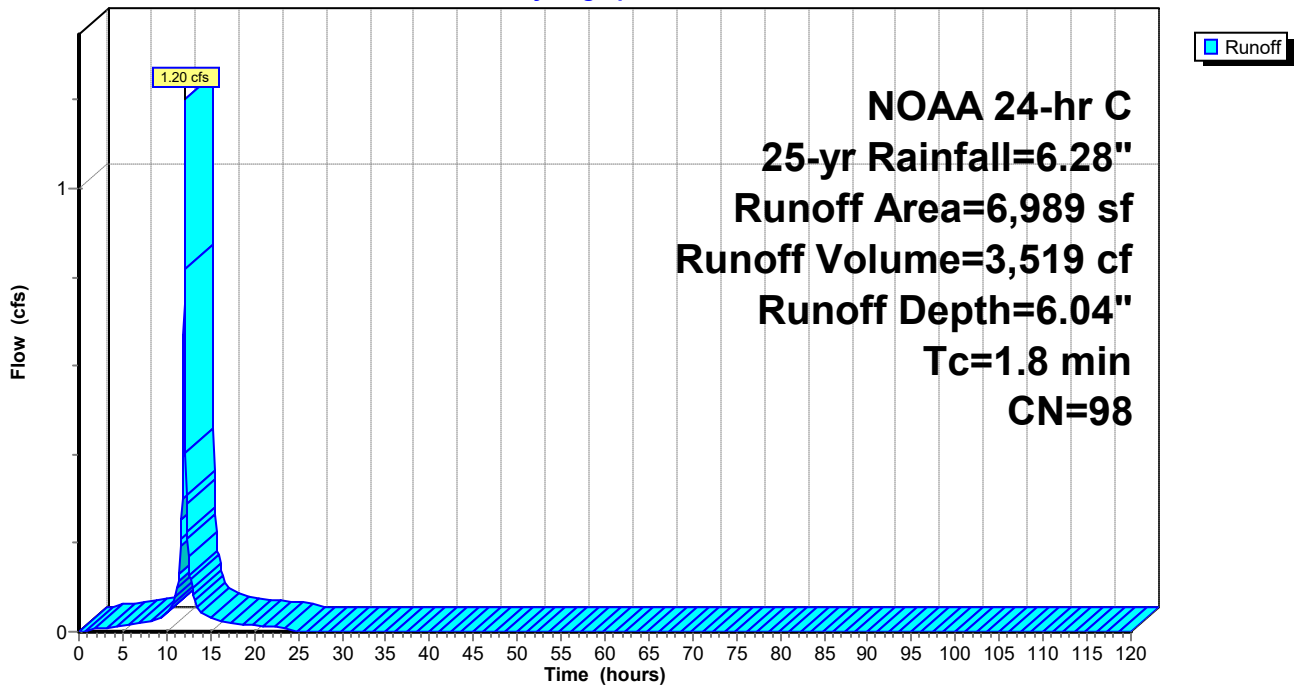
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment 2EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 2EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.06 | 0.01 |
| 5.00 | 0.40 | 0.23 | 0.01 |
| 7.50 | 0.68 | 0.48 | 0.02 |
| 10.00 | 1.15 | 0.93 | 0.04 |
| 12.50 | 4.42 | 4.19 | 0.20 |
| 15.00 | 5.36 | 5.13 | 0.03 |
| 17.50 | 5.73 | 5.49 | 0.02 |
| 20.00 | 5.97 | 5.73 | 0.01 |
| 22.50 | 6.18 | 5.94 | 0.01 |
| 25.00 | 6.28 | 6.04 | 0.00 |
| 27.50 | 6.28 | 6.04 | 0.00 |
| 30.00 | 6.28 | 6.04 | 0.00 |
| 32.50 | 6.28 | 6.04 | 0.00 |
| 35.00 | 6.28 | 6.04 | 0.00 |
| 37.50 | 6.28 | 6.04 | 0.00 |
| 40.00 | 6.28 | 6.04 | 0.00 |
| 42.50 | 6.28 | 6.04 | 0.00 |
| 45.00 | 6.28 | 6.04 | 0.00 |
| 47.50 | 6.28 | 6.04 | 0.00 |
| 50.00 | 6.28 | 6.04 | 0.00 |
| 52.50 | 6.28 | 6.04 | 0.00 |
| 55.00 | 6.28 | 6.04 | 0.00 |
| 57.50 | 6.28 | 6.04 | 0.00 |
| 60.00 | 6.28 | 6.04 | 0.00 |
| 62.50 | 6.28 | 6.04 | 0.00 |
| 65.00 | 6.28 | 6.04 | 0.00 |
| 67.50 | 6.28 | 6.04 | 0.00 |
| 70.00 | 6.28 | 6.04 | 0.00 |
| 72.50 | 6.28 | 6.04 | 0.00 |
| 75.00 | 6.28 | 6.04 | 0.00 |
| 77.50 | 6.28 | 6.04 | 0.00 |
| 80.00 | 6.28 | 6.04 | 0.00 |
| 82.50 | 6.28 | 6.04 | 0.00 |
| 85.00 | 6.28 | 6.04 | 0.00 |
| 87.50 | 6.28 | 6.04 | 0.00 |
| 90.00 | 6.28 | 6.04 | 0.00 |
| 92.50 | 6.28 | 6.04 | 0.00 |
| 95.00 | 6.28 | 6.04 | 0.00 |
| 97.50 | 6.28 | 6.04 | 0.00 |
| 100.00 | 6.28 | 6.04 | 0.00 |
| 102.50 | 6.28 | 6.04 | 0.00 |
| 105.00 | 6.28 | 6.04 | 0.00 |
| 107.50 | 6.28 | 6.04 | 0.00 |
| 110.00 | 6.28 | 6.04 | 0.00 |
| 112.50 | 6.28 | 6.04 | 0.00 |
| 115.00 | 6.28 | 6.04 | 0.00 |
| 117.50 | 6.28 | 6.04 | 0.00 |
| 120.00 | 6.28 | 6.04 | 0.00 |

Summary for Subcatchment 3EX: EX.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.18 cfs @ 12.05 hrs, Volume= 531 cf, Depth= 6.04"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

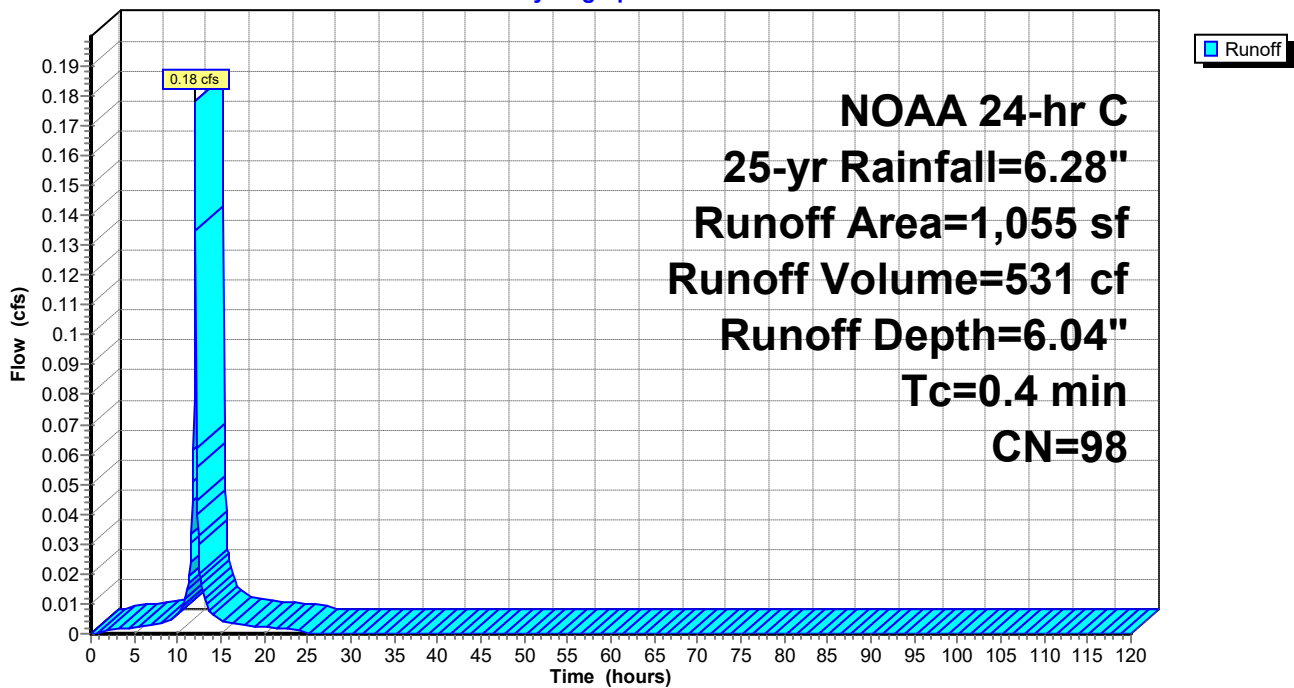
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 3EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 3EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.06 | 0.00 |
| 5.00 | 0.40 | 0.23 | 0.00 |
| 7.50 | 0.68 | 0.48 | 0.00 |
| 10.00 | 1.15 | 0.93 | 0.01 |
| 12.50 | 4.42 | 4.19 | 0.03 |
| 15.00 | 5.36 | 5.13 | 0.00 |
| 17.50 | 5.73 | 5.49 | 0.00 |
| 20.00 | 5.97 | 5.73 | 0.00 |
| 22.50 | 6.18 | 5.94 | 0.00 |
| 25.00 | 6.28 | 6.04 | 0.00 |
| 27.50 | 6.28 | 6.04 | 0.00 |
| 30.00 | 6.28 | 6.04 | 0.00 |
| 32.50 | 6.28 | 6.04 | 0.00 |
| 35.00 | 6.28 | 6.04 | 0.00 |
| 37.50 | 6.28 | 6.04 | 0.00 |
| 40.00 | 6.28 | 6.04 | 0.00 |
| 42.50 | 6.28 | 6.04 | 0.00 |
| 45.00 | 6.28 | 6.04 | 0.00 |
| 47.50 | 6.28 | 6.04 | 0.00 |
| 50.00 | 6.28 | 6.04 | 0.00 |
| 52.50 | 6.28 | 6.04 | 0.00 |
| 55.00 | 6.28 | 6.04 | 0.00 |
| 57.50 | 6.28 | 6.04 | 0.00 |
| 60.00 | 6.28 | 6.04 | 0.00 |
| 62.50 | 6.28 | 6.04 | 0.00 |
| 65.00 | 6.28 | 6.04 | 0.00 |
| 67.50 | 6.28 | 6.04 | 0.00 |
| 70.00 | 6.28 | 6.04 | 0.00 |
| 72.50 | 6.28 | 6.04 | 0.00 |
| 75.00 | 6.28 | 6.04 | 0.00 |
| 77.50 | 6.28 | 6.04 | 0.00 |
| 80.00 | 6.28 | 6.04 | 0.00 |
| 82.50 | 6.28 | 6.04 | 0.00 |
| 85.00 | 6.28 | 6.04 | 0.00 |
| 87.50 | 6.28 | 6.04 | 0.00 |
| 90.00 | 6.28 | 6.04 | 0.00 |
| 92.50 | 6.28 | 6.04 | 0.00 |
| 95.00 | 6.28 | 6.04 | 0.00 |
| 97.50 | 6.28 | 6.04 | 0.00 |
| 100.00 | 6.28 | 6.04 | 0.00 |
| 102.50 | 6.28 | 6.04 | 0.00 |
| 105.00 | 6.28 | 6.04 | 0.00 |
| 107.50 | 6.28 | 6.04 | 0.00 |
| 110.00 | 6.28 | 6.04 | 0.00 |
| 112.50 | 6.28 | 6.04 | 0.00 |
| 115.00 | 6.28 | 6.04 | 0.00 |
| 117.50 | 6.28 | 6.04 | 0.00 |
| 120.00 | 6.28 | 6.04 | 0.00 |

Summary for Reach EX1.CURR: POI-1 for EXDA-1 (current)

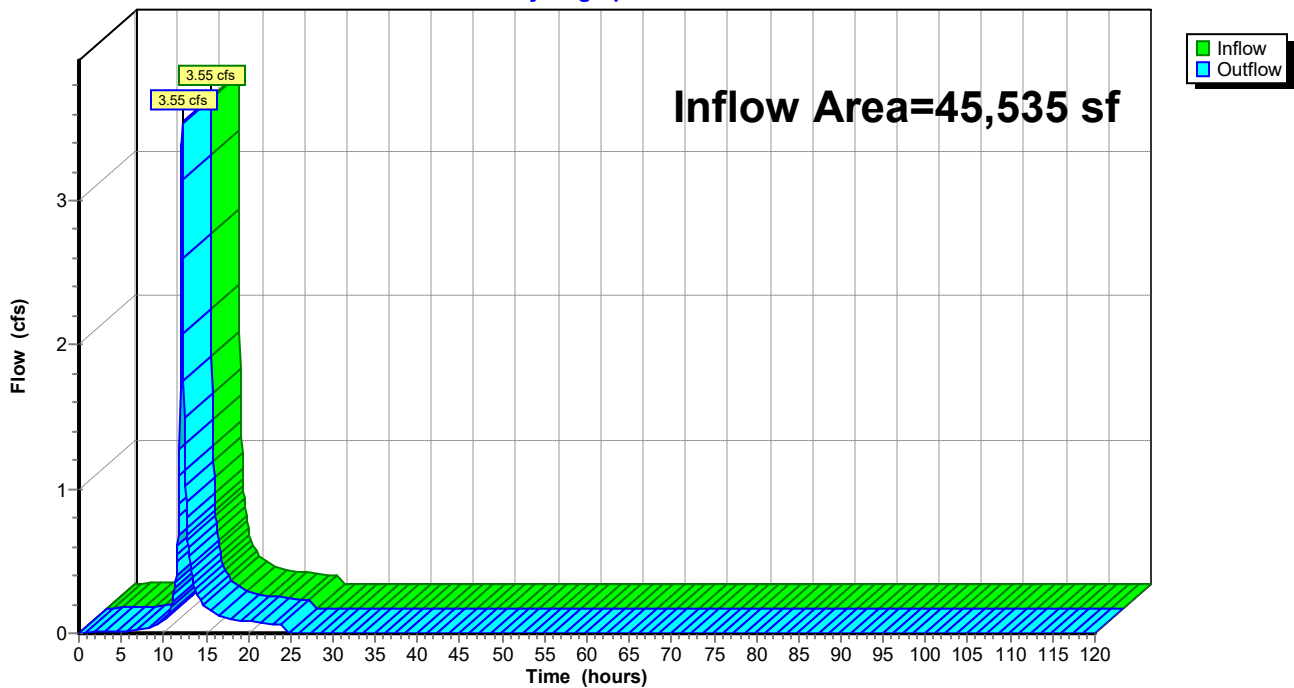
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 3.88" for 25-yr event
Inflow = 3.55 cfs @ 12.19 hrs, Volume= 14,740 cf
Outflow = 3.55 cfs @ 12.19 hrs, Volume= 14,740 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.CURR: POI-1 for EXDA-1 (current)

Hydrograph



Hydrograph for Reach EX1.CURR: POI-1 for EXDA-1 (current)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.01 | | 0.01 |
| 5.00 | 0.02 | | 0.02 |
| 7.50 | 0.02 | | 0.02 |
| 10.00 | 0.09 | | 0.09 |
| 12.50 | 1.31 | | 1.31 |
| 15.00 | 0.17 | | 0.17 |
| 17.50 | 0.11 | | 0.11 |
| 20.00 | 0.08 | | 0.08 |
| 22.50 | 0.07 | | 0.07 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1EX: EX.PER

Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=5.78"
Tc=12.0 min CN=74 Runoff=5.15 cfs 18,069 cf

Subcatchment 2EX: EX.IMP.SITE

Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=8.71"
Tc=1.8 min CN=98 Runoff=1.72 cfs 5,073 cf

Subcatchment 3EX: EX.IMP.BLDG

Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=8.71"
Tc=0.4 min CN=98 Runoff=0.25 cfs 766 cf

Reach EX1.CURR: POI-1 for EXDA-1 (current)

Inflow=5.83 cfs 23,907 cf
Outflow=5.83 cfs 23,907 cf

Summary for Subcatchment 1EX: EX.PER

Runoff = 5.15 cfs @ 12.20 hrs, Volume= 18,069 cf, Depth= 5.78"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

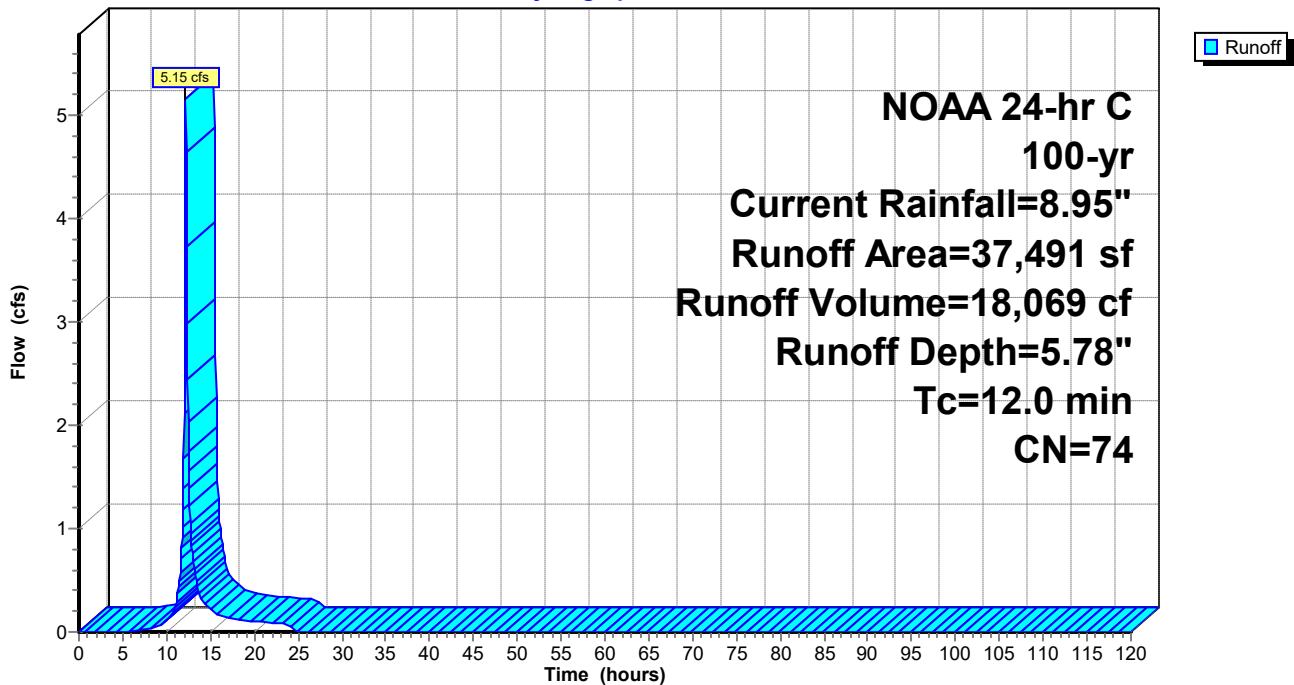
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Current Rainfall=8.95"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 1EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 1EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.26 | 0.00 | 0.00 |
| 5.00 | 0.57 | 0.00 | 0.00 |
| 7.50 | 0.97 | 0.02 | 0.02 |
| 10.00 | 1.63 | 0.19 | 0.11 |
| 12.50 | 6.31 | 3.44 | 1.74 |
| 15.00 | 7.64 | 4.61 | 0.22 |
| 17.50 | 8.16 | 5.07 | 0.13 |
| 20.00 | 8.51 | 5.39 | 0.10 |
| 22.50 | 8.80 | 5.65 | 0.08 |
| 25.00 | 8.95 | 5.78 | 0.00 |
| 27.50 | 8.95 | 5.78 | 0.00 |
| 30.00 | 8.95 | 5.78 | 0.00 |
| 32.50 | 8.95 | 5.78 | 0.00 |
| 35.00 | 8.95 | 5.78 | 0.00 |
| 37.50 | 8.95 | 5.78 | 0.00 |
| 40.00 | 8.95 | 5.78 | 0.00 |
| 42.50 | 8.95 | 5.78 | 0.00 |
| 45.00 | 8.95 | 5.78 | 0.00 |
| 47.50 | 8.95 | 5.78 | 0.00 |
| 50.00 | 8.95 | 5.78 | 0.00 |
| 52.50 | 8.95 | 5.78 | 0.00 |
| 55.00 | 8.95 | 5.78 | 0.00 |
| 57.50 | 8.95 | 5.78 | 0.00 |
| 60.00 | 8.95 | 5.78 | 0.00 |
| 62.50 | 8.95 | 5.78 | 0.00 |
| 65.00 | 8.95 | 5.78 | 0.00 |
| 67.50 | 8.95 | 5.78 | 0.00 |
| 70.00 | 8.95 | 5.78 | 0.00 |
| 72.50 | 8.95 | 5.78 | 0.00 |
| 75.00 | 8.95 | 5.78 | 0.00 |
| 77.50 | 8.95 | 5.78 | 0.00 |
| 80.00 | 8.95 | 5.78 | 0.00 |
| 82.50 | 8.95 | 5.78 | 0.00 |
| 85.00 | 8.95 | 5.78 | 0.00 |
| 87.50 | 8.95 | 5.78 | 0.00 |
| 90.00 | 8.95 | 5.78 | 0.00 |
| 92.50 | 8.95 | 5.78 | 0.00 |
| 95.00 | 8.95 | 5.78 | 0.00 |
| 97.50 | 8.95 | 5.78 | 0.00 |
| 100.00 | 8.95 | 5.78 | 0.00 |
| 102.50 | 8.95 | 5.78 | 0.00 |
| 105.00 | 8.95 | 5.78 | 0.00 |
| 107.50 | 8.95 | 5.78 | 0.00 |
| 110.00 | 8.95 | 5.78 | 0.00 |
| 112.50 | 8.95 | 5.78 | 0.00 |
| 115.00 | 8.95 | 5.78 | 0.00 |
| 117.50 | 8.95 | 5.78 | 0.00 |
| 120.00 | 8.95 | 5.78 | 0.00 |

Summary for Subcatchment 2EX: EX.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.72 cfs @ 12.08 hrs, Volume= 5,073 cf, Depth= 8.71"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

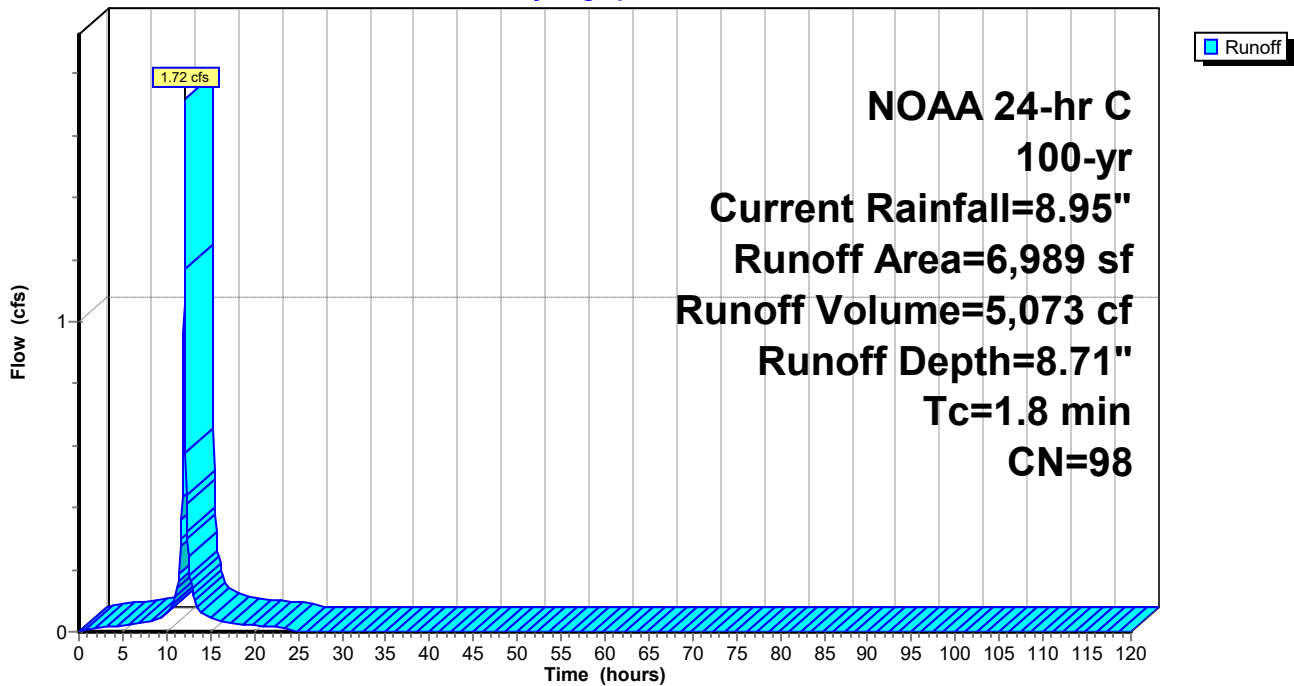
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Current Rainfall=8.95"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment 2EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 2EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.26 | 0.11 | 0.01 |
| 5.00 | 0.57 | 0.38 | 0.02 |
| 7.50 | 0.97 | 0.76 | 0.03 |
| 10.00 | 1.63 | 1.41 | 0.06 |
| 12.50 | 6.31 | 6.07 | 0.29 |
| 15.00 | 7.64 | 7.40 | 0.04 |
| 17.50 | 8.16 | 7.92 | 0.03 |
| 20.00 | 8.51 | 8.27 | 0.02 |
| 22.50 | 8.80 | 8.56 | 0.02 |
| 25.00 | 8.95 | 8.71 | 0.00 |
| 27.50 | 8.95 | 8.71 | 0.00 |
| 30.00 | 8.95 | 8.71 | 0.00 |
| 32.50 | 8.95 | 8.71 | 0.00 |
| 35.00 | 8.95 | 8.71 | 0.00 |
| 37.50 | 8.95 | 8.71 | 0.00 |
| 40.00 | 8.95 | 8.71 | 0.00 |
| 42.50 | 8.95 | 8.71 | 0.00 |
| 45.00 | 8.95 | 8.71 | 0.00 |
| 47.50 | 8.95 | 8.71 | 0.00 |
| 50.00 | 8.95 | 8.71 | 0.00 |
| 52.50 | 8.95 | 8.71 | 0.00 |
| 55.00 | 8.95 | 8.71 | 0.00 |
| 57.50 | 8.95 | 8.71 | 0.00 |
| 60.00 | 8.95 | 8.71 | 0.00 |
| 62.50 | 8.95 | 8.71 | 0.00 |
| 65.00 | 8.95 | 8.71 | 0.00 |
| 67.50 | 8.95 | 8.71 | 0.00 |
| 70.00 | 8.95 | 8.71 | 0.00 |
| 72.50 | 8.95 | 8.71 | 0.00 |
| 75.00 | 8.95 | 8.71 | 0.00 |
| 77.50 | 8.95 | 8.71 | 0.00 |
| 80.00 | 8.95 | 8.71 | 0.00 |
| 82.50 | 8.95 | 8.71 | 0.00 |
| 85.00 | 8.95 | 8.71 | 0.00 |
| 87.50 | 8.95 | 8.71 | 0.00 |
| 90.00 | 8.95 | 8.71 | 0.00 |
| 92.50 | 8.95 | 8.71 | 0.00 |
| 95.00 | 8.95 | 8.71 | 0.00 |
| 97.50 | 8.95 | 8.71 | 0.00 |
| 100.00 | 8.95 | 8.71 | 0.00 |
| 102.50 | 8.95 | 8.71 | 0.00 |
| 105.00 | 8.95 | 8.71 | 0.00 |
| 107.50 | 8.95 | 8.71 | 0.00 |
| 110.00 | 8.95 | 8.71 | 0.00 |
| 112.50 | 8.95 | 8.71 | 0.00 |
| 115.00 | 8.95 | 8.71 | 0.00 |
| 117.50 | 8.95 | 8.71 | 0.00 |
| 120.00 | 8.95 | 8.71 | 0.00 |

Summary for Subcatchment 3EX: EX.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.25 cfs @ 12.05 hrs, Volume= 766 cf, Depth= 8.71"
 Routed to Reach EX1.CURR : POI-1 for EXDA-1 (current)

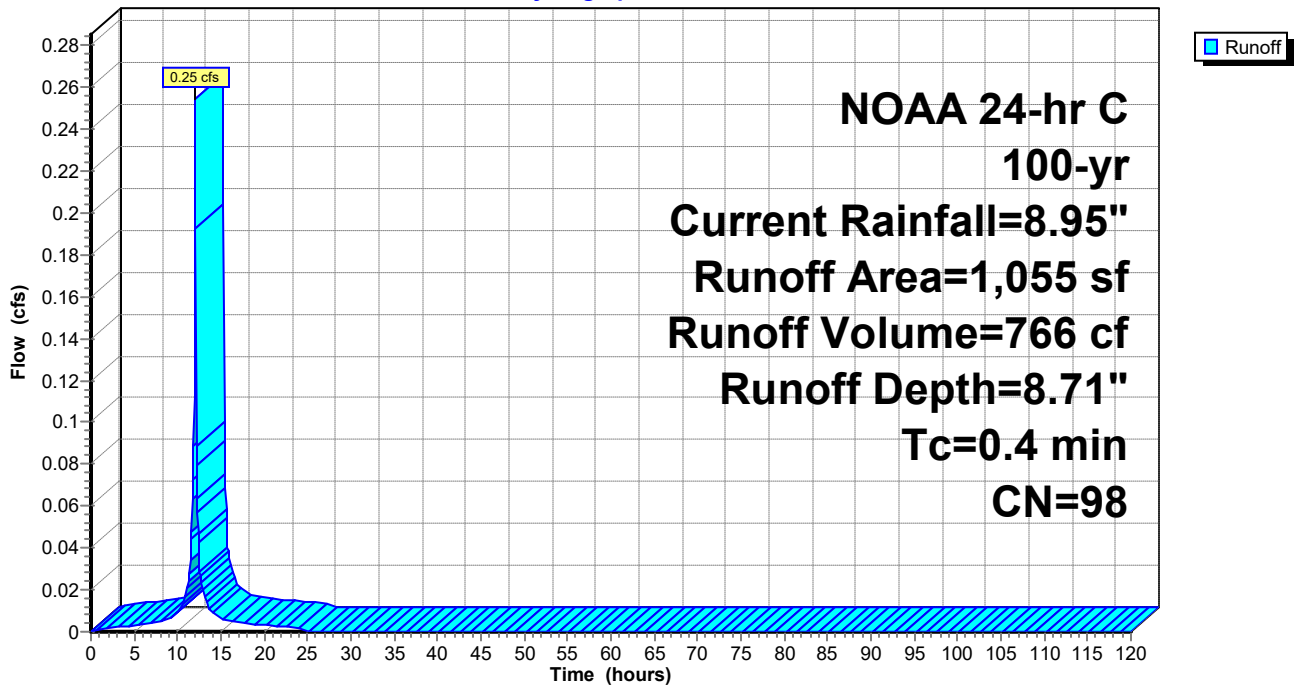
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Current Rainfall=8.95"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 3EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 3EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.26 | 0.11 | 0.00 |
| 5.00 | 0.57 | 0.38 | 0.00 |
| 7.50 | 0.97 | 0.76 | 0.00 |
| 10.00 | 1.63 | 1.41 | 0.01 |
| 12.50 | 6.31 | 6.07 | 0.04 |
| 15.00 | 7.64 | 7.40 | 0.01 |
| 17.50 | 8.16 | 7.92 | 0.00 |
| 20.00 | 8.51 | 8.27 | 0.00 |
| 22.50 | 8.80 | 8.56 | 0.00 |
| 25.00 | 8.95 | 8.71 | 0.00 |
| 27.50 | 8.95 | 8.71 | 0.00 |
| 30.00 | 8.95 | 8.71 | 0.00 |
| 32.50 | 8.95 | 8.71 | 0.00 |
| 35.00 | 8.95 | 8.71 | 0.00 |
| 37.50 | 8.95 | 8.71 | 0.00 |
| 40.00 | 8.95 | 8.71 | 0.00 |
| 42.50 | 8.95 | 8.71 | 0.00 |
| 45.00 | 8.95 | 8.71 | 0.00 |
| 47.50 | 8.95 | 8.71 | 0.00 |
| 50.00 | 8.95 | 8.71 | 0.00 |
| 52.50 | 8.95 | 8.71 | 0.00 |
| 55.00 | 8.95 | 8.71 | 0.00 |
| 57.50 | 8.95 | 8.71 | 0.00 |
| 60.00 | 8.95 | 8.71 | 0.00 |
| 62.50 | 8.95 | 8.71 | 0.00 |
| 65.00 | 8.95 | 8.71 | 0.00 |
| 67.50 | 8.95 | 8.71 | 0.00 |
| 70.00 | 8.95 | 8.71 | 0.00 |
| 72.50 | 8.95 | 8.71 | 0.00 |
| 75.00 | 8.95 | 8.71 | 0.00 |
| 77.50 | 8.95 | 8.71 | 0.00 |
| 80.00 | 8.95 | 8.71 | 0.00 |
| 82.50 | 8.95 | 8.71 | 0.00 |
| 85.00 | 8.95 | 8.71 | 0.00 |
| 87.50 | 8.95 | 8.71 | 0.00 |
| 90.00 | 8.95 | 8.71 | 0.00 |
| 92.50 | 8.95 | 8.71 | 0.00 |
| 95.00 | 8.95 | 8.71 | 0.00 |
| 97.50 | 8.95 | 8.71 | 0.00 |
| 100.00 | 8.95 | 8.71 | 0.00 |
| 102.50 | 8.95 | 8.71 | 0.00 |
| 105.00 | 8.95 | 8.71 | 0.00 |
| 107.50 | 8.95 | 8.71 | 0.00 |
| 110.00 | 8.95 | 8.71 | 0.00 |
| 112.50 | 8.95 | 8.71 | 0.00 |
| 115.00 | 8.95 | 8.71 | 0.00 |
| 117.50 | 8.95 | 8.71 | 0.00 |
| 120.00 | 8.95 | 8.71 | 0.00 |

Summary for Reach EX1.CURR: POI-1 for EXDA-1 (current)

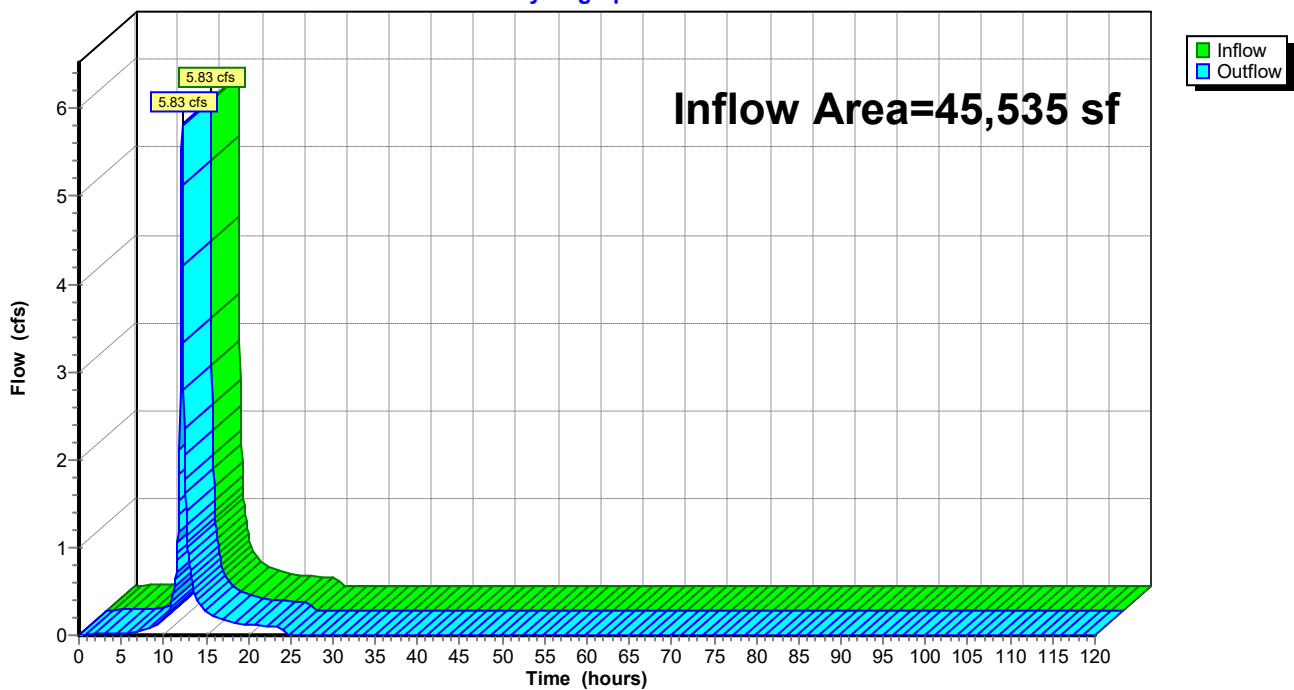
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 6.30" for 100-yr, Current event
Inflow = 5.83 cfs @ 12.19 hrs, Volume= 23,907 cf
Outflow = 5.83 cfs @ 12.19 hrs, Volume= 23,907 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.CURR: POI-1 for EXDA-1 (current)

Hydrograph

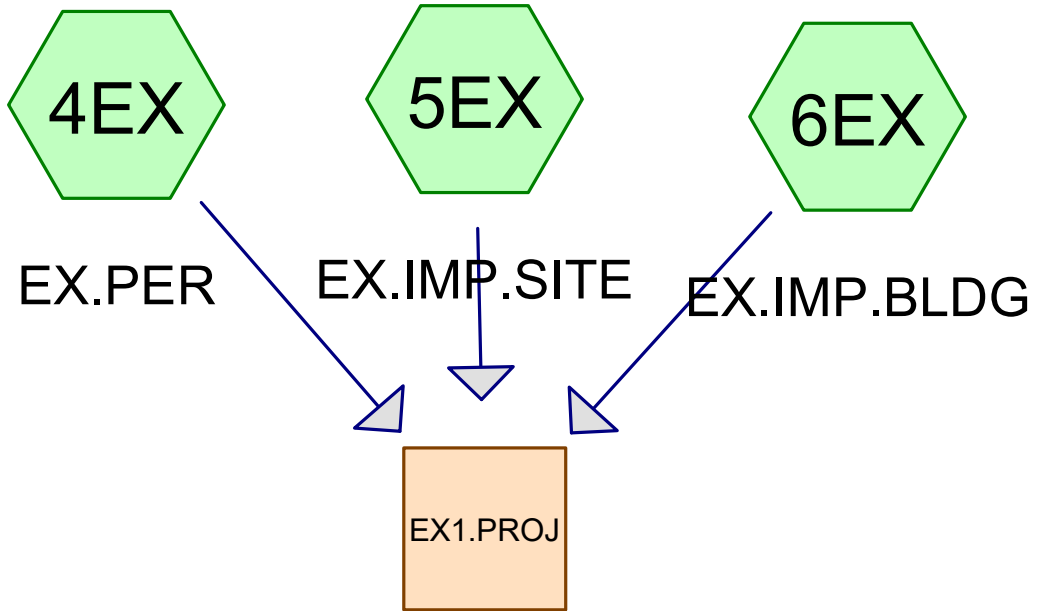


Hydrograph for Reach EX1.CURR: POI-1 for EXDA-1 (current)

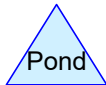
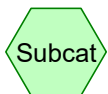
| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.02 | | 0.02 |
| 5.00 | 0.02 | | 0.02 |
| 7.50 | 0.06 | | 0.06 |
| 10.00 | 0.18 | | 0.18 |
| 12.50 | 2.06 | | 2.06 |
| 15.00 | 0.27 | | 0.27 |
| 17.50 | 0.16 | | 0.16 |
| 20.00 | 0.12 | | 0.12 |
| 22.50 | 0.10 | | 0.10 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

EXISTING

Projected Rainfall



POI-1 for EXDA-1
(projected)



Area Listing (selected nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|----|---------------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C (4EX) |
| 6,989 | 98 | Paved parking, HSG D (5EX) |
| 1,055 | 98 | Roofs, HSG D (6EX) |

2024-03-18 - Stormwater Analysis Concept - Co NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

Prepared by Langan Engineering

Printed 3/18/2024

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Page 3

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4EX: EX.PER

Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=1.53"
Tc=12.0 min CN=74 Runoff=1.36 cfs 4,782 cf

Subcatchment 5EX: EX.IMP.SITE

Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=3.68"
Tc=1.7 min CN=98 Runoff=0.73 cfs 2,141 cf

Subcatchment 6EX: EX.IMP.BLDG

Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=3.68"
Tc=0.4 min CN=98 Runoff=0.11 cfs 323 cf

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Inflow=1.66 cfs 7,246 cf
Outflow=1.66 cfs 7,246 cf

Summary for Subcatchment 4EX: EX.PER

Runoff = 1.36 cfs @ 12.21 hrs, Volume= 4,782 cf, Depth= 1.53"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

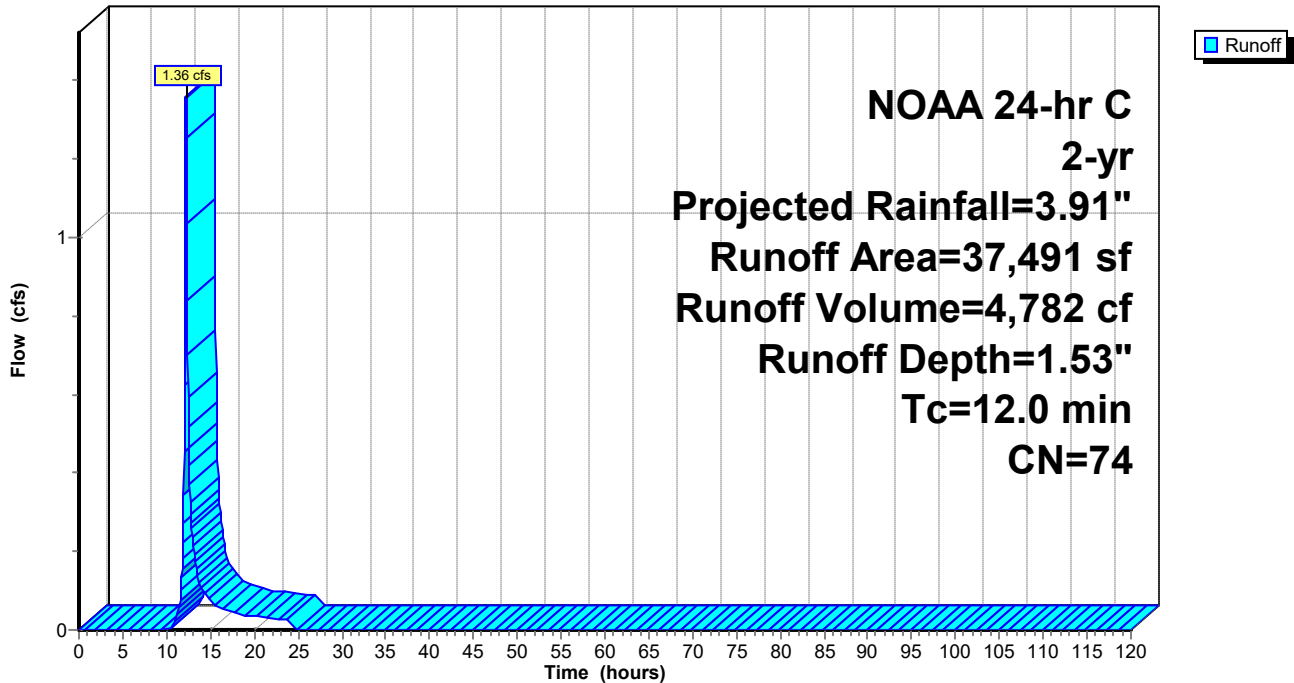
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 4EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 4EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.11 | 0.00 | 0.00 |
| 5.00 | 0.25 | 0.00 | 0.00 |
| 7.50 | 0.42 | 0.00 | 0.00 |
| 10.00 | 0.71 | 0.00 | 0.00 |
| 12.50 | 2.75 | 0.76 | 0.52 |
| 15.00 | 3.34 | 1.13 | 0.07 |
| 17.50 | 3.57 | 1.29 | 0.04 |
| 20.00 | 3.72 | 1.39 | 0.03 |
| 22.50 | 3.84 | 1.48 | 0.03 |
| 25.00 | 3.91 | 1.53 | 0.00 |
| 27.50 | 3.91 | 1.53 | 0.00 |
| 30.00 | 3.91 | 1.53 | 0.00 |
| 32.50 | 3.91 | 1.53 | 0.00 |
| 35.00 | 3.91 | 1.53 | 0.00 |
| 37.50 | 3.91 | 1.53 | 0.00 |
| 40.00 | 3.91 | 1.53 | 0.00 |
| 42.50 | 3.91 | 1.53 | 0.00 |
| 45.00 | 3.91 | 1.53 | 0.00 |
| 47.50 | 3.91 | 1.53 | 0.00 |
| 50.00 | 3.91 | 1.53 | 0.00 |
| 52.50 | 3.91 | 1.53 | 0.00 |
| 55.00 | 3.91 | 1.53 | 0.00 |
| 57.50 | 3.91 | 1.53 | 0.00 |
| 60.00 | 3.91 | 1.53 | 0.00 |
| 62.50 | 3.91 | 1.53 | 0.00 |
| 65.00 | 3.91 | 1.53 | 0.00 |
| 67.50 | 3.91 | 1.53 | 0.00 |
| 70.00 | 3.91 | 1.53 | 0.00 |
| 72.50 | 3.91 | 1.53 | 0.00 |
| 75.00 | 3.91 | 1.53 | 0.00 |
| 77.50 | 3.91 | 1.53 | 0.00 |
| 80.00 | 3.91 | 1.53 | 0.00 |
| 82.50 | 3.91 | 1.53 | 0.00 |
| 85.00 | 3.91 | 1.53 | 0.00 |
| 87.50 | 3.91 | 1.53 | 0.00 |
| 90.00 | 3.91 | 1.53 | 0.00 |
| 92.50 | 3.91 | 1.53 | 0.00 |
| 95.00 | 3.91 | 1.53 | 0.00 |
| 97.50 | 3.91 | 1.53 | 0.00 |
| 100.00 | 3.91 | 1.53 | 0.00 |
| 102.50 | 3.91 | 1.53 | 0.00 |
| 105.00 | 3.91 | 1.53 | 0.00 |
| 107.50 | 3.91 | 1.53 | 0.00 |
| 110.00 | 3.91 | 1.53 | 0.00 |
| 112.50 | 3.91 | 1.53 | 0.00 |
| 115.00 | 3.91 | 1.53 | 0.00 |
| 117.50 | 3.91 | 1.53 | 0.00 |
| 120.00 | 3.91 | 1.53 | 0.00 |

Summary for Subcatchment 5EX: EX.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.73 cfs @ 12.07 hrs, Volume= 2,141 cf, Depth= 3.68"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

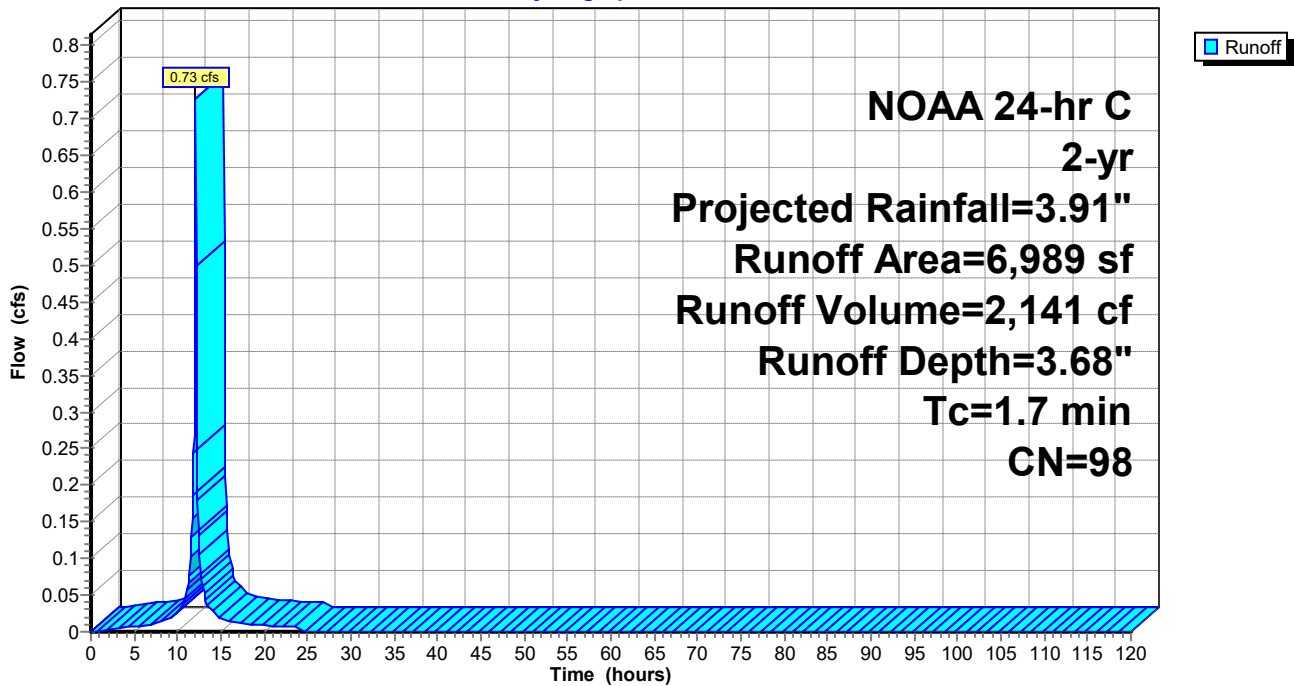
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|-------------|------------------|------------------|----------------------|-------------------|---------------|
| 1.7 | | | | | Direct Entry, |

Subcatchment 5EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 5EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.11 | 0.02 | 0.00 |
| 5.00 | 0.25 | 0.10 | 0.01 |
| 7.50 | 0.42 | 0.25 | 0.01 |
| 10.00 | 0.71 | 0.52 | 0.03 |
| 12.50 | 2.75 | 2.52 | 0.12 |
| 15.00 | 3.34 | 3.11 | 0.02 |
| 17.50 | 3.57 | 3.33 | 0.01 |
| 20.00 | 3.72 | 3.48 | 0.01 |
| 22.50 | 3.84 | 3.61 | 0.01 |
| 25.00 | 3.91 | 3.68 | 0.00 |
| 27.50 | 3.91 | 3.68 | 0.00 |
| 30.00 | 3.91 | 3.68 | 0.00 |
| 32.50 | 3.91 | 3.68 | 0.00 |
| 35.00 | 3.91 | 3.68 | 0.00 |
| 37.50 | 3.91 | 3.68 | 0.00 |
| 40.00 | 3.91 | 3.68 | 0.00 |
| 42.50 | 3.91 | 3.68 | 0.00 |
| 45.00 | 3.91 | 3.68 | 0.00 |
| 47.50 | 3.91 | 3.68 | 0.00 |
| 50.00 | 3.91 | 3.68 | 0.00 |
| 52.50 | 3.91 | 3.68 | 0.00 |
| 55.00 | 3.91 | 3.68 | 0.00 |
| 57.50 | 3.91 | 3.68 | 0.00 |
| 60.00 | 3.91 | 3.68 | 0.00 |
| 62.50 | 3.91 | 3.68 | 0.00 |
| 65.00 | 3.91 | 3.68 | 0.00 |
| 67.50 | 3.91 | 3.68 | 0.00 |
| 70.00 | 3.91 | 3.68 | 0.00 |
| 72.50 | 3.91 | 3.68 | 0.00 |
| 75.00 | 3.91 | 3.68 | 0.00 |
| 77.50 | 3.91 | 3.68 | 0.00 |
| 80.00 | 3.91 | 3.68 | 0.00 |
| 82.50 | 3.91 | 3.68 | 0.00 |
| 85.00 | 3.91 | 3.68 | 0.00 |
| 87.50 | 3.91 | 3.68 | 0.00 |
| 90.00 | 3.91 | 3.68 | 0.00 |
| 92.50 | 3.91 | 3.68 | 0.00 |
| 95.00 | 3.91 | 3.68 | 0.00 |
| 97.50 | 3.91 | 3.68 | 0.00 |
| 100.00 | 3.91 | 3.68 | 0.00 |
| 102.50 | 3.91 | 3.68 | 0.00 |
| 105.00 | 3.91 | 3.68 | 0.00 |
| 107.50 | 3.91 | 3.68 | 0.00 |
| 110.00 | 3.91 | 3.68 | 0.00 |
| 112.50 | 3.91 | 3.68 | 0.00 |
| 115.00 | 3.91 | 3.68 | 0.00 |
| 117.50 | 3.91 | 3.68 | 0.00 |
| 120.00 | 3.91 | 3.68 | 0.00 |

Summary for Subcatchment 6EX: EX.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.11 cfs @ 12.05 hrs, Volume= 323 cf, Depth= 3.68"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

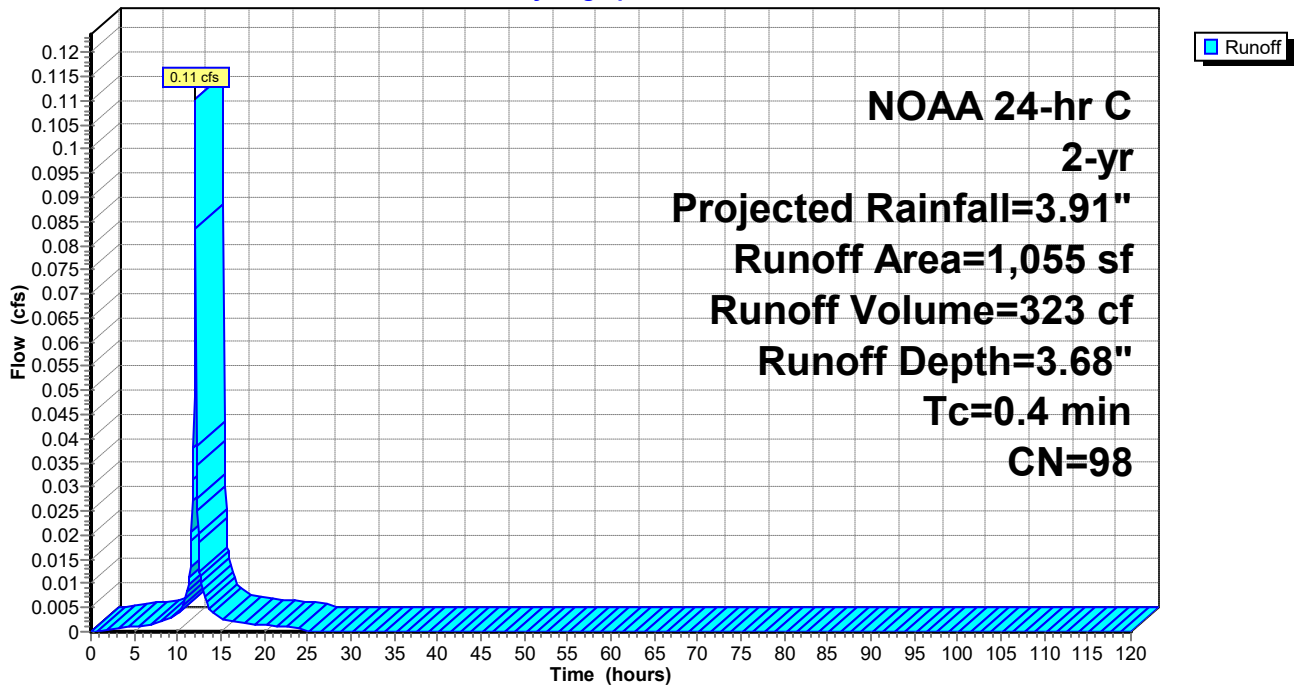
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 6EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 6EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.11 | 0.02 | 0.00 |
| 5.00 | 0.25 | 0.10 | 0.00 |
| 7.50 | 0.42 | 0.25 | 0.00 |
| 10.00 | 0.71 | 0.52 | 0.00 |
| 12.50 | 2.75 | 2.52 | 0.02 |
| 15.00 | 3.34 | 3.11 | 0.00 |
| 17.50 | 3.57 | 3.33 | 0.00 |
| 20.00 | 3.72 | 3.48 | 0.00 |
| 22.50 | 3.84 | 3.61 | 0.00 |
| 25.00 | 3.91 | 3.68 | 0.00 |
| 27.50 | 3.91 | 3.68 | 0.00 |
| 30.00 | 3.91 | 3.68 | 0.00 |
| 32.50 | 3.91 | 3.68 | 0.00 |
| 35.00 | 3.91 | 3.68 | 0.00 |
| 37.50 | 3.91 | 3.68 | 0.00 |
| 40.00 | 3.91 | 3.68 | 0.00 |
| 42.50 | 3.91 | 3.68 | 0.00 |
| 45.00 | 3.91 | 3.68 | 0.00 |
| 47.50 | 3.91 | 3.68 | 0.00 |
| 50.00 | 3.91 | 3.68 | 0.00 |
| 52.50 | 3.91 | 3.68 | 0.00 |
| 55.00 | 3.91 | 3.68 | 0.00 |
| 57.50 | 3.91 | 3.68 | 0.00 |
| 60.00 | 3.91 | 3.68 | 0.00 |
| 62.50 | 3.91 | 3.68 | 0.00 |
| 65.00 | 3.91 | 3.68 | 0.00 |
| 67.50 | 3.91 | 3.68 | 0.00 |
| 70.00 | 3.91 | 3.68 | 0.00 |
| 72.50 | 3.91 | 3.68 | 0.00 |
| 75.00 | 3.91 | 3.68 | 0.00 |
| 77.50 | 3.91 | 3.68 | 0.00 |
| 80.00 | 3.91 | 3.68 | 0.00 |
| 82.50 | 3.91 | 3.68 | 0.00 |
| 85.00 | 3.91 | 3.68 | 0.00 |
| 87.50 | 3.91 | 3.68 | 0.00 |
| 90.00 | 3.91 | 3.68 | 0.00 |
| 92.50 | 3.91 | 3.68 | 0.00 |
| 95.00 | 3.91 | 3.68 | 0.00 |
| 97.50 | 3.91 | 3.68 | 0.00 |
| 100.00 | 3.91 | 3.68 | 0.00 |
| 102.50 | 3.91 | 3.68 | 0.00 |
| 105.00 | 3.91 | 3.68 | 0.00 |
| 107.50 | 3.91 | 3.68 | 0.00 |
| 110.00 | 3.91 | 3.68 | 0.00 |
| 112.50 | 3.91 | 3.68 | 0.00 |
| 115.00 | 3.91 | 3.68 | 0.00 |
| 117.50 | 3.91 | 3.68 | 0.00 |
| 120.00 | 3.91 | 3.68 | 0.00 |

Summary for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

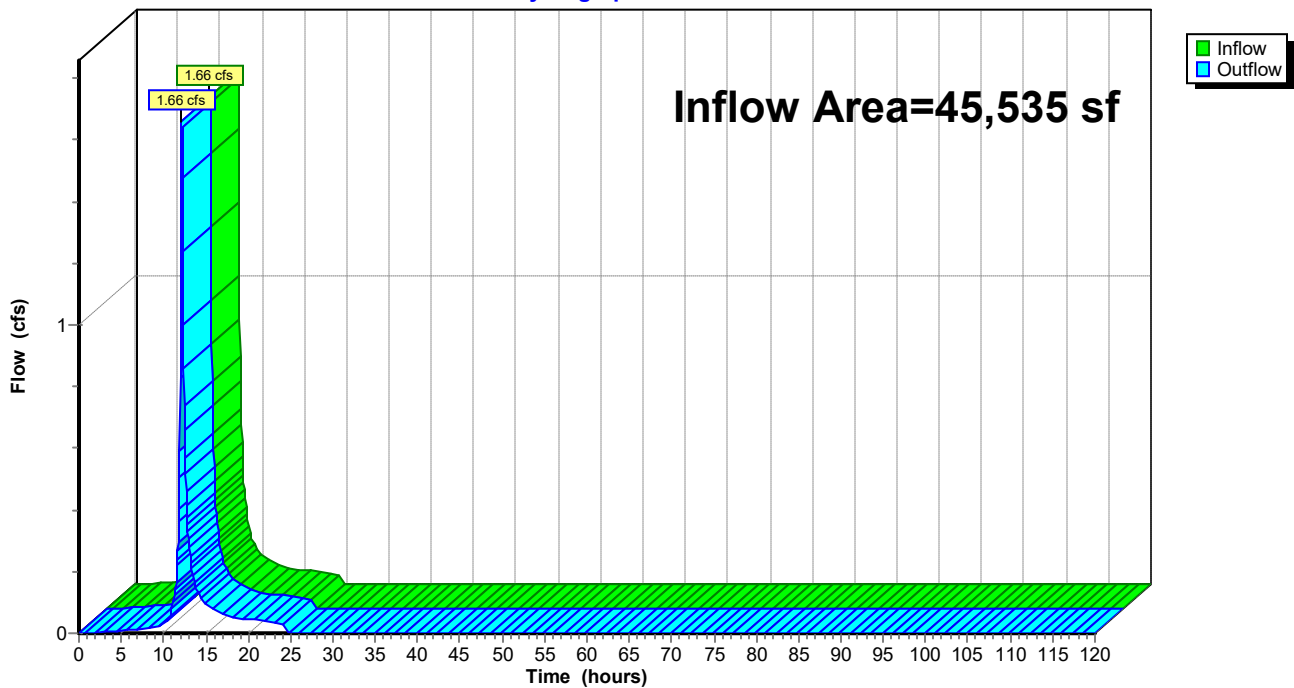
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 1.91" for 2-yr, Projected event
Inflow = 1.66 cfs @ 12.10 hrs, Volume= 7,246 cf
Outflow = 1.66 cfs @ 12.10 hrs, Volume= 7,246 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Hydrograph



Hydrograph for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.00 | | 0.00 |
| 5.00 | 0.01 | | 0.01 |
| 7.50 | 0.01 | | 0.01 |
| 10.00 | 0.03 | | 0.03 |
| 12.50 | 0.66 | | 0.66 |
| 15.00 | 0.09 | | 0.09 |
| 17.50 | 0.06 | | 0.06 |
| 20.00 | 0.04 | | 0.04 |
| 22.50 | 0.04 | | 0.04 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

2024-03-18 - Stormwater Analysis Concept - C NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

Prepared by Langan Engineering

Printed 3/18/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4EX: EX.PER

Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=3.33"
Tc=12.0 min CN=74 Runoff=3.00 cfs 10,399 cf

Subcatchment 5EX: EX.IMP.SITE

Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=5.93"
Tc=1.7 min CN=98 Runoff=1.15 cfs 3,455 cf

Subcatchment 6EX: EX.IMP.BLDG

Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=5.93"
Tc=0.4 min CN=98 Runoff=0.18 cfs 521 cf

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Inflow=3.45 cfs 14,375 cf
Outflow=3.45 cfs 14,375 cf

Summary for Subcatchment 4EX: EX.PER

Runoff = 3.00 cfs @ 12.20 hrs, Volume= 10,399 cf, Depth= 3.33"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

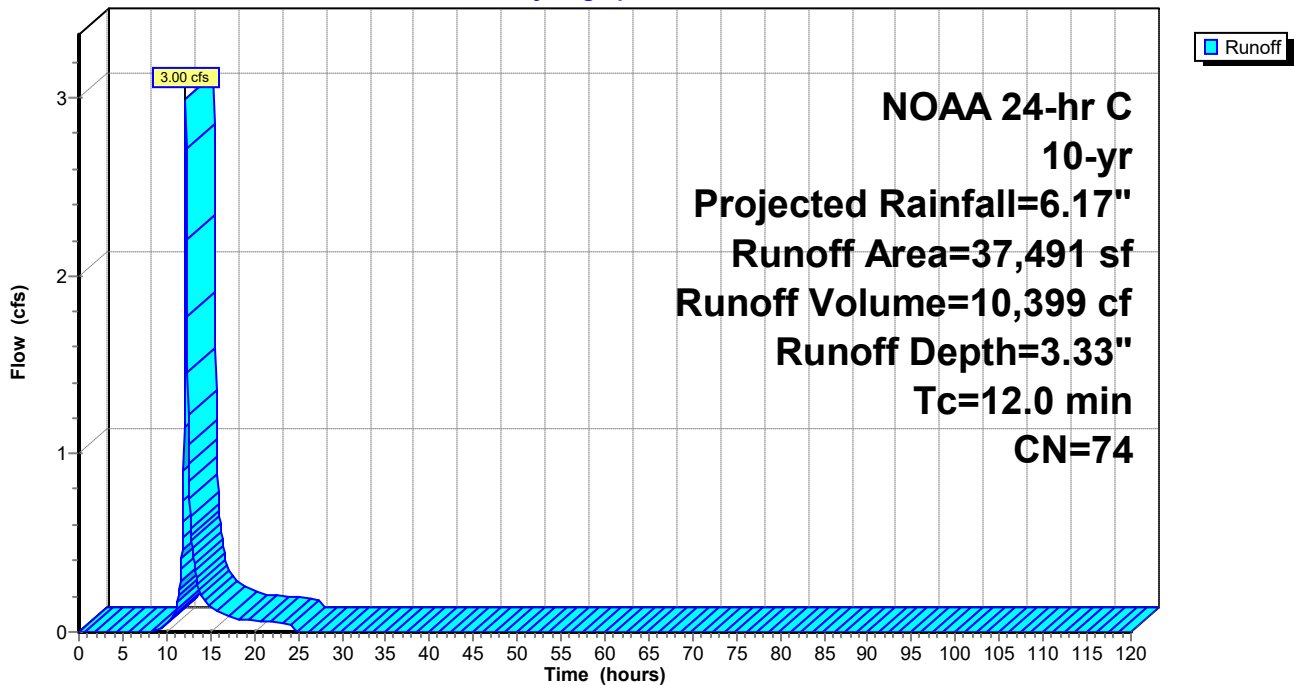
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 4EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 4EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.00 | 0.00 |
| 5.00 | 0.39 | 0.00 | 0.00 |
| 7.50 | 0.67 | 0.00 | 0.00 |
| 10.00 | 1.12 | 0.05 | 0.04 |
| 12.50 | 4.35 | 1.86 | 1.06 |
| 15.00 | 5.27 | 2.58 | 0.14 |
| 17.50 | 5.63 | 2.87 | 0.08 |
| 20.00 | 5.87 | 3.07 | 0.06 |
| 22.50 | 6.07 | 3.24 | 0.05 |
| 25.00 | 6.17 | 3.33 | 0.00 |
| 27.50 | 6.17 | 3.33 | 0.00 |
| 30.00 | 6.17 | 3.33 | 0.00 |
| 32.50 | 6.17 | 3.33 | 0.00 |
| 35.00 | 6.17 | 3.33 | 0.00 |
| 37.50 | 6.17 | 3.33 | 0.00 |
| 40.00 | 6.17 | 3.33 | 0.00 |
| 42.50 | 6.17 | 3.33 | 0.00 |
| 45.00 | 6.17 | 3.33 | 0.00 |
| 47.50 | 6.17 | 3.33 | 0.00 |
| 50.00 | 6.17 | 3.33 | 0.00 |
| 52.50 | 6.17 | 3.33 | 0.00 |
| 55.00 | 6.17 | 3.33 | 0.00 |
| 57.50 | 6.17 | 3.33 | 0.00 |
| 60.00 | 6.17 | 3.33 | 0.00 |
| 62.50 | 6.17 | 3.33 | 0.00 |
| 65.00 | 6.17 | 3.33 | 0.00 |
| 67.50 | 6.17 | 3.33 | 0.00 |
| 70.00 | 6.17 | 3.33 | 0.00 |
| 72.50 | 6.17 | 3.33 | 0.00 |
| 75.00 | 6.17 | 3.33 | 0.00 |
| 77.50 | 6.17 | 3.33 | 0.00 |
| 80.00 | 6.17 | 3.33 | 0.00 |
| 82.50 | 6.17 | 3.33 | 0.00 |
| 85.00 | 6.17 | 3.33 | 0.00 |
| 87.50 | 6.17 | 3.33 | 0.00 |
| 90.00 | 6.17 | 3.33 | 0.00 |
| 92.50 | 6.17 | 3.33 | 0.00 |
| 95.00 | 6.17 | 3.33 | 0.00 |
| 97.50 | 6.17 | 3.33 | 0.00 |
| 100.00 | 6.17 | 3.33 | 0.00 |
| 102.50 | 6.17 | 3.33 | 0.00 |
| 105.00 | 6.17 | 3.33 | 0.00 |
| 107.50 | 6.17 | 3.33 | 0.00 |
| 110.00 | 6.17 | 3.33 | 0.00 |
| 112.50 | 6.17 | 3.33 | 0.00 |
| 115.00 | 6.17 | 3.33 | 0.00 |
| 117.50 | 6.17 | 3.33 | 0.00 |
| 120.00 | 6.17 | 3.33 | 0.00 |

Summary for Subcatchment 5EX: EX.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 3,455 cf, Depth= 5.93"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

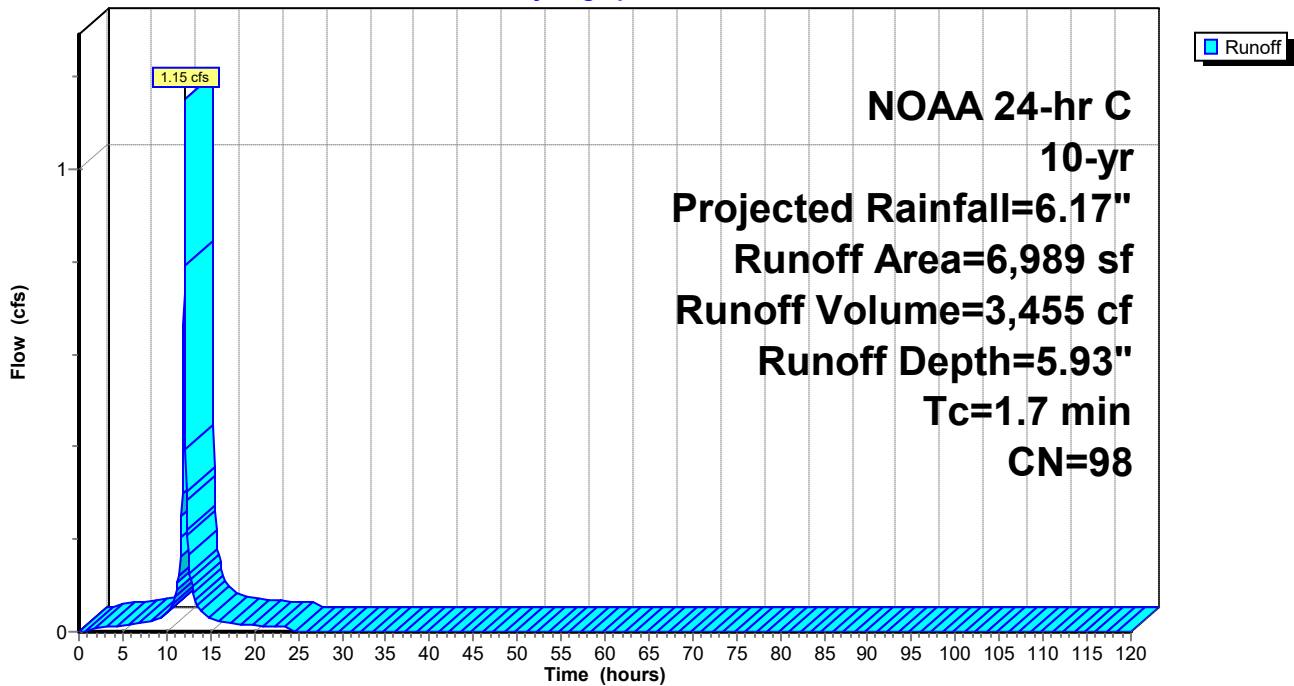
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.7 | | | | | Direct Entry, |

Subcatchment 5EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 5EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.06 | 0.01 |
| 5.00 | 0.39 | 0.22 | 0.01 |
| 7.50 | 0.67 | 0.47 | 0.02 |
| 10.00 | 1.12 | 0.91 | 0.04 |
| 12.50 | 4.35 | 4.11 | 0.20 |
| 15.00 | 5.27 | 5.03 | 0.03 |
| 17.50 | 5.63 | 5.39 | 0.02 |
| 20.00 | 5.87 | 5.63 | 0.01 |
| 22.50 | 6.07 | 5.83 | 0.01 |
| 25.00 | 6.17 | 5.93 | 0.00 |
| 27.50 | 6.17 | 5.93 | 0.00 |
| 30.00 | 6.17 | 5.93 | 0.00 |
| 32.50 | 6.17 | 5.93 | 0.00 |
| 35.00 | 6.17 | 5.93 | 0.00 |
| 37.50 | 6.17 | 5.93 | 0.00 |
| 40.00 | 6.17 | 5.93 | 0.00 |
| 42.50 | 6.17 | 5.93 | 0.00 |
| 45.00 | 6.17 | 5.93 | 0.00 |
| 47.50 | 6.17 | 5.93 | 0.00 |
| 50.00 | 6.17 | 5.93 | 0.00 |
| 52.50 | 6.17 | 5.93 | 0.00 |
| 55.00 | 6.17 | 5.93 | 0.00 |
| 57.50 | 6.17 | 5.93 | 0.00 |
| 60.00 | 6.17 | 5.93 | 0.00 |
| 62.50 | 6.17 | 5.93 | 0.00 |
| 65.00 | 6.17 | 5.93 | 0.00 |
| 67.50 | 6.17 | 5.93 | 0.00 |
| 70.00 | 6.17 | 5.93 | 0.00 |
| 72.50 | 6.17 | 5.93 | 0.00 |
| 75.00 | 6.17 | 5.93 | 0.00 |
| 77.50 | 6.17 | 5.93 | 0.00 |
| 80.00 | 6.17 | 5.93 | 0.00 |
| 82.50 | 6.17 | 5.93 | 0.00 |
| 85.00 | 6.17 | 5.93 | 0.00 |
| 87.50 | 6.17 | 5.93 | 0.00 |
| 90.00 | 6.17 | 5.93 | 0.00 |
| 92.50 | 6.17 | 5.93 | 0.00 |
| 95.00 | 6.17 | 5.93 | 0.00 |
| 97.50 | 6.17 | 5.93 | 0.00 |
| 100.00 | 6.17 | 5.93 | 0.00 |
| 102.50 | 6.17 | 5.93 | 0.00 |
| 105.00 | 6.17 | 5.93 | 0.00 |
| 107.50 | 6.17 | 5.93 | 0.00 |
| 110.00 | 6.17 | 5.93 | 0.00 |
| 112.50 | 6.17 | 5.93 | 0.00 |
| 115.00 | 6.17 | 5.93 | 0.00 |
| 117.50 | 6.17 | 5.93 | 0.00 |
| 120.00 | 6.17 | 5.93 | 0.00 |

Summary for Subcatchment 6EX: EX.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.18 cfs @ 12.05 hrs, Volume= 521 cf, Depth= 5.93"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

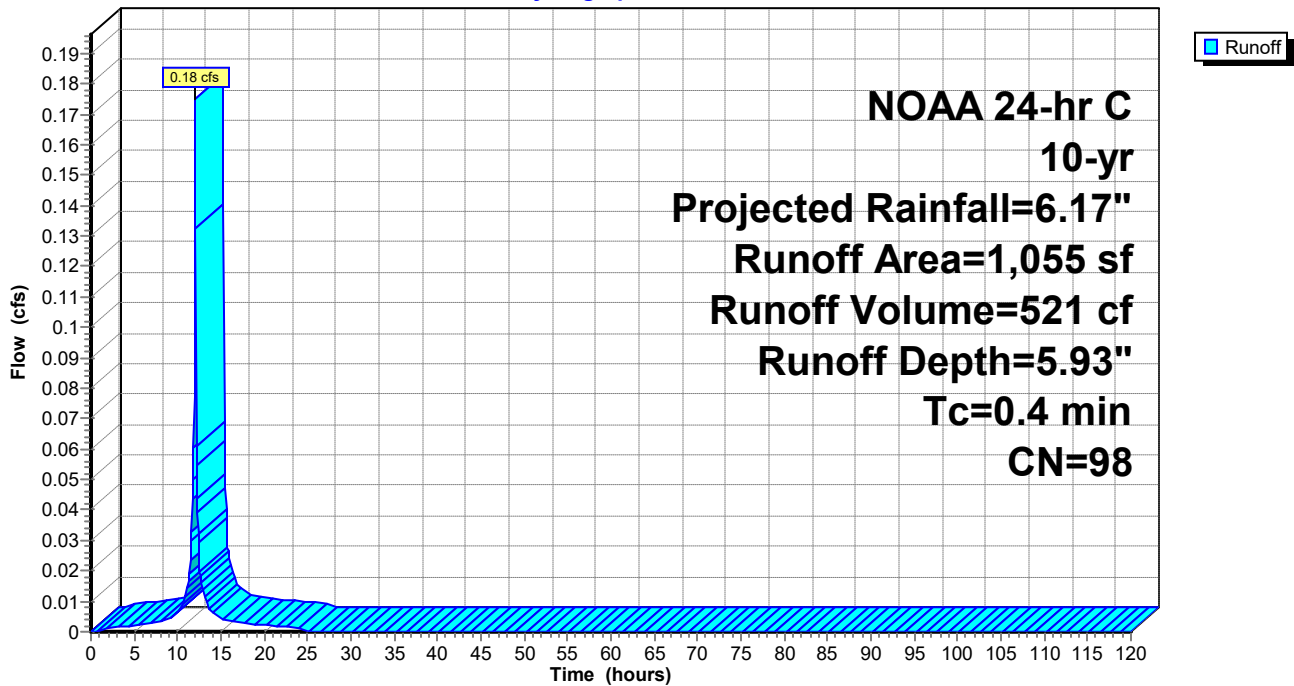
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 6EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 6EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.06 | 0.00 |
| 5.00 | 0.39 | 0.22 | 0.00 |
| 7.50 | 0.67 | 0.47 | 0.00 |
| 10.00 | 1.12 | 0.91 | 0.01 |
| 12.50 | 4.35 | 4.11 | 0.03 |
| 15.00 | 5.27 | 5.03 | 0.00 |
| 17.50 | 5.63 | 5.39 | 0.00 |
| 20.00 | 5.87 | 5.63 | 0.00 |
| 22.50 | 6.07 | 5.83 | 0.00 |
| 25.00 | 6.17 | 5.93 | 0.00 |
| 27.50 | 6.17 | 5.93 | 0.00 |
| 30.00 | 6.17 | 5.93 | 0.00 |
| 32.50 | 6.17 | 5.93 | 0.00 |
| 35.00 | 6.17 | 5.93 | 0.00 |
| 37.50 | 6.17 | 5.93 | 0.00 |
| 40.00 | 6.17 | 5.93 | 0.00 |
| 42.50 | 6.17 | 5.93 | 0.00 |
| 45.00 | 6.17 | 5.93 | 0.00 |
| 47.50 | 6.17 | 5.93 | 0.00 |
| 50.00 | 6.17 | 5.93 | 0.00 |
| 52.50 | 6.17 | 5.93 | 0.00 |
| 55.00 | 6.17 | 5.93 | 0.00 |
| 57.50 | 6.17 | 5.93 | 0.00 |
| 60.00 | 6.17 | 5.93 | 0.00 |
| 62.50 | 6.17 | 5.93 | 0.00 |
| 65.00 | 6.17 | 5.93 | 0.00 |
| 67.50 | 6.17 | 5.93 | 0.00 |
| 70.00 | 6.17 | 5.93 | 0.00 |
| 72.50 | 6.17 | 5.93 | 0.00 |
| 75.00 | 6.17 | 5.93 | 0.00 |
| 77.50 | 6.17 | 5.93 | 0.00 |
| 80.00 | 6.17 | 5.93 | 0.00 |
| 82.50 | 6.17 | 5.93 | 0.00 |
| 85.00 | 6.17 | 5.93 | 0.00 |
| 87.50 | 6.17 | 5.93 | 0.00 |
| 90.00 | 6.17 | 5.93 | 0.00 |
| 92.50 | 6.17 | 5.93 | 0.00 |
| 95.00 | 6.17 | 5.93 | 0.00 |
| 97.50 | 6.17 | 5.93 | 0.00 |
| 100.00 | 6.17 | 5.93 | 0.00 |
| 102.50 | 6.17 | 5.93 | 0.00 |
| 105.00 | 6.17 | 5.93 | 0.00 |
| 107.50 | 6.17 | 5.93 | 0.00 |
| 110.00 | 6.17 | 5.93 | 0.00 |
| 112.50 | 6.17 | 5.93 | 0.00 |
| 115.00 | 6.17 | 5.93 | 0.00 |
| 117.50 | 6.17 | 5.93 | 0.00 |
| 120.00 | 6.17 | 5.93 | 0.00 |

Summary for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

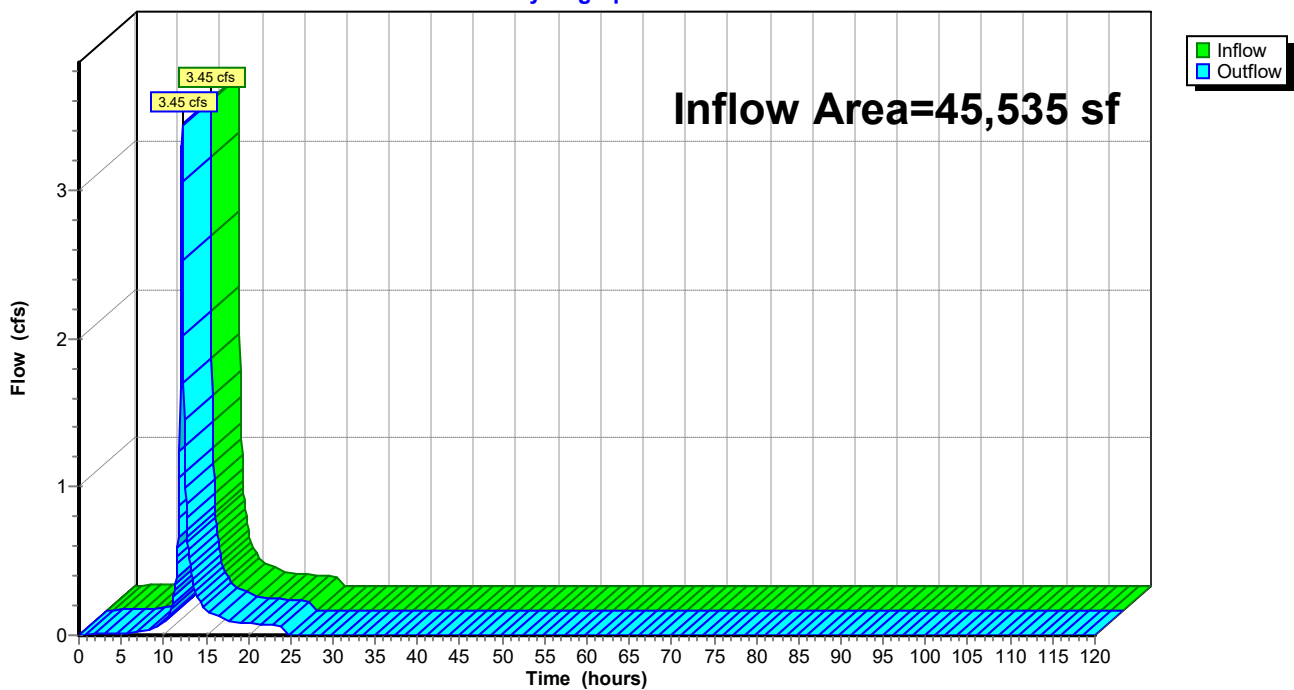
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 3.79" for 10-yr, Projected event
Inflow = 3.45 cfs @ 12.19 hrs, Volume= 14,375 cf
Outflow = 3.45 cfs @ 12.19 hrs, Volume= 14,375 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Hydrograph



Hydrograph for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.01 | | 0.01 |
| 5.00 | 0.02 | | 0.02 |
| 7.50 | 0.02 | | 0.02 |
| 10.00 | 0.09 | | 0.09 |
| 12.50 | 1.28 | | 1.28 |
| 15.00 | 0.17 | | 0.17 |
| 17.50 | 0.11 | | 0.11 |
| 20.00 | 0.08 | | 0.08 |
| 22.50 | 0.07 | | 0.07 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4EX: EX.PER Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=3.42"
Tc=12.0 min CN=74 Runoff=3.08 cfs 10,690 cf

Subcatchment 5EX: EX.IMP.SITE Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=6.04"
Tc=1.7 min CN=98 Runoff=1.18 cfs 3,519 cf

Subcatchment 6EX: EX.IMP.BLDG Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=6.04"
Tc=0.4 min CN=98 Runoff=0.18 cfs 531 cf

Reach EX1.PROJ: POI-1 for EXDA-1 (projected) Inflow=3.55 cfs 14,740 cf
Outflow=3.55 cfs 14,740 cf

Summary for Subcatchment 4EX: EX.PER

Runoff = 3.08 cfs @ 12.20 hrs, Volume= 10,690 cf, Depth= 3.42"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

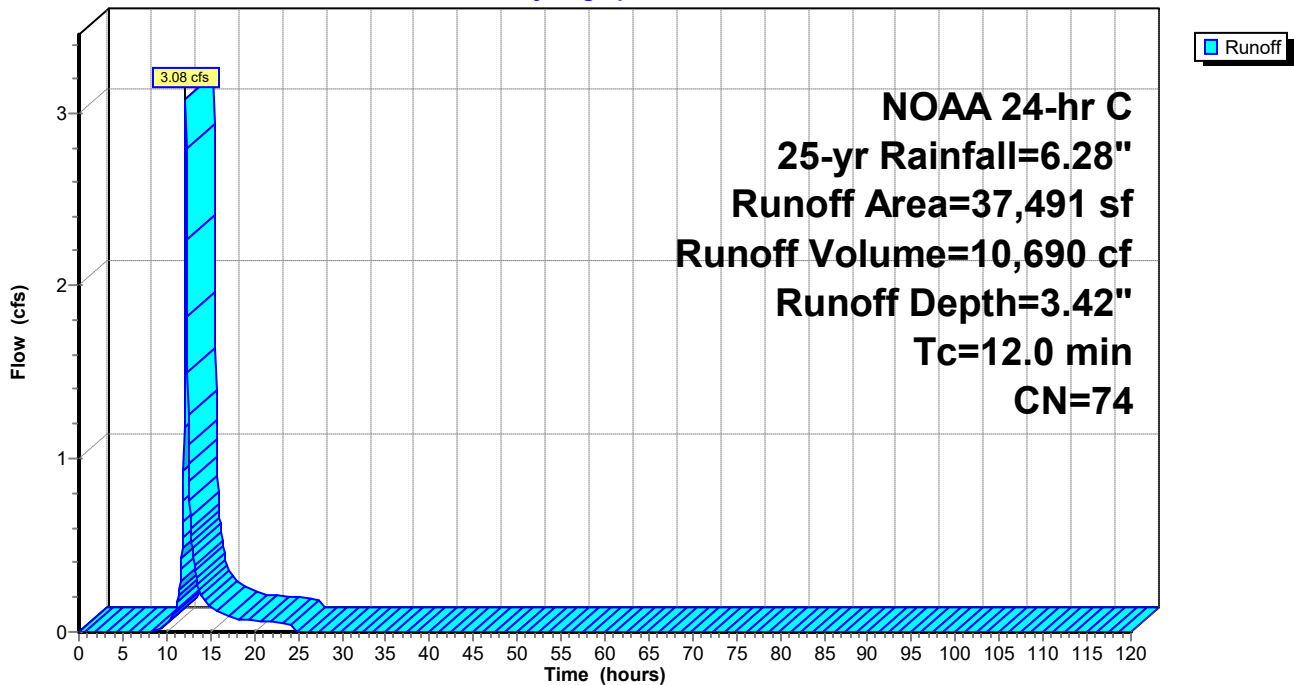
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 4EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 4EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.00 | 0.00 |
| 5.00 | 0.40 | 0.00 | 0.00 |
| 7.50 | 0.68 | 0.00 | 0.00 |
| 10.00 | 1.15 | 0.05 | 0.04 |
| 12.50 | 4.42 | 1.91 | 1.08 |
| 15.00 | 5.36 | 2.66 | 0.14 |
| 17.50 | 5.73 | 2.96 | 0.09 |
| 20.00 | 5.97 | 3.16 | 0.07 |
| 22.50 | 6.18 | 3.33 | 0.05 |
| 25.00 | 6.28 | 3.42 | 0.00 |
| 27.50 | 6.28 | 3.42 | 0.00 |
| 30.00 | 6.28 | 3.42 | 0.00 |
| 32.50 | 6.28 | 3.42 | 0.00 |
| 35.00 | 6.28 | 3.42 | 0.00 |
| 37.50 | 6.28 | 3.42 | 0.00 |
| 40.00 | 6.28 | 3.42 | 0.00 |
| 42.50 | 6.28 | 3.42 | 0.00 |
| 45.00 | 6.28 | 3.42 | 0.00 |
| 47.50 | 6.28 | 3.42 | 0.00 |
| 50.00 | 6.28 | 3.42 | 0.00 |
| 52.50 | 6.28 | 3.42 | 0.00 |
| 55.00 | 6.28 | 3.42 | 0.00 |
| 57.50 | 6.28 | 3.42 | 0.00 |
| 60.00 | 6.28 | 3.42 | 0.00 |
| 62.50 | 6.28 | 3.42 | 0.00 |
| 65.00 | 6.28 | 3.42 | 0.00 |
| 67.50 | 6.28 | 3.42 | 0.00 |
| 70.00 | 6.28 | 3.42 | 0.00 |
| 72.50 | 6.28 | 3.42 | 0.00 |
| 75.00 | 6.28 | 3.42 | 0.00 |
| 77.50 | 6.28 | 3.42 | 0.00 |
| 80.00 | 6.28 | 3.42 | 0.00 |
| 82.50 | 6.28 | 3.42 | 0.00 |
| 85.00 | 6.28 | 3.42 | 0.00 |
| 87.50 | 6.28 | 3.42 | 0.00 |
| 90.00 | 6.28 | 3.42 | 0.00 |
| 92.50 | 6.28 | 3.42 | 0.00 |
| 95.00 | 6.28 | 3.42 | 0.00 |
| 97.50 | 6.28 | 3.42 | 0.00 |
| 100.00 | 6.28 | 3.42 | 0.00 |
| 102.50 | 6.28 | 3.42 | 0.00 |
| 105.00 | 6.28 | 3.42 | 0.00 |
| 107.50 | 6.28 | 3.42 | 0.00 |
| 110.00 | 6.28 | 3.42 | 0.00 |
| 112.50 | 6.28 | 3.42 | 0.00 |
| 115.00 | 6.28 | 3.42 | 0.00 |
| 117.50 | 6.28 | 3.42 | 0.00 |
| 120.00 | 6.28 | 3.42 | 0.00 |

Summary for Subcatchment 5EX: EX.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 3,519 cf, Depth= 6.04"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

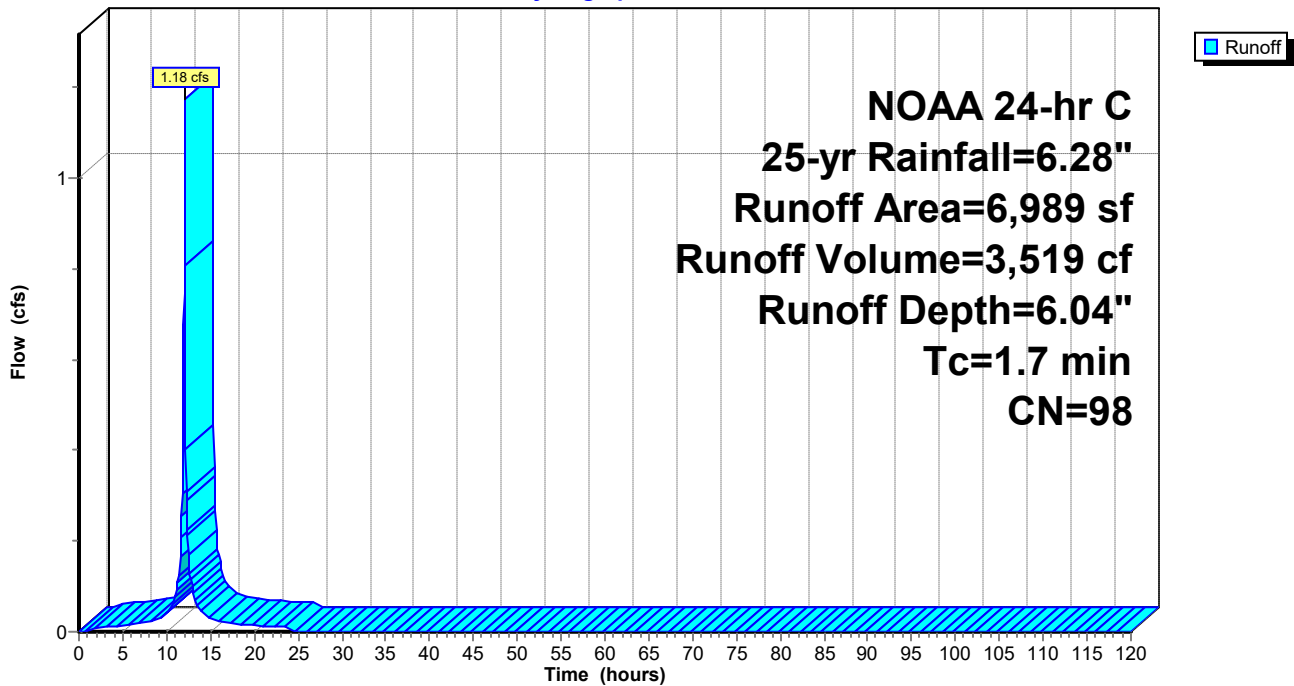
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.7 | | | | | Direct Entry, |

Subcatchment 5EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 5EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.06 | 0.01 |
| 5.00 | 0.40 | 0.23 | 0.01 |
| 7.50 | 0.68 | 0.48 | 0.02 |
| 10.00 | 1.15 | 0.93 | 0.04 |
| 12.50 | 4.42 | 4.19 | 0.20 |
| 15.00 | 5.36 | 5.13 | 0.03 |
| 17.50 | 5.73 | 5.49 | 0.02 |
| 20.00 | 5.97 | 5.73 | 0.01 |
| 22.50 | 6.18 | 5.94 | 0.01 |
| 25.00 | 6.28 | 6.04 | 0.00 |
| 27.50 | 6.28 | 6.04 | 0.00 |
| 30.00 | 6.28 | 6.04 | 0.00 |
| 32.50 | 6.28 | 6.04 | 0.00 |
| 35.00 | 6.28 | 6.04 | 0.00 |
| 37.50 | 6.28 | 6.04 | 0.00 |
| 40.00 | 6.28 | 6.04 | 0.00 |
| 42.50 | 6.28 | 6.04 | 0.00 |
| 45.00 | 6.28 | 6.04 | 0.00 |
| 47.50 | 6.28 | 6.04 | 0.00 |
| 50.00 | 6.28 | 6.04 | 0.00 |
| 52.50 | 6.28 | 6.04 | 0.00 |
| 55.00 | 6.28 | 6.04 | 0.00 |
| 57.50 | 6.28 | 6.04 | 0.00 |
| 60.00 | 6.28 | 6.04 | 0.00 |
| 62.50 | 6.28 | 6.04 | 0.00 |
| 65.00 | 6.28 | 6.04 | 0.00 |
| 67.50 | 6.28 | 6.04 | 0.00 |
| 70.00 | 6.28 | 6.04 | 0.00 |
| 72.50 | 6.28 | 6.04 | 0.00 |
| 75.00 | 6.28 | 6.04 | 0.00 |
| 77.50 | 6.28 | 6.04 | 0.00 |
| 80.00 | 6.28 | 6.04 | 0.00 |
| 82.50 | 6.28 | 6.04 | 0.00 |
| 85.00 | 6.28 | 6.04 | 0.00 |
| 87.50 | 6.28 | 6.04 | 0.00 |
| 90.00 | 6.28 | 6.04 | 0.00 |
| 92.50 | 6.28 | 6.04 | 0.00 |
| 95.00 | 6.28 | 6.04 | 0.00 |
| 97.50 | 6.28 | 6.04 | 0.00 |
| 100.00 | 6.28 | 6.04 | 0.00 |
| 102.50 | 6.28 | 6.04 | 0.00 |
| 105.00 | 6.28 | 6.04 | 0.00 |
| 107.50 | 6.28 | 6.04 | 0.00 |
| 110.00 | 6.28 | 6.04 | 0.00 |
| 112.50 | 6.28 | 6.04 | 0.00 |
| 115.00 | 6.28 | 6.04 | 0.00 |
| 117.50 | 6.28 | 6.04 | 0.00 |
| 120.00 | 6.28 | 6.04 | 0.00 |

Summary for Subcatchment 6EX: EX.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.18 cfs @ 12.05 hrs, Volume= 531 cf, Depth= 6.04"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

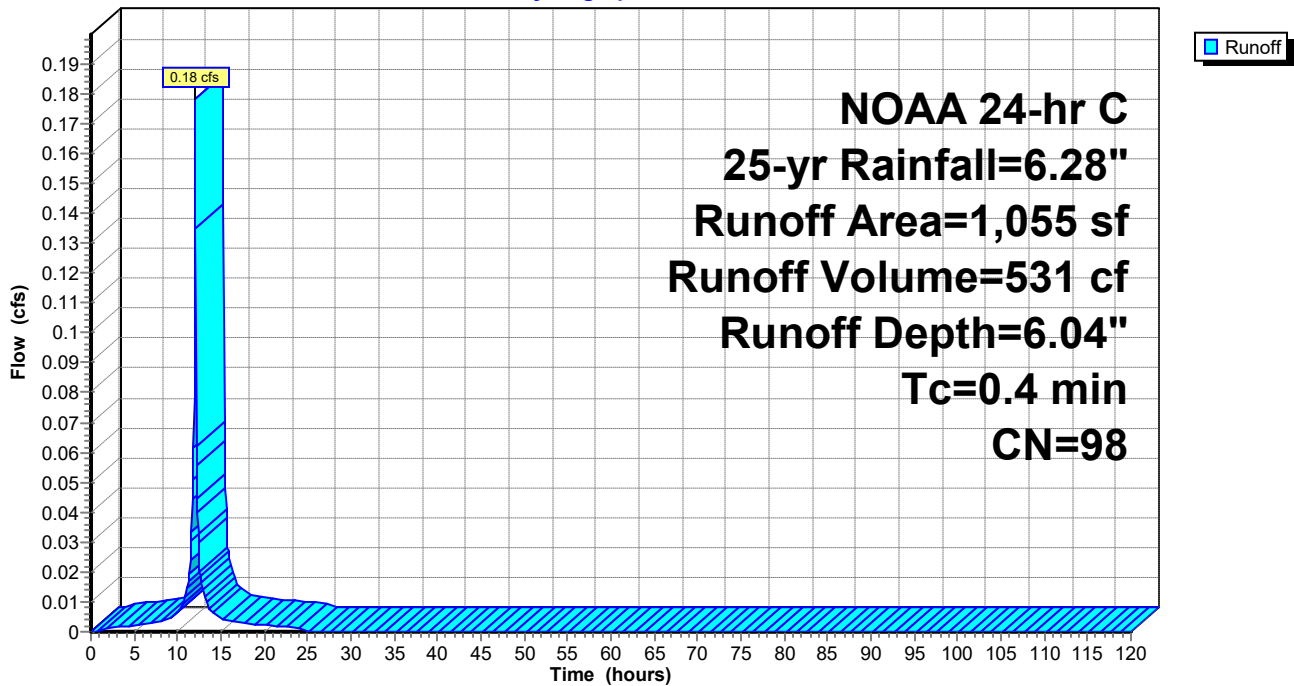
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 6EX: EX.IMP.BLDG

Hydrograph



Hydrograph for Subcatchment 6EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.18 | 0.06 | 0.00 |
| 5.00 | 0.40 | 0.23 | 0.00 |
| 7.50 | 0.68 | 0.48 | 0.00 |
| 10.00 | 1.15 | 0.93 | 0.01 |
| 12.50 | 4.42 | 4.19 | 0.03 |
| 15.00 | 5.36 | 5.13 | 0.00 |
| 17.50 | 5.73 | 5.49 | 0.00 |
| 20.00 | 5.97 | 5.73 | 0.00 |
| 22.50 | 6.18 | 5.94 | 0.00 |
| 25.00 | 6.28 | 6.04 | 0.00 |
| 27.50 | 6.28 | 6.04 | 0.00 |
| 30.00 | 6.28 | 6.04 | 0.00 |
| 32.50 | 6.28 | 6.04 | 0.00 |
| 35.00 | 6.28 | 6.04 | 0.00 |
| 37.50 | 6.28 | 6.04 | 0.00 |
| 40.00 | 6.28 | 6.04 | 0.00 |
| 42.50 | 6.28 | 6.04 | 0.00 |
| 45.00 | 6.28 | 6.04 | 0.00 |
| 47.50 | 6.28 | 6.04 | 0.00 |
| 50.00 | 6.28 | 6.04 | 0.00 |
| 52.50 | 6.28 | 6.04 | 0.00 |
| 55.00 | 6.28 | 6.04 | 0.00 |
| 57.50 | 6.28 | 6.04 | 0.00 |
| 60.00 | 6.28 | 6.04 | 0.00 |
| 62.50 | 6.28 | 6.04 | 0.00 |
| 65.00 | 6.28 | 6.04 | 0.00 |
| 67.50 | 6.28 | 6.04 | 0.00 |
| 70.00 | 6.28 | 6.04 | 0.00 |
| 72.50 | 6.28 | 6.04 | 0.00 |
| 75.00 | 6.28 | 6.04 | 0.00 |
| 77.50 | 6.28 | 6.04 | 0.00 |
| 80.00 | 6.28 | 6.04 | 0.00 |
| 82.50 | 6.28 | 6.04 | 0.00 |
| 85.00 | 6.28 | 6.04 | 0.00 |
| 87.50 | 6.28 | 6.04 | 0.00 |
| 90.00 | 6.28 | 6.04 | 0.00 |
| 92.50 | 6.28 | 6.04 | 0.00 |
| 95.00 | 6.28 | 6.04 | 0.00 |
| 97.50 | 6.28 | 6.04 | 0.00 |
| 100.00 | 6.28 | 6.04 | 0.00 |
| 102.50 | 6.28 | 6.04 | 0.00 |
| 105.00 | 6.28 | 6.04 | 0.00 |
| 107.50 | 6.28 | 6.04 | 0.00 |
| 110.00 | 6.28 | 6.04 | 0.00 |
| 112.50 | 6.28 | 6.04 | 0.00 |
| 115.00 | 6.28 | 6.04 | 0.00 |
| 117.50 | 6.28 | 6.04 | 0.00 |
| 120.00 | 6.28 | 6.04 | 0.00 |

Summary for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

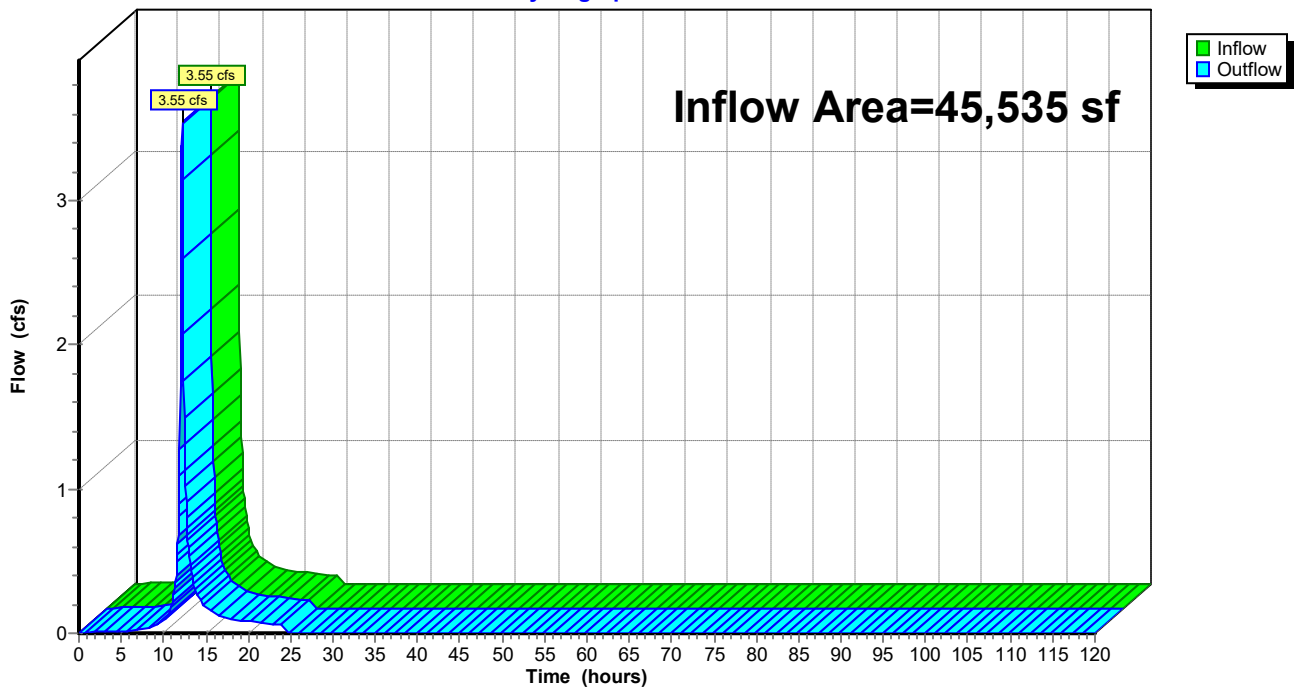
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 3.88" for 25-yr event
Inflow = 3.55 cfs @ 12.19 hrs, Volume= 14,740 cf
Outflow = 3.55 cfs @ 12.19 hrs, Volume= 14,740 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Hydrograph



Hydrograph for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.01 | | 0.01 |
| 5.00 | 0.02 | | 0.02 |
| 7.50 | 0.02 | | 0.02 |
| 10.00 | 0.09 | | 0.09 |
| 12.50 | 1.31 | | 1.31 |
| 15.00 | 0.17 | | 0.17 |
| 17.50 | 0.11 | | 0.11 |
| 20.00 | 0.08 | | 0.08 |
| 22.50 | 0.07 | | 0.07 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

2024-03-18 - Stormwater Analysis Concept - NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

Prepared by Langan Engineering

Printed 3/18/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4EX: EX.PER

Runoff Area=37,491 sf 0.00% Impervious Runoff Depth=8.47"
Tc=12.0 min CN=74 Runoff=7.43 cfs 26,451 cf

Subcatchment 5EX: EX.IMP.SITE

Runoff Area=6,989 sf 100.00% Impervious Runoff Depth=11.60"
Tc=1.7 min CN=98 Runoff=2.22 cfs 6,755 cf

Subcatchment 6EX: EX.IMP.BLDG

Runoff Area=1,055 sf 100.00% Impervious Runoff Depth=11.60"
Tc=0.4 min CN=98 Runoff=0.34 cfs 1,020 cf

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Inflow=8.32 cfs 34,226 cf
Outflow=8.32 cfs 34,226 cf

Summary for Subcatchment 4EX: EX.PER

Runoff = 7.43 cfs @ 12.20 hrs, Volume= 26,451 cf, Depth= 8.47"

Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

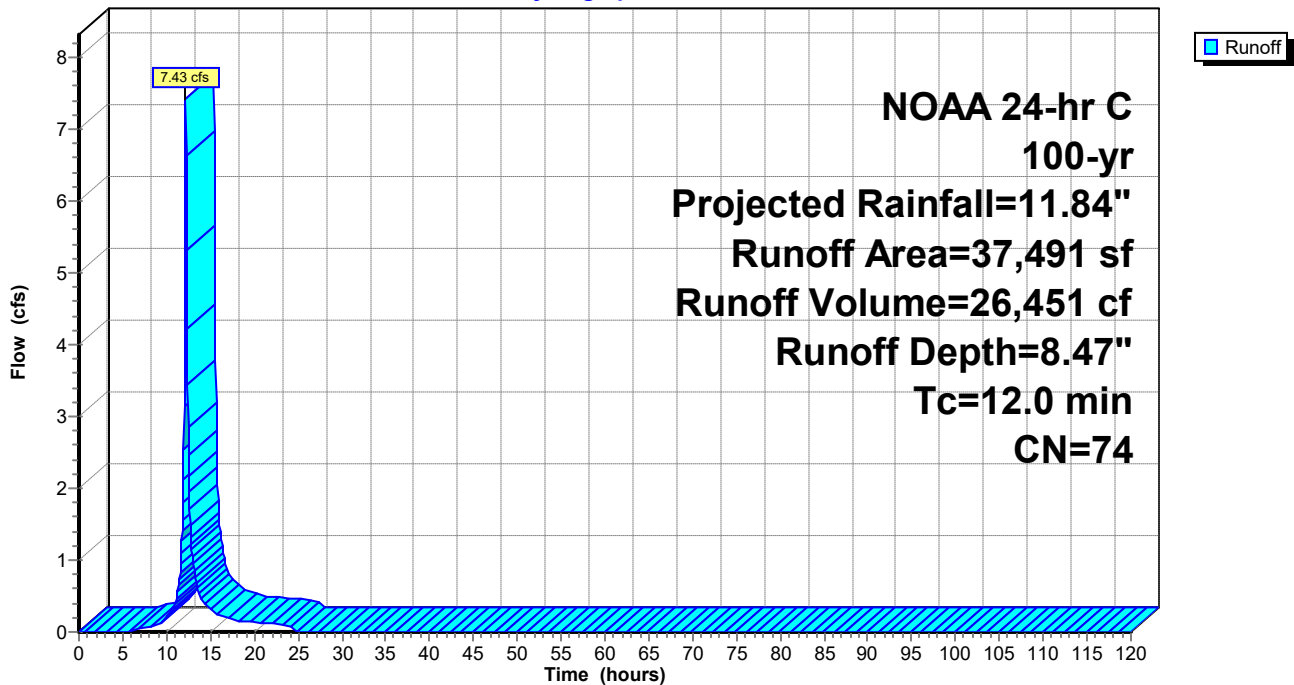
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 37,491 | 74 | >75% Grass cover, Good, HSG C |
| 37,491 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 12.0 | | | | | Direct Entry, |

Subcatchment 4EX: EX.PER

Hydrograph



Hydrograph for Subcatchment 4EX: EX.PER

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.34 | 0.00 | 0.00 |
| 5.00 | 0.75 | 0.00 | 0.00 |
| 7.50 | 1.28 | 0.08 | 0.05 |
| 10.00 | 2.16 | 0.43 | 0.20 |
| 12.50 | 8.34 | 5.23 | 2.45 |
| 15.00 | 10.11 | 6.85 | 0.30 |
| 17.50 | 10.80 | 7.49 | 0.18 |
| 20.00 | 11.26 | 7.92 | 0.14 |
| 22.50 | 11.64 | 8.28 | 0.11 |
| 25.00 | 11.84 | 8.47 | 0.00 |
| 27.50 | 11.84 | 8.47 | 0.00 |
| 30.00 | 11.84 | 8.47 | 0.00 |
| 32.50 | 11.84 | 8.47 | 0.00 |
| 35.00 | 11.84 | 8.47 | 0.00 |
| 37.50 | 11.84 | 8.47 | 0.00 |
| 40.00 | 11.84 | 8.47 | 0.00 |
| 42.50 | 11.84 | 8.47 | 0.00 |
| 45.00 | 11.84 | 8.47 | 0.00 |
| 47.50 | 11.84 | 8.47 | 0.00 |
| 50.00 | 11.84 | 8.47 | 0.00 |
| 52.50 | 11.84 | 8.47 | 0.00 |
| 55.00 | 11.84 | 8.47 | 0.00 |
| 57.50 | 11.84 | 8.47 | 0.00 |
| 60.00 | 11.84 | 8.47 | 0.00 |
| 62.50 | 11.84 | 8.47 | 0.00 |
| 65.00 | 11.84 | 8.47 | 0.00 |
| 67.50 | 11.84 | 8.47 | 0.00 |
| 70.00 | 11.84 | 8.47 | 0.00 |
| 72.50 | 11.84 | 8.47 | 0.00 |
| 75.00 | 11.84 | 8.47 | 0.00 |
| 77.50 | 11.84 | 8.47 | 0.00 |
| 80.00 | 11.84 | 8.47 | 0.00 |
| 82.50 | 11.84 | 8.47 | 0.00 |
| 85.00 | 11.84 | 8.47 | 0.00 |
| 87.50 | 11.84 | 8.47 | 0.00 |
| 90.00 | 11.84 | 8.47 | 0.00 |
| 92.50 | 11.84 | 8.47 | 0.00 |
| 95.00 | 11.84 | 8.47 | 0.00 |
| 97.50 | 11.84 | 8.47 | 0.00 |
| 100.00 | 11.84 | 8.47 | 0.00 |
| 102.50 | 11.84 | 8.47 | 0.00 |
| 105.00 | 11.84 | 8.47 | 0.00 |
| 107.50 | 11.84 | 8.47 | 0.00 |
| 110.00 | 11.84 | 8.47 | 0.00 |
| 112.50 | 11.84 | 8.47 | 0.00 |
| 115.00 | 11.84 | 8.47 | 0.00 |
| 117.50 | 11.84 | 8.47 | 0.00 |
| 120.00 | 11.84 | 8.47 | 0.00 |

Summary for Subcatchment 5EX: EX.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.22 cfs @ 12.07 hrs, Volume= 6,755 cf, Depth=11.60"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

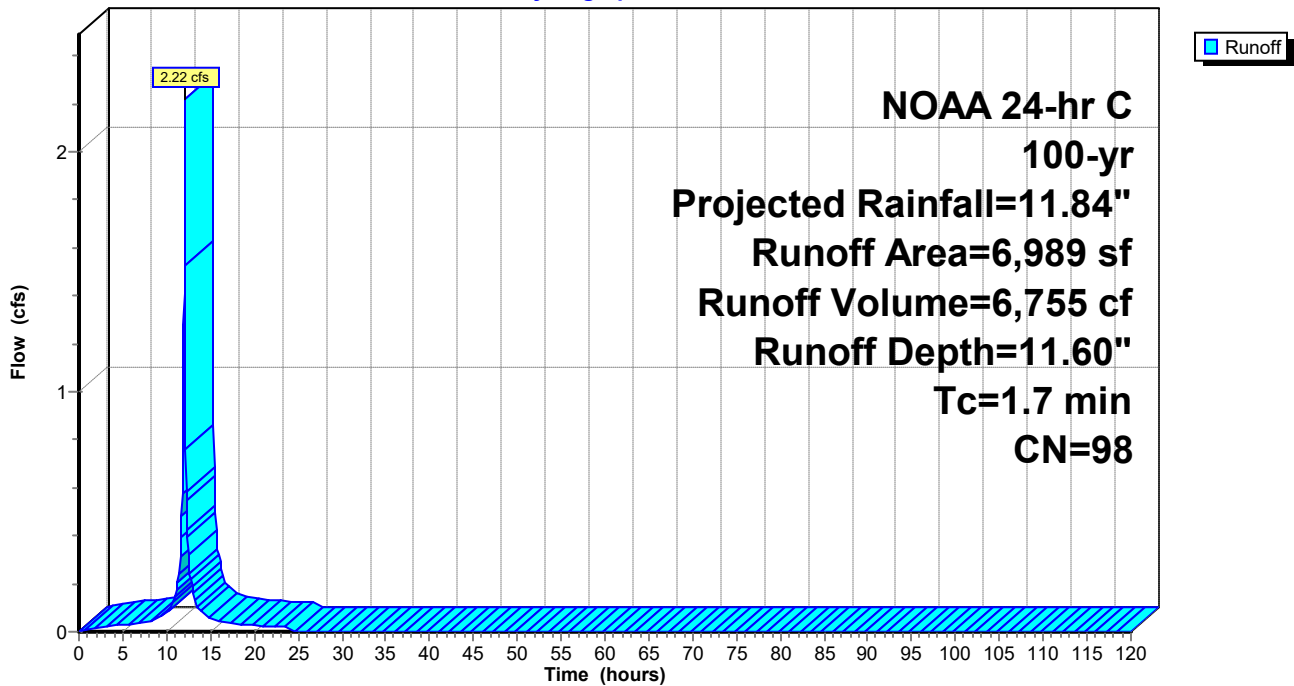
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 6,989 | 98 | Paved parking, HSG D |
| 6,989 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.7 | | | | | Direct Entry, |

Subcatchment 5EX: EX.IMP.SITE

Hydrograph



Hydrograph for Subcatchment 5EX: EX.IMP.SITE

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.34 | 0.18 | 0.02 |
| 5.00 | 0.75 | 0.55 | 0.03 |
| 7.50 | 1.28 | 1.06 | 0.04 |
| 10.00 | 2.16 | 1.93 | 0.08 |
| 12.50 | 8.34 | 8.10 | 0.38 |
| 15.00 | 10.11 | 9.87 | 0.06 |
| 17.50 | 10.80 | 10.56 | 0.04 |
| 20.00 | 11.26 | 11.02 | 0.03 |
| 22.50 | 11.64 | 11.40 | 0.02 |
| 25.00 | 11.84 | 11.60 | 0.00 |
| 27.50 | 11.84 | 11.60 | 0.00 |
| 30.00 | 11.84 | 11.60 | 0.00 |
| 32.50 | 11.84 | 11.60 | 0.00 |
| 35.00 | 11.84 | 11.60 | 0.00 |
| 37.50 | 11.84 | 11.60 | 0.00 |
| 40.00 | 11.84 | 11.60 | 0.00 |
| 42.50 | 11.84 | 11.60 | 0.00 |
| 45.00 | 11.84 | 11.60 | 0.00 |
| 47.50 | 11.84 | 11.60 | 0.00 |
| 50.00 | 11.84 | 11.60 | 0.00 |
| 52.50 | 11.84 | 11.60 | 0.00 |
| 55.00 | 11.84 | 11.60 | 0.00 |
| 57.50 | 11.84 | 11.60 | 0.00 |
| 60.00 | 11.84 | 11.60 | 0.00 |
| 62.50 | 11.84 | 11.60 | 0.00 |
| 65.00 | 11.84 | 11.60 | 0.00 |
| 67.50 | 11.84 | 11.60 | 0.00 |
| 70.00 | 11.84 | 11.60 | 0.00 |
| 72.50 | 11.84 | 11.60 | 0.00 |
| 75.00 | 11.84 | 11.60 | 0.00 |
| 77.50 | 11.84 | 11.60 | 0.00 |
| 80.00 | 11.84 | 11.60 | 0.00 |
| 82.50 | 11.84 | 11.60 | 0.00 |
| 85.00 | 11.84 | 11.60 | 0.00 |
| 87.50 | 11.84 | 11.60 | 0.00 |
| 90.00 | 11.84 | 11.60 | 0.00 |
| 92.50 | 11.84 | 11.60 | 0.00 |
| 95.00 | 11.84 | 11.60 | 0.00 |
| 97.50 | 11.84 | 11.60 | 0.00 |
| 100.00 | 11.84 | 11.60 | 0.00 |
| 102.50 | 11.84 | 11.60 | 0.00 |
| 105.00 | 11.84 | 11.60 | 0.00 |
| 107.50 | 11.84 | 11.60 | 0.00 |
| 110.00 | 11.84 | 11.60 | 0.00 |
| 112.50 | 11.84 | 11.60 | 0.00 |
| 115.00 | 11.84 | 11.60 | 0.00 |
| 117.50 | 11.84 | 11.60 | 0.00 |
| 120.00 | 11.84 | 11.60 | 0.00 |

Summary for Subcatchment 6EX: EX.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.34 cfs @ 12.05 hrs, Volume= 1,020 cf, Depth=11.60"
 Routed to Reach EX1.PROJ : POI-1 for EXDA-1 (projected)

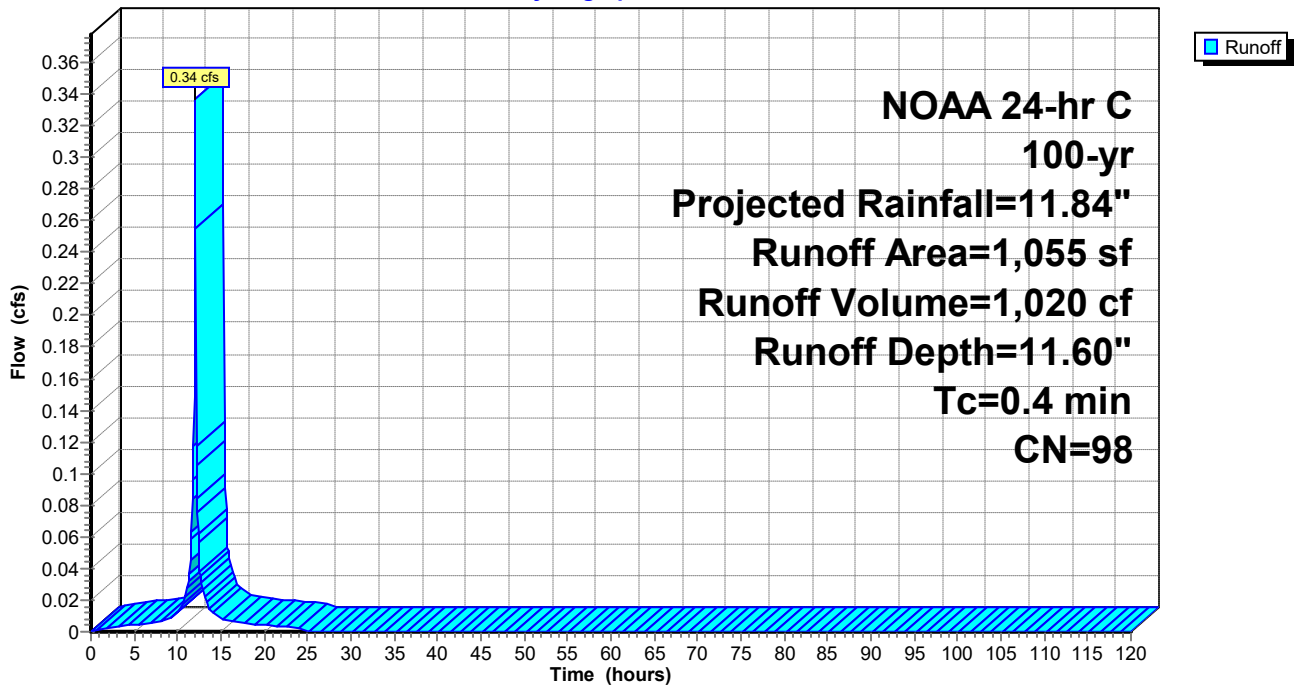
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 1,055 | 98 | Roofs, HSG D |
| 1,055 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 0.4 | | | | | Direct Entry, |

Subcatchment 6EX: EX.IMP.BLDG

Hydrograph



2024-03-18 - Stormwater Analysis Concept - NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

Prepared by Langan Engineering

Printed 3/18/2024

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Hydrograph for Subcatchment 6EX: EX.IMP.BLDG

| Time (hours) | Precip. (inches) | Excess (inches) | Runoff (cfs) |
|-----------------|---------------------|--------------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.34 | 0.18 | 0.00 |
| 5.00 | 0.75 | 0.55 | 0.00 |
| 7.50 | 1.28 | 1.06 | 0.01 |
| 10.00 | 2.16 | 1.93 | 0.01 |
| 12.50 | 8.34 | 8.10 | 0.05 |
| 15.00 | 10.11 | 9.87 | 0.01 |
| 17.50 | 10.80 | 10.56 | 0.01 |
| 20.00 | 11.26 | 11.02 | 0.00 |
| 22.50 | 11.64 | 11.40 | 0.00 |
| 25.00 | 11.84 | 11.60 | 0.00 |
| 27.50 | 11.84 | 11.60 | 0.00 |
| 30.00 | 11.84 | 11.60 | 0.00 |
| 32.50 | 11.84 | 11.60 | 0.00 |
| 35.00 | 11.84 | 11.60 | 0.00 |
| 37.50 | 11.84 | 11.60 | 0.00 |
| 40.00 | 11.84 | 11.60 | 0.00 |
| 42.50 | 11.84 | 11.60 | 0.00 |
| 45.00 | 11.84 | 11.60 | 0.00 |
| 47.50 | 11.84 | 11.60 | 0.00 |
| 50.00 | 11.84 | 11.60 | 0.00 |
| 52.50 | 11.84 | 11.60 | 0.00 |
| 55.00 | 11.84 | 11.60 | 0.00 |
| 57.50 | 11.84 | 11.60 | 0.00 |
| 60.00 | 11.84 | 11.60 | 0.00 |
| 62.50 | 11.84 | 11.60 | 0.00 |
| 65.00 | 11.84 | 11.60 | 0.00 |
| 67.50 | 11.84 | 11.60 | 0.00 |
| 70.00 | 11.84 | 11.60 | 0.00 |
| 72.50 | 11.84 | 11.60 | 0.00 |
| 75.00 | 11.84 | 11.60 | 0.00 |
| 77.50 | 11.84 | 11.60 | 0.00 |
| 80.00 | 11.84 | 11.60 | 0.00 |
| 82.50 | 11.84 | 11.60 | 0.00 |
| 85.00 | 11.84 | 11.60 | 0.00 |
| 87.50 | 11.84 | 11.60 | 0.00 |
| 90.00 | 11.84 | 11.60 | 0.00 |
| 92.50 | 11.84 | 11.60 | 0.00 |
| 95.00 | 11.84 | 11.60 | 0.00 |
| 97.50 | 11.84 | 11.60 | 0.00 |
| 100.00 | 11.84 | 11.60 | 0.00 |
| 102.50 | 11.84 | 11.60 | 0.00 |
| 105.00 | 11.84 | 11.60 | 0.00 |
| 107.50 | 11.84 | 11.60 | 0.00 |
| 110.00 | 11.84 | 11.60 | 0.00 |
| 112.50 | 11.84 | 11.60 | 0.00 |
| 115.00 | 11.84 | 11.60 | 0.00 |
| 117.50 | 11.84 | 11.60 | 0.00 |
| 120.00 | 11.84 | 11.60 | 0.00 |

Summary for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

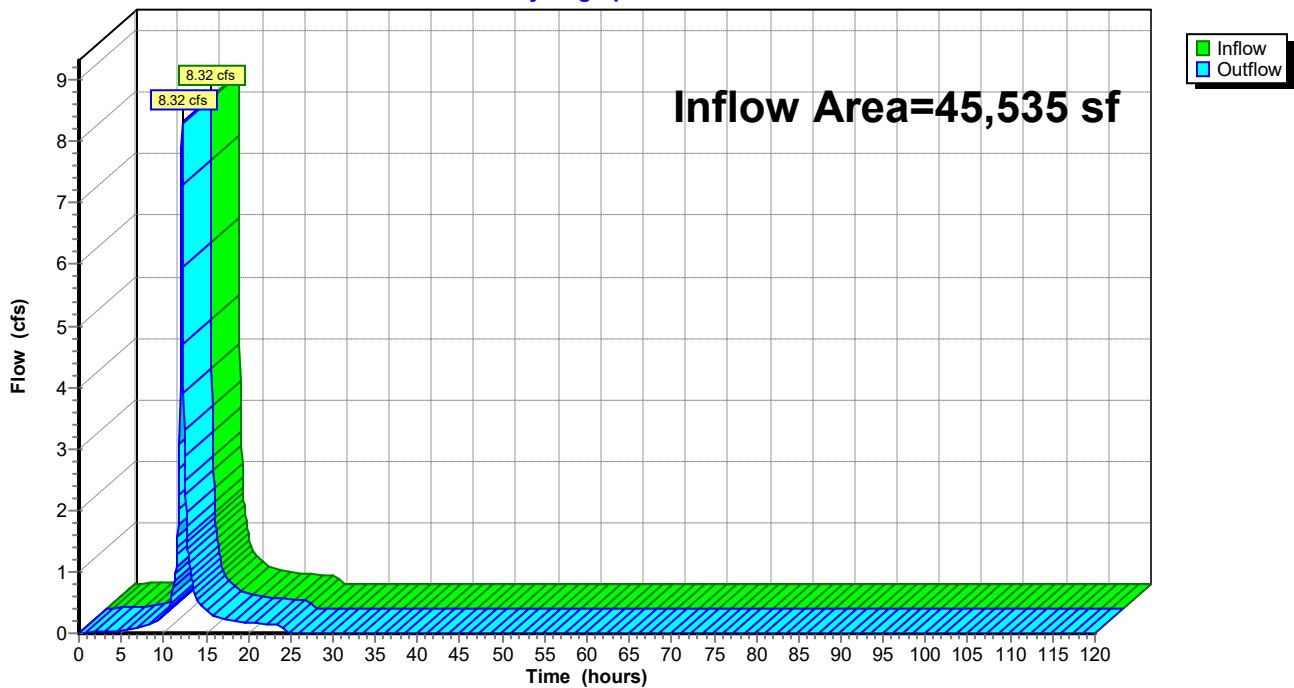
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 17.67% Impervious, Inflow Depth = 9.02" for 100-yr, Projected event
Inflow = 8.32 cfs @ 12.19 hrs, Volume= 34,226 cf
Outflow = 8.32 cfs @ 12.19 hrs, Volume= 34,226 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

Hydrograph



Hydrograph for Reach EX1.PROJ: POI-1 for EXDA-1 (projected)

| Time (hours) | Inflow (cfs) | Elevation (feet) | Outflow (cfs) |
|-----------------|-----------------|---------------------|------------------|
| 0.00 | 0.00 | | 0.00 |
| 2.50 | 0.02 | | 0.02 |
| 5.00 | 0.03 | | 0.03 |
| 7.50 | 0.10 | | 0.10 |
| 10.00 | 0.30 | | 0.30 |
| 12.50 | 2.88 | | 2.88 |
| 15.00 | 0.36 | | 0.36 |
| 17.50 | 0.22 | | 0.22 |
| 20.00 | 0.17 | | 0.17 |
| 22.50 | 0.14 | | 0.14 |
| 25.00 | 0.00 | | 0.00 |
| 27.50 | 0.00 | | 0.00 |
| 30.00 | 0.00 | | 0.00 |
| 32.50 | 0.00 | | 0.00 |
| 35.00 | 0.00 | | 0.00 |
| 37.50 | 0.00 | | 0.00 |
| 40.00 | 0.00 | | 0.00 |
| 42.50 | 0.00 | | 0.00 |
| 45.00 | 0.00 | | 0.00 |
| 47.50 | 0.00 | | 0.00 |
| 50.00 | 0.00 | | 0.00 |
| 52.50 | 0.00 | | 0.00 |
| 55.00 | 0.00 | | 0.00 |
| 57.50 | 0.00 | | 0.00 |
| 60.00 | 0.00 | | 0.00 |
| 62.50 | 0.00 | | 0.00 |
| 65.00 | 0.00 | | 0.00 |
| 67.50 | 0.00 | | 0.00 |
| 70.00 | 0.00 | | 0.00 |
| 72.50 | 0.00 | | 0.00 |
| 75.00 | 0.00 | | 0.00 |
| 77.50 | 0.00 | | 0.00 |
| 80.00 | 0.00 | | 0.00 |
| 82.50 | 0.00 | | 0.00 |
| 85.00 | 0.00 | | 0.00 |
| 87.50 | 0.00 | | 0.00 |
| 90.00 | 0.00 | | 0.00 |
| 92.50 | 0.00 | | 0.00 |
| 95.00 | 0.00 | | 0.00 |
| 97.50 | 0.00 | | 0.00 |
| 100.00 | 0.00 | | 0.00 |
| 102.50 | 0.00 | | 0.00 |
| 105.00 | 0.00 | | 0.00 |
| 107.50 | 0.00 | | 0.00 |
| 110.00 | 0.00 | | 0.00 |
| 112.50 | 0.00 | | 0.00 |
| 115.00 | 0.00 | | 0.00 |
| 117.50 | 0.00 | | 0.00 |
| 120.00 | 0.00 | | 0.00 |

Appendix C
Post-Development Drainage Area and Land Cover Summary /
Runoff Hydrographs

STORMWATER ANALYSIS

PROJECT: Cooper University Hospital - Tower A

LOCATION: Camden, New Jersey

JOB #: 220187001

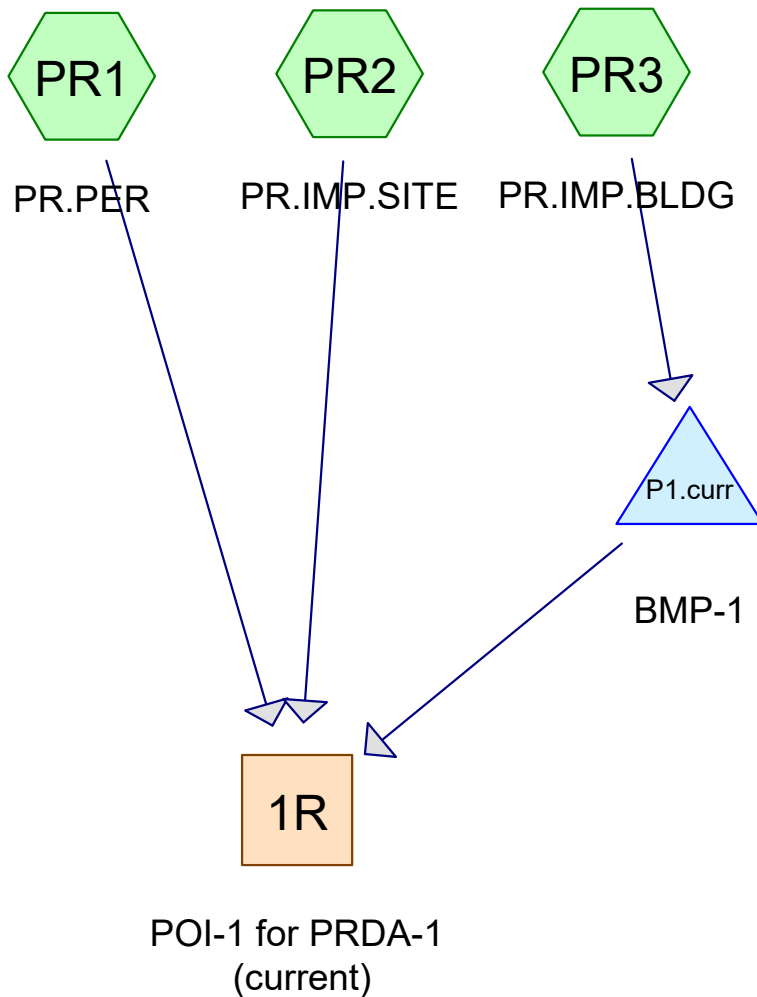
DATE: 20 March 2024

LAND COVER SUMMARY - POST-DEVELOPMENT CONDITIONS

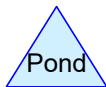
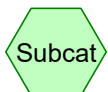
| DRAINAGE AREA | LAND COVER | HYDROLOGIC SOIL GROUP | AREA | | CN | Tc | |
|-------------------|----------------------------|--------------------------|---------------|--------------|----|---------|-----------|
| | | | SF | ACRES | | Current | Projected |
| PRDA-1 (POI-1) | Impervious Building (Roof) | C | 37,664 | 0.865 | 98 | 1.8 | 1.8 |
| | Impervious Site (Ground) | C | 4,006 | 0.092 | 98 | 3.8 | 3.7 |
| | Lawn | C | 3,865 | 0.089 | 74 | 5.5 | 5.2 |
| | TOTAL | | 45,535 | 1.045 | | | |

PROPOSED

Current Rainfall



NOTE: "P1.curr" and "P1.proj" are have identical design (storage, outlets). The ponds are duplicated for ease of analysis between current and projected rainfall.



Area Listing (selected nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|----|---------------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C (PR1) |
| 4,006 | 98 | Paved parking, HSG D (PR2) |
| 37,664 | 98 | Roofs, HSG D (PR3) |

2024-03-18 - Stormwater Analysis Concept - Coo NOAA 24-hr C 2-yr, Current Rainfall=3.41"

Prepared by Langan Engineering

Printed 3/19/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR1: PR.PER Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=1.18"
Tc=5.5 min CN=74 Runoff=0.13 cfs 379 cf

Subcatchment PR2: PR.IMP.SITE Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=3.18"
Tc=3.8 min CN=98 Runoff=0.35 cfs 1,061 cf

Subcatchment PR3: PR.IMP.BLDG Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=3.18"
Tc=1.8 min CN=98 Runoff=3.50 cfs 9,971 cf

Reach 1R: POI-1 for PRDA-1 (current) Inflow=1.32 cfs 11,411 cf
Outflow=1.32 cfs 11,411 cf

Pond P1.curr: BMP-1 Peak Elev=7.76' Storage=1,917 cf Inflow=3.50 cfs 9,971 cf
Outflow=0.85 cfs 9,971 cf

Summary for Subcatchment PR1: PR.PER

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.13 cfs @ 12.13 hrs, Volume= 379 cf, Depth= 1.18"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

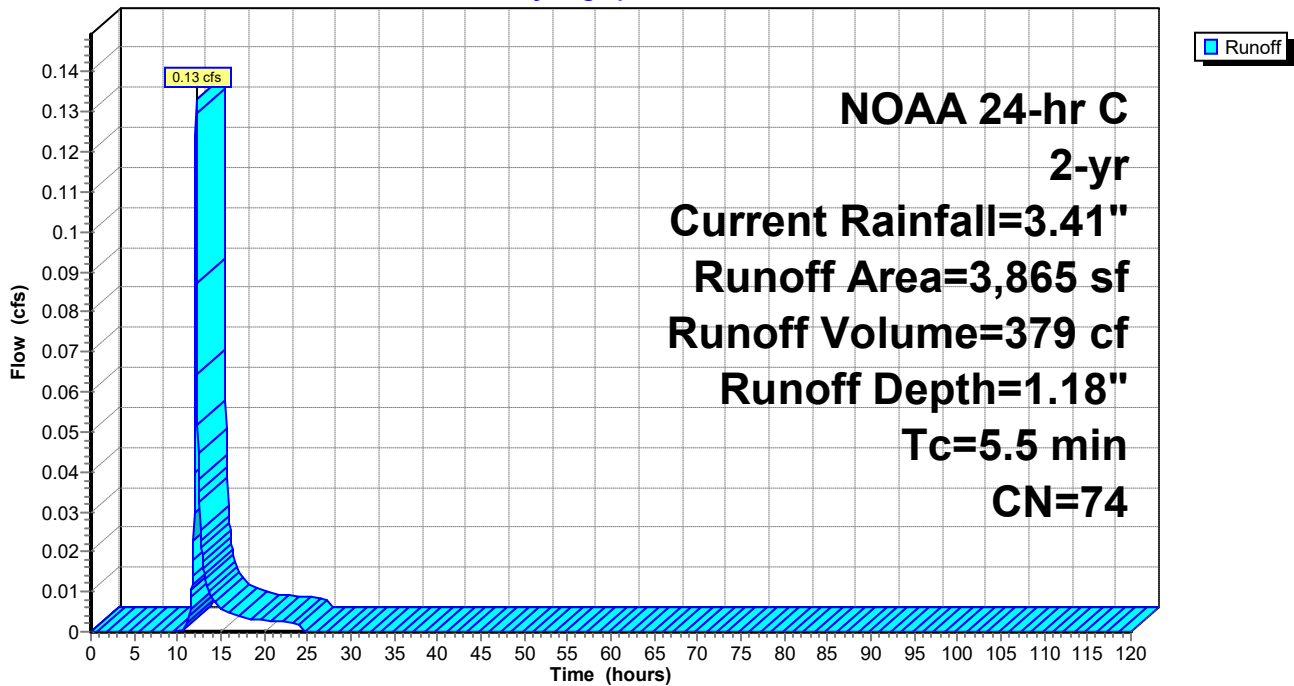
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Current Rainfall=3.41"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.5 | | | | | Direct Entry, |

Subcatchment PR1: PR.PER

Hydrograph



Summary for Subcatchment PR2: PR.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.35 cfs @ 12.10 hrs, Volume= 1,061 cf, Depth= 3.18"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

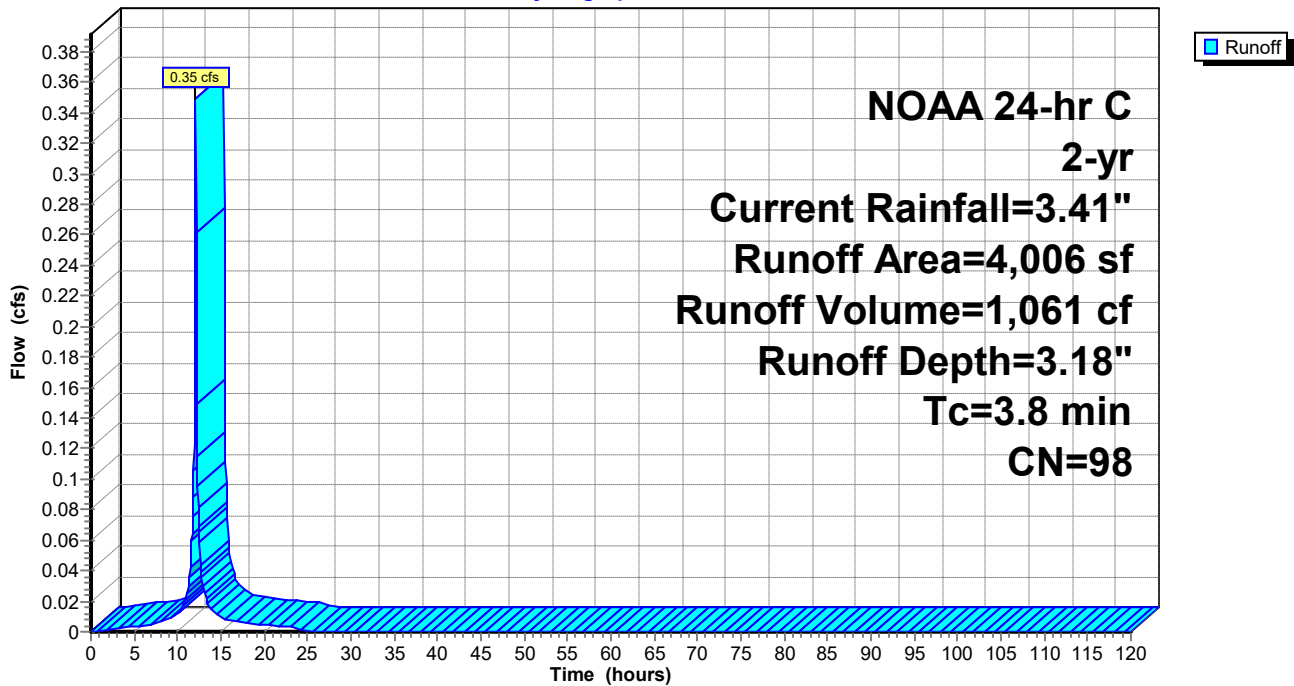
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Current Rainfall=3.41"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.8 | | | | | Direct Entry, |

Subcatchment PR2: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR3: PR.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.50 cfs @ 12.08 hrs, Volume= 9,971 cf, Depth= 3.18"
 Routed to Pond p1.curr : BMP-1

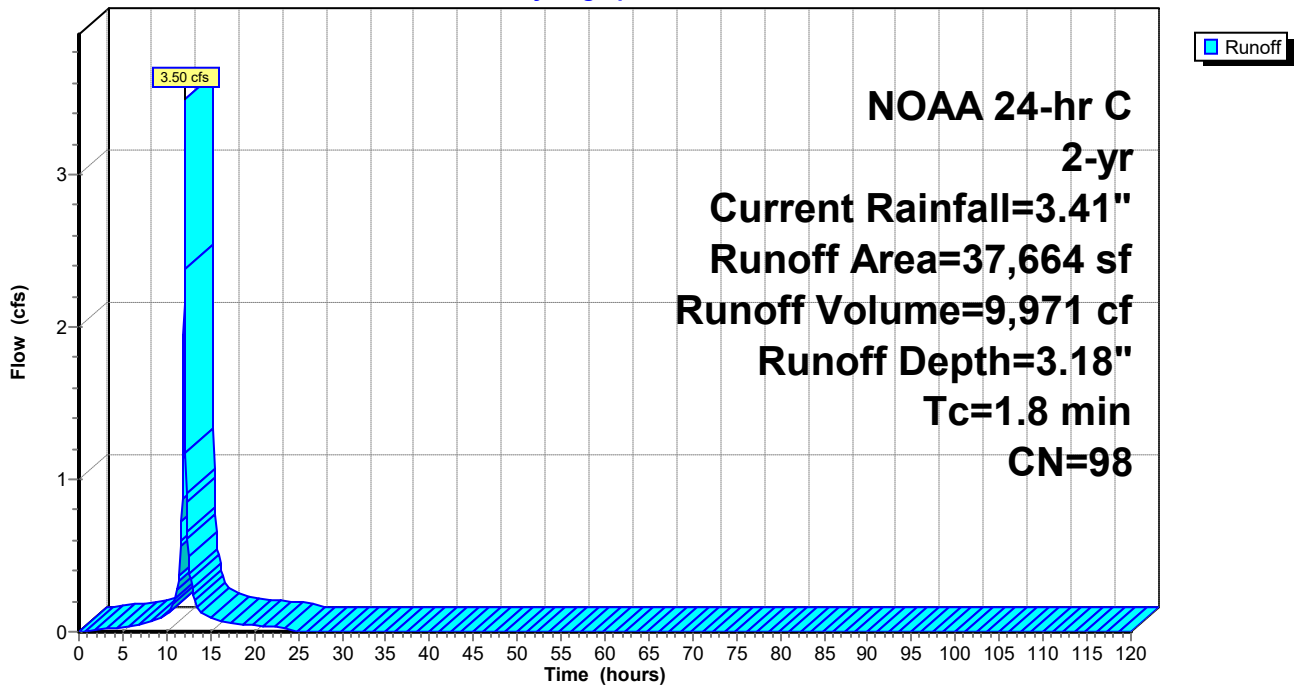
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Current Rainfall=3.41"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR3: PR.IMP.BLDG

Hydrograph



Summary for Reach 1R: POI-1 for PRDA-1 (current)

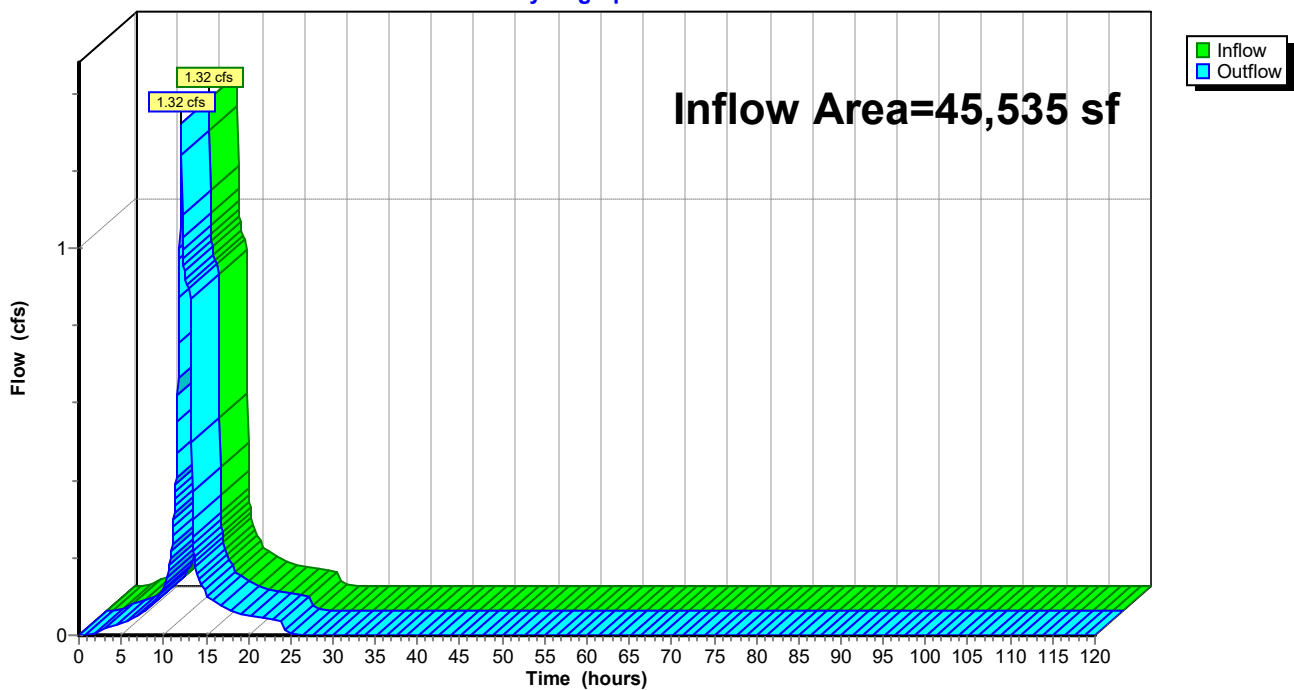
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 3.01" for 2-yr, Current event
Inflow = 1.32 cfs @ 12.10 hrs, Volume= 11,411 cf
Outflow = 1.32 cfs @ 12.10 hrs, Volume= 11,411 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 1R: POI-1 for PRDA-1 (current)

Hydrograph



Summary for Pond P1.curr: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 3.18" for 2-yr, Current event
 Inflow = 3.50 cfs @ 12.08 hrs, Volume= 9,971 cf
 Outflow = 0.85 cfs @ 11.95 hrs, Volume= 9,971 cf, Atten= 76%, Lag= 0.0 min
 Primary = 0.85 cfs @ 11.95 hrs, Volume= 9,971 cf
 Routed to Reach 1r : POI-1 for PRDA-1 (current)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 7.76' @ 12.28 hrs Surf.Area= 744 sf Storage= 1,917 cf

Plug-Flow detention time= 19.9 min calculated for 9,967 cf (100% of inflow)
 Center-of-Mass det. time= 20.0 min (772.3 - 752.3)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

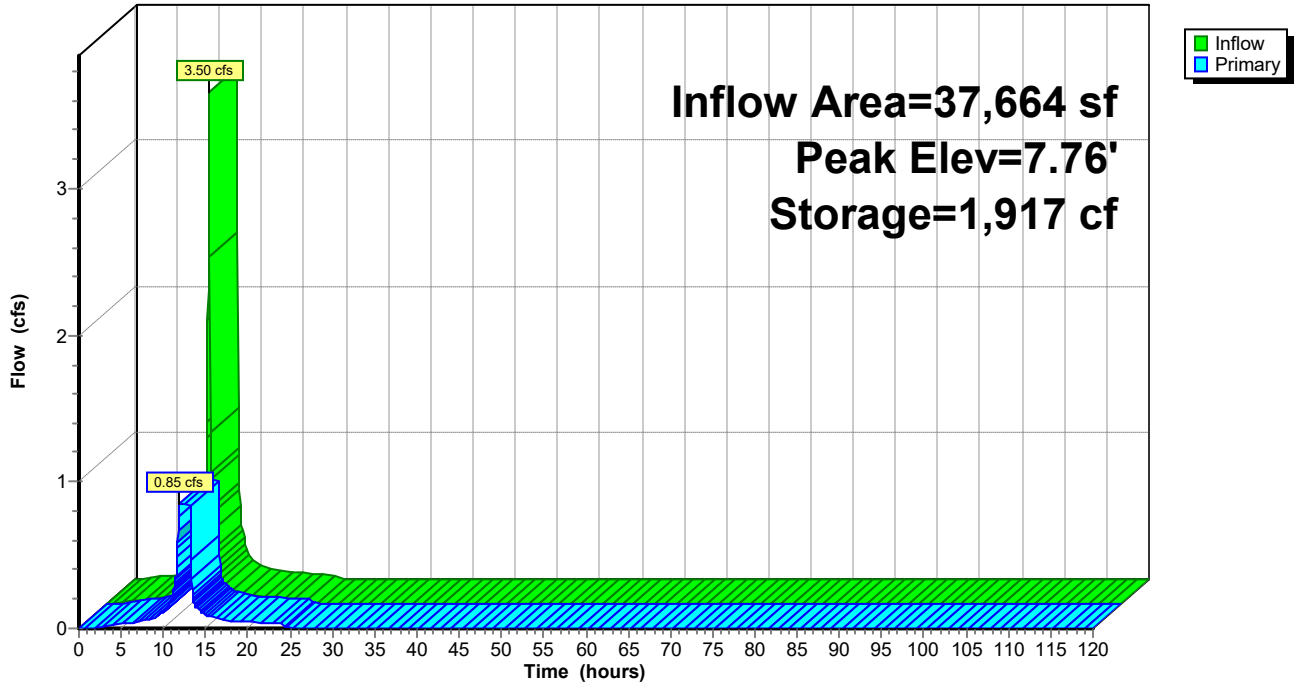
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=0.85 cfs @ 11.95 hrs HW=5.90' (Free Discharge)

- ↑ **1=Outlet** (Passes 0.85 cfs of 2.11 cfs potential flow)
- ↑ **2=Constant Flow 1 (2-yr)** (Constant Controls 0.85 cfs)
- ↑ **3=Constant Flow 2 (10yr)** (Constant Controls 0.00 cfs)
- ↑ **4=Constant Flow 3 (25-yr)** (Constant Controls 0.00 cfs)
- ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- ↑ **6=Orifice** (Controls 0.00 cfs)

Pond P1.curr: BMP-1

Hydrograph



Stage-Discharge for Pond P1.curr: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.curr: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR1: PR.PER Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=2.57"
Tc=5.5 min CN=74 Runoff=0.30 cfs 829 cf

Subcatchment PR2: PR.IMP.SITE Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=5.02"
Tc=3.8 min CN=98 Runoff=0.54 cfs 1,677 cf

Subcatchment PR3: PR.IMP.BLDG Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=5.02"
Tc=1.8 min CN=98 Runoff=5.42 cfs 15,765 cf

Reach 1R: POI-1 for PRDA-1 (current) Inflow=2.67 cfs 18,270 cf
Outflow=2.67 cfs 18,270 cf

Pond P1.curr: BMP-1 Peak Elev=9.17' Storage=2,971 cf Inflow=5.42 cfs 15,765 cf
Outflow=1.85 cfs 15,765 cf

Summary for Subcatchment PR1: PR.PER

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.30 cfs @ 12.13 hrs, Volume= 829 cf, Depth= 2.57"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

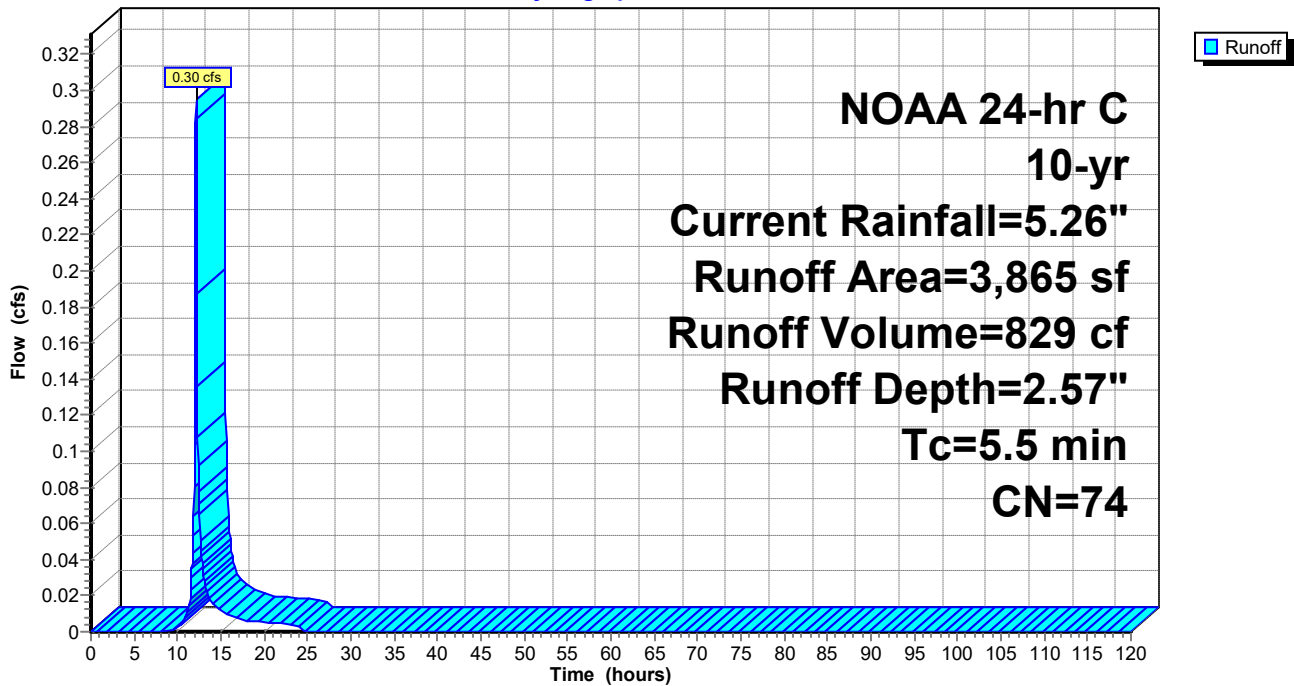
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Current Rainfall=5.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.5 | | | | | Direct Entry, |

Subcatchment PR1: PR.PER

Hydrograph



Summary for Subcatchment PR2: PR.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.54 cfs @ 12.10 hrs, Volume= 1,677 cf, Depth= 5.02"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

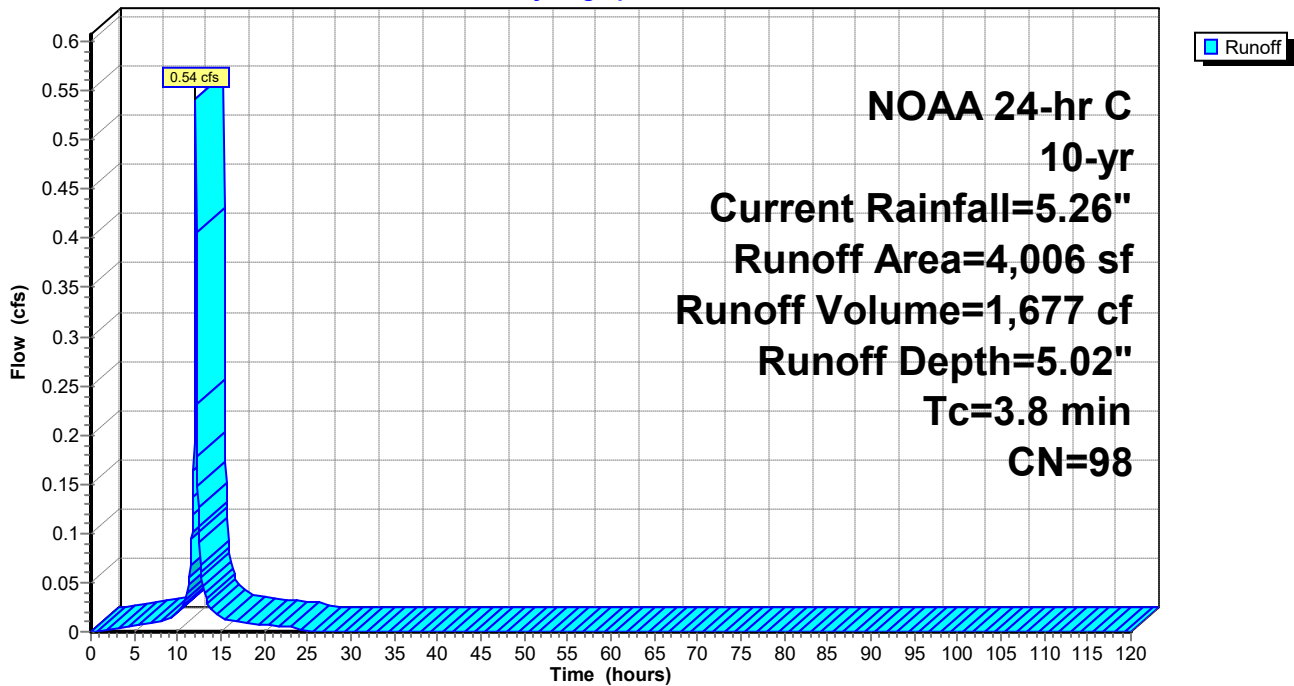
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Current Rainfall=5.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.8 | | | | | Direct Entry, |

Subcatchment PR2: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR3: PR.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.42 cfs @ 12.08 hrs, Volume= 15,765 cf, Depth= 5.02"
 Routed to Pond p1.curr : BMP-1

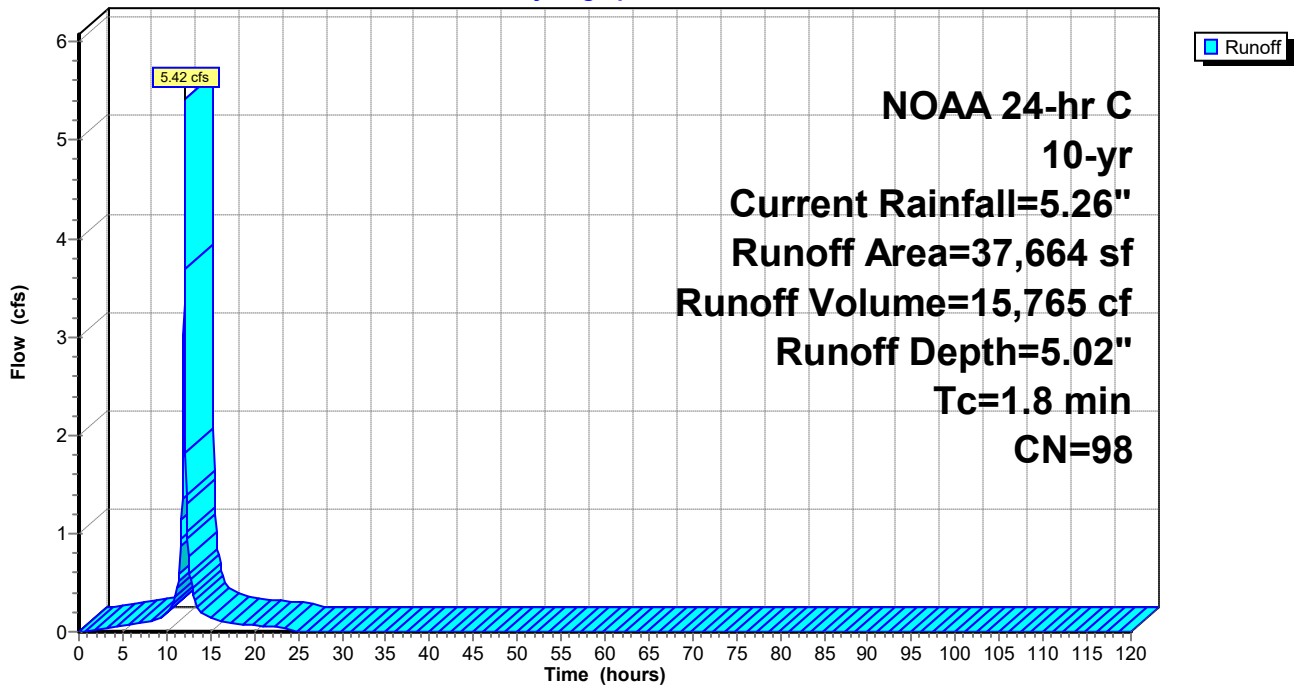
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Current Rainfall=5.26"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR3: PR.IMP.BLDG

Hydrograph



Summary for Reach 1R: POI-1 for PRDA-1 (current)

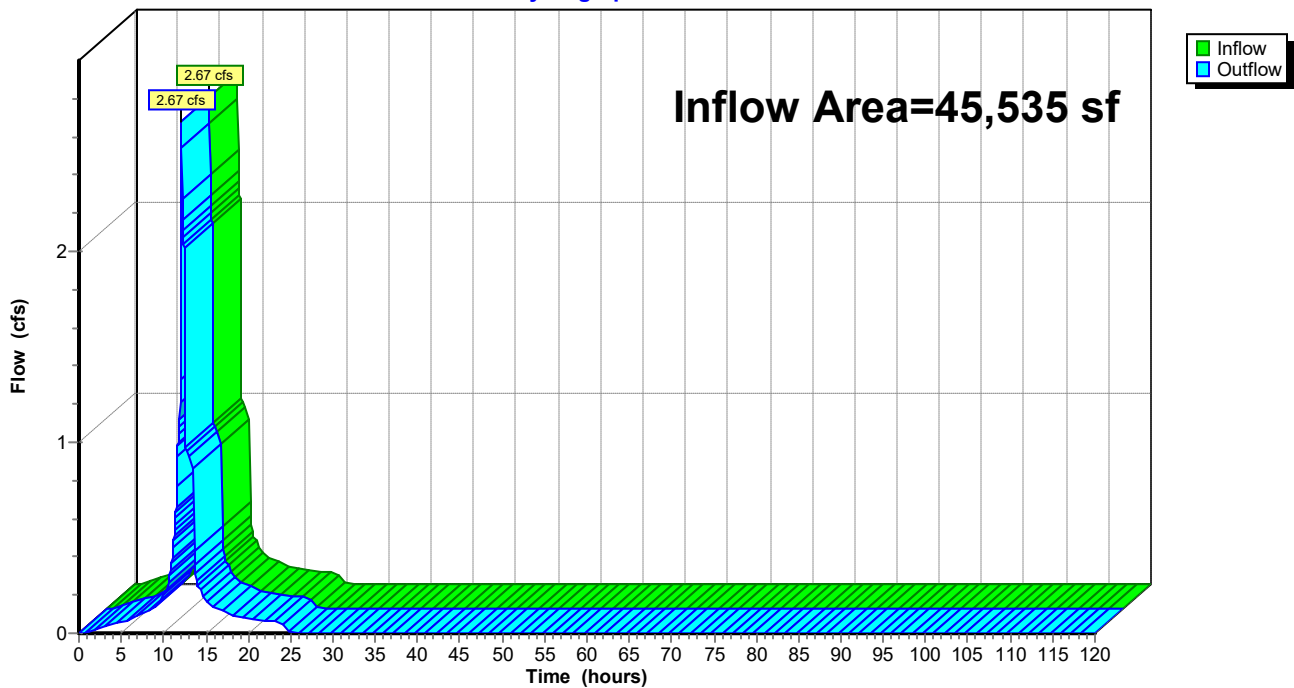
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 4.81" for 10-yr, Current event
Inflow = 2.67 cfs @ 12.10 hrs, Volume= 18,270 cf
Outflow = 2.67 cfs @ 12.10 hrs, Volume= 18,270 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 1R: POI-1 for PRDA-1 (current)

Hydrograph



Summary for Pond P1.curr: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 5.02" for 10-yr, Current event
 Inflow = 5.42 cfs @ 12.08 hrs, Volume= 15,765 cf
 Outflow = 1.85 cfs @ 12.05 hrs, Volume= 15,765 cf, Atten= 66%, Lag= 0.0 min
 Primary = 1.85 cfs @ 12.05 hrs, Volume= 15,765 cf
 Routed to Reach 1r : POI-1 for PRDA-1 (current)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 9.17' @ 12.20 hrs Surf.Area= 744 sf Storage= 2,971 cf

Plug-Flow detention time= 18.8 min calculated for 15,758 cf (100% of inflow)
 Center-of-Mass det. time= 18.8 min (762.9 - 744.1)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

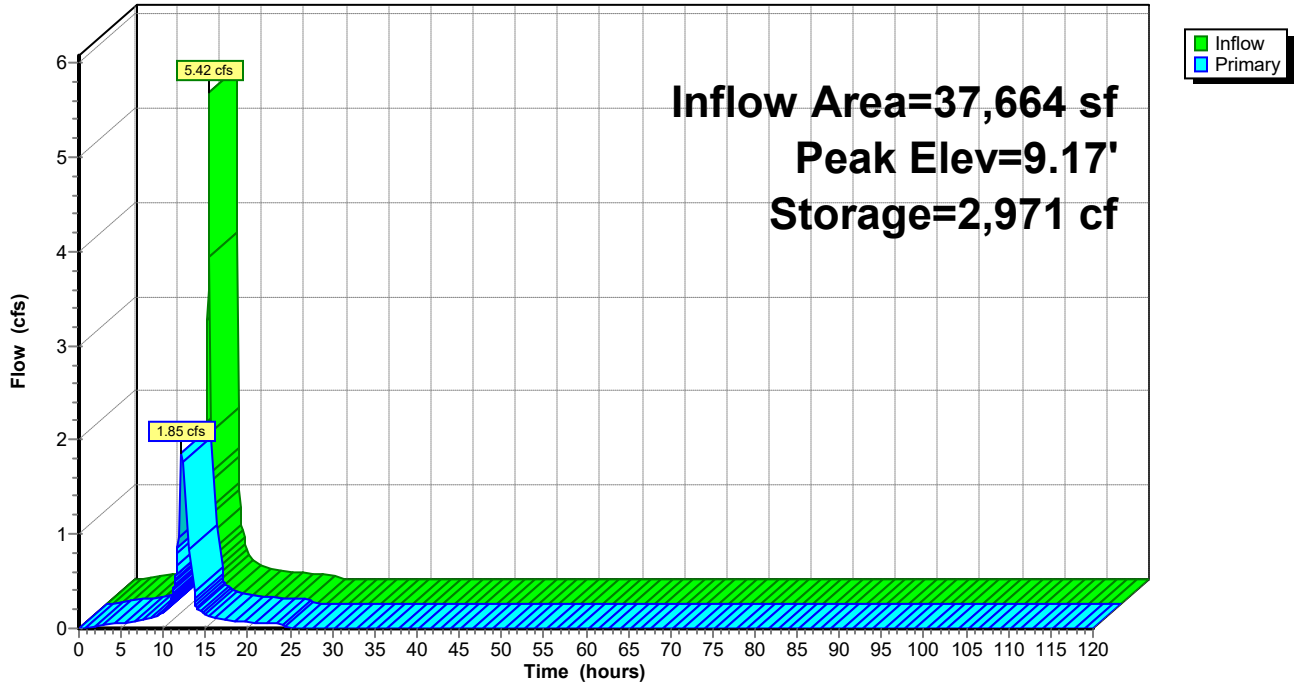
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=1.85 cfs @ 12.05 hrs HW=7.90' (Free Discharge)

- 1=Outlet (Passes 1.85 cfs of 8.56 cfs potential flow)
- 2=Constant Flow 1 (2-yr) (Constant Controls 0.85 cfs)
- 3=Constant Flow 2 (10yr) (Constant Controls 1.00 cfs)
- 4=Constant Flow 3 (25-yr) (Constant Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 6=Orifice (Controls 0.00 cfs)

Pond P1.curr: BMP-1

Hydrograph



Stage-Discharge for Pond P1.curr: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.curr: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

| | |
|---|---|
| Subcatchment PR1: PR.PER | Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=3.42" Tc=5.5 min CN=74 Runoff=0.39 cfs 1,102 cf |
| Subcatchment PR2: PR.IMP.SITE | Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=6.04" Tc=3.8 min CN=98 Runoff=0.65 cfs 2,017 cf |
| Subcatchment PR3: PR.IMP.BLDG | Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=6.04" Tc=1.8 min CN=98 Runoff=6.49 cfs 18,962 cf |
| Reach 1R: POI-1 for PRDA-1 (current) | Inflow=2.87 cfs 22,081 cf Outflow=2.87 cfs 22,081 cf |
| Pond P1.curr: BMP-1 | Peak Elev=10.47' Storage=3,937 cf Inflow=6.49 cfs 18,962 cf Outflow=1.85 cfs 18,962 cf |

Summary for Subcatchment PR1: PR.PER

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.39 cfs @ 12.13 hrs, Volume= 1,102 cf, Depth= 3.42"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

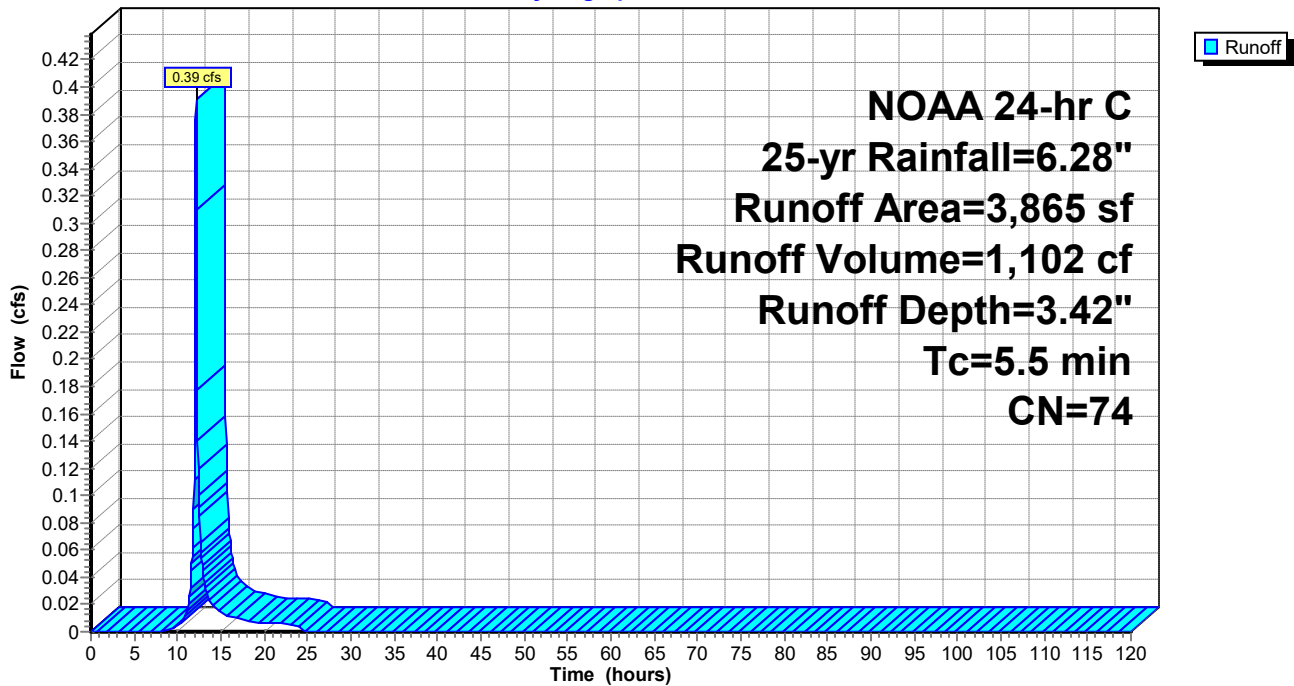
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.5 | | | | | Direct Entry, |

Subcatchment PR1: PR.PER

Hydrograph



Summary for Subcatchment PR2: PR.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 2,017 cf, Depth= 6.04"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

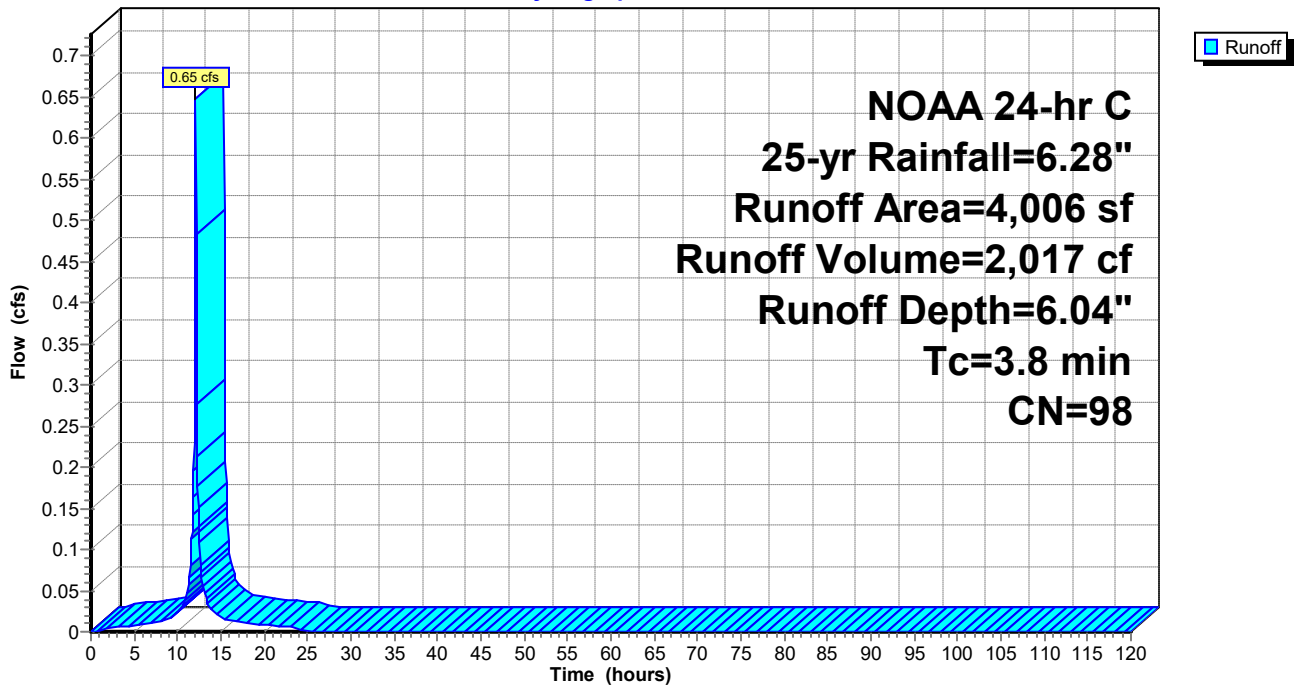
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.8 | | | | | Direct Entry, |

Subcatchment PR2: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR3: PR.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 6.49 cfs @ 12.08 hrs, Volume= 18,962 cf, Depth= 6.04"
 Routed to Pond p1.curr : BMP-1

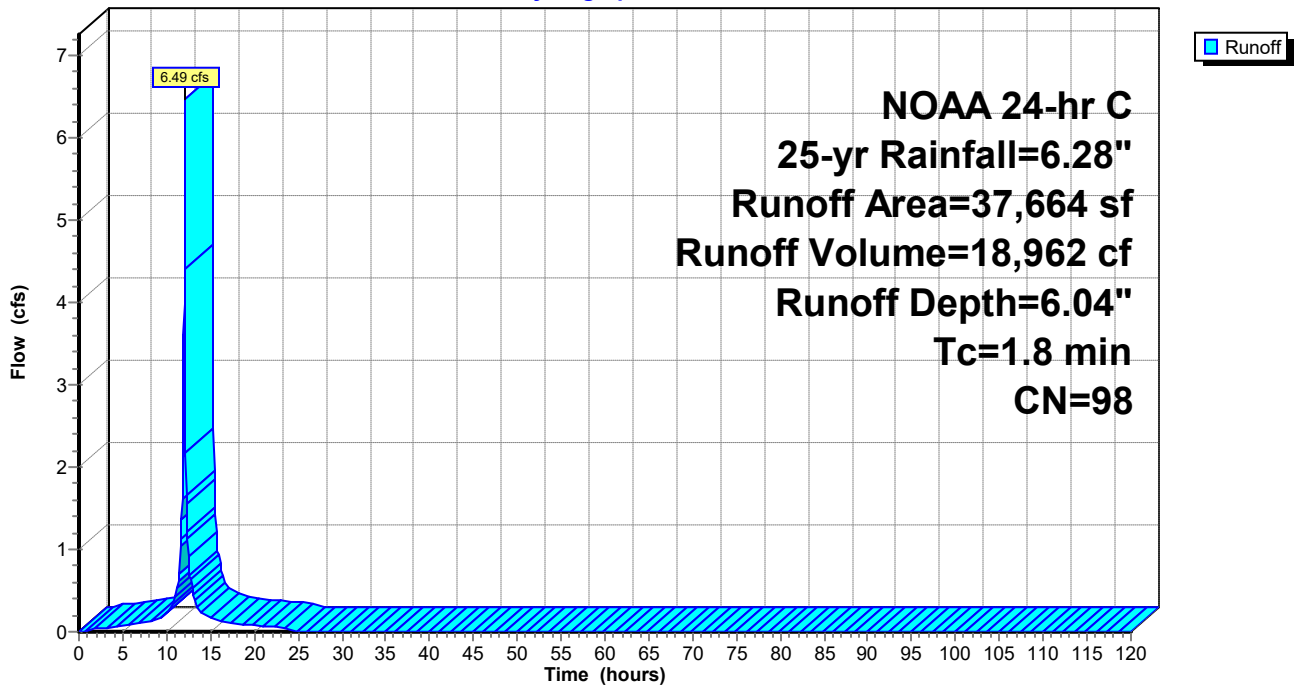
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR3: PR.IMP.BLDG

Hydrograph



Summary for Reach 1R: POI-1 for PRDA-1 (current)

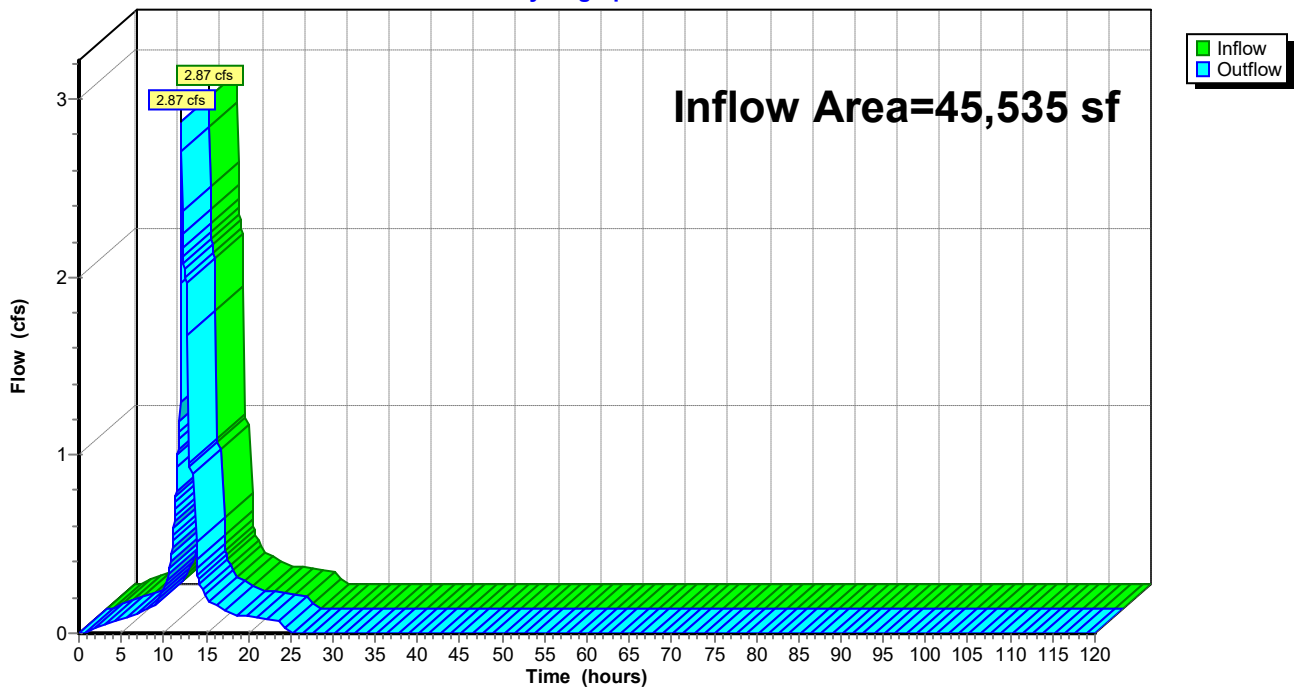
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 5.82" for 25-yr event
Inflow = 2.87 cfs @ 12.10 hrs, Volume= 22,081 cf
Outflow = 2.87 cfs @ 12.10 hrs, Volume= 22,081 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 1R: POI-1 for PRDA-1 (current)

Hydrograph



Summary for Pond P1.curr: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 6.04" for 25-yr event
 Inflow = 6.49 cfs @ 12.08 hrs, Volume= 18,962 cf
 Outflow = 1.85 cfs @ 12.05 hrs, Volume= 18,962 cf, Atten= 71%, Lag= 0.0 min
 Primary = 1.85 cfs @ 12.05 hrs, Volume= 18,962 cf
 Routed to Reach 1r : POI-1 for PRDA-1 (current)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.47' @ 12.24 hrs Surf.Area= 744 sf Storage= 3,937 cf

Plug-Flow detention time= 20.3 min calculated for 18,955 cf (100% of inflow)
 Center-of-Mass det. time= 20.3 min (761.6 - 741.3)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

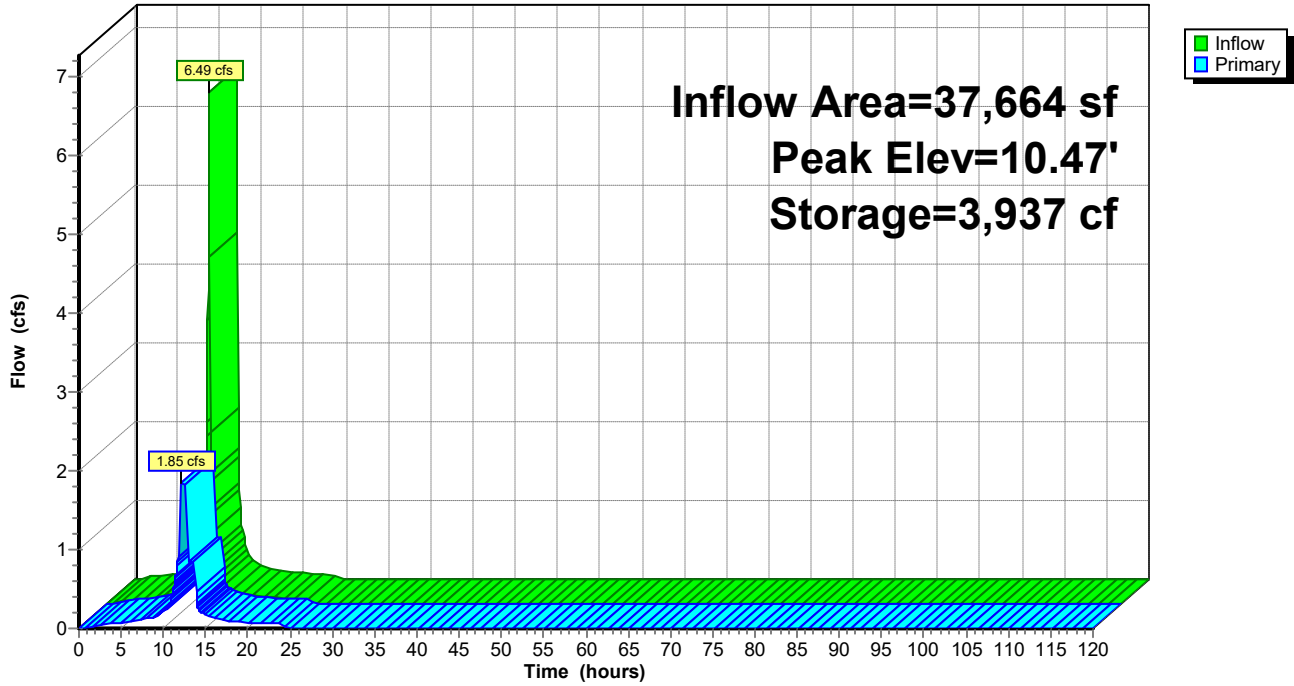
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=1.85 cfs @ 12.05 hrs HW=8.67' (Free Discharge)

- 1=Outlet (Passes 1.85 cfs of 10.00 cfs potential flow)
- 2=Constant Flow 1 (2-yr) (Constant Controls 0.85 cfs)
- 3=Constant Flow 2 (10yr) (Constant Controls 1.00 cfs)
- 4=Constant Flow 3 (25-yr) (Constant Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 6=Orifice (Controls 0.00 cfs)

Pond P1.curr: BMP-1

Hydrograph



Stage-Discharge for Pond P1.curr: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.curr: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR1: PR.PER Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=5.78"
Tc=5.5 min CN=74 Runoff=0.65 cfs 1,863 cf

Subcatchment PR2: PR.IMP.SITE Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=8.71"
Tc=3.8 min CN=98 Runoff=0.93 cfs 2,908 cf

Subcatchment PR3: PR.IMP.BLDG Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=8.71"
Tc=1.8 min CN=98 Runoff=9.26 cfs 27,337 cf

Reach 1R: POI-1 for PRDA-1 (current) Inflow=5.81 cfs 32,107 cf
Outflow=5.81 cfs 32,107 cf

Pond P1.curr: BMP-1 Peak Elev=12.37' Storage=5,351 cf Inflow=9.26 cfs 27,337 cf
Outflow=4.10 cfs 27,337 cf

Summary for Subcatchment PR1: PR.PER

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.65 cfs @ 12.12 hrs, Volume= 1,863 cf, Depth= 5.78"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

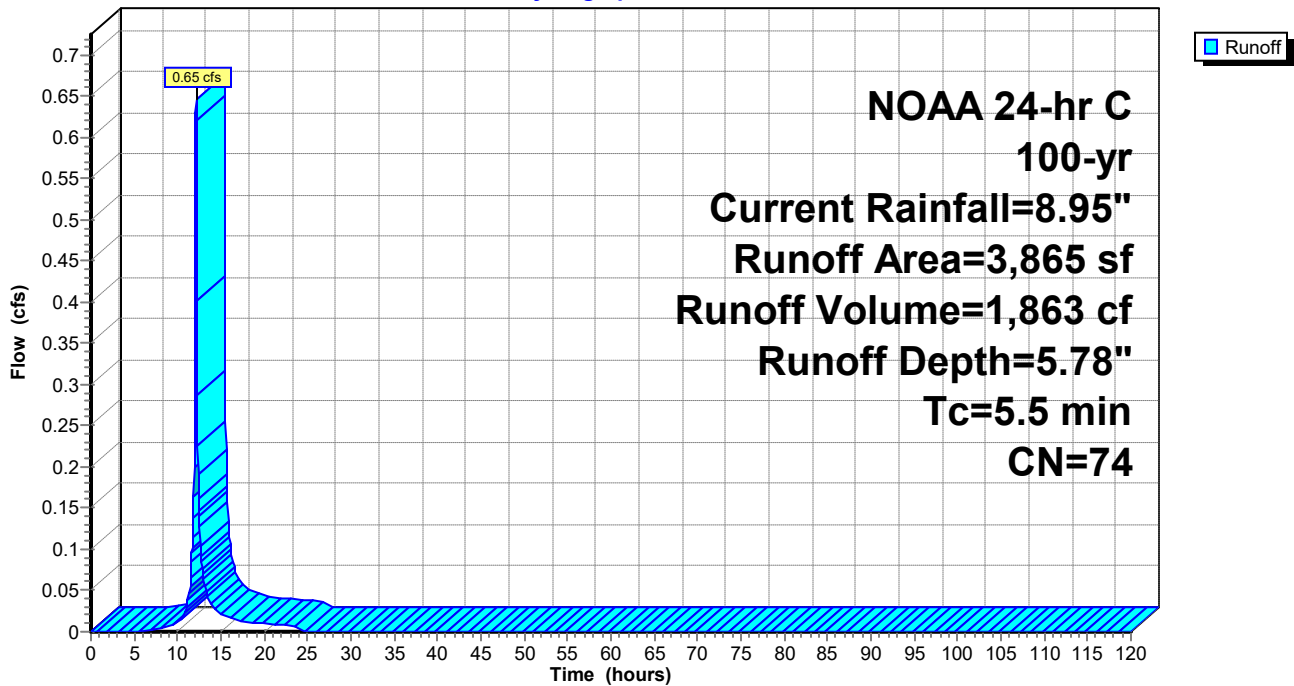
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Current Rainfall=8.95"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.5 | | | | | Direct Entry, |

Subcatchment PR1: PR.PER

Hydrograph



Summary for Subcatchment PR2: PR.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.93 cfs @ 12.10 hrs, Volume= 2,908 cf, Depth= 8.71"
 Routed to Reach 1R : POI-1 for PRDA-1 (current)

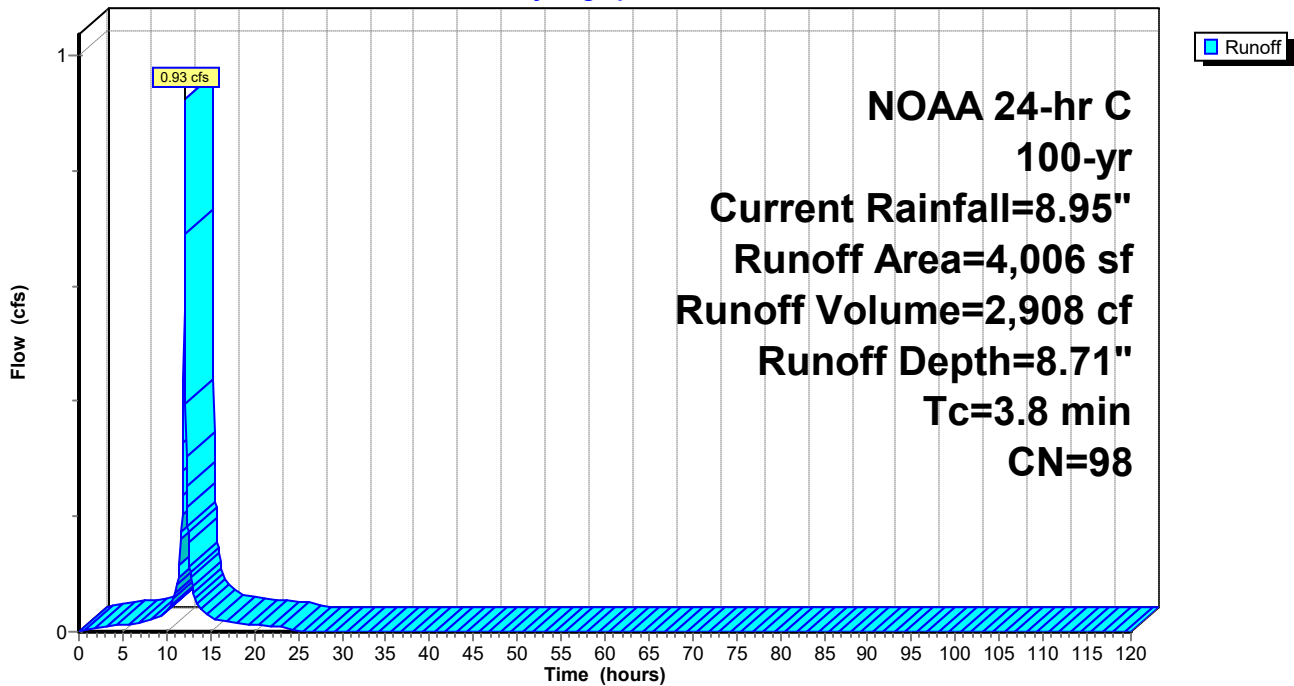
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Current Rainfall=8.95"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.8 | | | | | Direct Entry, |

Subcatchment PR2: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR3: PR.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 9.26 cfs @ 12.08 hrs, Volume= 27,337 cf, Depth= 8.71"
 Routed to Pond p1.curr : BMP-1

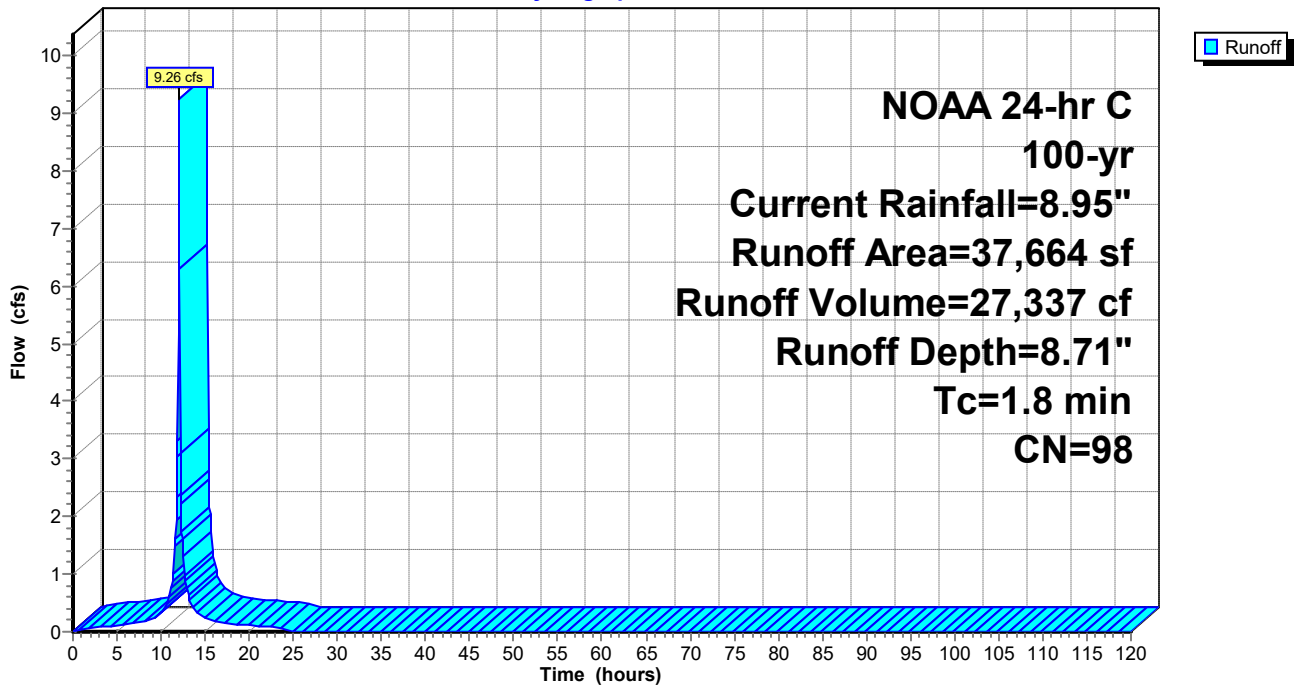
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Current Rainfall=8.95"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR3: PR.IMP.BLDG

Hydrograph



Summary for Reach 1R: POI-1 for PRDA-1 (current)

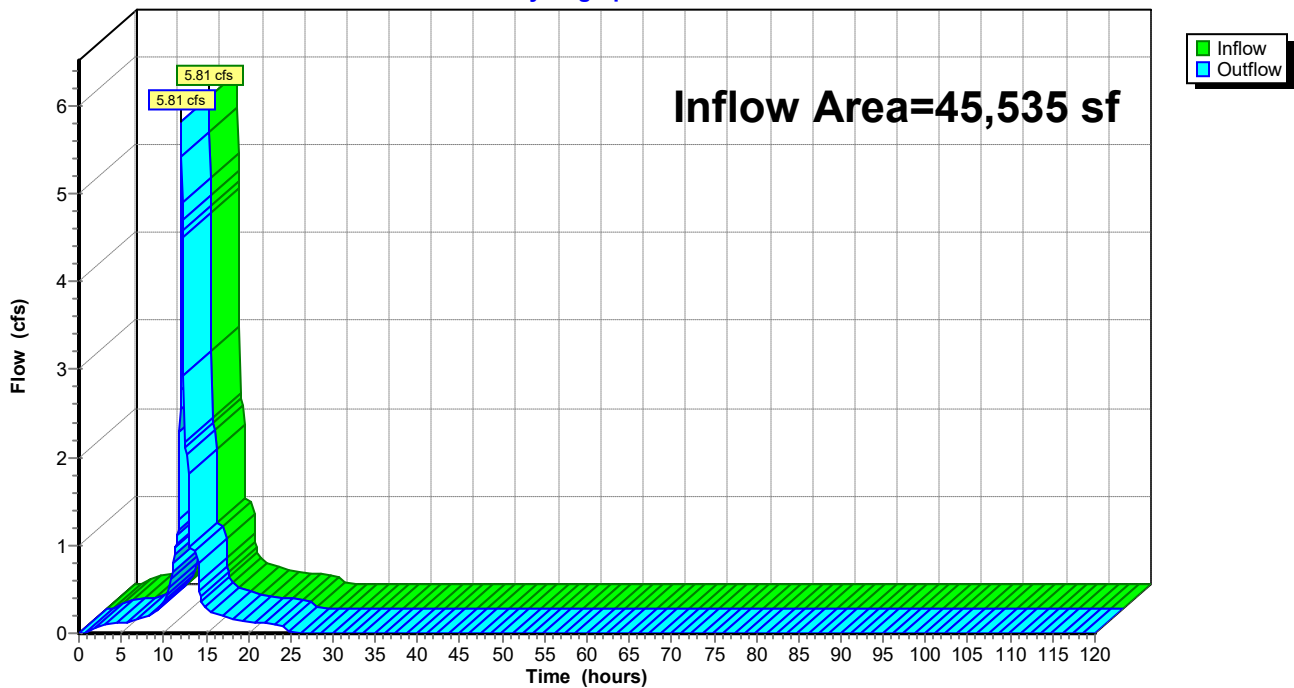
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 8.46" for 100-yr, Current event
Inflow = 5.81 cfs @ 12.12 hrs, Volume= 32,107 cf
Outflow = 5.81 cfs @ 12.12 hrs, Volume= 32,107 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 1R: POI-1 for PRDA-1 (current)

Hydrograph



Summary for Pond P1.curr: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 8.71" for 100-yr, Current event
 Inflow = 9.26 cfs @ 12.08 hrs, Volume= 27,337 cf
 Outflow = 4.10 cfs @ 12.10 hrs, Volume= 27,337 cf, Atten= 56%, Lag= 1.5 min
 Primary = 4.10 cfs @ 12.10 hrs, Volume= 27,337 cf
 Routed to Reach 1r : POI-1 for PRDA-1 (current)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 12.37' @ 12.16 hrs Surf.Area= 744 sf Storage= 5,351 cf

Plug-Flow detention time= 18.6 min calculated for 27,325 cf (100% of inflow)
 Center-of-Mass det. time= 18.6 min (755.1 - 736.5)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

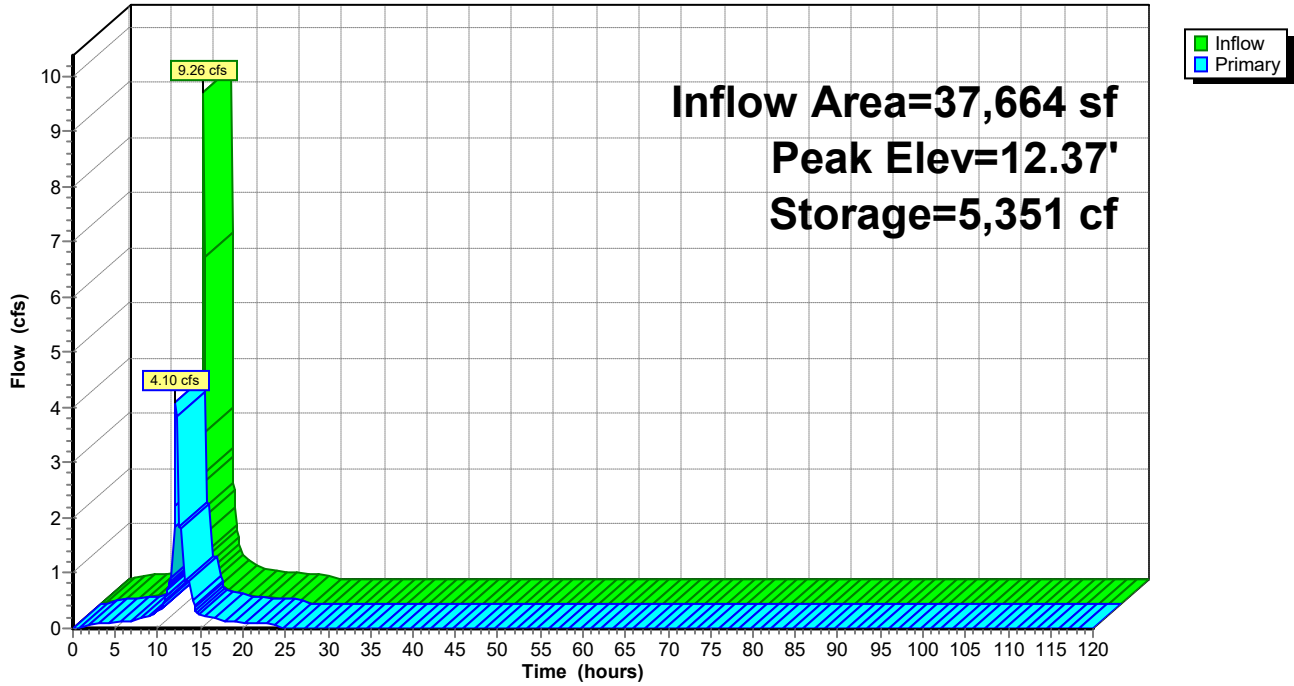
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=4.10 cfs @ 12.10 hrs HW=11.82' (Free Discharge)

- 1=Outlet (Passes 4.10 cfs of 14.49 cfs potential flow)
- 2=Constant Flow 1 (2-yr) (Constant Controls 0.85 cfs)
- 3=Constant Flow 2 (10yr) (Constant Controls 1.00 cfs)
- 4=Constant Flow 3 (25-yr) (Constant Controls 2.25 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 6=Orifice (Controls 0.00 cfs)

Pond P1.curr: BMP-1

Hydrograph



Stage-Discharge for Pond P1.curr: BMP-1

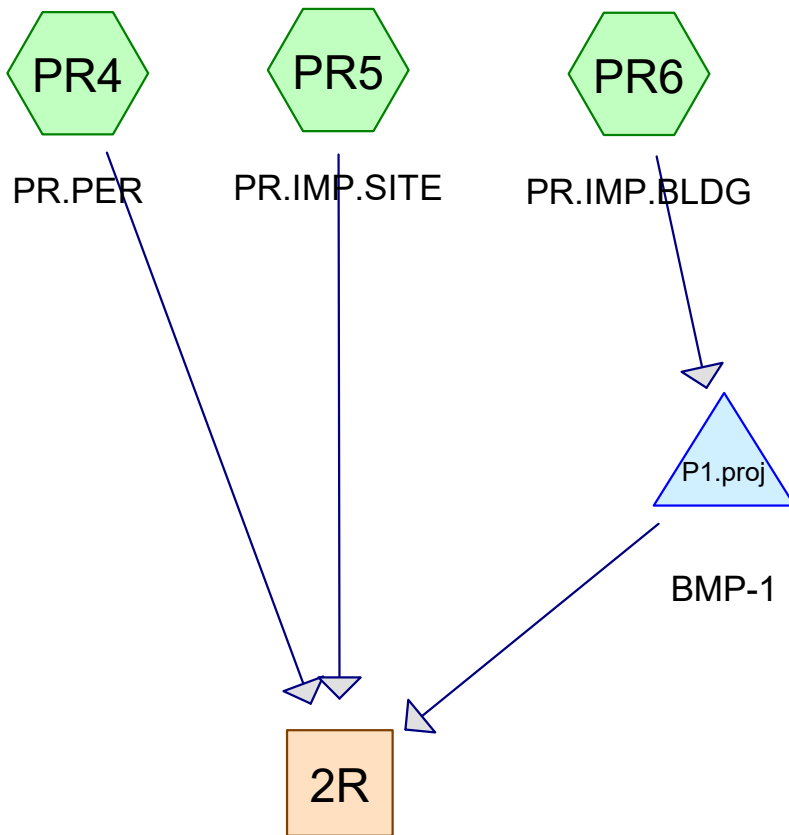
| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.curr: BMP-1

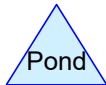
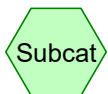
| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

PROPOSED

Projected Rainfall



NOTE: "P1.curr" and "P1.proj" are have identical design (storage, outlets). The ponds are duplicated for ease of analysis between current and projected rainfall.



Area Listing (selected nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|----|---------------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C (PR4) |
| 4,006 | 98 | Paved parking, HSG D (PR5) |
| 37,664 | 98 | Roofs, HSG D (PR6) |

2024-03-18 - Stormwater Analysis Concept - Co NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

Prepared by Langan Engineering

Printed 3/19/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR4: PR.PER Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=1.53"
Tc=5.2 min CN=74 Runoff=0.17 cfs 493 cf

Subcatchment PR5: PR.IMP.SITE Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=3.68"
Tc=3.7 min CN=98 Runoff=0.40 cfs 1,227 cf

Subcatchment PR6: PR.IMP.BLDG Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=3.68"
Tc=1.8 min CN=98 Runoff=4.02 cfs 11,536 cf

Reach 2R: POI-1 for PRDA-1 (projected) Inflow=2.37 cfs 13,256 cf
Outflow=2.37 cfs 13,256 cf

Pond P1.proj: BMP-1 Peak Elev=8.03' Storage=2,123 cf Inflow=4.02 cfs 11,536 cf
Outflow=1.98 cfs 11,536 cf

Summary for Subcatchment PR4: PR.PER

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.17 cfs @ 12.12 hrs, Volume= 493 cf, Depth= 1.53"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

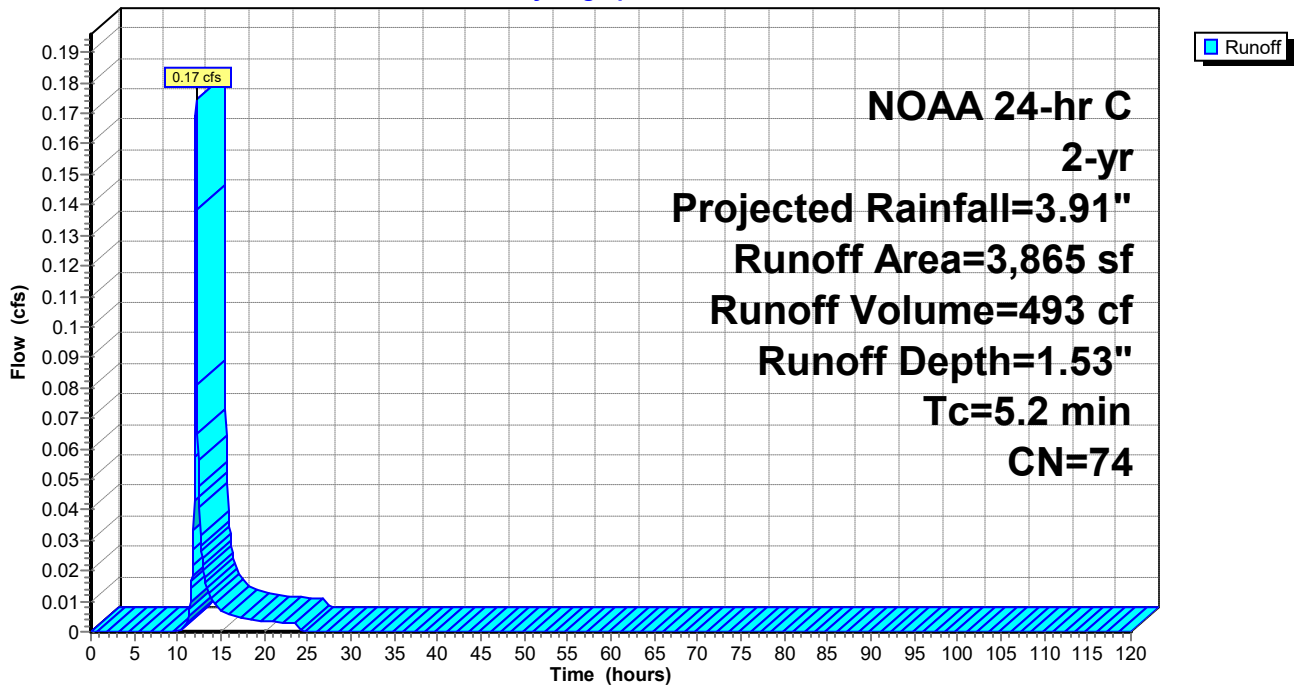
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.2 | | | | | Direct Entry, |

Subcatchment PR4: PR.PER

Hydrograph



Summary for Subcatchment PR5: PR.IMP.SITE

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.40 cfs @ 12.10 hrs, Volume= 1,227 cf, Depth= 3.68"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

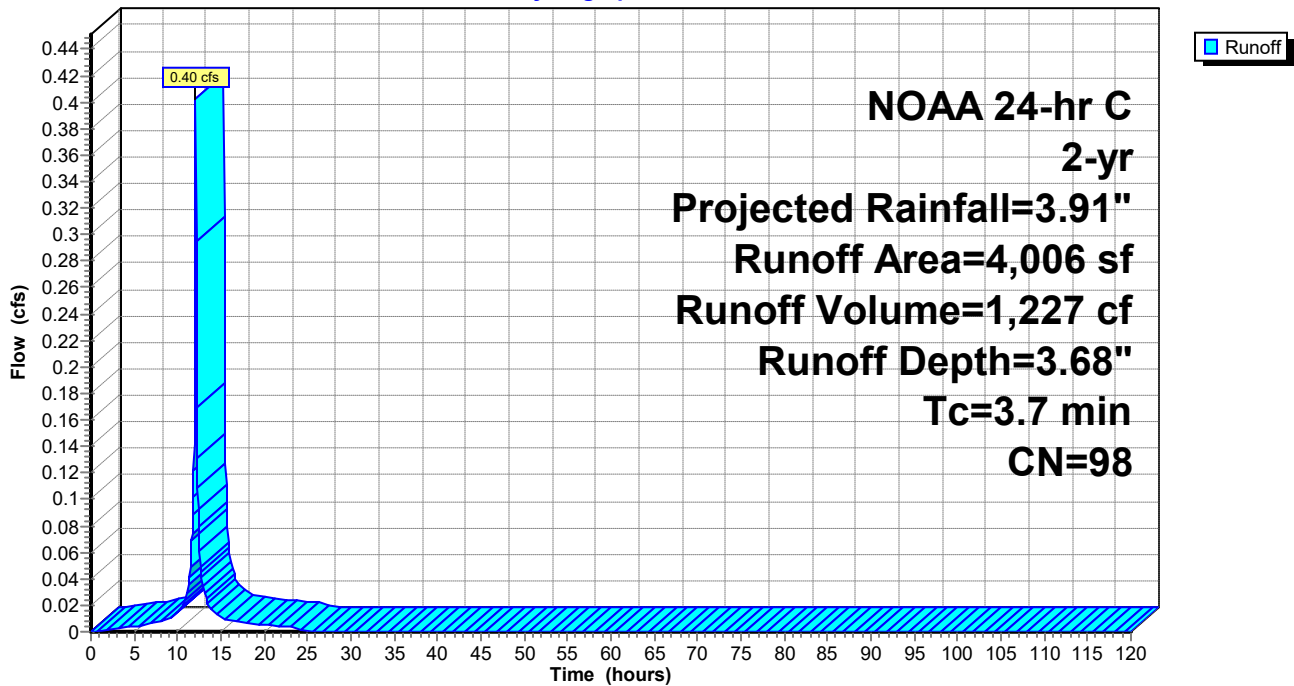
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.7 | | | | | Direct Entry, |

Subcatchment PR5: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR6: PR.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.02 cfs @ 12.08 hrs, Volume= 11,536 cf, Depth= 3.68"
 Routed to Pond P1.proj : BMP-1

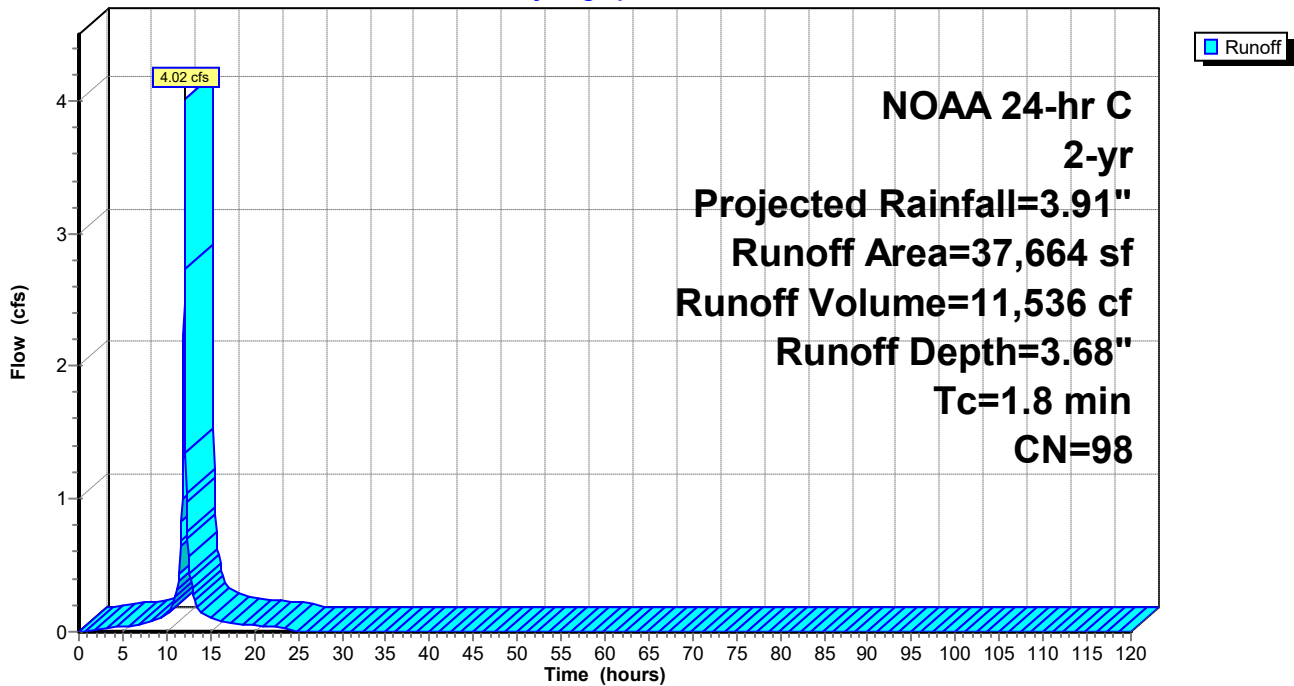
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, $dt= 0.05$ hrs
 NOAA 24-hr C 2-yr, Projected Rainfall=3.91"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|-------------|------------------|------------------|----------------------|-------------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR6: PR.IMP.BLDG

Hydrograph



Summary for Reach 2R: POI-1 for PRDA-1 (projected)

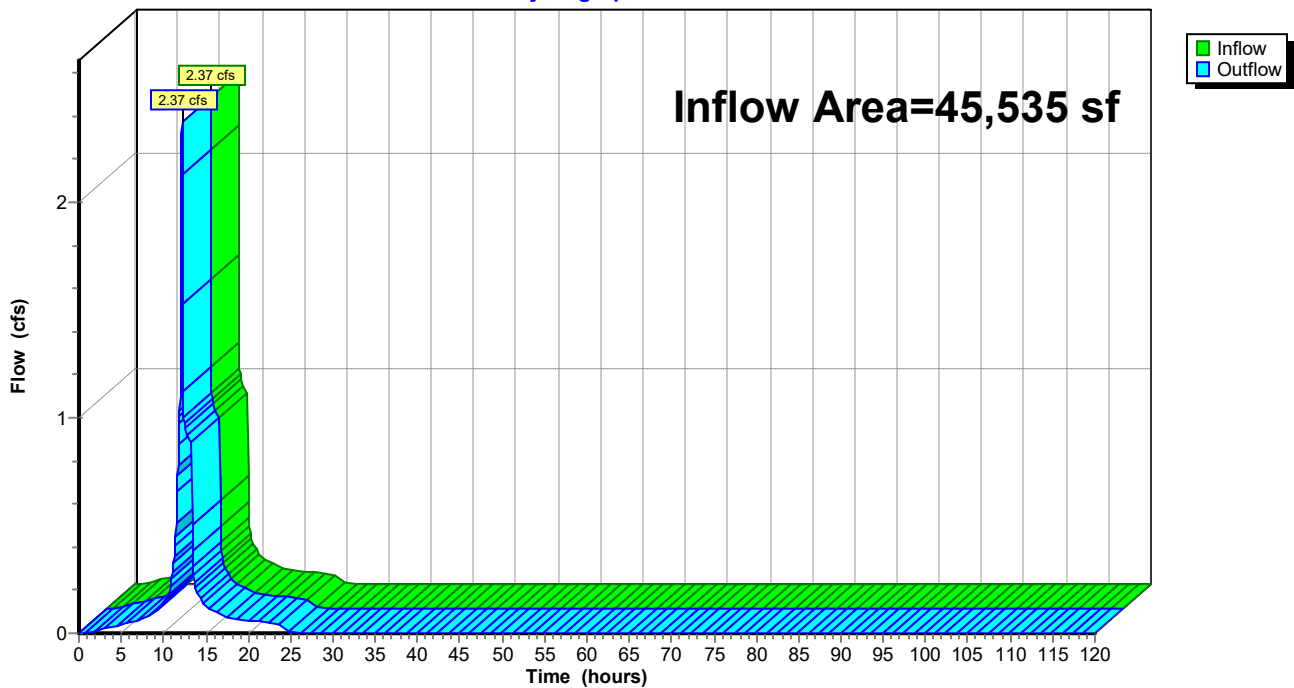
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 3.49" for 2-yr, Projected event
Inflow = 2.37 cfs @ 12.17 hrs, Volume= 13,256 cf
Outflow = 2.37 cfs @ 12.17 hrs, Volume= 13,256 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1 for PRDA-1 (projected)

Hydrograph



Summary for Pond P1.proj: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 3.68" for 2-yr, Projected event
 Inflow = 4.02 cfs @ 12.08 hrs, Volume= 11,536 cf
 Outflow = 1.98 cfs @ 12.18 hrs, Volume= 11,536 cf, Atten= 51%, Lag= 6.0 min
 Primary = 1.98 cfs @ 12.18 hrs, Volume= 11,536 cf
 Routed to Reach 2r : POI-1 for PRDA-1 (projected)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 8.03' @ 12.17 hrs Surf.Area= 744 sf Storage= 2,123 cf

Plug-Flow detention time= 19.4 min calculated for 11,531 cf (100% of inflow)
 Center-of-Mass det. time= 19.5 min (769.0 - 749.5)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

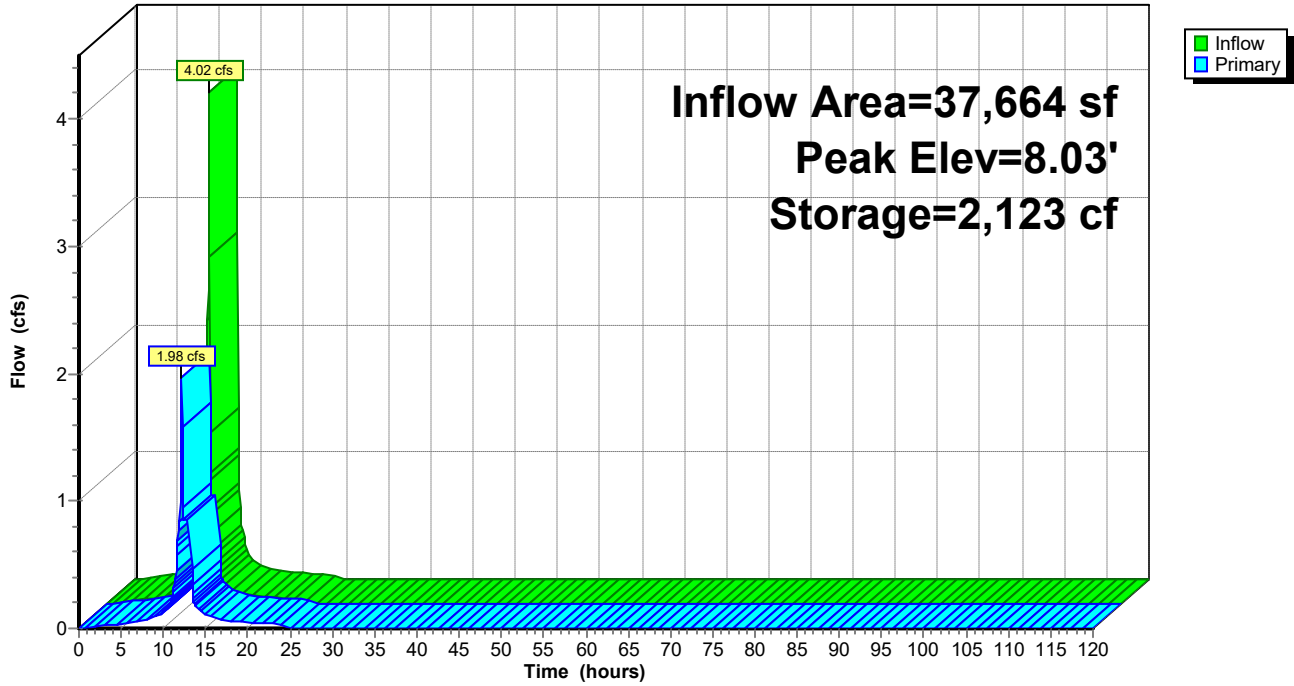
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=1.85 cfs @ 12.18 hrs HW=7.97' (Free Discharge)

- ↑ **1=Outlet** (Passes 1.85 cfs of 8.70 cfs potential flow)
- ↑ **2=Constant Flow 1 (2-yr)** (Constant Controls 0.85 cfs)
- ↑ **3=Constant Flow 2 (10yr)** (Constant Controls 1.00 cfs)
- ↑ **4=Constant Flow 3 (25-yr)** (Constant Controls 0.00 cfs)
- ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- ↑ **6=Orifice** (Controls 0.00 cfs)

Pond P1.proj: BMP-1

Hydrograph



Stage-Discharge for Pond P1.proj: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.proj: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

2024-03-18 - Stormwater Analysis Concept - C NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

Prepared by Langan Engineering

Printed 3/19/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

| | |
|---|---|
| Subcatchment PR4: PR.PER | Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=3.33" Tc=5.2 min CN=74 Runoff=0.38 cfs 1,072 cf |
| Subcatchment PR5: PR.IMP.SITE | Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=5.93" Tc=3.7 min CN=98 Runoff=0.64 cfs 1,980 cf |
| Subcatchment PR6: PR.IMP.BLDG | Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=5.93" Tc=1.8 min CN=98 Runoff=6.37 cfs 18,618 cf |
| Reach 2R: POI-1 for PRDA-1 (projected) | Inflow=2.86 cfs 21,670 cf Outflow=2.86 cfs 21,670 cf |
| Pond P1.proj: BMP-1 | Peak Elev=10.40' Storage=3,886 cf Inflow=6.37 cfs 18,618 cf Outflow=1.85 cfs 18,618 cf |

Summary for Subcatchment PR4: PR.PER

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 1,072 cf, Depth= 3.33"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

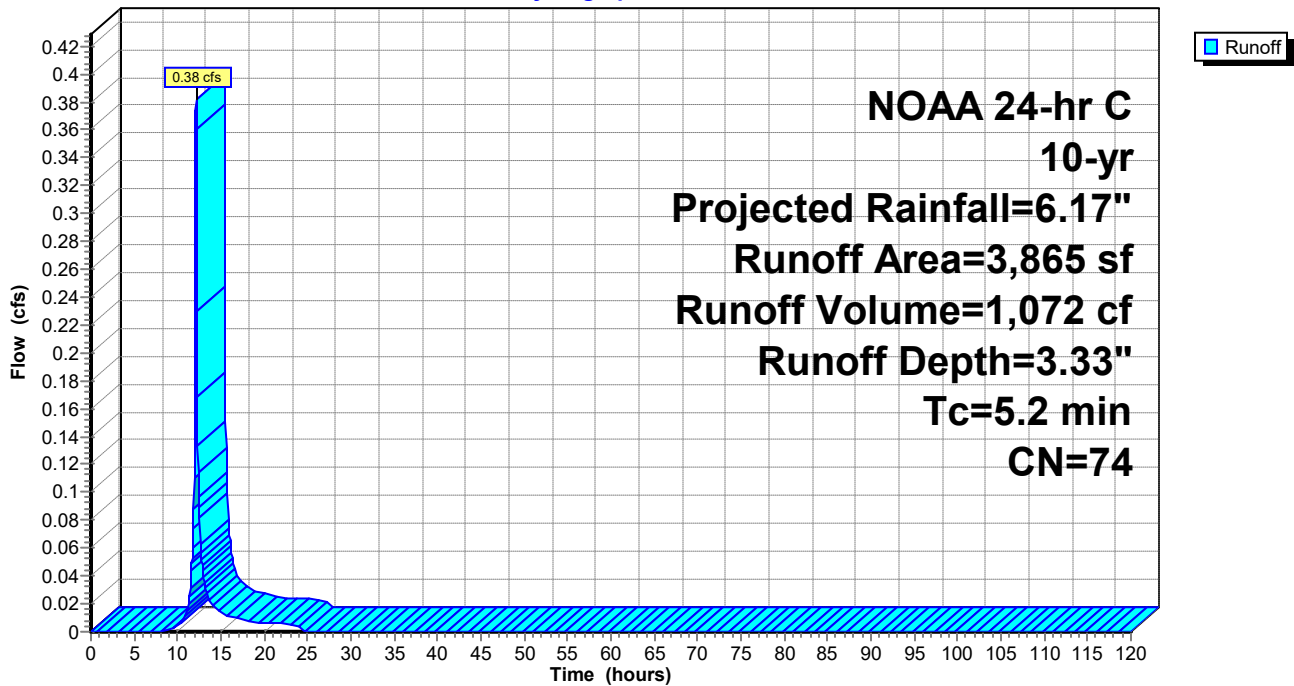
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.2 | | | | | Direct Entry, |

Subcatchment PR4: PR.PER

Hydrograph



Summary for Subcatchment PR5: PR.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 1,980 cf, Depth= 5.93"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

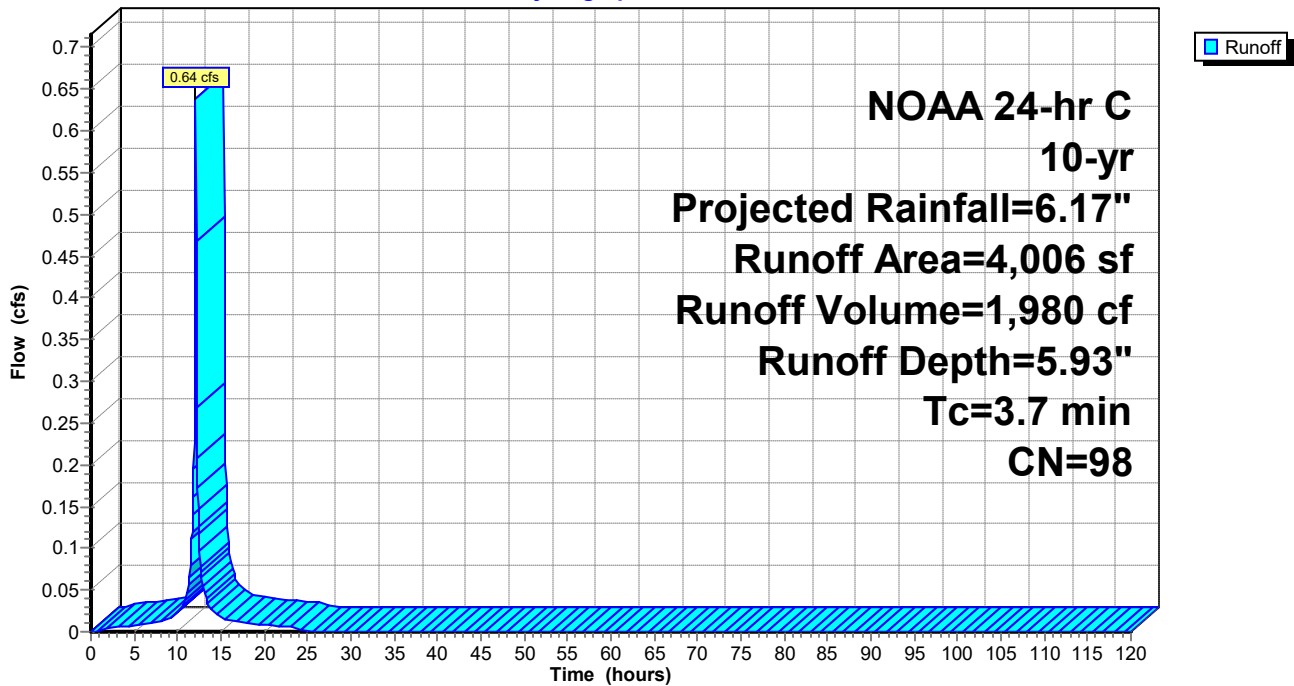
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.7 | | | | | Direct Entry, |

Subcatchment PR5: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR6: PR.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 6.37 cfs @ 12.08 hrs, Volume= 18,618 cf, Depth= 5.93"
 Routed to Pond P1.proj : BMP-1

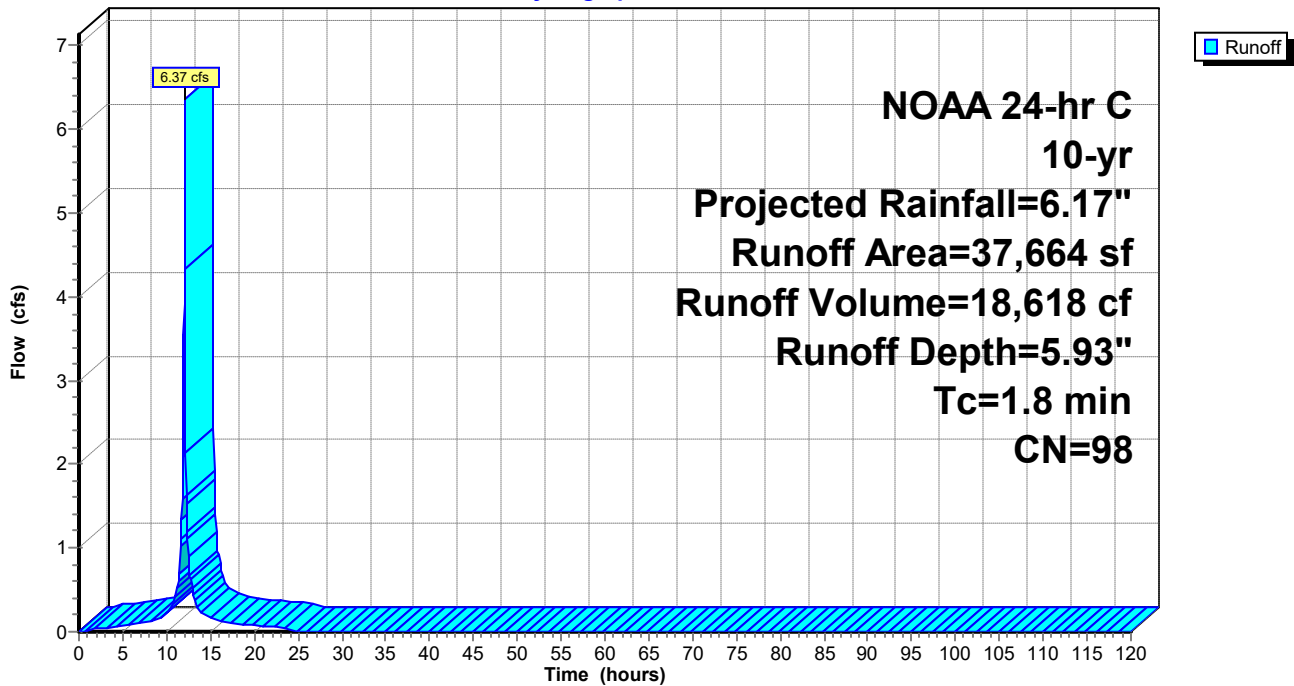
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 10-yr, Projected Rainfall=6.17"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR6: PR.IMP.BLDG

Hydrograph



Summary for Reach 2R: POI-1 for PRDA-1 (projected)

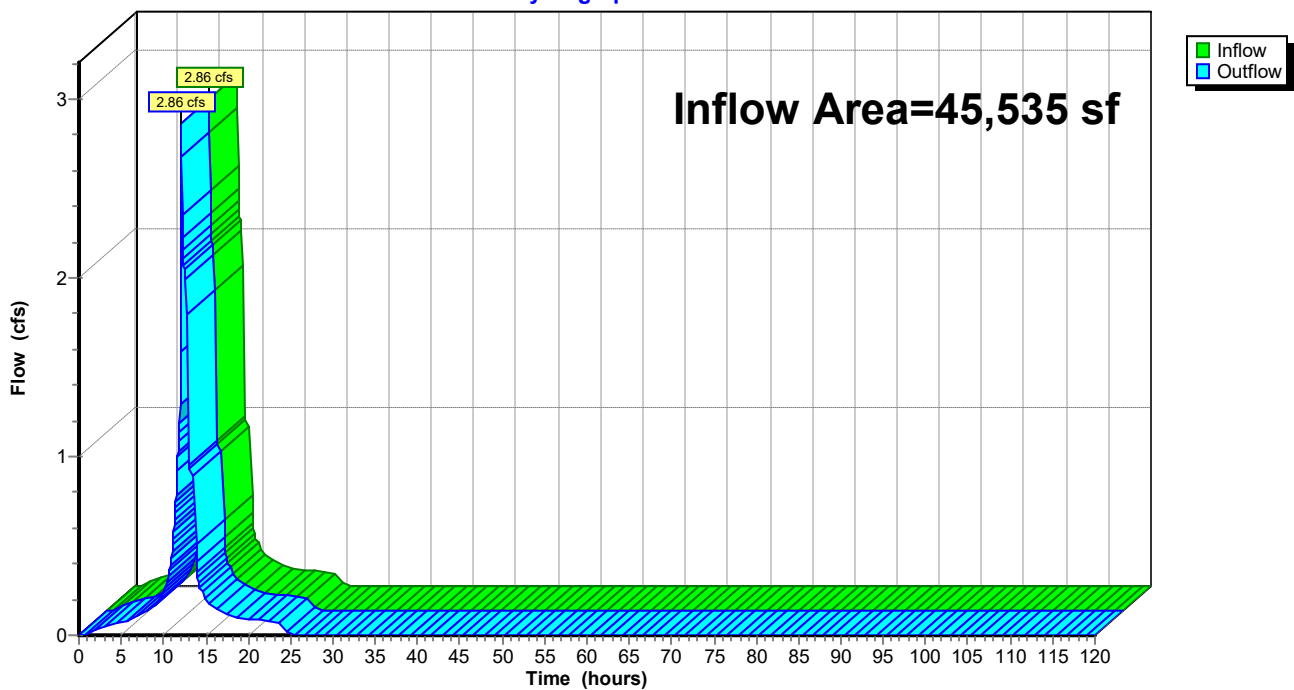
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 5.71" for 10-yr, Projected event
Inflow = 2.86 cfs @ 12.10 hrs, Volume= 21,670 cf
Outflow = 2.86 cfs @ 12.10 hrs, Volume= 21,670 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1 for PRDA-1 (projected)

Hydrograph



Summary for Pond P1.proj: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 5.93" for 10-yr, Projected event
 Inflow = 6.37 cfs @ 12.08 hrs, Volume= 18,618 cf
 Outflow = 1.85 cfs @ 12.05 hrs, Volume= 18,618 cf, Atten= 71%, Lag= 0.0 min
 Primary = 1.85 cfs @ 12.05 hrs, Volume= 18,618 cf
 Routed to Reach 2r : POI-1 for PRDA-1 (projected)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.40' @ 12.23 hrs Surf.Area= 744 sf Storage= 3,886 cf

Plug-Flow detention time= 20.4 min calculated for 18,610 cf (100% of inflow)
 Center-of-Mass det. time= 20.4 min (762.0 - 741.5)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

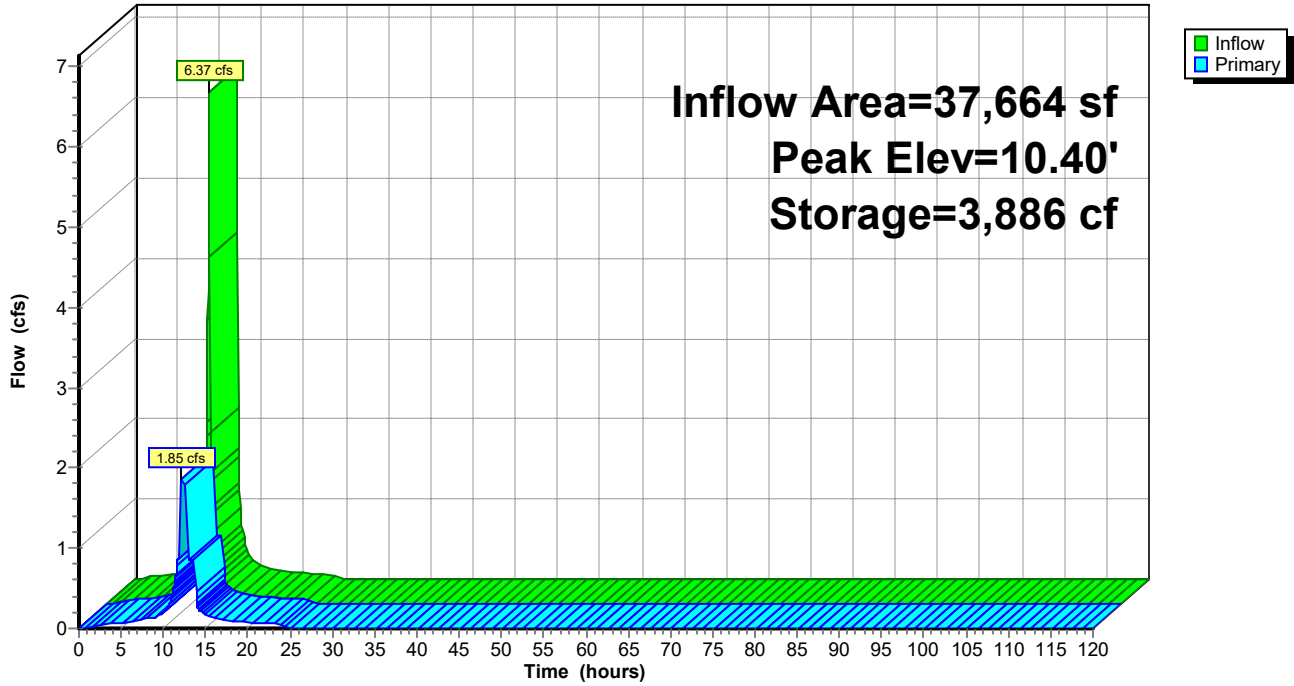
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=1.85 cfs @ 12.05 hrs HW=8.66' (Free Discharge)

- ↑ **1=Outlet** (Passes 1.85 cfs of 9.98 cfs potential flow)
- ↑ **2=Constant Flow 1 (2-yr)** (Constant Controls 0.85 cfs)
- ↑ **3=Constant Flow 2 (10yr)** (Constant Controls 1.00 cfs)
- ↑ **4=Constant Flow 3 (25-yr)** (Constant Controls 0.00 cfs)
- ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
- ↑ **6=Orifice** (Controls 0.00 cfs)

Pond P1.proj: BMP-1

Hydrograph



Stage-Discharge for Pond P1.proj: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.proj: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

2024-03-18 - Stormwater Analysis Concept - Cooper To NOAA 24-hr C 25-yr Rainfall=6.28"

Prepared by Langan Engineering

Printed 3/19/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR4: PR.PER Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=3.42"
Tc=5.2 min CN=74 Runoff=0.39 cfs 1,102 cf

Subcatchment PR5: PR.IMP.SITE Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=6.04"
Tc=3.7 min CN=98 Runoff=0.65 cfs 2,017 cf

Subcatchment PR6: PR.IMP.BLDG Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=6.04"
Tc=1.8 min CN=98 Runoff=6.49 cfs 18,962 cf

Reach 2R: POI-1 for PRDA-1 (projected) Inflow=2.88 cfs 22,081 cf
Outflow=2.88 cfs 22,081 cf

Pond P1.proj: BMP-1 Peak Elev=10.47' Storage=3,937 cf Inflow=6.49 cfs 18,962 cf
Outflow=1.85 cfs 18,962 cf

Summary for Subcatchment PR4: PR.PER

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.39 cfs @ 12.12 hrs, Volume= 1,102 cf, Depth= 3.42"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

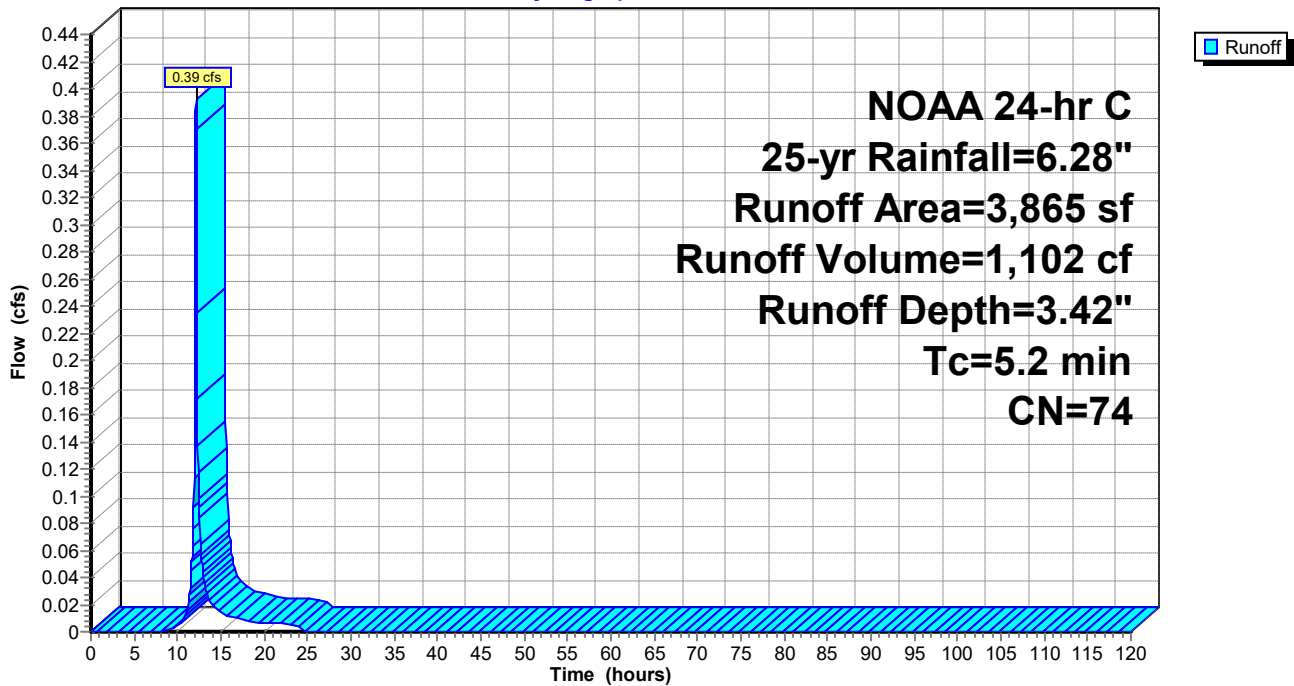
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.2 | | | | | Direct Entry, |

Subcatchment PR4: PR.PER

Hydrograph



Summary for Subcatchment PR5: PR.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 2,017 cf, Depth= 6.04"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

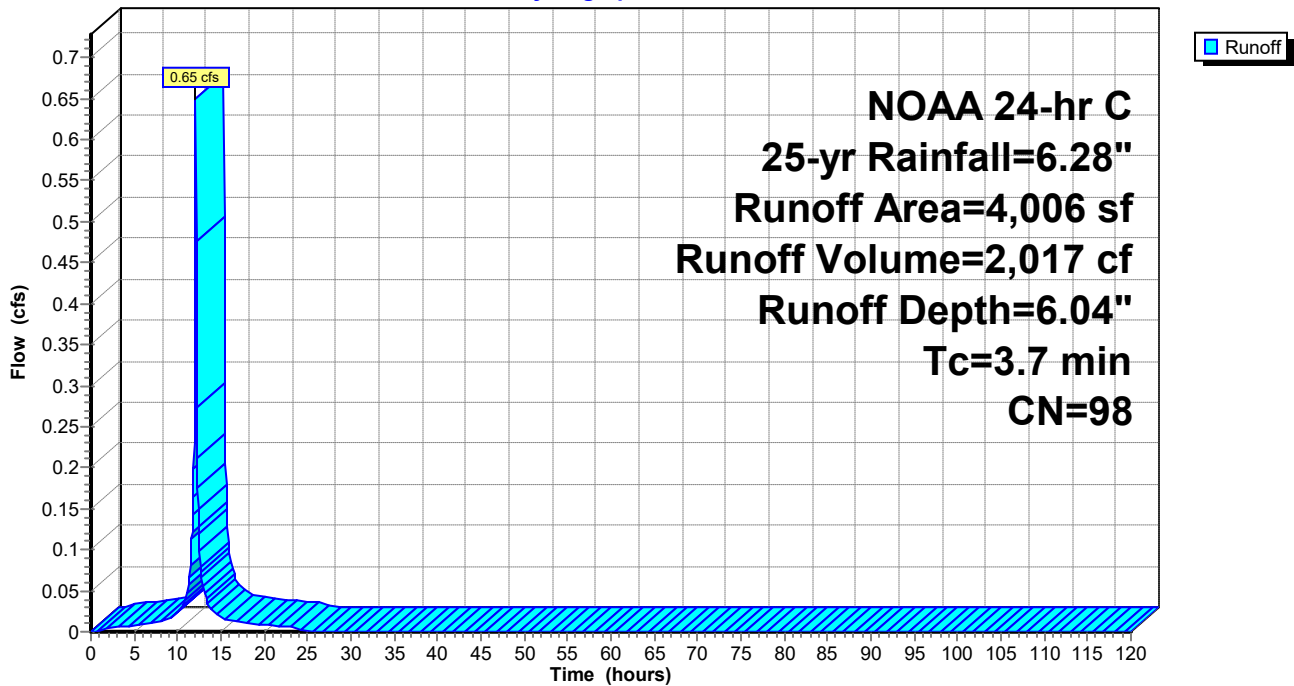
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.7 | | | | | Direct Entry, |

Subcatchment PR5: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR6: PR.IMP.BLDG

[49] Hint: Tc<2dt may require smaller dt

Runoff = 6.49 cfs @ 12.08 hrs, Volume= 18,962 cf, Depth= 6.04"
 Routed to Pond P1.proj : BMP-1

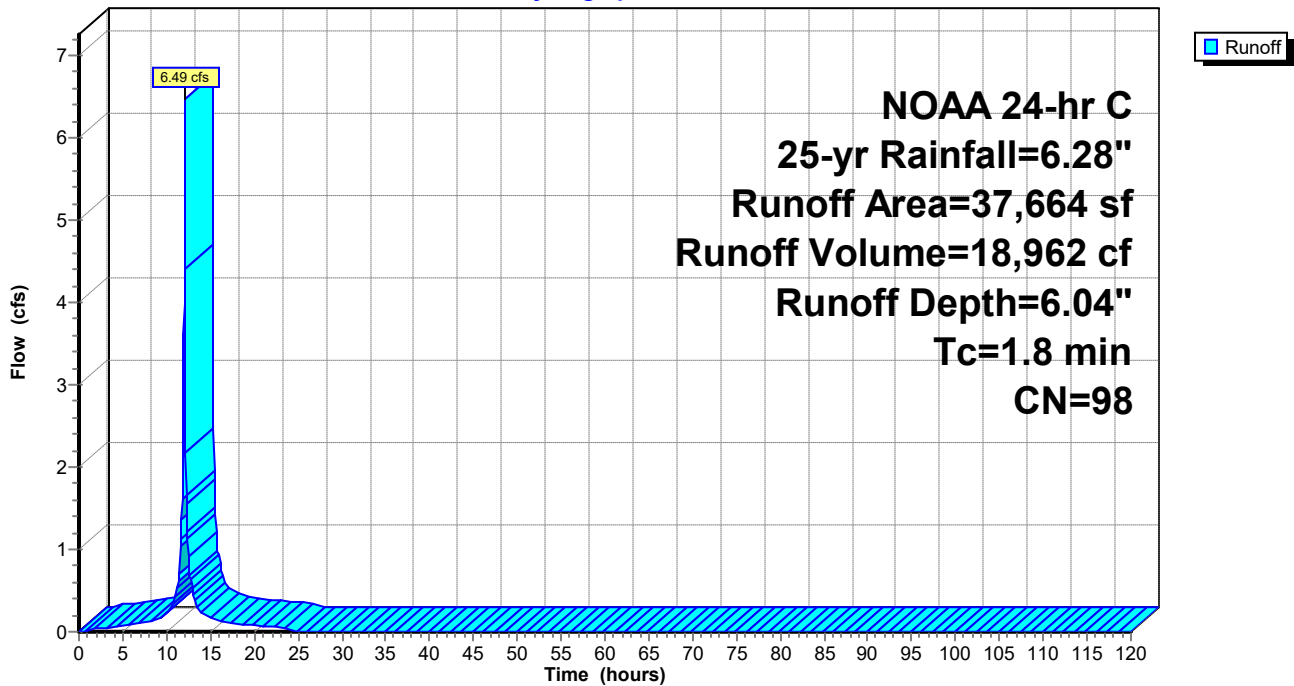
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 25-yr Rainfall=6.28"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR6: PR.IMP.BLDG

Hydrograph



Summary for Reach 2R: POI-1 for PRDA-1 (projected)

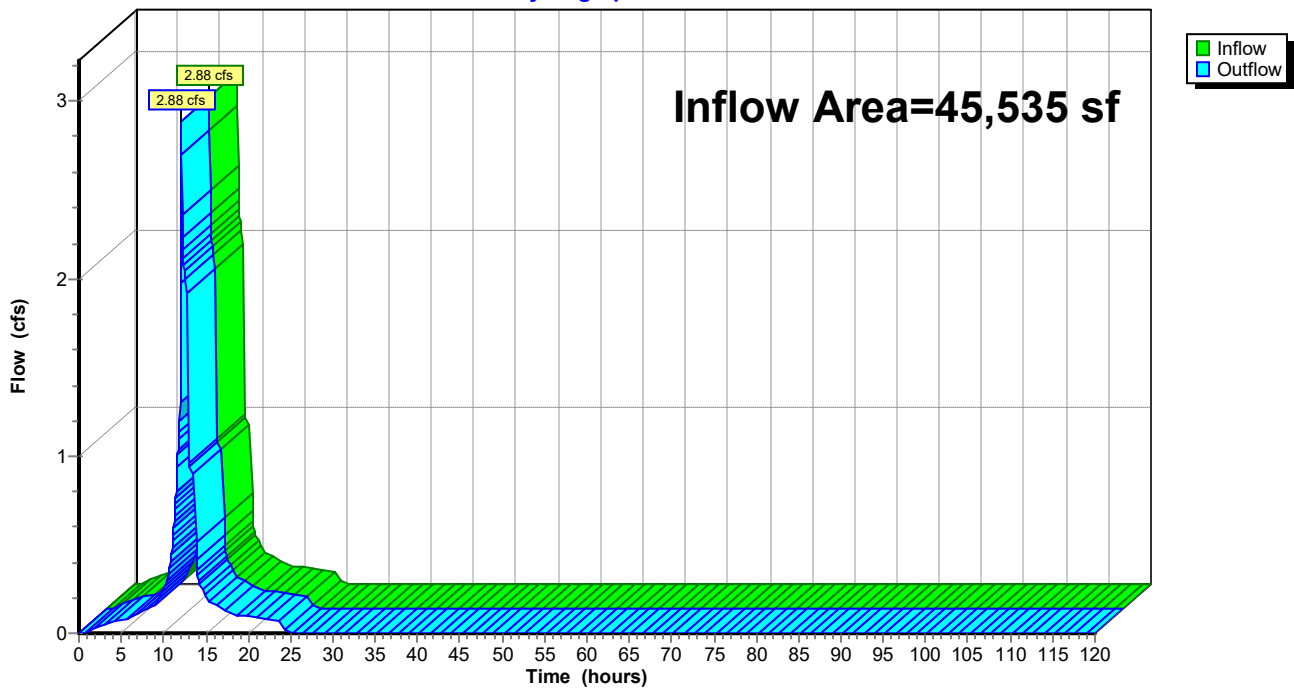
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 5.82" for 25-yr event
Inflow = 2.88 cfs @ 12.10 hrs, Volume= 22,081 cf
Outflow = 2.88 cfs @ 12.10 hrs, Volume= 22,081 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1 for PRDA-1 (projected)

Hydrograph



Summary for Pond P1.proj: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 6.04" for 25-yr event
 Inflow = 6.49 cfs @ 12.08 hrs, Volume= 18,962 cf
 Outflow = 1.85 cfs @ 12.05 hrs, Volume= 18,962 cf, Atten= 71%, Lag= 0.0 min
 Primary = 1.85 cfs @ 12.05 hrs, Volume= 18,962 cf
 Routed to Reach 2r : POI-1 for PRDA-1 (projected)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.47' @ 12.24 hrs Surf.Area= 744 sf Storage= 3,937 cf

Plug-Flow detention time= 20.3 min calculated for 18,955 cf (100% of inflow)
 Center-of-Mass det. time= 20.3 min (761.6 - 741.3)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

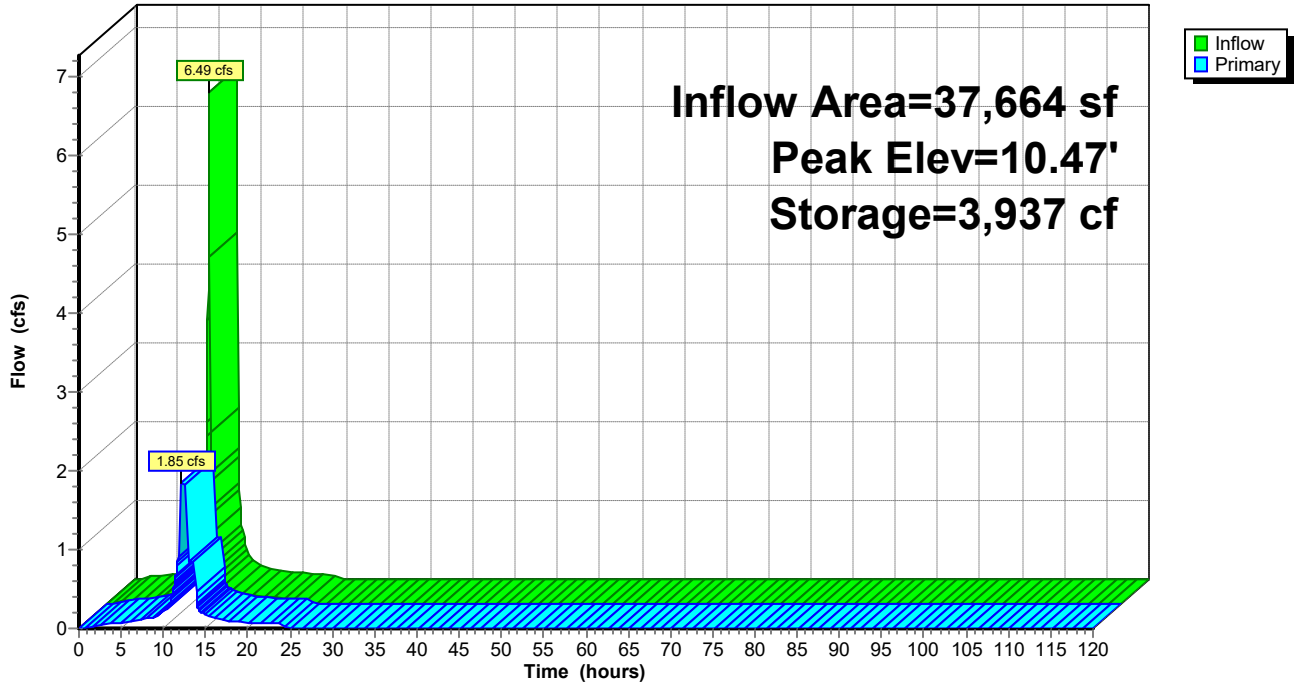
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=1.85 cfs @ 12.05 hrs HW=8.67' (Free Discharge)

- 1=Outlet (Passes 1.85 cfs of 10.00 cfs potential flow)
- 2=Constant Flow 1 (2-yr) (Constant Controls 0.85 cfs)
- 3=Constant Flow 2 (10yr) (Constant Controls 1.00 cfs)
- 4=Constant Flow 3 (25-yr) (Constant Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 6=Orifice (Controls 0.00 cfs)

Pond P1.proj: BMP-1

Hydrograph



Stage-Discharge for Pond P1.proj: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.proj: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

2024-03-18 - Stormwater Analysis Concept - NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

Prepared by Langan Engineering

Printed 3/19/2024

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Time span=0.00-120.00 hrs, dt=0.05 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR4: PR.PER Runoff Area=3,865 sf 0.00% Impervious Runoff Depth=8.47"
Tc=5.2 min CN=74 Runoff=0.94 cfs 2,727 cf

Subcatchment PR5: PR.IMP.SITE Runoff Area=4,006 sf 100.00% Impervious Runoff Depth=11.60"
Tc=3.7 min CN=98 Runoff=1.23 cfs 3,872 cf

Subcatchment PR6: PR.IMP.BLDG Runoff Area=37,664 sf 100.00% Impervious Runoff Depth=11.60"
Tc=1.8 min CN=98 Runoff=12.26 cfs 36,404 cf

Reach 2R: POI-1 for PRDA-1 (projected) Inflow=6.38 cfs 43,003 cf
Outflow=6.38 cfs 43,003 cf

Pond P1.proj: BMP-1 Peak Elev=15.24' Storage=7,486 cf Inflow=12.26 cfs 36,404 cf
Outflow=4.30 cfs 36,404 cf

Summary for Subcatchment PR4: PR.PER

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.94 cfs @ 12.12 hrs, Volume= 2,727 cf, Depth= 8.47"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

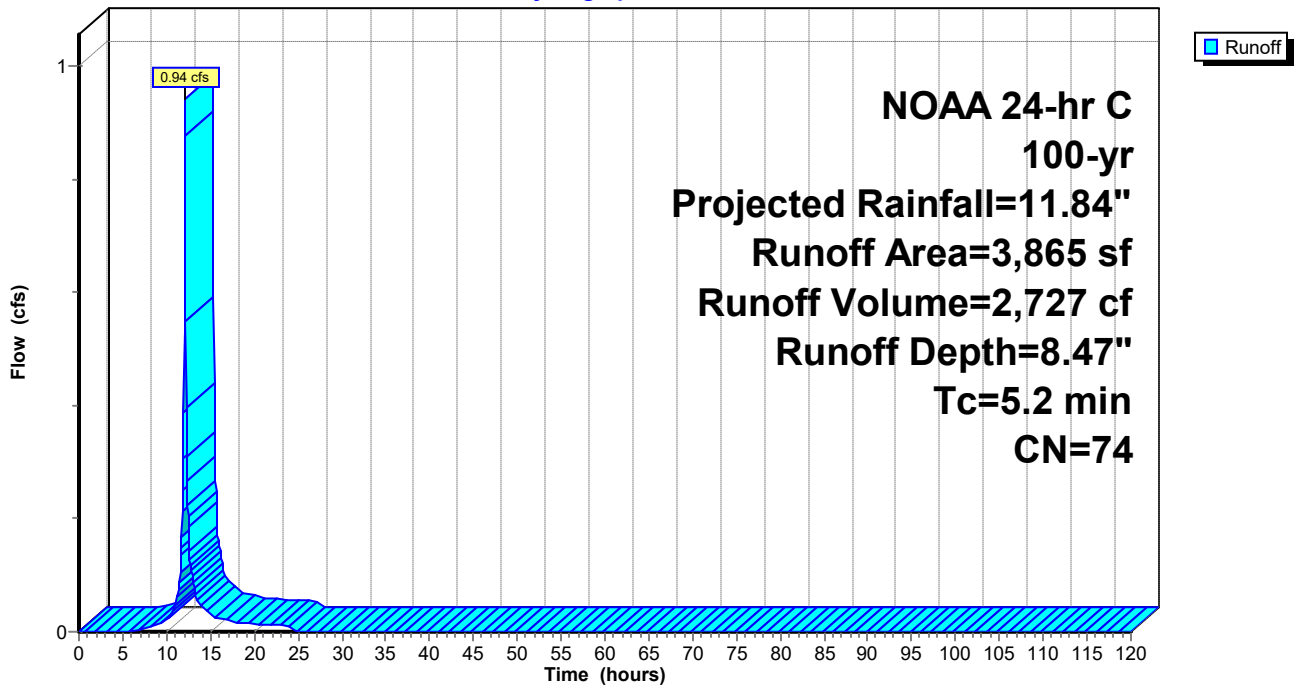
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

| Area (sf) | CN | Description |
|-----------|----|-------------------------------|
| 3,865 | 74 | >75% Grass cover, Good, HSG C |
| 3,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.2 | | | | | Direct Entry, |

Subcatchment PR4: PR.PER

Hydrograph



Summary for Subcatchment PR5: PR.IMP.SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.23 cfs @ 12.10 hrs, Volume= 3,872 cf, Depth=11.60"
 Routed to Reach 2R : POI-1 for PRDA-1 (projected)

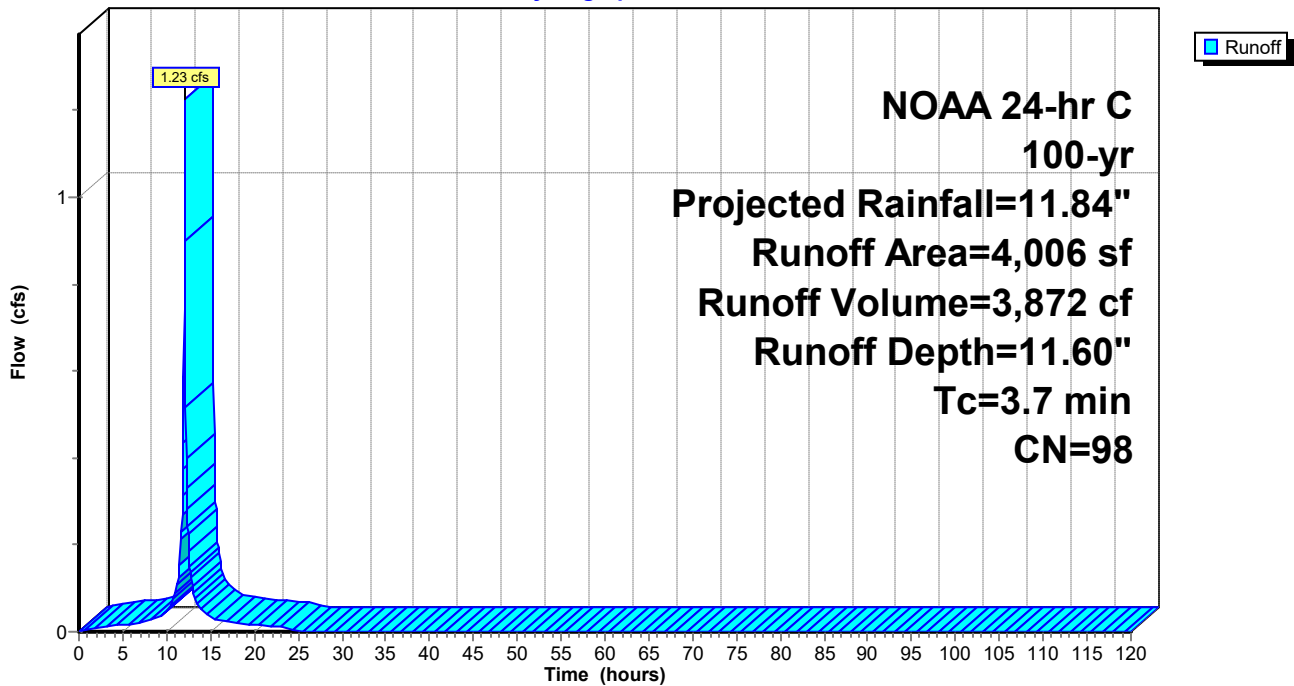
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 4,006 | 98 | Paved parking, HSG D |
| 4,006 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 3.7 | | | | | Direct Entry, |

Subcatchment PR5: PR.IMP.SITE

Hydrograph



Summary for Subcatchment PR6: PR.IMP.BLDG

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 12.26 cfs @ 12.08 hrs, Volume= 36,404 cf, Depth=11.60"
 Routed to Pond P1.proj : BMP-1

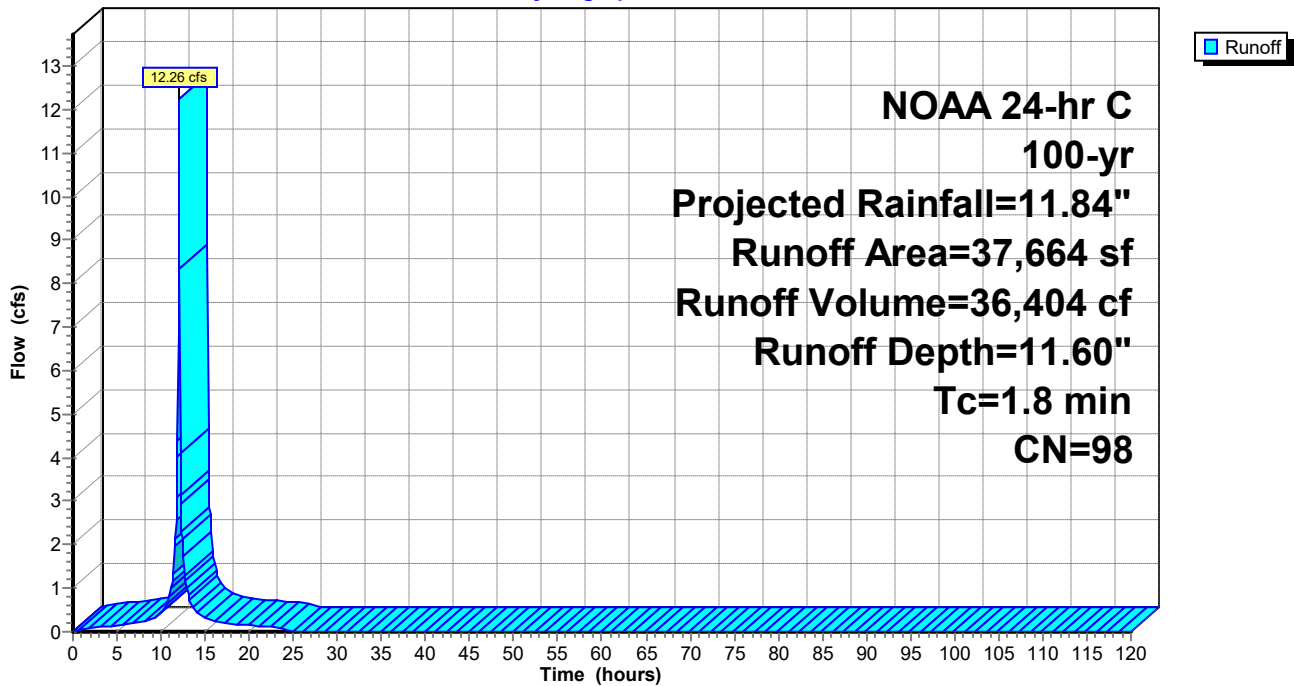
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-120.00 hrs, $dt= 0.05$ hrs
 NOAA 24-hr C 100-yr, Projected Rainfall=11.84"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| 37,664 | 98 | Roofs, HSG D |
| 37,664 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|-------------|------------------|------------------|----------------------|-------------------|---------------|
| 1.8 | | | | | Direct Entry, |

Subcatchment PR6: PR.IMP.BLDG

Hydrograph



Summary for Reach 2R: POI-1 for PRDA-1 (projected)

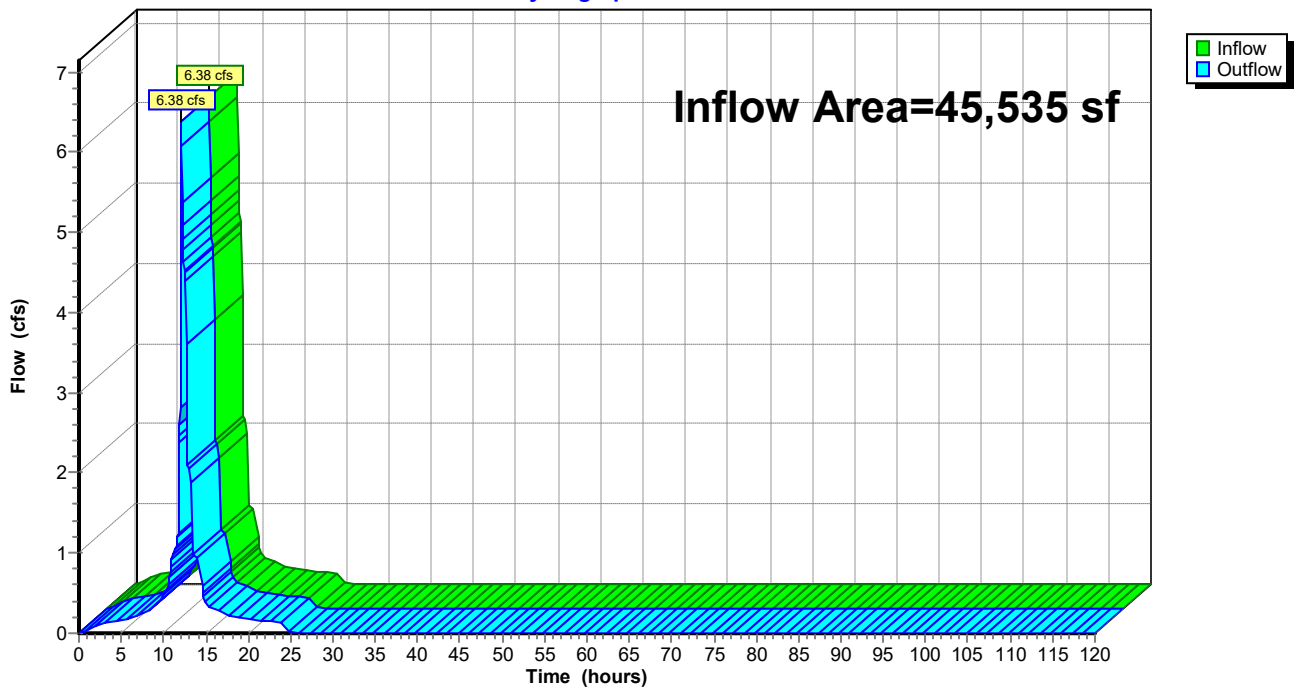
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 45,535 sf, 91.51% Impervious, Inflow Depth = 11.33" for 100-yr, Projected event
Inflow = 6.38 cfs @ 12.11 hrs, Volume= 43,003 cf
Outflow = 6.38 cfs @ 12.11 hrs, Volume= 43,003 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1 for PRDA-1 (projected)

Hydrograph



Summary for Pond P1.proj: BMP-1

Inflow Area = 37,664 sf, 100.00% Impervious, Inflow Depth = 11.60" for 100-yr, Projected event
 Inflow = 12.26 cfs @ 12.08 hrs, Volume= 36,404 cf
 Outflow = 4.30 cfs @ 12.19 hrs, Volume= 36,404 cf, Atten= 65%, Lag= 7.0 min
 Primary = 4.30 cfs @ 12.19 hrs, Volume= 36,404 cf
 Routed to Reach 2r : POI-1 for PRDA-1 (projected)

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 15.24' @ 12.19 hrs Surf.Area= 744 sf Storage= 7,486 cf

Plug-Flow detention time= 19.3 min calculated for 36,389 cf (100% of inflow)
 Center-of-Mass det. time= 19.3 min (752.8 - 733.5)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|--------|---------------|--|
| #1 | 5.18' | 8,050 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 5.18 | 744 | 0 | 0 |
| 6.00 | 744 | 610 | 610 |
| 7.00 | 744 | 744 | 1,354 |
| 8.00 | 744 | 744 | 2,098 |
| 9.00 | 744 | 744 | 2,842 |
| 10.00 | 744 | 744 | 3,586 |
| 11.00 | 744 | 744 | 4,330 |
| 12.00 | 744 | 744 | 5,074 |
| 13.00 | 744 | 744 | 5,818 |
| 14.00 | 744 | 744 | 6,562 |
| 15.00 | 744 | 744 | 7,306 |
| 16.00 | 744 | 744 | 8,050 |

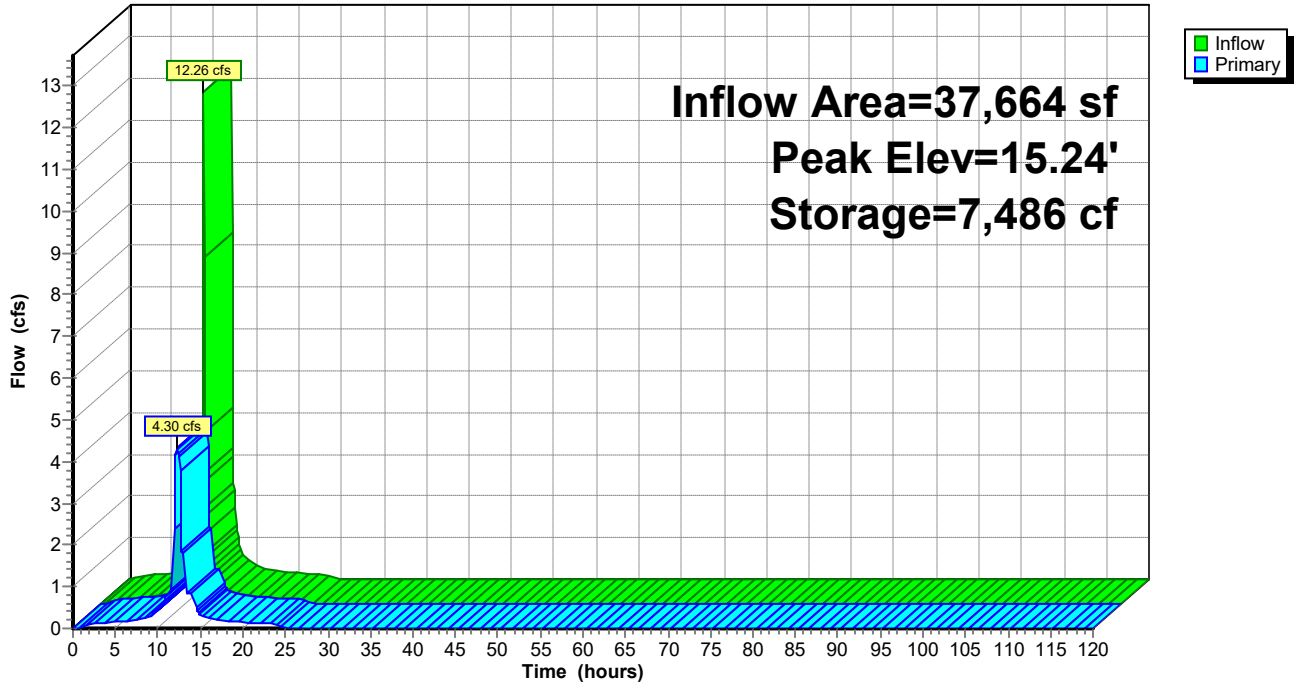
| Device | Routing | Invert | Outlet Devices |
|--------|----------|--------|--|
| #1 | Primary | 5.18' | 15.0" Vert. Outlet C= 0.600 Limited to weir flow at low heads |
| #2 | Device 1 | 5.18' | 0.850 cfs Constant Flow 1 (2-yr) |
| #3 | Device 1 | 7.80' | 1.000 cfs Constant Flow 2 (10yr) |
| #4 | Device 1 | 10.50' | 2.250 cfs Constant Flow 3 (25-yr) |
| #5 | Device 1 | 15.25' | 5.6' long Sharp-Crested Rectangular Weir 2 End Contraction(s) |
| #6 | Device 1 | 13.58' | 2.5" Vert. Orifice C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=4.30 cfs @ 12.19 hrs HW=15.22' (Free Discharge)

- 1=Outlet (Passes 4.30 cfs of 18.13 cfs potential flow)
- 2=Constant Flow 1 (2-yr) (Constant Controls 0.85 cfs)
- 3=Constant Flow 2 (10yr) (Constant Controls 1.00 cfs)
- 4=Constant Flow 3 (25-yr) (Constant Controls 2.25 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 6=Orifice (Orifice Controls 0.20 cfs @ 5.98 fps)

Pond P1.proj: BMP-1

Hydrograph



Stage-Discharge for Pond P1.proj: BMP-1

| Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) | Elevation (feet) | Primary (cfs) |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| 5.18 | 0.00 | 10.38 | 1.85 | 15.58 | 7.76 |
| 5.28 | 0.05 | 10.48 | 1.85 | 15.68 | 9.42 |
| 5.38 | 0.19 | 10.58 | 4.10 | 15.78 | 11.27 |
| 5.48 | 0.42 | 10.68 | 4.10 | 15.88 | 13.29 |
| 5.58 | 0.73 | 10.78 | 4.10 | 15.98 | 15.47 |
| 5.68 | 0.85 | 10.88 | 4.10 | | |
| 5.78 | 0.85 | 10.98 | 4.10 | | |
| 5.88 | 0.85 | 11.08 | 4.10 | | |
| 5.98 | 0.85 | 11.18 | 4.10 | | |
| 6.08 | 0.85 | 11.28 | 4.10 | | |
| 6.18 | 0.85 | 11.38 | 4.10 | | |
| 6.28 | 0.85 | 11.48 | 4.10 | | |
| 6.38 | 0.85 | 11.58 | 4.10 | | |
| 6.48 | 0.85 | 11.68 | 4.10 | | |
| 6.58 | 0.85 | 11.78 | 4.10 | | |
| 6.68 | 0.85 | 11.88 | 4.10 | | |
| 6.78 | 0.85 | 11.98 | 4.10 | | |
| 6.88 | 0.85 | 12.08 | 4.10 | | |
| 6.98 | 0.85 | 12.18 | 4.10 | | |
| 7.08 | 0.85 | 12.28 | 4.10 | | |
| 7.18 | 0.85 | 12.38 | 4.10 | | |
| 7.28 | 0.85 | 12.48 | 4.10 | | |
| 7.38 | 0.85 | 12.58 | 4.10 | | |
| 7.48 | 0.85 | 12.68 | 4.10 | | |
| 7.58 | 0.85 | 12.78 | 4.10 | | |
| 7.68 | 0.85 | 12.88 | 4.10 | | |
| 7.78 | 0.85 | 12.98 | 4.10 | | |
| 7.88 | 1.85 | 13.08 | 4.10 | | |
| 7.98 | 1.85 | 13.18 | 4.10 | | |
| 8.08 | 1.85 | 13.28 | 4.10 | | |
| 8.18 | 1.85 | 13.38 | 4.10 | | |
| 8.28 | 1.85 | 13.48 | 4.10 | | |
| 8.38 | 1.85 | 13.58 | 4.10 | | |
| 8.48 | 1.85 | 13.68 | 4.12 | | |
| 8.58 | 1.85 | 13.78 | 4.15 | | |
| 8.68 | 1.85 | 13.88 | 4.17 | | |
| 8.78 | 1.85 | 13.98 | 4.19 | | |
| 8.88 | 1.85 | 14.08 | 4.20 | | |
| 8.98 | 1.85 | 14.18 | 4.22 | | |
| 9.08 | 1.85 | 14.28 | 4.23 | | |
| 9.18 | 1.85 | 14.38 | 4.24 | | |
| 9.28 | 1.85 | 14.48 | 4.25 | | |
| 9.38 | 1.85 | 14.58 | 4.26 | | |
| 9.48 | 1.85 | 14.68 | 4.26 | | |
| 9.58 | 1.85 | 14.78 | 4.27 | | |
| 9.68 | 1.85 | 14.88 | 4.28 | | |
| 9.78 | 1.85 | 14.98 | 4.29 | | |
| 9.88 | 1.85 | 15.08 | 4.29 | | |
| 9.98 | 1.85 | 15.18 | 4.30 | | |
| 10.08 | 1.85 | 15.28 | 4.40 | | |
| 10.18 | 1.85 | 15.38 | 5.17 | | |
| 10.28 | 1.85 | 15.48 | 6.32 | | |

Stage-Area-Storage for Pond P1.proj: BMP-1

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) | Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---------------------|--------------------|-------------------------|---------------------|--------------------|-------------------------|
| 5.18 | 744 | 0 | 15.58 | 744 | 7,738 |
| 5.38 | 744 | 149 | 15.78 | 744 | 7,886 |
| 5.58 | 744 | 298 | 15.98 | 744 | 8,035 |
| 5.78 | 744 | 446 | | | |
| 5.98 | 744 | 595 | | | |
| 6.18 | 744 | 744 | | | |
| 6.38 | 744 | 893 | | | |
| 6.58 | 744 | 1,042 | | | |
| 6.78 | 744 | 1,190 | | | |
| 6.98 | 744 | 1,339 | | | |
| 7.18 | 744 | 1,488 | | | |
| 7.38 | 744 | 1,637 | | | |
| 7.58 | 744 | 1,786 | | | |
| 7.78 | 744 | 1,934 | | | |
| 7.98 | 744 | 2,083 | | | |
| 8.18 | 744 | 2,232 | | | |
| 8.38 | 744 | 2,381 | | | |
| 8.58 | 744 | 2,530 | | | |
| 8.78 | 744 | 2,678 | | | |
| 8.98 | 744 | 2,827 | | | |
| 9.18 | 744 | 2,976 | | | |
| 9.38 | 744 | 3,125 | | | |
| 9.58 | 744 | 3,274 | | | |
| 9.78 | 744 | 3,422 | | | |
| 9.98 | 744 | 3,571 | | | |
| 10.18 | 744 | 3,720 | | | |
| 10.38 | 744 | 3,869 | | | |
| 10.58 | 744 | 4,018 | | | |
| 10.78 | 744 | 4,166 | | | |
| 10.98 | 744 | 4,315 | | | |
| 11.18 | 744 | 4,464 | | | |
| 11.38 | 744 | 4,613 | | | |
| 11.58 | 744 | 4,762 | | | |
| 11.78 | 744 | 4,910 | | | |
| 11.98 | 744 | 5,059 | | | |
| 12.18 | 744 | 5,208 | | | |
| 12.38 | 744 | 5,357 | | | |
| 12.58 | 744 | 5,506 | | | |
| 12.78 | 744 | 5,654 | | | |
| 12.98 | 744 | 5,803 | | | |
| 13.18 | 744 | 5,952 | | | |
| 13.38 | 744 | 6,101 | | | |
| 13.58 | 744 | 6,250 | | | |
| 13.78 | 744 | 6,398 | | | |
| 13.98 | 744 | 6,547 | | | |
| 14.18 | 744 | 6,696 | | | |
| 14.38 | 744 | 6,845 | | | |
| 14.58 | 744 | 6,994 | | | |
| 14.78 | 744 | 7,142 | | | |
| 14.98 | 744 | 7,291 | | | |
| 15.18 | 744 | 7,440 | | | |
| 15.38 | 744 | 7,589 | | | |

Appendix D
Time of Concentration Calculations

**Time of Concentration (T_c) or Travel Time (T_t)
EXISTING DRAINAGE AREA**

Project Cooper Master Plan - Phase I By MXK Date 3/20/2024
 Location Camden, NJ Checked KJM Date _____
 Circle One: Present During Developed **Pre-Developed Tower A**
 Circle One: T_c T_t through subarea _____

NOTES: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

| IMPERVIOUS SITE | | | | | | | | | | | | |
|---|-----------------|------------------|--------|-------|-------|-----------------|--------|-------|-------|-------|-------|-------|
| | | CURRENT RAINFALL | | | | FUTURE RAINFALL | | | | | | |
| <u>Sheet Flow</u> (Applicable to T _c only) | | | | | | | | | | | | |
| Segment ID | | AB | | | | AB | | | | | | |
| 1. Surface Description (Table 3-1 of TR-55)..... | | PAVED | | | | PAVED | | | | | | |
| 2. Manning's Roughness Coeff., n (Table 3-1 of TR-55)..... | | 0.011 | | | | 0.011 | | | | | | |
| 3. Flow Length, L (total L ≤ 150 ft)..... | ft | 100 | | | | 100 | | | | | | |
| 4. Two-yr 24-hr Rainfall, P ₂ | in | 3.41 | | | | 3.91 | | | | | | |
| 5. Land Slope, s..... | ft/ft | 0.038 | | | | 0.038 | | | | | | |
| 6. T _t = (0.007 (nL) ^{0.8}) / (P ₂ ^{0.5} s ^{0.4}) Compute T _t | hr | 0.015 | | | = | 0.015 | | | = | 0.014 | | |
| <u>Shallow Concentrated Flow</u> | | | | | | | | | | | | |
| Segment ID | | BC | | | | BC | | | | | | |
| 7. Surface Description (Paved or Unpaved)..... | | PAVED | | | | PAVED | | | | | | |
| 8. Flow Length, L..... | ft | 84 | | | | 84 | | | | | | |
| 9. Watercourse Slope, s..... | ft/ft | 0.044 | | | | 0.044 | | | | | | |
| 10. Average Velocity, V (Figure 3-1 of TR-55)..... | ft/sec | 4.15 | | | | 4.15 | | | | | | |
| 11. T _t = L / 3600V Compute T _t | hr | 0.006 | | | = | 0.006 | | | = | 0.006 | | |
| <u>Channel or Pipe Flow</u> | | PIPE | | | | PIPE | | | | | | |
| Segment ID | | CD | DE | EF | FG | CD | DE | EF | FG | | | |
| 12. Cross Sectional Flow Area, A..... | ft ² | 0.09 | 1.23 | 1.23 | 3.14 | 0.09 | 1.23 | 1.23 | 3.14 | | | |
| 13. Wetted Perimeter, P _w | ft | 1.05 | 3.93 | 3.93 | 6.28 | 1.05 | 3.93 | 3.93 | 6.28 | | | |
| 14. Hydraulic Radius, R = A / P _w Compute R..... | ft | 0.083 | 0.313 | 0.313 | 0.500 | 0.083 | 0.313 | 0.313 | 0.500 | | | |
| 15. Channel Slope, s..... | ft/ft | 0.054 | 0.056 | 0.010 | 0.013 | 0.054 | 0.056 | 0.010 | 0.013 | | | |
| 16. Manning's Roughness Coeff., n..... | | 0.011 | 0.012 | 0.012 | 0.012 | 0.011 | 0.012 | 0.012 | 0.012 | | | |
| 17. V = (1.486 R ^{0.67} s ^{0.5}) / n Compute V..... | ft/sec | 5.944 | 13.470 | 5.681 | 8.874 | 5.944 | 13.470 | 5.681 | 8.874 | | | |
| 18. Flow Length, L..... | ft | 81 | 106 | 21 | 63 | 81 | 106 | 21 | 63 | | | |
| 19. T _t = L / 3600V Compute T _t | hr | 0.004 | 0.002 | 0.001 | 0.002 | = | 0.009 | 0.004 | 0.002 | 0.001 | 0.002 | = |
| 20. Watershed or Subarea T _c or T _t (add T _t in steps 6, 11, and 19)..... | hr | | | | | 0.030 | | | | | | 0.029 |
| | min | | | | | 1.8 | | | | | | 1.7 |

EXISTING DRAINAGE AREA

| IMPERVIOUS BLDG | | | | | | | | | | | | | |
|--|-----------------|-------|--------|-------|-----------------|-------|--------|-------|-------|-------|-------|-------|-------|
| CURRENT RAINFALL | | | | | FUTURE RAINFALL | | | | | | | | |
| Sheet Flow (Applicable to T_c only) | | | | | | | | | | | | | |
| Segment ID | | | | | | | | | | | | | |
| 1. Surface Description (Table 3-1 of TR-55)..... | | | | | | | | | | | | | |
| 2. Manning's Roughness Coeff., n (Table 3-1 of TR-55)..... | | | | | | | | | | | | | |
| 3. Flow Length, L (total $L \leq 150$ ft)..... | ft | | | | | | | | | | | | |
| 4. Two-yr 24-hr Rainfall, P_2 | in | | | | | | | | | | | | |
| 5. Land Slope, s..... | ft/ft | | | | | | | | | | | | |
| 6. $T_t = (0.007 (nL)^{0.8}) / (P_2^{0.5} s^{0.4})$ Compute T_t | hr | | | | = | 0.000 | | | = | 0.000 | | | |
| Shallow Concentrated Flow | | | | | | | | | | | | | |
| Segment ID | | | | | | | | | | | | | |
| 7. Surface Description (Paved or Unpaved)..... | | | | | | | | | | | | | |
| 8. Flow Length, L..... | ft | | | | | | | | | | | | |
| 9. Watercourse Slope, s..... | ft/ft | | | | | | | | | | | | |
| 10. Average Velocity, V (Figure 3-1 of TR-55)..... | ft/sec | | | | | | | | | | | | |
| 11. $T_t = L / 3600V$ Compute T_t | hr | | | | = | 0.000 | | | = | 0.000 | | | |
| Channel or Pipe Flow | | | | | | | | | | | | | |
| Segment ID | | | | | | | | | | | | | |
| 12. Cross Sectional Flow Area, A..... | ft ² | AB | BC | CD | DE | AB | BC | CD | DE | | | | |
| 13. Wetted Perimeter, P_w | ft | 0.09 | 1.23 | 1.23 | 3.14 | 0.09 | 1.23 | 1.23 | 3.14 | | | | |
| 14. Hydraulic Radius, $R = A / P_w$ Compute R..... | ft | 1.05 | 3.93 | 3.93 | 6.28 | 1.05 | 3.93 | 3.93 | 6.28 | | | | |
| 15. Channel Slope, s..... | ft/ft | 0.083 | 0.313 | 0.313 | 0.500 | 0.083 | 0.313 | 0.313 | 0.500 | | | | |
| 16. Manning's Roughness Coeff., n..... | | 0.010 | 0.056 | 0.010 | 0.013 | 0.010 | 0.056 | 0.010 | 0.013 | | | | |
| 17. $V = (1.486 R^{0.67} s^{0.5}) / n$ Compute V..... | ft/sec | 0.011 | 0.012 | 0.012 | 0.012 | 0.011 | 0.012 | 0.012 | 0.012 | | | | |
| 18. Flow Length, L..... | ft | 2.556 | 13.470 | 5.681 | 8.874 | 2.556 | 13.470 | 5.681 | 8.874 | | | | |
| 19. $T_t = L / 3600V$ Compute T_t | hr | 19 | 106 | 21 | 63 | 19 | 106 | 21 | 63 | | | | |
| 20. Watershed or Subarea T_c or T_t (add T_t in steps 6, 11, and 19) | hr | 0.002 | 0.002 | 0.001 | 0.002 | = | 0.007 | 0.002 | 0.002 | 0.001 | 0.002 | = | 0.007 |
| | min | | | | | | 0.007 | | | | | 0.007 | |
| | | | | | | | 0.4 | | | | | 0.4 | |

EXISTING DRAINAGE AREA

| | | PERVIOUS | | | | | | | | | | |
|--|-----------------|------------------|---------|-------|-------|---|-----------------|-------|-------|-------|-------|-------|
| | | CURRENT RAINFALL | | | | | FUTURE RAINFALL | | | | | |
| <u>Sheet Flow</u> (Applicable to T _c only) | | Segment ID | AB | | | | AB | | | | | |
| 1. Surface Description (Table 3-1 of TR-55)..... | | | UNPAVED | | | | UNPAVED | | | | | |
| 2. Manning's Roughness Coeff., n (Table 3-1 of TR-55)..... | | | 0.15 | | | | 0.15 | | | | | |
| 3. Flow Length, L (total L ≤ 150 ft)..... | ft | | 100 | | | | 100 | | | | | |
| 4. Two-yr 24-hr Rainfall, P ₂ | in | | 3.41 | | | | 3.91 | | | | | |
| 5. Land Slope, s..... | ft/ft | | 0.021 | | | | 0.021 | | | | | |
| 6. T _t = (0.007 (nL) ^{0.8}) / (P ₂ ^{0.5} s ^{0.4}) Compute T _t | hr | | 0.155 | | | = | 0.155 | | | = | 0.155 | |
| <u>Shallow Concentrated Flow</u> | | Segment ID | BC | | | | BC | | | | | |
| 7. Surface Description (Paved or Unpaved)..... | | | UNPAVED | | | | UNPAVED | | | | | |
| 8. Flow Length, L..... | ft | | 59 | | | | 59 | | | | | |
| 9. Watercourse Slope, s..... | ft/ft | | 0.025 | | | | 0.025 | | | | | |
| 10. Average Velocity, V (Figure 3-1 of TR-55)..... | ft/sec | | 1.15 | | | | 1.15 | | | | | |
| 11. T _t = L / 3600V Compute T _t | hr | | 0.014 | | | = | 0.014 | | | = | 0.014 | |
| <u>Channel or Pipe Flow</u> | | Segment ID | CD | DE | EF | | CD | DE | EF | | | |
| 12. Cross Sectional Flow Area, A..... | ft ² | | 0.09 | 1.23 | 3.14 | | 0.09 | 1.23 | 3.14 | | | |
| 13. Wetted Perimeter, P _w | ft | | 1.05 | 3.93 | 6.28 | | 1.05 | 3.93 | 6.28 | | | |
| 14. Hydraulic Radius, R = A / P _w Compute R..... | ft | | 0.083 | 0.313 | 0.500 | | 0.083 | 0.313 | 0.500 | | | |
| 15. Channel Slope, s..... | ft/ft | | 0.010 | 0.010 | 0.013 | | 0.010 | 0.010 | 0.013 | | | |
| 16. Manning's Roughness Coeff., n..... | | | 0.012 | 0.012 | 0.012 | | 0.012 | 0.012 | 0.012 | | | |
| 17. V = (1.486 R ^{0.67} s ^{0.5}) / n Compute V..... | ft/sec | | 2.343 | 5.681 | 8.874 | | 2.343 | 5.681 | 8.874 | | | |
| 18. Flow Length, L..... | ft | | 229 | 21 | 63 | | 229 | 21 | 63 | | | |
| 19. T _t = L / 3600V Compute T _t | hr | | 0.027 | 0.001 | 0.002 | = | 0.030 | 0.027 | 0.001 | 0.002 | = | 0.030 |
| 20. Watershed or Subarea T _c or T _t (add T _t in steps 6, 11, and 19) | hr | | | | | | 0.200 | | | | | 0.200 |
| | min | | | | | | 12.0 | | | | | 12.0 |

PROPOSED DRAINAGE AREA

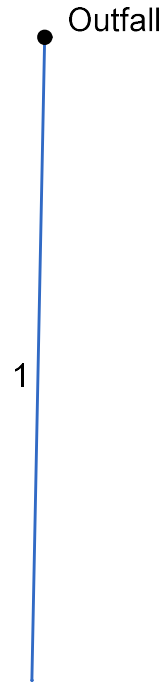
| IMPERVIOUS BUILDING | | | | | | | | | | | | | |
|--|-----------------|------------------|-------|-------|------|-------|-----------------|-------|-------|-------|-------|-------|--|
| | | CURRENT RAINFALL | | | | | FUTURE RAINFALL | | | | | | |
| Sheet Flow (Applicable to T_c only) | | | | | | | | | | | | | |
| 1. Surface Description (Table 3-1 of TR-55)..... | Segment ID | | | | | | | | | | | | |
| 2. Manning's Roughness Coeff., n (Table 3-1 of TR-55)..... | | | | | | | | | | | | | |
| 3. Flow Length, L (total $L \leq 150$ ft)..... | ft | | | | | | | | | | | | |
| 4. Two-yr 24-hr Rainfall, P_2 | in | | | | | | | | | | | | |
| 5. Land Slope, s..... | ft/ft | | | | | | | | | | | | |
| 6. $T_t = (0.007 (nL)^{0.8}) / (P_2^{0.5} s^{0.4})$ Compute T_t | hr | | | | | = | 0.000 | | | = | 0.000 | | |
| Shallow Concentrated Flow | | | | | | | | | | | | | |
| 7. Surface Description (Paved or Unpaved)..... | Segment ID | | | | | | | | | | | | |
| 8. Flow Length, L..... | ft | | | | | | | | | | | | |
| 9. Watercourse Slope, s..... | ft/ft | | | | | | | | | | | | |
| 10. Average Velocity, V (Figure 3-1 of TR-55)..... | ft/sec | | | | | | | | | | | | |
| 11. $T_t = L / 3600V$ Compute T_t | hr | | | | | = | 0.000 | | | = | 0.000 | | |
| Channel or Pipe Flow | | | | | | | | | | | | | |
| | | PIPE | | | PIPE | | | PIPE | | | PIPE | | |
| 12. Cross Sectional Flow Area, A..... | ft ² | AB | BC | CD | | AB | BC | CD | | AB | BC | CD | |
| 13. Wetted Perimeter, P_w | ft | 0.09 | 0.79 | 3.14 | | 0.09 | 0.79 | 3.14 | | 0.09 | 0.79 | 3.14 | |
| 14. Hydraulic Radius, $R = A / P_w$ Compute R..... | ft | 1.05 | 3.14 | 6.28 | | 1.05 | 3.14 | 6.28 | | 1.05 | 3.14 | 6.28 | |
| 15. Channel Slope, s..... | ft/ft | 0.083 | 0.250 | 0.500 | | 0.083 | 0.250 | 0.500 | | 0.083 | 0.250 | 0.500 | |
| 16. Manning's Roughness Coeff., n..... | ft/ft | 0.010 | 0.010 | 0.013 | | 0.010 | 0.010 | 0.013 | | 0.010 | 0.010 | 0.013 | |
| 17. $V = (1.486 R^{0.67} s^{0.5}) / n$ Compute V..... | ft/sec | 0.012 | 0.012 | 0.012 | | 0.012 | 0.012 | 0.012 | | 0.012 | 0.012 | 0.012 | |
| 18. Flow Length, L..... | ft | 2.343 | 4.892 | 8.874 | | 2.343 | 4.892 | 8.874 | | 2.343 | 4.892 | 8.874 | |
| 19. $T_t = L / 3600V$ Compute T_t | hr | 224 | 23 | 89 | | 224 | 23 | 89 | | 224 | 23 | 89 | |
| 20. Watershed or Subarea T_c or T_t (add T_t in steps 6, 11, and 19) | hr | 0.027 | 0.001 | 0.003 | | = | 0.031 | 0.027 | 0.001 | 0.003 | = | 0.031 | |
| | min | | | | | | 0.031 | | | | | 0.031 | |
| | | | | | | | 1.8 | | | | | 1.8 | |

PROPOSED DRAINAGE AREA

| | | PERVIOUS | | | | | | | | | | | |
|--|-----------------|------------------|---------|---------|--|---|-----------------|---------|---------|--|---|-------|--|
| | | CURRENT RAINFALL | | | | | FUTURE RAINFALL | | | | | | |
| <u>Sheet Flow</u> (Applicable to T_c only) | | Segment ID | AB | BC | | | | AB | BC | | | | |
| 1. Surface Description (Table 3-1 of TR-55)..... | | | UNPAVED | UNPAVED | | | | UNPAVED | UNPAVED | | | | |
| 2. Manning's Roughness Coeff., n (Table 3-1 of TR-55)..... | | | 0.15 | 0.15 | | | | 0.15 | 0.15 | | | | |
| 3. Flow Length, L (total $L \leq 150$ ft)..... | ft | | 49 | 22 | | | | 49 | 22 | | | | |
| 4. Two-yr 24-hr Rainfall, P_2 | in | | 3.41 | 3.41 | | | | 3.91 | 3.91 | | | | |
| 5. Land Slope, s..... | ft/ft | | 0.050 | 0.135 | | | | 0.050 | 0.135 | | | | |
| 6. $T_t = (0.007 (nL)^{0.8}) / (P_2^{0.5} s^{0.4})$ Compute T_t | hr | | 0.062 | 0.022 | | = | 0.084 | 0.058 | 0.021 | | = | 0.078 | |
| <u>Shallow Concentrated Flow</u> | | Segment ID | CD | | | | | CD | | | | | |
| 7. Surface Description (Paved or Unpaved)..... | | | PAVED | | | | | PAVED | | | | | |
| 8. Flow Length, L..... | ft | | 56 | | | | | 56 | | | | | |
| 9. Watercourse Slope, s..... | ft/ft | | 0.011 | | | | | 0.011 | | | | | |
| 10. Average Velocity, V (Figure 3-1 of TR-55)..... | ft/sec | | 2.10 | | | | | 2.1 | | | | | |
| 11. $T_t = L / 3600V$ Compute T_t | hr | | 0.007 | | | = | 0.007 | 0.007 | | | = | 0.007 | |
| <u>Channel or Pipe Flow</u> | | Segment ID | EF | | | | | EF | | | | | |
| 12. Cross Sectional Flow Area, A..... | ft ² | | 1.77 | | | | | 1.77 | | | | | |
| 13. Wetted Perimeter, P_w | ft | | 4.71 | | | | | 4.71 | | | | | |
| 14. Hydraulic Radius, $R = A / P_w$ Compute R..... | ft | | 0.375 | | | | | 0.375 | | | | | |
| 15. Channel Slope, s..... | ft/ft | | 0.010 | | | | | 0.010 | | | | | |
| 16. Manning's Roughness Coeff., n..... | | | 0.012 | | | | | 0.012 | | | | | |
| 17. $V = (1.486 R^{0.67} s^{0.5}) / n$ Compute V..... | ft/sec | | 6.419 | | | | | 6.419 | | | | | |
| 18. Flow Length, L..... | ft | | 21 | | | | | 21 | | | | | |
| 19. $T_t = L / 3600V$ Compute T_t | hr | | 0.001 | | | = | 0.001 | 0.001 | | | = | 0.001 | |
| 20. Watershed or Subarea T_c or T_t (add T_t in steps 6, 11, and 19) | hr min | | | | | | 0.092 | | | | | 0.087 | |
| | | | | | | | 5.5 | | | | | 5.2 | |

Appendix E
On-Site Stormwater Collection System Calculations

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Structure Report

| Struct No. | Structure ID | Junction Type | Rim Elev (ft) | Structure | | | Line Out | | | Line In | | |
|------------|--------------|---------------|---------------|-----------|-------------|------------|-----------|-------|-------------|-----------|-------|-------------|
| | | | | Shape | Length (ft) | Width (ft) | Size (in) | Shape | Invert (ft) | Size (in) | Shape | Invert (ft) |
| 1 | OCS-01 | Manhole | 21.41 | Cir | 0.00 | 0.00 | 15 | Cir | 13.58 | | | |

Project File: 2024-03-18 - Stormsewers_Tower A_city submission 1.stm

Number of Structures: 1

Run Date: 3/18/2024

Storm Sewer Summary Report

| Line No. | Line ID | Flow rate (cfs) | Line Size (in) | Line shape | Line length (ft) | Invert EL Dn (ft) | Invert EL Up (ft) | Line Slope (%) | HGL Down (ft) | HGL Up (ft) | Minor loss (ft) | HGL Junct (ft) | Dns Line No. | Junction Type |
|----------|---------|-----------------|----------------|------------|------------------|-------------------|-------------------|----------------|---------------|-------------|-----------------|----------------|--------------|---------------|
| 1 | PIPE-1 | 4.30 | 15 | Cir | 25.019 | 13.33 | 13.58 | 0.999 | 14.04 | 14.42 | n/a | 14.42 | End | Manhole |

| | | |
|--|--------------------|---------------------|
| Project File: 2024-03-18 - Stormsewers_Tower A_city submission 1.stm | Number of lines: 1 | Run Date: 3/18/2024 |
|--|--------------------|---------------------|

NOTES: Known Qs only

Storm Sewer Tabulation

| Station | | Len (ft) | Drng Area | | Rnoff coeff (C) | Area x C | | Tc | | Rain (l) (in/hr) | Total flow (cfs) | Cap full (cfs) | Vel (ft/s) | Pipe | | Invert Elev | | HGL Elev | | Grnd / Rim Elev | | Line ID |
|---------|------------|-------------|--------------|---------------|-----------------------|----------|-------|----------------|---------------|------------------------|------------------------|----------------------|---------------|--------------|--------------|-------------|------------|------------|------------|-----------------|------------|---------|
| Line | To Line | | Incr (ac) | Total (ac) | | Incr | Total | Inlet (min) | Syst (min) | | | | | Size (in) | Slope (%) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | Dn (ft) | Up (ft) | |
| 1 | End | 25.019 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 4.30 | 6.99 | 5.45 | 15 | 1.00 | 13.33 | 13.58 | 14.04 | 14.42 | 20.56 | 21.41 | PIPE-1 |

Project File: 2024-03-18 - Stormsewers_Tower A_city submission 1.stm

Number of lines: 1

Run Date: 3/18/2024

NOTES: Known Qs only ; c = cir e = ellip b = box

Appendix F
City of Camden Stormwater Fee Calculation

APPENDIX XVIII

STORMWATER FEES

Stormwater Rate

The stormwater rate is imposed on each and every new, renovated, change in use, rehabilitated and/or rebuilt Single-Family Residential Developed Property, Other Residential Developed Property, Non-Residential Developed Property, and Vacant Property, other than Exempt Property, and the owner and non-owner users, and is hereby set as follows:

(a) The Equivalent Stormwater Unit (ESU) rate is **ten dollars and seventy-seven cents (\$10.77)**. The ESU measurement is 1,530 square feet of impervious area.

(b) The stormwater rate imposed on Single-Family Residential Developed Properties shall be categorized into three tiers based on the estimated amount of impervious area as follows:

High - Single-Family Residential Developed Property - greater than one thousand five hundred and seventy-eight (1,578) square feet of estimated impervious area. The ESU shall be 1.25 and the stormwater rate set at **thirteen dollars and forty-six cents (\$13.46)**.

Medium - Single-Family Residential Developed Property - equal to or greater than one thousand four hundred and eighty-five (1,485) square feet and less than or equal to one thousand five hundred and seventy-eight (1,578) square feet of estimated impervious area. The ESU shall be 1.00 and the stormwater rate set at **ten dollars and seventy-seven cents (10.77)**.

Low - Single-Family Residential Developed Property - less than one thousand four hundred and eighty-five (1,485) square feet of estimated impervious area. The ESU shall be .75 and the stormwater rate set at **eight dollars and eight cents (\$8.08)**.

(c) Stormwater charges for all other properties will be based on the following calculation:

$$\begin{aligned} & (\text{Gross Lot Size in sq. ft.} \times \text{Runoff Coefficient}) / 1,530 \text{ sq. ft.} = \# \text{ of ESU} \\ & \# \text{ of ESU} \times \mathbf{\$ 10.77} = \text{Monthly Fee} \end{aligned}$$

$$((339,870 \text{ SF}) \times (0.90)) / 1530 \text{ SF} = 199.93 \text{ ESU}$$

$$(199.93 \text{ ESU}) \times (\$10.77) = \$2,153.25$$

The runoff coefficient assumed for each land use category is shown below:

Land Use

Coefficient Applied

| | |
|--------------------------------|------|
| Bar-Restaurant - Entertainment | .75 |
| Car Sales Lot | .95 |
| Cemetery w/Monuments | .20 |
| Central Business District | 1.00 |
| Common Area | .20 |
| Garage or Misc. Res. | .55 |
| Group Residence | .75 |
| Ind. Warehouse-Factory | .90 |
| Industrial Railway | .85 |
| Institution-Sch.-Church | .90 |
| Misc. Commercial | .90 |
| Mixed Comm.-Res.-Apt. | .75 |
| Multi-Family Apartment | .75 |
| Multi-Family Residential | .40 |
| Office | .91 |
| Parks & Playgrounds | .20 |
| Public Accommodations | .91 |
| Retail | .91 |
| Single Family Attached | .75 |
| Single Family Detached | ESU |
| Sport or Rec. Facility | .60 |
| Utility | .90 |
| Vacant Land Use | .20 |
| Vehicle Related Use | .90 |

Assume 0.90 for
Institution - Hospital

