

# Residential Development Plans

Assessor's Parcel 220-87-2  
 74 EMERY STREET  
 &  
 Assessor's Parcel 220-87-3  
 64 EMERY STREET  
 Portsmouth, New Hampshire

APPROVED BY THE PORTSMOUTH PLANNING BOARD	
CHAIRMAN	DATE

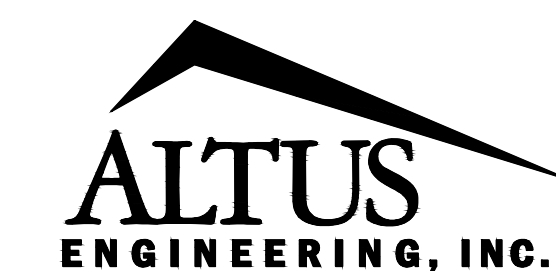
Issued:

OCTOBER 11, 2018      PLANNING BOARD SUBMISSION  
~~SEPTEMBER 14, 2018      TAC Submission~~

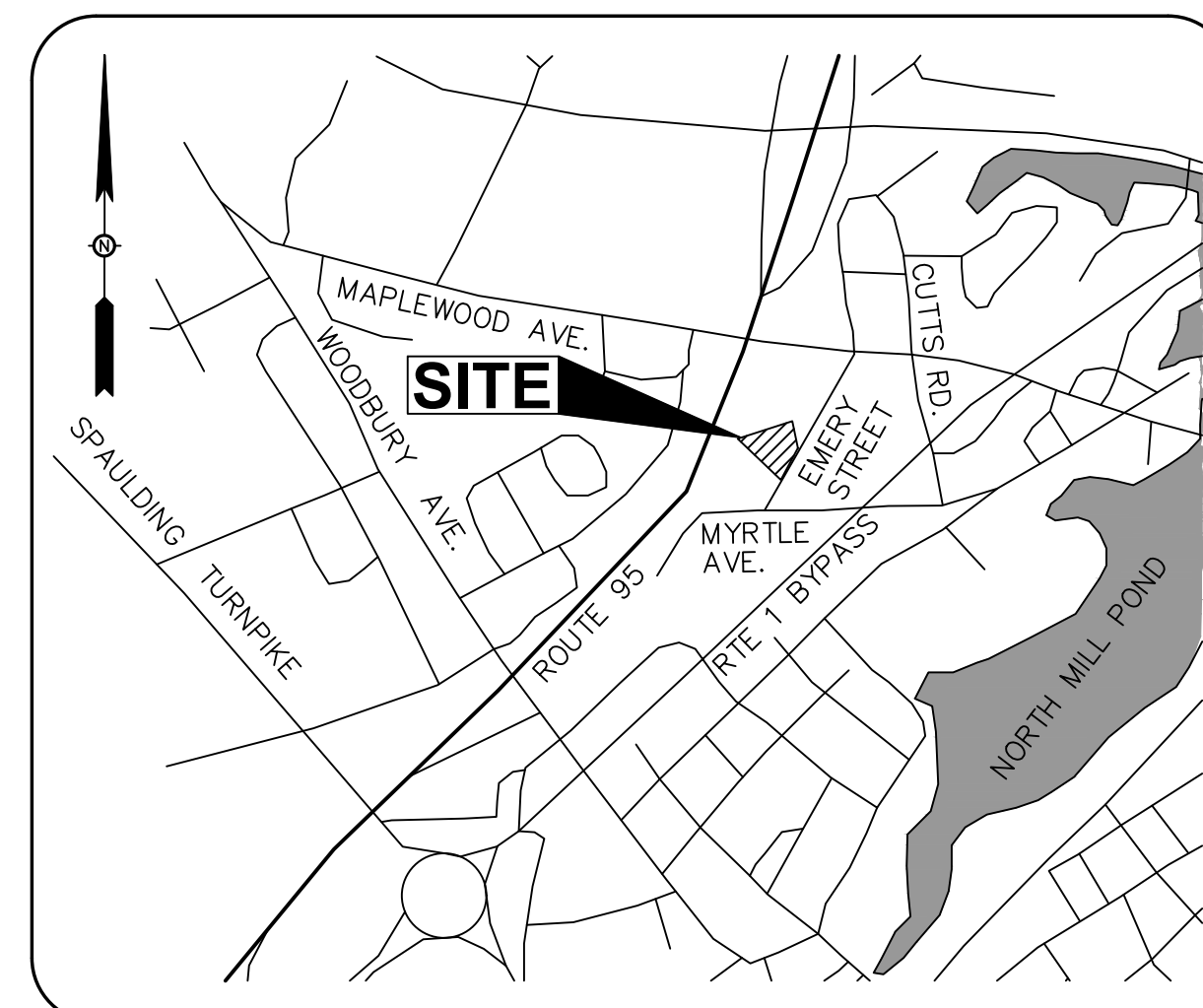
*Owner/Applicant:*

HAPPY MOUNTAIN HOLDINGS, LLC  
 901 N. MARKET STREET  
 SUITE 705  
 WILMINGTON, DE 19801

*Civil Engineer:*



133 COURT STREET    PORTSMOUTH, NH 03801  
 (603) 433-2335    www.ALTUS-ENG.com



LOCUS MAP  
 1" = 1,000 FEET +/-

**Sheet Index**  
**Title**

	<b>Sheet No.:</b>	<b>Rev.</b>	<b>Date</b>
Existing Conditions Plan (by Civil Consultants, Inc.)	EC-1	0	09/27/13
Site Plan	C-1	2	10/11/18
Grading Plan	C-2	2	10/11/18
Utilities Plan	C-3	2	10/11/18
General Notes & Sitework Details	C-4	1	10/11/18
Sitework Details	C-5	0	09/14/18







**ZONING RELIEF**

PORTSMOUTH ZONING BOARD OF ADJUSTMENT ON JUNE 26, 2018 GRANTED:

1. A VARIANCE FROM SECTION 10.44, USE #1.30 TO ALLOW A TWO FAMILY DWELLING ON EACH OF TWO LOTS WHERE A TWO FAMILY DWELLING IS NOT ALLOWED;
2. SECTION 10.521 TO ALLOW A LOT AREA PER DWELLING UNIT FOR LOT 220-87-3 (64 EMERY STREET) OF 10,616± WHERE 15,000 SF IS REQUIRED.

**WAIVERS**

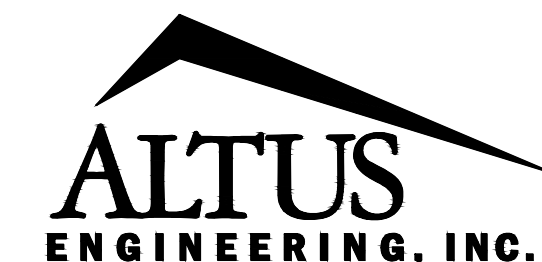
SECTION 2.5.4 2 (E)  
A NOTE SHALL BE PROVIDED ON THE SITE PLAN STATING: "ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS."

- SECTION 2.5.4 3 (C) ACCESS AND CIRCULATION
- SECTION 2.5.4 3 (D) PARKING AND LOADING
- SECTION 2.5.4 3 (J) OUTDOOR LIGHTING
- SECTION 3.4 CURBING (A)  
WHERE ACCESS WAYS AND DRIVEWAYS MEET PUBLIC STREETS
- SECTION 5.2 SIDEWALK AND PEDESTRIAN PATHWAYS
- SECTION 5.3 BICYCLE FACILITIES
- SECTION 6.1 LANDSCAPING AND SCREENING STANDARDS
- SECTION 2.13.3 RECORDING NOTES
- SECTION 2.13.4 LANDSCAPING REQUIREMENTS

**ZONING SUMMARY**

ZONE: SRB (SINGLE RESIDENCE B)

DIMENSIONAL REQUIREMENTS	REQUIRED	PROVIDED	
		ASSESSOR'S PARCEL 220-87-2	ASSESSOR'S PARCEL 220-87-3
MIN. LOT AREA:	15,000 S.F.	32,427 SF	21,232 S.F.
MIN. STREET FRONTAGE:	100'	104'±	100'
MIN. LOT DEPTH:	100'	224'±	146'±
FRONT SETBACK:	30'	125'±	56'±
SIDE SETBACK:	10'	14'±	14'±
REAR SETBACK:	30'	75'±	57'±
MAX. HEIGHT:	35'	<35'	<35'
MAX. BUILDING COVERAGE:	20%	8.2%±	12.5%±
MIN. OPEN SPACE:	40%	71%±	74%±



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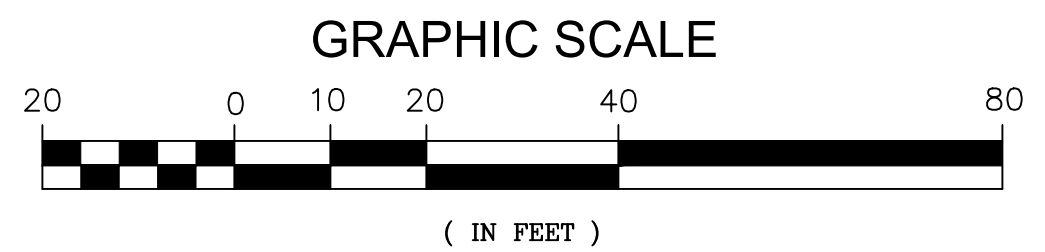
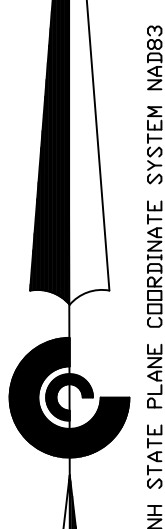
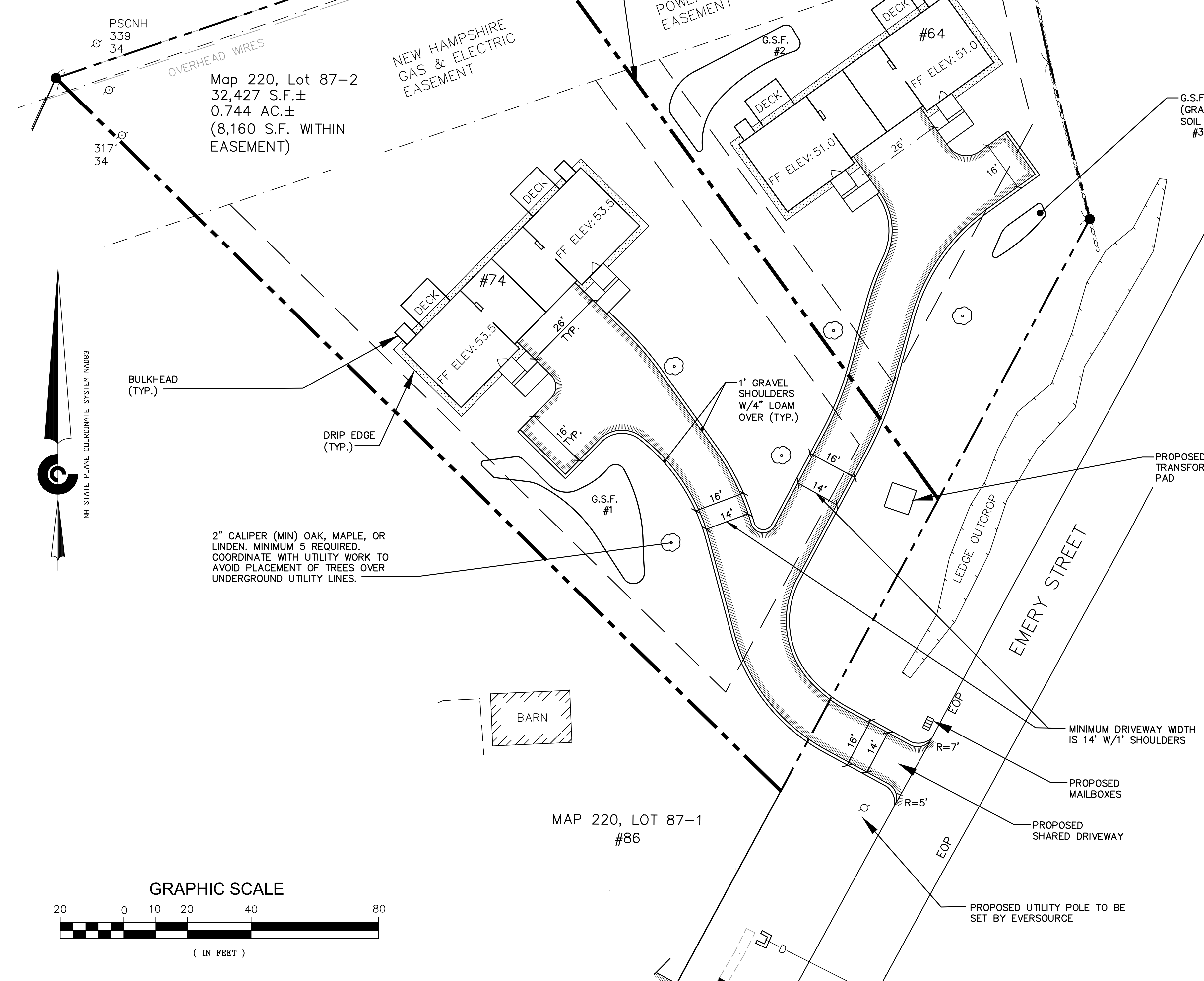
**DWELLING DENSITY PER LOT:**  
LOT 220-87-2: 16,213.5 SF/DWELLING UNIT  
LOT 220-87-3: 10,616 SF/DWELLING UNIT

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN \_\_\_\_\_ DATE \_\_\_\_\_

**SITE NOTES**

1. THE INTENT OF THIS PLAN SET IS TO PROVIDE THE NECESSARY INFORMATION FOR THE REVIEW, PERMITTING AND DEVELOPMENT OF TWO RESIDENTIAL DUPLEXES ON TWO ADJACENT LOTS. THESE PLANS PROVIDE DETAILED INFORMATION FOR THE SITE LAYOUT, GRADING, UTILITIES, STORMWATER MANAGEMENT, AND LANDSCAPE IMPROVEMENTS.
2. DO NOT BEGIN CONSTRUCTION UNTIL ALL STATE, LOCAL AND FEDERAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED. THE LANDOWNER (CITY OF PORTSMOUTH) AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH LOCAL, STATE AND FEDERAL WETLAND PERMITTING REQUIREMENTS INCLUDING PROTECTION OF NATURAL RESOURCES AND THEIR BUFFERS.
3. CONTRACTOR SHALL CALL DIG SAFE AT 1 (800) DIG-SAFE AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO COMMENCING CONSTRUCTION.
4. CONTRACTOR SHALL NOTIFY CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
5. CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY SEDIMENT AND EROSION CONTROL ITEMS TO PREVENT SEDIMENT FROM CONSTRUCTION ACTIVITIES FROM LEAVING THE SITE. CONTROLS SHALL BE INSPECTED ON A REGULAR BASIS AND AFTER ALL RAIN EVENTS OF 0.25 INCHES OR GREATER. ANY DEFICIENCIES IN THE CONTROLS SHALL BE ADDRESSED IMMEDIATELY AND BROUGHT TO THE ATTENTION OF THE OWNER. ALL STORMS DRAINS WITHIN OR ADJACENT TO THE WORK AREA, WITH THE POTENTIAL TO RECEIVE RUNOFF FROM EXPOSED CONSTRUCTION AREAS, SHALL RECEIVE STORM DRAIN INLET PROTECTION.
6. CONTRACTOR SHALL PREVENT TRACKING OF DIRT ONTO ANY PUBLIC OR PRIVATE ROADWAYS. IF TRACKING OF DIRT FROM CONSTRUCTION VEHICLES IS PRESENT ON THE OPEN STREETS, CONTRACTOR WILL BE REQUIRED TO SWEEP THE ROADWAY AT NO ADDITIONAL EXPENSE TO THE OWNER.
7. SEE DETAIL SHEET FOR EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.
8. ALL BONDS AND FEES SHALL BE PAID/POSTED PRIOR TO INITIATING CONSTRUCTION.
9. DRIVEWAY TO BE A MINIMUM OF 16' WIDE WITH 2' SHOULDERS. SHOULDERS SHALL BE PLOWED.
10. ALL CONSTRUCTION SHALL MEET THE MINIMUM CONSTRUCTION STANDARDS OF THE CITY OF PORTSMOUTH & NHDOT'S STANDARD SPECIFICATIONS FOR ROAD & BRIDGE, LATEST EDITION. THE MORE STRINGENT SPECIFICATION SHALL GOVERN.
11. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAWCUT LINE WITH RS-1 IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
12. THE CONTRACTOR SHALL VERIFY ALL BENCHMARKS AND TOPOGRAPHY IN THE FIELD PRIOR TO CONSTRUCTION.
13. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PRIOR TO CONSTRUCTION. ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER FOR RESOLUTION.
14. AREA OF DISTURBANCE IS UNDER 43,560 SF, COVERAGE UNDER EPA NPDES PHASE II CONSTRUCTION GENERAL PERMIT IS NOT REQUIRED.
15. THE CONTRACTOR SHALL VERIFY ALL BUILDING DIMENSIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY AND ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF BOTH THE ARCHITECT AND CIVIL ENGINEER FOR RESOLUTION.
16. ALL DRAINAGE 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 TO THE STORMWATER MANAGEMENT ASPECTS OF THIS DEVELOPMENT SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
17. TRASH AND RECYCLING SHALL BE STORED INSIDE THE HOMES.
18. STREET ADDRESSES FOR EACH UNIT SHALL BE DETERMINED BY FIRE DEPARTMENT & PORTSMOUTH DPW.
19. BICYCLE RACKS WILL NOT BE PROVIDED.
20. PARKING REQUIREMENTS  
EACH UNIT WILL HAVE A SINGLE SPACE IN THE GARAGE AND SPACE STACKED BEHIND THE GARAGE. ONE ADDITIONAL SPACE PER LOT IS PROVIDED FOR A TOTAL OF 10 SPACES FOR 4 RESIDENTIAL UNITS.
21. COMMERCIAL OUTDOOR LIGHTING WILL NOT BE PROVIDED. OUTDOOR LIGHTING WILL BE LIMITED TO BUILDING MOUNTED LIGHTS AT ENTRIES AND POTENTIALLY RESIDENTIAL SCALED LIGHTS ALONG THE DRIVEWAY. ALL LIGHTS WILL BE DARK SKY FRIENDLY.
22. SNOW STORAGE IS NOT DEPICTED ON THE PLANS. IT WILL BE STORED ALONG THE EDGE OF THE DRIVEWAY ON PRIVATE PROPERTY AND IN LOCATIONS AS NOT TO IMPEDE SITE DISTANCE AT THE DRIVEWAY.
23. THERE ARE NO WETLANDS ON THE PROPERTY OR WITHIN 100-FEET OF ANY PROPOSED SITE DISTURBANCES.
24. NO BURNING SHALL BE PERMITTED PER LOCAL REGULATIONS.
25. HAZARDOUS MATERIALS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES SHALL BE ABATED IN STRICT ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL REGULATIONS.
26. SHOULD GROUNDWATER BE ENCOUNTERED DURING SITEWORK EXCAVATION, BEST MANAGEMENT PRACTICES SHALL BE EMPLOYED TO ENSURE SEDIMENT LADEN WATER IS NOT DISCHARGED INTO THE CITY DRAINAGE SYSTEM. CONTRACTOR SHALL USE SILT BAGS OR OTHER APPROVED DPW DEVICES.
27. SALT STORAGE FOR DEICING SHALL BE LOCATED INDOORS.
28. PERIMETER FOUNDATION DRAINS IF PROVIDED MAY REQUIRE PUMPING TO DAYLIGHT.



P4916

**SITE PLAN**

SHEET NUMBER:  
**C - 1**



ISSUED FOR:  
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CHAIRMAN \_\_\_\_\_ DATE \_\_\_\_\_

DRAWN BY: \_\_\_\_\_ RLH  
APPROVED BY: \_\_\_\_\_ EDW  
DRAWING FILE: 4916 SITE.DWG

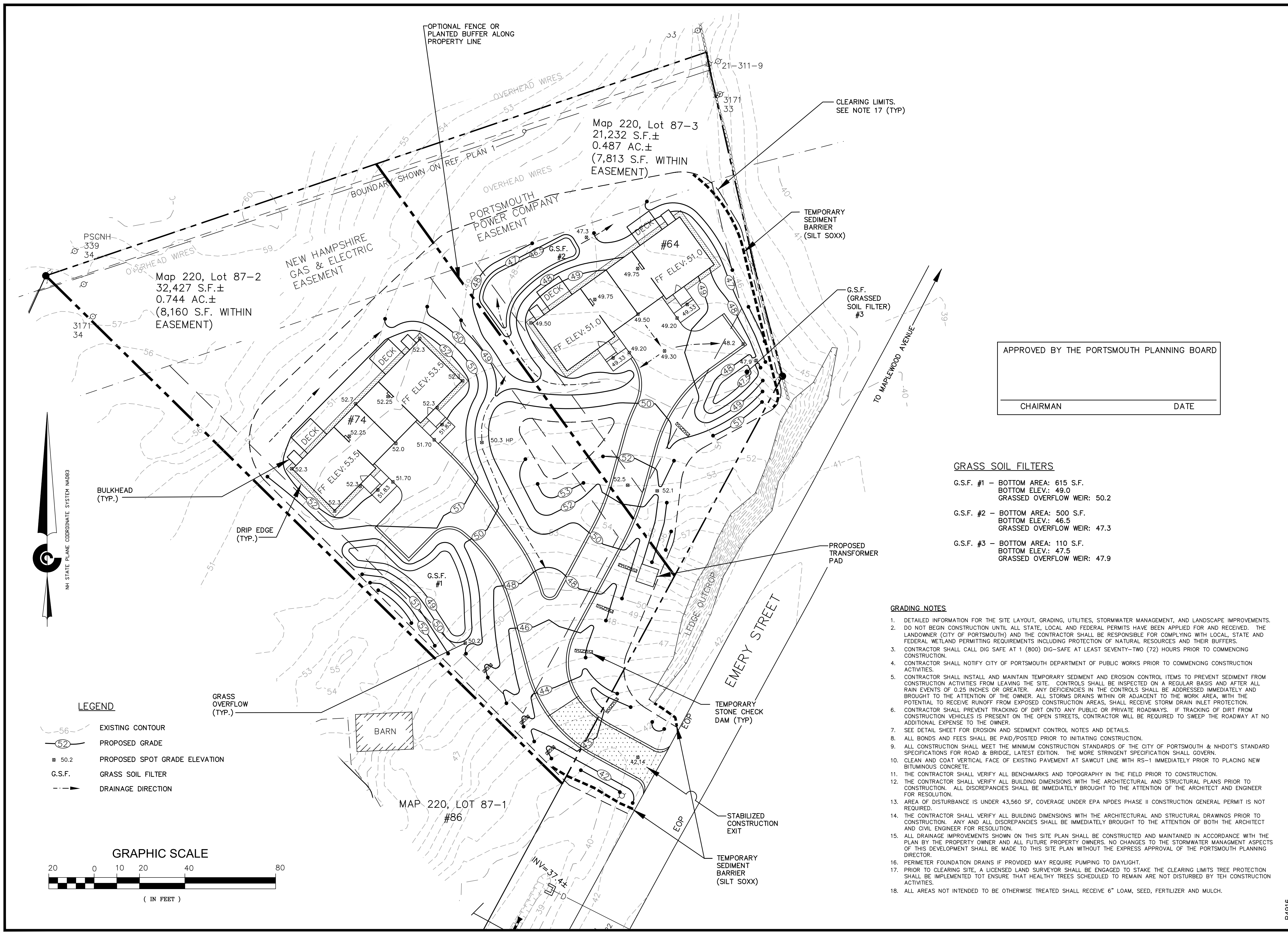
SCALE:  
11"x17": 1" = 40'  
22"x 34": 1" = 20'

APPLICANT/OWNER:  
**HAPPY MOUNTAIN HOLDINGS, LLC**  
  
901 N. MARKET STREET  
SUITE 705  
WILMINGTON, DE 19801

PROJECT:  
**RESIDENTIAL DEVELOPMENT**  
**ASSESSOR'S PARCEL 220-87-2**  
**74 EMERY STREET**  
**&**  
**ASSESSOR'S PARCEL 220-87-3**  
**64 EMERY STREET**  
  
**PORTSMOUTH, NEW HAMPSHIRE**

TITLE:  
**GRADING PLAN**

SHEET NUMBER:  
**C - 2**



**GRASS SOIL FILTERS**

- G.S.F. #1 - BOTTOM AREA: 615 S.F.  
BOTTOM ELEV.: 49.0  
GRASSED OVERFLOW WEIR: 50.2
- G.S.F. #2 - BOTTOM AREA: 500 S.F.  
BOTTOM ELEV.: 46.5  
GRASSED OVERFLOW WEIR: 47.3
- G.S.F. #3 - BOTTOM AREA: 110 S.F.  
BOTTOM ELEV.: 47.5  
GRASSED OVERFLOW WEIR: 47.9

**GRADING NOTES**

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16. PERIMETER FOUNDATION DRAINS IF PROVIDED MAY REQUIRE PUMPING TO DAYLIGHT.
17. PRIOR TO CLEARING SITE, A LICENSED LAND SURVEYOR SHALL BE ENGAGED TO STAKE THE CLEARING LIMITS TREE PROTECTION SHALL BE IMPLEMENTED TO ENSURE THAT HEALTHY TREES SCHEDULED TO REMAIN ARE NOT DISTURBED BY THE CONSTRUCTION ACTIVITIES.
18. ALL AREAS NOT INTENDED TO BE OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER AND MULCH.



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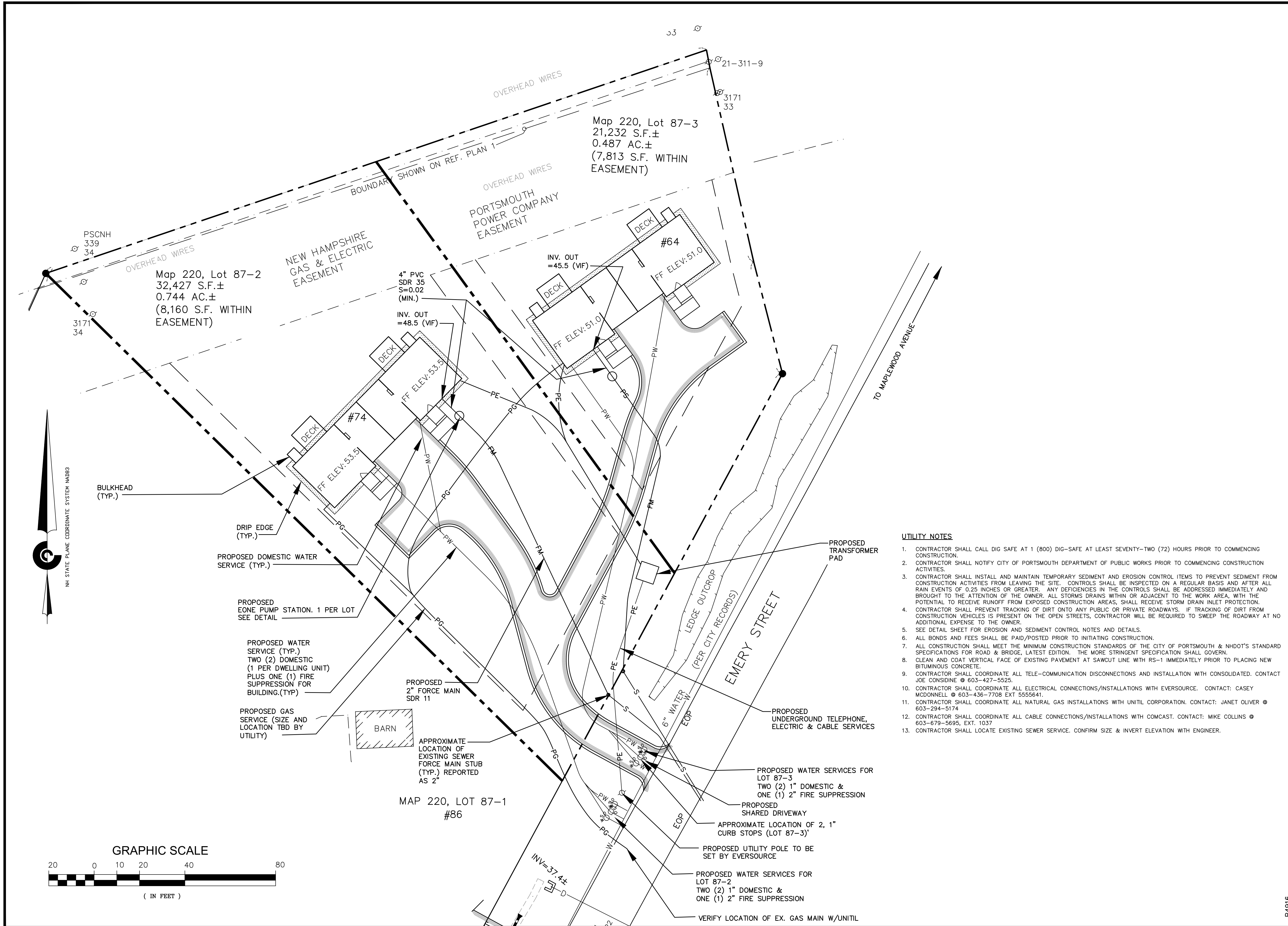
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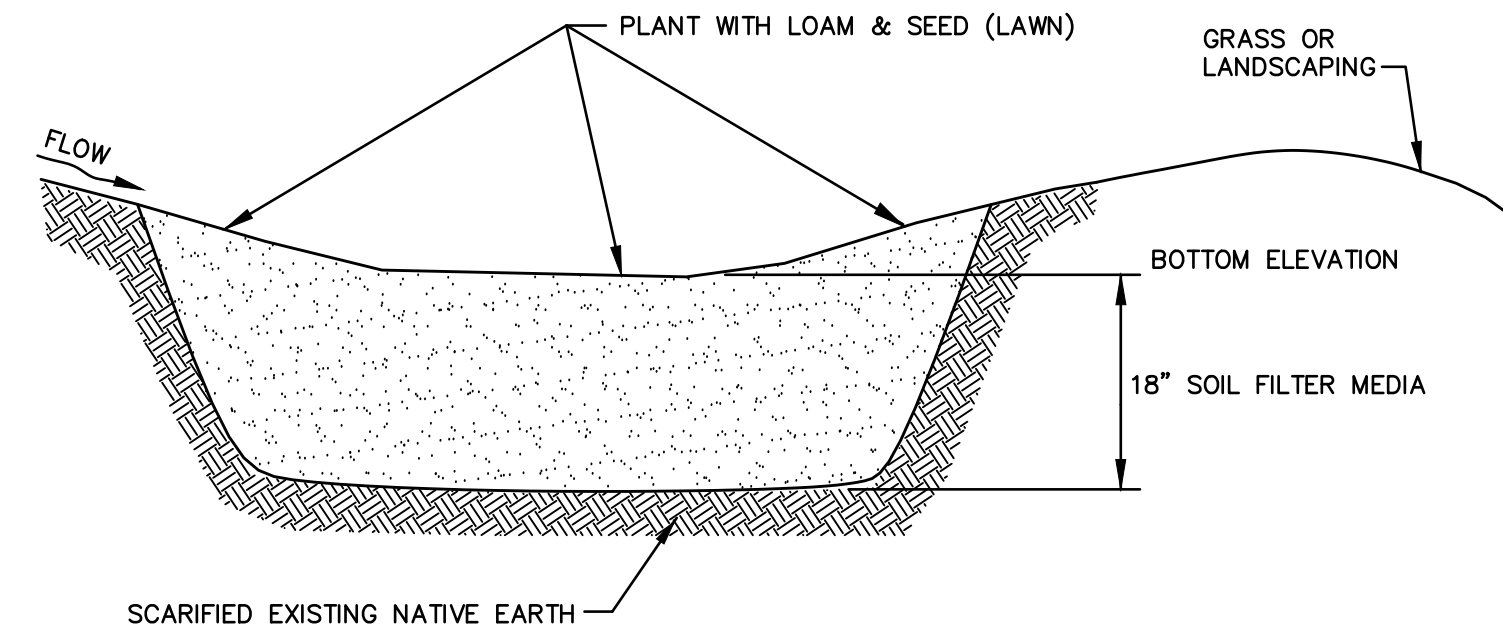
TITLE:  
**UTILITIES PLAN**

SHEET NUMBER:  
**C - 3**



P4916





**NOTES**

- CONTRACTOR SHALL EXCAVATE THE POND AREA TO SUBGRADE AND DESIGN ENGINEER SHALL PERFORM SUBSURFACE EVALUATION PRIOR TO THE PLACEMENT OF ANY SELECT MATERIAL OR OTHER BACKFILL.
- SOIL FILTER MEDIA SHALL BE PER THE DESIGN FILTER MIXTURE. IF AN ALTERNATIVE MIXTURE IS PROPOSED, IT SHALL BE APPROVED BY THE DESIGN ENGINEER.
- DO NOT PLACE THE POND INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
- DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO THE POND AREA DURING ANY STAGE OF CONSTRUCTION.
- DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

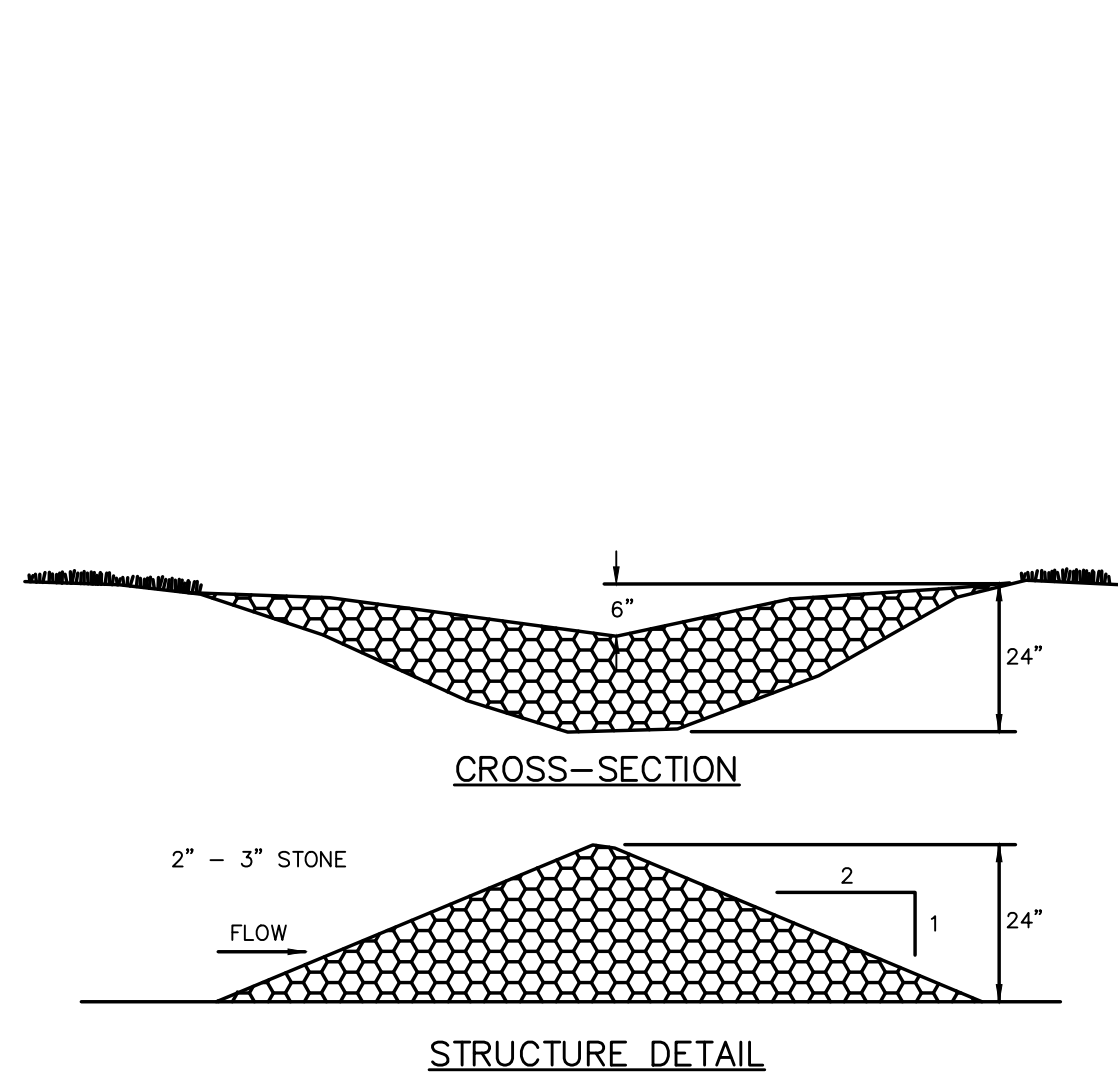
**MAINTENANCE REQUIREMENTS**

- PONDS SHOULD BE INSPECTED ANNUALLY, AND FOLLOWING ANY RAINFALL EXCEEDING 2.5 INCHES IN A 24-HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
- AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF POND DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
- VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING, PRUNING, REMOVAL, AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

FILTER MEDIA MIXTURES			
Component Material	Percent of Mixture by Volume	Gradation of material	
		Sieve No.	Percent by Weight Passing Standard Sieve
<b>Filter Media</b>			
ASTM C-33 concrete sand	30		
Loamy sand topsoil, with fines as indicated	70	200	15 to 25

**GRASS SOIL FILTER**

NOT TO SCALE



**SPACING BETWEEN STRUCTURES**

- L = DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION
- CHECK DAM SHALL BE CONSTRUCTED OF 2" TO 3" STONE WITH COMPLETE COVERAGE OF DITCH OR SWALE TO INSURE THAT THE CENTER OF THE STRUCTURE IS LOWER THAN THE EDGES.

**MAINTENANCE**

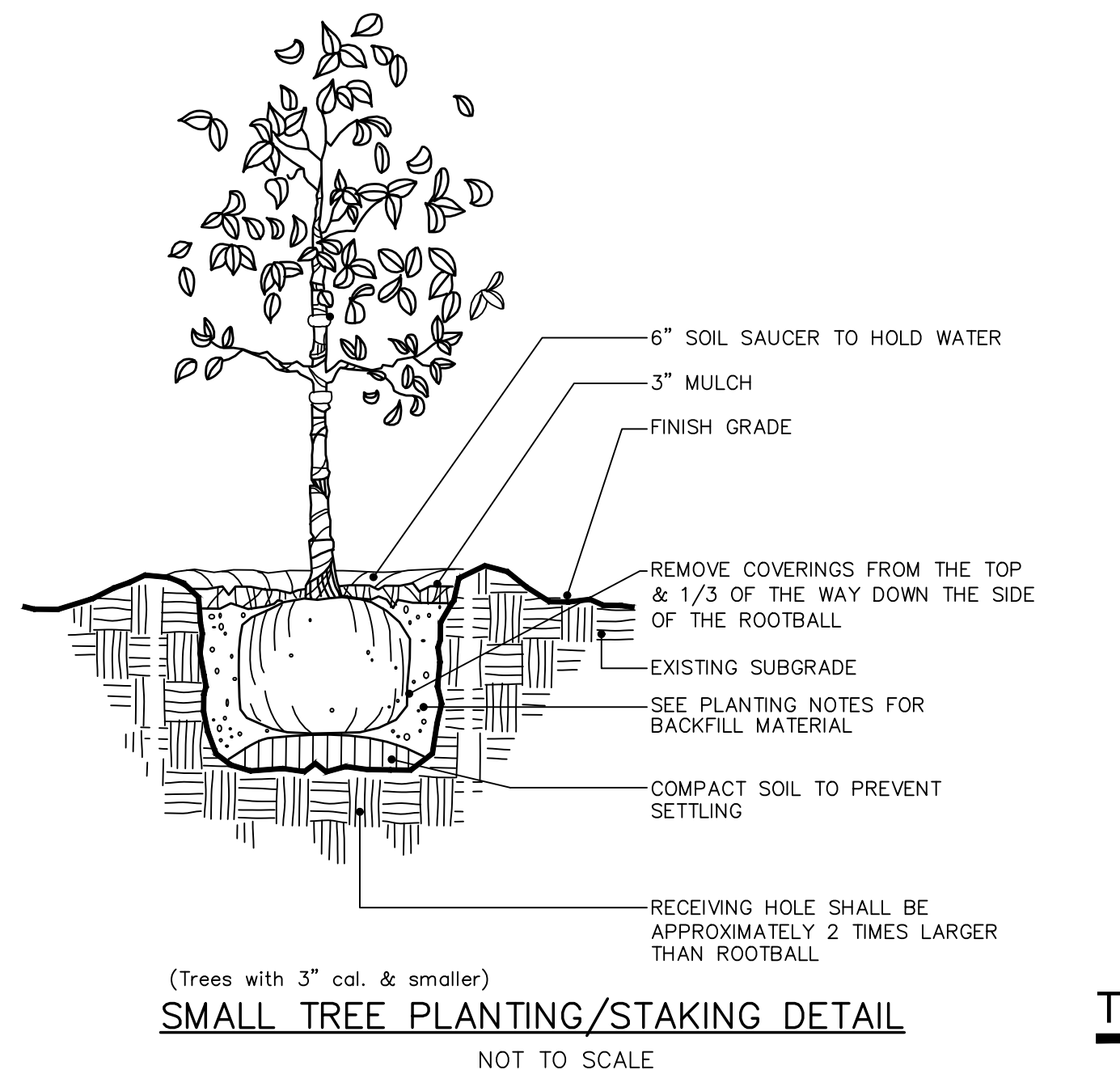
TEMPORARY GRADE STABILIZATION STRUCTURES SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED STORMS. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY. PARTICULAR ATTENTION SHOULD BE GIVEN TO END RUN AND EROSION AT THE DOWNSTREAM TOE OF THE STRUCTURE. WHEN THE STRUCTURES ARE REMOVED, THE DISTURBED PORTION SHOULD BE BROUGHT TO THE EXISTING CHANNEL GRADE AND THE AREAS PREPARED, SEEDED, AND MULCHED. WHILE THIS PRACTICE IS NOT INTENDED TO BE USED PRIMARILY FOR SEDIMENT TRAPPING, SOME SEDIMENT WILL ACCUMULATE BEHIND THE STRUCTURES. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE.

**CONSTRUCTION SPECIFICATIONS**

- STRUCTURES SHALL BE INSTALLED ACCORDING TO THE DIMENSIONS SHOWN ON THE PLANS AT THE APPROPRIATE SPACING.
- CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER SO THAT EROSION AND AIR AND WATER POLLUTION WILL BE MINIMIZED.
- SEEDING, FERTILIZING, AND MULCHING SHALL CONFORM TO THE RECOMMENDATIONS IN THE APPROPRIATE VEGETATIVE BMP.
- STRUCTURES SHALL BE REMOVED FROM THE CHANNEL WHEN THEIR USEFUL LIFE HAS BEEN COMPLETED.

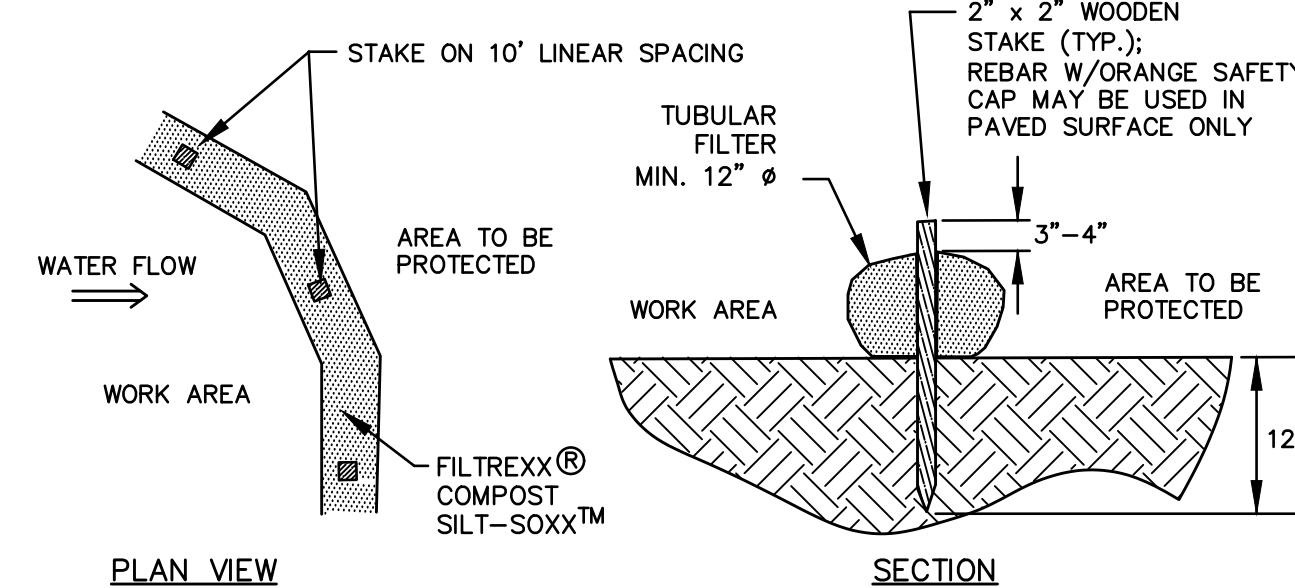
**STONE CHECK DAM**

NOT TO SCALE



**SMALL TREE PLANTING/STAKING DETAIL**

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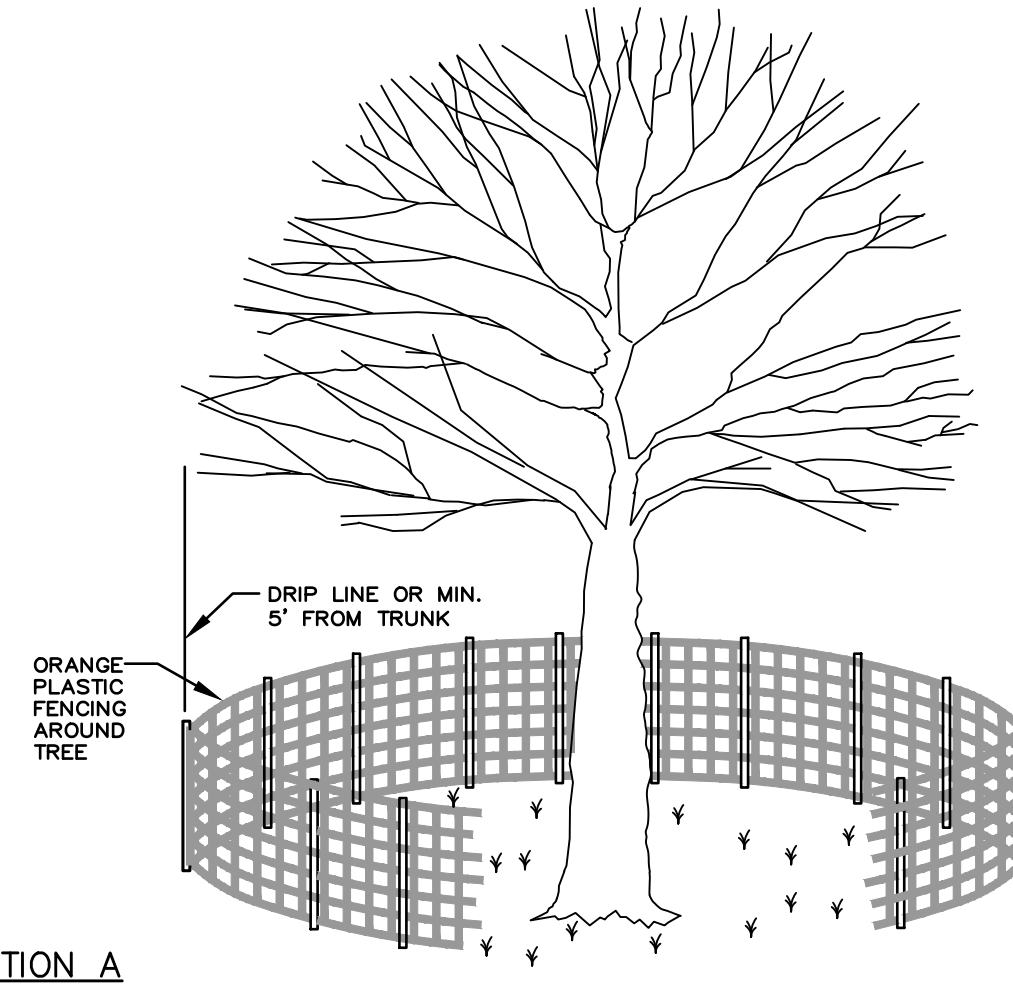


**NOTES:**

- SILT/SOXX OR APPROVED EQUAL SHALL BE USED FOR TUBULAR SEDIMENT BARRIERS.
- ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS.
- COMPOST/SOIL/ROCK/SEED FILL MATERIAL SHALL BE ADJUSTED AS NECESSARY TO MEET THE REQUIREMENTS OF THE SPECIFIC APPLICATION.
- ALL SEDIMENT TRAPPED BY BARRIER SHALL BE DISPOSED OF PROPERLY.
- STUMPS GRINDINGS MAY BE SUBSTITUTED W/PRIOR APPROVAL FROM ENGINEER.

**SILT SOXX BARRIER**

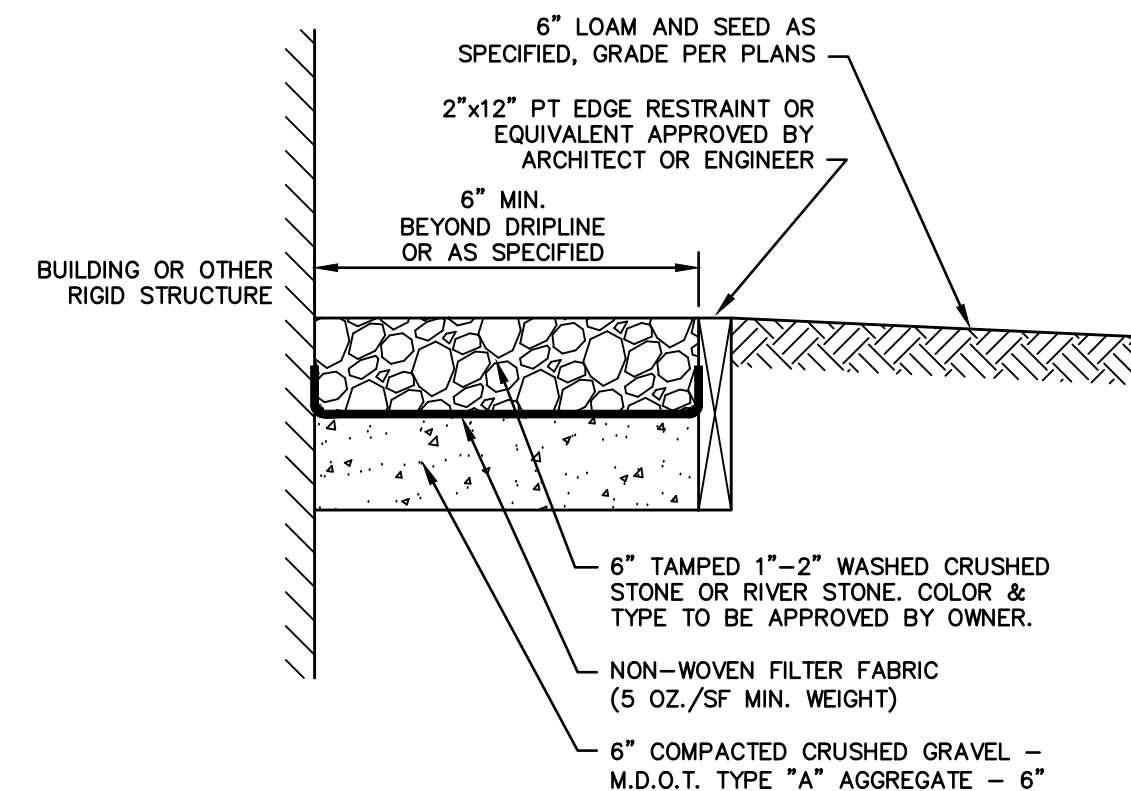
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**OPTION A**

**TREE PROTECTION DETAILS**

NOT TO SCALE

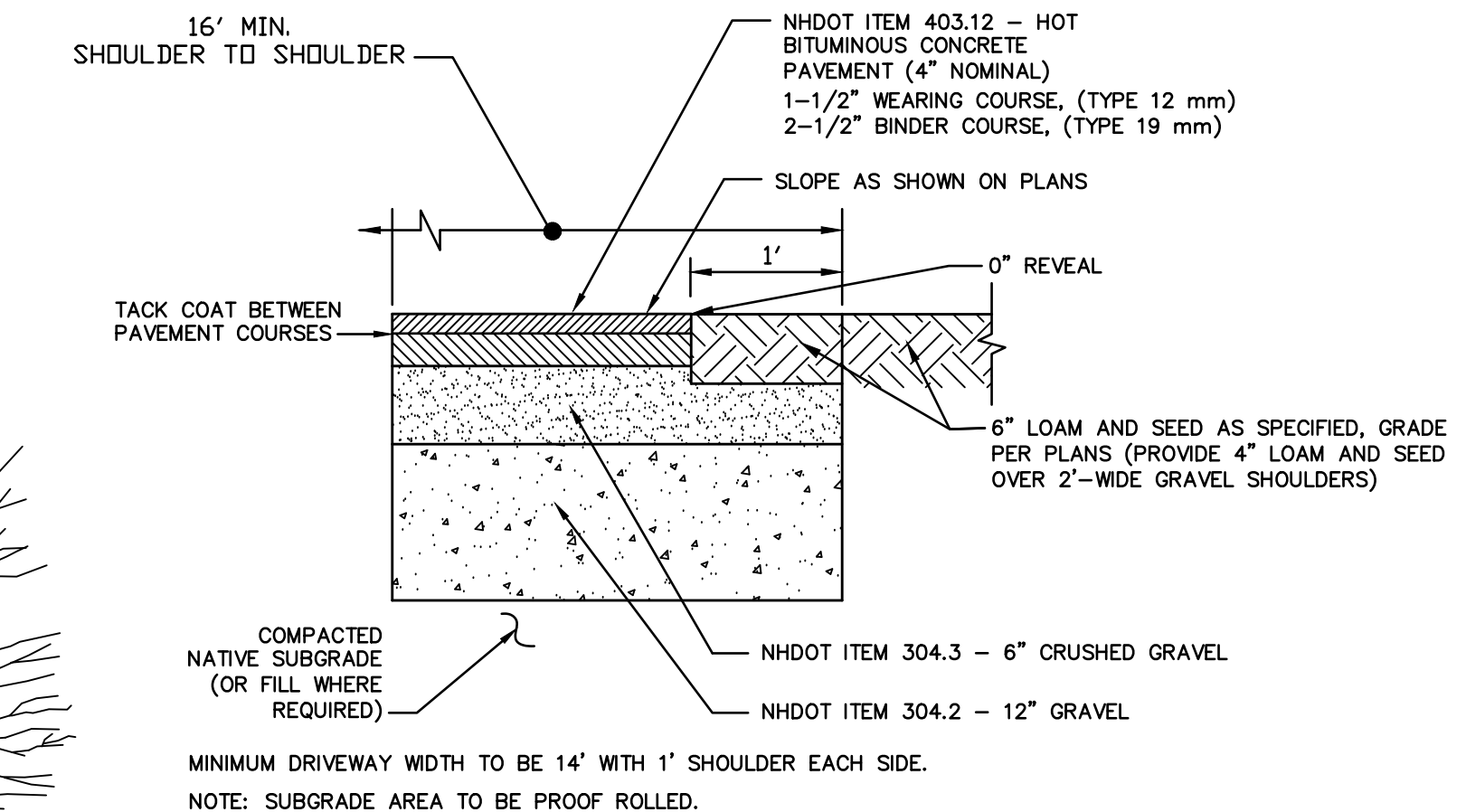


**STONE DRIP EDGE**

NOT TO SCALE

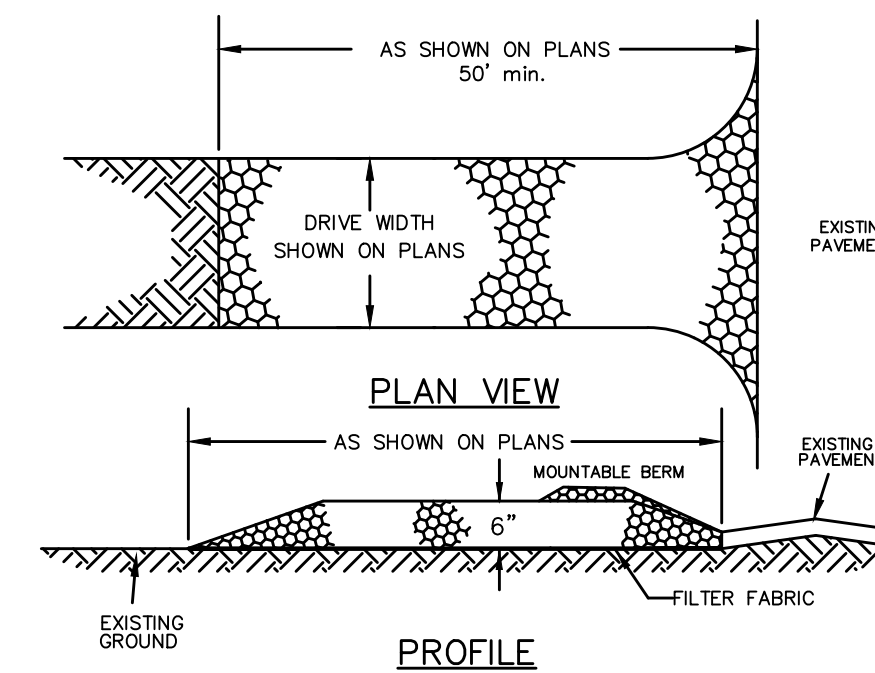
**GRADING & DRAINAGE NOTES**

- UNLESS OTHERWISE AGREED IN WRITING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING TEMPORARY BENCHMARKS (TBMS) AND PERFORMING ALL CONSTRUCTION SURVEY LAYOUT.
- DEWATERING ACTIVITIES SHALL BE DONE IN ACCORDANCE WITH EPA AND NHDES REGULATIONS.
- PROTECTION OF SUBGRADE: THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN STABLE, DEWATERED SUBGRADES FOR FOUNDATIONS, PAVEMENT AREAS, UTILITY TRENCHES, AND OTHER AREAS DURING CONSTRUCTION. SUBGRADE DISTURBANCE MAY BE INFLUENCED BY EXCAVATION METHODS, MOISTURE, PRECIPITATION, GROUNDWATER CONTROL, AND CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT SUBGRADE DISTURBANCE. SUCH PRECAUTIONS MAY INCLUDE DIVERTING STORMWATER RUNOFF AWAY FROM CONSTRUCTION AREAS, REDUCING TRAFFIC IN SENSITIVE AREAS, AND MAINTAINING AN EFFECTIVE DEWATERING PROGRAM. SOILS EXHIBITING HEAVING OR INSTABILITY SHALL BE OVER EXCAVATED TO MORE COMPETENT BEARING SOIL AND REPLACED WITH FREE DRAINING STRUCTURAL FILL. IF THE EARTHWORK IS PERFORMED DURING FREEZING WEATHER, EXPOSED SUBGRADES ARE SUSCEPTIBLE TO FROST. NO FILL OR UTILITIES SHALL BE PLACED ON FROZEN GROUND. THIS WILL LIKELY REQUIRE REMOVAL OF A FROZEN SOIL CRUST AT THE COMMENCEMENT OF EACH DAY'S OPERATIONS. THE FINAL SUBGRADE ELEVATION WOULD ALSO REQUIRE AN APPROPRIATE DEGREE OF INSULATION AGAINST FREEZING.
- IF SUITABLE, EXCAVATED MATERIALS SHALL BE PLACED AS FILL WITHIN UPLAND AREAS ONLY AND SHALL NOT BE PLACED WITHIN WETLANDS. PLACEMENT OF BORROW MATERIALS SHALL BE PERFORMED IN A MANNER THAT PREVENTS LONG TERM DIFFERENTIAL SETTLEMENT. EXCESSIVELY WET MATERIALS SHALL BE STOCKPILED AND ALLOWED TO DRAIN BEFORE PLACEMENT. FROZEN MATERIAL SHALL NOT BE USED FOR CONSTRUCTION.
- ALL DRAINAGE PIPE SHALL BE ADS N-12 OR EQUAL APPROVED BY THE ENGINEER.
- ALL SPOT GRADES ARE AT FINISH GRADE AND BOTTOM OF CURB WHERE APPLICABLE.
- UNLESS OTHERWISE SPECIFIED, ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE A MINIMUM OF SIX (6") INCHES OF LOAM, LIMESTONE, FERTILIZER, SEED, AND HAY MULCH USING APPROPRIATE SOIL STABILIZATION TECHNIQUES. SEE DETAILS FOR ADDITIONAL INFORMATION.
- IN ORDER TO PROVIDE VISUAL CLARITY ON THE PLANS, DRAINAGE AND OTHER UTILITY STRUCTURES MAY NOT BE DRAWN TO SCALE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SIZING AND LOCATION OF ALL STRUCTURES AND IS DIRECTED TO RESOLVE ANY POTENTIAL DISCREPANCY WITH THE ENGINEER PRIOR TO CONSTRUCTION.



**PAVEMENT CROSS SECTION**

NOT TO SCALE

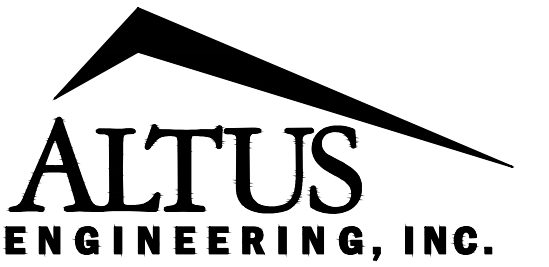


**CONSTRUCTION SPECIFICATIONS**

- STONE SIZE - NHDOT STANDARD STONE SIZE #4 - SECTION 703 OF NHDOT STANDARD.
- LENGTH - DETAILED ON PLANS (50 FOOT MINIMUM).
- THICKNESS - SIX (6) INCHES (MINIMUM).
- WIDTH - FULL DRIVE WIDTH UNLESS OTHERWISE SPECIFIED.
- FILTER FABRIC - MIRAFI 600X OR EQUAL APPROVED BY ENGINEER.
- SURFACE WATER CONTROL - ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
- MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
- WHEELS SHALL BE CLEANED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
- STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AT ALL ENTRANCES TO PUBLIC RIGHTS-OF-WAY, AT LOCATIONS SHOWN ON THE PLANS, AND/OR WHERE AS DIRECTED BY THE ENGINEER.

**STABILIZED CONSTRUCTION EXIT**

NOT TO SCALE



133 COURT STREET PORTSMOUTH, NH 03801  
(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR:  
**PLANNING BOARD APPROVAL**

ISSUE DATE:  
**OCTOBER 11, 2018**

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	09/14/18
1	PB APPROVAL	EDW	10/11/18

DRAWN BY: RLH  
APPROVED BY: EDW  
DRAWING FILE: 4916 DETAILS.DWG

SCALE:  
**22"x 34": N.T.S.**

APPLICANT/OWNER:  
**HAPPY MOUNTAIN HOLDINGS, LLC**  
**901 N. MARKET STREET SUITE 705 WILMINGTON, DE 19801**

PROJECT:  
**RESIDENTIAL DEVELOPMENT**  
**ASSESSOR'S PARCEL 220-87-2**  
**74 EMERY STREET**  
**&**  
**ASSESSOR'S PARCEL 220-87-3**  
**64 EMERY STREET**  
**PORTSMOUTH, NEW HAMPSHIRE**

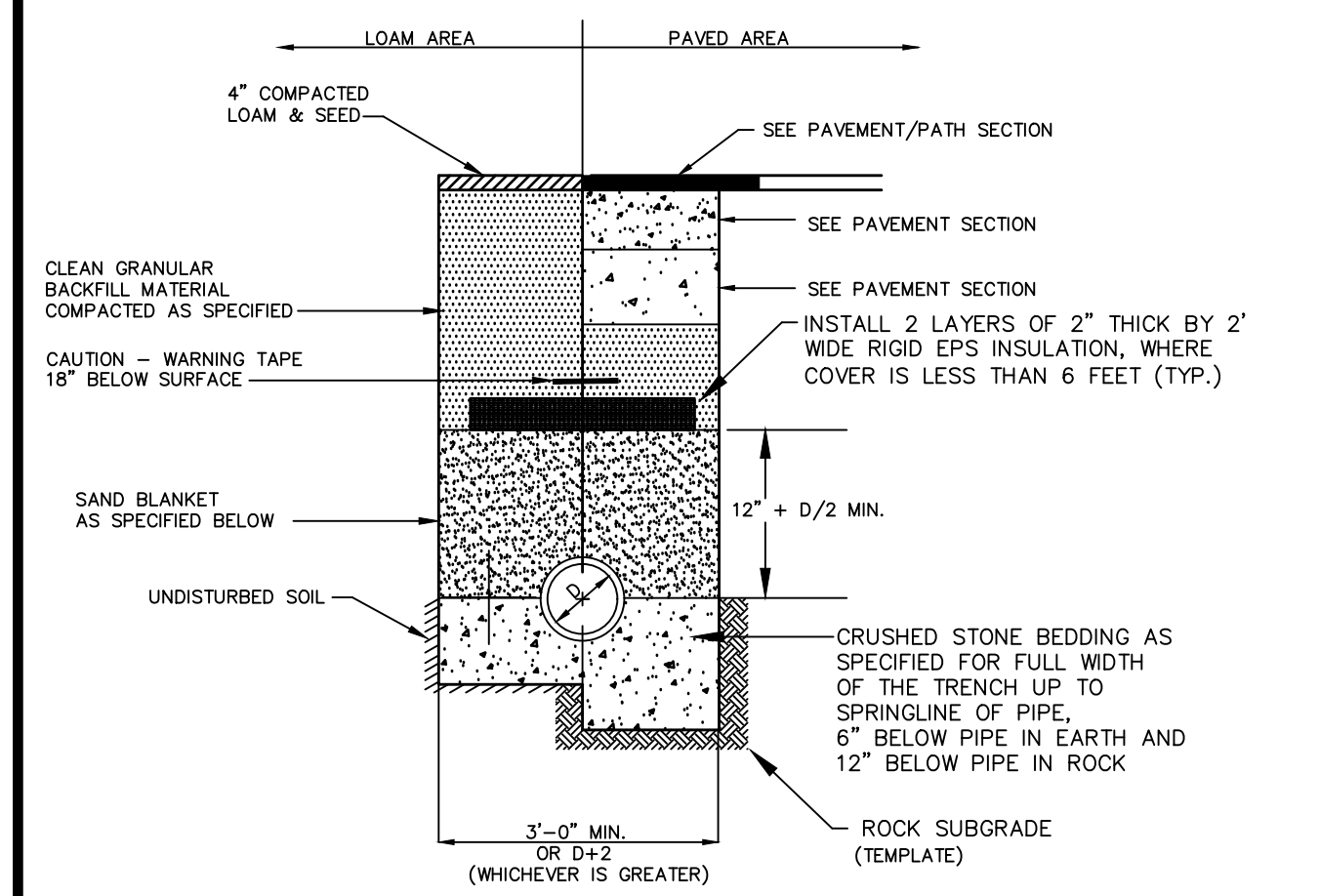
TITLE:  
**GENERAL NOTES & SITEWORK DETAILS**

SHEET NUMBER:

**C - 4**

P-4916





BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.

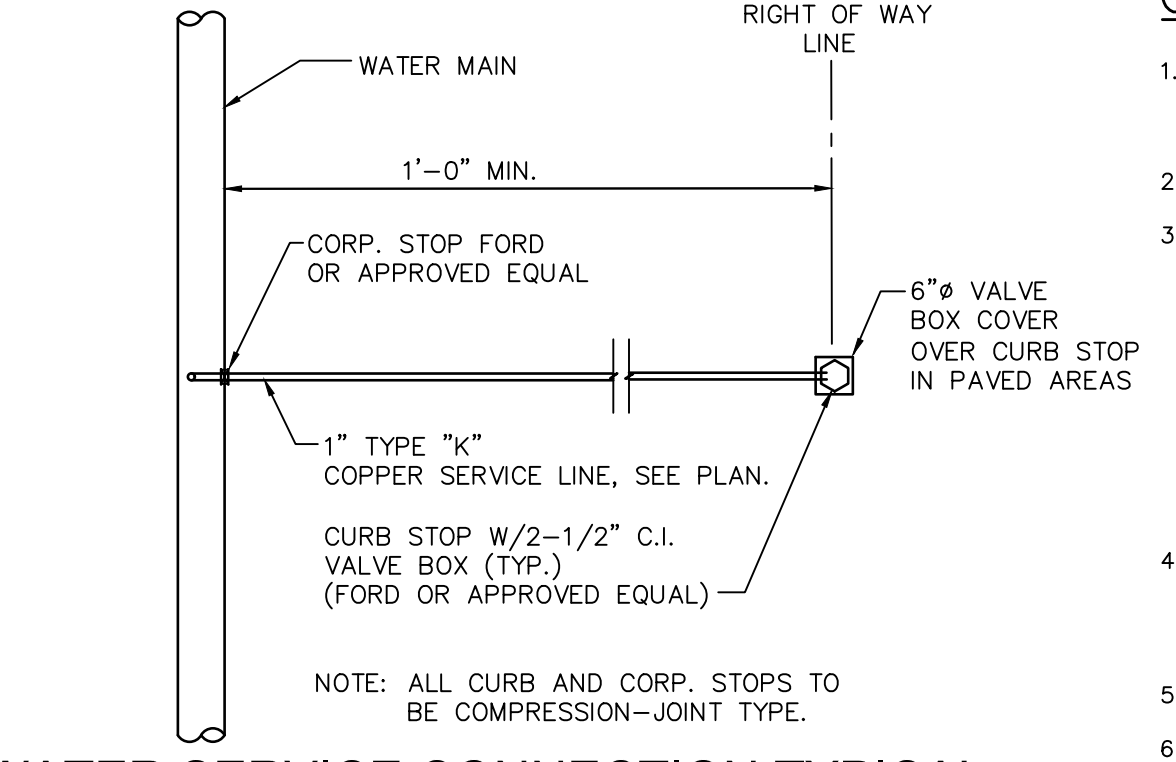
SAND BLANKET		CRUSHED STONE BEDDING *	
SIEVE SIZE	% FINER BY WEIGHT	SIEVE SIZE	% PASSING BY WEIGHT
1/2"	90 - 100	1"	100
200	0 - 15	3/4"	90 - 100
		3/8"	20 - 55
		# 4	0 - 10
		# 8	0 - 5

\* EQUIVALENT TO STANDARD STONE SIZE #67 - SECTION 703 OF NHDOT STANDARD SPECIFICATIONS

**SEWER TRENCH SECTION** NOT TO SCALE

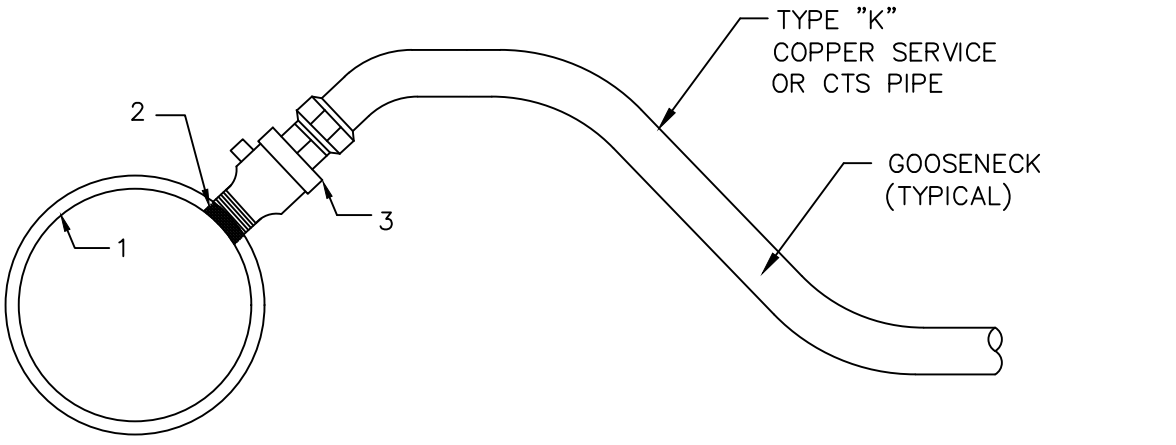
**STANDARD TRENCH NOTES:**

- ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE; BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN OF THE DRAWING.
- BEDDINGS: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM CLAY, LOAM, ORGANIC MATTER AND MEETING ASTM D333, STONE SIZE NO. 67.
  - 100% PASSING 1 INCH SCREEN
  - 90 - 100% PASSING 3/4 INCH SCREEN
  - 20 - 55% PASSING 3/8 INCH SCREEN
  - 0-10% PASSING #4 SIEVE
  - 0-5% PASSING #8 SIEVE
 WHERE ORDERED BY THE ENGINEER TO STABILIZE THE BASE, SCREENED GRAVEL OR CRUSHED STONE 1-1/2 INCH TO 1/2 INCH SHALL BE USED.
- SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90 - 100% PASSES 1/2 INCH SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE. BLANKET MAY BE OMITTED FOR CAST-IRON, DUCTILE IRON, AND REINFORCED CONCRETE PIPE PROVIDED HOWEVER, THAT NO STONE LARGER THAN 2" IS IN CONTACT WITH THE PIPE.
- 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; 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.
- 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.
- SHEETING, 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 WIDTH TO A PLANE 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 15 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.) ALSO, W SHALL BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE.
- FOR CROSS COUNTRY CONSTRUCTION, BACKFILL OR FILL SHALL BE MOUND TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
- CONCRETE FOR ENCASEMENT SHALL CONFORM TO THE NEW HAMPSHIRE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS STANDARD SPECIFICATION REQUIREMENTS FOR CLASS A (3000#) CONCRETE AS FOLLOWS:
  - CEMENT: 6.0 BAGS PER CUBIC YARD
  - WATER: 5.75 GALLONS PER BAG CEMENT
  - MAXIMUM SIZE OF AGGREGATE: 1 INCH
  - CONCRETE ENCASEMENT IS NOT ALLOWED FOR PVC PIPE.
- 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.
- NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES DESIGN STANDARDS REQUIRE TEN FEET (10') SEPARATION BETWEEN WATER AND SEWER. REFER TO CITY'S STANDARD SPECIFICATIONS FOR METHODS OF PROTECTION IN AREAS THAT CANNOT MEET THESE REQUIREMENTS.



**WATER SERVICE CONNECTION TYPICAL**

- NOTES:
- REPORTED 6"
  - REPORTED 6" x 1" OR 2" TAP. (PER PLANS)
  - CORPORATION STOP, FORD OR APPROVED EQUAL TO BE INSTALLED.

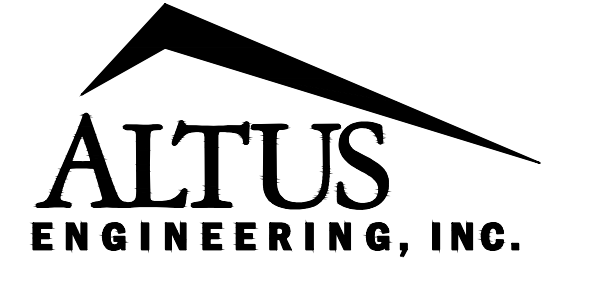


**SERVICE TO MAIN CONNECTION DETAIL**

NOT TO SCALE

**GRADING & DRAINAGE NOTES**

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133 COURT STREET PORTSMOUTH, NH 03801  
(603) 433-2335 www.ALTUS-ENG.com

ISSUED FOR:  
**PLANNING BOARD APPROVAL**

ISSUE DATE:  
**SEPTEMBER 14, 2018**

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	09/14/18

DRAWN BY: \_\_\_\_\_ RLH  
APPROVED BY: \_\_\_\_\_ EDW  
DRAWING FILE: \_\_\_\_\_ 4916 DETAILS.DWG

SCALE:  
**22" x 34": N.T.S.**

APPLICANT/OWNER:  
**HAPPY MOUNTAIN HOLDINGS, LLC**  
  
901 N. MARKET STREET  
SUITE 705  
WILMINGTON, DE 19801

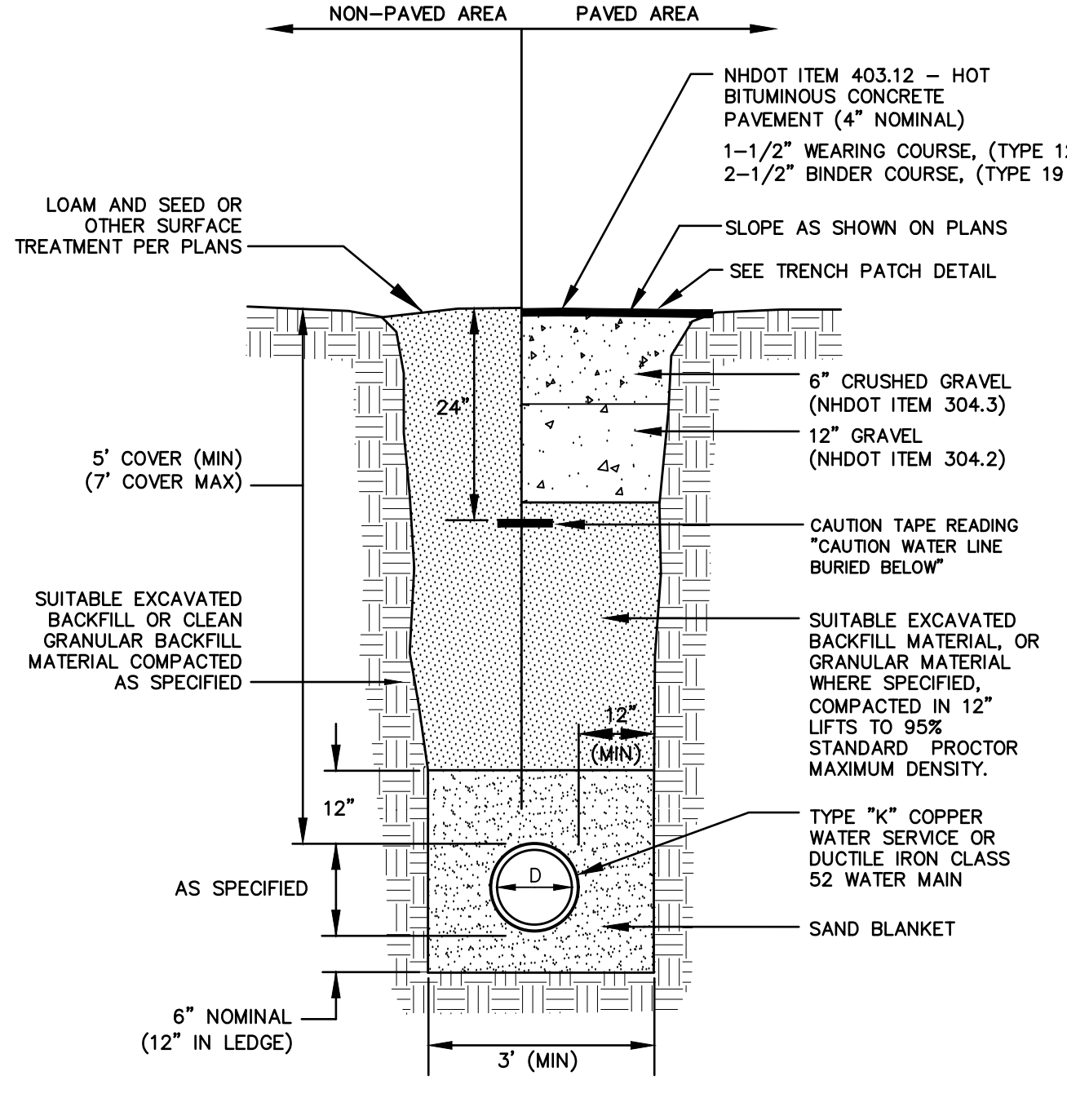
PROJECT:  
**RESIDENTIAL DEVELOPMENT**  
**ASSESSOR'S PARCEL 220-87-2**  
**74 EMERY STREET**  
**&**  
**ASSESSOR'S PARCEL 220-87-3**  
**64 EMERY STREET**  
**PORTSMOUTH, NEW HAMPSHIRE**

TITLE:

**SITWORK DETAILS**

SHEET NUMBER:

**C - 5**



SAND BLANKET/BARRIER	
SIEVE SIZE	% FINER BY WEIGHT
1/2"	90 - 100
200	0 - 15

- NOTES:
- BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
  - WATER MAINS SHALL BE POLY WRAPPED.
  - WATER MAINS SHALL HAVE 3 WEDGES PER JOINT.

**WATER MAIN TRENCH** NOT TO SCALE

## DH071/DR071

**General Features**  
The model DH071 or DR071 grinder pump station is a complete unit that includes: the grinder pump, check valve, HDPE (high density polyethylene) tank controls, and alarm panel. A single DH071 or DR071 is a popular choice for one, average single-family home and can also be used for up to two average single-family homes where codes allow and with consent of the factory.

- Rated for flows of 700 gpd (2650 lpd)
- 70 gallons (265 liters) of capacity
- Indoor or outdoor installation
- Standard outdoor heights range from 61 inches to 160 inches

The DH071 is the "hardwired" or "wired" model where a cable connects the motor controls to the level controls through watertight penetrations. The DR071 is the "radio frequency identification" (RFID) or "wireless" model that uses wireless technology to communicate between the level controls and the motor controls.

**Operational Information**  
**Motor**  
1 hp, 1,725 rpm, high torque, capacitor start, thermally protected, 120/240V, 60 Hz, 1 phase

**Inlet Connections**  
4-inch inlet grommet standard for DWV pipe. Other inlet configurations available from the factory.

**Discharge Connections**  
Pump discharge terminates in 1.25-inch NPT female thread. Can easily be adapted to 1.25-inch PVC pipe or any other material required by local codes.

**Discharge**  
15 gpm at 0 psig (0.95 lps at 0 m)  
11 gpm at 40 psig (0.80 lps at 28 m)  
7.8 gpm at 80 psig (0.49 lps at 56 m)

**Accessories**  
E/One requires that the Uni-Lateral, E/One's own stainless steel check valve, be installed between the grinder pump station and the street main for added protection against backflow.

Alarm panels are available with a variety of options, from basic monitoring to advanced notice of service requirements.

The Remote Sentry is ideal for installations where the alarm panel may be hidden from view.

Patent Numbers: 5,752,315  
5,662,254 5,439,180

NA0050P01 Rev C

**OPTIONS:**  DH071 (HARD WIRED LEVEL CONTROLS)  DR071 (WIRELESS LEVEL CONTROLS)

**General Features:**  
- GASKETED LID, HDPE  
- STRAIN RELIEF CORD CONNECTOR  
- PROTECTIVE CABLE SHROUD (HDPE)  
- POWER/ALARM CABLE 12-6 W/GND.  
- E/ONE EQUALIZER  
- INTERNAL WELL VENT 2.0" DIA.  
- INLET GROMMET TO ACCEPT 4.50" O.D. PVC PIPE (STANDARD). DUST COVER SUPPLIED FOR SHIPMENT (NOT SUITABLE FOR BURIAL).  
- ALARM  
- ON/OFF  
- 18 in 447 mm  
- 47 gal 179 L  
- 32 gal 121 L  
- 29.5 DIA in 749 mm  
- 14 in 345 mm  
- 24 gal 91 L

**Dimensions:**  
- 41.6 in 1057 mm TO DISCHARGE  
- 1-1/4" DISCHARGE LINE (304 S.S.)  
- CHECK VALVE (NORYL)  
- ANTI-SIPHON VALVE (NORYL)  
- 1-1/4" DISCHARGE TO INLET  
- 36.0 in 914 mm  
- 28 in 650 mm  
- 14 in 345 mm  
- 24 gal 91 L

**Other Labels:**  
- ELECTRICAL QUICK DISCONNECT NEMA 6P (EGD)  
- QUICK DISCONNECT ASSY. (304 S.S.)  
- S.S. CAST BALL VALVE  
- DISCHARGE 1-1/4" FPT  
- 1-1/4" DISCHARGE LINE (304 S.S.)  
- GASKETED LID, HDPE  
- STRAIN RELIEF CORD CONNECTOR  
- PROTECTIVE CABLE SHROUD (HDPE)  
- POWER/ALARM CABLE 12-6 W/GND.  
- E/ONE EQUALIZER  
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- ALARM  
- ON/OFF  
- 18 in 447 mm  
- 47 gal 179 L  
- 32 gal 121 L  
- 29.5 DIA in 749 mm  
- 14 in 345 mm  
- 24 gal 91 L

**UL NSF SE**

CONCRETE BALLAST MAY BE REQUIRED SEE INSTALLATION INSTRUCTION FOR DETAILS.

NOTE: DIMENSIONS ARE FOR REF ONLY

NA0050P02

**SEWER PUMP STATION (E-ONE) DETAILS** NOT TO SCALE

**STAINLESS STEEL LATERAL KIT**  
**- 1 1/4" SDR 11 HDPE PIPE**

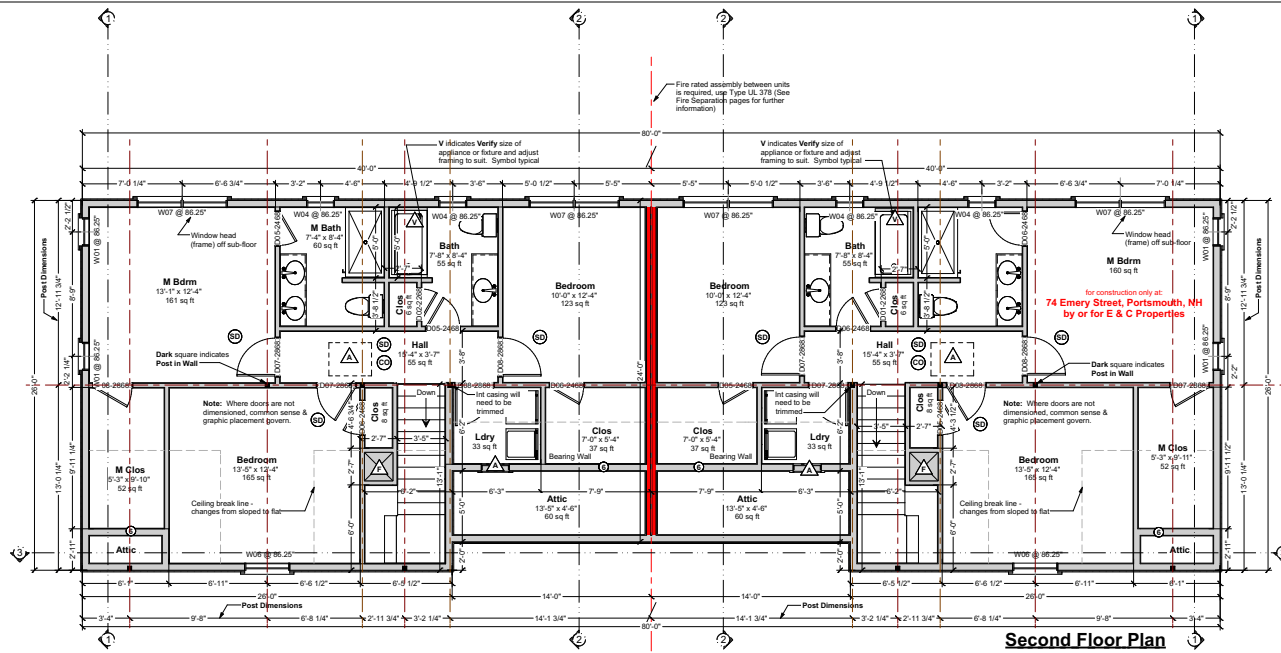
NOT TO SCALE

P-4916









Second Floor Plan

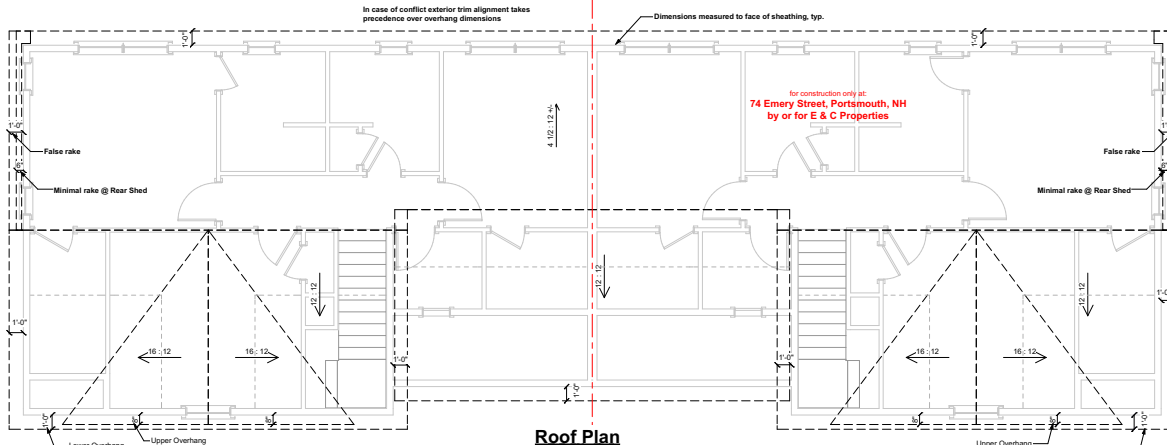


Living Area this Floor: 935 sq ft  
 Condo Living Area This Unit: 864 SF  
 8ft Finished Ceiling Height

Second Floor Plan



Living Area this Floor: 935 sq ft  
 Condo Living Area This Unit: 864 SF  
 8ft Finished Ceiling Height



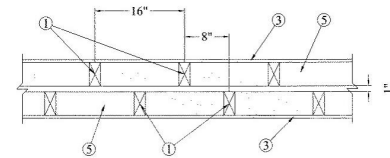
Roof Plan



Living Area this Floor: 935 sq ft  
 Condo Living Area This Unit: 864 SF  
 8ft Finished Ceiling Height

Living Area this Floor: 935 sq ft  
 Condo Living Area This Unit: 864 SF  
 8ft Finished Ceiling Height

- Design No. U378**  
**Bearing Wall Rating — 1 1/2 Hr or 2 Hr (See Item 3)**  
 Finish Rating — See Items 3
- This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide EXUV or EXUV7
- \* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



- Wood Studs** — Double row of nominal 2 x 4 in. studs, spaced 16 in. OC and cross-braced at mid-height. Opposite rows spaced 1 in. apart, staggered 8 in. OC and jointed at the top and bottom with bearing plates.
  - Bearing Plates** — (Not shown) Nominal 2 x 4 in. Two layers on top and one layer on bottom for each row of studs.
  - Wallboard, Gypsum** — For 1-1/2 Hr Rating — Finish rating is 20 minutes. One layer of 5/8 in. thick wallboard, 4 ft wide. Applied vertically and nailed to studs and bearing plates 7 in. OC, with 6d cement coated nails, 1-7/8 in. long, 0.0915 in. shank diameter and 1/4 in. diameter head. Vertical joints centered over studs. As an alternative, No. 6 bugle head drywall screws, 1-7/8 in. long may be substituted for the 6d cement coated nails. For 2 Hr Rating (not shown) — Finish rating is 37 minutes. Two layers of 5/8 in. thick wallboard, 4 ft wide. Inner layer applied vertically and nailed to studs and bearing plates 6 in. OC, with 6d cement coated nails, 1-7/8 in. long, 0.0915 in. shank diameter and 1/4 in. diameter head, with first nail starting 3 in. from all edges. Outer layer applied vertically and nailed to studs and bearing plates 8 in. OC with 6d cement coated nails, 2-3/8 in. long, 0.113 in. shank diameter and 5/16 in. diameter head, with first nail starting 4 in. from all edges. Vertical joints centered over studs. All joints in face layers staggered with joints in base layers.  
 UNITED STATES GYPSUM CO — Type C
  - Joints and Nailheads** — (Not shown) — Wallboard joints taped and both joints and nailheads covered with joint compound.
  - Loose Fill Materials** — Blown-in fiberglass loose-fill insulation material. The insulation is blown into the wall cavity to completely fill the enclosed 8 in. cavity in accordance with the application instructions supplied with the product. The minimum average overall density is 2.6 lb/ft<sup>3</sup> dry blown, with no individual density less than 2.2 lb/ft<sup>3</sup> dry blown.  
 OWENS CORNING — ProPink Complete or ProPink L77
  - Retention Fabric** — (Not shown) — ProPink Complete or ProPink L77 non-woven fibrous fabric material attached with staples to the outer face of one row of studs to facilitate the installation of the insulation.
- \* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Your use of these drawings constitutes an acceptance of responsibility as outlined in "Dear Code Officer" on the first page of these drawings, and on our web site: <http://www.artform.com/clients/74EmeryStreet/conditions.php>

If you have any concerns or questions, please feel free to contact us. We are happy to clarify matters that fall within our scope, as listed on the first page. We can also offer provide affordable support for issues that are your responsibility, such as energy design/analysis, or additional detailing.

**Artform Home Plans**  
 Design # 182,254,12  
 © 2008-2018 Artform Architecture, Inc.  
 Project: Classic Duplex  
 74 Emery Street  
 Portsmouth, NH  
 10/17/18 - 10/18/18 - Condo Living Area

403.431.9559

2

10/17/18 - 10/18/18 - Condo Living Area

















**Civil  
Site Planning  
Environmental  
Engineering**

133 Court Street  
Portsmouth, NH  
03801-4413

October 9, 2018

Juliet T. H. Walker, AICP, Planning Director  
City of Portsmouth Municipal Complex  
Planning Department  
1 Junkins Avenue  
Portsmouth, New Hampshire 03801

**Re: Application for Site Plan Review - Planning Board Approval  
Assessor's Map 220, Lots 87-2 and 87-3  
74 and 64 Emery Street  
Altus Project P4916**

Dear Juliet:

On behalf of Corey Cawthorn and Happy Mountain Holdings, LLC, Altus Engineering, Inc. (Altus) respectfully submits the revised Site Plan Review application package for the properties located at 64 and 74 Emery Street. The project proposes to construct one two-unit residential building on each lot, each building to be 2-stories with a 2,080 s.f. footprint and a 3,000 s.f. Gross Floor Area, with related paving, lighting, utilities, landscaping, drainage and associated site improvements. Although the project is residential in nature, the development requires Site Plan Approval as four dwelling units will be constructed. As such, we believe many of the "standard" Site Plan Review requirements are not relevant and merit obtaining waivers. The waiver requests are included in this submittal along with the additional supporting documentation.

On June 26, 2018, Happy Mountain Holdings obtained Zoning relief from Section 10.44 and Section 10.521 of the City of Portsmouth Zoning Ordinance to allow the construction of two multi-family dwellings (duplex) where only single family residential units are allowed and a variance from Section 10.521 for Lot 87-3 for lot size of 21,232 SF where 30,000 SF is required. The applicant met with the Technical Advisory Committee (TAC) work session on August 14, 2018 and after addressing initial comments from the work session, the project was considered at the October 2, 2018 TAC Meeting where the Committee voted to **recommend** Site Plan approval to the Planning Board.



The following stipulations were noted by TAC and are addressed below:

1. *Applicant shall show outline of proposed stormwater areas on the site plan so that it is clear to future homeowners.*

*Response: The stormwater areas have been added to the site plan, sheet C-1.*

2. *Stormwater features must be maintained by the owners in perpetuity. Stormwater system maintenance and enforcement oversight by City of Portsmouth shall be documented in a deed restriction. The deed restriction for stormwater maintenance shall be recorded and include language that notes any changes shall require review and approval by the Planning Director.*

*Response: Agreed. The deed restriction will be provided prior to CO.*

3. *An easement shall be required between the two properties to allow stormwater to drain across lot lines.*

*Response: Agreed. All easements will be provided prior to CO.*

4. *A Conditional Use Permit shall be required from the Planning Board to comply with the new Highway Noise Overlay District.*

*Response: The Owner is currently working with Planning Department to address this new zoning regulation.*

5. *The applicant may reduce the overall driveway width to 14' driveway as previously proposed.*

*Response: The driveway width has been reduced to 14' indicated.*

6. *Applicant shall provide documentation of utility and driveway access easements prior to the issuance of a Certificate of Occupancy for either property.*

*Response: Agreed. Easements will be provided prior to CO.*

7. *Applicant shall provide a landscaping plan that includes limits of clearing, loaming and seeding.*

*Response: As discussed at TAC, a minimum of 5 trees are required and are shown on the site plan. All other disturbed areas will be lawn.*

8. *Temporary check dams shall be placed during construction to address any impact to abutting property.*

*Response: Temporary check dams are shown on the grading plan.*

9. *Drainage and grading shall be updated and clarified to address TAC comments and approved by Planning and DPW staff prior to Planning Board review.*

*Response: The grading plan has been updated and is submitted for final approval.*



Juliet T. H. Walker, AICP, Planning Director  
October 9, 2018  
Page 3

The Applicant will submit twelve (12) copies of the following items for consideration at the October 18<sup>th</sup> Planning Board Meeting:

- Site Plan Review Application and Checklist
- Site Plans (two full size (22" x 34") and ten half size (11" x 17"))
- Zoning Board of Adjustment decision letter, dated June 29, 2018.
- Waiver Requests
- Sitework Cost Estimate
- Autoturn - Truck Turning Movements
- Drainage Study (two full copies and ten summaries)
- CD with pdf copies of the complete application package.

As always, Altus looks to working with the Planning Department on this development project. Please call me if you have any questions or need any additional information.

Sincerely,

**ALTUS ENGINEERING, INC.**



Eric D. Weinrieb, PE  
President

wde/4916-PB cvr ltr\_101918

Enclosure

Ecopy: Corey Cawthorn





**Civil  
Site Planning  
Environmental  
Engineering**

133 Court Street  
Portsmouth, NH  
03801-4413

October 9, 2018

Juliet T. H. Walker, AICP, Planning Director  
City of Portsmouth Municipal Complex  
Planning Department  
1 Junkins Avenue  
Portsmouth, New Hampshire 03801

**Re: Application for Site Plan Review - Planning Board Approval  
Assessor's Map 220, Lots 87-2 and 87-3  
74 and 64 Emery Street  
Altus Project P4916**

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Sincerely,

**ALTUS ENGINEERING, INC.**



Eric D. Weinrieb, PE  
President

wde/4916-PB cvr ltr\_101918

Enclosure

Ecopy: Corey Cawthorn



**CITY OF PORTSMOUTH  
NEW HAMPSHIRE**

Building Permit Application Number 30387/89

**SITE REVIEW  
APPLICATION**

Case Number \_\_\_\_\_

Fee \_\_\_\_\_

Map 220 Lot 87-2/3 Zone SRB Wetlands: Inland N/A Coastal \_\_\_\_\_ Lot Area 53,579

Date of Approvals (Indicate if Pending)

Conservation Commission \_\_\_\_\_ Conditional Use \_\_\_\_\_ Board of Adjustment 6/26/18  
Historic District Commission \_\_\_\_\_ Subdivision \_\_\_\_\_ Other \_\_\_\_\_

Street Address 64 & 74 EMERY ST.

Description of Project including all use(s) CONSTRUCTION OF ONE CONDEX STYLE BUILDING ON EACH LOT CONTAINING TWO 1500 SQ FT. CONDO UNITS.

Building(s) Footprint 26 X 80 Gross Floor Area 3000 X 2 #of Stories 2

# of Dwelling Units 4 Number of Parking Spaces: Existing \_\_\_\_\_ Proposed 10

Print Information Below

Property Owner's Name HAPPY MOUNTAIN HOLDINGS LLC  
Street Address 901 N MARKET SUITE 765 City/Town WILMINGTON State DE Zip 19801  
817-707-6901 Telephone # \_\_\_\_\_ Cell Phone # \_\_\_\_\_ Fax # \_\_\_\_\_ Email Address JEFF@BISHOPME

Print Information Below

Applicant's / Developer's Name CAWTHON BUILDERS LLC  
Street Address 27 SPINE ST. City/Town DOVER State NH Zip 03820  
603-731-8156 Telephone # \_\_\_\_\_ Cell Phone # \_\_\_\_\_ Fax # \_\_\_\_\_ Email Address CCAWTHON@KW.COM

Print Information Below (Include Additional Contact Information on Next Page)

Check One: Owner's Attorney  Applicant's Attorney  Engineer  Surveyor  Other  If other, state relationship \_\_\_\_\_  
Representative's Name ERIC WEINRIEB - ALMS ENGINEERING  
Street Address 133 COURT ST. City/Town PORTSMOUTH State NH Zip 03801  
603-433-2335 Telephone # \_\_\_\_\_ Cell Phone # \_\_\_\_\_ Fax # \_\_\_\_\_ Email Address ERIC@ALMS-ENG.COM

I hereby apply for Site Review and acknowledge that I will comply with all the ordinances and any stipulations of the Site Review Committee of the City of Portsmouth in the development and construction of this project.

Owner's Signature [Signature] Print Owner's Name JEFF BISHOP Date 9/11/18

Applicant's/Developer's Signature [Signature] Print Applicant's/Developer's Name COREY CAWTHON Date 9/11/18



Print Information Below

Check One: Owner's Attorney  Applicant's Attorney  Engineer  Surveyor  Other  If other, state relationship \_\_\_\_\_

**Representative's Name** \_\_\_\_\_

Street Address \_\_\_\_\_ City/Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone # \_\_\_\_\_ Cell Phone # \_\_\_\_\_ Fax # \_\_\_\_\_ Email Address \_\_\_\_\_

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Telephone # \_\_\_\_\_ Cell Phone # \_\_\_\_\_ Fax # \_\_\_\_\_ Email Address \_\_\_\_\_

**Attachments**

**The following materials must be submitted to the Planning Department along with the completed Application Form:**

- Site Plan Application Checklist
- Ten (10) stamped and folded copies of the site plan – four (4) full-size (22" x 34") and six (6) reduced (11" x 17")
- Digital copy of any plans and/or exhibits (in PDF format)
- Application Fee
- Any required State or Federal Permits





## 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: Happy Mountain Holdings LLC/Cawthron Builders LLC Date Submitted: 9/17/2018  
 Phone Number: 603-731-8156 E-mail: ccawthron@kw.com  
 Site Address: 64 & 74 Emery Street Map: 220 Lot: 87-2/87-3  
 Zoning District: Single Residence B Lot area: 53579 sq. ft.

Application Requirements			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Fully executed and signed Application form. (2.5.2.3)	Application Package	N/A
<input checked="" type="checkbox"/>	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)	Application Package	N/A

Site Plan Review Application Required Information			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Statement that lists and describes "green" building components and systems. (2.5.3.1A)	Application Package	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. (2.5.3.1B)	Construction Set	N/A
<input checked="" type="checkbox"/>	Tax map and lot number, and current zoning of all parcels under Site Plan Review. (2.5.3.1C)	Site Plan C-1	N/A
<input checked="" type="checkbox"/>	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. (2.5.3.1D)	Application Package	N/A



**Site Plan Review Application Required Information**

<input checked="" type="checkbox"/>	<b>Required Items for Submittal</b>	<b>Item Location (e.g. Page/line or Plan Sheet/Note #)</b>	<b>Waiver Requested</b>
<input checked="" type="checkbox"/>	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. <b>(2.5.3.1E)</b>	Site Plan EC-1	N/A
<input checked="" type="checkbox"/>	Names, addresses and telephone numbers of all professionals involved in the site plan design. <b>(2.5.3.1F)</b>	Cover Sheet	N/A
<input checked="" type="checkbox"/>	List of reference plans. <b>(2.5.3.1G)</b>	Site Plan EC-1	N/A
<input checked="" type="checkbox"/>	List of names and contact information of all public or private utilities servicing the site. <b>(2.5.3.1H)</b>	Utility Plan C-3 Notes #9-#12	N/A

**Site Plan Specifications**

<input checked="" type="checkbox"/>	<b>Required Items for Submittal</b>	<b>Item Location (e.g. Page/line or Plan Sheet/Note #)</b>	<b>Waiver Requested</b>
<input checked="" type="checkbox"/>	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. <b>(2.5.4.1A)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. <b>(2.5.4.1B)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. <b>(2.5.4.1C)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Plans shall be drawn to scale. <b>(2.5.4.1D)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Plans shall be prepared and stamped by a NH licensed civil engineer. <b>(2.5.4.1D)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Wetlands shall be delineated by a NH certified wetlands scientist. <b>(2.5.4.1E)</b>	N/A	N/A
<input checked="" type="checkbox"/>	Title (name of development project), north point, scale, legend. <b>(2.5.4.2A)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Date plans first submitted, date and explanation of revisions. <b>(2.5.4.2B)</b>	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Individual plan sheet title that clearly describes the information that is displayed. <b>(2.5.4.2C)</b>	Required on all plan sheets	N/A

Site Plan Specifications			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Source and date of data displayed on the plan. (2.5.4.2D)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	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  WAIVER REQUESTED	N/A
<input checked="" type="checkbox"/>	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)	Waiver Requested	N/A
<input checked="" type="checkbox"/>	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)	Waiver Requested	N/A



**Site Plan Specifications – Required Exhibits and Data**

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

**Site Plan Specifications – Required Exhibits and Data**

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	<b>8. Solid Waste Facilities: (2.5.4.3H)</b>		
<input checked="" type="checkbox"/>	a. The size, type and location of solid waste facilities.	C-1 Note #17	<input type="checkbox"/>
	<b>9. Storm water Management: (2.5.4.3I)</b>		
<input checked="" type="checkbox"/>	a. The location, elevation and layout of all storm-water drainage.	Grading Plan C-2	<input type="checkbox"/>
	<b>10. Outdoor Lighting: (2.5.4.3J)</b>		
<input checked="" type="checkbox"/>	a. Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and; b. photometric plan.		<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<b>11. Indicate where dark sky friendly lighting measures have been implemented. (10.1)</b>		<input checked="" type="checkbox"/>
	<b>12. Landscaping: (2.5.4.3K)</b>		
<input checked="" type="checkbox"/>	a. Identify all undisturbed area, existing vegetation and that which is to be retained;		<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	b. Location of any irrigation system and water source.		<input checked="" type="checkbox"/>
	<b>13. Contours and Elevation: (2.5.4.3L)</b>		
<input checked="" type="checkbox"/>	a. Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Grading Plan C-2	<input type="checkbox"/>
	<b>14. Open Space: (2.5.4.3M)</b>		
<input checked="" type="checkbox"/>	a. Type, extent and location of all existing/proposed open space.	Site Plan C-1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<b>15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)</b>	Application Package	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<b>16. Location of snow storage areas and/or off-site snow removal. (2.5.4.3O)</b>	C-1 Note #22	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<b>17. Character/Civic District (All following information shall be included): (2.5.4.3P)</b>	N/A	<input type="checkbox"/>
	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			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	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>	N/A	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Indicate where Low Impact Development Design practices have been incorporated. <b>(7.1)</b>	Grading Plan C-2	<input type="checkbox"/>
<input checked="" type="checkbox"/>	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. <b>(7.3.1)</b>	N/A	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Indicate where measures to minimize impervious surfaces have been implemented. <b>(7.4.3)</b>	No Other Practical Alternative	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Calculation of the maximum effective impervious surface as a percentage of the site. <b>(7.4.3.2)</b>	Site Plan C-1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	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>	Grading Plan C-2 and Application Package	<input type="checkbox"/>

Final Site Plan Approval Required Information			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	All local approvals, permits, easements and licenses required, including but not limited to: <ul style="list-style-type: none"> <li>a. Waivers;</li> <li>b. Driveway permits;</li> <li>c. Special exceptions;</li> <li>d. Variances granted;</li> <li>e. Easements;</li> <li>f. Licenses.</li> </ul> <b>(2.5.3.2A)</b>	Site Plan C-1 and Application Package	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: <ul style="list-style-type: none"> <li>a. Calculations relating to stormwater runoff;</li> <li>b. Information on composition and quantity of water demand and wastewater generated;</li> <li>c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls;</li> <li>d. Estimates of traffic generation and counts pre- and post-construction;</li> <li>e. Estimates of noise generation;</li> <li>f. A Stormwater Management and Erosion Control Plan;</li> <li>g. Endangered species and archaeological / historical studies;</li> <li>h. Wetland and water body (coastal and inland) delineations;</li> <li>i. Environmental impact studies.</li> </ul> <b>(2.5.3.2B)</b>	<ul style="list-style-type: none"> <li>a. Application Package</li> <li>b. Domestic Water</li> <li>c. N/A</li> <li>d. N/A</li> <li>e. N/A</li> <li>f. C-2 Grading Plan</li> <li>g. N/A</li> <li>h. N/A</li> </ul>	<input type="checkbox"/>

Final Site Plan Approval Required Information

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	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)	Application Package	<input type="checkbox"/>
<input checked="" type="checkbox"/>	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	<input type="checkbox"/>

Applicant's Signature: \_\_\_\_\_

*Cary Cant*

Date: \_\_\_\_\_

9/17/18





## HAPPY MOUNTAIN HOLDINGS LLC

### “Statement of Green Building Components and Systems”

64 & 74 Emery Street  
Portsmouth, NH

#### SECTION 2.5.3.1A

The Condominium units will be constructed using quality building products and will be certified under the Energy Star Home Program. Building products and techniques are as follows:

- Energy Star Certified exterior doors and windows
- James Hardie Fiber Cement Siding
- York Energy Star Certified 90+% AFUE Gas Furnaces
- Programmable Thermostats
- Code Compliant Energy Star Insulating for Climate Zone 5
- Energy Star Certified Appliances
- LED Lighting and Energy Star Light Bulbs
- Low Flow toilets and faucets
- LID Elements including rain gardens for Stormwater Management
- Avoiding large ledge outcrop to minimize site work disturbance area with shared impervious driveway.



Electric Service Support Center PO  
Box 330  
Manchester, NH 03105  
1-800-362-7764

07/31/2018

Corey Cawthron  
750 Lafayette Rd. Suite 201  
Portsmouth, NH 03801

Re: 64 Emery Street  
Portsmouth, NH 03801

Dear Corey:

Eversource Energy agrees to provide electric service to the above site in accordance with the Tariff for Electric Service on file with the New Hampshire Public Utilities Commission (NHPUC), subject to the applicable NHPUC rules and regulations, as well as Eversource's "Requirements for Electric Service Connections".

Please keep in mind that all requirements for providing electric service, such as, but not limited to, contracts, licenses, fees, payments, easements and inspections must be provided to Eversource prior to the construction of the electric facilities.

Should you have any questions or concerns, please call us at 1-800-362-7764

Sincerely,

Tom Eger  
Electric Service Support Center  
PO Box 330  
Manchester, NH 03105-9989





Electric Service Support Center PO  
Box 330  
Manchester, NH 03105  
1-800-362-7764

07/31/2018

Corey Cawthron  
750 Lafayette Rd. Suite 201  
Portsmouth, NH 03801

Re: 74 Emery Street  
Portsmouth, NH 03801

Dear Corey:

Eversource Energy agrees to provide electric service to the above site in accordance with the Tariff for Electric Service on file with the New Hampshire Public Utilities Commission (NHPUC), subject to the applicable NHPUC rules and regulations, as well as Eversource's "Requirements for Electric Service Connections".

Please keep in mind that all requirements for providing electric service, such as, but not limited to, contracts, licenses, fees, payments, easements and inspections must be provided to Eversource prior to the construction of the electric facilities.

Should you have any questions or concerns, please call us at 1-800-362-7764

Sincerely,

Tom Eger  
Electric Service Support Center  
PO Box 330  
Manchester, NH 03105-9989



September 14, 2018

Corey Cawthron  
Happy Mountain Holdings LLC  
91 N Market St  
Wilmington DE 19801

RE: Natural Gas Availability to 64 & 74 Emery St Portsmouth

Dear Corey

Unitil's natural gas division has reviewed the requested site for natural gas service.

Unitil hereby confirms natural gas service will be available to 64 & 74 Emery St Portsmouth. Installation is pending an authorized installation agreement with Happy Mountain Holdings LLC and street opening approval from the City of Portsmouth DPW

Let me know if you have any questions. You can email me at [oliver@unitil.com](mailto:oliver@unitil.com). My phone number is 603-294-5174.

Sincerely,

Janet Oliver  
Business Development Representative





September 14, 2018, 2018

RE: "Will Serve Letter for 64 and 74 Emery St. Portsmouth, NH.

Dear Mr. Cawthron,

Consolidated Communications has agreed to provide communications service to these locations subject to the Tariffs and terms of NHPUC No. 83, section 2.

Please note that a payment may be required from the customer requesting service as described in NH PUC Tariff No. 83, section 2.1.3.

You may review these documents at:

[http://www.puc.nh.gov/Regulatory/Tariffs/FairPoint\\_83/FairPointLST.HTM](http://www.puc.nh.gov/Regulatory/Tariffs/FairPoint_83/FairPointLST.HTM)

Subsequent to the customer responsibilities being satisfied, FairPoint will proceed with construction of the services requested.

Should you have any questions, please feel free to contact me at 603-427-5525

Joseph P. Considine  
Engineer  
Consolidated Communications



Civil  
Site Planning  
Environmental  
Engineering

133 Court Street  
Portsmouth, NH  
03801-4413

**WAIVER REQUESTS**  
**Assessor's Map 220**  
**Lot 87-2 (74 Emery Street)**  
**&**  
**Lot 87-3 (64 Emery Street)**  
**Altus Project P4916**  
**September 17, 2018**

On behalf of Happy Mountain Holdings, LLC, Altus Engineering, Inc. request the following waivers from the City of Portsmouth, New Hampshire Site Plan Review Regulations.

*Section 2.5.4 2 (E) A Note shall be provided on the plan stating, "All conditions on this plan shall remain in effect in perpetuity pursuant to the requirements of the site plan regulations."*

*Section 2.5.4 3 (C) Access and circulation*

*Section 2.5.4 3 (D) Parking and loading*

*Section 2.5.4 3 (J) Outdoor lighting*

*Section 3.4 Curbing (A) where access ways and driveways meet public streets*

*Section 5.2 Sidewalk and Pedestrian Pathways*

*Section 5.3 Bicycle Facilities*

*Section 6.1 Landscaping and Screening Standards.*

*Section 2.13.3 Recording Notes*

This project is unique in the fact that it is the development of two duplex homes on two abutting lots. Because four residential housing units are proposed, the project falls under the criteria for Site Plan Review Regulations. As such, the duplex homes do not require loading, outdoor lighting, curbing at the entrance, bicycle racks and other types of development features that normally are depicted on commercial site developments. We have combined all of the waiver requests with a single explanation.

As discussed at the TAC Workshop, it is understood that the general intent of the Technical Advisory Committee's Review and the concerns that would be of interest to the Planning Board include the design of the stormwater management system and the utility service design. The plans submitted for review and approval demonstrate that there will be no adverse impacts to abutting properties from runoff from the site. A detailed utility service design plan is included in



Waiver Requests  
Emery Street  
September 2018  
Page 2

the plan set.

To require that all conditions on the plan to remain in effect in perpetuity is an overly burdensome requirement for the homes. This would require the homeowners to file an amendment to the Site Plans to install a shed, light post, swing set or any other feature that is normally constructed on a duplex lot without requiring Site Plan Approval. To require the Site Plan to be recorded is an excessive requirement for this development.

Wde/4916 waiver



## City of Portsmouth Driveway Permit

Public Works Department  
680 Peverly Hill Road

Portsmouth, NH 03801  
(603) 427-1530

Permit Number:  
32320

Date of Issue:  
September 11, 2018

Site Address: 74 Emery Street Portsmouth, NH 03801  
Main Address: 74 EMERY ST Portsmouth NH 03801  
Property Owner: HAPPY MOUNTAIN HOLDINGS LLC

Applicant's Name: Corey Cawthron  
Phone: 6037318156  
Email: ccaawthron@kw.com

Description of Work: Shared driveway servicing 64 & 74 Emery Street with one access point from public street.

New Drive: true

Existing Drive:

City Staff Remarks & Comments:

**PERMIT HOLDER has read this permit, permit application, DPW Driveway Rules & Procedures, conditions and comments, and agrees to perform the work authorized. The cost of all work shall be borne by the applicant / property owner.**

An **EXCAVATION PERMIT** is required if cutting into any public way or public right-of-way.

A **FLAGGING PERMIT** is required if any action would hinder free passage of vehicles on any street or right-of-way.

Permits are issued by DPW. Applications can be found online: <http://www.cityofportsmouth.com/publicworks/permits-applications>

Call **DIG SAFE** at 811 for every project.

The City of Portsmouth reserves the right to deny any permits when:

Proposed driveway does not conform to the requirements of the Portsmouth Zoning Ordinance;  
Proposed driveway does not conform to the Driveway Specifications that are part of this permitting process; or  
Proposed driveway would present an unreasonable safety risk to the public.

**The Permit Card Shall Be Posted and Visible from the Street During Driveway Construction.**

Contact Dave Desfosses @ (603) 766-1411 / [djdesfosses@cityofportsmouth.com](mailto:djdesfosses@cityofportsmouth.com) for a FINAL INSPECTION when work is completed.

Department Director:

Peter H. Rice, P.E.  
Director of Public Works

This is an e-permit.







# CITY OF PORTSMOUTH

Community Development Department  
(603) 610-7281

Planning Department  
(603) 610-7216

## PLANNING DEPARTMENT

June 29, 2018

Happy Mountain Holdings LLC  
901 N. Market St, Ste. 705  
Wilmington, Delaware 19801

Re: Property at 64 & 74 Emery Street, Permit #30387  
Assessor Plan 220, Lot 87-2&3

Dear Applicant:

The Board of Adjustment at its reconvened meeting on June 26, 2018 completed its consideration of your application described as follows:

### Application:

Case 6-7

Petitioner: Happy Mountain Holdings LLC

Property: 64 and 74 Emery Street

Assessor Plan: Map 220, Lots 87-2 and 87-3

Zoning District: Single Residence B

Description: Build a two-family dwelling on two lots

Requests: Variances and/or Special Exceptions necessary to grant the required relief from the Zoning Ordinance including the following variances:

1. from Section 10.440, Use #1.30 to allow a two family dwelling on each of two lots where a two family dwelling on a lot is not allowed; and
2. from Section 10.521 to allow a lot area per dwelling unit for Lot 220-87-3 (64 Emery Street) of 10,616±s.f. where 15,000 s.f. is required.

### Action:

The Board voted to **grant** the petition as presented and advertised.

1 Junkins Avenue  
Portsmouth, New Hampshire 03801  
Fax (603) 427-1593

Review Criteria:

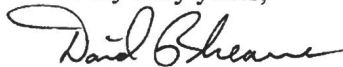
The petition was granted for the following reasons:

- Granting the variances will not be contrary to the public interest and the spirit of the ordinance will be observed as the essential character of the neighborhood will not be altered, nor will the health, safety or welfare of the public be threatened. The project will fit appropriately within this neighborhood which is a mixture of commercial and residential uses.
- Substantial justice will be done as the loss to the applicant if the petition were denied and strict adherence to the ordinance enforced would not be outweighed by any gain to the general public.
- The value of surrounding properties will not be diminished. Most of the surrounding properties are either commercial, places of assembly or other residential properties, all of which will sustain their values.
- Literal enforcement of the ordinance would result in unnecessary hardship due to the special conditions of the property. These include the proximity of the properties to the highway and the bypass as well as its location in a single residence zone while surrounded on three sides by commercial uses or places of assembly. Due to the special conditions, there is no fair and substantial relationship between the purposes of the ordinance provision limiting a lot to a single residence and their specific application to these properties. A residential use in a residential zone is a reasonable use.

As provided for in NH RSA Chapter 677, the Board's decision may be appealed 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. Construction drawings or sketches must be reviewed and approved by the Building Inspector prior to the issuance of a building permit. Approvals by other land use boards may also be required prior to the issuance of a building permit.

The minutes and tape recording of the meeting may be reviewed in the Planning Department.

Very truly yours,



David Rheaume, Chairman  
Board of Adjustment

mek

c: Robert Marsilia, Chief Building Inspector  
Roseann Maurice-Lentz, City Assessor  
Douglas W. Macdonald, Esq.



WARRANTY DEED

**KNOW ALL MEN BY THESE PRESENTS**, that **HAPPY MOUNTAIN HOLDINGS, LLC**, a Delaware limited liability company with a business address at Delaware Corporate Service, Inc., 901 N. Market St., Suite 705, Wilmington, County of New Castle, Delaware, 19801, grant to \_\_\_\_\_, with WARRANTY COVENANTS, the following:

A certain parcel or tract of land situated in the City of Portsmouth, County of Rockingham, State of New Hampshire, located on the northwesterly side of Emery Street, (f/k/a Central Avenue), being Proposed Map 220, Lot 103, (also known as 64 Emery Street), shown on a plan by Civil Consultants and Altus Engineering, Inc., dated September 27, 2013, entitled "PROPOSED DIVISION OF LAND OF CATHERINE T. MORETTI - PHASE 2 - MYRTLE AVENUE & CENTRAL AVENUE, PORTSMOUTH, ROCKINGHAM COUNTY, NEW HAMPSHIRE", recorded at the Rockingham County Registry of Deeds on June 23, 2014 as Plan D-38286 and being more particularly described as follows:

BEGINNING at a point in the northwesterly line of Central Avenue at the southeasterly corner of the parcel herein described, marked by a set 5/8" diameter rebar;

thence N 35°56'34" W, 32.91 feet to a set 5/8" diameter rebar;

thence N 35°56'34" W, 22.09 feet to a set 5/8" diameter rebar;

thence N 35°56'34" W, 166.58 feet to a set 5/8" diameter rebar;

thence N 35°56'34" W, 57.58 feet to a 5/8" diameter rebar set;

thence N 71°18'39" E, 153.74 feet to a found 1" diameter, 3" tall iron pipe in a stone wall;

thence S 10°47'38" E, along said stone wall, 8.02 feet to a found a 5/8" diameter rebar;

thence S 12°42'58" E, along said stone wall, 47.31 feet to a set 5/8" diameter rebar;

thence S 12°42'58" E, along said stone wall, 40.33 feet to a found 3/8" diameter drill hole;

thence S 14°25'35" E, along said stone wall, 51.02 feet to a 5/8" diameter rebar set in the northwesterly line of Central Avenue;

thence S 28°23'29" W, by the northwesterly line of Central Avenue, 100.00 feet to the POINT OF BEGINNING;

containing 21,232 square feet;

Subject to an easement as granted by Ethel B. Anderson to New Hampshire Gas & Electric Company as described in easement deed recorded at book 1137, page 357 of the Rockingham County Registry of Deeds.

Subject to an easement as granted by Aldolph F. Anderson to Portsmouth Power Company as described in easement deed recorded at book 836, page 116 of the Rockingham County Registry of Deeds.

Subject to an easement as granted by Marshall H. and Dorothy A. Chalk to New Hampshire Electric Company as described in easement deed recorded at book 1520, page 412 of the Rockingham County Registry of Deeds.

Subject to a Declaration of Easement Imposed by Catherine T. Moretti, for a Subdivision Located at Myrtle Avenue and Central Avenue, recorded at book 5539, page 730 of the Rockingham County Registry of Deeds.

Subject to all other restrictions, rights, easements, rights-of-way, and anything else as shown on said above described plan.

Meaning and intending to describe and convey the premises conveyed to the Grantor herein by fiduciary Deed dated April 16,, 2018 and recorded at the Rockingham County Registry of Deeds at Book 5905, Page 2549.

IN WITNESS WHEREOF, I have executed this deed on this this \_\_\_\_ day of \_\_\_\_\_, 201\_.

Witness:

**HAPPY MOUNTAIN  
HOLDINGS, LLC,**

By: \_\_\_\_\_  
Its: \_\_\_\_\_, Duly Authorized

**STATE OF NEW HAMPSHIRE  
COUNTY OF ROCKINGHAM, SS:**

This instrument was acknowledged before me on this \_\_\_\_\_ day of \_\_\_\_\_, 201\_,  
by \_\_\_\_\_ in his capacity as \_\_\_\_\_ of Happy Mountain Holdings, LLC.

**NOTARY PUBLIC**

**Name:**

**My Commission Expires:**



MAIL TO pd

Return to: City of Portsmouth  
Legal Department  
Planning Division  
City Hall - 1 Jenkins Ave.  
Portsmouth, NH 03801

**DECLARATION OF EASEMENT IMPOSED BY CATHERINE T. MORETTI,  
FOR A SUBDIVISION LOCATED AT MYRTLE AVENUE AND CENTRAL AVENUE AS  
SHOWN ON THE SUBDIVISION PLAN ENTITLED "PROPOSED DIVISION OF LAND  
OF CATHERINE T. MORETTI PHASE 2 - MYRTLE AVENUE & CENTRAL AVENUE  
PORTSMOUTH, ROCKINGHAM COUNTY, NEW HAMPSHIRE"**

THIS DECLARATION is made by CATHERINE T. MORETTI, with a mailing address of 9 Prince Lane, Raymond, NH 03077, (hereinafter "Declarant") and is made for the benefit of Lot 104 as shown on a plan of land entitled "Proposed Division of Land of Catherine T. Moretti Phase 2 - Myrtle Avenue & Central Avenue Portsmouth, Rockingham County, New Hampshire", dated June, 10, 2014 and prepared by Civil Consultants and Altus Engineering, Inc. (hereinafter "Subdivision Plan") to be recorded herewith in the Rockingham County Registry of Deeds. D - 38286

Acceptance of a deed by any person of either Lot 103 or Lot 104 shall constitute acceptance of these easements, regardless of whether said deed is expressly made subject thereto.

1. **COMMON ACCESS EASEMENT.** Lot 103 is hereby burdened by, and Lot 104 is hereby benefited by, a common access easement on Lot 103 for access from Central Avenue to each respective lot over the area shown on the Subdivision Plan as "Proposed Driveway Easement Appurtenant to Lot 104 4,219 S.F." (hereinafter "Common Access Easement Area"). The owners of Lot 103 and Lot 104 shall equally share in the ongoing costs and maintenance of and repair to said Common Access Easement Area, including the cost of snow removal. Repairs and maintenance of the Common Access Easement Area shall be performed from time to time by agreement of the then owners of Lot 103 and Lot 104. There shall be no parking upon or the obstruction of the Common Access Easement Area by any person entitled to use the same.

2. **SEWER & WATER LINE EASEMENT.** Lot 103 is hereby burdened by and Lot 104 is hereby benefited by, a sewer and water line easements on Lot 103 in the area depicted on the Subdivision Plan as "Proposed Sewer and Water Line Easement Appurtenant to Lot 104 2,072 S.F." (hereinafter "Sewer & Water Line Easement Area"). The owner of Lot 104 is hereby granted an easement over Lot 103, in the Sewer & Water Line Easement Area, for the installation, maintenance and repair of underground water and sewer lines.

3. **ENFORCEMENT.** Enforcement of these Declarations of Easements shall be by a proceeding at law or in equity against any person or persons violating or attempting to violate any easement, either to restrain violation of, or to recover damages, and failure by any owner to

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2014 JUN 23 PM 3:08  
ROCKINGHAM COUNTY  
REGISTRY OF DEEDS

enforce any easement or other rights listed herein shall in no event be deemed a waiver of a right to do so thereafter.

4. **AMENDMENT, MODIFICATION OR TERMINATION.** This Declaration of Easements may only be amended, modified or terminated by an instrument signed by the then owners of both Lot 103 and Lot 104 and the Planning Director for the City of Portsmouth (or similar official authorized by the City Manager).

5. **TITLE REFERENCE.** Being a portion of the lands of Grantor described in a deed dated April 28, 2005 and recorded at the Rockingham County Registry of Deeds in Book 4471, Page 2618, being Lot 2 shown on a plan by Civil Consultants and Altus Engineering, Inc., dated April 2, 2013, entitled "PROPOSED DIVISION OF LAND OF CATHERINE T. MORETTI, 261 MYRTLE AVENUE, PORTSMOUTH, ROCKINGHAM, NEW HAMPSHIRE", recorded at the Rockingham County Registry of Deeds as Plan D-37764.

Executed this 10 day of June, 2014.

Signature: Catherine T. Moretti  
Catherine T. Moretti

STATE OF NEW HAMPSHIRE  
COUNTY OF ROCKINGHAM

The foregoing instrument was acknowledged before me this 10<sup>th</sup> day of June, 2014 by the above-named Catherine T. Moretti.

[Signature]  
Notary Public / Justice of the Peace

Print Name: Samantha L. Garland

Commission Expires: Aug 10, 2016

**SAMANTHA L. GARLAND**  
Notary Public, State of New Hampshire  
My Commission Expires Aug. 10, 2016





# CITY OF PORTSMOUTH

Community Development Department  
(603) 610-7281

Planning Department  
(603) 610-7216

## PLANNING DEPARTMENT

June 29, 2018

Happy Mountain Holdings LLC  
901 N. Market St, Ste. 705  
Wilmington, Delaware 19801

Re: Property at 64 & 74 Emery Street, Permit #30387  
Assessor Plan 220, Lot 87-2&3

Dear Applicant:

The Board of Adjustment at its reconvened meeting on June 26, 2018 completed its consideration of your application described as follows:

### Application:

Case 6-7

Petitioner: Happy Mountain Holdings LLC  
Property: 64 and 74 Emery Street  
Assessor Plan: Map 220, Lots 87-2 and 87-3  
Zoning District: Single Residence B  
Description: Build a two-family dwelling on two lots  
Requests: Variances and/or Special Exceptions necessary to grant the required relief from the Zoning Ordinance including the following variances:  
1. from Section 10.440, Use #1.30 to allow a two family dwelling on each of two lots where a two family dwelling on a lot is not allowed; and  
2. from Section 10.521 to allow a lot area per dwelling unit for Lot 220-87-3 (64 Emery Street) of 10,616±s.f. where 15,000 s.f. is required.

### Action:

The Board voted to **grant** the petition as presented and advertised.



Review Criteria:

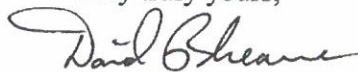
The petition was granted for the following reasons:

- Granting the variances will not be contrary to the public interest and the spirit of the ordinance will be observed as the essential character of the neighborhood will not be altered, nor will the health, safety or welfare of the public be threatened. The project will fit appropriately within this neighborhood which is a mixture of commercial and residential uses.
- Substantial justice will be done as the loss to the applicant if the petition were denied and strict adherence to the ordinance enforced would not be outweighed by any gain to the general public.
- The value of surrounding properties will not be diminished. Most of the surrounding properties are either commercial, places of assembly or other residential properties, all of which will sustain their values.
- Literal enforcement of the ordinance would result in unnecessary hardship due to the special conditions of the property. These include the proximity of the properties to the highway and the bypass as well as its location in a single residence zone while surrounded on three sides by commercial uses or places of assembly. Due to the special conditions, there is no fair and substantial relationship between the purposes of the ordinance provision limiting a lot to a single residence and their specific application to these properties. A residential use in a residential zone is a reasonable use.

As provided for in NH RSA Chapter 677, the Board's decision may be appealed 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. Construction drawings or sketches must be reviewed and approved by the Building Inspector prior to the issuance of a building permit. Approvals by other land use boards may also be required prior to the issuance of a building permit.

The minutes and tape recording of the meeting may be reviewed in the Planning Department.

Very truly yours,



David Rheume, Chairman  
Board of Adjustment

mek

c: Robert Marsilia, Chief Building Inspector  
Roseann Maurice-Lentz, City Assessor  
Douglas W. Macdonald, Esq.



Civil  
Site Planning  
Environmental  
Engineering

133 Court Street  
Portsmouth, NH  
03801-4413

**WAIVER REQUESTS**  
**Assessor's Map 220**  
**Lot 87-2 (74 Emery Street)**  
**&**  
**Lot 87-3 (64 Emery Street)**  
**Altus Project P4916**  
**September 17, 2018**

On behalf of Happy Mountain Holdings, LLC, Altus Engineering, Inc. request the following waivers from the City of Portsmouth, New Hampshire Site Plan Review Regulations.

*Section 2.5.4 2 (E) A Note shall be provided on the plan stating, "All conditions on this plan shall remain in effect in perpetuity pursuant to the requirements of the site plan regulations."*

*Section 2.5.4 3 (C) Access and circulation*

*Section 2.5.4 3 (D) Parking and loading*

*Section 2.5.4 3 (J) Outdoor lighting*

*Section 2.5.4.3 (K) Landscaping*

*Section 3.4 Curbing (A) where access ways and driveways meet public streets*

*Section 5.2 Sidewalk and Pedestrian Pathways*

*Section 5.3 Bicycle Facilities*

*Section 6.1 Landscaping and Screening Standards.*

*Section 2.13.3 Recording Notes*

*Section 2.13.4 Landscaping requirements*

This project is unique in the fact that it is the development of two duplex homes on two abutting lots. Because four residential housing units are proposed, the project falls under the criteria for Site Plan Review Regulations. As such, the duplex homes do not require loading, outdoor lighting, curbing at the entrance, bicycle racks and other types of development features that normally are depicted on commercial site developments. We have combined all of the waiver requests with a single explanation.

As discussed at the TAC Workshop, it is understood that the general intent of the Technical Advisory Committee's Review and the concerns that would be of interest to the Planning Board include the design of the stormwater management system and the utility service design. The plans submitted for review and approval demonstrate that there will be no adverse impacts to abutting properties from runoff from the site. A detailed utility service design plan is included in

Waiver Requests  
Emery Street  
September 2018  
Page 2

the plan set.

To require that all conditions on the plan to remain in effect in perpetuity is an overly burdensome requirement for the homes. This would require the homeowners to file an amendment to the Site Plans to install a shed, light post, swing set or any other feature that is normally constructed on a duplex lot without requiring Site Plan Approval. To require the Site Plan to be recorded is an excessive requirement for this development.

Wde/4916 waiver





Civil  
Site Planning  
Environmental  
Engineering

133 Court Street  
Portsmouth, NH  
03801-4413

## HAPPY MOUNTAIN HOLDINGS, LCC

64 & 74 EMERY STREET  
Portsmouth, NH

### PRELIMINARY OPINION OF SITEWORK COST

DATE: 14-Sep-18  
PROJECT: 4916

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
<b>SITWORK DEMOLITION</b>				
MOBILIZATION	1	LS	\$2,000.00	\$2,000.00
<b>CLEARING AND GRUBBING</b>				
TREE AND VEGETATION REMOVAL	1	LS	\$3,000.00	\$3,000.00
<b>SEWER SERVICE</b>				
LOW PRESSURE FORCE MAIN	300	LF	\$34.00	\$10,200
<b>WATER SERVICE</b>				
2-INCH FIRE SUPPRESSION WATER SERVICES	420	LF	\$36.00	\$15,120
1-INCH DOMESTIC WATER SERVICES	830	LF	\$32.00	\$26,560
WATER TAPS AND CURB STOPS	4	EA	\$500.00	\$2,000
<b>GAS SERVICE</b>				
GAS SERVICES	335	LF	\$26.00	\$8,710
<b>ELECTRIC/PHONE/CABLE SERVICES</b>				
UNDERGROUND ELECTRIC AND TELE-COMMUNICATION CONDUITS	260	LF	\$30.00	\$7,800
TRANSFORMER AND PAD	1	EA	\$4,000.00	\$4,000
<b>STORM DRAINAGE SYSTEM</b>				
EROSION CONTROL RIPRAP AND DRIP EDGE	1	LS	\$1,000.00	\$1,000
<b>SEDIMENT AND EROSION CONTROL</b>				
TEMPORARY EROSION CONTROL	1	LS	\$1,500.00	\$1,500
<b>AGGREGATE BASE COURSES</b>				
12" GRAVEL (NHDOT 304.2)	312	CY	\$18.00	\$5,616
6" CRUSHED GRAVEL (NHDOT 304.3)	156	CY	\$22.00	\$3,432
CUTS AND FILLS	250	CY	\$12.00	\$3,000
<b>HOT BITUMINOUS PAVEMENT</b>				
2.5" BASE COURSE	112	TONS	\$85.00	\$9,520
1.5" WEARING COURSE	68	TONS	\$85.00	\$5,780
<b>LANDSCAPING</b>				
LOAM AND SEED - TURF ESTABLISHMENT	1	LS	\$6,000.00	\$6,000
<b>LIGHTING</b>				
		NIC		
<b>SUBTOTAL</b>				<b>\$115,238</b>
<b>TOTAL:</b>				<b>\$115,238</b>

EXCLUSIONS:  
ITEMS EXCLUDED FROM THIS ESTIMATE INCLUDE, BUT ARE NOT LIMITED TO, THOSE ITEMS SPECIFIED ABOVE AS BEING NOT INCLUDED IN THIS ESTIMATE AND THE FOLLOWING:  
LEDGE REMOVAL, TAPPING FEES, INSPECTIONS, UTILITY SERVICE FEES

## **DRAINAGE STUDY**

### ***EXECUTIVE SUMMARY***

Happy Mountain Holdings, LLC and Corey Cawthron are planning to develop two residential lots that have recently been approved by the Board of Adjustment to allow each to have a duplex housing. The project involves just lot development as the utility services are available in the public right-of-way. There are no wetlands on the lot or within 100-feet of the lot lines. The lots are encumbered with a utility easement at the rear of the site. No site improvements are proposed in the easement. However, it is expected that the homeowners will mow and maintain the easement areas. The two lots that will be developed are:

Assessor's Parcel	Lot Area
220-87-2	32,427 SF
2220-87-3	21,232 SF

The two lots are 53,659 square feet in size (1.23 acres) and are predominantly wooded lots. The lots were created in 2013. At that time, the City approved the development with a shared driveway and utility cross easements to allow Lot 87-3 to be developed without impacting the ledge outcrop in the Emery Street right-of-way. The two lots are approved developable lots that could be developed with up to 60% impervious area based on zoning regulations, which would allow over 30,000 sf of impervious area. The proposed development will provide approximately 12,000 sf of combined impervious areas as well as three stormwater management ponds to reduce peak flows and provide stormwater treatment.

The proposed project will include the two duplexes, a shared driveway, new utility services and associated site improvements, including; site grading, drainage improvements, and utility service connections. Stormwater ponds will be constructed on each of the two residential lots to manage the storm water flow and provide treatment. The ponds will consist of a depressed lawn area with a loamy-sand material that will promote infiltration, drainage, and provide treatment.

### ***DRAINAGE ANALYSIS***

This drainage study is intended to show that the proposed development will manage and treat the stormwater to improve the existing site conditions and minimize impacts from the development. The project was analyzed to compare the ½", 2, 10, 25, and 50 year storm events. As a conservative design approach, which exceeds the city Site Plan Review Regulations, Altus has designed the site following the NHDES Alteration of Terrain rainfall criteria by adding 15-percent to the 24-hour rainfall precipitation for each storm event modeled.

The pre-development subcatchments were modeled and input into HydroCAD for analysis. The "Pre-Development Watershed Plan" illustrates the subcatchments that were modeled for the existing stormwater system. The existing site drains towards the Emery Street right-of-way with a high point near the proposed driveway that directs a portion of the flow to the south towards Myrtle Ave and a portion of the flow to the north towards Maplewood Avenue .

The “Post-Development Watershed Plan” illustrates the proposed stormwater management system. The original subcatchments have been divided into smaller areas to emulate the proposed grading and stormwater management system proposed for construction. The post-development conditions were analyzed at the same primary discharge points examined in the pre-development modeling.

For existing soil conditions the NRCS Web Soil Survey tool was used to determine the existing hydrologic soil groups. The entire site is listed as a type 799 soil series, urban land -canton complex. Hydrologic Soil Group (HSG) Type B was used for the entire as a conservative approach, as much of the site appears to be HSG Type C based on field observations. Referencing the Ksat Values for NH Soils, an infiltration rate of 0.6 was used for the design of the grassed soil filter ponds. The low C Ksat value for Canton is 6.0, but due to the disturbed soil, the design rate used was 1/10 of low Ksat instead of 1/2 (3.0 in/hr) which is a typical design application.

The following Stormwater Modelling Summary compares pre-development and post-development peak rates of runoff for all analyzed storm events:

***Stormwater Modeling Summary***

The Stormwater Modeling Summary Table below shows the results for the peak flow rates for stormwater discharge for the 1/2” Inch, 2 year, 10 year, 25 year, and 50 year storm events:

**Stormwater Modeling Summary Table  
(Pre vs. Post-Development Stormwater Peak Runoff Rates)**

	<b>1/2”- Storm (0.5 inch)</b>	<b>2-Yr Storm (3.69 inch)</b>	<b>10-Yr Storm (5.60 inch)</b>	<b>25-Yr Storm (7.10 inch)</b>	<b>50-Yr Storm (8.50 inch)</b>
<b>POA #1</b>					
Pre	0.00	0.27	1.46	2.82	4.28
Post	0.00	0.28	1.22	1.99	3.78
<b>Change</b>	0.0	+0.01	-0.24	-0.83	-0.50
<b>POA #2</b>					
Pre	0.00	0.05	0.26	0.49	0.72
Post	0.00	0.17	0.36	1.19	2.12
<b>Change</b>	0.0	+0.12	+0.10	+0.70	+1.40
<b>Net Change</b>	<b>0.0</b>	<b>+0.13</b>	<b>-0.14</b>	<b>-0.13</b>	<b>+0.90</b>

As the Stormwater Modeling Summaries demonstrate, the proposed project will manage the stormwater runoff to mitigate impacts to the surrounding areas. The peak flow rates are managed to replicate the existing conditions, with a variance of 0.1 cfs +/- for the 1/2” storm through the 25 year storm event, which is the design intent for low impact development.



## CONCLUSION

The proposed project will not have an adverse effect on abutting properties and infrastructure as a result of stormwater runoff. As the stormwater summary indicates, the peak flow rates discharging from the site will be managed to minimize impacts to the surrounding areas. Three grass soil filter ponds will be constructed to provide retention and treatment of stormwater on site prior discharging to the Emery Street drainage. As noted in the drainage report, the stormwater model utilizes a number of conservative design approaches. The estimated soil type and infiltration rates were conservative based on the Soil and Ksat values. Although not a City of Portsmouth requirement, a 15-percent increase was added to each rainfall event, similar to the requirements of NHDES Alteration of Terrain permitting. Additionally, there are proposed stormwater management features such as roof drip edges and grasses swales that were not incorporated in to the design model. It is expected that the drip edges will infiltrate all of the roof flows directed to them in all but the largest storm events. With this conservative approach, the post development stormwater model still indicates a variance of 0.1 cfs +/- for the 1/2" storm through the 25 year storm event, which is within the design modeling tolerance, and illustrates that the project is managing the stormwater flows.

In addition to the permanent stormwater management practices, appropriate steps will be taken to properly mitigate erosion and sedimentation during construction through the use of temporary Best Management Practices for sediment and erosion control. In summary, the proposed development will manage stormwater runoff during construction and post development so that there is no adverse impact to the surrounding area as a result of this development.



ISSUED FOR: TAC

ISSUE DATE: SEPTEMBER 14, 2018

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	09/14/18

DRAWN BY: CDB  
APPROVED BY: EDW  
DRAWING FILE: 4916 SITE.DWG

SCALE: 11"x17": 1" = 40'  
22"x 34": 1" = 20'

APPLICANT/OWNER:  
HAPPY MOUNTAIN HOLDINGS, LLC  
901 N. MARKET STREET  
SUITE 705  
WILMINGTON, DE 19801

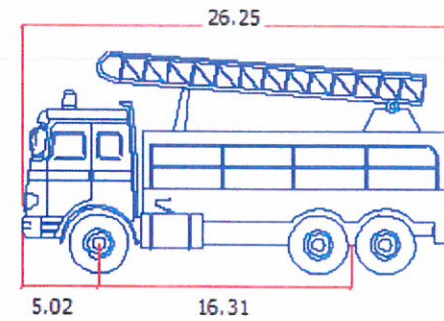
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RESIDENTIAL DEVELOPMENT  
ASSESSOR'S PARCEL 220-87-2  
74 EMERY STREET &  
ASSESSOR'S PARCEL 220-87-3  
64 EMERY STREET  
PORTSMOUTH, NEW HAMPSHIRE

TITLE:

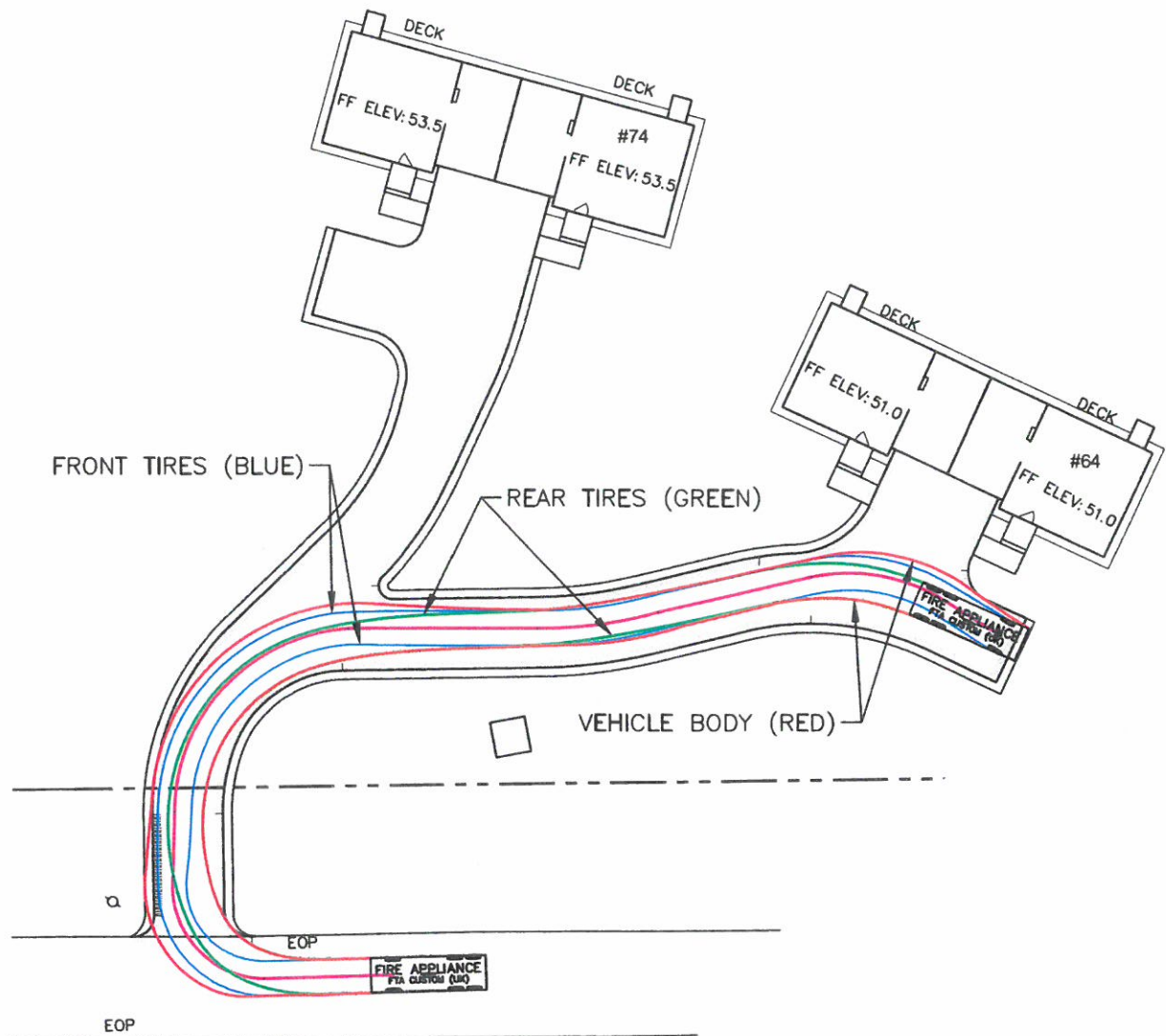
AUTOTURN  
64 EMERY ST

SHEET NUMBER:

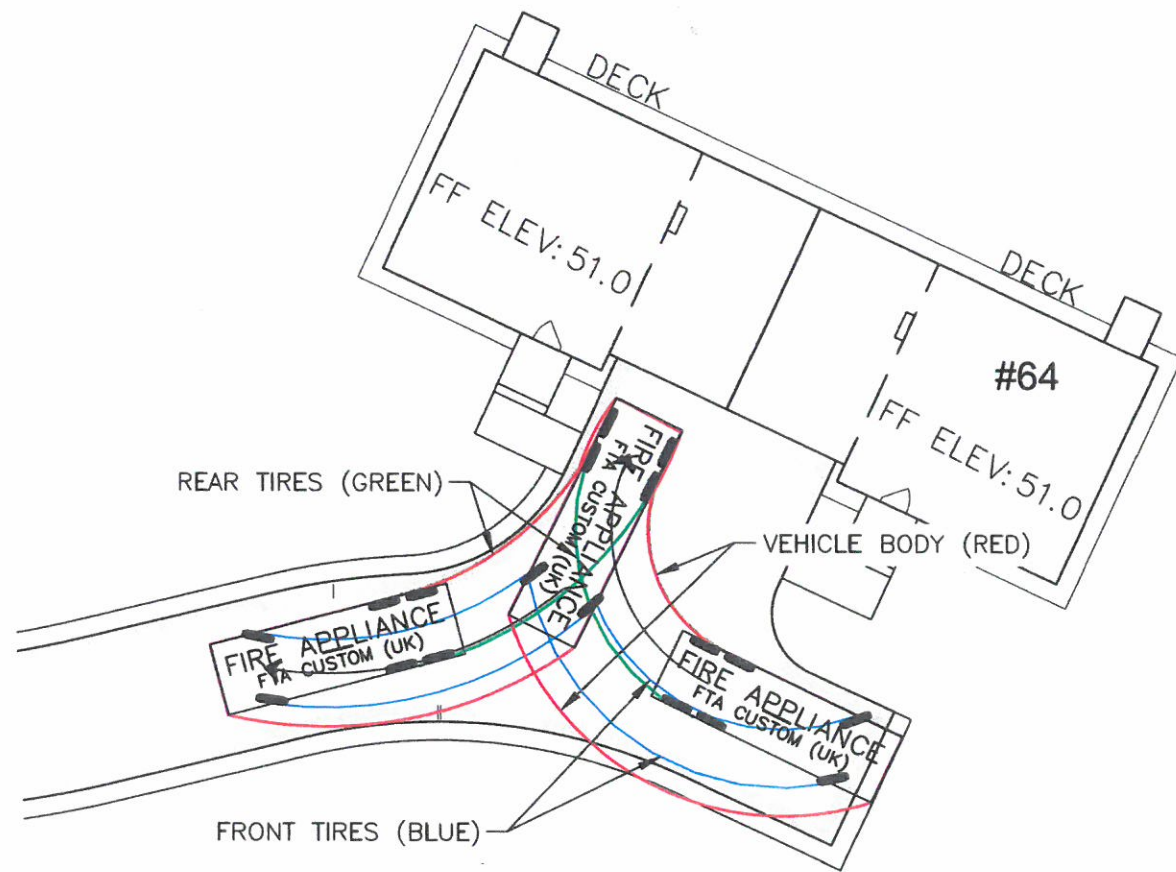
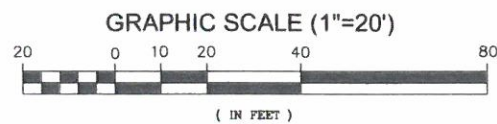
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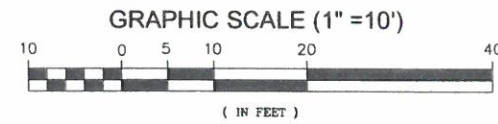
FIRE APPLIANCE TRUCK DIMENSIONS



**TURN MOVEMENT #1**  
Entrance from Emery St.



**TURN MOVEMENT #2**  
3Pt Turn - Reverse and Exit





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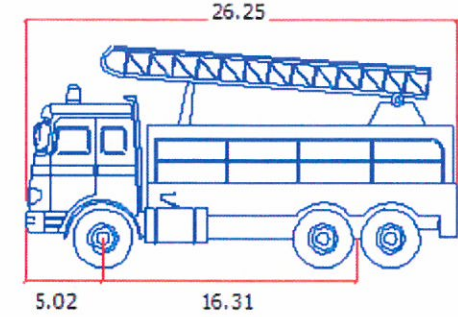
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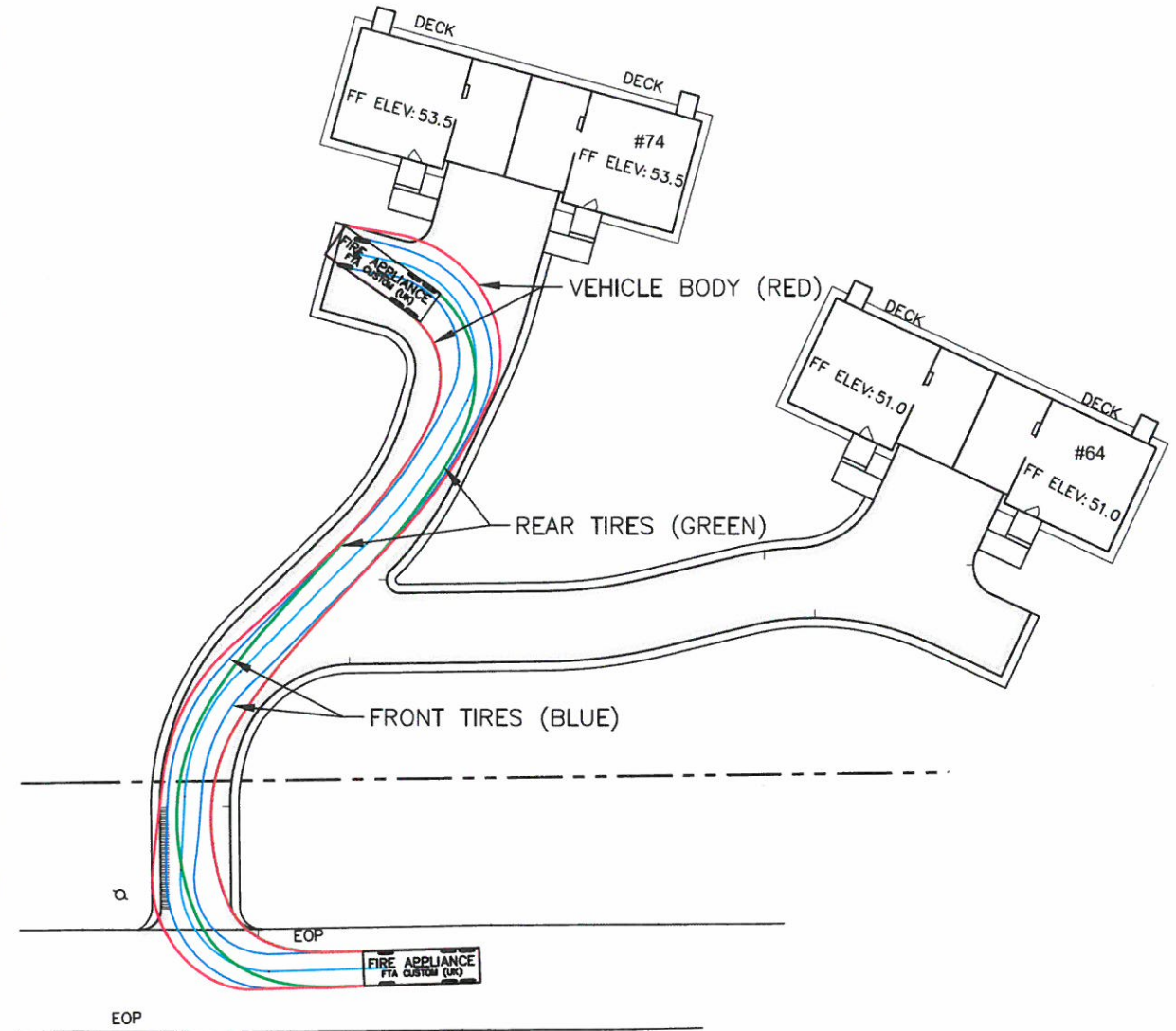
PROJECT:  
RESIDENTIAL DEVELOPMENT  
ASSESSOR'S PARCEL  
220-87-2  
74 EMERY STREET  
&  
ASSESSOR'S PARCEL  
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PORTSMOUTH,  
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TITLE:  
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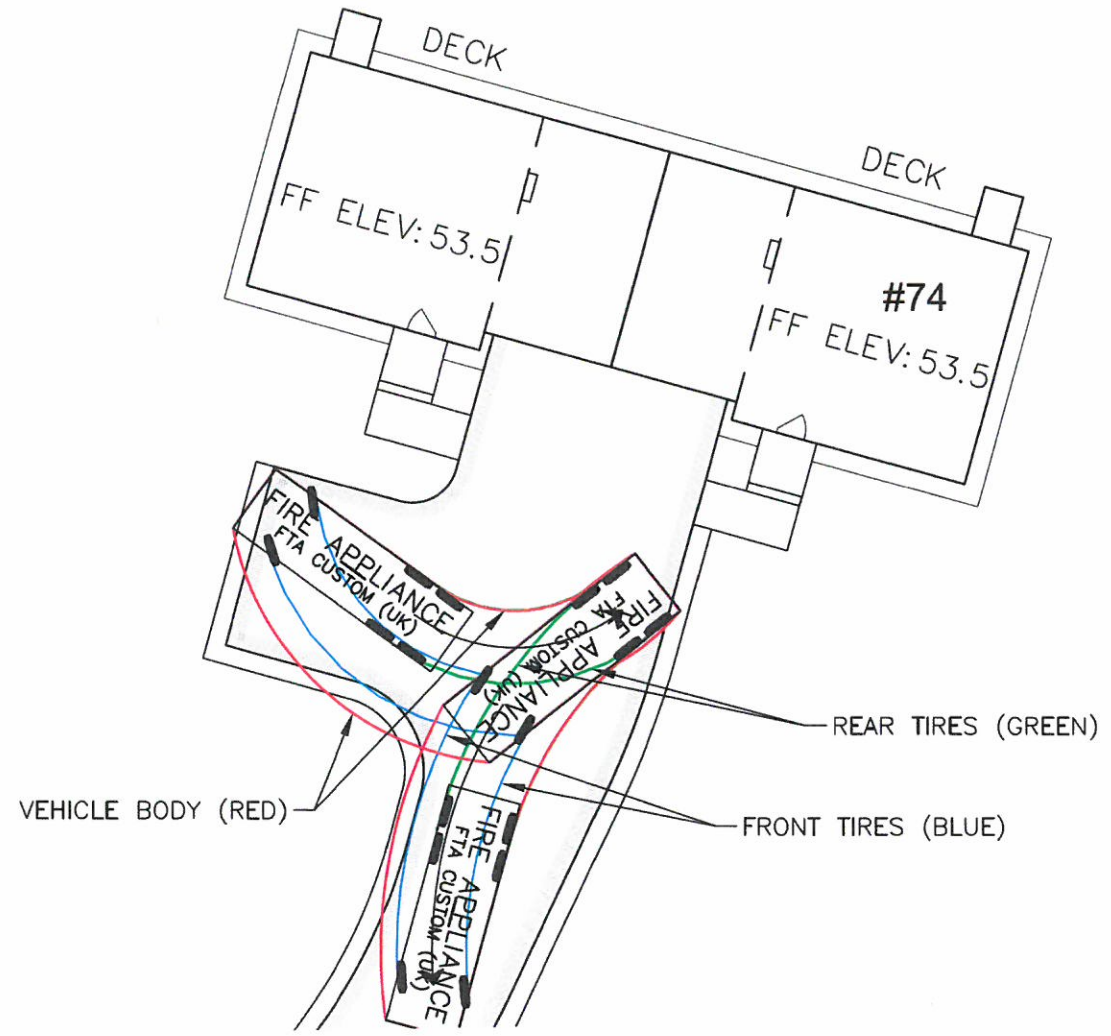
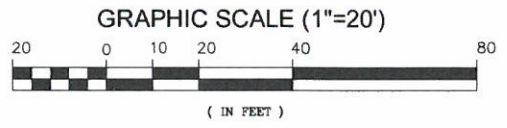
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AT - 2



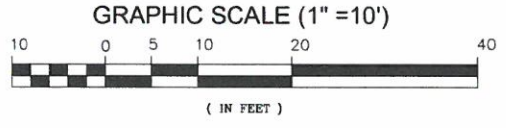
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Entrance from Emery St.



**TURN MOVEMENT #2**  
3Pt Turn - Reverse and Exit





# Two Residential Duplexes

64 & 74 Emery Street

Portsmouth, NH

Assessor's Map 220, Lots 87-2 & 87-3

# DRAINAGE STUDY

**OCTOBER 2018**

~~**SEPTEMBER 2018**~~

*Prepared For:*

HAPPY MOUNTAIN HOLDINGS, LLC

901 N. MARKET STREET

SUITE 705

WILMINGTON, DE 19801

C/O:

Corey Cawthron

750 Lafayette Road

Portsmouth, NH 03801

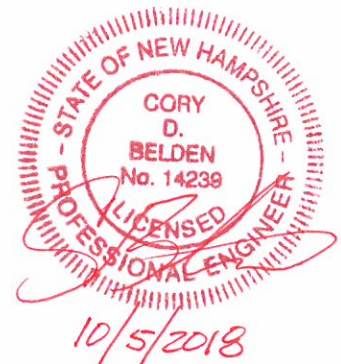
*Prepared By:*

**ALTUS ENGINEERING, INC.**

133 Court Street

Portsmouth, NH 03801

Phone: (603) 433-2335



## **DRAINAGE STUDY**

### ***EXECUTIVE SUMMARY***

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In addition to the permanent stormwater management practices, appropriate steps will be taken to properly mitigate erosion and sedimentation during construction through the use of temporary Best Management Practices for sediment and erosion control. In summary, the proposed development will manage stormwater runoff during construction and post development so that there is no adverse impact to the surrounding area as a result of this development.

### ***Methodology***

The drainage study was completed using the USDA SCS TR-20 Method within the HydroCAD Stormwater Modeling System. Reservoir routing was performed with the Dynamic Storage Indication method which automates the calculation of Tailwater conditions. A Type III 24-hour rainfall distribution was utilized in analyzing the data for the 0.5", 2, 10, 25, and 50 year 24-hour storm events using rainfall data obtained from the Northeast Regional Climate Center (NRCC) Extreme Precipitation Tables. As a conservative measure, 15-percent has been added to each rainfall mimic the requirements of NHDES Alteration of Terrain Permitting requirements. Site topography, existing features, proposed site improvements, proposed grading, drainage and erosion control measures are shown on the accompanying plans. Recommended erosion control measures are based upon the December 2008 edition of the "New Hampshire Stormwater Manual Volumes 1 through 3" prepared by NHDES and Comprehensive Environmental, Inc. as amended.

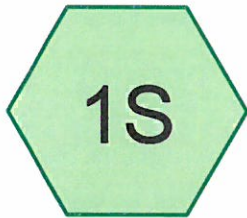
### ***Stormwater Modeling Disclaimer***

Altus Engineering, Inc. notes that stormwater modeling is limited in its capacity to precisely predict peak rates of runoff and flood elevations. Results should not be considered to represent actual storm events due to the number of variables and assumptions involved in the modeling effort. Surface roughness coefficients ( $n$ ), entrance loss coefficients ( $k_e$ ), velocity factors ( $k_v$ ) and times of concentration ( $T_c$ ) are based on subjective field observations and engineering judgment using available data. For design purposes, curve numbers ( $C_n$ ) describe the average conditions. However, curve numbers will vary from storm to storm depending on the antecedent runoff conditions (ARC) including saturation and frozen ground. Also, higher water elevations than predicted by modeling could occur if drainage channels, closed drain systems or culverts are not maintained and/or become blocked by debris before and/or during a storm event as this will impact flow capacity of the structures. Structures should be re-evaluated if future changes occur within relevant drainage areas in order to assess any required design modification.

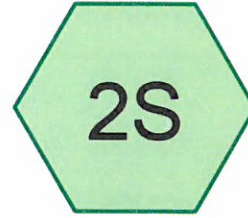
## APPENDIX

- A. Site Maps
  - a. USGS Map
  - b. Aerial Image
- B. HydroCAD Modeling Results
  - a. Extreme Precipitation Table
  - b. Pre-Development (2, 10, 25, & 50 Year Storms)
  - c. Post Development (2, 10, 25, & 50 Year Storms)
- C. Web Soil Survey
- D. Plans
  - Project Site Plans (Separate Submittal)
  - Pre-Development Watershed Plan
  - Post-Development Watershed Plan





POA #1



POA #2



**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.634	48	Brush, Good, HSG B (1S)
1.629	55	Woods, Good, HSG B (1S, 2S)
<b>2.263</b>	<b>53</b>	<b>TOTAL AREA</b>

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.263	HSG B	1S, 2S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>2.263</b>		<b>TOTAL AREA</b>



**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.634	0.000	0.000	0.000	0.634	Brush, Good	1S
0.000	1.629	0.000	0.000	0.000	1.629	Woods, Good	1S, 2S
<b>0.000</b>	<b>2.263</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>2.263</b>	<b>TOTAL AREA</b>	

4916 pre

Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Prepared by Altus Engineering, Inc.

Printed 9/14/2018

HydroCAD® 10.00-22 s/n 01222 © 2018 HydroCAD Software Solutions LLC

Page 5

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: POA #1**

Runoff Area=88,216 sf 0.00% Impervious Runoff Depth=0.00"  
Flow Length=425' Tc=21.5 min CN=53 Runoff=0.00 cfs 0.000 af

**Subcatchment 2S: POA #2**

Runoff Area=10,360 sf 0.00% Impervious Runoff Depth=0.00"  
Flow Length=100' Slope=0.1000 '/' Tc=10.5 min CN=55 Runoff=0.00 cfs 0.000 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"**  
**100.00% Pervious = 2.263 ac 0.00% Impervious = 0.000 ac**

**Summary for Subcatchment 1S: POA #1**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 0.5 Inch storm Rainfall=0.50"

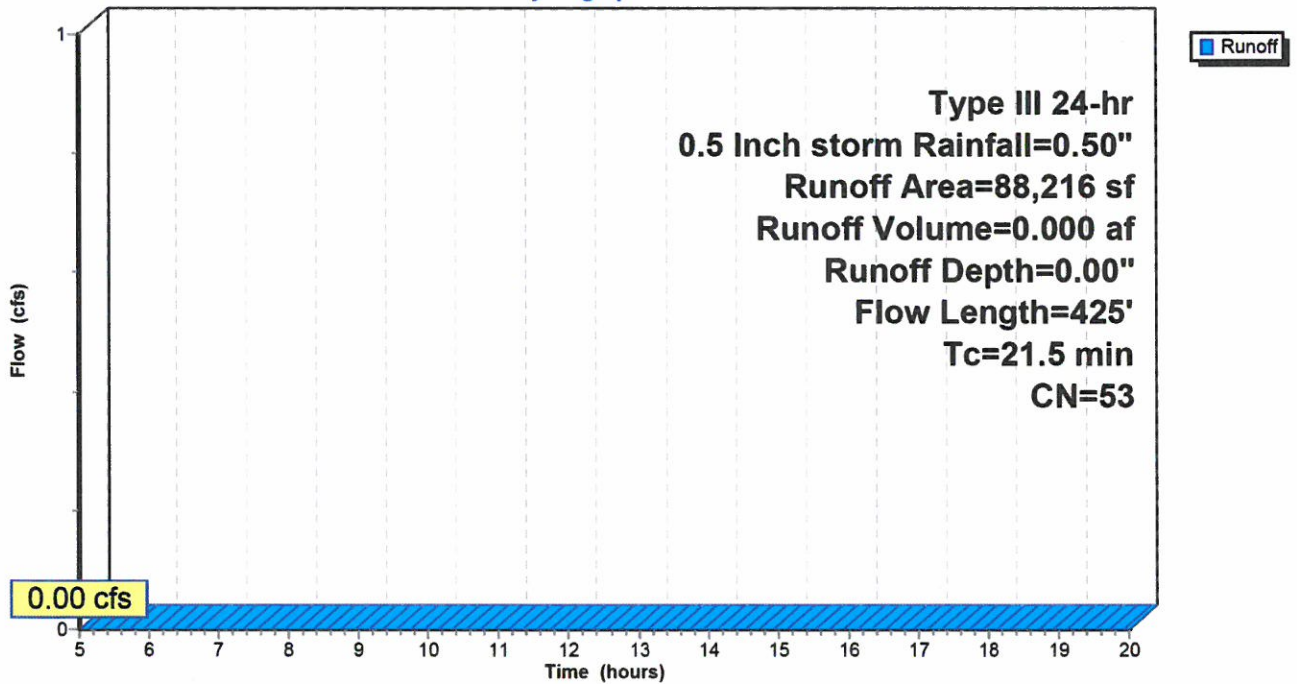
Area (sf)	CN	Description
27,600	48	Brush, Good, HSG B
60,616	55	Woods, Good, HSG B
88,216	53	Weighted Average
88,216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"
6.3	325	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.5	425	Total			

**Subcatchment 1S: POA #1**

Hydrograph





### Summary for Subcatchment 2S: POA #2

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

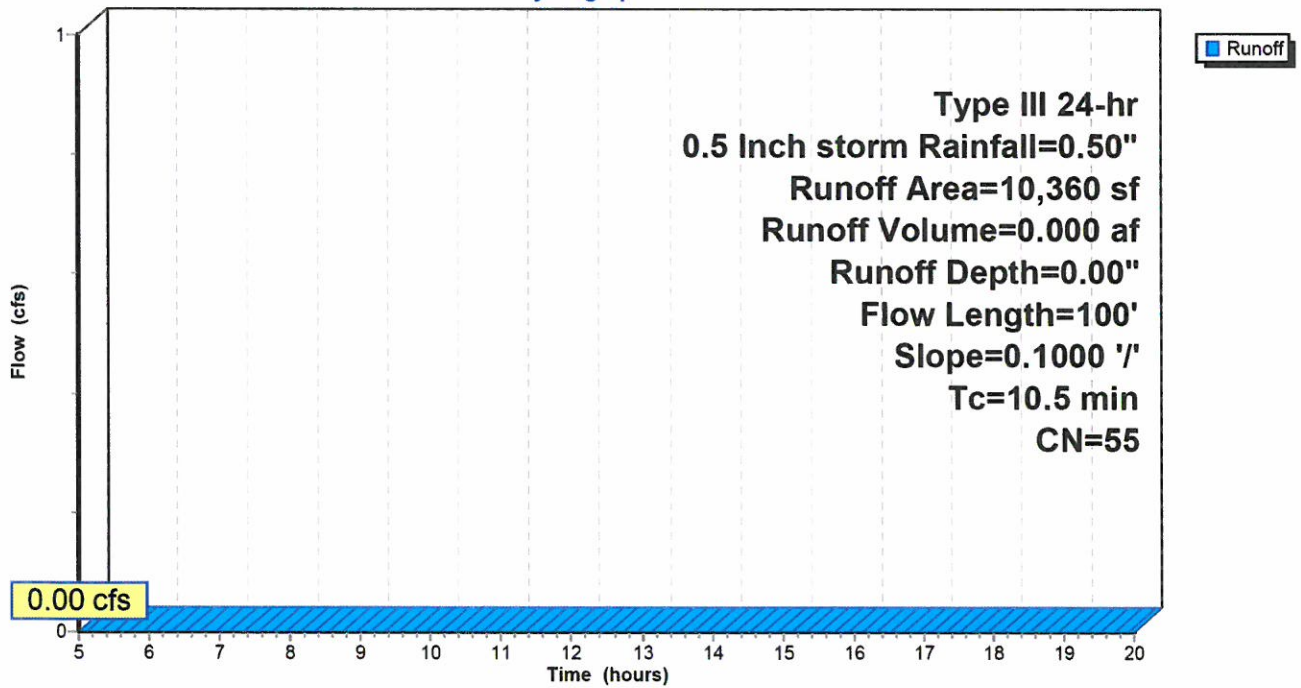
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
10,360	55	Woods, Good, HSG B
10,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1000	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"

### Subcatchment 2S: POA #2

Hydrograph



**4916 pre**

*Type III 24-hr 2-yr storm Rainfall=3.69"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: POA #1**

Runoff Area=88,216 sf 0.00% Impervious Runoff Depth>0.29"  
Flow Length=425' Tc=21.5 min CN=53 Runoff=0.27 cfs 0.048 af

**Subcatchment 2S: POA #2**

Runoff Area=10,360 sf 0.00% Impervious Runoff Depth>0.35"  
Flow Length=100' Slope=0.1000 '/ Tc=10.5 min CN=55 Runoff=0.05 cfs 0.007 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.055 af Average Runoff Depth = 0.29"**  
**100.00% Pervious = 2.263 ac 0.00% Impervious = 0.000 ac**

### Summary for Subcatchment 1S: POA #1

Runoff = 0.27 cfs @ 12.53 hrs, Volume= 0.048 af, Depth> 0.29"

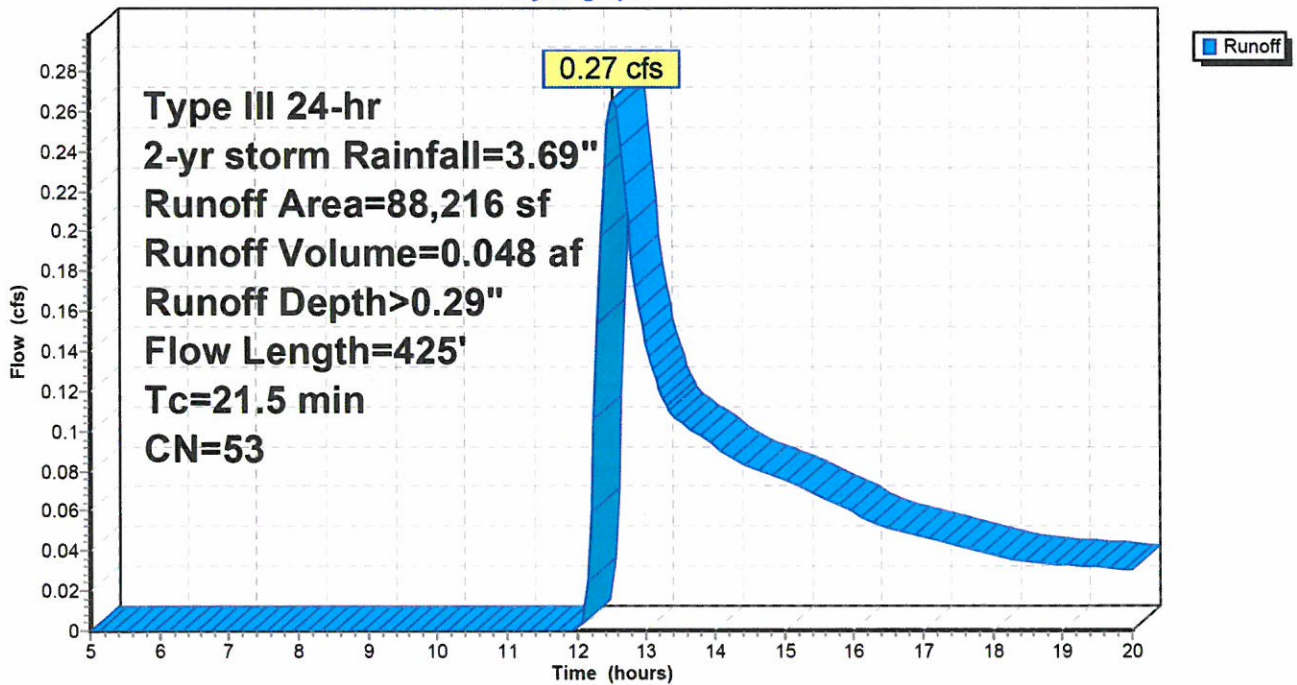
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
27,600	48	Brush, Good, HSG B
60,616	55	Woods, Good, HSG B
88,216	53	Weighted Average
88,216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"
6.3	325	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.5	425	Total			

### Subcatchment 1S: POA #1

Hydrograph





**Summary for Subcatchment 2S: POA #2**

Runoff = 0.05 cfs @ 12.28 hrs, Volume= 0.007 af, Depth> 0.35"

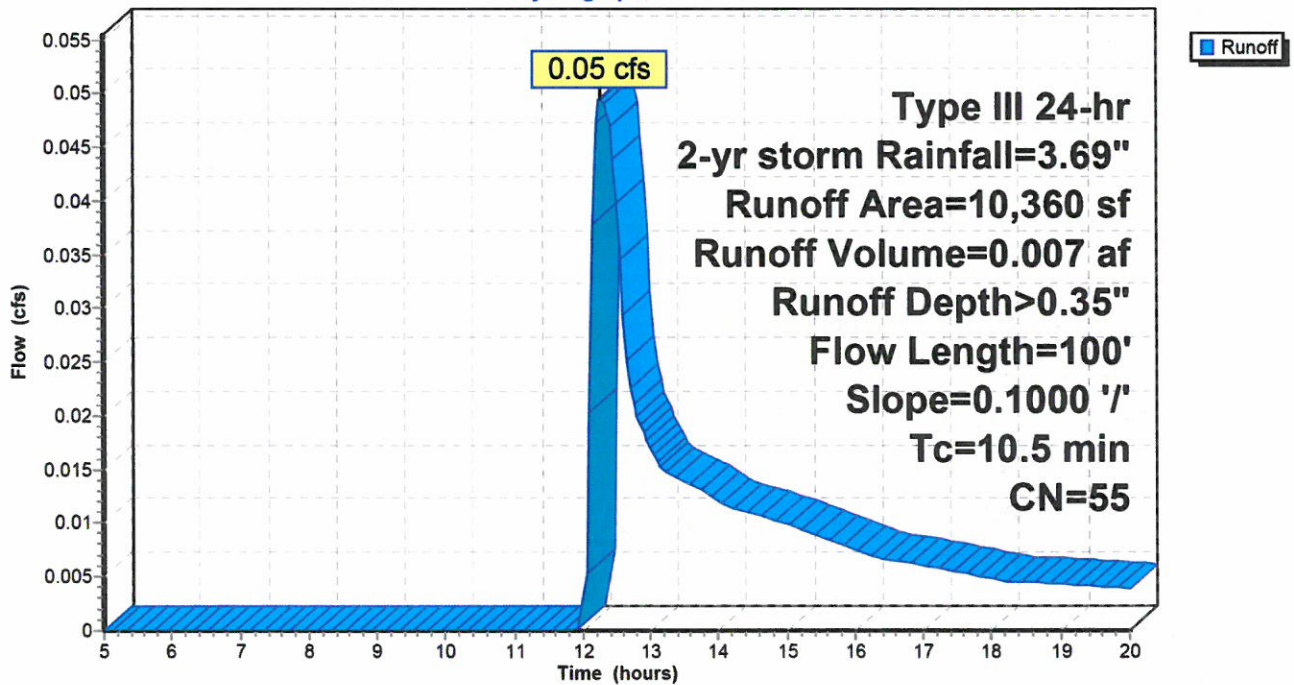
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
10,360	55	Woods, Good, HSG B
10,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1000	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"

**Subcatchment 2S: POA #2**

Hydrograph



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Type III 24-hr 10-yr storm Rainfall=5.60"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: POA #1**

Runoff Area=88,216 sf 0.00% Impervious Runoff Depth>1.02"  
Flow Length=425' Tc=21.5 min CN=53 Runoff=1.46 cfs 0.172 af

**Subcatchment 2S: POA #2**

Runoff Area=10,360 sf 0.00% Impervious Runoff Depth>1.16"  
Flow Length=100' Slope=0.1000 '/' Tc=10.5 min CN=55 Runoff=0.26 cfs 0.023 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.195 af Average Runoff Depth = 1.04"**  
**100.00% Pervious = 2.263 ac 0.00% Impervious = 0.000 ac**

**Summary for Subcatchment 1S: POA #1**

Runoff = 1.46 cfs @ 12.36 hrs, Volume= 0.172 af, Depth> 1.02"

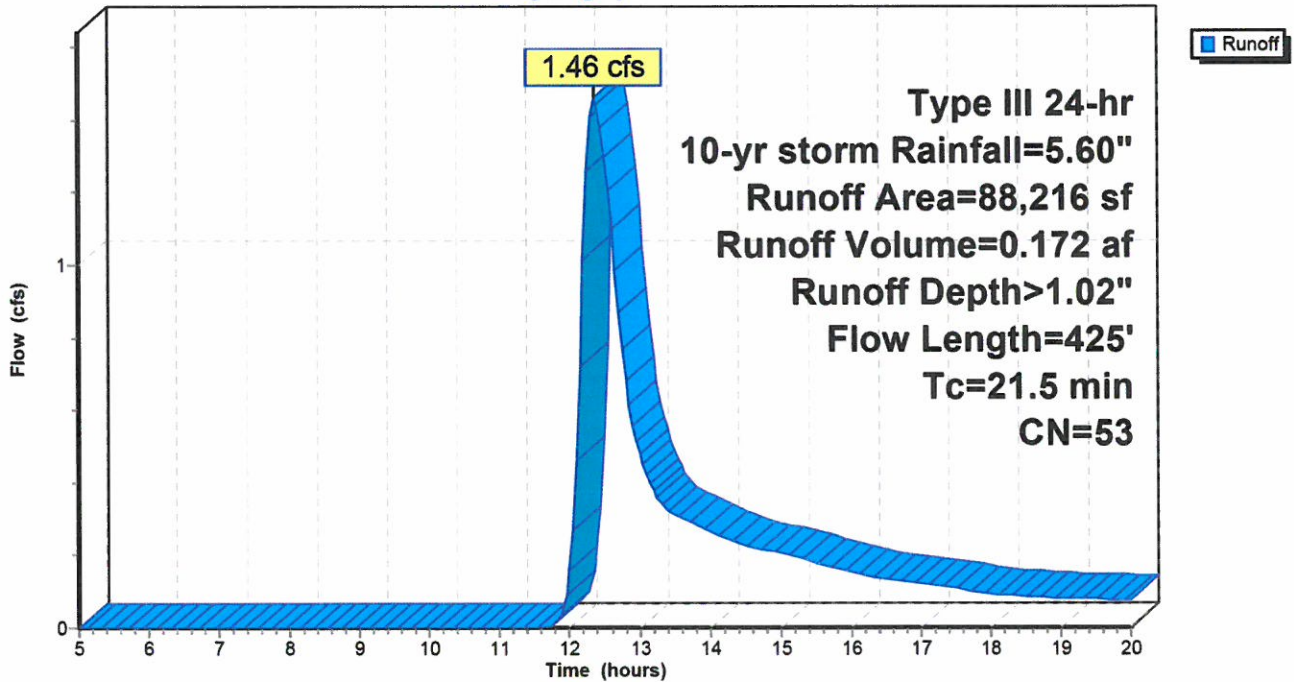
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
27,600	48	Brush, Good, HSG B
60,616	55	Woods, Good, HSG B
88,216	53	Weighted Average
88,216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"
6.3	325	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.5	425	Total			

**Subcatchment 1S: POA #1**

Hydrograph





**Summary for Subcatchment 2S: POA #2**

Runoff = 0.26 cfs @ 12.17 hrs, Volume= 0.023 af, Depth> 1.16"

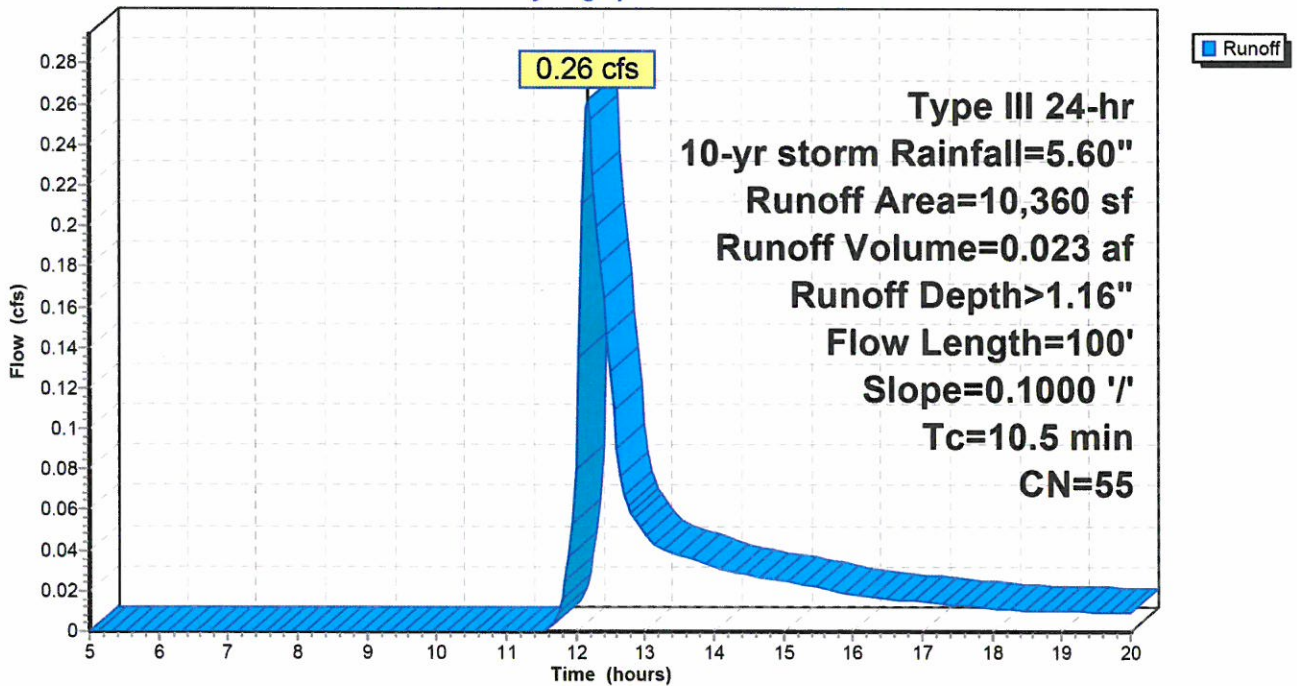
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
10,360	55	Woods, Good, HSG B
10,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1000	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"

**Subcatchment 2S: POA #2**

Hydrograph



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*Type III 24-hr 25-yr storm Rainfall=7.10"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: POA #1**

Runoff Area=88,216 sf 0.00% Impervious Runoff Depth>1.80"  
Flow Length=425' Tc=21.5 min CN=53 Runoff=2.82 cfs 0.303 af

**Subcatchment 2S: POA #2**

Runoff Area=10,360 sf 0.00% Impervious Runoff Depth>1.99"  
Flow Length=100' Slope=0.1000 '/' Tc=10.5 min CN=55 Runoff=0.49 cfs 0.039 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.343 af Average Runoff Depth = 1.82"**  
**100.00% Pervious = 2.263 ac 0.00% Impervious = 0.000 ac**

### Summary for Subcatchment 1S: POA #1

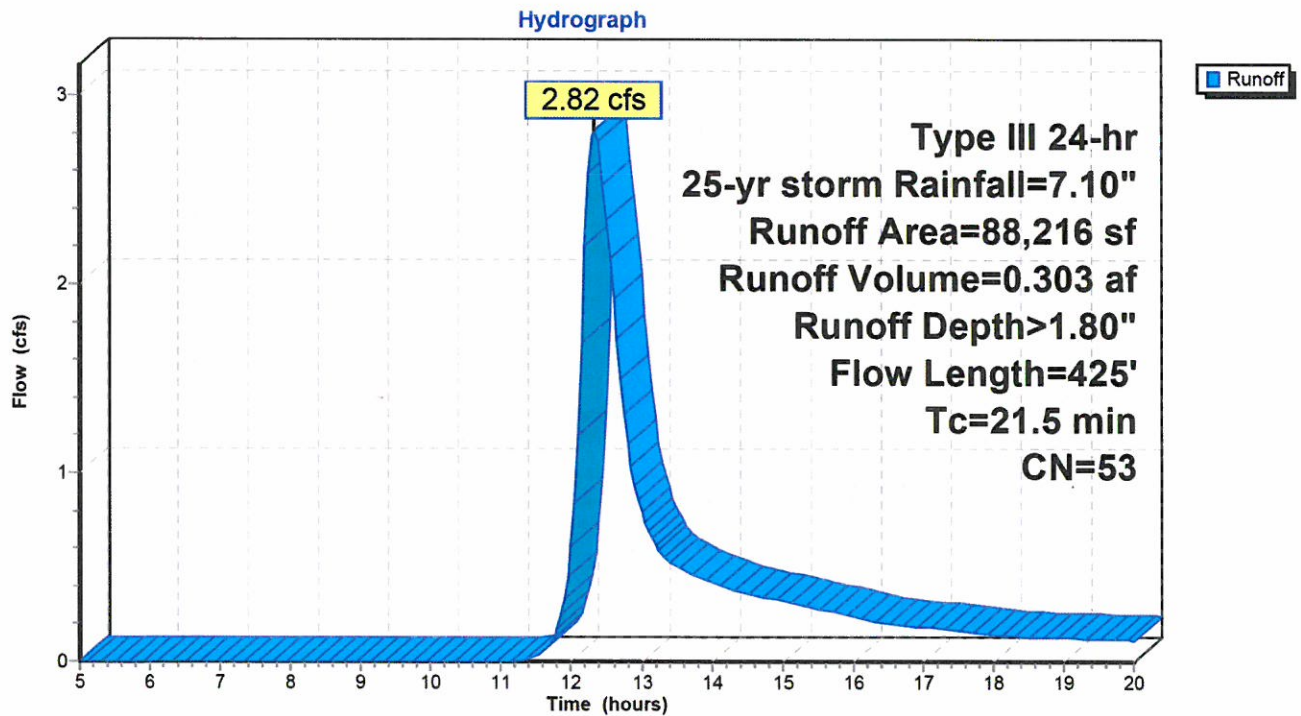
Runoff = 2.82 cfs @ 12.33 hrs, Volume= 0.303 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
27,600	48	Brush, Good, HSG B
60,616	55	Woods, Good, HSG B
88,216	53	Weighted Average
88,216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"
6.3	325	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.5	425	Total			

### Subcatchment 1S: POA #1





**Summary for Subcatchment 2S: POA #2**

Runoff = 0.49 cfs @ 12.16 hrs, Volume= 0.039 af, Depth> 1.99"

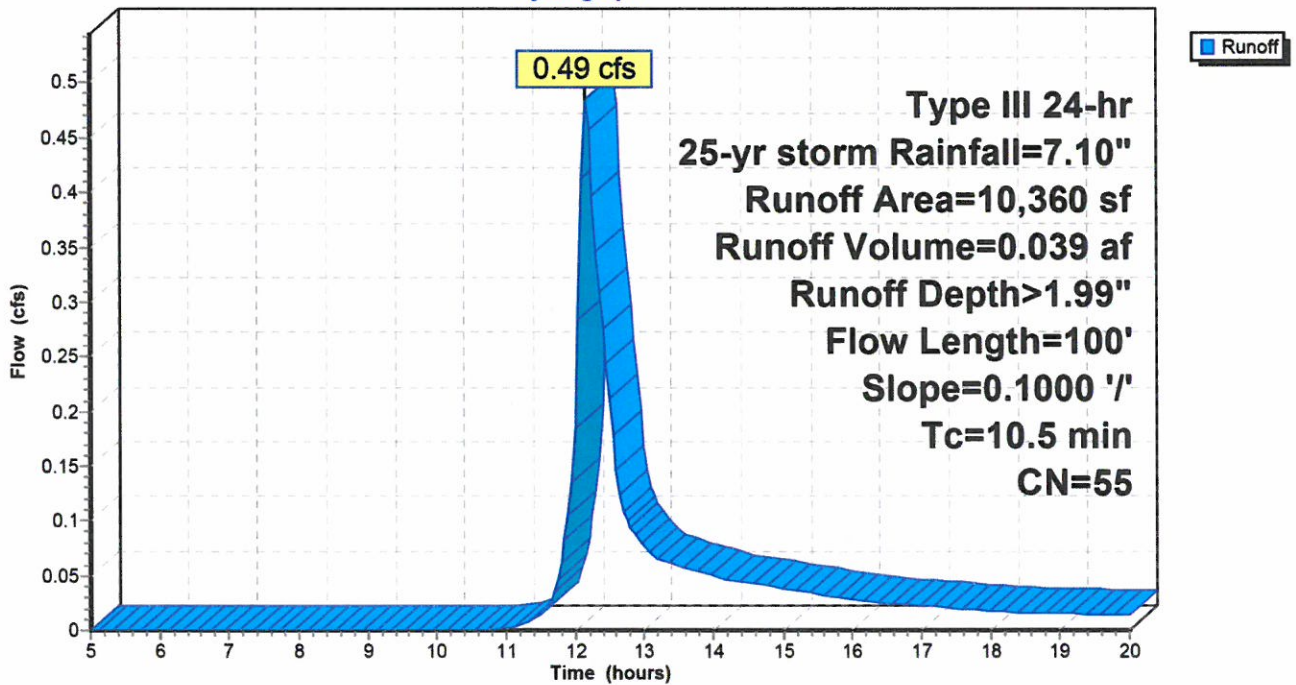
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
10,360	55	Woods, Good, HSG B
10,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1000	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"

**Subcatchment 2S: POA #2**

Hydrograph



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Type III 24-hr 50-yr storm Rainfall=8.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: POA #1**

Runoff Area=88,216 sf 0.00% Impervious Runoff Depth>2.63"  
Flow Length=425' Tc=21.5 min CN=53 Runoff=4.28 cfs 0.445 af

**Subcatchment 2S: POA #2**

Runoff Area=10,360 sf 0.00% Impervious Runoff Depth>2.87"  
Flow Length=100' Slope=0.1000 '/' Tc=10.5 min CN=55 Runoff=0.72 cfs 0.057 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.501 af Average Runoff Depth = 2.66"**  
**100.00% Pervious = 2.263 ac 0.00% Impervious = 0.000 ac**

**Summary for Subcatchment 1S: POA #1**

Runoff = 4.28 cfs @ 12.32 hrs, Volume= 0.445 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 50-yr storm Rainfall=8.50"

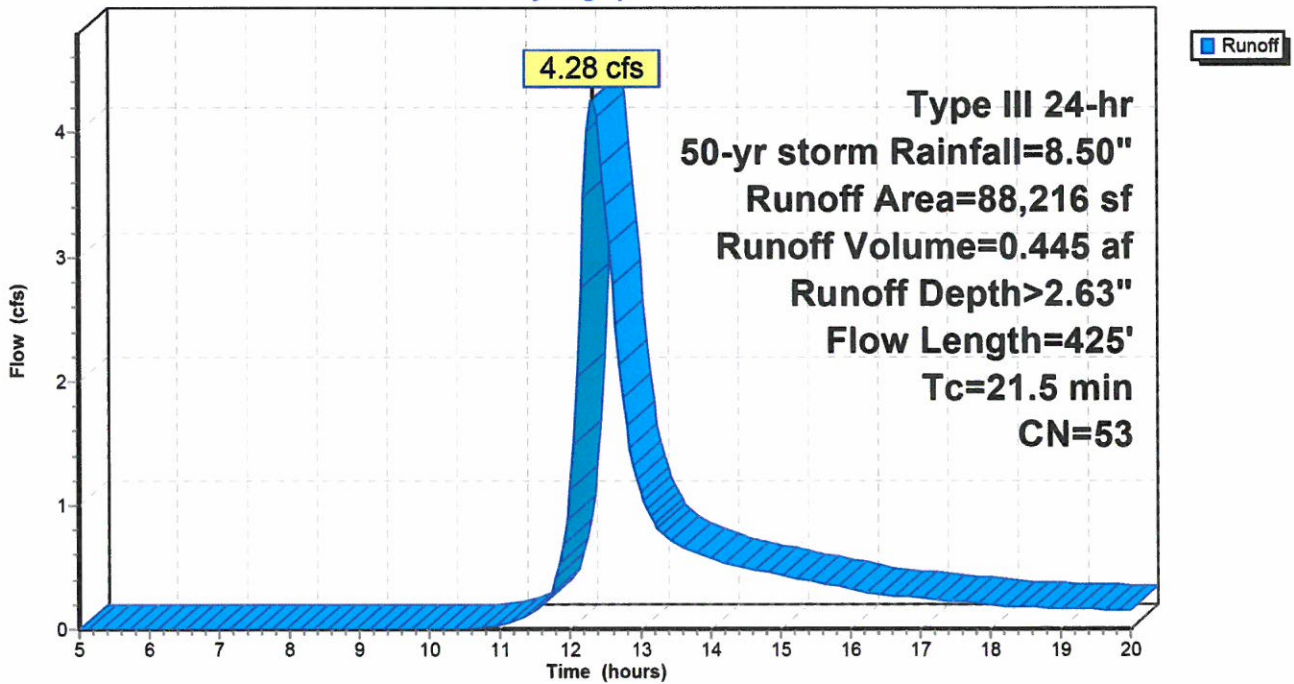
Area (sf)	CN	Description
27,600	48	Brush, Good, HSG B
60,616	55	Woods, Good, HSG B
88,216	53	Weighted Average
88,216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"
6.3	325	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.5	425	Total			

**Subcatchment 1S: POA #1**

Hydrograph





**Summary for Subcatchment 2S: POA #2**

Runoff = 0.72 cfs @ 12.16 hrs, Volume= 0.057 af, Depth> 2.87"

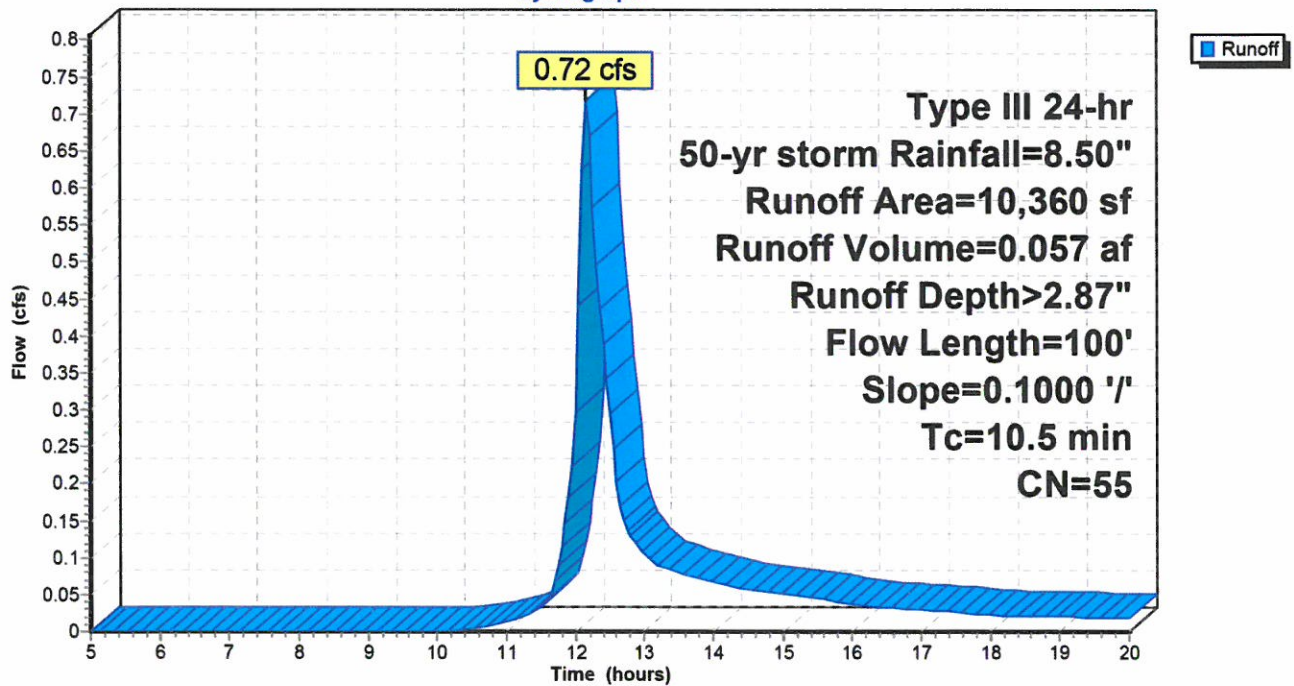
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
10,360	55	Woods, Good, HSG B
10,360		100.00% Pervious Area

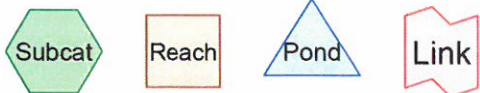
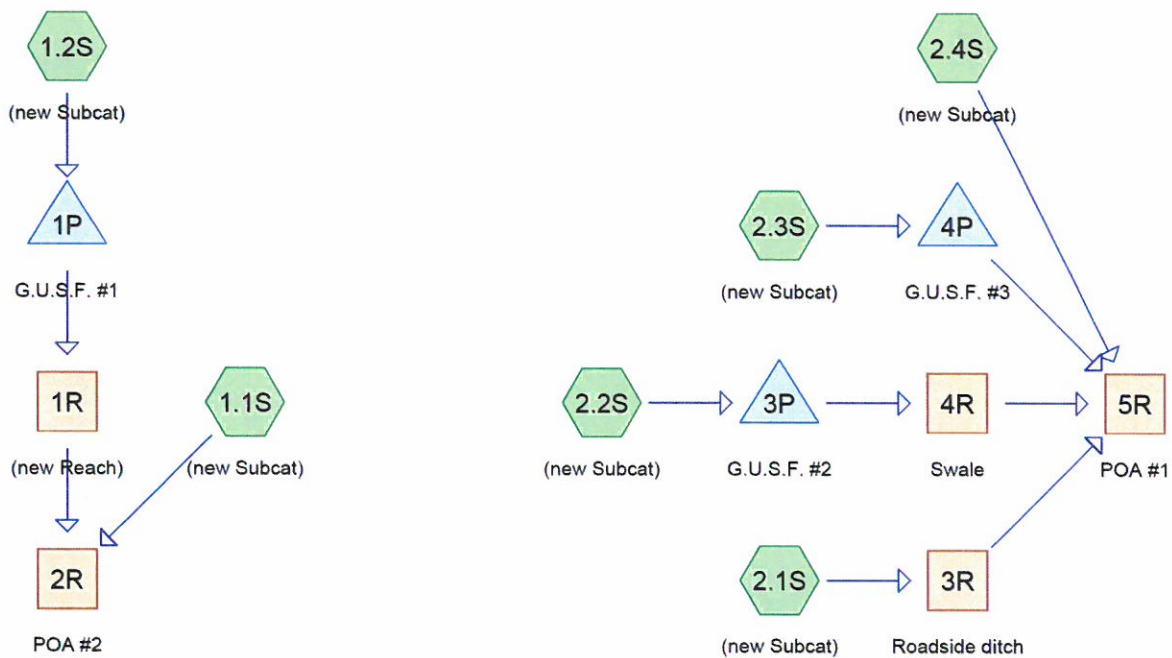
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.1000	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.69"

**Subcatchment 2S: POA #2**

Hydrograph







**Routing Diagram for 4916 post**  
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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.434	61	>75% Grass cover, Good, HSG B (1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S)
0.634	48	Brush, Good, HSG B (1.2S, 2.2S, 2.4S)
0.166	98	Paved parking, HSG B (1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S)
0.025	98	Roofs, HSG B (1.2S, 2.2S, 2.4S)
0.066	98	Unconnected roofs, HSG B (1.2S, 2.2S, 2.4S)
0.939	55	Woods, Good, HSG B (1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S)
<b>2.263</b>	<b>59</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.263	HSG B	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>2.263</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.434	0.000	0.000	0.000	0.434	>75% Grass cover, Good	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
0.000	0.634	0.000	0.000	0.000	0.634	Brush, Good	1.2S, 2.2S, 2.4S
0.000	0.166	0.000	0.000	0.000	0.166	Paved parking	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
0.000	0.025	0.000	0.000	0.000	0.025	Roofs	1.2S, 2.2S, 2.4S
0.000	0.066	0.000	0.000	0.000	0.066	Unconnected roofs	1.2S, 2.2S, 2.4S
0.000	0.939	0.000	0.000	0.000	0.939	Woods, Good	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
<b>0.000</b>	<b>2.263</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>2.263</b>	<b>TOTAL AREA</b>	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth=0.00"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.00 cfs 0.000 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth=0.00"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth=0.00"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth=0.00"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth=0.00"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth=0.00"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.00 cfs 0.000 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=0.00 cfs 0.000 af

**Reach 2R: POA #2** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.00 cfs 0.000 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.00 cfs 0.000 af

**Reach 4R: Swale** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.00 cfs 0.000 af

**Reach 5R: POA #1** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.00 cfs 0.000 af

**Pond 1P: G.U.S.F. #1** Peak Elev=46.17' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 3P: G.U.S.F. #2** Peak Elev=44.17' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 4P: G.U.S.F. #3** Peak Elev=45.17' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**



**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			

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Type III 24-hr 0.5 Inch storm Rainfall=0.50"

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**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

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Type III 24-hr 0.5 Inch storm Rainfall=0.50"

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**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'





**Summary for Reach 3R: Roadside ditch**

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 160.0' Slope= 0.0125 '/'  
Inlet Invert= 42.00', Outlet Invert= 40.00'



**Summary for Reach 4R: Swale**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 85.0' Slope= 0.0624 '/'  
Inlet Invert= 47.30', Outlet Invert= 42.00'



**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
 Average Depth at Peak Storage= 0.00'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 '/'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 46.17' @ 5.00 hrs Surf.Area= 615 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description	
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283



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Type III 24-hr 0.5 Inch storm Rainfall=0.50"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
			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 4.50 5.00 5.50
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64
			2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

**Discarded OutFlow** Max=0.00 cfs @ 5.00 hrs HW=46.17' (Free Discharge)

↳ **1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=46.17' (Free Discharge)

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

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 44.17' @ 5.00 hrs Surf.Area= 500 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet) Cum.Store (cubic-feet)
44.17	500	0.0	0 0
44.67	500	40.0	100 100
46.17	500	20.0	150 250
46.50	500	100.0	165 415
47.00	697	100.0	299 714
47.75	1,000	100.0	636 1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
			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 4.50 5.00 5.50
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64
			2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

4916 post

Type III 24-hr 0.5 Inch storm Rainfall=0.50"

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Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.17' (Free Discharge)

↳1=Exfiltration (Passes 0.00 cfs of 0.01 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.17' (Free Discharge)

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

### Summary for Pond 4P: G.U.S.F. #3

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 45.17' @ 5.00 hrs Surf.Area= 110 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices																		
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>																		
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>																		
			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	4.50	5.00	5.50	
			Coef. (English)	2.43	2.54	2.70	2.69	2.68	2.68	2.66	2.64	2.64	2.64	2.64	2.64	2.65	2.65	2.66	2.66	2.68	2.74

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=45.17' (Free Discharge)

↳1=Exfiltration (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=45.17' (Free Discharge)

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



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>1.26"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.17 cfs 0.011 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>0.35"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=0.18 cfs 0.028 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>1.20"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.27 cfs 0.018 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>0.54"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=0.18 cfs 0.020 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>1.08"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.11 cfs 0.008 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>0.26"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.06 cfs 0.011 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=0.00 cfs 0.000 af

**Reach 2R: POA #2** Avg. Flow Depth=0.09' Max Vel=3.23 fps Inflow=0.17 cfs 0.011 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.17 cfs 0.011 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.18' Max Vel=1.78 fps Inflow=0.27 cfs 0.018 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.25 cfs 0.018 af

**Reach 4R: Swale** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.00 cfs 0.000 af

**Reach 5R: POA #1** Avg. Flow Depth=0.12' Max Vel=3.76 fps Inflow=0.28 cfs 0.031 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.28 cfs 0.031 af

**Pond 1P: G.U.S.F. #1** Peak Elev=49.34' Storage=930 cf Inflow=0.18 cfs 0.028 af  
 Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

**Pond 3P: G.U.S.F. #2** Peak Elev=46.84' Storage=621 cf Inflow=0.18 cfs 0.020 af  
 Discarded=0.01 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

**Pond 4P: G.U.S.F. #3** Peak Elev=47.91' Storage=175 cf Inflow=0.11 cfs 0.008 af  
 Discarded=0.00 cfs 0.002 af Primary=0.01 cfs 0.001 af Outflow=0.01 cfs 0.004 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.096 af Average Runoff Depth = 0.51"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

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Type III 24-hr 2-yr storm Rainfall=3.69"

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**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.011 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 0.18 cfs @ 12.43 hrs, Volume= 0.028 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			



**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.018 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 0.18 cfs @ 12.21 hrs, Volume= 0.020 af, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



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Type III 24-hr 2-yr storm Rainfall=3.69"

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**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.06 cfs @ 12.39 hrs, Volume= 0.011 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth = 0.00" for 2-yr storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



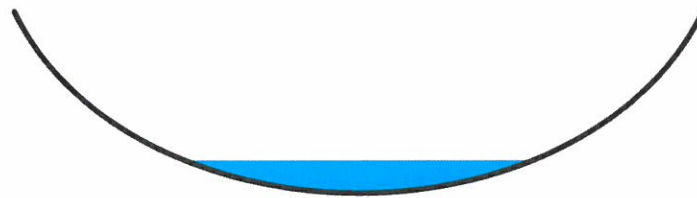
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 0.13" for 2-yr storm event  
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 0.011 af  
Outflow = 0.17 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.23 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.10 hrs  
Average Depth at Peak Storage= 0.09'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



**4916 post**

Type III 24-hr 2-yr storm Rainfall=3.69"

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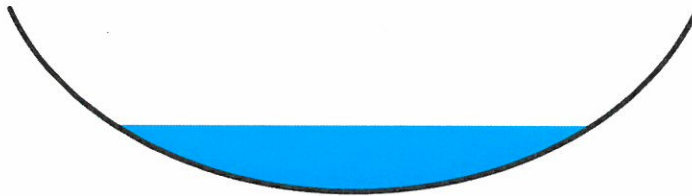
**Summary for Reach 3R: Roadside ditch**

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 1.20" for 2-yr storm event  
Inflow = 0.27 cfs @ 12.10 hrs, Volume= 0.018 af  
Outflow = 0.25 cfs @ 12.15 hrs, Volume= 0.018 af, Atten= 6%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.78 fps, Min. Travel Time= 1.5 min  
Avg. Velocity = 0.75 fps, Avg. Travel Time= 3.6 min

Peak Storage= 23 cf @ 12.12 hrs  
Average Depth at Peak Storage= 0.18'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 160.0' Slope= 0.0125 '/'  
Inlet Invert= 42.00', Outlet Invert= 40.00'



**Summary for Reach 4R: Swale**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth = 0.00" for 2-yr storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 85.0' Slope= 0.0624 '/'  
Inlet Invert= 47.30', Outlet Invert= 42.00'





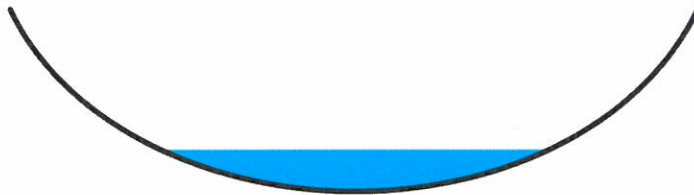
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 0.30" for 2-yr storm event  
 Inflow = 0.28 cfs @ 12.16 hrs, Volume= 0.031 af  
 Outflow = 0.28 cfs @ 12.16 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.76 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.16 hrs  
 Average Depth at Peak Storage= 0.12'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 '/'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 0.35" for 2-yr storm event  
 Inflow = 0.18 cfs @ 12.43 hrs, Volume= 0.028 af  
 Outflow = 0.01 cfs @ 20.00 hrs, Volume= 0.006 af, Atten= 94%, Lag= 454.0 min  
 Discarded = 0.01 cfs @ 20.00 hrs, Volume= 0.006 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 49.34' @ 20.00 hrs Surf.Area= 787 sf Storage= 930 cf

Plug-Flow detention time= 232.7 min calculated for 0.006 af (23% of inflow)  
 Center-of-Mass det. time= 101.2 min ( 977.3 - 876.0 )

Volume	Invert	Avail.Storage	Storage Description	
#1	46.17'	2,283 cf	Custom Stage Data (Prismatic) Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 2-yr storm Rainfall=3.69"

Prepared by Altus Engineering, Inc.

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

**Discarded OutFlow** Max=0.01 cfs @ 20.00 hrs HW=49.34' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=46.17' (Free Discharge)

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

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 0.54" for 2-yr storm event  
 Inflow = 0.18 cfs @ 12.21 hrs, Volume= 0.020 af  
 Outflow = 0.01 cfs @ 20.00 hrs, Volume= 0.005 af, Atten= 95%, Lag= 467.1 min  
 Discarded = 0.01 cfs @ 20.00 hrs, Volume= 0.005 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 46.84' @ 20.00 hrs Surf.Area= 636 sf Storage= 621 cf

Plug-Flow detention time= 236.6 min calculated for 0.005 af (27% of inflow)  
 Center-of-Mass det. time= 120.0 min ( 972.4 - 852.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.17	500	0.0	0	0
44.67	500	40.0	100	100
46.17	500	20.0	150	250
46.50	500	100.0	165	415
47.00	697	100.0	299	714
47.75	1,000	100.0	636	1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74



Discarded OutFlow Max=0.01 cfs @ 20.00 hrs HW=46.84' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=44.17' (Free Discharge)

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

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 1.08" for 2-yr storm event  
 Inflow = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af  
 Outflow = 0.01 cfs @ 13.13 hrs, Volume= 0.004 af, Atten= 89%, Lag= 61.9 min  
 Discarded = 0.00 cfs @ 13.13 hrs, Volume= 0.002 af  
 Primary = 0.01 cfs @ 13.13 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.91' @ 13.13 hrs Surf.Area= 266 sf Storage= 175 cf

Plug-Flow detention time= 195.4 min calculated for 0.004 af (49% of inflow)  
 Center-of-Mass det. time= 104.2 min ( 922.9 - 818.7 )

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices										
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>										
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>										
			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	4.50	5.00	5.50			
			Coef. (English)	2.43	2.54	2.70	2.69	2.68	2.68	2.66	2.64	2.64	
				2.64	2.65	2.65	2.66	2.66	2.68	2.70	2.74		

Discarded OutFlow Max=0.00 cfs @ 13.13 hrs HW=47.91' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 13.13 hrs HW=47.91' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 0.00 cfs @ 0.18 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>2.65"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.36 cfs 0.024 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>1.15"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=0.85 cfs 0.091 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>2.56"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.58 cfs 0.039 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>1.51"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=0.64 cfs 0.055 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>2.39"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.25 cfs 0.017 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>0.96"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.43 cfs 0.041 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.09' Max Vel=3.27 fps Inflow=0.17 cfs 0.039 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=0.17 cfs 0.038 af

**Reach 2R: POA #2** Avg. Flow Depth=0.13' Max Vel=4.05 fps Inflow=0.36 cfs 0.062 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.36 cfs 0.062 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.26' Max Vel=2.25 fps Inflow=0.58 cfs 0.039 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.55 cfs 0.039 af

**Reach 4R: Swale** Avg. Flow Depth=0.10' Max Vel=2.77 fps Inflow=0.18 cfs 0.024 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.17 cfs 0.024 af

**Reach 5R: POA #1** Avg. Flow Depth=0.23' Max Vel=5.84 fps Inflow=1.22 cfs 0.115 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=1.22 cfs 0.115 af

**Pond 1P: G.U.S.F. #1** Peak Elev=50.26' Storage=1,845 cf Inflow=0.85 cfs 0.091 af  
 Discarded=0.02 cfs 0.011 af Primary=0.17 cfs 0.039 af Outflow=0.19 cfs 0.050 af

**Pond 3P: G.U.S.F. #2** Peak Elev=47.37' Storage=1,027 cf Inflow=0.64 cfs 0.055 af  
 Discarded=0.01 cfs 0.008 af Primary=0.18 cfs 0.024 af Outflow=0.19 cfs 0.032 af

**Pond 4P: G.U.S.F. #3** Peak Elev=47.99' Storage=192 cf Inflow=0.25 cfs 0.017 af  
 Discarded=0.00 cfs 0.003 af Primary=0.25 cfs 0.010 af Outflow=0.26 cfs 0.013 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.266 af Average Runoff Depth = 1.41"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.024 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 0.85 cfs @ 12.29 hrs, Volume= 0.091 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			



**4916 post**

Type III 24-hr 10-yr storm Rainfall=5.60"

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**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 0.64 cfs @ 12.18 hrs, Volume= 0.055 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.43 cfs @ 12.18 hrs, Volume= 0.041 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**4916 post**

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Type III 24-hr 10-yr storm Rainfall=5.60"

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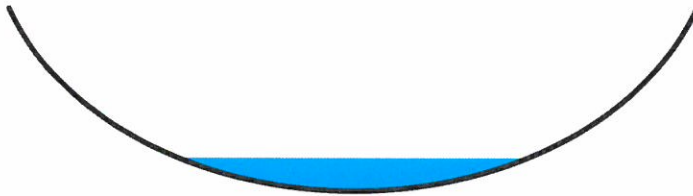
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 0.49" for 10-yr storm event  
Inflow = 0.17 cfs @ 13.18 hrs, Volume= 0.039 af  
Outflow = 0.17 cfs @ 13.20 hrs, Volume= 0.038 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.27 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 2.35 fps, Avg. Travel Time= 0.7 min

Peak Storage= 5 cf @ 13.20 hrs  
Average Depth at Peak Storage= 0.09'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



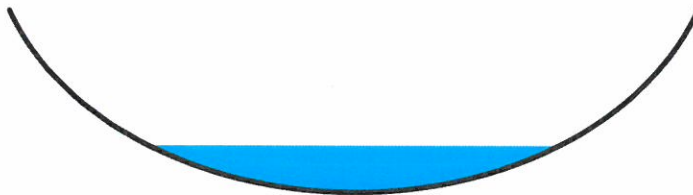
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 0.71" for 10-yr storm event  
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.062 af  
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 4.05 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.17 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.09 hrs  
Average Depth at Peak Storage= 0.13'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



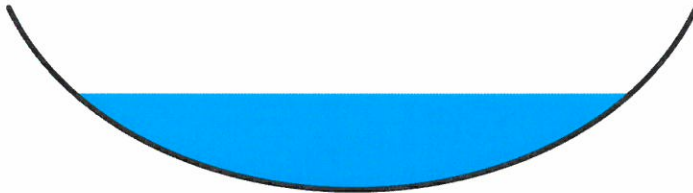
### Summary for Reach 3R: Roadside ditch

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 2.56" for 10-yr storm event  
 Inflow = 0.58 cfs @ 12.09 hrs, Volume= 0.039 af  
 Outflow = 0.55 cfs @ 12.13 hrs, Volume= 0.039 af, Atten= 6%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.25 fps, Min. Travel Time= 1.2 min  
 Avg. Velocity = 0.88 fps, Avg. Travel Time= 3.0 min

Peak Storage= 41 cf @ 12.11 hrs  
 Average Depth at Peak Storage= 0.26'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 160.0' Slope= 0.0125 '/'  
 Inlet Invert= 42.00', Outlet Invert= 40.00'



### Summary for Reach 4R: Swale

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 0.67" for 10-yr storm event  
 Inflow = 0.18 cfs @ 12.67 hrs, Volume= 0.024 af  
 Outflow = 0.17 cfs @ 12.69 hrs, Volume= 0.024 af, Atten= 3%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.77 fps, Min. Travel Time= 0.5 min  
 Avg. Velocity = 1.65 fps, Avg. Travel Time= 0.9 min

Peak Storage= 5 cf @ 12.67 hrs  
 Average Depth at Peak Storage= 0.10'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 85.0' Slope= 0.0624 '/'  
 Inlet Invert= 47.30', Outlet Invert= 42.00'





**4916 post**

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Type III 24-hr 10-yr storm Rainfall=5.60"

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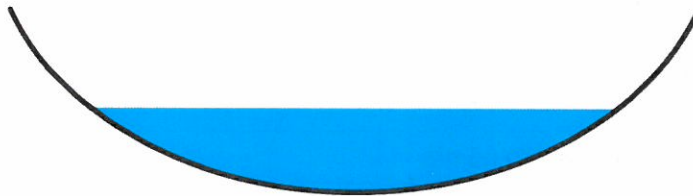
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 1.13" for 10-yr storm event  
Inflow = 1.22 cfs @ 12.15 hrs, Volume= 0.115 af  
Outflow = 1.22 cfs @ 12.15 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.84 fps, Min. Travel Time= 0.0 min  
Avg. Velocity= 2.52 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.15 hrs  
Average Depth at Peak Storage= 0.23'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 1.15" for 10-yr storm event  
Inflow = 0.85 cfs @ 12.29 hrs, Volume= 0.091 af  
Outflow = 0.19 cfs @ 13.18 hrs, Volume= 0.050 af, Atten= 78%, Lag= 53.2 min  
Discarded = 0.02 cfs @ 13.18 hrs, Volume= 0.011 af  
Primary = 0.17 cfs @ 13.18 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 50.26' @ 13.18 hrs Surf.Area= 1,285 sf Storage= 1,845 cf

Plug-Flow detention time= 175.7 min calculated for 0.050 af (55% of inflow)  
Center-of-Mass det. time= 85.0 min ( 927.3 - 842.3 )

Volume	Invert	Avail.Storage	Storage Description	
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 10-yr storm Rainfall=5.60"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

**Discarded OutFlow** Max=0.02 cfs @ 13.18 hrs HW=50.26' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.16 cfs @ 13.18 hrs HW=50.26' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.16 cfs @ 0.62 fps)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 1.51" for 10-yr storm event  
 Inflow = 0.64 cfs @ 12.18 hrs, Volume= 0.055 af  
 Outflow = 0.19 cfs @ 12.67 hrs, Volume= 0.032 af, Atten= 70%, Lag= 29.0 min  
 Discarded = 0.01 cfs @ 12.67 hrs, Volume= 0.008 af  
 Primary = 0.18 cfs @ 12.67 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.37' @ 12.67 hrs Surf.Area= 846 sf Storage= 1,027 cf

Plug-Flow detention time= 154.1 min calculated for 0.032 af (59% of inflow)  
 Center-of-Mass det. time= 70.0 min ( 896.6 - 826.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
Cum.Store (cubic-feet)			
44.17	500	0.0	0
44.67	500	40.0	100
46.17	500	20.0	150
46.50	500	100.0	165
47.00	697	100.0	299
47.75	1,000	100.0	636
			1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			



**4916 post**

Type III 24-hr 10-yr storm Rainfall=5.60"

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**Discarded OutFlow** Max=0.01 cfs @ 12.67 hrs HW=47.37' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.17 cfs @ 12.67 hrs HW=47.37' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 0.17 cfs @ 0.63 fps)

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 2.39" for 10-yr storm event  
 Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af  
 Outflow = 0.26 cfs @ 12.16 hrs, Volume= 0.013 af, Atten= 0%, Lag= 3.6 min  
 Discarded = 0.00 cfs @ 12.16 hrs, Volume= 0.003 af  
 Primary = 0.25 cfs @ 12.16 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.99' @ 12.16 hrs Surf.Area= 297 sf Storage= 192 cf

Plug-Flow detention time= 90.7 min calculated for 0.013 af (76% of inflow)  
 Center-of-Mass det. time= 31.3 min ( 832.3 - 801.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
45.17	110	0.0	0	0	
45.67	110	40.0	22	22	
47.17	110	20.0	33	55	
47.50	110	100.0	36	91	
48.00	302	100.0	103	194	
48.50	410	100.0	178	372	

Device	Routing	Invert	Outlet Devices																		
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>																		
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>																		
			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	4.50	5.00	5.50	
			Coef. (English)	2.43	2.54	2.70	2.69	2.68	2.68	2.66	2.64	2.64	2.64	2.64	2.64	2.65	2.65	2.66	2.66	2.68	2.74

**Discarded OutFlow** Max=0.00 cfs @ 12.16 hrs HW=47.98' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.24 cfs @ 12.16 hrs HW=47.98' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 0.24 cfs @ 0.70 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>3.86"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.52 cfs 0.035 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>1.98"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=1.58 cfs 0.155 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>3.75"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.85 cfs 0.058 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>2.45"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=1.08 cfs 0.089 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>3.55"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.37 cfs 0.025 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>1.72"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.88 cfs 0.073 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.22' Max Vel=5.67 fps Inflow=1.09 cfs 0.102 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=1.08 cfs 0.102 af

**Reach 2R: POA #2** Avg. Flow Depth=0.23' Max Vel=5.78 fps Inflow=1.19 cfs 0.137 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=1.19 cfs 0.137 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.32' Max Vel=2.52 fps Inflow=0.85 cfs 0.058 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.81 cfs 0.058 af

**Reach 4R: Swale** Avg. Flow Depth=0.21' Max Vel=4.34 fps Inflow=0.80 cfs 0.058 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.75 cfs 0.058 af

**Reach 5R: POA #1** Avg. Flow Depth=0.29' Max Vel=6.73 fps Inflow=1.99 cfs 0.206 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=1.99 cfs 0.206 af

**Pond 1P: G.U.S.F. #1** Peak Elev=50.43' Storage=2,062 cf Inflow=1.58 cfs 0.155 af  
 Discarded=0.02 cfs 0.012 af Primary=1.09 cfs 0.102 af Outflow=1.11 cfs 0.114 af

**Pond 3P: G.U.S.F. #2** Peak Elev=47.49' Storage=1,129 cf Inflow=1.08 cfs 0.089 af  
 Discarded=0.01 cfs 0.008 af Primary=0.80 cfs 0.058 af Outflow=0.81 cfs 0.066 af

**Pond 4P: G.U.S.F. #3** Peak Elev=48.01' Storage=198 cf Inflow=0.37 cfs 0.025 af  
 Discarded=0.00 cfs 0.003 af Primary=0.35 cfs 0.018 af Outflow=0.36 cfs 0.021 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.435 af Average Runoff Depth = 2.30"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**4916 post**

Type III 24-hr 25-yr storm Rainfall=7.10"

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**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 1.58 cfs @ 12.27 hrs, Volume= 0.155 af, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			



**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 0.058 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 1.08 cfs @ 12.17 hrs, Volume= 0.089 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



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**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.88 cfs @ 12.16 hrs, Volume= 0.073 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

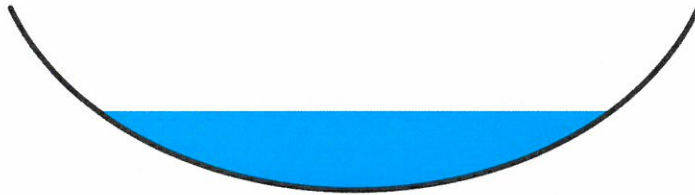
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 1.30" for 25-yr storm event  
Inflow = 1.09 cfs @ 12.52 hrs, Volume= 0.102 af  
Outflow = 1.08 cfs @ 12.53 hrs, Volume= 0.102 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.67 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 2.96 fps, Avg. Travel Time= 0.6 min

Peak Storage= 19 cf @ 12.53 hrs  
Average Depth at Peak Storage= 0.22'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



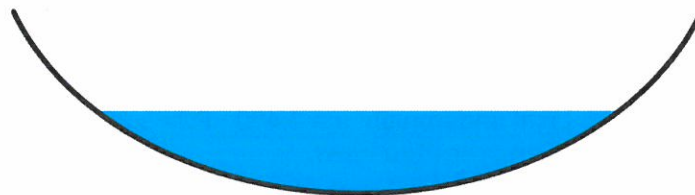
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 1.57" for 25-yr storm event  
Inflow = 1.19 cfs @ 12.52 hrs, Volume= 0.137 af  
Outflow = 1.19 cfs @ 12.52 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.78 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.50 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.52 hrs  
Average Depth at Peak Storage= 0.23'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



**4916 post**

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Type III 24-hr 25-yr storm Rainfall=7.10"

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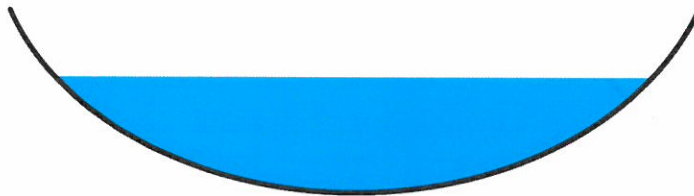
**Summary for Reach 3R: Roadside ditch**

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 3.75" for 25-yr storm event  
Inflow = 0.85 cfs @ 12.09 hrs, Volume= 0.058 af  
Outflow = 0.81 cfs @ 12.12 hrs, Volume= 0.058 af, Atten= 5%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.52 fps, Min. Travel Time= 1.1 min  
Avg. Velocity = 0.95 fps, Avg. Travel Time= 2.8 min

Peak Storage= 54 cf @ 12.11 hrs  
Average Depth at Peak Storage= 0.32'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 160.0' Slope= 0.0125 '/'  
Inlet Invert= 42.00', Outlet Invert= 40.00'



**Summary for Reach 4R: Swale**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 1.59" for 25-yr storm event  
Inflow = 0.80 cfs @ 12.32 hrs, Volume= 0.058 af  
Outflow = 0.75 cfs @ 12.34 hrs, Volume= 0.058 af, Atten= 6%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 4.34 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 2.03 fps, Avg. Travel Time= 0.7 min

Peak Storage= 16 cf @ 12.32 hrs  
Average Depth at Peak Storage= 0.21'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 85.0' Slope= 0.0624 '/'  
Inlet Invert= 47.30', Outlet Invert= 42.00'





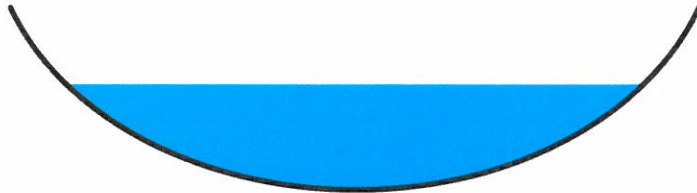
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 2.04" for 25-yr storm event  
 Inflow = 1.99 cfs @ 12.14 hrs, Volume= 0.206 af  
 Outflow = 1.99 cfs @ 12.14 hrs, Volume= 0.206 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 6.73 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 2.81 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.14 hrs  
 Average Depth at Peak Storage= 0.29'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 '/'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 1.98" for 25-yr storm event  
 Inflow = 1.58 cfs @ 12.27 hrs, Volume= 0.155 af  
 Outflow = 1.11 cfs @ 12.52 hrs, Volume= 0.114 af, Atten= 30%, Lag= 14.5 min  
 Discarded = 0.02 cfs @ 12.52 hrs, Volume= 0.012 af  
 Primary = 1.09 cfs @ 12.52 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 50.43' @ 12.52 hrs Surf.Area= 1,392 sf Storage= 2,062 cf

Plug-Flow detention time= 105.2 min calculated for 0.114 af (74% of inflow)  
 Center-of-Mass det. time= 40.6 min ( 870.3 - 829.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 25-yr storm Rainfall=7.10"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

**Discarded OutFlow** Max=0.02 cfs @ 12.52 hrs HW=50.43' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.07 cfs @ 12.52 hrs HW=50.43' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 1.07 cfs @ 1.17 fps)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 2.45" for 25-yr storm event  
 Inflow = 1.08 cfs @ 12.17 hrs, Volume= 0.089 af  
 Outflow = 0.81 cfs @ 12.32 hrs, Volume= 0.066 af, Atten= 25%, Lag= 9.0 min  
 Discarded = 0.01 cfs @ 12.32 hrs, Volume= 0.008 af  
 Primary = 0.80 cfs @ 12.32 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.49' @ 12.32 hrs Surf.Area= 895 sf Storage= 1,129 cf

Plug-Flow detention time= 99.2 min calculated for 0.066 af (75% of inflow)  
 Center-of-Mass det. time= 36.4 min ( 852.3 - 815.8 )

Volume	Invert	Avail.Storage	Storage Description	
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.17	500	0.0	0	0
44.67	500	40.0	100	100
46.17	500	20.0	150	250
46.50	500	100.0	165	415
47.00	697	100.0	299	714
47.75	1,000	100.0	636	1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74



Discarded OutFlow Max=0.01 cfs @ 12.32 hrs HW=47.48' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.75 cfs @ 12.32 hrs HW=47.48' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 0.75 cfs @ 1.04 fps)

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 3.55" for 25-yr storm event  
 Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.025 af  
 Outflow = 0.36 cfs @ 12.11 hrs, Volume= 0.021 af, Atten= 3%, Lag= 1.0 min  
 Discarded = 0.00 cfs @ 12.11 hrs, Volume= 0.003 af  
 Primary = 0.35 cfs @ 12.11 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 48.01' @ 12.11 hrs Surf.Area= 304 sf Storage= 198 cf

Plug-Flow detention time= 68.6 min calculated for 0.021 af (84% of inflow)  
 Center-of-Mass det. time= 22.3 min ( 814.4 - 792.0 )

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices											
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>											
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>											
			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	4.50	5.00	5.50				
			Coef. (English)	2.43	2.54	2.70	2.69	2.68	2.68	2.66	2.64	2.64		
				2.64	2.65	2.65	2.66	2.66	2.68	2.70	2.74			

Discarded OutFlow Max=0.00 cfs @ 12.11 hrs HW=48.01' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.34 cfs @ 12.11 hrs HW=48.01' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 0.34 cfs @ 0.80 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>5.04"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.67 cfs 0.046 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>2.86"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=2.33 cfs 0.224 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>4.92"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=1.11 cfs 0.076 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>3.42"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=1.53 cfs 0.124 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>4.69"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.48 cfs 0.033 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>2.54"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=1.35 cfs 0.108 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.30' Max Vel=6.89 fps Inflow=2.12 cfs 0.170 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=2.11 cfs 0.170 af

**Reach 2R: POA #2** Avg. Flow Depth=0.31' Max Vel=7.05 fps Inflow=2.35 cfs 0.216 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=2.35 cfs 0.216 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.36' Max Vel=2.72 fps Inflow=1.11 cfs 0.076 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=1.06 cfs 0.076 af

**Reach 4R: Swale** Avg. Flow Depth=0.29' Max Vel=5.21 fps Inflow=1.47 cfs 0.092 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=1.47 cfs 0.092 af

**Reach 5R: POA #1** Avg. Flow Depth=0.39' Max Vel=8.12 fps Inflow=3.78 cfs 0.301 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=3.78 cfs 0.301 af

**Pond 1P: G.U.S.F. #1** Peak Elev=50.55' Storage=2,223 cf Inflow=2.33 cfs 0.224 af  
 Discarded=0.02 cfs 0.013 af Primary=2.12 cfs 0.170 af Outflow=2.14 cfs 0.183 af

**Pond 3P: G.U.S.F. #2** Peak Elev=47.58' Storage=1,207 cf Inflow=1.53 cfs 0.124 af  
 Discarded=0.01 cfs 0.009 af Primary=1.47 cfs 0.092 af Outflow=1.48 cfs 0.101 af

**Pond 4P: G.U.S.F. #3** Peak Elev=48.03' Storage=206 cf Inflow=0.48 cfs 0.033 af  
 Discarded=0.00 cfs 0.003 af Primary=0.46 cfs 0.026 af Outflow=0.47 cfs 0.029 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.610 af Average Runoff Depth = 3.23"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.046 af, Depth> 5.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 2.33 cfs @ 12.27 hrs, Volume= 0.224 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			



**4916 post**

Type III 24-hr 50-yr storm Rainfall=8.50"

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**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.076 af, Depth&gt; 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 1.53 cfs @ 12.17 hrs, Volume= 0.124 af, Depth&gt; 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.033 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 1.35 cfs @ 12.16 hrs, Volume= 0.108 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

**4916 post**

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Type III 24-hr 50-yr storm Rainfall=8.50"

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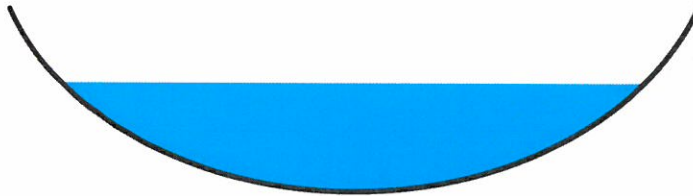
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 2.17" for 50-yr storm event  
Inflow = 2.12 cfs @ 12.37 hrs, Volume= 0.170 af  
Outflow = 2.11 cfs @ 12.37 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 6.89 fps, Min. Travel Time= 0.2 min  
Avg. Velocity = 3.34 fps, Avg. Travel Time= 0.5 min

Peak Storage= 31 cf @ 12.37 hrs  
Average Depth at Peak Storage= 0.30'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



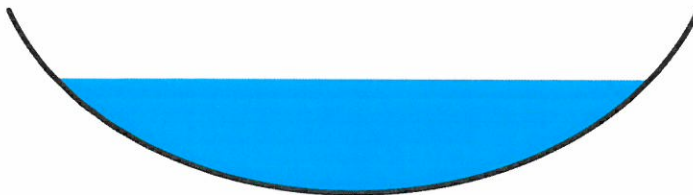
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 2.46" for 50-yr storm event  
Inflow = 2.35 cfs @ 12.37 hrs, Volume= 0.216 af  
Outflow = 2.35 cfs @ 12.37 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 7.05 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.70 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.37 hrs  
Average Depth at Peak Storage= 0.31'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



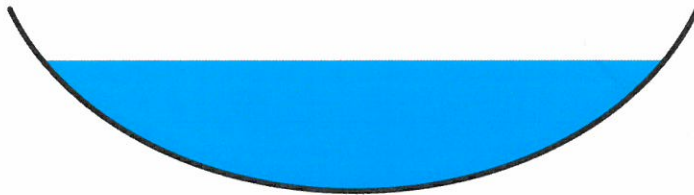
### Summary for Reach 3R: Roadside ditch

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 4.92" for 50-yr storm event  
 Inflow = 1.11 cfs @ 12.09 hrs, Volume= 0.076 af  
 Outflow = 1.06 cfs @ 12.12 hrs, Volume= 0.076 af, Atten= 5%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.72 fps, Min. Travel Time= 1.0 min  
 Avg. Velocity = 1.01 fps, Avg. Travel Time= 2.7 min

Peak Storage= 65 cf @ 12.10 hrs  
 Average Depth at Peak Storage= 0.36'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 160.0' Slope= 0.0125 '/'  
 Inlet Invert= 42.00', Outlet Invert= 40.00'



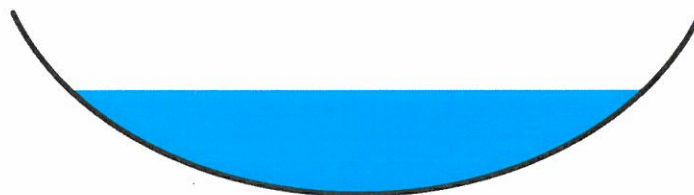
### Summary for Reach 4R: Swale

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 2.55" for 50-yr storm event  
 Inflow = 1.47 cfs @ 12.22 hrs, Volume= 0.092 af  
 Outflow = 1.47 cfs @ 12.22 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 5.21 fps, Min. Travel Time= 0.3 min  
 Avg. Velocity = 2.28 fps, Avg. Travel Time= 0.6 min

Peak Storage= 25 cf @ 12.22 hrs  
 Average Depth at Peak Storage= 0.29'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 85.0' Slope= 0.0624 '/'  
 Inlet Invert= 47.30', Outlet Invert= 42.00'





**4916 post**

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Type III 24-hr 50-yr storm Rainfall=8.50"

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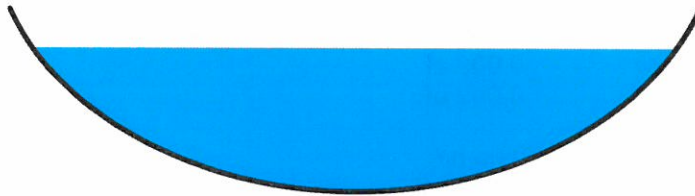
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 2.98" for 50-yr storm event  
 Inflow = 3.78 cfs @ 12.20 hrs, Volume= 0.301 af  
 Outflow = 3.78 cfs @ 12.20 hrs, Volume= 0.301 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 8.12 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 3.01 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.20 hrs  
 Average Depth at Peak Storage= 0.39'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 '/'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 2.86" for 50-yr storm event  
 Inflow = 2.33 cfs @ 12.27 hrs, Volume= 0.224 af  
 Outflow = 2.14 cfs @ 12.37 hrs, Volume= 0.183 af, Atten= 8%, Lag= 6.1 min  
 Discarded = 0.02 cfs @ 12.37 hrs, Volume= 0.013 af  
 Primary = 2.12 cfs @ 12.37 hrs, Volume= 0.170 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 50.55' @ 12.37 hrs Surf.Area= 1,470 sf Storage= 2,223 cf

Plug-Flow detention time= 76.5 min calculated for 0.182 af (81% of inflow)  
 Center-of-Mass det. time= 27.1 min ( 848.7 - 821.6 )

Volume	Invert	Avail.Storage	Storage Description	
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

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Type III 24-hr 50-yr storm Rainfall=8.50"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

Discarded OutFlow Max=0.02 cfs @ 12.37 hrs HW=50.55' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.07 cfs @ 12.37 hrs HW=50.55' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 2.07 cfs @ 1.48 fps)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 3.42" for 50-yr storm event  
 Inflow = 1.53 cfs @ 12.17 hrs, Volume= 0.124 af  
 Outflow = 1.48 cfs @ 12.22 hrs, Volume= 0.101 af, Atten= 3%, Lag= 3.1 min  
 Discarded = 0.01 cfs @ 12.22 hrs, Volume= 0.009 af  
 Primary = 1.47 cfs @ 12.22 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.58' @ 12.22 hrs Surf.Area= 932 sf Storage= 1,207 cf

Plug-Flow detention time= 75.8 min calculated for 0.101 af (82% of inflow)  
 Center-of-Mass det. time= 25.8 min ( 834.2 - 808.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.17	500	0.0	0	0
44.67	500	40.0	100	100
46.17	500	20.0	150	250
46.50	500	100.0	165	415
47.00	697	100.0	299	714
47.75	1,000	100.0	636	1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			



Discarded OutFlow Max=0.01 cfs @ 12.22 hrs HW=47.57' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.40 cfs @ 12.22 hrs HW=47.57' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 1.40 cfs @ 1.29 fps)

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 4.69" for 50-yr storm event  
 Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.033 af  
 Outflow = 0.47 cfs @ 12.11 hrs, Volume= 0.029 af, Atten= 3%, Lag= 1.1 min  
 Discarded = 0.00 cfs @ 12.11 hrs, Volume= 0.003 af  
 Primary = 0.46 cfs @ 12.11 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 48.03' @ 12.11 hrs Surf.Area= 309 sf Storage= 206 cf

Plug-Flow detention time= 57.1 min calculated for 0.029 af (88% of inflow)  
 Center-of-Mass det. time= 19.2 min ( 804.9 - 785.6 )

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices																			
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>																			
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>																			
			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	4.50	5.00	5.50		
			Coef. (English)	2.43	2.54	2.70	2.69	2.68	2.68	2.66	2.64	2.64	2.64	2.64	2.64	2.65	2.65	2.66	2.66	2.68	2.70	2.74

Discarded OutFlow Max=0.00 cfs @ 12.11 hrs HW=48.03' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.45 cfs @ 12.11 hrs HW=48.03' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Weir Controls 0.45 cfs @ 0.87 fps)



ISSUED FOR: TAC

ISSUE DATE: SEPTEMBER 14, 2018

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	08/07/18
1	PER TAC COMMENTS	EDW	09/14/18

DRAWN BY: RLH  
APPROVED BY: EDW  
DRAWING FILE: 4916 SITE.DWG

SCALE:  
11"x17": 1" = 40'  
22"x 34": 1" = 20'

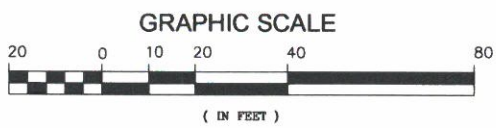
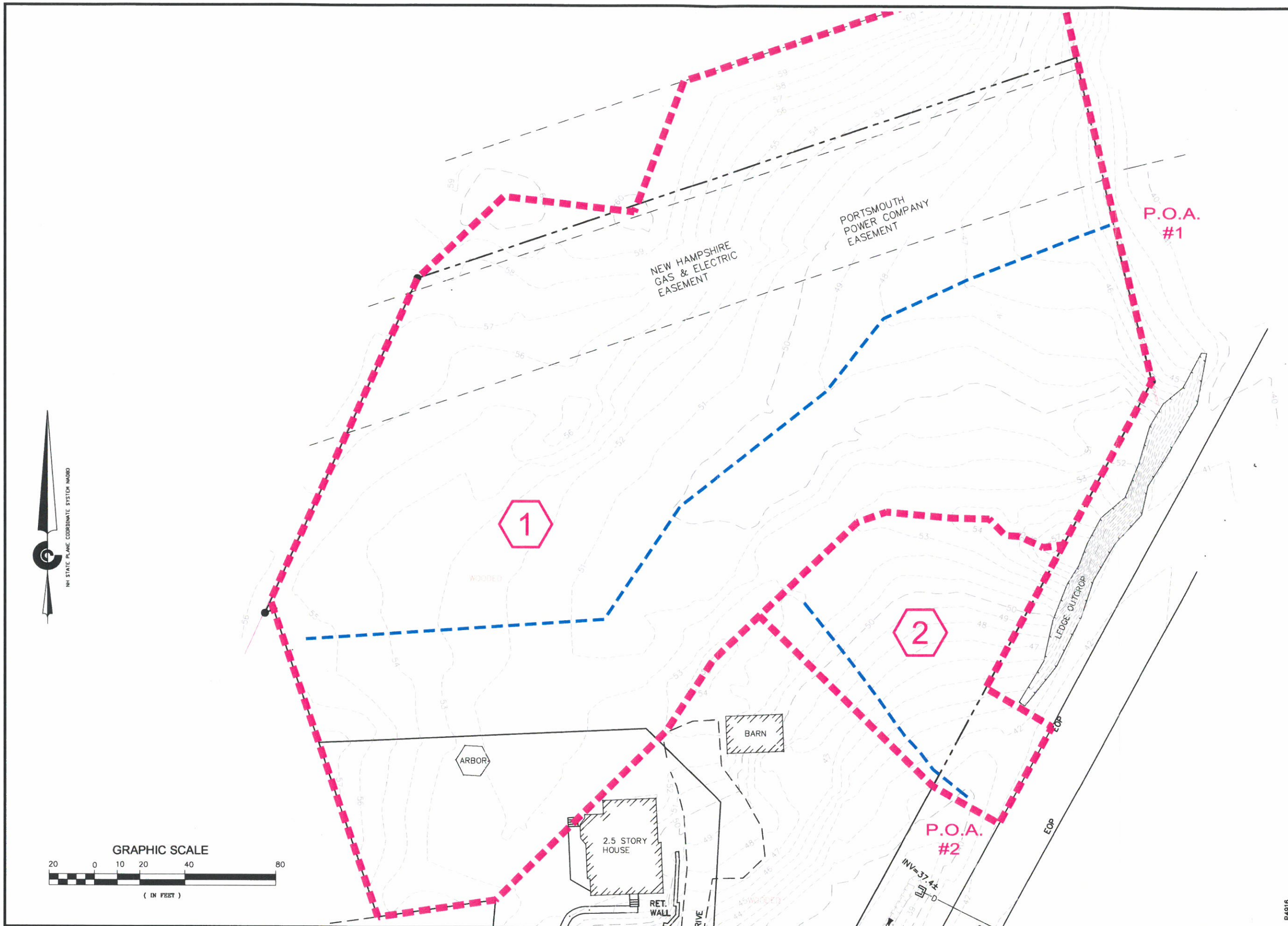
APPLICANT/OWNER:  
HAPPY MOUNTAIN HOLDINGS, LLC  
901 N. MARKET STREET  
SUITE 705  
WILMINGTON, DE 19801

PROJECT:  
RESIDENTIAL DEVELOPMENT  
ASSESSOR'S PARCEL 220-87-2  
74 EMERY STREET  
&  
ASSESSOR'S PARCEL 220-87-3  
64 EMERY STREET  
PORTSMOUTH, NEW HAMPSHIRE

TITLE:  
PRE-DEVELOPMENT WATERSHED PLAN

SHEET NUMBER:  
DS - 1

P4916





ISSUED FOR: TAC

ISSUE DATE: SEPTEMBER 14, 2018

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	08/07/18
1	PER TAC COMMENTS	EDW	09/14/18

DRAWN BY: RLH  
APPROVED BY: EDW  
DRAWING FILE: 4916 SITE.DWG

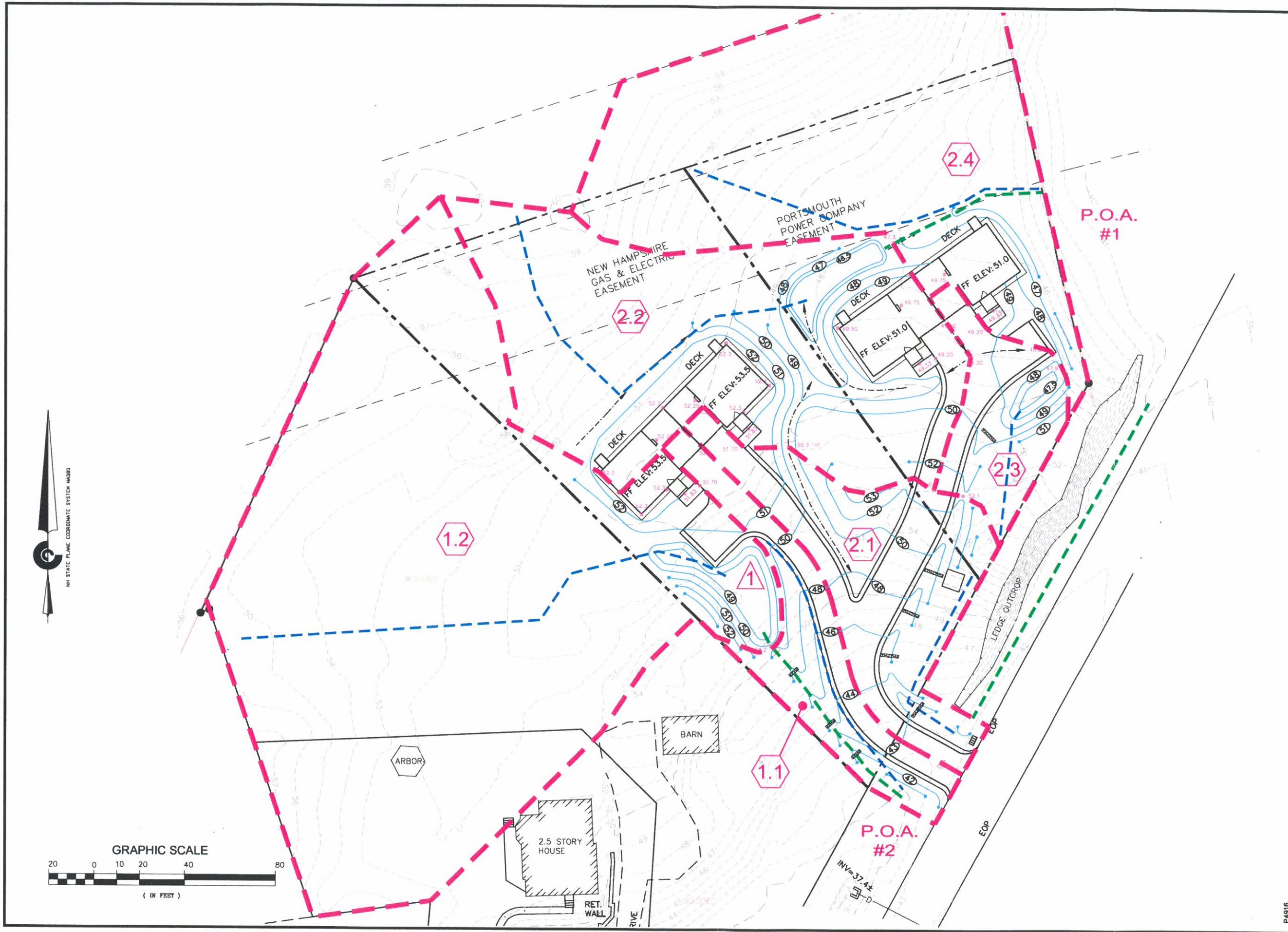
SCALE:  
11"x17": 1" = 40'  
22"x 34": 1" = 20'

APPLICANT/OWNER:  
**HAPPY MOUNTAIN HOLDINGS, LLC**  
  
901 N. MARKET STREET  
SUITE 705  
WILMINGTON, DE 19801

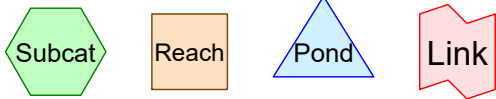
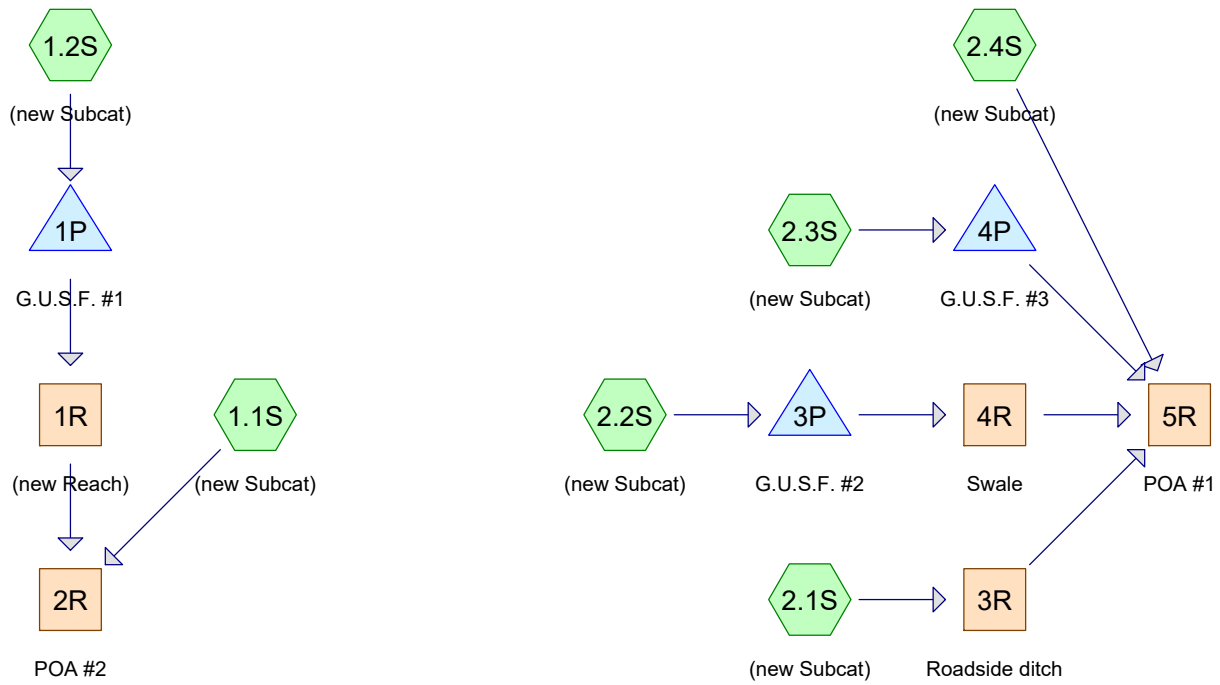
PROJECT:  
**RESIDENTIAL DEVELOPMENT**  
ASSESSOR'S PARCEL 220-87-2  
74 EMERY STREET  
&  
ASSESSOR'S PARCEL 220-87-3  
64 EMERY STREET  
PORTSMOUTH, NEW HAMPSHIRE

TITLE:  
**POST-DEVELOPMENT WATERSHED PLAN**

SHEET NUMBER:  
**DS - 2**



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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.434	61	>75% Grass cover, Good, HSG B (1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S)
0.634	48	Brush, Good, HSG B (1.2S, 2.2S, 2.4S)
0.166	98	Paved parking, HSG B (1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S)
0.025	98	Roofs, HSG B (1.2S, 2.2S, 2.4S)
0.066	98	Unconnected roofs, HSG B (1.2S, 2.2S, 2.4S)
0.939	55	Woods, Good, HSG B (1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S)
<b>2.263</b>	<b>59</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.263	HSG B	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
<b>2.263</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.434	0.000	0.000	0.000	0.434	>75% Grass cover, Good	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
0.000	0.634	0.000	0.000	0.000	0.634	Brush, Good	1.2S, 2.2S, 2.4S
0.000	0.166	0.000	0.000	0.000	0.166	Paved parking	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
0.000	0.025	0.000	0.000	0.000	0.025	Roofs	1.2S, 2.2S, 2.4S
0.000	0.066	0.000	0.000	0.000	0.066	Unconnected roofs	1.2S, 2.2S, 2.4S
0.000	0.939	0.000	0.000	0.000	0.939	Woods, Good	1.1S, 1.2S, 2.1S, 2.2S, 2.3S, 2.4S
<b>0.000</b>	<b>2.263</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>2.263</b>	<b>TOTAL AREA</b>	



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth=0.00"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.00 cfs 0.000 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth=0.00"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth=0.00"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth=0.00"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth=0.00"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.00 cfs 0.000 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth=0.00"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.00 cfs 0.000 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=0.00 cfs 0.000 af

**Reach 2R: POA #2** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.00 cfs 0.000 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.00 cfs 0.000 af

**Reach 4R: Swale** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.00 cfs 0.000 af

**Reach 5R: POA #1** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.00 cfs 0.000 af

**Pond 1P: G.U.S.F. #1** Peak Elev=46.17' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 3P: G.U.S.F. #2** Peak Elev=44.17' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 4P: G.U.S.F. #3** Peak Elev=45.17' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			

**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

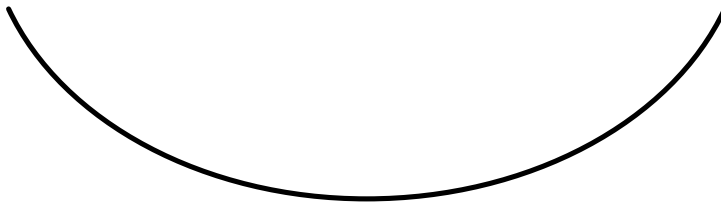
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



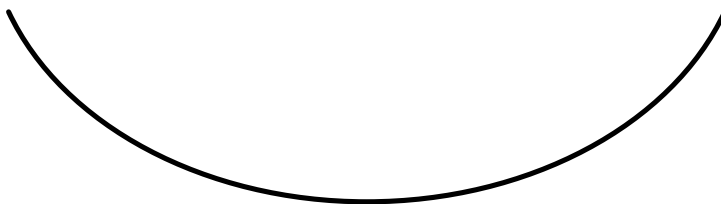
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



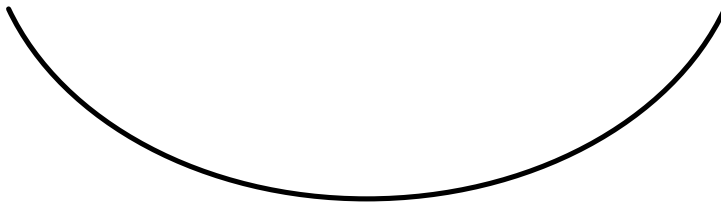
**Summary for Reach 3R: Roadside ditch**

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 160.0' Slope= 0.0125 '/'  
Inlet Invert= 42.00', Outlet Invert= 40.00'



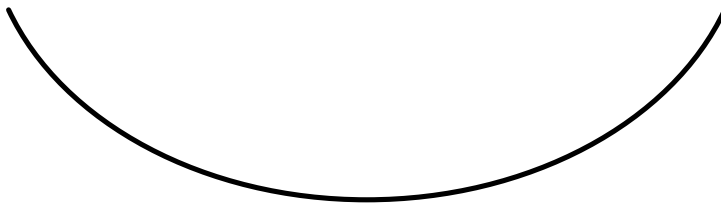
**Summary for Reach 4R: Swale**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 85.0' Slope= 0.0624 '/'  
Inlet Invert= 47.30', Outlet Invert= 42.00'





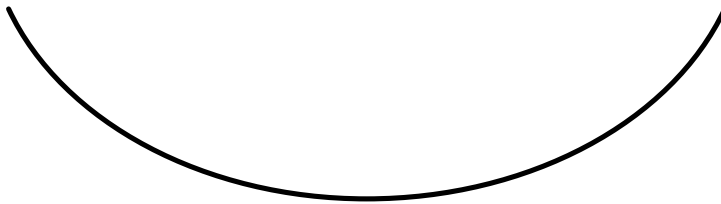
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
 Average Depth at Peak Storage= 0.00'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 1'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 46.17' @ 5.00 hrs Surf.Area= 615 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 0.5 Inch storm Rainfall=0.50"

Prepared by Altus Engineering, Inc.

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

**Discarded OutFlow** Max=0.00 cfs @ 5.00 hrs HW=46.17' (Free Discharge)

↳ **1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=46.17' (Free Discharge)

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

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 44.17' @ 5.00 hrs Surf.Area= 500 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description	
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.17	500	0.0	0	0
44.67	500	40.0	100	100
46.17	500	20.0	150	250
46.50	500	100.0	165	415
47.00	697	100.0	299	714
47.75	1,000	100.0	636	1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

**Discarded OutFlow** Max=0.00 cfs @ 5.00 hrs HW=44.17' (Free Discharge)

↳ **1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=44.17' (Free Discharge)

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

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth = 0.00" for 0.5 Inch storm event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 45.17' @ 5.00 hrs Surf.Area= 110 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices										
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>										
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>										
			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 4.50 5.00 5.50										
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64										
			2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74										

**Discarded OutFlow** Max=0.00 cfs @ 5.00 hrs HW=45.17' (Free Discharge)

↳ **1=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=45.17' (Free Discharge)

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



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>1.26"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.17 cfs 0.011 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>0.35"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=0.18 cfs 0.028 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>1.20"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.27 cfs 0.018 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>0.54"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=0.18 cfs 0.020 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>1.08"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.11 cfs 0.008 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>0.26"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.06 cfs 0.011 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=0.00 cfs 0.000 af

**Reach 2R: POA #2** Avg. Flow Depth=0.09' Max Vel=3.23 fps Inflow=0.17 cfs 0.011 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.17 cfs 0.011 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.18' Max Vel=1.78 fps Inflow=0.27 cfs 0.018 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.25 cfs 0.018 af

**Reach 4R: Swale** Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.00 cfs 0.000 af

**Reach 5R: POA #1** Avg. Flow Depth=0.12' Max Vel=3.76 fps Inflow=0.28 cfs 0.031 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.28 cfs 0.031 af

**Pond 1P: G.U.S.F. #1** Peak Elev=49.34' Storage=930 cf Inflow=0.18 cfs 0.028 af  
 Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

**Pond 3P: G.U.S.F. #2** Peak Elev=46.84' Storage=621 cf Inflow=0.18 cfs 0.020 af  
 Discarded=0.01 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

**Pond 4P: G.U.S.F. #3** Peak Elev=47.91' Storage=175 cf Inflow=0.11 cfs 0.008 af  
 Discarded=0.00 cfs 0.002 af Primary=0.01 cfs 0.001 af Outflow=0.01 cfs 0.004 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.096 af Average Runoff Depth = 0.51"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**4916 post**

Type III 24-hr 2-yr storm Rainfall=3.69"

Prepared by Altus Engineering, Inc.

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**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.011 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 0.18 cfs @ 12.43 hrs, Volume= 0.028 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			

**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.018 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 0.18 cfs @ 12.21 hrs, Volume= 0.020 af, Depth> 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.06 cfs @ 12.39 hrs, Volume= 0.011 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr storm Rainfall=3.69"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

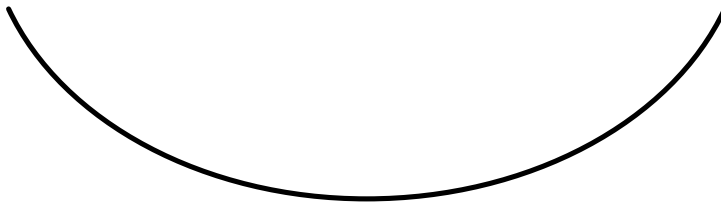
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth = 0.00" for 2-yr storm event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs  
Average Depth at Peak Storage= 0.00'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



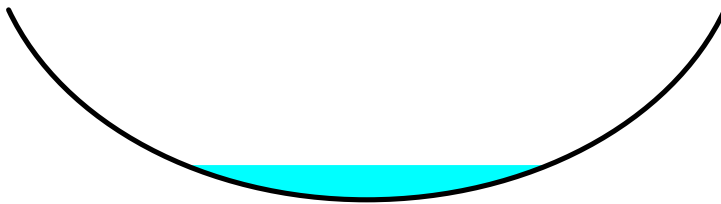
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 0.13" for 2-yr storm event  
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 0.011 af  
Outflow = 0.17 cfs @ 12.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.23 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.10 hrs  
Average Depth at Peak Storage= 0.09'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



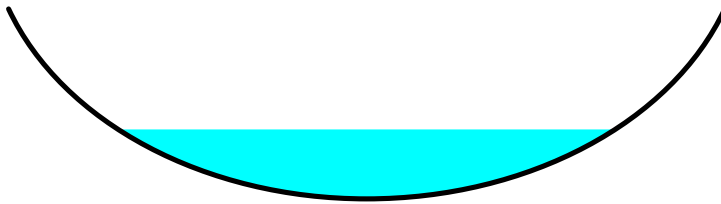
Summary for Reach 3R: Roadside ditch

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 1.20" for 2-yr storm event
Inflow = 0.27 cfs @ 12.10 hrs, Volume= 0.018 af
Outflow = 0.25 cfs @ 12.15 hrs, Volume= 0.018 af, Atten= 6%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.78 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 3.6 min

Peak Storage= 23 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 160.0' Slope= 0.0125 '/'
Inlet Invert= 42.00', Outlet Invert= 40.00'



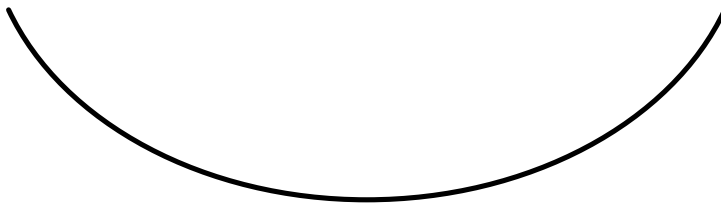
Summary for Reach 4R: Swale

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth = 0.00" for 2-yr storm event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 5.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 85.0' Slope= 0.0624 '/'
Inlet Invert= 47.30', Outlet Invert= 42.00'





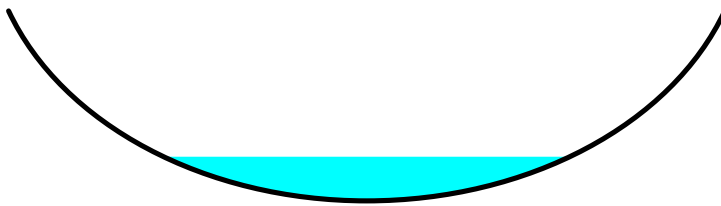
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 0.30" for 2-yr storm event  
 Inflow = 0.28 cfs @ 12.16 hrs, Volume= 0.031 af  
 Outflow = 0.28 cfs @ 12.16 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.76 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.16 hrs  
 Average Depth at Peak Storage= 0.12'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 1'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 0.35" for 2-yr storm event  
 Inflow = 0.18 cfs @ 12.43 hrs, Volume= 0.028 af  
 Outflow = 0.01 cfs @ 20.00 hrs, Volume= 0.006 af, Atten= 94%, Lag= 454.0 min  
 Discarded = 0.01 cfs @ 20.00 hrs, Volume= 0.006 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 49.34' @ 20.00 hrs Surf.Area= 787 sf Storage= 930 cf

Plug-Flow detention time= 232.7 min calculated for 0.006 af (23% of inflow)  
 Center-of-Mass det. time= 101.2 min ( 977.3 - 876.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 2-yr storm Rainfall=3.69"

Prepared by Altus Engineering, Inc.

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b> <b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Primary	50.20'	

**Discarded OutFlow** Max=0.01 cfs @ 20.00 hrs HW=49.34' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=46.17' (Free Discharge)  
 ↳2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 0.54" for 2-yr storm event  
 Inflow = 0.18 cfs @ 12.21 hrs, Volume= 0.020 af  
 Outflow = 0.01 cfs @ 20.00 hrs, Volume= 0.005 af, Atten= 95%, Lag= 467.1 min  
 Discarded = 0.01 cfs @ 20.00 hrs, Volume= 0.005 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 46.84' @ 20.00 hrs Surf.Area= 636 sf Storage= 621 cf

Plug-Flow detention time= 236.6 min calculated for 0.005 af (27% of inflow)  
 Center-of-Mass det. time= 120.0 min ( 972.4 - 852.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.17	500	0.0	0	0
44.67	500	40.0	100	100
46.17	500	20.0	150	250
46.50	500	100.0	165	415
47.00	697	100.0	299	714
47.75	1,000	100.0	636	1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b> <b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Primary	47.30'	

**Discarded OutFlow** Max=0.01 cfs @ 20.00 hrs HW=46.84' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=44.17' (Free Discharge)

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

### Summary for Pond 4P: G.U.S.F. #3

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 1.08" for 2-yr storm event  
 Inflow = 0.11 cfs @ 12.10 hrs, Volume= 0.008 af  
 Outflow = 0.01 cfs @ 13.13 hrs, Volume= 0.004 af, Atten= 89%, Lag= 61.9 min  
 Discarded = 0.00 cfs @ 13.13 hrs, Volume= 0.002 af  
 Primary = 0.01 cfs @ 13.13 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.91' @ 13.13 hrs Surf.Area= 266 sf Storage= 175 cf

Plug-Flow detention time= 195.4 min calculated for 0.004 af (49% of inflow)  
 Center-of-Mass det. time= 104.2 min ( 922.9 - 818.7 )

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices										
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>										
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>										
			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 4.50 5.00 5.50										
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64										
			2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74										

**Discarded OutFlow** Max=0.00 cfs @ 13.13 hrs HW=47.91' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.00 cfs @ 13.13 hrs HW=47.91' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.18 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>2.65"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.36 cfs 0.024 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>1.15"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=0.85 cfs 0.091 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>2.56"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.58 cfs 0.039 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>1.51"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=0.64 cfs 0.055 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>2.39"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.25 cfs 0.017 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>0.96"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.43 cfs 0.041 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.09' Max Vel=3.27 fps Inflow=0.17 cfs 0.039 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=0.17 cfs 0.038 af

**Reach 2R: POA #2** Avg. Flow Depth=0.13' Max Vel=4.05 fps Inflow=0.36 cfs 0.062 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=0.36 cfs 0.062 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.26' Max Vel=2.25 fps Inflow=0.58 cfs 0.039 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=0.55 cfs 0.039 af

**Reach 4R: Swale** Avg. Flow Depth=0.10' Max Vel=2.77 fps Inflow=0.18 cfs 0.024 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=0.17 cfs 0.024 af

**Reach 5R: POA #1** Avg. Flow Depth=0.23' Max Vel=5.84 fps Inflow=1.22 cfs 0.115 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=1.22 cfs 0.115 af

**Pond 1P: G.U.S.F. #1** Peak Elev=50.26' Storage=1,845 cf Inflow=0.85 cfs 0.091 af  
 Discarded=0.02 cfs 0.011 af Primary=0.17 cfs 0.039 af Outflow=0.19 cfs 0.050 af

**Pond 3P: G.U.S.F. #2** Peak Elev=47.37' Storage=1,027 cf Inflow=0.64 cfs 0.055 af  
 Discarded=0.01 cfs 0.008 af Primary=0.18 cfs 0.024 af Outflow=0.19 cfs 0.032 af

**Pond 4P: G.U.S.F. #3** Peak Elev=47.99' Storage=192 cf Inflow=0.25 cfs 0.017 af  
 Discarded=0.00 cfs 0.003 af Primary=0.25 cfs 0.010 af Outflow=0.26 cfs 0.013 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.266 af Average Runoff Depth = 1.41"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**4916 post**

Type III 24-hr 10-yr storm Rainfall=5.60"

Prepared by Altus Engineering, Inc.

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**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.024 af, Depth&gt; 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 0.85 cfs @ 12.29 hrs, Volume= 0.091 af, Depth&gt; 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			

**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.58 cfs @ 12.09 hrs, Volume= 0.039 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 0.64 cfs @ 12.18 hrs, Volume= 0.055 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			



**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.43 cfs @ 12.18 hrs, Volume= 0.041 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr storm Rainfall=5.60"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

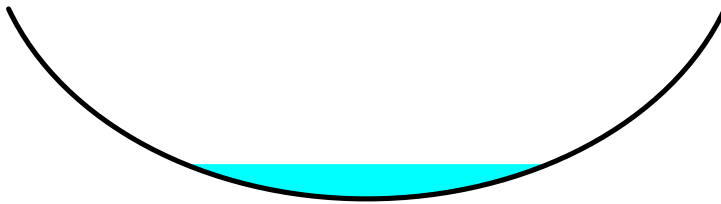
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 0.49" for 10-yr storm event  
Inflow = 0.17 cfs @ 13.18 hrs, Volume= 0.039 af  
Outflow = 0.17 cfs @ 13.20 hrs, Volume= 0.038 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.27 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 2.35 fps, Avg. Travel Time= 0.7 min

Peak Storage= 5 cf @ 13.20 hrs  
Average Depth at Peak Storage= 0.09'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



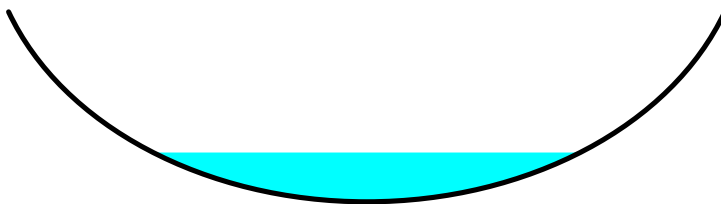
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 0.71" for 10-yr storm event  
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.062 af  
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 4.05 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.17 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.09 hrs  
Average Depth at Peak Storage= 0.13'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



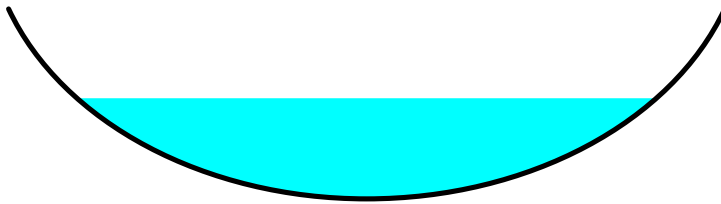
Summary for Reach 3R: Roadside ditch

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 2.56" for 10-yr storm event
Inflow = 0.58 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.55 cfs @ 12.13 hrs, Volume= 0.039 af, Atten= 6%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.25 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 3.0 min

Peak Storage= 41 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 160.0' Slope= 0.0125 '/'
Inlet Invert= 42.00', Outlet Invert= 40.00'



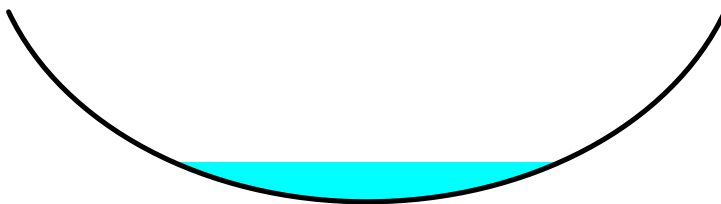
Summary for Reach 4R: Swale

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 0.67" for 10-yr storm event
Inflow = 0.18 cfs @ 12.67 hrs, Volume= 0.024 af
Outflow = 0.17 cfs @ 12.69 hrs, Volume= 0.024 af, Atten= 3%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.65 fps, Avg. Travel Time= 0.9 min

Peak Storage= 5 cf @ 12.67 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 85.0' Slope= 0.0624 '/'
Inlet Invert= 47.30', Outlet Invert= 42.00'





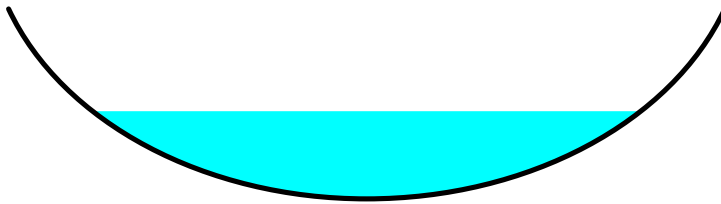
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 1.13" for 10-yr storm event  
 Inflow = 1.22 cfs @ 12.15 hrs, Volume= 0.115 af  
 Outflow = 1.22 cfs @ 12.15 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 5.84 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 2.52 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.15 hrs  
 Average Depth at Peak Storage= 0.23'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 1'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 1.15" for 10-yr storm event  
 Inflow = 0.85 cfs @ 12.29 hrs, Volume= 0.091 af  
 Outflow = 0.19 cfs @ 13.18 hrs, Volume= 0.050 af, Atten= 78%, Lag= 53.2 min  
 Discarded = 0.02 cfs @ 13.18 hrs, Volume= 0.011 af  
 Primary = 0.17 cfs @ 13.18 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 50.26' @ 13.18 hrs Surf.Area= 1,285 sf Storage= 1,845 cf

Plug-Flow detention time= 175.7 min calculated for 0.050 af (55% of inflow)  
 Center-of-Mass det. time= 85.0 min ( 927.3 - 842.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 10-yr storm Rainfall=5.60"

Prepared by Altus Engineering, Inc.

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

**Discarded OutFlow** Max=0.02 cfs @ 13.18 hrs HW=50.26' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.16 cfs @ 13.18 hrs HW=50.26' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.16 cfs @ 0.62 fps)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 1.51" for 10-yr storm event  
 Inflow = 0.64 cfs @ 12.18 hrs, Volume= 0.055 af  
 Outflow = 0.19 cfs @ 12.67 hrs, Volume= 0.032 af, Atten= 70%, Lag= 29.0 min  
 Discarded = 0.01 cfs @ 12.67 hrs, Volume= 0.008 af  
 Primary = 0.18 cfs @ 12.67 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.37' @ 12.67 hrs Surf.Area= 846 sf Storage= 1,027 cf

Plug-Flow detention time= 154.1 min calculated for 0.032 af (59% of inflow)  
 Center-of-Mass det. time= 70.0 min ( 896.6 - 826.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
Cum.Store (cubic-feet)			
44.17	500	0.0	0
44.67	500	40.0	100
46.17	500	20.0	150
46.50	500	100.0	165
47.00	697	100.0	299
47.75	1,000	100.0	636
			1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

**Discarded OutFlow** Max=0.01 cfs @ 12.67 hrs HW=47.37' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.17 cfs @ 12.67 hrs HW=47.37' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.63 fps)

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 2.39" for 10-yr storm event  
 Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.017 af  
 Outflow = 0.26 cfs @ 12.16 hrs, Volume= 0.013 af, Atten= 0%, Lag= 3.6 min  
 Discarded = 0.00 cfs @ 12.16 hrs, Volume= 0.003 af  
 Primary = 0.25 cfs @ 12.16 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.99' @ 12.16 hrs Surf.Area= 297 sf Storage= 192 cf

Plug-Flow detention time= 90.7 min calculated for 0.013 af (76% of inflow)  
 Center-of-Mass det. time= 31.3 min ( 832.3 - 801.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b> 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 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

**Discarded OutFlow** Max=0.00 cfs @ 12.16 hrs HW=47.98' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.24 cfs @ 12.16 hrs HW=47.98' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.24 cfs @ 0.70 fps)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>3.86"  
 Flow Length=130' Slope=0.0750 '/ Tc=6.0 min CN=74 Runoff=0.52 cfs 0.035 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>1.98"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=1.58 cfs 0.155 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>3.75"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=0.85 cfs 0.058 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>2.45"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=1.08 cfs 0.089 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>3.55"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.37 cfs 0.025 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>1.72"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=0.88 cfs 0.073 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.22' Max Vel=5.67 fps Inflow=1.09 cfs 0.102 af  
 n=0.022 L=100.0' S=0.1020 '/ Capacity=6.31 cfs Outflow=1.08 cfs 0.102 af

**Reach 2R: POA #2** Avg. Flow Depth=0.23' Max Vel=5.78 fps Inflow=1.19 cfs 0.137 af  
 n=0.022 L=1.0' S=0.1000 '/ Capacity=6.24 cfs Outflow=1.19 cfs 0.137 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.32' Max Vel=2.52 fps Inflow=0.85 cfs 0.058 af  
 n=0.022 L=160.0' S=0.0125 '/ Capacity=2.21 cfs Outflow=0.81 cfs 0.058 af

**Reach 4R: Swale** Avg. Flow Depth=0.21' Max Vel=4.34 fps Inflow=0.80 cfs 0.058 af  
 n=0.022 L=85.0' S=0.0624 '/ Capacity=4.93 cfs Outflow=0.75 cfs 0.058 af

**Reach 5R: POA #1** Avg. Flow Depth=0.29' Max Vel=6.73 fps Inflow=1.99 cfs 0.206 af  
 n=0.022 L=1.0' S=0.1000 '/ Capacity=6.24 cfs Outflow=1.99 cfs 0.206 af

**Pond 1P: G.U.S.F. #1** Peak Elev=50.43' Storage=2,062 cf Inflow=1.58 cfs 0.155 af  
 Discarded=0.02 cfs 0.012 af Primary=1.09 cfs 0.102 af Outflow=1.11 cfs 0.114 af

**Pond 3P: G.U.S.F. #2** Peak Elev=47.49' Storage=1,129 cf Inflow=1.08 cfs 0.089 af  
 Discarded=0.01 cfs 0.008 af Primary=0.80 cfs 0.058 af Outflow=0.81 cfs 0.066 af

**Pond 4P: G.U.S.F. #3** Peak Elev=48.01' Storage=198 cf Inflow=0.37 cfs 0.025 af  
 Discarded=0.00 cfs 0.003 af Primary=0.35 cfs 0.018 af Outflow=0.36 cfs 0.021 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.435 af Average Runoff Depth = 2.30"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**



**4916 post**

Type III 24-hr 25-yr storm Rainfall=7.10"

Prepared by Altus Engineering, Inc.

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**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.035 af, Depth&gt; 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 1.58 cfs @ 12.27 hrs, Volume= 0.155 af, Depth&gt; 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			

**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 0.058 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 1.08 cfs @ 12.17 hrs, Volume= 0.089 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			

**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 0.88 cfs @ 12.16 hrs, Volume= 0.073 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr storm Rainfall=7.10"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			

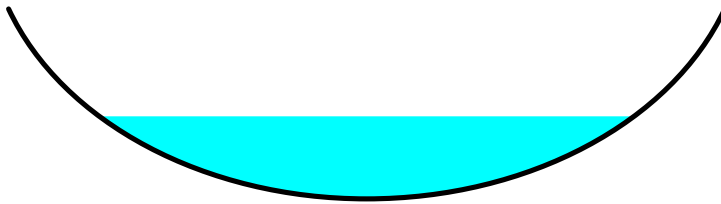
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 1.30" for 25-yr storm event  
Inflow = 1.09 cfs @ 12.52 hrs, Volume= 0.102 af  
Outflow = 1.08 cfs @ 12.53 hrs, Volume= 0.102 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.67 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 2.96 fps, Avg. Travel Time= 0.6 min

Peak Storage= 19 cf @ 12.53 hrs  
Average Depth at Peak Storage= 0.22'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



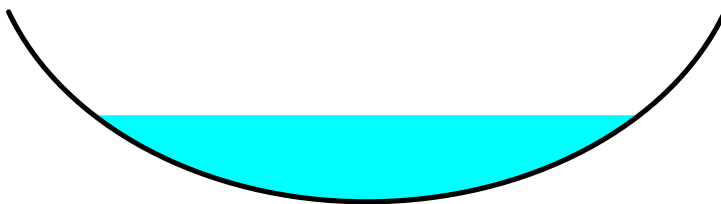
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 1.57" for 25-yr storm event  
Inflow = 1.19 cfs @ 12.52 hrs, Volume= 0.137 af  
Outflow = 1.19 cfs @ 12.52 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.78 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.50 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.52 hrs  
Average Depth at Peak Storage= 0.23'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'





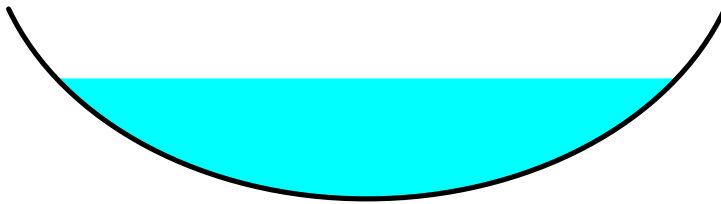
Summary for Reach 3R: Roadside ditch

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 3.75" for 25-yr storm event
Inflow = 0.85 cfs @ 12.09 hrs, Volume= 0.058 af
Outflow = 0.81 cfs @ 12.12 hrs, Volume= 0.058 af, Atten= 5%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.52 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 2.8 min

Peak Storage= 54 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 160.0' Slope= 0.0125 '/'
Inlet Invert= 42.00', Outlet Invert= 40.00'



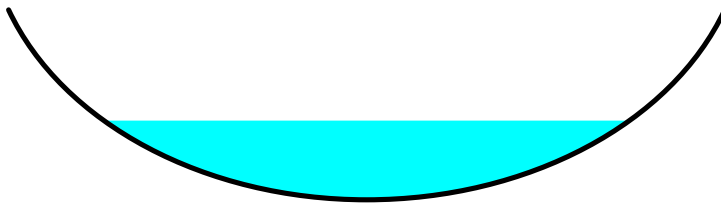
Summary for Reach 4R: Swale

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 1.59" for 25-yr storm event
Inflow = 0.80 cfs @ 12.32 hrs, Volume= 0.058 af
Outflow = 0.75 cfs @ 12.34 hrs, Volume= 0.058 af, Atten= 6%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.34 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.03 fps, Avg. Travel Time= 0.7 min

Peak Storage= 16 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 85.0' Slope= 0.0624 '/'
Inlet Invert= 47.30', Outlet Invert= 42.00'



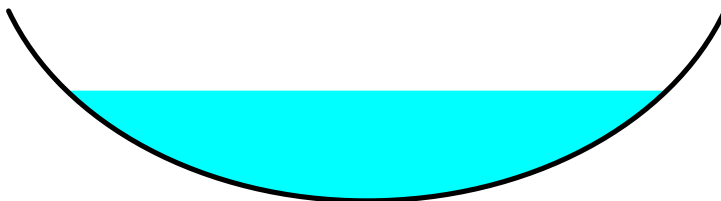
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 2.04" for 25-yr storm event  
 Inflow = 1.99 cfs @ 12.14 hrs, Volume= 0.206 af  
 Outflow = 1.99 cfs @ 12.14 hrs, Volume= 0.206 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 6.73 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 2.81 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.14 hrs  
 Average Depth at Peak Storage= 0.29'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 1'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 1.98" for 25-yr storm event  
 Inflow = 1.58 cfs @ 12.27 hrs, Volume= 0.155 af  
 Outflow = 1.11 cfs @ 12.52 hrs, Volume= 0.114 af, Atten= 30%, Lag= 14.5 min  
 Discarded = 0.02 cfs @ 12.52 hrs, Volume= 0.012 af  
 Primary = 1.09 cfs @ 12.52 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 50.43' @ 12.52 hrs Surf.Area= 1,392 sf Storage= 2,062 cf

Plug-Flow detention time= 105.2 min calculated for 0.114 af (74% of inflow)  
 Center-of-Mass det. time= 40.6 min ( 870.3 - 829.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 25-yr storm Rainfall=7.10"

Prepared by Altus Engineering, Inc.

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

**Discarded OutFlow** Max=0.02 cfs @ 12.52 hrs HW=50.43' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.07 cfs @ 12.52 hrs HW=50.43' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 1.07 cfs @ 1.17 fps)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 2.45" for 25-yr storm event  
 Inflow = 1.08 cfs @ 12.17 hrs, Volume= 0.089 af  
 Outflow = 0.81 cfs @ 12.32 hrs, Volume= 0.066 af, Atten= 25%, Lag= 9.0 min  
 Discarded = 0.01 cfs @ 12.32 hrs, Volume= 0.008 af  
 Primary = 0.80 cfs @ 12.32 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.49' @ 12.32 hrs Surf.Area= 895 sf Storage= 1,129 cf

Plug-Flow detention time= 99.2 min calculated for 0.066 af (75% of inflow)  
 Center-of-Mass det. time= 36.4 min ( 852.3 - 815.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
Cum.Store (cubic-feet)			
44.17	500	0.0	0
44.67	500	40.0	100
46.17	500	20.0	150
46.50	500	100.0	165
47.00	697	100.0	299
47.75	1,000	100.0	636
			1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

**Discarded OutFlow** Max=0.01 cfs @ 12.32 hrs HW=47.48' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.75 cfs @ 12.32 hrs HW=47.48' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.75 cfs @ 1.04 fps)

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 3.55" for 25-yr storm event  
 Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.025 af  
 Outflow = 0.36 cfs @ 12.11 hrs, Volume= 0.021 af, Atten= 3%, Lag= 1.0 min  
 Discarded = 0.00 cfs @ 12.11 hrs, Volume= 0.003 af  
 Primary = 0.35 cfs @ 12.11 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 48.01' @ 12.11 hrs Surf.Area= 304 sf Storage= 198 cf

Plug-Flow detention time= 68.6 min calculated for 0.021 af (84% of inflow)  
 Center-of-Mass det. time= 22.3 min ( 814.4 - 792.0 )

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices										
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>										
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>										
			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 4.50 5.00 5.50										
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64										
			2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74										

**Discarded OutFlow** Max=0.00 cfs @ 12.11 hrs HW=48.01' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.34 cfs @ 12.11 hrs HW=48.01' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 0.80 fps)



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1.1S: (new Subcat)** Runoff Area=4,731 sf 37.16% Impervious Runoff Depth>5.04"  
 Flow Length=130' Slope=0.0750 '/' Tc=6.0 min CN=74 Runoff=0.67 cfs 0.046 af

**Subcatchment 1.2S: (new Subcat)** Runoff Area=41,050 sf 2.04% Impervious Runoff Depth>2.86"  
 Flow Length=230' Tc=18.1 min CN=55 Runoff=2.33 cfs 0.224 af

**Subcatchment 2.1S: (new Subcat)** Runoff Area=8,038 sf 36.17% Impervious Runoff Depth>4.92"  
 Flow Length=85' Tc=6.0 min CN=73 Runoff=1.11 cfs 0.076 af

**Subcatchment 2.2S: (new Subcat)** Runoff Area=18,932 sf 16.87% Impervious Runoff Depth>3.42"  
 Flow Length=190' Tc=11.9 min UI Adjusted CN=60 Runoff=1.53 cfs 0.124 af

**Subcatchment 2.3S: (new Subcat)** Runoff Area=3,654 sf 31.53% Impervious Runoff Depth>4.69"  
 Flow Length=65' Tc=6.0 min CN=71 Runoff=0.48 cfs 0.033 af

**Subcatchment 2.4S: (new Subcat)** Runoff Area=22,171 sf 6.02% Impervious Runoff Depth>2.54"  
 Flow Length=160' Tc=10.4 min UI Adjusted CN=52 Runoff=1.35 cfs 0.108 af

**Reach 1R: (new Reach)** Avg. Flow Depth=0.30' Max Vel=6.89 fps Inflow=2.12 cfs 0.170 af  
 n=0.022 L=100.0' S=0.1020 '/' Capacity=6.31 cfs Outflow=2.11 cfs 0.170 af

**Reach 2R: POA #2** Avg. Flow Depth=0.31' Max Vel=7.05 fps Inflow=2.35 cfs 0.216 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=2.35 cfs 0.216 af

**Reach 3R: Roadside ditch** Avg. Flow Depth=0.36' Max Vel=2.72 fps Inflow=1.11 cfs 0.076 af  
 n=0.022 L=160.0' S=0.0125 '/' Capacity=2.21 cfs Outflow=1.06 cfs 0.076 af

**Reach 4R: Swale** Avg. Flow Depth=0.29' Max Vel=5.21 fps Inflow=1.47 cfs 0.092 af  
 n=0.022 L=85.0' S=0.0624 '/' Capacity=4.93 cfs Outflow=1.47 cfs 0.092 af

**Reach 5R: POA #1** Avg. Flow Depth=0.39' Max Vel=8.12 fps Inflow=3.78 cfs 0.301 af  
 n=0.022 L=1.0' S=0.1000 '/' Capacity=6.24 cfs Outflow=3.78 cfs 0.301 af

**Pond 1P: G.U.S.F. #1** Peak Elev=50.55' Storage=2,223 cf Inflow=2.33 cfs 0.224 af  
 Discarded=0.02 cfs 0.013 af Primary=2.12 cfs 0.170 af Outflow=2.14 cfs 0.183 af

**Pond 3P: G.U.S.F. #2** Peak Elev=47.58' Storage=1,207 cf Inflow=1.53 cfs 0.124 af  
 Discarded=0.01 cfs 0.009 af Primary=1.47 cfs 0.092 af Outflow=1.48 cfs 0.101 af

**Pond 4P: G.U.S.F. #3** Peak Elev=48.03' Storage=206 cf Inflow=0.48 cfs 0.033 af  
 Discarded=0.00 cfs 0.003 af Primary=0.46 cfs 0.026 af Outflow=0.47 cfs 0.029 af

**Total Runoff Area = 2.263 ac Runoff Volume = 0.610 af Average Runoff Depth = 3.23"**  
**88.66% Pervious = 2.006 ac 11.34% Impervious = 0.257 ac**

**4916 post**

Type III 24-hr 50-yr storm Rainfall=8.50"

Prepared by Altus Engineering, Inc.

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**Summary for Subcatchment 1.1S: (new Subcat)**

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.046 af, Depth> 5.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
1,758	98	Paved parking, HSG B
2,373	61	>75% Grass cover, Good, HSG B
600	55	Woods, Good, HSG B
4,731	74	Weighted Average
2,973		62.84% Pervious Area
1,758		37.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	130	0.0750	4.11		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
0.5	130	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 1.2S: (new Subcat)**

Runoff = 2.33 cfs @ 12.27 hrs, Volume= 0.224 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
138	98	Roofs, HSG B
214	98	Unconnected roofs, HSG B
486	98	Paved parking, HSG B
3,131	61	>75% Grass cover, Good, HSG B
4,903	48	Brush, Good, HSG B
32,178	55	Woods, Good, HSG B
41,050	55	Weighted Average
40,212		97.96% Pervious Area
838		2.04% Impervious Area
214		25.54% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	100	0.0400	0.11		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
2.7	100	0.0150	0.61		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
0.2	30	0.0200	2.12		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
18.1	230	Total			

**Summary for Subcatchment 2.1S: (new Subcat)**

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.076 af, Depth> 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
2,907	98	Paved parking, HSG B
3,899	61	>75% Grass cover, Good, HSG B
1,232	55	Woods, Good, HSG B
8,038	73	Weighted Average
5,131		63.83% Pervious Area
2,907		36.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.2000	0.18		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.2	35	0.0600	3.67		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.8	85	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.2S: (new Subcat)**

Runoff = 1.53 cfs @ 12.17 hrs, Volume= 0.124 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Adj	Description
626	98		Roofs, HSG B
1,794	98		Unconnected roofs, HSG B
774	98		Paved parking, HSG B
5,940	61		>75% Grass cover, Good, HSG B
4,945	48		Brush, Good, HSG B
4,853	55		Woods, Good, HSG B
18,932	62	60	Weighted Average, UI Adjusted
15,738			83.13% Pervious Area
3,194			16.87% Impervious Area
1,794			56.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0800	0.15		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.4	90	0.0500	3.35		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
11.9	190	Total			

**4916 post**

Type III 24-hr 50-yr storm Rainfall=8.50"

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**Summary for Subcatchment 2.3S: (new Subcat)**

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.033 af, Depth&gt; 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Description
1,152	98	Paved parking, HSG B
1,622	61	>75% Grass cover, Good, HSG B
880	55	Woods, Good, HSG B
3,654	71	Weighted Average
2,502		68.47% Pervious Area
1,152		31.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	40	0.1500	0.16		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
0.1	25	0.1800	6.36		<b>Shallow Concentrated Flow,</b> Grassed Waterway Kv= 15.0 fps
4.4	65	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 2.4S: (new Subcat)**

Runoff = 1.35 cfs @ 12.16 hrs, Volume= 0.108 af, Depth&gt; 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 50-yr storm Rainfall=8.50"

Area (sf)	CN	Adj	Description
317	98		Roofs, HSG B
872	98		Unconnected roofs, HSG B
145	98		Paved parking, HSG B
1,928	61		>75% Grass cover, Good, HSG B
17,752	48		Brush, Good, HSG B
1,157	55		Woods, Good, HSG B
22,171	53	52	Weighted Average, UI Adjusted
20,837			93.98% Pervious Area
1,334			6.02% Impervious Area
872			65.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	80	0.0875	0.14		<b>Sheet Flow,</b> Woods: Light underbrush n= 0.400 P2= 3.69"
1.1	80	0.0625	1.25		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
10.4	160	Total			



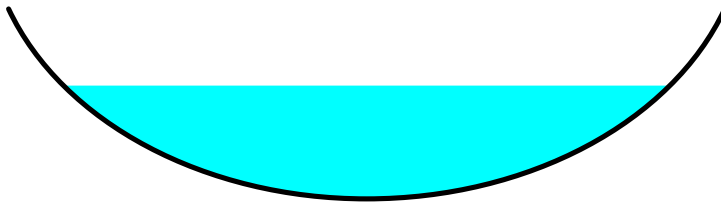
**Summary for Reach 1R: (new Reach)**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 2.17" for 50-yr storm event  
Inflow = 2.12 cfs @ 12.37 hrs, Volume= 0.170 af  
Outflow = 2.11 cfs @ 12.37 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 6.89 fps, Min. Travel Time= 0.2 min  
Avg. Velocity = 3.34 fps, Avg. Travel Time= 0.5 min

Peak Storage= 31 cf @ 12.37 hrs  
Average Depth at Peak Storage= 0.30'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.31 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 100.0' Slope= 0.1020 '/'  
Inlet Invert= 50.20', Outlet Invert= 40.00'



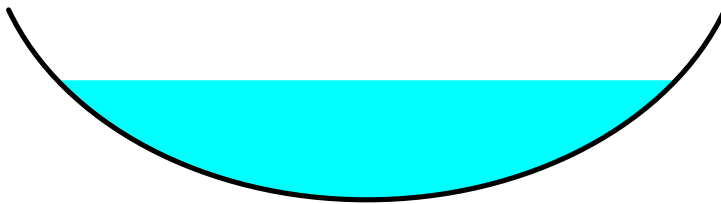
**Summary for Reach 2R: POA #2**

Inflow Area = 1.051 ac, 5.67% Impervious, Inflow Depth > 2.46" for 50-yr storm event  
Inflow = 2.35 cfs @ 12.37 hrs, Volume= 0.216 af  
Outflow = 2.35 cfs @ 12.37 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 7.05 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.70 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.37 hrs  
Average Depth at Peak Storage= 0.31'  
Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
Length= 1.0' Slope= 0.1000 '/'  
Inlet Invert= 40.00', Outlet Invert= 39.90'



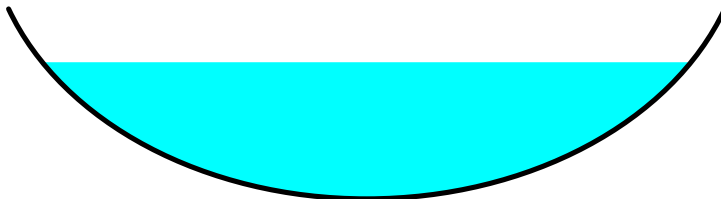
### Summary for Reach 3R: Roadside ditch

Inflow Area = 0.185 ac, 36.17% Impervious, Inflow Depth > 4.92" for 50-yr storm event  
 Inflow = 1.11 cfs @ 12.09 hrs, Volume= 0.076 af  
 Outflow = 1.06 cfs @ 12.12 hrs, Volume= 0.076 af, Atten= 5%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.72 fps, Min. Travel Time= 1.0 min  
 Avg. Velocity = 1.01 fps, Avg. Travel Time= 2.7 min

Peak Storage= 65 cf @ 12.10 hrs  
 Average Depth at Peak Storage= 0.36'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 2.21 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 160.0' Slope= 0.0125 '/  
 Inlet Invert= 42.00', Outlet Invert= 40.00'



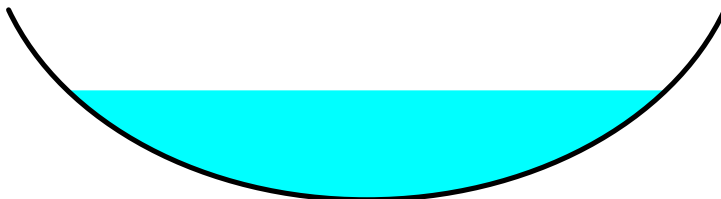
### Summary for Reach 4R: Swale

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 2.55" for 50-yr storm event  
 Inflow = 1.47 cfs @ 12.22 hrs, Volume= 0.092 af  
 Outflow = 1.47 cfs @ 12.22 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 5.21 fps, Min. Travel Time= 0.3 min  
 Avg. Velocity = 2.28 fps, Avg. Travel Time= 0.6 min

Peak Storage= 25 cf @ 12.22 hrs  
 Average Depth at Peak Storage= 0.29'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 4.93 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 85.0' Slope= 0.0624 '/  
 Inlet Invert= 47.30', Outlet Invert= 42.00'



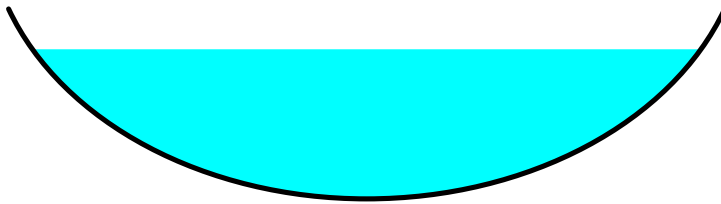
**Summary for Reach 5R: POA #1**

Inflow Area = 1.212 ac, 16.26% Impervious, Inflow Depth > 2.98" for 50-yr storm event  
 Inflow = 3.78 cfs @ 12.20 hrs, Volume= 0.301 af  
 Outflow = 3.78 cfs @ 12.20 hrs, Volume= 0.301 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 8.12 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 3.01 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.20 hrs  
 Average Depth at Peak Storage= 0.39'  
 Bank-Full Depth= 0.50' Flow Area= 0.7 sf, Capacity= 6.24 cfs

2.00' x 0.50' deep Parabolic Channel, n= 0.022 Earth, clean & straight  
 Length= 1.0' Slope= 0.1000 1'  
 Inlet Invert= 40.00', Outlet Invert= 39.90'



**Summary for Pond 1P: G.U.S.F. #1**

Inflow Area = 0.942 ac, 2.04% Impervious, Inflow Depth > 2.86" for 50-yr storm event  
 Inflow = 2.33 cfs @ 12.27 hrs, Volume= 0.224 af  
 Outflow = 2.14 cfs @ 12.37 hrs, Volume= 0.183 af, Atten= 8%, Lag= 6.1 min  
 Discarded = 0.02 cfs @ 12.37 hrs, Volume= 0.013 af  
 Primary = 2.12 cfs @ 12.37 hrs, Volume= 0.170 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 50.55' @ 12.37 hrs Surf.Area= 1,470 sf Storage= 2,223 cf

Plug-Flow detention time= 76.5 min calculated for 0.182 af (81% of inflow)  
 Center-of-Mass det. time= 27.1 min ( 848.7 - 821.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	46.17'	2,283 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.17	615	0.0	0	0
47.17	615	40.0	246	246
48.67	615	20.0	185	431
49.00	615	100.0	203	633
50.00	1,115	100.0	865	1,498
50.60	1,500	100.0	785	2,283

**4916 post**

Type III 24-hr 50-yr storm Rainfall=8.50"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	46.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	50.20'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			

**Discarded OutFlow** Max=0.02 cfs @ 12.37 hrs HW=50.55' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=2.07 cfs @ 12.37 hrs HW=50.55' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 2.07 cfs @ 1.48 fps)

**Summary for Pond 3P: G.U.S.F. #2**

Inflow Area = 0.435 ac, 16.87% Impervious, Inflow Depth > 3.42" for 50-yr storm event  
 Inflow = 1.53 cfs @ 12.17 hrs, Volume= 0.124 af  
 Outflow = 1.48 cfs @ 12.22 hrs, Volume= 0.101 af, Atten= 3%, Lag= 3.1 min  
 Discarded = 0.01 cfs @ 12.22 hrs, Volume= 0.009 af  
 Primary = 1.47 cfs @ 12.22 hrs, Volume= 0.092 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 47.58' @ 12.22 hrs Surf.Area= 932 sf Storage= 1,207 cf

Plug-Flow detention time= 75.8 min calculated for 0.101 af (82% of inflow)  
 Center-of-Mass det. time= 25.8 min ( 834.2 - 808.4 )

Volume	Invert	Avail.Storage	Storage Description	
#1	44.17'	1,351 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.17	500	0.0	0	0
44.67	500	40.0	100	100
46.17	500	20.0	150	250
46.50	500	100.0	165	415
47.00	697	100.0	299	714
47.75	1,000	100.0	636	1,351

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.17'	<b>0.600 in/hr Exfiltration over Surface area</b>
#2	Primary	47.30'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>
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 4.50 5.00 5.50			
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64			
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74			



**Discarded OutFlow** Max=0.01 cfs @ 12.22 hrs HW=47.57' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=1.40 cfs @ 12.22 hrs HW=47.57' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 1.40 cfs @ 1.29 fps)

**Summary for Pond 4P: G.U.S.F. #3**

Inflow Area = 0.084 ac, 31.53% Impervious, Inflow Depth > 4.69" for 50-yr storm event  
 Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.033 af  
 Outflow = 0.47 cfs @ 12.11 hrs, Volume= 0.029 af, Atten= 3%, Lag= 1.1 min  
 Discarded = 0.00 cfs @ 12.11 hrs, Volume= 0.003 af  
 Primary = 0.46 cfs @ 12.11 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 48.03' @ 12.11 hrs Surf.Area= 309 sf Storage= 206 cf

Plug-Flow detention time= 57.1 min calculated for 0.029 af (88% of inflow)  
 Center-of-Mass det. time= 19.2 min ( 804.9 - 785.6 )

Volume	Invert	Avail.Storage	Storage Description	
#1	45.17'	372 cf	<b>Custom Stage Data (Prismatic)</b> Listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.17	110	0.0	0	0
45.67	110	40.0	22	22
47.17	110	20.0	33	55
47.50	110	100.0	36	91
48.00	302	100.0	103	194
48.50	410	100.0	178	372

Device	Routing	Invert	Outlet Devices										
#1	Discarded	45.17'	<b>0.600 in/hr Exfiltration over Surface area</b>										
#2	Primary	47.90'	<b>4.0' long x 8.0' breadth Broad-Crested Rectangular Weir</b>										
			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 4.50 5.00 5.50										
			Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64										
			2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74										

**Discarded OutFlow** Max=0.00 cfs @ 12.11 hrs HW=48.03' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.45 cfs @ 12.11 hrs HW=48.03' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.45 cfs @ 0.87 fps)