

**Ross Engineering, LLC
Civil / Structural Engineering**

**909 Islington Street
Portsmouth, NH 03801**

**603-433-7560
alexross@comcast.net**

**Saratoga Way
Project Description**

August 4, 2020

This site review application involves combining Tax Map 212, Lots 112 & 113. Currently there is a garage, a shed, and an area of pavement on these parcels. The existing structures will be removed and a 4 unit multi-family dwelling will be constructed. A new driveway permit off of Saratoga Way will be applied for, underground utilities will be connected in Saratoga Way. The necessary Board of Adjustment approvals were granted for this project at the June 17, 2020 meeting.

Sincerely,

Alex Ross, P.E.
Ross Engineering
909 Islington St. Suite 6
Portsmouth, NH, 03801

Site Plan Review

Saratoga Way, Lots 112 & 113

Portsmouth, New Hampshire

PREPARED FOR:

Raleigh Way Holding Group, LLC

PREPARED BY:

ROSS ENGINEERING, LLC

Civil/Structural Engineering
& Surveying

909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

LIST OF PROJECT PLANS:

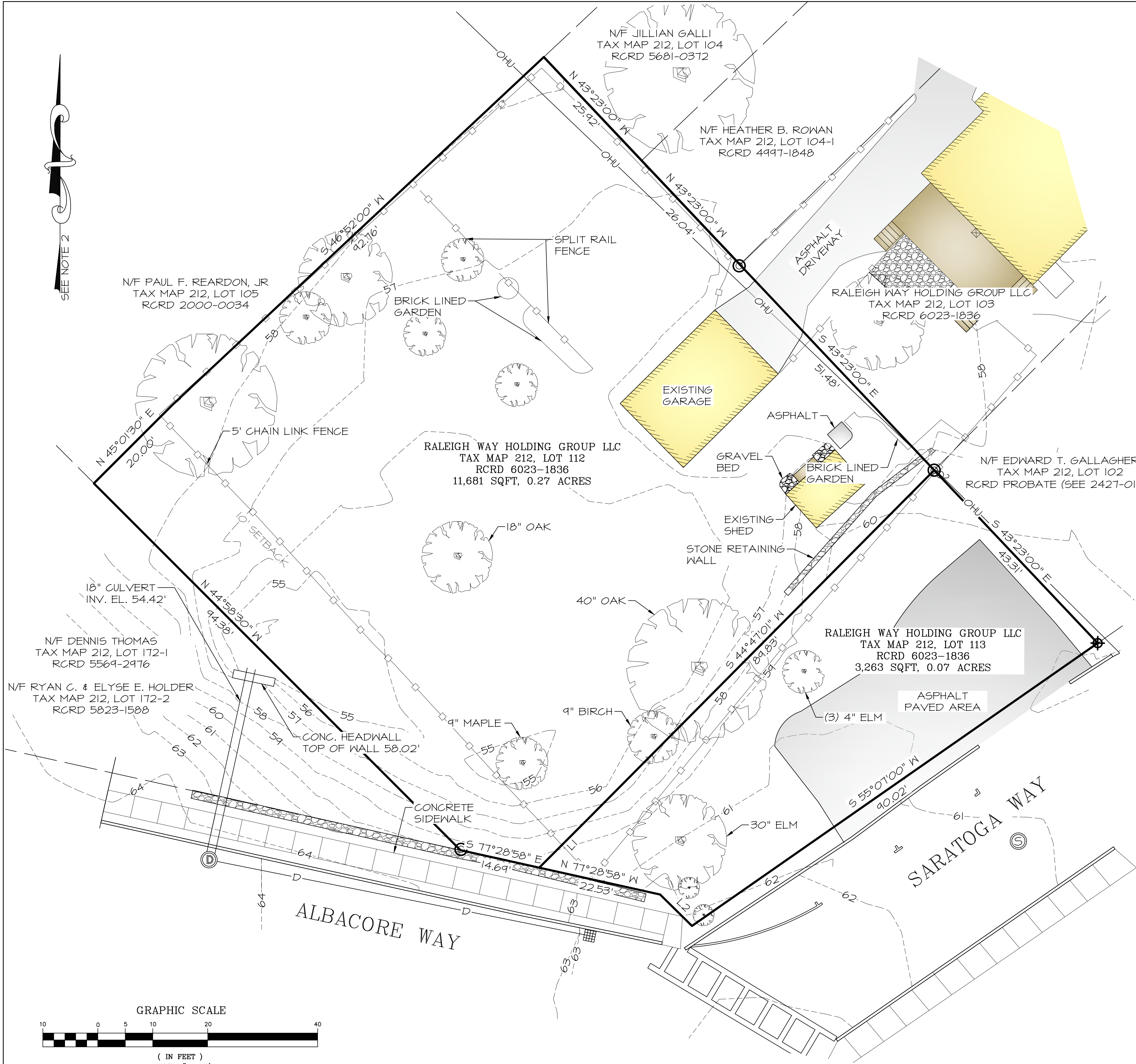
SITE PLAN SET

- 1 - Existing Conditions
- 2 - Site Plan
- 3 - Utility Plan
- 4 - Grading & Drainage
- 5 - Landscape Plan
- 6 - Traffic Plan
- 7 - Erosion Control Plan
- 8 - Details
- 9 - Notes

ARCHITECTURAL PLAN SET

- Color Rendering
- A1 - Proposed West & East Elev.
- A2 - Proposed South & North Elev.
- A3 - First Floor Plan
- A4 - Second Floor Plan
- A5 - Third Floor (Attic) Plan
- A6 - First Floor Plan, Unit #1

September 21, 2020



NOTES

- 1) OWNER OF RECORD:
RALEIGH WAY HOLDING GROUP LLC
1 MIDDLE STREET SUITE 1
PORTSMOUTH, NH 03801
SITE LOCATION:
SARATOGA WAY
TAX MAP 212, LOT 103
RCRD: 6023-1836
AREA: 14,944 SF, 0.34 ACRES
PARCELS 2 AND 3
- 2) BASIS OF BEARING AS PER REF. PLAN #2.
- 3) PARCEL IS IN GENERAL RESIDENCE B ZONE (GRB):
MINIMUM LOT AREA.....5,000 SF
MIN. LOT AREA PER DWELLING UNIT.....5,000 SF
MINIMUM FRONTAGE.....80 FT
MINIMUM DEPTH.....60 FT
SETBACKS:
FRONT.....5 FT
SIDE.....10 FT
REAR.....25 FT
MAXIMUM BUILDING HEIGHT:
SLOPED ROOF.....35 FT
FLAT ROOF.....30 FT
MAXIMUM BUILDING COVERAGE.....30%
MINIMUM OPEN SPACE.....25%
- 4) THE PARCEL IS NOT WITHIN A FEMA FLOOD ZONE,
AS PER FLOOD INSURANCE RATE MAP
#33015C0259E, PANEL 259 OF 681. DATED MAY
17, 2005.

ADDITIONAL ABUTTERS

TAX MAP 212

LOT 36-1
MICHAELB. & LEANNE L. POWER
RCRD: 5642-0310

LOT 37
LISA H. & THOMAS M. CONRAD
RCRD: 5435-1874

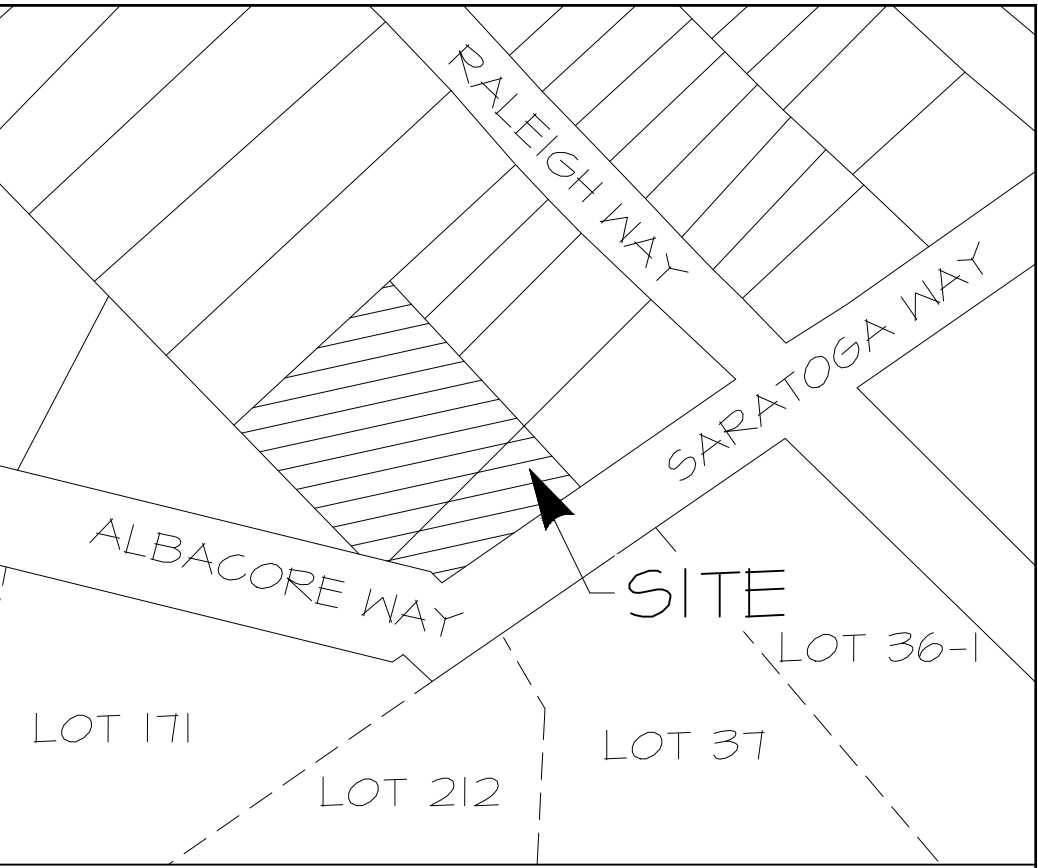
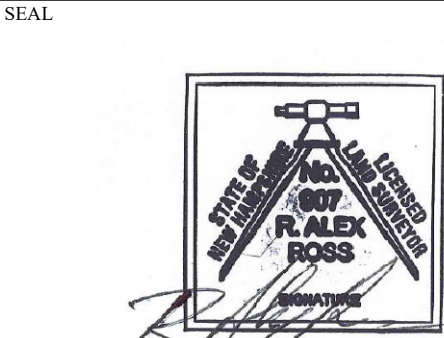
LOT 121
PHA HOUSING DEVELOPMENT, LTD.
RCRD: 5452-0868

LOT 171-01
GEORGE COURTOVICH
RCRD: 4847-0230

LOT 171-02
JEFFREY T. VEINO
RCRD: 4828-0417

- I ALEX ROSS, HEREBY CERTIFY:
- A) THAT THIS SURVEY PLAT WAS PREPARED BY ME OR THOSE UNDER MY DIRECT SUPERVISION.
- B) THIS PLAN IS A RESULT OF FIELD SURVEY PERFORMED BY DDD, MGP & AR DURING NOVEMBER OF 2019 AND JULY 2020. THE ERROR OF CLOSURE IS BETTER THAN 1/15,000. SURVEY PER NHLSA STANDARDS; CATEGORY 1, CONDITION 1.
- C) "I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUB-DIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN."

R. ALEX ROSS DATE



LOCUS PLAN
N.T.S.

REFERENCE PLANS

- 1) "PROPERTY MAP OF ATLANTIC HEIGHTS COMPANY FOR ATLANTIC HEIGHTS DEVELOPERS", BY LOCKWOOD, GREENE & CO. ENGINEERS, JULY, 1919. RCRD 0247.
- 2) "ATLANTIC HEIGHTS CO., PORTSMOUTH, N.H., PLAN SHOWING ADDITIONS TO AND REVISION OF LAYOUT PLAN OF 1919", BY JOHN W. DURGIN, C.E., DATED MAY, 1925. RCRD 0273
- 3) "SUBDIVISION PLAN MAP 212 - LOT 104 FOR JAMES A. MULEY LIVING TRUST & PETER BROWN", BY AMBIT ENGINEERING, DATED SEPTEMBER, 2004. RCRD D-32010.
- 4) "SUBDIVISION PLAN MEADOW VIEW HEIGHTS CHANGING PLACES, LLC", BY AMES MSC ARCHITECTS & ENGINEERS, DATED MAY 2, 2006. RCRD D-33771
- 5) "CONDOMINIUM SITE PLAN "ATLANTIC POINTE" A CONDOMINIUM UNIT OWNERS ASSOCIATION", BY AMES MSC ARCHITECTS & ENGINEERS, DATED JULY 19, 2007. RCRD D-34872
- 6) "AS BUILT ROADWAY PLAN FOR ATLANTIC POINTE BUILDERS, LLC" BY MSC CIVIL ENGINEERS & LAND SURVEYORS, INC. DATED NOV. 17, 2010. NOT RECORDED.

LEGEND

- ⊕ MONUMENT TO BE SET
- ⊙ MONUMENT FOUND
- ⊕ UTILITY POLE
- 6' STOCKADE FENCE
- VERTICAL GRANITE CURB

3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	
SCALE: 1" = 10'			
CHECKED: A.ROSS			
DRAWN: M.G.P.			
CHECKED: A.ROSS			

ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

TITLE
**EXISTING
CONDITIONS**
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER	DWG. NO.	ISSUE
19-097	1 OF 9	3

LEGEND

- MONUMENT TO BE SET
- MONUMENT FOUND
- UTILITY POLE
- 6' STOCKADE FENCE
- VERTICAL GRANITE CURB

- (4) 8.5'x14' PARKING SPACES
- 6" CULVERT (C-1)
- 1' WIDE RETAINING WALL
- 1' WIDE SWALE

NOTES

1) OWNER OF RECORD:
RALEIGH WAY HOLDING GROUP LLC
1 MIDDLE STREET, SUITE 1
PORTSMOUTH, NH 03801
RCRD: 6023-1836
TAX MAP 212, LOTS 112 & 113
AREA: 14,944 SF, 0.34 ACRES
PARCEL 2 AND 3

NOTES (CONT...)

2) PARCEL IS IN GENERAL RESIDENCE B ZONE (GRB):
MINIMUM LOT AREA.....5,000 SF
MIN. LOT AREA PER DWELLING UNIT.....5,000 SF
MINIMUM FRONTAGE.....80 FT
MINIMUM DEPTH.....60 FT
SETBACKS:
FRONT.....5 FT
SIDE.....10 FT
REAR.....25 FT
MAXIMUM BUILDING HEIGHT:
SLOPED ROOF.....35 FT
FLAT ROOF.....30 FT
MAXIMUM BUILDING COVERAGE.....30%
MINIMUM OPEN SPACE.....25%

3) COVERAGES:

BUILDING COVERAGE

EXISTING BUILDING COVERAGE
GARAGE.....397 SF
SHED.....100 SF
EXISTING STRUCTURE.....497 SF
BUILDING COVERAGE 497 / 14,944 = 3.3%

PROPOSED BUILDING COVERAGE

HOUSE.....3840 SF
PORCH.....288 SF
PROPOSED STRUCTURE.....4,128 SF
BUILDING COVERAGE 4,128 / 14,944 = 27.6%

OPEN SPACE

EXISTING OPEN SPACE

BUILDING COVERAGE.....497 SF
ASPHALT.....1249 SF
RETAINING WALL.....35 SF
GRAVEL.....15 SF
TOTAL LOT COVERAGE.....1,796 SF
EXISTING OPEN SPACE = 14,944 - 1,796 = 13,148 SF
EXISTING OPEN SPACE = 13,148 / 14,944 = 88.0%

PROPOSED OPEN SPACE

BUILDING COVERAGE.....4,128 SF
ROOF OVERHANG < 30".....545 SF
ASPHALT DRIVEWAY.....3387 SF
RETAINING WALL.....181 SF
DECK.....220 SF
TOTAL LOT COVERAGE.....8,461 SF
PROPOSED OPEN SPACE = 14,944 - 8,461 = 6,483 SF
PROPOSED OPEN SPACE = 6,483 / 14,944 = 43.4%

4) THIS SITE PLAN SHALL BE RECORDED IN THE
ROCKINGHAM COUNTY REGISTRY OF DEEDS.

5) ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE
CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH
THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE
PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO
THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF
THE PORTSMOUTH PLANNING DIRECTOR.

ALL CONDITIONS ON THIS PLAN SHALL
REMAIN IN EFFECT IN PERPETUITY
PURSUANT TO THE REQUIREMENTS OF
THE SITE PLAN REVIEW REGULATIONS.

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON

DATE

SEAL



3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	

ISS.	DATE	DESCRIPTION OF ISSUE
CHECKED:	A.ROSS	
DRAWN:	M.G.P.	
CHECKED:	A.ROSS	

ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

TITLE
SITE PLAN
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER	DWG. NO.	ISSUE
19-097	2 OF 9	3

GRAPHIC SCALE



(IN FEET)
SCALE: 1" = 10'

9/21/2020	TAC SUBMITTAL	
8/17/2020	TAC SUBMITTAL	
8/4/2020	TAC SUBMITTAL	
DATE	DESCRIPTION OF ISSUE	

SCALE: 1" = 10'

CHECKED: A.ROSS

DRAWN: M.G.P.

CHECKED: A.ROSS

ROSS ENGINEERING, LLC
 Civil/Structural Engineering
 & Surveying
 909 Islington St.
 Portsmouth, NH 03801
 (603) 433-7560

TITLE

**UTILITY
 PLAN**
 for
SARATOGA WAY
 Tax Map 212, Lots 112 & 113
 Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
 1 Middle Street, Suite 1
 Portsmouth, NH 03801

JOB NUMBER	DWG. NO.	ISSUE
19-097	3 OF 9	3

NOTES

- 1) OWNER OF RECORD:
RALEIGH WAY HOLDING GROUP, LLC
1 MIDDLE ST., SUITE 1
PORTSMOUTH NH, 03801
RDRC: 6023-1836
- 2) ASSURE LEAST PRACTICAL DISTURBANCE OF THE PHYSICAL ENVIRONMENT. INSTALL SILTSACKS ON CATCH BASINS A & B AND ON CATCH BASIN 3. FOLLOW NHDES REGULATIONS AND GUIDELINES IN "STORMWATER & EROSION & SEDIMENTATION CONTROL HANDBOOK FOR URBAN & DEVELOPING AREAS IN NEW HAMPSHIRE" LATEST EDITION.
- 3) FOOT PATHS FROM THE SIDEWALK TO THE THE SIDE ENTRY DOOR MUST NOT HAVE A SLOPE GREATER THAN 1":12". THE LANDINGS AT THE TOP AND BOTTOM OF THE STAIRS ARE TO HAVE A SLOPE OF 5%.
- 4) EROSION CONTROL:
-INSTALL "SILTSACK" CATCH BASIN FILTRATION SYSTEM BY ACF ENVIRONMENTAL AT BOTH NEW CATCH BASINS, C.B. A AND C.B. B & EXISTING C.B. 3
-INSTALL INLET FILTER SHOWN ON DRAWING 7 ON CATCH BASINS 1 & 3.
- 5) SNOW DISPOSAL AREA
SNOW TO BE MOVED WEST ALONG THE 24' WIDE PARKING AREA TO THE SWALE.

LEGEND

- ⊙ MONUMENT FOUND
- ⊙ UTILITY POLE
- ⊙ DRAIN MANHOLE
- ⊙ CATCH BASIN
- ⊙ SEWER MANHOLE
- 58 - EXISTING CONTOUR
- 60 - PROPOSED CONTOUR
- 60x50 PROPOSED SPOT ELEVATION

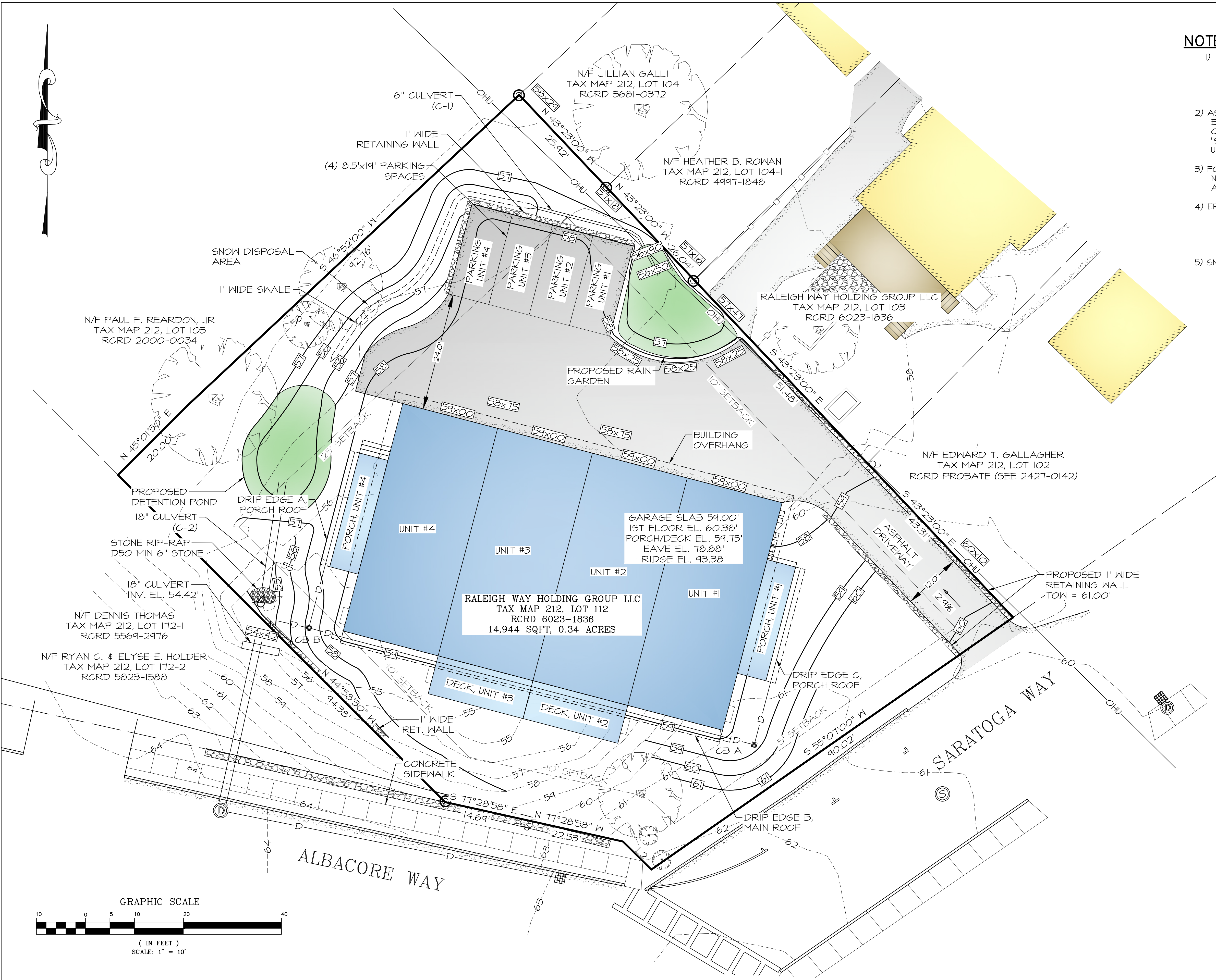
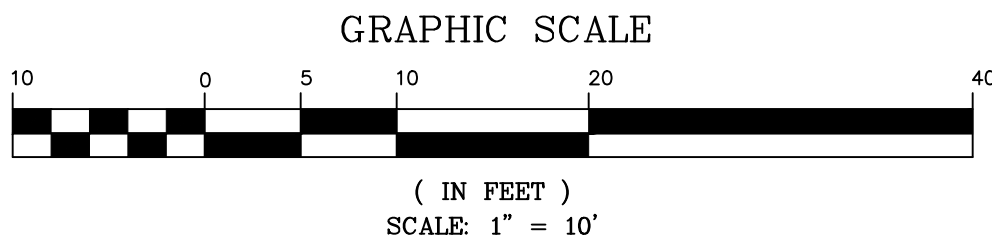
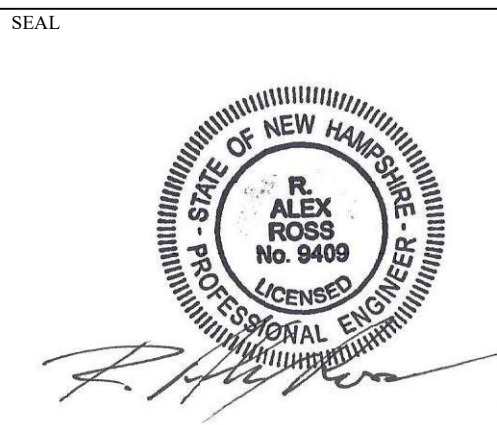
3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	
SCALE: 1" = 10'			
CHECKED: A.ROSS			
DRAWN: M.G.P.			
CHECKED: A.ROSS			

ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

TITLE
**GRADING &
DRAINAGE PLAN**
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER	DWG. NO.	ISSUE
19-097	4 OF 9	3



CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON

DATE

ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

NOTES

- 1) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
- 2) ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

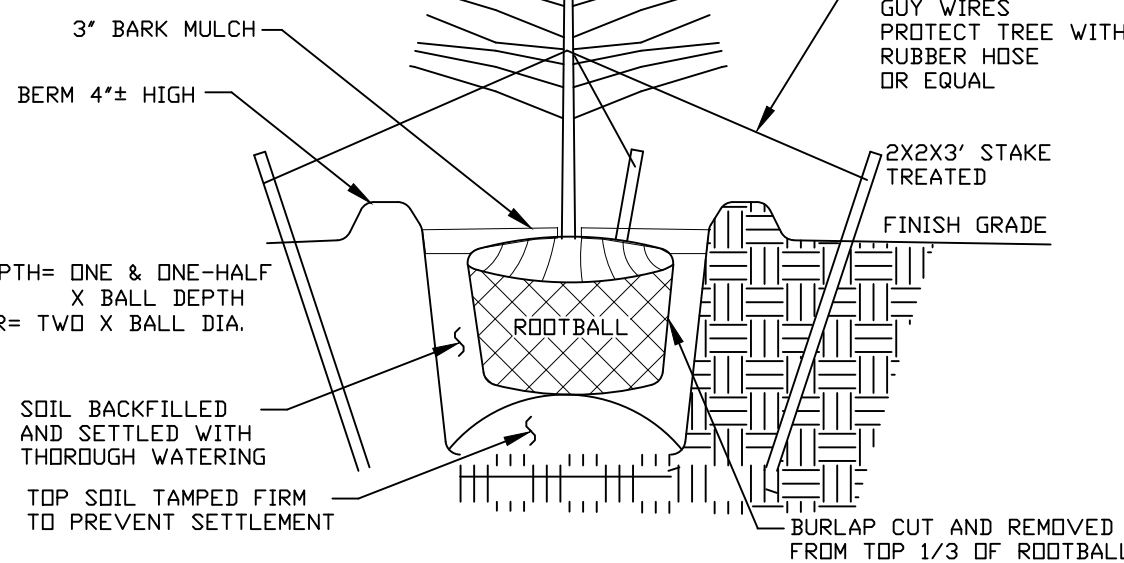
PLANTING NOTES

1. ALL PLANT MATERIALS SHALL BE FIRST QUALITY NURSERY GROWN STOCK.
2. ALL PLANTS SHALL BE PLANTED IN ACCORDANCE WITH NEW HAMPSHIRE LANDSCAPE ASSOCIATION STANDARDS AND GUARANTEED FOR ONE YEAR BY THE LANDSCAPE CONTRACTOR.
3. AFTER PLANTING, ALL PLANTS SHALL BE FLOODED AT THE BASE WITH WATER FROM A SLOW-RUNNING HOSE FOR 5 MINUTES EACH.
4. ALL PLANTS SHALL BE INSTALLED BEFORE ANY GRASS IS SEEDED.
5. ALL SHRUBS AND PLANTING BEDS SHALL BE MULCHED WITH 3" OF DARK BROWN AGED BARK MULCH AS A FINAL STEP. MULCH MUST BE KEPT 2" AWAY FROM BASE OF EACH PLANT.
6. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
7. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
8. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
9. ALL REQUIRED PLANT MATERIALS SHALL BE TENDED AND MAINTAINED IN A HEALTHY GROWING CONDITION, REPLACED WHEN NECESSARY, AND KEPT FREE OF REFUSE AND DEBRIS. ALL REQUIRED FENCES AND WALLS SHALL BE MAINTAINED IN GOOD REPAIR.
10. THE PROPERTY OWNER SHALL BE RESPONSIBLE TO REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE, AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED, AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.

INSTALLATION REQUIREMENTS:

1. THE INSTALLATION OF A DRIP IRRIGATION SYSTEM IS RECOMMENDED TO ASSURE WELL GROWN PLANTS.
2. IN CASE OF DROUGHT (DEFINED AS TWO WEEK PERIOD WITHOUT RAIN) ALL NEW PLANTS SHALL BE WATERED THROUGH NOVEMBER 1ST DURING THE FIRST SEASON IN WHICH THEY ARE INSTALLED. THEY SHALL BE WATERED ONE TIME PER DAY FOR THE FIRST WEEK AFTER INSTALLATION AND THREE TIMES PER WEEK FOR THE REMAINDER OF THE SEASON. AFTER THE FIRST SEASON WHEN THE ROOTS OF THE PLANTS ARE ESTABLISHED THEY WILL NOT REQUIRE WATERING.
3. SOAKER HOSES WOUND THROUGH THE BED NEAR THE BASE OF EACH PLANT ARE THE RECOMMENDED METHOD OF WATERING DURING THE FIRST SEASON. THESE CAN BE REMOVED AFTER NOVEMBER 30TH WHEN THE PLANTS ARE ESTABLISHED.

NOTE: TREE/SHRUB SHALL BEAR SAME RELATIONSHIP TO FINISHED GRADE AS IT BORE TO NURSERY OR FIELD GRADE.



PLANTING DETAIL

N.T.S.

LEGEND



Grassed Area



Hosta 'Minute Man'



Hosta 'Big Daddy'



Hosta 'Sun & Substance'



Hydrangea paniculata 'Limelight'



Spiraea nipponica 'Snowmound'



Thuja occidentalis 'Nigra'



Tsuga canadensis



QUERCUS rubra

3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	
SCALE: 1" = 10'			
CHECKED: A.ROSS			
DRAWN: M.G.P.			
CHECKED: A.ROSS			

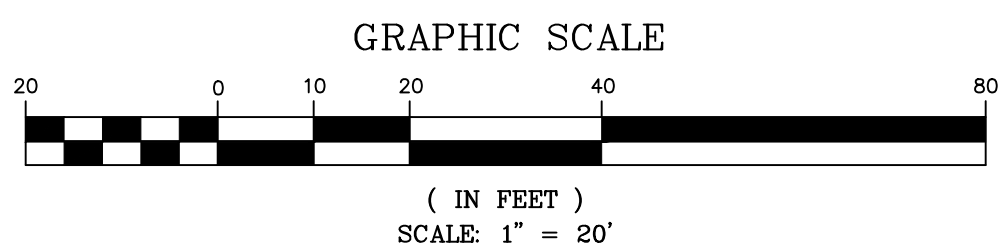
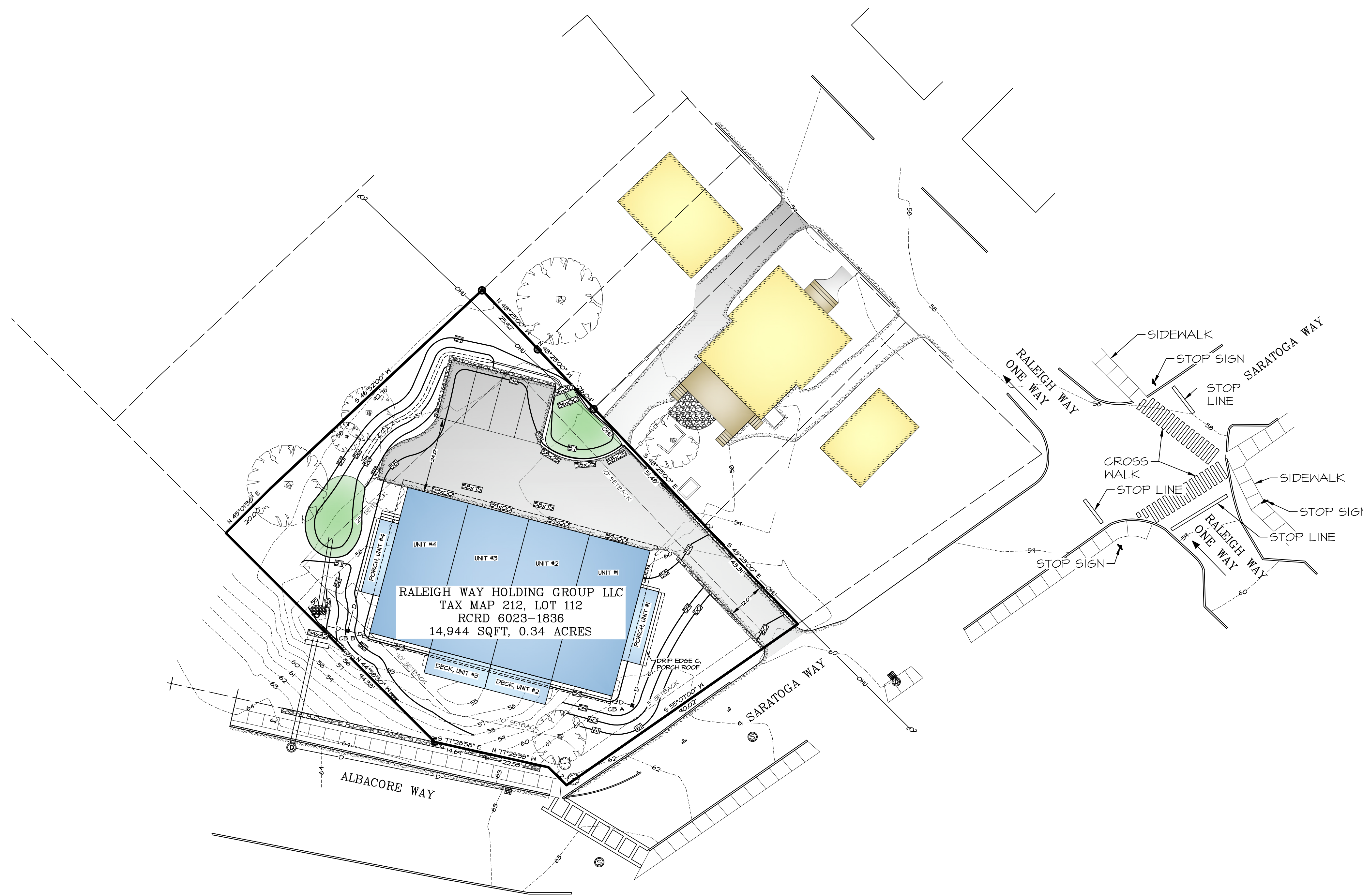
ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

TITLE
**LANDSCAPE
PLAN**
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER	DWG. NO.	ISSUE
19-097	5 OF 9	3

BOTANICAL/COMMON NAME	NOTES:	MATURE SIZE	POT SIZE	QTY:
Hosta 'Big Daddy'	Shade tolerant, leafy perennial	24" T x 36" W	1 G	6
Hosta 'Minute Man'	Sun tolerant, leafy perennial	18" T x 30" W	1 G	5
Hosta 'Sun & Substance'	Sun & Shade tolerant, leafy perennial	36" T x 48" W	1 G	5
Hydrangea paniculata 'Limelight'	Deciduous flowering shrub	6' T x 6' W	6 G	3
Spiraea nipponica 'Snowmound'	Deciduous flowering shrub	4-5' T x 4-5' W	5 G	6
Thuja occidentalis 'Nigra': Arborvitae	Pyramidal evergreen hedging shrub	20-30' T x 5-10' W	6-7' BB	4
Tsuga canadensis: Canadian Hemlock	Evergreen shade tolerant tree	60' T x 20-30' W	5-6' BB	1
Quercus rubra: Red Oak	Hardy, deciduous shade tree	60' T x 60' W	2.5-3' C	1

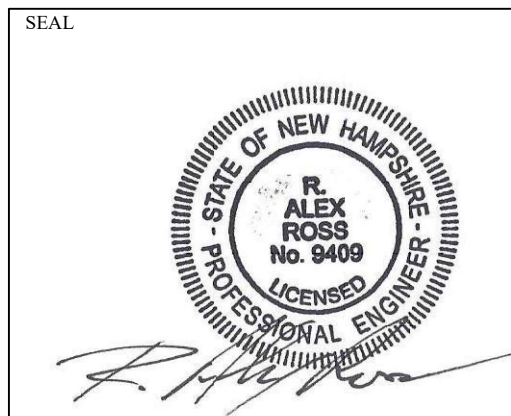


3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	

SCALE:	1" = 20'
CHECKED:	A.ROSS
DRAWN:	M.G.P.
CHECKED:	A.ROSS

ROSS ENGINEERING, LLC
Civil/Structural Engineering
& Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

TITLE		
ROADWAY PLAN for SARATOGA WAY Tax Map 212, Lots 112 & 113 Portsmouth, NH		
OWNER OF RECORD Raleigh Way Holding Group, LLC 1 Middle Street, Suite 1 Portsmouth, NH 03801		
JOB NUMBER	DWG. NO.	ISSUE
19-097	6 OF 9	3



EROSION AND SEDIMENTATION CONTROL
CONSTRUCTION PHASING AND SEQUENCING

1. SEE "EROSION AND SEDIMENTATION CONTROL GENERAL NOTES" WHICH ARE TO BE AN INTEGRAL PART OF THIS PROCESS.
2. INSTALL SILT/SOXX FENCING AS PER DETAILS AND AT SEDIMENT MIGRATION.
3. CONSTRUCT TREATMENT SWALES, LEVEL SPREADERS AND DETENTION STRUCTURES AS DEPICTED ON DRAWINGS.
4. INSTALL TEMPORARY GRAVEL CONSTRUCTION ENTRANCE(S) AS PER DETAIL AND AT LOCATIONS SHOWN ON THE DRAWINGS. MAINTAIN (TOP DRESS) REGULARLY TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC STREETS.
5. STRIP AND STOCKPILE TOPSOIL. STABILIZE PILES OF SOIL CONSTRUCTION MATERIAL & COVER WHERE PRACTICABLE.
6. MINIMIZE DUST THROUGH APPROPRIATE APPLICATION OF WATER OR OTHER DUST SUPPRESSION TECHNIQUES ON SITE.
7. ROUGH GRADE SITE. INSTALL CULVERTS AND ROAD DITCHES.
8. FINISH GRADE AND COMPACT SITE.
9. RE-SPREAD AND ADD TOPSOIL TO ALL ROADSIDE SLOPES. TOTAL TOPSOIL THICKNESS TO BE A MINIMUM OF FOUR TO SIX INCHES.
10. STABILIZE ALL AREAS OF BARE SOIL WITH MULCH AND SEEDING.
11. RE-SEED PER EROSION AND SEDIMENTATION CONTROL GENERAL NOTES.
12. SILT /SOXX FENCING TO REMAIN AND BE MAINTAINED FOR TWENTY FOUR MONTHS AFTER CONSTRUCTION TO ENSURE ESTABLISHMENT OF ADEQUATE SOIL STABILIZATION AND VEGETATIVE COVER. ALL SILT /SOXX FENCING ARE THEN TO BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.
13. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.
14. ALL TEMPORARY WATER DIVERSION (SWALES, BASINS, ETC. MUST BE USED AS NECESSARY UNTIL AREAS ARE STABILIZED.
15. PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE - BEFORE ROUGH GRADING THE SITE.
16. ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM
17. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 12 HOURS OF ACHIEVING FINISHED GRADE.
18. ALL CUT AND FILL OFES SHALL BE SEEDED/LOAMED WITHIN 12 HOURS OF ACHIEVING FINISH GRADE.
19. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL.
20. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
21. LOT DISTURBANCE, OTHER THAN THAT SHOWN ON THE APPROVED PLANS, SHALL NOT COMMENCE UNTIL AFTER THE ROADWAY HAS THE BASE COURSE TO DESIGN ELEVATION AND THE ASSOCIATED DRAINAGE IS COMPLETE AND STABLE.

PLANTING NOTES:

1. ALL PLANT MATERIALS SHALL BE FIRST QUALITY NURSERY GROWN STOCK.
2. ALL PLANTS SHALL BE PLANTED IN ACCORDANCE WITH NEW HAMPSHIRE LANDSCAPE ASSOCIATION STANDARDS AND GUARANTEED FOR ONE YEAR BY THE LANDSCAPE CONTRACTOR.
3. ALL TREES AND SHRUBS SHALL HAVE WATER SAUCERS BUILT AROUND THEIR BASES AND THESE SHALL BE MULCHED WITH 4" OF DARK BROWN AGED BARK MULCH. MULCH MUST BE KEPT 2" AWAY FROM THEIR TRUNKS.
4. ALL TREES AND SHRUBS SHALL BE PLANTED AND MULCHED BEFORE LAWN IS SEEDED.

MAINTENANCE REQUIREMENTS:

1. ALL TREES, SHRUBS, AND PERENNIALS WILL NEED TO BE WATERED THROUGH THANKSGIVING DURING THE FIRST SEASON IN WHICH THEY ARE INSTALLED.
2. AN UNDERGROUND DRIP IRRIGATION SYSTEM IS RECOMMENDED. IF AN UNDERGROUND DRIP IRRIGATION SYSTEM IS NOT INSTALLED, SOAKER HOSES WOUND THROUGHOUT PLANTING BEDS ARE ACCEPTABLE. ALTHOUGH OVERHEAD SPRINKLERS ARE RECOMMENDED FOR LAWN AREAS, THEY ARE NOT ACCEPTABLE FOR IRRIGATING TREES AND SHRUBS.

SEEDING AND STABILIZATION FOR LOAMED SITE:

FOR TEMPORARY & LONG TERM SEEDINGS USE AGWAY'S SOIL CONSERVATION GRASS SEED OR EQUAL
COMPONENTS: ANNUAL RYE GRASS, PERENNIAL RYE GRASS, WHITE CLOVER, 2 FESCUES, SEED AT A RATE OF 100 POUNDS PER ACRE,
FERTILIZER & LIME:
NITROGEN (N) 50 LBS/ACRE, PHOSPHATE (P2O5) 100 LBS/ACRE, POTASH (K2O) 100 LBS/ACRE, LIME 2000 LBS/ACRE
MULCH:
HAY OR STRAW 1.5-2 TONS/ACRE

A) GRADING AND SHAPING

- 1) SLOPES SHALL NOT BE STEEPER THAN 2:1; 3:1 SLOPES OR FLATTER ARE PREFERRED. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.

B) SEED BED PREPARATION

- 1) SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
- 2) STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND MIX FERTILIZER AND LIME INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.

EROSION AND SEDIMENTATION CONTROL GENERAL NOTES

1. CONDUCT ALL CONSTRUCTION IN A MANNER AND SEQUENCE THAT CAUSES THE LEAST PRACTICAL DISTURBANCE OF THE PHYSICAL ENVIRONMENT, BUT IN NO CASE SHALL EXCEED 2 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
3. ALL DITCHES, SWALES AND PONDS MUST BE STABILIZED PRIOR TO DIRECTING FLOW TO THEM.
4. ALL GROUND AREAS OPENED UP FOR CONSTRUCTION WILL BE STABILIZED WITHIN 24 HOURS OF EARTH-DISTURBING ACTIVITIES BEING CEASED, AND WILL BE FULLY STABILIZED NO LONGER THAN 14 DAYS AFTER INITIATION. (SEE NOTE II FOR DEFINITION OF STABLE). ALL SOILS FINISH GRADED MUST BE STABILIZED WITHIN SEVENTY TWO HOURS OF DISTURBANCE. ALL TEMPORARY OR LONG TERM SEEDING MUST BE APPLIED TO COMPLY WITH "WINTER CONSTRUCTION NOTES" (SEE WINTER CONSTRUCTION NOTES). EMPLOY TEMPORARY EROSION AND SEDIMENTATION CONTROL DEVICES AS DETAILED ON THIS PLAN AS NECESSARY UNTIL ADEQUATE STABILIZATION HAS BEEN ASSURED (SEE NOTE II FOR DEFINITION OF STABLE).
5. TEMPORARY & LONG TERM SEEDING: USE SEED MIXTURES, FERTILIZER, LIME AND MULCHING AS RECOMMENDED (SEE SEEDING AND STABILIZATION NOTES).
6. SILT/SOXX FENCING TO BE SECURELY EMBEDDED AND STAKED AS DETAILED. WHEREVER POSSIBLE A VEGETATED STRIP OF AT LEAST TWENTY FIVE FEET IS TO BE KEPT BETWEEN SILT/SOXX AND ANY EDGE OF WET AREA.
7. SEEDED AREAS WILL BE FERTILIZED AND RE-SEEDED AS NECESSARY TO ENSURE VEGETATIVE ESTABLISHMENT.
8. SEDIMENT BASIN(S), IF REQUIRED, TO BE CHECKED AFTER EACH SIGNIFICANT RAINFALL AND CLEANED AS NEEDED TO RETAIN DESIGN CAPACITY.
9. SILT/SOXX FENCING WILL BE CHECKED REGULARLY AND AFTER EACH SIGNIFICANT RAINFALL. NECESSARY REPAIRS WILL BE MADE TO CORRECT UNDERMINING OR DETERIORATION OF THE BARRIER AS WELL AS CLEANING, REMOVAL AND PROPER DISPOSAL OF TRAPPED SEDIMENT.
10. TREATMENT SWALES WILL BE CHECKED WEEKLY AND REPAIRED WHEN NECESSARY UNTIL ADEQUATE VEGETATIVE COVER HAS BEEN ESTABLISHED.
11. AN AREA SHALL BE CONSIDERED FULLY STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
 - BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
 - A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
 - A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP RAP HAS BEEN INSTALLED.
 - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
12. ALL EROSION AND SEDIMENTATION CONTROL MEASURES IN THE PLAN SHALL MEET THE DESIGN BASED ON STANDARDS AND SPECIFICATIONS SET FORTH IN THE STORM WATER MANAGEMENT AND EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE (DECEMBER 2008 OR LATEST) PREPARED BY ROCKINGHAM COUNTY CONSERVATION DISTRICT, N.H. DES AND NRCS.

WINTER CONSTRUCTION NOTES

1. ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1 AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENT;
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS;
3. AFTER OCTOBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.

LONG TERM SEEDING

*WELL TO MODERATELY WELL DRAINED SOILS

FOR CUT AND FILL AREA AND FOR WATERWAYS AND CHANNELS

SEEDING MIXTURE C

	lb/ACRE	lb/1000S.F.
TALL FESCUE	20	0.45
CREeping RED FESCUE	20	0.45
RED CLOVER (ALSIKE)	20	0.45
TOTAL	48	1.35

LIME: AT 2 TONS PER ACRE OR 100 LBS PER 1,000 S.F.
FERTILIZER: 10 20 20 (NITROGEN, PHOSPHATE, POTASH AT 500# PER ACRE.
MULCH: HAY OR CLEAN STRAW; 2 TONS/ACRE OR 2 BALES/1000 S.F.

GRADING AND SHAPING:

SLOPES SHALL NOT BE STEEPER THAN 2 TO 1. 3 TO 1 OR FLATTER SLOPES ARE PREFERRED.

SEEDBED PREPARATION:

SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
STONES LARGER THAN FOUR INCHES AND TRASH SHOULD BE REMOVED.
SOD SHOULD BE TILLED TO A DEPTH OF FOUR INCHES TO PREPARE SEEDBED.
FERTILIZER & LIME SHOULD BE MIXED INTO THE SOIL.

THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.

* FROM: STORMWATER MANAGEMENT AND EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE, DECEMBER 2008.

SHORT TERM SEEDING

*WELL TO MODERATELY WELL DRAINED SOILS

FOR CUT AND FILL AREA AND FOR WATERWAYS AND CHANNELS

SEEDING MIXTURE C

	#/ACRE	#/1000S.F.
FOR APRIL 1 - AUGUST 15		
ANNUAL RYE GRASS	40	1
FOR FALL SEEDING		
WINTER RYE	112	2.5

LIME: AT 1 TON PER ACRE OR 100 LBS PER 1,000 S.F.
FERTILIZER: 10 10 10 (NITROGEN, PHOSPHATE, POTASH AT 500# PER ACRE.
MULCH: HAY OR CLEAN STRAW; 2 TONS/ACRE OR 2 BALES/1000 S.F.

GRADING AND SHAPING:

SLOPES SHALL NOT BE STEEPER THAN 2 TO 1. 3 TO 1 OR FLATTER SLOPES ARE PREFERRED.

SEEDBED PREPARATION:

SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
STONES LARGER THAN FOUR INCHES AND TRASH SHOULD BE REMOVED.
SOD SHOULD BE TILLED TO A DEPTH OF FOUR INCHES TO PREPARE SEEDBED.
FERTILIZER & LIME SHOULD BE MIXED INTO THE SOIL.

THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.

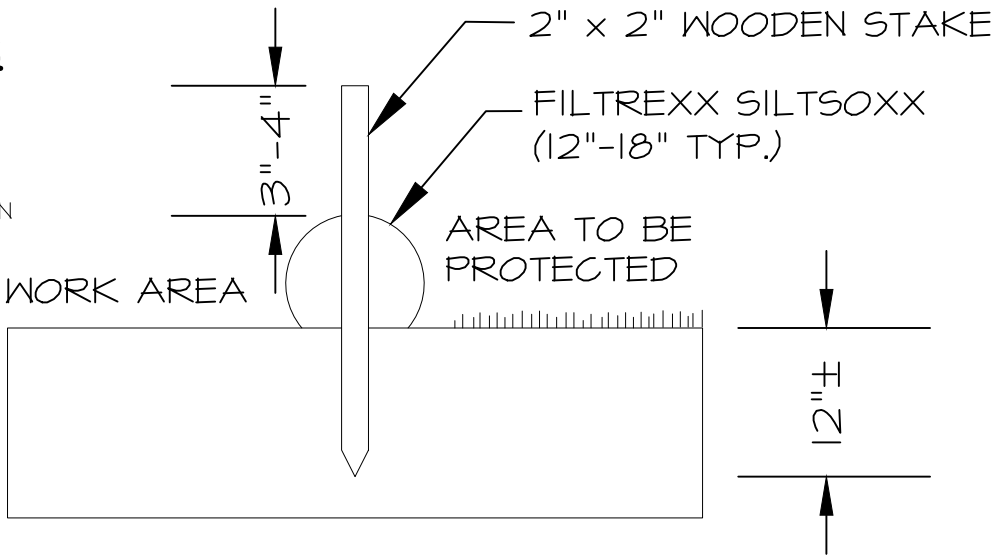
* FROM: STORMWATER MANAGEMENT AND EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE, DECEMBER 2008.

WHEN PROPOSED FOR ALTERATION DURING CONSTRUCTION AS BEING INFESTED WITH INVASIVE SPECIES SHALL BE MANAGED APPROPRIATELY USING THE DISPOSAL PRACTICES IDENTIFIED IN "NHDOT - BEST MANAGEMENT PRACTICES FOR ROADSIDE INVASIVE PLANTS -2008" AND "METHODS FOR DISPOSING NON-NATIVE INVASIVE PLANTS - UNH COOPERATIVE EXTENSION - 2010"

SEED MIXES SHALL NOT CONTAIN ANY SPECIES IDENTIFIED BY THE NEW HAMPSHIRE PROHIBITED INVASIVE PLANT SPECIES LIST.

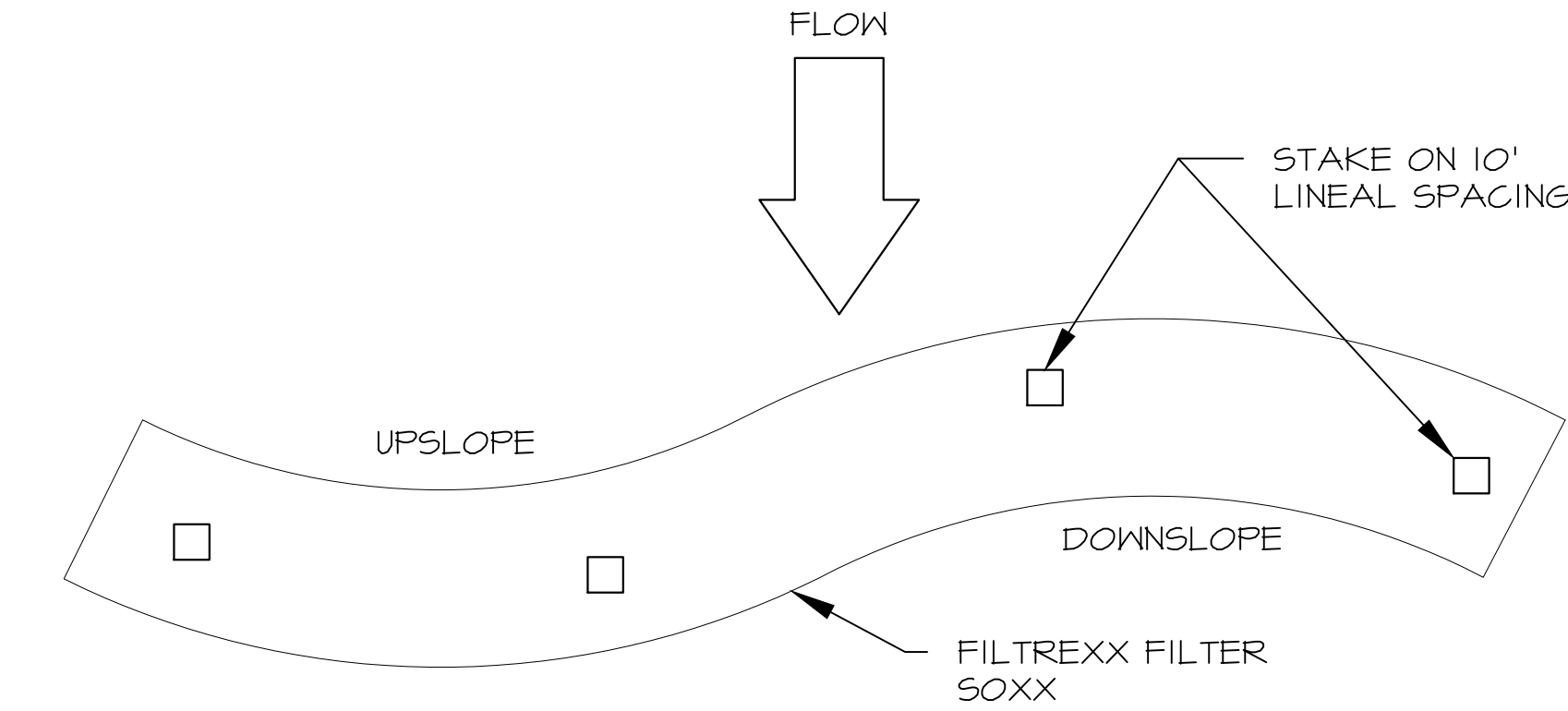
FILTREXX SILT/SOXX NOTES

- 1) ALL MAERTIAL TO MEET FILTREXX SPECIFICATIONS
- 2) SILT/SOXX COMPOST, SOIL, ROCK, SEED FILL TO MEET APPLICATION REQUIREMENTS



Filtrex SiltSoxx Section

N.T.S.



Filtrex SiltSoxx Plan View

N.T.S.

TRENCH NOTES - STORM DRAIN:

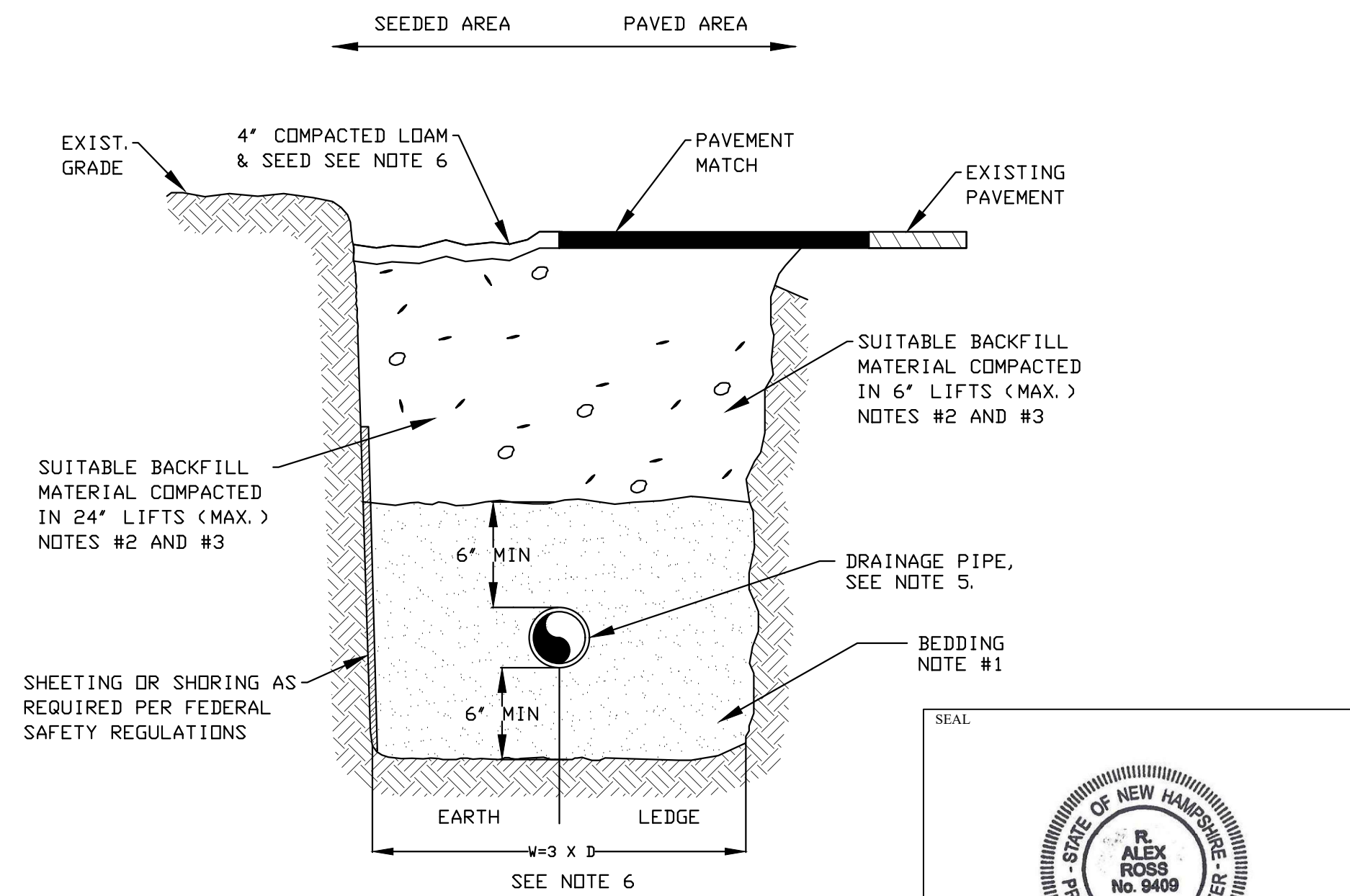
- 1) **BEDDING:** BEDDING FOR PIPES SHALL CONSIST OF PREPARING THE BOTTOM OF THE TRENCH TO SUPPORT THE ENTIRE LENGTH OF THE PIPE AT A UNIFORM SLOPE AND ALIGNMENT. CRUSHED STONE SHALL BE USED TO BED THE PIPE TO THE ELEVATION SHOWN ON THE DRAWINGS. NDRMAL PIPE BEDDING IS CRUSHED STONE TO THE HAUNCH OF THE PIPE AND SAND BEDDING 6" ABOVE THE CROWN. IF THE TOP OF THE PIPE IS LESS THAN 30" FROM FINISH GRADE, BED PIPE COMPLETELY IN STONE UP TO 6" ABOVE PIPE CROWN. UNDERDRAIN TO HAVE 4" MIN' OF STONE OVER PIPE OR AS NECESSARY TO BE IN CONTACT WITH GRAVEL LAYER OF SELECTS ABOVE.
- 2) **COMPACTION:** ALL BACKFILL SHALL BE COMPACTED AT OR NEAR OPTIMUM MOISTURE CONTENT BY PNEUMATIC TAMPERS, VIBRATORY COMPACTORS OR OTHER APPROVED MEANS. BACKFILL BENEATH PAVED SURFACES SHALL BE COZMPACTED TO NOT LESS THAN 95 PERCENT OF AASHTO T99, METHOD C.
- 3) **SUITABLE MATERIAL:** IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ROCKS OVER 6 INCHES IN LARGEST DIMENSION; FROZEN EARTH AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.

IN SEEDED AREAS, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAD, ROCKS UNDER 12", FROZEN EARTH OR CLAY, IF HE/SHE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EAST ACCESS TO THE PIPE WILL BE PRESERVED.

- 4) **BASE COURSE AND PAVEMENT:** SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY.

- 5) **DRAINAGE PIPE:** PIPE MATERIALS SHALL BE POLYETHYLENE (SEE SPECIFICATIONS).

- 6) **W=MAXIMUM ALLOWABLE TRENCH WIDTH:** W SHALL BE THE MAXIMUM PAYMENT WIDTH FOR ROCK EXCAVATION (TRENCH) AND FOR ORDERED EXCAVATION BELOW GRADE.



TRENCH DETAIL-STORM DRAIN

Scale : N.T.S.

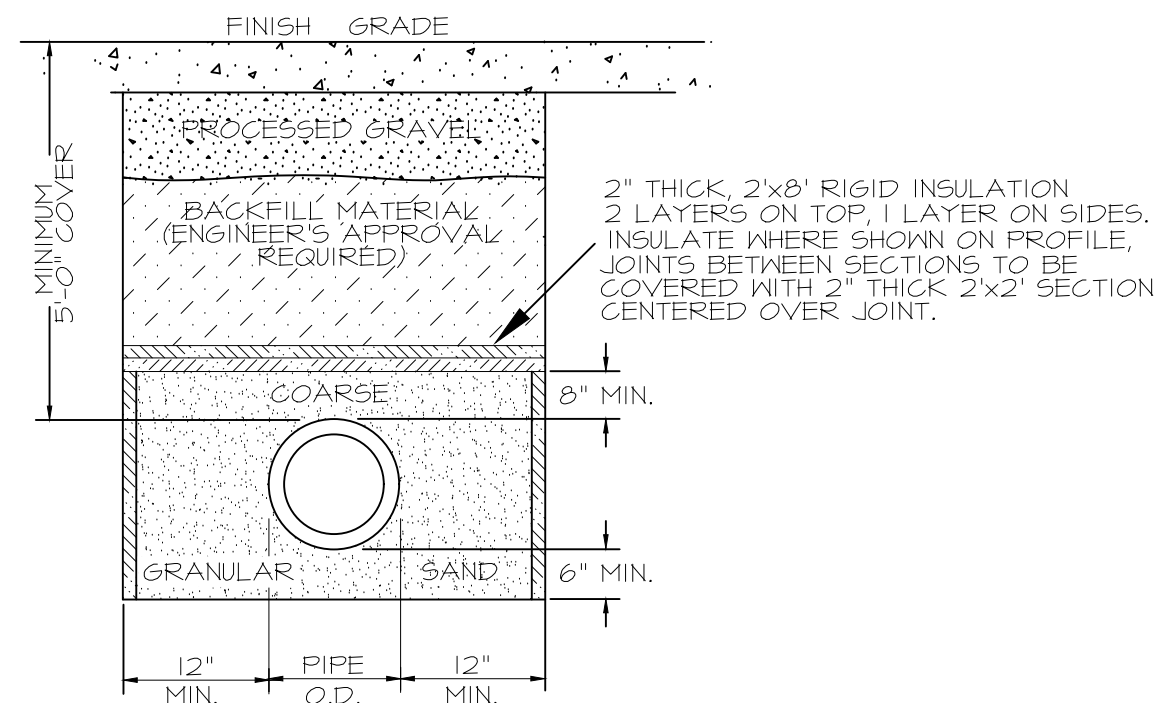
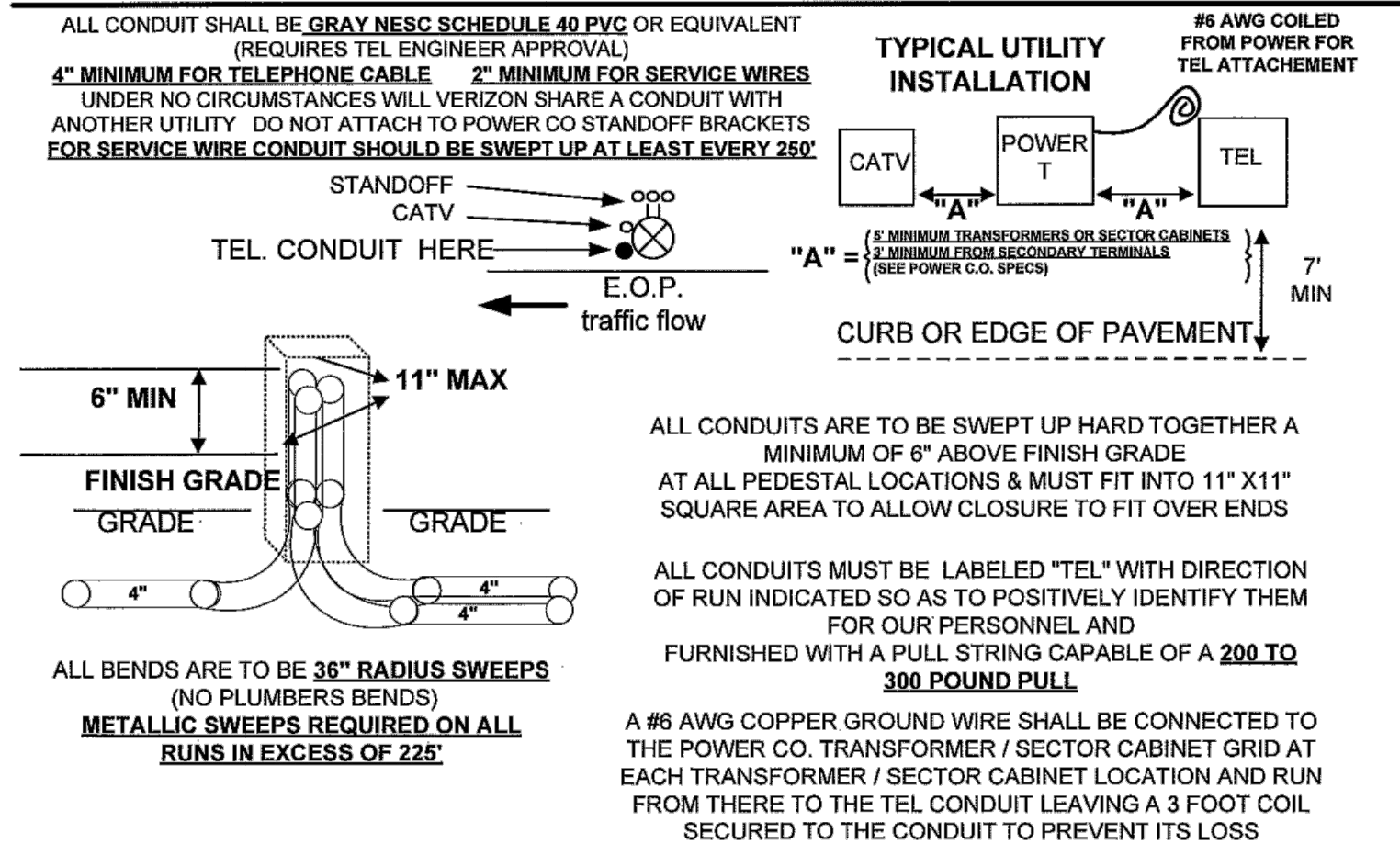
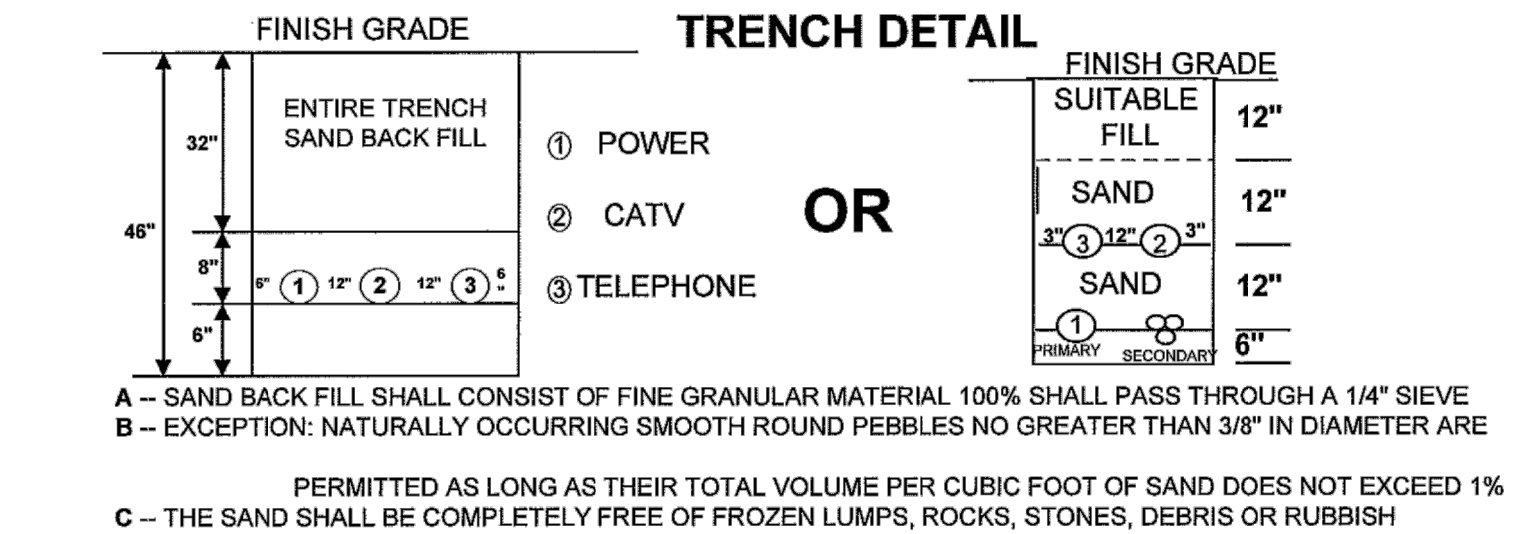
3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	
SCALE:	1" = 10'		
CHECKED:	A.ROSS		
DRAWN:	M.G.P.		
CHECKED:	A.ROSS		
ROSS ENGINEERING, LLC Civil/Structural Engineering & Surveying 909 Islington St. Portsmouth, NH 03801 (603) 433-7560			
TITLE EROSION CONTROL PLAN for SARATOGA WAY Tax Map 212, Lots 112 & 113 Portsmouth, NH			
OWNER OF RECORD Raleigh Way Holding Group, LLC 1 Middle Street, Suite 1 Portsmouth, NH 03801			
JOB NUMBER	DWG. NO.	ISSUE	
19-097	7 OF 9	3	



ENGINEER:
TELEPHONE:

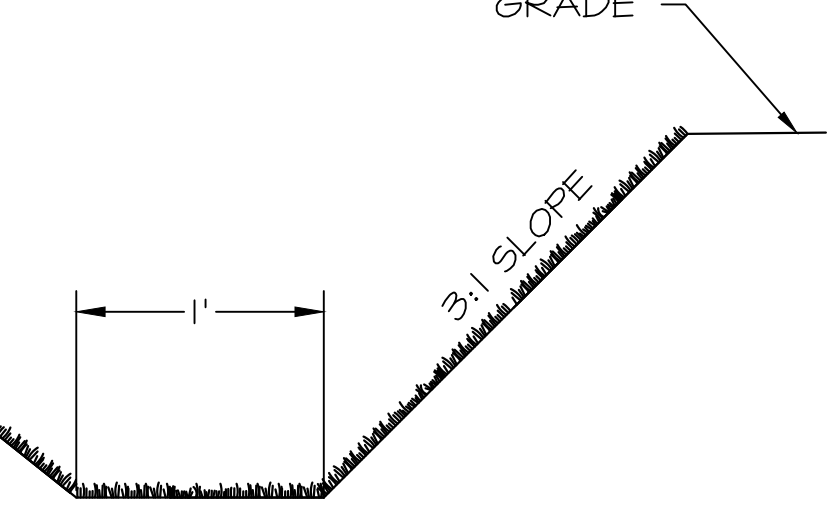
CONDUIT SPECIFICATIONS

ANY DEVIATION FROM OUTLINED SPECIFICATIONS MUST BE AGREED TO IN ADVANCE BY VERIZON ENGINEER.
IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE CONDUIT THROUGH WHICH CABLE CAN BE SUCCESSFULLY PULLED. THE CONTRACTOR IS RESPONSIBLE FOR ALL EXPENSE ASSOCIATED WITH THE REPAIR OF CONDUIT THAT CANNOT BE USED BY VERIZON. VERIZON RESERVES THE RIGHT TO REQUIRE INSPECTION OF CONDUIT PRIOR TO BACK FILLING TO ENSURE COMPLIANCE.



- NOTE:
- SEE SITE PLAN FOR PIPE SIZES AND SERVICES.
 - WATER PIPE TO BE DUCTILE IRON (DI) CLASS 52.
 - CONTRACTOR TO REVIEW ALL UTILITIES WITH PORTSMOUTH DPW.

Waterline Installation

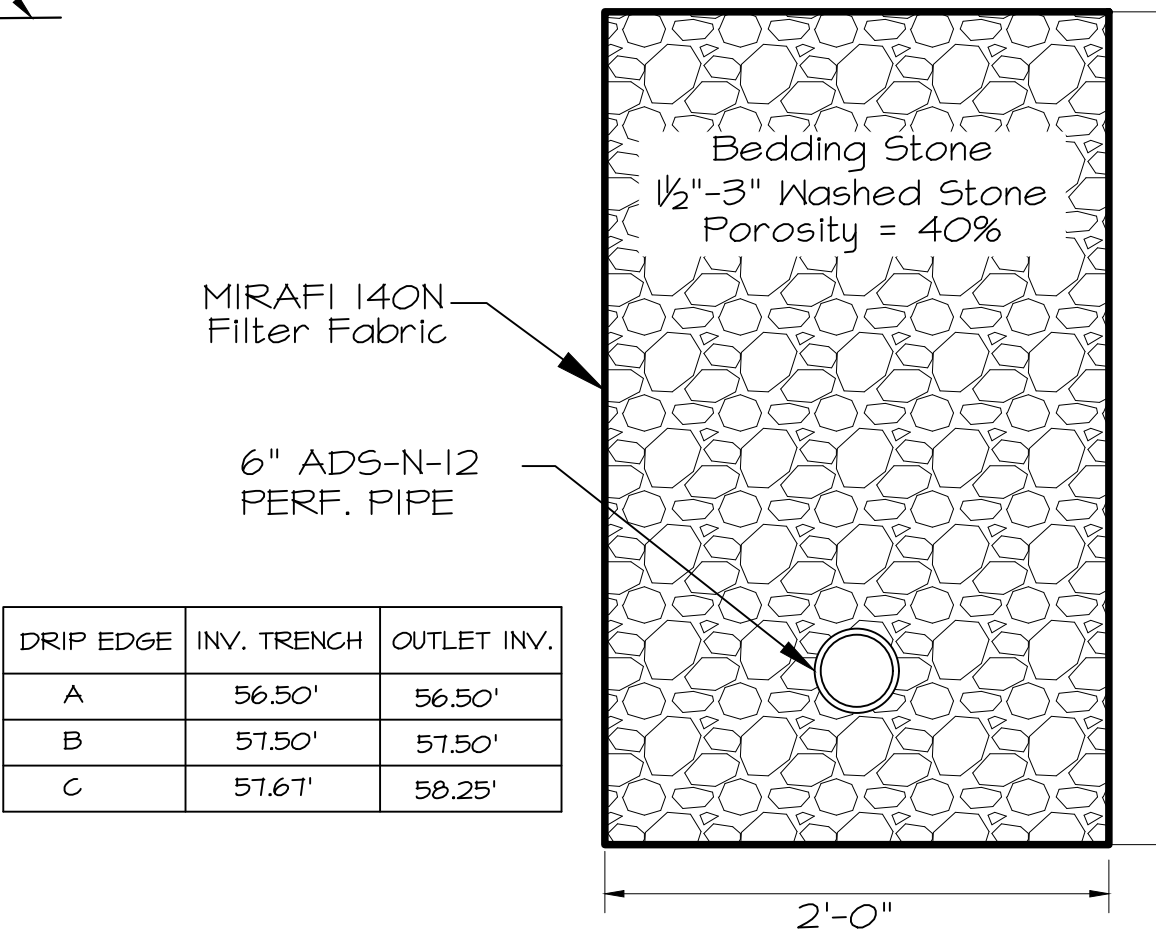


TYPICAL SWALE DETAIL

Scale : NTS

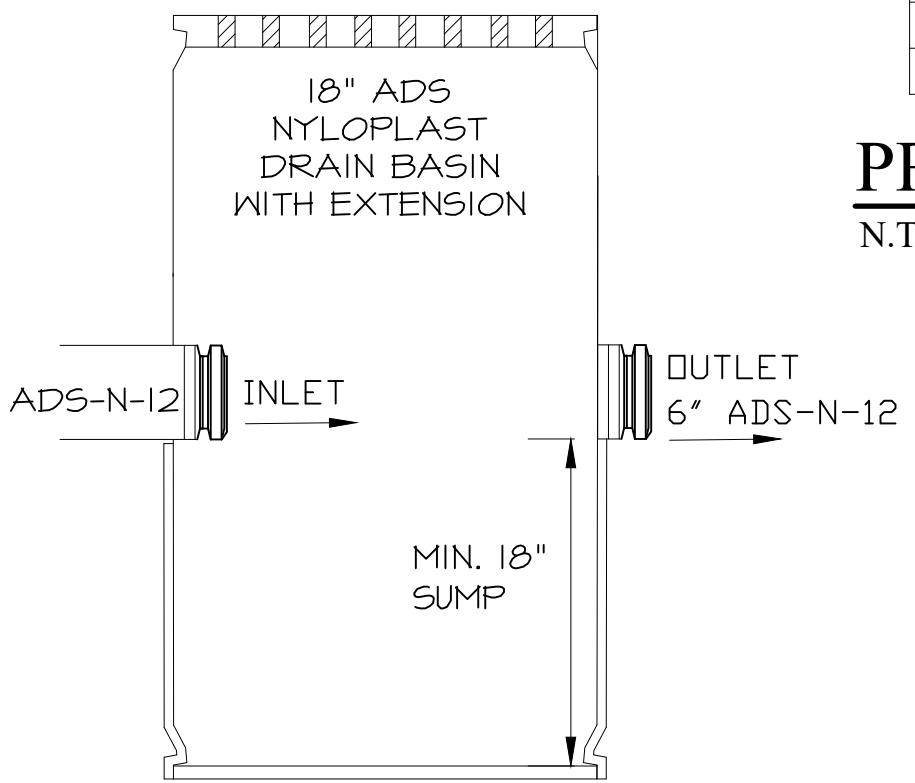
CRUSHED STONE BEDDING *	SIEVE SIZE	% PASSING BY WEIGHT
1"	100	
3/4"	90 - 100	
3/8"	20 - 55	
#4	0 - 10	
#6	0 - 5	

* EQUIVALENT TO STANDARD STONE SIZE #67 - SECTION 103 OF NHDOT NHDOT STANDARD SPECIFICATIONS



DRIP EDGE DETAIL

N.T.S.



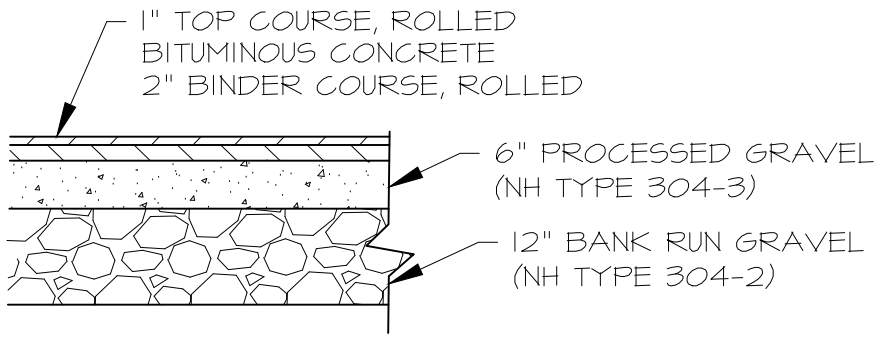
TYP. PROPOSED CATCH BASIN

N.T.S.

#	DESCRIPTION	TYPE	INLET	OUTLET	LENGTH
C-1	CULVERT FROM RAIN GARDEN	6" ADS N-12	56.25'	56.00'	31.00'
C-2	CULVERT FROM DET. POND	18" ADS N-12	55.70'	54.50'	22.00'

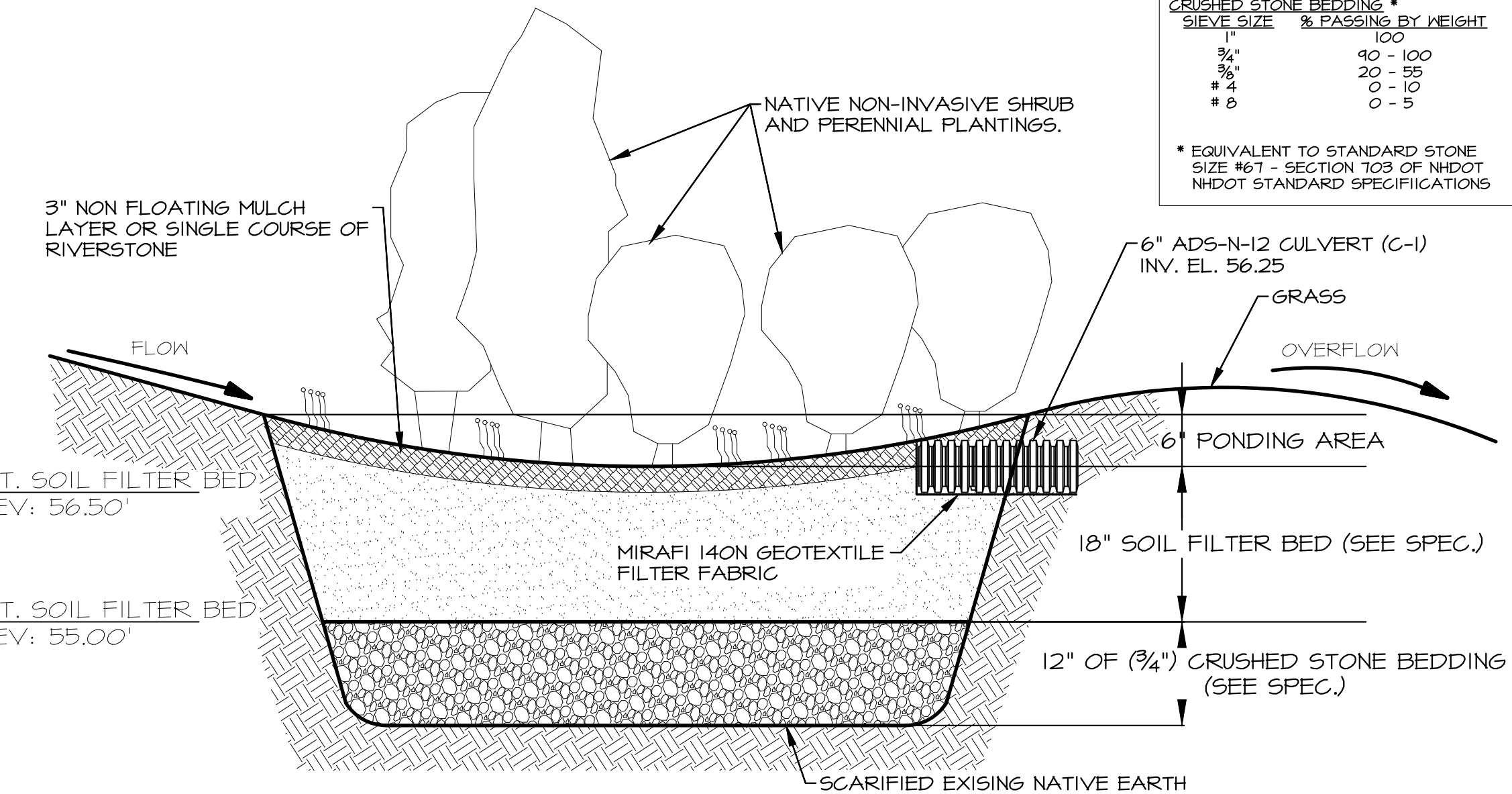
PROPOSED CULVERT DESCRIPTION

N.T.S.



PAVEMENT DETAIL

N.T.S.

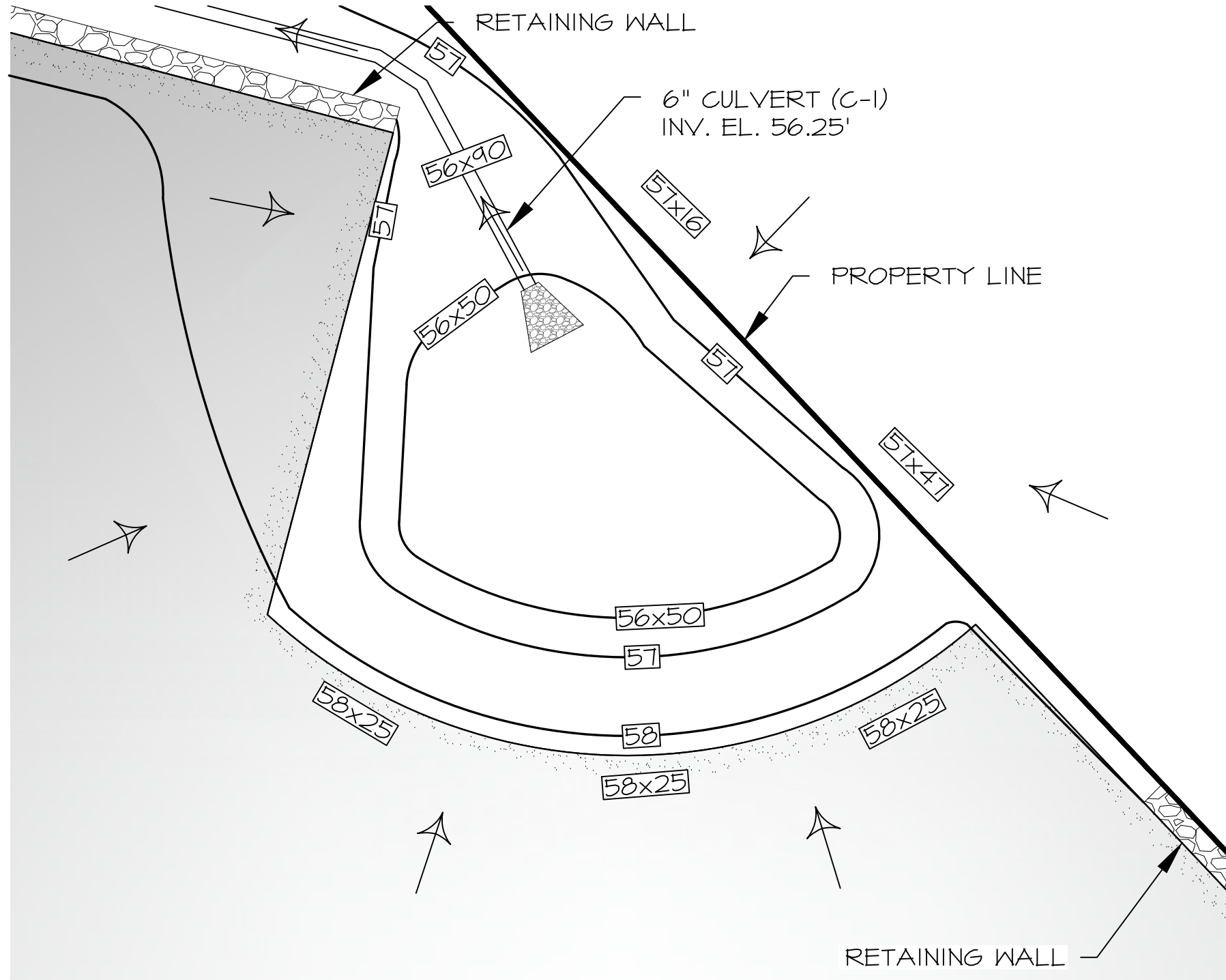


TYPICAL RAINGARDEN DETAIL

NOT TO SCALE

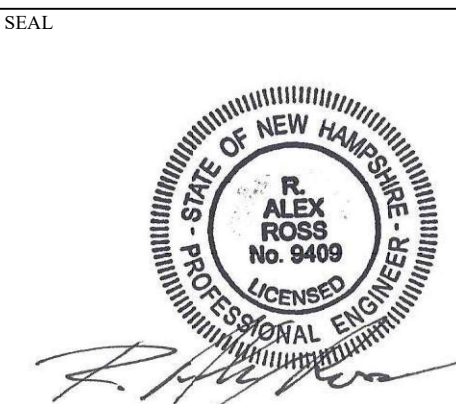
Component Material	Percent of Mixture by Volume	Gradation of Material	Sieve No.	Percent by Weight Passing Standard Sieve
Moderately fine shredded bark or wood fiber mulch, with fines as indicated	20 to 30	200		<5
Loamy coarse sand	70 to 80	10		85 to 100
		20		70 to 100
		60		15 to 40
		200		8 to 15

FILTER MEDIA SPECIFICATION



RAIN GARDEN PLAN VIEW

Scale: 1" = 5'



3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	
CHECKED:	A.ROSS		
DRAWN:	M.G.P.		
CHECKED:	A.ROSS		

ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

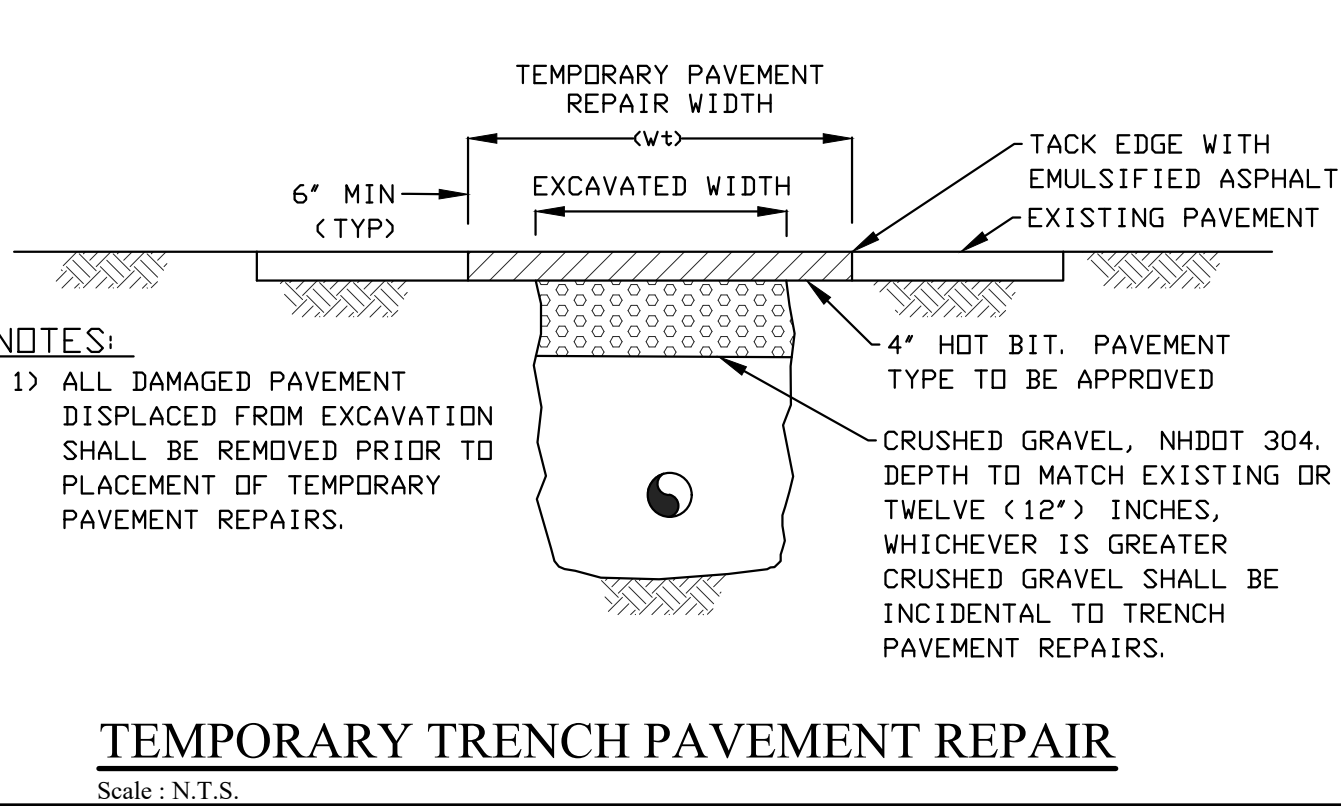
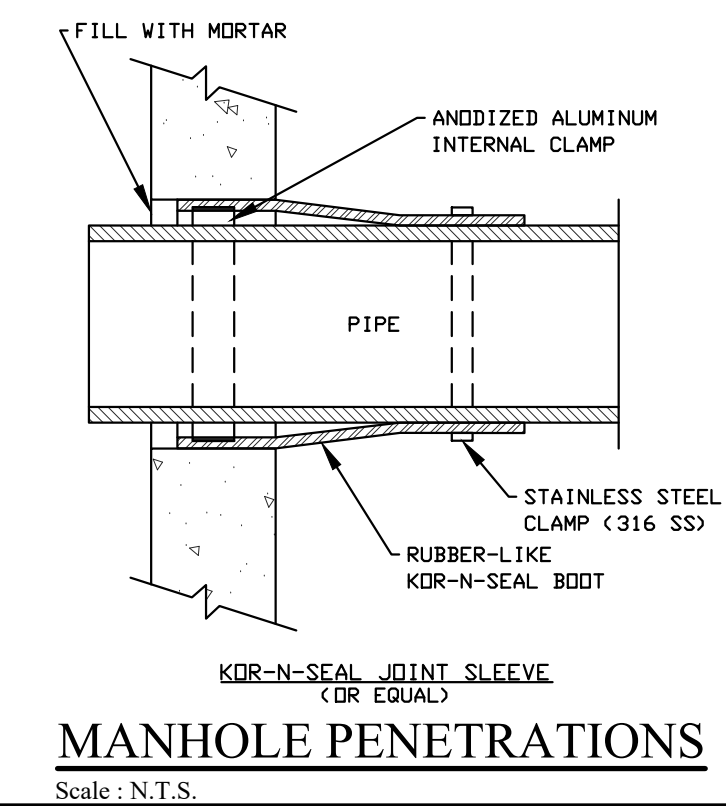
DETAILS		
for		
SARATOGA WAY		
Tax Map 212, Lots 112 & 113		
Portsmouth, NH		
OWNER OF RECORD		
Raleigh Way Holding Group, LLC		
1 Middle Street, Suite 1		
Portsmouth, NH 03801		
JOB NUMBER	DWG. NO.	ISSUE
19-097	8 OF 9	3

WATER SYSTEM NOTES:

- ALL WATER SERVICES SHALL BE AT LEAST 1" COPPER UNLESS THE EXISTING SERVICE IS LARGER.
- NO WORK SHALL BE PERFORMED ON PRIVATE PROPERTY UNTIL THE OWNER HAS SIGNED A MEMORANDUM OF UNDERSTANDING WITH THE CITY.
- THE CONTRACTOR SHALL PHASE THE CONSTRUCTION OF THE WATER TO MINIMIZE DISRUPTION TO THE EXISTING SYSTEM. THE SYSTEM SHALL NOT BE IMPACTED OR SHUT DOWN WITHOUT PROPER NOTICE AND ANY DAMAGE CAUSED BY A SHUTDOWN WILL BE PAID FOR BY THE CONTRACTOR. MAINTENANCE OF THE WATER FLOW IS SUBSIDIARY TO THE WORK.
- WATER SHUT DOWN NOTICES SHALL BE 3 WEEK DAYS IN ADVANCE OF THE SHUTDOWN.
- THE WATER MAINS SHALL BE CONSTRUCTED OF 8" CEMENT LINED DUCTILE IRON EXCEPT FOR TIE LINES AND HYDRANT STUBS.
- WATER SERVICE CURB STOPS SHALL BE SET 1/4" OF AN INCH BELOW GRADE IN THE SIDEWALK SURFACE IF POSSIBLE.
- ALL EXISTING PIPES ABANDONED IN PLACE SHALL BE PLUGGED AT ALL OPEN AREAS.
- THE SYSTEM WILL BE TESTED FOR LEAKS, CONTAMINATION AND FLAWS PRIOR TO ACCEPTANCE BY THE CITY.
- ALL EXISTING WATER GATE BOXES SHALL BE SET TO FINAL GRADE DURING THE ROAD WORK OPERATION.
- ALL GATE VALVES SHALL BE RESTRAINED WITH MECHANICAL RESTRAINT JOINTS AND REINFORCED WITH THRUST BLOCKING.
- ALL TEES, BENDS GATES AND CAPS SHALL BE USED WITH MECHANICAL RESTRAINT JOINTS AND REINFORCED WITH THRUST BLOCKING.
- MAINTAIN A MINIMUM DISTANCE OF 10' BETWEEN THE SEWER AND THE WATER SYSTEM EXCEPT FOR CROSSINGS WHICH SHALL BE CONSTRUCTED PER THE CURRENT STATE APPROVED RULES.
- ALL PORTIONS OF THE NEW DUCTILE IRON WATER MAIN SYSTEM SHALL BE PROTECTED USING PLASTIC WRAPPINGS AND BRASS CONDUCTIVITY WEDGES. SEE SPECIFICATIONS.
- ADD FITTINGS AS NECESSARY TO ENSURE THAT VALVES ARE INSTALLED NEARLY LEVEL.

GENERAL NOTES:

- THIS PLAN IS BASED ON A FIELD SURVEY PERFORMED BY ROSS ENGINEERING. EXISTING UTILITIES THAT ARE SHOWN ON THE PLANS WERE GATHERED FROM AVAILABLE STRUCTURES THAT WERE VIABLE, RECORD DRAWINGS OF THE VARIOUS UTILITY COMPANIES, CAMERA INSPECTIONS AND OBSERVATIONS MADE. THERE IS NO GUARANTEE THAT THE UTILITIES SHOWN ARE EXACTLY AS PORTRAYED OR THAT OTHER UTILITIES THAT ARE NOT SHOWN DON'T EXIST. ALL THE STRUCTURES SHOWN HAVE MULTIPLE SERVICES AND MAY HAVE OLD CONNECTIONS THAT MAY HAVE NOT BEEN PROPERLY ABANDONED. THE BIDDER SHOULD ASSUME THAT EXTREME CAUTION AND HAND EXCAVATION MAY BE REQUIRED IN THESE OLDER PORTIONS OF THE CITY. NO EXTRA PAYMENTS WILL BE MADE FOR EXPLORATION OF DEFUNCT UTILITIES LEFT IN THE GROUND.
- THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION, PROTECTION AND REPAIR (IF DAMAGED) OF THE EXISTING UTILITY INFRASTRUCTURE WITHIN THE BOUNDS OF THE PROJECT ONCE CONSTRUCTION HAS BEGUN. NOTIFY DIG SAFE AT LEAST 72 HOURS PRIOR TO THE BEGINNING OF EXCAVATION WORK. CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER OF CONFLICTS BETWEEN THE EXISTING AND PROPOSED UTILITIES.
- ALL CONFLICTS WITH GAS LINES SHALL BE COORDINATED WITH UNITIL, THE GAS COMPANY, AND SHALL BE SUBSIDIARY. THE GAS COMPANY WAS NOTIFIED OF OBVIOUS CONFLICTS PREVIOUSLY AND WAS TO LOCATE THEIR MAINS AND SERVICES IN ACCORDANCE TO THE PROPOSED LAYOUT ON THIS PLAN. THE CITY MAKES NO GUARANTEES THAT THE ACTUAL AS BUILT LOCATIONS OF THE GAS LINES ARE AS SHOWN ON THESE PLANS.
- THE CONTRACTOR SHALL MAINTAIN ONE PASSABLE LANE AND SAFE PASSAGE FOR RESIDENTS TO AND FROM THEIR BUSINESS AND DWELLINGS IN THE NEIGHBORHOOD. WORK THAT REQUIRES THE COMPLETE SHUT DOWN OF THE STREET HAS TO BE APPROVED BY THE ENGINEER PRIOR TO THE WORK COMMENCING.
- THE STREETS IN THE PROJECT AREA WILL BE PASSABLE AND SAFE IN THE OPINION OF THE ENGINEER PRIOR TO WORK TERMINATING AT THE END OF THE DAY.
- THE USE OF STEEL PLATES IN LIEU OF BACKFILLING WILL NOT BE ALLOWED UNLESS APPROVED BY THE DIRECTOR OF PUBLIC WORKS AHEAD OF TIME.
- THESE PLANS HAVE BEEN CREATED TO BE USED TOGETHER WITH THE CONTRACT AND SPECIFICATIONS TO CREATE ONE COMPLETE BID AND CONSTRUCTION DOCUMENT.
- THE CONTRACTOR SHALL PROVIDE SUBMITTALS FOR ALL MATERIALS TO BE USED ON THIS PROJECT. THE CONTRACTOR SHALL NOT PURCHASE ANY MATERIALS UNTIL THEY HAVE BEEN APPROVED FOR USE BY THE DEPARTMENT.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL SURPLUS EARTHEN MATERIALS, PIPE, UNUSED CURBING, LEDGE, OLD OR UNUSED SEWER AND DRAINAGE STRUCTURES ETC.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL PROPERTY RESTORATION BOTH PUBLIC AND PRIVATE FOR DAMAGE DONE BY THE CONTRACTOR. RESTORATION WILL BE COMPLETED WITH NOT COST TO THE CITY.
- TEMPORARY OR PERMANENT PAVING WILL BE RESTORED TO EXISTING LINE AND GRADE UNLESS DIRECTED BY THE ENGINEER.
- OVERHEAD WIRES ARE SHOWN ON THE DRAWINGS BUT THE CITY MAKES NO WARRANTY TO THEIR COMPLETENESS OR THAT THEIR HEIGHT IS SUFFICIENT TO COMPLETE THE WORK. POLES THAT NEED TO BE HELD UP BY THE UTILITY COMPANY WILL BE PAID FOR BY THE CONTRACTOR WITH NO ADDITIONAL COST PASSED ON TO THE CITY.
- THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF TRAFFIC AND CONSTRUCTION SIGNS AS NEEDED TO ACCOMPLISH THE WORK. CITY SIGNS (STOP, NO PARKING, ONE WAY, ETC) NEED TO BE REINSTALLED AT THE END OF EACH WORKDAY.
- ALL WORK BEING DONE IN THE CITY RIGHT-OF-WAY SHALL BE REVIEWED BY THE CITY AND INSPECTED BY THE CITY AS IT IS BEING DONE.



NOTE:
THE DIMENSIONS SHOWN SHALL BE CONSIDERED MINIMUM PAVEMENT PAYMENT WIDTHS FOR 0-10' DEEP CONSTRUCTION. Wt AND Wp SHALL BE INCREASED BY 4'-0" FOR TRENCHES 10' TO 15' AND BY 8'-0" FOR TRENCHES 15' TO 20' IN DEPTH.

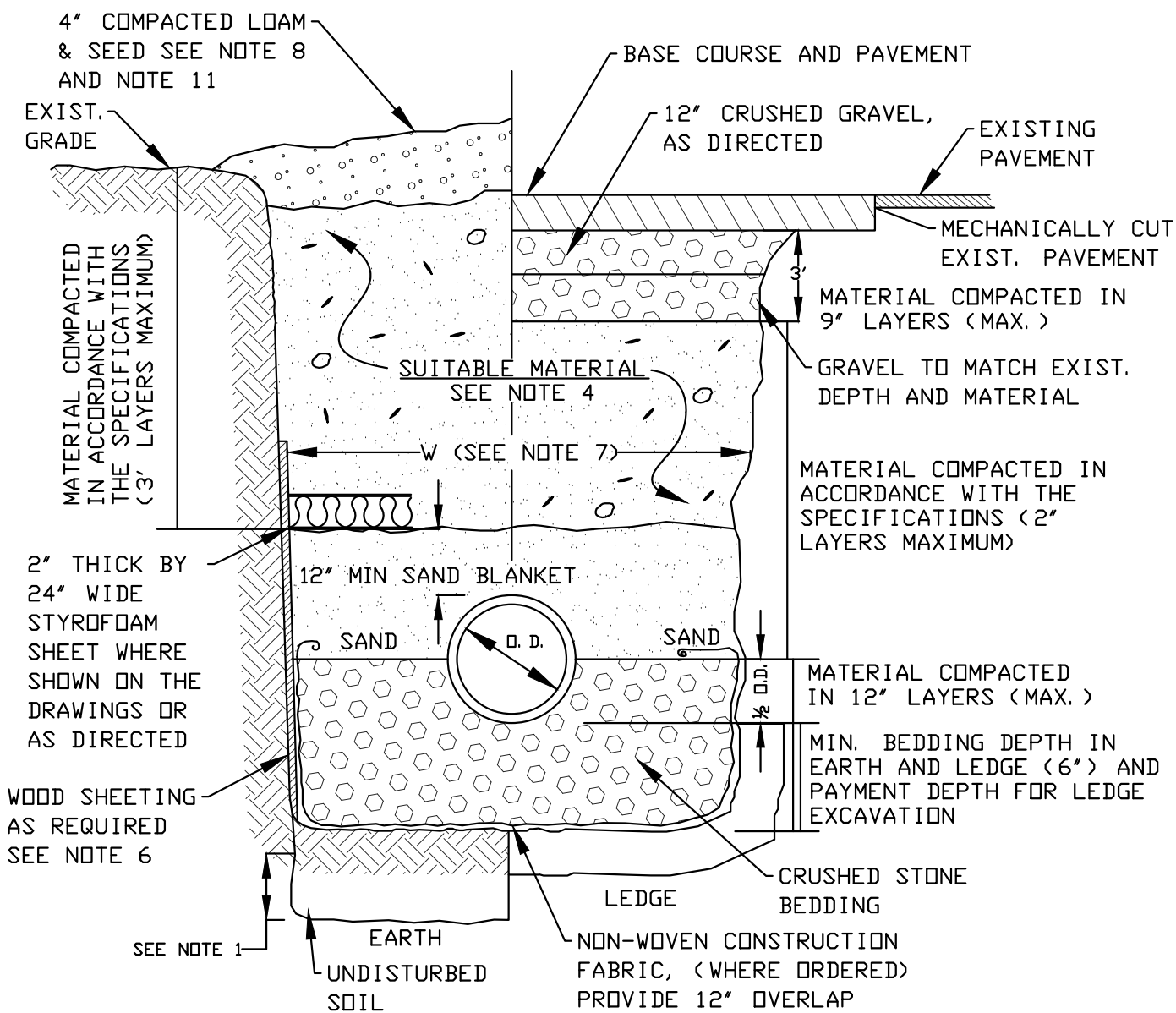
PIPE I. D.	Wt < INCHES>.	Wp < INCHES>
1-21 INCHES	72	108
24-30 INCHES	84	120
> 30 INCHES	96	132

GRAVITY SEWER TRENCH NOTES:

- ~~ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE.~~ BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWINGS.
- ~~BEDDING.~~ SEE NOTE 7 OF STANDARD MANHOLE NOTES. WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, GRADED SCREENED GRAVEL OR CRUSHED STONE 1/2 INCH TO 1-1/2 INCH SHALL BE USED.
- ~~SAND BLANKET.~~ CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90-100% PASSES A 1/2 INCH SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE. NO STONE LARGER THAN 2" SHOULD BE IN CONTACT WITH THE PIPE.
- ~~SUITABLE MATERIAL.~~ IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELEDWAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION; AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN CROSS-COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK, OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLY RECONSTRUCTION, WILL BE PRESERVED.
- ~~BASE COURSE AND PAVEMENT~~ SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY AND LOCAL REGULATION.
- ~~WOOD SHEATHING, IF REQUIRED.~~ WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE.
- ~~W = MAXIMUM ALLOWABLE TRENCH PAYMENT WIDTH~~ FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 12 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.) ALSO, W SHALL BE THE PAYMENT WIDTH.
- ~~FOR CROSS-COUNTRY CONSTRUCTION.~~ BACKFILL OR FILL SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
- ~~CONCRETE FOR ENCASEMENT~~ SHALL CONFORM TO THE REQUIREMENTS OF SECTION 520, (NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.
- ~~CONCRETE FULL ENCASEMENT:~~ IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I.D. (<4" MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.
- ~~GRAVEL DRIVEWAY AND SHOULDER RESTORATION:~~ CRUSHED GRAVEL IN DRIVEWAYS AND ROAD SHOULDERS SHALL MATCH EXISTING WITH A MINIMUM OF 12". GRAVEL REPLACEMENT SHALL BE SUBSIDIARY TO SEWER CONSTRUCTION AND WILL NOT BE MEASURED FOR PAYMENT.

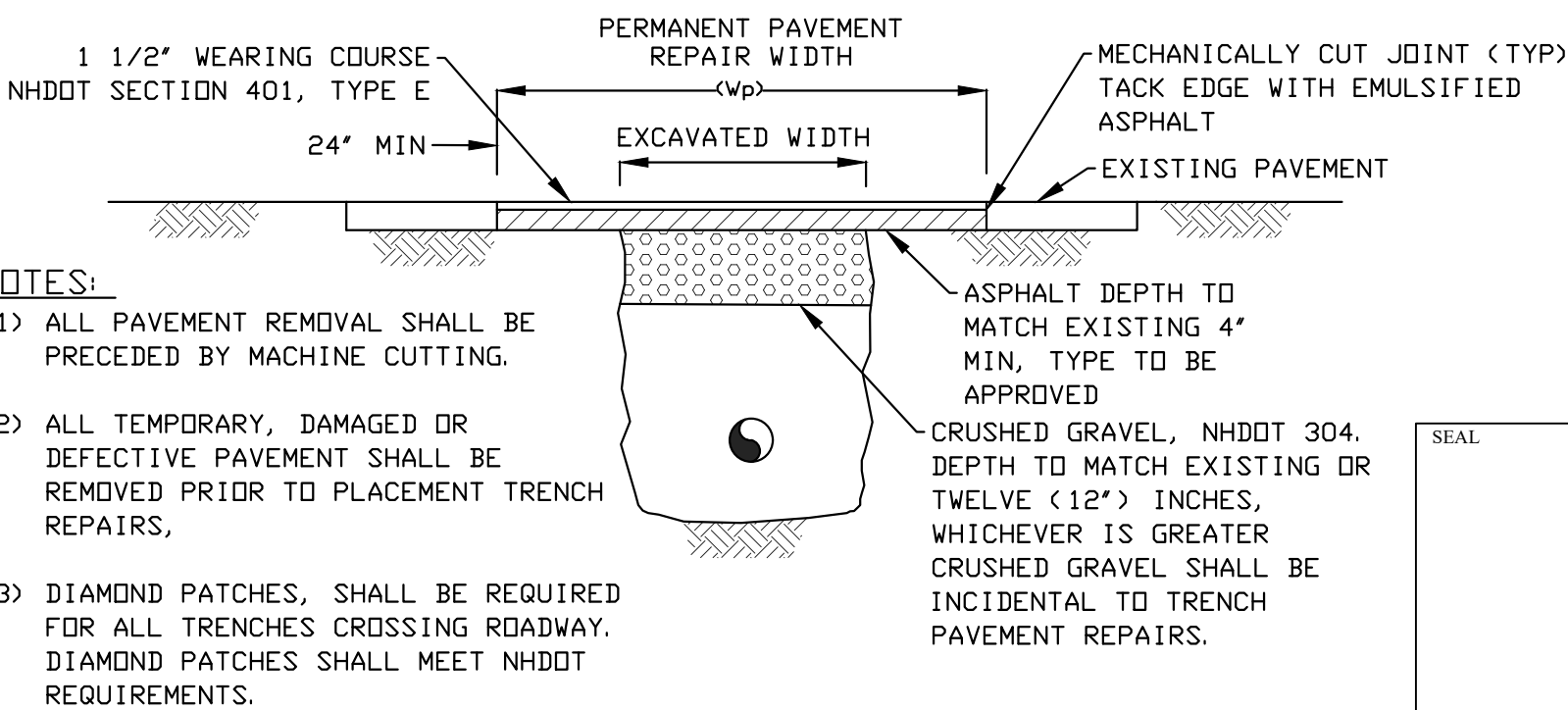
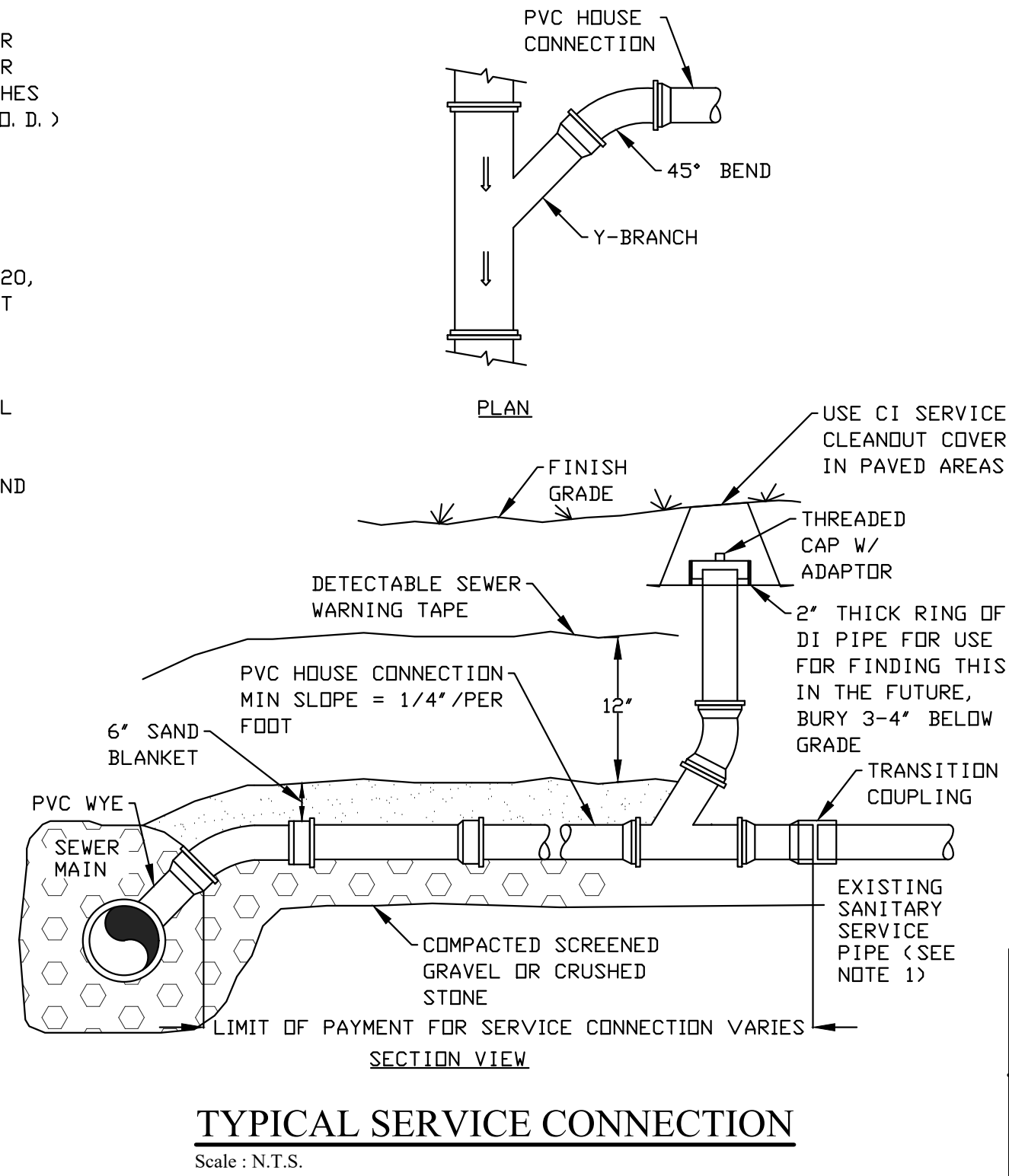
NOTES:

- ALL SEWER SERVICE EXTENSIONS SHALL BE 6', CONTRACTOR SHALL VERIFY EXISTING SEWER SERVICE LOCATION AND ELEVATION BY EXCAVATION OF TEST PITS OR OTHER MEANS PRIOR TO THE CONSTRUCTION OF SEWER MAIN.
- SERVICE CONNECTION SHALL BE INSTALLED BELOW WATER MAIN WHERE POSSIBLE.
- VARIOUS SIZE TRANSITION COUPLINGS SHALL BE STORED ON SITE FOR CONNECTION TO EXISTING SERVICES.
- CLEANOUTS SHALL BE INSTALLED AT EACH LIVE SEWER SERVICE CONNECTION, AS SHOWN ON THIS PLAN. REBAR SHALL BE PLACED AT SIDE OF CLEANOUT.
- CLEANOUT SHALL BE USED TO PLUG AND TEST ALL NEW LATERALS WITH MINIMAL INTERRUPTION TO OPERATION OF HOMEOWNER SANITARY SYSTEM. CLEANOUTS SHALL BE INCIDENTAL TO SERVICE CONNECTIONS AND SHALL NOT BE CONSIDERED FOR PAYMENT.



TRENCH DETAIL- GRAVITY SEWER

Scale: N.T.S.



NOTES:

- ALL PAVEMENT REMOVAL SHALL BE PRECEDED BY MACHINE CUTTING.
- ALL TEMPORARY, DAMAGED OR DEFECTIVE PAVEMENT SHALL BE REMOVED PRIOR TO PLACEMENT TRENCH REPAIRS.
- DIAMOND PATCHES, SHALL BE REQUIRED FOR ALL TRENCHES CROSSING ROADWAY. DIAMOND PATCHES SHALL MEET NHDOT REQUIREMENTS.

PERMANENT TRENCH PAVEMENT REPAIR

3	9/21/2020	TAC SUBMITTAL	
2	8/17/2020	TAC SUBMITTAL	
1	8/4/2020	TAC SUBMITTAL	
ISS.	DATE	DESCRIPTION OF ISSUE	
SCALE: 1" = 10'			
CHECKED: A.ROSS			
DRAWN: M.G.P.			
CHECKED: A.ROSS			
ROSS ENGINEERING, LLC Civil/Structural Engineering & Surveying 909 Islington St. Portsmouth, NH 03801 (603) 433-7560			
TITLE			
NOTES for SARATOGA WAY Tax Map 212, Lots 112 & 113 Portsmouth, NH			
OWNER OF RECORD Raleigh Way Holding Group, LLC 1 Middle Street, Suite 1 Portsmouth, NH 03801			
JOB NUMBER	DWG. NO.	ISSUE	
19-097	9 OF 9	3	



PROPOSED VIEW
FROM SARATOGA WAY

RIDGE HEIGHT
EL=32'7"

ATTIC FLOOR
EL=19'9 3/4"

2ND FLOOR
EL=9'10 7/8"

1ST FLOOR
EL=0'0"



WEST ELEVATION 1/8"=1'0"

RIDGE HEIGHT
EL=32'7"

ATTIC FLOOR
EL=19'9 3/4"

2ND FLOOR
EL=9'10 7/8"

1ST FLOOR
EL=0'0"



EAST ELEVATION 1/8"=1'0"

PROPOSED BUILDING AT SARATOGA WAY PORTSMOUTH, NH

TITLE: PROP WEST & EAST ELEV
SCALE: 1/8"=1'0"
DATE: 9.10.2020

REVISIONS:

TOP OF RIDGE
EL = 32'7"

ATTIC FLOOR
EL = 19'9 3/4"

2ND FLOOR
EL = 9'10 7/8"

1ST FLOOR
EL = 0'0"



SOUTH ELEVATION 1/8" = 1'0"

TOP OF RIDGE
EL = 32'7"

ATTIC FLOOR
EL = 19'9 3/4"

2ND FLOOR
EL = 9'10 7/8"

1ST FLOOR
EL = 0'0"

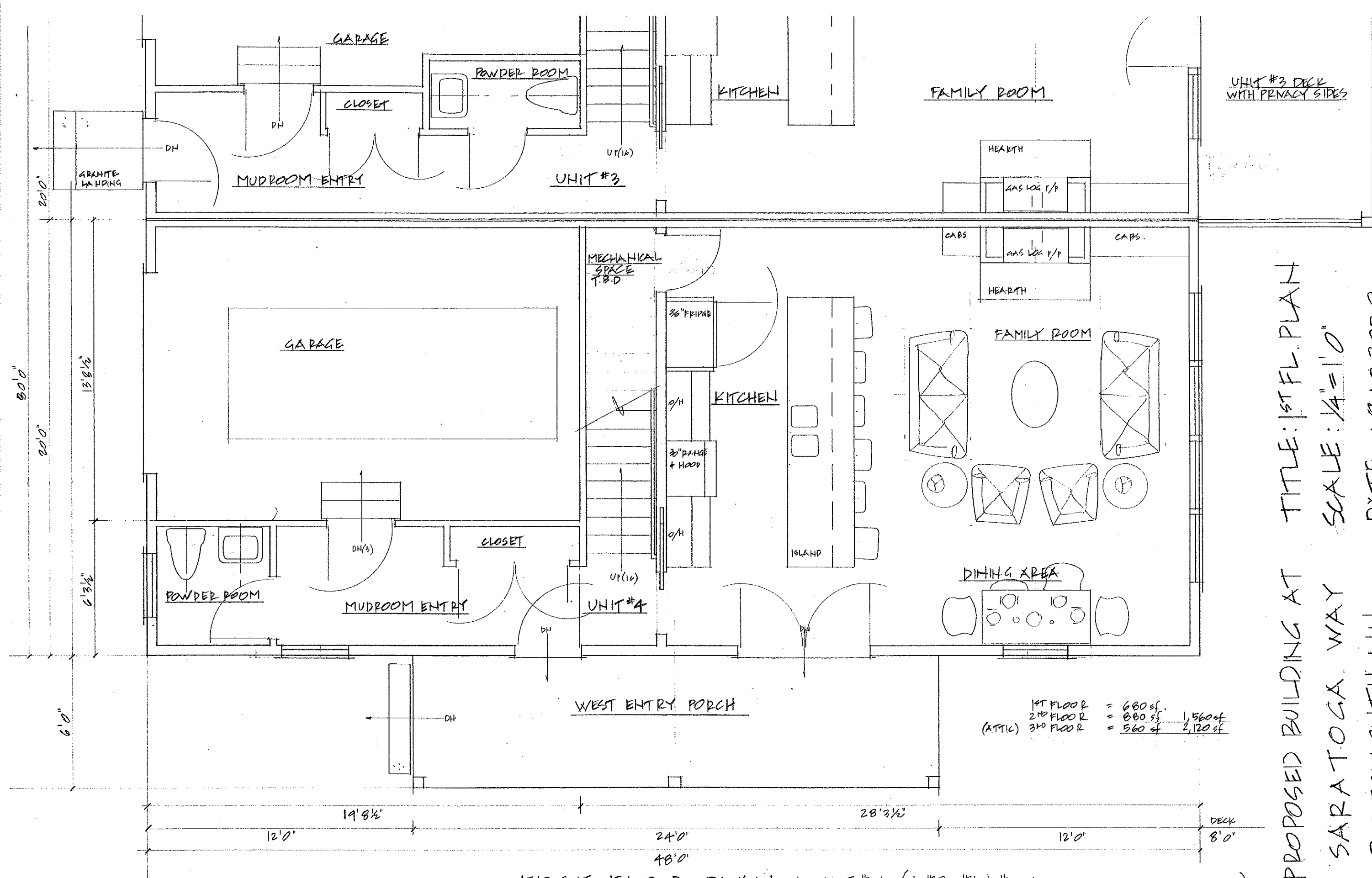


NORTH ELEVATION 1/8" = 1'0"

PROPOSED BUILDING AT
SARATOGA WAY
PORTSMOUTH, NH

DATE : 9.10.2020

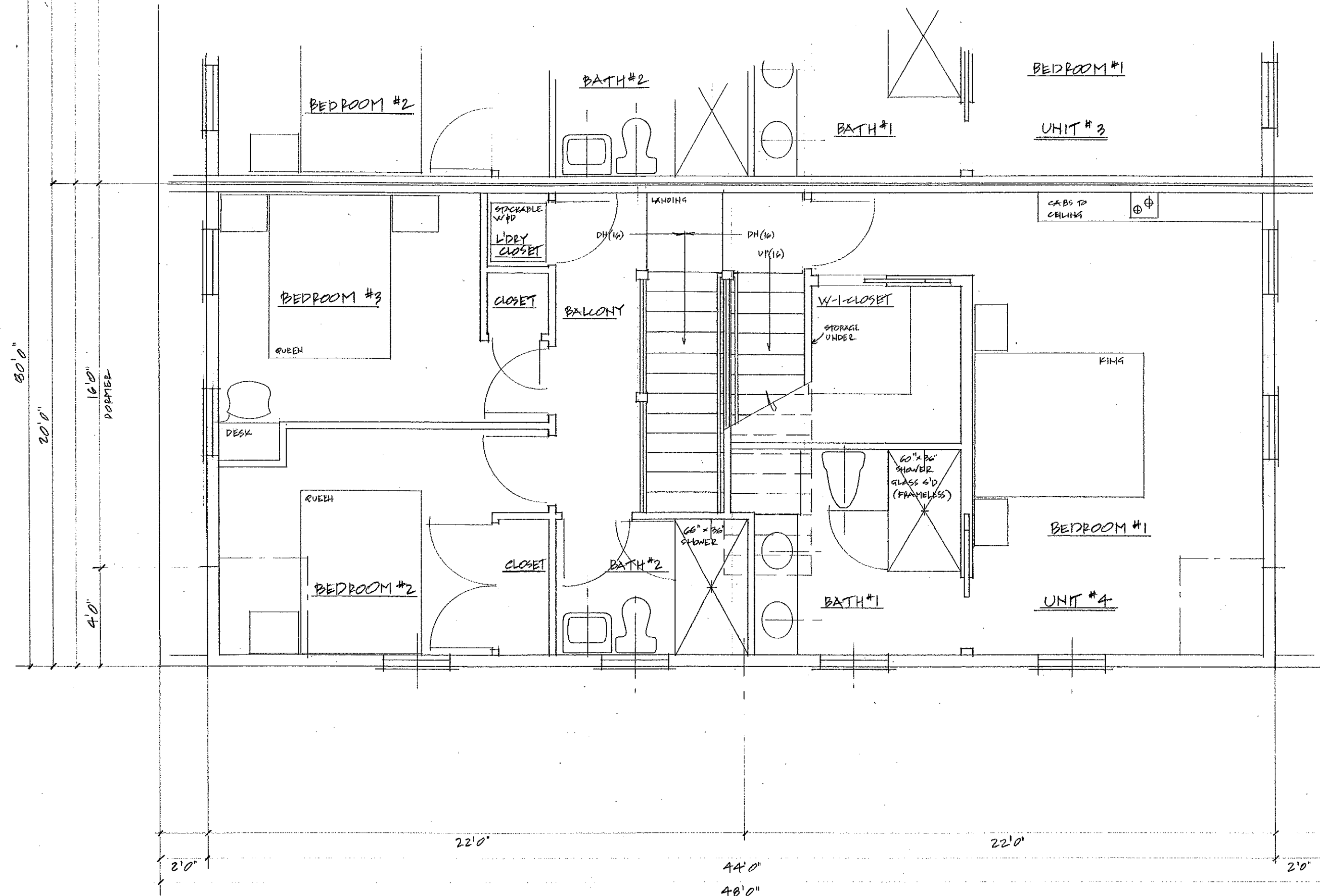
REVISIONS:



FIRST FLOOR PLAN, UNIT #4 (#3, #1 & #2 ARE MIRROR REVERSED)

HLS = 680sf

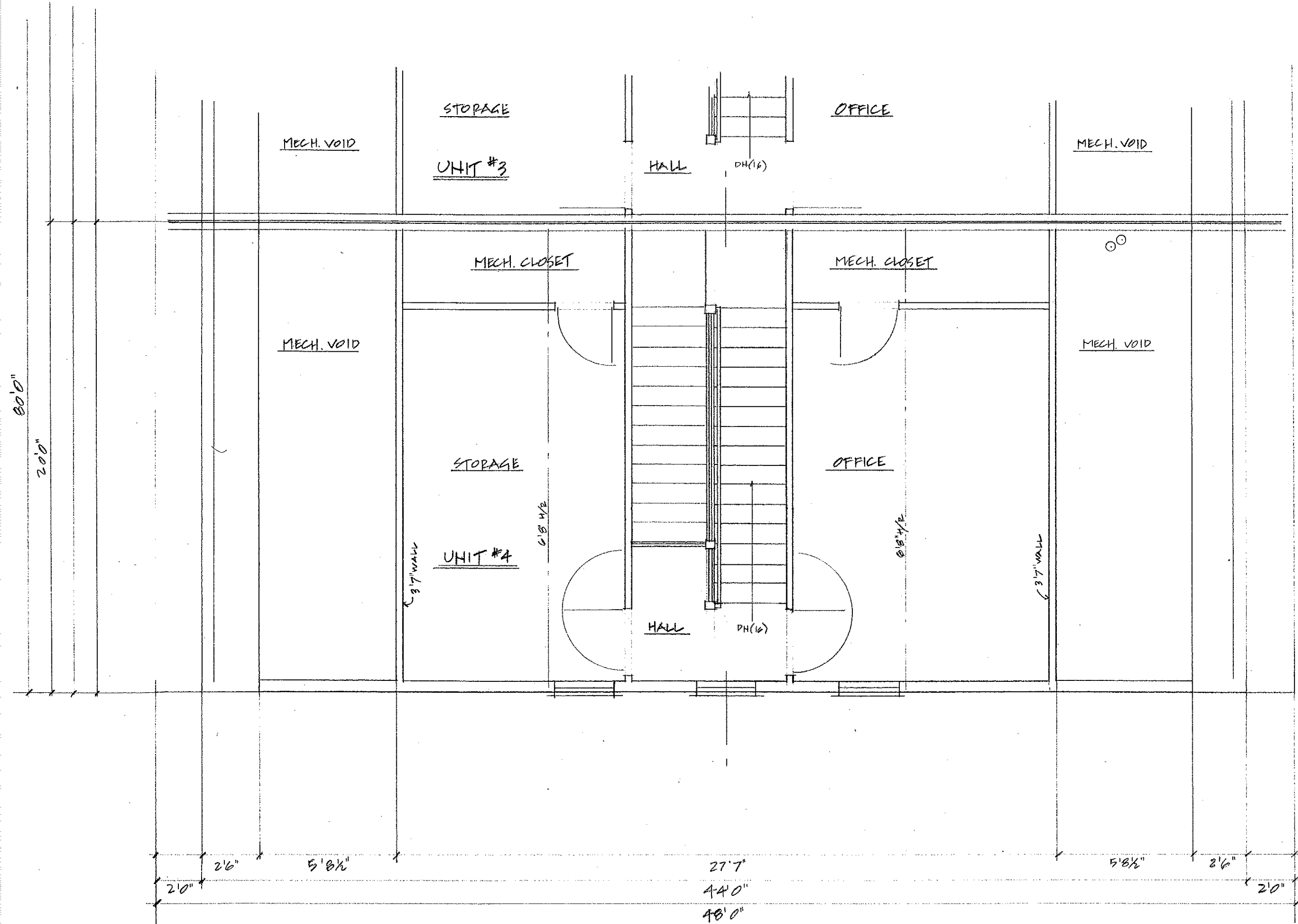
PROPOSED BUILDING AT
 SARATOGA WAY
 PORTSMOUTH, NH
 TITLE: 1ST FL. PLAN
 SCALE: 1/4" = 1'0"
 DATE: 9.10.2020
 REVISIONS:
 PAGE A.3



SECOND FLOOR PLAN UNIT #4 (#3, #1 & #2 ARE MIRROR REVERSED)

HLS = 8804.

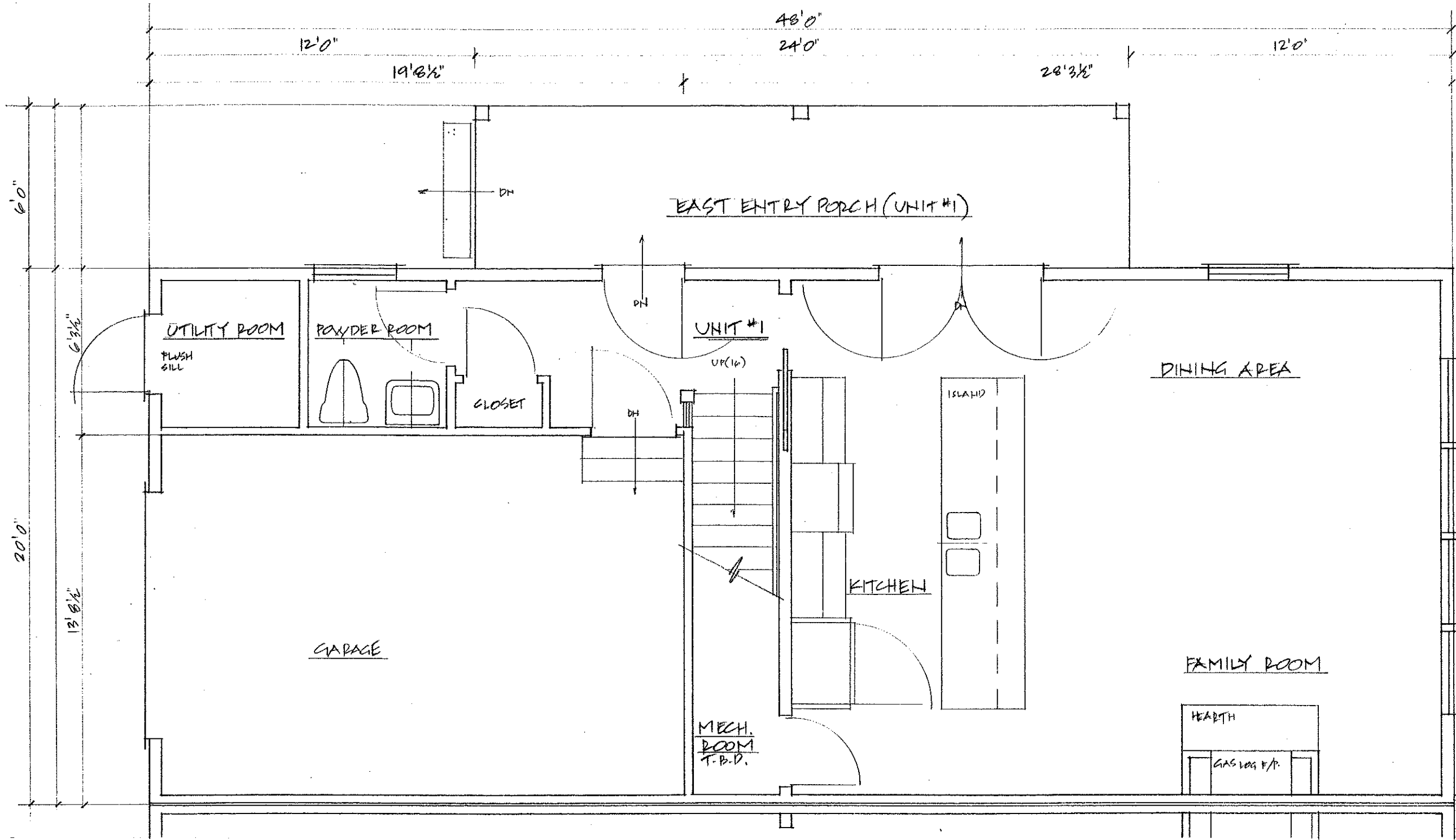
PROPOSED BUILDING AT SARATOGA WAY PORTSMOUTH, NH
 TITLE: 2ND FLOOR PLAN
 SCALE: 1/4" = 1'0"
 DATE: 3.30.2020
 REVISIONS:



THIRD FLOOR PLAN (ATTIC), UNIT #4 (1#3, 1#1 & #2 ARE MIRROR REV)

WITH 6'8" HEADROOM = 320sf, TO KNEE WALLS = 500sf.

PROPOSED BUILDING AT TITLE: 3RD FLOOR (ATTIC) PLAN
 SARATOGA WAY SCALE: 1/4" = 1'0"
 PORTSMOUTH, NH DATE: 3.30.2020
 REVISIONS:



FIRST FLOOR PLAN, UNIT #1

PROPOSED BUILDING AT TITLE: FIRST FLOOR PLAN, UNIT #1
 SARATOGA WAY, SCALE: 1/4" = 1'0"
 PORTSMOUTH, NH. DATE: 9.10.2020
 REVISIONS:



City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Owner/Applicant: Alex Ross Date Submitted: 9-17-20
 Phone Number: 603-433-7560 E-mail: alexross@comcast.net
 Site Address: Saratoga Way Map: 212 Lot: 112 & 113
 Zoning District: General Residence B Lot area: 14,944 sq. ft.

Application Requirements			
☒	Required Items for Submittal	Item Location (e.g. Page or Plan Sheet/Note #)	Waiver Requested
☒	Fully executed and signed Application form. (2.5.2.3)	Online Land Use Application	N/A
☒	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF) on compact disc, DVD or flash drive. (2.5.2.8)	Attached with Hard Copy Submittal	N/A

Site Plan Review Application Required Information			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	Statement that lists and describes "green" building components and systems. (2.5.3.1A)	See Attached Green Building Description	☐
☒	Gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. (2.5.3.1B)	Architectural Plan Set A3 & A4	N/A
☒	Tax map and lot number, and current zoning of all parcels under Site Plan Review. (2.5.3.1C)	Sheet 1 "Existing Conditions"	N/A
☒	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. (2.5.3.1D)	Jay McSharry Raleigh Way Holding Group 1 Middle St, Suite 1 Portsmouth, NH 03801 jaymcsharry@me.com	N/A

Site Plan Review Application Required Information			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. (2.5.3.1E)	See Attached Abutter's List	N/A
☒	Names, addresses and telephone numbers of all professionals involved in the site plan design. (2.5.3.1F)	Sheet 1 "Existing Conditions"	N/A
☒	List of reference plans. (2.5.3.1G)	Sheet 1 "Existing Conditions"	N/A
☒	List of names and contact information of all public or private utilities servicing the site. (2.5.3.1H)	Sheet 3 "Utility Plan"	N/A

Site Plan Specifications			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director. Submittals shall be a minimum of 11 inches by 17 inches as specified by Planning Dept. staff. (2.5.4.1A)	Required on all plan sheets	N/A
☒	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. (2.5.4.1B)	Required on all plan sheets	N/A
☒	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. (2.5.4.1C)	Required on all plan sheets	N/A
☒	Plans shall be drawn to scale. (2.5.4.1D)	Required on all plan sheets	N/A
☒	Plans shall be prepared and stamped by a NH licensed civil engineer. (2.5.4.1D)	Required on all plan sheets	N/A
☒	Wetlands shall be delineated by a NH certified wetlands scientist. (2.5.4.1E)	No wetlands on site	N/A
☒	Title (name of development project), north point, scale, legend. (2.5.4.2A)	Required on all plan sheets	N/A
☒	Date plans first submitted, date and explanation of revisions. (2.5.4.2B)	Required on all plan sheets	N/A
☒	Individual plan sheet title that clearly describes the information that is displayed. (2.5.4.2C)	Required on all plan sheets	N/A

Site Plan Specifications			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	Source and date of data displayed on the plan. (2.5.4.2D)	Required on all plan sheets	N/A
☒	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." (2.5.4.2E)	Required on all plan sheets	N/A
☒	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." (2.13.3)	Sheet 2 "Site Plan" & Sheet 5 "Landscape Plan"	N/A
☒	Plan sheets showing landscaping and screening shall also include the following additional notes: a. "The property owner and all future property owners shall be responsible for the maintenance, repair and replacement of all required screening and landscape materials." b. "All required plant materials shall be tended and maintained in a healthy growing condition, replaced when necessary, and kept free of refuse and debris. All required fences and walls shall be maintained in good repair." c. "The property owner shall be responsible to remove and replace dead or diseased plant materials immediately with the same type, size and quantity of plant materials as originally installed, unless alternative plantings are requested, justified and approved by the Planning Board or Planning Director." (2.13.4)	Sheet 5 "Landscape Plan"	N/A

Site Plan Specifications – Required Exhibits and Data			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
	1. Existing Conditions: (2.5.4.3A)		
☒	a. Surveyed plan of site showing existing natural and built features;	Sheet 1 "Existing Conditions"	☐
☒	b. Zoning boundaries;	Sheet 1 - Note 2	☐
☒	c. Dimensional Regulations;	Sheet 1 - Note 2	☐
☒	d. Wetland delineation, wetland function and value assessment;	No wetlands on site	☐
☒	e. SFHA, 100-year flood elevation line and BFE data.	Sheet 1 - Note 4	☐
	2. Buildings and Structures: (2.5.4.3B)		
☒	a. Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation;	Architectural - Page A.1	☐
☒	b. Elevations: Height, massing, placement, materials, lighting, façade treatments;	Architectural - Page A.1	☐
☒	c. Total Floor Area;	Architectural - Page A.3	☐
☒	d. Number of Usable Floors;	Architectural - Page A.3	☐
☒	e. Gross floor area by floor and use.	Architectural - Page A.3	☐
	3. Access and Circulation: (2.5.4.3C)		
☒	a. Location/width of access ways within site;	Sheet 2 "Site Plan"	☐
☒	b. Location of curbing, right of ways, edge of pavement and sidewalks;	Sheet 2 "Site Plan"	☐
☒	c. Location, type, size and design of traffic signing (pavement markings);	Sheet 2 "Site Plan"	☐
☒	d. Names/layout of existing abutting streets;	Sheet 1 "Existing Conditions"	☐
☒	e. Driveway curb cuts for abutting prop. and public roads;	Sheet 7 "Roadway Plan"	☐
☒	f. If subdivision; Names of all roads, right of way lines and easements noted;	N/A	☐
☒	g. AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	N/A	☐
	4. Parking and Loading: (2.5.4.3D)		
☒	a. Location of off street parking/loading areas, landscaped areas/buffers;	No off street parking	☐
☒	b. Parking Calculations (# required and the # provided).	See Attached - Parking Demand Calculations	☐
	5. Water Infrastructure: (2.5.4.3E)		
☒	a. Size, type and location of water mains, shut-offs, hydrants & Engineering data;	Sheet 3 "Utility Plan"	☐
☒	b. Location of wells and monitoring wells (include protective radii).	N/A	☐
	6. Sewer Infrastructure: (2.5.4.3F)		
☒	a. Size, type and location of sanitary sewage facilities & Engineering data.	Sheet 3 "Utility Plan"	☐
	7. Utilities: (2.5.4.3G)		
☒	a. The size, type and location of all above & below ground utilities;	Sheet 3 "Utility Plan"	☐
☒	b. Size type and location of generator pads, transformers and other fixtures.	Sheet 3 "Utility Plan"	☐

Site Plan Specifications – Required Exhibits and Data

☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	8. Solid Waste Facilities: (2.5.4.3H)		
☒	a. The size, type and location of solid waste facilities.	Solid Waste to be Stored Inside Garage	☐
	9. Storm water Management: (2.5.4.3I)		
☒	a. The location, elevation and layout of all storm-water drainage.	Sheet 3 "Utility Plan"	☐
	10. Outdoor Lighting: (2.5.4.3J)		
☒	a. Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and; b. photometric plan.	Sheet 3 "Utility Plan"	☐
☒	11. Indicate where dark sky friendly lighting measures have been implemented. (10.1)	Sheet 3 "Utility Plan"	☐
	12. Landscaping: (2.5.4.3K)		
☒	a. Identify all undisturbed area, existing vegetation and that which is to be retained;	Sheet 5 "Landscape Plan"	☐
☒	b. Location of any irrigation system and water source.	N/A	☐
	13. Contours and Elevation: (2.5.4.3L)		
☒	a. Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Sheet 4 "Grading & Drainage Plan"	☐
	14. Open Space: (2.5.4.3M)		
☒	a. Type, extent and location of all existing/proposed open space.	Sheet 2 "Site Plan"	☐
☒	15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)	N/A	☐
☒	16. Location of snow storage areas and/or off-site snow removal. (2.5.4.3O)	Sheet 4 - Note 5	☐
☒	17. Character/Civic District (All following information shall be included): (2.5.4.3Q)	N/A	☐
	a. Applicable Building Height (10.5A21.20 & 10.5A43.30);		
	b. Applicable Special Requirements (10.5A21.30);		
	c. Proposed building form/type (10.5A43);		
	d. Proposed community space (10.5A46).		

Other Required Information			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	Traffic Impact Study or Trip Generation Report, as required. <i>(Four (4) hardcopies of the full study/report and Six (6) summaries to be submitted with the Site Plan Application) (3.2.1-2)</i>	See Sheet 6 "Roadway Plan"	☐
☒	Indicate where Low Impact Development Design practices have been incorporated. (7.1)	See Rain Garden on Sheet 2 "Site Plan"	☐
☒	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. (7.3.1)	Not in a wellhead protection or aquifer protection area	☐
☒	Indicate where measures to minimize impervious surfaces have been implemented. (7.4.3)	See Rain Garden, Detention Pond, & Drip Edge on Sheet 2 "Site Plan"	☐
☒	Calculation of the maximum effective impervious surface as a percentage of the site. (7.4.3.2)	Sheet 2 "Site Plan"	☐
☒	Stormwater Management and Erosion Control Plan. <i>(Four (4) hardcopies of the full plan/report and Six (6) summaries to be submitted with the Site Plan Application) (7.4.4.1)</i>	Sheet 7 "Erosion Control Plan"	☐

Final Site Plan Approval Required Information			
☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	All local approvals, permits, easements and licenses required, including but not limited to: a. Waivers; b. Driveway permits; c. Special exceptions; d. Variances granted; e. Easements; f. Licenses. (2.5.3.2A)	See ZBA Letter of Approval dated June 17, 2020	☐
☒	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: a. Calculations relating to stormwater runoff; b. Information on composition and quantity of water demand and wastewater generated; c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; d. Estimates of traffic generation and counts pre- and post-construction; e. Estimates of noise generation; f. A Stormwater Management and Erosion Control Plan; g. Endangered species and archaeological / historical studies; h. Wetland and water body (coastal and inland) delineations; i. Environmental impact studies. (2.5.3.2B)	Drainage Report Dated 8-17-20 & Sheet 7 "Erosion Control Plan"	☐

Final Site Plan Approval Required Information

☒	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
☒	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. (2.5.3.2D)	Letters to serve the building shall be submitted	☐
☒	A list of any required state and federal permit applications required for the project and the status of same. (2.5.3.2E)	N/A	☐

Applicant's Signature: _____

Date: _____

Ross Engineering
Civil/Structural Engineering & Surveying

909 Islington Street
Portsmouth, NH 03801

603-433-7560
alexross@comcast.net

August 24, 2020

Parking Demand Analysis

As per the City Zoning Ordinance sections:

10.1112.311 -Parking for Residential Uses, a minimum of 1.3 spaces per unit is required for dwellings over 750 s.f.

4 units each over 750 s.f.= $1.3 \times 4 = 5.2$ round up to**6 spaces**
Spaces Provided.....**8 spaces**

There is sufficient on-site parking on the property as 8 spaces (2 per unit) are provided. This is greater than the requirement of 6 as per the City Zoning Ordinance.

Parking Calculations Based on Zoning Ordinance: Amended through December 16, 2019

Residential Units:

As per 10.1112.311 of Article 11 Site Development Standards

1.3 spaces per unit with Over 750 sq. ft. shall be provided

2 Residential Units exist with 3 parking spaces required



CITY OF PORTSMOUTH

Planning Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801

(603) 610-7216

ZONING BOARD OF ADJUSTMENT

June 17, 2020

Raleigh Way Holdings Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

RE: Board of Adjustment request for property located at 0 Falkland Way

Dear Property Owner:

The Zoning Board of Adjustment, at its regularly scheduled meeting of **Tuesday, June 16, 2020**, considered your application for merge two lots and demo existing structures in order to construct a 4 unit multi family dwelling which requires the following: 1) A Variance from Section 10.521 to allow a lot area per dwelling unit of 3,736 square feet where 5,000 square feet is the minimum required; and 2) A Special Exception from Section 10.440 Use #1.51 to allow 4 dwelling units where the use is allowed by a special exception. Said property is shown on Assessor Map 212 Lot 112 and lies within the General Residence B (GRB) District. As a result of said consideration, the Board voted to grant your request as presented.

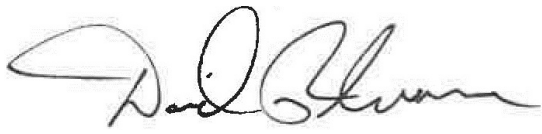
The Board's decision may be appealed up to thirty (30) days after the vote. Any action taken by the applicant pursuant to the Board's decision during this appeal period shall be at the applicant's risk. Please contact the Planning Department for more details about the appeals process.

Approvals may also be required from other City Commissions or Boards. Once all required approvals have been received, applicant is responsible for applying for and securing a building permit from the Inspection Department prior to starting any project work.

This approval shall expire unless a building permit is issued within a period of two (2) years from the date granted unless an extension is granted in accordance with Section 10.236 of the Zoning Ordinance.

The minutes and audio recording of this meeting are available by contacting the Planning Department.

Very truly yours,

A handwritten signature in black ink, appearing to read "David Rheame". The signature is fluid and cursive, with a large initial "D" and "R".

David Rheame, Chairman of the Zoning Board of Adjustment

cc: Robert Marsilia, Chief Building Inspector

Rosann Maurice-Lentz, City Assessor

Derek Durbin, Esq. Durbin Law Office, PLLC

Description of “Green” Building Approach, Components and Systems for New, (4) Unit Residential Condominium Building at Saratoga Way, Portsmouth

- Massing of the structure. By embracing a single, cohesive structure containing the (4) units, we generate the most favorable ratio of exterior wall/roof to interior space.
- By creating an elongated building, aligned East/West we are able to maximize favorable orientation to sun exposure.
- The gambrel roof provides the most favorable location for solar PV and hot water panels. It is anticipated that this building will eventually accommodate independent energy production.
- By providing on site, covered and heated parking, we accommodate the transition to electric vehicles, and the need for suitable charging stations.
- We will follow or exceed the guidelines of the Federal Energy Star program.
- The quality of the Thermal Enclosure will be assured through the use of High Performance Windows, Quality Installed Insulation (Closed Cell spray foam), Fully-Aligned Air Barriers (spray foam), Reduced Thermal Bridging (continuous exterior foam layer) and Air Sealing (spray foam and thorough caulking)
- HVAC efficiencies will be achieved through the use of Air Source Heat Pumps (Mitsubishi Multizone Ductless Hyper Heat Pumps). Domestic Hot Water will be provided by Solar Hot Water panels with natural gas back up. Energy Recovery Ventilation systems will be installed to each unit.
- Water saving appliances will be used where possible, i.e., Front Loading Washers.
- See Site Plans for storm water mitigation approaches.

PLAN FOR STORMWATER MANAGEMENT

**For Property Located At:
Saratoga Way
Tax Map 212, Lots 112 & 113
Portsmouth, NH 03801**

**Prepared by:
Alex Ross, P.E.
Ross Engineering
September 18, 2020**

Table of Contents

Site Description.....	1
USGS Map.....	2
FEMA Flood Insurance Rate Map.....	3
Aerial View.....	4
Drainage Design.....	5
Proposed Development.....	6
Drainage Summary	9

Drainage Computations:

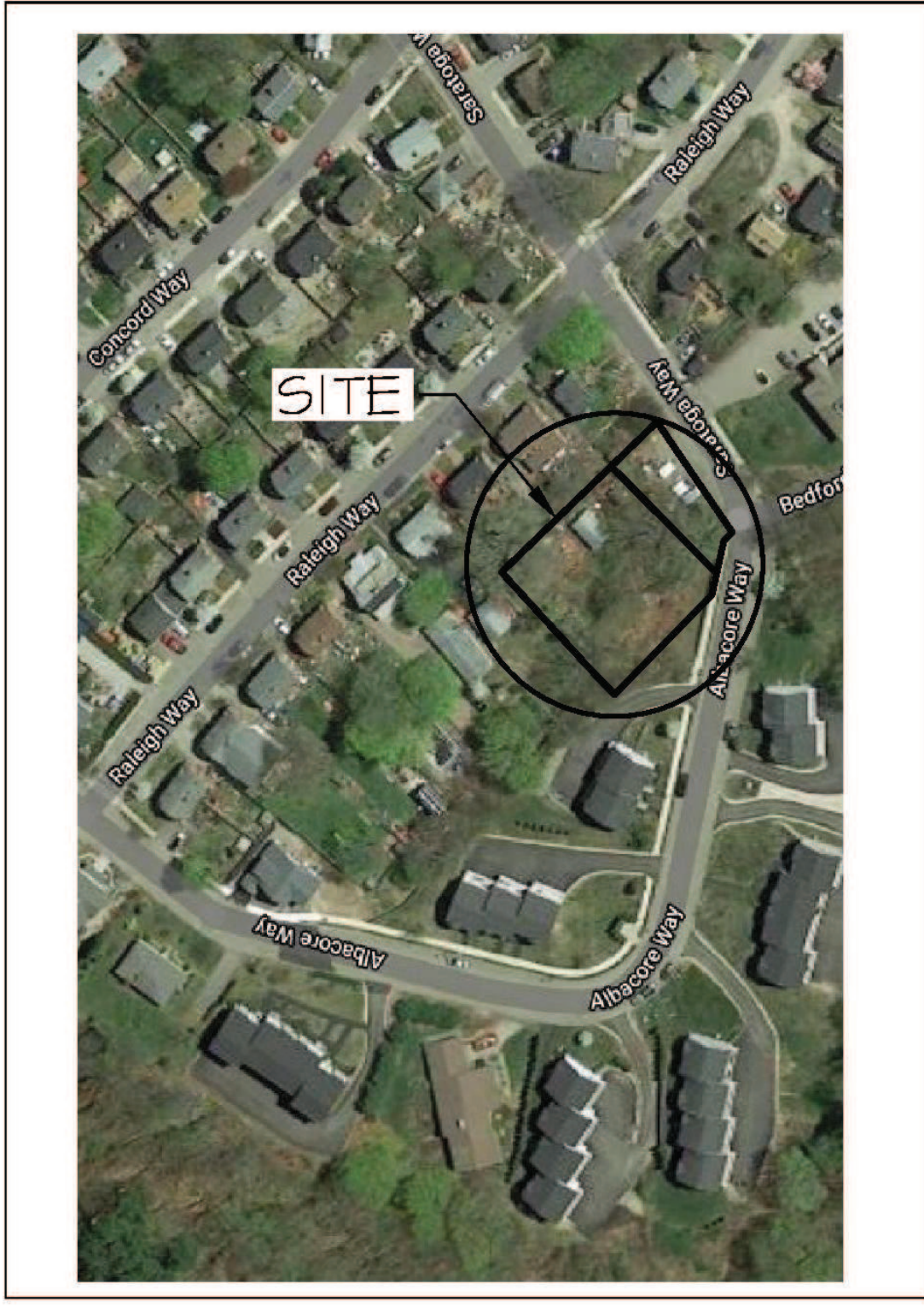
Pre-Development Watershed Diagram.....	11
Pre-Development Drainage Calculations.....	12
Post-Development Watershed Diagram.....	29
Post-Development Drainage Calculations.....	30
Appendix A	
USDA Rainfall Charts.....	A1
Appendix B	
Soil Information.....	B1

Site Description

The parcel being analyzed is located at Saratoga Wat in Portsmouth, NH. This site is made up of 2 lots, Tax Map 212, Lots 112 & 113, 0.27 and 0.07 acres in size respectively. The proposed improvements offer an opportunity to control stormwater and provide protection to the surrounding lots.

The Site is located at the lowest part of a larger watershed composing most of the block of Raleigh Way, Albacore Way, and Saratoga Way. Water in this watershed flows south west through this lot to an 18" culvert in the southwest. The County Soil Survey Map describes the soil in the area as 799, "Urban Land-Canton complex". This soil is in the hydrologic soil group A which was used in modeling stormwater events.



Aerial View

Drainage Design

Pre-development stormwater runoff flows must be analyzed to establish a comparable baseline for post-development flows. A stormwater management system should be installed that will adequately handle any increased post-development runoff.

The stormwater runoff analysis of the site was based on the **two, ten, twenty-five,** and **fifty** year storm event as per the City Site Plan Review Regulations, Section 7.4.2.8. The research method applied was the TR-55 method, which was developed from the U.S. Soil Conservation Service's TR-20 runoff procedure. The TR-55 Manual describes the method as a "...procedure to calculate storm runoff, peak rate of discharge, hydrographs, and storage volumes required for floodwater reservoirs." The model begins with a rainfall amount uniformly imposed on the watershed over a specified time distribution. Mass rainfall is converted to mass runoff by using a runoff curve number (CN). The curve number is based on soils, plant cover, amount of impervious area, interception, and surface storage to determine a coefficient representing the capability of a surface to infiltrate stormwater. Runoff is then transformed into a hydrograph by using the unit hydrograph theory and routing procedures through segments of the watershed. A hydrograph models the volume of runoff with respect to time, reflecting the unit hydrograph theory, which is that a one-day rainfall event produces a one inch depth of runoff over a given area. The routing of runoff is segmented into areas of the watershed dependent on topography and travel time. These segmented areas are known as subcatchments. Modeling calculations were performed using the HydroCAD stormwater modeling system version 10.

Proposed Development

The existing garage will be removed. A 4 Unit Condo Building with 2 attached decks, and 2 attached covered porches is proposed. In addition, an asphalt driveway and parking area is proposed along the northeast side of the parcel. Three 24" wide, 18" deep stone drip edges are proposed to collect roof runoff and reduce the rate draining to the 18" culvert. A rain garden is proposed northeast of the proposed asphalt driveway to collect surface runoff. This water is directed into a 1' wide grassed swale through a 6" underdrain, then to a proposed detention pond before being released to the 18" culvert. A percolation test was performed on the soil with the rate found being 11 min/in. This translates to an exfiltration rate of 5.5 in/hr which was used in the analysis.

Results of Drainage Analysis

Pre-Development Runoff

One subcatchment area was utilized to model the pre-development stormwater conditions. This subcatchment is comprised of the developed area between Albacore Way, Saratoga Way, & Raleigh Way. Runoff from this subcatchment flows to the south to the 18" culvert in the SW portion of the parcel.

Post-Development Runoff

The subcatchment areas for the post-development stormwater conditions were modeled similarly to the pre-development conditions.

Subcatchment 1 collects runoff from the southwest portion of the area being analyzed, directing it to the 18" culvert in the SW portion of the parcel.

Subcatchment 2 collects runoff from the center portion of the area being analyzed as well as the north half of the proposed building and a portion of the proposed asphalt driveway, directing it to a Detention Pond, before being released to the 18" culvert in the SW portion of the parcel.

Subcatchment 3 collects runoff from the north portion of the area being analyzed as well as a portion of the proposed asphalt driveway, directing it into a rain garden, then through a 1' wide grassed swale, then to a detention pond, before being released to the 18" culvert in the SW portion of the parcel.

Subcatchment 4 collects runoff from the Roof of the Western Covered Porch, directing it into a 24" wide drip edge (Drip Edge A), then directing it to a Catch Basin (CB B), then daylighting to the 18" culvert in the SW portion of the parcel.

Subcatchment 5 collects runoff from the South Roof of the main building, directing it to a 24" wide drip edge (Drip Edge B), then to a Catch Basin (CB B), then daylighting to the 18" culvert in the SW portion of the parcel.

Subcatchment 6 collects runoff from the Roof of the Eastern Covered Porch, directing it into a 24" wide drip edge (Drip Edge C), then directing it to a Catch Basin (CB A), then directing it into another 24" wide drip edge (Drip Edge B), then to another Catch Basin (CB B), then daylighting to the 18" Culvert in the SW portion of the parcel.

Drainage Summary

As required by the City of Portsmouth's Site Plan Review Regulations for Stormwater Management Best Practices (Section 7.4.2.8), the **two, ten, twenty-five, and fifty** year storm events were analyzed. The post-development flow meets or exceeds the requirements set forth by the city, resulting in no net increase in stormwater runoff rates. As shown on the plan, the stormwater system will adequately handle the post-development peak rate of runoff.

The proposed site improvements will have a positive drainage impact on the neighborhood and the city. Currently the flow from the majority of the block travels through this site to the 18" culvert located just off the property. The stormwater control measures provided by the drip edges, rain garden, swale, and detention pond will reduce both the rate of runoff and the total from the site

Rate of Runoff Comparison

Pre-Development (CFS)				
Analysis Points	2yr	10yr	25yr	50yr
Analysis Point 1	2.07	4.06	5.38	6.30
Post-Development (CFS)				
Analysis Point 1	1.86	4.03	5.32	6.30
Decrease in Flow (CFS)				
Analysis Point 1	0.21	0.03	0.06	0.00

Total Volume Comparison

Pre-Development (Acre-Feet)				
Analysis Points	2yr	10yr	25yr	50yr
Analysis Point 1	0.16	0.30	0.39	0.47
Post-Development (Acre-Feet)				
Analysis Point 1	0.12	0.24	0.33	0.40
Decrease in Volume (Acre-Feet)				
Analysis Point 1	0.04	0.06	0.06	0.07

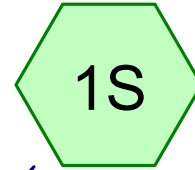
PRE-DEVELOPMENT CALCULATIONS

LEGEND

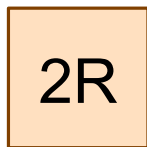
-  SUBCATCHMENT
-  DRAINAGE FLOW PATH
-  ANALYSIS POINT



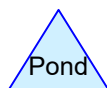
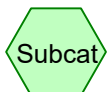
PRE-DEVELOPMENT
SCALE: 1" = 50'



SW area



AP1



Routing Diagram for Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering, Printed 8/17/2020

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 8/17/2020

Page 13

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.393	77	1/8 acre lots, 65% imp, HSG A (1S)
0.298	68	<50% Grass cover, Poor, HSG A (1S)
0.000	96	Gravel surface, HSG A (1S)
0.038	98	Paved parking, HSG A (1S)
0.011	98	Roofs, HSG A (1S)
1.741	76	TOTAL AREA

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 8/17/2020

Page 14

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.741	HSG A	1S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.741		TOTAL AREA

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 8/17/2020

Page 15

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.393	0.000	0.000	0.000	0.000	1.393	1/8 acre lots, 65% imp	1S
0.298	0.000	0.000	0.000	0.000	0.298	<50% Grass cover, Poor	1S
0.000	0.000	0.000	0.000	0.000	0.000	Gravel surface	1S
0.038	0.000	0.000	0.000	0.000	0.038	Paved parking	1S
0.011	0.000	0.000	0.000	0.000	0.011	Roofs	1S
1.741	0.000	0.000	0.000	0.000	1.741	TOTAL AREA	

Saratoga Way Pre 7-23-2020*Type III 24-hr 2 yr Rainfall=3.10"*

Prepared by Ross Engineering

Printed 8/17/2020

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Page 16

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=75,831 sf 54.87% Impervious Runoff Depth>1.08"
Flow Length=317' Tc=6.7 min CN=76 Runoff=2.07 cfs 0.157 af

Reach2R: AP1

Inflow=2.07 cfs 0.157 af
Outflow=2.07 cfs 0.157 af

Total Runoff Area = 1.741 ac Runoff Volume = 0.157 af Average Runoff Depth = 1.08"
45.13% Pervious = 0.786 ac 54.87% Impervious = 0.955 ac

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 8/17/2020

Page 17

Summary for Subcatchment 1S: SW area

Runoff = 2.07 cfs @ 12.10 hrs, Volume= 0.157 af, Depth> 1.08"

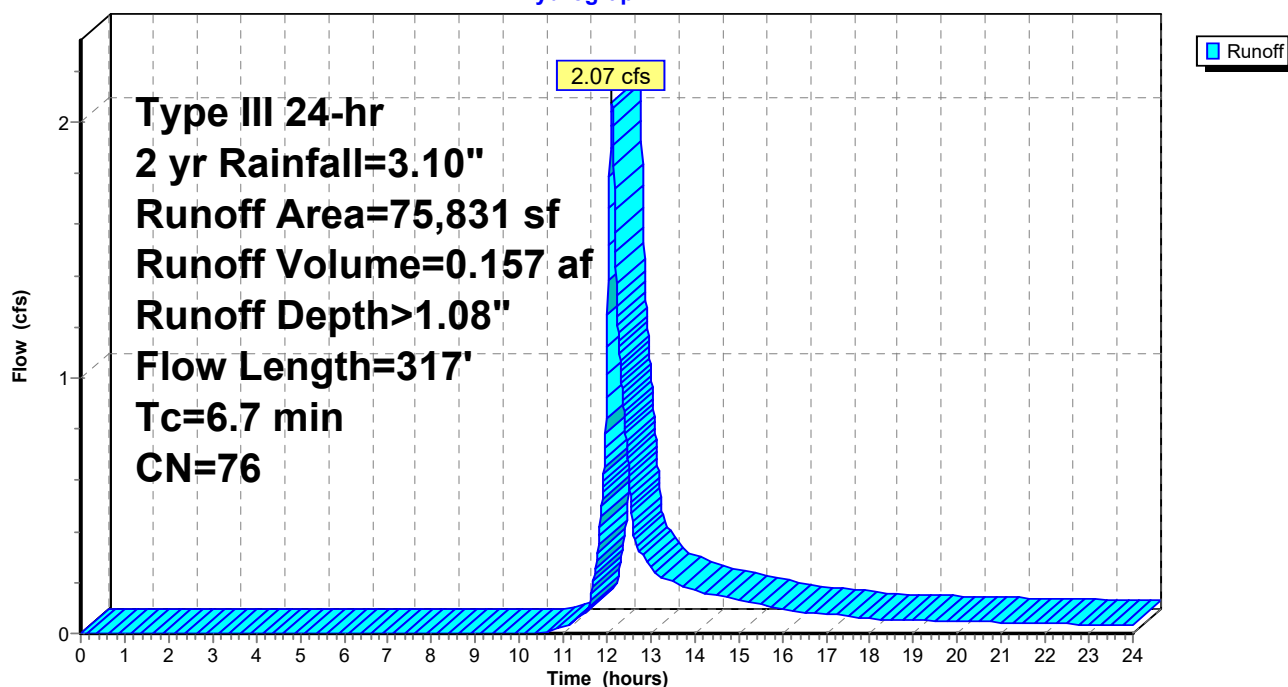
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
60,692	77	1/8 acre lots, 65% imp, HSG A
12,962	68	<50% Grass cover, Poor, HSG A
497	98	Roofs, HSG A
15	96	Gravel surface, HSG A
1,665	98	Paved parking, HSG A
75,831	76	Weighted Average
34,219		45.13% Pervious Area
41,612		54.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	267	0.0800	4.24		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.7	317	Total			

Subcatchment 1S: SW area

Hydrograph

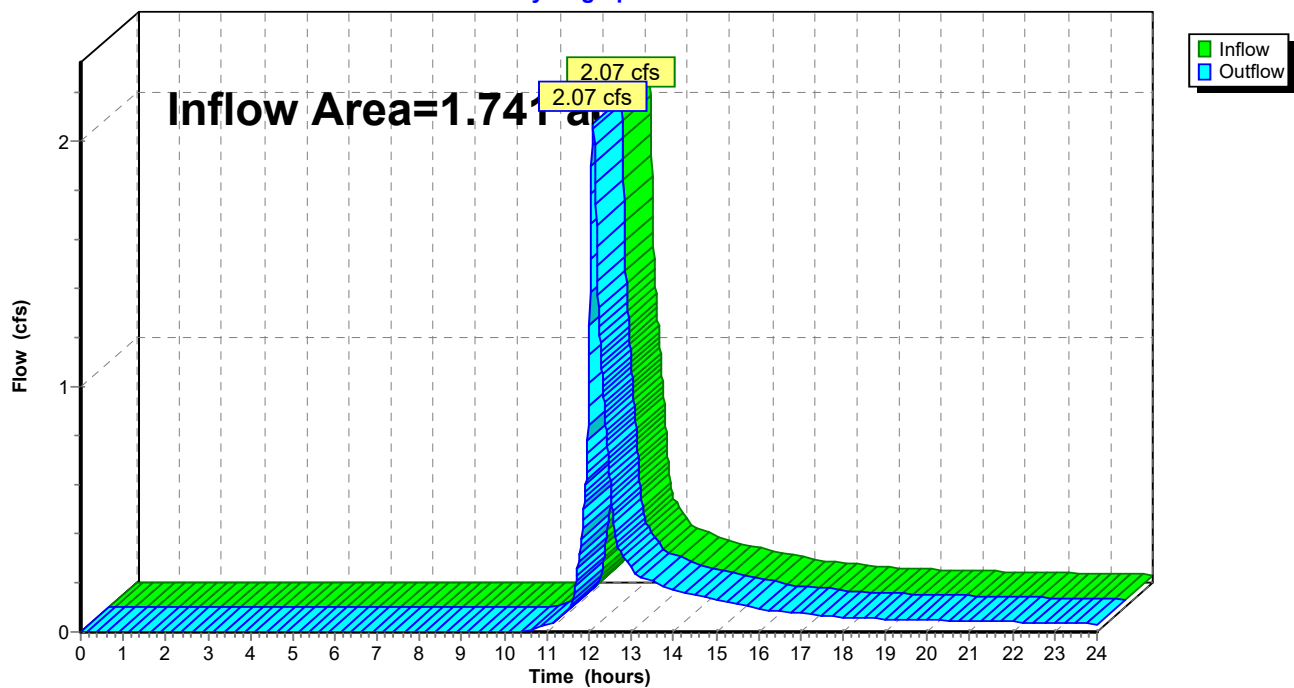


Summary for Reach 2R: AP1

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

Inflow Area = 1.741 ac, 54.87% Impervious, Inflow Depth > 1.08" for 2 yr event
Inflow = 2.07 cfs @ 12.10 hrs, Volume= 0.157 af
Outflow = 2.07 cfs @ 12.10 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: AP1**Hydrograph**

Saratoga Way Pre 7-23-2020*Type III 24-hr 10 yr Rainfall=4.40"*

Prepared by Ross Engineering

Printed 8/17/2020

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Page 19

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=75,831 sf 54.87% Impervious Runoff Depth>2.05"
Flow Length=317' Tc=6.7 min CN=76 Runoff=4.06 cfs 0.297 af

Reach2R: AP1

Inflow=4.06 cfs 0.297 af
Outflow=4.06 cfs 0.297 af

Total Runoff Area = 1.741 ac Runoff Volume = 0.297 af Average Runoff Depth = 2.05"
45.13% Pervious = 0.786 ac 54.87% Impervious = 0.955 ac

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 10 yr Rainfall=4.40"

Printed 8/17/2020

Page 20

Summary for Subcatchment 1S: SW area

Runoff = 4.06 cfs @ 12.10 hrs, Volume= 0.297 af, Depth> 2.05"

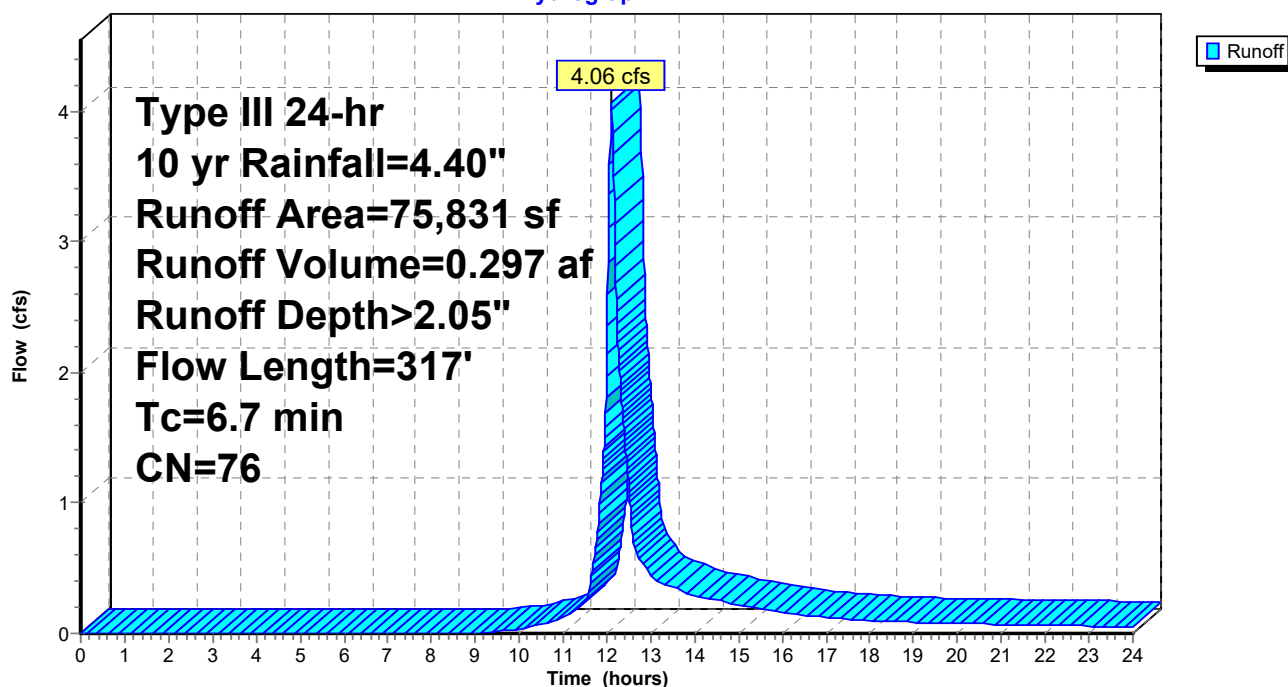
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
60,692	77	1/8 acre lots, 65% imp, HSG A
12,962	68	<50% Grass cover, Poor, HSG A
497	98	Roofs, HSG A
15	96	Gravel surface, HSG A
1,665	98	Paved parking, HSG A
75,831	76	Weighted Average
34,219		45.13% Pervious Area
41,612		54.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	267	0.0800	4.24		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.7	317	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach 2R: AP1

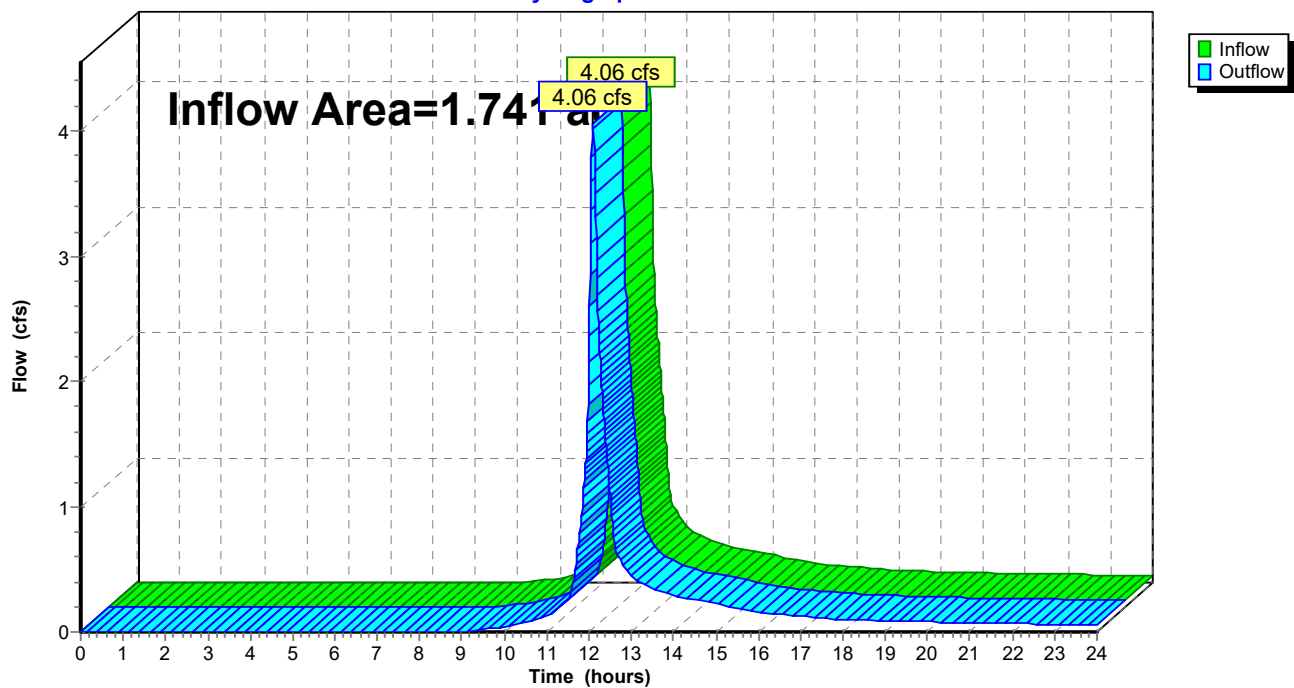
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.741 ac, 54.87% Impervious, Inflow Depth > 2.05" for 10 yr event
Inflow = 4.06 cfs @ 12.10 hrs, Volume= 0.297 af
Outflow = 4.06 cfs @ 12.10 hrs, Volume= 0.297 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: AP1

Hydrograph



Saratoga Way Pre 7-23-2020*Type III 24-hr 25 yr Rainfall=5.20"*

Prepared by Ross Engineering

Printed 8/17/2020

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Page 22

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=75,831 sf 54.87% Impervious Runoff Depth>2.70"
Flow Length=317' Tc=6.7 min CN=76 Runoff=5.38 cfs 0.391 af

Reach2R: AP1

Inflow=5.38 cfs 0.391 af
Outflow=5.38 cfs 0.391 af

Total Runoff Area = 1.741 ac Runoff Volume = 0.391 af Average Runoff Depth = 2.70"
45.13% Pervious = 0.786 ac 54.87% Impervious = 0.955 ac

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 25 yr Rainfall=5.20"

Printed 8/17/2020

Page 23

Summary for Subcatchment 1S: SW area

Runoff = 5.38 cfs @ 12.10 hrs, Volume= 0.391 af, Depth> 2.70"

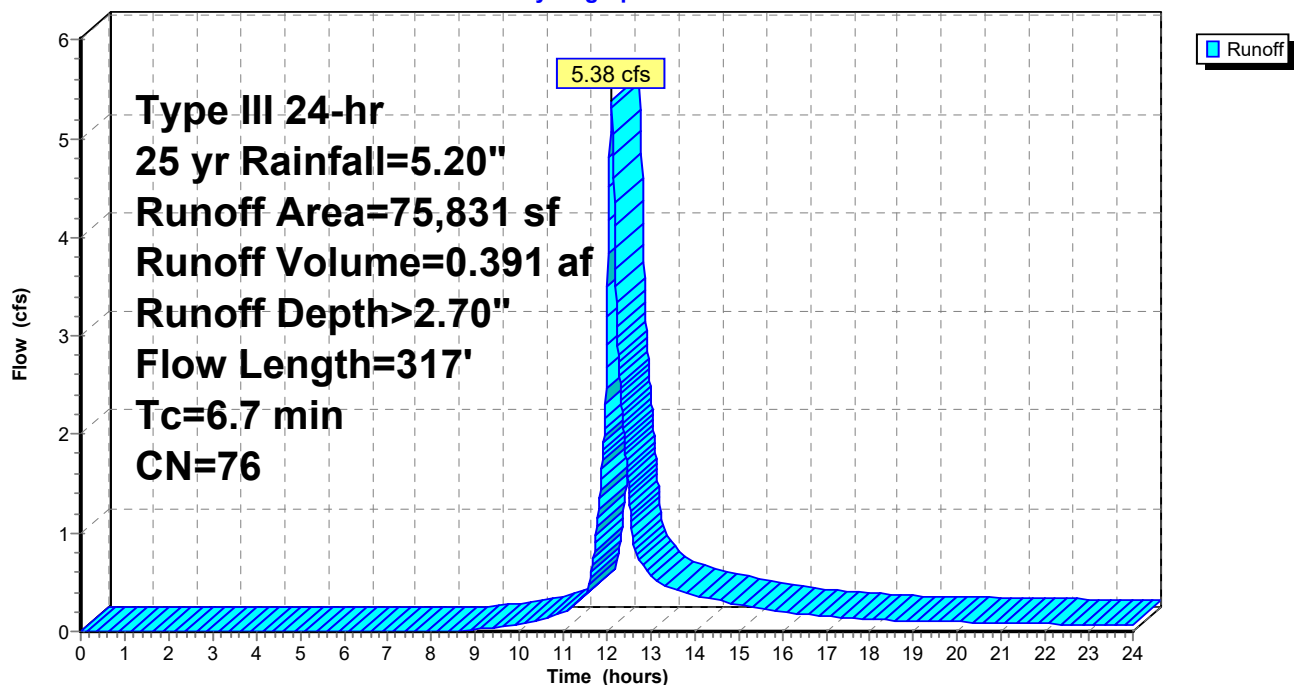
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
60,692	77	1/8 acre lots, 65% imp, HSG A
12,962	68	<50% Grass cover, Poor, HSG A
497	98	Roofs, HSG A
15	96	Gravel surface, HSG A
1,665	98	Paved parking, HSG A
75,831	76	Weighted Average
34,219		45.13% Pervious Area
41,612		54.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	267	0.0800	4.24		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.7	317	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach 2R: AP1

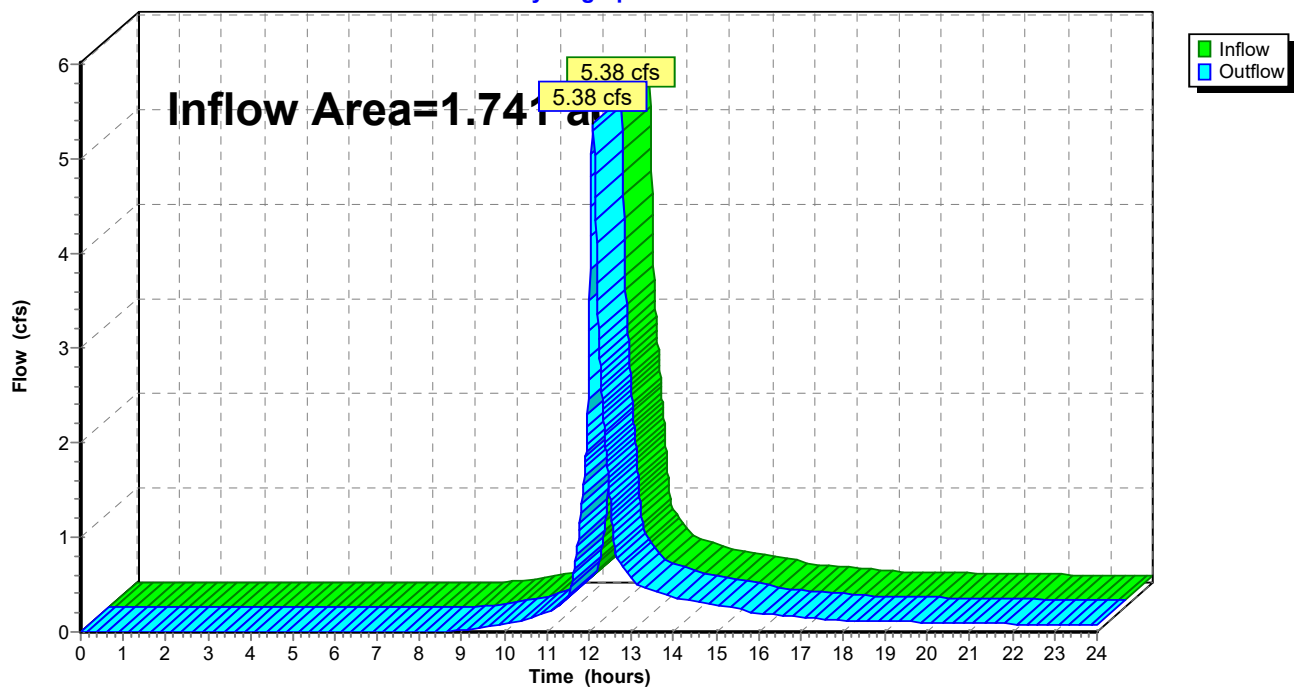
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.741 ac, 54.87% Impervious, Inflow Depth > 2.70" for 25 yr event
Inflow = 5.38 cfs @ 12.10 hrs, Volume= 0.391 af
Outflow = 5.38 cfs @ 12.10 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: AP1

Hydrograph



Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 8/17/2020

Page 25

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=75,831 sf 54.87% Impervious Runoff Depth>3.20"
Flow Length=317' Tc=6.7 min CN=76 Runoff=6.39 cfs 0.465 af

Reach2R: AP1

Inflow=6.39 cfs 0.465 af
Outflow=6.39 cfs 0.465 af

Total Runoff Area = 1.741 ac Runoff Volume = 0.465 af Average Runoff Depth = 3.20"
45.13% Pervious = 0.786 ac 54.87% Impervious = 0.955 ac

Saratoga Way Pre 7-23-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 8/17/2020

Page 26

Summary for Subcatchment 1S: SW area

Runoff = 6.39 cfs @ 12.10 hrs, Volume= 0.465 af, Depth> 3.20"

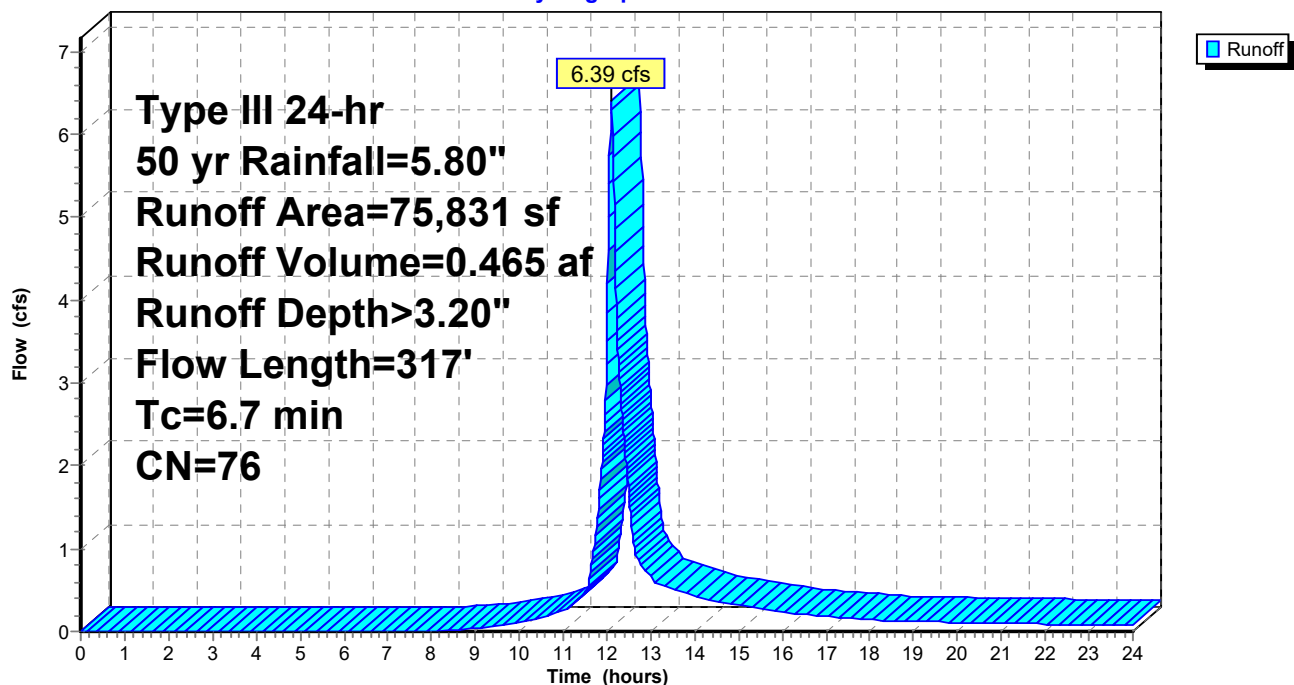
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
60,692	77	1/8 acre lots, 65% imp, HSG A
12,962	68	<50% Grass cover, Poor, HSG A
497	98	Roofs, HSG A
15	96	Gravel surface, HSG A
1,665	98	Paved parking, HSG A
75,831	76	Weighted Average
34,219		45.13% Pervious Area
41,612		54.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	267	0.0800	4.24		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.7	317	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach 2R: AP1

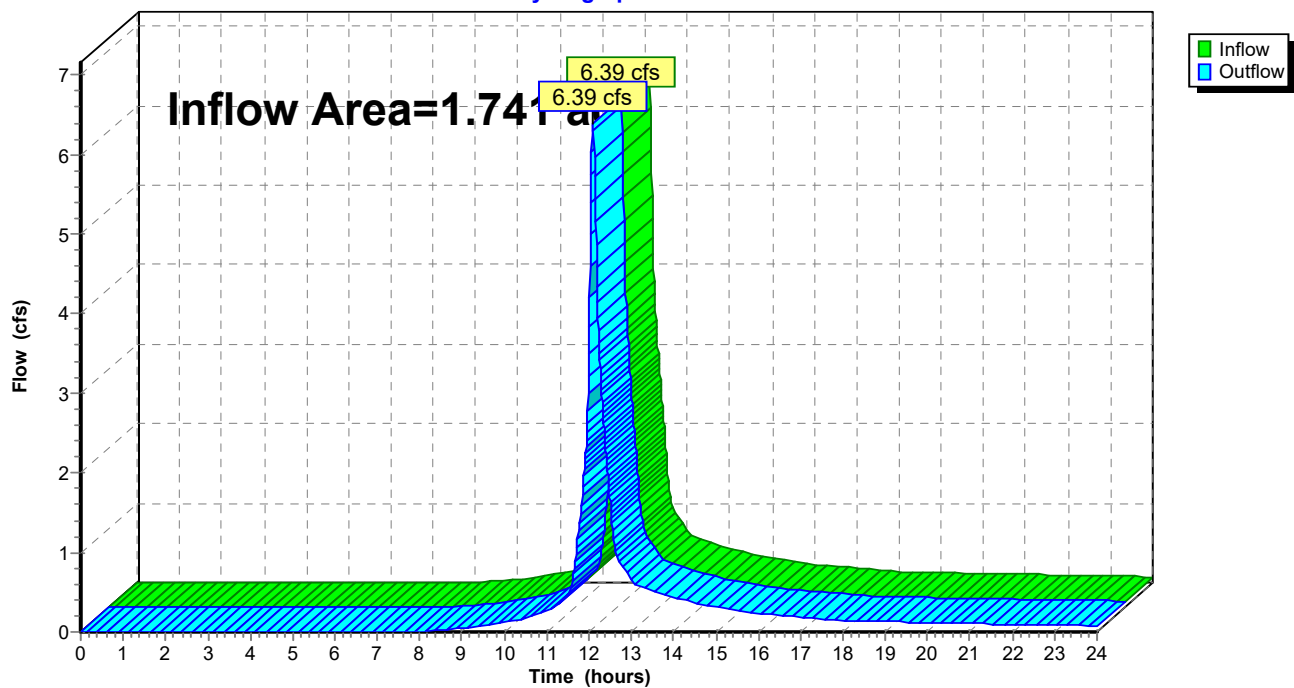
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.741 ac, 54.87% Impervious, Inflow Depth > 3.20" for 50 yr event
Inflow = 6.39 cfs @ 12.10 hrs, Volume= 0.465 af
Outflow = 6.39 cfs @ 12.10 hrs, Volume= 0.465 af, Atten= 0%, Lag= 0.0 min

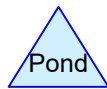
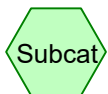
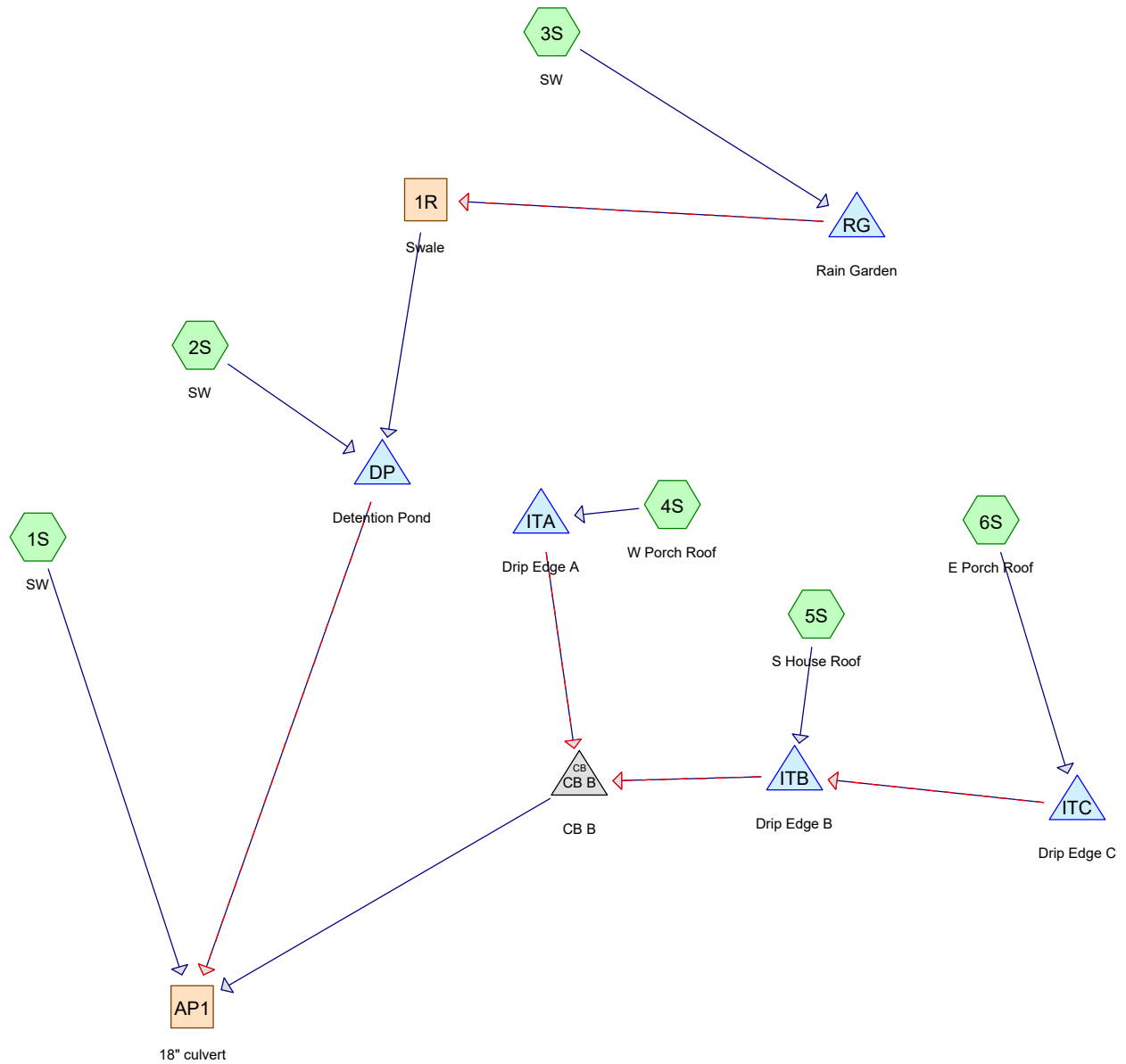
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: AP1

Hydrograph



POST-DEVELOPMENT CALCULATIONS



Routing Diagram for Saratoga Way Post 9-18-2020
 Prepared by Ross Engineering, Printed 9/18/2020
 HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 9/18/2020

Page 31

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.552	77	1/8 acre lots, 65% imp, HSG A (1S, 2S, 3S)
0.007	96	Gravel surface, HSG A (4S, 5S, 6S)
0.079	98	Paved parking, HSG A (2S, 3S)
0.003	98	Retaining Wall, HSG A (2S, 3S)
0.051	98	Roofs, HSG A (4S, 5S, 6S)
0.044	98	Unconnected roofs, HSG A (3S)
0.005	98	deck, HSG A (1S)
0.000	98	retaining wall, HSG A (1S)
1.741	79	TOTAL AREA

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 9/18/2020

Page 32

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.741	HSG A	1S, 2S, 3S, 4S, 5S, 6S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.741		TOTAL AREA

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 9/18/2020

Page 33

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.552	0.000	0.000	0.000	0.000	1.552	1/8 acre lots, 65% imp	1S, 2S, 3S
0.007	0.000	0.000	0.000	0.000	0.007	Gravel surface	4S, 5S, 6S
0.079	0.000	0.000	0.000	0.000	0.079	Paved parking	2S, 3S
0.003	0.000	0.000	0.000	0.000	0.003	Retaining Wall	2S, 3S
0.051	0.000	0.000	0.000	0.000	0.051	Roofs	4S, 5S, 6S
0.044	0.000	0.000	0.000	0.000	0.044	Unconnected roofs	3S
0.005	0.000	0.000	0.000	0.000	0.005	deck	1S
0.000	0.000	0.000	0.000	0.000	0.000	retaining wall	1S
1.741	0.000	0.000	0.000	0.000	1.741	TOTAL AREA	

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Printed 9/18/2020

Page 34

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	CB B	55.25	55.00	5.8	0.0431	0.012	6.0	0.0	0.0
2	DP	55.70	54.50	22.0	0.0545	0.012	18.0	0.0	0.0
3	ITA	56.50	56.00	12.7	0.0394	0.012	6.0	0.0	0.0
4	ITB	57.50	56.00	7.0	0.2143	0.012	6.0	0.0	0.0
5	ITC	58.25	58.12	12.7	0.0102	0.012	6.0	0.0	0.0
6	RG	56.25	56.00	31.0	0.0081	0.012	6.0	0.0	0.0

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 9/18/2020

Page 35

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SWRunoff Area=21,743 sf 65.38% Impervious Runoff Depth>1.14"
Flow Length=299' Tc=4.7 min CN=77 Runoff=0.68 cfs 0.047 af**Subcatchment2S: SW**Runoff Area=21,872 sf 65.41% Impervious Runoff Depth>1.14"
Flow Length=273' Tc=6.5 min CN=77 Runoff=0.64 cfs 0.048 af**Subcatchment3S: SW**Runoff Area=29,712 sf 71.18% Impervious Runoff Depth>1.39"
Flow Length=330' Tc=6.9 min CN=81 Runoff=1.07 cfs 0.079 af**Subcatchment4S: W Porch Roof**Runoff Area=192 sf 75.00% Impervious Runoff Depth>2.87"
Flow Length=6' Slope=0.5830 '/' Tc=0.0 min CN=98 Runoff=0.02 cfs 0.001 af**Subcatchment5S: S House Roof**Runoff Area=2,120 sf 90.57% Impervious Runoff Depth>2.87"
Flow Length=24' Slope=0.5830 '/' Tc=0.1 min CN=98 Runoff=0.18 cfs 0.012 af**Subcatchment6S: E Porch Roof**Runoff Area=192 sf 75.00% Impervious Runoff Depth>2.87"
Flow Length=6' Slope=0.5830 '/' Tc=0.0 min CN=98 Runoff=0.02 cfs 0.001 af**Reach1R: Swale**Avg. Flow Depth=0.57' Max Vel=0.54 fps Inflow=0.90 cfs 0.034 af
n=0.150 L=60.0' S=0.0125 '/' Capacity=2.96 cfs Outflow=0.84 cfs 0.034 af**ReachAP1: 18" culvert**Inflow=1.86 cfs 0.117 af
Outflow=1.86 cfs 0.117 af**PondCB B: CB B**Peak Elev=55.48' Inflow=0.15 cfs 0.003 af
6.0" Round Culvert n=0.012 L=5.8' S=0.0431 '/' Outflow=0.15 cfs 0.003 af**PondDP: DetentionPond**Peak Elev=56.22' Storage=96 cf Inflow=1.39 cfs 0.081 af
Discarded=0.03 cfs 0.014 af Primary=1.34 cfs 0.067 af Secondary=0.00 cfs 0.000 af Outflow=1.37 cfs 0.081 af**PondITA: Drip Edge A**Peak Elev=56.55' Storage=0.000 af Inflow=0.02 cfs 0.001 af
Discarded=0.01 cfs 0.001 af Primary=0.01 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.001 af**PondITB: Drip Edge B**Peak Elev=57.73' Storage=0.000 af Inflow=0.18 cfs 0.012 af
Discarded=0.03 cfs 0.009 af Primary=0.14 cfs 0.003 af Secondary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.012 af**PondITC: Drip Edge C**Peak Elev=57.88' Storage=0.000 af Inflow=0.02 cfs 0.001 af
Discarded=0.01 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.001 af**PondRG: Rain Garden**Peak Elev=56.97' Storage=360 cf Inflow=1.07 cfs 0.079 af
Discarded=0.10 cfs 0.045 af Primary=0.56 cfs 0.031 af Secondary=0.37 cfs 0.003 af Outflow=1.01 cfs 0.079 af**Total Runoff Area = 1.741 ac Runoff Volume = 0.188 af Average Runoff Depth = 1.29"**
31.58% Pervious = 0.550 ac 68.42% Impervious = 1.191 ac

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 9/18/2020

Page 36

Summary for Subcatchment 1S: SW

Runoff = 0.68 cfs @ 12.08 hrs, Volume= 0.047 af, Depth> 1.14"

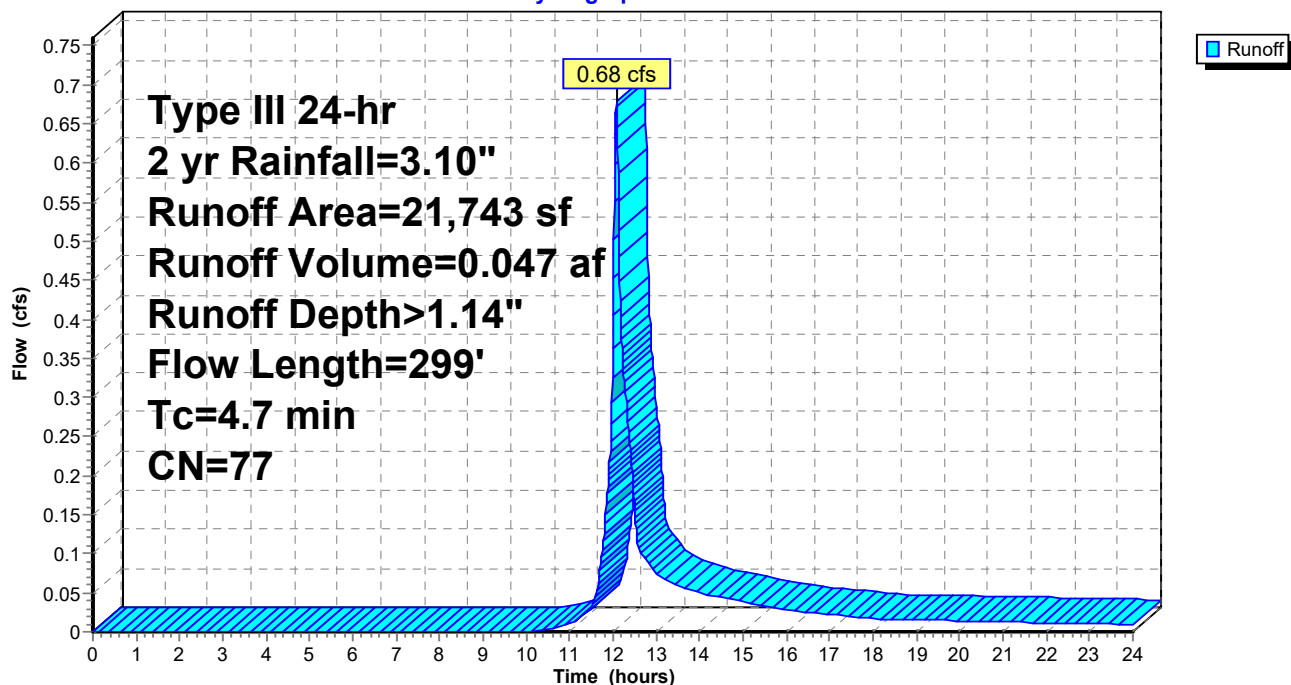
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
21,506	77	1/8 acre lots, 65% imp, HSG A
* 220	98	deck, HSG A
* 17	98	retaining wall, HSG A
21,743	77	Weighted Average
7,527		34.62% Pervious Area
14,216		65.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	249	0.0786	4.21		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
4.7	299	Total			

Subcatchment 1S: SW

Hydrograph



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 9/18/2020

Page 37

Summary for Subcatchment 2S: SW

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 0.048 af, Depth> 1.14"

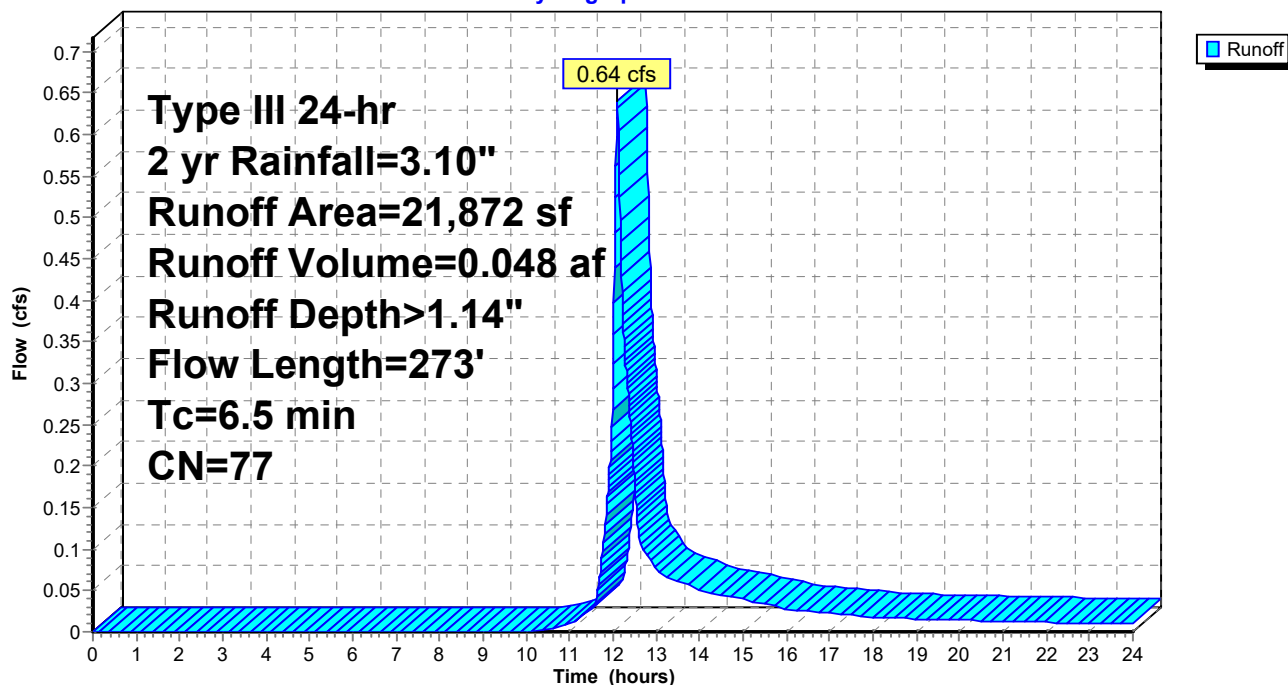
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
21,613	77	1/8 acre lots, 65% imp, HSG A
205	98	Paved parking, HSG A
* 54	98	Retaining Wall, HSG A
21,872	77	Weighted Average
7,565		34.59% Pervious Area
14,307		65.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
0.8	223	0.0900	4.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.5	273	Total			

Subcatchment 2S: SW

Hydrograph



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 9/18/2020

Page 38

Summary for Subcatchment 3S: SW

Runoff = 1.07 cfs @ 12.10 hrs, Volume= 0.079 af, Depth> 1.39"

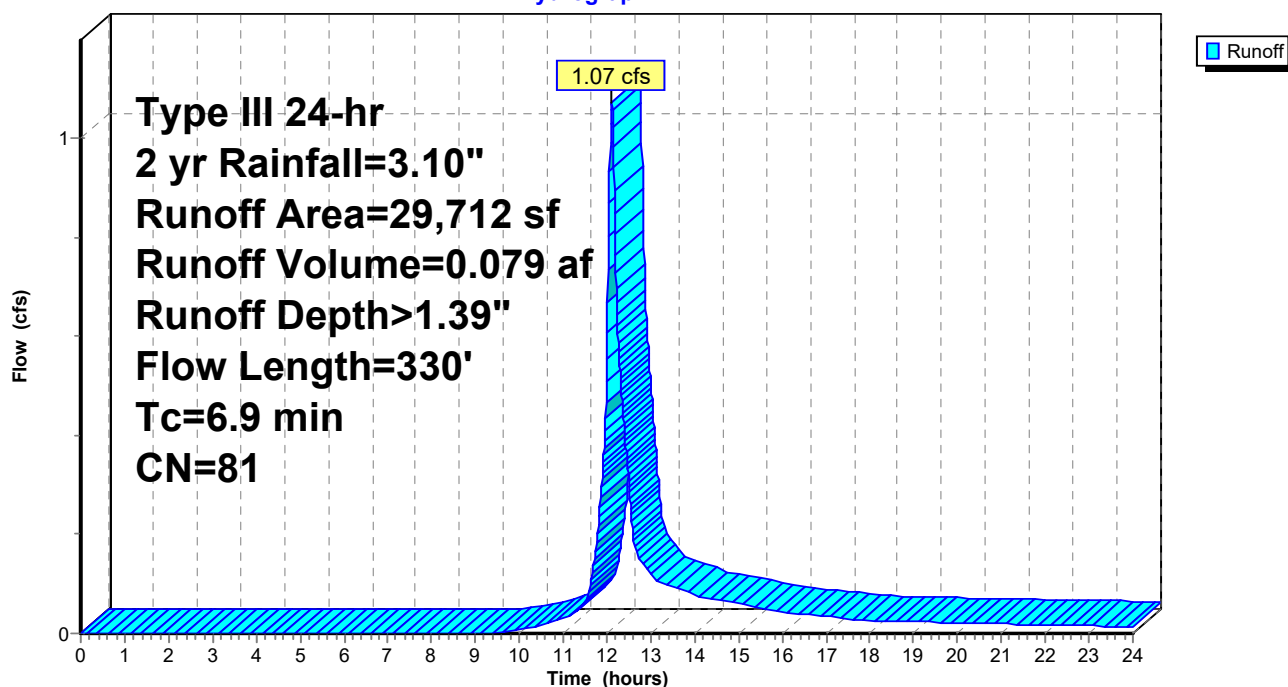
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
24,467	77	1/8 acre lots, 65% imp, HSG A
3,229	98	Paved parking, HSG A
* 92	98	Retaining Wall, HSG A
1,924	98	Unconnected roofs, HSG A
29,712	81	Weighted Average
8,563		28.82% Pervious Area
21,149		71.18% Impervious Area
1,924		9.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	280	0.0680	3.91		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.9	330	Total			

Subcatchment 3S: SW

Hydrograph



Summary for Subcatchment 4S: W Porch Roof[46] Hint: $T_c=0$ (Instant runoff peak depends on dt)

Runoff = 0.02 cfs @ 12.00 hrs, Volume= 0.001 af, Depth> 2.87"

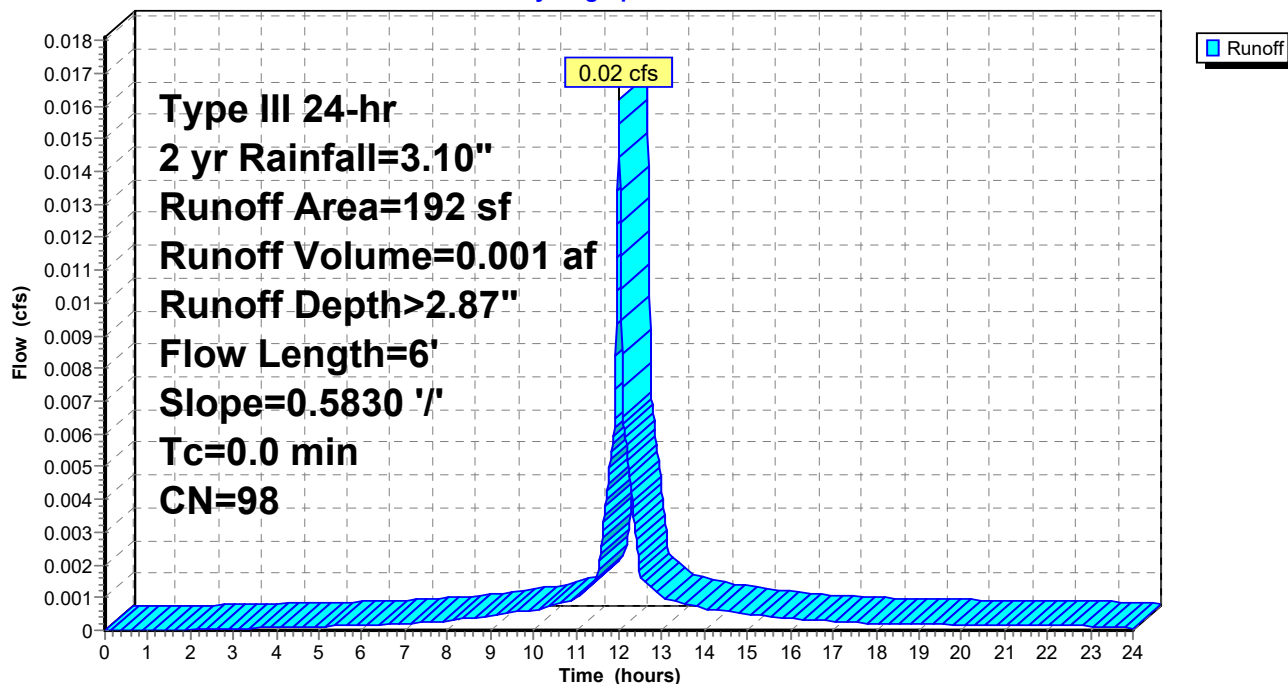
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

T_c (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces $n=0.011$ $P2=3.10"$

Subcatchment 4S: W Porch Roof

Hydrograph



Summary for Subcatchment 5S: S House Roof[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.18 cfs @ 12.00 hrs, Volume= 0.012 af, Depth> 2.87"

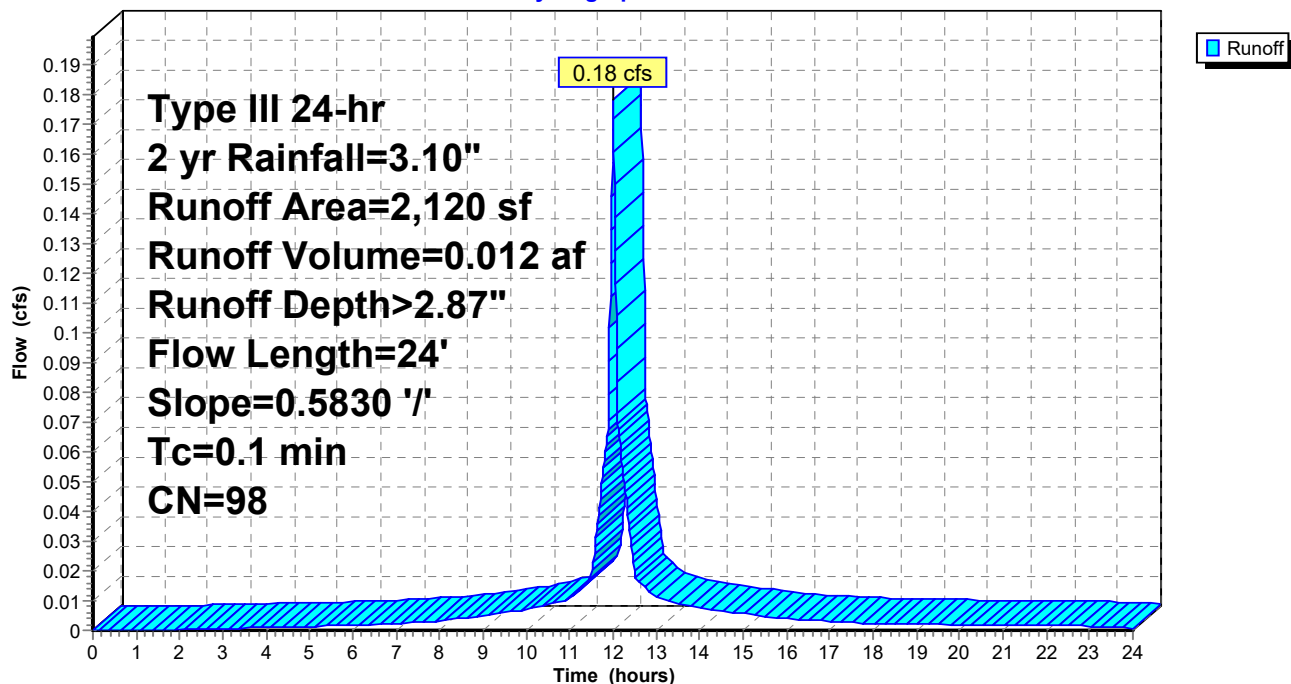
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
1,920	98	Roofs, HSG A
200	96	Gravel surface, HSG A
2,120	98	Weighted Average
200		9.43% Pervious Area
1,920		90.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	24	0.5830	3.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 5S: S House Roof

Hydrograph



Summary for Subcatchment 6S: E Porch Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.02 cfs @ 12.00 hrs, Volume= 0.001 af, Depth> 2.87"

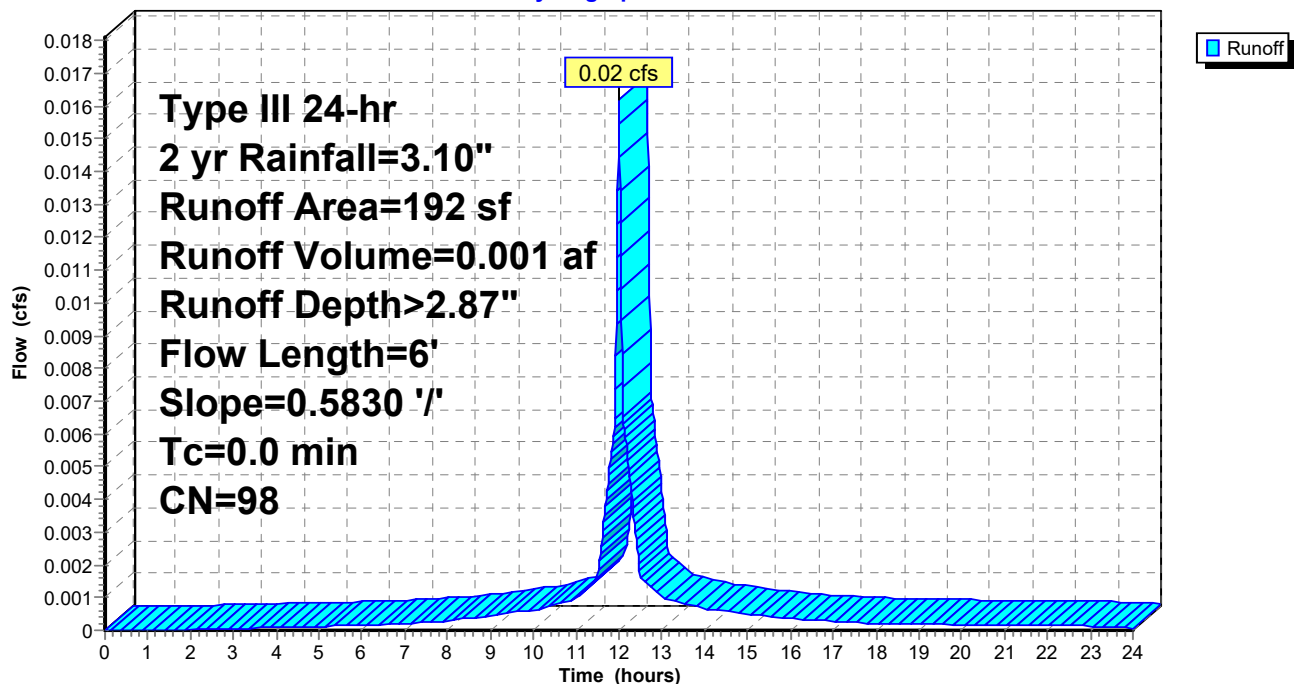
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 6S: E Porch Roof

Hydrograph



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 9/18/2020

Page 42

Summary for Reach 1R: Swale

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth = 0.59" for 2 yr event
Inflow = 0.90 cfs @ 12.13 hrs, Volume= 0.034 af
Outflow = 0.84 cfs @ 12.16 hrs, Volume= 0.034 af, Atten= 7%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.54 fps, Min. Travel Time= 1.9 min

Avg. Velocity = 0.18 fps, Avg. Travel Time= 5.4 min

Peak Storage= 94 cf @ 12.16 hrs

Average Depth at Peak Storage= 0.57'

Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 2.96 cfs

1.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 '/' Top Width= 7.00'

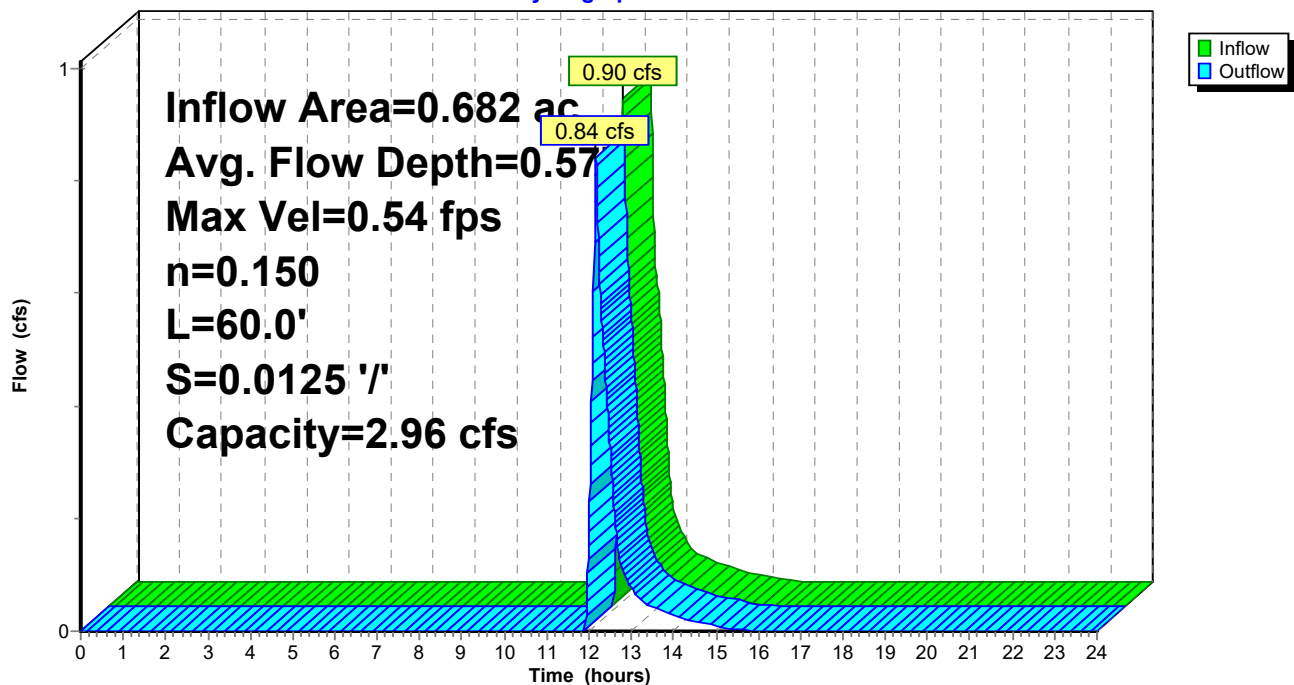
Length= 60.0' Slope= 0.0125 '/'

Inlet Invert= 56.00', Outlet Invert= 55.25'



Reach 1R: Swale

Hydrograph



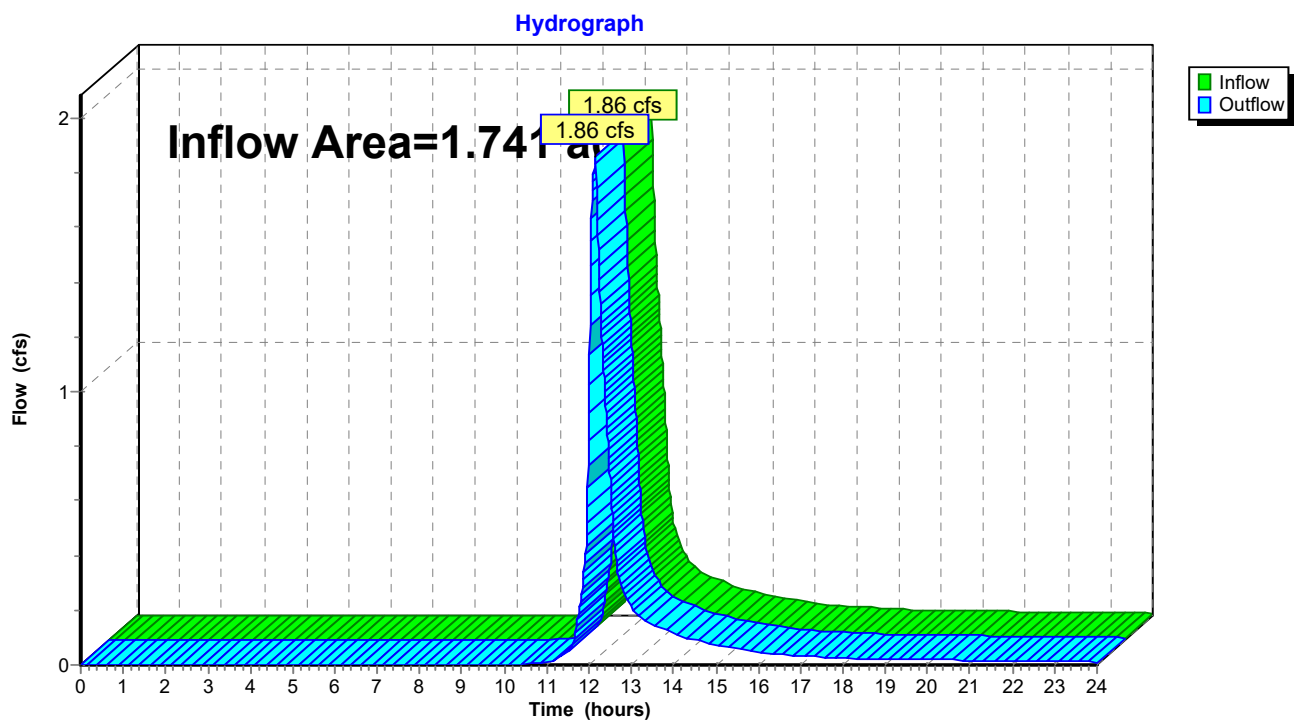
Summary for Reach AP1: 18" culvert

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

Inflow Area = 1.741 ac, 68.42% Impervious, Inflow Depth > 0.81" for 2 yr event
Inflow = 1.86 cfs @ 12.14 hrs, Volume= 0.117 af
Outflow = 1.86 cfs @ 12.14 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: 18" culvert



Summary for Pond CB B: CB B

[57] Hint: Peaked at 55.48' (Flood elevation advised)

Inflow Area = 0.057 ac, 88.18% Impervious, Inflow Depth = 0.63" for 2 yr event
 Inflow = 0.15 cfs @ 12.02 hrs, Volume= 0.003 af
 Outflow = 0.15 cfs @ 12.02 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.15 cfs @ 12.02 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 55.48' @ 12.02 hrs

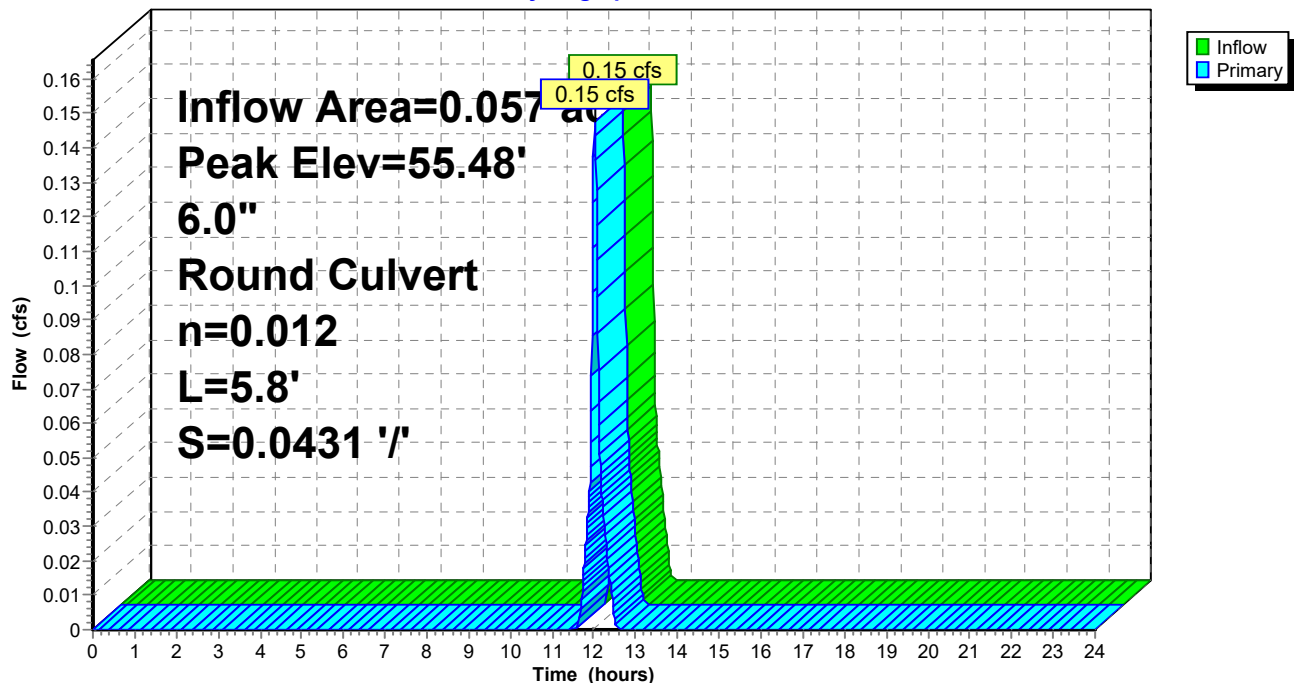
Device	Routing	Invert	Outlet Devices
#1	Primary	55.25'	6.0" Round Culvert L= 5.8' Ke= 0.500 Inlet / Outlet Invert= 55.25' / 55.00' S= 0.0431 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.15 cfs @ 12.02 hrs HW=55.48' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.15 cfs @ 1.64 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond DP: Detention Pond

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.61' @ 11.90 hrs

Inflow Area = 1.184 ac, 68.73% Impervious, Inflow Depth > 0.83" for 2 yr event
 Inflow = 1.39 cfs @ 12.14 hrs, Volume= 0.081 af
 Outflow = 1.37 cfs @ 12.16 hrs, Volume= 0.081 af, Atten= 2%, Lag= 0.9 min
 Discarded = 0.03 cfs @ 12.16 hrs, Volume= 0.014 af
 Primary = 1.34 cfs @ 12.16 hrs, Volume= 0.067 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.22' @ 12.16 hrs Surf.Area= 248 sf Storage= 96 cf

Plug-Flow detention time=2.4 min calculated for 0.081 af (100% of inflow)
 Center-of-Mass det. time=1.8 min (814.2 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1	55.65'	340 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.65	50	0	0
56.00	211	46	46
57.00	378	295	340

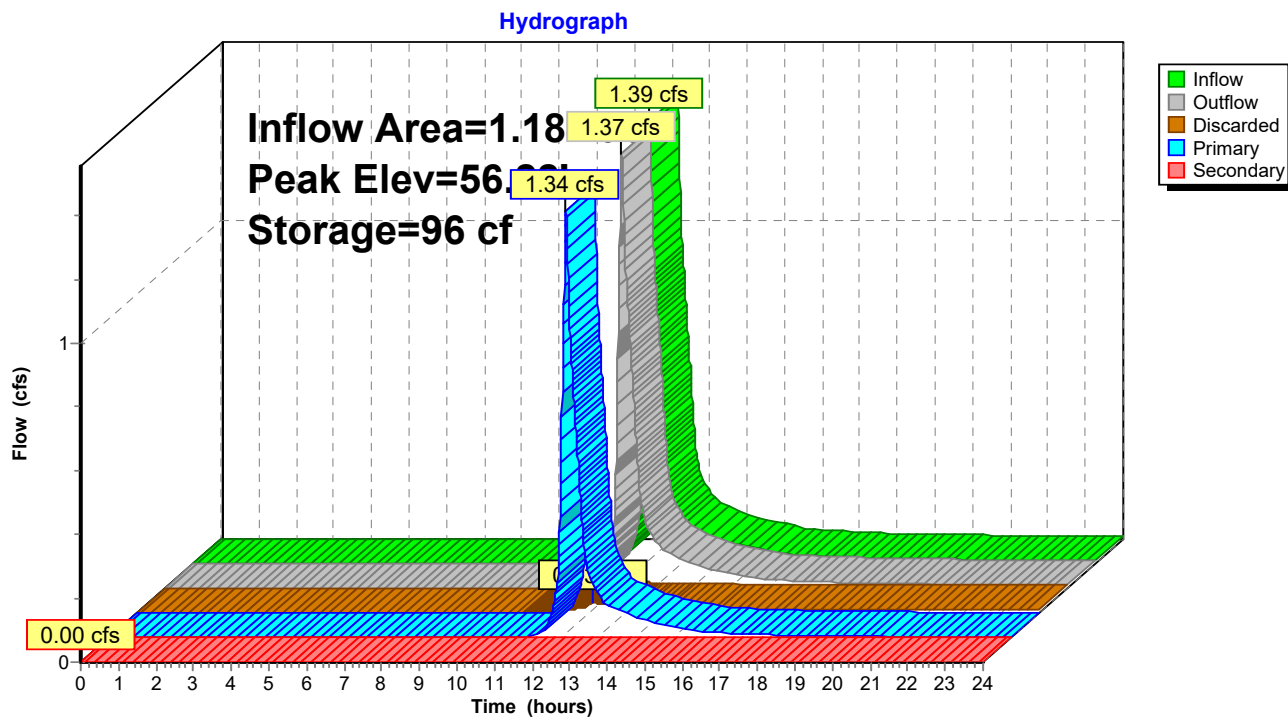
Device	Routing	Invert	Outlet Devices
#1	Primary	55.70'	18.0" Round Culvert L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 55.70' / 54.50' S= 0.0545'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	56.85'	10.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	55.65'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 12.16 hrs HW=56.22' (Free Discharge)
 ↑ **3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.34 cfs @ 12.16 hrs HW=56.22' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 1.34 cfs @ 2.46 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.65' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP: Detention Pond



Summary for Pond ITA: Drip Edge A

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 2.87" for 2 yr event
 Inflow = 0.02 cfs @ 12.00 hrs, Volume= 0.001 af
 Outflow = 0.02 cfs @ 12.01 hrs, Volume= 0.001 af, Atten= 7%, Lag= 0.9 min
 Discarded = 0.01 cfs @ 11.93 hrs, Volume= 0.001 af
 Primary = 0.01 cfs @ 12.01 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 56.55' @ 12.01 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=0.6 min calculated for 0.001 af (100% of inflow)

Center-of-Mass det. time=0.6 min (752.1 - 751.5)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	56.50'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 56.50' / 56.00' S= 0.0394'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	57.90'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	56.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.01 cfs @ 11.93 hrs HW=56.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlowMax=0.01 cfs @ 12.01 hrs HW=56.55' TW=55.48' (Dynamic Tailwater)

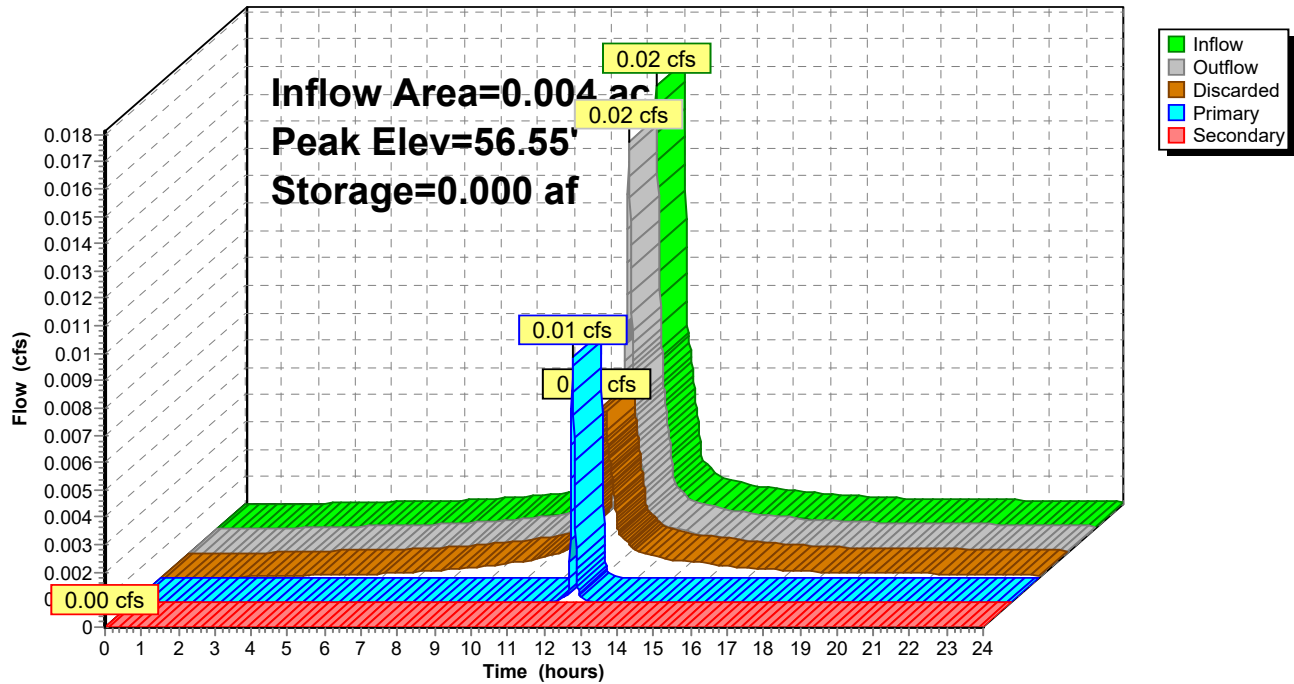
↑**1=Culvert** (Inlet Controls 0.01 cfs @ 0.79 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=56.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITA: Drip Edge A

Hydrograph



Summary for Pond ITB: Drip Edge B

Inflow Area = 0.053 ac, 89.27% Impervious, Inflow Depth > 2.63" for 2 yr event
 Inflow = 0.18 cfs @ 12.00 hrs, Volume= 0.012 af
 Outflow = 0.16 cfs @ 12.02 hrs, Volume= 0.012 af, Atten= 8%, Lag= 1.0 min
 Discarded = 0.03 cfs @ 11.61 hrs, Volume= 0.009 af
 Primary = 0.14 cfs @ 12.02 hrs, Volume= 0.003 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.73' @ 12.02 hrs Surf.Area= 0.005 ac Storage= 0.000 af

Plug-Flow detention time=1.2 min calculated for 0.012 af (100% of inflow)

Center-of-Mass det. time=1.1 min (752.7 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	57.50'	0.003 af	2.50'W x 80.00'L x 1.50'H Prismatic 0.007 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	6.0" Round Culvert L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 57.50' / 56.00' S= 0.2143'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	80.0' long x 2.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32
#3	Discarded	57.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.03 cfs @ 11.61 hrs HW=57.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlowMax=0.14 cfs @ 12.02 hrs HW=57.73' TW=55.48' (Dynamic Tailwater)

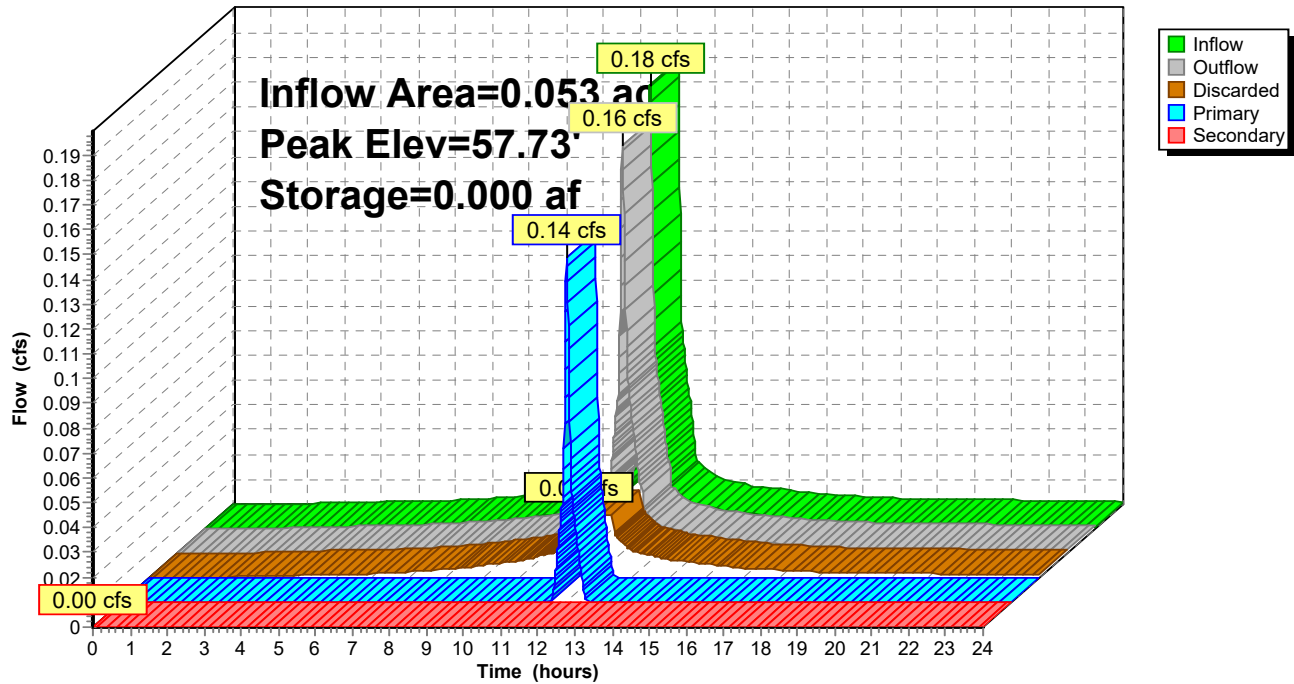
↑**1=Culvert** (Inlet Controls 0.14 cfs @ 1.62 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=57.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITB: Drip Edge B

Hydrograph



Summary for Pond ITC: Drip Edge C

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 2.87" for 2 yr event
 Inflow = 0.02 cfs @ 12.00 hrs, Volume= 0.001 af
 Outflow = 0.01 cfs @ 11.92 hrs, Volume= 0.001 af, Atten= 62%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.92 hrs, Volume= 0.001 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.88' @ 12.13 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=2.6 min calculated for 0.001 af (100% of inflow)
 Center-of-Mass det. time=2.5 min (754.0 - 751.5)

Volume	Invert	Avail.Storage	Storage Description
#1	57.67'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	58.25'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 58.25' / 58.12' S= 0.0102' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.07'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	57.67'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

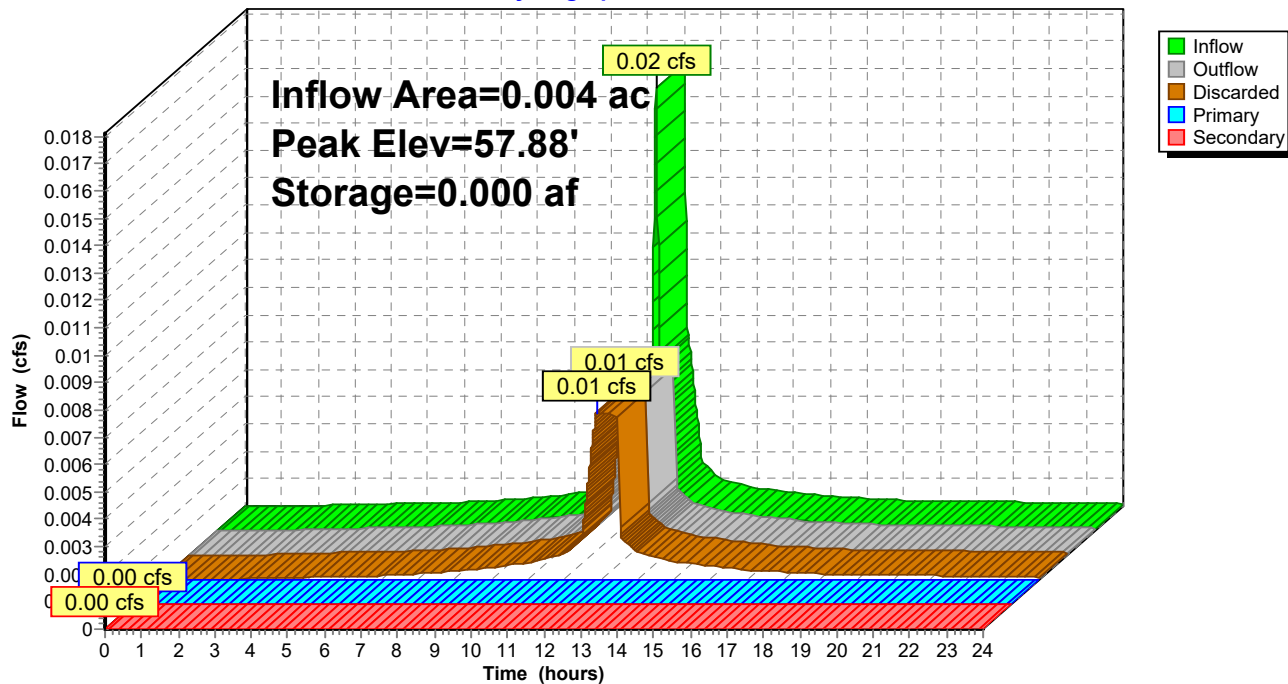
Discarded OutFlow Max=0.01 cfs @ 11.92 hrs HW=57.69' (Free Discharge)
 ↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.67' TW=57.50' (Dynamic Tailwater)
 ↑ **1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.67' TW=57.50' (Dynamic Tailwater)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITC: Drip Edge C

Hydrograph



Summary for Pond RG: Rain Garden

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth > 1.39" for 2 yr event
 Inflow = 1.07 cfs @ 12.10 hrs, Volume= 0.079 af
 Outflow = 1.01 cfs @ 12.13 hrs, Volume= 0.079 af, Atten= 6%, Lag= 1.6 min
 Discarded = 0.10 cfs @ 12.13 hrs, Volume= 0.045 af
 Primary = 0.56 cfs @ 12.11 hrs, Volume= 0.031 af
 Secondary= 0.37 cfs @ 12.13 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 56.97' @ 12.13 hrs Surf.Area= 708 sf Storage= 360 cf

Plug-Flow detention time= 19.0 min calculated for 0.079 af (100% of inflow)

Center-of-Mass det. time= 18.9 min (859.9 - 841.1)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	398 cf	Ponding Area (Conic) listed below (Recalc)
#2	55.00'	203 cf	Soil Filter Bed (Conic) listed below (Recalc)
			507 cf Overall x 40.0% Voids
		601 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	300	0	0	300
57.00	375	168	168	382
57.50	550	230	398	561

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
55.00	338	0	0	338
56.00	338	338	338	403
56.50	338	169	507	436

Device	Routing	Invert	Outlet Devices
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	55.00'	5.500 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#3	Primary	56.25'	6.0" Round Culvert L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 56.25' / 56.00' S= 0.0081 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 2 yr Rainfall=3.10"

Printed 9/18/2020

Page 54

Discarded OutFlowMax=0.10 cfs @ 12.13 hrs HW=56.97' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

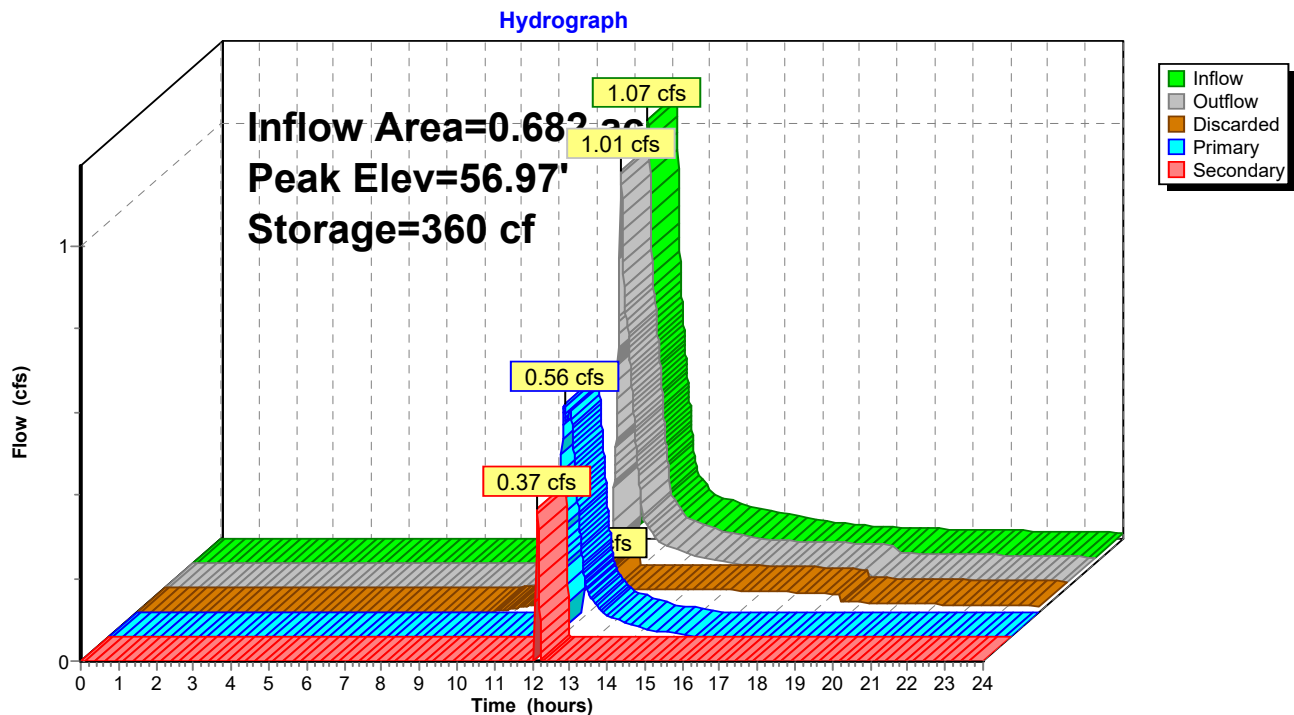
Primary OutFlowMax=0.56 cfs @ 12.11 hrs HW=56.96' TW=56.49' (Dynamic Tailwater)

↑**3=Culvert** (Barrel Controls 0.56 cfs @ 2.86 fps)

Secondary OutFlowMax=0.36 cfs @ 12.13 hrs HW=56.97' TW=56.56' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.36 cfs @ 0.67 fps)

Pond RG: Rain Garden



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 10 yr Rainfall=4.40"

Printed 9/18/2020

Page 55

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SW	Runoff Area=21,743 sf 65.38% Impervious Runoff Depth>2.13" Flow Length=299' Tc=4.7 min CN=77 Runoff=1.30 cfs 0.089 af
Subcatchment2S: SW	Runoff Area=21,872 sf 65.41% Impervious Runoff Depth>2.13" Flow Length=273' Tc=6.5 min CN=77 Runoff=1.23 cfs 0.089 af
Subcatchment3S: SW	Runoff Area=29,712 sf 71.18% Impervious Runoff Depth>2.46" Flow Length=330' Tc=6.9 min CN=81 Runoff=1.91 cfs 0.140 af
Subcatchment4S: W Porch Roof	Runoff Area=192 sf 75.00% Impervious Runoff Depth>4.16" Flow Length=6' Slope=0.5830 '/' Tc=0.0 min CN=98 Runoff=0.02 cfs 0.002 af
Subcatchment5S: S House Roof	Runoff Area=2,120 sf 90.57% Impervious Runoff Depth>4.16" Flow Length=24' Slope=0.5830 '/' Tc=0.1 min CN=98 Runoff=0.25 cfs 0.017 af
Subcatchment6S: E Porch Roof	Runoff Area=192 sf 75.00% Impervious Runoff Depth>4.16" Flow Length=6' Slope=0.5830 '/' Tc=0.0 min CN=98 Runoff=0.02 cfs 0.002 af
Reach1R: Swale	Avg. Flow Depth=0.79' Max Vel=0.65 fps Inflow=1.78 cfs 0.079 af n=0.150 L=60.0' S=0.0125 '/' Capacity=2.96 cfs Outflow=1.74 cfs 0.079 af
ReachAP1: 18" culvert	Inflow=4.03 cfs 0.243 af Outflow=4.03 cfs 0.243 af
PondCB B: CB B	Peak Elev=55.55' Inflow=0.23 cfs 0.005 af 6.0" Round Culvert n=0.012 L=5.8' S=0.0431 '/' Outflow=0.23 cfs 0.005 af
PondDP: Detention Pond	Peak Elev=56.49' Storage=168 cf Inflow=2.91 cfs 0.168 af Discarded=0.04 cfs 0.018 af Primary=2.84 cfs 0.150 af Secondary=0.00 cfs 0.000 af Outflow=2.88 cfs 0.168 af
PondITA: Drip Edge A	Peak Elev=56.57' Storage=0.000 af Inflow=0.02 cfs 0.002 af Discarded=0.01 cfs 0.001 af Primary=0.02 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.002 af
PondITB: Drip Edge B	Peak Elev=57.79' Storage=0.001 af Inflow=0.25 cfs 0.017 af Discarded=0.03 cfs 0.012 af Primary=0.21 cfs 0.005 af Secondary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.017 af
PondITC: Drip Edge C	Peak Elev=58.16' Storage=0.000 af Inflow=0.02 cfs 0.002 af Discarded=0.01 cfs 0.002 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af
PondRG: Rain Garden	Peak Elev=57.06' Storage=396 cf Inflow=1.91 cfs 0.140 af Discarded=0.11 cfs 0.061 af Primary=0.56 cfs 0.057 af Secondary=1.34 cfs 0.022 af Outflow=1.89 cfs 0.140 af

Total Runoff Area = 1.741 ac Runoff Volume = 0.337 af Average Runoff Depth = 2.32"
31.58% Pervious = 0.550 ac 68.42% Impervious = 1.191 ac

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 10 yr Rainfall=4.40"

Printed 9/18/2020

Page 56

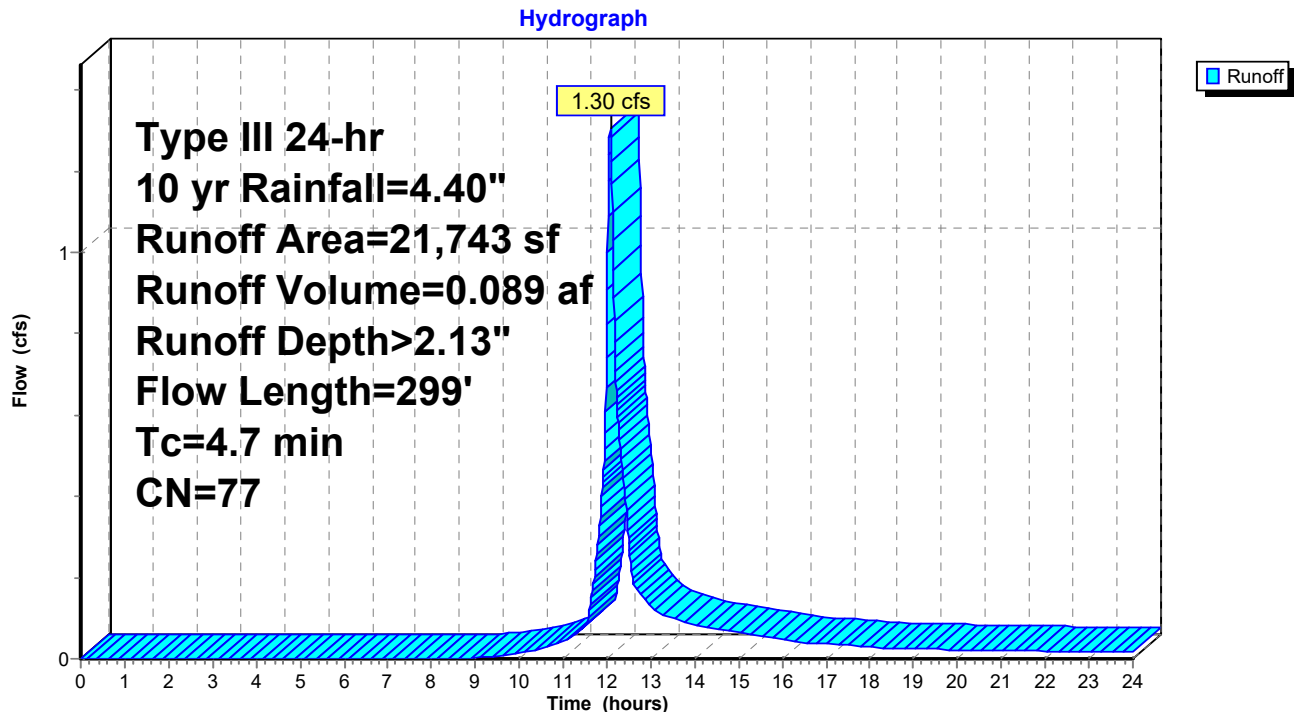
Summary for Subcatchment 1S: SW

Runoff = 1.30 cfs @ 12.07 hrs, Volume= 0.089 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
21,506	77	1/8 acre lots, 65% imp, HSG A
* 220	98	deck, HSG A
* 17	98	retaining wall, HSG A
21,743	77	Weighted Average
7,527		34.62% Pervious Area
14,216		65.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	249	0.0786	4.21		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
4.7	299	Total			

Subcatchment 1S: SW

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 10 yr Rainfall=4.40"

Printed 9/18/2020

Page 57

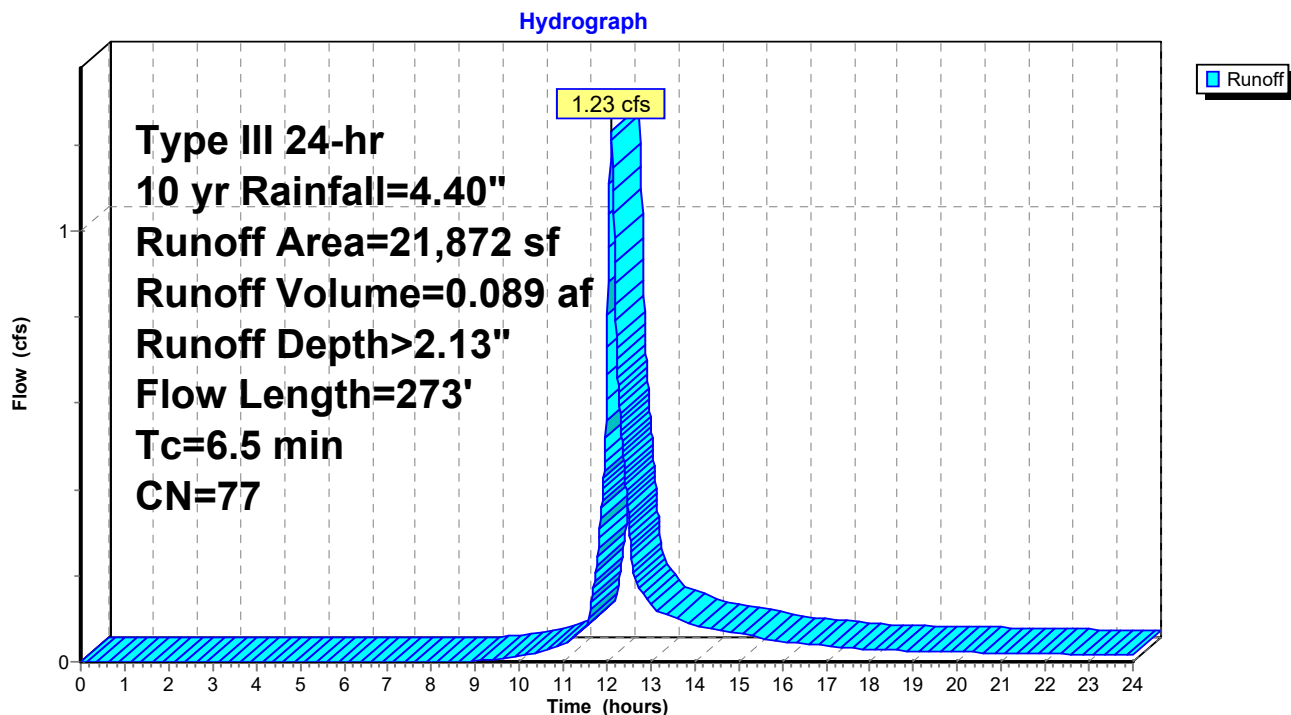
Summary for Subcatchment 2S: SW

Runoff = 1.23 cfs @ 12.10 hrs, Volume= 0.089 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
21,613	77	1/8 acre lots, 65% imp, HSG A
205	98	Paved parking, HSG A
* 54	98	Retaining Wall, HSG A
21,872	77	Weighted Average
7,565		34.59% Pervious Area
14,307		65.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
0.8	223	0.0900	4.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.5	273	Total			

Subcatchment 2S: SW

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 10 yr Rainfall=4.40"

Printed 9/18/2020

Page 58

Summary for Subcatchment 3S: SW

Runoff = 1.91 cfs @ 12.10 hrs, Volume= 0.140 af, Depth> 2.46"

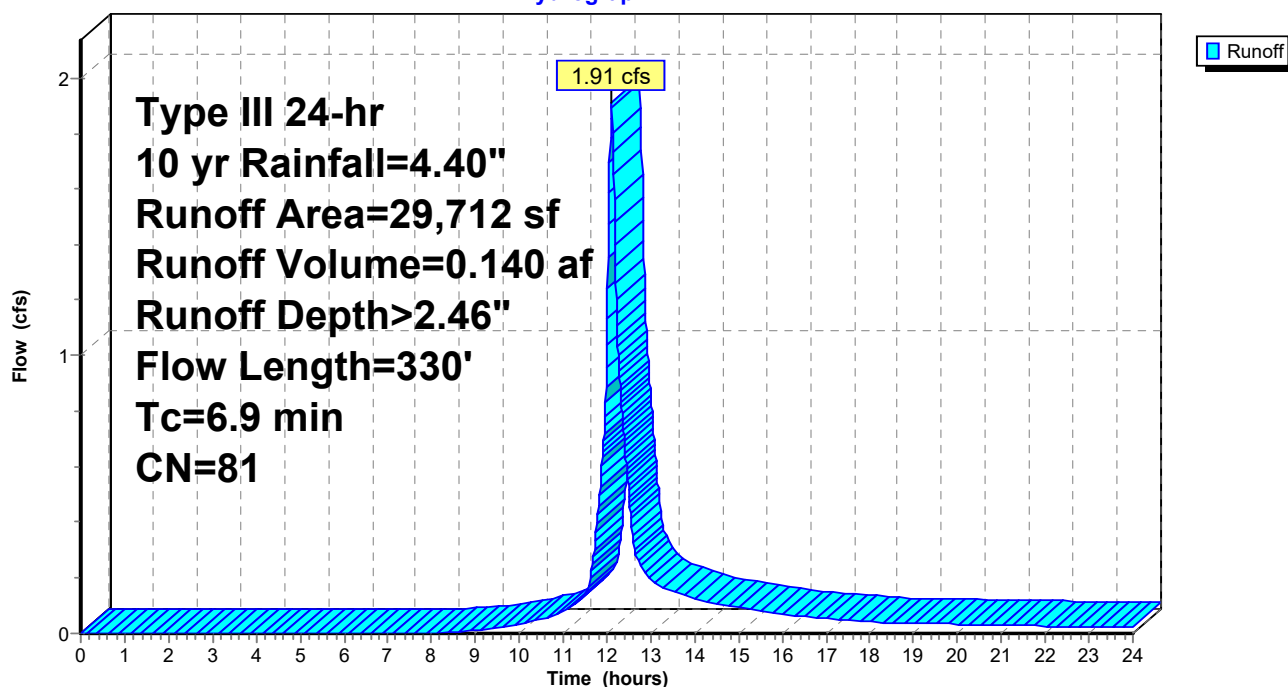
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
24,467	77	1/8 acre lots, 65% imp, HSG A
3,229	98	Paved parking, HSG A
* 92	98	Retaining Wall, HSG A
1,924	98	Unconnected roofs, HSG A
29,712	81	Weighted Average
8,563		28.82% Pervious Area
21,149		71.18% Impervious Area
1,924		9.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	280	0.0680	3.91		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.9	330	Total			

Subcatchment 3S: SW

Hydrograph



Summary for Subcatchment 4S: W Porch Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.02 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 4.16"

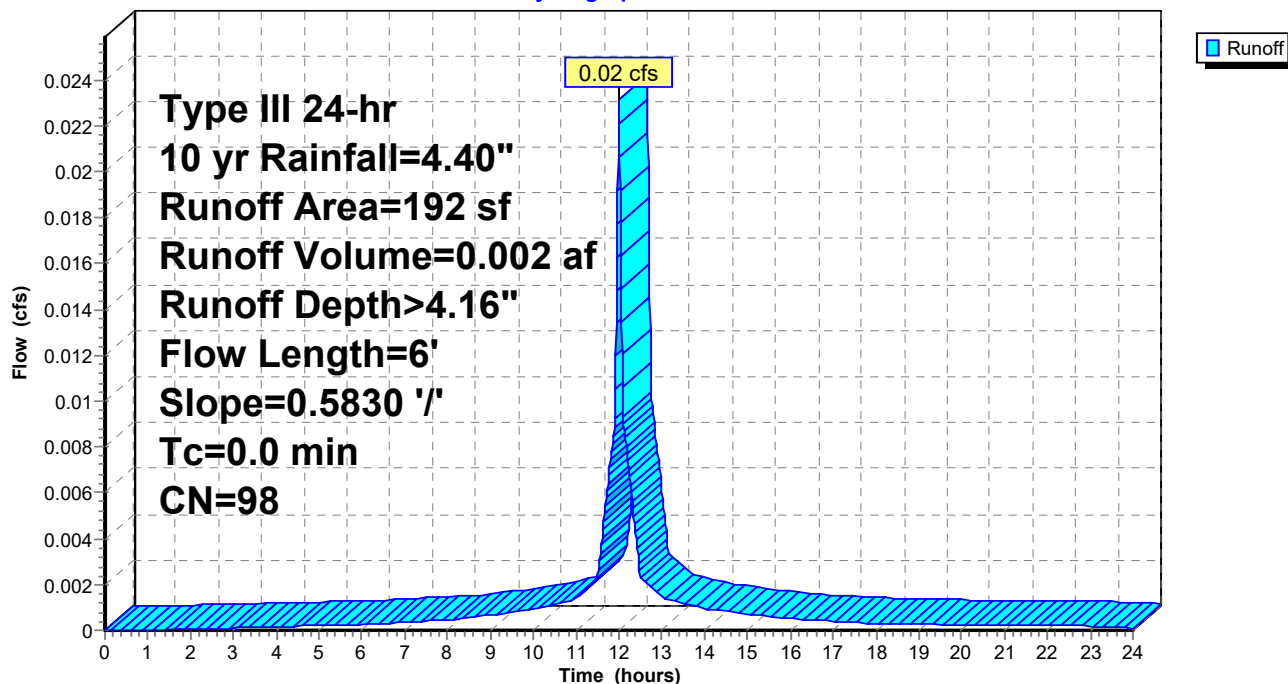
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 4S: W Porch Roof

Hydrograph



Summary for Subcatchment 5S: S House Roof[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.25 cfs @ 12.00 hrs, Volume= 0.017 af, Depth> 4.16"

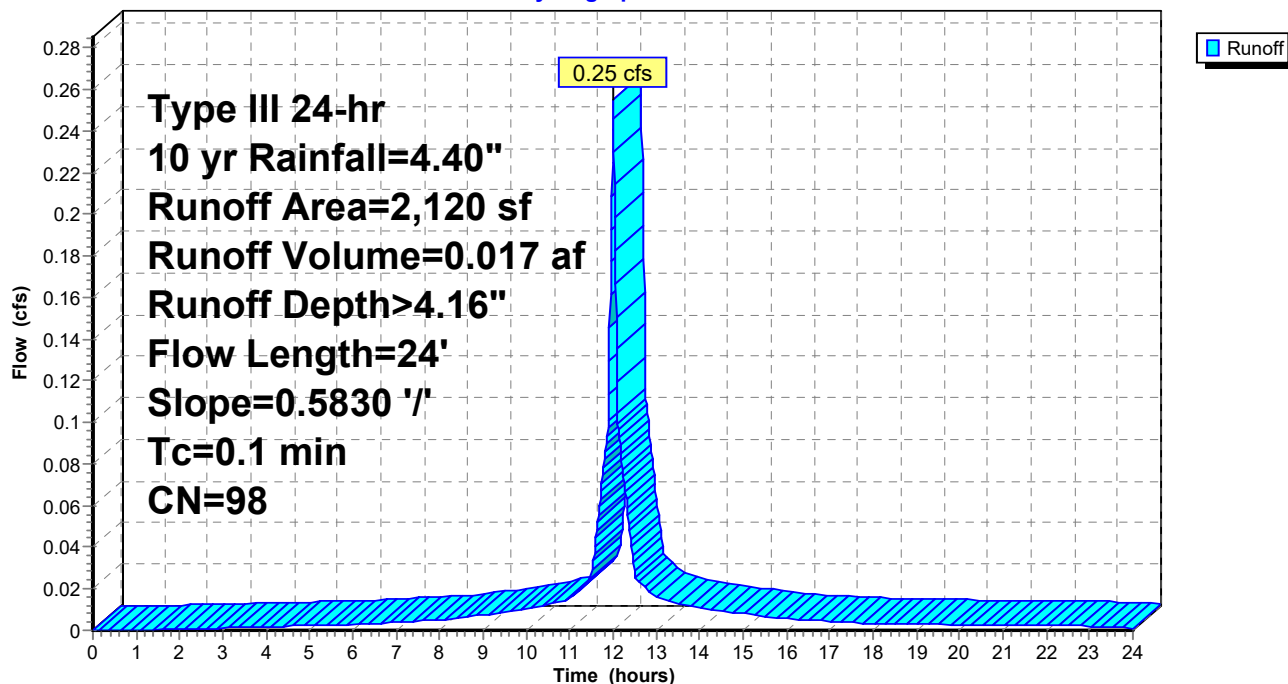
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
1,920	98	Roofs, HSG A
200	96	Gravel surface, HSG A
2,120	98	Weighted Average
200		9.43% Pervious Area
1,920		90.57% Impervious Area

T_c (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	24	0.5830	3.92		Sheet Flow, Smooth surfaces $n=0.011$ $P_2=3.10"$

Subcatchment 5S: S House Roof

Hydrograph



Summary for Subcatchment 6S: E Porch Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.02 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 4.16"

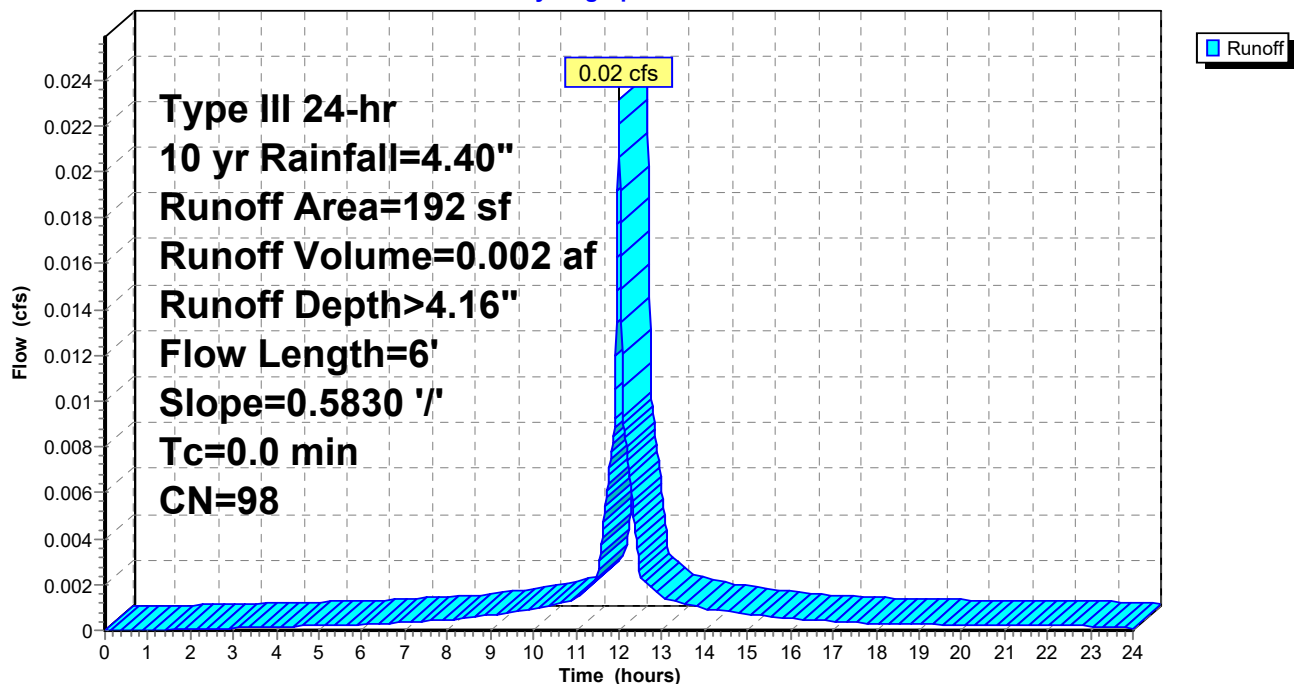
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.40"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 6S: E Porch Roof

Hydrograph



Summary for Reach 1R: Swale

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth = 1.38" for 10 yr event
Inflow = 1.78 cfs @ 12.11 hrs, Volume= 0.079 af
Outflow = 1.74 cfs @ 12.13 hrs, Volume= 0.079 af, Atten= 3%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.65 fps, Min. Travel Time= 1.5 min

Avg. Velocity = 0.22 fps, Avg. Travel Time= 4.5 min

Peak Storage= 161 cf @ 12.13 hrs

Average Depth at Peak Storage= 0.79'

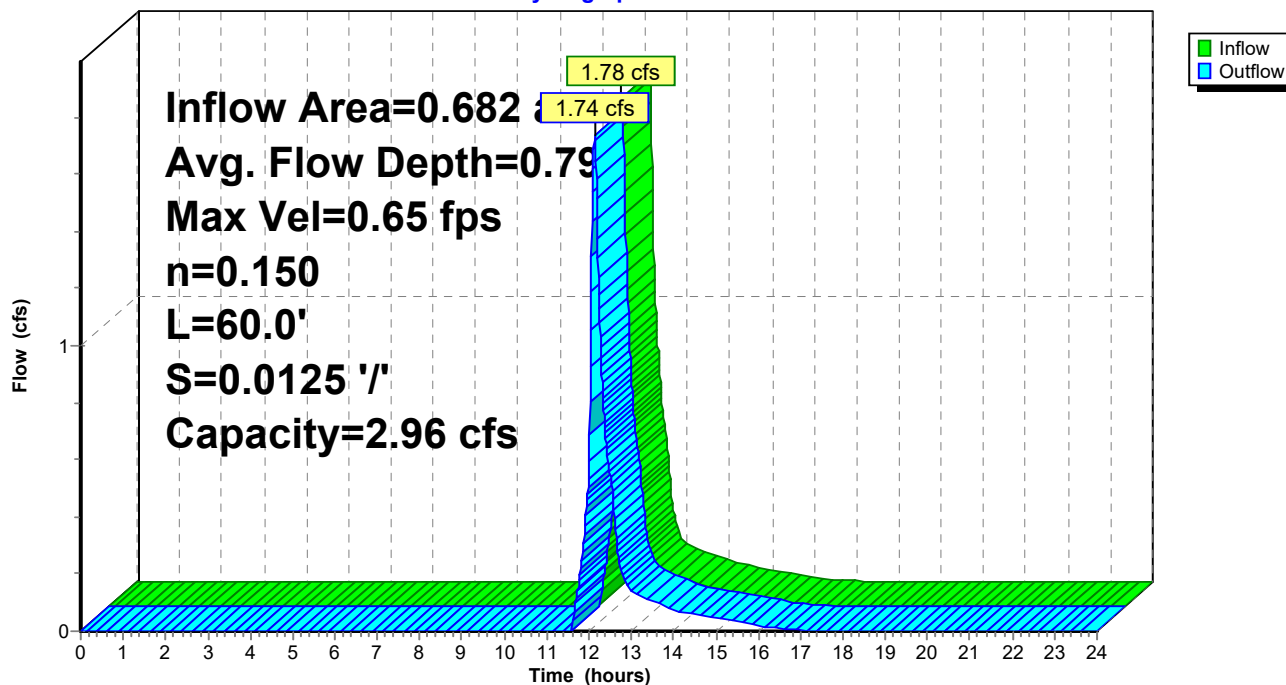
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 2.96 cfs

1.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 '/' Top Width= 7.00'

Length= 60.0' Slope= 0.0125 '/'

Inlet Invert= 56.00', Outlet Invert= 55.25'

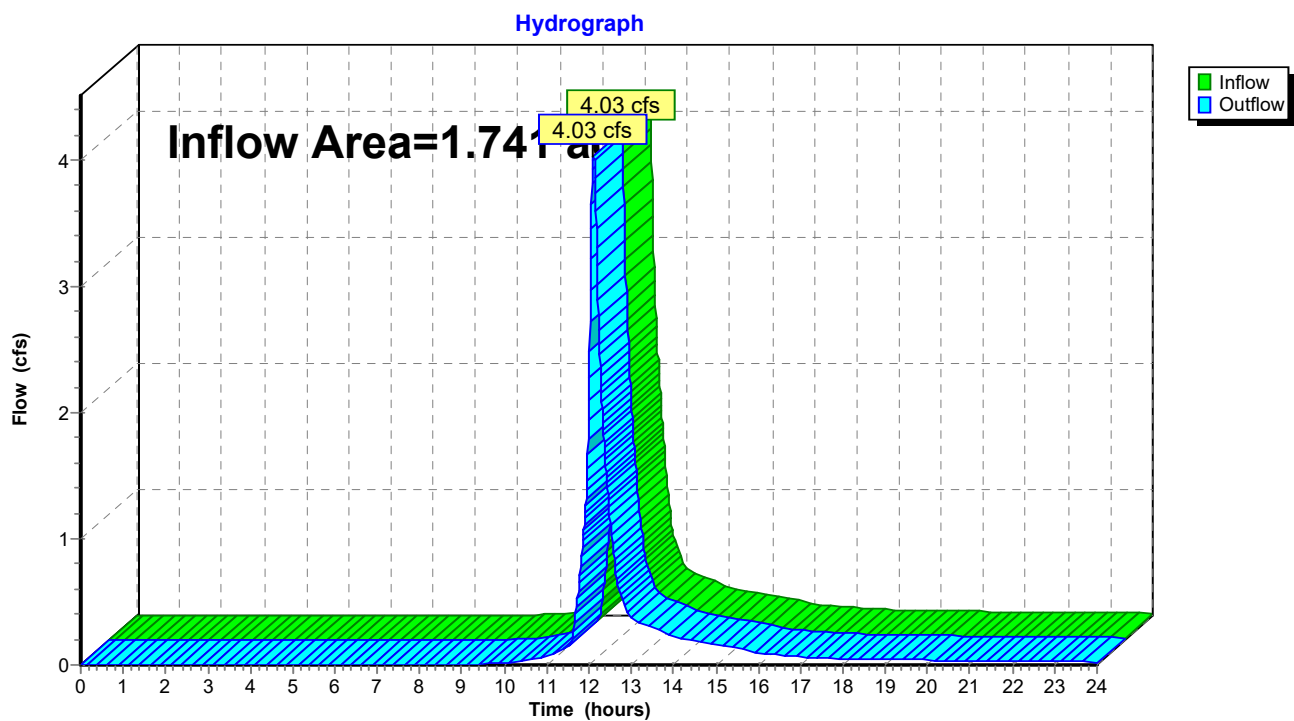
**Reach 1R: Swale****Hydrograph**

Summary for Reach AP1: 18" culvert

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

Inflow Area = 1.741 ac, 68.42% Impervious, Inflow Depth > 1.68" for 10 yr event
Inflow = 4.03 cfs @ 12.11 hrs, Volume= 0.243 af
Outflow = 4.03 cfs @ 12.11 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: 18" culvert

Summary for Pond CB B: CB B

[57] Hint: Peaked at 55.55' (Flood elevation advised)

Inflow Area = 0.057 ac, 88.18% Impervious, Inflow Depth = 1.10" for 10 yr event
 Inflow = 0.23 cfs @ 12.01 hrs, Volume= 0.005 af
 Outflow = 0.23 cfs @ 12.01 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.23 cfs @ 12.01 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 55.55' @ 12.01 hrs

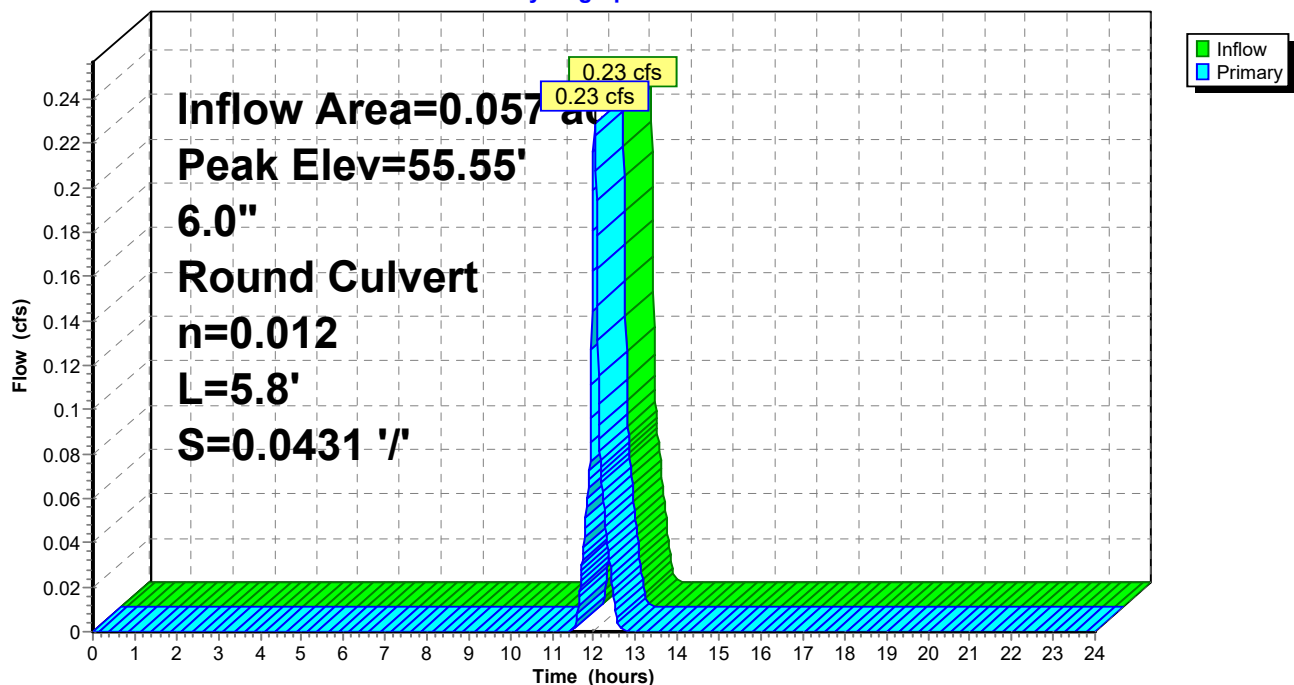
Device	Routing	Invert	Outlet Devices
#1	Primary	55.25'	6.0" Round Culvert L= 5.8' Ke= 0.500 Inlet / Outlet Invert= 55.25' / 55.00' S= 0.0431 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.23 cfs @ 12.01 hrs HW=55.55' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.23 cfs @ 1.86 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond DP: Detention Pond

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.56' @ 11.57 hrs

Inflow Area = 1.184 ac, 68.73% Impervious, Inflow Depth > 1.70" for 10 yr event
 Inflow = 2.91 cfs @ 12.12 hrs, Volume= 0.168 af
 Outflow = 2.88 cfs @ 12.13 hrs, Volume= 0.168 af, Atten= 1%, Lag= 0.8 min
 Discarded = 0.04 cfs @ 12.13 hrs, Volume= 0.018 af
 Primary = 2.84 cfs @ 12.13 hrs, Volume= 0.150 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.49' @ 12.13 hrs Surf.Area= 292 sf Storage= 168 cf

Plug-Flow detention time= 1.9 min calculated for 0.168 af (100% of inflow)
 Center-of-Mass det. time= 1.4 min (801.8 - 800.4)

Volume	Invert	Avail.Storage	Storage Description
#1	55.65'	340 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.65	50	0	0
56.00	211	46	46
57.00	378	295	340

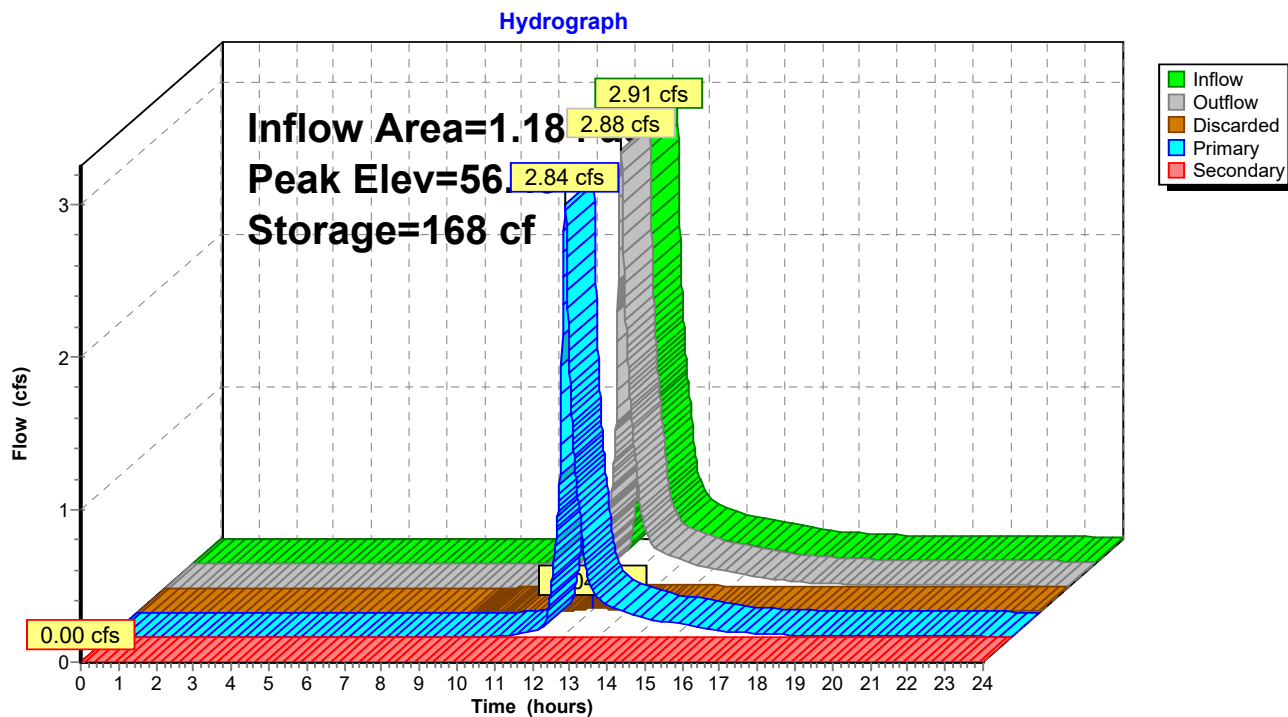
Device	Routing	Invert	Outlet Devices
#1	Primary	55.70'	18.0" Round Culvert L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 55.70' / 54.50' S= 0.0545'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	56.85'	10.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	55.65'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=56.49' (Free Discharge)
 ↑ **3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=2.84 cfs @ 12.13 hrs HW=56.49' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 2.84 cfs @ 3.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.65' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP: Detention Pond



Summary for Pond ITA: Drip Edge A

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 4.16" for 10 yr event
 Inflow = 0.02 cfs @ 12.00 hrs, Volume= 0.002 af
 Outflow = 0.02 cfs @ 12.01 hrs, Volume= 0.002 af, Atten= 4%, Lag= 0.7 min
 Discarded = 0.01 cfs @ 11.81 hrs, Volume= 0.001 af
 Primary = 0.02 cfs @ 12.01 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.57' @ 12.01 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=0.7 min calculated for 0.002 af (100% of inflow)
 Center-of-Mass det. time=0.6 min (745.3 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	56.50'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 56.50' / 56.00' S= 0.0394'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	57.90'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	56.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

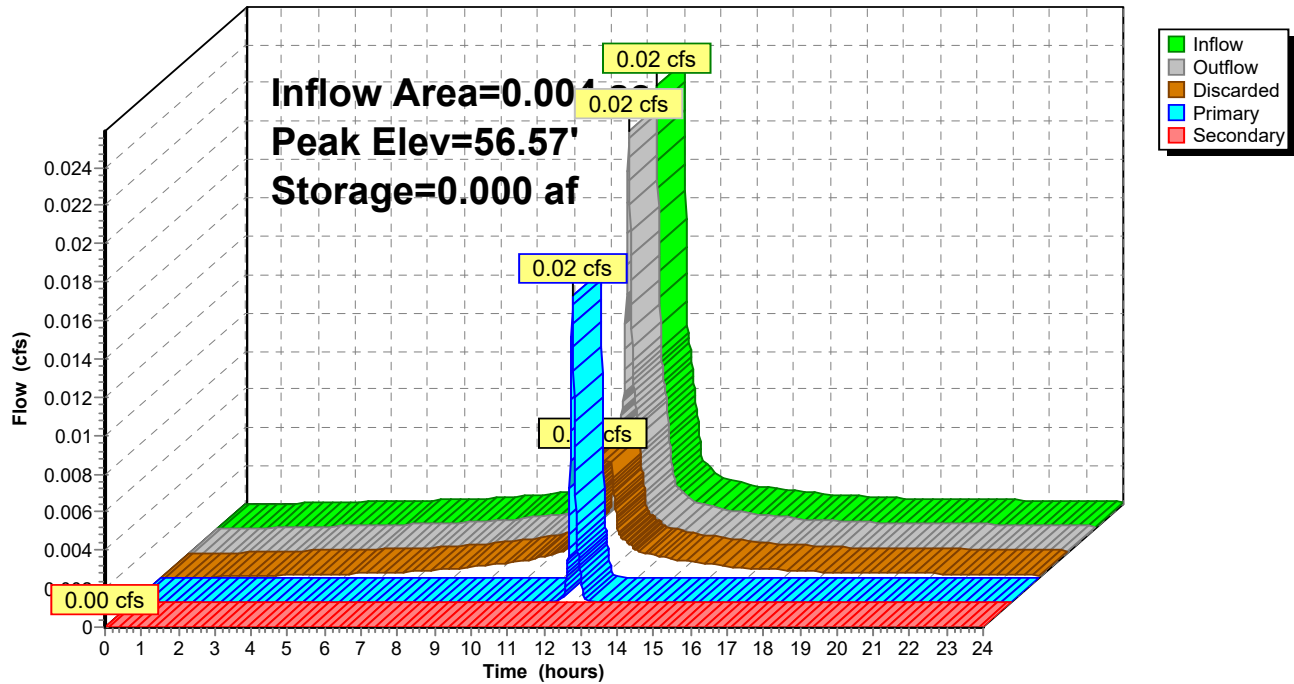
Discarded OutFlow Max=0.01 cfs @ 11.81 hrs HW=56.52' (Free Discharge)
 ↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.02 cfs @ 12.01 hrs HW=56.57' TW=55.55' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.02 cfs @ 0.91 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.50' TW=55.25' (Dynamic Tailwater)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITA: Drip Edge A

Hydrograph



Summary for Pond ITB: Drip Edge B

Inflow Area = 0.053 ac, 89.27% Impervious, Inflow Depth > 3.82" for 10 yr event
 Inflow = 0.25 cfs @ 12.00 hrs, Volume= 0.017 af
 Outflow = 0.24 cfs @ 12.02 hrs, Volume= 0.017 af, Atten= 7%, Lag= 0.9 min
 Discarded = 0.03 cfs @ 11.55 hrs, Volume= 0.012 af
 Primary = 0.21 cfs @ 12.02 hrs, Volume= 0.005 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.79' @ 12.02 hrs Surf.Area= 0.005 ac Storage= 0.001 af

Plug-Flow detention time=1.2 min calculated for 0.017 af (100% of inflow)

Center-of-Mass det. time=1.1 min (745.9 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	57.50'	0.003 af	2.50'W x 80.00'L x 1.50'H Prismatic 0.007 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	6.0" Round Culvert L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 57.50' / 56.00' S= 0.2143'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	80.0' long x 2.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32
#3	Discarded	57.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.03 cfs @ 11.55 hrs HW=57.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlowMax=0.21 cfs @ 12.02 hrs HW=57.79' TW=55.55' (Dynamic Tailwater)

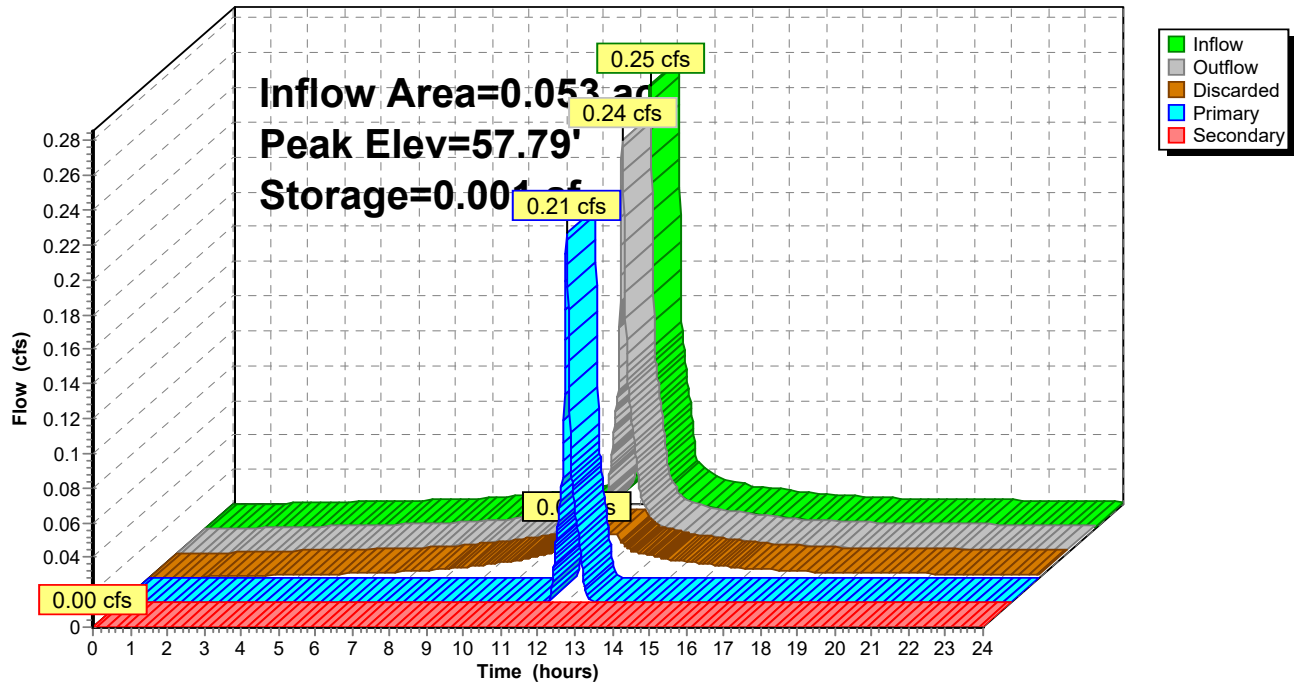
↑**1=Culvert** (Inlet Controls 0.21 cfs @ 1.82 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=57.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITB: Drip Edge B

Hydrograph



Summary for Pond ITC: Drip Edge C

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 4.16" for 10 yr event
 Inflow = 0.02 cfs @ 12.00 hrs, Volume= 0.002 af
 Outflow = 0.01 cfs @ 11.79 hrs, Volume= 0.002 af, Atten= 74%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.79 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 58.16' @ 12.28 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=6.4 min calculated for 0.002 af (100% of inflow)

Center-of-Mass det. time=6.4 min (751.0 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	57.67'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	58.25'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 58.25' / 58.12' S= 0.0102' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.07'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	57.67'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.79 hrs HW=57.69' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.67' TW=57.50' (Dynamic Tailwater)

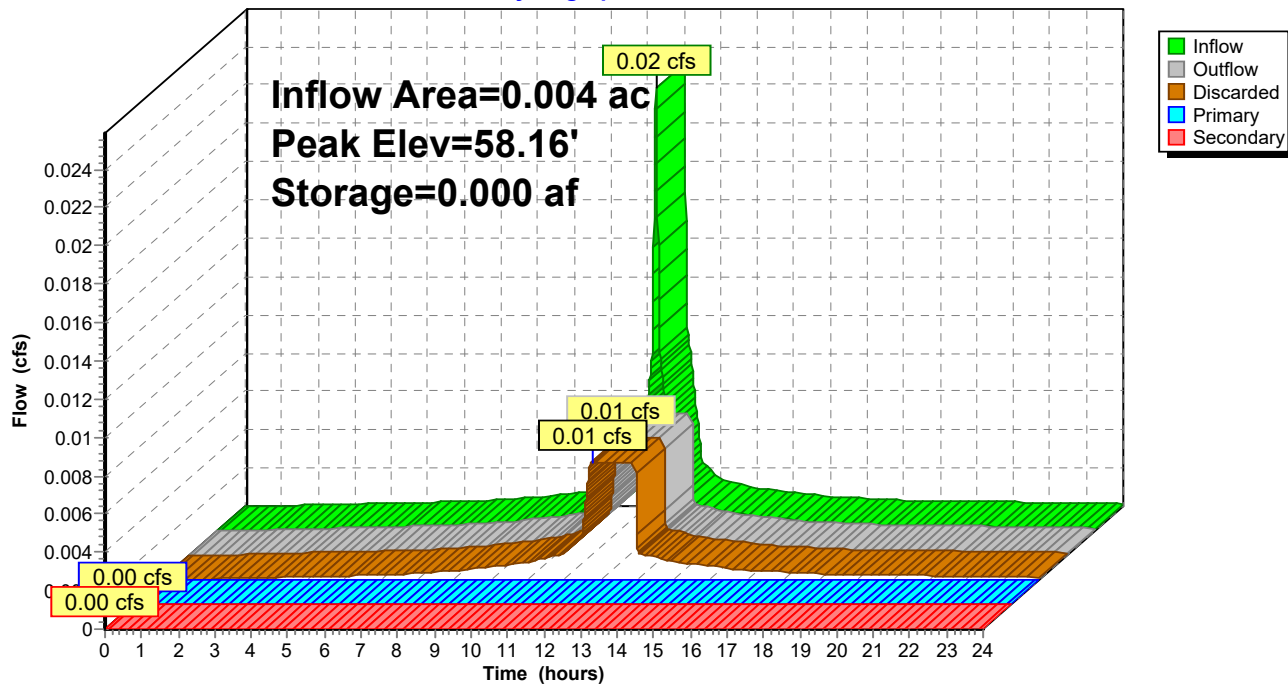
↑ **1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.67' TW=57.50' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITC: Drip Edge C

Hydrograph



Summary for Pond RG: Rain Garden

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth > 2.46" for 10 yr event
 Inflow = 1.91 cfs @ 12.10 hrs, Volume= 0.140 af
 Outflow = 1.89 cfs @ 12.11 hrs, Volume= 0.140 af, Atten= 1%, Lag= 0.6 min
 Discarded = 0.11 cfs @ 12.11 hrs, Volume= 0.061 af
 Primary = 0.56 cfs @ 12.01 hrs, Volume= 0.057 af
 Secondary= 1.34 cfs @ 12.11 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.06' @ 12.11 hrs Surf.Area= 733 sf Storage= 396 cf

Plug-Flow detention time= 16.3 min calculated for 0.140 af (100% of inflow)

Center-of-Mass det. time= 16.3 min (840.9 - 824.6)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	398 cf	Ponding Area (Conic) listed below (Recalc)
#2	55.00'	203 cf	Soil Filter Bed (Conic) listed below (Recalc)
			507 cf Overall x 40.0% Voids
			601 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	300	0	0	300
57.00	375	168	168	382
57.50	550	230	398	561

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
55.00	338	0	0	338
56.00	338	338	338	403
56.50	338	169	507	436

Device	Routing	Invert	Outlet Devices
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	55.00'	5.500 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#3	Primary	56.25'	6.0" Round Culvert L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 56.25' / 56.00' S= 0.0081 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 10 yr Rainfall=4.40"

Printed 9/18/2020

Page 74

Discarded OutFlowMax=0.11 cfs @ 12.11 hrs HW=57.06' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.11 cfs)

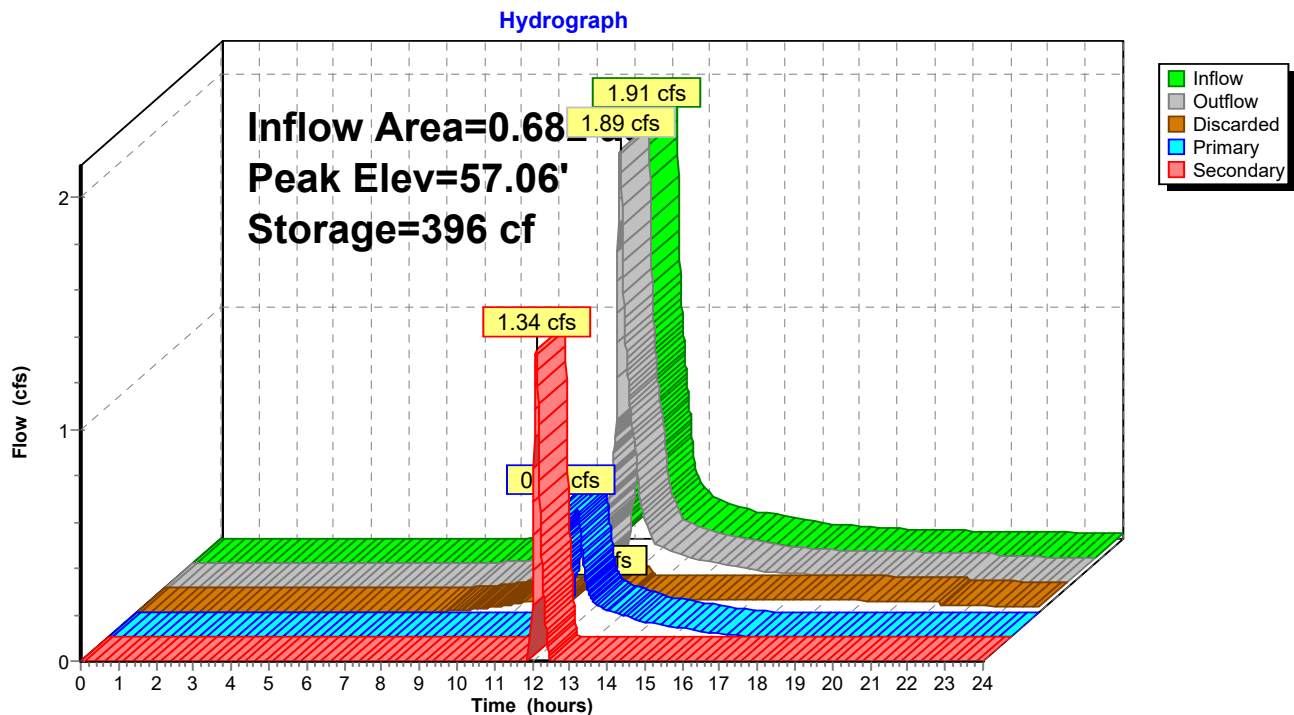
Primary OutFlowMax=0.56 cfs @ 12.01 hrs HW=56.96' TW=56.50' (Dynamic Tailwater)

↑**3=Culvert** (Outlet Controls 0.56 cfs @ 2.86 fps)

Secondary OutFlowMax=1.34 cfs @ 12.11 hrs HW=57.06' TW=56.79' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.34 cfs @ 1.03 fps)

Pond RG: Rain Garden



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 25 yr Rainfall=5.20"

Printed 9/18/2020

Page 75

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SWRunoff Area=21,743 sf 65.38% Impervious Runoff Depth>2.79"
Flow Length=299' Tc=4.7 min CN=77 Runoff=1.71 cfs 0.116 af**Subcatchment2S: SW**Runoff Area=21,872 sf 65.41% Impervious Runoff Depth>2.79"
Flow Length=273' Tc=6.5 min CN=77 Runoff=1.61 cfs 0.117 af**Subcatchment3S: SW**Runoff Area=29,712 sf 71.18% Impervious Runoff Depth>3.16"
Flow Length=330' Tc=6.9 min CN=81 Runoff=2.45 cfs 0.180 af**Subcatchment4S: W Porch Roof**Runoff Area=192 sf 75.00% Impervious Runoff Depth>4.96"
Flow Length=6' Slope=0.5830 '/' Tc=0.0 min CN=98 Runoff=0.03 cfs 0.002 af**Subcatchment5S: S House Roof**Runoff Area=2,120 sf 90.57% Impervious Runoff Depth>4.96"
Flow Length=24' Slope=0.5830 '/' Tc=0.1 min CN=98 Runoff=0.30 cfs 0.020 af**Subcatchment6S: E Porch Roof**Runoff Area=192 sf 75.00% Impervious Runoff Depth>4.96"
Flow Length=6' Slope=0.5830 '/' Tc=0.0 min CN=98 Runoff=0.03 cfs 0.002 af**Reach1R: Swale**Avg. Flow Depth=0.89' Max Vel=0.69 fps Inflow=2.32 cfs 0.110 af
n=0.150 L=60.0' S=0.0125 '/' Capacity=2.96 cfs Outflow=2.27 cfs 0.110 af**ReachAP1: 18" culvert**Inflow=5.32 cfs 0.330 af
Outflow=5.32 cfs 0.330 af**PondCB B: CB B**Peak Elev=55.59' Inflow=0.28 cfs 0.007 af
6.0" Round Culvert n=0.012 L=5.8' S=0.0431 '/' Outflow=0.28 cfs 0.007 af**PondDP: DetentionPond**Peak Elev=56.62' Storage=210 cf Inflow=3.82 cfs 0.227 af
Discarded=0.04 cfs 0.020 af Primary=3.74 cfs 0.207 af Secondary=0.00 cfs 0.000 af Outflow=3.78 cfs 0.227 af**PondITA: Drip Edge A**Peak Elev=56.58' Storage=0.000 af Inflow=0.03 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Primary=0.02 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.002 af**PondITB: Drip Edge B**Peak Elev=57.82' Storage=0.001 af Inflow=0.30 cfs 0.020 af
Discarded=0.03 cfs 0.014 af Primary=0.26 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.020 af**PondITC: Drip Edge C**Peak Elev=58.29' Storage=0.000 af Inflow=0.03 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af**PondRG: Rain Garden**Peak Elev=57.11' Storage=413 cf Inflow=2.45 cfs 0.180 af
Discarded=0.11 cfs 0.069 af Primary=0.55 cfs 0.072 af Secondary=1.93 cfs 0.038 af Outflow=2.43 cfs 0.180 af**Total Runoff Area = 1.741 ac Runoff Volume = 0.436 af Average Runoff Depth = 3.01"**
31.58% Pervious = 0.550 ac 68.42% Impervious = 1.191 ac

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 25 yr Rainfall=5.20"

Printed 9/18/2020

Page 76

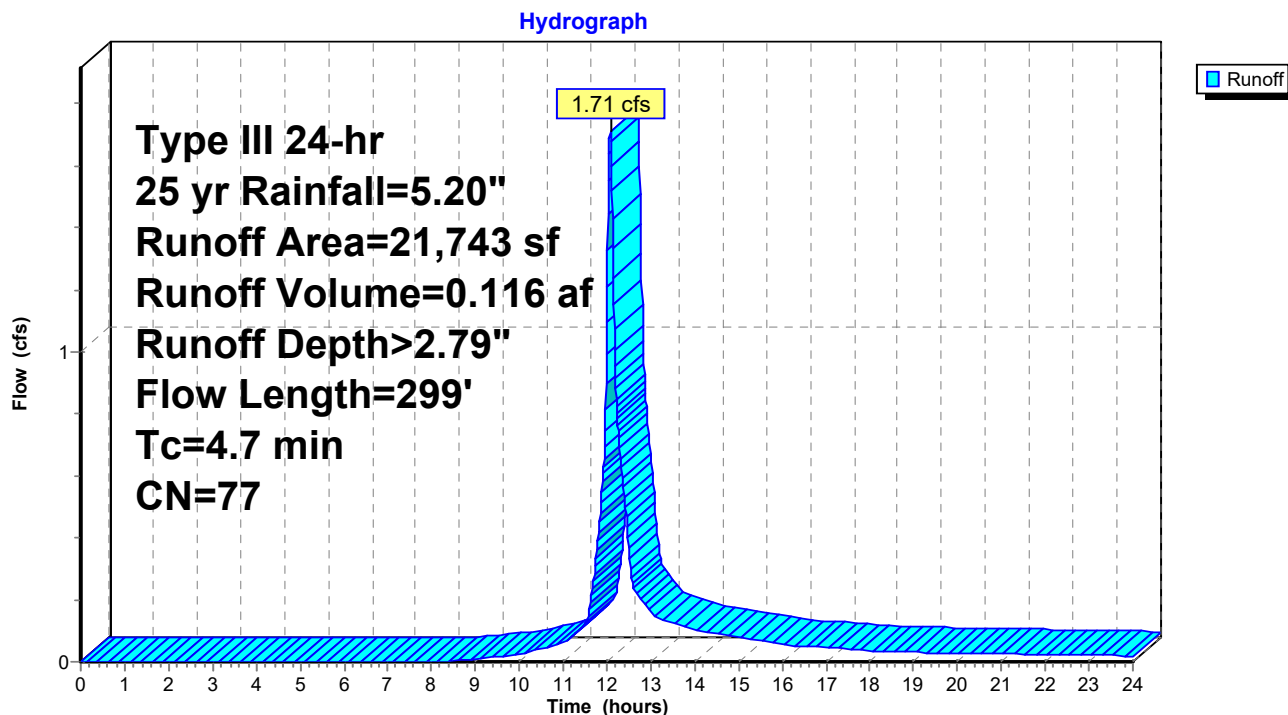
Summary for Subcatchment 1S: SW

Runoff = 1.71 cfs @ 12.07 hrs, Volume= 0.116 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
21,506	77	1/8 acre lots, 65% imp, HSG A
* 220	98	deck, HSG A
* 17	98	retaining wall, HSG A
21,743	77	Weighted Average
7,527		34.62% Pervious Area
14,216		65.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	249	0.0786	4.21		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
4.7	299	Total			

Subcatchment 1S: SW

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 25 yr Rainfall=5.20"

Printed 9/18/2020

Page 77

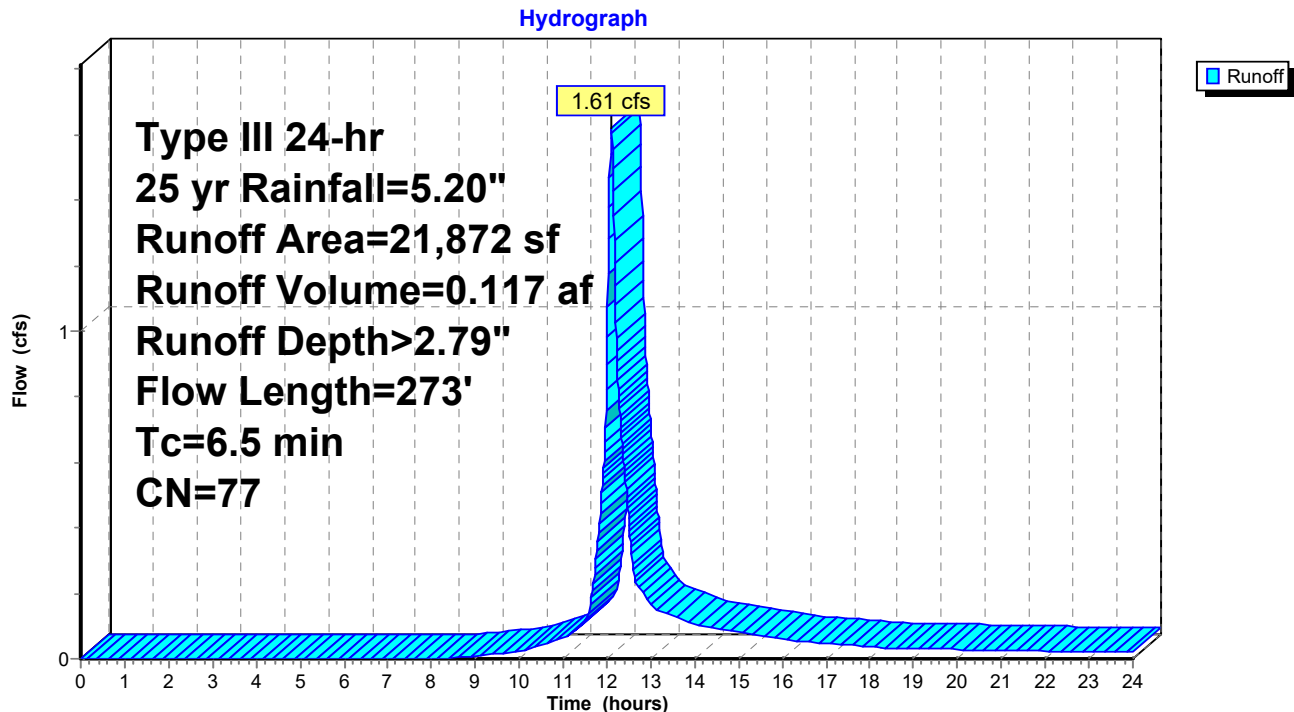
Summary for Subcatchment 2S: SW

Runoff = 1.61 cfs @ 12.10 hrs, Volume= 0.117 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
21,613	77	1/8 acre lots, 65% imp, HSG A
205	98	Paved parking, HSG A
* 54	98	Retaining Wall, HSG A
21,872	77	Weighted Average
7,565		34.59% Pervious Area
14,307		65.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
0.8	223	0.0900	4.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.5	273	Total			

Subcatchment 2S: SW

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 25 yr Rainfall=5.20"

Printed 9/18/2020

Page 78

Summary for Subcatchment 3S: SW

Runoff = 2.45 cfs @ 12.10 hrs, Volume= 0.180 af, Depth> 3.16"

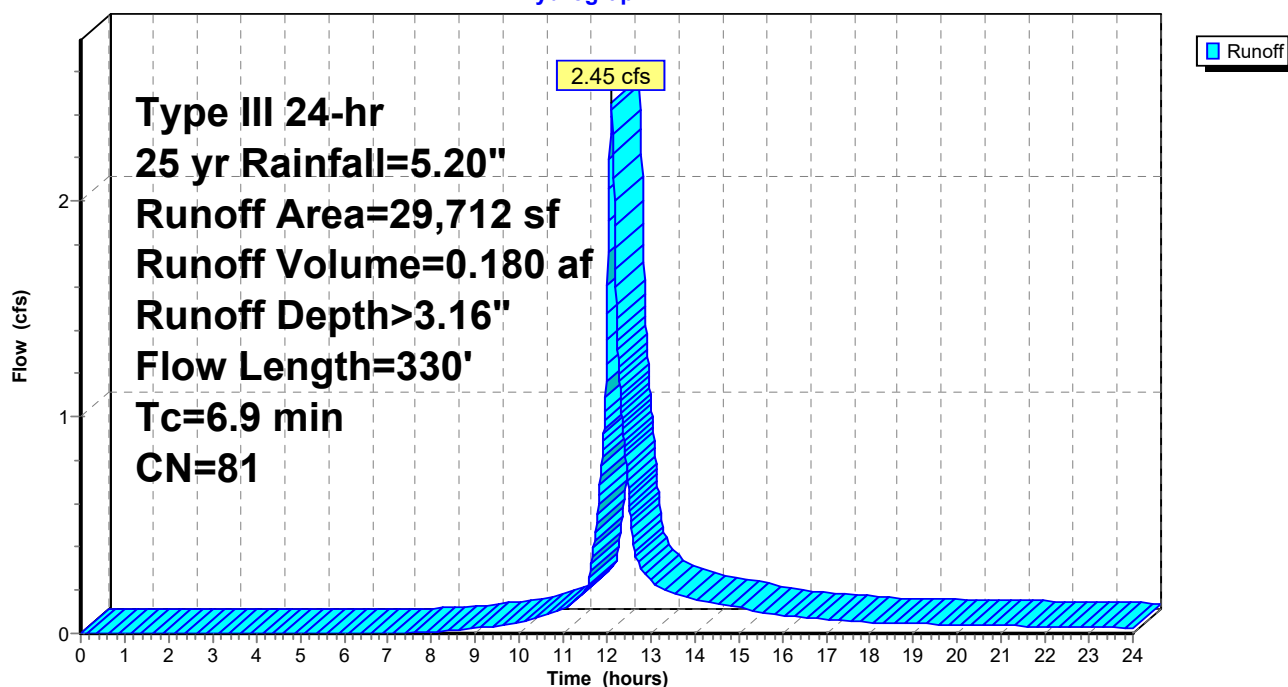
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
24,467	77	1/8 acre lots, 65% imp, HSG A
3,229	98	Paved parking, HSG A
* 92	98	Retaining Wall, HSG A
1,924	98	Unconnected roofs, HSG A
29,712	81	Weighted Average
8,563		28.82% Pervious Area
21,149		71.18% Impervious Area
1,924		9.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	280	0.0680	3.91		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.9	330	Total			

Subcatchment 3S: SW

Hydrograph



Summary for Subcatchment 4S: W Porch Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 4.96"

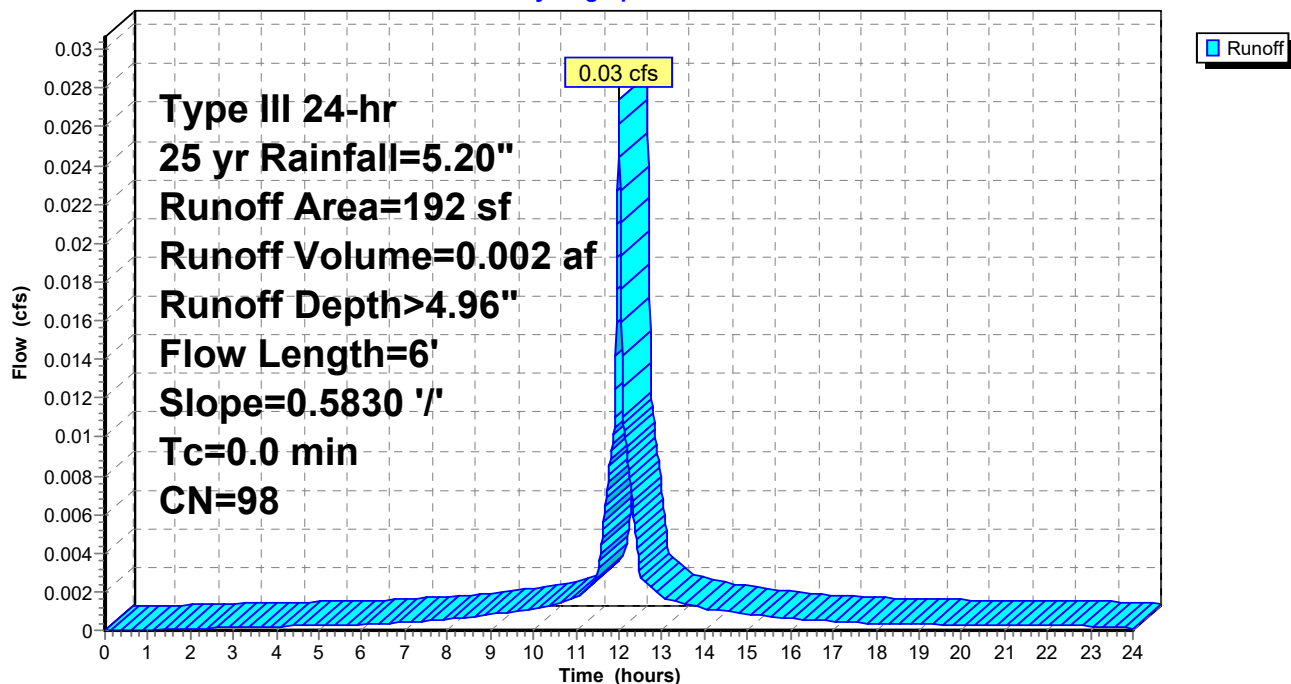
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 4S: W Porch Roof

Hydrograph



Summary for Subcatchment 5S: S House Roof[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.30 cfs @ 12.00 hrs, Volume= 0.020 af, Depth> 4.96"

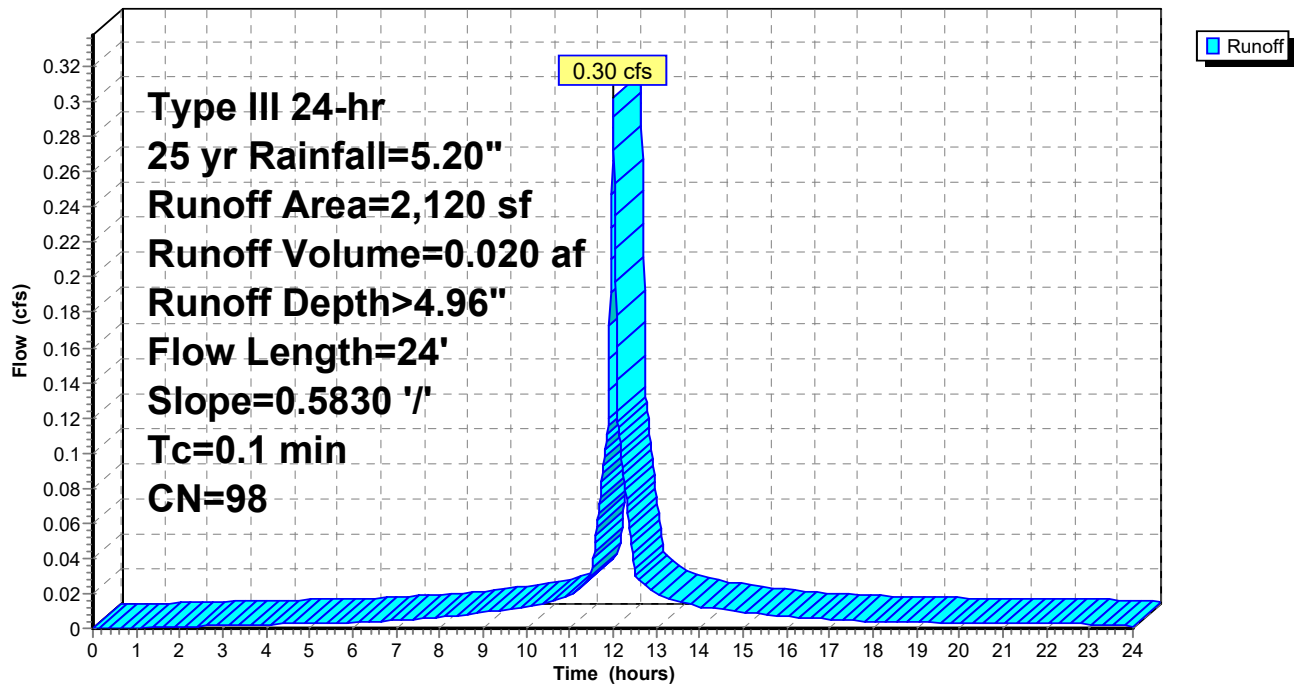
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
1,920	98	Roofs, HSG A
200	96	Gravel surface, HSG A
2,120	98	Weighted Average
200		9.43% Pervious Area
1,920		90.57% Impervious Area

T_c (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	24	0.5830	3.92		Sheet Flow, Smooth surfaces $n=0.011$ $P2=3.10"$

Subcatchment 5S: S House Roof

Hydrograph



Summary for Subcatchment 6S: E Porch Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 4.96"

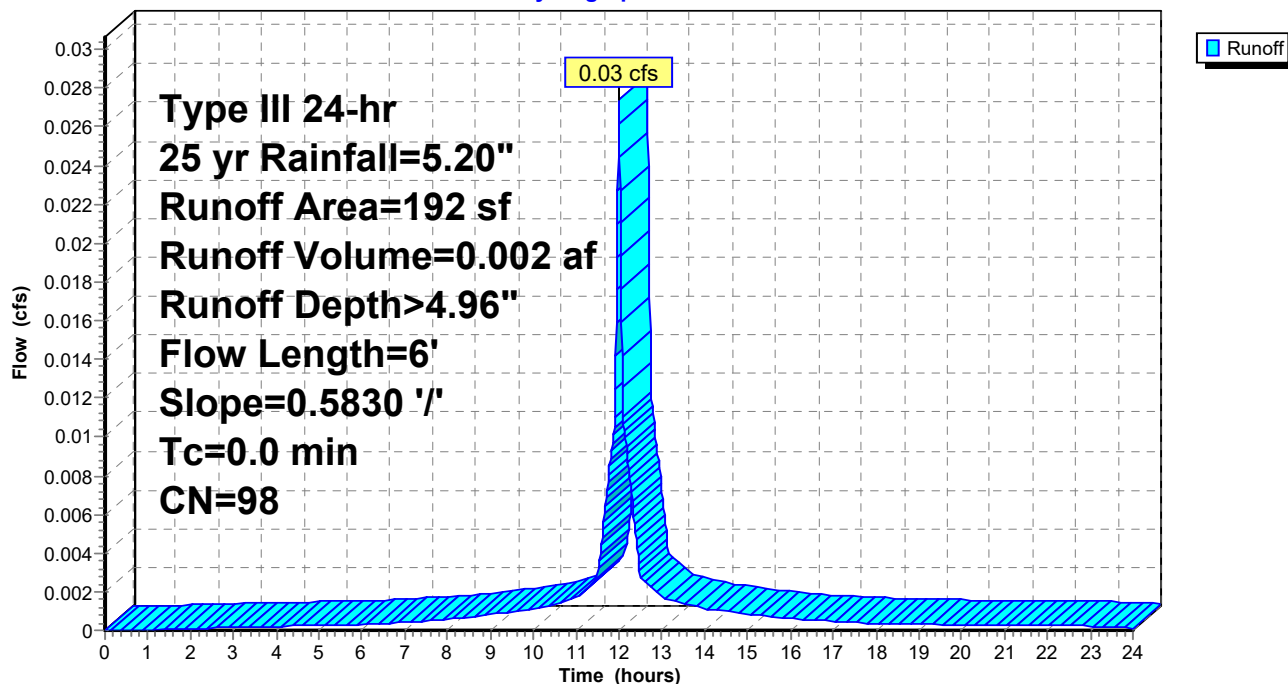
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=5.20"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 6S: E Porch Roof

Hydrograph



Summary for Reach 1R: Swale

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth = 1.94" for 25 yr event
Inflow = 2.32 cfs @ 12.11 hrs, Volume= 0.110 af
Outflow = 2.27 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 2%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.69 fps, Min. Travel Time= 1.4 min

Avg. Velocity = 0.24 fps, Avg. Travel Time= 4.2 min

Peak Storage= 197 cf @ 12.13 hrs

Average Depth at Peak Storage= 0.89'

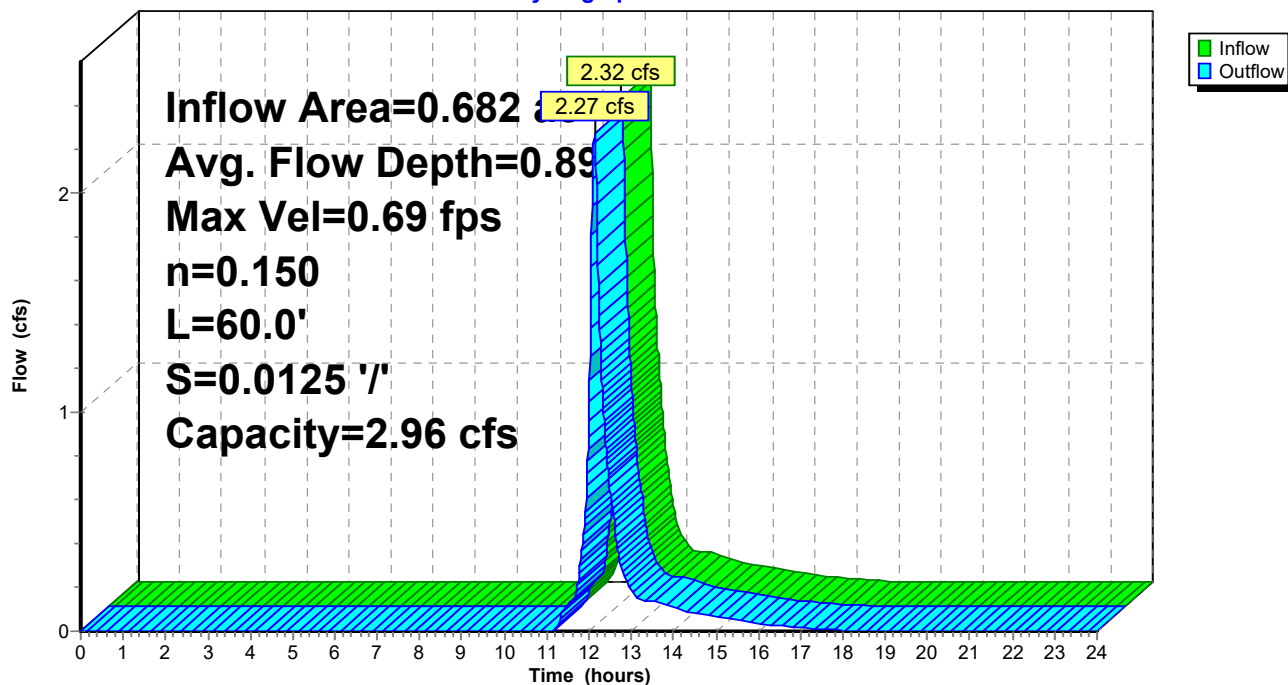
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 2.96 cfs

1.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 '/' Top Width= 7.00'

Length= 60.0' Slope= 0.0125 '/'

Inlet Invert= 56.00', Outlet Invert= 55.25'

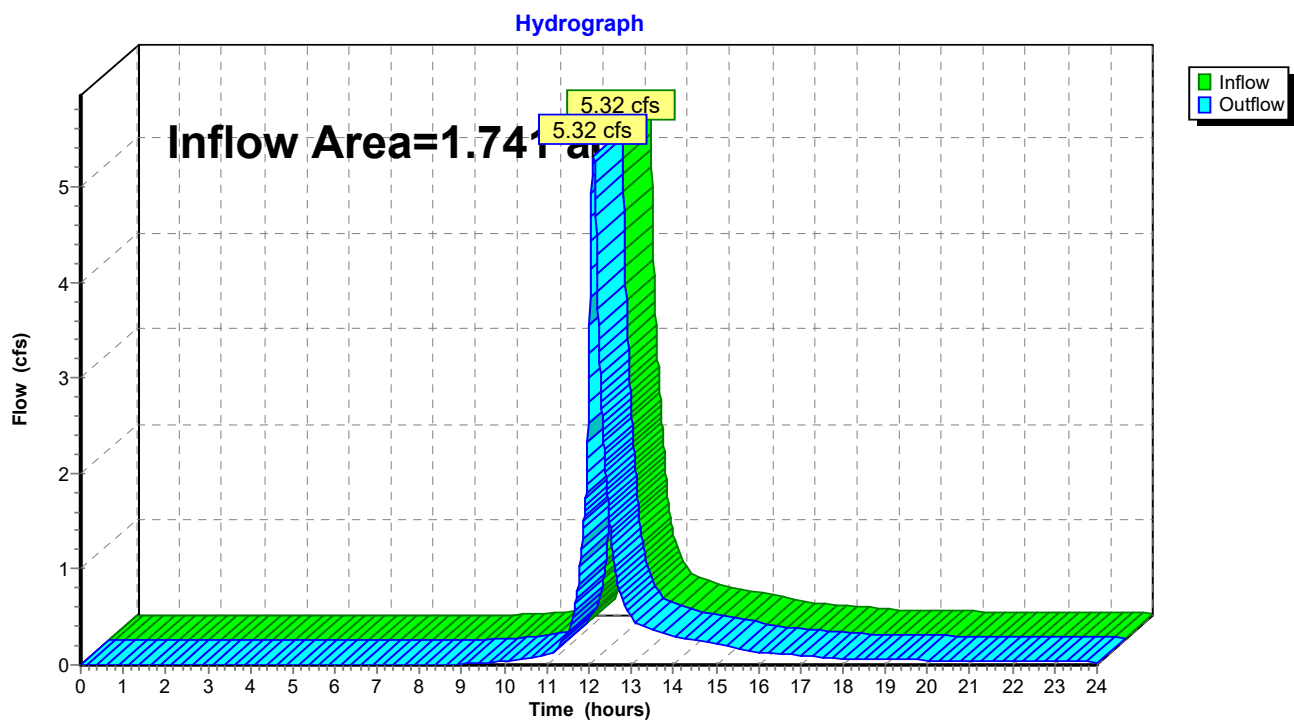
**Reach 1R: Swale****Hydrograph**

Summary for Reach AP1: 18" culvert

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

Inflow Area = 1.741 ac, 68.42% Impervious, Inflow Depth > 2.27" for 25 yr event
Inflow = 5.32 cfs @ 12.11 hrs, Volume= 0.330 af
Outflow = 5.32 cfs @ 12.11 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: 18" culvert

Summary for Pond CB B: CB B

[57] Hint: Peaked at 55.59' (Flood elevation advised)

Inflow Area = 0.057 ac, 88.18% Impervious, Inflow Depth = 1.43" for 25 yr event
 Inflow = 0.28 cfs @ 12.01 hrs, Volume= 0.007 af
 Outflow = 0.28 cfs @ 12.01 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.28 cfs @ 12.01 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 55.59' @ 12.01 hrs

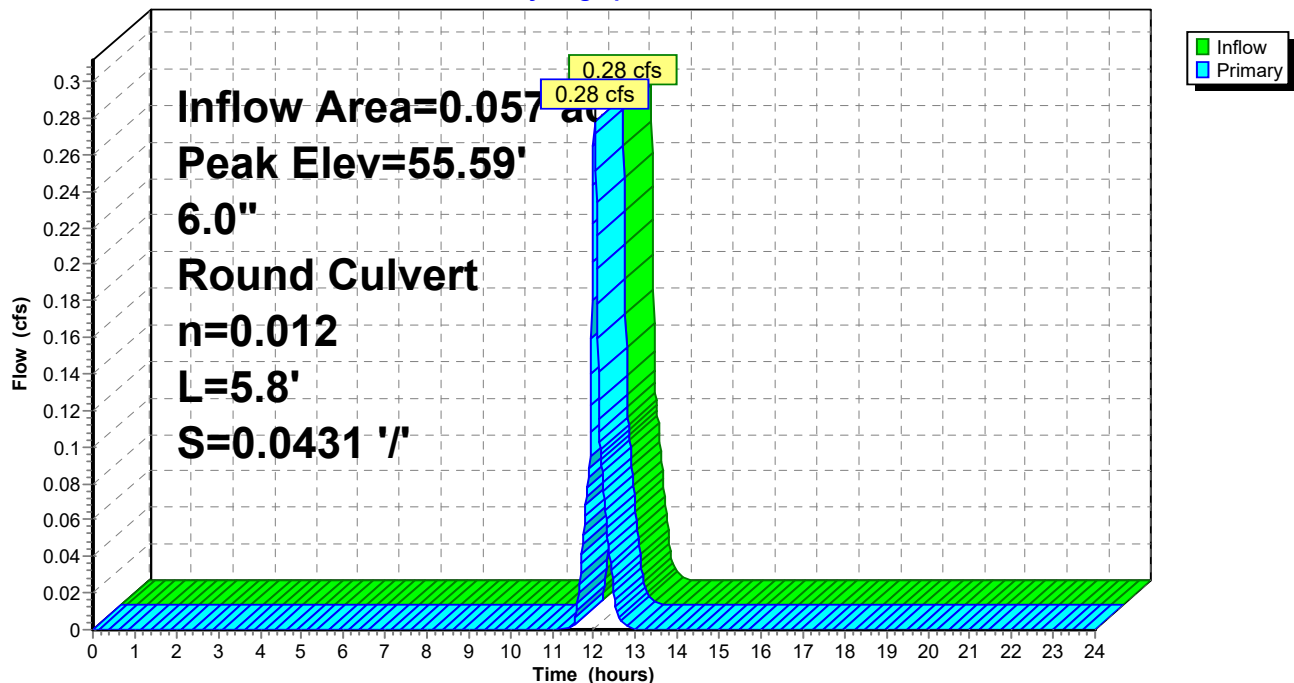
Device	Routing	Invert	Outlet Devices
#1	Primary	55.25'	6.0" Round Culvert L= 5.8' Ke= 0.500 Inlet / Outlet Invert= 55.25' / 55.00' S= 0.0431 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.28 cfs @ 12.01 hrs HW=55.59' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Inlet Controls 0.28 cfs @ 1.97 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond DP: Detention Pond

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.55' @ 11.18 hrs

Inflow Area = 1.184 ac, 68.73% Impervious, Inflow Depth > 2.30" for 25 yr event
 Inflow = 3.82 cfs @ 12.11 hrs, Volume= 0.227 af
 Outflow = 3.78 cfs @ 12.13 hrs, Volume= 0.227 af, Atten= 1%, Lag= 0.8 min
 Discarded = 0.04 cfs @ 12.13 hrs, Volume= 0.020 af
 Primary = 3.74 cfs @ 12.13 hrs, Volume= 0.207 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.62' @ 12.13 hrs Surf.Area= 315 sf Storage= 210 cf

Plug-Flow detention time= 1.7 min calculated for 0.227 af (100% of inflow)
 Center-of-Mass det. time= 1.3 min (797.6 - 796.3)

Volume	Invert	Avail.Storage	Storage Description
#1	55.65'	340 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.65	50	0	0
56.00	211	46	46
57.00	378	295	340

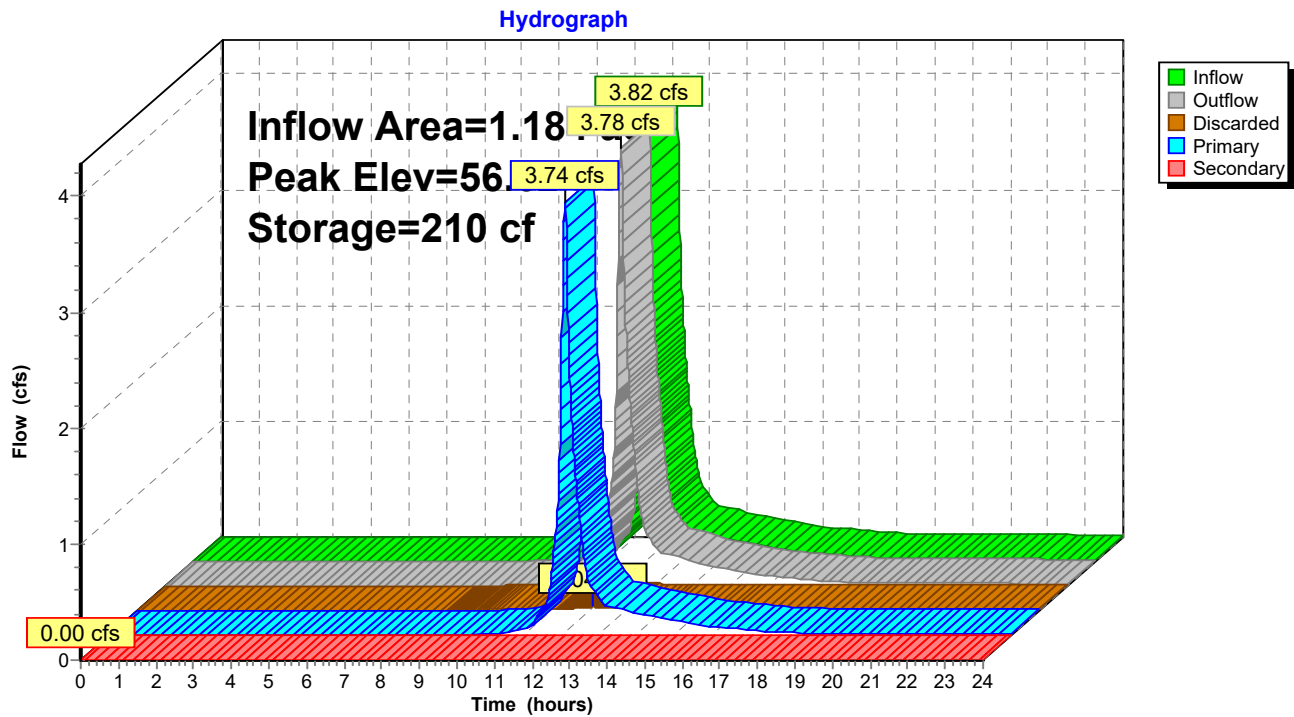
Device	Routing	Invert	Outlet Devices
#1	Primary	55.70'	18.0" Round Culvert L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 55.70' / 54.50' S= 0.0545'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	56.85'	10.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	55.65'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=56.62' (Free Discharge)
 ↑ **3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=3.74 cfs @ 12.13 hrs HW=56.62' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 3.74 cfs @ 3.27 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.65' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP: Detention Pond



Summary for Pond ITA: Drip Edge A

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 4.96" for 25 yr event
 Inflow = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af
 Outflow = 0.03 cfs @ 12.01 hrs, Volume= 0.002 af, Atten= 4%, Lag= 0.6 min
 Discarded = 0.01 cfs @ 11.75 hrs, Volume= 0.002 af
 Primary = 0.02 cfs @ 12.01 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 56.58' @ 12.01 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=0.7 min calculated for 0.002 af (100% of inflow)

Center-of-Mass det. time=0.7 min (742.5 - 741.8)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	56.50'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 56.50' / 56.00' S= 0.0394'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	57.90'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	56.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.01 cfs @ 11.75 hrs HW=56.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlowMax=0.02 cfs @ 12.01 hrs HW=56.58' TW=55.59' (Dynamic Tailwater)

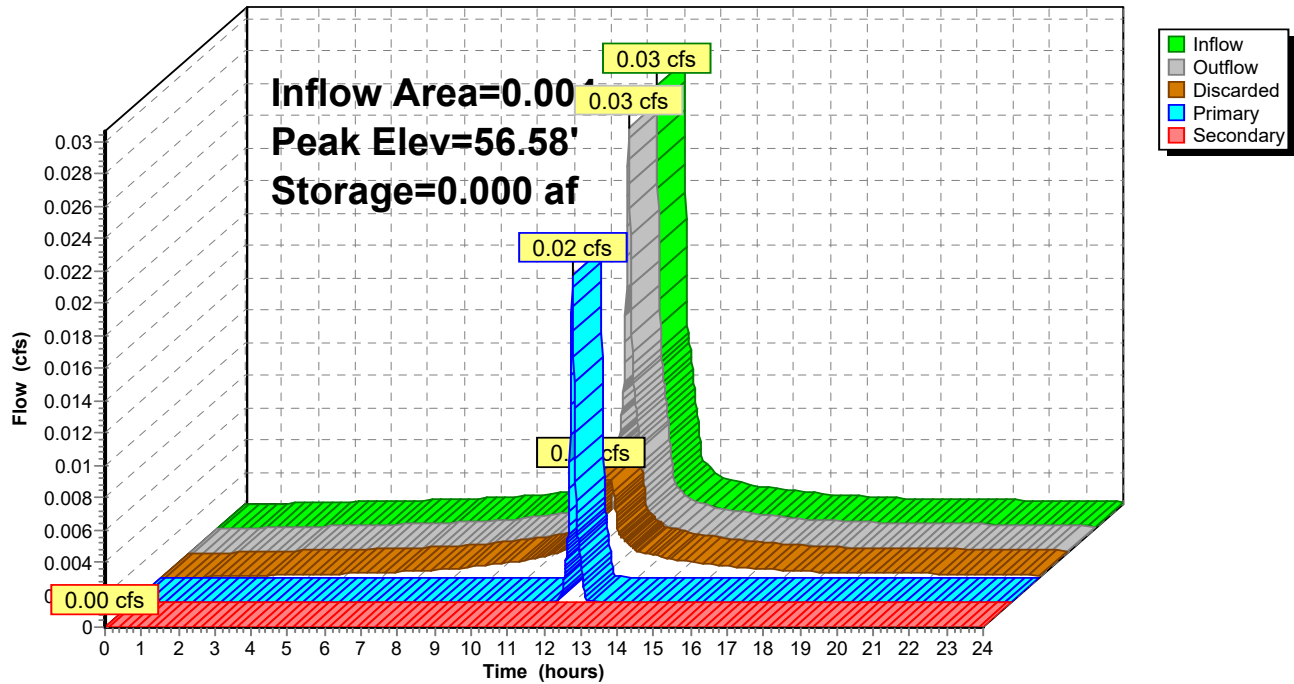
↑**1=Culvert** (Inlet Controls 0.02 cfs @ 0.97 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=56.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITA: Drip Edge A

Hydrograph



Summary for Pond ITB: Drip Edge B

Inflow Area = 0.053 ac, 89.27% Impervious, Inflow Depth > 4.56" for 25 yr event
 Inflow = 0.30 cfs @ 12.00 hrs, Volume= 0.020 af
 Outflow = 0.28 cfs @ 12.01 hrs, Volume= 0.020 af, Atten= 6%, Lag= 0.8 min
 Discarded = 0.03 cfs @ 11.43 hrs, Volume= 0.014 af
 Primary = 0.26 cfs @ 12.01 hrs, Volume= 0.007 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.82' @ 12.01 hrs Surf.Area= 0.005 ac Storage= 0.001 af

Plug-Flow detention time=1.2 min calculated for 0.020 af (100% of inflow)

Center-of-Mass det. time=1.1 min (743.0 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1	57.50'	0.003 af	2.50'W x 80.00'L x 1.50'H Prismatic 0.007 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	6.0" Round Culvert L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 57.50' / 56.00' S= 0.2143'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	80.0' long x 2.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32
#3	Discarded	57.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.03 cfs @ 11.43 hrs HW=57.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlowMax=0.26 cfs @ 12.01 hrs HW=57.82' TW=55.59' (Dynamic Tailwater)

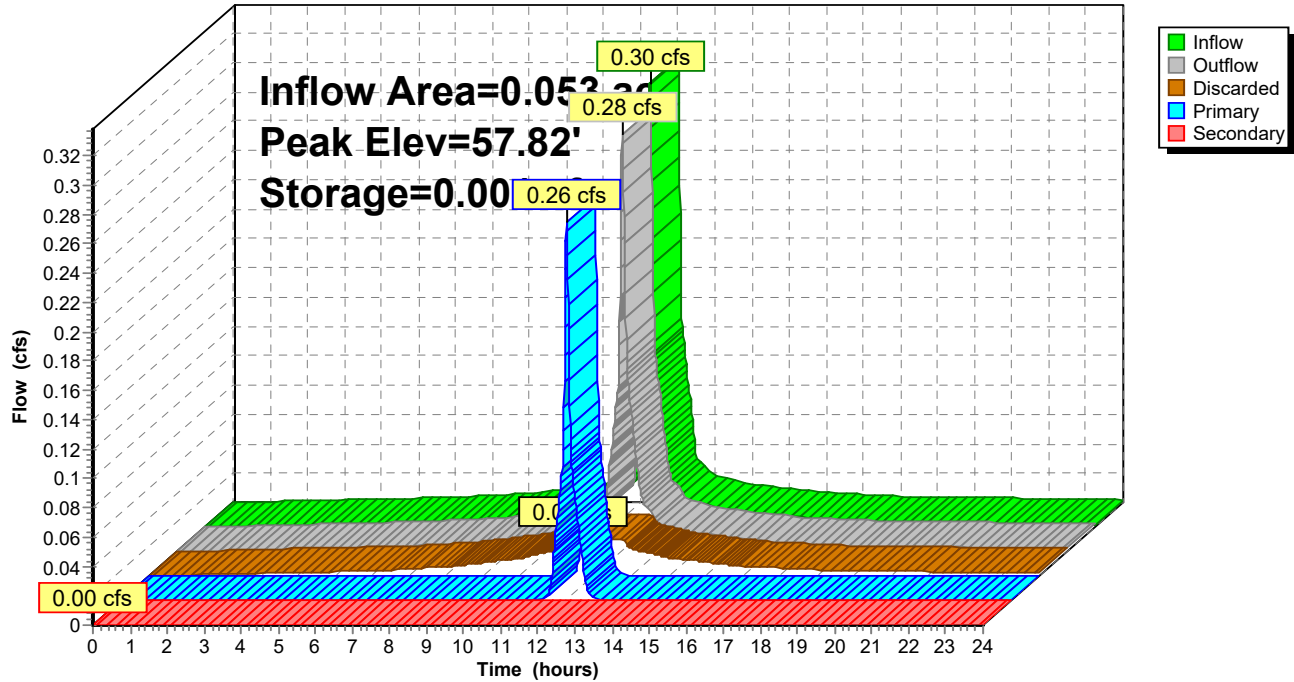
↑**1=Culvert** (Inlet Controls 0.26 cfs @ 1.93 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=57.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITB: Drip Edge B

Hydrograph



Summary for Pond ITC: Drip Edge C

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 4.96" for 25 yr event
 Inflow = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af
 Outflow = 0.01 cfs @ 12.16 hrs, Volume= 0.002 af, Atten= 65%, Lag= 9.4 min
 Discarded = 0.01 cfs @ 11.73 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 12.16 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 58.29' @ 12.16 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=7.9 min calculated for 0.002 af (100% of inflow)

Center-of-Mass det. time=7.8 min (749.6 - 741.8)

Volume	Invert	Avail.Storage	Storage Description
#1	57.67'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	58.25'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 58.25' / 58.12' S= 0.0102' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.07'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	57.67'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.73 hrs HW=57.69' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.16 hrs HW=58.29' TW=57.68' (Dynamic Tailwater)

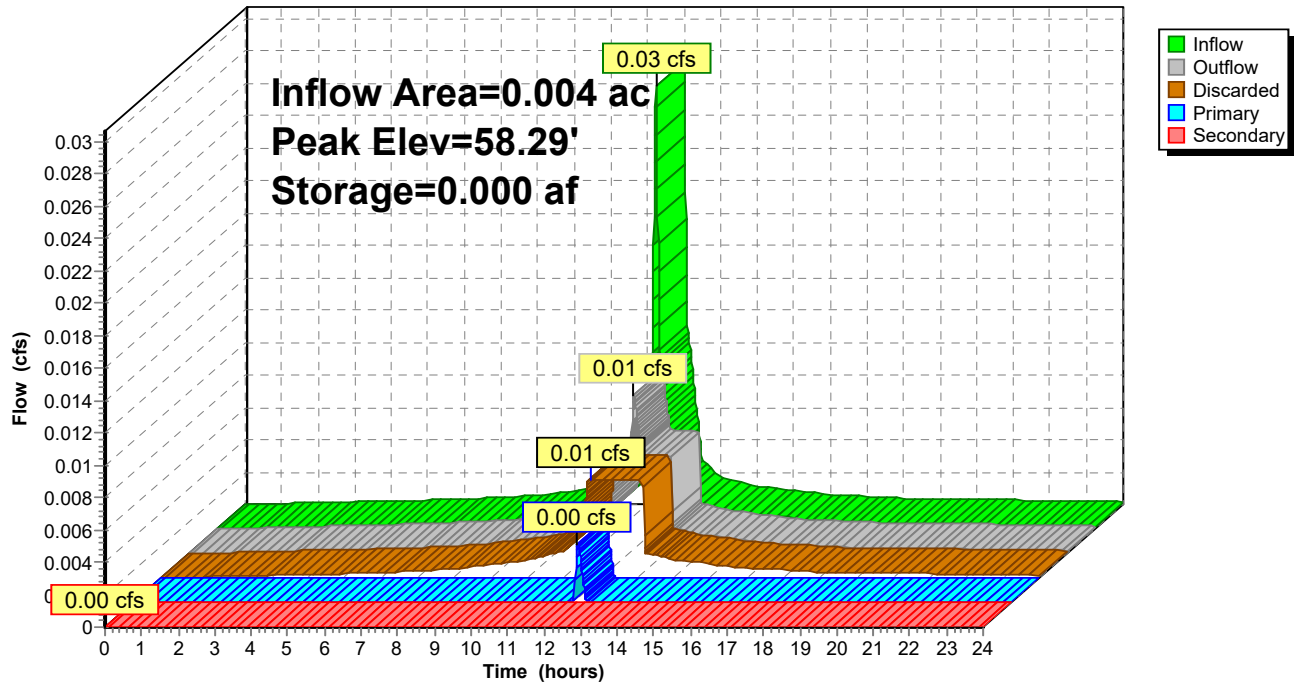
↑ **1=Culvert** (Barrel Controls 0.00 cfs @ 0.84 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.67' TW=57.50' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITC: Drip Edge C

Hydrograph



Summary for Pond RG: Rain Garden

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth > 3.16" for 25 yr event
 Inflow = 2.45 cfs @ 12.10 hrs, Volume= 0.180 af
 Outflow = 2.43 cfs @ 12.11 hrs, Volume= 0.180 af, Atten= 1%, Lag= 0.5 min
 Discarded = 0.11 cfs @ 12.11 hrs, Volume= 0.069 af
 Primary = 0.55 cfs @ 11.94 hrs, Volume= 0.072 af
 Secondary= 1.93 cfs @ 12.11 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.11'@ 12.11 hrs Surf.Area= 748 sf Storage= 413 cf

Plug-Flow detention time= 15.8 min calculated for 0.180 af (100% of inflow)

Center-of-Mass det. time= 15.7 min (833.1 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	398 cf	Ponding Area (Conic) listed below (Recalc)
#2	55.00'	203 cf	Soil Filter Bed (Conic) listed below (Recalc)
			507 cf Overall x 40.0% Voids
			601 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	300	0	0	300
57.00	375	168	168	382
57.50	550	230	398	561

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
55.00	338	0	0	338
56.00	338	338	338	403
56.50	338	169	507	436

Device	Routing	Invert	Outlet Devices
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	55.00'	5.500 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#3	Primary	56.25'	6.0" Round Culvert L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 56.25' / 56.00' S= 0.0081 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Discarded OutFlowMax=0.11 cfs @ 12.11 hrs HW=57.11' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.11 cfs)

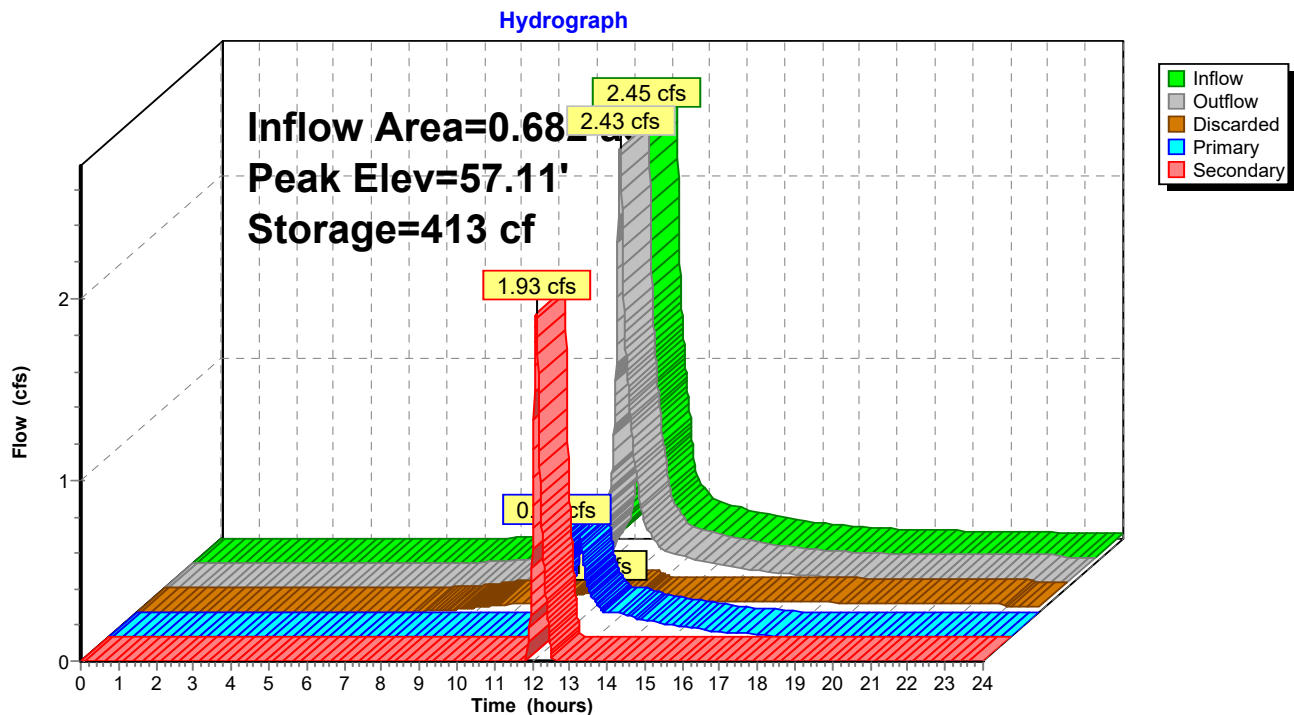
Primary OutFlowMax=0.56 cfs @ 11.94 hrs HW=56.95' TW=56.50' (Dynamic Tailwater)

↑**3=Culvert** (Barrel Controls 0.56 cfs @ 2.83 fps)

Secondary OutFlowMax=1.92 cfs @ 12.11 hrs HW=57.11' TW=56.88' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.92 cfs @ 1.16 fps)

Pond RG: Rain Garden



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 9/18/2020

Page 95

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SWRunoff Area=21,743 sf 65.38% Impervious Runoff Depth>3.30"
Flow Length=299' Tc=4.7 min CN=77 Runoff=2.03 cfs 0.137 af**Subcatchment2S: SW**Runoff Area=21,872 sf 65.41% Impervious Runoff Depth>3.30"
Flow Length=273' Tc=6.5 min CN=77 Runoff=1.91 cfs 0.138 af**Subcatchment3S: SW**Runoff Area=29,712 sf 71.18% Impervious Runoff Depth>3.70"
Flow Length=330' Tc=6.9 min CN=81 Runoff=2.85 cfs 0.210 af**Subcatchment4S: W Porch Roof**Runoff Area=192 sf 75.00% Impervious Runoff Depth>5.56"
Flow Length=6' Slope=0.5830 '/ Tc=0.0 min CN=98 Runoff=0.03 cfs 0.002 af**Subcatchment5S: S House Roof**Runoff Area=2,120 sf 90.57% Impervious Runoff Depth>5.56"
Flow Length=24' Slope=0.5830 '/ Tc=0.1 min CN=98 Runoff=0.34 cfs 0.023 af**Subcatchment6S: E Porch Roof**Runoff Area=192 sf 75.00% Impervious Runoff Depth>5.56"
Flow Length=6' Slope=0.5830 '/ Tc=0.0 min CN=98 Runoff=0.03 cfs 0.002 af**Reach1R: Swale**Avg. Flow Depth=0.95' Max Vel=0.72 fps Inflow=2.70 cfs 0.135 af
n=0.150 L=60.0' S=0.0125 '/ Capacity=2.96 cfs Outflow=2.66 cfs 0.135 af**ReachAP1: 18" culvert**Inflow=6.30 cfs 0.397 af
Outflow=6.30 cfs 0.397 af**PondCB B: CB B**Peak Elev=55.61' Inflow=0.32 cfs 0.008 af
6.0" Round Culvert n=0.012 L=5.8' S=0.0431 '/ Outflow=0.32 cfs 0.008 af**PondDP: DetentionPond**Peak Elev=56.72' Storage=241 cf Inflow=4.50 cfs 0.273 af
Discarded=0.04 cfs 0.021 af Primary=4.41 cfs 0.251 af Secondary=0.00 cfs 0.000 af Outflow=4.45 cfs 0.273 af**PondITA: Drip Edge A**Peak Elev=56.59' Storage=0.000 af Inflow=0.03 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Primary=0.02 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.002 af**PondITB: Drip Edge B**Peak Elev=57.85' Storage=0.001 af Inflow=0.34 cfs 0.023 af
Discarded=0.03 cfs 0.015 af Primary=0.29 cfs 0.008 af Secondary=0.00 cfs 0.000 af Outflow=0.32 cfs 0.023 af**PondITC: Drip Edge C**Peak Elev=58.31' Storage=0.000 af Inflow=0.03 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Primary=0.01 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.002 af**PondRG: Rain Garden**Peak Elev=57.14' Storage=428 cf Inflow=2.85 cfs 0.210 af
Discarded=0.11 cfs 0.075 af Primary=0.56 cfs 0.083 af Secondary=2.34 cfs 0.052 af Outflow=2.81 cfs 0.210 af**Total Runoff Area = 1.741 ac Runoff Volume = 0.512 af Average Runoff Depth = 3.53"**
31.58% Pervious = 0.550 ac 68.42% Impervious = 1.191 ac

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 9/18/2020

Page 96

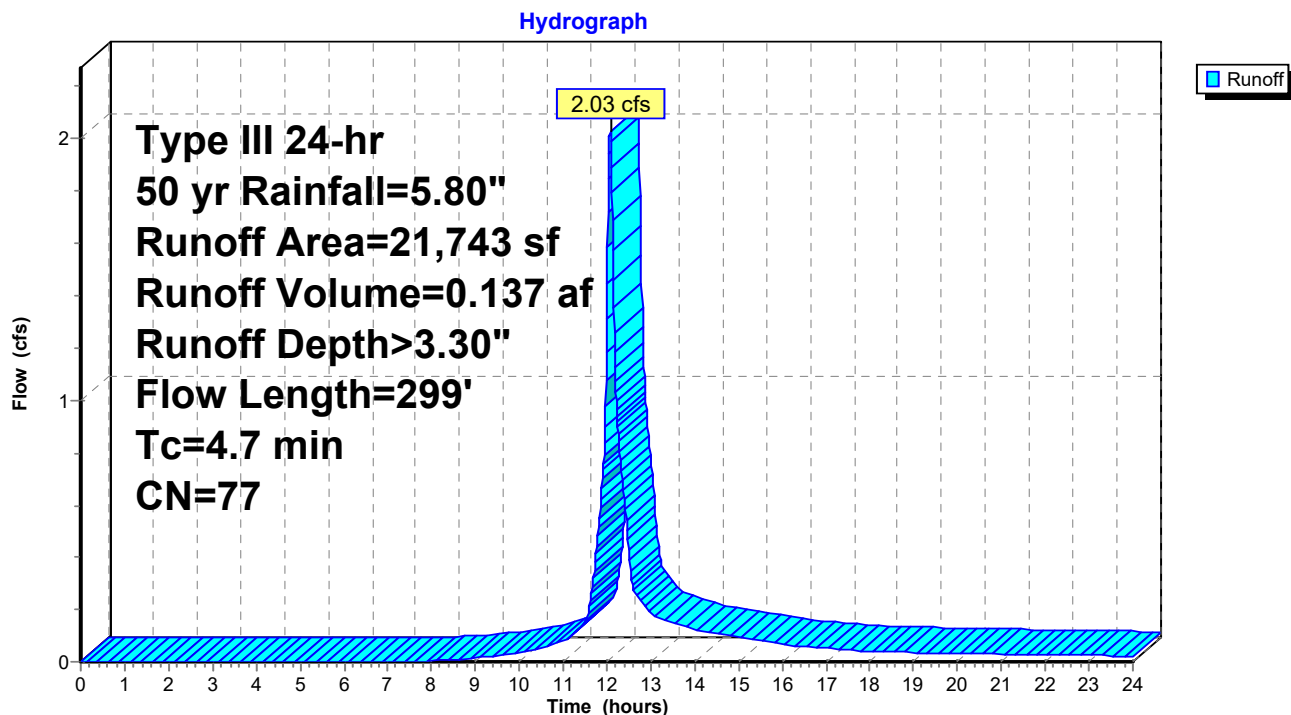
Summary for Subcatchment 1S: SW

Runoff = 2.03 cfs @ 12.07 hrs, Volume= 0.137 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
21,506	77	1/8 acre lots, 65% imp, HSG A
* 220	98	deck, HSG A
* 17	98	retaining wall, HSG A
21,743	77	Weighted Average
7,527		34.62% Pervious Area
14,216		65.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.23		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.0	249	0.0786	4.21		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
4.7	299	Total			

Subcatchment 1S: SW

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 9/18/2020

Page 97

Summary for Subcatchment 2S: SW

Runoff = 1.91 cfs @ 12.10 hrs, Volume= 0.138 af, Depth> 3.30"

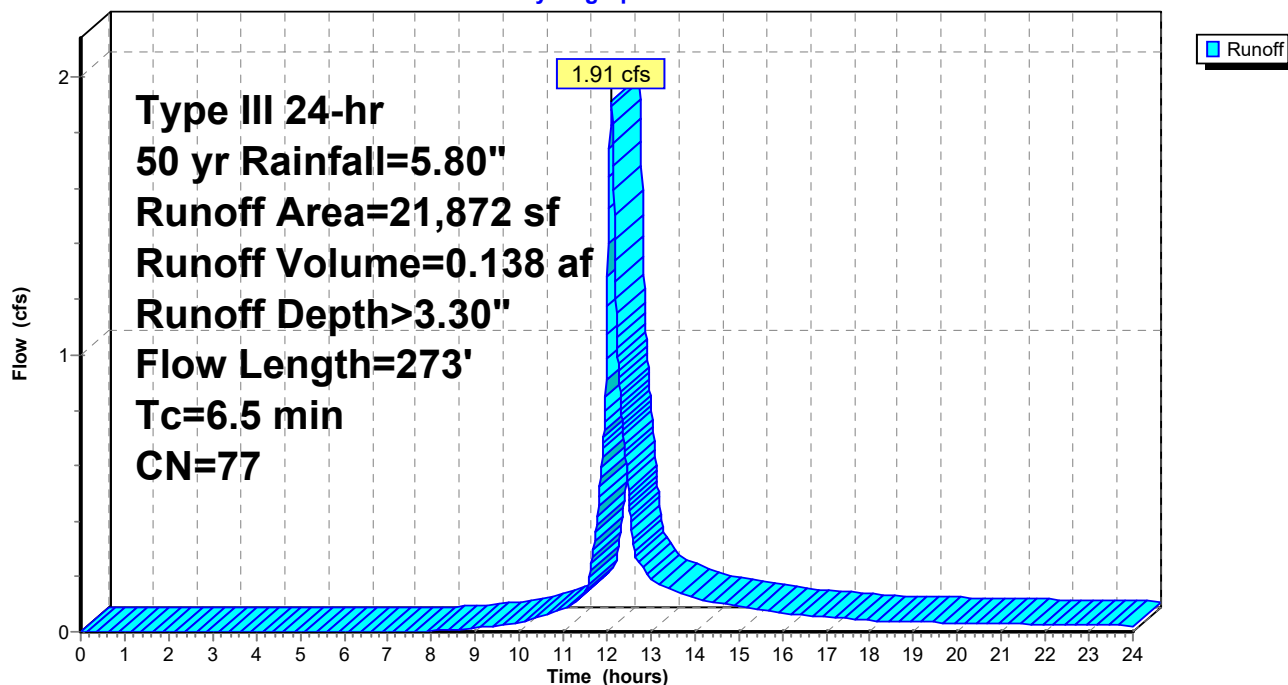
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
21,613	77	1/8 acre lots, 65% imp, HSG A
205	98	Paved parking, HSG A
* 54	98	Retaining Wall, HSG A
21,872	77	Weighted Average
7,565		34.59% Pervious Area
14,307		65.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
0.8	223	0.0900	4.50		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.5	273	Total			

Subcatchment 2S: SW

Hydrograph



Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 9/18/2020

Page 98

Summary for Subcatchment 3S: SW

Runoff = 2.85 cfs @ 12.10 hrs, Volume= 0.210 af, Depth> 3.70"

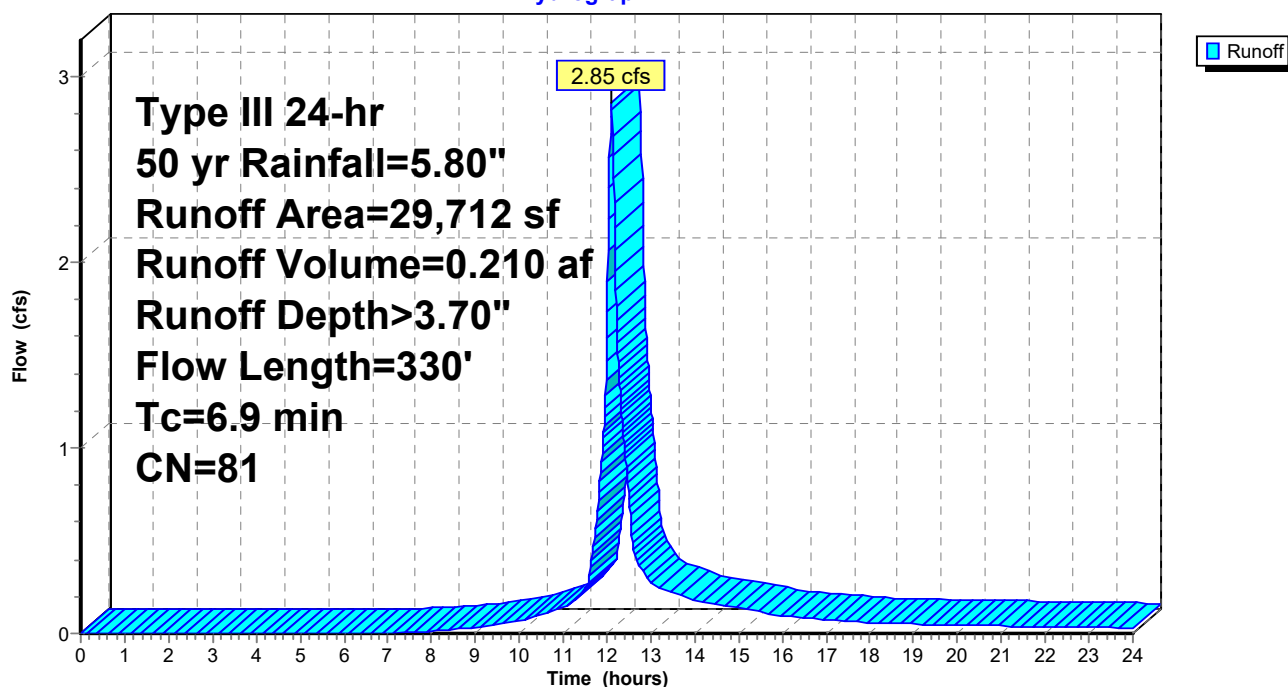
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
24,467	77	1/8 acre lots, 65% imp, HSG A
3,229	98	Paved parking, HSG A
* 92	98	Retaining Wall, HSG A
1,924	98	Unconnected roofs, HSG A
29,712	81	Weighted Average
8,563		28.82% Pervious Area
21,149		71.18% Impervious Area
1,924		9.10% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.10"
1.2	280	0.0680	3.91		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.9	330	Total			

Subcatchment 3S: SW

Hydrograph



Summary for Subcatchment 4S: W Porch Roof[46] Hint: $T_c=0$ (Instant runoff peak depends on dt)

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 5.56"

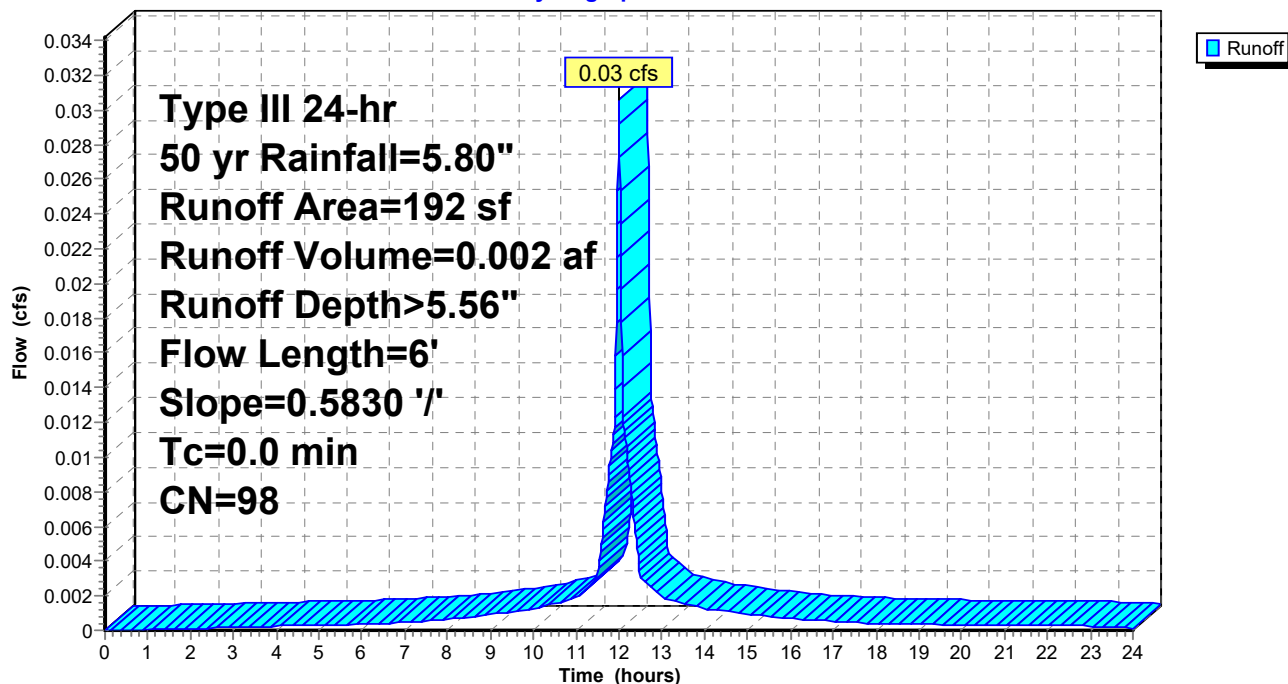
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

T_c (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces $n=0.011$ $P2=3.10"$

Subcatchment 4S: W Porch Roof

Hydrograph



Summary for Subcatchment 5S: S House Roof[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.34 cfs @ 12.00 hrs, Volume= 0.023 af, Depth> 5.56"

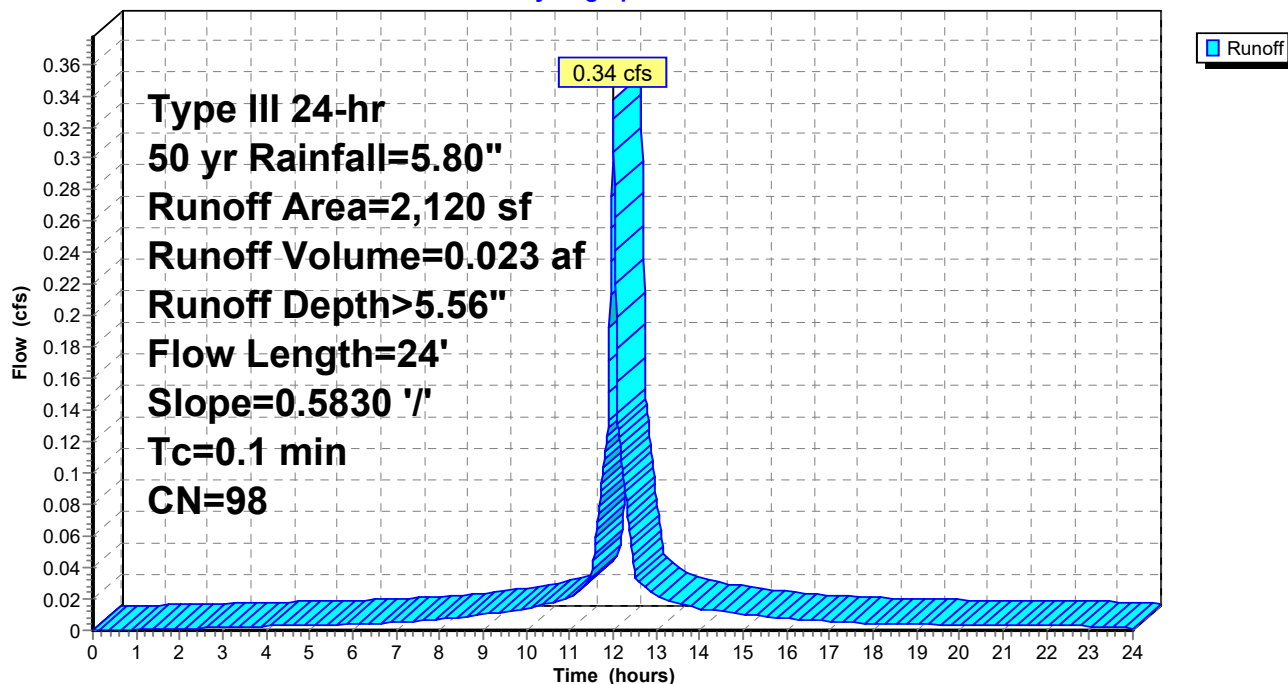
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
1,920	98	Roofs, HSG A
200	96	Gravel surface, HSG A
2,120	98	Weighted Average
200		9.43% Pervious Area
1,920		90.57% Impervious Area

T_c (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	24	0.5830	3.92		Sheet Flow, Smooth surfaces $n=0.011$ $P_2=3.10"$

Subcatchment 5S: S House Roof

Hydrograph



Summary for Subcatchment 6S: E Porch Roof

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af, Depth> 5.56"

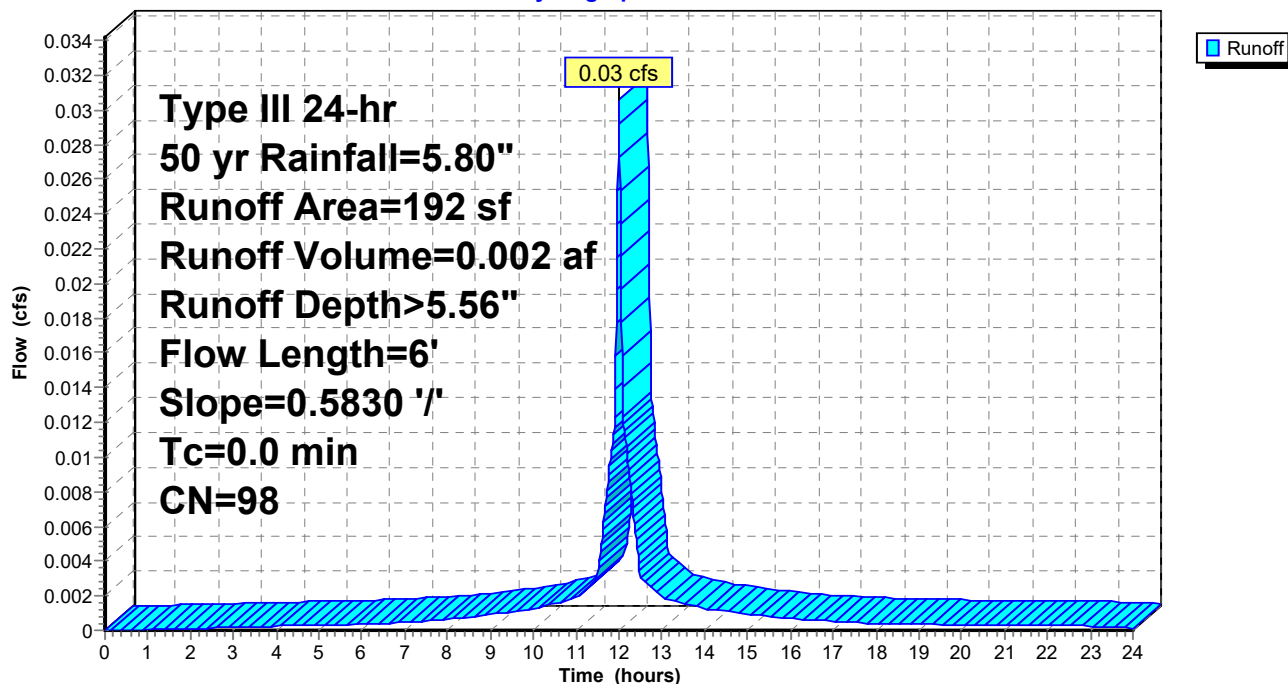
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=5.80"

Area (sf)	CN	Description
144	98	Roofs, HSG A
48	96	Gravel surface, HSG A
192	98	Weighted Average
48		25.00% Pervious Area
144		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	6	0.5830	2.97		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.10"

Subcatchment 6S: E Porch Roof

Hydrograph



Summary for Reach 1R: Swale

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth = 2.37" for 50 yr event
Inflow = 2.70 cfs @ 12.11 hrs, Volume= 0.135 af
Outflow = 2.66 cfs @ 12.13 hrs, Volume= 0.135 af, Atten= 2%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 0.72 fps, Min. Travel Time= 1.4 min

Avg. Velocity = 0.24 fps, Avg. Travel Time= 4.1 min

Peak Storage= 221 cf @ 12.13 hrs

Average Depth at Peak Storage= 0.95'

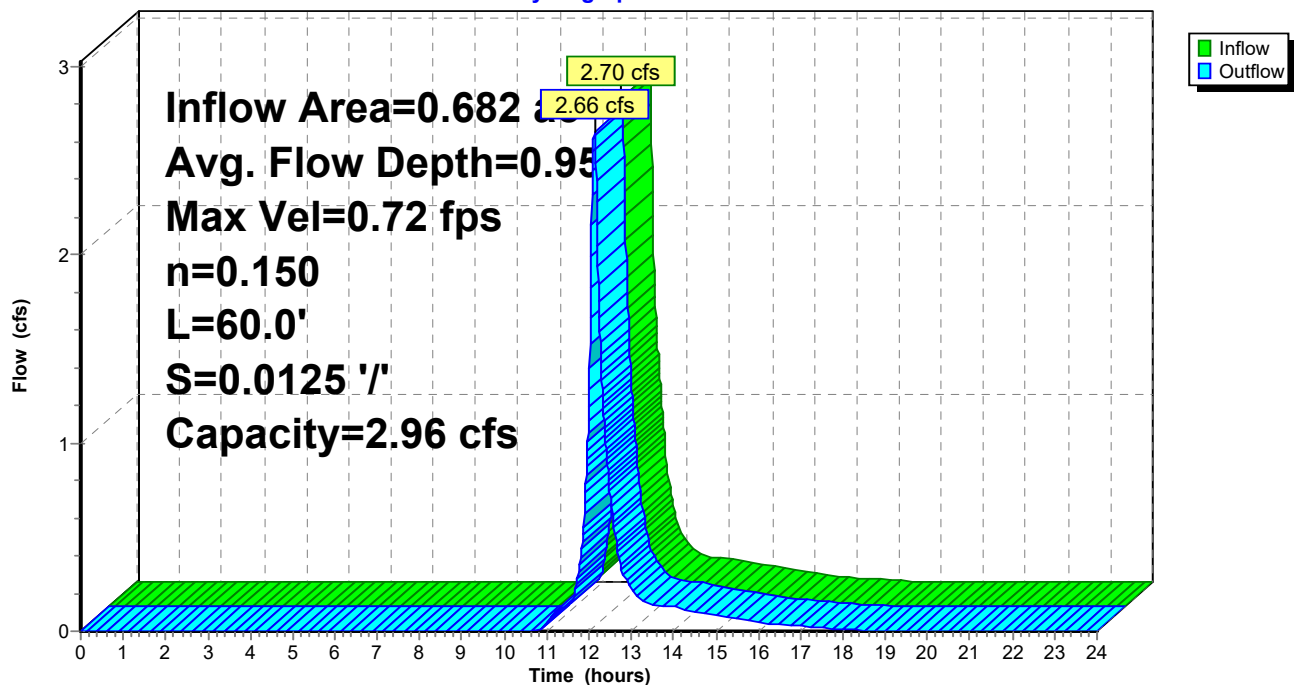
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 2.96 cfs

1.00' x 1.00' deep channel, n= 0.150 Sheet flow over Short Grass

Side Slope Z-value= 3.0 '/' Top Width= 7.00'

Length= 60.0' Slope= 0.0125 '/'

Inlet Invert= 56.00', Outlet Invert= 55.25'

**Reach 1R: Swale****Hydrograph**

Summary for Reach AP1: 18" culvert

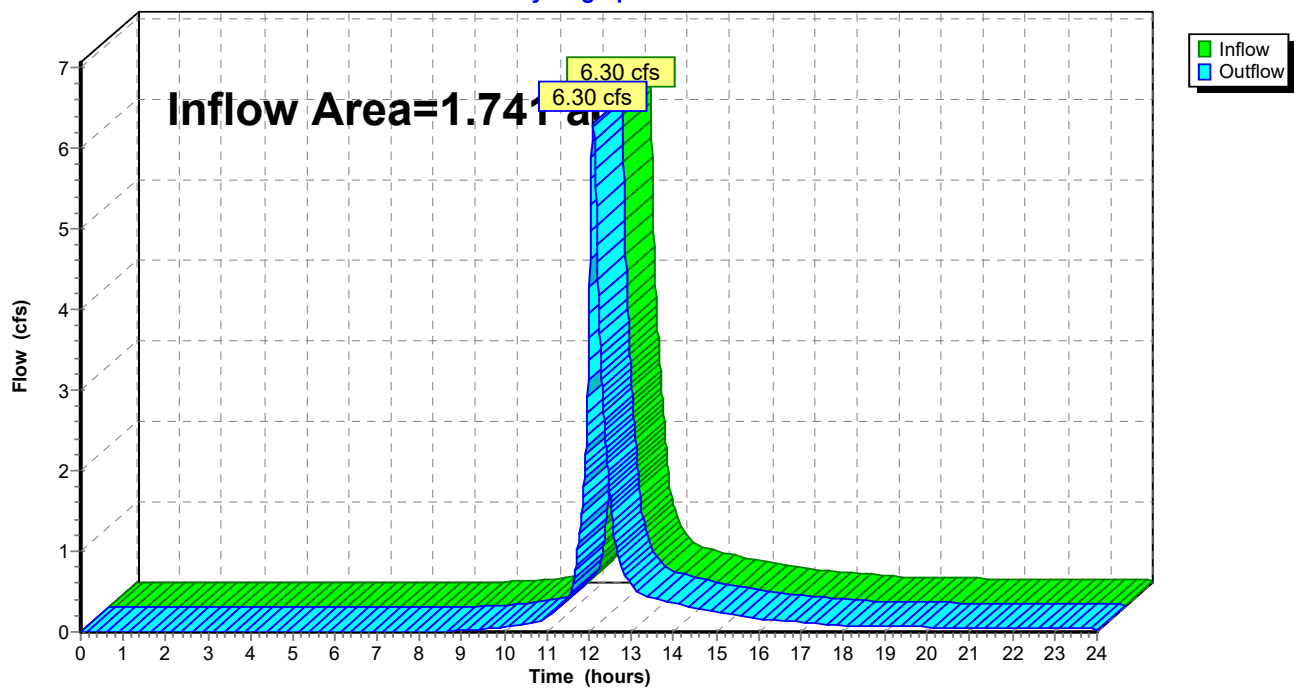
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.741 ac, 68.42% Impervious, Inflow Depth > 2.74" for 50 yr event
Inflow = 6.30 cfs @ 12.10 hrs, Volume= 0.397 af
Outflow = 6.30 cfs @ 12.10 hrs, Volume= 0.397 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: 18" culvert

Hydrograph



Summary for Pond CB B: CB B

[57] Hint: Peaked at 55.61' (Flood elevation advised)

Inflow Area = 0.057 ac, 88.18% Impervious, Inflow Depth = 1.70" for 50 yr event
 Inflow = 0.32 cfs @ 12.01 hrs, Volume= 0.008 af
 Outflow = 0.32 cfs @ 12.01 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.32 cfs @ 12.01 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 55.61' @ 12.01 hrs

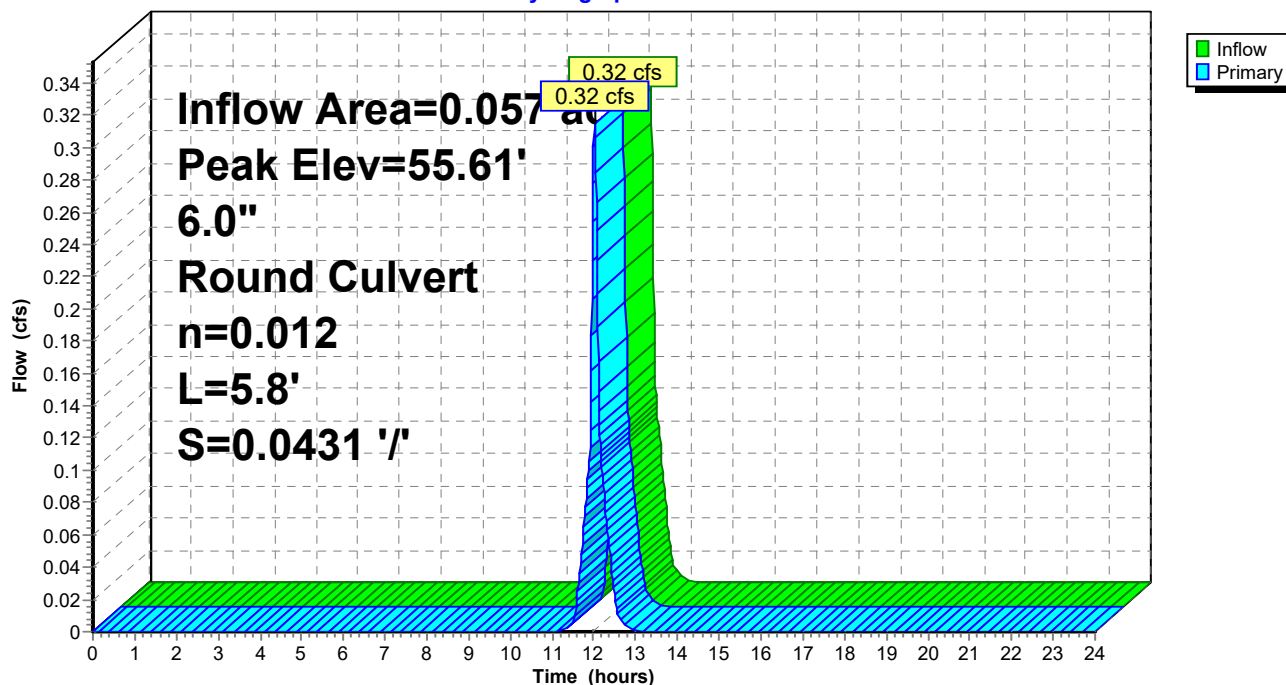
Device	Routing	Invert	Outlet Devices
#1	Primary	55.25'	6.0" Round Culvert L= 5.8' Ke= 0.500 Inlet / Outlet Invert= 55.25' / 55.00' S= 0.0431 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlowMax=0.31 cfs @ 12.01 hrs HW=55.61' TW=0.00' (Dynamic Tailwater)

1=Culvert (Inlet Controls 0.31 cfs @ 2.05 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond DP: Detention Pond

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.55' @ 10.83 hrs

Inflow Area = 1.184 ac, 68.73% Impervious, Inflow Depth > 2.76" for 50 yr event
 Inflow = 4.50 cfs @ 12.11 hrs, Volume= 0.273 af
 Outflow = 4.45 cfs @ 12.13 hrs, Volume= 0.273 af, Atten= 1%, Lag= 0.8 min
 Discarded = 0.04 cfs @ 12.13 hrs, Volume= 0.021 af
 Primary = 4.41 cfs @ 12.13 hrs, Volume= 0.251 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.72' @ 12.13 hrs Surf.Area= 331 sf Storage= 241 cf

Plug-Flow detention time= 1.6 min calculated for 0.273 af (100% of inflow)
 Center-of-Mass det. time= 1.3 min (795.1 - 793.8)

Volume	Invert	Avail.Storage	Storage Description
#1	55.65'	340 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.65	50	0	0
56.00	211	46	46
57.00	378	295	340

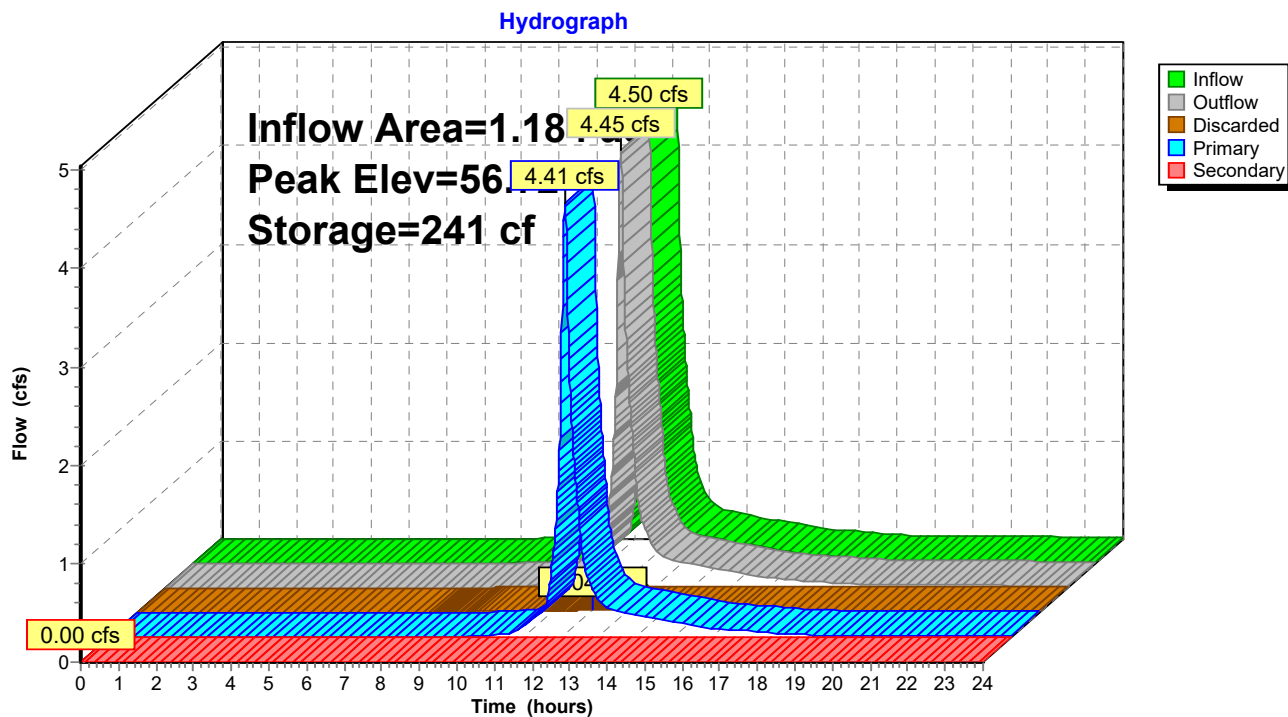
Device	Routing	Invert	Outlet Devices
#1	Primary	55.70'	18.0" Round Culvert L= 22.0' Ke= 0.500 Inlet / Outlet Invert= 55.70' / 54.50' S= 0.0545'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#2	Secondary	56.85'	10.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	55.65'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=56.72' (Free Discharge)
 ↑ **3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=4.40 cfs @ 12.13 hrs HW=56.72' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 4.40 cfs @ 3.44 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.65' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DP: Detention Pond



Summary for Pond ITA: Drip Edge A

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 5.56" for 50 yr event
 Inflow = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af
 Outflow = 0.03 cfs @ 12.01 hrs, Volume= 0.002 af, Atten= 4%, Lag= 0.6 min
 Discarded = 0.01 cfs @ 11.71 hrs, Volume= 0.002 af
 Primary = 0.02 cfs @ 12.01 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 56.59' @ 12.01 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=0.7 min calculated for 0.002 af (100% of inflow)

Center-of-Mass det. time=0.7 min (740.8 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	56.50'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 56.50' / 56.00' S= 0.0394'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	57.90'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	56.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.01 cfs @ 11.71 hrs HW=56.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlowMax=0.02 cfs @ 12.01 hrs HW=56.59' TW=55.61' (Dynamic Tailwater)

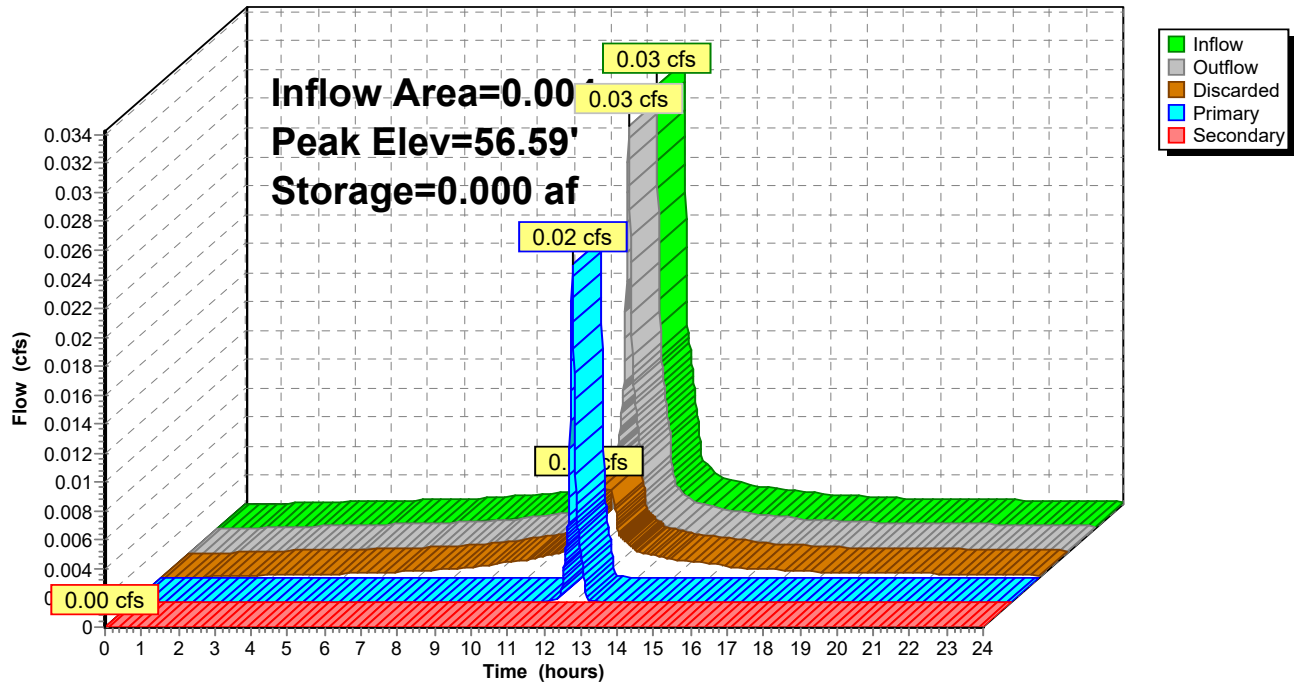
↑**1=Culvert** (Inlet Controls 0.02 cfs @ 1.01 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=56.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITA: Drip Edge A

Hydrograph



Summary for Pond ITB: Drip Edge B

Inflow Area = 0.053 ac, 89.27% Impervious, Inflow Depth > 5.13" for 50 yr event
 Inflow = 0.34 cfs @ 12.00 hrs, Volume= 0.023 af
 Outflow = 0.32 cfs @ 12.01 hrs, Volume= 0.023 af, Atten= 6%, Lag= 0.8 min
 Discarded = 0.03 cfs @ 11.31 hrs, Volume= 0.015 af
 Primary = 0.29 cfs @ 12.01 hrs, Volume= 0.008 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.85' @ 12.01 hrs Surf.Area= 0.005 ac Storage= 0.001 af

Plug-Flow detention time=1.2 min calculated for 0.023 af (100% of inflow)

Center-of-Mass det. time=1.1 min (741.3 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1	57.50'	0.003 af	2.50'W x 80.00'L x 1.50'H Prismatic 0.007 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	57.50'	6.0" Round Culvert L= 7.0' Ke= 0.500 Inlet / Outlet Invert= 57.50' / 56.00' S= 0.2143'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	80.0' long x 2.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32
#3	Discarded	57.50'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlowMax=0.03 cfs @ 11.31 hrs HW=57.52' (Free Discharge)

↑**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlowMax=0.29 cfs @ 12.01 hrs HW=57.85' TW=55.61' (Dynamic Tailwater)

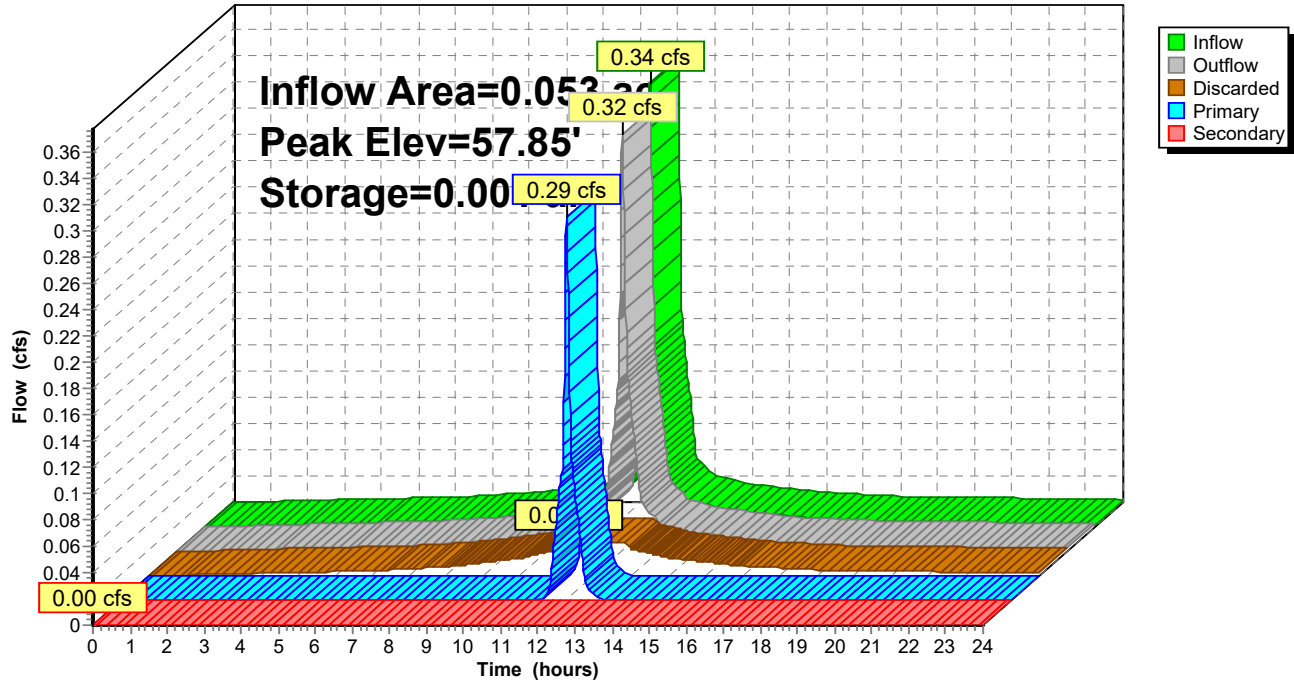
↑**1=Culvert** (Inlet Controls 0.29 cfs @ 2.00 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=57.50' TW=55.25' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITB: Drip Edge B

Hydrograph



Summary for Pond ITC: Drip Edge C

Inflow Area = 0.004 ac, 75.00% Impervious, Inflow Depth > 5.56" for 50 yr event
 Inflow = 0.03 cfs @ 12.00 hrs, Volume= 0.002 af
 Outflow = 0.02 cfs @ 12.07 hrs, Volume= 0.002 af, Atten= 43%, Lag= 4.4 min
 Discarded = 0.01 cfs @ 11.69 hrs, Volume= 0.002 af
 Primary = 0.01 cfs @ 12.07 hrs, Volume= 0.000 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 58.31' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=7.7 min calculated for 0.002 af (100% of inflow)

Center-of-Mass det. time=7.6 min (747.7 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1	57.67'	0.001 af	2.00'W x 24.00'L x 1.50'H Prismatic 0.002 af Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	58.25'	6.0" Round Culvert L= 12.7' Ke= 0.500 Inlet / Outlet Invert= 58.25' / 58.12' S= 0.0102' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.07'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Discarded	57.67'	5.500 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.69 hrs HW=57.69' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 12.07 hrs HW=58.31' TW=57.78' (Dynamic Tailwater)

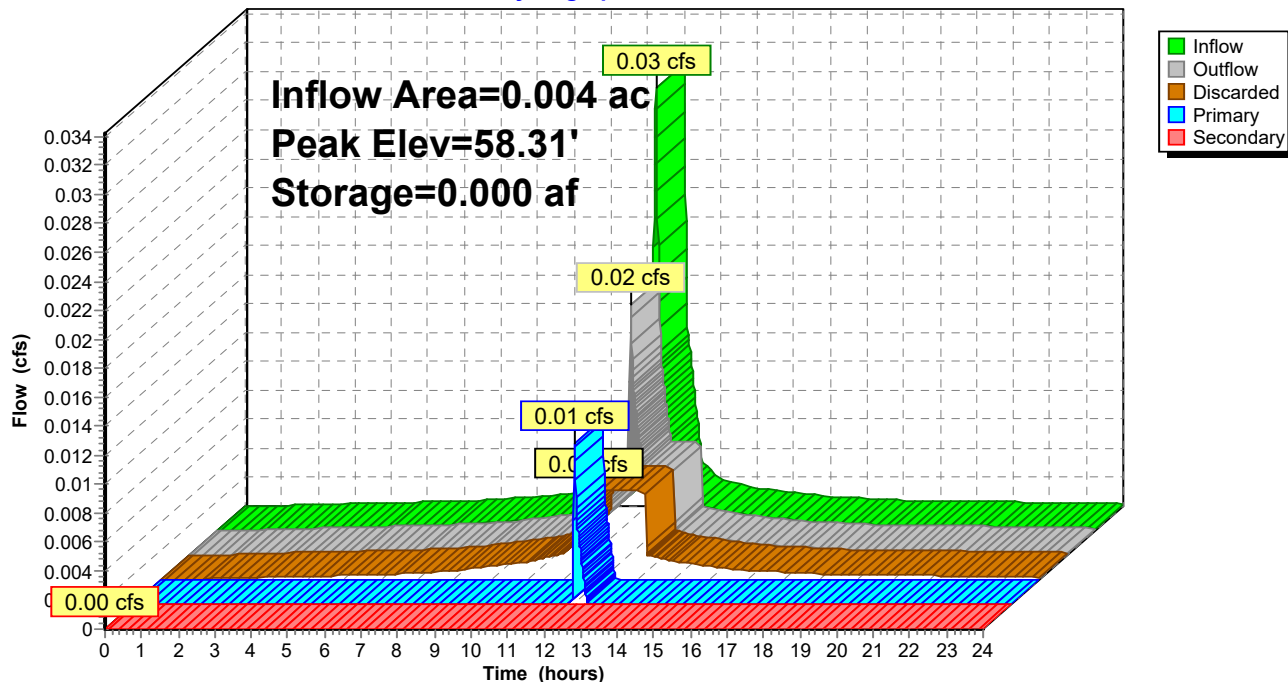
↑ **1=Culvert** (Barrel Controls 0.01 cfs @ 1.15 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.67' TW=57.50' (Dynamic Tailwater)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITC: Drip Edge C

Hydrograph



Summary for Pond RG: Rain Garden

Inflow Area = 0.682 ac, 71.18% Impervious, Inflow Depth > 3.70" for 50 yr event
 Inflow = 2.85 cfs @ 12.10 hrs, Volume= 0.210 af
 Outflow = 2.81 cfs @ 12.11 hrs, Volume= 0.210 af, Atten= 1%, Lag= 0.6 min
 Discarded = 0.11 cfs @ 12.11 hrs, Volume= 0.075 af
 Primary = 0.56 cfs @ 11.89 hrs, Volume= 0.083 af
 Secondary= 2.34 cfs @ 12.11 hrs, Volume= 0.052 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 57.14' @ 12.11 hrs Surf.Area= 759 sf Storage= 428 cf

Plug-Flow detention time= 15.6 min calculated for 0.210 af (100% of inflow)

Center-of-Mass det. time= 14.4 min (827.4 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	56.50'	398 cf	Ponding Area (Conic) listed below (Recalc)
#2	55.00'	203 cf	Soil Filter Bed (Conic) listed below (Recalc)
			507 cf Overall x 40.0% Voids
			601 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	300	0	0	300
57.00	375	168	168	382
57.50	550	230	398	561

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
55.00	338	0	0	338
56.00	338	338	338	403
56.50	338	169	507	436

Device	Routing	Invert	Outlet Devices
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Discarded	55.00'	5.500 in/hr Exfiltration over Wetted area Phase-In= 0.01'
#3	Primary	56.25'	6.0" Round Culvert L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 56.25' / 56.00' S= 0.0081 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Saratoga Way Post 9-18-2020

Prepared by Ross Engineering

HydroCAD® 10.00-25 s/n 02051 © 2019 HydroCAD Software Solutions LLC

Type III 24-hr 50 yr Rainfall=5.80"

Printed 9/18/2020

Page 114

Discarded OutFlowMax=0.11 cfs @ 12.11 hrs HW=57.14' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.11 cfs)

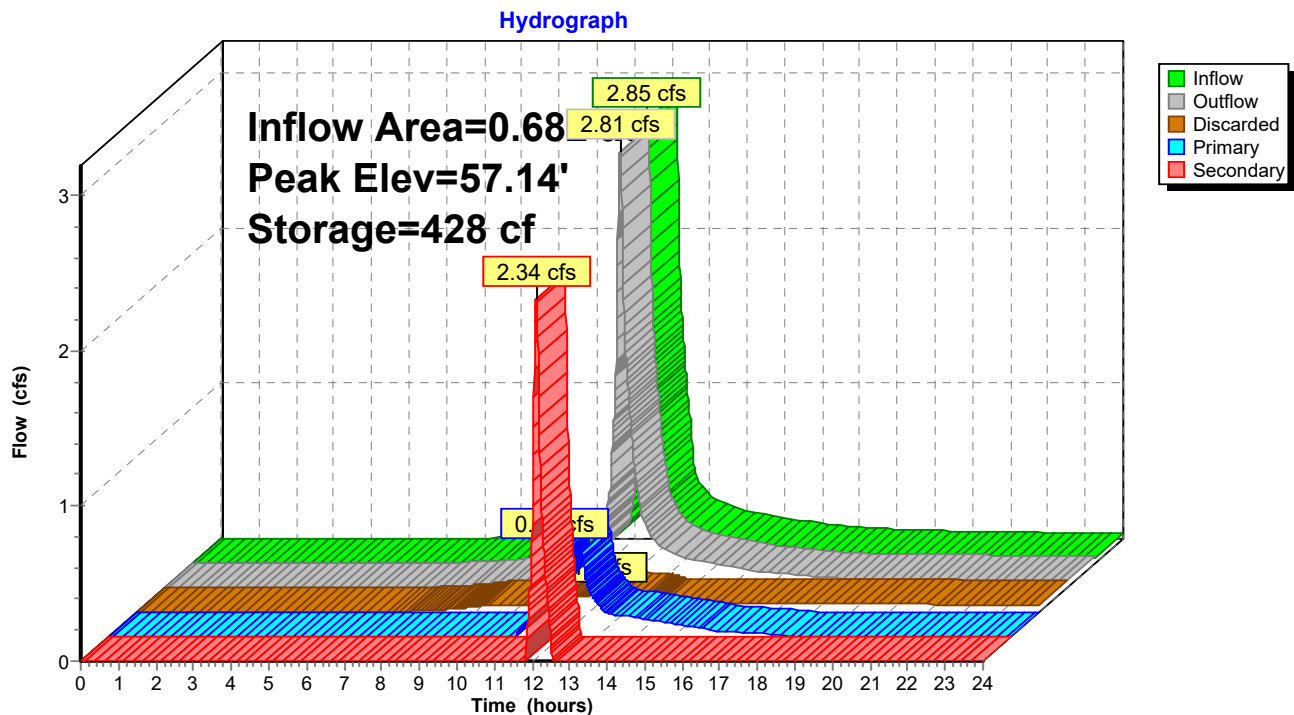
Primary OutFlowMax=0.56 cfs @ 11.89 hrs HW=56.95' TW=56.50' (Dynamic Tailwater)

↑**3=Culvert** (Barrel Controls 0.56 cfs @ 2.83 fps)

Secondary OutFlowMax=2.34 cfs @ 12.11 hrs HW=57.14' TW=56.95' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2.34 cfs @ 1.21 fps)

Pond RG: Rain Garden



Appendix - A

USDA Rainfall Charts

TOWN	24-hour SCS Rainfall*					
	1 yr	2 yr	10 yr	25 yr	50 yr	100 yr
NEWFIELDS	2.6	3.0	4.4	5.2	5.7	6.4
NEWINGTON	2.6	3.0	4.4	5.2	5.7	6.4
NEWMARKET	2.6	3.0	4.3	5.2	5.7	6.4
NEWPORT	2.3	2.7	4.1	4.8	5.3	6.0
NEWTON	2.6	3.1	4.4	5.2	5.8	6.5
NORTH HAMPTON	2.6	3.1	4.4	5.2	5.8	6.5
NORTHFIELD	2.4	2.8	4.2	5.0	5.5	6.1
NORTHUMBERLAND	2.4	2.5	4.0	4.9	5.1	5.9
NORTHWOOD	2.5	2.9	4.3	5.1	5.6	6.3
NOTTINGHAM	2.5	3.0	4.3	5.1	5.7	6.4
ODELL	2.4	2.5	3.9	4.7	5.0	5.7
ORANGE	2.3	2.6	4.0	4.8	5.3	5.9
ORFORD	2.3	2.6	4.0	4.7	5.1	5.8
OSSIPEE	2.5	2.9	4.3	5.2	5.5	6.2
PELHAM	2.6	3.0	4.4	5.2	5.8	6.5
PEMBROKE	2.4	2.9	4.2	5.0	5.6	6.2
PETERBOROUGH	2.4	2.9	4.2	5.0	5.6	6.3
PIERMONT	2.3	2.5	3.9	4.7	5.1	5.8
PINKHAM'S GRANT	3.0	3.8	5.2	6.2	6.6	7.2
PITTSBURG	2.3	2.4	3.7	4.4	4.9	5.2
PITTSFIELD	2.5	2.9	4.2	5.1	5.6	6.2
PLAINFIELD	2.3	2.6	4.0	4.8	5.2	5.9
PLAISTOW	2.6	3.1	4.4	5.2	5.8	6.5
PLYMOUTH	2.4	2.7	4.2	4.9	5.3	5.9
PORTSMOUTH	2.6	3.1	4.4	5.2	5.8	6.5
RANDOLPH	2.7	3.3	4.6	5.2	6.1	6.4
RAYMOND	2.5	3.0	4.3	5.1	5.7	6.4
RICHMOND	2.4	2.8	4.2	5.0	5.6	6.3
RINDGE	2.4	2.9	4.2	5.0	5.7	6.4
ROCHESTER	2.5	3.0	4.3	5.1	5.6	6.3
ROLLINSFORD	2.5	3.0	4.3	5.2	5.7	6.4
ROXBURY	2.4	2.8	4.2	4.9	5.6	6.3
RUMNEY	2.4	2.6	4.1	4.9	5.3	5.9
RYE	2.6	3.1	4.4	5.2	5.8	6.5
SALEM	2.5	3.0	4.4	5.2	5.8	6.5
SALISBURY	2.4	2.8	4.1	4.9	5.5	6.1
SANBORNTON	2.4	2.8	4.1	5.0	5.4	6.1
SANDOWN	2.5	3.0	4.3	5.2	5.7	6.4
SANDWICH	2.5	3.0	4.4	5.1	5.5	6.2
SARGENT'S PURCHASE	2.9	3.8	5.2	6.1	6.6	7.2
SEABROOK	2.6	3.1	4.4	5.2	5.8	6.5
SECOND COLLEGE GRANT	2.3	2.5	3.8	4.7	5.0	5.5
SHARON	2.4	2.9	4.2	5.0	5.7	6.4

*Rainfall data is interpolated from *Technical Paper No. 40 (TP40) Rainfall Frequency Atlas of the Eastern United States*. Other data may be used (e.g., *Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada* by Cornell University, Northeast Regional Climate Center, September, 1993.)

Appendix - B

Soil Information

Soil Map—Rockingham County, New Hampshire



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

7/23/2020
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Rockingham County, New Hampshire

Survey Area Data: Version 22, May 29, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
799	Urban land-Canton complex, 3 to 15 percent slopes	3.6	100.0%
Totals for Area of Interest		3.6	100.0%

Rockingham County, New Hampshire

799—Urban land-Canton complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9cq0

Elevation: 0 to 1,000 feet

Mean annual precipitation: 42 to 46 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 120 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent

Canton and similar soils: 20 percent

Minor components: 25 percent

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

Description of Canton

Setting

Parent material: Till

Typical profile

H1 - 0 to 5 inches: gravelly fine sandy loam

H2 - 5 to 21 inches: gravelly fine sandy loam

H3 - 21 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High
(2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Ecological site: Well Drained Till Uplands (F144AY034CT)

Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 5 percent

Hydric soil rating: No

Squamscott and scitico

Percent of map unit: 4 percent

Landform: Marine terraces

Hydric soil rating: Yes

Boxford and eldridge

Percent of map unit: 4 percent

Hydric soil rating: No

Chatfield

Percent of map unit: 4 percent

Hydric soil rating: No

Scituate and newfields

Percent of map unit: 4 percent

Hydric soil rating: No

Walpole

Percent of map unit: 4 percent

Landform: Depressions

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Rockingham County, New Hampshire

Survey Area Data: Version 22, May 29, 2020