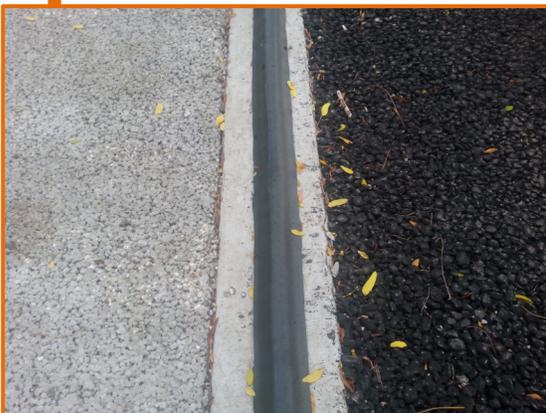


STORMWATER MANAGEMENT PLAN

EXHIBIT F-1



SANDHILL

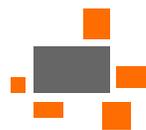
Village of Hartland, Waukesha County, Wisconsin
PEG Project Number: 767.00-WI

Prepared for:

Longmeadow Development LLC

February 19, 2021

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INTRODUCTION

The proposed Sandhill project consists of a 110-unit condominium development generally located in the Southeast Quarter (SE ¼) of Section 2, Town 8 North, Range 18 East in the Village of Hartland, Waukesha County, Wisconsin. The subject property is approximately 60.7 acres in size and is located north of Lisbon Road (CTH K) between Winkleman Road (CTH KE) and Walnut Grove Drive. To address stormwater management requirements, three wet ponds and two dry ponds have been included as part of the development plan. A location map that illustrates the tract of land is included in **Appendix 1**.

DESIGN CRITERIA

Village of Hartland Chapter 76 Municipal Code, October 2017

Wisconsin Department of Natural Resources: NR 216 & NR 151

Water Quantity:

Peak Discharge:

- a) The Village ordinance requires peak discharge rate reduction such that the peak runoff rate from the developed site from the 10-year, 24-hour design storm does not exceed the peak discharge rate from the 2-year, 24-hour design storm under pre-development conditions; and that the peak discharge rate from the developed site from the 100-year, 24-hour design storm does not exceed the peak discharge rate from the 10-year, 24-hour design storm under pre-development conditions.
- b) NR 151 requires the 1-year, 24-hour and 2-year, 24-hour post-development peak discharge rates to be detained to the respective pre-development peak discharge rate.

Water Quality: The minimum Village and DNR requirements are to remove 80% of the total suspended solids (TSS) load on an average annual basis from the runoff. The minimum Village requirement is to remove 30% of phosphorus on an average annual basis from the runoff.

Infiltration: The minimum Village and DNR requirements are to infiltrate at least 90 percent of the pre-development infiltration volume for developments with up to 40 percent connected imperviousness, based on an average annual rainfall.

PRE-DEVELOPMENT CONDITIONS

The pre-development site comprises of mostly open farmland. There is an isolated natural resource area along the north side of the site which will have only minor disturbance during development. There are no wetlands or floodplain present. The natural drainage patterns provide five main discharge points from the site.

Three of the discharge points are found in the northern half of the site and drain towards the Bark River. Onsite Area 7.1 and offsite Area 7.2 drain by overland flow towards a 21"x15" corrugated metal arch culvert underneath Winkleman Road near the northwest corner of the

site (Winkleman Road North Culvert). The farm field acts as a ponding area for the culvert. Onsite Area 8.1 and offsite Area 8.2 drain by overland flow and leave the site at the northeast corner of the site (Lot 31 Walnut Grove Swale). Onsite Area 10.1 drains by overland flow and leaves the site to the east at existing Teri Lane (Teri Lane).

The other two discharge points are found in the southern half of the site and drain towards Coco Creek. Onsite Area 6.1, offsite Area 6.2, and offsite Area 6.3 drain by overland flow to a 28"x20" corrugated metal arch culvert underneath Lisbon Road on the south side of the site (Lisbon Road Culvert). The farm field acts as a ponding area for the culvert. Offsite Area 6.3 drains to an existing offsite pond (Walnut Grove Stormwater Pond). In looking at historical aerial photos of the Walnut Grove Stormwater Pond, it appears that the pond is wet at or below elevation 1037. For modeling purposes, elevations above 1037 were used as active storage in the pond. Onsite Area 9.1 drains by overland flow to the west towards a 42"x29" corrugated metal arch culvert underneath Winkleman Road (Winkleman Road South Culvert). A Pre-Development Conditions Exhibit and Modeling can be found in **Appendix 2**.

Soils on the site are Kendall Silt Loam, Dodge Silt Loam and Theresa Silt Loam which are classified as hydrologic soil group C, along with Hochheim Loam which is classified as hydrological soil group D. Hydrologic soil group information can be found in **Appendix 1**.

POST-DEVELOPMENT CONDITIONS

It is proposed to construct a 110-unit condominium development. To address stormwater management requirements, three wet ponds and two dry ponds have been included as part of the development plan.

The northwest wet pond (71.5P) receives water from both onsite areas (20.88 acres) and offsite areas (2.57 acres) The wet pond discharges to the west towards the Winkleman Road North Culvert. There is one onsite area (0.75 acres) and one offsite area (0.56 acres) that flow directly to the Winkleman Road Culvert.

The north dry pond (81.4P) receives water from both an onsite area (4.02 acres) and an offsite area (3.03 acres). The dry pond outlet discharges to the northeast wet pond (81.2P).

The northeast wet pond (81.2P) receives water from dry pond 81.4P as well as from onsite areas (6.14 acres) and an offsite area (2.69 acres). The wet pond discharges to the east towards the Lot 31 Walnut Grove Swale. There is one onsite area (0.79 acres) and one offsite area (0.98 acres) that flow directly offsite to the Lot 31 Walnut Grove Swale.

There is an onsite area (0.60 acres) that flows directly offsite to Teri Lane.

The south dry pond (61.1P) receives water from both an onsite area (6.66 acres), an offsite area (2.46 acres) and the existing offsite Walnut Grove Stormwater Pond (7.50 acres). The dry pond discharges towards the Lisbon Road Culvert. There is an onsite area (3.52 acres) and an offsite area (0.46 acres) that flow directly to the Lisbon Road Culvert.

The south wet pond (91.3P) receives water from onsite areas (18.78 acres). The wet pond discharges to the west towards the Winkleman Road South Culvert. There is an onsite area (0.56 acres) that flows directly to the Winkleman Road South Culvert.

A Post-Development Hydrology Exhibit and Modeling can be found in **Appendix 3**. Detailed cross-sections, outlet structure details and site plans are included in the construction plan set.

ANALYSIS METHODS

HydroCAD® (Version 10.00) software has been used to analyze stormwater characteristics for this stormwater management plan. HydroCAD uses the accepted TR-55 methodology for determining peak discharge runoff rates. Rainfall depths for the 1-year, 2-year, 10-year, and 100-year storm events are 2.40, 2.70, 3.83, and 6.29 inches in accordance with the Wisconsin DNR and Village of Hartland Ordinances. Rainfall depths can be found in **Appendix 1**.

TSS reduction characteristics for the proposed water quality facilities were determined using WinSLAMM® (Version 10.4.1) Source Loading and Management Model.

SUMMARY OF RESULTS

Water Quantity

The water quantity requirement has been met by the construction of three wet ponds and two dry ponds. It can be noted on the attached summary tables that the post-development peak discharge rates leaving the site at all five discharge points are less than the pre-development discharge rates. In addition to the Village quantity requirement, the discharge through the county highway culverts were also analyzed to ensure that the existing flows through the culverts did not increase in the post-developed conditions.

To determine the post-developed allowable release rates, the onsite and offsite areas were modeled as follows to meet the Village ordinance. This is considered the pre-development discharge:

1-year Pre-Development Discharge (1-year onsite areas plus 1-year offsite areas)
2-year Pre-Development Discharge (2-year onsite areas plus 2-year offsite areas)
10-year Pre-Development Discharge (2-year onsite areas plus 10-year offsite areas)
100-year Pre-Development Discharge (10-year onsite areas plus 100-year offsite areas)

Three HydroCAD models were used in the analysis. The 1-year and 2-year allowable release rates were taken from the Pre-Development Conditions Model. A 10-year Allowable Model was created which used the 2-year flows from the Pre-Development Conditions Model for onsite areas and 10-year flows for offsite areas. A 100-year Allowable Model was created which used the 10-year flows from the Pre-Development Conditions Model for onsite areas and 100-year flows for offsite areas.

For the discharge points at existing county road culverts, the culvert and upslope storage areas were modeled in HydroCAD using the existing conditions. This determined the discharge through the culvert in existing conditions. Due to the size of the culverts, in some

cases the culverts are undersized and there is ponding upslope of the culvert and other culverts are oversized where there is no upslope ponding.

The lowest discharge between the pre-development discharge and the exist discharge through the culvert was deemed to be the allowable post-development discharge.

In the Post-Development Conditions Model, the storage volume behind the existing road culverts was reduced to match the proposed grading.

In addition to meeting the design requirement, the storm water ponds were also modeled during what would be considered a frozen condition within the watershed. To analyze this, the runoff curve numbers for all drainage areas were changed to 98 for an impervious condition. The 100-year storm event was then routed through the ponds to determine the peak water elevations for this frozen condition. The peak elevation in each of the ponds is contained below the top of berm.

Water Quality

The water quality requirement has been met by the construction of the three wet ponds. The water quality requirement is analyzed using small storm events comparable to a 1-year storm. Runoff from offsite areas, right-of-way areas, and existing impervious areas onsite was accounted for in the WinSLAMM model, but credit was not taken for any reduction in total suspended solids from these areas. This was done in the model by sending the offsite areas through an “other device” and setting the pollutant load reduction value to 1.

Water Quality Summary - TSS

Area	Pounds of TSS Generated	Pounds of TSS Remaining	Percent Removal
82.95	10,260	1,564	84.76%

The onsite wet ponds will remove in excess of the 80% minimum required.

Water Quality Summary – Phosphorus

Area	Pounds of Phosphorus Generated	Pounds of Phosphorus Remaining	Percent Removal
82.95	48.21	18.97	60.66%

The onsite wet ponds will remove in excess of the 30% minimum required.

Refer to **Appendix 4** for the WinSLAMM modeling summary.

Infiltration

The soils on the property are hydrologic soils groups C and D. Butler Engineering completed soil testing for stormwater infiltration throughout the property and concluded that infiltration of stormwater may be feasible in the southwest corner of the site near borings 212-214, 217 and 218. The infiltration testing report can be found in **Appendix 5**. In reviewing the borings that would be suitable for infiltration, it can be noted that the borings are located in the area of the proposed south wet storm water pond. The elevations in which infiltration could occur range from 1015.2 to 1020.3. The south wet storm water pond discharges toward an existing culvert beneath Winkelman Road (CTH KE). The existing culvert invert elevation is 1022.4 which set the bottom of the pond (permanent pool) at elevation 1022.5. Elevation 1022.5 would also be the bottom of the pond if it was designed as an infiltration pond so that a drawn down pipe could be installed to allow the pond to drain if the infiltration area clogged. At elevation 1022.5, the depth to suitable soils for infiltration range from 2.2 feet to 7.3 feet below the bottom of pond. Boring 218 (2.2' depth to suitable soils) is north of Homestead Drive and not in the pond area. Borings 212 (7.3'), 213 (2.2'), 214 (5.2') and 215 (5.1') are in the pond area. Other than boring 213, the suitable soils are in excess of five feet below the bottom of the pond. Due to this depth, it is not feasible to excavate five feet from the pond area and replace the five feet with granular material to promote infiltration. If the suitable soils were more uniform across the pond area and at a shallower depth as shown in boring 213, it would be more feasible to overexcavate to the suitable soils.

Since the soil boring logs show that the infiltration rate at the bottom of the pond is anticipated to be 0.5 inches per hour, the site is exempt from meeting the infiltration requirement.

Stormwater Conveyance System

Storm sewer is generally sized to accommodate stormwater runoff for the 10-year design storm event intensity using rational method and manning's formulas. Some drainage areas were sized for the 100-year design storm event intensity to limit ponding behind inlets and to prevent bypassing the stormwater ponds. Refer to **Appendix 6** for the storm sewer calculations and exhibit showing storm sewer drainage areas.

Storm sewer 100-year overland flow paths were analyzed for areas that were not sized for the 100-year design storm. The remaining flow that does not get into the pipes from the 100-year storm were modeled using a weir flow calculator. The peak water elevation was checked to be sure that 2 feet of freeboard was provided between the peak water elevation and the yard grades of adjacent buildings. In addition to meeting the freeboard requirement, the overland flow paths were also modeled during what would be considered a frozen condition within the watershed. To analyze this, the c-values for all drainage areas were changed to 0.90 for an impervious condition. The remaining flow that does not get into the pipes from the 100-year storm were modeled using a weir flow calculator. The peak water elevation was checked to be sure that adjacent buildings are not impacted. Refer to **Appendix 6** for the overland flow calculations and the exhibit showing the overland flow locations.

The three main swales running along the back yards of the buildings were analyzed for the 100-year design storm. A channel calculator was used to determine the depth of flow for the worst-case location in each of the swales. The depth of flow in each of the swales was determined to be less than 0.5 feet. Using a depth of 0.5 feet in the swales, it can be seen on the grading plan that 2 feet of freeboard is provided between the peak water elevation in

the swales and the yard grades of adjacent buildings. Refer to **Appendix 6** for the swale calculations and the exhibit showing the swale locations.

CONCLUSION

The stormwater management features for the development have been designed to comply with the Village of Hartland Municipal Code and WDNR NR151/216 requirements. Peak discharge rates for the 1, 2, 10, and 100-year storms have been reduced to the appropriate allowable rates. Storm water runoff from the site will be treated to remove at least 80% total suspended solids and 30% phosphorus annually via onsite wet ponds. The site is exempt from infiltration. Maintenance is expected to occur on a regular basis. An agreement with the Village of Hartland can be found in **Appendix 7**.

Village of Hartland Application Checklist Summary Tables

Hydrologic Parameters

Discharge Points	Drainage Area (Ac)		Runoff Curve Number		Time of Concentration (min.)	
	Existing	Proposed	Existing	Future	Existing	Future
1. Winkleman Road North Culvert						
a. Existing						
Area 7.1 Sandhill	21.83	---	81	---	48.9	---
Area 7.2 Offsite	3.13	---	80	---	45.1	---
b. Proposed						
Area 71.1 Sandhill	---	6.94	---	88	---	10.7
Area 71.2 Sandhill	---	3.27	---	82	---	36.0
Area 71.3 Sandhill	---	4.03	---	84	---	20.1
Area 71.4 Sandhill	---	3.04	---	78	---	22.0
Area 71.5 Sandhill	---	3.60	---	89	---	11.8
Area 71.6 Sandhill	---	0.75	---	83	---	6.0
Area 72.1 Offsite	---	2.57	---	79	---	34.8
Area 72.2 Offsite	---	0.56	---	86	---	12.7
2. Lot 31 Walnut Grove Swale						
a. Existing						
Area 8.1 Sandhill	11.35	---	79	---	34.6	---
Area 8.2 Offsite	6.70	---	82	---	47.0	---
b. Proposed						
Area 81.1 Sandhill	---	1.04	---	91	---	6.0
Area 81.2 Sandhill	---	5.10	---	81	---	32.4
Area 81.3 Sandhill	---	0.79	---	78	---	31.7
Area 81.4 Sandhill	---	4.02	---	77	---	20.1
Area 82.1 Offsite	---	2.69	---	82	---	35.9
Area 82.2 Offsite	---	0.98	---	81	---	30.0
Area 82.3 Offsite	---	3.03	---	82	---	34.0
3. Teri Lane						
a. Existing						
Area 10.1 Sandhill	1.16	---	80	---	22.8	---
b. Proposed						
Area 100 Sandhill	--	0.60	--	77	--	29.0

Hydrologic Parameters

Discharge Points	Drainage Area (Ac)		Runoff Curve Number		Time of Concentration (min.)	
	Existing	Proposed	Existing	Future	Existing	Future
4. Lisbon Road Culvert						
a. Existing						
Area 6.1 Sandhill	18.65	---	80	---	31.8	---
Area 6.2 Offsite	2.92	---	81	---	53.9	---
Area 6.3 Offsite	7.50		81		32.4	
b. Proposed						
Area 61.1 Sandhill	---	6.66	---	79	---	27.3
Area 61.2 Sandhill	---	3.52	---	84	---	9.3
Area 62.1 Offsite	---	2.46	---	81	---	39.8
Area 62.2 Offsite	---	0.46	---	81	---	18.9
Area 63 Offsite	---	7.50	---	81	---	32.4
5. Winkleman Road South Culvert						
a. Existing						
Area 9.1 Sandhill	9.71	---	80	---	33.2	---
b. Proposed						
Area 91.1 Sandhill	---	9.24	---	88	---	15.8
Area 91.2 Sandhill	---	4.75	---	82	---	36.1
Area 91.3 Sandhill	---	4.79	---	86	---	13.0
Area 91.4 Sandhill	---	0.56	---	82	---	6.0

Village of Hartland Application Checklist Summary Tables

Peak Discharge Summary

Winkleman Road North Culvert

Storm Frequency	Peak Discharge (cfs)			
	Pre-Development Discharge*	Post-Development	Post-Development w/Detention	Exist Discharge through road culvert**
1 Year	13.80	28.60	1.72	4.18
2 Year	17.48	34.81	2.05	4.79
10 Year	19.42	59.25	3.19	5.94
100 Year	37.37	114.62	6.20	8.52

* The pre-development discharge was calculated as follows:

1-year Pre-Development Discharge (1-year onsite areas plus 1-year offsite areas)
2-year Pre-Development Discharge (2-year onsite areas plus 2-year offsite areas)
10-year Pre-Development Discharge (2-year onsite areas plus 10-year offsite areas)
100-year Pre-Development Discharge (10-year onsite areas plus 100-year offsite areas)

** The existing discharge through the road culvert is the existing discharge through the culvert beneath the CTH. The culvert and upslope storage area were modeled in HydroCAD using existing conditions. This was completed to ensure that the discharge through the culvert beneath the CTH did not increase in the postdeveloped condition.

The lowest discharge between the pre-development discharge and the exist discharge through the culvert was deemed to be the allowable post-development discharge.

Detention Basin Summary

Northwest Wet Pond 71.5P

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
1 Year	1.796	26.86	0.36	1027.39
2 Year	2.212	32.68	0.40	1027.59
10 Year	3.422	55.60	1.78	1028.16
100 Year	6.317	107.56	6.01	1029.46

Peak Discharge Summary

Lot 31 Walnut Grove Swale

Storm Frequency	Peak Discharge (cfs)		
	Pre-Development Discharge*	Post-Development	Post-Development w/Detention
1 Year	10.62	11.73	1.54
2 Year	13.55	14.88	1.92
10 Year	17.77	27.83	9.66
100 Year	35.50	58.69	28.31

* The pre-development discharge was calculated as follows:

1-year Pre-Development Discharge (1-year onsite areas plus 1-year offsite areas)
2-year Pre-Development Discharge (2-year onsite areas plus 2-year offsite areas)
10-year Pre-Development Discharge (2-year onsite areas plus 10-year offsite areas)
100-year Pre-Development Discharge (10-year onsite areas plus 100-year offsite areas)

Detention Basin Summary

North Dry Pond 81.4P

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
1 Year	0.027	4.67	4.30	1026.67
2 Year	0.039	6.03	5.44	1026.82
10 Year	0.103	11.70	9.65	1027.37
100 Year	0.480	25.42	12.76	1028.94

Detention Basin Summary

Northeast Wet Pond 81.2P

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
1 Year	0.806	10.37	0.56	1025.97
2 Year	1.023	13.05	0.62	1026.38
10 Year	1.323	23.54	8.76	1026.91
100 Year	1.884	40.86	24.60	1027.79

Peak Discharge Summary

Teri Lane

Storm Frequency	Peak Discharge (cfs)		
	Pre-Development Discharge*	Post-Development	Post-Development w/Detention
1 Year	0.96	0.34	n/a
2 Year	1.22	0.45	n/a
10 Year	1.22	0.91	n/a
100 Year	2.31	2.05	n/a

* The pre-development discharge was calculated as follows:

1-year Pre-Development Discharge (1-year onsite areas plus 1-year offsite areas)
2-year Pre-Development Discharge (2-year onsite areas plus 2-year offsite areas)
10-year Pre-Development Discharge (2-year onsite areas plus 10-year offsite areas)
100-year Pre-Development Discharge (10-year onsite areas plus 100-year offsite areas)

Peak Discharge Summary

Lisbon Road Culvert

Storm Frequency	Peak Discharge (cfs)			
	Pre-Development Discharge*	Post-Development	Post-Development w/Detention	Exist Discharge through road culvert**
1 Year	13.72	8.54	7.19	11.67
2 Year	17.53	10.86	8.66	12.54
10 Year	18.87	20.36	12.31	15.54
100 Year	42.81	42.94	15.46	18.41

* The pre-development discharge was calculated as follows:

1-year Pre-Development Discharge (1-year onsite areas plus 1-year offsite areas)
2-year Pre-Development Discharge (2-year onsite areas plus 2-year offsite areas)
10-year Pre-Development Discharge (2-year onsite areas plus 10-year offsite areas)
100-year Pre-Development Discharge (10-year onsite areas plus 100-year offsite areas)

** The existing discharge through the road culvert is the existing discharge through the culvert beneath the CTH. The culvert and upslope storage area were modeled in HydroCAD using existing conditions. This was completed to ensure that the discharge through the culvert beneath the CTH did not increase in the postdeveloped condition.

The lowest flow between the pre-development discharge and the exist discharge through the culvert was deemed to be the allowable post-development discharge.

Detention Basin Summary

South Dry Pond 61.1P

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
1 Year	0.052	5.94	4.92	1025.14
2 Year	0.080	7.62	5.95	1025.33
10 Year	0.267	14.62	8.26	1026.06
100 Year	1.420	33.93	13.09	1027.79

Peak Discharge Summary

Winkleman Road South Culvert

Storm Frequency	Peak Discharge (cfs)			
	Pre-Development Discharge*	Post-Development	Post-Development w/Detention	Exist Discharge through road culvert**
1 Year	6.43	24.66	1.07	6.43
2 Year	8.20	29.84	1.36	8.20
10 Year	8.20	50.03	5.23	15.53
100 Year	15.53	95.15	15.33	33.06

* The pre-development discharge was calculated as follows:

1-year Pre-Development Discharge (1-year onsite areas plus 1-year offsite areas)
2-year Pre-Development Discharge (2-year onsite areas plus 2-year offsite areas)
10-year Pre-Development Discharge (2-year onsite areas plus 10-year offsite areas)
100-year Pre-Development Discharge (10-year onsite areas plus 100-year offsite areas)

** The existing discharge through the road culvert is the existing discharge through the culvert beneath the CTH. The culvert and upslope storage area were modeled in HydroCAD using existing conditions. This was completed to ensure that the discharge through the culvert beneath the CTH did not increase in the postdeveloped condition.

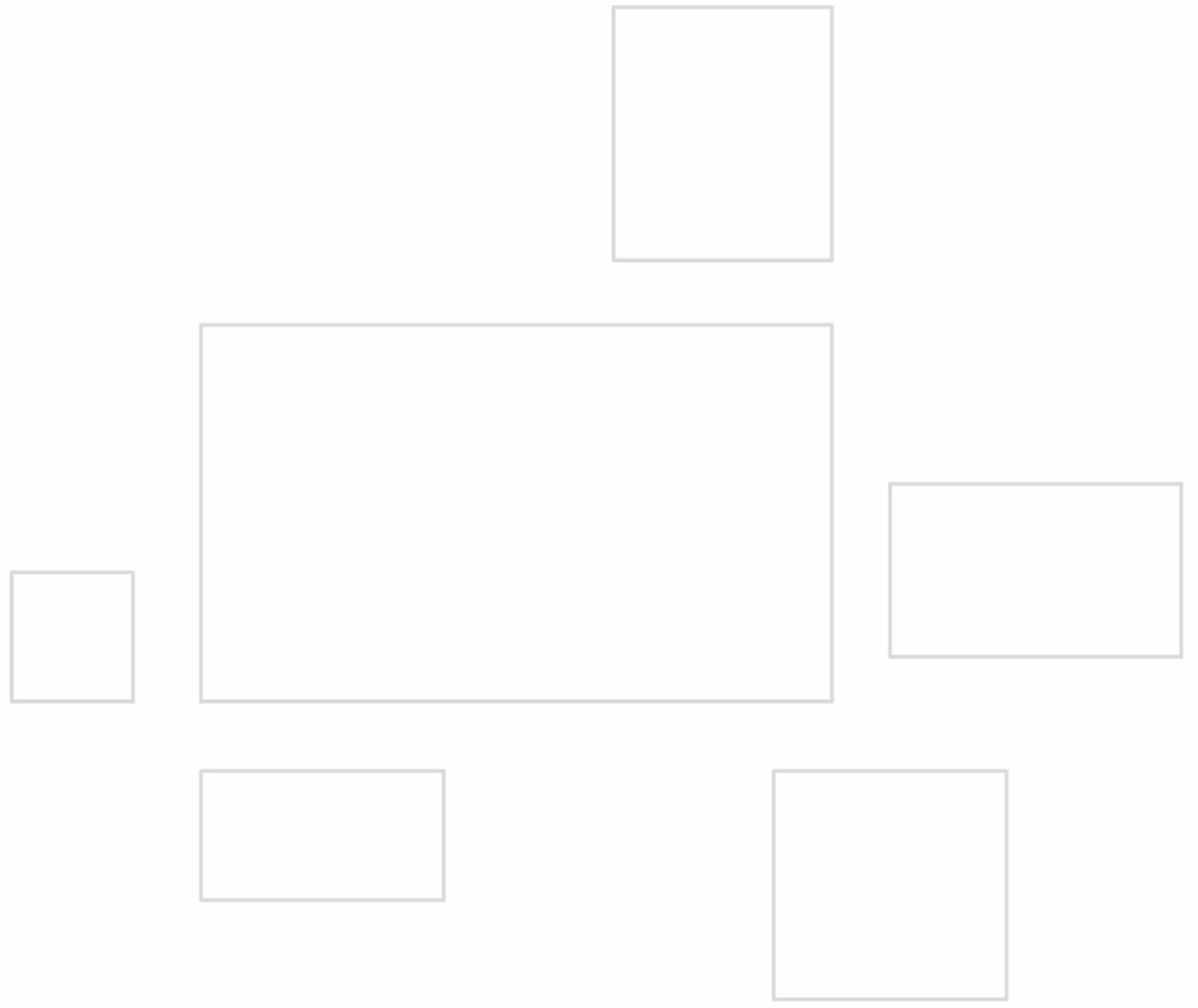
The lowest flow between the pre-development discharge and the exist discharge through the culvert was deemed to be the allowable post-development discharge.

Detention Basin Summary

South Wet Pond 91.3P

Storm Frequency	Storage Volume (ac-ft)	Peak Discharge (cfs)		
		Inflow	Discharge	Pond Elevation
1 Year	1.480	24.20	0.42	1024.17
2 Year	1.756	29.27	0.66	1024.36
10 Year	2.445	49.03	5.12	1024.83
100 Year	4.292	93.17	15.02	1025.99

APPENDIX 1 MAPS





Vicinity Map



Legend

	Wetland Identifications and Confirmations
	Wetland Class Points
	Dammed pond
	Excavated pond
	Filled excavated pond
	Filled/drained wetland
	Wetland too small to delineate
	Filled Points
	Wetland Class Areas
	Wetland
	Upland
	Filled Areas
	Wetland Class Points
	Dammed pond
	Excavated pond
	Filled excavated pond
	Filled/drained wetland
	Wetland too small to delineate
	Filled Points
	Wetland Class Areas
	Wetland
	Upland
	Filled Areas
	Municipality
	State Boundaries
	County Boundaries
	Major Roads
	Interstate Highway
	State Highway
	US Highway
	County and Local Roads
	County HWY
	Local Road

Notes

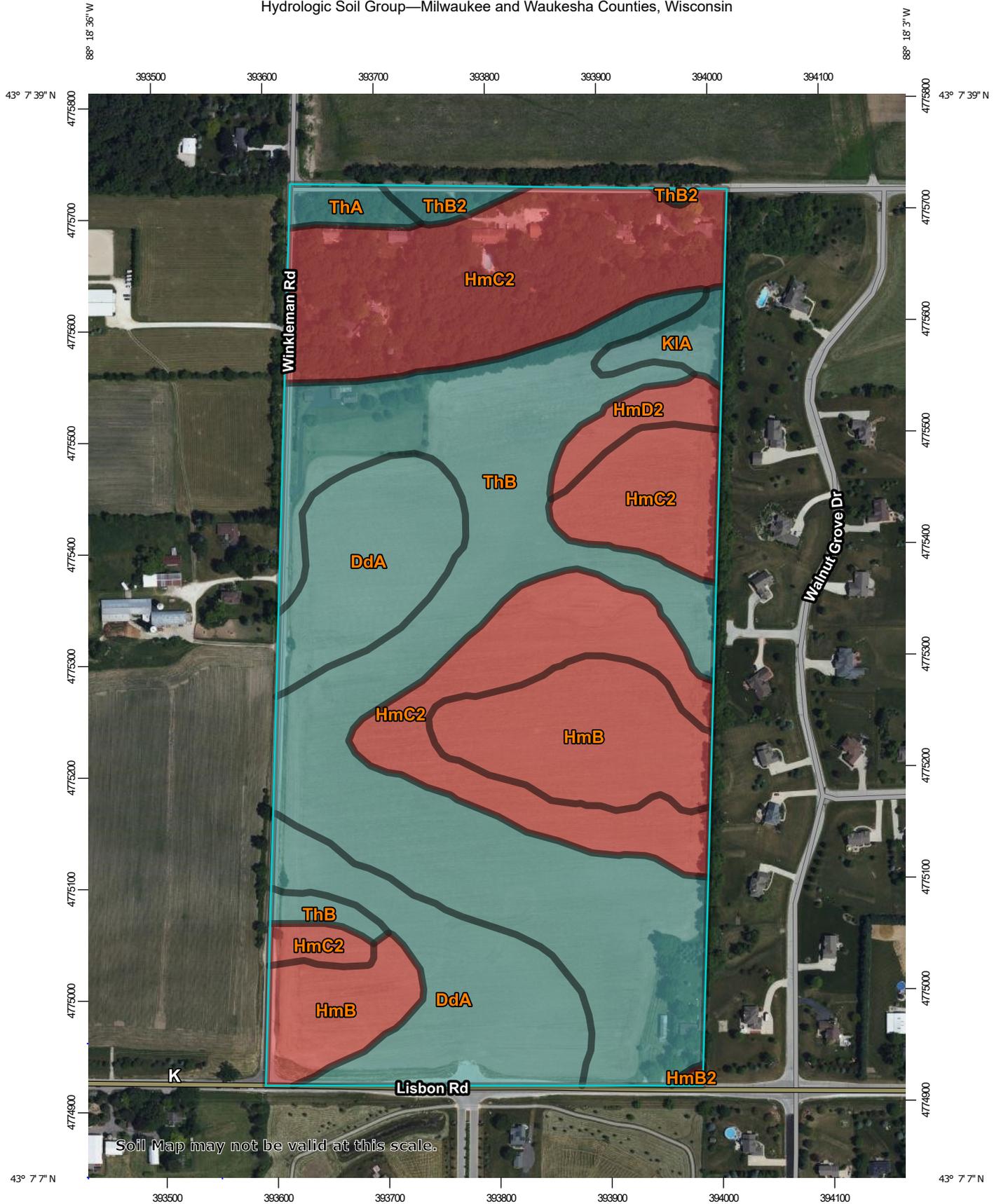
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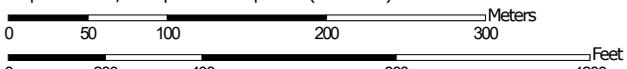
NAD_1983_HARN_Wisconsin_TM

1: 7,920

Hydrologic Soil Group—Milwaukee and Waukesha Counties, Wisconsin



Map Scale: 1:4,730 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84



MAP LEGEND

Area of Interest (AOI)
 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points

-  A
-  A/D
-  B
-  B/D

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
 Survey Area Data: Version 16, Jun 8, 2020

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

Date(s) aerial images were photographed: Jun 6, 2020—Jun 28, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DdA	Dodge silt loam, 0 to 2 percent slopes	C	13.2	16.8%
HmB	Hochheim loam, 2 to 6 percent slopes	D	9.1	11.6%
HmB2	Hochheim loam, 2 to 6 percent slopes, eroded	D	0.1	0.1%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	24.6	31.3%
HmD2	Hochheim loam, 12 to 20 percent slopes, eroded	D	1.5	1.9%
KIA	Kendall silt loam, 1 to 3 percent slopes	C	1.2	1.5%
ThA	Theresa silt loam, 0 to 2 percent slopes	C	0.9	1.2%
ThB	Theresa silt loam, 2 to 6 percent slopes	C	27.2	34.7%
ThB2	Theresa silt loam, 2 to 6 percent slopes, eroded	C	0.8	1.0%
Totals for Area of Interest			78.6	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

PF tabular

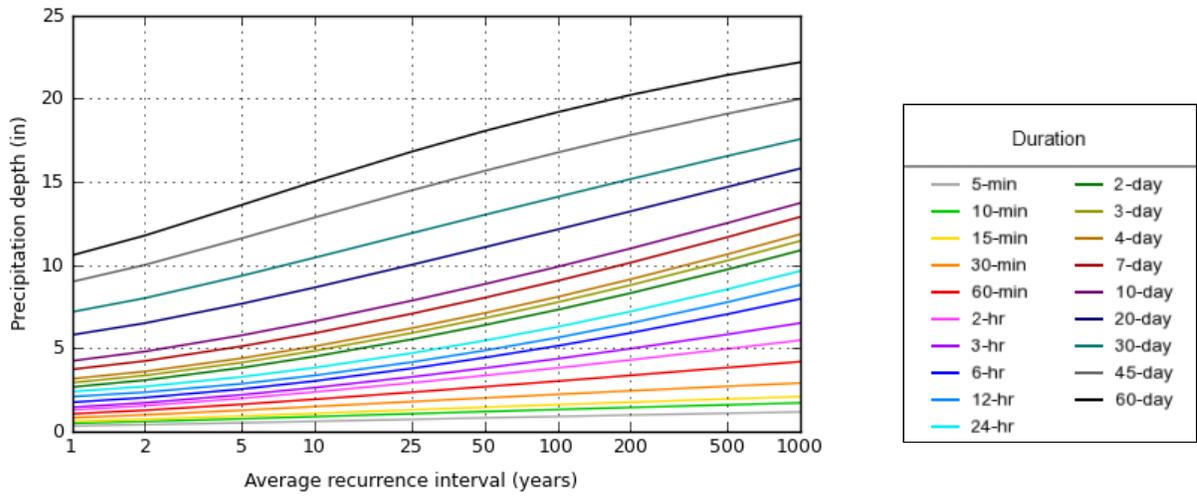
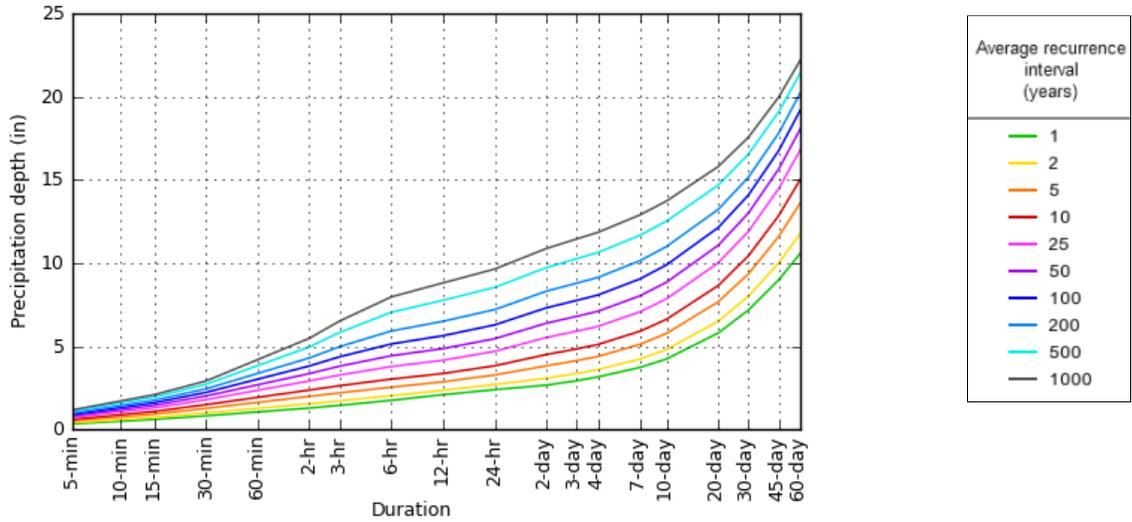
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.340 (0.274-0.419)	0.409 (0.330-0.505)	0.520 (0.417-0.642)	0.608 (0.486-0.753)	0.727 (0.562-0.911)	0.816 (0.619-1.03)	0.901 (0.664-1.16)	0.986 (0.701-1.28)	1.09 (0.753-1.45)	1.17 (0.792-1.57)
10-min	0.498 (0.402-0.614)	0.599 (0.483-0.739)	0.761 (0.611-0.939)	0.891 (0.712-1.10)	1.07 (0.822-1.33)	1.19 (0.906-1.51)	1.32 (0.973-1.69)	1.44 (1.03-1.88)	1.60 (1.10-2.12)	1.72 (1.16-2.30)
15-min	0.608 (0.490-0.749)	0.731 (0.589-0.901)	0.928 (0.745-1.15)	1.09 (0.868-1.35)	1.30 (1.00-1.63)	1.46 (1.11-1.84)	1.61 (1.19-2.06)	1.76 (1.25-2.29)	1.95 (1.34-2.59)	2.09 (1.41-2.81)
30-min	0.825 (0.665-1.02)	0.997 (0.803-1.23)	1.27 (1.02-1.57)	1.50 (1.20-1.85)	1.79 (1.38-2.25)	2.01 (1.53-2.55)	2.23 (1.64-2.86)	2.44 (1.74-3.18)	2.71 (1.87-3.59)	2.91 (1.97-3.90)
60-min	1.06 (0.853-1.30)	1.27 (1.02-1.57)	1.63 (1.31-2.01)	1.93 (1.54-2.39)	2.36 (1.83-2.98)	2.69 (2.05-3.42)	3.02 (2.24-3.90)	3.37 (2.41-4.41)	3.84 (2.65-5.10)	4.20 (2.83-5.63)
2-hr	1.29 (1.05-1.57)	1.55 (1.26-1.89)	1.99 (1.62-2.43)	2.37 (1.92-2.90)	2.92 (2.30-3.67)	3.36 (2.59-4.25)	3.82 (2.86-4.89)	4.30 (3.11-5.59)	4.96 (3.47-6.56)	5.48 (3.74-7.29)
3-hr	1.45 (1.19-1.76)	1.72 (1.41-2.09)	2.20 (1.80-2.68)	2.63 (2.14-3.21)	3.27 (2.61-4.12)	3.81 (2.96-4.81)	4.37 (3.30-5.59)	4.98 (3.63-6.47)	5.83 (4.11-7.69)	6.52 (4.47-8.62)
6-hr	1.76 (1.46-2.11)	2.03 (1.68-2.44)	2.55 (2.10-3.06)	3.03 (2.49-3.65)	3.78 (3.07-4.75)	4.43 (3.50-5.57)	5.14 (3.94-6.55)	5.92 (4.38-7.66)	7.05 (5.03-9.25)	7.97 (5.52-10.5)
12-hr	2.09 (1.76-2.48)	2.36 (1.98-2.80)	2.87 (2.40-3.41)	3.37 (2.80-4.01)	4.16 (3.42-5.18)	4.86 (3.89-6.07)	5.64 (4.38-7.13)	6.50 (4.87-8.35)	7.77 (5.61-10.1)	8.81 (6.17-11.5)
24-hr	2.40 (2.03-2.81)	2.70 (2.29-3.17)	3.28 (2.77-3.86)	3.83 (3.22-4.52)	4.70 (3.90-5.78)	5.46 (4.41-6.73)	6.29 (4.93-7.86)	7.21 (5.45-9.16)	8.54 (6.23-11.0)	9.64 (6.82-12.4)
2-day	2.67 (2.29-3.10)	3.08 (2.65-3.58)	3.83 (3.28-4.46)	4.51 (3.84-5.26)	5.53 (4.62-6.69)	6.39 (5.21-7.76)	7.31 (5.78-9.02)	8.31 (6.33-10.4)	9.73 (7.16-12.4)	10.9 (7.78-13.9)
3-day	2.93 (2.54-3.38)	3.36 (2.91-3.89)	4.14 (3.57-4.79)	4.85 (4.15-5.62)	5.91 (4.97-7.10)	6.80 (5.58-8.21)	7.76 (6.17-9.51)	8.79 (6.74-11.0)	10.3 (7.60-13.0)	11.5 (8.24-14.6)
4-day	3.17 (2.75-3.64)	3.61 (3.13-4.15)	4.40 (3.81-5.06)	5.12 (4.41-5.91)	6.20 (5.24-7.41)	7.11 (5.86-8.54)	8.09 (6.46-9.87)	9.14 (7.04-11.4)	10.6 (7.91-13.4)	11.9 (8.57-15.0)
7-day	3.73 (3.27-4.25)	4.24 (3.71-4.82)	5.12 (4.47-5.84)	5.91 (5.14-6.76)	7.07 (6.01-8.35)	8.03 (6.68-9.55)	9.05 (7.29-10.9)	10.1 (7.87-12.5)	11.7 (8.75-14.6)	12.9 (9.41-16.2)
10-day	4.24 (3.75-4.80)	4.81 (4.24-5.44)	5.78 (5.08-6.55)	6.62 (5.80-7.54)	7.85 (6.70-9.19)	8.85 (7.39-10.4)	9.89 (8.01-11.9)	11.0 (8.57-13.4)	12.5 (9.43-15.6)	13.7 (10.1-17.2)
20-day	5.80 (5.19-6.49)	6.51 (5.81-7.29)	7.67 (6.83-8.61)	8.65 (7.66-9.74)	10.0 (8.61-11.5)	11.1 (9.32-12.8)	12.1 (9.91-14.3)	13.2 (10.4-15.9)	14.7 (11.2-18.0)	15.8 (11.7-19.6)
30-day	7.18 (6.47-7.98)	8.01 (7.21-8.92)	9.35 (8.39-10.4)	10.4 (9.32-11.7)	11.9 (10.3-13.5)	13.0 (11.0-15.0)	14.1 (11.6-16.5)	15.2 (12.0-18.1)	16.5 (12.6-20.2)	17.6 (13.1-21.7)
45-day	8.99 (8.16-9.93)	10.0 (9.07-11.1)	11.6 (10.5-12.8)	12.9 (11.6-14.3)	14.5 (12.6-16.3)	15.7 (13.3-17.8)	16.8 (13.8-19.4)	17.8 (14.2-21.1)	19.1 (14.6-23.1)	20.0 (15.0-24.6)
60-day	10.6 (9.65-11.6)	11.8 (10.7-12.9)	13.6 (12.4-15.0)	15.0 (13.6-16.6)	16.8 (14.6-18.8)	18.0 (15.4-20.4)	19.2 (15.9-22.1)	20.2 (16.1-23.8)	21.4 (16.5-25.7)	22.2 (16.8-27.2)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

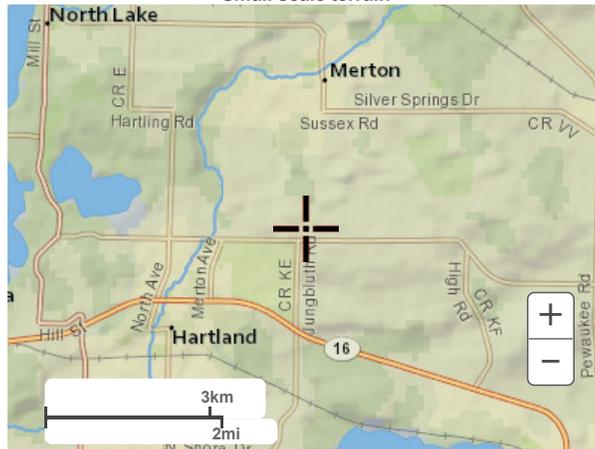
PDS-based depth-duration-frequency (DDF) curves
 Latitude: 43.1214°, Longitude: -88.3109°



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Maps & aeriels

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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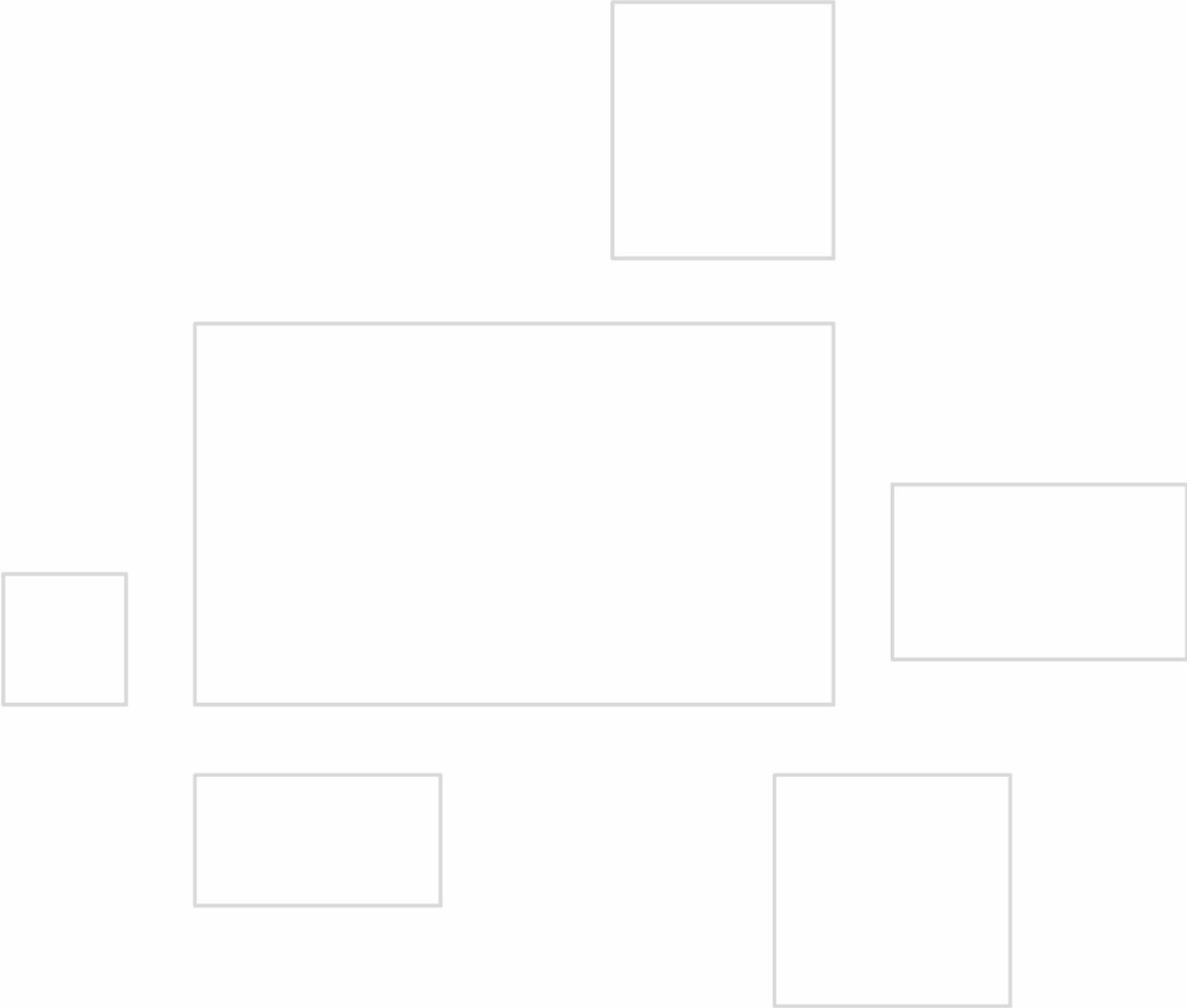
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
 1325 East West Highway
 Silver Spring, MD 20910
 Questions?: HDSC.Questions@noaa.gov

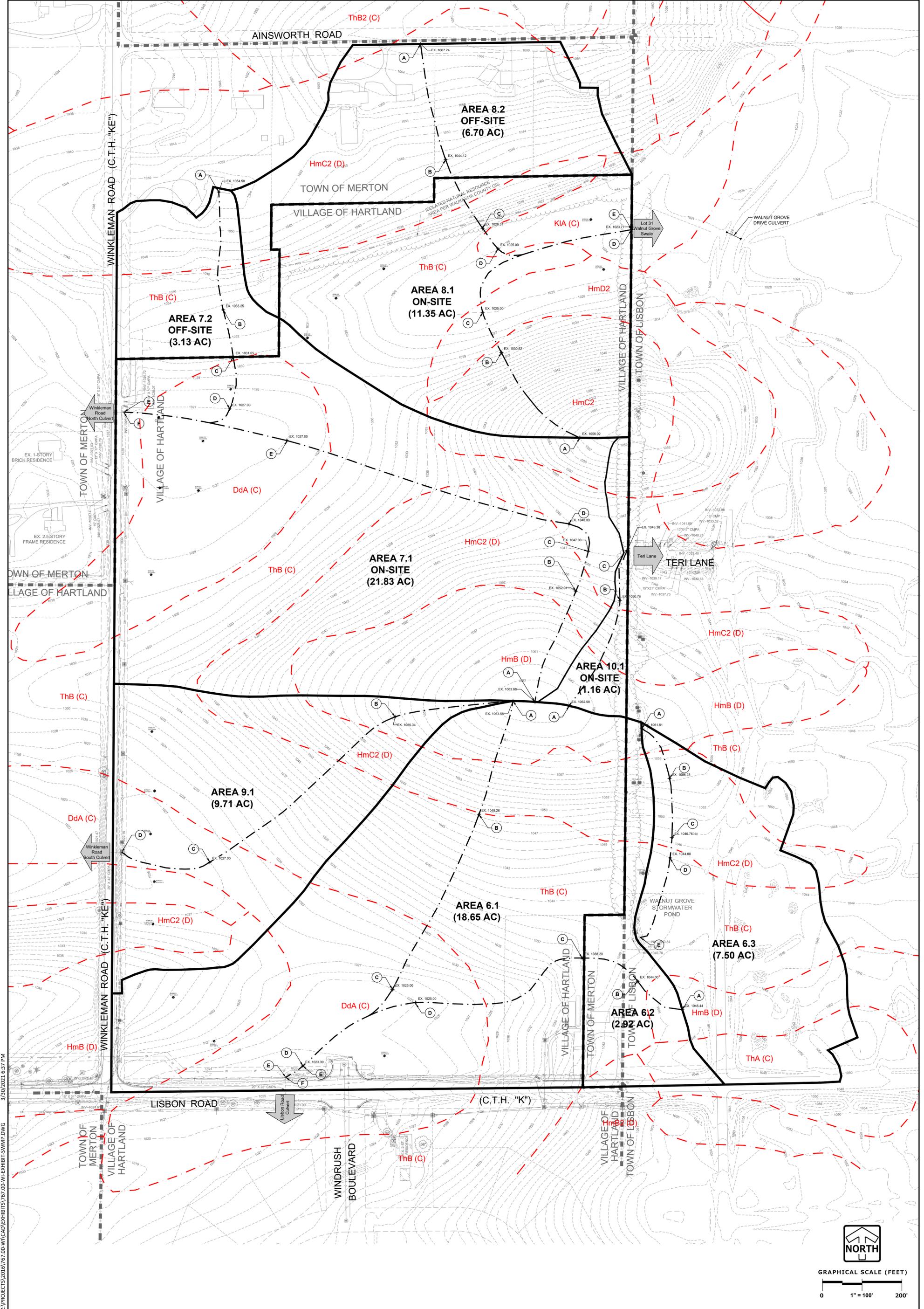
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APPENDIX 2

PRE-DEVELOPMENT CONDITIONS

INFORMATION





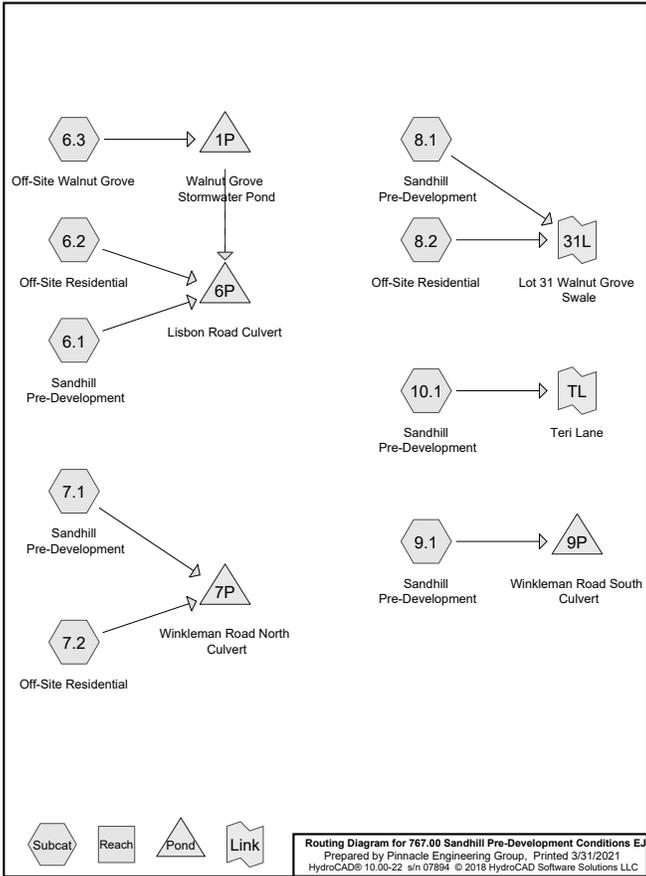
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GRAPHICAL SCALE (FEET)
0 1" = 100' 200'

SANDHILL - SWMP - PRE-DEVELOPMENT CONDITIONS

03/31/21



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.290	79	1 acre lots, 20% imp, HSG C (6.2, 6.3)
4.130	84	1 acre lots, 20% imp, HSG D (6.2, 6.3)
2.290	77	2 acre lots, 12% imp, HSG C (7.2, 8.2)
7.250	82	2 acre lots, 12% imp, HSG D (7.2, 8.2)
0.650	74	>75% Grass cover, Good, HSG C (6.1)
0.100	80	>75% Grass cover, Good, HSG D (6.1)
33.750	78	Cropland, Pre-Development, HSG C (6.1, 7.1, 8.1, 9.1, 10.1)
22.140	83	Cropland, Pre-Development, HSG D (6.1, 7.1, 8.1, 9.1, 10.1)
0.050	74	Greenspace, Good, HSG C (7.1)
0.190	98	Impervious Areas (6.1, 7.1)
2.010	92	Paved roads w/open ditches, 50% imp, HSG C (6.1, 7.1, 7.2, 9.1)
0.560	93	Paved roads w/open ditches, 50% imp, HSG D (6.1, 7.2, 9.1)
1.790	70	Woodland, Pre-Development, HSG C (6.1, 8.1, 10.1)
1.750	77	Woodland, Pre-Development, HSG D (6.1, 8.1, 10.1)
82.950	80	TOTAL AREA

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	1,040.84	1,040.70	20.3	0.0069	0.013	15.0	0.0	0.0
2	6P	1,021.67	1,021.09	67.6	0.0086	0.025	28.0	20.0	0.0
3	7P	1,025.97	1,025.70	36.6	0.0074	0.025	21.0	15.0	0.0
4	9P	1,022.15	1,021.47	53.7	0.0127	0.025	42.0	29.0	0.0

Time span=5:00-72:00 hrs, dt=0.01 hrs, 6701 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 6.1: Sandhill	Runoff Area=18.650 ac 3.67% Impervious Runoff Depth=0.82" Flow Length=1,146' Tc=31.8 min CN=80 Runoff=12.68 cfs 1.275 af
Subcatchment 6.2: Off-Site Residential	Runoff Area=2.920 ac 20.00% Impervious Runoff Depth=0.87" Flow Length=1,148' Tc=53.9 min CN=81 Runoff=1.52 cfs 0.212 af
Subcatchment 6.3: Off-Site Walnut Grove	Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=0.87" Flow Length=576' Tc=32.4 min CN=81 Runoff=5.41 cfs 0.545 af
Subcatchment 7.1: Sandhill	Runoff Area=21.830 ac 1.60% Impervious Runoff Depth=0.87" Flow Length=1,664' Tc=48.9 min CN=81 Runoff=12.10 cfs 1.586 af
Subcatchment 7.2: Off-Site Residential	Runoff Area=3.130 ac 15.52% Impervious Runoff Depth=0.82" Flow Length=840' Tc=45.1 min CN=80 Runoff=1.71 cfs 0.214 af
Subcatchment 8.1: Sandhill	Runoff Area=11.350 ac 0.00% Impervious Runoff Depth=0.77" Flow Length=898' Tc=34.6 min CN=79 Runoff=6.81 cfs 0.729 af
Subcatchment 8.2: Off-Site Residential	Runoff Area=6.700 ac 12.00% Impervious Runoff Depth=0.93" Flow Length=912' Tc=47.0 min CN=82 Runoff=4.12 cfs 0.517 af
Subcatchment 9.1: Sandhill	Runoff Area=9.710 ac 3.04% Impervious Runoff Depth=0.82" Flow Length=1,132' Tc=33.2 min CN=80 Runoff=6.43 cfs 0.664 af
Subcatchment 10.1: Sandhill	Runoff Area=1.160 ac 0.00% Impervious Runoff Depth=0.82" Flow Length=437' Tc=22.8 min CN=80 Runoff=0.96 cfs 0.079 af
Pond 1P: Walnut Grove Stormwater Pond	Peak Elev=1,039.66' Storage=23,734 cf Inflow=5.41 cfs 0.545 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond 6P: Lisbon Road Culvert	Peak Elev=1,023.55' Storage=3,399 cf Inflow=13.72 cfs 1.487 af Primary=11.67 cfs 1.487 af Secondary=0.00 cfs 0.000 af Outflow=11.67 cfs 1.487 af
Pond 7P: Winkleman Road North Culvert	Peak Elev=1,027.10' Storage=31,294 cf Inflow=13.80 cfs 1.800 af Primary=4.18 cfs 1.800 af Secondary=0.00 cfs 0.000 af Outflow=4.18 cfs 1.800 af
Pond 9P: Winkleman Road South Culvert	Peak Elev=1,023.00' Storage=1 cf Inflow=6.43 cfs 0.664 af 42.0" x 29.0", R=21.5'66.1" Pipe Arch Culvert n=0.025 L=53.7' S=0.0127'/' Outflow=6.43 cfs 0.664 af
Link 31L: Lot 31 Walnut Grove Swale	Inflow=10.62 cfs 1.246 af Primary=10.62 cfs 1.246 af
Link TL: Teri Lane	Inflow=0.96 cfs 0.079 af Primary=0.96 cfs 0.079 af

Total Runoff Area = 82.950 ac Runoff Volume = 5.821 af Average Runoff Depth = 0.84"
 94.33% Pervious = 78.246 ac 5.67% Impervious = 4.704 ac

Summary for Subcatchment 6.1: Sandhill Pre-Development

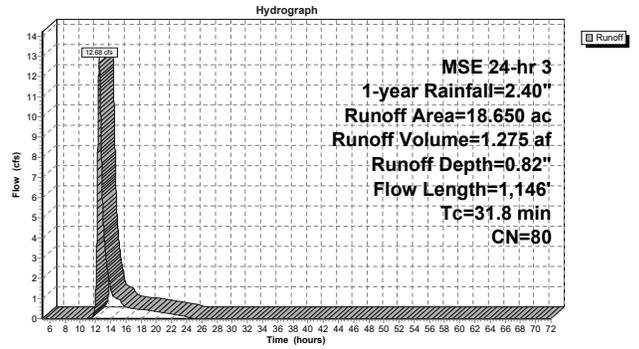
Runoff = 12.68 cfs @ 12.47 hrs, Volume= 1.275 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.260	93	Paved roads w/open ditches, 50% imp, HSG D
0.810	92	Paved roads w/open ditches, 50% imp, HSG C
* 0.150	98	Impervious Areas
* 5.230	83	Cropland, Pre-Development, HSG D
* 10.960	78	Cropland, Pre-Development, HSG C
* 0.140	77	Woodland, Pre-Development, HSG D
* 0.350	70	Woodland, Pre-Development, HSG C
0.100	80	>75% Grass cover, Good, HSG D
0.650	74	>75% Grass cover, Good, HSG C
18.650	80	Weighted Average
17.965		96.33% Pervious Area
0.685		3.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	300	0.0513	0.26		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
4.2	494	0.0470	1.95		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
7.6	300	0.0053	0.66		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
31.8	1,146	Total			

Subcatchment 6.1: Sandhill Pre-Development



Summary for Subcatchment 6.2: Off-Site Residential

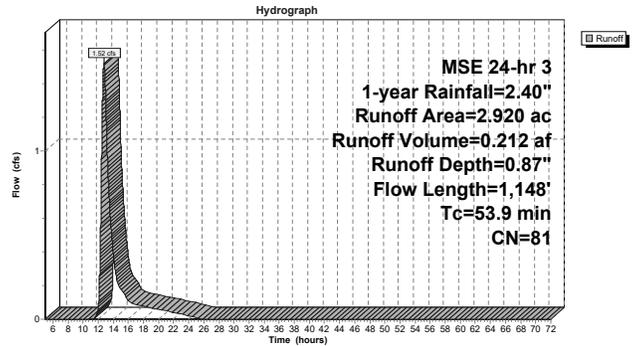
Runoff = 1.52 cfs @ 12.76 hrs, Volume= 0.212 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.950	84	1 acre lots, 20% imp, HSG D
1.970	79	1 acre lots, 20% imp, HSG C
2.920	81	Weighted Average
2.336		80.00% Pervious Area
0.584		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
5.1	463	0.0285	1.52		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	333	0.0048	0.62		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
53.9	1,148	Total			

Subcatchment 6.2: Off-Site Residential



Summary for Subcatchment 6.3: Off-Site Walnut Grove

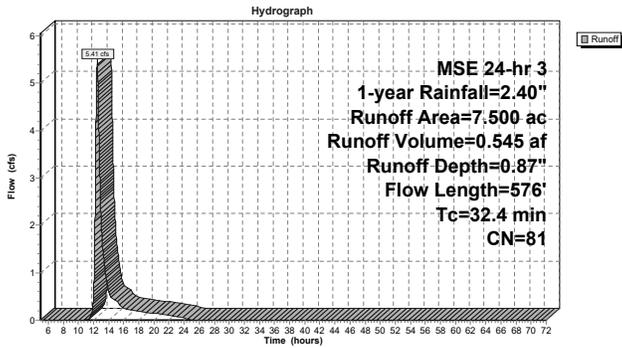
Runoff = 5.41 cfs @ 12.49 hrs, Volume= 0.545 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

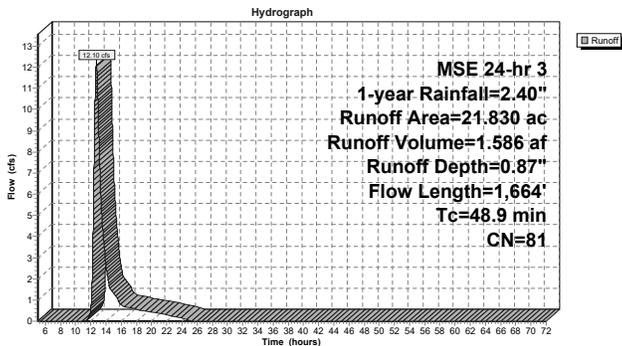
Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 6.3: Off-Site Walnut Grove



Subcatchment 7.1: Sandhill Pre-Development



Summary for Subcatchment 7.1: Sandhill Pre-Development

Runoff = 12.10 cfs @ 12.71 hrs, Volume= 1.586 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.620	92	Paved roads w/open ditches, 50% imp, HSG C
9.060	83	Cropland, Pre-Development, HSG D
12.060	78	Cropland, Pre-Development, HSG C
0.040	98	Impervious Areas
0.050	74	Greenspace, Good, HSG C
21.830	81	Weighted Average
21.480		98.40% Pervious Area
0.350		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	300	0.0389	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	106	0.0473	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
1.8	98	0.0100	0.90		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.6	742	0.0256	1.44		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
15.8	418	0.0024	0.44		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
48.9	1,664				Total

Summary for Subcatchment 7.2: Off-Site Residential

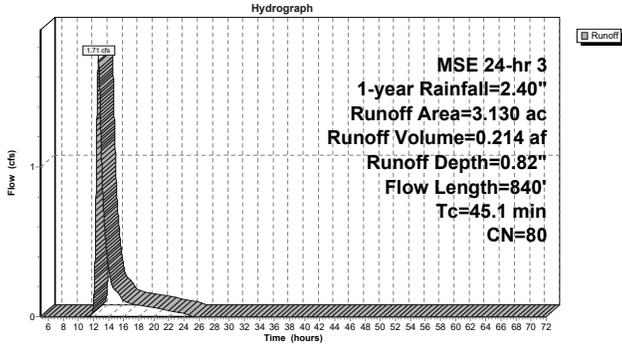
Runoff = 1.71 cfs @ 12.68 hrs, Volume= 0.214 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
1.120	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
1.720	77	2 acre lots, 12% imp, HSG C
3.130	80	Weighted Average
2.644		84.48% Pervious Area
0.486		15.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
1.4	134	0.0306	1.57		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	284	0.0035	0.53		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
45.1	840				Total

Subcatchment 7.2: Off-Site Residential



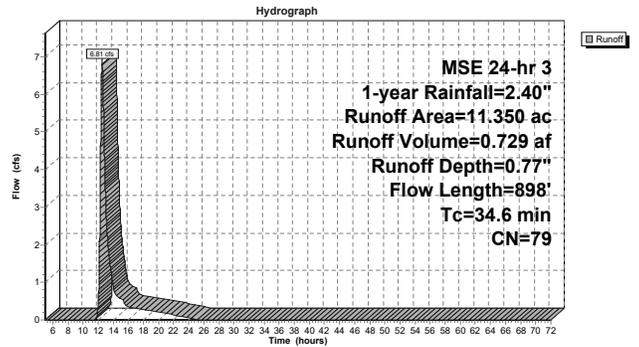
Summary for Subcatchment 8.1: Sandhill Pre-Development

Runoff = 6.81 cfs @ 12.53 hrs, Volume= 0.729 af, Depth= 0.77"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
* 4.140	83	Cropland, Pre-Development, HSG D
* 4.450	78	Cropland, Pre-Development, HSG C
* 1.410	77	Woodland, Pre-Development, HSG D
* 1.350	70	Woodland, Pre-Development, HSG C
11.350	79	Weighted Average
11.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	300	0.0880	0.32		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	112	0.0491	1.99		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
18.0	486	0.0025	0.45		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
34.6	898	Total			

Subcatchment 8.1: Sandhill Pre-Development



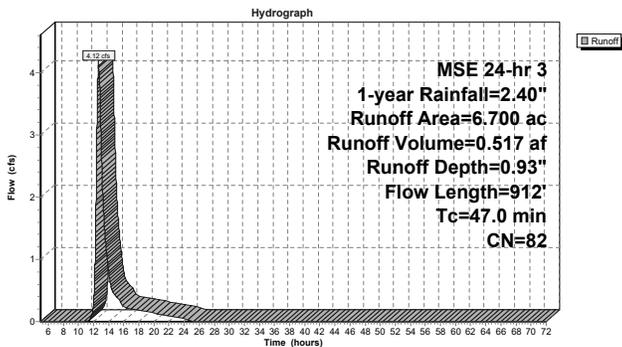
Summary for Subcatchment 8.2: Off-Site Residential

Runoff = 4.12 cfs @ 12.69 hrs, Volume= 0.517 af, Depth= 0.93"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
6.130	82	2 acre lots, 12% imp, HSG D
0.570	77	2 acre lots, 12% imp, HSG C
6.700	82	Weighted Average
5.696		88.00% Pervious Area
0.804		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	198	0.0904	1.50		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.9	65	0.0185	1.22		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
11.1	349	0.0034	0.52		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
47.0	912	Total			

Subcatchment 8.2: Off-Site Residential



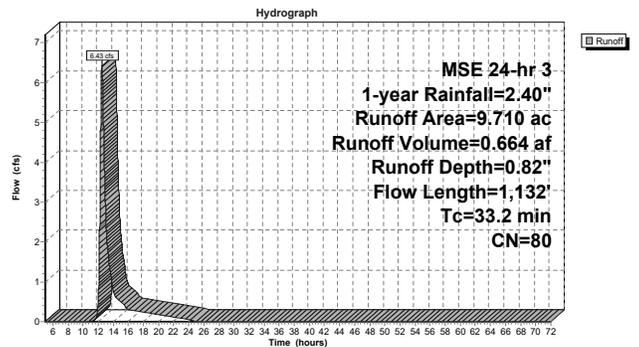
Summary for Subcatchment 9.1: Sandhill Pre-Development

Runoff = 6.43 cfs @ 12.50 hrs, Volume= 0.664 af, Depth= 0.82"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.170	93	Paved roads w/open ditches, 50% imp, HSG D
0.420	92	Paved roads w/open ditches, 50% imp, HSG C
* 2.970	83	Cropland, Pre-Development, HSG D
* 6.150	78	Cropland, Pre-Development, HSG C
9.710	80	Weighted Average
9.415		96.96% Pervious Area
0.295		3.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	300	0.0273	0.20		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
5.1	598	0.0475	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
3.0	234	0.0205	1.29		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
33.2	1,132	Total			

Subcatchment 9.1: Sandhill Pre-Development



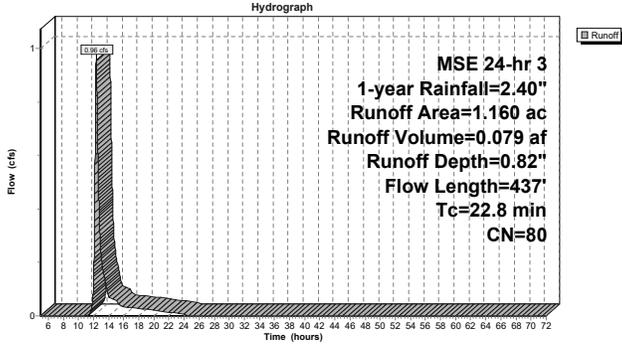
Summary for Subcatchment 10.1: Sandhill Pre-Development

Runoff = 0.96 cfs @ 12.34 hrs, Volume= 0.079 af, Depth= 0.82"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

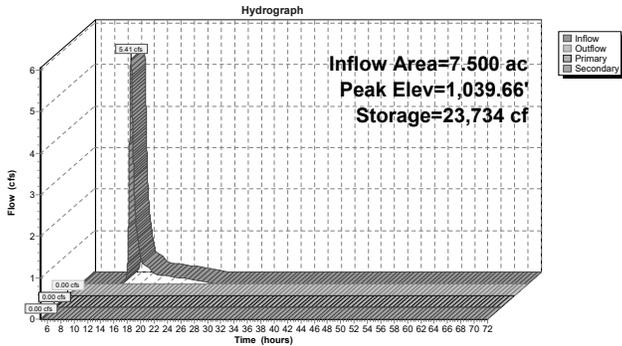
Area (ac)	CN	Description
* 0.740	83	Cropland, Pre-Development, HSG D
* 0.130	78	Cropland, Pre-Development, HSG C
* 0.090	70	Woodland, Pre-Development, HSG C
* 0.200	77	Woodland, Pre-Development, HSG D
1.160	80	Weighted Average
1.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	300	0.0407	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
1.4	137	0.0320	1.61		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
22.8	437	Total			

Subcatchment 10.1: Sandhill Pre-Development



Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7,500 ac, 20.00% Impervious, Inflow Depth = 0.87" for 1-year event
 Inflow = 5.41 cfs @ 12.49 hrs, Volume= 0.545 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,039.66' @ 25.86 hrs Surf.Area= 13,102 sf Storage= 23,734 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	60,394 cf	Existing Active Storage Volume (Irregular), Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.00	18,762	577.0	17,320	60,394	24,054

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' (Free Discharge)
 1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Summary for Pond 6P: Lisbon Road Culvert

Inflow Area = 29,070 ac, 9.53% Impervious, Inflow Depth = 0.61" for 1-year event
 Inflow = 13.72 cfs @ 12.48 hrs, Volume= 1.487 af
 Outflow = 11.67 cfs @ 12.66 hrs, Volume= 1.487 af, Atten= 15%, Lag= 10.6 min
 Primary = 11.67 cfs @ 12.66 hrs, Volume= 1.487 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.55' @ 12.66 hrs Surf.Area= 9,271 sf Storage= 3,399 cf

Plug-Flow detention time= 1.8 min calculated for 1.487 af (100% of inflow)
 Center-of-Mass det. time= 1.8 min (854.2 - 852.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,021.67'	186,687 cf	Custom Stage Data (Irregular), Listed below (Recalc)

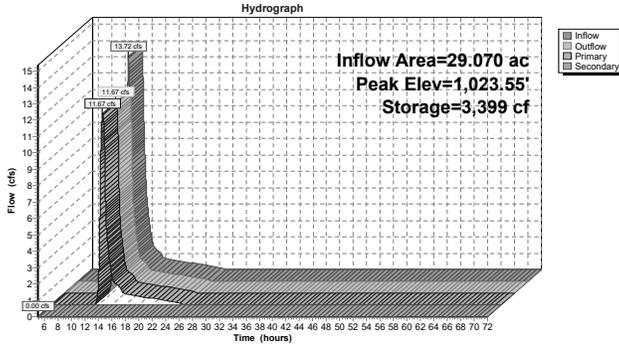
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,675	259.0	666	671	5,340
1,024.00	20,066	1,004.0	9,179	9,851	80,220
1,025.00	96,415	1,849.0	53,489	63,339	272,070
1,026.00	152,408	2,028.0	123,348	186,687	327,329

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=11.67 cfs @ 12.66 hrs HW=1,023.55' (Free Discharge)
 1=Culvert (Barrel Controls 11.67 cfs @ 4.11 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 6P: Lisbon Road Culvert



Summary for Pond 7P: Winkleman Road North Culvert

Inflow Area = 24,960 ac, 3.35% Impervious, Inflow Depth = 0.87" for 1-year event
 Inflow = 13.80 cfs @ 12.71 hrs, Volume= 1,800 af
 Outflow = 4.18 cfs @ 13.70 hrs, Volume= 1,800 af, Atten= 70%, Lag= 59.5 min
 Primary = 4.18 cfs @ 13.70 hrs, Volume= 1,800 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.10' @ 13.70 hrs Surf.Area= 77,490 sf Storage= 31,294 cf

Plug-Flow detention time= 86.4 min calculated for 1,800 af (100% of inflow)
 Center-of-Mass det. time= 86.4 min (949.3 - 862.9)

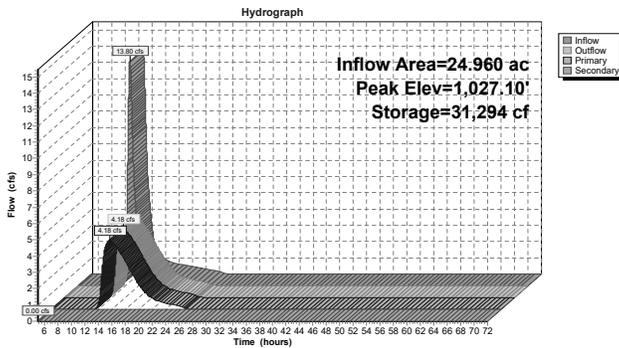
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	344,704 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	69,827	1,103.0	23,974	23,974	96,816
1,028.00	165,071	1,582.0	114,086	138,060	199,171
1,029.00	251,220	2,128.0	206,644	344,704	360,378

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 0.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=4.18 cfs @ 13.70 hrs HW=1,027.10' (Free Discharge)
 1=Culvert (Barrel Controls 4.18 cfs @ 3.17 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 7P: Winkleman Road North Culvert



Summary for Pond 9P: Winkleman Road South Culvert

Inflow Area = 9,710 ac, 3.04% Impervious, Inflow Depth = 0.82" for 1-year event
 Inflow = 6.43 cfs @ 12.50 hrs, Volume= 0.664 af
 Outflow = 6.43 cfs @ 12.50 hrs, Volume= 0.664 af, Atten= 0%, Lag= 0.0 min
 Primary = 6.43 cfs @ 12.50 hrs, Volume= 0.664 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.00' @ 12.50 hrs Surf.Area= 4 sf Storage= 1 cf

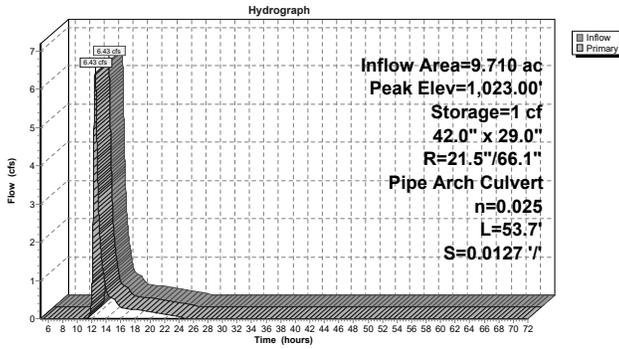
Plug-Flow detention time= 0.0 min calculated for 0.664 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (851.1 - 851.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.15'	111,237 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.15	0	0.0	0	0	0
1,023.00	4	8.0	1	1	6
1,024.00	34	23.0	17	18	46
1,025.00	90	36.0	60	77	114
1,026.00	6,337	322.0	2,394	2,472	8,264
1,027.00	57,106	955.0	27,489	29,960	72,693
1,028.00	108,140	1,412.0	81,277	111,237	158,681

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.15'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 53.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.15' / 1,021.47' S= 0.0127' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=6.43 cfs @ 12.50 hrs HW=1,023.00' (Free Discharge)
 1=Culvert (Barrel Controls 6.43 cfs @ 3.65 fps)

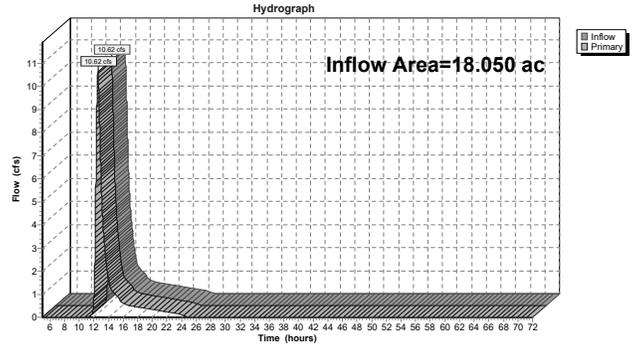
Pond 9P: Winkelman Road South Culvert



Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 18.050 ac, 4.45% Impervious, Inflow Depth = 0.83" for 1-year event
 Inflow = 10.62 cfs @ 12.57 hrs, Volume= 1.246 af
 Primary = 10.62 cfs @ 12.57 hrs, Volume= 1.246 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

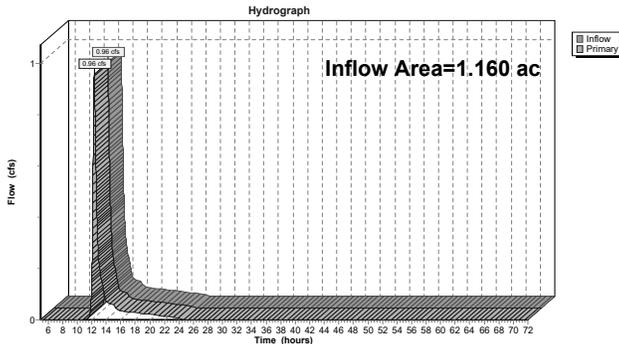
Link 31L: Lot 31 Walnut Grove Swale



Summary for Link TL: Teri Lane

Inflow Area = 1.160 ac, 0.00% Impervious, Inflow Depth = 0.82" for 1-year event
 Inflow = 0.96 cfs @ 12.34 hrs, Volume= 0.079 af
 Primary = 0.96 cfs @ 12.34 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

- Subcatchment6.1: Sandhill** Runoff Area=18.650 ac 3.67% Impervious Runoff Depth=1.03"
 Flow Length=1,146' Tc=31.8 min CN=80 Runoff=16.19 cfs 1.600 af
- Subcatchment6.2: Off-Site Residential** Runoff Area=2.920 ac 20.00% Impervious Runoff Depth=1.09"
 Flow Length=1,148' Tc=53.9 min CN=81 Runoff=1.93 cfs 0.265 af
- Subcatchment6.3: Off-Site Walnut Grove** Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=1.09"
 Flow Length=576' Tc=32.4 min CN=81 Runoff=6.84 cfs 0.680 af
- Subcatchment7.1: Sandhill** Runoff Area=21.830 ac 1.60% Impervious Runoff Depth=1.09"
 Flow Length=1,664' Tc=48.9 min CN=81 Runoff=15.32 cfs 1.978 af
- Subcatchment7.2: Off-Site Residential** Runoff Area=3.130 ac 15.52% Impervious Runoff Depth=1.03"
 Flow Length=840' Tc=45.1 min CN=80 Runoff=2.18 cfs 0.269 af
- Subcatchment8.1: Sandhill** Runoff Area=11.350 ac 0.00% Impervious Runoff Depth=0.97"
 Flow Length=898' Tc=34.6 min CN=79 Runoff=8.78 cfs 0.921 af
- Subcatchment8.2: Off-Site Residential** Runoff Area=6.700 ac 12.00% Impervious Runoff Depth=1.15"
 Flow Length=912' Tc=47.0 min CN=82 Runoff=5.16 cfs 0.641 af
- Subcatchment9.1: Sandhill** Runoff Area=9.710 ac 3.04% Impervious Runoff Depth=1.03"
 Flow Length=1,132' Tc=33.2 min CN=80 Runoff=8.20 cfs 0.833 af
- Subcatchment10.1: Sandhill** Runoff Area=1.160 ac 0.00% Impervious Runoff Depth=1.03"
 Flow Length=437' Tc=22.8 min CN=80 Runoff=1.22 cfs 0.100 af

Pond 1P: Walnut Grove Stormwater Pond Peak Elev=1,040.10' Storage=29.605 cf Inflow=6.84 cfs 0.680 af
 Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 6P: Lisbon Road Culvert Peak Elev=1,023.86' Storage=7,270 cf Inflow=17.53 cfs 1.865 af
 Primary=12.54 cfs 1.865 af Secondary=0.00 cfs 0.000 af Outflow=12.54 cfs 1.865 af

Pond 7P: Winkelman Road North Culvert Peak Elev=1,027.23' Storage=41,854 cf Inflow=17.48 cfs 2.247 af
 Primary=4.79 cfs 2.247 af Secondary=0.00 cfs 0.000 af Outflow=4.79 cfs 2.247 af

Pond 9P: Winkelman Road South Culvert Peak Elev=1,023.13' Storage=2 cf Inflow=8.20 cfs 0.833 af
 42.0" x 29.0", R=21.5"/66.1" Pipe Arch Culvert n=0.025 L=53.7' S=0.0127'/' Outflow=8.20 cfs 0.833 af

Link 31L: Lot 31 Walnut Grove Swale Inflow=13.55 cfs 1.562 af
 Primary=13.55 cfs 1.562 af

Link TL: Teri Lane Inflow=1.22 cfs 0.100 af
 Primary=1.22 cfs 0.100 af

Total Runoff Area = 82.950 ac Runoff Volume = 7.286 af Average Runoff Depth = 1.05"
94.33% Pervious = 78.246 ac 5.67% Impervious = 4.704 ac

Summary for Subcatchment 6.1: Sandhill Pre-Development

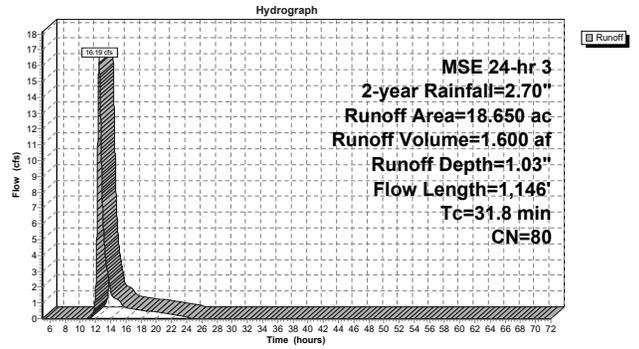
Runoff = 16.19 cfs @ 12.47 hrs, Volume= 1.600 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.260	93	Paved roads w/open ditches, 50% imp, HSG D
0.810	92	Paved roads w/open ditches, 50% imp, HSG C
* 0.150	98	Impervious Areas
* 5.230	83	Cropland, Pre-Development, HSG D
* 10.960	78	Cropland, Pre-Development, HSG C
* 0.140	77	Woodland, Pre-Development, HSG D
* 0.350	70	Woodland, Pre-Development, HSG C
0.100	80	>75% Grass cover, Good, HSG D
0.650	74	>75% Grass cover, Good, HSG C
18.650	80	Weighted Average
17.965		96.33% Pervious Area
0.685		3.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	300	0.0513	0.26		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
4.2	494	0.0470	1.95		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
7.6	300	0.0053	0.66		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
31.8	1,146	Total			

Subcatchment 6.1: Sandhill Pre-Development



Summary for Subcatchment 6.2: Off-Site Residential

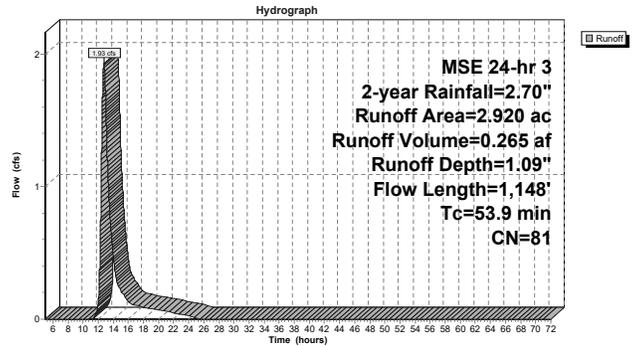
Runoff = 1.93 cfs @ 12.76 hrs, Volume= 0.265 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.950	84	1 acre lots, 20% imp, HSG D
1.970	79	1 acre lots, 20% imp, HSG C
2.920	81	Weighted Average
2.336		80.00% Pervious Area
0.584		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
5.1	463	0.0285	1.52		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	333	0.0048	0.62		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
53.9	1,148	Total			

Subcatchment 6.2: Off-Site Residential



Summary for Subcatchment 6.3: Off-Site Walnut Grove

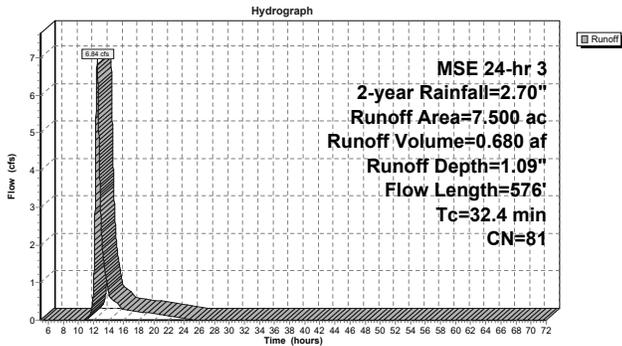
Runoff = 6.84 cfs @ 12.49 hrs, Volume= 0.680 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 6.3: Off-Site Walnut Grove



Summary for Subcatchment 7.1: Sandhill Pre-Development

Summary for Subcatchment 7.1: Sandhill Pre-Development

Runoff = 15.32 cfs @ 12.71 hrs, Volume= 1.978 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.620	92	Paved roads w/open ditches, 50% imp, HSG C
9.060	83	Cropland, Pre-Development, HSG D
12.060	78	Cropland, Pre-Development, HSG C
0.040	98	Impervious Areas
0.050	74	Greenspace, Good, HSG C
21.830	81	Weighted Average
21.480		98.40% Pervious Area
0.350		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	300	0.0389	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	106	0.0473	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
1.8	98	0.0100	0.90		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.6	742	0.0256	1.44		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
15.8	418	0.0024	0.44		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
48.9	1,664				Total

Summary for Subcatchment 7.2: Off-Site Residential

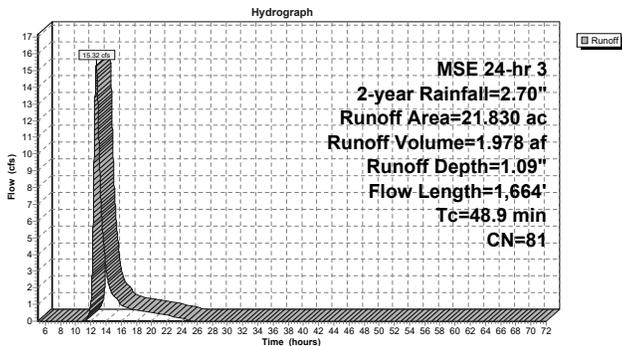
Summary for Subcatchment 7.2: Off-Site Residential

Runoff = 2.18 cfs @ 12.67 hrs, Volume= 0.269 af, Depth= 1.03"

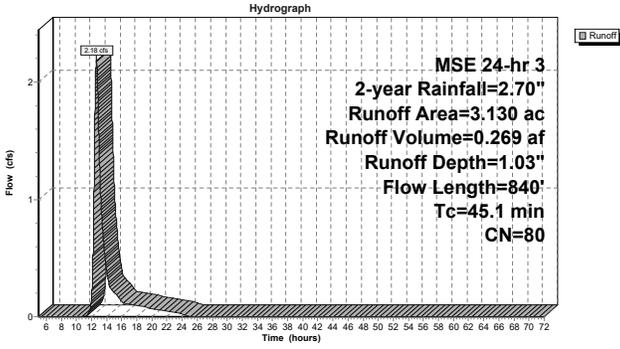
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
1.120	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
1.720	77	2 acre lots, 12% imp, HSG C
3.130	80	Weighted Average
2.644		84.48% Pervious Area
0.486		15.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
1.4	134	0.0306	1.57		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	284	0.0035	0.53		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
45.1	840				Total



Subcatchment 7.2: Off-Site Residential



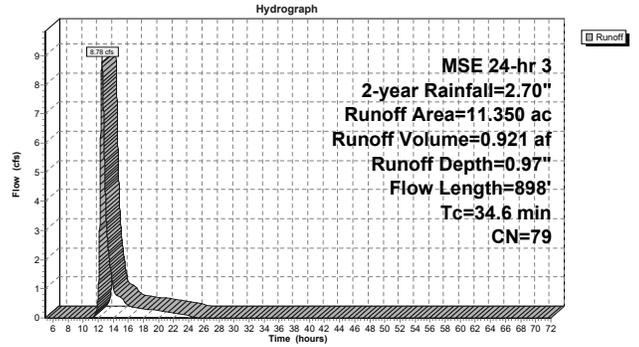
Summary for Subcatchment 8.1: Sandhill Pre-Development

Runoff = 8.78 cfs @ 12.50 hrs, Volume= 0.921 af, Depth= 0.97"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
* 4.140	83	Cropland, Pre-Development, HSG D
* 4.450	78	Cropland, Pre-Development, HSG C
* 1.410	77	Woodland, Pre-Development, HSG D
* 1.350	70	Woodland, Pre-Development, HSG C
11.350	79	Weighted Average
11.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	300	0.0880	0.32		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	112	0.0491	1.99		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
18.0	486	0.0025	0.45		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
34.6	898	Total			

Subcatchment 8.1: Sandhill Pre-Development



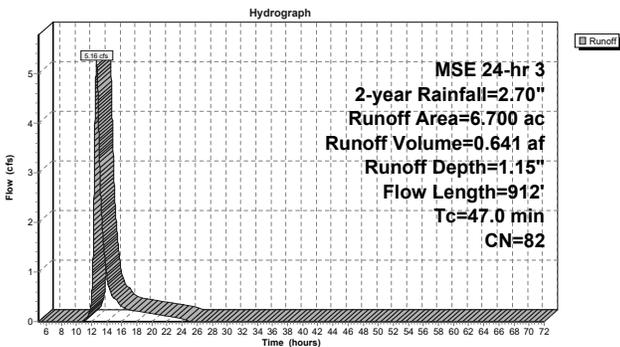
Summary for Subcatchment 8.2: Off-Site Residential

Runoff = 5.16 cfs @ 12.69 hrs, Volume= 0.641 af, Depth= 1.15"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
6.130	82	2 acre lots, 12% imp, HSG D
0.570	77	2 acre lots, 12% imp, HSG C
6.700	82	Weighted Average
5.696		88.00% Pervious Area
0.804		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	198	0.0904	1.50		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.9	65	0.0185	1.22		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
11.1	349	0.0034	0.52		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
47.0	912	Total			

Subcatchment 8.2: Off-Site Residential



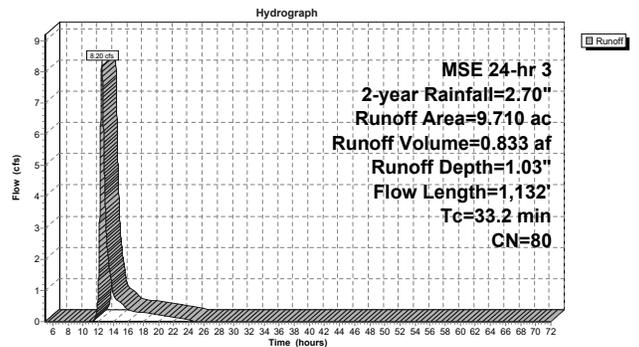
Summary for Subcatchment 9.1: Sandhill Pre-Development

Runoff = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af, Depth= 1.03"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.170	93	Paved roads w/open ditches, 50% imp, HSG D
0.420	92	Paved roads w/open ditches, 50% imp, HSG C
* 2.970	83	Cropland, Pre-Development, HSG D
* 6.150	78	Cropland, Pre-Development, HSG C
9.710	80	Weighted Average
9.415		96.96% Pervious Area
0.295		3.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	300	0.0273	0.20		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
5.1	598	0.0475	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
3.0	234	0.0205	1.29		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
33.2	1,132	Total			

Subcatchment 9.1: Sandhill Pre-Development



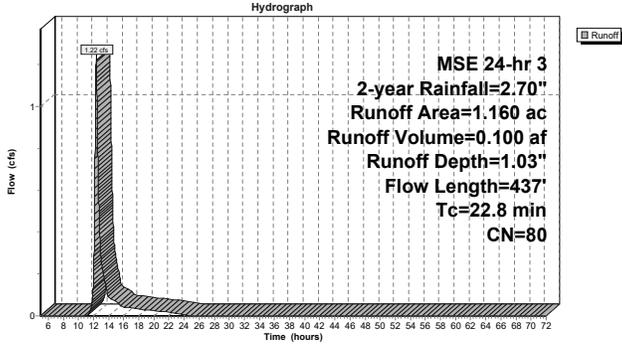
Summary for Subcatchment 10.1: Sandhill Pre-Development

Runoff = 1.22 cfs @ 12.34 hrs, Volume= 0.100 af, Depth= 1.03"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

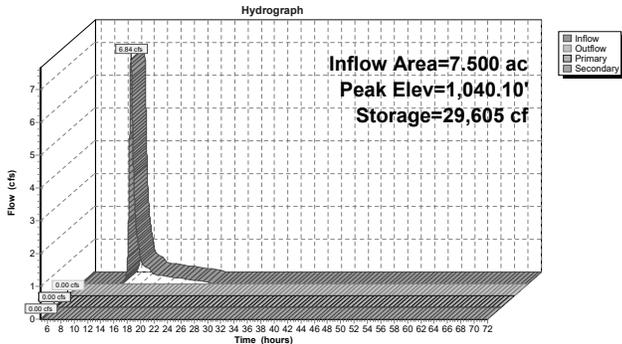
Area (ac)	CN	Description
* 0.740	83	Cropland, Pre-Development, HSG D
* 0.130	78	Cropland, Pre-Development, HSG C
* 0.090	70	Woodland, Pre-Development, HSG C
* 0.200	77	Woodland, Pre-Development, HSG D
1.160	80	Weighted Average
1.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	300	0.0407	0.23		Sheet Flow, Segment AB
					Cultivated: Residue>20% n= 0.170 P2= 2.70"
1.4	137	0.0320	1.61		Shallow Concentrated Flow, Segment BC
					Cultivated Straight Rows Kv= 9.0 fps
22.8	437	Total			

Subcatchment 10.1: Sandhill Pre-Development



Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7,500 ac, 20.00% Impervious, Inflow Depth = 1.09" for 2-year event
 Inflow = 6.84 cfs @ 12.49 hrs, Volume= 0.680 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,040.10' @ 25.86 hrs Surf.Area= 13,965 sf Storage= 29,605 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	60,394 cf	Existing Active Storage Volume (Irregular), Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.00	18,762	577.0	17,320	60,394	24,054

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' (Free Discharge)
 1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Summary for Pond 6P: Lisbon Road Culvert

Inflow Area = 29,070 ac, 9.53% Impervious, Inflow Depth = 0.77" for 2-year event
 Inflow = 17.53 cfs @ 12.48 hrs, Volume= 1.865 af
 Outflow = 12.54 cfs @ 12.91 hrs, Volume= 1.865 af, Atten= 28%, Lag= 25.9 min
 Primary = 12.54 cfs @ 12.91 hrs, Volume= 1.865 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.86' @ 12.75 hrs Surf.Area= 16,204 sf Storage= 7,270 cf

Plug-Flow detention time= 3.5 min calculated for 1.865 af (100% of inflow)
 Center-of-Mass det. time= 3.5 min (850.9 - 847.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,021.67'	186,687 cf	Custom Stage Data (Irregular), Listed below (Recalc)

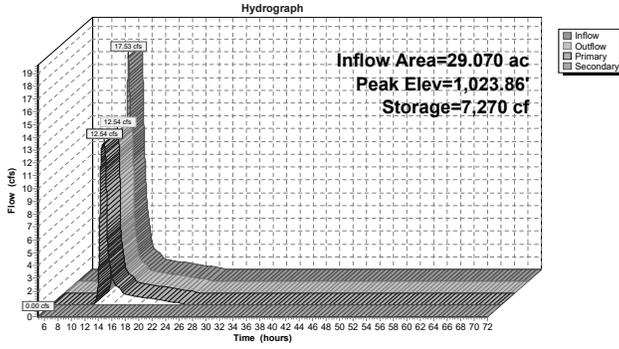
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,675	259.0	666	671	5,340
1,024.00	20,066	1,004.0	9,179	9,851	80,220
1,025.00	96,415	1,849.0	53,489	63,339	272,070
1,026.00	152,408	2,028.0	123,348	186,687	327,329

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=12.54 cfs @ 12.91 hrs HW=1,023.79' (Free Discharge)
 1=Culvert (Barrel Controls 12.54 cfs @ 4.11 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 6P: Lisbon Road Culvert



Summary for Pond 7P: Winkleman Road North Culvert

Inflow Area = 24,960 ac, 3.35% Impervious, Inflow Depth = 1.08" for 2-year event
 Inflow = 17.48 cfs @ 12.68 hrs, Volume= 2,247 af
 Outflow = 4.79 cfs @ 13.76 hrs, Volume= 2,247 af, Atten= 73%, Lag= 64.4 min
 Primary = 4.79 cfs @ 13.76 hrs, Volume= 2,247 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.23' @ 13.76 hrs Surf.Area= 87,923 sf Storage= 41,854 cf

Plug-Flow detention time= 101.0 min calculated for 2,247 af (100% of inflow)
 Center-of-Mass det. time= 101.0 min (959.0 - 858.0)

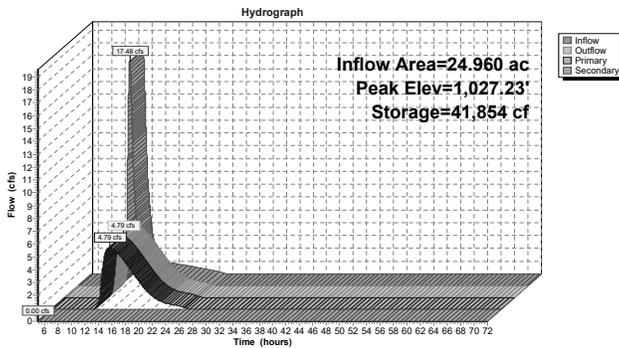
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	344,704 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	69,827	1,103.0	23,974	23,974	96,816
1,028.00	165,071	1,582.0	114,086	138,060	199,171
1,029.00	251,220	2,128.0	206,644	344,704	360,378

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=4.79 cfs @ 13.76 hrs HW=1,027.23' (Free Discharge)
 1=Culvert (Barrel Controls 4.79 cfs @ 3.29 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 7P: Winkleman Road North Culvert



Summary for Pond 9P: Winkleman Road South Culvert

Inflow Area = 9,710 ac, 3.04% Impervious, Inflow Depth = 1.03" for 2-year event
 Inflow = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af
 Outflow = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af, Atten= 0%, Lag= 0.0 min
 Primary = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.13' @ 12.50 hrs Surf.Area= 6 sf Storage= 2 cf

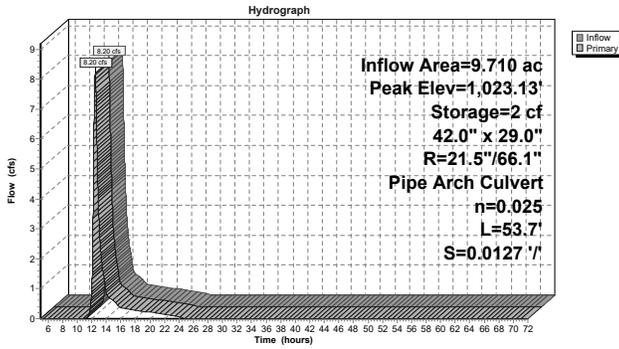
Plug-Flow detention time= 0.0 min calculated for 0.833 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (846.1 - 846.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.15'	111,237 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.15	0	0.0	0	0	0
1,023.00	4	8.0	1	1	6
1,024.00	34	23.0	17	18	46
1,025.00	90	36.0	60	77	114
1,026.00	6,337	322.0	2,394	2,472	8,264
1,027.00	57,106	955.0	27,489	29,960	72,693
1,028.00	108,140	1,412.0	81,277	111,237	158,681

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.15'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 53.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.15' / 1,021.47' S= 0.0127 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=8.20 cfs @ 12.50 hrs HW=1,023.13' (Free Discharge)
 1=Culvert (Barrel Controls 8.20 cfs @ 3.91 fps)

Pond 9P: Winkleman Road South Culvert

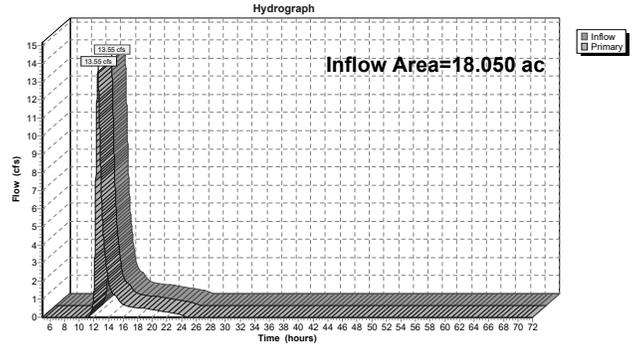


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 18.050 ac, 4.45% Impervious, Inflow Depth = 1.04" for 2-year event
 Inflow = 13.55 cfs @ 12.57 hrs, Volume= 1.562 af
 Primary = 13.55 cfs @ 12.57 hrs, Volume= 1.562 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale

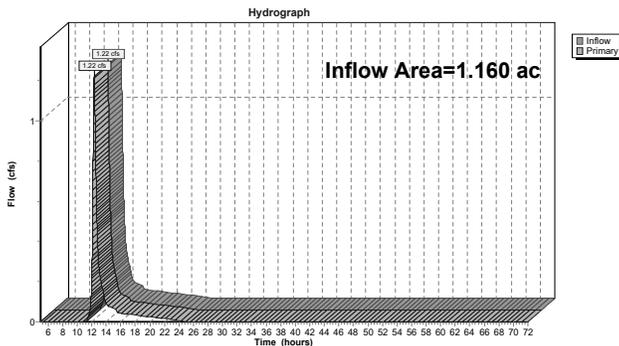


Summary for Link TL: Teri Lane

Inflow Area = 1.160 ac, 0.00% Impervious, Inflow Depth = 1.03" for 2-year event
 Inflow = 1.22 cfs @ 12.34 hrs, Volume= 0.100 af
 Primary = 1.22 cfs @ 12.34 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

- Subcatchment6.1: Sandhill** Runoff Area=18.650 ac 3.67% Impervious Runoff Depth=1.90"
 Flow Length=1,146' Tc=31.8 min CN=80 Runoff=30.62 cfs 2.956 af
- Subcatchment6.2: Off-Site Residential** Runoff Area=2.920 ac 20.00% Impervious Runoff Depth=1.98"
 Flow Length=1,148' Tc=53.9 min CN=81 Runoff=3.60 cfs 0.482 af
- Subcatchment6.3: Off-Site Walnut Grove** Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=1.98"
 Flow Length=576' Tc=32.4 min CN=81 Runoff=12.68 cfs 1.237 af
- Subcatchment7.1: Sandhill** Runoff Area=21.830 ac 1.60% Impervious Runoff Depth=1.98"
 Flow Length=1,664' Tc=48.9 min CN=81 Runoff=28.61 cfs 3.601 af
- Subcatchment7.2: Off-Site Residential** Runoff Area=3.130 ac 15.52% Impervious Runoff Depth=1.90"
 Flow Length=840' Tc=45.1 min CN=80 Runoff=4.14 cfs 0.496 af
- Subcatchment8.1: Sandhill** Runoff Area=11.350 ac 0.00% Impervious Runoff Depth=1.83"
 Flow Length=898' Tc=34.6 min CN=79 Runoff=17.01 cfs 1.727 af
- Subcatchment8.2: Off-Site Residential** Runoff Area=6.700 ac 12.00% Impervious Runoff Depth=2.06"
 Flow Length=912' Tc=47.0 min CN=82 Runoff=9.40 cfs 1.149 af
- Subcatchment9.1: Sandhill** Runoff Area=9.710 ac 3.04% Impervious Runoff Depth=1.90"
 Flow Length=1,132' Tc=33.2 min CN=80 Runoff=15.53 cfs 1.539 af
- Subcatchment10.1: Sandhill** Runoff Area=1.160 ac 0.00% Impervious Runoff Depth=1.90"
 Flow Length=437' Tc=22.8 min CN=80 Runoff=2.31 cfs 0.184 af
- Pond 1P: Walnut Grove Stormwater** Peak Elev=1,041.13' Storage=45,212 cf Inflow=12.68 cfs 1.237 af
 Primary=0.29 cfs 0.263 af Secondary=0.10 cfs 0.036 af Outflow=0.39 cfs 0.299 af
- Pond 6P: Lisbon Road Culvert** Peak Elev=1,024.60' Storage=32,303 cf Inflow=33.25 cfs 3.737 af
 Primary=15.45 cfs 3.737 af Secondary=0.00 cfs 0.000 af Outflow=15.45 cfs 3.737 af
- Pond 7P: Winkleman Road North Culvert** Peak Elev=1,027.69' Storage=91,736 cf Inflow=32.74 cfs 4.097 af
 Primary=5.94 cfs 4.097 af Secondary=0.00 cfs 0.000 af Outflow=5.94 cfs 4.097 af
- Pond 9P: Winkleman Road South Culvert** Peak Elev=1,023.61' Storage=7 cf Inflow=15.53 cfs 1.539 af
 42.0" x 29.0", R=21.5"/66.1" Pipe Arch Culvert n=0.025 L=53.7' S=0.0127 '/' Outflow=15.53 cfs 1.539 af

Link 31L: Lot 31 Walnut Grove Swale Inflow=25.64 cfs 2.877 af
 Primary=25.64 cfs 2.877 af

Link TL: Teri Lane Inflow=2.31 cfs 0.184 af
 Primary=2.31 cfs 0.184 af

**Total Runoff Area = 82.950 ac Runoff Volume = 13.371 af Average Runoff Depth = 1.93"
 94.33% Pervious = 78.246 ac 5.67% Impervious = 4.704 ac**

Summary for Subcatchment 6.1: Sandhill Pre-Development

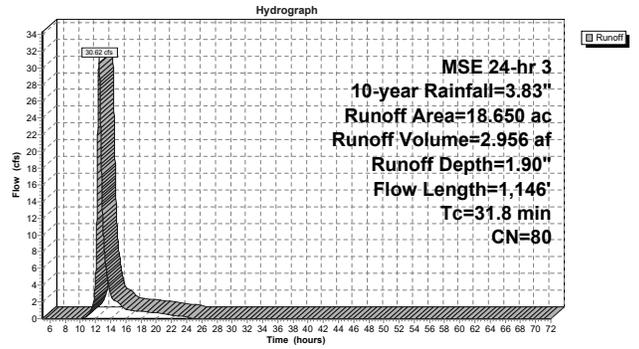
Runoff = 30.62 cfs @ 12.47 hrs, Volume= 2.956 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.260	93	Paved roads w/open ditches, 50% imp, HSG D
0.810	92	Paved roads w/open ditches, 50% imp, HSG C
* 0.150	98	Impervious Areas
* 5.230	83	Cropland, Pre-Development, HSG D
* 10.960	78	Cropland, Pre-Development, HSG C
* 0.140	77	Woodland, Pre-Development, HSG D
* 0.350	70	Woodland, Pre-Development, HSG C
0.100	80	>75% Grass cover, Good, HSG D
0.650	74	>75% Grass cover, Good, HSG C
18.650	80	Weighted Average
17.965		96.33% Pervious Area
0.685		3.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	300	0.0513	0.26		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
4.2	494	0.0470	1.95		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
7.6	300	0.0053	0.66		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
31.8	1,146	Total			

Subcatchment 6.1: Sandhill Pre-Development



Summary for Subcatchment 6.2: Off-Site Residential

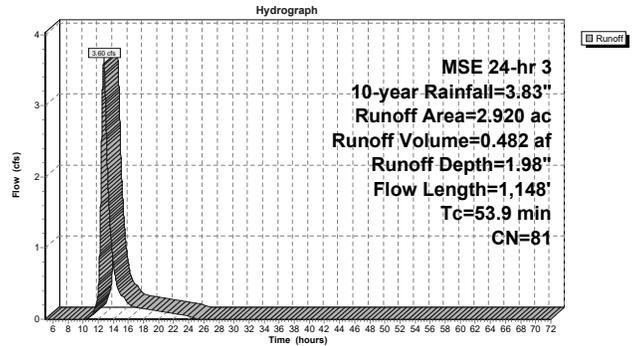
Runoff = 3.60 cfs @ 12.75 hrs, Volume= 0.482 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.950	84	1 acre lots, 20% imp, HSG D
1.970	79	1 acre lots, 20% imp, HSG C
2.920	81	Weighted Average
2.336		80.00% Pervious Area
0.584		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
5.1	463	0.0285	1.52		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	333	0.0048	0.62		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
53.9	1,148	Total			

Subcatchment 6.2: Off-Site Residential



Summary for Subcatchment 6.3: Off-Site Walnut Grove

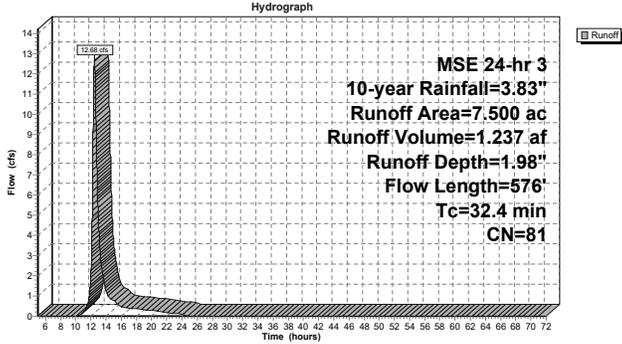
Runoff = 12.68 cfs @ 12.46 hrs, Volume= 1.237 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

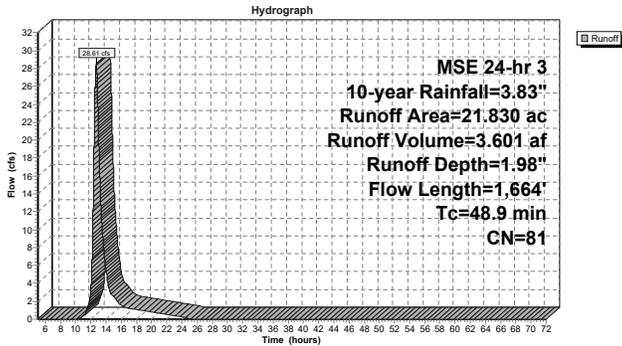
Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 6.3: Off-Site Walnut Grove



Subcatchment 7.1: Sandhill Pre-Development



Summary for Subcatchment 7.1: Sandhill Pre-Development

Runoff = 28.61 cfs @ 12.66 hrs, Volume= 3.601 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.620	92	Paved roads w/open ditches, 50% imp, HSG C
9.060	83	Cropland, Pre-Development, HSG D
12.060	78	Cropland, Pre-Development, HSG C
0.040	98	Impervious Areas
0.050	74	Greenspace, Good, HSG C
21.830	81	Weighted Average
21.480		98.40% Pervious Area
0.350		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	300	0.0389	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	106	0.0473	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
1.8	98	0.0100	0.90		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.6	742	0.0256	1.44		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
15.8	418	0.0024	0.44		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
48.9	1,664				Total

Summary for Subcatchment 7.2: Off-Site Residential

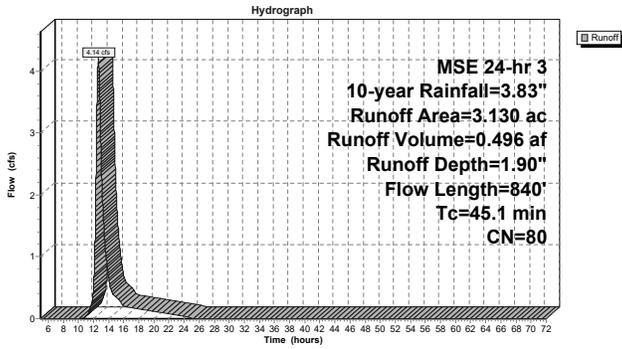
Runoff = 4.14 cfs @ 12.63 hrs, Volume= 0.496 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
1.120	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
1.720	77	2 acre lots, 12% imp, HSG C
3.130	80	Weighted Average
2.644		84.48% Pervious Area
0.486		15.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
1.4	134	0.0306	1.57		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	284	0.0035	0.53		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
45.1	840				Total

Subcatchment 7.2: Off-Site Residential



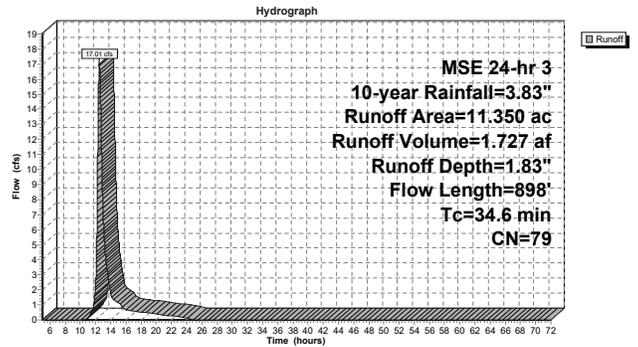
Summary for Subcatchment 8.1: Sandhill Pre-Development

Runoff = 17.01 cfs @ 12.50 hrs, Volume= 1.727 af, Depth= 1.83"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
* 4.140	83	Cropland, Pre-Development, HSG D
* 4.450	78	Cropland, Pre-Development, HSG C
* 1.410	77	Woodland, Pre-Development, HSG D
* 1.350	70	Woodland, Pre-Development, HSG C
11.350	79	Weighted Average
11.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	300	0.0880	0.32		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	112	0.0491	1.99		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
18.0	486	0.0025	0.45		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
34.6	898	Total			

Subcatchment 8.1: Sandhill Pre-Development



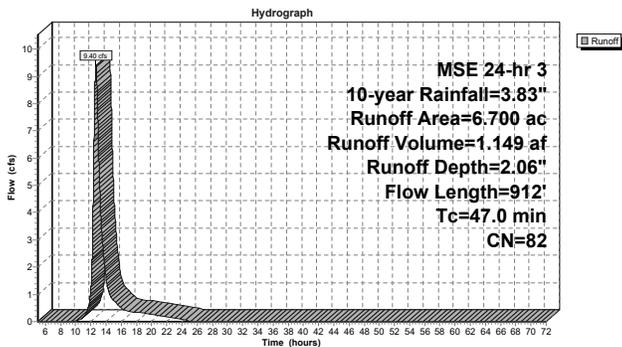
Summary for Subcatchment 8.2: Off-Site Residential

Runoff = 9.40 cfs @ 12.64 hrs, Volume= 1.149 af, Depth= 2.06"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
6.130	82	2 acre lots, 12% imp, HSG D
0.570	77	2 acre lots, 12% imp, HSG C
6.700	82	Weighted Average
5.696		88.00% Pervious Area
0.804		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	198	0.0904	1.50		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.9	65	0.0185	1.22		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
11.1	349	0.0034	0.52		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
47.0	912	Total			

Subcatchment 8.2: Off-Site Residential



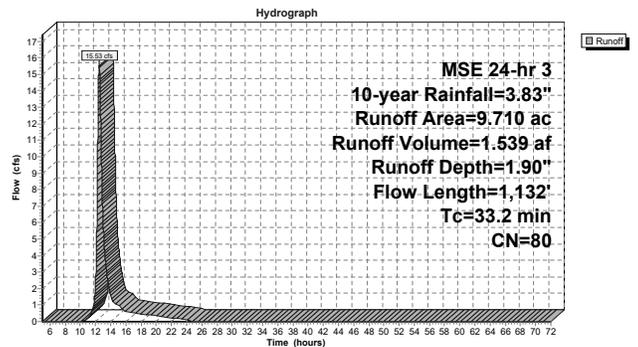
Summary for Subcatchment 9.1: Sandhill Pre-Development

Runoff = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af, Depth= 1.90"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.170	93	Paved roads w/open ditches, 50% imp, HSG D
0.420	92	Paved roads w/open ditches, 50% imp, HSG C
* 2.970	83	Cropland, Pre-Development, HSG D
* 6.150	78	Cropland, Pre-Development, HSG C
9.710	80	Weighted Average
9.415		96.96% Pervious Area
0.295		3.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	300	0.0273	0.20		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
5.1	598	0.0475	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
3.0	234	0.0205	1.29		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
33.2	1,132	Total			

Subcatchment 9.1: Sandhill Pre-Development



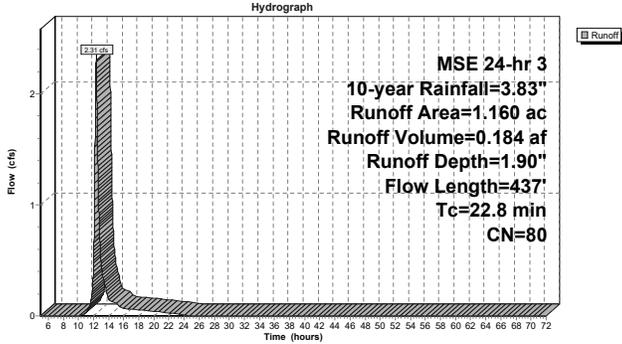
Summary for Subcatchment 10.1: Sandhill Pre-Development

Runoff = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af, Depth= 1.90"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

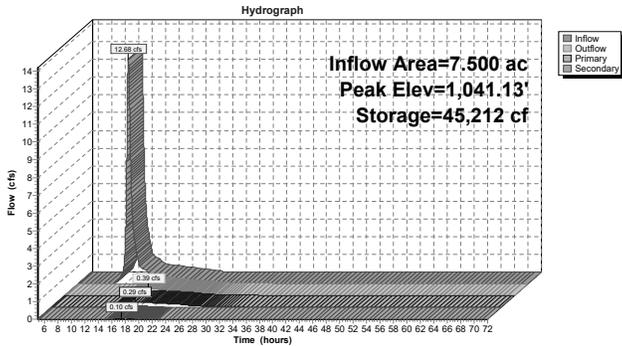
Area (ac)	CN	Description
* 0.740	83	Cropland, Pre-Development, HSG D
* 0.130	78	Cropland, Pre-Development, HSG C
* 0.090	70	Woodland, Pre-Development, HSG C
* 0.200	77	Woodland, Pre-Development, HSG D
1.160	80	Weighted Average
1.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	300	0.0407	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
1.4	137	0.0320	1.61		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
22.8	437	Total			

Subcatchment 10.1: Sandhill Pre-Development



Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7,500 ac, 20.00% Impervious, Inflow Depth = 1.98" for 10-year event
 Inflow = 12.68 cfs @ 12.46 hrs, Volume= 1.237 af
 Outflow = 0.39 cfs @ 17.42 hrs, Volume= 0.299 af, Atten= 97%, Lag= 297.3 min
 Primary = 0.29 cfs @ 17.42 hrs, Volume= 0.263 af
 Secondary = 0.10 cfs @ 17.42 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.13' @ 17.42 hrs Surf.Area= 16,281 sf Storage= 45,212 cf

Plug-Flow detention time= 619.8 min calculated for 0.299 af (24% of inflow)
 Center-of-Mass det. time= 517.6 min (1,347.9 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	60,394 cf	Existing Active Storage Volume (Irregular), Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.00	18,762	577.0	17,320	60,394	24,054

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.29 cfs @ 17.42 hrs HW=1,041.13' (Free Discharge)
 1=Culvert (Barrel Controls 0.29 cfs @ 2.02 fps)

Secondary OutFlow Max=0.09 cfs @ 17.42 hrs HW=1,041.13' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 0.09 cfs @ 0.33 fps)

Pond 1P: Walnut Grove Stormwater Pond

Summary for Pond 6P: Lisbon Road Culvert

Inflow Area = 29,070 ac, 9.53% Impervious, Inflow Depth = 1.54" for 10-year event
 Inflow = 33.25 cfs @ 12.47 hrs, Volume= 3.737 af
 Outflow = 15.45 cfs @ 12.94 hrs, Volume= 3.737 af, Atten= 54%, Lag= 28.1 min
 Primary = 15.45 cfs @ 12.94 hrs, Volume= 3.737 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.60' @ 12.94 hrs Surf.Area= 58,683 sf Storage= 32,303 cf

Plug-Flow detention time= 14.5 min calculated for 3.737 af (100% of inflow)
 Center-of-Mass det. time= 14.5 min (890.0 - 875.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,021.67'	186,687 cf	Custom Stage Data (Irregular), Listed below (Recalc)

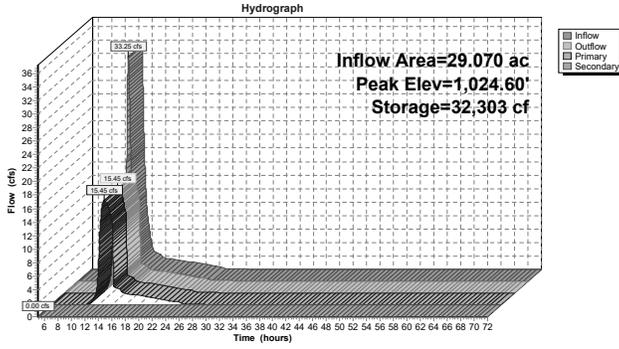
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,675	259.0	666	671	5,340
1,024.00	20,066	1,004.0	9,179	9,851	80,220
1,025.00	96,415	1,849.0	53,489	63,339	272,070
1,026.00	152,408	2,028.0	123,348	186,687	327,329

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=15.45 cfs @ 12.94 hrs HW=1,024.60' (Free Discharge)
 1=Culvert (Barrel Controls 15.45 cfs @ 4.99 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 6P: Lisbon Road Culvert



Summary for Pond 7P: Winkleman Road North Culvert

Inflow Area = 24,960 ac, 3.35% Impervious, Inflow Depth = 1.97' for 10-year event
 Inflow = 32.74 cfs @ 12.66 hrs, Volume= 4.097 af
 Outflow = 5.94 cfs @ 14.01 hrs, Volume= 4.097 af, Atten= 82%, Lag= 80.6 min
 Primary = 5.94 cfs @ 14.01 hrs, Volume= 4.097 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.69' @ 14.01 hrs Surf.Area= 130,839 sf Storage= 91,736 cf

Plug-Flow detention time= 166.2 min calculated for 4.096 af (100% of inflow)
 Center-of-Mass det. time= 166.2 min (1,011.7 - 845.5)

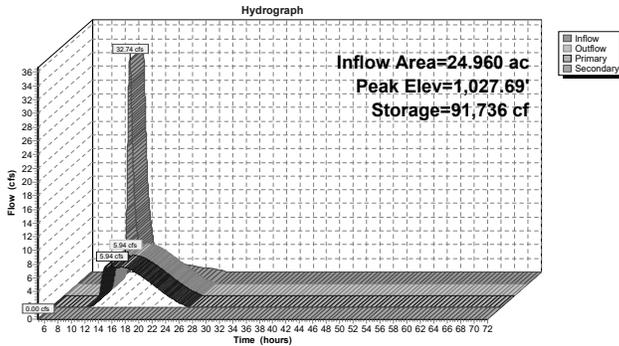
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	344,704 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	69,827	1,103.0	23,974	23,974	96,816
1,028.00	165,071	1,582.0	114,086	138,060	199,171
1,029.00	251,220	2,128.0	206,644	344,704	360,378

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=5.94 cfs @ 14.01 hrs HW=1,027.69' (Free Discharge)
 1=Culvert (Barrel Controls 5.94 cfs @ 3.41 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 7P: Winkleman Road North Culvert



Summary for Pond 9P: Winkleman Road South Culvert

Inflow Area = 9,710 ac, 3.04% Impervious, Inflow Depth = 1.90' for 10-year event
 Inflow = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af
 Outflow = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af, Atten= 0%, Lag= 0.0 min
 Primary = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.61' @ 12.47 hrs Surf.Area= 19 sf Storage= 7 cf

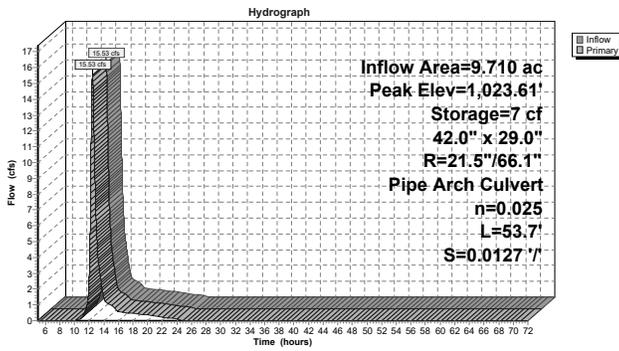
Plug-Flow detention time= 0.0 min calculated for 1.539 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (833.2 - 833.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.15'	111,237 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.15	0	0.0	0	0	0
1,023.00	4	8.0	1	1	6
1,024.00	34	23.0	17	18	46
1,025.00	90	36.0	60	77	114
1,026.00	6,337	322.0	2,394	2,472	8,264
1,027.00	57,106	955.0	27,489	29,960	72,693
1,028.00	108,140	1,412.0	81,277	111,237	158,681

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.15'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 53.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.15' / 1,021.47' S= 0.0127' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=15.52 cfs @ 12.47 hrs HW=1,023.61' (Free Discharge)
 1=Culvert (Barrel Controls 15.52 cfs @ 4.66 fps)

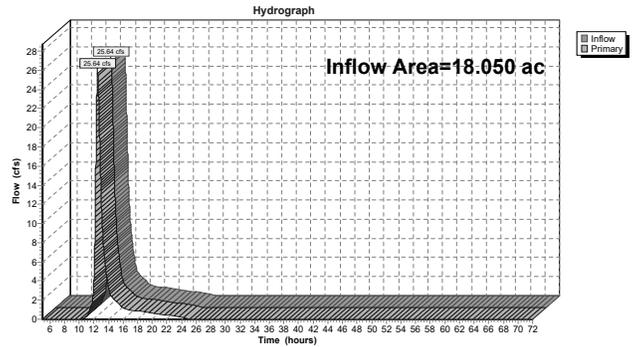
Pond 9P: Winkleman Road South Culvert



Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 18.050 ac, 4.45% Impervious, Inflow Depth = 1.91" for 10-year event
 Inflow = 25.64 cfs @ 12.54 hrs, Volume= 2.877 af
 Primary = 25.64 cfs @ 12.54 hrs, Volume= 2.877 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

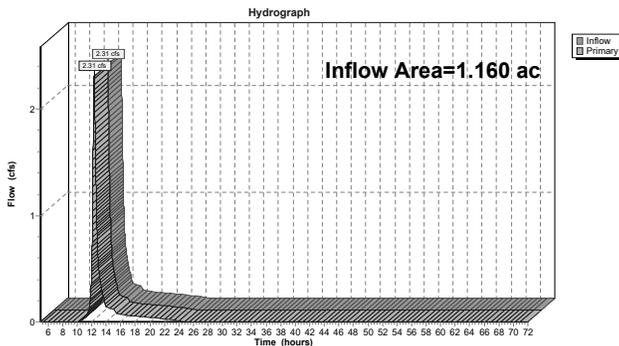
Link 31L: Lot 31 Walnut Grove Swale



Summary for Link TL: Teri Lane

Inflow Area = 1.160 ac, 0.00% Impervious, Inflow Depth = 1.90" for 10-year event
 Inflow = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af
 Primary = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

- Subcatchment6.1: Sandhill** Runoff Area=18.650 ac 3.67% Impervious Runoff Depth=4.04"
 Flow Length=1,146' Tc=31.8 min CN=80 Runoff=65.02 cfs 6.285 af
- Subcatchment6.2: Off-Site Residential** Runoff Area=2.920 ac 20.00% Impervious Runoff Depth=4.15"
 Flow Length=1,148' Tc=53.9 min CN=81 Runoff=7.55 cfs 1.010 af
- Subcatchment6.3: Off-Site Walnut Grove** Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=4.15"
 Flow Length=576' Tc=32.4 min CN=81 Runoff=26.51 cfs 2.593 af
- Subcatchment7.1: Sandhill** Runoff Area=21.830 ac 1.60% Impervious Runoff Depth=4.15"
 Flow Length=1,664' Tc=48.9 min CN=81 Runoff=60.12 cfs 7.548 af
- Subcatchment7.2: Off-Site Residential** Runoff Area=3.130 ac 15.52% Impervious Runoff Depth=4.04"
 Flow Length=840' Tc=45.1 min CN=80 Runoff=8.83 cfs 1.055 af
- Subcatchment8.1: Sandhill** Runoff Area=11.350 ac 0.00% Impervious Runoff Depth=3.94"
 Flow Length=898' Tc=34.6 min CN=79 Runoff=36.86 cfs 3.726 af
- Subcatchment8.2: Off-Site Residential** Runoff Area=6.700 ac 12.00% Impervious Runoff Depth=4.25"
 Flow Length=912' Tc=47.0 min CN=82 Runoff=19.40 cfs 2.376 af
- Subcatchment9.1: Sandhill** Runoff Area=9.710 ac 3.04% Impervious Runoff Depth=4.04"
 Flow Length=1,132' Tc=33.2 min CN=80 Runoff=33.06 cfs 3.272 af
- Subcatchment10.1: Sandhill** Runoff Area=1.160 ac 0.00% Impervious Runoff Depth=4.04"
 Flow Length=437' Tc=22.8 min CN=80 Runoff=4.89 cfs 0.391 af
- Pond 1P: Walnut Grove Stormwater** Peak Elev=1,041.64' Storage=53,814 cf Inflow=26.51 cfs 2.593 af
 Primary=1.76 cfs 0.530 af Secondary=13.36 cfs 1.125 af Outflow=15.12 cfs 1.655 af
- Pond 6P: Lisbon Road Culvert** Peak Elev=1,025.37' Storage=102,291 cf Inflow=70.69 cfs 8.949 af
 Primary=18.41 cfs 7.634 af Secondary=32.72 cfs 1.315 af Outflow=51.13 cfs 8.949 af
- Pond 7P: Winkleman Road North** Peak Elev=1,028.46' Storage=223,388 cf Inflow=68.89 cfs 8.602 af
 Primary=8.52 cfs 8.602 af Secondary=0.00 cfs 0.000 af Outflow=8.52 cfs 8.602 af
- Pond 9P: Winkleman Road South Culvert** Peak Elev=1,024.71' Storage=54 cf Inflow=33.06 cfs 3.272 af
 42.0" x 29.0", R=21.5"/66.1" Pipe Arch Culvert n=0.025 L=53.7' S=0.0127 '/ Outflow=33.06 cfs 3.272 af

Link 31L: Lot 31 Walnut Grove Swale Inflow=54.66 cfs 6.102 af
 Primary=54.66 cfs 6.102 af

Link TL: Teri Lane Inflow=4.89 cfs 0.391 af
 Primary=4.89 cfs 0.391 af

Total Runoff Area = 82.950 ac Runoff Volume = 28.255 af Average Runoff Depth = 4.09"
94.33% Pervious = 78.246 ac 5.67% Impervious = 4.704 ac

Summary for Subcatchment 6.1: Sandhill Pre-Development

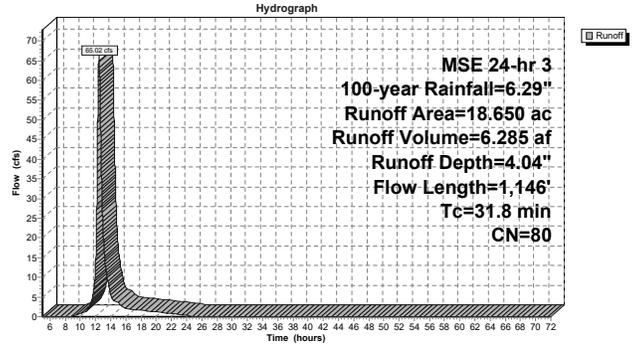
Runoff = 65.02 cfs @ 12.44 hrs, Volume= 6.285 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.260	93	Paved roads w/open ditches, 50% imp, HSG D
0.810	92	Paved roads w/open ditches, 50% imp, HSG C
* 0.150	98	Impervious Areas
* 5.230	83	Cropland, Pre-Development, HSG D
* 10.960	78	Cropland, Pre-Development, HSG C
* 0.140	77	Woodland, Pre-Development, HSG D
* 0.350	70	Woodland, Pre-Development, HSG C
0.100	80	>75% Grass cover, Good, HSG D
0.650	74	>75% Grass cover, Good, HSG C
18.650	80	Weighted Average
17.965		96.33% Pervious Area
0.685		3.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	300	0.0513	0.26		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
4.2	494	0.0470	1.95		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
7.6	300	0.0053	0.66		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
31.8	1,146	Total			

Subcatchment 6.1: Sandhill Pre-Development



Summary for Subcatchment 6.2: Off-Site Residential

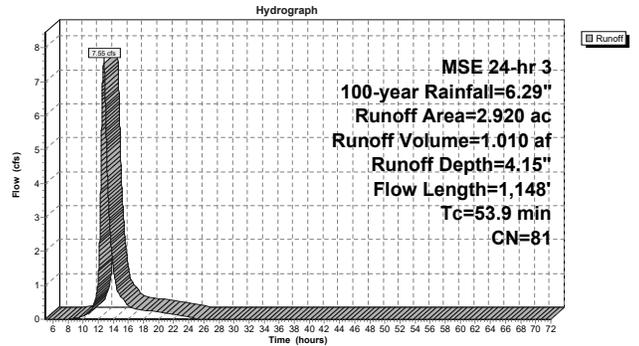
Runoff = 7.55 cfs @ 12.75 hrs, Volume= 1.010 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.950	84	1 acre lots, 20% imp, HSG D
1.970	79	1 acre lots, 20% imp, HSG C
2.920	81	Weighted Average
2.336		80.00% Pervious Area
0.584		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
5.1	463	0.0285	1.52		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	333	0.0048	0.62		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
53.9	1,148	Total			

Subcatchment 6.2: Off-Site Residential



Summary for Subcatchment 6.3: Off-Site Walnut Grove

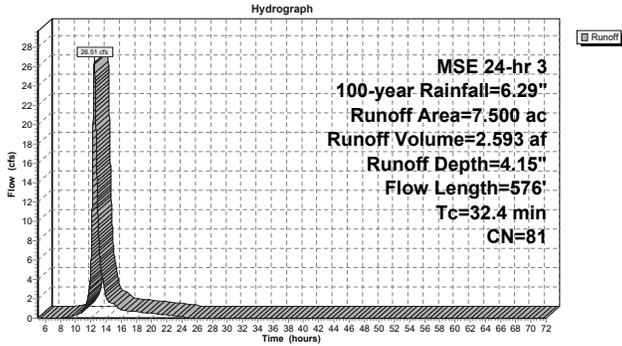
Runoff = 26.51 cfs @ 12.45 hrs, Volume= 2.593 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 6.3: Off-Site Walnut Grove



Summary for Subcatchment 7.1: Sandhill Pre-Development

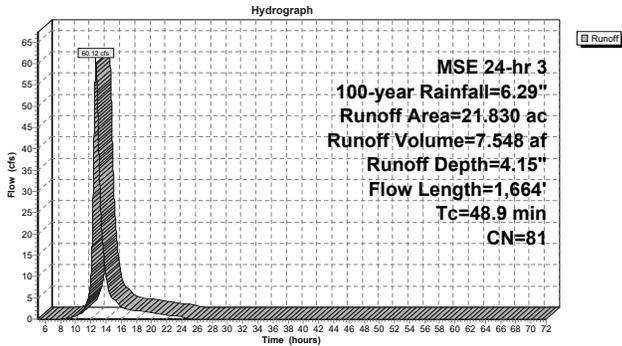
Runoff = 60.12 cfs @ 12.66 hrs, Volume= 7.548 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.620	92	Paved roads w/open ditches, 50% imp, HSG C
9.060	83	Cropland, Pre-Development, HSG D
12.060	78	Cropland, Pre-Development, HSG C
0.040	98	Impervious Areas
0.050	74	Greenspace, Good, HSG C
21.830	81	Weighted Average
21.480		98.40% Pervious Area
0.350		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	300	0.0389	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	106	0.0473	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
1.8	98	0.0100	0.90		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.6	742	0.0256	1.44		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
15.8	418	0.0024	0.44		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
48.9	1,664				Total

Subcatchment 7.1: Sandhill Pre-Development



Summary for Subcatchment 7.2: Off-Site Residential

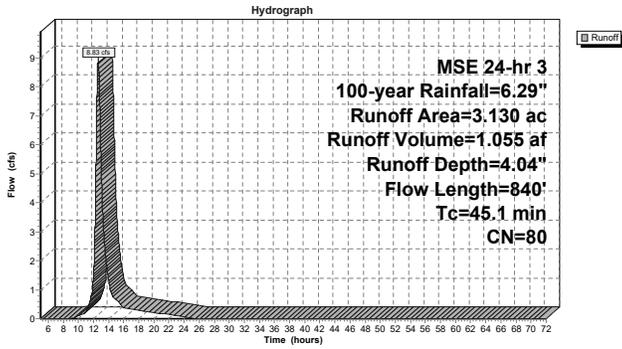
Runoff = 8.83 cfs @ 12.62 hrs, Volume= 1.055 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
1.120	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
1.720	77	2 acre lots, 12% imp, HSG C
3.130	80	Weighted Average
2.644		84.48% Pervious Area
0.486		15.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
1.4	134	0.0306	1.57		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	284	0.0035	0.53		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
45.1	840				Total

Subcatchment 7.2: Off-Site Residential



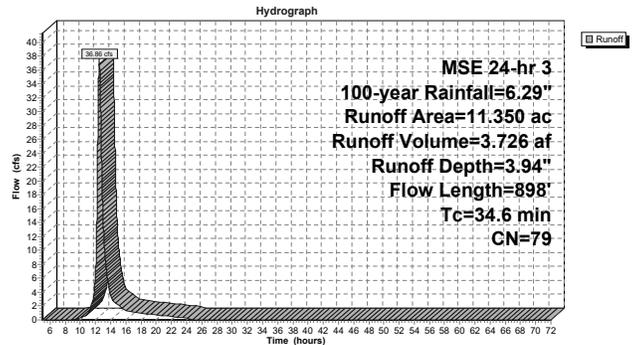
Summary for Subcatchment 8.1: Sandhill Pre-Development

Runoff = 36.86 cfs @ 12.49 hrs, Volume= 3.726 af, Depth= 3.94"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 4.140	83	Cropland, Pre-Development, HSG D
* 4.450	78	Cropland, Pre-Development, HSG C
* 1.410	77	Woodland, Pre-Development, HSG D
* 1.350	70	Woodland, Pre-Development, HSG C
11.350	79	Weighted Average
11.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	300	0.0880	0.32		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
0.9	112	0.0491	1.99		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
18.0	486	0.0025	0.45		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
34.6	898	Total			

Subcatchment 8.1: Sandhill Pre-Development



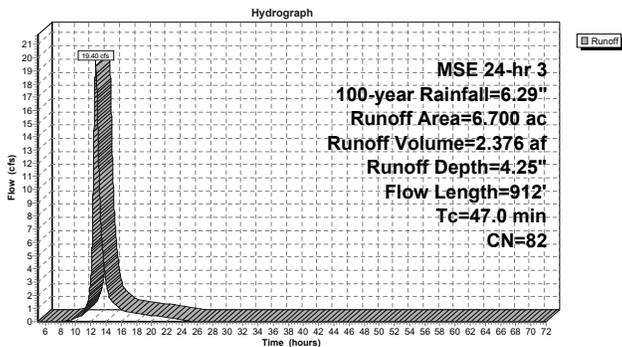
Summary for Subcatchment 8.2: Off-Site Residential

Runoff = 19.40 cfs @ 12.64 hrs, Volume= 2.376 af, Depth= 4.25"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
6.130	82	2 acre lots, 12% imp, HSG D
0.570	77	2 acre lots, 12% imp, HSG C
6.700	82	Weighted Average
5.696		88.00% Pervious Area
0.804		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	198	0.0904	1.50		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.9	65	0.0185	1.22		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
11.1	349	0.0034	0.52		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
47.0	912	Total			

Subcatchment 8.2: Off-Site Residential



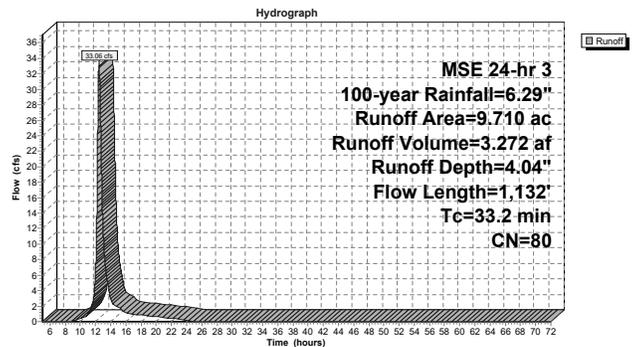
Summary for Subcatchment 9.1: Sandhill Pre-Development

Runoff = 33.06 cfs @ 12.46 hrs, Volume= 3.272 af, Depth= 4.04"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.170	93	Paved roads w/open ditches, 50% imp, HSG D
0.420	92	Paved roads w/open ditches, 50% imp, HSG C
* 2.970	83	Cropland, Pre-Development, HSG D
* 6.150	78	Cropland, Pre-Development, HSG C
9.710	80	Weighted Average
9.415		96.96% Pervious Area
0.295		3.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	300	0.0273	0.20		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
5.1	598	0.0475	1.96		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
3.0	234	0.0205	1.29		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
33.2	1,132	Total			

Subcatchment 9.1: Sandhill Pre-Development



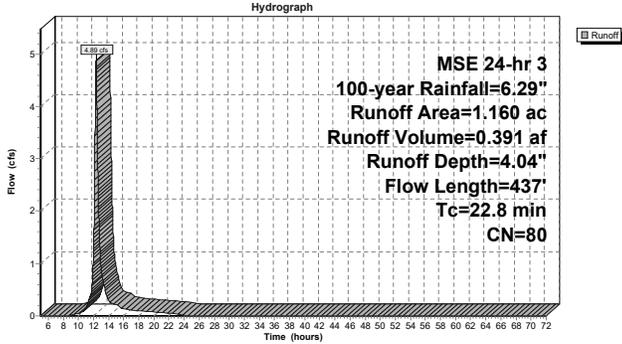
Summary for Subcatchment 10.1: Sandhill Pre-Development

Runoff = 4.89 cfs @ 12.33 hrs, Volume= 0.391 af, Depth= 4.04"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

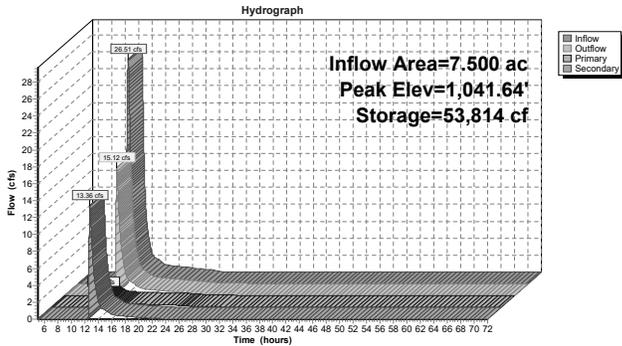
Area (ac)	CN	Description
* 0.740	83	Cropland, Pre-Development, HSG D
* 0.130	78	Cropland, Pre-Development, HSG C
* 0.090	70	Woodland, Pre-Development, HSG C
* 0.200	77	Woodland, Pre-Development, HSG D
1.160	80	Weighted Average
1.160		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	300	0.0407	0.23		Sheet Flow, Segment AB Cultivated: Residue>20% n= 0.170 P2= 2.70"
1.4	137	0.0320	1.61		Shallow Concentrated Flow, Segment BC Cultivated Straight Rows Kv= 9.0 fps
22.8	437	Total			

Subcatchment 10.1: Sandhill Pre-Development



Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7.500 ac, 20.00% Impervious, Inflow Depth = 4.15" for 100-year event
 Inflow = 26.51 cfs @ 12.45 hrs, Volume= 2.593 af
 Outflow = 15.12 cfs @ 12.77 hrs, Volume= 1.655 af, Atten= 43%, Lag= 19.5 min
 Primary = 1.76 cfs @ 12.77 hrs, Volume= 0.530 af
 Secondary = 13.36 cfs @ 12.77 hrs, Volume= 1.125 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.64' @ 12.77 hrs Surf.Area= 17,708 sf Storage= 53,814 cf

Plug-Flow detention time= 206.6 min calculated for 1.655 af (64% of inflow)
 Center-of-Mass det. time= 130.7 min (946.2 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	60,394 cf	Existing Active Storage Volume (Irregular), Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.00	18,762	577.0	17,320	60,394	24,054

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=1.76 cfs @ 12.77 hrs HW=1,041.64' (Free Discharge)
 1=Culvert (Barrel Controls 1.76 cfs @ 3.03 fps)

Secondary OutFlow Max=13.36 cfs @ 12.77 hrs HW=1,041.64' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 13.36 cfs @ 1.72 fps)

Summary for Pond 6P: Lisbon Road Culvert

Inflow Area = 29,070 ac, 9.53% Impervious, Inflow Depth = 3.69" for 100-year event
 Inflow = 70.69 cfs @ 12.47 hrs, Volume= 8,949 af
 Outflow = 51.13 cfs @ 12.86 hrs, Volume= 8,949 af, Atten= 28%, Lag= 23.3 min
 Primary = 18.41 cfs @ 12.86 hrs, Volume= 7,634 af
 Secondary = 32.72 cfs @ 12.86 hrs, Volume= 1,315 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.37' @ 12.86 hrs Surf.Area= 115,539 sf Storage= 102,291 cf

Plug-Flow detention time= 36.8 min calculated for 8.948 af (100% of inflow)
 Center-of-Mass det. time= 36.8 min (879.6 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,021.67'	186,687 cf	Custom Stage Data (Irregular), Listed below (Recalc)

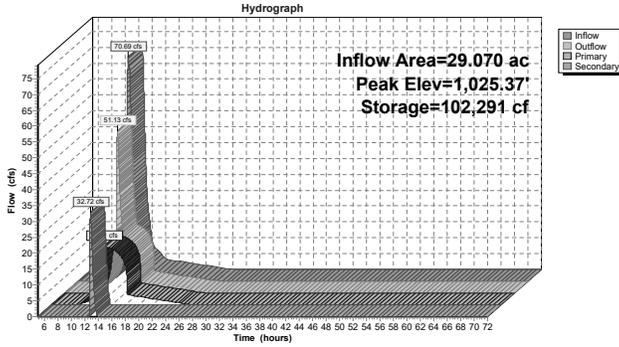
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,675	259.0	666	671	5,340
1,024.00	20,066	1,004.0	9,179	9,851	80,220
1,025.00	96,415	1,849.0	53,489	63,339	272,070
1,026.00	152,408	2,028.0	123,348	186,687	327,329

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=18.41 cfs @ 12.86 hrs HW=1,025.37' (Free Discharge)
 1=Culvert (Barrel Controls 18.41 cfs @ 5.94 fps)

Secondary OutFlow Max=32.13 cfs @ 12.86 hrs HW=1,025.37' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 32.13 cfs @ 0.93 fps)

Pond 6P: Lisbon Road Culvert



Summary for Pond 7P: Winkleman Road North Culvert

Inflow Area = 24,960 ac, 3.35% Impervious, Inflow Depth = 4.14" for 100-year event
 Inflow = 68.89 cfs @ 12.66 hrs, Volume= 8,602 af
 Outflow = 8.52 cfs @ 14.23 hrs, Volume= 8,602 af, Atten= 88%, Lag= 94.5 min
 Primary = 8.52 cfs @ 14.23 hrs, Volume= 8,602 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.46' @ 14.23 hrs Surf.Area= 202,858 sf Storage= 223,388 cf

Plug-Flow detention time= 297.0 min calculated for 8,602 af (100% of inflow)
 Center-of-Mass det. time= 297.0 min (1,127.6 - 830.6)

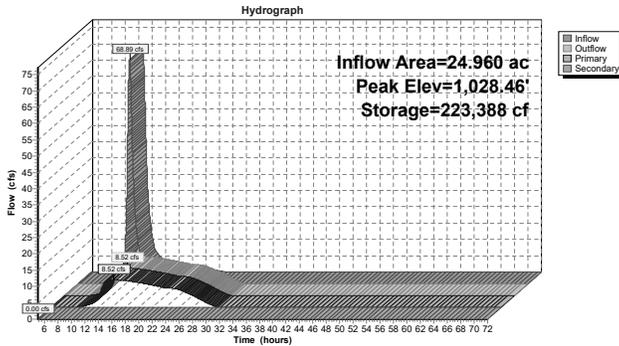
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	344,704 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	69,827	1,103.0	23,974	23,974	96,816
1,028.00	165,071	1,582.0	114,086	138,060	199,171
1,029.00	251,220	2,128.0	206,644	344,704	360,378

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074' /' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 0.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=8.52 cfs @ 14.23 hrs HW=1,028.46' (Free Discharge)
 1=Culvert (Barrel Controls 8.52 cfs @ 4.89 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 7P: Winkleman Road North Culvert



Summary for Pond 9P: Winkleman Road South Culvert

Inflow Area = 9,710 ac, 3.04% Impervious, Inflow Depth = 4.04" for 100-year event
 Inflow = 33.06 cfs @ 12.46 hrs, Volume= 3,272 af
 Outflow = 33.06 cfs @ 12.46 hrs, Volume= 3,272 af, Atten= 0%, Lag= 0.2 min
 Primary = 33.06 cfs @ 12.46 hrs, Volume= 3,272 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.71' @ 12.46 hrs Surf.Area= 71 sf Storage= 54 cf

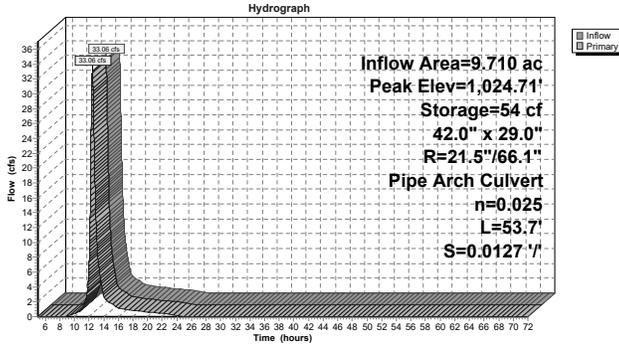
Plug-Flow detention time= 0.0 min calculated for 3,272 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (818.0 - 818.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.15'	111,237 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.15	0	0.0	0	0	0
1,023.00	4	8.0	1	1	6
1,024.00	34	23.0	17	18	46
1,025.00	90	36.0	60	77	114
1,026.00	6,337	322.0	2,394	2,472	8,264
1,027.00	57,106	955.0	27,489	29,960	72,693
1,028.00	108,140	1,412.0	81,277	111,237	158,681

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.15'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 53.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.15' / 1,021.47' S= 0.0127' /' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=33.06 cfs @ 12.46 hrs HW=1,024.71' (Free Discharge)
 1=Culvert (Barrel Controls 33.06 cfs @ 5.63 fps)

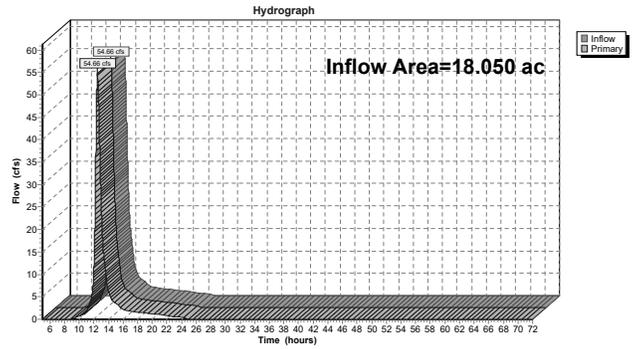
Pond 9P: Winkleman Road South Culvert



Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 18.050 ac, 4.45% Impervious, Inflow Depth = 4.06" for 100-year event
 Inflow = 54.66 cfs @ 12.53 hrs, Volume= 6.102 af
 Primary = 54.66 cfs @ 12.53 hrs, Volume= 6.102 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

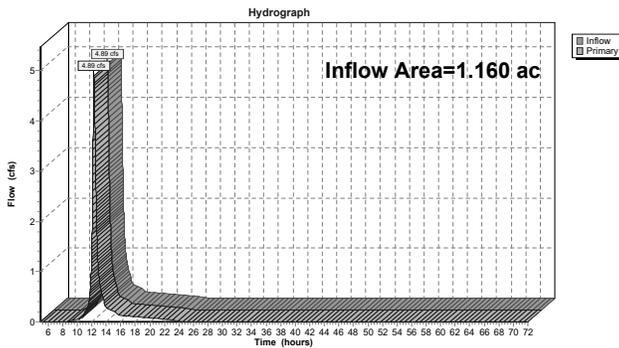
Link 31L: Lot 31 Walnut Grove Swale

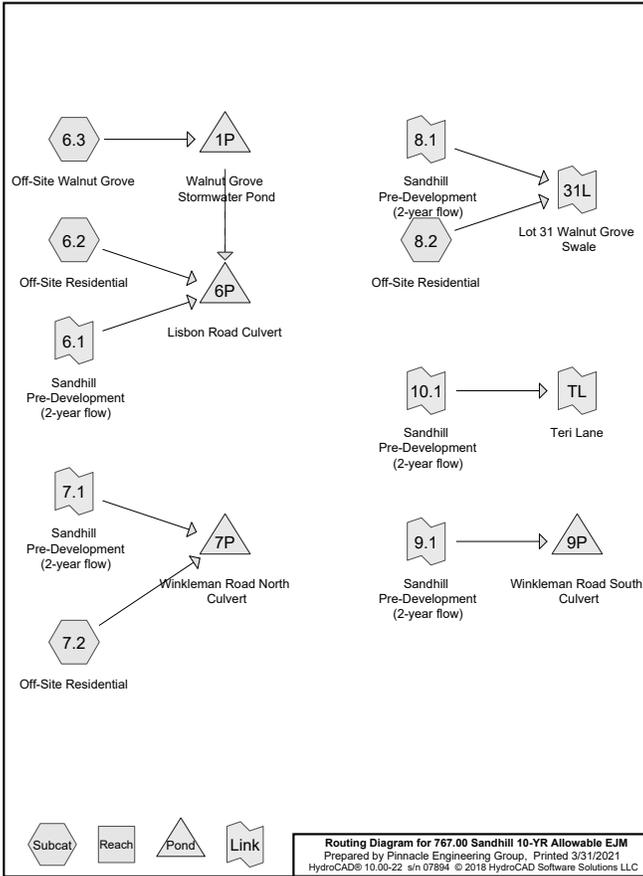


Summary for Link TL: Teri Lane

Inflow Area = 1.160 ac, 0.00% Impervious, Inflow Depth = 4.04" for 100-year event
 Inflow = 4.89 cfs @ 12.33 hrs, Volume= 0.391 af
 Primary = 4.89 cfs @ 12.33 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane





Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.290	79	1 acre lots, 20% imp, HSG C (6.2, 6.3)
4.130	84	1 acre lots, 20% imp, HSG D (6.2, 6.3)
2.290	77	2 acre lots, 12% imp, HSG C (7.2, 8.2)
7.250	82	2 acre lots, 12% imp, HSG D (7.2, 8.2)
0.160	92	Paved roads w/open ditches, 50% imp, HSG C (7.2)
0.130	93	Paved roads w/open ditches, 50% imp, HSG D (7.2)
20.250	81	TOTAL AREA

767.00 Sandhill 10-YR Allowable EJM

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	1,040.84	1,040.70	20.3	0.0069	0.013	15.0	0.0	0.0
2	6P	1,021.67	1,021.09	67.6	0.0086	0.025	28.0	20.0	0.0
3	7P	1,025.97	1,025.70	36.6	0.0074	0.025	21.0	15.0	0.0
4	9P	1,022.15	1,021.47	53.7	0.0127	0.025	42.0	29.0	0.0

767.00 Sandhill 10-YR Allowable EJM

Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 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 6.2: Off-Site Residential	Runoff Area=2.920 ac 20.00% Impervious Runoff Depth=1.98" Flow Length=1,148' Tc=53.9 min CN=81 Runoff=3.60 cfs 0.482 af
Subcatchment 6.3: Off-Site Walnut Grove	Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=1.98" Flow Length=576' Tc=32.4 min CN=81 Runoff=12.68 cfs 1.237 af
Subcatchment 7.2: Off-Site Residential	Runoff Area=3.130 ac 15.52% Impervious Runoff Depth=1.90" Flow Length=840' Tc=45.1 min CN=80 Runoff=4.14 cfs 0.496 af
Subcatchment 8.2: Off-Site Residential	Runoff Area=6.700 ac 12.00% Impervious Runoff Depth=2.06" Flow Length=912' Tc=47.0 min CN=82 Runoff=9.40 cfs 1.149 af
Pond 1P: Walnut Grove Stormwater	Peak Elev=1,041.13' Storage=45,212 cf Inflow=12.68 cfs 1.237 af Primary=0.29 cfs 0.263 af Secondary=0.10 cfs 0.036 af Outflow=0.39 cfs 0.299 af
Pond 6P: Lisbon Road Culvert	Peak Elev=1,023.99' Storage=9,637 cf Inflow=18.87 cfs 2.381 af Primary=12.65 cfs 2.381 af Secondary=0.00 cfs 0.000 af Outflow=12.65 cfs 2.381 af
Pond 7P: Winkleman Road North Culvert	Peak Elev=1,027.29' Storage=47,409 cf Inflow=19.42 cfs 2.474 af Primary=5.06 cfs 2.474 af Secondary=0.00 cfs 0.000 af Outflow=5.06 cfs 2.474 af
Pond 9P: Winkleman Road South Culvert	Peak Elev=1,023.13' Storage=2 cf Inflow=8.20 cfs 0.833 af 42.0' x 29.0', R=21.5'/66.1" Pipe Arch Culvert n=0.025 L=53.7' S=0.0127'/l' Outflow=8.20 cfs 0.833 af
Link 1P: Walnut Grove Stormwater	SWMPHYDROCAD/EJM/Existing 2-year/767.00 Sandhill Existing Conditions EJM-Subcat 6.1.csv Inflow=16.19 cfs 1.600 af Primary=16.19 cfs 1.600 af
Link 6P: Lisbon Road Culvert	SWMPHYDROCAD/EJM/Existing 2-year/767.00 Sandhill Existing Conditions EJM-Subcat 7.1.csv Inflow=15.32 cfs 1.978 af Primary=15.32 cfs 1.978 af
Link 7P: Winkleman Road North Culvert	SWMPHYDROCAD/EJM/Existing 2-year/767.00 Sandhill Existing Conditions EJM-Subcat 8.1.csv Inflow=8.78 cfs 0.921 af Primary=8.78 cfs 0.921 af
Link 9P: Winkleman Road South Culvert	SWMPHYDROCAD/EJM/Existing 2-year/767.00 Sandhill Existing Conditions EJM-Subcat 9.1.csv Inflow=8.20 cfs 0.833 af Primary=8.20 cfs 0.833 af
Link 10.1: Sandhill Pre-Development (2-year flow)	SWMPHYDROCAD/EJM/Existing 2-year/767.00 Sandhill Existing Conditions EJM-Subcat 10.1.csv Inflow=1.22 cfs 0.099 af Primary=1.22 cfs 0.099 af
Link 31L: Lot 31 Walnut Grove Swale	Inflow=17.77 cfs 2.071 af Primary=17.77 cfs 2.071 af
Link TL: Teri Lane	Inflow=1.22 cfs 0.099 af Primary=1.22 cfs 0.099 af

**Total Runoff Area = 20.250 ac Runoff Volume = 3.364 af Average Runoff Depth = 1.99"
83.34% Pervious = 16.876 ac 16.66% Impervious = 3.374 ac**

Summary for Subcatchment 6.2: Off-Site Residential

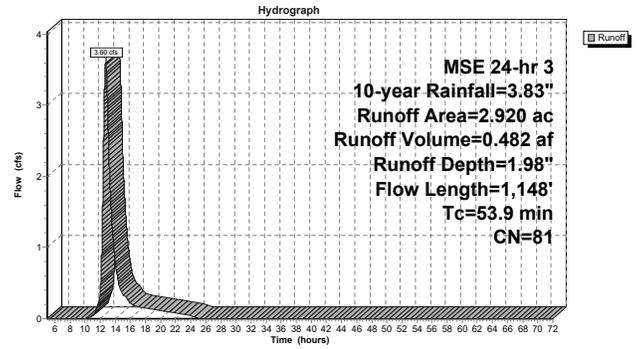
Runoff = 3.60 cfs @ 12.75 hrs, Volume= 0.482 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.950	84	1 acre lots, 20% imp, HSG D
1.970	79	1 acre lots, 20% imp, HSG C
2.920	81	Weighted Average
2.336		80.00% Pervious Area
0.584		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
5.1	463	0.0285	1.52		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	333	0.0048	0.62		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
53.9	1,148	Total			

Subcatchment 6.2: Off-Site Residential



Summary for Subcatchment 6.3: Off-Site Walnut Grove

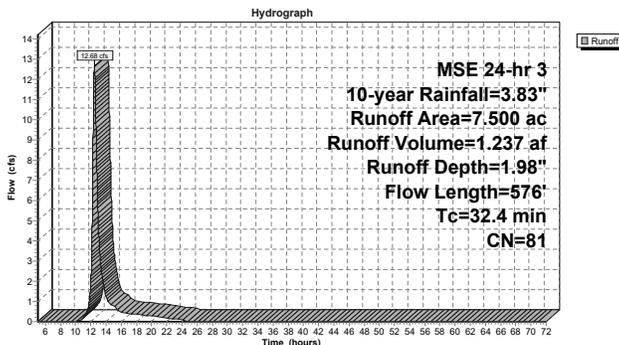
Runoff = 12.68 cfs @ 12.46 hrs, Volume= 1.237 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576	Total			

Subcatchment 6.3: Off-Site Walnut Grove



Summary for Subcatchment 7.2: Off-Site Residential

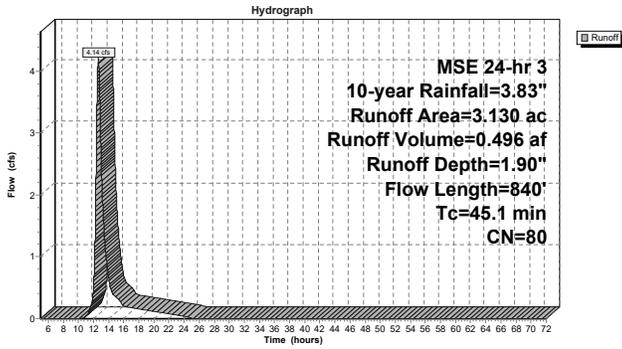
Runoff = 4.14 cfs @ 12.63 hrs, Volume= 0.496 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
1.120	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
1.720	77	2 acre lots, 12% imp, HSG C
3.130	80	Weighted Average
2.644		84.48% Pervious Area
0.486		15.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
1.4	134	0.0306	1.57		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	284	0.0035	0.53		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
45.1	840	Total			

Subcatchment 7.2: Off-Site Residential



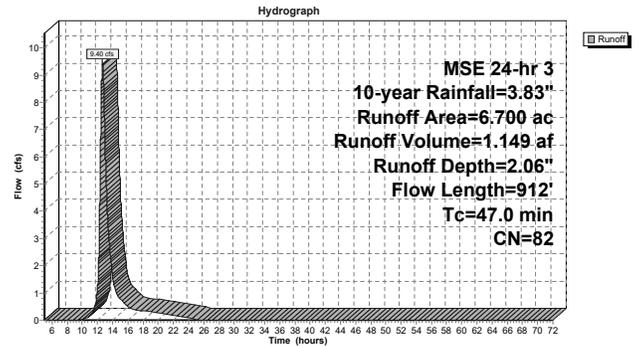
Summary for Subcatchment 8.2: Off-Site Residential

Runoff = 9.40 cfs @ 12.64 hrs, Volume= 1.149 af, Depth= 2.06"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
6.130	82	2 acre lots, 12% imp, HSG D
0.570	77	2 acre lots, 12% imp, HSG C
6.700	82	Weighted Average
5.896		88.00% Pervious Area
0.804		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	198	0.0904	1.50		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.9	65	0.0185	1.22		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
11.1	349	0.0034	0.52		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
47.0	912				Total

Subcatchment 8.2: Off-Site Residential



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7,500 ac, 20.00% Impervious, Inflow Depth = 1.98" for 10-year event
 Inflow = 12.68 cfs @ 12.46 hrs, Volume= 1.237 af
 Outflow = 0.39 cfs @ 17.42 hrs, Volume= 0.299 af, Atten= 97%, Lag= 297.3 min
 Primary = 0.29 cfs @ 17.42 hrs, Volume= 0.263 af
 Secondary = 0.10 cfs @ 17.42 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.13' @ 17.42 hrs Surf.Area= 16,281 sf Storage= 45,212 cf

Plug-Flow detention time= 619.8 min calculated for 0.299 af (24% of inflow)
 Center-of-Mass det. time= 517.6 min (1,347.9 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	60,394 cf	Existing Active Storage Volume (Irregular), listed below (Recalc)

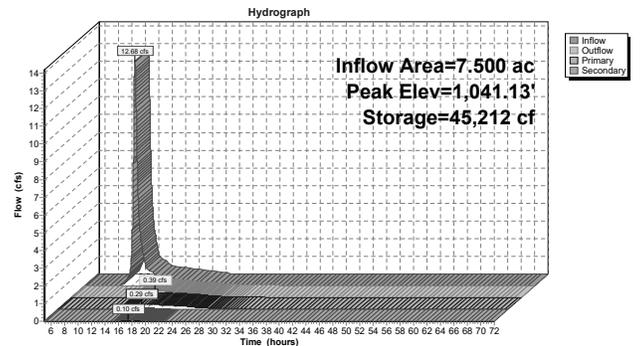
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.00	18,762	577.0	17,320	60,394	24,054

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.29 cfs @ 17.42 hrs HW=1,041.13' (Free Discharge)
 1=Culvert (Barrel Controls 0.29 cfs @ 2.02 fps)

Secondary OutFlow Max=0.09 cfs @ 17.42 hrs HW=1,041.13' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 0.09 cfs @ 0.33 fps)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 6P: Lisbon Road Culvert

Inflow Area = 10.420 ac, 20.00% Impervious, Inflow Depth > 2.74" for 10-year event
 Inflow = 18.87 cfs @ 12.49 hrs, Volume= 2,381 af
 Outflow = 12.65 cfs @ 12.81 hrs, Volume= 2,381 af, Atten= 33%, Lag= 19.4 min
 Primary = 12.65 cfs @ 12.81 hrs, Volume= 2,381 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.99' @ 12.81 hrs Surf.Area= 19,761 sf Storage= 9,637 cf

Plug-Flow detention time= 4.2 min calculated for 2,381 af (100% of inflow)
 Center-of-Mass det. time= 4.2 min (913.3 - 909.0)

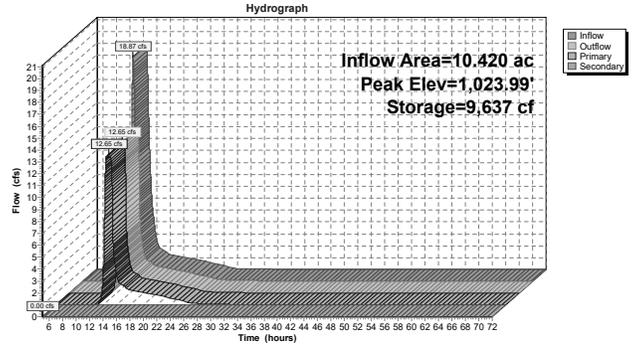
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	186,687 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,675	259.0	666	671	5,340
1,024.00	20,066	1,004.0	9,179	9,851	80,220
1,025.00	96,415	1,849.0	53,489	63,339	272,070
1,026.00	152,408	2,028.0	123,348	186,687	327,329

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086'/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=12.65 cfs @ 12.81 hrs HW=1,023.99' (Free Discharge)
 1=Culvert (Barrel Controls 12.65 cfs @ 4.08 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 6P: Lisbon Road Culvert



Summary for Pond 7P: Winkleman Road North Culvert

Inflow Area = 3.130 ac, 15.52% Impervious, Inflow Depth = 9.49" for 10-year event
 Inflow = 19.42 cfs @ 12.68 hrs, Volume= 2,474 af
 Outflow = 5.06 cfs @ 13.77 hrs, Volume= 2,474 af, Atten= 74%, Lag= 65.9 min
 Primary = 5.06 cfs @ 13.77 hrs, Volume= 2,474 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.29' @ 13.77 hrs Surf.Area= 93,168 sf Storage= 47,409 cf

Plug-Flow detention time= 108.1 min calculated for 2,474 af (100% of inflow)
 Center-of-Mass det. time= 108.1 min (963.4 - 855.3)

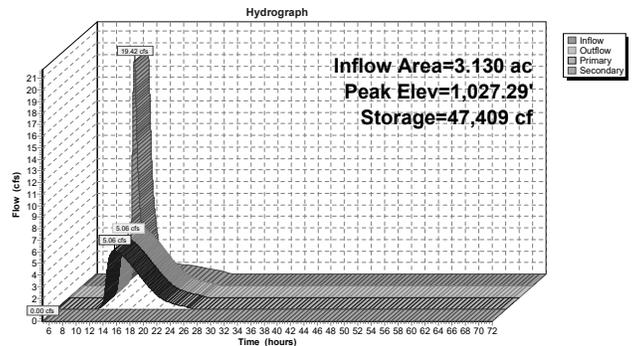
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	344,704 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	69,827	1,103.0	23,974	23,974	96,816
1,028.00	165,071	1,582.0	114,086	138,060	199,171
1,029.00	251,220	2,128.0	206,644	344,704	360,378

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074'/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=5.06 cfs @ 13.77 hrs HW=1,027.29' (Free Discharge)
 1=Culvert (Barrel Controls 5.06 cfs @ 3.34 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 7P: Winkleman Road North Culvert



Summary for Pond 9P: Winkleman Road South Culvert

Inflow = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af
 Outflow = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af, Atten= 0%, Lag= 0.0 min
 Primary = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.13' @ 12.50 hrs Surf.Area= 6 sf Storage= 2 cf

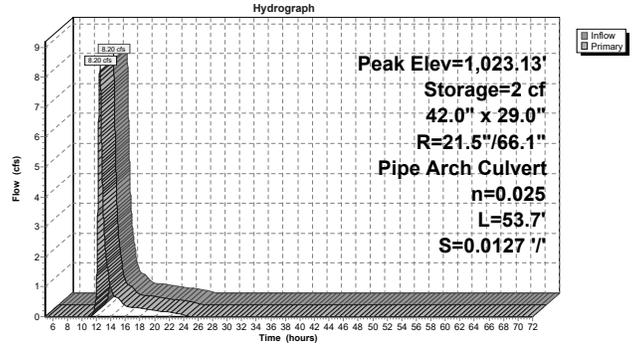
Plug-Flow detention time= 0.0 min calculated for 0.833 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (846.1 - 846.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.15'	111,237 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.15	0	0.0	0	0	0
1,023.00	4	8.0	1	1	6
1,024.00	34	23.0	17	18	46
1,025.00	90	36.0	60	77	114
1,026.00	6,337	322.0	2,394	2,472	8,264
1,027.00	57,106	955.0	27,489	29,960	72,593
1,028.00	108,140	1,412.0	81,277	111,237	158,681

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.15'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 53.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.15' / 1,021.47' S= 0.0127' /' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=8.20 cfs @ 12.50 hrs HW=1,023.13' (Free Discharge)
 ←1=Culvert (Barrel Controls 8.20 cfs @ 3.91 fps)

Pond 9P: Winkleman Road South Culvert



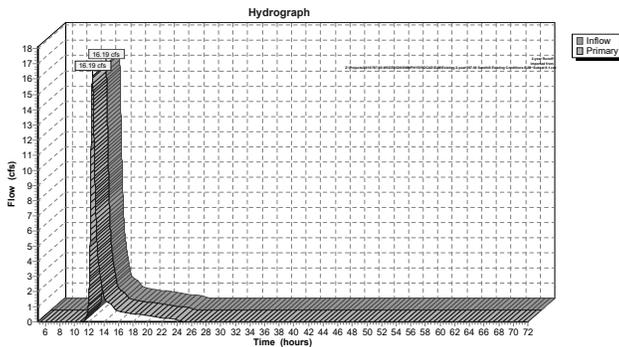
Summary for Link 6.1: Sandhill Pre-Development (2-year flow)

Inflow = 16.19 cfs @ 12.47 hrs, Volume= 1,600 af
 Primary = 16.19 cfs @ 12.47 hrs, Volume= 1,600 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

2-year Runoff Imported from Z:\Projects\2016\767.00-W\DESIGN\SWMP\HYDROCAD\EJM\Existing 2-year\767.00 S:

Link 6.1: Sandhill Pre-Development (2-year flow)



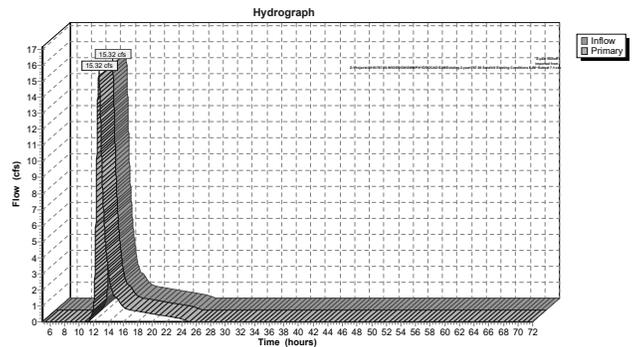
Summary for Link 7.1: Sandhill Pre-Development (2-year flow)

Inflow = 15.32 cfs @ 12.71 hrs, Volume= 1,978 af
 Primary = 15.32 cfs @ 12.71 hrs, Volume= 1,978 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

2-year Runoff Imported from Z:\Projects\2016\767.00-W\DESIGN\SWMP\HYDROCAD\EJM\Existing 2-year\767.00 S:

Link 7.1: Sandhill Pre-Development (2-year flow)



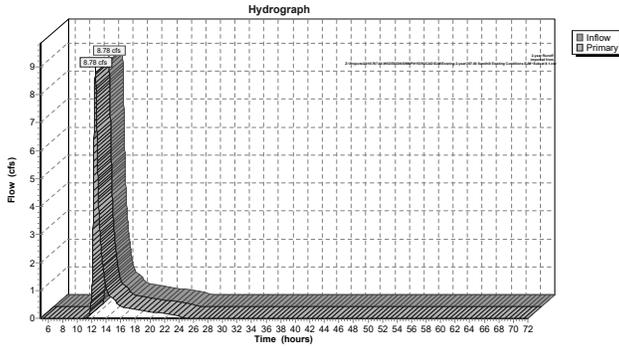
Summary for Link 8.1: Sandhill Pre-Development (2-year flow)

Inflow = 8.78 cfs @ 12.51 hrs, Volume= 0.921 af
 Primary = 8.78 cfs @ 12.51 hrs, Volume= 0.921 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

2-year Runoff Imported from Z:\Projects\2016\767.00-W\DESIGN\SWMP\HYDROCAD\EJM\Existing 2-year\767.00 S:

Link 8.1: Sandhill Pre-Development (2-year flow)



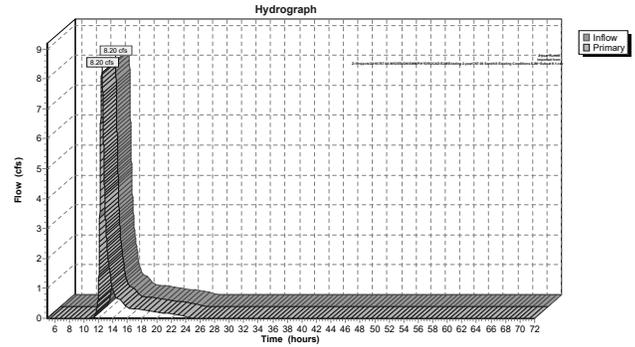
Summary for Link 9.1: Sandhill Pre-Development (2-year flow)

Inflow = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af
 Primary = 8.20 cfs @ 12.50 hrs, Volume= 0.833 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

2-year Runoff Imported from Z:\Projects\2016\767.00-W\DESIGN\SWMP\HYDROCAD\EJM\Existing 2-year\767.00 S:

Link 9.1: Sandhill Pre-Development (2-year flow)



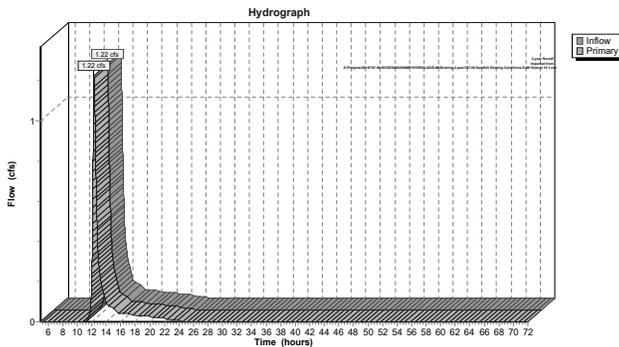
Summary for Link 10.1: Sandhill Pre-Development (2-year flow)

Inflow = 1.22 cfs @ 12.33 hrs, Volume= 0.099 af
 Primary = 1.22 cfs @ 12.33 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

2-year Runoff Imported from Z:\Projects\2016\767.00-W\DESIGN\SWMP\HYDROCAD\EJM\Existing 2-year\767.00 S:

Link 10.1: Sandhill Pre-Development (2-year flow)

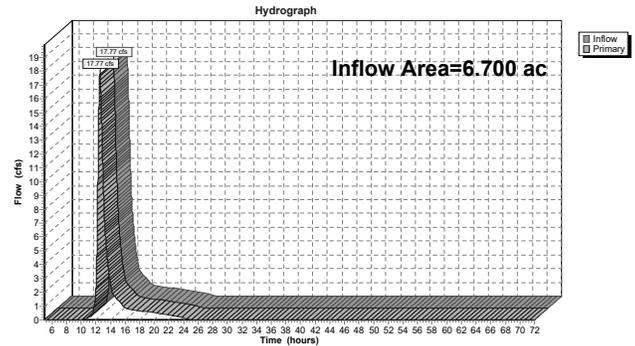


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 6.700 ac, 12.00% Impervious, Inflow Depth = 3.71" for 10-year event
 Inflow = 17.77 cfs @ 12.58 hrs, Volume= 2.071 af
 Primary = 17.77 cfs @ 12.58 hrs, Volume= 2.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale



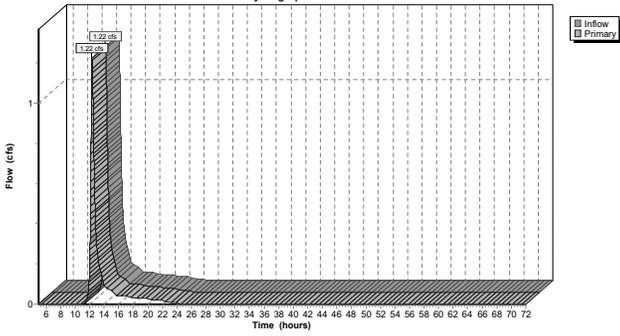
Summary for Link TL: Teri Lane

Inflow = 1.22 cfs @ 12.33 hrs, Volume= 0.099 af
Primary = 1.22 cfs @ 12.33 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

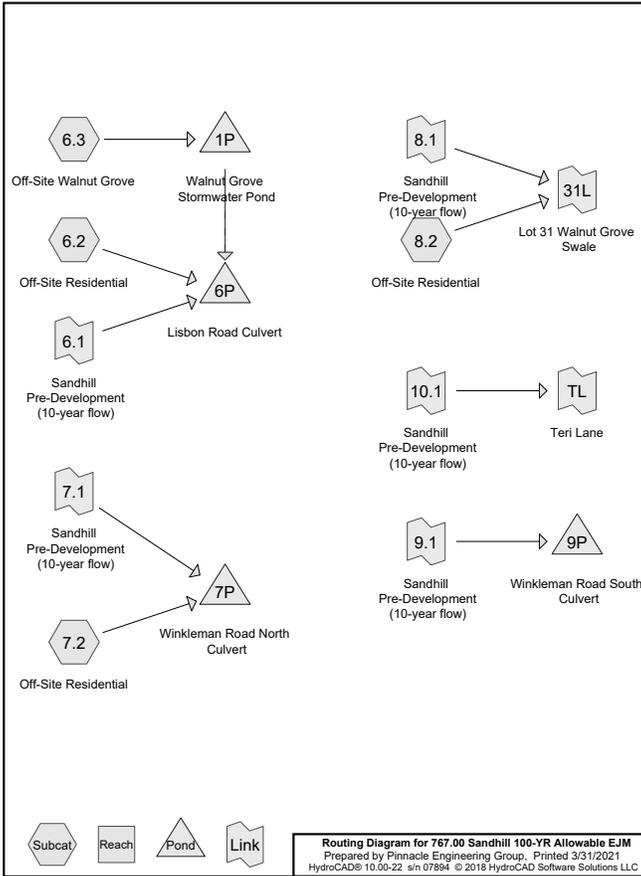
Link TL: Teri Lane

Hydrograph



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.290	79	1 acre lots, 20% imp, HSG C (6.2, 6.3)
4.130	84	1 acre lots, 20% imp, HSG D (6.2, 6.3)
2.290	77	2 acre lots, 12% imp, HSG C (7.2, 8.2)
7.250	82	2 acre lots, 12% imp, HSG D (7.2, 8.2)
0.160	92	Paved roads w/open ditches, 50% imp, HSG C (7.2)
0.130	93	Paved roads w/open ditches, 50% imp, HSG D (7.2)
20.250	81	TOTAL AREA



Routing Diagram for 767.00 Sandhill 100-YR Allowable EJM
Prepared by Pinnacle Engineering Group, Printed 3/31/2021
HydroCAD® 10.00-22 s/n 07894 © 2018 HydroCAD Software Solutions LLC

767.00 Sandhill 100-YR Allowable EJM

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	1,040.84	1,040.70	20.3	0.0069	0.013	15.0	0.0	0.0
2	6P	1,021.67	1,021.09	67.6	0.0086	0.025	28.0	20.0	0.0
3	7P	1,025.97	1,025.70	36.6	0.0074	0.025	21.0	15.0	0.0
4	9P	1,022.15	1,021.47	53.7	0.0127	0.025	42.0	29.0	0.0

767.00 Sandhill 100-YR Allowable EJM

Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 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 6.2: Off-Site Residential Runoff Area=2.920 ac 20.00% Impervious Runoff Depth=4.15"
Flow Length=1,148' Tc=53.9 min CN=81 Runoff=7.55 cfs 1,010 af

Subcatchment 6.3: Off-Site Walnut Grove Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=4.15"
Flow Length=576' Tc=32.4 min CN=81 Runoff=26.51 cfs 2,593 af

Subcatchment 7.2: Off-Site Residential Runoff Area=3.130 ac 15.52% Impervious Runoff Depth=4.04"
Flow Length=840' Tc=45.1 min CN=80 Runoff=8.83 cfs 1,055 af

Subcatchment 8.2: Off-Site Residential Runoff Area=6.700 ac 12.00% Impervious Runoff Depth=4.25"
Flow Length=912' Tc=47.0 min CN=82 Runoff=19.40 cfs 2,376 af

Pond 1P: Walnut Grove Stormwater Peak Elev=1,041.64' Storage=53,814 cf Inflow=26.51 cfs 2,593 af
Primary=1.76 cfs 0.530 af Secondary=13.36 cfs 1.125 af Outflow=15.12 cfs 1,655 af

Pond 6P: Lisbon Road Culvert Peak Elev=1,025.01' Storage=64,728 cf Inflow=42.81 cfs 5,620 af
Primary=17.12 cfs 5,620 af Secondary=0.00 cfs 0.000 af Outflow=17.12 cfs 5,620 af

Pond 7P: Winkleman Road North Peak Elev=1,027.80' Storage=107,440 cf Inflow=37.37 cfs 4,656 af
Primary=6.39 cfs 4,656 af Secondary=0.00 cfs 0.000 af Outflow=6.39 cfs 4,656 af

Pond 9P: Winkleman Road South Culvert Peak Elev=1,023.61' Storage=7 cf Inflow=15.53 cfs 1,539 af
42.0' x 29.0', R=21.5'/66.1" Pipe Arch Culvert n=0.025 L=53.7' S=0.0127' Outflow=15.53 cfs 1,539 af

WMPHYDRCAD EJM Existing 10-year 767.00 Sandhill Existing Conditions EJM-Subcat 6.1.csv Inflow=30.61 cfs 2,956 af
Primary=30.61 cfs 2,956 af

WMPHYDRCAD EJM Existing 10-year 767.00 Sandhill Existing Conditions EJM-Subcat 7.1.csv Inflow=28.61 cfs 3,601 af
Primary=28.61 cfs 3,601 af

WMPHYDRCAD EJM Existing 10-year 767.00 Sandhill Existing Conditions EJM-Subcat 8.1.csv Inflow=17.01 cfs 1,727 af
Primary=17.01 cfs 1,727 af

WMPHYDRCAD EJM Existing 10-year 767.00 Sandhill Existing Conditions EJM-Subcat 9.1.csv Inflow=15.53 cfs 1,539 af
Primary=15.53 cfs 1,539 af

WMPHYDRCAD EJM Existing 10-year 767.00 Sandhill Existing Conditions EJM-Subcat 10.1.csv Inflow=2.31 cfs 0.184 af
Primary=2.31 cfs 0.184 af

Link 31L: Lot 31 Walnut Grove Swale Inflow=35.50 cfs 4,103 af
Primary=35.50 cfs 4,103 af

Link TL: Teri Lane Inflow=2.31 cfs 0.184 af
Primary=2.31 cfs 0.184 af

Total Runoff Area = 20.250 ac Runoff Volume = 7.033 af Average Runoff Depth = 4.17"
83.34% Pervious = 16.876 ac 16.66% Impervious = 3.374 ac

Summary for Subcatchment 6.2: Off-Site Residential

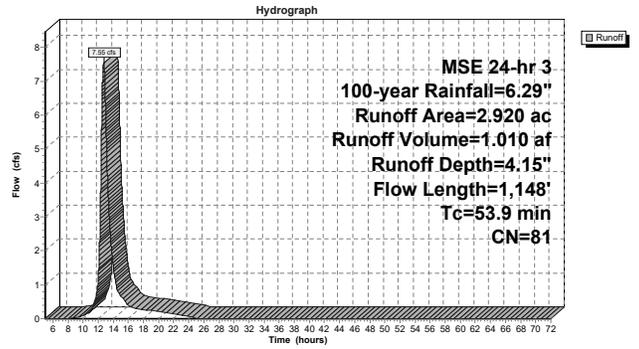
Runoff = 7.55 cfs @ 12.75 hrs, Volume= 1.010 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.950	84	1 acre lots, 20% imp, HSG D
1.970	79	1 acre lots, 20% imp, HSG C
2.920	81	Weighted Average
2.336		80.00% Pervious Area
0.584		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
5.1	463	0.0285	1.52		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	333	0.0048	0.62		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
0.5	52	0.0327	1.63		Shallow Concentrated Flow, Segment EF Cultivated Straight Rows Kv= 9.0 fps
53.9	1,148	Total			

Subcatchment 6.2: Off-Site Residential



Summary for Subcatchment 6.3: Off-Site Walnut Grove

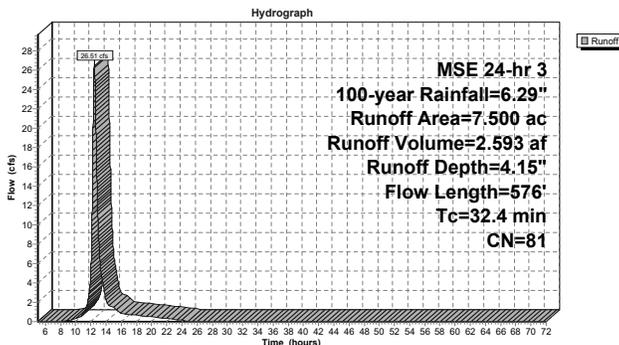
Runoff = 26.51 cfs @ 12.45 hrs, Volume= 2.593 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576	Total			

Subcatchment 6.3: Off-Site Walnut Grove



Summary for Subcatchment 7.2: Off-Site Residential

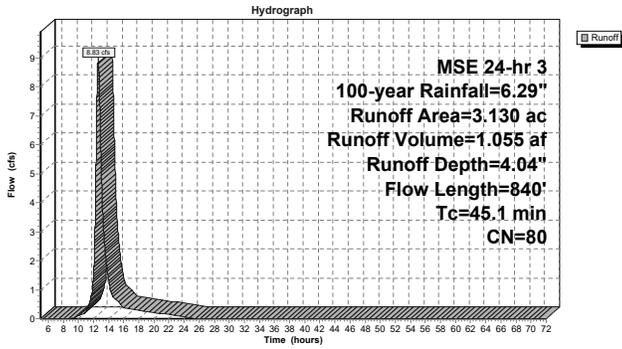
Runoff = 8.83 cfs @ 12.62 hrs, Volume= 1.055 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
1.120	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
1.720	77	2 acre lots, 12% imp, HSG C
3.130	80	Weighted Average
2.644		84.48% Pervious Area
0.486		15.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
1.4	134	0.0306	1.57		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
8.9	284	0.0035	0.53		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
45.1	840	Total			

Subcatchment 7.2: Off-Site Residential



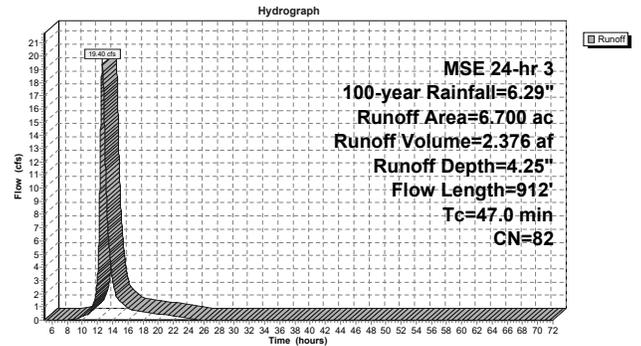
Summary for Subcatchment 8.2: Off-Site Residential

Runoff = 19.40 cfs @ 12.64 hrs, Volume= 2.376 af, Depth= 4.25"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
6.130	82	2 acre lots, 12% imp, HSG D
0.570	77	2 acre lots, 12% imp, HSG C
6.700	82	Weighted Average
5.896		88.00% Pervious Area
0.804		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	198	0.0904	1.50		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.9	65	0.0185	1.22		Shallow Concentrated Flow, Segment CD Cultivated Straight Rows Kv= 9.0 fps
11.1	349	0.0034	0.52		Shallow Concentrated Flow, Segment DE Cultivated Straight Rows Kv= 9.0 fps
47.0	912				Total

Subcatchment 8.2: Off-Site Residential



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7,500 ac, 20.00% Impervious, Inflow Depth = 4.15" for 100-year event
 Inflow = 26.51 cfs @ 12.45 hrs, Volume= 2.593 af
 Outflow = 15.12 cfs @ 12.77 hrs, Volume= 1.655 af, Atten= 43%, Lag= 19.5 min
 Primary = 1.76 cfs @ 12.77 hrs, Volume= 0.530 af
 Secondary = 13.36 cfs @ 12.77 hrs, Volume= 1.125 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.64' @ 12.77 hrs Surf.Area= 17,708 sf Storage= 53,814 cf

Plug-Flow detention time= 206.6 min calculated for 1.655 af (64% of inflow)
 Center-of-Mass det. time= 130.7 min (946.2 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	60,394 cf	Existing Active Storage Volume (Irregular), listed below (Recalc)

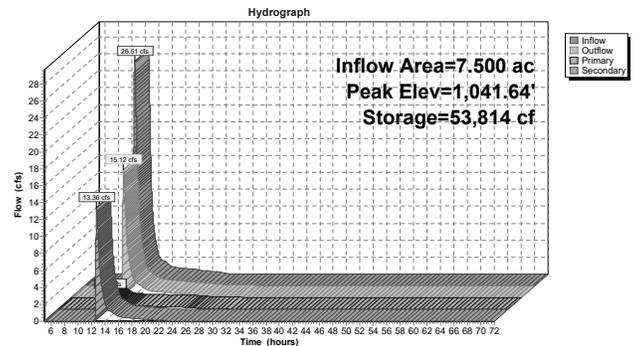
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.00	18,762	577.0	17,320	60,394	24,054

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=1.76 cfs @ 12.77 hrs HW=1,041.64' (Free Discharge)
 1=Culvert (Barrel Controls 1.76 cfs @ 3.03 fps)

Secondary OutFlow Max=13.36 cfs @ 12.77 hrs HW=1,041.64' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 13.36 cfs @ 1.72 fps)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 6P: Lisbon Road Culvert

Inflow Area = 10.420 ac, 20.00% Impervious, Inflow Depth = 6.47" for 100-year event
 Inflow = 42.81 cfs @ 12.69 hrs, Volume= 5,620 af
 Outflow = 17.12 cfs @ 13.31 hrs, Volume= 5,620 af, Atten= 60%, Lag= 37.2 min
 Primary = 17.12 cfs @ 13.31 hrs, Volume= 5,620 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.01' @ 13.31 hrs Surf.Area= 97,128 sf Storage= 64,728 cf

Plug-Flow detention time= 29.7 min calculated for 5,620 af (100% of inflow)
 Center-of-Mass det. time= 29.7 min (895.9 - 866.2)

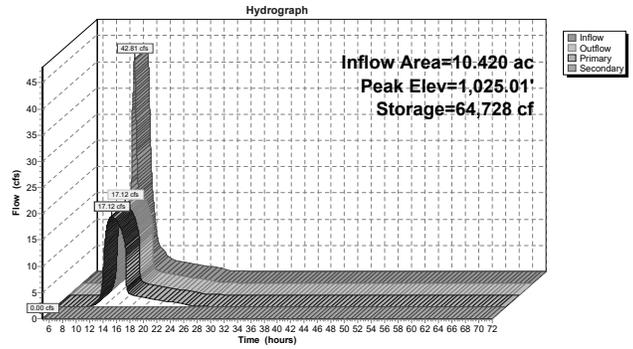
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	186,687 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,675	259.0	666	671	5,340
1,024.00	20,066	1,004.0	9,179	9,851	80,220
1,025.00	96,415	1,849.0	53,489	63,339	272,070
1,026.00	152,408	2,028.0	123,348	186,687	327,329

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.00867' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=17.12 cfs @ 13.31 hrs HW=1,025.01' (Free Discharge)
 1=Culvert (Barrel Controls 17.12 cfs @ 5.53 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 6P: Lisbon Road Culvert



Summary for Pond 7P: Winkleman Road North Culvert

Inflow Area = 3.130 ac, 15.52% Impervious, Inflow Depth = 17.85" for 100-year event
 Inflow = 37.37 cfs @ 12.66 hrs, Volume= 4,656 af
 Outflow = 6.39 cfs @ 14.03 hrs, Volume= 4,656 af, Atten= 83%, Lag= 81.9 min
 Primary = 6.39 cfs @ 14.03 hrs, Volume= 4,656 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.80' @ 14.03 hrs Surf.Area= 142,899 sf Storage= 107,440 cf

Plug-Flow detention time= 185.2 min calculated for 4,656 af (100% of inflow)
 Center-of-Mass det. time= 185.2 min (1,027.1 - 841.9)

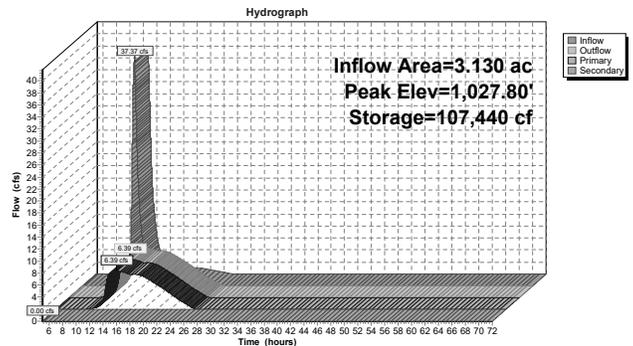
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	344,704 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	69,827	1,103.0	23,974	23,974	96,816
1,028.00	165,071	1,582.0	114,086	138,060	199,171
1,029.00	251,220	2,128.0	206,644	344,704	360,378

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.00747' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=6.39 cfs @ 14.03 hrs HW=1,027.80' (Free Discharge)
 1=Culvert (Barrel Controls 6.39 cfs @ 3.66 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 7P: Winkleman Road North Culvert



Summary for Pond 9P: Winkleman Road South Culvert

Inflow = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af
 Outflow = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af, Atten= 0%, Lag= 0.0 min
 Primary = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af

Routing by Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.61' @ 12.47 hrs Surf.Area= 19 sf Storage= 7 cf

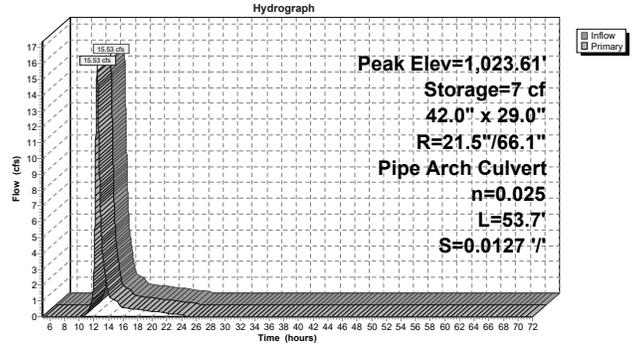
Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.0 min (833.2 - 833.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.15'	111,237 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.15	0	0.0	0	0	0
1,023.00	4	8.0	1	1	6
1,024.00	34	23.0	17	18	46
1,025.00	90	36.0	60	77	114
1,026.00	6,337	322.0	2,394	2,472	8,264
1,027.00	57,106	955.0	27,489	29,960	72,593
1,028.00	108,140	1,412.0	81,277	111,237	158,681

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.15'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 53.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.15' / 1,021.47' S= 0.0127' /' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=15.53 cfs @ 12.47 hrs HW=1,023.61' (Free Discharge)
 1=Culvert (Barrel Controls 15.53 cfs @ 4.66 fps)

Pond 9P: Winkleman Road South Culvert



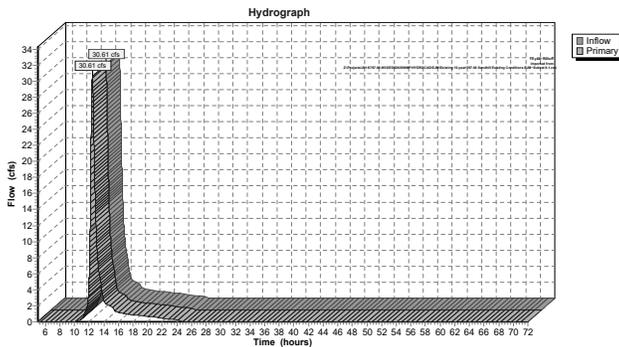
Summary for Link 6.1: Sandhill Pre-Development (10-year flow)

Inflow = 30.61 cfs @ 12.47 hrs, Volume= 2.956 af
 Primary = 30.61 cfs @ 12.47 hrs, Volume= 2.956 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

10-year Runoff Imported from Z:\Projects\2016\767.00-W\DESIGN\SWMP\HYDROCAD\EJM\Existing 10-year\767.00

Link 6.1: Sandhill Pre-Development (10-year flow)



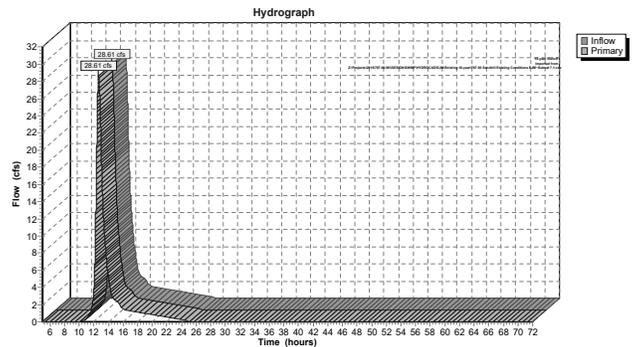
Summary for Link 7.1: Sandhill Pre-Development (10-year flow)

Inflow = 28.61 cfs @ 12.66 hrs, Volume= 3.601 af
 Primary = 28.61 cfs @ 12.66 hrs, Volume= 3.601 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

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Link 7.1: Sandhill Pre-Development (10-year flow)



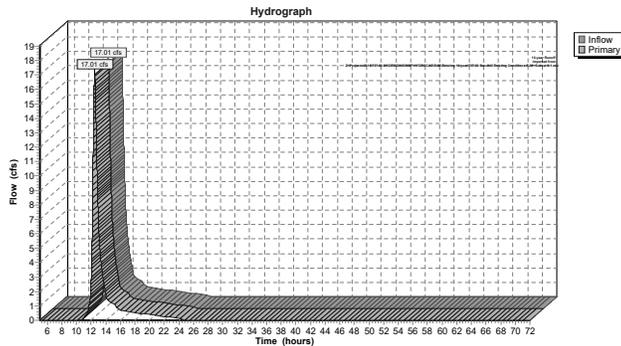
Summary for Link 8.1: Sandhill Pre-Development (10-year flow)

Inflow = 17.01 cfs @ 12.50 hrs, Volume= 1.727 af
 Primary = 17.01 cfs @ 12.50 hrs, Volume= 1.727 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

10-year Runoff Imported from Z:\Projects\2016\767.00-WIDESIGN\SWMPI\HYDROCAD\EJMExisting 10-year\767.00

Link 8.1: Sandhill Pre-Development (10-year flow)



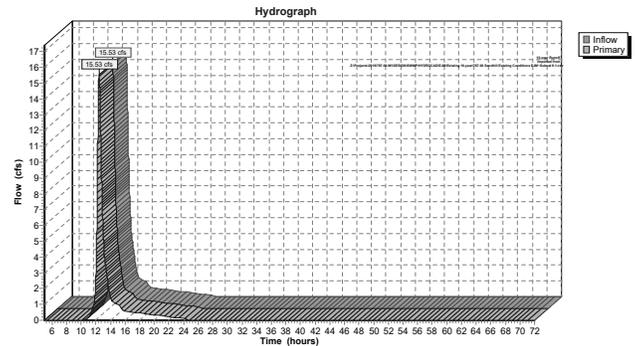
Summary for Link 9.1: Sandhill Pre-Development (10-year flow)

Inflow = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af
 Primary = 15.53 cfs @ 12.47 hrs, Volume= 1.539 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

10-year Runoff Imported from Z:\Projects\2016\767.00-WIDESIGN\SWMPI\HYDROCAD\EJMExisting 10-year\767.00

Link 9.1: Sandhill Pre-Development (10-year flow)



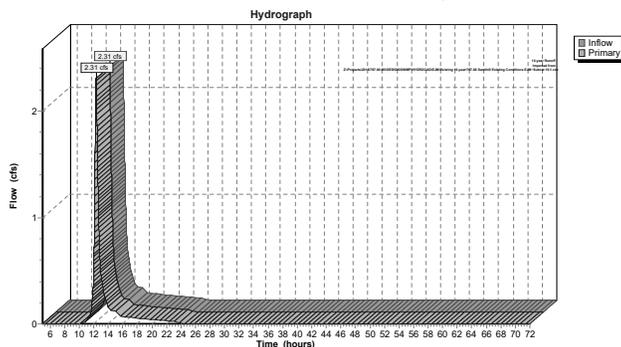
Summary for Link 10.1: Sandhill Pre-Development (10-year flow)

Inflow = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af
 Primary = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

10-year Runoff Imported from Z:\Projects\2016\767.00-WIDESIGN\SWMPI\HYDROCAD\EJMExisting 10-year\767.00

Link 10.1: Sandhill Pre-Development (10-year flow)

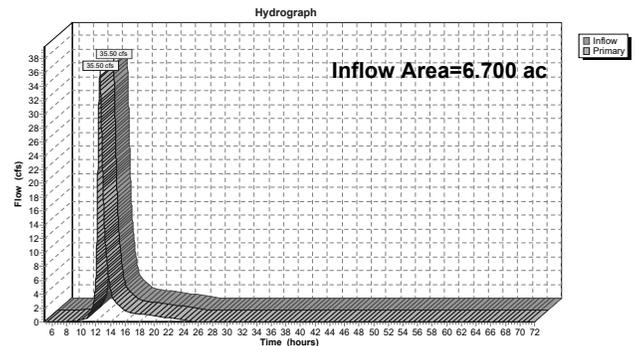


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 6.700 ac, 12.00% Impervious, Inflow Depth = 7.35" for 100-year event
 Inflow = 35.50 cfs @ 12.57 hrs, Volume= 4.103 af
 Primary = 35.50 cfs @ 12.57 hrs, Volume= 4.103 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale



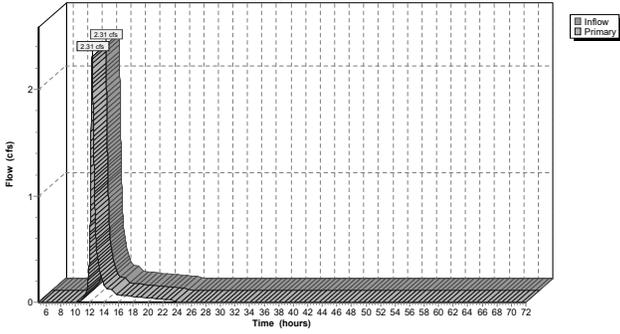
Summary for Link TL: Teri Lane

Inflow = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af
Primary = 2.31 cfs @ 12.34 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min

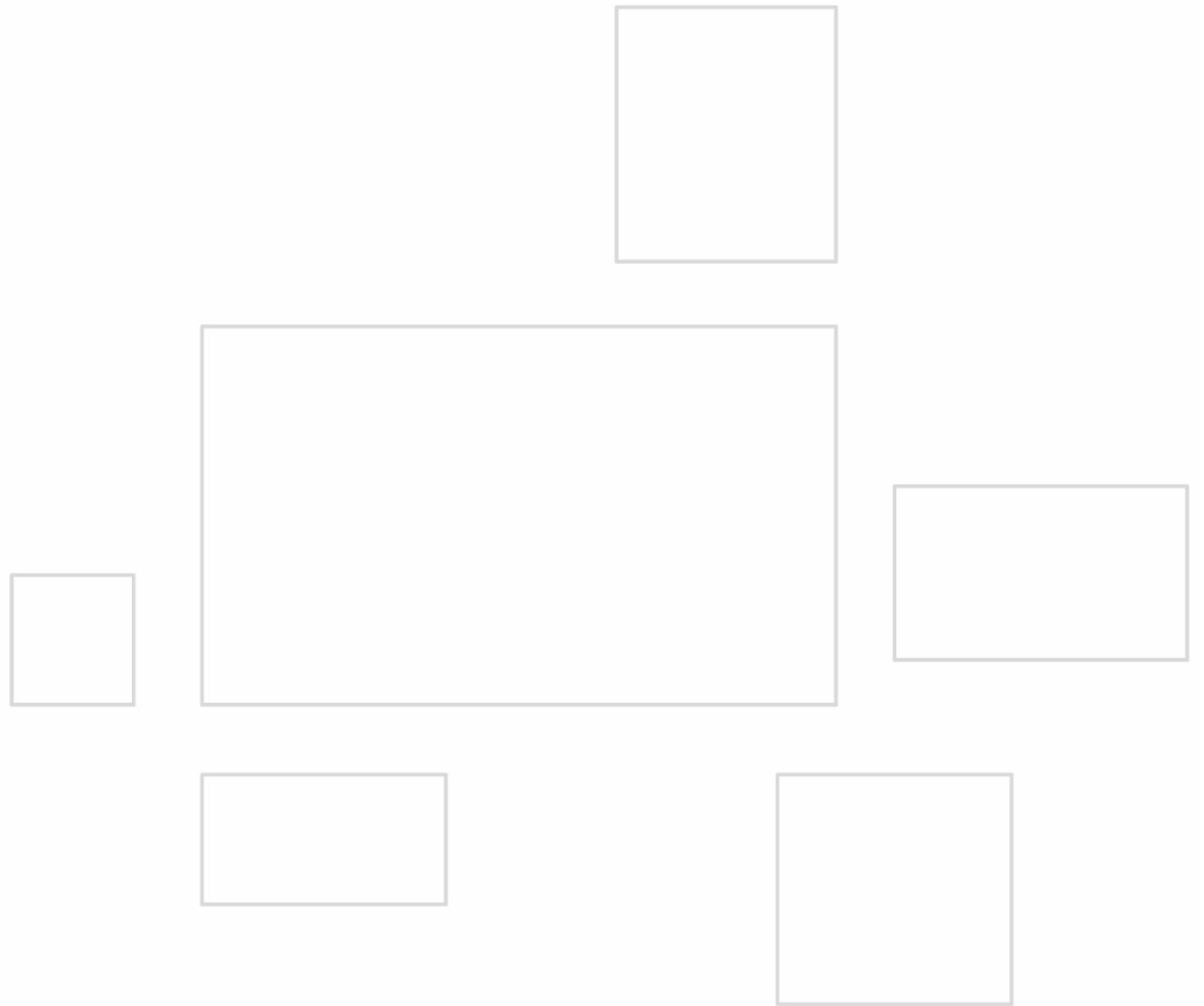
Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

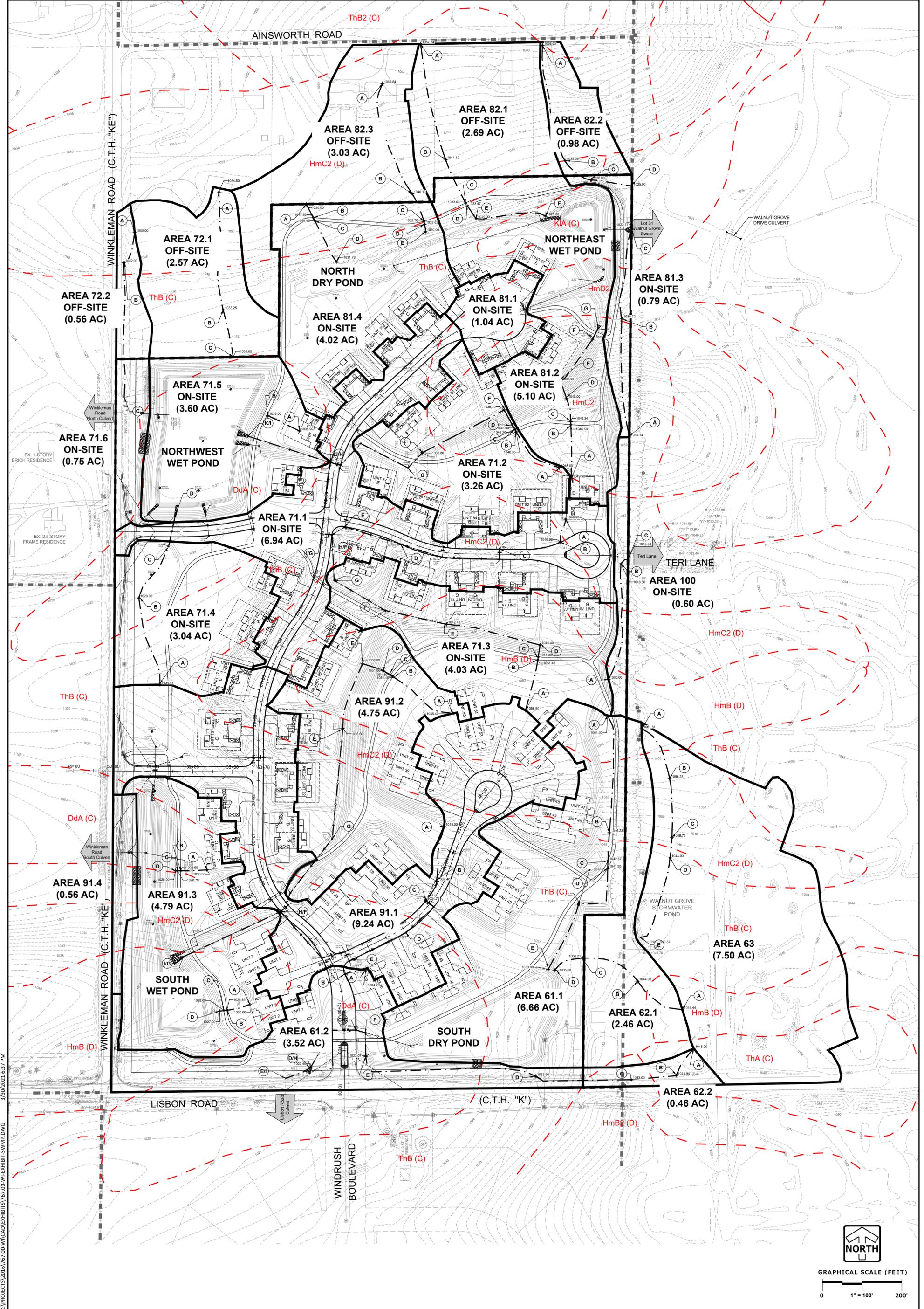
Link TL: Teri Lane

Hydrograph



APPENDIX 3 POST-DEVELOPMENT CONDITIONS (RATE ATTENUATION)





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SANDHILL - SWMP - POST-DEVELOPMENT CONDITIONS

Summary for Subcatchment 61.1: Sandhill Post-Development

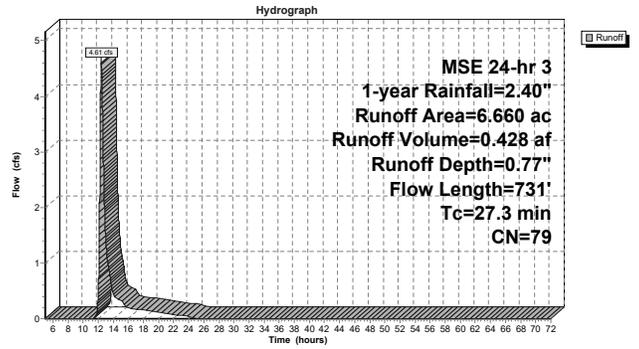
Runoff = 4.61 cfs @ 12.41 hrs, Volume= 0.428 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.340	98	Roofs, HSG C
0.310	98	Paved parking, HSG C
* 0.250	98	Sidewalk, HSG C
4.430	74	>75% Grass cover, Good, HSG C
0.110	70	Woods, Good, HSG C
0.230	98	Roofs, HSG D
* 0.010	98	Driveway, HSG D
* 0.100	98	Sidewalk, HSG D
0.740	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
6.660	79	Weighted Average
5.420		81.38% Pervious Area
1.240		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	300	0.0500	0.19		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.4	72	0.0490	3.32		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.1	19	0.0380	3.96		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.9	340	0.0260	6.21	37.27	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=2.00' D=1.00' Z= 4.0' Top.W=10.00' n= 0.027
27.3	731	Total			

Subcatchment 61.1: Sandhill Post-Development



Summary for Subcatchment 61.2: Sandhill Post-Development

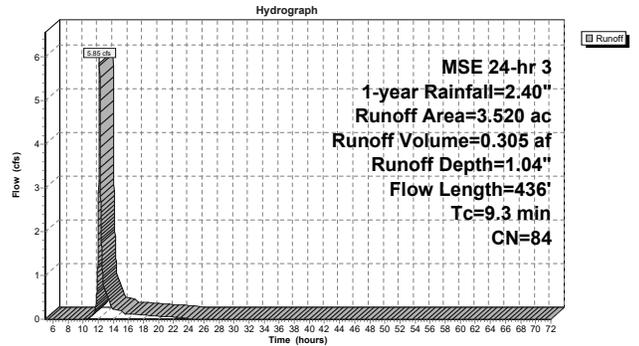
Runoff = 5.85 cfs @ 12.17 hrs, Volume= 0.305 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.170	98	Roofs, HSG C
0.160	98	Paved parking, HSG C
0.300	98	Paved roads w/curbs & sewers, HSG C
* 0.090	98	Sidewalk, HSG C
1.110	74	>75% Grass cover, Good, HSG C
* 0.520	98	Existing Impervious ROW, HSG C
* 0.690	74	>75% Grass cover ROW, Good, HSG C
* 0.020	98	Sidewalk, HSG D
0.180	80	>75% Grass cover, Good, HSG D
* 0.110	98	Existing Impervious ROW, HSG D
* 0.170	80	>75% Grass cover ROW, Good, HSG D
3.520	84	Weighted Average
2.150		61.08% Pervious Area
1.370		38.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	53	0.0368	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.7	146	0.0312	3.59		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment CD 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
9.3	436	Total			

Subcatchment 61.2: Sandhill Post-Development



Summary for Subcatchment 62.1: Off-Site Residential

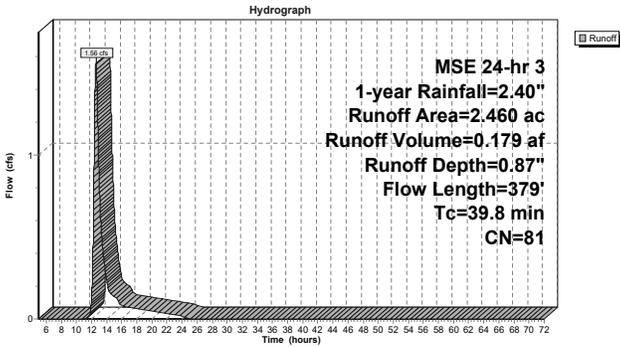
Runoff = 1.56 cfs @ 12.60 hrs, Volume= 0.179 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.770	84	1 acre lots, 20% imp, HSG D
1.690	79	1 acre lots, 20% imp, HSG C
2.460	81	Weighted Average
1.968		80.00% Pervious Area
0.492		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.4	79	0.0406	3.02		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
39.8	379				Total

Subcatchment 62.1: Off-Site Residential



Summary for Subcatchment 62.2: Off-Site Residential

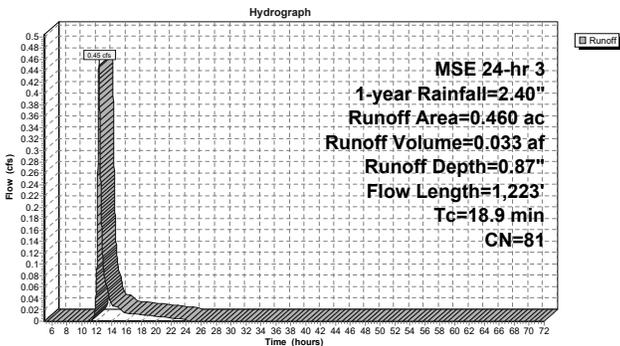
Runoff = 0.45 cfs @ 12.29 hrs, Volume= 0.033 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.180	84	1 acre lots, 20% imp, HSG D
0.280	79	1 acre lots, 20% imp, HSG C
0.460	81	Weighted Average
0.368		80.00% Pervious Area
0.092		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	82	0.0251	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.8	114	0.0258	2.41		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
1.0	245	0.0369	3.90		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
3.3	460	0.0238	2.31		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
0.3	60	0.0026	3.28	5.80	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38" n= 0.012
0.1	25	0.0026	4.62	22.66	Pipe Channel, Segment FG 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63" n= 0.012
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63" n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment HI Grassed Waterway Kv= 15.0 fps
18.9	1,223				Total

Subcatchment 62.2: Off-Site Residential



Summary for Subcatchment 63: Off-Site Walnut Grove

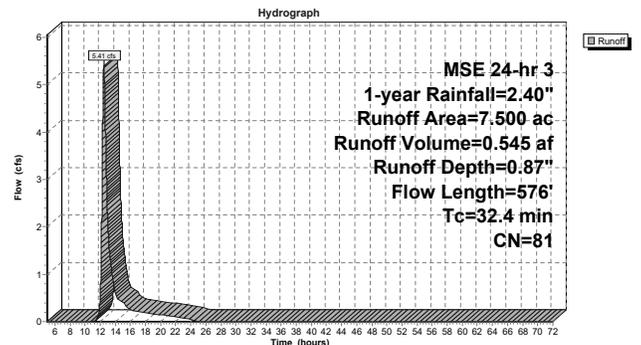
Runoff = 5.41 cfs @ 12.49 hrs, Volume= 0.545 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 63: Off-Site Walnut Grove



Summary for Subcatchment 71.1: Sandhill Post-Development

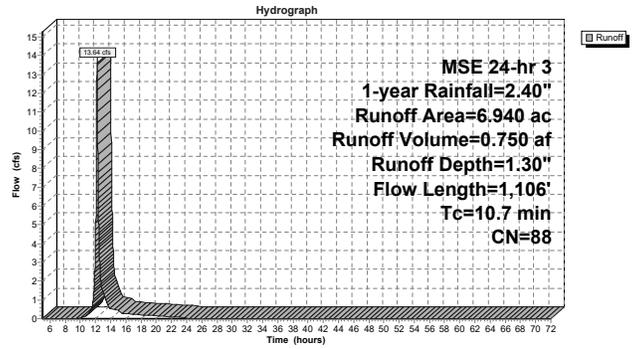
Runoff = 13.64 cfs @ 12.18 hrs, Volume= 0.750 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.450	98	Roofs, HSG C
0.500	98	Driveways, HSG C
0.990	98	Paved roads w/curbs & sewers, HSG C
0.140	98	Sidewalk, HSG C
1.880	74	>75% Grass cover, Good, HSG C
0.020	98	Existing Impervious ROW, HSG C
0.530	98	Roofs, HSG D
0.520	98	Driveway, HSG D
0.600	98	Paved roads w/curbs & sewers, HSG D
0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
6.940	88	Weighted Average
3.130		45.10% Pervious Area
3.810		54.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.0490	0.14		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.3	155	0.0100	2.03		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	279	0.0290	8.37	6.57	Pipe Channel, Segment CD 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	148	0.0200	8.06	9.90	Pipe Channel, Segment DE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	38	0.0100	6.44	11.38	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment FG 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	182	0.0033	5.20	25.53	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
10.7	1,106	Total			

Subcatchment 71.1: Sandhill Post-Development



Summary for Subcatchment 71.2: Sandhill Post-Development

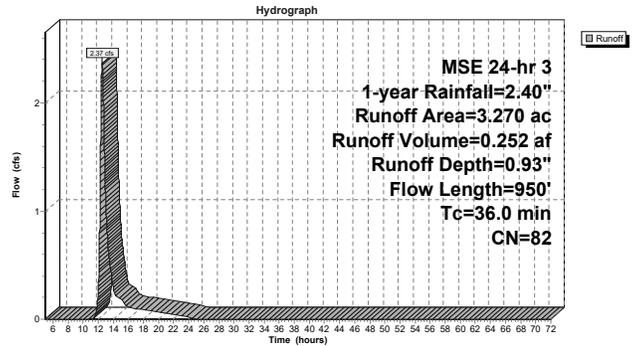
Runoff = 2.37 cfs @ 12.52 hrs, Volume= 0.252 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
0.030	98	Driveways, HSG C
0.090	98	Sidewalk, HSG C
1.280	74	>75% Grass cover, Good, HSG C
0.290	98	Roofs, HSG D
0.030	98	Driveway, HSG D
0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
3.270	82	Weighted Average
2.530		77.37% Pervious Area
0.740		22.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	148	0.0110	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
3.1	12	0.0166	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
2.9	43	0.2400	0.24		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
1.2	233	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0 ' Top.W=8.00' n= 0.027
0.2	53	0.0042	3.70	4.54	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.9	235	0.0030	4.27	13.42	Pipe Channel, Segment GH 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.0	950	Total			

Subcatchment 71.2: Sandhill Post-Development



Summary for Subcatchment 71.3: Sandhill Post-Development

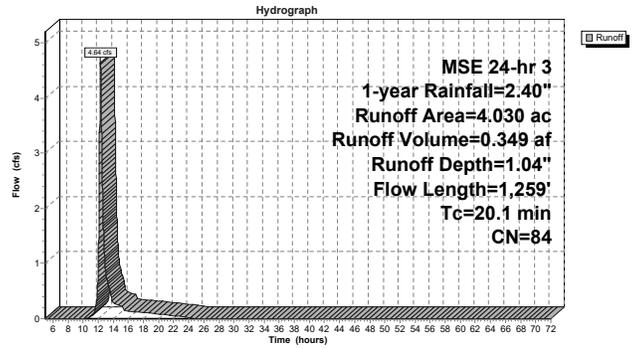
Runoff = 4.64 cfs @ 12.31 hrs, Volume= 0.349 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.530	98	Roofs, HSG D
* 0.020	98	Driveway, HSG D
* 0.260	98	Sidewalk, HSG D
3.220	80	>75% Grass cover, Good, HSG D
4.030	84	Weighted Average
3.220		79.90% Pervious Area
0.810		20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	131	0.0408	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
2.4	30	0.1967	0.21		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
1.3	241	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.3	158	0.0300	8.51	6.69	Pipe Channel, Segment EF 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	150	0.0200	8.06	9.90	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	115	0.0090	6.11	10.80	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment HI 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.2	182	0.0330	16.44	80.72	Pipe Channel, Segment IJ 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
20.1	1,259	Total			

Subcatchment 71.3: Sandhill Post-Development



Summary for Subcatchment 71.4: Sandhill Post-Development

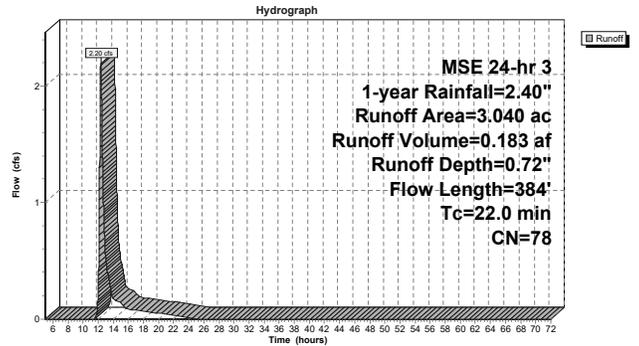
Runoff = 2.20 cfs @ 12.35 hrs, Volume= 0.183 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.100	98	Roofs, HSG C
* 0.010	98	Driveways, HSG C
* 0.100	98	Sidewalk, HSG C
2.200	74	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	96	New Gravel ROW, HSG C
* 0.100	98	Existing Impervious ROW, HSG C
* 0.240	74	>75% Grass cover ROW, Good, HSG C
0.110	98	Roofs, HSG D
* 0.010	98	Sidewalk, HSG D
0.130	80	>75% Grass cover, Good, HSG D
3.040	78	Weighted Average
2.580		84.87% Pervious Area
0.460		15.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	151	0.0240	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.7	151	0.0092	1.44		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.2	82	0.0076	5.61	9.92	Pipe Channel, Segment CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
22.0	384	Total			

Subcatchment 71.4: Sandhill Post-Development



Summary for Subcatchment 71.5: Sandhill Post-Development

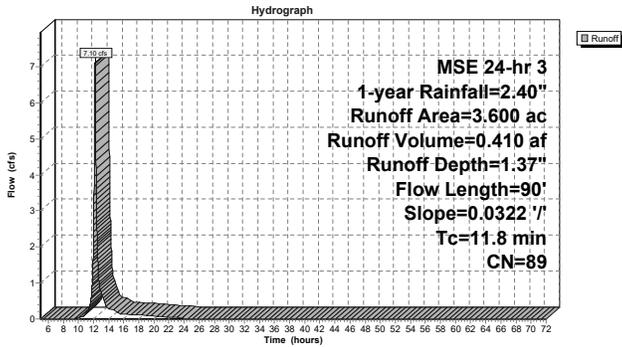
Runoff = 7.10 cfs @ 12.20 hrs, Volume= 0.410 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.150	98	Roofs, HSG C
0.090	98	Sidewalk, HSG C
1.400	74	>75% Grass cover, Good, HSG C
1.960	98	Water Surface, HSG C
3.600	89	Weighted Average
1.400		38.89% Pervious Area
2.200		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	90	0.0322	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 71.5: Sandhill Post-Development



Summary for Subcatchment 71.6: Sandhill Post-Development

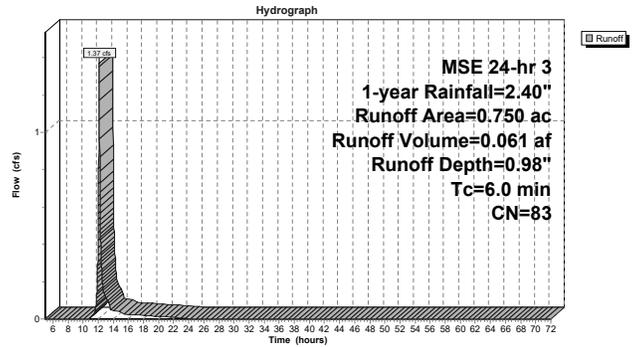
Runoff = 1.37 cfs @ 12.14 hrs, Volume= 0.061 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.260	74	>75% Grass cover, Good, HSG C
0.030	98	New Road ROW, HSG C
0.010	96	New Gravel ROW, HSG C
0.230	98	Existing Impervious ROW, HSG C
0.220	74	>75% Grass cover ROW, Good, HSG C
0.750	83	Weighted Average
0.490		65.33% Pervious Area
0.260		34.67% Impervious Area

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

Subcatchment 71.6: Sandhill Post-Development



Summary for Subcatchment 72.1: Off-Site Residential

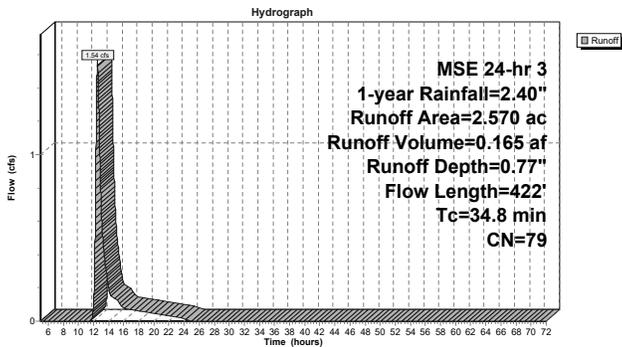
Runoff = 1.54 cfs @ 12.53 hrs, Volume= 0.165 af, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
1.060	82	2 acre lots, 12% imp, HSG D
1.510	77	2 acre lots, 12% imp, HSG C
2.570	79	Weighted Average
2.262		88.00% Pervious Area
0.308		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
34.8	422				Total

Subcatchment 72.1: Off-Site Residential



Summary for Subcatchment 72.2: Off-Site Residential

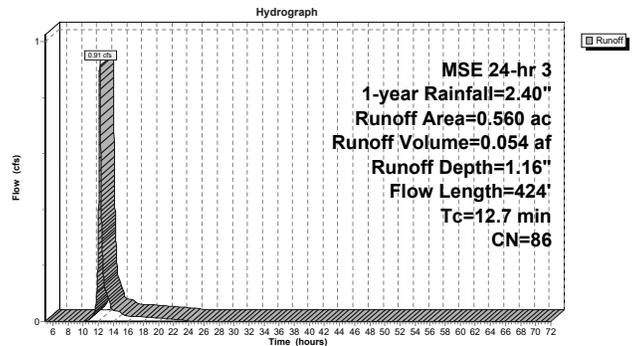
Runoff = 0.91 cfs @ 12.21 hrs, Volume= 0.054 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.060	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
0.210	77	2 acre lots, 12% imp, HSG C
0.560	86	Weighted Average
0.383		68.32% Pervious Area
0.177		31.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	84	0.0950	0.13		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.8	340	0.0450	3.18		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
12.7	424				Total

Subcatchment 72.2: Off-Site Residential



Summary for Subcatchment 81.1: Sandhill Post-Development

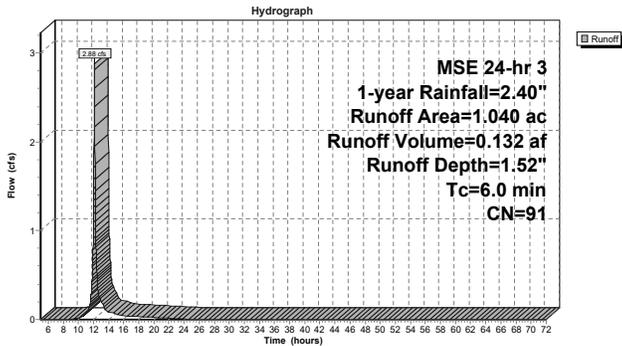
Runoff = 2.88 cfs @ 12.13 hrs, Volume= 0.132 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

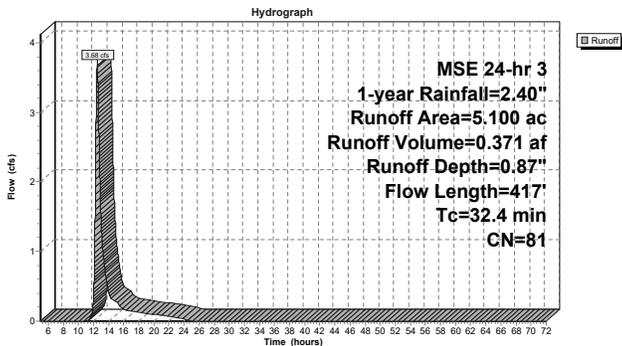
Area (ac)	CN	Description
0.070	98	Roofs, HSG C
0.040	98	Driveways, HSG C
0.020	98	Paved roads w/curbs & sewers, HSG C
0.010	98	Sidewalk, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.120	98	Roofs, HSG D
0.150	98	Driveway, HSG D
0.240	98	Paved roads w/curbs & sewers, HSG D
0.010	98	Sidewalk, HSG D
0.280	80	>75% Grass cover, Good, HSG D
1.040	91	Weighted Average
0.380		36.54% Pervious Area
0.660		63.46% Impervious Area

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

Subcatchment 81.1: Sandhill Post-Development



Subcatchment 81.2: Sandhill Post-Development



Summary for Subcatchment 81.2: Sandhill Post-Development

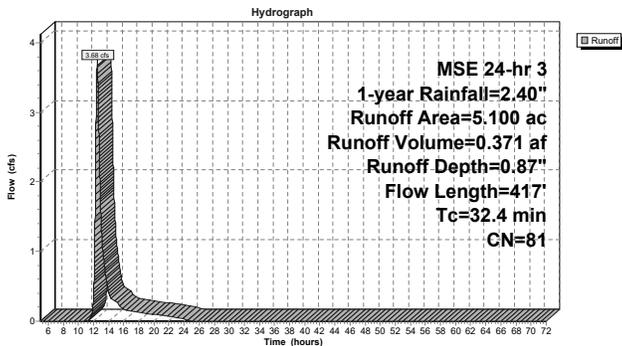
Runoff = 3.68 cfs @ 12.49 hrs, Volume= 0.371 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.220	98	Roofs, HSG C
0.090	98	Sidewalk, HSG C
1.140	74	>75% Grass cover, Good, HSG C
0.320	98	Water Surface, HSG C
0.350	70	Woods, Good, HSG C
0.100	98	Roofs, HSG D
0.030	98	Driveway, HSG D
0.160	98	Sidewalk, HSG D
2.410	80	>75% Grass cover, Good, HSG D
0.030	98	Water Surface, HSG D
0.250	77	Woods, Good, HSG D
5.100	81	Weighted Average
4.150		81.37% Pervious Area
0.950		18.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	136	0.0250	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
9.9	60	0.0223	0.10		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.2	47	0.2360	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	134	0.0110	2.97	8.91	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0.1' Top.W=8.00' n= 0.027
0.1	32	0.0095	5.56	6.82	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
32.4	417	Total			

Subcatchment 81.2: Sandhill Post-Development



Summary for Subcatchment 81.3: Sandhill Post-Development

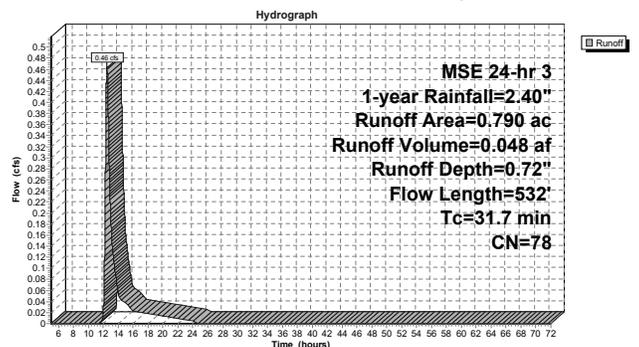
Runoff = 0.46 cfs @ 12.50 hrs, Volume= 0.048 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.040	98	Sidewalk, HSG C
0.130	74	>75% Grass cover, Good, HSG C
0.150	70	Woods, Good, HSG C
0.050	98	Sidewalk, HSG D
0.220	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.790	78	Weighted Average
0.700		88.61% Pervious Area
0.090		11.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	300	0.0950	0.17		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.5	232	0.0300	2.60		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
31.7	532	Total			

Subcatchment 81.3: Sandhill Post-Development



Summary for Subcatchment 81.4: Sandhill Post-Development

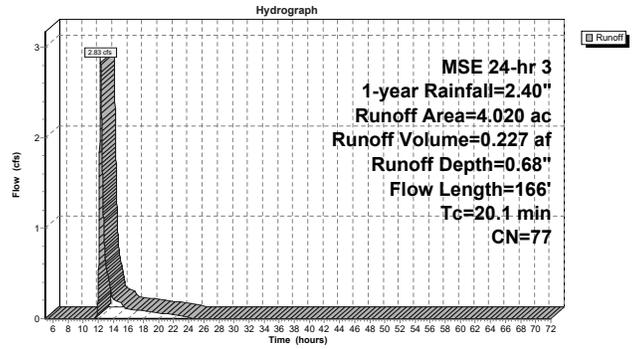
Runoff = 2.83 cfs @ 12.31 hrs, Volume= 0.227 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.290	98	Roofs, HSG C
* 0.050	98	Driveways, HSG C
* 0.090	98	Sidewalk, HSG C
2.330	74	>75% Grass cover, Good, HSG C
0.330	70	Woods, Good, HSG C
* 0.080	98	Sidewalk, HSG D
0.850	77	Woods, Good, HSG D
4.020	77	Weighted Average
3.510		87.31% Pervious Area
0.510		12.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	39	0.0610	0.09		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.2	9	0.0200	0.78		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
12.9	118	0.1240	0.15		Sheet Flow, Segment CD Woods: Light underbrush n= 0.400 P2= 2.70"
20.1	166	Total			

Subcatchment 81.4: Sandhill Post-Development



Summary for Subcatchment 82.1: Off-Site Residential

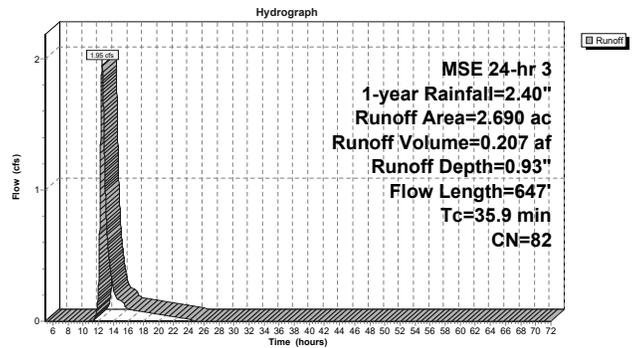
Runoff = 1.95 cfs @ 12.53 hrs, Volume= 0.207 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
2.630	82	2 acre lots, 12% imp, HSG D
0.060	77	2 acre lots, 12% imp, HSG C
2.690	82	Weighted Average
2.367		88.00% Pervious Area
0.323		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	121	0.0867	1.47		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.4	40	0.1120	1.67		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
1.3	178	0.0220	2.22		Shallow Concentrated Flow, Segment EF Grassed Waterway Kv= 15.0 fps
35.9	647	Total			

Subcatchment 82.1: Off-Site Residential



Summary for Subcatchment 82.2: Off-Site Residential

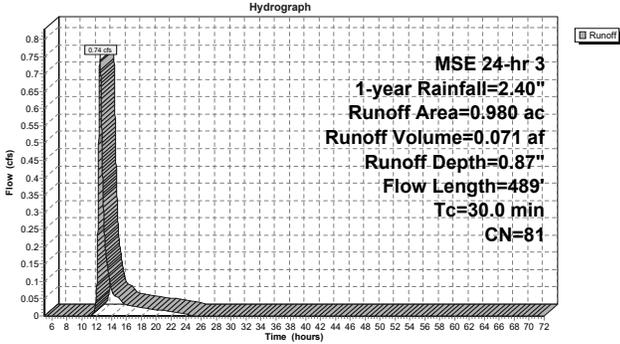
Runoff = 0.74 cfs @ 12.44 hrs, Volume= 0.071 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.770	82	2 acre lots, 12% imp, HSG D
0.210	77	2 acre lots, 12% imp, HSG C
0.980	81	Weighted Average
0.862		88.00% Pervious Area
0.118		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	300	0.1120	0.18		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.0	85	0.0830	1.44		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.7	104	0.0288	2.55		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
30.0	489				Total

Subcatchment 82.2: Off-Site Residential



Summary for Subcatchment 82.3: Off-Site Residential

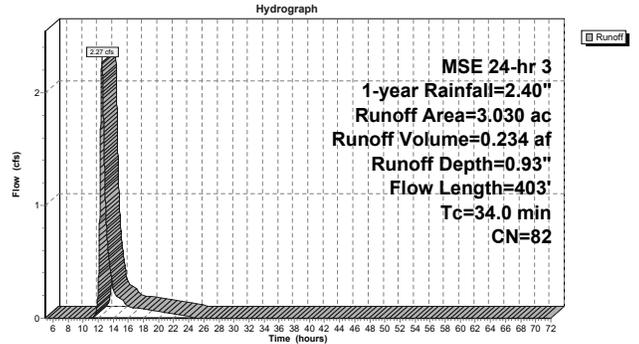
Runoff = 2.27 cfs @ 12.50 hrs, Volume= 0.234 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
2.730	82	2 acre lots, 12% imp, HSG D
0.300	77	2 acre lots, 12% imp, HSG C
3.030	82	Weighted Average
2.666		88.00% Pervious Area
0.364		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.0	300	0.0758	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.8	76	0.0960	1.55		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.2	19	0.1380	1.86		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
34.0	403				Total

Subcatchment 82.3: Off-Site Residential



Summary for Subcatchment 91.1: Sandhill Post-Development

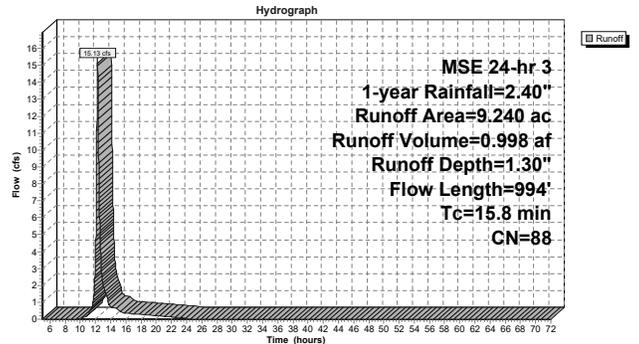
Runoff = 15.13 cfs @ 12.24 hrs, Volume= 0.998 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
1.120	98	Roofs, HSG C
* 0.870	98	Driveways, HSG C
1.080	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
* 0.220	98	Sidewalk, HSG C
2.990	74	>75% Grass cover, Good, HSG C
* 0.060	98	Existing Impervious ROW, HSG C
* 0.140	74	>75% Grass cover ROW, Good, HSG C
0.550	98	Roofs, HSG D
* 0.900	98	Driveway, HSG D
0.270	98	Paved roads w/curbs & sewers, HSG D
* 0.070	98	Sidewalk, HSG D
0.960	80	>75% Grass cover, Good, HSG D
9.240	88	Weighted Average
4.100		44.37% Pervious Area
5.140		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	140	0.0540	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	57	0.0460	4.35		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.3	122	0.0132	6.55	8.04	Pipe Channel, Segment CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	152	0.0090	6.11	10.80	Pipe Channel, Segment DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	251	0.0080	6.98	21.92	Pipe Channel, Segment EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.8	994				Total

Subcatchment 91.1: Sandhill Post-Development



Summary for Subcatchment 91.2: Sandhill Post-Development

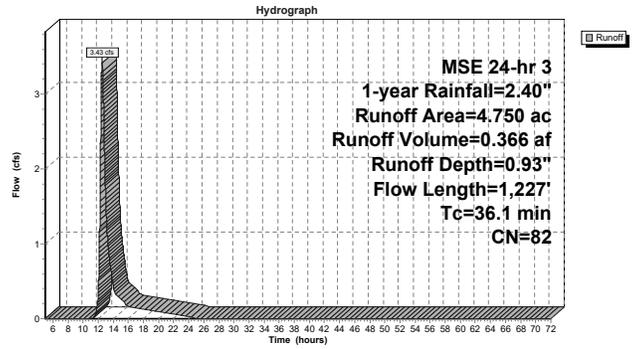
Runoff = 3.43 cfs @ 12.55 hrs, Volume= 0.366 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
* 0.110	98	Driveways, HSG C
* 0.110	98	Sidewalk, HSG C
1.700	74	>75% Grass cover, Good, HSG C
0.430	98	Roofs, HSG D
* 0.040	98	Driveway, HSG D
* 0.110	98	Sidewalk, HSG D
2.010	80	>75% Grass cover, Good, HSG D
4.750	82	Weighted Average
3.710		78.11% Pervious Area
1.040		21.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	184	0.0214	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
4.8	20	0.0150	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.7	56	0.2320	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	173	0.0145	3.41	10.23	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.8	280	0.0125	5.49	4.32	Pipe Channel, Segment FG 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.6	234	0.0100	6.44	11.38	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.1	1,227	Total			

Subcatchment 91.2: Sandhill Post-Development



Summary for Subcatchment 91.3: Sandhill Post-Development

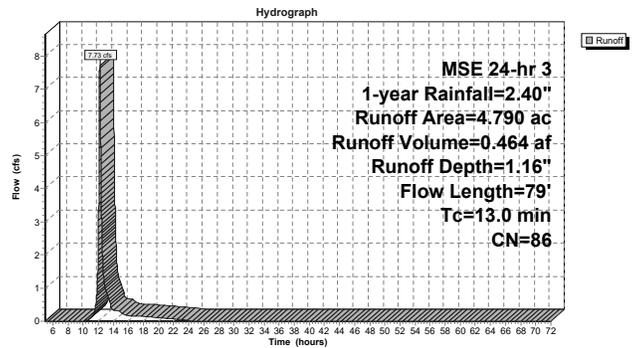
Runoff = 7.73 cfs @ 12.21 hrs, Volume= 0.464 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.300	98	Roofs, HSG C
* 0.020	98	Driveways, HSG C
* 0.120	98	Sidewalk, HSG C
1.150	74	>75% Grass cover, Good, HSG C
0.350	98	Water Surface, HSG C
* 0.020	74	>75% Grass cover ROW, Good, HSG C
0.210	98	Roofs, HSG D
* 0.070	98	Driveway, HSG D
* 0.140	98	Sidewalk, HSG D
1.460	80	>75% Grass cover, Good, HSG D
* 0.180	80	>75% Grass cover ROW, Good, HSG D
0.770	98	Water Surface, HSG D
4.790	86	Weighted Average
2.810		58.66% Pervious Area
1.980		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	66	0.0160	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
0.6	5	0.1600	0.14		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
13.0	79	Total			

Subcatchment 91.3: Sandhill Post-Development



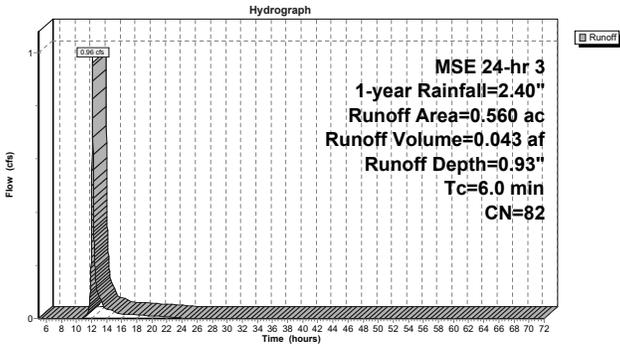
Summary for Subcatchment 91.4: Sandhill Post-Development

Runoff = 0.96 cfs @ 12.14 hrs, Volume= 0.043 af, Depth= 0.93"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.030	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
* 0.220	74	>75% Grass cover ROW, Good, HSG C
* 0.050	98	Existing Impervious ROW, HSG C
0.010	80	>75% Grass cover, Good, HSG D
* 0.060	98	Existing Impervious ROW, HSG D
* 0.110	80	>75% Grass cover ROW, Good, HSG D
0.560	82	Weighted Average
0.420		75.00% Pervious Area
0.140		25.00% Impervious Area

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

Subcatchment 91.4: Sandhill Post-Development



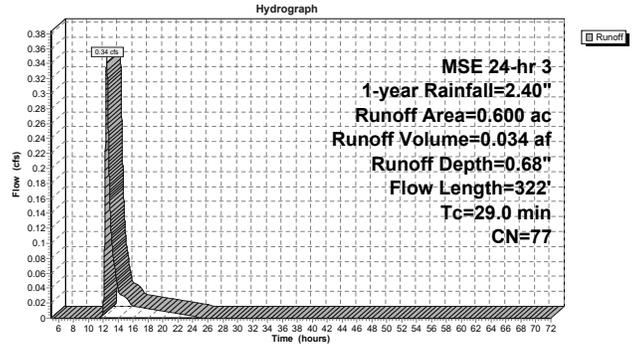
Summary for Subcatchment 100: Sandhill Post Development

Runoff = 0.34 cfs @ 12.46 hrs, Volume= 0.034 af, Depth= 0.68"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 1-year Rainfall=2.40"

Area (ac)	CN	Description
* 0.030	98	Sidewalk/Access Lane, HSG C
0.150	74	>75% Grass cover, Good, HSG C
* 0.010	98	Sidewalk, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.090	70	Woods, Good, HSG C
0.600	77	Weighted Average
0.560		93.33% Pervious Area
0.040		6.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	300	0.0380	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.1	22	0.0880	4.45		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
29.0	322	Total			

Subcatchment 100: Sandhill Post Development



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7.500 ac, 20.00% Impervious, Inflow Depth = 0.87" for 1-year event
 Inflow = 5.41 cfs @ 12.49 hrs, Volume= 0.545 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,039.66' @ 25.86 hrs Surf.Area= 13,103 sf Storage= 23,734 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	62,126 cf	Existing Active Storage Volume (Irregular), Listed below (Recalc)

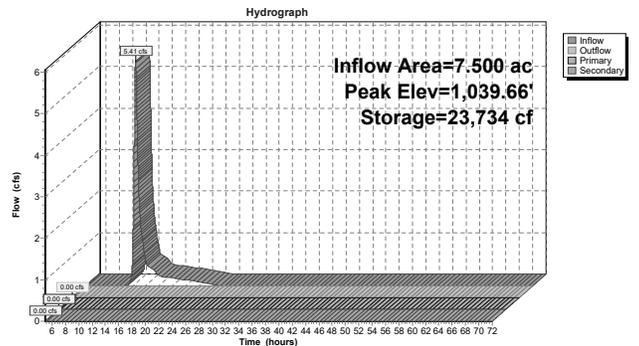
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.10	18,762	577.0	19,052	62,126	24,060

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' TW=1,023.80' (Dynamic Tailwater)
 1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' TW=1,023.80' (Dynamic Tailwater)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1R: Winkleman Road North Culvert

Inflow Area = 24.760 ac, 35.40% Impervious, Inflow Depth > 0.74" for 1-year event
 Inflow = 2.17 cfs @ 12.15 hrs, Volume= 1.519 af
 Outflow = 1.72 cfs @ 12.23 hrs, Volume= 1.518 af, Atten= 21%, Lag= 4.8 min
 Primary = 1.72 cfs @ 12.23 hrs, Volume= 1.518 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.61' @ 12.23 hrs Surf.Area= 1,969 sf Storage= 418 cf

Plug-Flow detention time= 1.5 min calculated for 1.518 af (100% of inflow)
 Center-of-Mass det. time= 1.1 min (2,225.0 - 2,223.9)

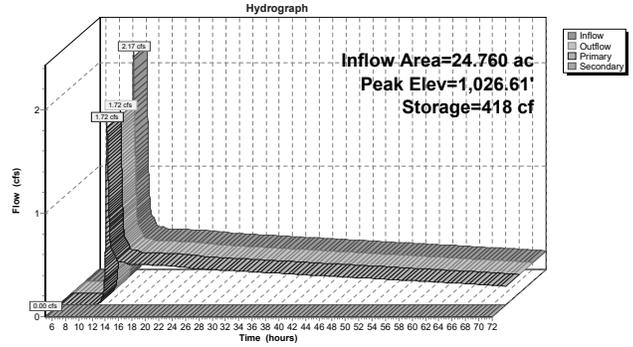
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	23,920 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	5,142	390.0	1,765	1,765	12,105
1,028.00	10,710	659.0	7,758	9,523	34,567
1,029.00	18,432	850.0	14,397	23,920	57,515

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 0.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=1.72 cfs @ 12.23 hrs HW=1,026.61' (Free Discharge)
 1=Culvert (Barrel Controls 1.72 cfs @ 2.44 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 1R: Winkleman Road North Culvert



Summary for Pond 60P: Lisbon Road Culvert

Inflow Area = 20.600 ac, 22.79% Impervious, Inflow Depth = 0.55" for 1-year event
 Inflow = 7.68 cfs @ 12.18 hrs, Volume= 0.945 af
 Outflow = 7.19 cfs @ 12.23 hrs, Volume= 0.945 af, Atten= 6%, Lag= 2.8 min
 Primary = 7.19 cfs @ 12.23 hrs, Volume= 0.945 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,022.94' @ 12.23 hrs Surf.Area= 1,580 sf Storage= 597 cf

Plug-Flow detention time= 0.7 min calculated for 0.945 af (100% of inflow)
 Center-of-Mass det. time= 0.7 min (842.5 - 841.9)

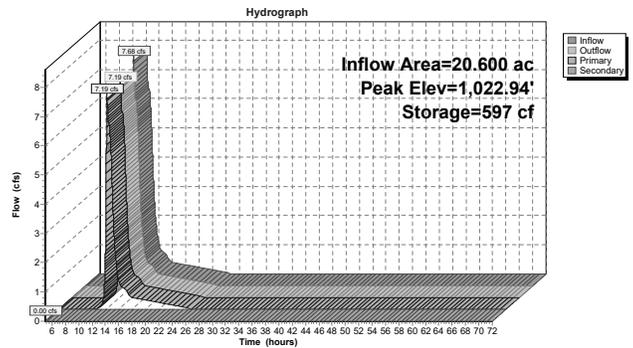
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	72,972 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,762	263.0	698	703	5,506
1,024.00	13,278	988.0	6,626	7,328	77,684
1,025.00	32,265	1,586.0	22,080	29,409	200,180
1,026.00	55,940	1,804.0	43,563	72,972	259,014

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=7.19 cfs @ 12.23 hrs HW=1,022.94' (Free Discharge)
 1=Culvert (Barrel Controls 7.19 cfs @ 3.66 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 60P: Lisbon Road Culvert



Summary for Pond 61.1P: SOUTH DRY POND

Inflow Area = 16.620 ac, 19.45% Impervious, Inflow Depth = 0.44" for 1-year event
 Inflow = 5.94 cfs @ 12.46 hrs, Volume= 0.607 af
 Outflow = 4.92 cfs @ 12.62 hrs, Volume= 0.607 af, Atten= 17%, Lag= 10.0 min
 Primary = 4.92 cfs @ 12.62 hrs, Volume= 0.607 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.14' @ 12.62 hrs Surf.Area= 5,411 sf Storage= 2,283 cf

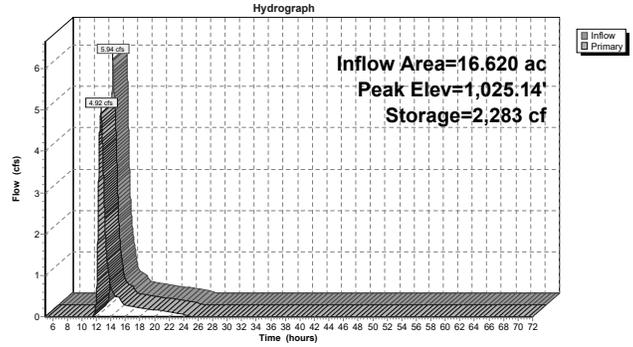
Plug-Flow detention time= 3.9 min calculated for 0.607 af (100% of inflow)
 Center-of-Mass det. time= 3.9 min (854.2 - 850.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.80'	114,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.80	10	10.0	0	0	10
1,024.00	45	25.0	5	5	52
1,025.00	4,302	289.0	1,596	1,601	6,650
1,026.00	14,928	555.0	9,081	10,682	24,521
1,027.00	31,978	829.0	22,918	33,600	54,706
1,028.00	41,963	930.0	36,858	70,458	68,871
1,029.00	46,095	1,019.0	44,013	114,471	82,709

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.68'	30.0" Round Culvert L= 109.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.68' / 1,022.40' S= 0.0026' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,022.84'	30.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.84' / 1,022.68' S= 0.0027' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#3	Device 2	1,022.91'	30.0" Round Culvert L= 24.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.91' / 1,022.84' S= 0.0028' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#4	Device 3	1,023.80'	18.0" Round Culvert L= 119.8' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,023.80' / 1,023.42' S= 0.0032' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.92 cfs @ 12.62 hrs HW=1,025.14' TW=1,022.82' (Dynamic Tailwater)
 1=Culvert (Passes 4.92 cfs of 20.01 cfs potential flow)
 2=Culvert (Passes 4.92 cfs of 18.14 cfs potential flow)
 3=Culvert (Passes 4.92 cfs of 17.23 cfs potential flow)
 4=Culvert (Barrel Controls 4.92 cfs @ 3.91 fps)

Pond 61.1P: SOUTH DRY POND



Summary for Pond 71.5P: NORTHWEST WET POND

Inflow Area = 23.450 ac, 35.52% Impervious, Inflow Depth = 1.08" for 1-year event
 Inflow = 26.86 cfs @ 12.21 hrs, Volume= 2.110 af
 Outflow = 0.36 cfs @ 21.43 hrs, Volume= 1.403 af, Atten= 99%, Lag= 553.2 min
 Primary = 0.36 cfs @ 21.43 hrs, Volume= 1.403 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.39' @ 21.43 hrs Surf.Area= 89,936 sf Storage= 78,246 cf
 Flood Elev= 1,029.50' Surf.Area= 100,772 sf Storage= 279,155 cf

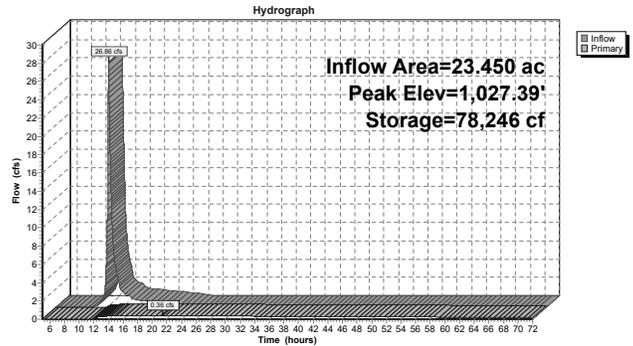
Plug-Flow detention time= 1,599.0 min calculated for 1.403 af (66% of inflow)
 Center-of-Mass det. time= 1,517.1 min (2,339.8 - 822.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,026.50'	382,566 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,026.50	85,502	1,222.0	0	0	85,502
1,027.50	90,480	1,253.0	87,979	87,979	91,732
1,028.50	95,573	1,283.0	93,015	180,994	97,917
1,029.50	100,772	1,310.0	98,161	279,155	103,638
1,030.50	106,073	1,336.0	103,411	382,566	109,270

Device	Routing	Invert	Outlet Devices
#1	Primary	1,026.50'	15.0" Round Culvert L= 36.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,026.50' / 1,026.40' S= 0.0027' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1,026.50'	4.0" Vert. Orifice/Gate C= 0.600
#3	Device 1	1,027.60'	13.5" Vert. Orifice/Gate C= 0.600

Primary OutFlow Max=0.36 cfs @ 21.43 hrs HW=1,027.39' TW=1,026.25' (Dynamic Tailwater)
 1=Culvert (Passes 0.36 cfs of 2.06 cfs potential flow)
 2=Orifice/Gate (Orifice Controls 0.36 cfs @ 4.10 fps)
 3=Orifice/Gate (Controls 0.00 cfs)

Pond 71.5P: NORTHWEST WET POND



Summary for Pond 81.2P: NORTHEAST WET POND

Inflow Area = 15.880 ac, 17.67% Impervious, Inflow Depth = 0.88" for 1-year event
 Inflow = 10.37 cfs @ 12.49 hrs, Volume= 1.171 af
 Outflow = 0.56 cfs @ 15.68 hrs, Volume= 1.152 af, Atten= 95%, Lag= 191.8 min
 Primary = 0.56 cfs @ 15.68 hrs, Volume= 1.152 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.97' @ 15.68 hrs Surf.Area= 22,000 sf Storage= 35,118 cf

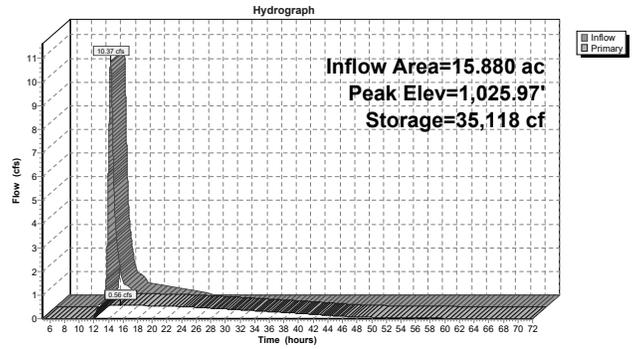
Plug-Flow detention time= 793.1 min calculated for 1.152 af (98% of inflow)
 Center-of-Mass det. time= 784.3 min (1,628.0 - 843.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,024.00'	121,316 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,024.00	14,944	567.0	0	0	14,944
1,025.00	17,393	609.0	16,153	16,153	18,918
1,026.00	22,177	747.0	19,737	35,890	33,825
1,027.00	26,059	839.0	24,092	59,982	45,463
1,028.00	30,682	975.0	28,339	88,321	65,116
1,029.00	35,365	1,078.0	32,996	121,316	81,975

Device	Routing	Invert	Outlet Devices
#1	Primary	1,024.00'	24.0" Round Culvert L= 55.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,024.00' / 1,023.80' S= 0.0036' /' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,024.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,026.50'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.56 cfs @ 15.68 hrs HW=1,025.97' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Passes 0.56 cfs of 11.82 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.56 cfs @ 6.46 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

Pond 81.2P: NORTHEAST WET POND



Summary for Pond 81.4P: NORTH DRY POND

Inflow Area = 7.050 ac, 12.39% Impervious, Inflow Depth = 0.78" for 1-year event
 Inflow = 4.67 cfs @ 12.38 hrs, Volume= 0.461 af
 Outflow = 4.30 cfs @ 12.49 hrs, Volume= 0.461 af, Atten= 8%, Lag= 6.3 min
 Primary = 4.30 cfs @ 12.49 hrs, Volume= 0.461 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.67' @ 12.49 hrs Surf.Area= 2,921 sf Storage= 1,197 cf
 Flood Elev= 1,029.00' Surf.Area= 14,929 sf Storage= 21,834 cf

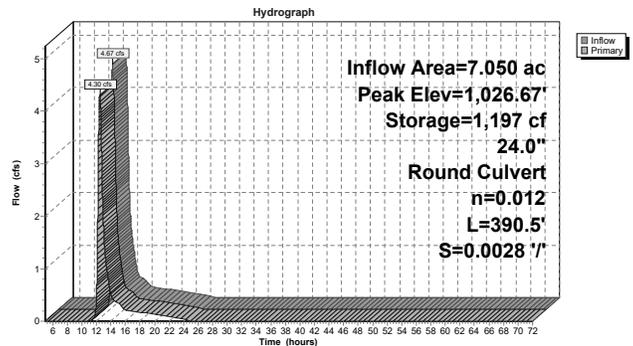
Plug-Flow detention time= 6.0 min calculated for 0.461 af (100% of inflow)
 Center-of-Mass det. time= 5.8 min (852.8 - 847.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.60'	40,190 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.60	10	5.0	0	0	10
1,026.00	642	92.0	98	98	682
1,027.00	4,663	306.0	2,345	2,443	7,463
1,028.00	9,843	557.0	7,094	9,536	24,705
1,029.00	14,929	868.0	12,298	21,834	59,979
1,030.00	22,010	1,004.0	18,355	40,190	80,261

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.60'	24.0" Round Culvert L= 390.5' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.60' / 1,024.50' S= 0.0028' /' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=4.30 cfs @ 12.49 hrs HW=1,026.67' TW=1,024.84' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 4.30 cfs @ 3.66 fps)

Pond 81.4P: NORTH DRY POND



Summary for Pond 90P: Winkleman Road South Culvert

Inflow Area = 19.340 ac, 42.92% Impervious, Inflow Depth > 0.96" for 1-year event
 Inflow = 1.07 cfs @ 12.14 hrs, Volume= 1.551 af
 Outflow = 1.07 cfs @ 12.14 hrs, Volume= 1.551 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.07 cfs @ 12.14 hrs, Volume= 1.551 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,022.73' @ 12.14 hrs Surf.Area= 18 sf Storage= 2 cf

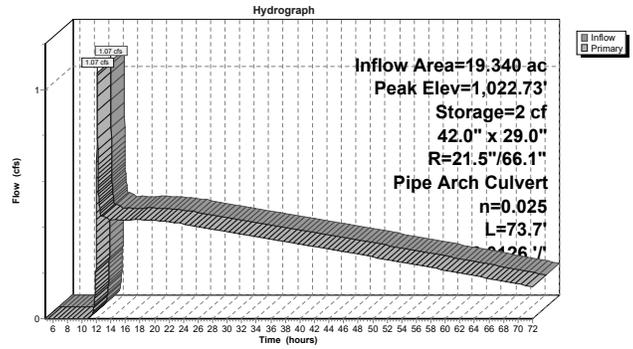
Plug-Flow detention time= 0.0 min calculated for 1.551 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (2,196.8 - 2,196.8)

Volume #1	Invert	Avail.Storage	Storage Description		
	1,022.40'	7,855 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.40	0	0.0	0	0	0
1,023.00	58	29.0	12	12	67
1,024.00	325	135.0	173	185	1,453
1,025.00	1,142	257.0	692	877	5,264
1,026.00	3,045	376.0	2,017	2,894	11,267
1,027.00	7,166	644.0	4,961	7,855	33,026

Device #1	Routing	Invert	Outlet Devices
	Primary	1,022.40'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 73.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.40' / 1,021.47' S= 0.0126 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=1.07 cfs @ 12.14 hrs HW=1,022.73' (Free Discharge)
 1=Culvert (Barrel Controls 1.07 cfs @ 2.08 fps)

Pond 90P: Winkleman Road South Culvert



Summary for Pond 91.3P WET: SOUTH WET POND

Inflow Area = 18.780 ac, 43.45% Impervious, Inflow Depth = 1.17" for 1-year event
 Inflow = 24.20 cfs @ 12.24 hrs, Volume= 1.828 af
 Outflow = 0.42 cfs @ 19.73 hrs, Volume= 1,508 af, Atten= 98%, Lag= 449.3 min
 Primary = 0.42 cfs @ 19.73 hrs, Volume= 1,508 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.17' @ 19.73 hrs Surf.Area= 61,070 sf Storage= 64,482 cf

Plug-Flow detention time= 1,477.2 min calculated for 1,508 af (82% of inflow)
 Center-of-Mass det. time= 1,415.7 min (2,236.2 - 820.5)

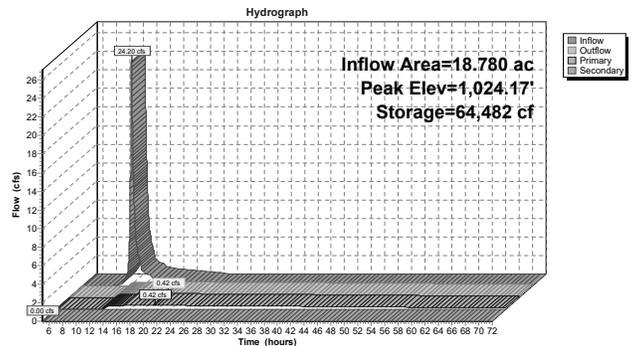
Volume #1	Invert	Avail.Storage	Storage Description		
	1,023.00'	264,057 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.00	49,054	1,453.0	0	0	49,054
1,024.00	60,009	1,608.0	54,440	54,440	86,841
1,025.00	66,548	1,638.0	63,250	117,690	94,758
1,026.00	73,201	1,666.0	69,848	187,538	102,303
1,027.00	79,886	1,691.0	76,519	264,057	109,190

Device #1	Routing	Invert	Outlet Devices
	Primary	1,023.00'	30.0" Round Culvert L= 36.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,023.00' / 1,022.60' S= 0.0110' / Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,023.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,024.25'	11.0" Vert. Orifice/Grate X 4.00 C= 0.600
#4	Secondary	1,026.00'	36.0" long x 17.0" breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.42 cfs @ 19.73 hrs HW=1,024.17' TW=1,022.61' (Dynamic Tailwater)
 1=Culvert (Passes 0.42 cfs of 7.40 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.42 cfs @ 4.81 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,023.00' TW=1,022.40' (Dynamic Tailwater)
 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 91.3P WET: SOUTH WET POND

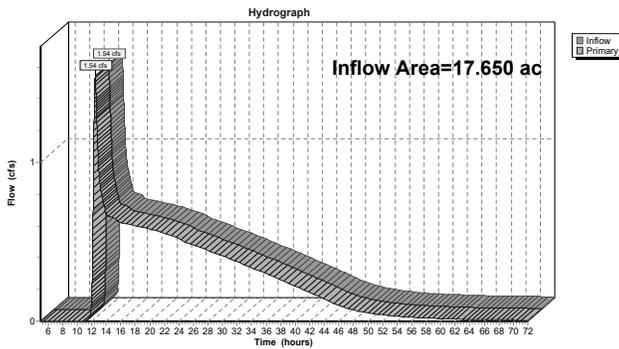


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 17.650 ac, 17.08% Impervious, Inflow Depth > 0.86" for 1-year event
 Inflow = 1.54 cfs @ 12.50 hrs, Volume= 1.271 af
 Primary = 1.54 cfs @ 12.50 hrs, Volume= 1.271 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale

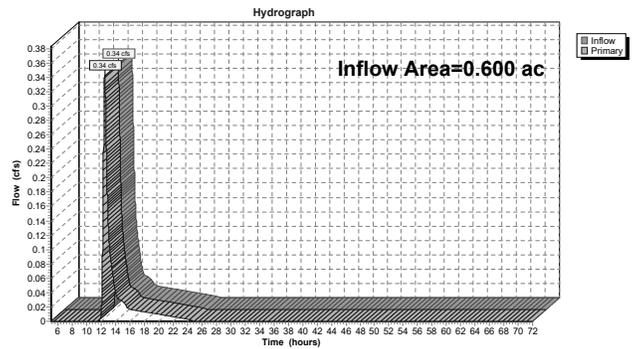


Summary for Link TL: Teri Lane

Inflow Area = 0.600 ac, 6.67% Impervious, Inflow Depth = 0.68" for 1-year event
 Inflow = 0.34 cfs @ 12.46 hrs, Volume= 0.034 af
 Primary = 0.34 cfs @ 12.46 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment61.1: Sandhill	Runoff Area=6.660 ac 18.62% Impervious Runoff Depth=0.97" Flow Length=731' Tc=27.3 min CN=79 Runoff=5.94 cfs 0.541 af
Subcatchment61.2: Sandhill	Runoff Area=3.520 ac 38.92% Impervious Runoff Depth=1.27" Flow Length=436' Tc=9.3 min CN=84 Runoff=7.18 cfs 0.373 af
Subcatchment62.1: Off-Site Residential	Runoff Area=2.460 ac 20.00% Impervious Runoff Depth=1.09" Flow Length=379' Tc=39.8 min CN=81 Runoff=1.98 cfs 0.223 af
Subcatchment62.2: Off-Site Residential	Runoff Area=0.460 ac 20.00% Impervious Runoff Depth=1.09" Flow Length=1,223' Tc=18.9 min CN=81 Runoff=0.57 cfs 0.042 af
Subcatchment63: Off-Site Walnut Grove	Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=1.09" Flow Length=576' Tc=32.4 min CN=81 Runoff=6.84 cfs 0.680 af
Subcatchment71.1: Sandhill	Runoff Area=6.940 ac 54.90% Impervious Runoff Depth=1.55" Flow Length=1,106' Tc=10.7 min CN=88 Runoff=16.30 cfs 0.899 af
Subcatchment71.2: Sandhill	Runoff Area=3.270 ac 22.63% Impervious Runoff Depth=1.15" Flow Length=950' Tc=36.0 min CN=82 Runoff=2.98 cfs 0.313 af
Subcatchment71.3: Sandhill	Runoff Area=4.030 ac 20.10% Impervious Runoff Depth=1.27" Flow Length=1,259' Tc=20.1 min CN=84 Runoff=5.72 cfs 0.428 af
Subcatchment71.4: Sandhill	Runoff Area=3.040 ac 15.13% Impervious Runoff Depth=0.92" Flow Length=384' Tc=22.0 min CN=78 Runoff=2.86 cfs 0.233 af
Subcatchment71.5: Sandhill	Runoff Area=3.600 ac 61.11% Impervious Runoff Depth=1.63" Flow Length=90' Slope=0.0322 ' Tc=11.8 min CN=89 Runoff=8.44 cfs 0.489 af
Subcatchment71.6: Sandhill	Runoff Area=0.750 ac 34.67% Impervious Runoff Depth=1.21" Tc=6.0 min CN=83 Runoff=1.69 cfs 0.076 af
Subcatchment72.1: Off-Site Residential	Runoff Area=2.570 ac 12.00% Impervious Runoff Depth=0.97" Flow Length=422' Tc=34.8 min CN=79 Runoff=1.98 cfs 0.209 af
Subcatchment72.2: Off-Site Residential	Runoff Area=0.560 ac 31.68% Impervious Runoff Depth=1.41" Flow Length=424' Tc=12.7 min CN=86 Runoff=1.11 cfs 0.066 af
Subcatchment81.1: Sandhill	Runoff Area=1.040 ac 63.46% Impervious Runoff Depth=1.79" Tc=6.0 min CN=91 Runoff=3.37 cfs 0.155 af
Subcatchment81.2: Sandhill	Runoff Area=5.100 ac 18.63% Impervious Runoff Depth=1.09" Flow Length=417' Tc=32.4 min CN=81 Runoff=4.65 cfs 0.462 af
Subcatchment81.3: Sandhill	Runoff Area=0.790 ac 11.39% Impervious Runoff Depth=0.92" Flow Length=532' Tc=31.7 min CN=78 Runoff=0.60 cfs 0.061 af

Subcatchment81.4: Sandhill	Runoff Area=4.020 ac 12.69% Impervious Runoff Depth=0.87" Flow Length=166' Tc=20.1 min CN=77 Runoff=3.72 cfs 0.291 af
Subcatchment82.1: Off-Site Residential	Runoff Area=2.690 ac 12.00% Impervious Runoff Depth=1.15" Flow Length=647' Tc=35.9 min CN=82 Runoff=2.45 cfs 0.257 af
Subcatchment82.2: Off-Site Residential	Runoff Area=0.980 ac 12.00% Impervious Runoff Depth=1.09" Flow Length=489' Tc=30.0 min CN=81 Runoff=0.94 cfs 0.089 af
Subcatchment82.3: Off-Site Residential	Runoff Area=3.030 ac 12.00% Impervious Runoff Depth=1.15" Flow Length=403' Tc=34.0 min CN=82 Runoff=2.85 cfs 0.290 af
Subcatchment91.1: Sandhill	Runoff Area=9.240 ac 55.63% Impervious Runoff Depth=1.55" Flow Length=994' Tc=15.8 min CN=88 Runoff=18.12 cfs 1.197 af
Subcatchment91.2: Sandhill	Runoff Area=4.750 ac 21.89% Impervious Runoff Depth=1.15" Flow Length=1,227' Tc=36.1 min CN=82 Runoff=4.30 cfs 0.454 af
Subcatchment91.3: Sandhill	Runoff Area=4.790 ac 41.34% Impervious Runoff Depth=1.41" Flow Length=79' Tc=13.0 min CN=86 Runoff=9.38 cfs 0.562 af
Subcatchment91.4: Sandhill	Runoff Area=0.560 ac 25.00% Impervious Runoff Depth=1.15" Tc=6.0 min CN=82 Runoff=1.20 cfs 0.054 af
Subcatchment100: Sandhill Post	Runoff Area=0.600 ac 6.67% Impervious Runoff Depth=0.87" Flow Length=322' Tc=29.0 min CN=77 Runoff=0.45 cfs 0.043 af
Pond 1P: Walnut Grove Stormwater Pond	Peak Elev=1,040.10' Storage=29,606 cf Inflow=6.84 cfs 0.680 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond 1R: Winkleman Road North Culvert	Peak Elev=1,026.68' Storage=575 cf Inflow=2.69 cfs 1.778 af Primary=2.05 cfs 1.777 af Secondary=0.00 cfs 0.000 af Outflow=2.05 cfs 1.777 af
Pond 60P: Lisbon Road Culvert	Peak Elev=1,023.12' Storage=956 cf Inflow=9.58 cfs 1.179 af Primary=8.66 cfs 1.179 af Secondary=0.00 cfs 0.000 af Outflow=8.66 cfs 1.179 af
Pond 61.1P: SOUTH DRY POND	Peak Elev=1,025.33' Storage=3,496 cf Inflow=7.62 cfs 0.764 af Outflow=5.95 cfs 0.764 af
Pond 71.5P: NORTHWESTWET POND	Peak Elev=1,027.59' Storage=96,363 cf Inflow=32.68 cfs 2.570 af Outflow=0.40 cfs 1.636 af
Pond 81.2P: NORTHEASTWET POND	Peak Elev=1,026.38' Storage=44,556 cf Inflow=13.05 cfs 1.455 af Outflow=0.62 cfs 1.434 af
Pond 81.4P: NORTH DRY POND	Peak Elev=1,026.82' Storage=1,691 cf Inflow=6.03 cfs 0.581 af 24.0" Round Culvert n=0.012 L=390.5' S=0.0028 ' Outflow=5.44 cfs 0.581 af
Pond 90P: Winkleman Road South Culvert	Peak Elev=1,022.77' Storage=3 cf Inflow=1.36 cfs 1.861 af 42.0" x 29.0", R=21.5' / 66.1" Pipe Arch Culvert n=0.025 L=73.7' S=0.0126 ' Outflow=1.36 cfs 1.861 af

Pond 91.3P WET: SOUTH WET POND Peak Elev=1,024.36' Storage=76,499 cf Inflow=29.27 cfs 2.213 af
 Primary=0.66 cfs 1.807 af Secondary=0.00 cfs 0.000 af Outflow=0.66 cfs 1.807 af

Link 31L: Lot 31 Walnut Grove Swale Inflow=1.92 cfs 1.583 af
 Primary=1.92 cfs 1.583 af

Link TL: Teri Lane Inflow=0.45 cfs 0.043 af
 Primary=0.45 cfs 0.043 af

Total Runoff Area = 82.950 ac Runoff Volume = 8.485 af Average Runoff Depth = 1.23"
70.09% Pervious = 58.136 ac 29.91% Impervious = 24.814 ac

Summary for Subcatchment 61.1: Sandhill Post-Development

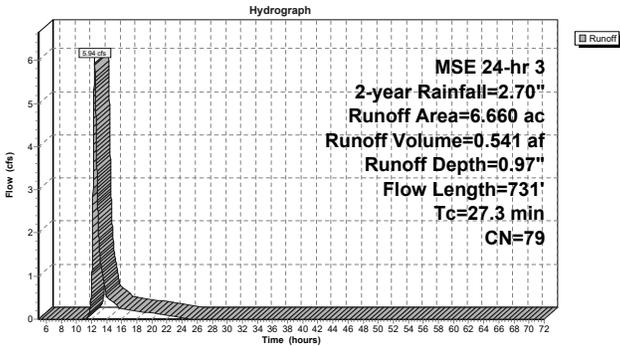
Runoff = 5.94 cfs @ 12.41 hrs, Volume= 0.541 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.340	98	Roofs, HSG C
0.310	98	Paved parking, HSG C
* 0.250	98	Sidewalk, HSG C
4.430	74	>75% Grass cover, Good, HSG C
0.110	70	Woods, Good, HSG C
0.230	98	Roofs, HSG D
* 0.010	98	Driveway, HSG D
* 0.100	98	Sidewalk, HSG D
0.740	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
6.660	79	Weighted Average
5.420		81.38% Pervious Area
1.240		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	300	0.0500	0.19		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.4	72	0.0490	3.32		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.1	19	0.0380	3.96		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.9	340	0.0260	6.21	37.27	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=2.00' D=1.00' Z= 4.0' Top.W=10.00' n= 0.027
27.3	731	Total			

Subcatchment 61.1: Sandhill Post-Development



Summary for Subcatchment 61.2: Sandhill Post-Development

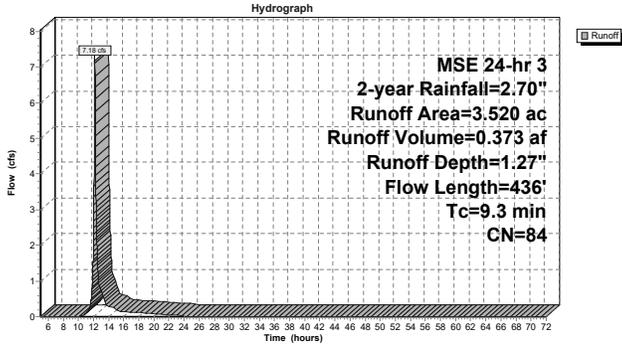
Runoff = 7.18 cfs @ 12.17 hrs, Volume= 0.373 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.170	98	Roofs, HSG C
0.160	98	Paved parking, HSG C
0.300	98	Paved roads w/curbs & sewers, HSG C
* 0.090	98	Sidewalk, HSG C
1.110	74	>75% Grass cover, Good, HSG C
* 0.520	98	Existing Impervious ROW, HSG C
* 0.690	74	>75% Grass cover ROW, Good, HSG C
* 0.020	98	Sidewalk, HSG D
0.180	80	>75% Grass cover, Good, HSG D
* 0.110	98	Existing Impervious ROW, HSG D
* 0.170	80	>75% Grass cover ROW, Good, HSG D
3.520	84	Weighted Average
2.150		61.08% Pervious Area
1.370		38.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	53	0.0368	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.7	146	0.0312	3.59		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment CD 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
9.3	436	Total			

Subcatchment 61.2: Sandhill Post-Development



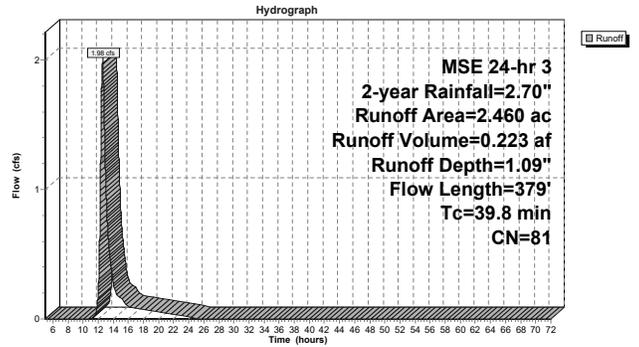
Summary for Subcatchment 62.1: Off-Site Residential

Runoff = 1.98 cfs @ 12.60 hrs, Volume= 0.223 af, Depth= 1.09"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.770	84	1 acre lots, 20% imp, HSG D
1.690	79	1 acre lots, 20% imp, HSG C
2.460	81	Weighted Average
1.968		80.00% Pervious Area
0.492		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.4	79	0.0406	3.02		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
39.8	379	Total			

Subcatchment 62.1: Off-Site Residential



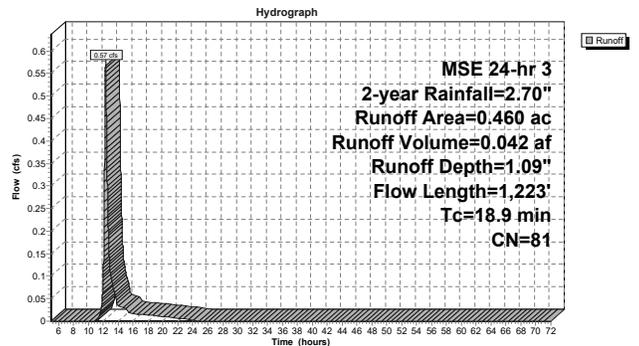
Summary for Subcatchment 62.2: Off-Site Residential

Runoff = 0.57 cfs @ 12.29 hrs, Volume= 0.042 af, Depth= 1.09"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.180	84	1 acre lots, 20% imp, HSG D
0.280	79	1 acre lots, 20% imp, HSG C
0.460	81	Weighted Average
0.368		80.00% Pervious Area
0.092		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	82	0.0251	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.8	114	0.0258	2.41		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
1.0	245	0.0369	3.90		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
3.3	460	0.0238	2.31		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
0.3	60	0.0026	3.28	5.80	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	25	0.0026	4.62	22.66	Pipe Channel, Segment FG 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment HI Grassed Waterway Kv= 15.0 fps
18.9	1,223	Total			

Subcatchment 62.2: Off-Site Residential



Summary for Subcatchment 63: Off-Site Walnut Grove

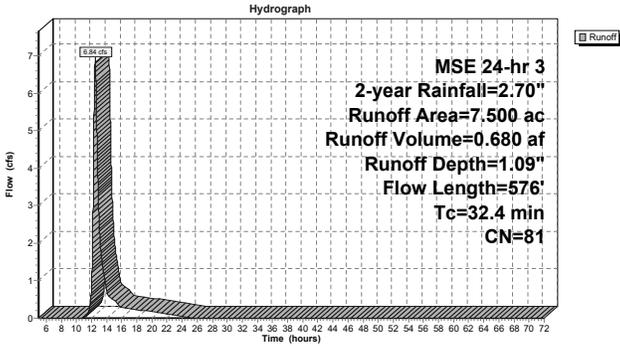
Runoff = 6.84 cfs @ 12.49 hrs, Volume= 0.680 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

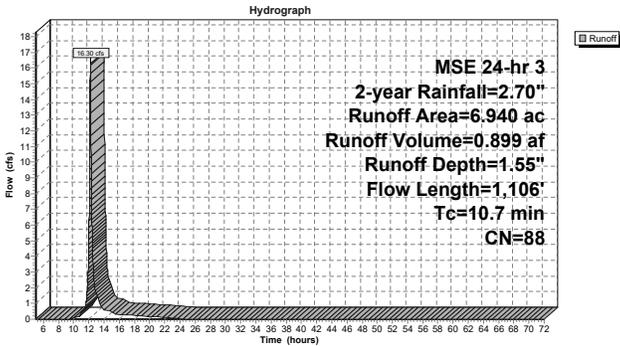
Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 63: Off-Site Walnut Grove



Summary for Subcatchment 71.1: Sandhill Post-Development



Summary for Subcatchment 71.1: Sandhill Post-Development

Runoff = 16.30 cfs @ 12.18 hrs, Volume= 0.899 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.450	98	Roofs, HSG C
0.500	98	Driveways, HSG C
0.990	98	Paved roads w/curbs & sewers, HSG C
0.140	98	Sidewalk, HSG C
1.880	74	>75% Grass cover, Good, HSG C
0.020	98	Existing Impervious ROW, HSG C
0.530	98	Roofs, HSG D
0.520	98	Driveway, HSG D
0.600	98	Paved roads w/curbs & sewers, HSG D
0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
6.940	88	Weighted Average
3.130		45.10% Pervious Area
3.810		54.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.0490	0.14		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.3	155	0.0100	2.03		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	279	0.0290	8.37	6.57	Pipe Channel, Segment CD 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	148	0.0200	8.06	9.90	Pipe Channel, Segment DE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	38	0.0100	6.44	11.38	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment FG 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	182	0.0033	5.20	25.53	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
10.7	1,106				Total

Summary for Subcatchment 71.2: Sandhill Post-Development

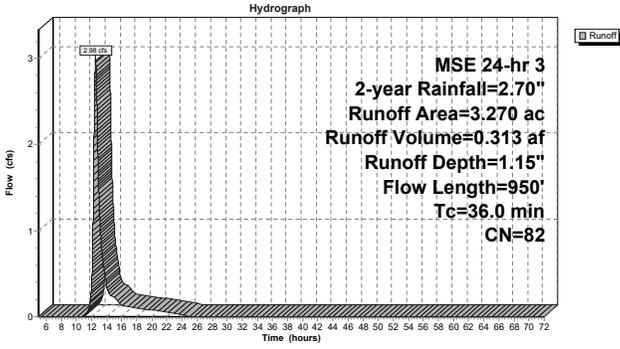
Runoff = 2.98 cfs @ 12.52 hrs, Volume= 0.313 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
0.030	98	Driveways, HSG C
0.090	98	Sidewalk, HSG C
1.280	74	>75% Grass cover, Good, HSG C
0.290	98	Roofs, HSG D
0.030	98	Driveway, HSG D
0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
3.270	82	Weighted Average
2.530		77.37% Pervious Area
0.740		22.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	148	0.0110	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
3.1	12	0.0166	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
2.9	43	0.2400	0.24		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
1.2	233	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.2	53	0.0042	3.70	4.54	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.9	235	0.0030	4.27	13.42	Pipe Channel, Segment GH 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.0	950				Total

Subcatchment 71.2: Sandhill Post-Development



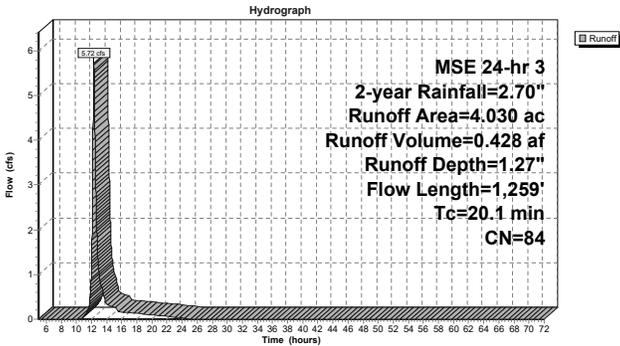
Summary for Subcatchment 71.3: Sandhill Post-Development

Runoff = 5.72 cfs @ 12.30 hrs, Volume= 0.428 af, Depth= 1.27"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.530	98	Roofs, HSG D
* 0.020	98	Driveway, HSG D
* 0.260	98	Sidewalk, HSG D
3.220	80	>75% Grass cover, Good, HSG D
4.030	84	Weighted Average
3.220		79.90% Pervious Area
0.810		20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	131	0.0408	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
2.4	30	0.1967	0.21		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
1.3	241	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.3	158	0.0300	8.51	6.69	Pipe Channel, Segment EF 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	150	0.0200	8.06	9.90	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	115	0.0090	6.11	10.80	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment HI 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.2	182	0.0330	16.44	80.72	Pipe Channel, Segment LJ 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
20.1	1,259				Total

Subcatchment 71.3: Sandhill Post-Development



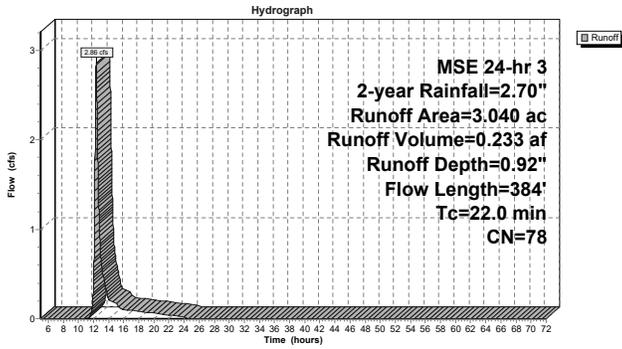
Summary for Subcatchment 71.4: Sandhill Post-Development

Runoff = 2.86 cfs @ 12.34 hrs, Volume= 0.233 af, Depth= 0.92"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.100	98	Roofs, HSG C
* 0.010	98	Driveways, HSG C
* 0.100	98	Sidewalk, HSG C
2.200	74	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	96	New Gravel ROW, HSG C
* 0.100	98	Existing Impervious ROW, HSG C
* 0.240	74	>75% Grass cover ROW, Good, HSG C
0.110	98	Roofs, HSG D
* 0.010	98	Sidewalk, HSG D
0.130	80	>75% Grass cover, Good, HSG D
3.040	78	Weighted Average
2.580		84.87% Pervious Area
0.460		15.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	151	0.0240	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.7	151	0.0092	1.44		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.2	82	0.0076	5.61	9.92	Pipe Channel, Segment CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
22.0	384				Total

Subcatchment 71.4: Sandhill Post-Development



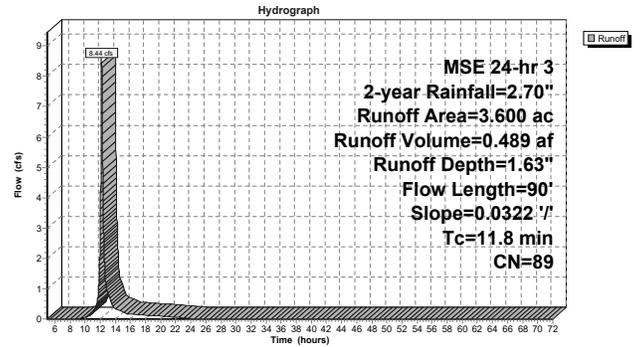
Summary for Subcatchment 71.5: Sandhill Post-Development

Runoff = 8.44 cfs @ 12.20 hrs, Volume= 0.489 af, Depth= 1.63"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.150	98	Roofs, HSG C
0.090	98	Sidewalk, HSG C
1.400	74	>75% Grass cover, Good, HSG C
1.960	98	Water Surface, HSG C
3.600	89	Weighted Average
1.400		38.89% Pervious Area
2.200		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	90	0.0322	0.13		Sheet Flow, Segment AB
					Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 71.5: Sandhill Post-Development



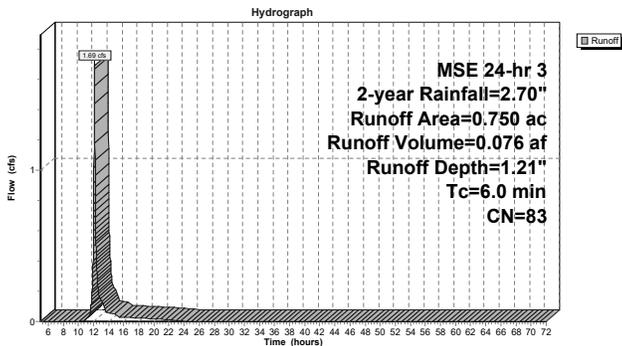
Summary for Subcatchment 71.6: Sandhill Post-Development

Runoff = 1.69 cfs @ 12.14 hrs, Volume= 0.076 af, Depth= 1.21"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.260	74	>75% Grass cover, Good, HSG C
0.030	98	New Road ROW, HSG C
0.010	96	New Gravel ROW, HSG C
0.230	98	Existing Impervious ROW, HSG C
0.220	74	>75% Grass cover ROW, Good, HSG C
0.750	83	Weighted Average
0.490		65.33% Pervious Area
0.260		34.67% Impervious Area

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

Subcatchment 71.6: Sandhill Post-Development



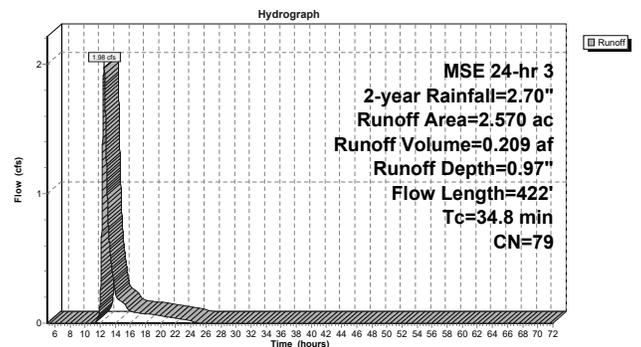
Summary for Subcatchment 72.1: Off-Site Residential

Runoff = 1.98 cfs @ 12.52 hrs, Volume= 0.209 af, Depth= 0.97"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
1.060	82	2 acre lots, 12% imp, HSG D
1.510	77	2 acre lots, 12% imp, HSG C
2.570	79	Weighted Average
2.262		88.00% Pervious Area
0.308		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB
0.9	122	0.0180	2.16		Woods: Light underbrush n= 0.400 P2= 2.70"
					Shallow Concentrated Flow, Segment BC
					Unpaved Kv= 16.1 fps
34.8	422				Total

Subcatchment 72.1: Off-Site Residential



Summary for Subcatchment 72.2: Off-Site Residential

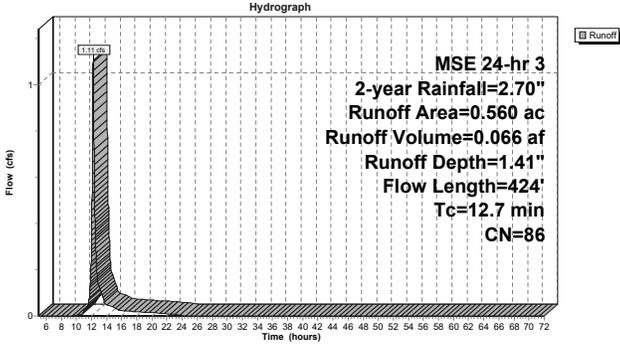
Runoff = 1.11 cfs @ 12.21 hrs, Volume= 0.066 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.060	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
0.210	77	2 acre lots, 12% imp, HSG C
0.560	86	Weighted Average
0.383		68.32% Pervious Area
0.177		31.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	84	0.0950	0.13		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.8	340	0.0450	3.18		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
12.7	424				Total

Subcatchment 72.2: Off-Site Residential



Summary for Subcatchment 81.1: Sandhill Post-Development

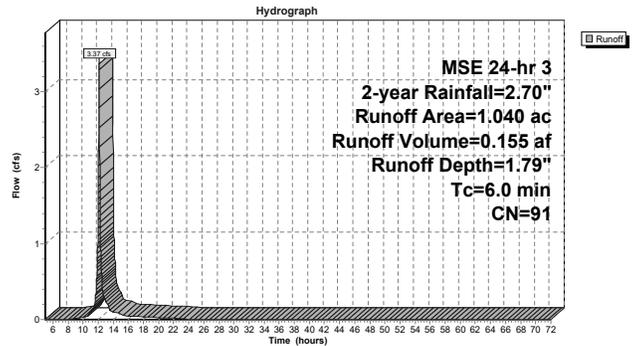
Runoff = 3.37 cfs @ 12.13 hrs, Volume= 0.155 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.070	98	Roofs, HSG C
0.040	98	Driveways, HSG C
0.020	98	Paved roads w/curbs & sewers, HSG C
0.010	98	Sidewalk, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.120	98	Roofs, HSG D
0.150	98	Driveway, HSG D
0.240	98	Paved roads w/curbs & sewers, HSG D
0.010	98	Sidewalk, HSG D
0.280	80	>75% Grass cover, Good, HSG D
1.040	91	Weighted Average
0.380		36.54% Pervious Area
0.660		63.46% Impervious Area

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

Subcatchment 81.1: Sandhill Post-Development



Summary for Subcatchment 81.2: Sandhill Post-Development

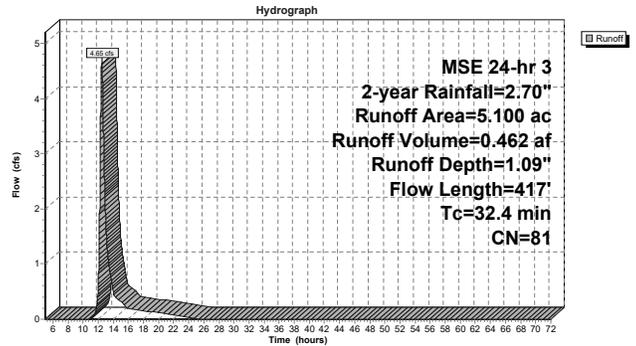
Runoff = 4.65 cfs @ 12.49 hrs, Volume= 0.462 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.220	98	Roofs, HSG C
0.090	98	Sidewalk, HSG C
1.140	74	>75% Grass cover, Good, HSG C
0.320	98	Water Surface, HSG C
0.350	70	Woods, Good, HSG C
0.100	98	Roofs, HSG D
0.030	98	Driveway, HSG D
0.160	98	Sidewalk, HSG D
2.410	80	>75% Grass cover, Good, HSG D
0.030	98	Water Surface, HSG D
0.250	77	Woods, Good, HSG D
5.100	81	Weighted Average
4.150		81.37% Pervious Area
0.950		18.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	136	0.0250	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
9.9	60	0.0223	0.10		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.2	47	0.2360	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	134	0.0110	2.97	8.91	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0 ' Top.W=8.00' n= 0.027
0.1	32	0.0095	5.56	6.82	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
32.4	417				Total

Subcatchment 81.2: Sandhill Post-Development



Summary for Subcatchment 81.3: Sandhill Post-Development

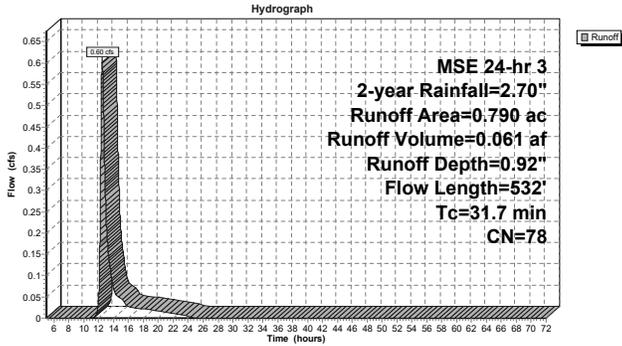
Runoff = 0.60 cfs @ 12.47 hrs, Volume= 0.061 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

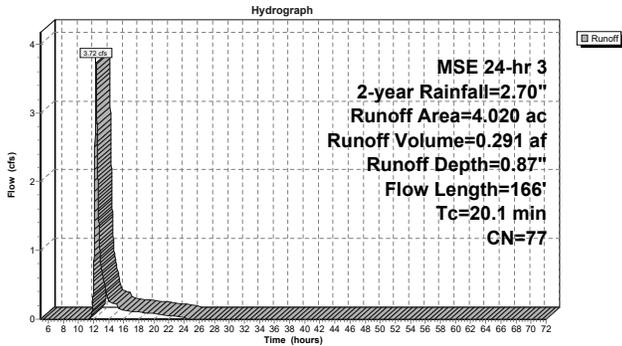
Area (ac)	CN	Description
* 0.040	98	Sidewalk, HSG C
0.130	74	>75% Grass cover, Good, HSG C
0.150	70	Woods, Good, HSG C
* 0.050	98	Sidewalk, HSG D
0.220	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.790	78	Weighted Average
0.700		88.61% Pervious Area
0.090		11.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	300	0.0950	0.17		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.5	232	0.0300	2.60		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
31.7	532				Total

Subcatchment 81.3: Sandhill Post-Development



Subcatchment 81.4: Sandhill Post-Development



Summary for Subcatchment 81.4: Sandhill Post-Development

Runoff = 3.72 cfs @ 12.31 hrs, Volume= 0.291 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
* 0.290	98	Roofs, HSG C
0.050	98	Driveways, HSG C
* 0.090	98	Sidewalk, HSG C
2.330	74	>75% Grass cover, Good, HSG C
0.330	70	Woods, Good, HSG C
* 0.080	98	Sidewalk, HSG D
0.850	77	Woods, Good, HSG D
4.020	77	Weighted Average
3.510		87.31% Pervious Area
0.510		12.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	39	0.0610	0.09		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.2	9	0.0200	0.78		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
12.9	118	0.1240	0.15		Sheet Flow, Segment CD Woods: Light underbrush n= 0.400 P2= 2.70"
20.1	166				Total

Summary for Subcatchment 82.1: Off-Site Residential

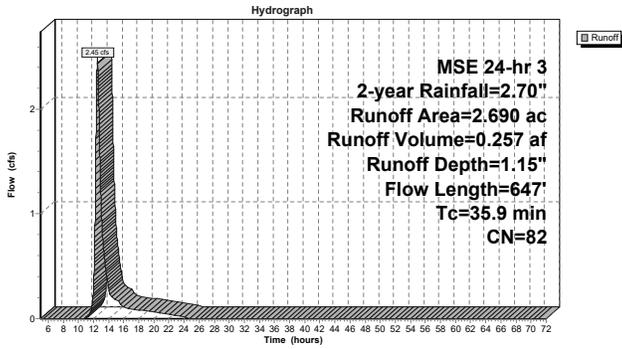
Runoff = 2.45 cfs @ 12.52 hrs, Volume= 0.257 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
2.630	82	2 acre lots, 12% imp, HSG D
0.060	77	2 acre lots, 12% imp, HSG C
2.690	82	Weighted Average
2.367		88.00% Pervious Area
0.323		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	121	0.0867	1.47		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.4	40	0.1120	1.67		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
1.3	178	0.0220	2.22		Shallow Concentrated Flow, Segment EF Grassed Waterway Kv= 15.0 fps
35.9	647				Total

Subcatchment 82.1: Off-Site Residential



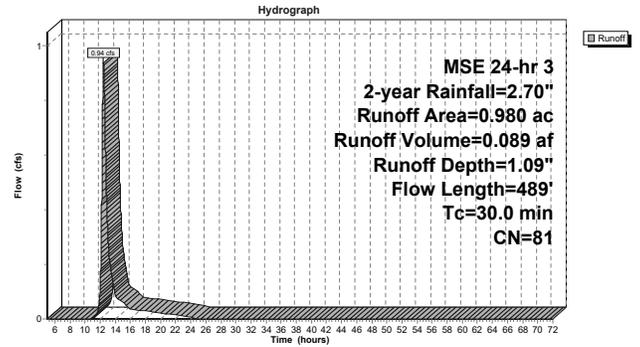
Summary for Subcatchment 82.2: Off-Site Residential

Runoff = 0.94 cfs @ 12.44 hrs, Volume= 0.089 af, Depth= 1.09"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.770	82	2 acre lots, 12% imp, HSG D
0.210	77	2 acre lots, 12% imp, HSG C
0.980	81	Weighted Average
0.862		88.00% Pervious Area
0.118		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	300	0.1120	0.18		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.0	85	0.0830	1.44		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.7	104	0.0288	2.55		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
30.0	489	Total			

Subcatchment 82.2: Off-Site Residential



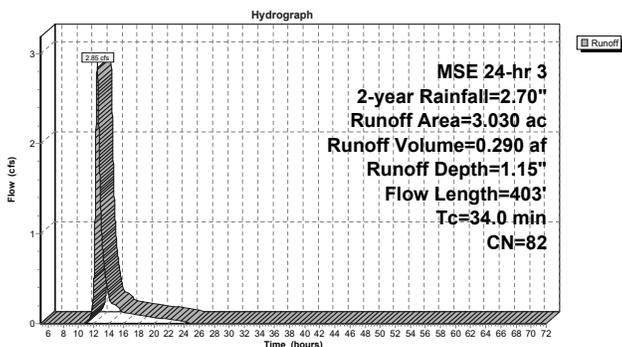
Summary for Subcatchment 82.3: Off-Site Residential

Runoff = 2.85 cfs @ 12.50 hrs, Volume= 0.290 af, Depth= 1.15"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
2.730	82	2 acre lots, 12% imp, HSG D
0.300	77	2 acre lots, 12% imp, HSG C
3.030	82	Weighted Average
2.666		88.00% Pervious Area
0.364		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.0	300	0.0758	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.8	76	0.0960	1.55		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.2	19	0.1380	1.86		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
34.0	403	Total			

Subcatchment 82.3: Off-Site Residential



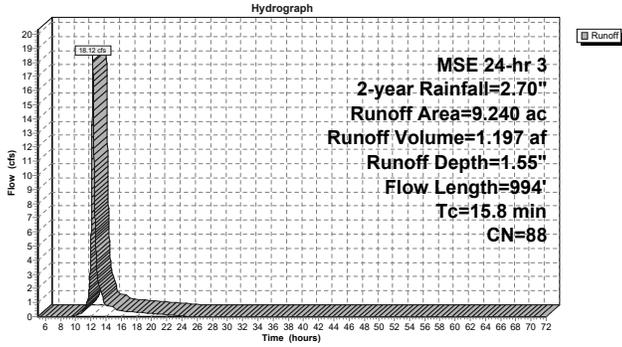
Summary for Subcatchment 91.1: Sandhill Post-Development

Runoff = 18.12 cfs @ 12.24 hrs, Volume= 1.197 af, Depth= 1.55"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
1.120	98	Roofs, HSG C
0.870	98	Driveways, HSG C
1.080	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
0.220	98	Sidewalk, HSG C
2.990	74	>75% Grass cover, Good, HSG C
0.060	98	Existing Impervious ROW, HSG C
0.140	74	>75% Grass cover ROW, Good, HSG C
0.550	98	Roofs, HSG D
0.900	98	Driveway, HSG D
0.270	98	Paved roads w/curbs & sewers, HSG D
0.070	98	Sidewalk, HSG D
0.960	80	>75% Grass cover, Good, HSG D
9.240	88	Weighted Average
4.100		44.37% Pervious Area
5.140		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	140	0.0540	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	57	0.0460	4.35		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.3	122	0.0132	6.55	8.04	Pipe Channel, Segment CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	152	0.0090	6.11	10.80	Pipe Channel, Segment DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	251	0.0080	6.98	21.92	Pipe Channel, Segment EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.8	994	Total			

Subcatchment 91.1: Sandhill Post-Development



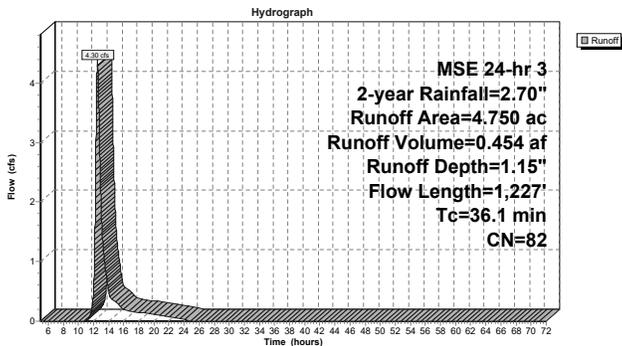
Summary for Subcatchment 91.2: Sandhill Post-Development

Runoff = 4.30 cfs @ 12.52 hrs, Volume= 0.454 af, Depth= 1.15"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
* 0.110	98	Driveways, HSG C
* 0.110	98	Sidewalk, HSG C
1.700	74	>75% Grass cover, Good, HSG C
0.430	98	Roofs, HSG D
* 0.040	98	Driveway, HSG D
* 0.110	98	Sidewalk, HSG D
2.010	80	>75% Grass cover, Good, HSG D
4.750	82	Weighted Average
3.710		78.11% Pervious Area
1.040		21.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	184	0.0214	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
4.8	20	0.0150	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.7	56	0.2320	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	173	0.0145	3.41	10.23	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.8	280	0.0125	5.49	4.32	Pipe Channel, Segment FG 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.6	234	0.0100	6.44	11.38	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.1	1,227	Total			

Subcatchment 91.2: Sandhill Post-Development



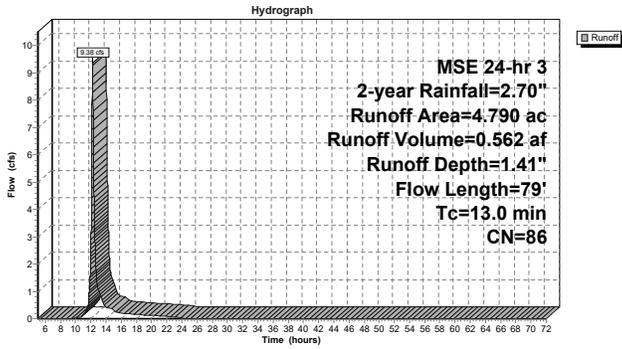
Summary for Subcatchment 91.3: Sandhill Post-Development

Runoff = 9.38 cfs @ 12.21 hrs, Volume= 0.562 af, Depth= 1.41"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.300	98	Roofs, HSG C
* 0.020	98	Driveways, HSG C
* 0.120	98	Sidewalk, HSG C
1.150	74	>75% Grass cover, Good, HSG C
0.350	98	Water Surface, HSG C
* 0.020	74	>75% Grass cover ROW, Good, HSG C
0.210	98	Roofs, HSG D
* 0.070	98	Driveway, HSG D
* 0.140	98	Sidewalk, HSG D
1.460	80	>75% Grass cover, Good, HSG D
* 0.180	80	>75% Grass cover ROW, Good, HSG D
0.770	98	Water Surface, HSG D
4.790	86	Weighted Average
2.810		58.66% Pervious Area
1.980		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	66	0.0160	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
0.6	5	0.1600	0.14		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
13.0	79	Total			

Subcatchment 91.3: Sandhill Post-Development



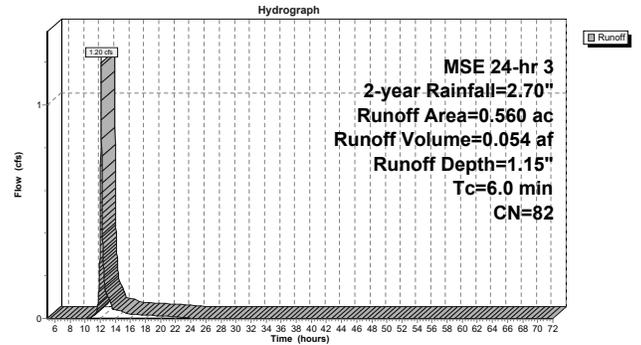
Summary for Subcatchment 91.4: Sandhill Post-Development

Runoff = 1.20 cfs @ 12.14 hrs, Volume= 0.054 af, Depth= 1.15"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.030	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
* 0.220	74	>75% Grass cover ROW, Good, HSG C
* 0.050	98	Existing Impervious ROW, HSG C
* 0.010	80	>75% Grass cover, Good, HSG D
* 0.060	98	Existing Impervious ROW, HSG D
* 0.110	80	>75% Grass cover ROW, Good, HSG D
0.560	82	Weighted Average
0.420		75.00% Pervious Area
0.140		25.00% Impervious Area

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

Subcatchment 91.4: Sandhill Post-Development



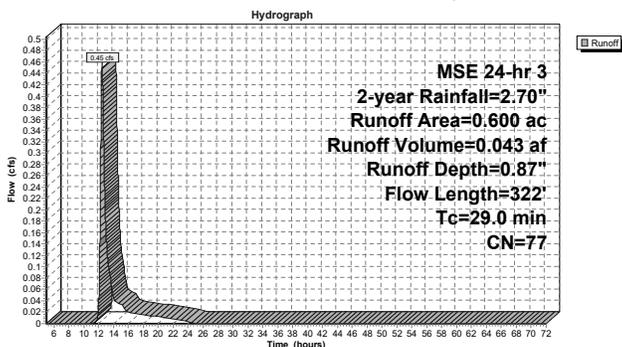
Summary for Subcatchment 100: Sandhill Post Development

Runoff = 0.45 cfs @ 12.44 hrs, Volume= 0.043 af, Depth= 0.87"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-year Rainfall=2.70"

Area (ac)	CN	Description
* 0.030	98	Sidewalk/Access Lane, HSG C
0.150	74	>75% Grass cover, Good, HSG C
* 0.010	98	Sidewalk, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.090	70	Woods, Good, HSG C
0.600	77	Weighted Average
0.560		93.33% Pervious Area
0.040		6.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	300	0.0380	0.17		Sheet Flow, Segment AB Grass: Dense n=0.240 P2= 2.70"
0.1	22	0.0880	4.45		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
29.0	322	Total			

Subcatchment 100: Sandhill Post Development



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7.500 ac, 20.00% Impervious, Inflow Depth = 1.09" for 2-year event
 Inflow = 6.84 cfs @ 12.49 hrs, Volume= 0.680 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,040.10' @ 25.86 hrs Surf.Area= 13,965 sf Storage= 29,606 cf

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

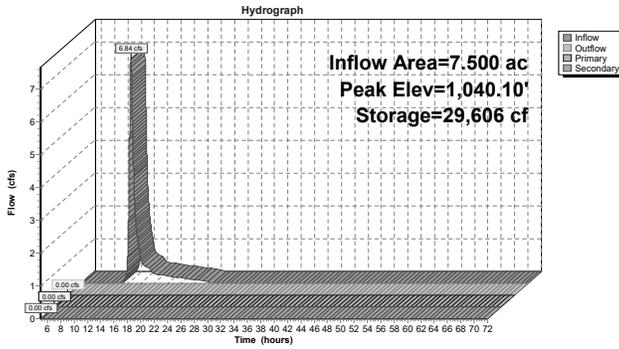
Volume	Invert	Avail.Storage	Storage Description		
#1	1,037.00'	62,126 cf	Existing Active Storage Volume (Irregular), listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.10	18,762	577.0	19,052	62,126	24,060

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' TW=1,023.80' (Dynamic Tailwater)
 1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,037.00' TW=1,023.80' (Dynamic Tailwater)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1R: Winkleman Road North Culvert

Inflow Area = 24.760 ac, 35.40% Impervious, Inflow Depth > 0.86" for 2-year event
 Inflow = 2.69 cfs @ 12.15 hrs, Volume= 1.778 af
 Outflow = 2.05 cfs @ 12.23 hrs, Volume= 1.777 af, Atten= 24%, Lag= 5.2 min
 Primary = 2.05 cfs @ 12.23 hrs, Volume= 1.777 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.68' @ 12.23 hrs Surf.Area= 2,433 sf Storage= 575 cf

Plug-Flow detention time= 1.6 min calculated for 1.777 af (100% of inflow)
 Center-of-Mass det. time= 1.2 min (2,245.9 - 2,244.7)

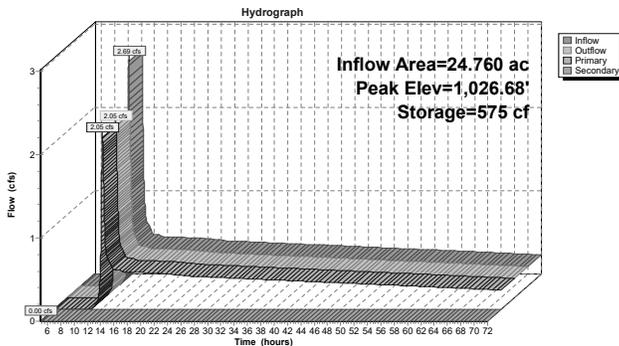
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	23,920 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	5,142	390.0	1,765	1,765	12,105
1,028.00	10,710	659.0	7,758	9,523	34,567
1,029.00	18,432	850.0	14,397	23,920	57,515

Device	Routing	Invert	Outlet Devices	
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf	
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30	

Primary OutFlow Max=2.05 cfs @ 12.23 hrs HW=1,026.68' (Free Discharge)
 1=Culvert (Barrel Controls 2.05 cfs @ 2.58 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 1R: Winkleman Road North Culvert



Summary for Pond 60P: Lisbon Road Culvert

Inflow Area = 20.600 ac, 22.79% Impervious, Inflow Depth = 0.69" for 2-year event
 Inflow = 9.58 cfs @ 12.18 hrs, Volume= 1.179 af
 Outflow = 8.66 cfs @ 12.24 hrs, Volume= 1.179 af, Atten= 10%, Lag= 3.7 min
 Primary = 8.66 cfs @ 12.24 hrs, Volume= 1.179 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.12' @ 12.24 hrs Surf.Area= 2,560 sf Storage= 956 cf

Plug-Flow detention time= 0.9 min calculated for 1.179 af (100% of inflow)
 Center-of-Mass det. time= 0.9 min (838.7 - 837.9)

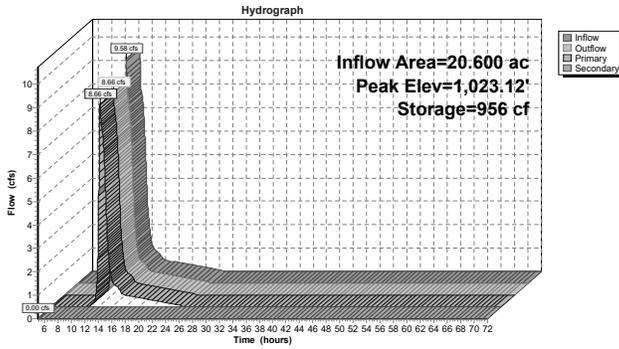
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	72,972 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,762	263.0	698	703	5,506
1,024.00	13,278	988.0	6,626	7,328	77,684
1,025.00	32,265	1,586.0	22,080	29,409	200,180
1,026.00	55,940	1,804.0	43,563	72,972	259,014

Device	Routing	Invert	Outlet Devices	
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf	
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79	

Primary OutFlow Max=8.66 cfs @ 12.24 hrs HW=1,023.12' (Free Discharge)
 1=Culvert (Barrel Controls 8.66 cfs @ 3.84 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 60P: Lisbon Road Culvert



Summary for Pond 61.1P: SOUTH DRY POND

Inflow Area = 16.620 ac, 19.45% Impervious, Inflow Depth = 0.55" for 2-year event
 Inflow = 7.62 cfs @ 12.44 hrs, Volume= 0.764 af
 Outflow = 5.95 cfs @ 12.65 hrs, Volume= 0.764 af, Atten= 22%, Lag= 12.4 min
 Primary = 5.95 cfs @ 12.65 hrs, Volume= 0.764 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.33' @ 12.65 hrs Surf.Area= 7,145 sf Storage= 3,496 cf

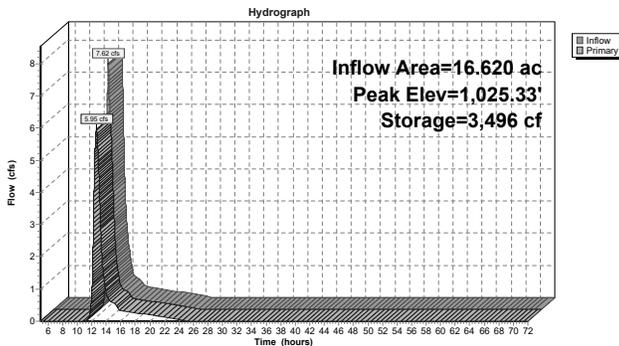
Plug-Flow detention time= 5.2 min calculated for 0.764 af (100% of inflow)
 Center-of-Mass det. time= 5.0 min (850.1 - 845.1)

Volume #	Invert	Avail.Storage	Storage Description		
#1	1,023.80'	114,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.80	10	10.0	0	0	10
1,024.00	45	25.0	5	5	52
1,025.00	4,302	289.0	1,596	1,601	6,650
1,026.00	14,928	555.0	9,081	10,682	24,521
1,027.00	31,978	829.0	22,918	33,600	54,706
1,028.00	41,963	930.0	36,858	70,458	68,871
1,029.00	46,095	1,019.0	44,013	114,471	82,709

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.68'	30.0" Round Culvert L= 109.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.68' / 1,022.40' S= 0.0026' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,022.84'	30.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.84' / 1,022.68' S= 0.0027' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#3	Device 2	1,022.91'	30.0" Round Culvert L= 24.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.91' / 1,022.84' S= 0.0028' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#4	Device 3	1,023.80'	18.0" Round Culvert L= 119.8' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,023.80' / 1,023.42' S= 0.0032' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.95 cfs @ 12.65 hrs HW=1,025.33' TW=1,022.96' (Dynamic Tailwater)
 1=Culvert (Passes 5.95 cfs of 22.22 cfs potential flow)
 2=Culvert (Passes 5.95 cfs of 20.48 cfs potential flow)
 3=Culvert (Passes 5.95 cfs of 19.62 cfs potential flow)
 4=Culvert (Barrel Controls 5.95 cfs @ 4.09 fps)

Pond 61.1P: SOUTH DRY POND



Summary for Pond 71.5P: NORTHWEST WET POND

Inflow Area = 23.450 ac, 35.52% Impervious, Inflow Depth = 1.32" for 2-year event
 Inflow = 32.68 cfs @ 12.21 hrs, Volume= 2,570 af
 Outflow = 0.40 cfs @ 21.57 hrs, Volume= 1,636 af, Atten= 99%, Lag= 562.2 min
 Primary = 0.40 cfs @ 21.57 hrs, Volume= 1,636 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.59' @ 21.57 hrs Surf.Area= 90,945 sf Storage= 96,363 cf
 Flood Elev= 1,029.50' Surf.Area= 100,772 sf Storage= 279,155 cf

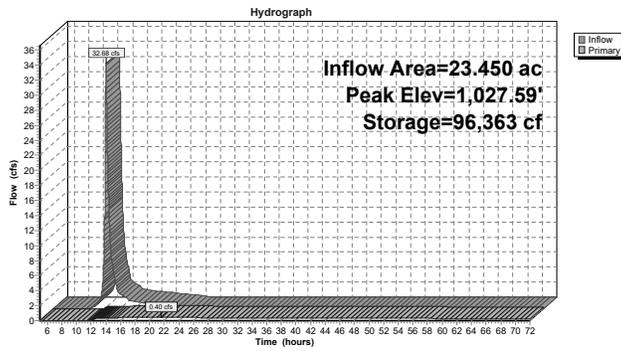
Plug-Flow detention time= 1,631.7 min calculated for 1.636 af (64% of inflow)
 Center-of-Mass det. time= 1,549.4 min (2,368.4 - 818.9)

Volume #	Invert	Avail.Storage	Storage Description		
#1	1,026.50'	382,566 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,026.50	85,502	1,222.0	0	0	85,502
1,027.50	90,480	1,253.0	87,979	87,979	91,732
1,028.50	95,573	1,283.0	93,015	180,994	97,917
1,029.50	100,772	1,310.0	98,161	279,155	103,638
1,030.50	106,073	1,336.0	103,411	382,566	109,270

Device	Routing	Invert	Outlet Devices
#1	Primary	1,026.50'	15.0" Round Culvert L= 36.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,026.50' / 1,026.40' S= 0.0027' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1,026.50'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,027.60'	13.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.40 cfs @ 21.57 hrs HW=1,027.59' TW=1,026.27' (Dynamic Tailwater)
 1=Culvert (Passes 0.40 cfs of 2.88 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.40 cfs @ 4.63 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

Pond 71.5P: NORTHWEST WET POND



Summary for Pond 81.2P: NORTHEAST WET POND

Inflow Area = 15.880 ac, 17.67% Impervious, Inflow Depth = 1.10" for 2-year event
 Inflow = 13.05 cfs @ 12.48 hrs, Volume= 1.455 af
 Outflow = 0.62 cfs @ 15.84 hrs, Volume= 1.434 af, Atten= 95%, Lag= 201.3 min
 Primary = 0.62 cfs @ 15.84 hrs, Volume= 1.434 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.38' @ 15.84 hrs Surf.Area= 23,610 sf Storage= 44,556 cf

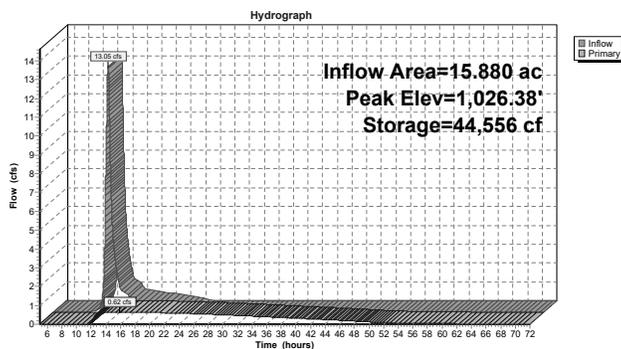
Plug-Flow detention time= 885.6 min calculated for 1.434 af (99% of inflow)
 Center-of-Mass det. time= 877.1 min (1,719.8 - 842.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,024.00'	121,316 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,024.00	14,944	567.0	0	0	14,944
1,025.00	17,393	609.0	16,153	16,153	18,918
1,026.00	22,177	747.0	19,737	35,890	33,825
1,027.00	26,059	839.0	24,092	59,982	45,463
1,028.00	30,682	975.0	28,339	88,321	65,116
1,029.00	35,365	1,078.0	32,996	121,316	81,975

Device	Routing	Invert	Outlet Devices
#1	Primary	1,024.00'	24.0" Round Culvert L= 55.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,024.00' / 1,023.80' S= 0.0036 1' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,024.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,026.50'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 15.84 hrs HW=1,026.38' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Passes 0.62 cfs of 15.09 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.62 cfs @ 7.16 fps)
 3=Orifice/Grate (Controls 0.00 cfs)

Pond 81.2P: NORTHEAST WET POND



Summary for Pond 81.4P: NORTH DRY POND

Inflow Area = 7.050 ac, 12.39% Impervious, Inflow Depth = 0.99" for 2-year event
 Inflow = 6.03 cfs @ 12.36 hrs, Volume= 0.581 af
 Outflow = 5.44 cfs @ 12.49 hrs, Volume= 0.581 af, Atten= 10%, Lag= 7.4 min
 Primary = 5.44 cfs @ 12.49 hrs, Volume= 0.581 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.82' @ 12.49 hrs Surf.Area= 3,662 sf Storage= 1,691 cf
 Flood Elev= 1,029.00' Surf.Area= 14,929 sf Storage= 21,834 cf

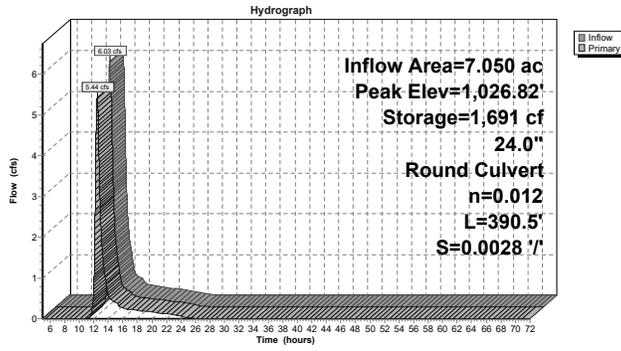
Plug-Flow detention time= 14.7 min calculated for 0.581 af (100% of inflow)
 Center-of-Mass det. time= 14.5 min (856.3 - 841.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.60'	40,190 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.60	10	5.0	0	0	10
1,026.00	642	92.0	98	98	682
1,027.00	4,663	306.0	2,345	2,443	7,463
1,028.00	9,843	557.0	7,094	9,536	24,705
1,029.00	14,929	868.0	12,298	21,834	59,979
1,030.00	22,010	1,004.0	18,355	40,190	80,261

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.60'	24.0" Round Culvert L= 390.5' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.60' / 1,024.50' S= 0.0028 1' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=5.44 cfs @ 12.49 hrs HW=1,026.82' TW=1,025.08' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 5.44 cfs @ 3.89 fps)

Pond 81.4P: NORTH DRY POND



Summary for Pond 90P: Winkleman Road South Culvert

Inflow Area = 19,340 ac, 42.92% Impervious, Inflow Depth > 1.15" for 2-year event
 Inflow = 1.36 cfs @ 12.14 hrs, Volume= 1.861 af
 Outflow = 1.36 cfs @ 12.14 hrs, Volume= 1.861 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.36 cfs @ 12.14 hrs, Volume= 1.861 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,022.77' @ 12.14 hrs Surf.Area= 22 sf Storage= 3 cf

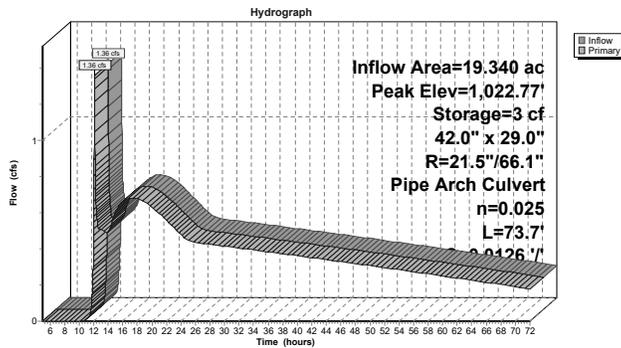
Plug-Flow detention time= 0.0 min calculated for 1.861 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (2,153.1 - 2,153.1)

Volume #1	Invert	Avail.Storage	Storage Description		
	1,022.40'	7,855 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.40	0	0.0	0	0	0
1,023.00	58	29.0	12	12	67
1,024.00	325	135.0	173	185	1,453
1,025.00	1,142	257.0	692	877	5,264
1,026.00	3,045	376.0	2,017	2,894	11,267
1,027.00	7,166	644.0	4,961	7,855	33,026

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.40'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 73.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.40' / 1,021.47' S= 0.0126 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=1.36 cfs @ 12.14 hrs HW=1,022.77' (Free Discharge)
 1=Culvert (Barrel Controls 1.36 cfs @ 2.25 fps)

Pond 90P: Winkleman Road South Culvert



Summary for Pond 91.3P WET: SOUTH WET POND

Inflow Area = 18,780 ac, 43.45% Impervious, Inflow Depth = 1.41" for 2-year event
 Inflow = 29.27 cfs @ 12.24 hrs, Volume= 2,213 af
 Outflow = 0.66 cfs @ 17.56 hrs, Volume= 1,807 af, Atten= 98%, Lag= 319.3 min
 Primary = 0.66 cfs @ 17.56 hrs, Volume= 1,807 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.36' @ 17.56 hrs Surf.Area= 62,328 sf Storage= 76,499 cf

Plug-Flow detention time= 1,438.2 min calculated for 1,807 af (82% of inflow)
 Center-of-Mass det. time= 1,375.9 min (2,192.7 - 816.8)

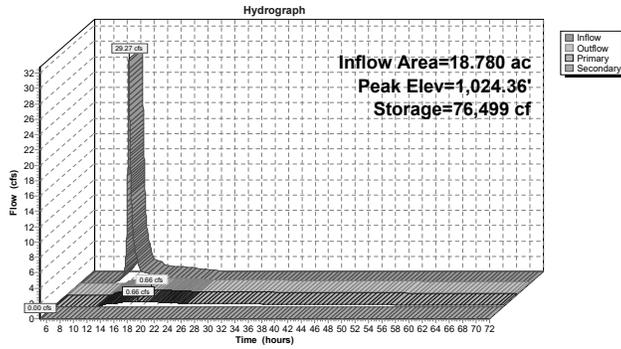
Volume #1	Invert	Avail.Storage	Storage Description		
	1,023.00'	264,057 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.00	49,054	1,453.0	0	0	49,054
1,024.00	60,009	1,608.0	54,440	54,440	86,841
1,025.00	66,548	1,638.0	63,250	117,690	94,758
1,026.00	73,201	1,666.0	69,848	187,538	102,303
1,027.00	79,886	1,691.0	76,519	264,057	109,190

Device	Routing	Invert	Outlet Devices
#1	Primary	1,023.00'	30.0" Round Culvert L= 36.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,023.00' / 1,022.60' S= 0.0110 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,023.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,024.25'	11.0" Vert. Orifice/Grate X 4.00 C= 0.600
#4	Secondary	1,026.00'	36.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.66 cfs @ 17.56 hrs HW=1,024.36' TW=1,022.67' (Dynamic Tailwater)
 1=Culvert (Passes 0.66 cfs of 9.57 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.46 cfs @ 5.26 fps)
 3=Orifice/Grate (Orifice Controls 0.20 cfs @ 1.13 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,023.00' TW=1,022.40' (Dynamic Tailwater)
 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

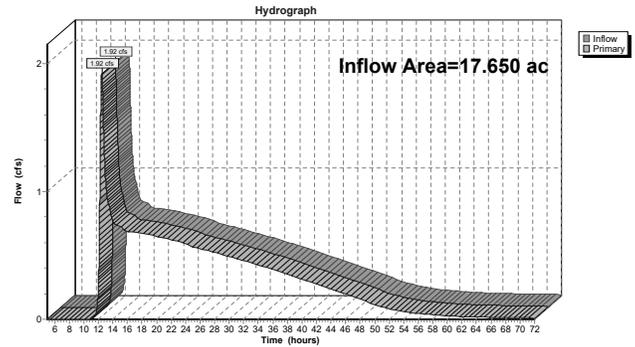
Pond 91.3P WET: SOUTH WET POND



Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 17.650 ac, 17.08% Impervious, Inflow Depth > 1.08" for 2-year event
 Inflow = 1.92 cfs @ 12.49 hrs, Volume= 1.583 af
 Primary = 1.92 cfs @ 12.49 hrs, Volume= 1.583 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

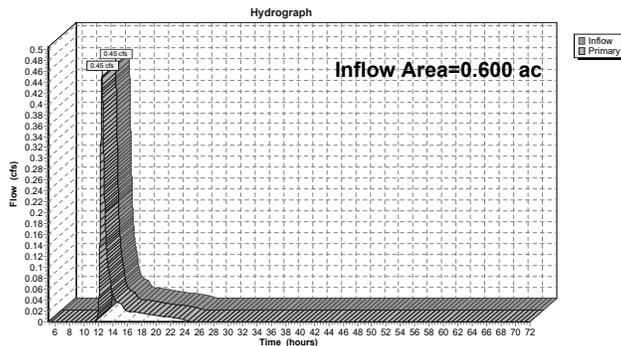
Link 31L: Lot 31 Walnut Grove Swale



Summary for Link TL: Teri Lane

Inflow Area = 0.600 ac, 6.67% Impervious, Inflow Depth = 0.87" for 2-year event
 Inflow = 0.45 cfs @ 12.44 hrs, Volume= 0.043 af
 Primary = 0.45 cfs @ 12.44 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min
 Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

- Subcatchment61.1: Sandhill** Runoff Area=6.660 ac 18.62% Impervious Runoff Depth=1.83"
 Flow Length=731' Tc=27.3 min CN=79 Runoff=11.46 cfs 1.014 af
- Subcatchment61.2: Sandhill** Runoff Area=3.520 ac 38.92% Impervious Runoff Depth=2.22"
 Flow Length=436' Tc=9.3 min CN=84 Runoff=12.46 cfs 0.652 af
- Subcatchment62.1: Off-Site Residential** Runoff Area=2.460 ac 20.00% Impervious Runoff Depth=1.98"
 Flow Length=379' Tc=39.8 min CN=81 Runoff=3.68 cfs 0.406 af
- Subcatchment62.2: Off-Site Residential** Runoff Area=0.460 ac 20.00% Impervious Runoff Depth=1.98"
 Flow Length=1,223' Tc=18.9 min CN=81 Runoff=1.05 cfs 0.076 af
- Subcatchment63: Off-Site Walnut Grove** Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=1.98"
 Flow Length=576' Tc=32.4 min CN=81 Runoff=12.68 cfs 1.237 af
- Subcatchment71.1: Sandhill** Runoff Area=6.940 ac 54.90% Impervious Runoff Depth=2.57"
 Flow Length=1,106' Tc=10.7 min CN=88 Runoff=26.56 cfs 1.487 af
- Subcatchment71.2: Sandhill** Runoff Area=3.270 ac 22.63% Impervious Runoff Depth=2.06"
 Flow Length=950' Tc=36.0 min CN=82 Runoff=5.42 cfs 0.561 af
- Subcatchment71.3: Sandhill** Runoff Area=4.030 ac 20.10% Impervious Runoff Depth=2.22"
 Flow Length=1,259' Tc=20.1 min CN=84 Runoff=10.02 cfs 0.746 af
- Subcatchment71.4: Sandhill** Runoff Area=3.040 ac 15.13% Impervious Runoff Depth=1.75"
 Flow Length=384' Tc=22.0 min CN=78 Runoff=5.62 cfs 0.444 af
- Subcatchment71.5: Sandhill** Runoff Area=3.600 ac 61.11% Impervious Runoff Depth=2.66"
 Flow Length=90' Slope=0.0322 1/ Tc=11.8 min CN=89 Runoff=13.55 cfs 0.799 af
- Subcatchment71.6: Sandhill** Runoff Area=0.750 ac 34.67% Impervious Runoff Depth=2.14"
 Tc=6.0 min CN=83 Runoff=2.97 cfs 0.134 af
- Subcatchment72.1: Off-Site Residential** Runoff Area=2.570 ac 12.00% Impervious Runoff Depth=1.83"
 Flow Length=422' Tc=34.8 min CN=79 Runoff=3.84 cfs 0.391 af
- Subcatchment72.2: Off-Site Residential** Runoff Area=0.560 ac 31.68% Impervious Runoff Depth=2.39"
 Flow Length=424' Tc=12.7 min CN=86 Runoff=1.87 cfs 0.112 af
- Subcatchment81.1: Sandhill** Runoff Area=1.040 ac 63.46% Impervious Runoff Depth=2.85"
 Tc=6.0 min CN=91 Runoff=5.23 cfs 0.247 af
- Subcatchment81.2: Sandhill** Runoff Area=5.100 ac 18.63% Impervious Runoff Depth=1.98"
 Flow Length=417' Tc=32.4 min CN=81 Runoff=8.62 cfs 0.841 af
- Subcatchment81.3: Sandhill** Runoff Area=0.790 ac 11.39% Impervious Runoff Depth=1.75"
 Flow Length=532' Tc=31.7 min CN=78 Runoff=1.19 cfs 0.115 af

Subcatchment81.4: Sandhill Runoff Area=4.020 ac 12.69% Impervious Runoff Depth=1.68"
 Flow Length=166' Tc=20.1 min CN=77 Runoff=7.50 cfs 0.563 af

Subcatchment82.1: Off-Site Residential Runoff Area=2.690 ac 12.00% Impervious Runoff Depth=2.06"
 Flow Length=647' Tc=35.9 min CN=82 Runoff=4.46 cfs 0.461 af

Subcatchment82.2: Off-Site Residential Runoff Area=0.980 ac 12.00% Impervious Runoff Depth=1.98"
 Flow Length=489' Tc=30.0 min CN=81 Runoff=1.74 cfs 0.162 af

Subcatchment82.3: Off-Site Residential Runoff Area=3.030 ac 12.00% Impervious Runoff Depth=2.06"
 Flow Length=403' Tc=34.0 min CN=82 Runoff=5.18 cfs 0.520 af

Subcatchment91.1: Sandhill Runoff Area=9.240 ac 55.63% Impervious Runoff Depth=2.57"
 Flow Length=994' Tc=15.8 min CN=88 Runoff=29.65 cfs 1.980 af

Subcatchment91.2: Sandhill Runoff Area=4.750 ac 21.89% Impervious Runoff Depth=2.06"
 Flow Length=1,227' Tc=36.1 min CN=82 Runoff=7.84 cfs 0.815 af

Subcatchment91.3: Sandhill Runoff Area=4.790 ac 41.34% Impervious Runoff Depth=2.39"
 Flow Length=79' Tc=13.0 min CN=86 Runoff=15.81 cfs 0.955 af

Subcatchment91.4: Sandhill Runoff Area=0.560 ac 25.00% Impervious Runoff Depth=2.06"
 Tc=6.0 min CN=82 Runoff=2.14 cfs 0.096 af

Subcatchment100: Sandhill Post Runoff Area=0.600 ac 6.67% Impervious Runoff Depth=1.68"
 Flow Length=322' Tc=29.0 min CN=77 Runoff=0.91 cfs 0.084 af

Pond 1P: Walnut Grove Stormwater Peak Elev=1,041.13' Storage=45,230 cf Inflow=12.68 cfs 1.237 af
 Primary=0.30 cfs 0.266 af Secondary=0.10 cfs 0.032 af Outflow=0.39 cfs 0.297 af

Pond 1R: Winkleman Road North Culvert Peak Elev=1,026.90' Storage=1,315 cf Inflow=4.67 cfs 3.367 af
 Primary=3.19 cfs 3.367 af Secondary=0.00 cfs 0.000 af Outflow=3.19 cfs 3.367 af

Pond 60P: Lisbon Road Culvert Peak Elev=1,023.69' Storage=3,982 cf Inflow=16.99 cfs 2.444 af
 Primary=12.31 cfs 2.444 af Secondary=0.00 cfs 0.000 af Outflow=12.31 cfs 2.444 af

Pond 61.1P: SOUTH DRY POND Peak Elev=1,026.06' Storage=11,632 cf Inflow=14.62 cfs 1.717 af
 Outflow=8.26 cfs 1.717 af

Pond 71.5P: NORTHWESTWET POND Peak Elev=1,028.16' Storage=149,063 cf Inflow=55.60 cfs 4.429 af
 Outflow=1.78 cfs 3.122 af

Pond 81.2P: NORTHEASTWET POND Peak Elev=1,026.91' Storage=57,627 cf Inflow=23.54 cfs 2.633 af
 Outflow=8.76 cfs 2.608 af

Pond 81.4P: NORTH DRY POND Peak Elev=1,027.37' Storage=4,493 cf Inflow=11.70 cfs 1.083 af
 24.0" Round Culvert n=0.012 L=390.5' S=0.0028 '/' Outflow=9.65 cfs 1.083 af

Pond 90P: Winkleman Road South Culvert Peak Elev=1,023.15' Storage=23 cf Inflow=5.23 cfs 3.408 af
 42.0" x 29.0", R=21.5"/66.1" Pipe Arch Culvert n=0.025 L=73.7' S=0.0126 '/' Outflow=5.23 cfs 3.408 af

Pond 91.3P WET: SOUTH WET POND Peak Elev=1,024.83' Storage=106,512 cf Inflow=49.03 cfs 3.750 af
 Primary=5.12 cfs 3.312 af Secondary=0.00 cfs 0.000 af Outflow=5.12 cfs 3.312 af

Link 31L: Lot 31 Walnut Grove Swale Inflow=9.66 cfs 2.885 af
 Primary=9.66 cfs 2.885 af

Link TL: Teri Lane Inflow=0.91 cfs 0.084 af
 Primary=0.91 cfs 0.084 af

Total Runoff Area = 82.950 ac Runoff Volume = 14.898 af Average Runoff Depth = 2.16"
70.09% Pervious = 58.136 ac 29.91% Impervious = 24.814 ac

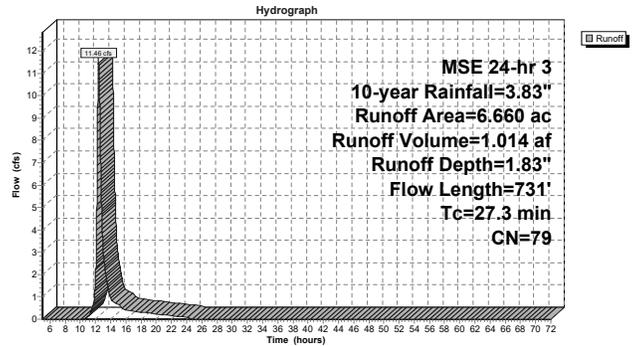
Summary for Subcatchment 61.1: Sandhill Post-Development

Runoff = 11.46 cfs @ 12.40 hrs, Volume= 1.014 af, Depth= 1.83"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.340	98	Roofs, HSG C
0.310	98	Paved parking, HSG C
* 0.250	98	Sidewalk, HSG C
4.430	74	>75% Grass cover, Good, HSG C
0.110	70	Woods, Good, HSG C
0.230	98	Roofs, HSG D
* 0.010	98	Driveway, HSG D
* 0.100	98	Sidewalk, HSG D
0.740	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
6.660	79	Weighted Average
5.420		81.38% Pervious Area
1.240		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	300	0.0500	0.19		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.4	72	0.0490	3.32		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.1	19	0.0380	3.96		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.9	340	0.0260	6.21	37.27	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=2.00' D=1.00' Z= 4.0 '/' Top.W=10.00' n= 0.027
27.3	731	Total			

Subcatchment 61.1: Sandhill Post-Development



Summary for Subcatchment 61.2: Sandhill Post-Development

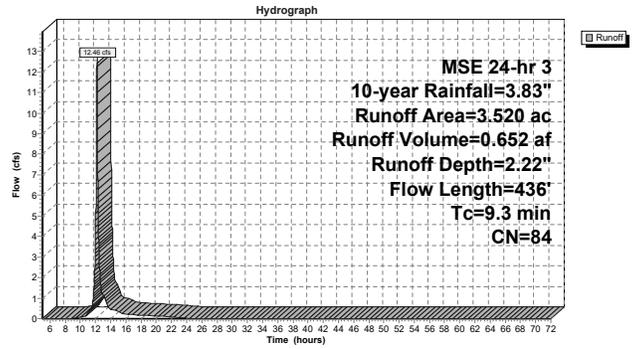
Runoff = 12.46 cfs @ 12.17 hrs, Volume= 0.652 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.170	98	Roofs, HSG C
0.160	98	Paved parking, HSG C
0.300	98	Paved roads w/curbs & sewers, HSG C
* 0.090	98	Sidewalk, HSG C
1.110	74	>75% Grass cover, Good, HSG C
* 0.520	98	Existing Impervious ROW, HSG C
* 0.690	74	>75% Grass cover ROW, Good, HSG C
* 0.020	98	Sidewalk, HSG D
0.180	80	>75% Grass cover, Good, HSG D
* 0.110	98	Existing Impervious ROW, HSG D
* 0.170	80	>75% Grass cover ROW, Good, HSG D
3.520	84	Weighted Average
2.150		61.08% Pervious Area
1.370		38.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	53	0.0368	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.7	146	0.0312	3.59		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment CD 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
9.3	436				Total

Subcatchment 61.2: Sandhill Post-Development



Summary for Subcatchment 62.1: Off-Site Residential

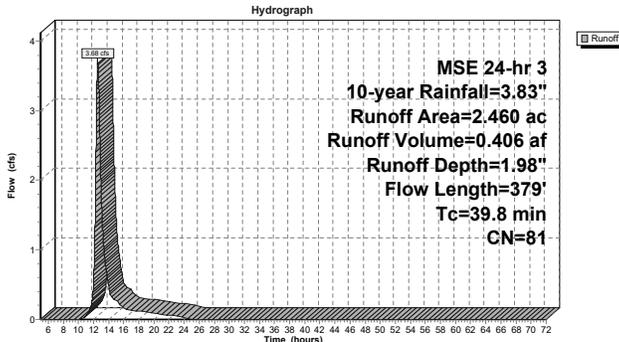
Runoff = 3.68 cfs @ 12.56 hrs, Volume= 0.406 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.770	84	1 acre lots, 20% imp, HSG D
1.690	79	1 acre lots, 20% imp, HSG C
2.460	81	Weighted Average
1.968		80.00% Pervious Area
0.492		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.4	79	0.0406	3.02		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
39.8	379				Total

Subcatchment 62.1: Off-Site Residential



Summary for Subcatchment 62.2: Off-Site Residential

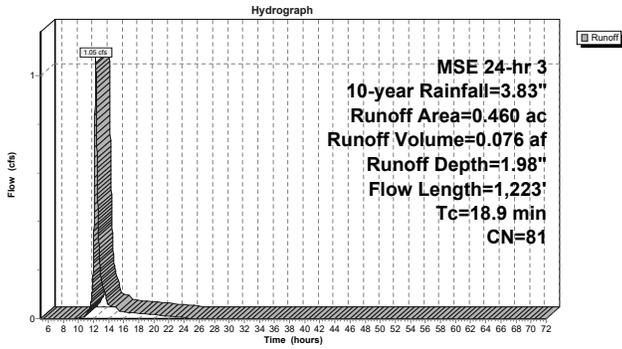
Runoff = 1.05 cfs @ 12.28 hrs, Volume= 0.076 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.180	84	1 acre lots, 20% imp, HSG D
0.280	79	1 acre lots, 20% imp, HSG C
0.460	81	Weighted Average
0.368		80.00% Pervious Area
0.092		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	82	0.0251	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.8	114	0.0258	2.41		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
1.0	245	0.0369	3.90		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
3.3	460	0.0238	2.31		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
0.3	60	0.0026	3.28	5.80	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	25	0.0026	4.62	22.66	Pipe Channel, Segment FG 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment HI Grassed Waterway Kv= 15.0 fps
18.9	1,223				Total

Subcatchment 62.2: Off-Site Residential



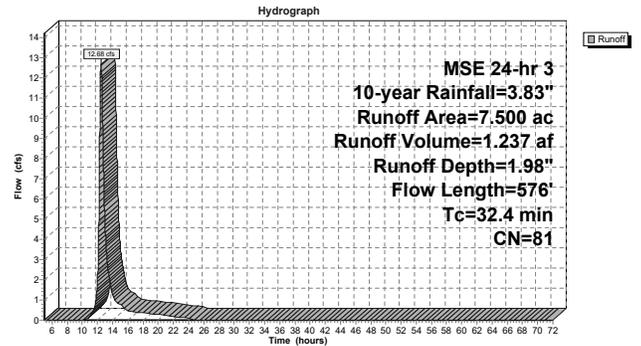
Summary for Subcatchment 63: Off-Site Walnut Grove

Runoff = 12.68 cfs @ 12.46 hrs, Volume= 1.237 af, Depth= 1.98"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 63: Off-Site Walnut Grove



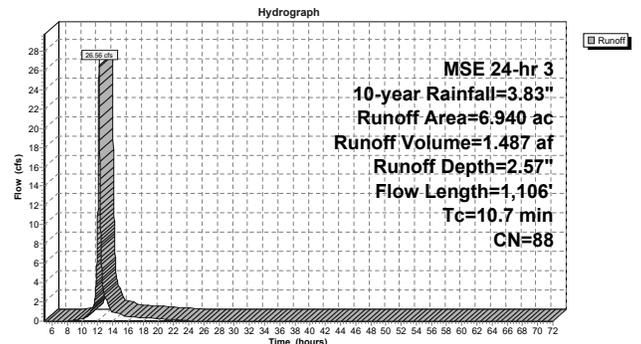
Summary for Subcatchment 71.1: Sandhill Post-Development

Runoff = 26.56 cfs @ 12.18 hrs, Volume= 1.487 af, Depth= 2.57"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.450	98	Roofs, HSG C
* 0.500	98	Driveways, HSG C
0.990	98	Paved roads w/curbs & sewers, HSG C
* 0.140	98	Sidewalk, HSG C
1.880	74	>75% Grass cover, Good, HSG C
* 0.020	98	Existing Impervious ROW, HSG C
0.530	98	Roofs, HSG D
* 0.520	98	Driveway, HSG D
0.600	98	Paved roads w/curbs & sewers, HSG D
* 0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
6.940	88	Weighted Average
3.130		45.10% Pervious Area
3.810		54.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.0490	0.14		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.3	155	0.0100	2.03		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	279	0.0290	8.37	6.57	Pipe Channel, Segment CD 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	148	0.0200	8.06	9.90	Pipe Channel, Segment DE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	38	0.0100	6.44	11.38	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment FG 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	182	0.0033	5.20	25.53	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
10.7	1,106				Total

Subcatchment 71.1: Sandhill Post-Development



Summary for Subcatchment 71.2: Sandhill Post-Development

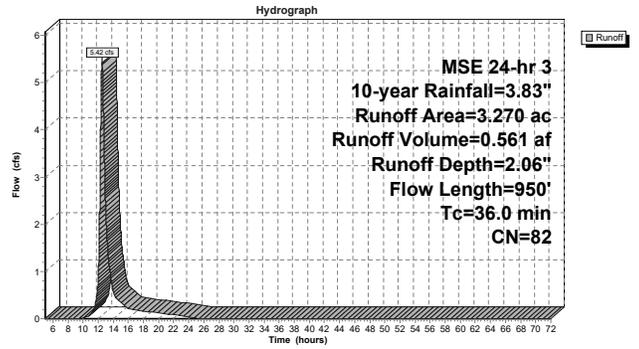
Runoff = 5.42 cfs @ 12.52 hrs, Volume= 0.561 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
* 0.030	98	Driveways, HSG C
* 0.090	98	Sidewalk, HSG C
1.280	74	>75% Grass cover, Good, HSG C
0.290	98	Roofs, HSG D
* 0.030	98	Driveway, HSG D
* 0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
3.270	82	Weighted Average
2.530		77.37% Pervious Area
0.740		22.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	148	0.0110	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
3.1	12	0.0166	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
2.9	43	0.2400	0.24		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
1.2	233	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.2	53	0.0042	3.70	4.54	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.9	235	0.0030	4.27	13.42	Pipe Channel, Segment GH 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.0	950				Total

Subcatchment 71.2: Sandhill Post-Development



Summary for Subcatchment 71.3: Sandhill Post-Development

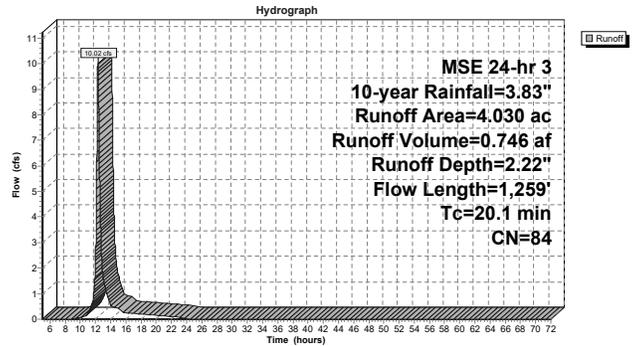
Runoff = 10.02 cfs @ 12.30 hrs, Volume= 0.746 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.530	98	Roofs, HSG D
* 0.020	98	Driveway, HSG D
* 0.260	98	Sidewalk, HSG D
3.220	80	>75% Grass cover, Good, HSG D
4.030	84	Weighted Average
3.220		79.90% Pervious Area
0.810		20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	131	0.0408	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
2.4	30	0.1967	0.21		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
1.3	241	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.3	158	0.0300	8.51	6.69	Pipe Channel, Segment EF 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	150	0.0200	8.06	9.90	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	115	0.0090	6.11	10.80	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment HI 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.2	182	0.0330	16.44	80.72	Pipe Channel, Segment IJ 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
20.1	1,259				Total

Subcatchment 71.3: Sandhill Post-Development



Summary for Subcatchment 71.4: Sandhill Post-Development

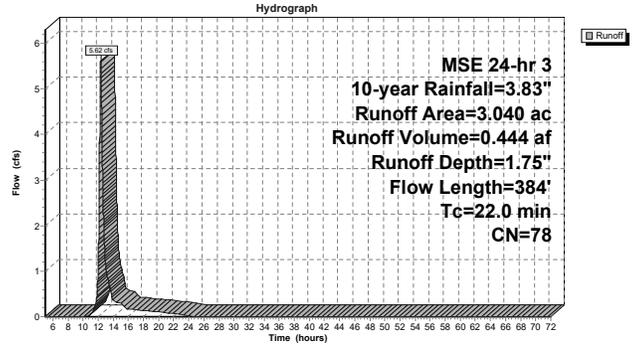
Runoff = 5.62 cfs @ 12.34 hrs, Volume= 0.444 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.100	98	Roofs, HSG C
* 0.010	98	Driveways, HSG C
* 0.100	98	Sidewalk, HSG C
2.200	74	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	96	New Gravel ROW, HSG C
* 0.100	98	Existing Impervious ROW, HSG C
* 0.240	74	>75% Grass cover ROW, Good, HSG C
0.110	98	Roofs, HSG D
* 0.010	98	Sidewalk, HSG D
0.130	80	>75% Grass cover, Good, HSG D
3.040	78	Weighted Average
2.580		84.87% Pervious Area
0.460		15.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	151	0.0240	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.7	151	0.0092	1.44		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.2	82	0.0076	5.61	9.92	Pipe Channel, Segment CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
22.0	384				Total

Subcatchment 71.4: Sandhill Post-Development



Summary for Subcatchment 71.5: Sandhill Post-Development

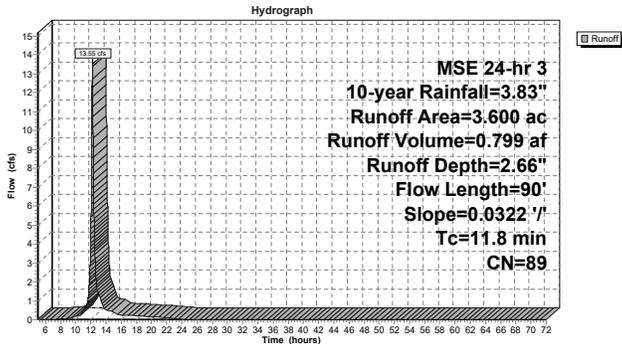
Runoff = 13.55 cfs @ 12.19 hrs, Volume= 0.799 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.150	98	Roofs, HSG C
* 0.090	98	Sidewalk, HSG C
1.400	74	>75% Grass cover, Good, HSG C
1.960	98	Water Surface, HSG C
3.600	89	Weighted Average
1.400		38.89% Pervious Area
2.200		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	90	0.0322	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 71.5: Sandhill Post-Development



Summary for Subcatchment 71.6: Sandhill Post-Development

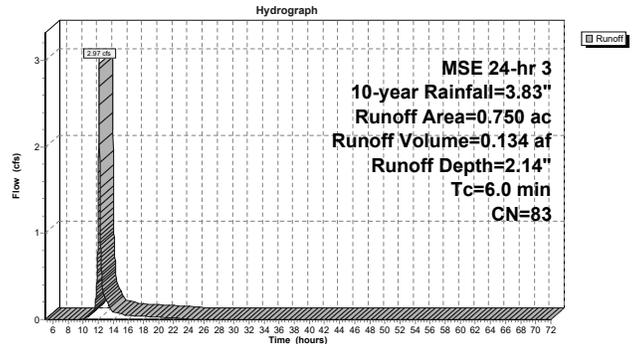
Runoff = 2.97 cfs @ 12.13 hrs, Volume= 0.134 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.260	74	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	96	New Gravel ROW, HSG C
* 0.230	98	Existing Impervious ROW, HSG C
* 0.220	74	>75% Grass cover ROW, Good, HSG C
0.750	83	Weighted Average
0.490		65.33% Pervious Area
0.260		34.67% Impervious Area

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

Subcatchment 71.6: Sandhill Post-Development



Summary for Subcatchment 72.1: Off-Site Residential

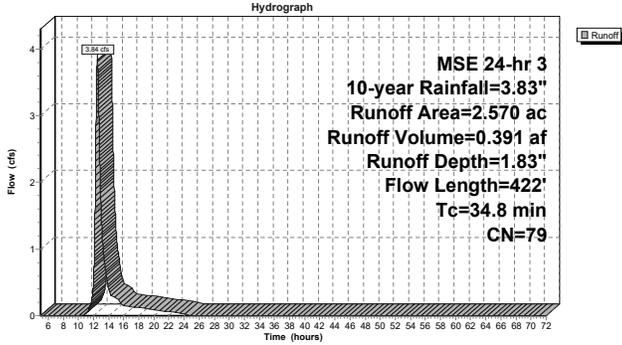
Runoff = 3.84 cfs @ 12.49 hrs, Volume= 0.391 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
1.060	82	2 acre lots, 12% imp, HSG D
1.510	77	2 acre lots, 12% imp, HSG C
2.570	79	Weighted Average
2.262		88.00% Pervious Area
0.308		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
34.8	422				Total

Subcatchment 72.1: Off-Site Residential



Summary for Subcatchment 72.2: Off-Site Residential

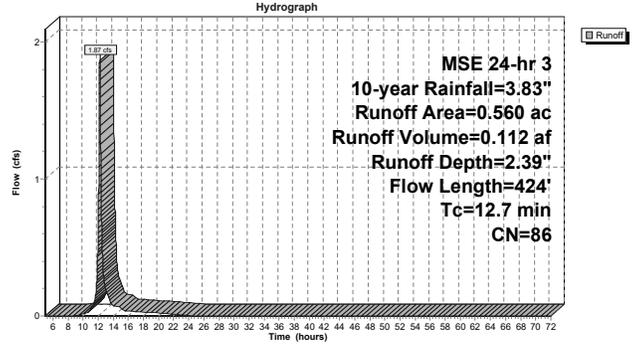
Runoff = 1.87 cfs @ 12.21 hrs, Volume= 0.112 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.060	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
0.210	77	2 acre lots, 12% imp, HSG C
0.560	86	Weighted Average
0.383		68.32% Pervious Area
0.177		31.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	84	0.0950	0.13		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.8	340	0.0450	3.18		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
12.7	424				Total

Subcatchment 72.2: Off-Site Residential



Summary for Subcatchment 81.1: Sandhill Post-Development

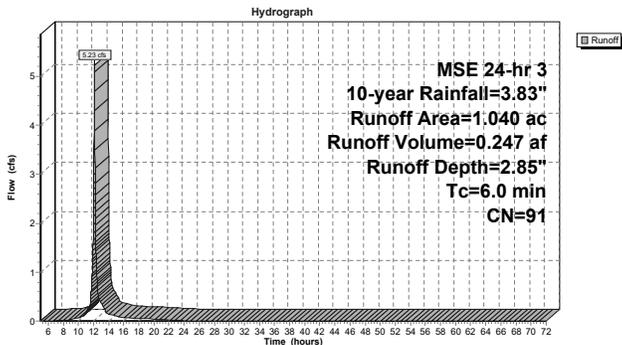
Runoff = 5.23 cfs @ 12.13 hrs, Volume= 0.247 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.070	98	Roofs, HSG C
* 0.040	98	Driveways, HSG C
0.020	98	Paved roads w/curbs & sewers, HSG C
* 0.010	98	Sidewalk, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.120	98	Roofs, HSG D
* 0.150	98	Driveway, HSG D
0.240	98	Paved roads w/curbs & sewers, HSG D
* 0.010	98	Sidewalk, HSG D
0.280	80	>75% Grass cover, Good, HSG D
1.040	91	Weighted Average
0.380		36.54% Pervious Area
0.660		63.46% Impervious Area

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

Subcatchment 81.1: Sandhill Post-Development



Summary for Subcatchment 81.2: Sandhill Post-Development

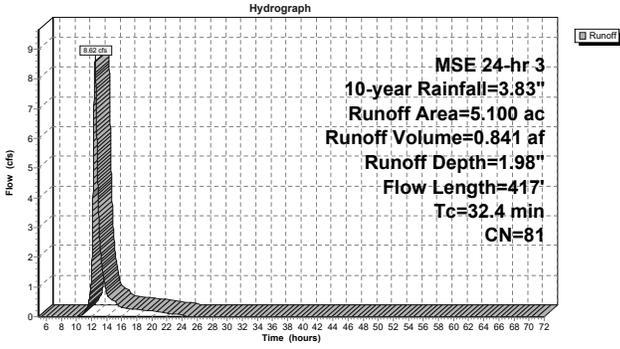
Runoff = 8.62 cfs @ 12.46 hrs, Volume= 0.841 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.220	98	Roofs, HSG C
* 0.090	98	Sidewalk, HSG C
1.140	74	>75% Grass cover, Good, HSG C
0.320	98	Water Surface, HSG C
0.350	70	Woods, Good, HSG C
0.100	98	Roofs, HSG D
* 0.030	98	Driveway, HSG D
* 0.160	98	Sidewalk, HSG D
2.410	80	>75% Grass cover, Good, HSG D
0.030	98	Water Surface, HSG D
0.250	77	Woods, Good, HSG D
5.100	81	Weighted Average
4.150		81.37% Pervious Area
0.950		18.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	136	0.0250	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
9.9	60	0.0223	0.10		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.2	47	0.2360	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	134	0.0110	2.97	8.91	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.1	32	0.0095	5.56	6.82	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
32.4	417				Total

Subcatchment 81.2: Sandhill Post-Development



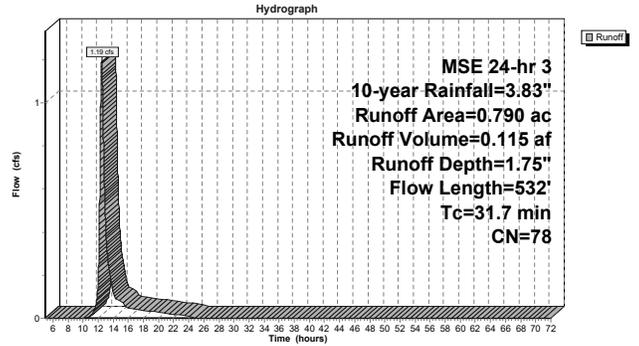
Summary for Subcatchment 81.3: Sandhill Post-Development

Runoff = 1.19 cfs @ 12.46 hrs, Volume= 0.115 af, Depth= 1.75"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
* 0.040	98	Sidewalk, HSG C
0.130	74	>75% Grass cover, Good, HSG C
0.150	70	Woods, Good, HSG C
* 0.050	98	Sidewalk, HSG D
0.220	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.790	78	Weighted Average
0.700		88.61% Pervious Area
0.090		11.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	300	0.0950	0.17		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.5	232	0.0300	2.60		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
31.7	532		Total		

Subcatchment 81.3: Sandhill Post-Development



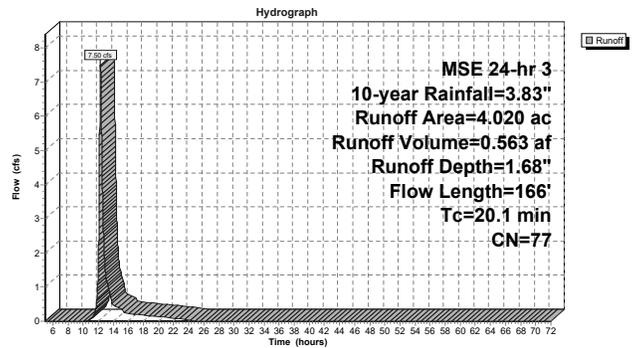
Summary for Subcatchment 81.4: Sandhill Post-Development

Runoff = 7.50 cfs @ 12.31 hrs, Volume= 0.563 af, Depth= 1.68"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.290	98	Roofs, HSG C
* 0.050	98	Driveways, HSG C
* 0.090	98	Sidewalk, HSG C
2.330	74	>75% Grass cover, Good, HSG C
0.330	70	Woods, Good, HSG C
* 0.080	98	Sidewalk, HSG D
0.850	77	Woods, Good, HSG D
4.020	77	Weighted Average
3.510		87.31% Pervious Area
0.510		12.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	39	0.0610	0.09		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.2	9	0.0200	0.78		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
12.9	118	0.1240	0.15		Sheet Flow, Segment CD Woods: Light underbrush n= 0.400 P2= 2.70"
20.1	166		Total		

Subcatchment 81.4: Sandhill Post-Development



Summary for Subcatchment 82.1: Off-Site Residential

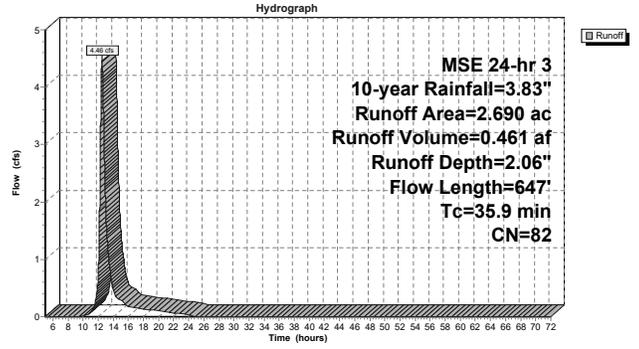
Runoff = 4.46 cfs @ 12.49 hrs, Volume= 0.461 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
2.630	82	2 acre lots, 12% imp, HSG D
0.060	77	2 acre lots, 12% imp, HSG C
2.690	82	Weighted Average
2.367		88.00% Pervious Area
0.323		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	121	0.0867	1.47		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.4	40	0.1120	1.67		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
1.3	178	0.0220	2.22		Shallow Concentrated Flow, Segment EF Grassed Waterway Kv= 15.0 fps
35.9	647				Total

Subcatchment 82.1: Off-Site Residential



Summary for Subcatchment 82.2: Off-Site Residential

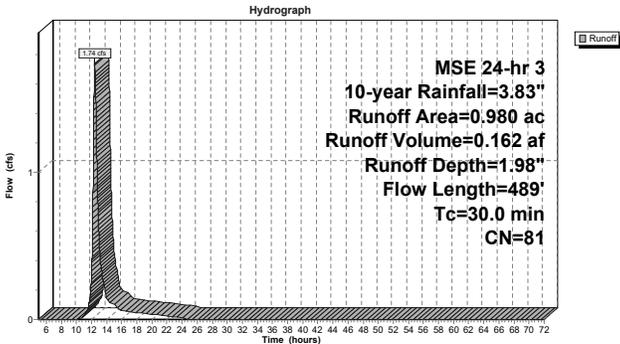
Runoff = 1.74 cfs @ 12.43 hrs, Volume= 0.162 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.770	82	2 acre lots, 12% imp, HSG D
0.210	77	2 acre lots, 12% imp, HSG C
0.980	81	Weighted Average
0.662		88.00% Pervious Area
0.118		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	300	0.1120	0.18		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.0	85	0.0830	1.44		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.7	104	0.0288	2.55		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
30.0	489				Total

Subcatchment 82.2: Off-Site Residential



Summary for Subcatchment 82.3: Off-Site Residential

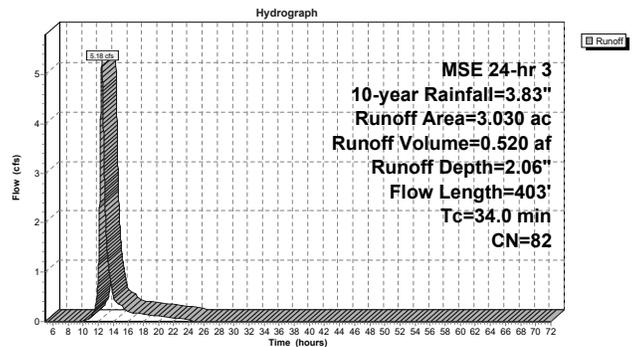
Runoff = 5.18 cfs @ 12.50 hrs, Volume= 0.520 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
2.730	82	2 acre lots, 12% imp, HSG D
0.300	77	2 acre lots, 12% imp, HSG C
3.030	82	Weighted Average
2.666		88.00% Pervious Area
0.364		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.0	300	0.0758	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.8	76	0.0960	1.55		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.2	19	0.1380	1.86		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
34.0	403				Total

Subcatchment 82.3: Off-Site Residential



Summary for Subcatchment 91.1: Sandhill Post-Development

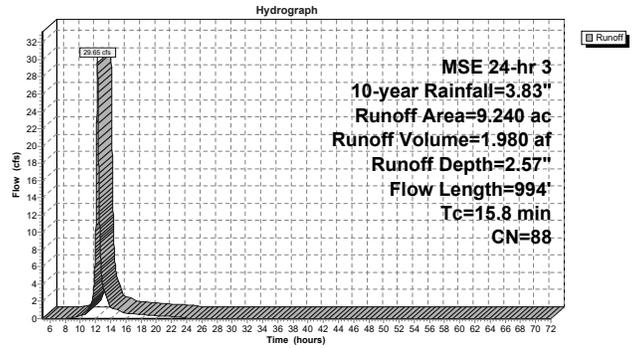
Runoff = 29.65 cfs @ 12.24 hrs, Volume= 1.980 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
1.120	98	Roofs, HSG C
0.870	98	Driveways, HSG C
1.080	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
0.220	98	Sidewalk, HSG C
2.990	74	>75% Grass cover, Good, HSG C
0.060	98	Existing Impervious ROW, HSG C
0.140	74	>75% Grass cover ROW, Good, HSG C
0.550	98	Roofs, HSG D
0.900	98	Driveway, HSG D
0.270	98	Paved roads w/curbs & sewers, HSG D
0.070	98	Sidewalk, HSG D
0.960	80	>75% Grass cover, Good, HSG D
9.240	88	Weighted Average
4.100	44.37%	Pervious Area
5.140	55.63%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	140	0.0540	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	57	0.0460	4.35		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.3	122	0.0132	6.55	8.04	Pipe Channel, Segment CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	152	0.0090	6.11	10.80	Pipe Channel, Segment DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	251	0.0080	6.98	21.92	Pipe Channel, Segment EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.8	994	Total			

Subcatchment 91.1: Sandhill Post-Development



Summary for Subcatchment 91.2: Sandhill Post-Development

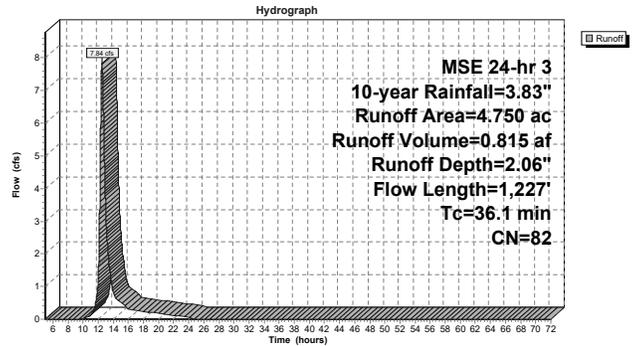
Runoff = 7.84 cfs @ 12.51 hrs, Volume= 0.815 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
0.110	98	Driveways, HSG C
0.110	98	Sidewalk, HSG C
1.700	74	>75% Grass cover, Good, HSG C
0.430	98	Roofs, HSG D
0.040	98	Driveway, HSG D
0.110	98	Sidewalk, HSG D
2.010	80	>75% Grass cover, Good, HSG D
4.750	82	Weighted Average
3.710	78.11%	Pervious Area
1.040	21.89%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	184	0.0214	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
4.8	20	0.0150	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.7	56	0.2320	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	173	0.0145	3.41	10.23	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.8	280	0.0125	5.49	4.32	Pipe Channel, Segment FG 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.6	234	0.0100	6.44	11.38	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.1	1,227	Total			

Subcatchment 91.2: Sandhill Post-Development



Summary for Subcatchment 91.3: Sandhill Post-Development

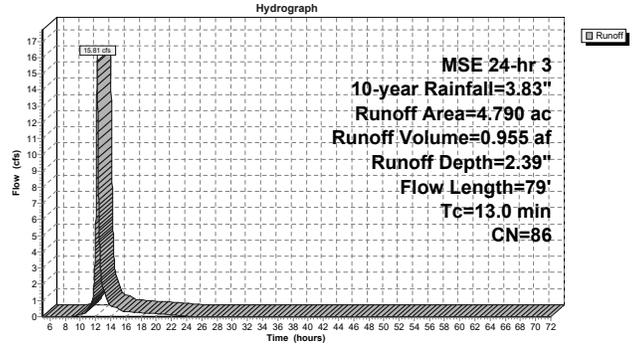
Runoff = 15.81 cfs @ 12.21 hrs, Volume= 0.955 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.300	98	Roofs, HSG C
* 0.020	98	Driveways, HSG C
* 0.120	98	Sidewalk, HSG C
1.150	74	>75% Grass cover, Good, HSG C
0.350	98	Water Surface, HSG C
* 0.020	74	>75% Grass cover ROW, Good, HSG C
0.210	98	Roofs, HSG D
* 0.070	98	Driveway, HSG D
* 0.140	98	Sidewalk, HSG D
1.460	80	>75% Grass cover, Good, HSG D
* 0.180	80	>75% Grass cover ROW, Good, HSG D
0.770	98	Water Surface, HSG D
4.790	86	Weighted Average
2.810		58.66% Pervious Area
1.980		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	66	0.0160	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
0.6	5	0.1600	0.14		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
13.0	79				Total

Subcatchment 91.3: Sandhill Post-Development



Summary for Subcatchment 91.4: Sandhill Post-Development

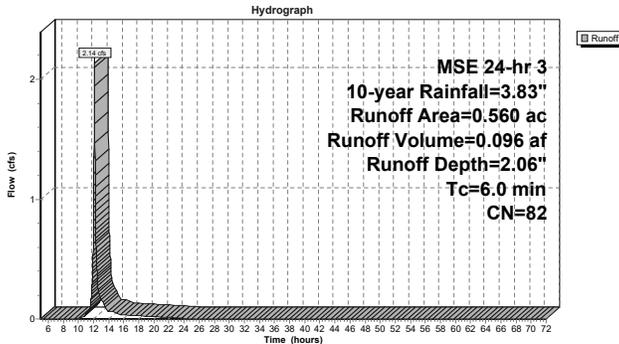
Runoff = 2.14 cfs @ 12.13 hrs, Volume= 0.096 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.030	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
* 0.220	74	>75% Grass cover ROW, Good, HSG C
* 0.050	98	Existing Impervious ROW, HSG C
0.010	80	>75% Grass cover, Good, HSG D
* 0.060	98	Existing Impervious ROW, HSG D
* 0.110	80	>75% Grass cover ROW, Good, HSG D
0.560	82	Weighted Average
0.420		75.00% Pervious Area
0.140		25.00% Impervious Area

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

Subcatchment 91.4: Sandhill Post-Development



Summary for Subcatchment 100: Sandhill Post Development

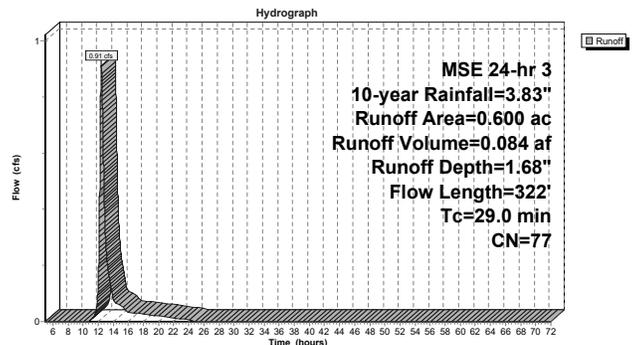
Runoff = 0.91 cfs @ 12.41 hrs, Volume= 0.084 af, Depth= 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-year Rainfall=3.83"

Area (ac)	CN	Description
* 0.030	98	Sidewalk/Access Lane, HSG C
0.150	74	>75% Grass cover, Good, HSG C
* 0.010	98	Sidewalk, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.090	70	Woods, Good, HSG C
0.600	77	Weighted Average
0.560		93.33% Pervious Area
0.040		6.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	300	0.0380	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.1	22	0.0880	4.45		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
29.0	322				Total

Subcatchment 100: Sandhill Post Development



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7,500 ac, 20.00% Impervious, Inflow Depth = 1.98" for 10-year event
 Inflow = 12.68 cfs @ 12.46 hrs, Volume= 1,237 af
 Outflow = 0.39 cfs @ 17.35 hrs, Volume= 0.297 af, Atten= 97%, Lag= 293.5 min
 Primary = 0.30 cfs @ 17.35 hrs, Volume= 0.266 af
 Secondary = 0.10 cfs @ 17.35 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.13' @ 17.35 hrs Surf.Area= 16,251 sf Storage= 45,230 cf

Plug-Flow detention time= 617.5 min calculated for 0.297 af (24% of inflow)
 Center-of-Mass det. time= 514.7 min (1,345.1 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	62,126 cf	Existing Active Storage Volume (Irregular), listed below (Recalc)

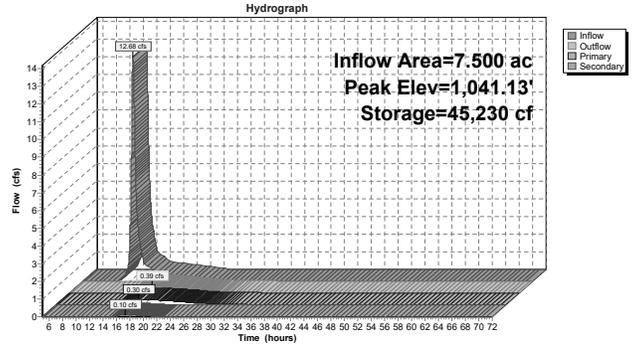
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.10	18,762	577.0	19,052	62,126	24,060

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=0.30 cfs @ 17.35 hrs HW=1,041.13' TW=1,024.30' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 0.30 cfs @ 2.02 fps)

Secondary OutFlow Max=0.10 cfs @ 17.35 hrs HW=1,041.13' TW=1,024.30' (Dynamic Tailwater)
 2=Asymmetrical Weir (Weir Controls 0.10 cfs @ 0.33 fps)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1R: Winkleman Road North Culvert

Inflow Area = 24,760 ac, 35.40% Impervious, Inflow Depth > 1.63" for 10-year event
 Inflow = 4.67 cfs @ 12.14 hrs, Volume= 3,367 af
 Outflow = 3.19 cfs @ 12.25 hrs, Volume= 3,367 af, Atten= 32%, Lag= 6.3 min
 Primary = 3.19 cfs @ 12.25 hrs, Volume= 3,367 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.90' @ 12.25 hrs Surf.Area= 4,225 sf Storage= 1,315 cf

Plug-Flow detention time= 2.9 min calculated for 3,367 af (100% of inflow)
 Center-of-Mass det. time= 2.5 min (1,854.6 - 1,852.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,025.97'	23,920 cf	Custom Stage Data (Irregular), listed below (Recalc)

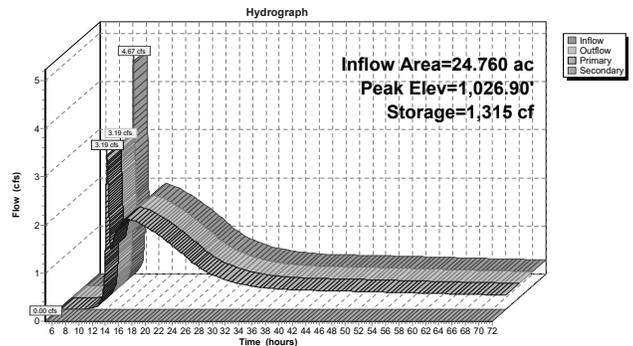
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	5,142	390.0	1,765	1,765	12,105
1,028.00	10,710	659.0	7,758	9,523	34,567
1,029.00	18,432	850.0	14,397	23,920	57,515

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=3.19 cfs @ 12.25 hrs HW=1,026.90' (Free Discharge)
 1=Culvert (Barrel Controls 3.19 cfs @ 2.94 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 1R: Winkleman Road North Culvert



Summary for Pond 60P: Lisbon Road Culvert

Inflow Area = 20,600 ac, 22.79% Impervious, Inflow Depth > 1.42" for 10-year event
 Inflow = 16.99 cfs @ 12.18 hrs, Volume= 2,444 af
 Outflow = 12.31 cfs @ 12.37 hrs, Volume= 2,444 af, Atten= 28%, Lag= 11.4 min
 Primary = 12.31 cfs @ 12.37 hrs, Volume= 2,444 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.69' @ 12.37 hrs Surf.Area= 8,579 sf Storage= 3,982 cf

Plug-Flow detention time= 1.9 min calculated for 2,444 af (100% of inflow)
 Center-of-Mass det. time= 1.9 min (894.8 - 892.9)

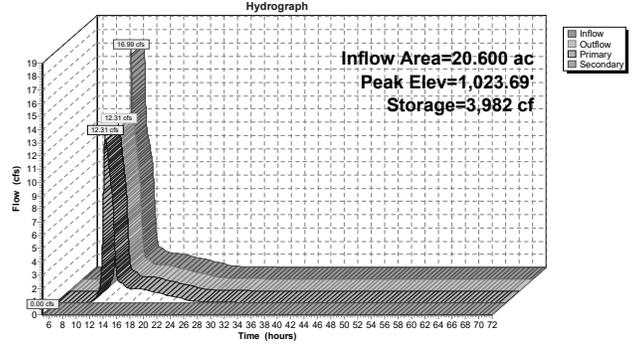
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	72,972 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,762	263.0	698	703	5,506
1,024.00	13,278	988.0	6,626	7,328	77,684
1,025.00	32,265	1,586.0	22,080	29,409	200,180
1,026.00	55,940	1,804.0	43,563	72,972	259,014

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086' /' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=12.31 cfs @ 12.37 hrs HW=1,023.69' (Free Discharge)
 1=Culvert (Barrel Controls 12.31 cfs @ 4.13 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 60P: Lisbon Road Culvert



Summary for Pond 61.1P: SOUTH DRY POND

Inflow Area = 16,620 ac, 19.45% Impervious, Inflow Depth > 1.24" for 10-year event
 Inflow = 14.62 cfs @ 12.42 hrs, Volume= 1,717 af
 Outflow = 8.26 cfs @ 12.77 hrs, Volume= 1,717 af, Atten= 44%, Lag= 21.2 min
 Primary = 8.26 cfs @ 12.77 hrs, Volume= 1,717 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.06' @ 12.77 hrs Surf.Area= 15,796 sf Storage= 11,632 cf

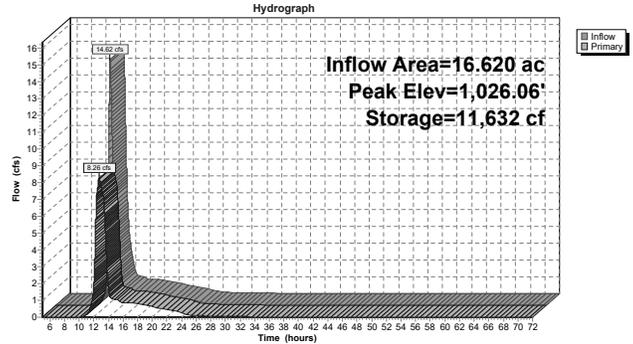
Plug-Flow detention time= 9.7 min calculated for 1,717 af (100% of inflow)
 Center-of-Mass det. time= 9.7 min (930.6 - 920.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.80'	114,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.80	10	10.0	0	0	10
1,024.00	45	25.0	5	5	52
1,025.00	4,302	289.0	1,596	1,601	6,650
1,026.00	14,928	555.0	9,081	10,682	24,521
1,027.00	31,978	829.0	22,918	33,600	54,706
1,028.00	41,963	930.0	36,858	70,458	68,871
1,029.00	46,095	1,019.0	44,013	114,471	82,709

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.68'	30.0" Round Culvert L= 109.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.68' / 1,022.40' S= 0.0026' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,022.84'	30.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.84' / 1,022.68' S= 0.0027' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#3	Device 2	1,022.91'	30.0" Round Culvert L= 24.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.91' / 1,022.84' S= 0.0028' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#4	Device 3	1,023.80'	18.0" Round Culvert L= 119.8' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,023.80' / 1,023.42' S= 0.0032' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.26 cfs @ 12.77 hrs HW=1,026.06' TW=1,023.45' (Dynamic Tailwater)
 1=Culvert (Passes 8.26 cfs of 27.63 cfs potential flow)
 2=Culvert (Passes 8.26 cfs of 27.74 cfs potential flow)
 3=Culvert (Passes 8.26 cfs of 27.70 cfs potential flow)
 4=Culvert (Barrel Controls 8.26 cfs @ 4.67 fps)

Pond 61.1P: SOUTH DRY POND



Summary for Pond 71.5P: NORTHWEST WET POND

Inflow Area = 23.450 ac, 35.52% Impervious, Inflow Depth = 2.27" for 10-year event
 Inflow = 55.60 cfs @ 12.20 hrs, Volume= 4,429 af
 Outflow = 1.78 cfs @ 15.40 hrs, Volume= 3,122 af, Atten= 97%, Lag= 191.8 min
 Primary = 1.78 cfs @ 15.40 hrs, Volume= 3,122 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.16' @ 15.40 hrs Surf.Area= 93,840 sf Storage= 149,063 cf
 Flood Elev= 1,029.50' Surf.Area= 100,772 sf Storage= 279,155 cf

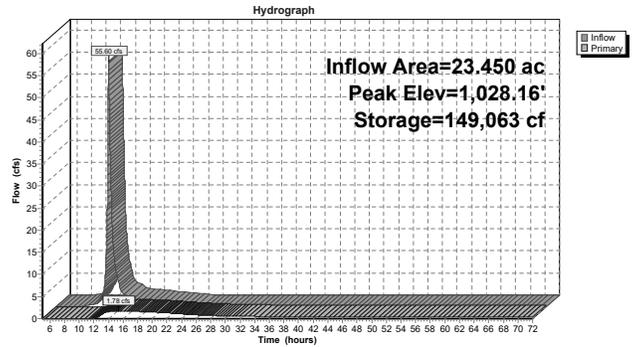
Plug-Flow detention time= 1,199.1 min calculated for 3,121 af (70% of inflow)
 Center-of-Mass det. time= 1,126.1 min (1,934.8 - 808.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,026.50'	382,566 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,026.50	85,502	1,222.0	0	0	85,502
1,027.50	90,480	1,253.0	87,979	87,979	91,732
1,028.50	95,573	1,283.0	93,015	180,994	97,917
1,029.50	100,772	1,310.0	98,161	279,155	103,638
1,030.50	106,073	1,336.0	103,411	382,566	109,270

Device	Routing	Invert	Outlet Devices
#1	Primary	1,026.50'	15.0" Round Culvert L= 36.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,026.50' / 1,026.40' S= 0.0027' / Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1,026.50'	4.0" Vert. Orifice/Gate C= 0.600
#3	Device 1	1,027.60'	13.5" Vert. Orifice/Gate C= 0.600

Primary OutFlow Max=1.78 cfs @ 15.40 hrs HW=1,028.16' TW=1,026.64' (Dynamic Tailwater)
 1=Culvert (Passes 1.78 cfs of 4.77 cfs potential flow)
 2=Orifice/Gate (Orifice Controls 0.51 cfs @ 5.89 fps)
 3=Orifice/Gate (Orifice Controls 1.27 cfs @ 2.55 fps)

Pond 71.5P: NORTHWEST WET POND



Summary for Pond 81.2P: NORTHEAST WET POND

Inflow Area = 15.880 ac, 17.67% Impervious, Inflow Depth = 1.99" for 10-year event
 Inflow = 23.54 cfs @ 12.45 hrs, Volume= 2,633 af
 Outflow = 8.76 cfs @ 13.05 hrs, Volume= 2,608 af, Atten= 63%, Lag= 36.1 min
 Primary = 8.76 cfs @ 13.05 hrs, Volume= 2,608 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.91' @ 13.05 hrs Surf.Area= 25,693 sf Storage= 57,627 cf

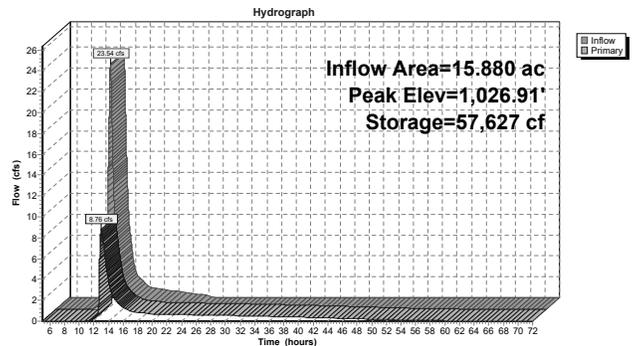
Plug-Flow detention time= 602.4 min calculated for 2,608 af (99% of inflow)
 Center-of-Mass det. time= 596.1 min (1,429.5 - 833.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,024.00'	121,316 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,024.00	14,944	567.0	0	0	14,944
1,025.00	17,393	609.0	16,153	16,153	18,918
1,026.00	22,177	747.0	19,737	35,890	33,825
1,027.00	26,059	839.0	24,092	59,982	45,463
1,028.00	30,682	975.0	28,339	88,321	65,116
1,029.00	35,365	1,078.0	32,996	121,316	81,975

Device	Routing	Invert	Outlet Devices
#1	Primary	1,024.00'	24.0" Round Culvert L= 55.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,024.00' / 1,023.80' S= 0.0036' / Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,024.00'	4.0" Vert. Orifice/Gate C= 0.600
#3	Device 1	1,026.50'	36.0" Horiz. Orifice/Gate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.76 cfs @ 13.05 hrs HW=1,026.91' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Passes 8.76 cfs of 18.35 cfs potential flow)
 2=Orifice/Gate (Orifice Controls 0.70 cfs @ 7.97 fps)
 3=Orifice/Gate (Weir Controls 8.06 cfs @ 2.09 fps)

Pond 81.2P: NORTHEAST WET POND



Summary for Pond 81.4P: NORTH DRY POND

Inflow Area = 7.050 ac, 12.39% Impervious, Inflow Depth = 1.84" for 10-year event
 Inflow = 11.70 cfs @ 12.35 hrs, Volume= 1.083 af
 Outflow = 9.65 cfs @ 12.45 hrs, Volume= 1.083 af, Atten= 18%, Lag= 6.0 min
 Primary = 9.65 cfs @ 12.45 hrs, Volume= 1.083 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.37' @ 12.60 hrs Surf.Area= 6,372 sf Storage= 4,493 cf
 Flood Elev= 1,029.00' Surf.Area= 14,929 sf Storage= 21,834 cf

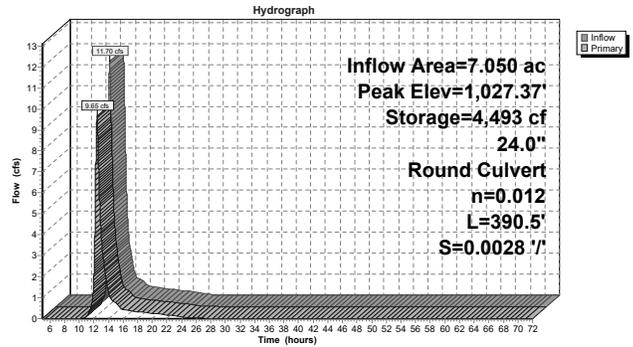
Plug-Flow detention time= 20.1 min calculated for 1.082 af (100% of inflow)
 Center-of-Mass det. time= 20.2 min (848.6 - 828.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.60'	40,190 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.60	10	5.0	0	0	10
1,026.00	642	92.0	98	98	682
1,027.00	4,663	306.0	2,345	2,443	7,463
1,028.00	9,843	557.0	7,094	9,536	24,705
1,029.00	14,929	868.0	12,298	21,834	59,979
1,030.00	22,010	1,004.0	18,355	40,190	80,261

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.60'	24.0" Round Culvert L= 390.5' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.60' / 1,024.50' S= 0.0028' / S= 0.0028' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=9.54 cfs @ 12.45 hrs HW=1,027.33' TW=1,025.83' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 9.54 cfs @ 4.42 fps)

Pond 81.4P: NORTH DRY POND



Summary for Pond 90P: Winkleman Road South Culvert

Inflow Area = 19,340 ac, 42.92% Impervious, Inflow Depth > 2.11" for 10-year event
 Inflow = 5.23 cfs @ 13.45 hrs, Volume= 3.408 af
 Outflow = 5.23 cfs @ 13.45 hrs, Volume= 3.408 af, Atten= 0%, Lag= 0.1 min
 Primary = 5.23 cfs @ 13.45 hrs, Volume= 3.408 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.15' @ 13.45 hrs Surf.Area= 85 sf Storage= 23 cf

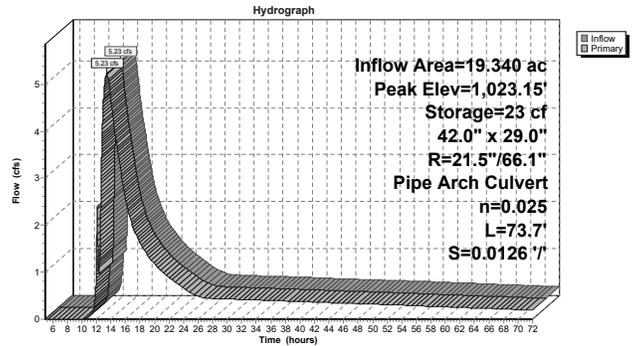
Plug-Flow detention time= 0.0 min calculated for 3.408 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (1,626.1 - 1,626.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.40'	7,855 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.40	0	0.0	0	0	0
1,023.00	58	29.0	12	12	67
1,024.00	325	135.0	173	185	1,453
1,025.00	1,142	257.0	692	877	5,264
1,026.00	3,045	376.0	2,017	2,894	11,267
1,027.00	7,166	644.0	4,961	7,855	33,026

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.40'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 73.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.40' / 1,021.47' S= 0.0126' / S= 0.0126' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=5.23 cfs @ 13.45 hrs HW=1,023.15' (Free Discharge)
 1=Culvert (Barrel Controls 5.23 cfs @ 3.46 fps)

Pond 90P: Winkleman Road South Culvert



Summary for Pond 91.3P WET: SOUTH WET POND

Inflow Area = 18.780 ac, 43.45% Impervious, Inflow Depth = 2.40" for 10-year event
 Inflow = 49.03 cfs @ 12.23 hrs, Volume= 3,750 af
 Outflow = 5.12 cfs @ 13.48 hrs, Volume= 3,312 af, Atten= 90%, Lag= 74.8 min
 Primary = 5.12 cfs @ 13.48 hrs, Volume= 3,312 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.83' @ 13.48 hrs Surf.Area= 65,416 sf Storage= 106,512 cf

Plug-Flow detention time= 890.1 min calculated for 3,312 af (88% of inflow)
 Center-of-Mass det. time= 843.3 min (1,649.9 - 806.6)

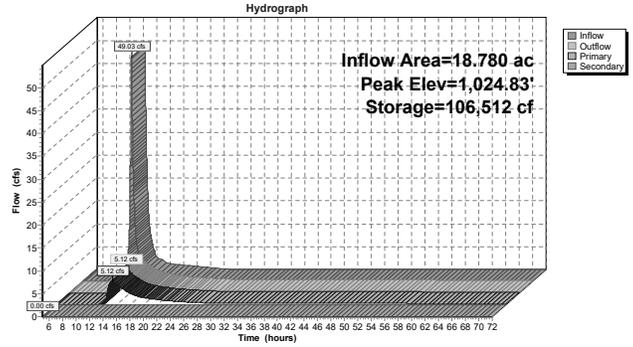
Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.00'	264,057 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.00	49,054	1,453.0	0	0	49,054
1,024.00	60,009	1,608.0	54,440	54,440	86,841
1,025.00	66,548	1,638.0	63,250	117,690	94,758
1,026.00	73,201	1,666.0	69,848	187,538	102,303
1,027.00	79,886	1,691.0	76,519	264,057	109,190

Device	Routing	Invert	Outlet Devices
#1	Primary	1,023.00'	30.0" Round Culvert L= 36.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,023.00' / 1,022.60' S= 0.0110 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,023.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,024.25'	11.0" Vert. Orifice/Grate X 4.00 C= 0.600
#4	Secondary	1,026.00'	36.0" long x 17.0" breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.12 cfs @ 13.48 hrs HW=1,024.83' TW=1,023.15' (Dynamic Tailwater)
 1=Culvert (Passes 5.12 cfs of 15.44 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.54 cfs @ 6.21 fps)
 3=Orifice/Grate (Orifice Controls 4.57 cfs @ 2.59 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,023.00' TW=1,022.40' (Dynamic Tailwater)
 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 91.3P WET: SOUTH WET POND

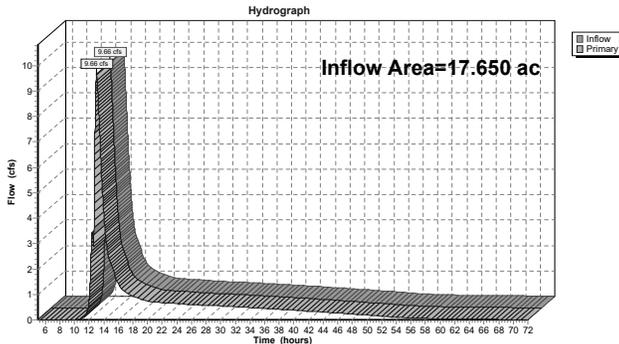


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 17.650 ac, 17.08% Impervious, Inflow Depth > 1.96" for 10-year event
 Inflow = 9.66 cfs @ 13.03 hrs, Volume= 2,885 af
 Primary = 9.66 cfs @ 13.03 hrs, Volume= 2,885 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale

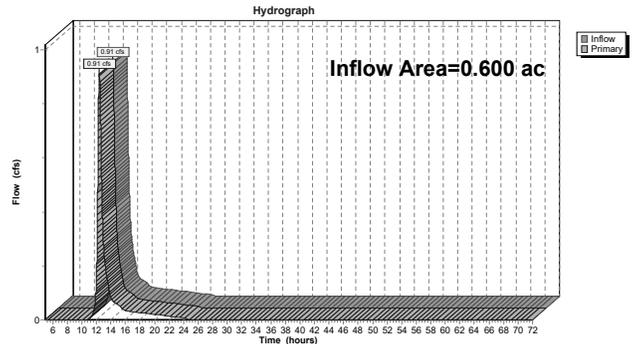


Summary for Link TL: Teri Lane

Inflow Area = 0.600 ac, 6.67% Impervious, Inflow Depth = 1.68" for 10-year event
 Inflow = 0.91 cfs @ 12.41 hrs, Volume= 0.084 af
 Primary = 0.91 cfs @ 12.41 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment61.1: Sandhill	Runoff Area=6.660 ac 18.62% Impervious Runoff Depth=3.94" Flow Length=731' Tc=27.3 min CN=79 Runoff=24.74 cfs 2.187 af
Subcatchment61.2: Sandhill	Runoff Area=3.520 ac 38.92% Impervious Runoff Depth=4.47" Flow Length=436' Tc=9.3 min CN=84 Runoff=24.40 cfs 1.311 af
Subcatchment62.1: Off-Site Residential	Runoff Area=2.460 ac 20.00% Impervious Runoff Depth=4.15" Flow Length=379' Tc=39.8 min CN=81 Runoff=7.70 cfs 0.851 af
Subcatchment62.2: Off-Site Residential	Runoff Area=0.460 ac 20.00% Impervious Runoff Depth=4.15" Flow Length=1,223' Tc=18.9 min CN=81 Runoff=2.19 cfs 0.159 af
Subcatchment63: Off-Site Walnut Grove	Runoff Area=7.500 ac 20.00% Impervious Runoff Depth=4.15" Flow Length=576' Tc=32.4 min CN=81 Runoff=26.51 cfs 2.593 af
Subcatchment71.1: Sandhill	Runoff Area=6.940 ac 54.90% Impervious Runoff Depth=4.91" Flow Length=1,106' Tc=10.7 min CN=88 Runoff=49.04 cfs 2.837 af
Subcatchment71.2: Sandhill	Runoff Area=3.270 ac 22.63% Impervious Runoff Depth=4.25" Flow Length=950' Tc=36.0 min CN=82 Runoff=11.12 cfs 1.159 af
Subcatchment71.3: Sandhill	Runoff Area=4.030 ac 20.10% Impervious Runoff Depth=4.47" Flow Length=1,259' Tc=20.1 min CN=84 Runoff=19.81 cfs 1.501 af
Subcatchment71.4: Sandhill	Runoff Area=3.040 ac 15.13% Impervious Runoff Depth=3.84" Flow Length=384' Tc=22.0 min CN=78 Runoff=12.36 cfs 0.972 af
Subcatchment71.5: Sandhill	Runoff Area=3.600 ac 61.11% Impervious Runoff Depth=5.02" Slope=0.0322' Tc=11.8 min CN=89 Runoff=24.70 cfs 1.505 af
Subcatchment71.6: Sandhill	Runoff Area=0.750 ac 34.67% Impervious Runoff Depth=4.36" Tc=6.0 min CN=83 Runoff=5.87 cfs 0.273 af
Subcatchment72.1: Off-Site Residential	Runoff Area=2.570 ac 12.00% Impervious Runoff Depth=3.94" Flow Length=422' Tc=34.8 min CN=79 Runoff=8.33 cfs 0.844 af
Subcatchment72.2: Off-Site Residential	Runoff Area=0.560 ac 31.68% Impervious Runoff Depth=4.69" Flow Length=424' Tc=12.7 min CN=86 Runoff=3.55 cfs 0.219 af
Subcatchment81.1: Sandhill	Runoff Area=1.040 ac 63.46% Impervious Runoff Depth=5.24" Tc=6.0 min CN=91 Runoff=9.23 cfs 0.454 af
Subcatchment81.2: Sandhill	Runoff Area=5.100 ac 18.63% Impervious Runoff Depth=4.15" Flow Length=417' Tc=32.4 min CN=81 Runoff=18.03 cfs 1.763 af
Subcatchment81.3: Sandhill	Runoff Area=0.790 ac 11.39% Impervious Runoff Depth=3.84" Flow Length=532' Tc=31.7 min CN=78 Runoff=2.63 cfs 0.253 af

Subcatchment81.4: Sandhill	Runoff Area=4.020 ac 12.69% Impervious Runoff Depth=3.73" Flow Length=166' Tc=20.1 min CN=77 Runoff=16.78 cfs 1.251 af
Subcatchment82.1: Off-Site Residential	Runoff Area=2.690 ac 12.00% Impervious Runoff Depth=4.25" Flow Length=647' Tc=35.9 min CN=82 Runoff=9.20 cfs 0.954 af
Subcatchment82.2: Off-Site Residential	Runoff Area=0.980 ac 12.00% Impervious Runoff Depth=4.15" Flow Length=489' Tc=30.0 min CN=81 Runoff=3.63 cfs 0.339 af
Subcatchment82.3: Off-Site Residential	Runoff Area=3.030 ac 12.00% Impervious Runoff Depth=4.25" Flow Length=403' Tc=34.0 min CN=82 Runoff=10.65 cfs 1.074 af
Subcatchment91.1: Sandhill	Runoff Area=9.240 ac 55.63% Impervious Runoff Depth=4.91" Flow Length=994' Tc=15.8 min CN=88 Runoff=54.99 cfs 3.777 af
Subcatchment91.2: Sandhill	Runoff Area=4.750 ac 21.89% Impervious Runoff Depth=4.25" Flow Length=1,227' Tc=36.1 min CN=82 Runoff=16.16 cfs 1.684 af
Subcatchment91.3: Sandhill	Runoff Area=4.790 ac 41.34% Impervious Runoff Depth=4.69" Flow Length=79' Tc=13.0 min CN=86 Runoff=30.15 cfs 1.870 af
Subcatchment91.4: Sandhill	Runoff Area=0.560 ac 25.00% Impervious Runoff Depth=4.25" Tc=6.0 min CN=82 Runoff=4.29 cfs 0.199 af
Subcatchment100: Sandhill Post	Runoff Area=0.600 ac 6.67% Impervious Runoff Depth=3.73" Flow Length=322' Tc=29.0 min CN=77 Runoff=2.05 cfs 0.187 af
Pond 1P: Walnut Grove Stormwater	Peak Elev=1,041.64' Storage=53,781 cf Inflow=26.51 cfs 2.593 af Primary=1.76 cfs 0.534 af Secondary=13.41 cfs 1.120 af Outflow=15.17 cfs 1.653 af
Pond 1R: Winkelman Road North Culvert	Peak Elev=1,027.75' Storage=7,069 cf Inflow=9.10 cfs 7.833 af Primary=6.20 cfs 7.833 af Secondary=0.00 cfs 0.000 af Outflow=6.20 cfs 7.833 af
Pond 60P: Lisbon Road Culvert	Peak Elev=1,024.60' Storage=18,197 cf Inflow=32.80 cfs 6.160 af Primary=15.46 cfs 6.160 af Secondary=0.00 cfs 0.000 af Outflow=15.46 cfs 6.160 af
Pond 61.1P: SOUTH DRY POND	Peak Elev=1,027.79' Storage=61,869 cf Inflow=33.93 cfs 4.690 af Outflow=13.09 cfs 4.690 af
Pond 71.5P: NORTHWESTWET POND	Peak Elev=1,029.46' Storage=275,156 cf Inflow=107.56 cfs 8.818 af Outflow=6.01 cfs 7.342 af
Pond 81.2P: NORTHEASTWET POND	Peak Elev=1,027.79' Storage=82,071 cf Inflow=40.86 cfs 5.496 af Outflow=24.60 cfs 5.471 af
Pond 81.4P: NORTH DRY POND	Peak Elev=1,028.94' Storage=20,917 cf Inflow=25.42 cfs 3.225 af 24.0" Round Culvert n=0.012 L=390.5' S=0.0028' /' Outflow=12.76 cfs 3.225 af
Pond 90P: Winkelman Road South Culvert	Peak Elev=1,023.83' Storage=134 cf Inflow=15.33 cfs 7.069 af 42.0" x 29.0", R=21.5'/66.1" Pipe Arch Culvert n=0.025 L=73.7' S=0.0126' /' Outflow=15.33 cfs 7.069 af

Pond 91.3P WET: SOUTH WET POND	Peak Elev=1,025.99' Storage=186,965 cf Inflow=93.17 cfs 7.332 af Primary=15.02 cfs 6.871 af Secondary=0.00 cfs 0.000 af Outflow=15.02 cfs 6.871 af
Link 31L: Lot 31 Walnut Grove Swale	Inflow=28.31 cfs 6.062 af Primary=28.31 cfs 6.062 af
Link TL: Teri Lane	Inflow=2.05 cfs 0.187 af Primary=2.05 cfs 0.187 af

Total Runoff Area = 82.950 ac Runoff Volume = 30.214 af Average Runoff Depth = 4.37"
70.09% Pervious = 58.136 ac 29.91% Impervious = 24.814 ac

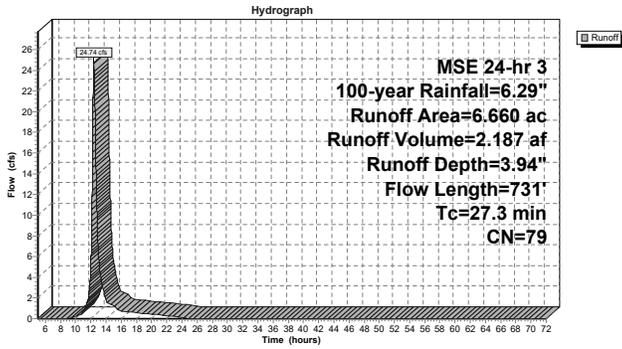
Summary for Subcatchment 61.1: Sandhill Post-Development

Runoff = 24.74 cfs @ 12.40 hrs, Volume= 2.187 af, Depth= 3.94"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.340	98	Roofs, HSG C
0.310	98	Paved parking, HSG C
0.250	98	Sidewalk, HSG C
4.430	74	>75% Grass cover, Good, HSG C
0.110	70	Woods, Good, HSG C
0.230	98	Roofs, HSG D
0.010	98	Driveway, HSG D
0.100	98	Sidewalk, HSG D
0.740	80	>75% Grass cover, Good, HSG D
0.140	77	Woods, Good, HSG D
6.660	79	Weighted Average
5.420		81.38% Pervious Area
1.240		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	300	0.0500	0.19		Sheet Flow, Segment AB Grass: Dense n=0.240 P2= 2.70"
0.4	72	0.0490	3.32		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.1	19	0.0380	3.96		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.9	340	0.0260	6.21	37.27	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=2.00' D=1.00' Z= 4.0' /' Top.W=10.00' n=0.027
27.3	731	Total			

Subcatchment 61.1: Sandhill Post-Development



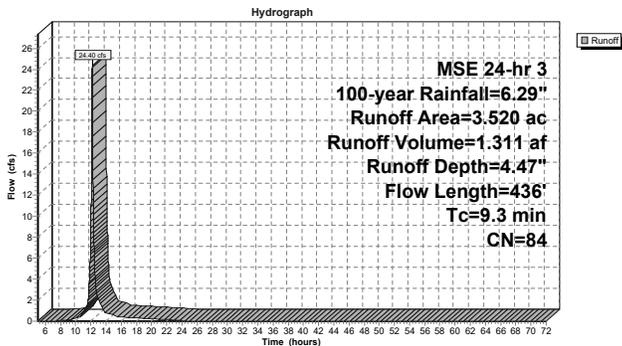
Summary for Subcatchment 61.2: Sandhill Post-Development

Runoff = 24.40 cfs @ 12.17 hrs, Volume= 1.311 af, Depth= 4.47"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.170	98	Roofs, HSG C
0.160	98	Paved parking, HSG C
0.300	98	Paved roads w/curbs & sewers, HSG C
* 0.090	98	Sidewalk, HSG C
1.110	74	>75% Grass cover, Good, HSG C
* 0.520	98	Existing Impervious ROW, HSG C
* 0.690	74	>75% Grass cover ROW, Good, HSG C
* 0.020	98	Sidewalk, HSG D
0.180	80	>75% Grass cover, Good, HSG D
* 0.110	98	Existing Impervious ROW, HSG D
* 0.170	80	>75% Grass cover ROW, Good, HSG D
3.520	84	Weighted Average
2.150		61.08% Pervious Area
1.370		38.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	53	0.0368	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.7	146	0.0312	3.59		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment CD 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
9.3	436	Total			

Subcatchment 61.2: Sandhill Post-Development



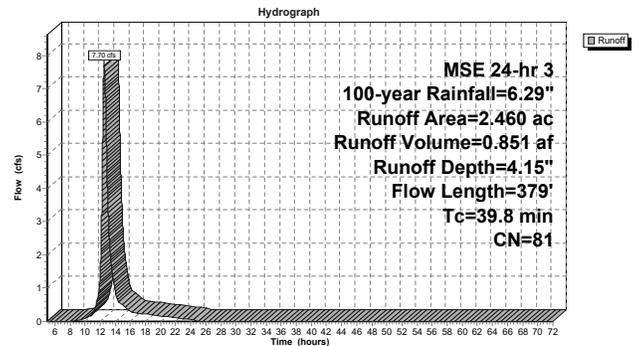
Summary for Subcatchment 62.1: Off-Site Residential

Runoff = 7.70 cfs @ 12.52 hrs, Volume= 0.851 af, Depth= 4.15"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.770	84	1 acre lots, 20% imp, HSG D
1.690	79	1 acre lots, 20% imp, HSG C
2.460	81	Weighted Average
1.968		80.00% Pervious Area
0.492		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.4	79	0.0406	3.02		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
39.8	379	Total			

Subcatchment 62.1: Off-Site Residential



Summary for Subcatchment 62.2: Off-Site Residential

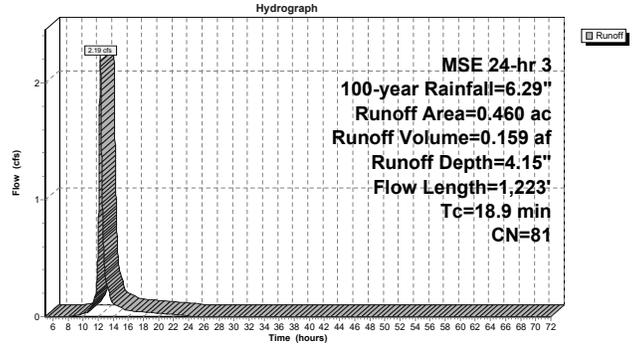
Runoff = 2.19 cfs @ 12.28 hrs, Volume= 0.159 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.180	84	1 acre lots, 20% imp, HSG D
0.280	79	1 acre lots, 20% imp, HSG C
0.460	81	Weighted Average
0.368		80.00% Pervious Area
0.092		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	82	0.0251	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.8	114	0.0258	2.41		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
1.0	245	0.0369	3.90		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
3.3	460	0.0238	2.31		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
0.3	60	0.0026	3.28	5.80	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	25	0.0026	4.62	22.66	Pipe Channel, Segment FG 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment HI Grassed Waterway Kv= 15.0 fps
18.9	1,223	Total			

Subcatchment 62.2: Off-Site Residential



Summary for Subcatchment 63: Off-Site Walnut Grove

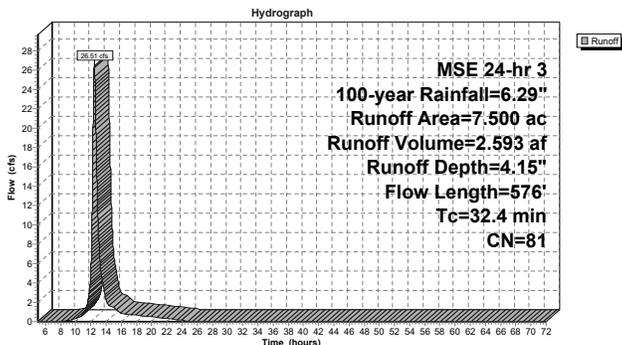
Runoff = 26.51 cfs @ 12.45 hrs, Volume= 2.593 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
3.180	84	1 acre lots, 20% imp, HSG D
4.320	79	1 acre lots, 20% imp, HSG C
7.500	81	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576	Total			

Subcatchment 63: Off-Site Walnut Grove



Summary for Subcatchment 71.1: Sandhill Post-Development

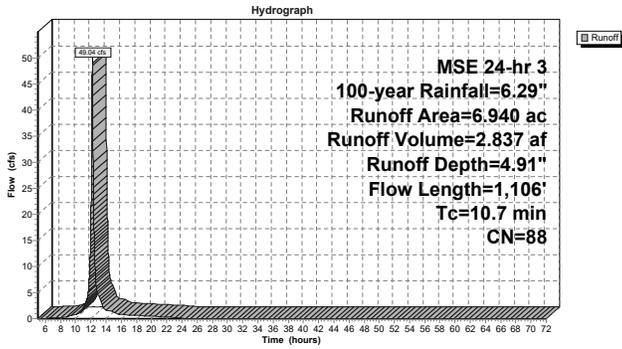
Runoff = 49.04 cfs @ 12.18 hrs, Volume= 2.837 af, Depth= 4.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.450	98	Roofs, HSG C
0.500	98	Driveways, HSG C
0.990	98	Paved roads w/curbs & sewers, HSG C
0.140	98	Sidewalk, HSG C
1.880	74	>75% Grass cover, Good, HSG C
0.020	98	Existing Impervious ROW, HSG C
0.530	98	Roofs, HSG D
0.520	98	Driveway, HSG D
0.600	98	Paved roads w/curbs & sewers, HSG D
0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
6.940	88	Weighted Average
3.130		45.10% Pervious Area
3.810		54.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.0490	0.14		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.3	155	0.0100	2.03		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	279	0.0290	8.37	6.57	Pipe Channel, Segment CD 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	148	0.0200	8.06	9.90	Pipe Channel, Segment DE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	38	0.0100	6.44	11.38	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment FG 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	182	0.0033	5.20	25.53	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
10.7	1,106	Total			

Subcatchment 71.1: Sandhill Post-Development



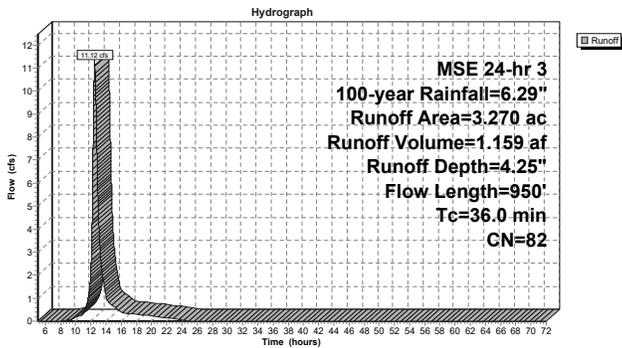
Summary for Subcatchment 71.2: Sandhill Post-Development

Runoff = 11.12 cfs @ 12.51 hrs, Volume= 1.159 af, Depth= 4.25"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
* 0.030	98	Driveways, HSG C
* 0.090	98	Sidewalk, HSG C
1.280	74	>75% Grass cover, Good, HSG C
0.290	98	Roofs, HSG D
* 0.030	98	Driveway, HSG D
* 0.060	98	Sidewalk, HSG D
1.250	80	>75% Grass cover, Good, HSG D
3.270	82	Weighted Average
2.530		77.37% Pervious Area
0.740		22.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	148	0.0110	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
3.1	12	0.0166	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
2.9	43	0.2400	0.24		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
1.2	233	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.2	53	0.0042	3.70	4.54	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.9	235	0.0030	4.27	13.42	Pipe Channel, Segment GH 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.0	950	Total			

Subcatchment 71.2: Sandhill Post-Development



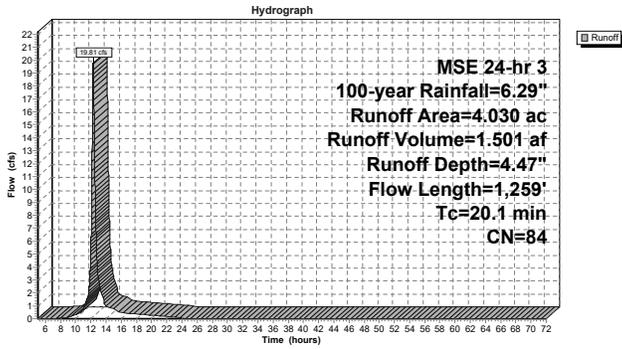
Summary for Subcatchment 71.3: Sandhill Post-Development

Runoff = 19.81 cfs @ 12.29 hrs, Volume= 1.501 af, Depth= 4.47"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.530	98	Roofs, HSG D
* 0.020	98	Driveway, HSG D
* 0.260	98	Sidewalk, HSG D
3.220	80	>75% Grass cover, Good, HSG D
4.030	84	Weighted Average
3.220		79.90% Pervious Area
0.810		20.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	131	0.0408	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
2.4	30	0.1967	0.21		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
1.3	241	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.3	158	0.0300	8.51	6.69	Pipe Channel, Segment EF 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	150	0.0200	8.06	9.90	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	115	0.0090	6.11	10.80	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment HI 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.2	182	0.0330	16.44	80.72	Pipe Channel, Segment IJ 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
20.1	1,259	Total			

Subcatchment 71.3: Sandhill Post-Development



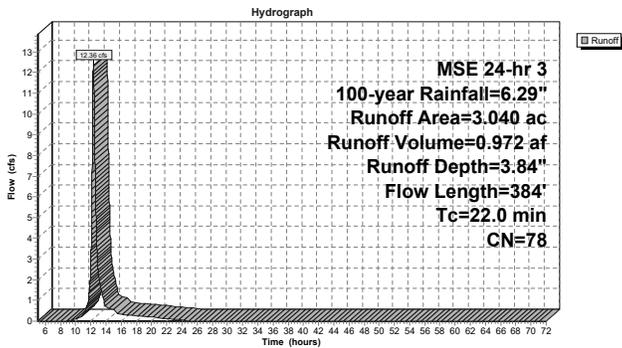
Summary for Subcatchment 71.4: Sandhill Post-Development

Runoff = 12.36 cfs @ 12.32 hrs, Volume= 0.972 af, Depth= 3.84"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.100	98	Roofs, HSG C
* 0.010	98	Driveways, HSG C
* 0.100	98	Sidewalk, HSG C
2.200	74	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	96	New Gravel ROW, HSG C
* 0.100	98	Existing Impervious ROW, HSG C
* 0.240	74	>75% Grass cover ROW, Good, HSG C
0.110	98	Roofs, HSG D
* 0.010	98	Sidewalk, HSG D
0.130	80	>75% Grass cover, Good, HSG D
3.040	78	Weighted Average
2.580		84.87% Pervious Area
0.460		15.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	151	0.0240	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.7	151	0.0092	1.44		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.2	82	0.0076	5.61	9.92	Pipe Channel, Segment CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38" n= 0.012
22.0	384		Total		

Subcatchment 71.4: Sandhill Post-Development



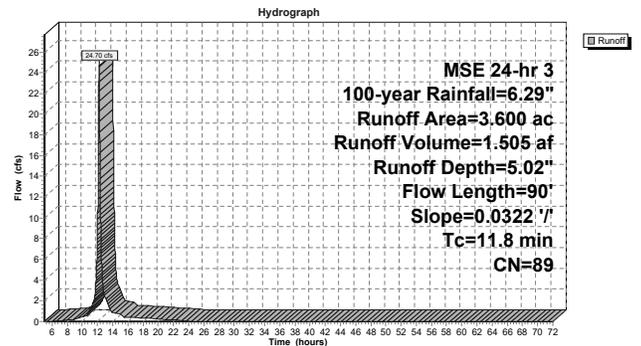
Summary for Subcatchment 71.5: Sandhill Post-Development

Runoff = 24.70 cfs @ 12.19 hrs, Volume= 1.505 af, Depth= 5.02"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.150	98	Roofs, HSG C
* 0.090	98	Sidewalk, HSG C
1.400	74	>75% Grass cover, Good, HSG C
1.960	98	Water Surface, HSG C
3.600	89	Weighted Average
1.400		38.89% Pervious Area
2.200		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	90	0.0322	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 71.5: Sandhill Post-Development



Summary for Subcatchment 71.6: Sandhill Post-Development

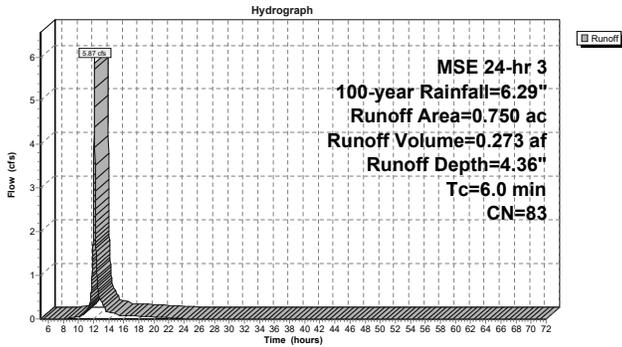
Runoff = 5.87 cfs @ 12.13 hrs, Volume= 0.273 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.260	74	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	96	New Gravel ROW, HSG C
* 0.230	98	Existing Impervious ROW, HSG C
* 0.220	74	>75% Grass cover ROW, Good, HSG C
0.750	83	Weighted Average
0.490		65.33% Pervious Area
0.260		34.67% Impervious Area

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

Subcatchment 71.6: Sandhill Post-Development



Summary for Subcatchment 72.1: Off-Site Residential

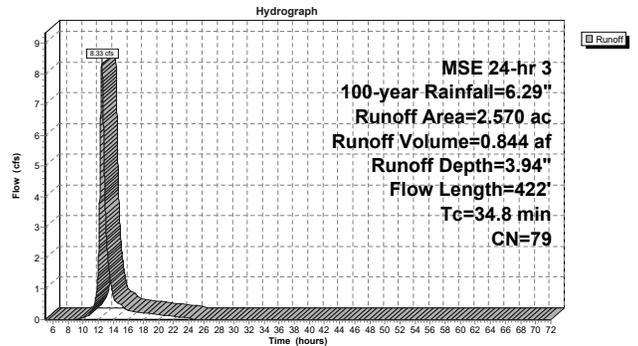
Runoff = 8.33 cfs @ 12.49 hrs, Volume= 0.844 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
1.060	82	2 acre lots, 12% imp, HSG D
1.510	77	2 acre lots, 12% imp, HSG C
2.570	79	Weighted Average
2.262		88.00% Pervious Area
0.308		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
34.8	422				Total

Subcatchment 72.1: Off-Site Residential



Summary for Subcatchment 72.2: Off-Site Residential

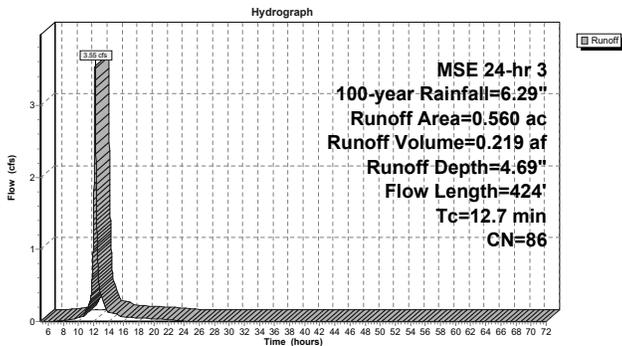
Runoff = 3.55 cfs @ 12.20 hrs, Volume= 0.219 af, Depth= 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.060	82	2 acre lots, 12% imp, HSG D
0.130	93	Paved roads w/open ditches, 50% imp, HSG D
0.160	92	Paved roads w/open ditches, 50% imp, HSG C
0.210	77	2 acre lots, 12% imp, HSG C
0.560	86	Weighted Average
0.383		68.32% Pervious Area
0.177		31.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	84	0.0950	0.13		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.8	340	0.0450	3.18		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
12.7	424				Total

Subcatchment 72.2: Off-Site Residential



Summary for Subcatchment 81.1: Sandhill Post-Development

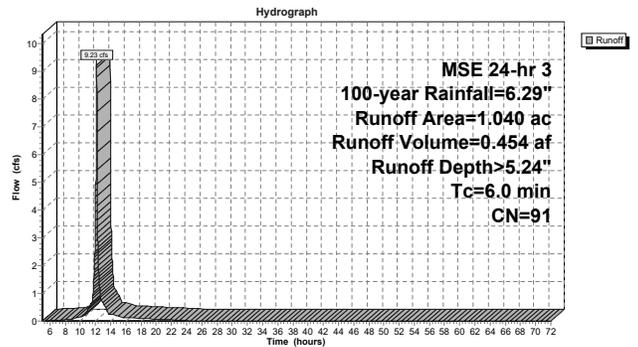
Runoff = 9.23 cfs @ 12.13 hrs, Volume= 0.454 af, Depth= 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.070	98	Roofs, HSG C
* 0.040	98	Driveways, HSG C
0.020	98	Paved roads w/curbs & sewers, HSG C
* 0.010	98	Sidewalk, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.120	98	Roofs, HSG D
* 0.150	98	Driveway, HSG D
0.240	98	Paved roads w/curbs & sewers, HSG D
* 0.010	98	Sidewalk, HSG D
0.280	80	>75% Grass cover, Good, HSG D
1.040	91	Weighted Average
0.380		36.54% Pervious Area
0.660		63.46% Impervious Area

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

Subcatchment 81.1: Sandhill Post-Development



Summary for Subcatchment 81.2: Sandhill Post-Development

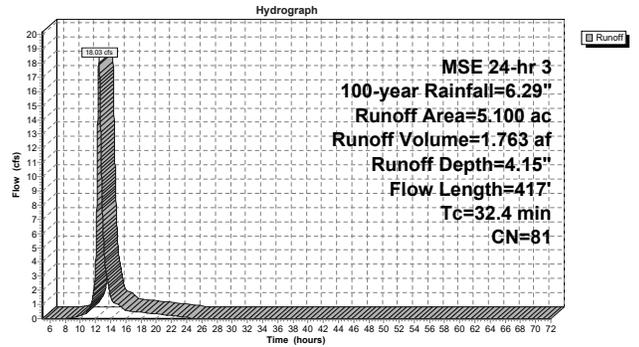
Runoff = 18.03 cfs @ 12.45 hrs, Volume= 1.763 af, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.220	98	Roofs, HSG C
0.090	98	Sidewalk, HSG C
1.140	74	>75% Grass cover, Good, HSG C
0.320	98	Water Surface, HSG C
0.350	70	Woods, Good, HSG C
0.100	98	Roofs, HSG D
0.030	98	Driveway, HSG D
0.160	98	Sidewalk, HSG D
2.410	80	>75% Grass cover, Good, HSG D
0.030	98	Water Surface, HSG D
0.250	77	Woods, Good, HSG D
5.100	81	Weighted Average
4.150		81.37% Pervious Area
0.950		18.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	136	0.0250	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
9.9	60	0.0223	0.10		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.2	47	0.2360	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	134	0.0110	2.97	8.91	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.1	32	0.0095	5.56	6.82	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
32.4	417				Total

Subcatchment 81.2: Sandhill Post-Development



Summary for Subcatchment 81.3: Sandhill Post-Development

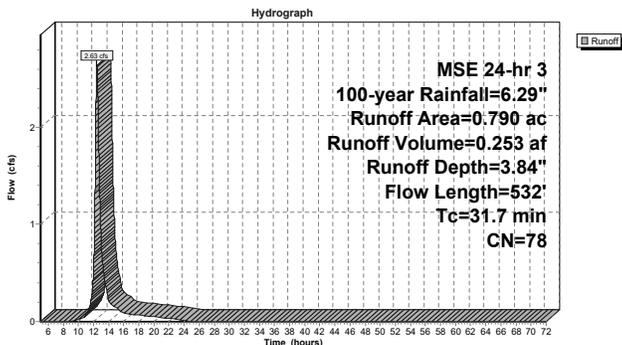
Runoff = 2.63 cfs @ 12.44 hrs, Volume= 0.253 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.040	98	Sidewalk, HSG C
0.130	74	>75% Grass cover, Good, HSG C
0.150	70	Woods, Good, HSG C
0.050	98	Sidewalk, HSG D
0.220	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.790	78	Weighted Average
0.700		88.61% Pervious Area
0.090		11.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	300	0.0950	0.17		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.5	232	0.0300	2.60		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
31.7	532				Total

Subcatchment 81.3: Sandhill Post-Development



Summary for Subcatchment 81.4: Sandhill Post-Development

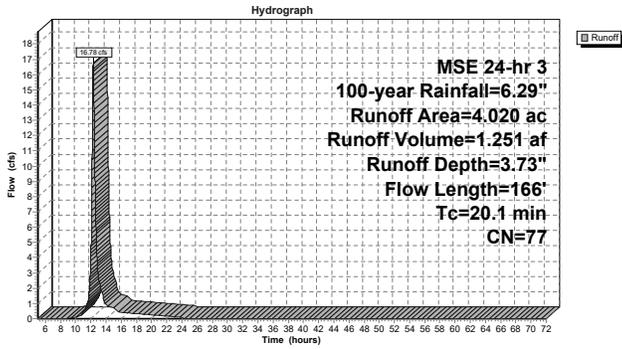
Runoff = 16.78 cfs @ 12.30 hrs, Volume= 1.251 af, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.290	98	Roofs, HSG C
0.050	98	Driveways, HSG C
0.090	98	Sidewalk, HSG C
2.330	74	>75% Grass cover, Good, HSG C
0.330	70	Woods, Good, HSG C
0.080	98	Sidewalk, HSG D
0.850	77	Woods, Good, HSG D
4.020	77	Weighted Average
3.510		87.31% Pervious Area
0.510		12.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	39	0.0610	0.09		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.2	9	0.0200	0.78		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
12.9	118	0.1240	0.15		Sheet Flow, Segment CD Woods: Light underbrush n= 0.400 P2= 2.70"
20.1	166				Total

Subcatchment 81.4: Sandhill Post-Development



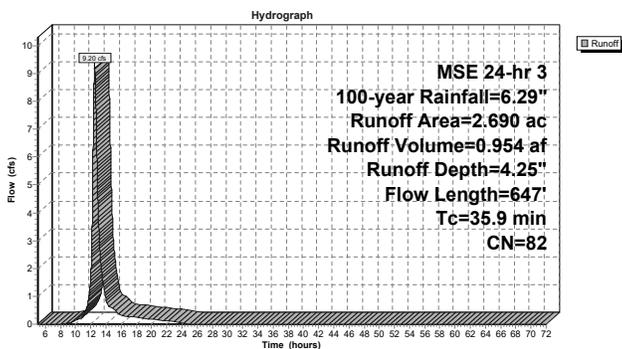
Summary for Subcatchment 82.1: Off-Site Residential

Runoff = 9.20 cfs @ 12.49 hrs, Volume= 0.954 af, Depth= 4.25"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
2.630	82	2 acre lots, 12% imp, HSG D
0.060	77	2 acre lots, 12% imp, HSG C
2.690	82	Weighted Average
2.367		88.00% Pervious Area
0.323		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	121	0.0867	1.47		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.4	40	0.1120	1.67		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
1.3	178	0.0220	2.22		Shallow Concentrated Flow, Segment EF Grassed Waterway Kv= 15.0 fps
35.9	647	Total			

Subcatchment 82.1: Off-Site Residential



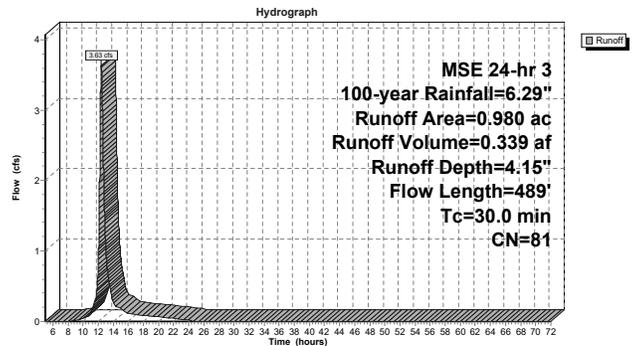
Summary for Subcatchment 82.2: Off-Site Residential

Runoff = 3.63 cfs @ 12.43 hrs, Volume= 0.339 af, Depth= 4.15"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.770	82	2 acre lots, 12% imp, HSG D
0.210	77	2 acre lots, 12% imp, HSG C
0.980	81	Weighted Average
0.862		88.00% Pervious Area
0.118		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	300	0.1120	0.18		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.0	85	0.0830	1.44		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.7	104	0.0288	2.55		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
30.0	489	Total			

Subcatchment 82.2: Off-Site Residential



Summary for Subcatchment 82.3: Off-Site Residential

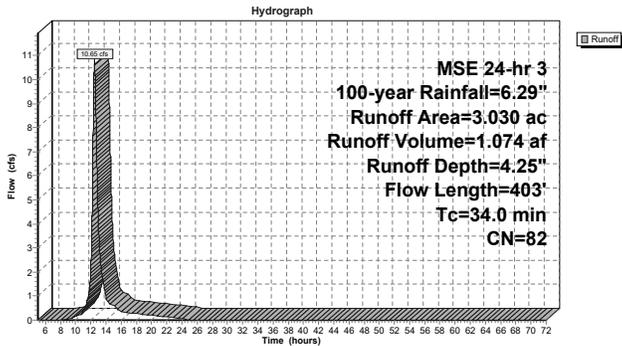
Runoff = 10.65 cfs @ 12.47 hrs, Volume= 1.074 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
2.730	82	2 acre lots, 12% imp, HSG D
0.300	77	2 acre lots, 12% imp, HSG C
3.030	82	Weighted Average
2.666		88.00% Pervious Area
0.364		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.0	300	0.0758	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.8	76	0.0960	1.55		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.2	19	0.1380	1.86		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
34.0	403				Total

Subcatchment 82.3: Off-Site Residential



Summary for Subcatchment 91.1: Sandhill Post-Development

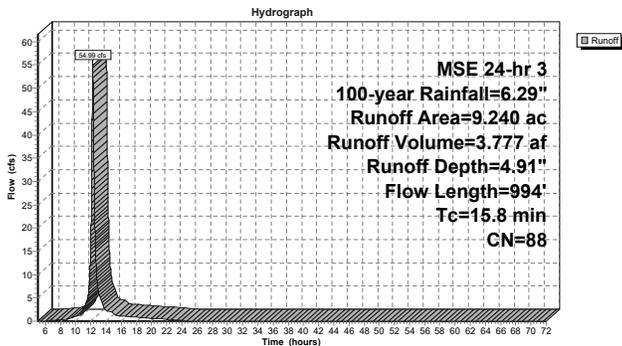
Runoff = 54.99 cfs @ 12.24 hrs, Volume= 3.777 af, Depth= 4.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
1.120	98	Roofs, HSG C
0.870	98	Driveways, HSG C
1.080	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
0.220	98	Sidewalk, HSG C
2.990	74	>75% Grass cover, Good, HSG C
0.060	98	Existing Impervious ROW, HSG C
0.140	74	>75% Grass cover ROW, Good, HSG C
0.550	98	Roofs, HSG D
0.900	98	Driveway, HSG D
0.270	98	Paved roads w/curbs & sewers, HSG D
0.070	98	Sidewalk, HSG D
0.960	80	>75% Grass cover, Good, HSG D
9.240	88	Weighted Average
4.100		44.37% Pervious Area
5.140		55.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	140	0.0540	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	57	0.0460	4.35		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.3	122	0.0132	6.55	8.04	Pipe Channel, Segment CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	152	0.0090	6.11	10.80	Pipe Channel, Segment DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	251	0.0080	6.98	21.92	Pipe Channel, Segment EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.8	994				Total

Subcatchment 91.1: Sandhill Post-Development



Summary for Subcatchment 91.2: Sandhill Post-Development

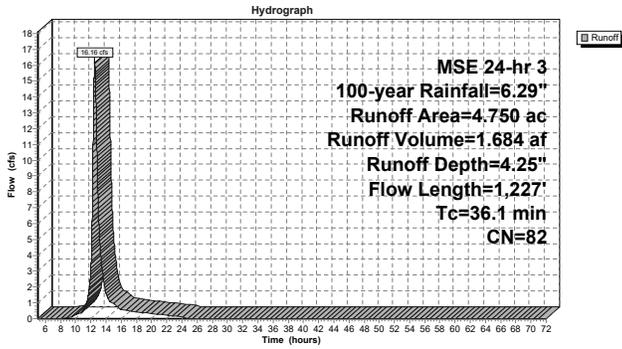
Runoff = 16.16 cfs @ 12.48 hrs, Volume= 1.684 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
0.110	98	Driveways, HSG C
0.110	98	Sidewalk, HSG C
1.700	74	>75% Grass cover, Good, HSG C
0.430	98	Roofs, HSG D
0.040	98	Driveway, HSG D
0.110	98	Sidewalk, HSG D
2.010	80	>75% Grass cover, Good, HSG D
4.750	82	Weighted Average
3.710		78.11% Pervious Area
1.040		21.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	184	0.0214	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
4.8	20	0.0150	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.7	56	0.2320	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	173	0.0145	3.41	10.23	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.8	280	0.0125	5.49	4.32	Pipe Channel, Segment FG 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.6	234	0.0100	6.44	11.38	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.1	1,227				Total

Subcatchment 91.2: Sandhill Post-Development



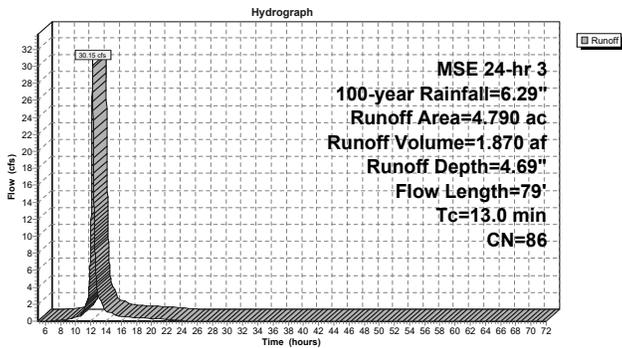
Summary for Subcatchment 91.3: Sandhill Post-Development

Runoff = 30.15 cfs @ 12.21 hrs, Volume= 1.870 af, Depth= 4.69"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.300	98	Roofs, HSG C
* 0.020	98	Driveways, HSG C
* 0.120	98	Sidewalk, HSG C
1.150	74	>75% Grass cover, Good, HSG C
0.350	98	Water Surface, HSG C
* 0.020	74	>75% Grass cover ROW, Good, HSG C
0.210	98	Roofs, HSG D
* 0.070	98	Driveway, HSG D
* 0.140	98	Sidewalk, HSG D
1.460	80	>75% Grass cover, Good, HSG D
* 0.180	80	>75% Grass cover ROW, Good, HSG D
0.770	98	Water Surface, HSG D
4.790	86	Weighted Average
2.810		58.66% Pervious Area
1.980		41.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	66	0.0160	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
0.6	5	0.1600	0.14		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
13.0	79	Total			

Subcatchment 91.3: Sandhill Post-Development



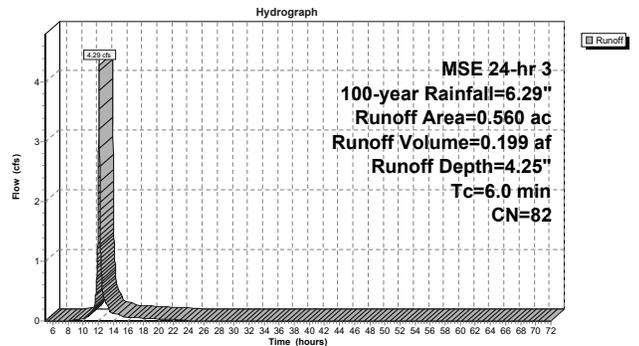
Summary for Subcatchment 91.4: Sandhill Post-Development

Runoff = 4.29 cfs @ 12.13 hrs, Volume= 0.199 af, Depth= 4.25"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.070	74	>75% Grass cover, Good, HSG C
0.030	98	Paved roads w/curbs & sewers, HSG C
0.010	96	Gravel surface, HSG C
* 0.220	74	>75% Grass cover ROW, Good, HSG C
* 0.050	98	Existing Impervious ROW, HSG C
0.010	80	>75% Grass cover, Good, HSG D
* 0.060	98	Existing Impervious ROW, HSG D
* 0.110	80	>75% Grass cover ROW, Good, HSG D
0.560	82	Weighted Average
0.420		75.00% Pervious Area
0.140		25.00% Impervious Area

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

Subcatchment 91.4: Sandhill Post-Development



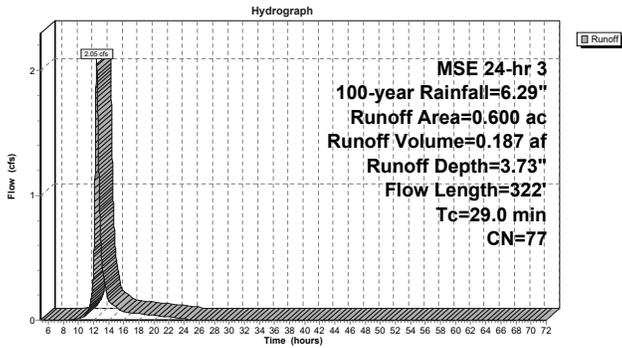
Summary for Subcatchment 100: Sandhill Post Development

Runoff = 2.05 cfs @ 12.41 hrs, Volume= 0.187 af, Depth= 3.73"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.030	98	Sidewalk/Access Lane, HSG C
0.150	74	>75% Grass cover, Good, HSG C
* 0.010	98	Sidewalk, HSG D
0.120	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.090	70	Woods, Good, HSG C
0.600	77	Weighted Average
0.560		93.33% Pervious Area
0.040		6.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	300	0.0380	0.17		Sheet Flow, Segment AB Grass: Dense n=0.240 P2= 2.70"
0.1	22	0.0880	4.45		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
29.0	322	Total			

Subcatchment 100: Sandhill Post Development



Summary for Pond 1P: Walnut Grove Stormwater Pond

Inflow Area = 7.500 ac, 20.00% Impervious, Inflow Depth = 4.15" for 100-year event
 Inflow = 26.51 cfs @ 12.45 hrs, Volume= 2.593 af
 Outflow = 15.17 cfs @ 12.77 hrs, Volume= 1.653 af, Atten= 43%, Lag= 19.4 min
 Primary = 1.76 cfs @ 12.77 hrs, Volume= 0.534 af
 Secondary = 13.41 cfs @ 12.77 hrs, Volume= 1.120 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.64' @ 12.77 hrs Surf.Area= 17,544 sf Storage= 53,781 cf

Plug-Flow detention time= 205.8 min calculated for 1.653 af (64% of inflow)
 Center-of-Mass det. time= 130.0 min (945.4 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	62,126 cf	Existing Active Storage Volume (Irregular), Listed below (Recalc)

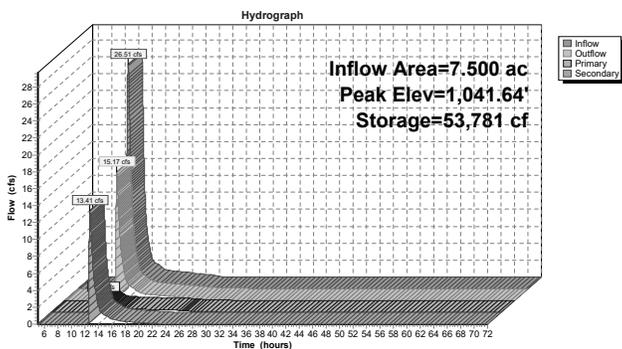
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.10	18,762	577.0	19,052	62,126	24,060

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069 1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=1.76 cfs @ 12.77 hrs HW=1,041.64' TW=1,027.38' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 1.76 cfs @ 3.03 fps)

Secondary OutFlow Max=13.41 cfs @ 12.77 hrs HW=1,041.64' TW=1,027.38' (Dynamic Tailwater)
 2=Asymmetrical Weir (Weir Controls 13.41 cfs @ 1.72 fps)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1R: Winkelman Road North Culvert

Inflow Area = 24.760 ac, 35.40% Impervious, Inflow Depth > 3.80" for 100-year event
 Inflow = 9.10 cfs @ 12.14 hrs, Volume= 7.833 af
 Outflow = 6.20 cfs @ 14.85 hrs, Volume= 7.833 af, Atten= 32%, Lag= 162.7 min
 Primary = 6.20 cfs @ 14.85 hrs, Volume= 7.833 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.75' @ 14.85 hrs Surf.Area= 9,144 sf Storage= 7,069 cf

Plug-Flow detention time= 10.2 min calculated for 7.832 af (100% of inflow)
 Center-of-Mass det. time= 10.0 min (1,480.9 - 1,471.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,025.97'	23,920 cf	Custom Stage Data (Irregular), Listed below (Recalc)

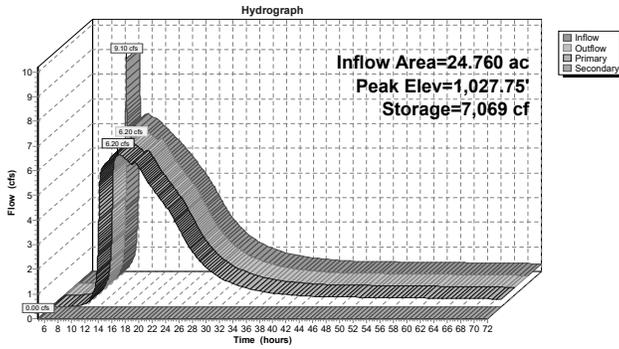
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	5,142	390.0	1,765	1,765	12,105
1,028.00	10,710	659.0	7,758	9,523	34,567
1,029.00	18,432	850.0	14,397	23,920	57,515

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=6.20 cfs @ 14.85 hrs HW=1,027.75' (Free Discharge)
 1=Culvert (Barrel Controls 6.20 cfs @ 3.56 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,025.97' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 1R: Winkleman Road North Culvert



Summary for Pond 60P: Lisbon Road Culvert

Inflow Area = 20,600 ac, 22.79% Impervious, Inflow Depth = 3.59" for 100-year event
 Inflow = 32.80 cfs @ 12.17 hrs, Volume= 6.160 af
 Outflow = 15.46 cfs @ 12.62 hrs, Volume= 6.160 af, Atten= 53%, Lag= 26.9 min
 Primary = 15.46 cfs @ 12.62 hrs, Volume= 6.160 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.60' @ 12.62 hrs Surf.Area= 23,618 sf Storage= 18,197 cf
 Plug-Flow detention time= 10.8 min calculated for 6.159 af (100% of inflow)
 Center-of-Mass det. time= 10.8 min (886.9 - 876.1)

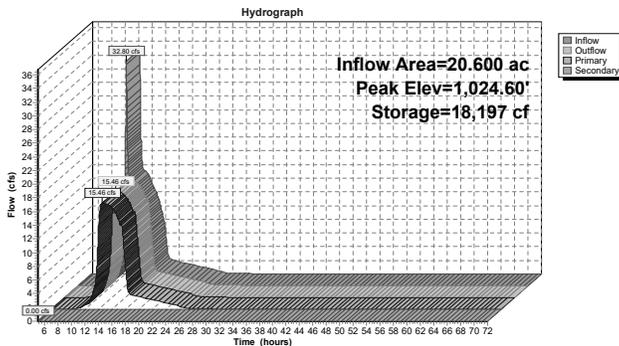
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	72,972 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,762	263.0	698	703	5,506
1,024.00	13,278	988.0	6,626	7,328	77,684
1,025.00	32,265	1,586.0	22,080	29,409	200,180
1,026.00	55,940	1,804.0	43,563	72,972	259,014

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.8' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=15.46 cfs @ 12.62 hrs HW=1,024.60' (Free Discharge)
 1=Culvert (Barrel Controls 15.46 cfs @ 4.99 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.67' (Free Discharge)
 2=Asymmetrical Weir (Controls 0.00 cfs)

Pond 60P: Lisbon Road Culvert



Summary for Pond 61.1P: SOUTH DRY POND

Inflow Area = 16,620 ac, 19.45% Impervious, Inflow Depth = 3.39" for 100-year event
 Inflow = 33.93 cfs @ 12.69 hrs, Volume= 4.690 af
 Outflow = 13.09 cfs @ 13.30 hrs, Volume= 4.690 af, Atten= 61%, Lag= 36.3 min
 Primary = 13.09 cfs @ 13.30 hrs, Volume= 4.690 af

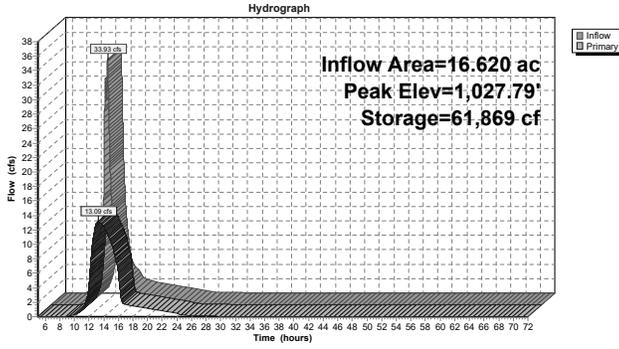
Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.79' @ 13.30 hrs Surf.Area= 39,751 sf Storage= 61,869 cf
 Plug-Flow detention time= 41.1 min calculated for 4.690 af (100% of inflow)
 Center-of-Mass det. time= 41.1 min (903.1 - 862.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.80'	114,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.80	10	10.0	0	0	10
1,024.00	45	25.0	5	5	52
1,025.00	4,302	289.0	1,596	1,601	6,650
1,026.00	14,928	555.0	9,081	10,682	24,521
1,027.00	31,978	829.0	22,918	33,600	54,706
1,028.00	41,963	930.0	36,858	70,458	68,871
1,029.00	46,095	1,019.0	44,013	114,471	82,709

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.68'	30.0" Round Culvert L= 109.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.68' / 1,022.40' S= 0.0026 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,022.84'	30.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.84' / 1,022.68' S= 0.0027 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#3	Device 2	1,022.91'	30.0" Round Culvert L= 24.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.91' / 1,022.84' S= 0.0028 1' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#4	Device 3	1,023.80'	18.0" Round Culvert L= 119.8' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,023.80' / 1,023.42' S= 0.0032 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=13.09 cfs @ 13.30 hrs HW=1,027.79' TW=1,024.57' (Dynamic Tailwater)
 1=Culvert (Passes 13.09 cfs of 42.38 cfs potential flow)
 2=Culvert (Passes 13.09 cfs of 42.38 cfs potential flow)
 3=Culvert (Passes 13.09 cfs of 42.38 cfs potential flow)
 4=Culvert (Barrel Controls 13.09 cfs @ 7.41 fps)

Pond 61.1P: SOUTH DRY POND



Summary for Pond 71.5P: NORTHWEST WET POND

Inflow Area = 23.450 ac, 35.52% Impervious, Inflow Depth = 4.51" for 100-year event
 Inflow = 107.56 cfs @ 12.20 hrs, Volume= 8,818 af
 Outflow = 6.01 cfs @ 13.94 hrs, Volume= 7,342 af, Atten= 94%, Lag= 104.0 min
 Primary = 6.01 cfs @ 13.94 hrs, Volume= 7,342 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,029.46' @ 13.98 hrs Surf.Area= 100,563 sf Storage= 275,156 cf
 Flood Elev= 1,029.50' Surf.Area= 100,772 sf Storage= 279,155 cf

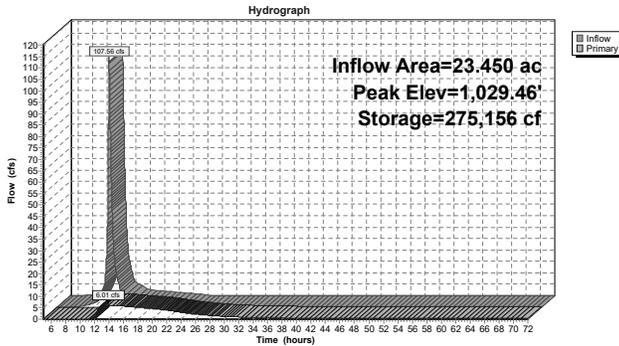
Plug-Flow detention time= 776.6 min calculated for 7.341 af (83% of inflow)
 Center-of-Mass det. time= 720.9 min (1,516.7 - 795.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,026.50'	382,566 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,026.50	85,502	1,222.0	0	0	85,502
1,027.50	90,480	1,253.0	87,979	87,979	91,732
1,028.50	95,573	1,283.0	93,015	180,994	97,917
1,029.50	100,772	1,310.0	98,161	279,155	103,638
1,030.50	106,073	1,336.0	103,411	382,566	109,270

Device	Routing	Invert	Outlet Devices
#1	Primary	1,026.50'	15.0" Round Culvert L= 36.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,026.50' / 1,026.40' S= 0.0027' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1,026.50'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,027.60'	13.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=6.01 cfs @ 13.94 hrs HW=1,029.46' TW=1,027.72' (Dynamic Tailwater)
 1=Culvert (Passes 6.01 cfs of 7.80 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.55 cfs @ 6.35 fps)
 3=Orifice/Grate (Orifice Controls 5.45 cfs @ 5.48 fps)

Pond 71.5P: NORTHWEST WET POND



Summary for Pond 81.2P: NORTHEAST WET POND

Inflow Area = 15.880 ac, 17.67% Impervious, Inflow Depth > 4.15" for 100-year event
 Inflow = 40.86 cfs @ 12.45 hrs, Volume= 5,496 af
 Outflow = 24.60 cfs @ 12.88 hrs, Volume= 5,471 af, Atten= 40%, Lag= 25.7 min
 Primary = 24.60 cfs @ 12.88 hrs, Volume= 5,471 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.79' @ 12.88 hrs Surf.Area= 29,694 sf Storage= 82,071 cf

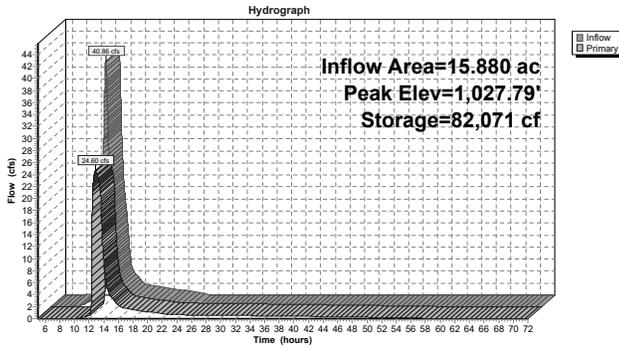
Plug-Flow detention time= 321.0 min calculated for 5.471 af (100% of inflow)
 Center-of-Mass det. time= 317.5 min (1,137.9 - 820.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,024.00'	121,316 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,024.00	14,944	567.0	0	0	14,944
1,025.00	17,393	609.0	16,153	16,153	18,918
1,026.00	22,177	747.0	19,737	35,890	33,825
1,027.00	26,059	839.0	24,092	59,982	45,463
1,028.00	30,682	975.0	28,339	88,321	65,116
1,029.00	35,365	1,078.0	32,996	121,316	81,975

Device	Routing	Invert	Outlet Devices
#1	Primary	1,024.00'	24.0" Round Culvert L= 55.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,024.00' / 1,023.80' S= 0.0036' /' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,024.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,026.50'	36.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=24.60 cfs @ 12.88 hrs HW=1,027.79' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 24.60 cfs @ 7.83 fps)
 2=Orifice/Grate (Passes < 0.80 cfs potential flow)
 3=Orifice/Grate (Passes < 38.70 cfs potential flow)

Pond 81.2P: NORTHEAST WET POND



Summary for Pond 81.4P: NORTH DRY POND

Inflow Area = 7.050 ac, 12.39% Impervious, Inflow Depth = 3.96" for 100-year event
 Inflow = 25.42 cfs @ 12.35 hrs, Volume= 2,325 af
 Outflow = 12.76 cfs @ 12.34 hrs, Volume= 2,325 af, Atten= 50%, Lag= 0.0 min
 Primary = 12.76 cfs @ 12.34 hrs, Volume= 2,325 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.94' @ 12.75 hrs Surf.Area= 14,582 sf Storage= 20,917 cf
 Flood Elev= 1,029.00' Surf.Area= 14,929 sf Storage= 21,834 cf

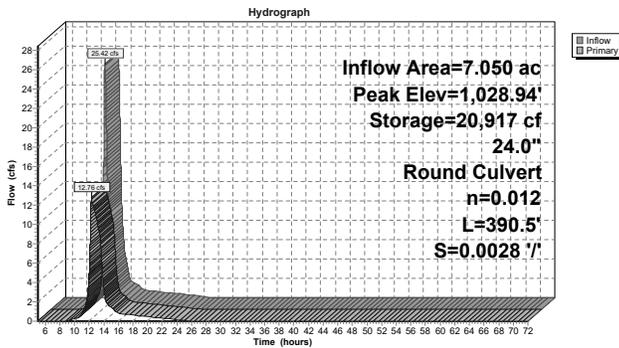
Plug-Flow detention time= 22.7 min calculated for 2,325 af (100% of inflow)
 Center-of-Mass det. time= 22.6 min (835.5 - 812.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.60'	40,190 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.60	10	5.0	0	0	10
1,026.00	642	92.0	98	98	682
1,027.00	4,663	306.0	2,345	2,443	7,463
1,028.00	9,843	557.0	7,094	9,536	24,705
1,029.00	14,929	868.0	12,298	21,834	59,979
1,030.00	22,010	1,004.0	18,355	40,190	80,261

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.60'	24.0" Round Culvert L= 390.5' RCP, end-section conforming to fill, Ke= 0.50 Inlet / Outlet Invert= 1,025.60' / 1,024.50' S= 0.0028 1' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=12.54 cfs @ 12.34 hrs HW=1,028.13' TW=1,026.85' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 12.54 cfs @ 4.07 fps)

Pond 81.4P: NORTH DRY POND



Summary for Pond 90P: Winkelman Road South Culvert

Inflow Area = 19,340 ac, 42.92% Impervious, Inflow Depth > 4.39" for 100-year event
 Inflow = 15.33 cfs @ 13.02 hrs, Volume= 7,069 af
 Outflow = 15.33 cfs @ 13.02 hrs, Volume= 7,069 af, Atten= 0%, Lag= 0.2 min
 Primary = 15.33 cfs @ 13.02 hrs, Volume= 7,069 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,023.83' @ 13.02 hrs Surf.Area= 263 sf Storage= 134 cf

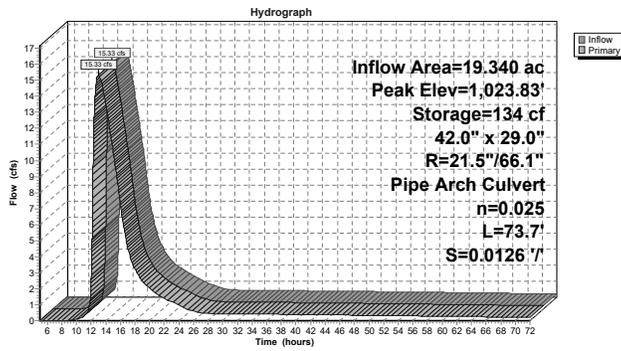
Plug-Flow detention time= 0.1 min calculated for 7,068 af (100% of inflow)
 Center-of-Mass det. time= 0.1 min (1,258.0 - 1,257.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.40'	7,855 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.40	0	0.0	0	0	0
1,023.00	58	29.0	12	12	67
1,024.00	325	135.0	173	185	1,453
1,025.00	1,142	257.0	692	877	5,264
1,026.00	3,045	376.0	2,017	2,894	11,267
1,027.00	7,166	644.0	4,961	7,855	33,026

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.40'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 73.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.40' / 1,021.47' S= 0.0126 1' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=15.33 cfs @ 13.02 hrs HW=1,023.83' (Free Discharge)
 1=Culvert (Barrel Controls 15.33 cfs @ 4.71 fps)

Pond 90P: Winkleman Road South Culvert



Summary for Pond 91.3P WET: SOUTH WET POND

Inflow Area = 18,780 ac, 43.45% Impervious, Inflow Depth = 4.68" for 100-year event
 Inflow = 93.17 cfs @ 12.23 hrs, Volume= 7,332 af
 Outflow = 15.02 cfs @ 13.04 hrs, Volume= 6,871 af, Atten= 84%, Lag= 48.8 min
 Primary = 15.02 cfs @ 13.04 hrs, Volume= 6,871 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.99' @ 13.04 hrs Surf.Area= 73,148 sf Storage= 186,965 cf

Plug-Flow detention time= 507.5 min calculated for 6.870 af (94% of inflow)
 Center-of-Mass det. time= 477.8 min (1,271.5 - 793.6)

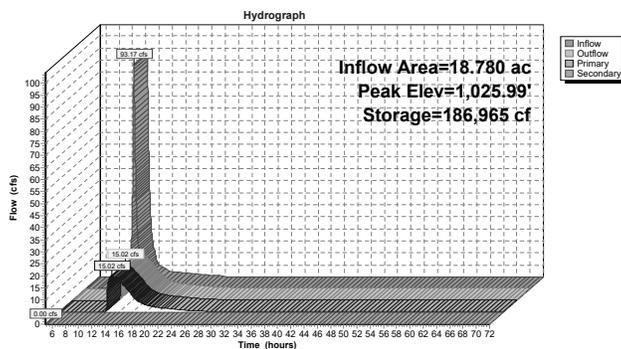
Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.00'	264,057 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.00	49,054	1,453.0	0	0	49,054
1,024.00	60,009	1,608.0	54,440	54,440	86,841
1,025.00	66,548	1,638.0	63,250	117,690	94,758
1,026.00	73,201	1,666.0	69,848	187,538	102,303
1,027.00	79,886	1,691.0	76,519	264,057	109,190

Device	Routing	Invert	Outlet Devices
#1	Primary	1,023.00'	30.0" Round Culvert L= 36.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,023.00' / 1,022.60' S= 0.0110 1/1 Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,023.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,024.25'	11.0" Vert. Orifice/Grate X 4.00 C= 0.600
#4	Secondary	1,026.00'	36.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=15.02 cfs @ 13.04 hrs HW=1,025.99' TW=1,023.83' (Dynamic Tailwater)
 1=Culvert (Passes 15.02 cfs of 30.39 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.62 cfs @ 7.09 fps)
 3=Orifice/Grate (Orifice Controls 14.40 cfs @ 5.46 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,023.00' TW=1,022.40' (Dynamic Tailwater)
 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 91.3P WET: SOUTH WET POND

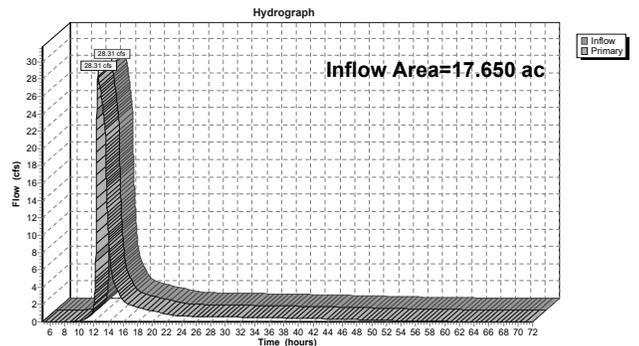


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 17,650 ac, 17.08% Impervious, Inflow Depth > 4.12" for 100-year event
 Inflow = 28.31 cfs @ 12.60 hrs, Volume= 6,062 af
 Primary = 28.31 cfs @ 12.60 hrs, Volume= 6,062 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale



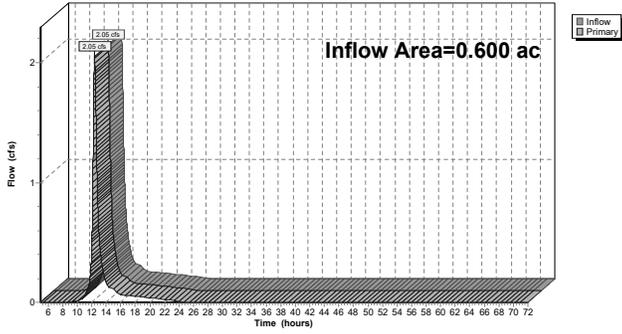
Summary for Link TL: Teri Lane

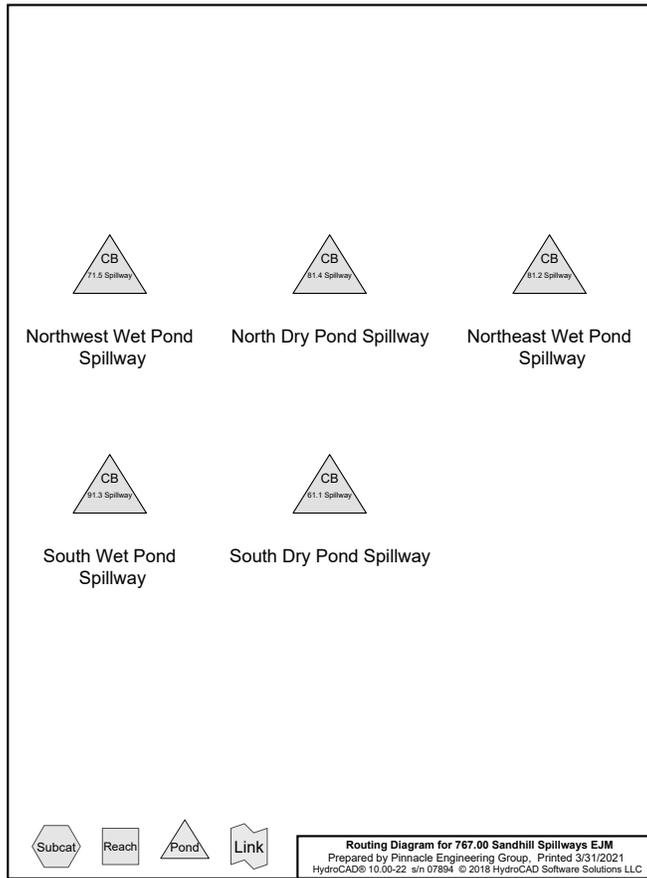
Inflow Area = 0.600 ac, 6.67% Impervious, Inflow Depth = 3.73" for 100-year event
Inflow = 2.05 cfs @ 12.41 hrs, Volume= 0.187 af
Primary = 2.05 cfs @ 12.41 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane

Hydrograph





Summary for Pond 61.1 Spillway: South Dry Pond Spillway

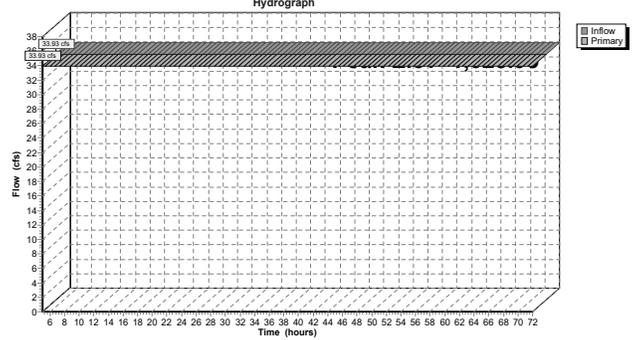
Inflow = 33.93 cfs @ 5.00 hrs, Volume= 187.905 af, Incl. 33.93 cfs Base Flow
 Outflow = 33.93 cfs @ 5.00 hrs, Volume= 187.905 af, Atten= 0%, Lag= 0.0 min
 Primary = 33.93 cfs @ 5.00 hrs, Volume= 187.905 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.95' @ 5.00 hrs
 Flood Elev= 1,029.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	14.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=33.93 cfs @ 5.00 hrs HW=1,028.95' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 33.93 cfs @ 2.56 fps)

Pond 61.1 Spillway: South Dry Pond Spillway



Summary for Pond 71.5 Spillway: Northwest Wet Pond Spillway

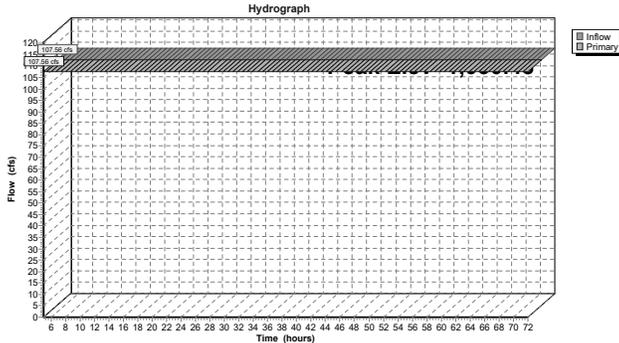
Inflow = 107.56 cfs @ 5.00 hrs, Volume= 595.669 af, Incl. 107.56 cfs Base Flow
 Outflow = 107.56 cfs @ 5.00 hrs, Volume= 595.669 af, Atten= 0%, Lag= 0.0 min
 Primary = 107.56 cfs @ 5.00 hrs, Volume= 595.669 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,030.48' @ 5.00 hrs
 Flood Elev= 1,030.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,029.50'	42.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=107.56 cfs @ 5.00 hrs HW=1,030.48' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 107.56 cfs @ 2.61 fps)

Pond 71.5 Spillway: Northwest Wet Pond Spillway



Summary for Pond 81.2 Spillway: Northeast Wet Pond Spillway

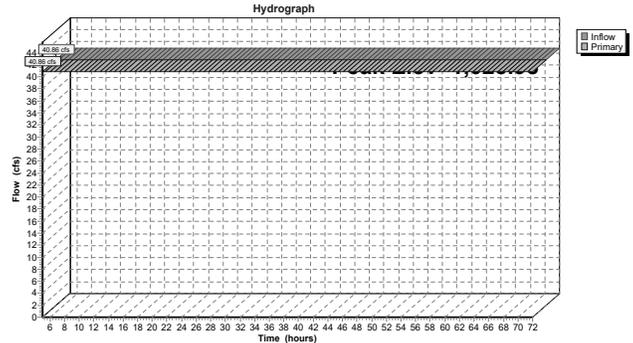
Inflow = 40.86 cfs @ 5.00 hrs, Volume= 226.283 af, Incl. 40.86 cfs Base Flow
 Outflow = 40.86 cfs @ 5.00 hrs, Volume= 226.283 af, Atten= 0%, Lag= 0.0 min
 Primary = 40.86 cfs @ 5.00 hrs, Volume= 226.283 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.98' @ 5.00 hrs
 Flood Elev= 1,029.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	16.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=40.86 cfs @ 5.00 hrs HW=1,028.98' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 40.86 cfs @ 2.60 fps)

Pond 81.2 Spillway: Northeast Wet Pond Spillway



Summary for Pond 81.4 Spillway: North Dry Pond Spillway

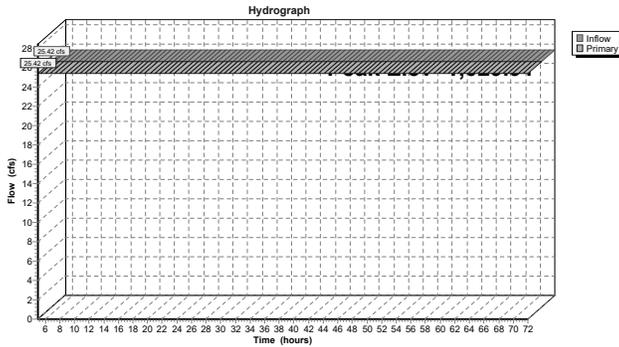
Inflow = 25.42 cfs @ 5.00 hrs, Volume= 140.776 af, Incl. 25.42 cfs Base Flow
 Outflow = 25.42 cfs @ 5.00 hrs, Volume= 140.776 af, Atten= 0%, Lag= 0.0 min
 Primary = 25.42 cfs @ 5.00 hrs, Volume= 140.776 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,029.91' @ 5.00 hrs
 Flood Elev= 1,030.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,029.00'	10.0' long x 1.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00
			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
			3.30 3.31 3.32

Primary OutFlow Max=25.42 cfs @ 5.00 hrs HW=1,029.91' (Free Discharge)
 1=Broad-Crested Rectangular Weir(Weir Controls 25.42 cfs @ 2.79 fps)

Pond 81.4 Spillway: North Dry Pond Spillway



Summary for Pond 91.3 Spillway: South Wet Pond Spillway

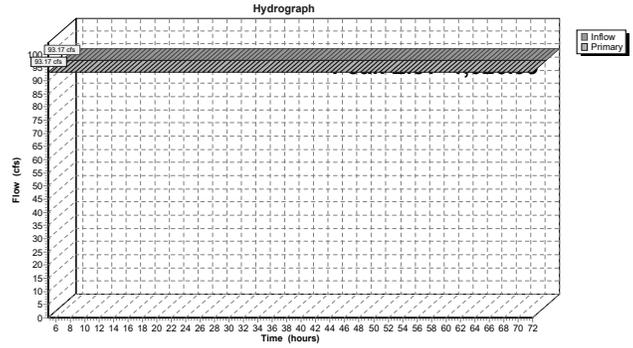
Inflow = 93.17 cfs @ 5.00 hrs, Volume= 515.977 af, Incl. 93.17 cfs Base Flow
 Outflow = 93.17 cfs @ 5.00 hrs, Volume= 515.977 af, Atten= 0%, Lag= 0.0 min
 Primary = 93.17 cfs @ 5.00 hrs, Volume= 515.977 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.99' @ 5.00 hrs
 Flood Elev= 1,027.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1,026.00'	36.0' long x 17.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

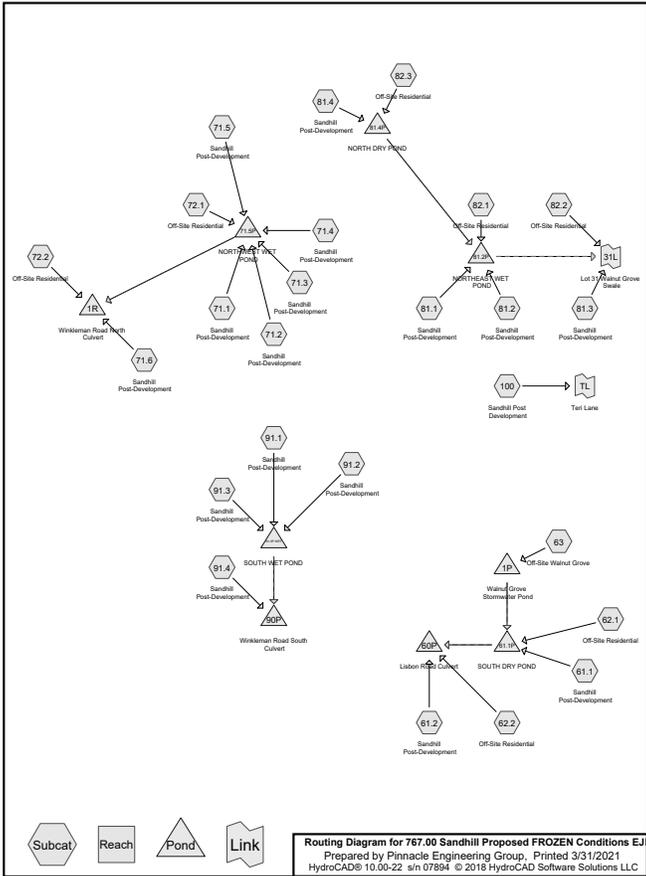
Primary OutFlow Max=93.17 cfs @ 5.00 hrs HW=1,026.99' (Free Discharge)
 1=Broad-Crested Rectangular Weir(Weir Controls 93.17 cfs @ 2.62 fps)

Pond 91.3 Spillway: South Wet Pond Spillway



Time span=5.00-72.00 hrs, dt=0.01 hrs, 6701 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

- Subcatchment61.1: Sandhill** Runoff Area=6.660 ac 100.00% Impervious Runoff Depth>5.98"
Flow Length=731' Tc=27.3 min CN=98 Runoff=33.58 cfs 3.318 af
- Subcatchment61.2: Sandhill** Runoff Area=3.520 ac 100.00% Impervious Runoff Depth>5.96"
Flow Length=436' Tc=9.3 min CN=98 Runoff=28.98 cfs 1.750 af
- Subcatchment62.1: Off-Site Residential** Runoff Area=2.460 ac 20.00% Impervious Runoff Depth>5.99"
Flow Length=379' Tc=39.8 min CN=98 Runoff=10.08 cfs 1.228 af
- Subcatchment62.2: Off-Site Residential** Runoff Area=0.460 ac 20.00% Impervious Runoff Depth>5.97"
Flow Length=1,223' Tc=18.9 min CN=98 Runoff=2.81 cfs 0.229 af
- Subcatchment63: Off-Site Walnut Grove** Runoff Area=7.500 ac 20.00% Impervious Runoff Depth>5.98"
Flow Length=576' Tc=32.4 min CN=98 Runoff=34.58 cfs 3.739 af
- Subcatchment71.1: Sandhill** Runoff Area=6.940 ac 100.00% Impervious Runoff Depth>5.97"
Flow Length=1,106' Tc=10.7 min CN=98 Runoff=54.37 cfs 3.450 af
- Subcatchment71.2: Sandhill** Runoff Area=3.270 ac 100.00% Impervious Runoff Depth>5.99"
Flow Length=950' Tc=36.0 min CN=98 Runoff=14.14 cfs 1.631 af
- Subcatchment71.3: Sandhill** Runoff Area=4.030 ac 100.00% Impervious Runoff Depth>5.97"
Flow Length=1,259' Tc=20.1 min CN=98 Runoff=23.88 cfs 2.006 af
- Subcatchment71.4: Sandhill** Runoff Area=3.040 ac 100.00% Impervious Runoff Depth>5.97"
Flow Length=384' Tc=22.0 min CN=98 Runoff=17.16 cfs 1.514 af
- Subcatchment71.5: Sandhill** Runoff Area=3.600 ac 100.00% Impervious Runoff Depth>5.97"
Slope=0.0322 7' Tc=11.8 min CN=98 Runoff=27.01 cfs 1.790 af
- Subcatchment71.6: Sandhill** Runoff Area=0.750 ac 100.00% Impervious Runoff Depth>5.96"
Tc=6.0 min CN=98 Runoff=7.04 cfs 0.373 af
- Subcatchment72.1: Off-Site Residential** Runoff Area=2.570 ac 12.00% Impervious Runoff Depth>5.98"
Flow Length=422' Tc=34.8 min CN=98 Runoff=11.33 cfs 1.282 af
- Subcatchment72.2: Off-Site Residential** Runoff Area=0.560 ac 31.68% Impervious Runoff Depth>5.97"
Flow Length=424' Tc=12.7 min CN=98 Runoff=4.09 cfs 0.278 af
- Subcatchment81.1: Sandhill** Runoff Area=1.040 ac 100.00% Impervious Runoff Depth>5.96"
Tc=6.0 min CN=98 Runoff=9.76 cfs 0.517 af
- Subcatchment81.2: Sandhill** Runoff Area=5.100 ac 100.00% Impervious Runoff Depth>5.98"
Flow Length=417' Tc=32.4 min CN=98 Runoff=23.51 cfs 2.543 af
- Subcatchment81.3: Sandhill** Runoff Area=0.790 ac 100.00% Impervious Runoff Depth>5.98"
Flow Length=532' Tc=31.7 min CN=98 Runoff=3.69 cfs 0.394 af



- Subcatchment81.4: Sandhill** Runoff Area=4.020 ac 100.00% Impervious Runoff Depth>5.97"
Flow Length=166' Tc=20.1 min CN=98 Runoff=23.82 cfs 2.001 af
- Subcatchment82.1: Off-Site Residential** Runoff Area=2.690 ac 12.00% Impervious Runoff Depth>5.99"
Flow Length=647' Tc=35.9 min CN=98 Runoff=11.70 cfs 1.342 af
- Subcatchment82.2: Off-Site Residential** Runoff Area=0.980 ac 12.00% Impervious Runoff Depth>5.98"
Flow Length=489' Tc=30.0 min CN=98 Runoff=4.70 cfs 0.488 af
- Subcatchment82.3: Off-Site Residential** Runoff Area=3.030 ac 12.00% Impervious Runoff Depth>5.98"
Flow Length=403' Tc=34.0 min CN=98 Runoff=13.53 cfs 1.511 af
- Subcatchment91.1: Sandhill** Runoff Area=9.240 ac 100.00% Impervious Runoff Depth>5.97"
Flow Length=994' Tc=15.8 min CN=98 Runoff=61.30 cfs 4.597 af
- Subcatchment91.2: Sandhill** Runoff Area=4.750 ac 100.00% Impervious Runoff Depth>5.99"
Flow Length=1,227' Tc=36.1 min CN=98 Runoff=20.60 cfs 2.369 af
- Subcatchment91.3: Sandhill** Runoff Area=4.790 ac 100.00% Impervious Runoff Depth>5.97"
Flow Length=79' Tc=13.0 min CN=98 Runoff=34.68 cfs 2.382 af
- Subcatchment91.4: Sandhill** Runoff Area=0.560 ac 100.00% Impervious Runoff Depth>5.96"
Tc=6.0 min CN=98 Runoff=5.26 cfs 0.278 af
- Subcatchment100: Sandhill Post** Runoff Area=0.600 ac 100.00% Impervious Runoff Depth>5.98"
Flow Length=322' Tc=29.0 min CN=98 Runoff=2.94 cfs 0.299 af
- Pond 1P: Walnut Grove Stormwater** Peak Elev=1,041.93' Storage=58,900 cf Inflow=34.58 cfs 3.739 af
Primary=2.88 cfs 0.645 af Secondary=29.71 cfs 2.155 af Outflow=32.59 cfs 2.799 af
- Pond 1R: Winkelman Road North** Peak Elev=1,028.90' Storage=22,145 cf Inflow=34.88 cfs 10.832 af
Primary=9.67 cfs 9.291 af Secondary=25.13 cfs 1.541 af Outflow=34.80 cfs 10.831 af
- Pond 60P: Lisbon Road Culvert** Peak Elev=1,025.33' Storage=41,198 cf Inflow=39.38 cfs 9.323 af
Primary=18.28 cfs 8.544 af Secondary=18.93 cfs 0.779 af Outflow=37.21 cfs 9.323 af
- Pond 61.1P: SOUTH DRY POND** Peak Elev=1,028.68' Storage=99,734 cf Inflow=72.10 cfs 7.345 af
Primary=14.35 cfs 6.172 af Secondary=20.81 cfs 1.173 af Outflow=34.97 cfs 7.345 af
- Pond 71.5P: NORTHWESTWET** Peak Elev=1,029.90' Storage=319,845 cf Inflow=128.09 cfs 11.672 af
Primary=6.54 cfs 7.717 af Secondary=28.65 cfs 2.463 af Outflow=33.85 cfs 10.181 af
- Pond 81.2P: NORTHEASTWET POND** Peak Elev=1,028.51' Storage=104,695 cf Inflow=58.26 cfs 7.913 af
Primary=28.36 cfs 7.308 af Secondary=15.92 cfs 0.579 af Outflow=44.27 cfs 7.887 af
- Pond 81.4P: NORTH DRY POND** Peak Elev=1,029.55' Storage=31,031 cf Inflow=34.87 cfs 3.512 af
Primary=12.95 cfs 3.089 af Secondary=11.15 cfs 0.423 af Outflow=22.72 cfs 3.512 af
- Pond 90P: Winkelman Road South Culvert** Peak Elev=1,025.62' Storage=1,893 cf Inflow=39.48 cfs 9.163 af
42.0" x 29.0", R=21.57/66.1" Pipe Arch Culvert n=0.025 L=73.7' S=0.0126 7' Outflow=38.25 cfs 9.163 af

- Pond 91.3P WET: SOUTH WET POND** Peak Elev=1,026.42' Storage=218,779 cf Inflow=107.42 cfs 9.348 af
Primary=16.55 cfs 7.555 af Secondary=26.35 cfs 1.330 af Outflow=38.95 cfs 8.885 af
- Link 31L: Lot 31 Walnut Grove Swale** Inflow=49.38 cfs 8.769 af
Primary=49.38 cfs 8.769 af
- Link TL: Teri Lane** Inflow=2.94 cfs 0.299 af
Primary=2.94 cfs 0.299 af

Total Runoff Area = 82.950 ac Runoff Volume = 41.307 af Average Runoff Depth = 5.98"
20.35% Pervious = 16.876 ac 79.65% Impervious = 66.074 ac

Summary for Subcatchment 61.1: Sandhill Post-Development

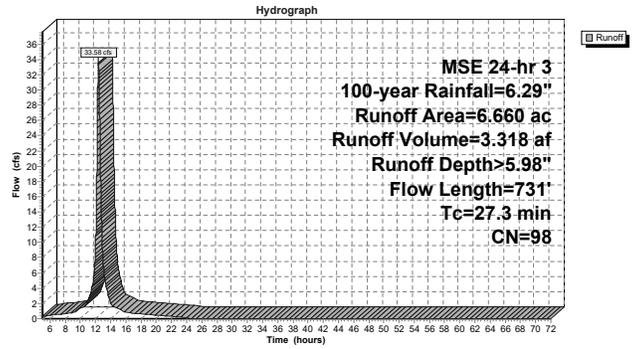
Runoff = 33.58 cfs @ 12.37 hrs, Volume= 3.318 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.340	98	Roofs, HSG C
0.310	98	Paved parking, HSG C
* 0.250	98	Sidewalk, HSG C
* 4.430	98	>75% Grass cover, Good, HSG C
* 0.110	98	Woods, Good, HSG C
0.230	98	Roofs, HSG D
* 0.010	98	Driveway, HSG D
* 0.100	98	Sidewalk, HSG D
* 0.740	98	>75% Grass cover, Good, HSG D
* 0.140	98	Woods, Good, HSG D
6.660	98	Weighted Average
6.660		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	300	0.0500	0.19		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.4	72	0.0490	3.32		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.1	19	0.0380	3.96		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.9	340	0.0260	6.21	37.27	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=2.00' D=1.00' Z= 4.0' Top.W=10.00' n= 0.027
27.3	731				Total

Subcatchment 61.1: Sandhill Post-Development



Summary for Subcatchment 61.2: Sandhill Post-Development

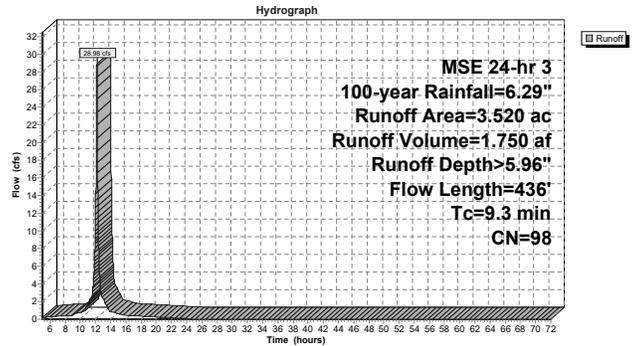
Runoff = 28.98 cfs @ 12.16 hrs, Volume= 1.750 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.170	98	Roofs, HSG C
0.160	98	Paved parking, HSG C
0.300	98	Paved roads w/curbs & sewers, HSG C
* 0.090	98	Sidewalk, HSG C
* 1.110	98	>75% Grass cover, Good, HSG C
* 0.520	98	Existing Impervious ROW, HSG C
* 0.690	98	>75% Grass cover ROW, Good, HSG C
* 0.020	98	Sidewalk, HSG D
* 0.180	98	>75% Grass cover, Good, HSG D
* 0.110	98	Existing Impervious ROW, HSG D
* 0.170	98	>75% Grass cover ROW, Good, HSG D
3.520	98	Weighted Average
3.520		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	53	0.0368	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.7	146	0.0312	3.59		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment CD 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
9.3	436				Total

Subcatchment 61.2: Sandhill Post-Development



Summary for Subcatchment 62.1: Off-Site Residential

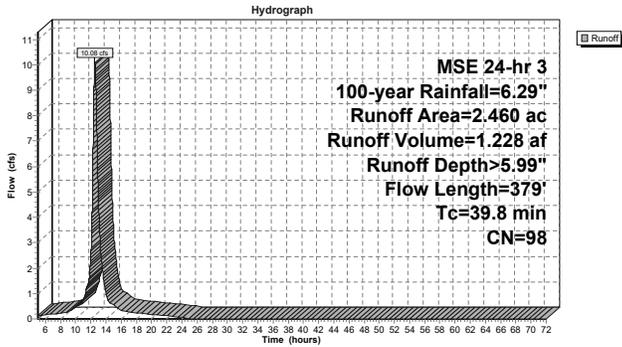
Runoff = 10.08 cfs @ 12.52 hrs, Volume= 1.228 af, Depth> 5.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.770	98	1 acre lots, 20% imp, HSG D
* 1.690	98	1 acre lots, 20% imp, HSG C
2.460	98	Weighted Average
1.968		80.00% Pervious Area
0.492		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	140	0.0171	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
17.8	160	0.0362	0.15		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.4	79	0.0406	3.02		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
39.8	379				Total

Subcatchment 62.1: Off-Site Residential



Summary for Subcatchment 62.2: Off-Site Residential

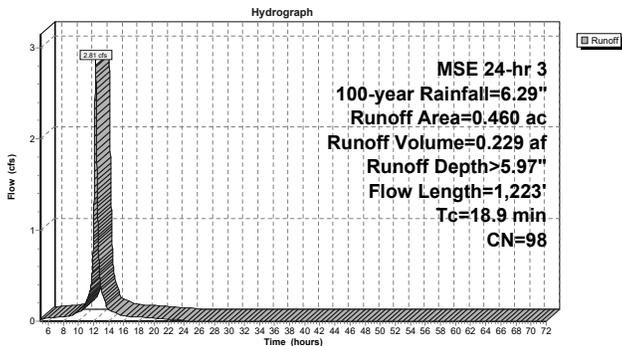
Runoff = 2.81 cfs @ 12.27 hrs, Volume= 0.229 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.180	98	1 acre lots, 20% imp, HSG D
* 0.280	98	1 acre lots, 20% imp, HSG C
0.460	98	Weighted Average
0.368		80.00% Pervious Area
0.092		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	82	0.0251	0.11		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.8	114	0.0258	2.41		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
1.0	245	0.0369	3.90		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
3.3	460	0.0238	2.31		Shallow Concentrated Flow, Segment DE Grassed Waterway Kv= 15.0 fps
0.3	60	0.0026	3.28	5.80	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38" n= 0.012
0.1	25	0.0026	4.62	22.66	Pipe Channel, Segment FG 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63" n= 0.012
0.6	169	0.0026	4.62	22.66	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63" n= 0.012
0.7	68	0.0107	1.55		Shallow Concentrated Flow, Segment HI Grassed Waterway Kv= 15.0 fps
18.9	1,223				Total

Subcatchment 62.2: Off-Site Residential



Summary for Subcatchment 63: Off-Site Walnut Grove

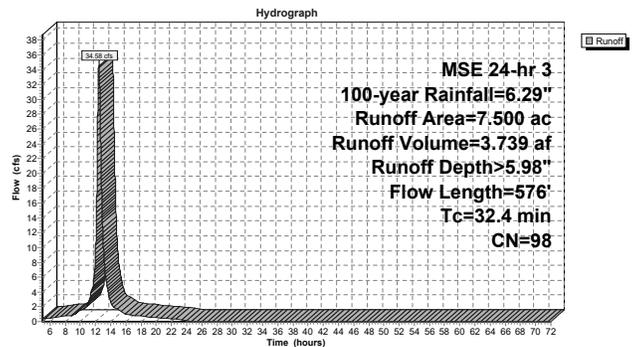
Runoff = 34.58 cfs @ 12.42 hrs, Volume= 3.739 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 3.180	98	1 acre lots, 20% imp, HSG D
* 4.320	98	1 acre lots, 20% imp, HSG C
7.500	98	Weighted Average
6.000		80.00% Pervious Area
1.500		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.7	150	0.0373	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
13.6	150	0.0627	0.18		Sheet Flow, Segment BC Grass: Dense n= 0.240 P2= 2.70"
0.2	52	0.0538	3.73		Shallow Concentrated Flow, Segment CD Unpaved Kv= 16.1 fps
1.9	224	0.0143	1.93		Shallow Concentrated Flow, Segment DE Unpaved Kv= 16.1 fps
32.4	576				Total

Subcatchment 63: Off-Site Walnut Grove



Summary for Subcatchment 71.1: Sandhill Post-Development

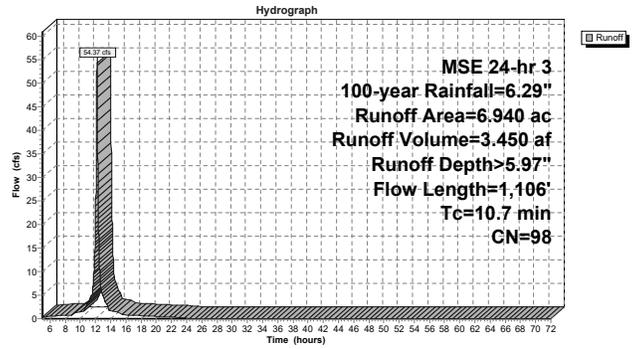
Runoff = 54.37 cfs @ 12.18 hrs, Volume= 3.450 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.450	98	Roofs, HSG C
0.500	98	Driveways, HSG C
0.990	98	Paved roads w/curbs & sewers, HSG C
0.140	98	Sidewalk, HSG C
1.880	98	>75% Grass cover, Good, HSG C
0.020	98	Existing Impervious ROW, HSG C
0.530	98	Roofs, HSG D
0.520	98	Driveway, HSG D
0.600	98	Paved roads w/curbs & sewers, HSG D
0.060	98	Sidewalk, HSG D
1.250	98	>75% Grass cover, Good, HSG D
6.940	98	Weighted Average
6.940		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	60	0.0490	0.14		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.3	155	0.0100	2.03		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.6	279	0.0290	8.37	6.57	Pipe Channel, Segment CD 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	148	0.0200	8.06	9.90	Pipe Channel, Segment DE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.1	38	0.0100	6.44	11.38	Pipe Channel, Segment EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment FG 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	182	0.0033	5.20	25.53	Pipe Channel, Segment GH 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
10.7	1,106	Total			

Subcatchment 71.1: Sandhill Post-Development



Summary for Subcatchment 71.2: Sandhill Post-Development

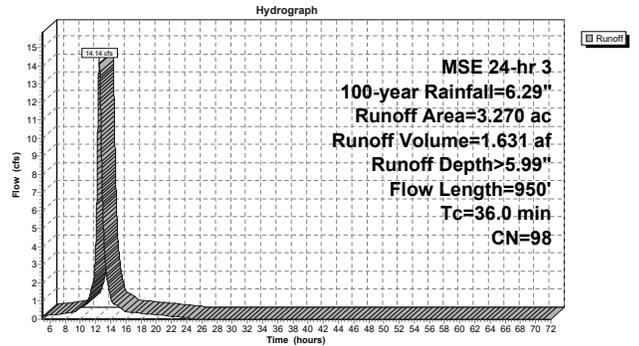
Runoff = 14.14 cfs @ 12.48 hrs, Volume= 1.631 af, Depth> 5.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
0.030	98	Driveways, HSG C
0.090	98	Sidewalk, HSG C
1.280	98	>75% Grass cover, Good, HSG C
0.290	98	Roofs, HSG D
0.030	98	Driveway, HSG D
0.060	98	Sidewalk, HSG D
1.250	98	>75% Grass cover, Good, HSG D
3.270	98	Weighted Average
3.270		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	148	0.0110	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
3.1	12	0.0166	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
2.9	43	0.2400	0.24		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
1.2	233	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0 ' Top.W=8.00' n= 0.027
0.2	53	0.0042	3.70	4.54	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.9	235	0.0030	4.27	13.42	Pipe Channel, Segment GH 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.0	950	Total			

Subcatchment 71.2: Sandhill Post-Development



Summary for Subcatchment 71.3: Sandhill Post-Development

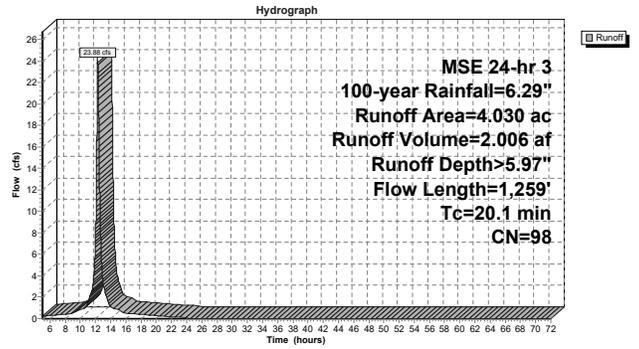
Runoff = 23.88 cfs @ 12.28 hrs, Volume= 2.006 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.530	98	Roofs, HSG D
* 0.020	98	Driveway, HSG D
* 0.260	98	Sidewalk, HSG D
* 3.220	98	>75% Grass cover, Good, HSG D
4.030	98	Weighted Average
4.030		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	131	0.0408	0.15		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
2.4	30	0.1967	0.21		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
1.3	241	0.0124	3.15	9.46	Trap/Vee/Rect Channel Flow, Segment DE Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.3	158	0.0300	8.51	6.69	Pipe Channel, Segment EF 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.3	150	0.0200	8.06	9.90	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.3	115	0.0090	6.11	10.80	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	26	0.0100	7.80	24.51	Pipe Channel, Segment HI 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.2	182	0.0330	16.44	80.72	Pipe Channel, Segment IJ 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012
0.5	218	0.0050	7.23	51.09	Pipe Channel, Segment JK 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
20.1	1,259	Total			

Subcatchment 71.3: Sandhill Post-Development



Summary for Subcatchment 71.4: Sandhill Post-Development

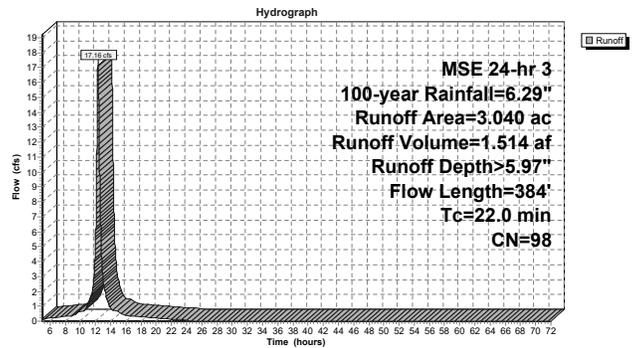
Runoff = 17.16 cfs @ 12.30 hrs, Volume= 1.514 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.100	98	Roofs, HSG C
* 0.010	98	Driveways, HSG C
* 0.100	98	Sidewalk, HSG C
* 2.200	98	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	98	New Gravel ROW, HSG C
* 0.100	98	Existing Impervious ROW, HSG C
* 0.240	98	>75% Grass cover ROW, Good, HSG C
0.110	98	Roofs, HSG D
* 0.010	98	Sidewalk, HSG D
* 0.130	98	>75% Grass cover, Good, HSG D
3.040	98	Weighted Average
3.040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	151	0.0240	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
1.7	151	0.0092	1.44		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
0.2	82	0.0076	5.61	9.92	Pipe Channel, Segment CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
22.0	384	Total			

Subcatchment 71.4: Sandhill Post-Development



Summary for Subcatchment 71.5: Sandhill Post-Development

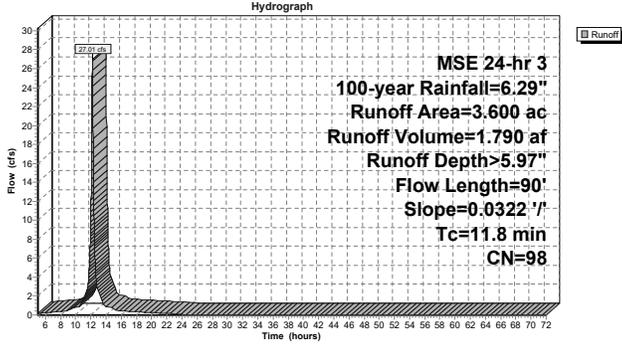
Runoff = 27.01 cfs @ 12.19 hrs, Volume= 1.790 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.150	98	Roofs, HSG C
* 0.090	98	Sidewalk, HSG C
* 1.400	98	>75% Grass cover, Good, HSG C
1.960	98	Water Surface, HSG C
3.600	98	Weighted Average
3.600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	90	0.0322	0.13		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 71.5: Sandhill Post-Development



Summary for Subcatchment 71.6: Sandhill Post-Development

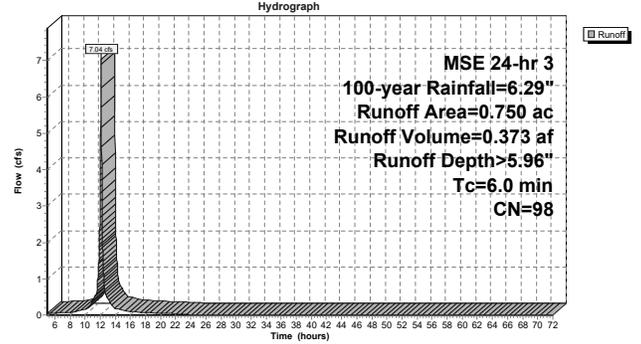
Runoff = 7.04 cfs @ 12.13 hrs, Volume= 0.373 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.260	98	>75% Grass cover, Good, HSG C
* 0.030	98	New Road ROW, HSG C
* 0.010	98	New Gravel ROW, HSG C
* 0.230	98	Existing Impervious ROW, HSG C
* 0.220	98	>75% Grass cover ROW, Good, HSG C
0.750	98	Weighted Average
0.750		100.00% Impervious Area

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

Subcatchment 71.6: Sandhill Post-Development



Summary for Subcatchment 72.1: Off-Site Residential

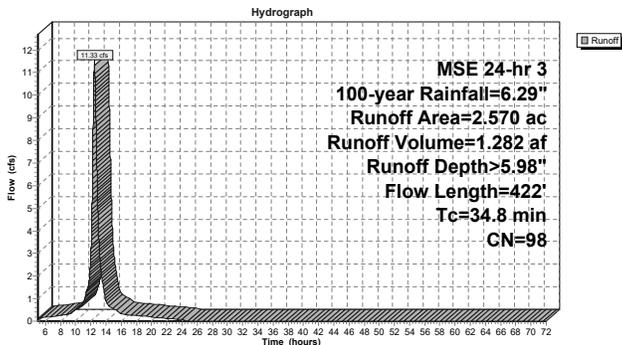
Runoff = 11.33 cfs @ 12.48 hrs, Volume= 1.282 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 1.060	98	2 acre lots, 12% imp, HSG D
* 1.510	98	2 acre lots, 12% imp, HSG C
2.570	98	Weighted Average
2.262		88.00% Pervious Area
0.308		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.9	300	0.0710	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	122	0.0180	2.16		Shallow Concentrated Flow, Segment BC Unpaved Kv= 16.1 fps
34.8	422				Total

Subcatchment 72.1: Off-Site Residential



Summary for Subcatchment 72.2: Off-Site Residential

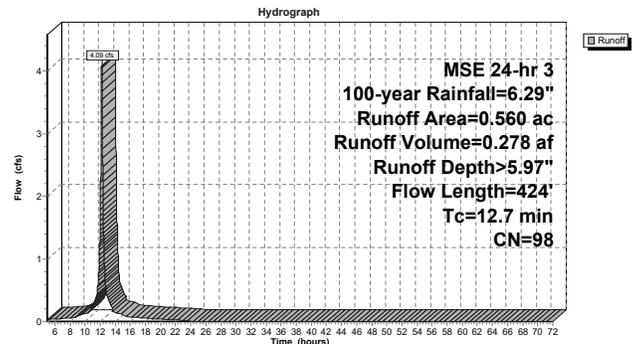
Runoff = 4.09 cfs @ 12.20 hrs, Volume= 0.278 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.060	98	2 acre lots, 12% imp, HSG D
* 0.130	98	Paved roads w/open ditches, 50% imp, HSG D
* 0.160	98	Paved roads w/open ditches, 50% imp, HSG C
* 0.210	98	2 acre lots, 12% imp, HSG C
0.560	98	Weighted Average
0.383		68.32% Pervious Area
0.177		31.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	84	0.0950	0.13		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.8	340	0.0450	3.18		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
12.7	424				Total

Subcatchment 72.2: Off-Site Residential



Summary for Subcatchment 81.1: Sandhill Post-Development

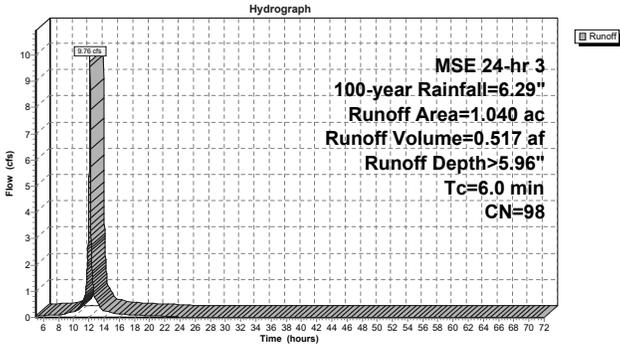
Runoff = 9.76 cfs @ 12.13 hrs, Volume= 0.517 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.070	98	Roofs, HSG C
* 0.040	98	Driveways, HSG C
* 0.020	98	Paved roads w/curbs & sewers, HSG C
* 0.010	98	Sidewalk, HSG C
* 0.100	98	>75% Grass cover, Good, HSG C
* 0.120	98	Roofs, HSG D
* 0.150	98	Driveway, HSG D
* 0.240	98	Paved roads w/curbs & sewers, HSG D
* 0.010	98	Sidewalk, HSG D
* 0.280	98	>75% Grass cover, Good, HSG D
1.040	98	Weighted Average
1.040		100.00% Impervious Area

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

Subcatchment 81.1: Sandhill Post-Development



Summary for Subcatchment 81.2: Sandhill Post-Development

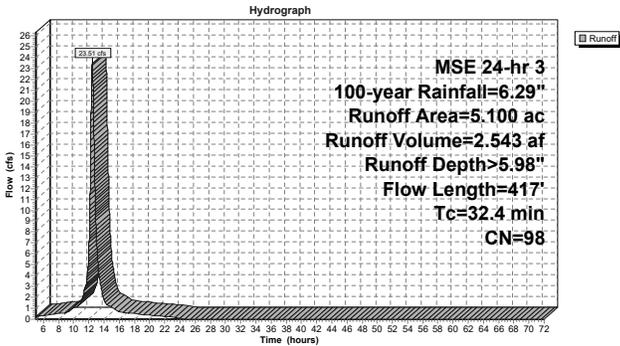
Runoff = 23.51 cfs @ 12.42 hrs, Volume= 2.543 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.220	98	Roofs, HSG C
* 0.090	98	Sidewalk, HSG C
* 1.140	98	>75% Grass cover, Good, HSG C
* 0.320	98	Water Surface, HSG C
* 0.350	98	Woods, Good, HSG C
* 0.100	98	Roofs, HSG D
* 0.030	98	Driveway, HSG D
* 0.160	98	Sidewalk, HSG D
* 2.410	98	>75% Grass cover, Good, HSG D
* 0.030	98	Water Surface, HSG D
* 0.250	98	Woods, Good, HSG D
5.100	98	Weighted Average
5.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	136	0.0250	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
9.9	60	0.0223	0.10		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.2	47	0.2360	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	134	0.0110	2.97	8.91	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.1	32	0.0095	5.56	6.82	Pipe Channel, Segment FG 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
32.4	417	Total			

Subcatchment 81.2: Sandhill Post-Development



Summary for Subcatchment 81.3: Sandhill Post-Development

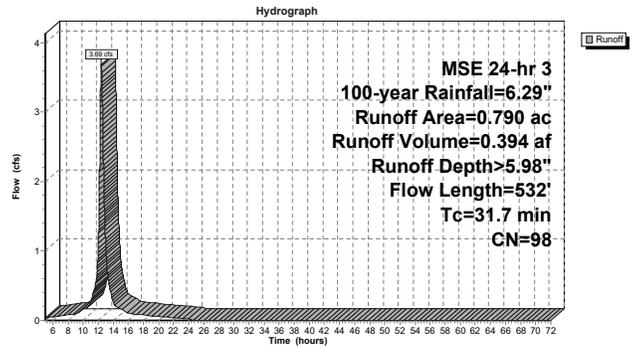
Runoff = 3.69 cfs @ 12.43 hrs, Volume= 0.394 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.040	98	Sidewalk, HSG C
* 0.130	98	>75% Grass cover, Good, HSG C
* 0.150	98	Woods, Good, HSG C
* 0.050	98	Sidewalk, HSG D
* 0.220	98	>75% Grass cover, Good, HSG D
* 0.200	98	Woods, Good, HSG D
0.790	98	Weighted Average
0.790		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	300	0.0950	0.17		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.5	232	0.0300	2.60		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
31.7	532	Total			

Subcatchment 81.3: Sandhill Post-Development



Summary for Subcatchment 81.4: Sandhill Post-Development

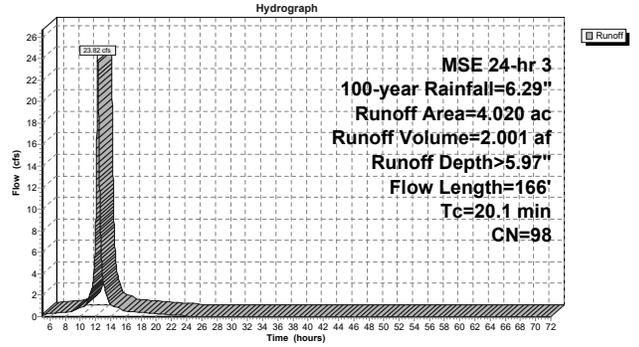
Runoff = 23.82 cfs @ 12.28 hrs, Volume= 2.001 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.290	98	Roofs, HSG C
* 0.050	98	Driveways, HSG C
* 0.090	98	Sidewalk, HSG C
* 2.330	98	>75% Grass cover, Good, HSG C
* 0.330	98	Woods, Good, HSG C
* 0.080	98	Sidewalk, HSG D
* 0.850	98	Woods, Good, HSG D
4.020	98	Weighted Average
4.020		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	39	0.0610	0.09		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.2	9	0.0200	0.78		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
12.9	118	0.1240	0.15		Sheet Flow, Segment CD Woods: Light underbrush n= 0.400 P2= 2.70"
20.1	166				Total

Subcatchment 81.4: Sandhill Post-Development



Summary for Subcatchment 82.1: Off-Site Residential

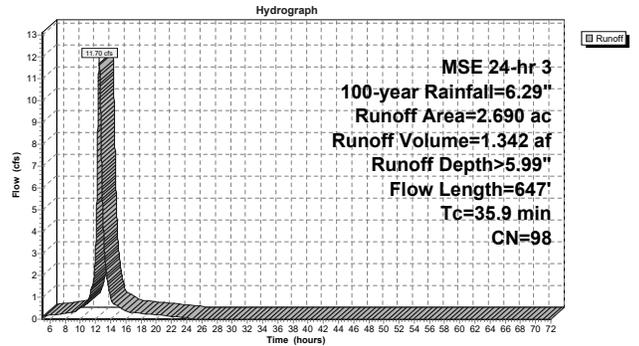
Runoff = 11.70 cfs @ 12.48 hrs, Volume= 1.342 af, Depth> 5.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 2.630	98	2 acre lots, 12% imp, HSG D
* 0.060	98	2 acre lots, 12% imp, HSG C
2.690	98	Weighted Average
2.367		88.00% Pervious Area
0.323		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.8	300	0.0770	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	121	0.0867	1.47		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.4	40	0.1120	1.67		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
1.3	178	0.0220	2.22		Shallow Concentrated Flow, Segment EF Grassed Waterway Kv= 15.0 fps
35.9	647				Total

Subcatchment 82.1: Off-Site Residential



Summary for Subcatchment 82.2: Off-Site Residential

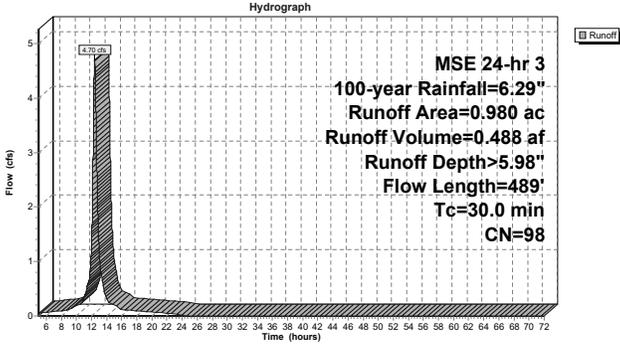
Runoff = 4.70 cfs @ 12.40 hrs, Volume= 0.488 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.770	98	2 acre lots, 12% imp, HSG D
* 0.210	98	2 acre lots, 12% imp, HSG C
0.980	98	Weighted Average
0.862		88.00% Pervious Area
0.118		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	300	0.1120	0.18		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
1.0	85	0.0830	1.44		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.7	104	0.0288	2.55		Shallow Concentrated Flow, Segment CD Grassed Waterway Kv= 15.0 fps
30.0	489				Total

Subcatchment 82.2: Off-Site Residential



Summary for Subcatchment 82.3: Off-Site Residential

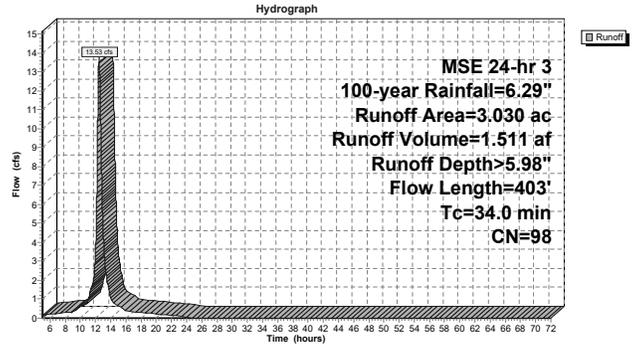
Runoff = 13.53 cfs @ 12.44 hrs, Volume= 1.511 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 2.730	98	2 acre lots, 12% imp, HSG D
* 0.300	98	2 acre lots, 12% imp, HSG C
3.030	98	Weighted Average
2.666		88.00% Pervious Area
0.364		12.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
33.0	300	0.0758	0.15		Sheet Flow, Segment AB Woods: Light underbrush n= 0.400 P2= 2.70"
0.8	76	0.0960	1.55		Shallow Concentrated Flow, Segment BC Woodland Kv= 5.0 fps
0.0	8	0.0200	2.87		Shallow Concentrated Flow, Segment CD Paved Kv= 20.3 fps
0.2	19	0.1380	1.86		Shallow Concentrated Flow, Segment DE Woodland Kv= 5.0 fps
34.0	403				Total

Subcatchment 82.3: Off-Site Residential



Summary for Subcatchment 91.1: Sandhill Post-Development

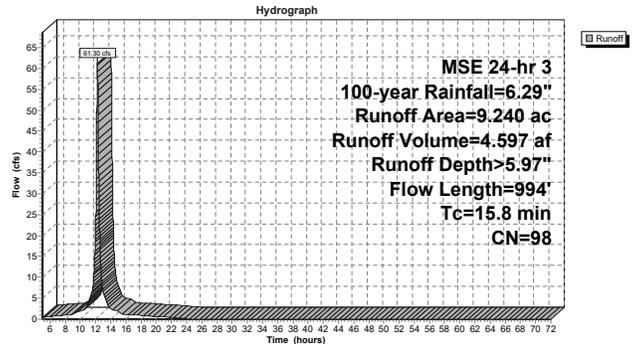
Runoff = 61.30 cfs @ 12.24 hrs, Volume= 4.597 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
1.120	98	Roofs, HSG C
* 0.870	98	Driveways, HSG C
1.080	98	Paved roads w/curbs & sewers, HSG C
* 0.010	98	Gravel surface, HSG C
* 0.220	98	Sidewalk, HSG C
* 2.990	98	>75% Grass cover, Good, HSG C
* 0.060	98	Existing Impervious ROW, HSG C
* 0.140	98	>75% Grass cover ROW, Good, HSG C
0.550	98	Roofs, HSG D
* 0.900	98	Driveway, HSG D
0.270	98	Paved roads w/curbs & sewers, HSG D
* 0.070	98	Sidewalk, HSG D
* 0.960	98	>75% Grass cover, Good, HSG D
9.240	98	Weighted Average
9.240		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	140	0.0540	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	57	0.0460	4.35		Shallow Concentrated Flow, Segment BC Paved Kv= 20.3 fps
0.3	122	0.0132	6.55	8.04	Pipe Channel, Segment CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	152	0.0090	6.11	10.80	Pipe Channel, Segment DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	251	0.0080	6.98	21.92	Pipe Channel, Segment EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
15.8	994				Total

Subcatchment 91.1: Sandhill Post-Development



Summary for Subcatchment 91.2: Sandhill Post-Development

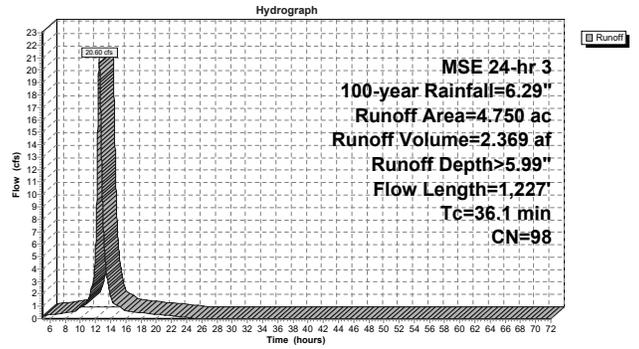
Runoff = 20.60 cfs @ 12.47 hrs, Volume= 2.369 af, Depth> 5.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.240	98	Roofs, HSG C
* 0.110	98	Driveways, HSG C
* 0.110	98	Sidewalk, HSG C
* 1.700	98	>75% Grass cover, Good, HSG C
0.430	98	Roofs, HSG D
* 0.040	98	Driveway, HSG D
* 0.110	98	Sidewalk, HSG D
* 2.010	98	>75% Grass cover, Good, HSG D
4.750	98	Weighted Average
4.750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.6	184	0.0214	0.12		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
4.8	20	0.0150	0.07		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
3.7	56	0.2320	0.25		Sheet Flow, Segment DE Grass: Dense n= 0.240 P2= 2.70"
0.8	173	0.0145	3.41	10.23	Trap/Vee/Rect Channel Flow, Segment EF Bot.W=4.00' D=0.50' Z= 4.0' Top.W=8.00' n= 0.027
0.8	280	0.0125	5.49	4.32	Pipe Channel, Segment FG 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.6	234	0.0100	6.44	11.38	Pipe Channel, Segment GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.6	272	0.0064	8.18	57.81	Pipe Channel, Segment HI 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
36.1	1,227	Total			

Subcatchment 91.2: Sandhill Post-Development



Summary for Subcatchment 91.3: Sandhill Post-Development

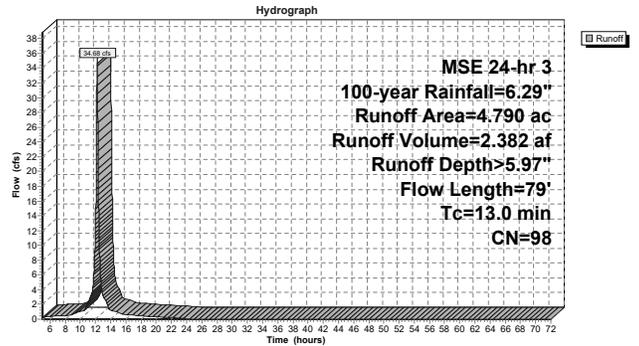
Runoff = 34.68 cfs @ 12.20 hrs, Volume= 2.382 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
0.300	98	Roofs, HSG C
* 0.020	98	Driveways, HSG C
* 0.120	98	Sidewalk, HSG C
* 1.150	98	>75% Grass cover, Good, HSG C
0.350	98	Water Surface, HSG C
* 0.020	98	>75% Grass cover ROW, Good, HSG C
0.210	98	Roofs, HSG D
* 0.070	98	Driveway, HSG D
* 0.140	98	Sidewalk, HSG D
* 1.460	98	>75% Grass cover, Good, HSG D
* 0.180	98	>75% Grass cover ROW, Good, HSG D
0.770	98	Water Surface, HSG D
4.790	98	Weighted Average
4.790		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	66	0.0160	0.09		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.2	8	0.0200	0.76		Sheet Flow, Segment BC Smooth surfaces n= 0.011 P2= 2.70"
0.6	5	0.1600	0.14		Sheet Flow, Segment CD Grass: Dense n= 0.240 P2= 2.70"
13.0	79	Total			

Subcatchment 91.3: Sandhill Post-Development



Summary for Subcatchment 91.4: Sandhill Post-Development

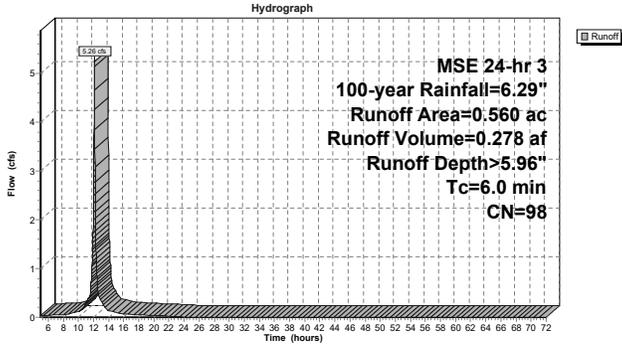
Runoff = 5.26 cfs @ 12.13 hrs, Volume= 0.278 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.070	98	>75% Grass cover, Good, HSG C
* 0.030	98	Paved roads w/curbs & sewers, HSG C
* 0.010	98	Gravel surface, HSG C
* 0.220	98	>75% Grass cover ROW, Good, HSG C
* 0.050	98	Existing Impervious ROW, HSG C
* 0.010	98	>75% Grass cover, Good, HSG D
* 0.060	98	Existing Impervious ROW, HSG D
* 0.110	98	>75% Grass cover ROW, Good, HSG D
0.560	98	Weighted Average
0.560		100.00% Impervious Area

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

Subcatchment 91.4: Sandhill Post-Development



Summary for Subcatchment 100: Sandhill Post Development

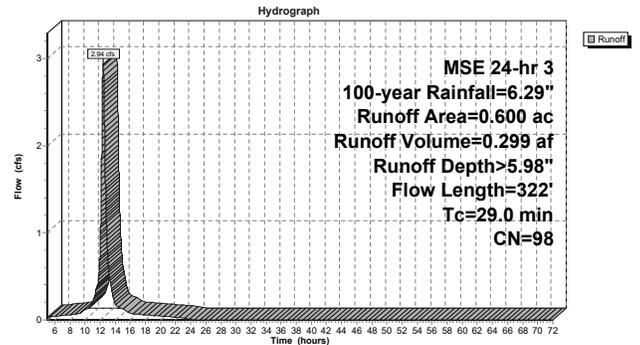
Runoff = 2.94 cfs @ 12.40 hrs, Volume= 0.299 af, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-year Rainfall=6.29"

Area (ac)	CN	Description
* 0.030	98	Sidewalk/Access Lane, HSG C
* 0.150	98	>75% Grass cover, Good, HSG C
* 0.010	98	Sidewalk, HSG D
* 0.120	98	>75% Grass cover, Good, HSG D
* 0.200	98	Woods, Good, HSG D
* 0.090	98	Woods, Good, HSG C
0.600	98	Weighted Average
0.600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.9	300	0.0380	0.17		Sheet Flow, Segment AB Grass: Dense n= 0.240 P2= 2.70"
0.1	22	0.0880	4.45		Shallow Concentrated Flow, Segment BC Grassed Waterway Kv= 15.0 fps
29.0	322	Total			

Subcatchment 100: Sandhill Post Development



Summary for Pond 1P: Walnut Grove Stormwater Pond

[82] Warning: Early inflow requires earlier time span

Inflow Area = 7.500 ac, 20.00% Impervious, Inflow Depth > 5.98" for 100-year event
 Inflow = 34.58 cfs @ 12.42 hrs, Volume= 3.739 af
 Outflow = 32.59 cfs @ 12.52 hrs, Volume= 2.799 af, Atten= 6%, Lag= 5.7 min
 Primary = 2.88 cfs @ 12.52 hrs, Volume= 0.645 af
 Secondary = 29.71 cfs @ 12.52 hrs, Volume= 2.155 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,041.93' @ 12.52 hrs Surf.Area= 18,296 sf Storage= 58,900 cf

Plug-Flow detention time= 165.4 min calculated for 2.799 af (75% of inflow)
 Center-of-Mass det. time= 101.3 min (874.0 - 772.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,037.00'	62,126 cf	Existing Active Storage Volume (Irregular), listed below (Recalc)

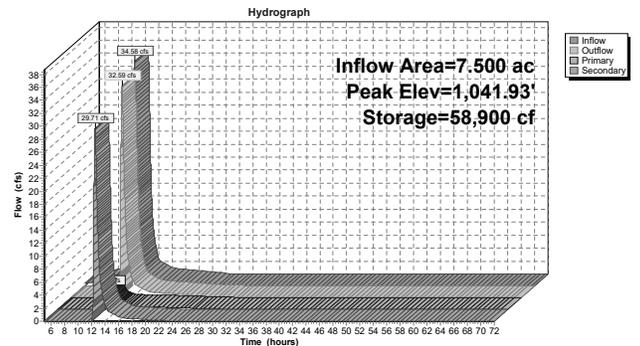
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,037.00	2,259	247.0	0	0	2,259
1,038.00	8,795	408.0	5,170	5,170	10,657
1,039.00	11,849	446.0	10,284	15,455	13,275
1,040.00	13,761	477.0	12,793	28,248	15,598
1,041.00	15,917	514.0	14,826	43,074	18,558
1,042.10	18,762	577.0	19,052	62,126	24,060

Device	Routing	Invert	Outlet Devices
#1	Primary	1,040.84'	15.0" Round Culvert L= 20.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,040.84' / 1,040.70' S= 0.0069' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Secondary	1,041.07'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 21.00 52.00 61.00 63.00 73.00 78.00 Elev. (feet) 1,042.10 1,041.80 1,042.10 1,041.93 1,041.22 1,041.07 1,042.10

Primary OutFlow Max=2.88 cfs @ 12.52 hrs HW=1,041.93' TW=1,027.94' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 2.88 cfs @ 3.40 fps)

Secondary OutFlow Max=29.71 cfs @ 12.52 hrs HW=1,041.93' TW=1,027.94' (Dynamic Tailwater)
 2=Asymmetrical Weir (Weir Controls 29.71 cfs @ 1.83 fps)

Pond 1P: Walnut Grove Stormwater Pond



Summary for Pond 1R: Winkleman Road North Culvert

[82] Warning: Early inflow requires earlier time span

Inflow Area = 24.760 ac, 89.32% Impervious, Inflow Depth > 5.25" for 100-year event
 Inflow = 34.88 cfs @ 12.78 hrs, Volume= 10,832 af
 Outflow = 34.80 cfs @ 12.80 hrs, Volume= 10,831 af, Atten= 0%, Lag= 1.4 min
 Primary = 9.67 cfs @ 12.80 hrs, Volume= 9,291 af
 Secondary = 25.13 cfs @ 12.80 hrs, Volume= 1,541 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.90' @ 12.80 hrs Surf.Area= 17,578 sf Storage= 22,145 cf

Plug-Flow detention time= 13.6 min calculated for 10,830 af (100% of inflow)
 Center-of-Mass det. time= 13.4 min (1,313.0 - 1,299.5)

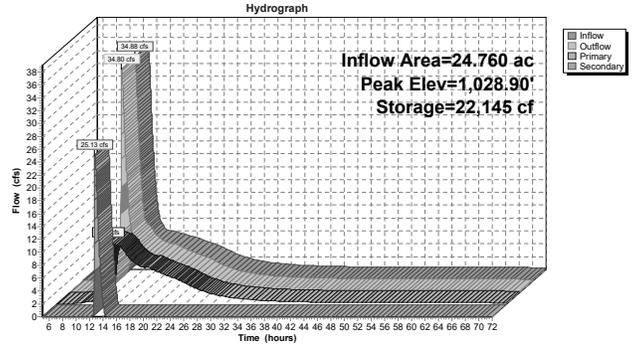
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.97'	23,920 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.97	0	0.0	0	0	0
1,027.00	5,142	390.0	1,765	1,765	12,105
1,028.00	10,710	659.0	7,758	9,523	34,567
1,029.00	18,432	850.0	14,397	23,920	57,515

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.97'	21.0" W x 15.0" H, R=10.8"/33.1" Pipe Arch Culvert L= 36.6' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 1,025.97' / 1,025.70' S= 0.0074' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.74 sf
#2	Secondary	1,028.70'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 8.00 60.00 114.00 167.00 172.00 Height (feet) 0.30 0.24 0.02 0.00 0.21 0.30

Primary OutFlow Max=9.67 cfs @ 12.80 hrs HW=1,028.90' (Free Discharge)
 1=Culvert (Barrel Controls 9.67 cfs @ 5.55 fps)

Secondary OutFlow Max=25.13 cfs @ 12.80 hrs HW=1,028.90' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 25.13 cfs @ 0.87 fps)

Pond 1R: Winkleman Road North Culvert



Summary for Pond 60P: Lisbon Road Culvert

[82] Warning: Early inflow requires earlier time span

Inflow Area = 20.600 ac, 59.53% Impervious, Inflow Depth > 5.43" for 100-year event
 Inflow = 39.38 cfs @ 12.17 hrs, Volume= 9,323 af
 Outflow = 37.21 cfs @ 12.93 hrs, Volume= 9,323 af, Atten= 6%, Lag= 45.7 min
 Primary = 18.28 cfs @ 12.93 hrs, Volume= 8,544 af
 Secondary = 18.93 cfs @ 12.93 hrs, Volume= 0,779 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.33' @ 12.93 hrs Surf.Area= 39,356 sf Storage= 41,198 cf

Plug-Flow detention time= 16.7 min calculated for 9,322 af (100% of inflow)
 Center-of-Mass det. time= 16.7 min (849.8 - 833.1)

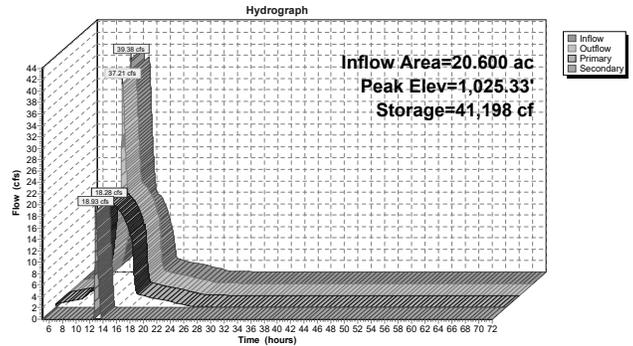
Volume	Invert	Avail.Storage	Storage Description		
#1	1,021.67'	72,972 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,021.67	0	0.0	0	0	0
1,022.00	46	25.0	5	5	50
1,023.00	1,762	263.0	698	703	5,506
1,024.00	13,278	988.0	6,626	7,328	77,684
1,025.00	32,265	1,586.0	22,080	29,409	200,180
1,026.00	55,940	1,804.0	43,563	72,972	259,014

Device	Routing	Invert	Outlet Devices
#1	Primary	1,021.67'	28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch Culvert L= 67.6' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,021.67' / 1,021.09' S= 0.0086' / Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.10 sf
#2	Secondary	1,025.21'	Asymmetrical Weir, C= 3.27 Offset (feet) 0.00 35.00 87.00 140.00 193.00 247.00 300.00 355.00 404.00 457.00 497.00 Height (feet) 0.79 0.51 0.35 0.18 0.16 0.01 0.00 0.04 0.03 0.28 0.79

Primary OutFlow Max=18.28 cfs @ 12.93 hrs HW=1,025.33' (Free Discharge)
 1=Culvert (Barrel Controls 18.28 cfs @ 5.90 fps)

Secondary OutFlow Max=18.93 cfs @ 12.93 hrs HW=1,025.33' (Free Discharge)
 2=Asymmetrical Weir (Weir Controls 18.93 cfs @ 0.81 fps)

Pond 60P: Lisbon Road Culvert



Summary for Pond 61.1P: SOUTH DRY POND

[82] Warning: Early inflow requires earlier time span

Inflow Area = 16.620 ac, 52.06% Impervious, Inflow Depth > 5.30" for 100-year event
 Inflow = 72.10 cfs @ 12.47 hrs, Volume= 7.345 af
 Outflow = 34.97 cfs @ 12.86 hrs, Volume= 7.345 af, Atten= 52%, Lag= 23.8 min
 Primary = 14.35 cfs @ 12.71 hrs, Volume= 6.172 af
 Secondary = 20.81 cfs @ 12.87 hrs, Volume= 1.173 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.68' @ 12.87 hrs Surf.Area= 44,733 sf Storage= 99,734 cf

Plug-Flow detention time= 44.0 min calculated for 7.344 af (100% of inflow)
 Center-of-Mass det. time= 44.0 min (854.4 - 810.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.80'	114,471 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.80	10	10.0	0	0	10
1,024.00	45	25.0	5	5	52
1,025.00	4,302	289.0	1,596	1,601	6,650
1,026.00	14,928	555.0	9,081	10,682	24,521
1,027.00	31,978	829.0	22,918	33,600	54,706
1,028.00	41,963	930.0	36,858	70,458	68,871
1,029.00	46,095	1,019.0	44,013	114,471	82,709

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.68'	30.0" Round Culvert L= 109.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.68' / 1,022.40' S= 0.0026' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,022.84'	30.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.84' / 1,022.68' S= 0.0027' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#3	Device 2	1,022.91'	30.0" Round Culvert L= 24.9' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,022.91' / 1,022.84' S= 0.0028' /' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#4	Device 3	1,023.80'	18.0" Round Culvert L= 119.8' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,023.80' / 1,023.42' S= 0.0032' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#5	Secondary	1,028.00'	14.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

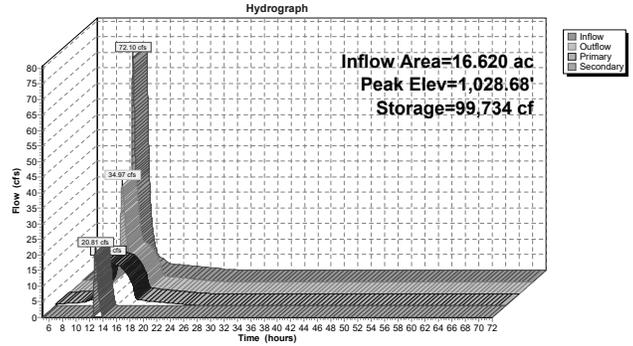
Primary OutFlow Max=14.31 cfs @ 12.71 hrs HW=1,028.56' TW=1,025.13' (Dynamic Tailwater)

- 1=Culvert (Passes 14.31 cfs of 43.77 cfs potential flow)
- 2=Culvert (Passes 14.31 cfs of 43.77 cfs potential flow)
- 3=Culvert (Passes 14.31 cfs of 43.77 cfs potential flow)
- 4=Culvert (Outlet Controls 14.31 cfs @ 8.10 fps)

Secondary OutFlow Max=20.81 cfs @ 12.87 hrs HW=1,028.68' TW=1,025.32' (Dynamic Tailwater)

- 5=Broad-Crested Rectangular Weir (Weir Controls 20.81 cfs @ 2.20 fps)

Pond 61.1P: SOUTH DRY POND



Summary for Pond 71.5P: NORTHWEST WET POND

[82] Warning: Early inflow requires earlier time span

Inflow Area = 23.450 ac, 90.36% Impervious, Inflow Depth > 5.97" for 100-year event
 Inflow = 128.09 cfs @ 12.20 hrs, Volume= 11.672 af
 Outflow = 33.85 cfs @ 12.78 hrs, Volume= 10.181 af, Atten= 74%, Lag= 34.8 min
 Primary = 6.54 cfs @ 12.53 hrs, Volume= 7.717 af
 Secondary = 28.65 cfs @ 12.78 hrs, Volume= 2.463 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,029.90' @ 12.78 hrs Surf.Area= 102,874 sf Storage= 319,845 cf

Plug-Flow detention time= 619.9 min calculated for 10.180 af (87% of inflow)
 Center-of-Mass det. time= 572.3 min (1,334.5 - 762.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,026.50'	382,566 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,026.50	85,502	1,222.0	0	0	85,502
1,027.50	90,480	1,253.0	87,979	87,979	91,732
1,028.50	95,573	1,283.0	93,015	180,994	97,917
1,029.50	100,772	1,310.0	98,161	279,155	103,638
1,030.50	106,073	1,336.0	103,411	382,566	109,270

Device	Routing	Invert	Outlet Devices
#1	Primary	1,026.50'	15.0" Round Culvert L= 36.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,026.50' / 1,026.40' S= 0.0027' /' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	1,026.50'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,027.60'	13.5" Vert. Orifice/Grate C= 0.600
#4	Secondary	1,029.50'	42.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

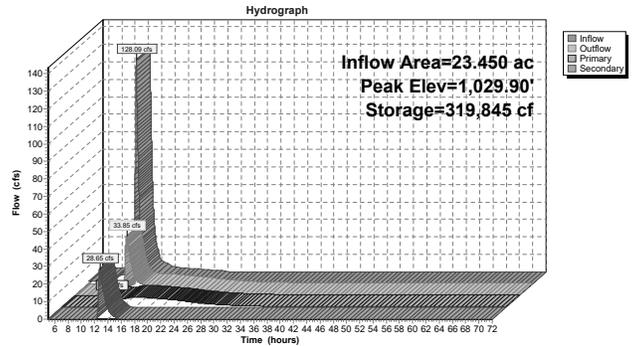
Primary OutFlow Max=6.48 cfs @ 12.53 hrs HW=1,029.74' TW=1,028.19' (Dynamic Tailwater)

- 1=Culvert (Passes 6.48 cfs of 7.36 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.52 cfs @ 6.00 fps)
- 3=Orifice/Grate (Orifice Controls 5.96 cfs @ 6.00 fps)

Secondary OutFlow Max=28.64 cfs @ 12.78 hrs HW=1,029.90' TW=1,028.90' (Dynamic Tailwater)

- 4=Broad-Crested Rectangular Weir (Weir Controls 28.64 cfs @ 1.71 fps)

Pond 71.5P: NORTHWEST WET POND



Summary for Pond 81.2P: NORTHEAST WET POND

[82] Warning: Early inflow requires earlier time span

Inflow Area = 15,880 ac, 68.30% Impervious, Inflow Depth > 5.98" for 100-year event
 Inflow = 58.26 cfs @ 12.49 hrs, Volume= 7,913 af
 Outflow = 44.27 cfs @ 12.71 hrs, Volume= 7,887 af, Atten= 24%, Lag= 13.2 min
 Primary = 28.36 cfs @ 12.71 hrs, Volume= 7,308 af
 Secondary = 15.92 cfs @ 12.71 hrs, Volume= 0,579 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,028.51' @ 12.71 hrs Surf.Area= 33,047 sf Storage= 104,695 cf

Plug-Flow detention time= 249.5 min calculated for 7,887 af (100% of inflow)
 Center-of-Mass det. time= 246.9 min (1,026.3 - 779.4)

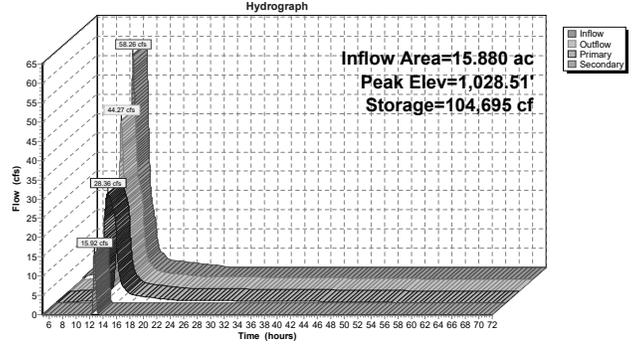
Volume	Invert	Avail.Storage	Storage Description		
#1	1,024.00'	121,316 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,024.00	14,944	567.0	0	0	14,944
1,025.00	17,393	609.0	16,153	16,153	18,918
1,026.00	22,177	747.0	19,737	35,890	33,825
1,027.00	26,059	839.0	24,092	59,982	45,463
1,028.00	30,682	975.0	28,339	88,321	65,116
1,029.00	35,365	1,078.0	32,996	121,316	81,975

Device	Routing	Invert	Outlet Devices
#1	Primary	1,024.00'	24.0" Round Culvert L= 55.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,024.00' / 1,023.80' S= 0.0036' / Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	1,024.00'	4.0" Vert. Orifice/Gate C= 0.600
#3	Device 1	1,026.50'	36.0" Horiz. Orifice/Gate C= 0.600 Limited to weir flow at low heads
#4	Secondary	1,028.00'	16.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=28.36 cfs @ 12.71 hrs HW=1,028.51' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Inlet Controls 28.36 cfs @ 9.03 fps)
 2=Orifice/Gate (Passes < 0.88 cfs potential flow)
 3=Orifice/Gate (Passes < 48.30 cfs potential flow)

Secondary OutFlow Max=15.91 cfs @ 12.71 hrs HW=1,028.51' TW=0.00' (Dynamic Tailwater)
 4=Broad-Crested Rectangular Weir (Weir Controls 15.91 cfs @ 1.94 fps)

Pond 81.2P: NORTHEAST WET POND



Summary for Pond 81.4P: NORTH DRY POND

[82] Warning: Early inflow requires earlier time span

Inflow Area = 7,050 ac, 62.18% Impervious, Inflow Depth > 5.98" for 100-year event
 Inflow = 34.87 cfs @ 12.31 hrs, Volume= 3,512 af
 Outflow = 22.72 cfs @ 12.54 hrs, Volume= 3,512 af, Atten= 35%, Lag= 13.7 min
 Primary = 12.95 cfs @ 12.39 hrs, Volume= 3,089 af
 Secondary = 11.15 cfs @ 12.58 hrs, Volume= 0,423 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,029.55' @ 12.58 hrs Surf.Area= 18,646 sf Storage= 31,031 cf

Plug-Flow detention time= 22.7 min calculated for 3,512 af (100% of inflow)
 Center-of-Mass det. time= 22.5 min (789.8 - 767.3)

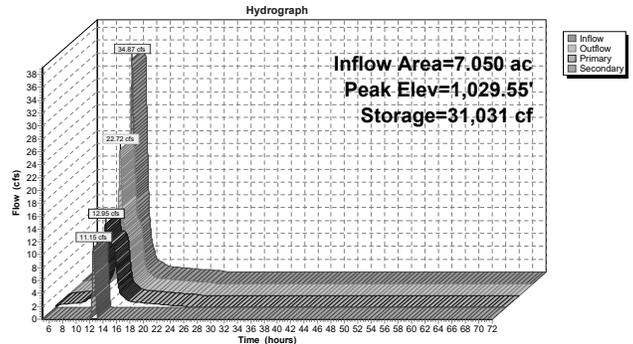
Volume	Invert	Avail.Storage	Storage Description		
#1	1,025.60'	40,190 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,025.60	10	5.0	0	0	10
1,026.00	642	92.0	98	98	682
1,027.00	4,663	306.0	2,345	2,443	7,463
1,028.00	9,843	557.0	7,094	9,536	24,705
1,029.00	14,929	868.0	12,298	21,834	59,979
1,030.00	22,010	1,004.0	18,355	40,190	80,261

Device	Routing	Invert	Outlet Devices
#1	Primary	1,025.60'	24.0" Round Culvert L= 390.5' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,025.60' / 1,024.50' S= 0.0028' / Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Secondary	1,029.00'	10.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=12.80 cfs @ 12.39 hrs HW=1,029.30' TW=1,027.84' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 12.80 cfs @ 4.08 fps)

Secondary OutFlow Max=11.15 cfs @ 12.58 hrs HW=1,029.55' TW=1,028.41' (Dynamic Tailwater)
 2=Broad-Crested Rectangular Weir (Weir Controls 11.15 cfs @ 2.03 fps)

Pond 81.4P: NORTH DRY POND



Summary for Pond 90P: Winkleman Road South Culvert

Inflow Area = 19,340 ac, 100.00% Impervious, Inflow Depth > 5.69" for 100-year event
 Inflow = 39.48 cfs @ 12.59 hrs, Volume= 9.163 af
 Outflow = 38.25 cfs @ 12.62 hrs, Volume= 9.163 af, Atten= 3%, Lag= 1.6 min
 Primary = 38.25 cfs @ 12.62 hrs, Volume= 9.163 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.62' @ 12.71 hrs Surf.Area= 2,208 sf Storage= 1,893 cf

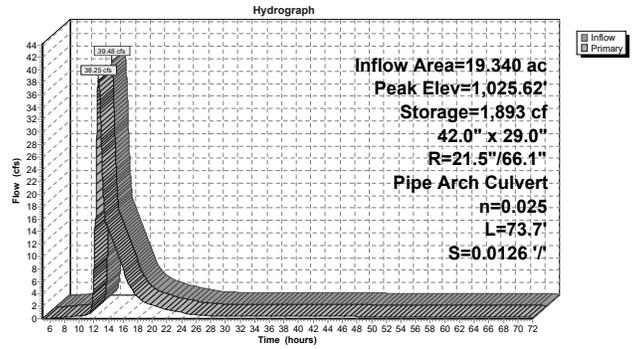
Plug-Flow detention time= 0.2 min calculated for 9.162 af (100% of inflow)
 Center-of-Mass det. time= 0.2 min (1,150.3 - 1,150.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	1,022.40'	7,855 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,022.40	0	0.0	0	0	0
1,023.00	58	29.0	12	12	67
1,024.00	325	135.0	173	185	1,453
1,025.00	1,142	257.0	692	877	5,264
1,026.00	3,045	376.0	2,017	2,894	11,267
1,027.00	7,166	644.0	4,961	7,855	33,026

Device	Routing	Invert	Outlet Devices
#1	Primary	1,022.40'	42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch Culvert L= 73.7' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,022.40' / 1,021.47' S= 0.0126'/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf

Primary OutFlow Max=38.25 cfs @ 12.62 hrs HW=1,025.52' (Free Discharge)
 1=Culvert (Barrel Controls 38.25 cfs @ 5.73 fps)

Pond 90P: Winkleman Road South Culvert



Summary for Pond 91.3P WET: SOUTH WET POND

[82] Warning: Early inflow requires earlier time span

Inflow Area = 18,780 ac, 100.00% Impervious, Inflow Depth > 5.97" for 100-year event
 Inflow = 107.42 cfs @ 12.23 hrs, Volume= 9,348 af
 Outflow = 38.95 cfs @ 12.60 hrs, Volume= 8,885 af, Atten= 64%, Lag= 22.2 min
 Primary = 16.55 cfs @ 12.44 hrs, Volume= 7,555 af
 Secondary = 26.35 cfs @ 12.64 hrs, Volume= 1,330 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.42' @ 12.64 hrs Surf.Area= 75,966 sf Storage= 218,779 cf

Plug-Flow detention time= 425.8 min calculated for 8.885 af (95% of inflow)
 Center-of-Mass det. time= 400.4 min (1,162.7 - 762.2)

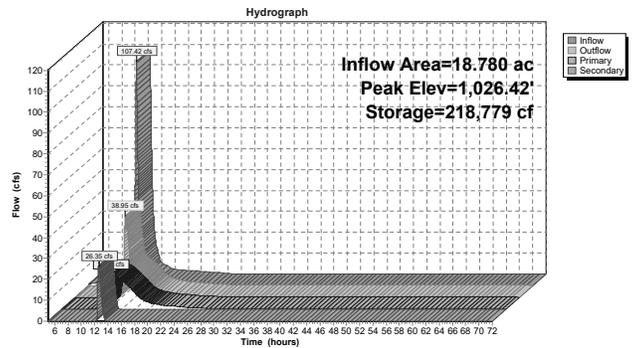
Volume	Invert	Avail.Storage	Storage Description		
#1	1,023.00'	264,057 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,023.00	49,054	1,453.0	0	0	49,054
1,024.00	60,009	1,608.0	54,440	54,440	86,841
1,025.00	66,548	1,638.0	63,250	117,690	94,758
1,026.00	73,201	1,666.0	69,848	187,538	102,303
1,027.00	79,886	1,691.0	76,519	264,057	109,190

Device	Routing	Invert	Outlet Devices
#1	Primary	1,023.00'	30.0" Round Culvert L= 36.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,023.00' / 1,022.60' S= 0.0110'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	1,023.00'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	1,024.25'	11.0" Vert. Orifice/Grate X 4.00 C= 0.600
#4	Secondary	1,026.00'	36.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=16.24 cfs @ 12.44 hrs HW=1,026.29' TW=1,024.76' (Dynamic Tailwater)
 1=Culvert (Passes 16.24 cfs of 29.23 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.52 cfs @ 5.95 fps)
 3=Orifice/Grate (Orifice Controls 15.72 cfs @ 5.95 fps)

Secondary OutFlow Max=26.35 cfs @ 12.64 hrs HW=1,026.42' TW=1,025.55' (Dynamic Tailwater)
 4=Broad-Crested Rectangular Weir (Weir Controls 26.35 cfs @ 1.75 fps)

Pond 91.3P WET: SOUTH WET POND

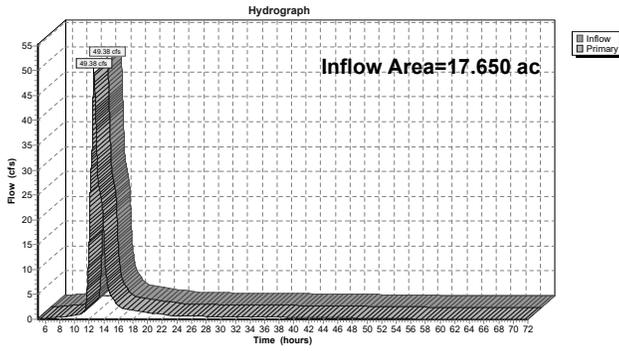


Summary for Link 31L: Lot 31 Walnut Grove Swale

Inflow Area = 17.650 ac, 66.59% Impervious, Inflow Depth > 5.96" for 100-year event
 Inflow = 49.38 cfs @ 12.68 hrs, Volume= 8.769 af
 Primary = 49.38 cfs @ 12.68 hrs, Volume= 8.769 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link 31L: Lot 31 Walnut Grove Swale

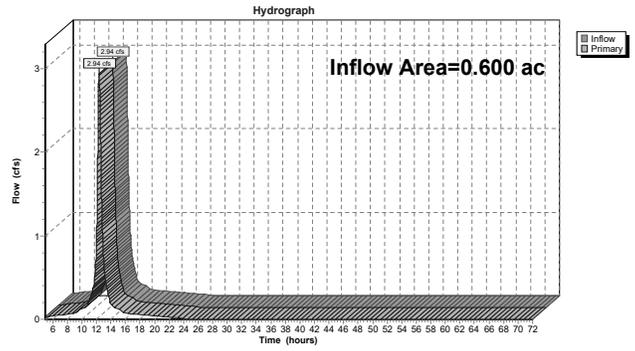


Summary for Link TL: Teri Lane

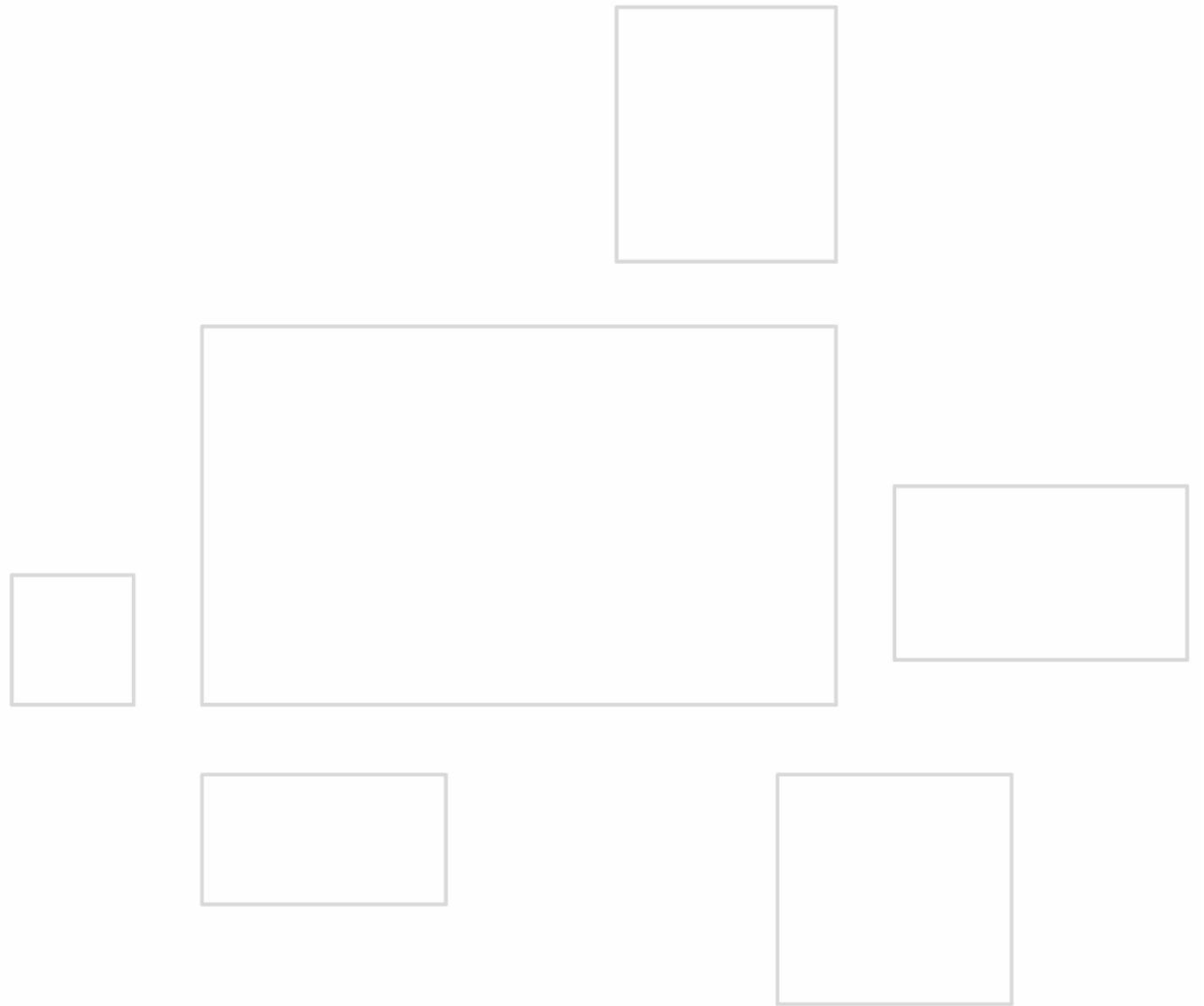
Inflow Area = 0.600 ac, 100.00% Impervious, Inflow Depth > 5.98" for 100-year event
 Inflow = 2.94 cfs @ 12.40 hrs, Volume= 0.299 af
 Primary = 2.94 cfs @ 12.40 hrs, Volume= 0.299 af, Atten= 0%, Lag= 0.0 min

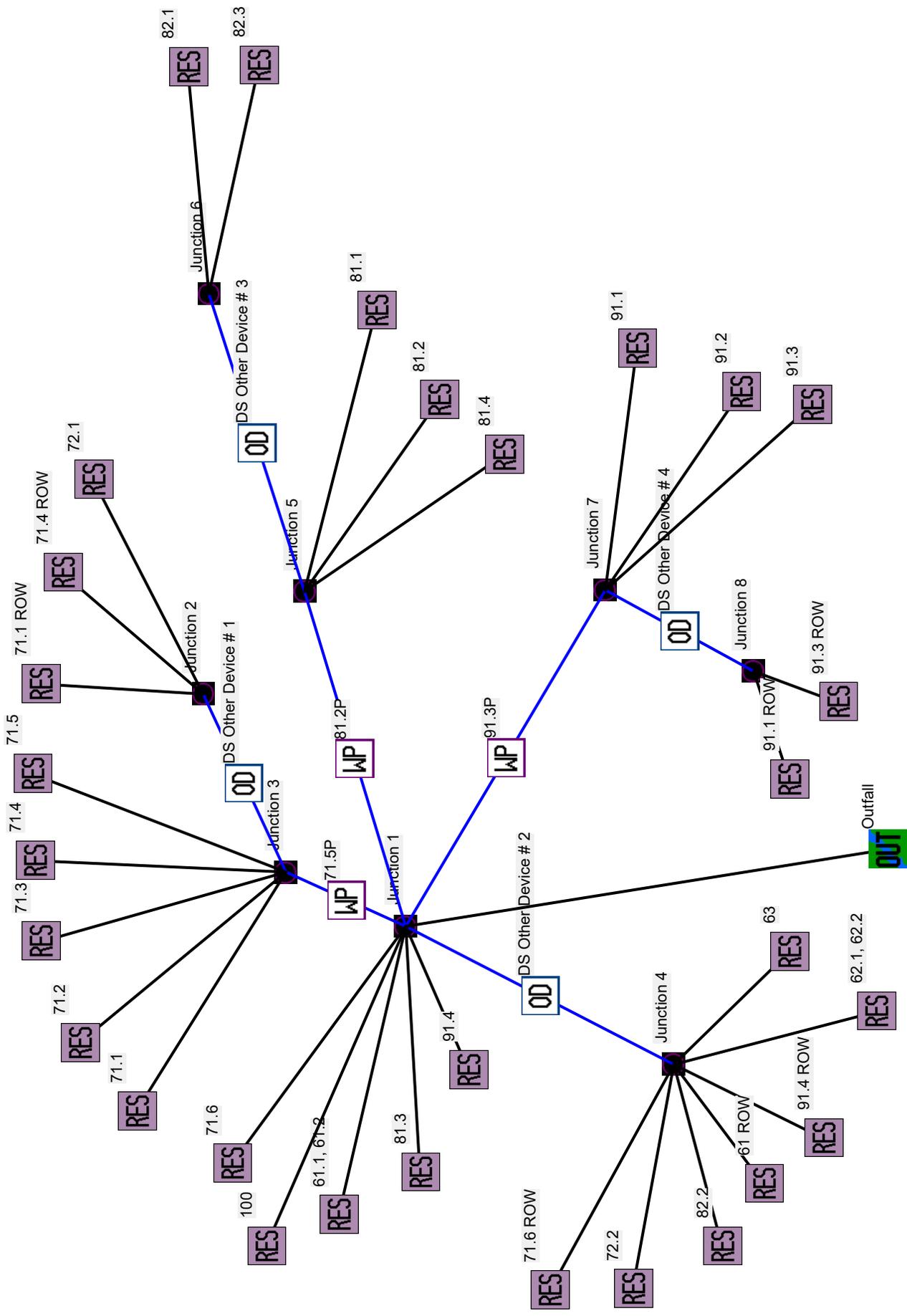
Primary outflow = Inflow, Time Span= 5.00-72.00 hrs, dt= 0.01 hrs

Link TL: Teri Lane



APPENDIX 4 POST-DEVELOPMENT CONDITIONS (WATER QUALITY)





Data file name: Z:\Projects\2016\767.00-WI\DESIGN\SWMP\SLAMM\767.00 SLAMM.mdb

WinSLAMM Version 10.4.1

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN

Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx

Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx

Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std

Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False

Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx

Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv

Cost Data file name:

If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations

Seed for random number generator: -42

Study period starting date: 01/05/69

Study period ending date: 12/31/69

Start of Winter Season: 12/06

End of Winter Season: 03/28

Date: 02-18-2021

Time: 17:04:08

Site information:

LU# 1 - Residential: 71.1 Total area (ac): 6.920

1 - Roofs 1: 0.980 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 1.020 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.200 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

37 - Streets 1: 1.590 ac. Smooth Street Length = 0.89 curb-mi Street Width (assuming two curb-mi per street mile) = 29.47753 ft

Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 3.130 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Residential: 71.1 ROW Total area (ac): 0.020

77 - Other Direct Con Imp Areas: 0.020 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Residential: 71.2 Total area (ac): 3.430

1 - Roofs 1: 0.530 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 0.060 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.150 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 2.690 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Residential: 71.3 Total area (ac): 4.030

1 - Roofs 1: 0.530 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 0.020 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.260 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 3.220 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 5 - Residential: 71.4 Total area (ac): 2.700

1 - Roofs 1: 0.210 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

19 - Unpaved Parking 1: 0.010 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 0.010 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.110 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

37 - Streets 1: 0.030 ac. Smooth Street Length = 0.038 curb-mi Street Width (assuming two curb-mi per street mile) = 13.02632 ft

Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 2.330 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 6 - Residential: 71.4 ROW Total area (ac): 0.340

76 - Other Pervious Areas 6: 0.240 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

78 - Other Part Con Imp Areas 1: 0.100 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 7 - Residential: 71.5 Total area (ac): 3.630

1 - Roofs 1: 0.150 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

31 - Sidewalks 1: 0.090 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 1.430 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

70 - Water Body Areas: 1.960 ac. PSD File:

LU# 8 - Residential: 71.6 Total area (ac): 0.270

19 - Unpaved Parking 1: 0.010 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

37 - Streets 1: 0.030 ac. Smooth Street Length = 0.02 curb-mi Street Width (assuming two curb-mi per street mile) = 24.75 ft

Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz

45 - Large Landscaped Areas 1: 0.230 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 9 - Residential: 71.6 ROW Total area (ac): 0.450

71 - Other Pervious Areas 1: 0.220 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

78 - Other Part Con Imp Areas 1: 0.230 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 10 - Residential: 72.1 Total area (ac): 2.570

71 - Other Pervious Areas 1: 2.260 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

78 - Other Part Con Imp Areas 1: 0.310 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 11 - Residential: 72.2 Total area (ac): 0.560

71 - Other Pervious Areas 1: 0.380 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

78 - Other Part Con Imp Areas 1: 0.180 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 12 - Residential: 81.1 Total area (ac): 1.040

1 - Roofs 1: 0.190 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 0.190 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.020 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.260 ac. Smooth Street Length = 0.134 curb-mi Street Width (assuming two curb-mi per street mile) = 32.01492 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.380 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 13 - Residential: 81.2 Total area (ac): 4.940

1 - Roofs 1: 0.320 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.030 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.250 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 3.390 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.600 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.350 ac. PSD File:

LU# 14 - Residential: 81.3 Total area (ac): 0.790

31 - Sidewalks 1: 0.090 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.350 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.350 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 15 - Residential: 81.4 Total area (ac): 4.020

1 - Roofs 1: 0.290 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.050 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.170 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 2.330 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 1.180 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 16 - Residential: 82.1 Total area (ac): 2.690

71 - Other Pervious Areas 1: 2.360 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
78 - Other Part Con Imp Areas 1: 0.330 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 17 - Residential: 82.3 Total area (ac): 3.030

71 - Other Pervious Areas 1: 2.670 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
78 - Other Part Con Imp Areas 1: 0.360 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 18 - Residential: 82.2 Total area (ac): 0.980

71 - Other Pervious Areas 1: 0.860 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
78 - Other Part Con Imp Areas 1: 0.120 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 19 - Residential: 100 Total area (ac): 0.600

31 - Sidewalks 1: 0.040 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.270 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.290 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 20 - Residential: 61.1, 61.2 Total area (ac): 8.500

1 - Roofs 1: 0.740 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.480 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.460 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.300 ac. Smooth Street Length = 0.138 curb-mi Street Width (assuming two curb-mi per street mile) = 35.86957 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 6.270 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
57 - Undeveloped Areas 1: 0.250 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 21 - Residential: 61 ROW Total area (ac): 1.680

71 - Other Pervious Areas 1: 0.860 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
78 - Other Part Con Imp Areas 1: 0.820 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 22 - Residential: 91.4 Total area (ac): 0.120

19 - Unpaved Parking 1: 0.010 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 0.030 ac. Smooth Street Length = 0.038 curb-mi Street Width (assuming two curb-mi per street mile) = 13.02632 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.080 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 23 - Residential: 91.4 ROW Total area (ac): 0.440

71 - Other Pervious Areas 1: 0.330 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
78 - Other Part Con Imp Areas 1: 0.110 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 24 - Residential: 91.1 Total area (ac): 9.040

1 - Roofs 1: 1.670 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
19 - Unpaved Parking 1: 0.010 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 1.770 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.290 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
37 - Streets 1: 1.350 ac. Smooth Street Length = 0.753 curb-mi Street Width (assuming two curb-mi per street mile) = 29.58167 ft
Default St. Dirt Accum. Annual Winter Load = 2500 lbs PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 3.950 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 25 - Residential: 91.2 Total area (ac): 4.750

1 - Roofs 1: 0.670 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
25 - Driveways 1: 0.150 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.220 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 3.710 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 26 - Residential: 91.3 Total area (ac): 4.590

1 - Roofs 1: 0.510 ac. Pitched Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

25 - Driveways 1: 0.090 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
 31 - Sidewalks 1: 0.260 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz
 45 - Large Landscaped Areas 1: 2.620 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
 70 - Water Body Areas: 1.110 ac. PSD File:

LU# 27 - Residential: 91.3 ROW Total area (ac): 0.200
 71 - Other Pervious Areas 1: 0.200 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 28 - Residential: 62.1, 62.2 Total area (ac): 2.920
 71 - Other Pervious Areas 1: 2.340 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
 78 - Other Part Con Imp Areas 1: 0.580 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 29 - Residential: 63 Total area (ac): 7.500
 71 - Other Pervious Areas 1: 6.000 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
 78 - Other Part Con Imp Areas 1: 1.500 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 30 - Residential: 91.1 ROW Total area (ac): 0.200
 71 - Other Pervious Areas 1: 0.140 ac. Normal Clayey PSD File: C:\WinSLAMM Files\NURP.cpz
 78 - Other Part Con Imp Areas 1: 0.060 ac. Disconnected Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Other Device CP# 1 (DS) - DS Other Device # 1

Fraction of drainage area served by device (ac) = 1.00
 Particulate Concentration reduction fraction = 1.00
 Filterable Concentration reduction fraction = 1.00
 Runoff volume reduction fraction = 0

Control Practice 2: Wet Detention Pond CP# 1 (DS) - 71.5P

Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 6
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.33
2. Number of orifices: 1
3. Invert elevation above datum (ft): 6

Outlet type: Orifice 2

1. Orifice diameter (ft): 1.13
2. Number of orifices: 1
3. Invert elevation above datum (ft): 7.1

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 40
2. Weir crest width (ft): 17
3. Height from datum to bottom of weir opening: 9

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	1.3130	0.00	0.00
2	1.50	1.3850	0.00	0.00
3	2.50	1.4340	0.00	0.00
4	3.50	1.4830	0.00	0.00
5	4.50	1.5330	0.00	0.00
6	5.50	1.5840	0.00	0.00
7	6.00	1.9630	0.00	0.00
8	7.00	2.0770	0.00	0.00
9	8.00	2.1940	0.00	0.00
10	9.00	2.3130	0.00	0.00
11	10.00	2.4350	0.00	0.00

Control Practice 3: Other Device CP# 2 (DS) - DS Other Device # 2

Fraction of drainage area served by device (ac) = 1.00
 Particulate Concentration reduction fraction = 1.00
 Filterable Concentration reduction fraction = 1.00
 Runoff volume reduction fraction = 0

Control Practice 4: Wet Detention Pond CP# 2 (DS) - 81.2P

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 6

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

- 1. Orifice diameter (ft): 0.33
- 2. Number of orifices: 1
- 3. Invert elevation above datum (ft): 6

Outlet type: Broad Crested Weir

- 1. Weir crest length (ft): 16
- 2. Weir crest width (ft): 17
- 3. Height from datum to bottom of weir opening: 10

Outlet type: Vertical Stand Pipe

- 1. Stand pipe diameter (ft): 3
- 2. Stand pipe height above datum (ft): 8.5

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0871	0.00	0.00
2	1.00	0.1014	0.00	0.00
3	2.00	0.1167	0.00	0.00
4	3.00	0.1331	0.00	0.00
5	4.00	0.1508	0.00	0.00
6	5.50	0.1788	0.00	0.00
7	6.00	0.3431	0.00	0.00
8	7.00	0.3993	0.00	0.00
9	8.00	0.5091	0.00	0.00
10	9.00	0.5982	0.00	0.00
11	10.00	0.7044	0.00	0.00
12	11.00	0.8119	0.00	0.00

Control Practice 5: Other Device CP# 3 (DS) - DS Other Device # 3

Fraction of drainage area served by device (ac) = 1.00

Particulate Concentration reduction fraction = 1.00

Filterable Concentration reduction fraction = 1.00

Runoff volume reduction fraction = 0

Control Practice 6: Wet Detention Pond CP# 3 (DS) - 91.3P

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 6

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

- 1. Orifice diameter (ft): 0.33
- 2. Number of orifices: 1
- 3. Invert elevation above datum (ft): 6

Outlet type: Orifice 2

- 1. Orifice diameter (ft): 0.92
- 2. Number of orifices: 4
- 3. Invert elevation above datum (ft): 7.25

Outlet type: Broad Crested Weir

- 1. Weir crest length (ft): 36
- 2. Weir crest width (ft): 17
- 3. Height from datum to bottom of weir opening: 9

Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.3333	0.00	0.00
2	1.00	0.3912	0.00	0.00
3	2.00	0.4498	0.00	0.00
4	3.00	0.5091	0.00	0.00
5	4.00	0.5693	0.00	0.00
6	5.50	0.6606	0.00	0.00
7	6.00	1.1089	0.00	0.00
8	7.00	1.3776	0.00	0.00
9	8.00	1.5277	0.00	0.00
10	9.00	1.6805	0.00	0.00
11	10.00	1.8339	0.00	0.00

Control Practice 7: Other Device CP# 4 (DS) - DS Other Device # 4

Fraction of drainage area served by device (ac) = 1.00

Particulate Concentration reduction fraction = 1.00

Filterable Concentration reduction fraction = 1.00

Runoff volume reduction fraction = 0

Data file name: Z:\Projects\2016\767.00-WI\DESIGN\SWMP\SLAMM\767.00 SLAMM.mdb
WinSLAMM Version 10.4.1

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:

If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations

Seed for random number generator: -42

Study period starting date: 01/05/69 Study period ending date: 12/31/69

Start of Winter Season: 12/06 End of Winter Season: 03/28

Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69

Date of run: 02-18-2021 Time of run: 17:06:25

Total Area Modeled (acres): 82.950

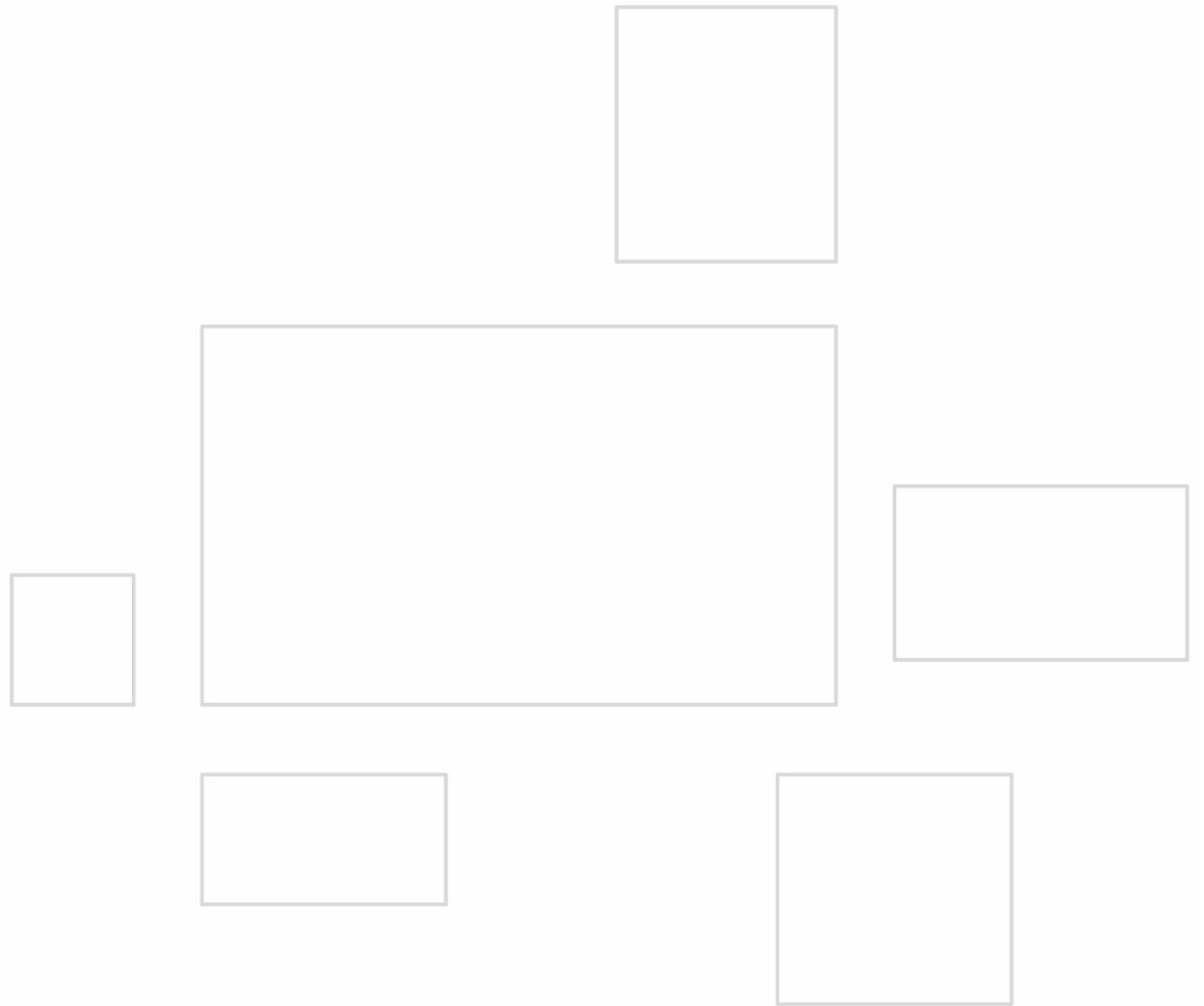
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	1.458E+06	-	112.7	10260	-
Outfall Total with Controls:	1.459E+06	-0.07%	17.13	1561	84.79%
Annualized Total After Outfall Controls:	1.479E+06			1582	

Pollutant	Conc. No Controls	Conc. With Controls	Conc. Units	Pollutant Yield No Controls	Pollutant Yield With Controls	Pol. Yield Units	Percent Reduction
Particulate Solids	112.7	17.13	mg/L	10260	1561	lbs	84.79 %
Particulate Phosphorus	0.4673	0.06221	mg/L	32.59	5.670	lbs	82.60 %
Total Phosphorus	0.7013	0.2078	mg/L	48.21	18.94	lbs	60.71 %

APPENDIX 5

INFILTRATION TESTING REPORT





Butler Engineering, Inc.

Soil Testing • Engineering & Safety Consulting • Safety Training

February 8, 2021

Longmeadow Development LLC
W240 N1221 Pewaukee Rd.
Waukesha, WI 53188

Attn: John Siepmann

Subject: WDNR Infiltration Testing
Sandhill Subdivision
SE1/4, S2, T8N, R18E
Village of Hartland, Waukesha Co., WI

Dear Mr. Siepmann,

We have completed soil testing for storm water infiltration at the above referenced site. Our report and conclusions regarding storm water infiltration are as follows:

Site Description

The proposed site is located on the east side of Winkleman Road north of Lisbon Road. The property is bordered by residential land to the north, east, and south. There is agricultural land located across Winkleman Road to the west.

The USDA soil map for Milwaukee and Waukesha Counties indicates that the soils on the site include Dodge, Hochheim, and Theresa Series Soils.

Subsurface Exploration

Soil boring pits 211 through 229 were made on February 4, 2021. Soils were classified in accordance with the USDA soil classification system.

Free water was not observed in any of the borings. High chroma mottling was observed in gravelly sandy loam horizons. The Waukesha County Basement Wetness Ordinance allows high chroma mottling in Hochheim and Theresa soils to be disregarded as an indicator of Seasonal High Groundwater. In borings with underlying sand and gravel, mottling was not observed in the sand and gravel horizons.

Longmeadow Development LLC
WDNR Infiltration Testing
February 8, 2021
Page 2 of 2

Conclusions

Infiltration of storm water may be feasible in areas of Borings 212 – 214, 217 and 218.

Infiltration of storm water may be exempt in areas of Borings 211, 215, 216, 219 – 229. The borings exhibited soils that are exempt based upon the requirements of NR 151.12(5) (c) 6.a. These borings included soils with infiltration rates less than 0.6 in/hr.

If you have any questions or concerns, please call at (262) 650-2000.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Harry Butler', with a long horizontal flourish extending to the right.

Harry Butler, P.E.
Butler Engineering Inc.

cc: Tony Zanon, Pinnacle Engineering Group via email

SOIL EVALUATION REPORT

In accordance with SPS 385, Wis. Adm. Code

County: Waukesha	
Parcel ID: HAV 0388989001	
Reviewed by:	Date:

Please print all information

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04(1)(m)).

Property Owner Longmeadow Development				Property Location SE¼, S2, T8N, R18E			
Property Owner's Mailing Address W240 N1221 Pewaukee Rd.				Lot #	Block#	Subd. Name or CSM# Proposed Subdivision	
City Waukesha	State WI	Zip Code 53188	Phone Number 262 650 4700	Municipality: Village of Hartland		Nearest Road: Winkleman Rd.	
<input type="checkbox"/> New Construction Use: <input type="checkbox"/> Residential/Number of Bedrooms: _____ <input type="checkbox"/> Replacement <input type="checkbox"/> Public or Commercial - Describe: _____				Code derived design flow rate: _____ GPD			
Material: _____							
General Comments & Recommendations: Borings completed 2/4/2021							

211	Boring #	<input type="checkbox"/> Boring <input checked="" type="checkbox"/> Pit	Ground Surface Elev.: <u>1024.4</u> ft.	Depth to Limiting Factor: <u>25</u> in.
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Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate
									Inches per Hr
1	0 - 25	7.5 YR 3/2	none	l	2vfsbk	mfr	cw	0	0.24
2	25 - 50	7.5 YR 4/4	f2d 10 YR 5/8	sil	1fsbk	mfr	cw	0	0.13
3	50 - 62	7.5 YR 4/4	f2d 10 YR 5/8, 6/2	sil	0m	mfr	cw	0	0.13
4	62 - 96	7.5 YR 5/4	f1f 10 YR 5/8	grsl	1fsbk	ml		20	0.5

212	Boring #	<input type="checkbox"/> Boring <input checked="" type="checkbox"/> Pit	Ground Surface Elev.: <u>1027.2</u> ft.	Depth to Limiting Factor: <u>44</u> in.
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Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate
									Inches per Hr
1	0 - 8	7.5 YR 3/2	none	l	2vfsbk	mfr	cw	0	0.24
2	8 - 24	7.5 YR 4/4	none	cl	1fsbk	mfr	cw	0	0.03
3	24 - 44	7.5 YR 5/4	none	grsl	1fsbk	mfr	cw	20	0.50
4	44 - 144	7.5 YR 5/4	f2d 10 YR 5/8	grsl	1fsbk	mfr	gs	20	0.50
5	144 - 156	7.5 YR 6/4	none	grs	0sg	ml		25	3.6

*Effluent #1 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

*Effluent #2 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

CST Name (Please Print) Harry Butler	Signature 	CST Number 222742
Address N679 Tamarack Rd. Palmyra, WI 53156	Date Evaluation Conducted 2/4/2021	Telephone Number (262) 650 - 2000

County:	Waukesha
Parcel ID:	HAV 0388989001

213	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	1033.3 ft.	Depth to Limiting Factor:	44 in.
		<input checked="" type="checkbox"/> Pit				

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate Inches per Hr
1	0 - 8	7.5 YR 3/2	none	l	2vfsbk	mfr	cw	0	0.24
2	8 - 16	7.5 YR 4/4	none	cl	1fsbk	mfr	cw	0	0.03
3	16 - 44	7.5 YR 5/4	none	grsl	1fsbk	mfr	cw	20	0.50
4	44 - 156	7.5 YR 5/4	f2d 10 YR 5/8	grsl	1fsbk	mfr	gs	20	0.50
5	156 - 220	7.5 YR 6/4	none	grs	0sg	ml		25	3.6

214	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	1027.8 ft.	Depth to Limiting Factor:	46 in.
		<input checked="" type="checkbox"/> Pit				

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate Inches per Hr
1	0 - 8	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13
2	8 - 24	7.5 YR 4/4	none	cl	1fsbk	mfr	cw	0	0.03
3	24 - 46	7.5 YR 5/4	none	grsl	1fsbk	mfr	cw	20	0.50
4	46 - 126	7.5 YR 5/4	f2d 10 YR 5/8	grsl	1fsbk	mfr	gs	20	0.50
5	126 - 174	7.5 YR 6/4	none	grs	0sg	ml		25	3.6

215	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	1025.9 ft.	Depth to Limiting Factor:	40 in.
		<input checked="" type="checkbox"/> Pit				

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate Inches per Hr
1	0 - 21	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13
2	21 - 30	7.5 YR 4/4	none	sil	1fsbk	mfr	cw	0	0.13
3	30 - 40	7.5 YR 4/4	none	cl	1fsbk	mfr	cw	0	0.03
4	40 - 160	7.5 YR 5/4	f2f 10 YR 5/8	grsl	1fsbk	mfr		20	0.50

*Effluent #1 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

*Effluent #2 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

County:	Waukesha
Parcel ID:	HAV 0388989001

216	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit		

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate
									Inches per Hr
1	0 - 10	7.5 YR 3/3	none	sil	2vfsbk	mfr	cw	0	0.13
2	10 - 32	7.5 YR 3/2	none	sil	1fsbk	mfr	cw	0	0.13
3	32 - 54	7.5 YR 4/4	none	cl	1fsbk	mfr	cw	0	0.03
4	54 - 144	7.5 YR 5/4	f2f 10 YR 5/8	grsl	1fsbk	mfr		20	0.50

217	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit		

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate
									Inches per Hr
1	0 - 11	7.5 YR 3/3	none	sil	2vfsbk	mfr	cw	0	0.13
2	11 - 21	7.5 YR 3/2	none	sil	1fsbk	mfr	cw	0	0.13
3	21 - 32	7.5 YR 4/4	none	sil	1fsbk	mfr	cw	0	0.13
4	32 - 44	7.5 YR 4/4	none	sicl	1fsbk	mfr	gs	0	0.04
5	44 - 116	7.5 YR 5/4	f1f 10 YR 5/8	grsl	1fsbk	mfr	cs	20	0.5
6	116 - 166	7.5 YR 6/4	none	grsl	0sg	ml		25	3.6

218	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit		

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate
									Inches per Hr
1	0 - 12	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13
2	12 - 21	7.5 YR 4/4	none	sicl	1fsbk	mfr	cw	0	0.04
3	21 - 34	7.5 YR 4/4	none	grscl	1fsbk	mfr	cw	10	0.11
4	34 - 121	7.5 YR 5/4	f2d 10 YR 5/8	grsl	1fsbk	mfr	gs	20	0.50
5	121 - 162	7.5 YR 6/4	none	grs	0sg	ml		25	3.6

*Effluent #1 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

*Effluent #2 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

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Parcel ID:	HAV 0388989001

219	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	1028.5 ft.	Depth to Limiting Factor:	30 in.
		<input checked="" type="checkbox"/> Pit				

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 14	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13	
2	14 - 24	7.5 YR 3/1	none	sil	1fsbk	mfr	cw	0	0.13	
3	24 - 30	7.5 YR 5/3	none	sil	1fsbk	mfr	cw	0	0.13	
4	30 - 66	7.5 YR 4/4	f2d 10 YR 5/8	sicl	1fsbk	mfr	gs	0	0.04	
5	66 - 104	7.5 YR 5/4	f1f 10 YR 5/8	grsl	1fsbk	mfr		20	0.5	

220	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	1026.9 ft.	Depth to Limiting Factor:	24 in.
		<input checked="" type="checkbox"/> Pit				

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 11	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13	
2	11 - 24	7.5 YR 5/3	none	sil	1fsbk	mfr	cw	0	0.13	
3	24 - 41	7.5 YR 5/6	m2p 10 YR 5/8, 6/2	sicl	1fsbk	mfr	cw	0	0.04	
4	41 - 60	7.5 YR 4/4	m2p 10 YR 5/8, 6/2	cl	1fsbk	mfr	gs	0	0.04	
5	60 - 108	7.5 YR 5/4	m2p 10 YR 5/8, 6/2	sicl	1fsbk	mfr	cs	0	0.04	
6	108 - 120	7.5 YR 5/4	f2d 10 YR 5/8	grsl	fsbk	mfr		25	0.5	

221	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	1026.9 ft.	Depth to Limiting Factor:	32 in.
		<input checked="" type="checkbox"/> Pit				

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	Roots	GPD/Ft. ²	
									*Eff#1	*Eff#2
Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
Inches per Hr										
1	0 - 17	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13	
2	17 - 28	7.5 YR 3/1	none	sil	1fsbk	mfr	cw	0	0.13	
3	28 - 32	7.5 YR 5/4	none	sil	1fsbk	mfr	cw	0	0.13	
4	32 - 40	7.5 YR 5/3	f2d 10 YR 5/8, 6/2	sicl	1fsbk	mfr	gs	0	0.04	
5	40 - 120	7.5 YR 5/6	m2d 10 YR 5/8, 6/2	sicl	1fsbk	mfr		0	0.04	

*Effluent #1 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

*Effluent #2 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

County:	Waukesha
Parcel ID:	HAV 0388989001

222	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit		

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 14	7.5 YR 3/2	none	sil	1fpl	mfr	cw	0	0.13	
2	14 - 24	7.5 YR 3/1	none	sil	2fsbk	mfr	cw	0	0.13	
3	24 - 34	7.5 YR 5/3	none	sil	1fsbk	mfr	cw	0	0.13	
4	34 - 104	7.5 YR 5/6	f2d 10 YR 5/8, 6/2	sicl	0m	mfr	gs	0	0.04	
5	104 - 140	7.5 YR 5/4	f2d 10 YR 5/8, 6/2	grscl	0m	mfr		20	0.11	

223	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit		

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 13	7.5 YR 3/2	none	sil	1fpl	mfr	cw	0	0.13	
2	13 - 19	7.5 YR 4/4	none	cl	2msbk	mfr	cw	0	0.03	
3	19 - 81	7.5 YR 5/6	m2p 10 YR 5/8, 6/2	sicl	1fsbk	mfr	cw	0	0.04	
4	81 - 127	7.5 YR 5/4	f1f 10 YR 5/8	grsl	1fsbk	mfr		20	0.50	

224	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit		

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	Roots	GPD/Ft. ²	
									*Eff#1	*Eff#2
Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
Inches per Hr										
1	0 - 12	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13	
2	12 - 20	7.5 YR 4/4	none	cl	1fsbk	mfr	cw	0	0.04	
3	20 - 39	7.5 YR 5/6	f2d 10YR 5/8, 6/2	cl	1fsbk	mfr	cw	0	0.04	
4	39 - 63	7.5 YR 5/3	m2p 10 YR 5/8, 6/2	sil	1fsbk	mfr	gs	0	0.13	
5	63 - 128	7.5 YR 5/4	f2f 10 YR 5/8	grsl	1fsbk	mfr		25	0.50	

*Effluent #1 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

*Effluent #2 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

County:	Waukesha
Parcel ID:	HAV 0388989001

225	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit	<u>1030.9</u> ft.	<u>34</u> in.

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 8	7.5 YR 3/2	none	sil	2msbk	mfr	cw	0	0.13	
2	8 - 16	7.5 YR 4/4	none	cl	2fsbk	mfr	cw	0	0.03	
3	16 - 34	7.5 YR 4/3	none	grscl	1msbk	mfr	cw	10	0.11	
4	34 - 144	7.5 YR 5/4	f2d 10 YR 5/8	grsl	1fsbk	mfr		25	0.50	

226	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit	<u>1028.7</u> ft.	<u>0</u> in.

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 11	7.5 YR 3/2	none	sil	2fsbk	mfr	cw	0	0.13	
2	11 - 38	7.5 YR 4/4	c2d 10 YR 5/8, 6/2	sicl	2msbk	mfr	cw	0	0.04	
3	38 - 60	7.5 YR 5/6	m2p 10 YR 5/8, 6/2	sicl	0m	mfr	cw	0	0.04	
4	60 - 72	7.5 YR 5/4	f1f 10 YR 5/8	sil	0m	mfr	cw	0	0.13	
5	72 - 128	7.5 YR 5/4	f1f 10 YR 5/8	grsl	1fsbk	mfr		25	0.50	

227	Boring #	<input type="checkbox"/> Boring	Ground Surface Elev.:	Depth to Limiting Factor:
		<input checked="" type="checkbox"/> Pit	<u>1027.7</u> ft.	<u>17</u> in.

Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	Roots	GPD/Ft. ²	
									*Eff#1	*Eff#2
Horizon	Depth (In.)	Dominant Color	Redox Description (Qu.Az.Cont.Color)	Texture	Structure (Gr. Sz. Sh.)	Consistence	Boundary	% Rock	Hydraulic App. Rate	
									Inches per Hr	
1	0 - 10	7.5 YR 3/2	none	sil	2vfsbk	mfr	cw	0	0.13	
2	10 - 17	7.5 YR 5/3	none	cl	2msbk	mfr	cw	0	0.04	
3	17 - 34	7.5 YR 4/6	f2d 10YR 5/8	sicl	2csbk	mfr	cw	0	0.04	
4	34 - 51	7.5 YR 5/4	m2p 10 YR 5/8	grsil	0m	mfr	gs	20	0.13	
5	51 - 118	7.5 YR 5/4	f2f 10 YR 5/8	grsl	1fsbk	mfr		25	0.50	

*Effluent #1 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

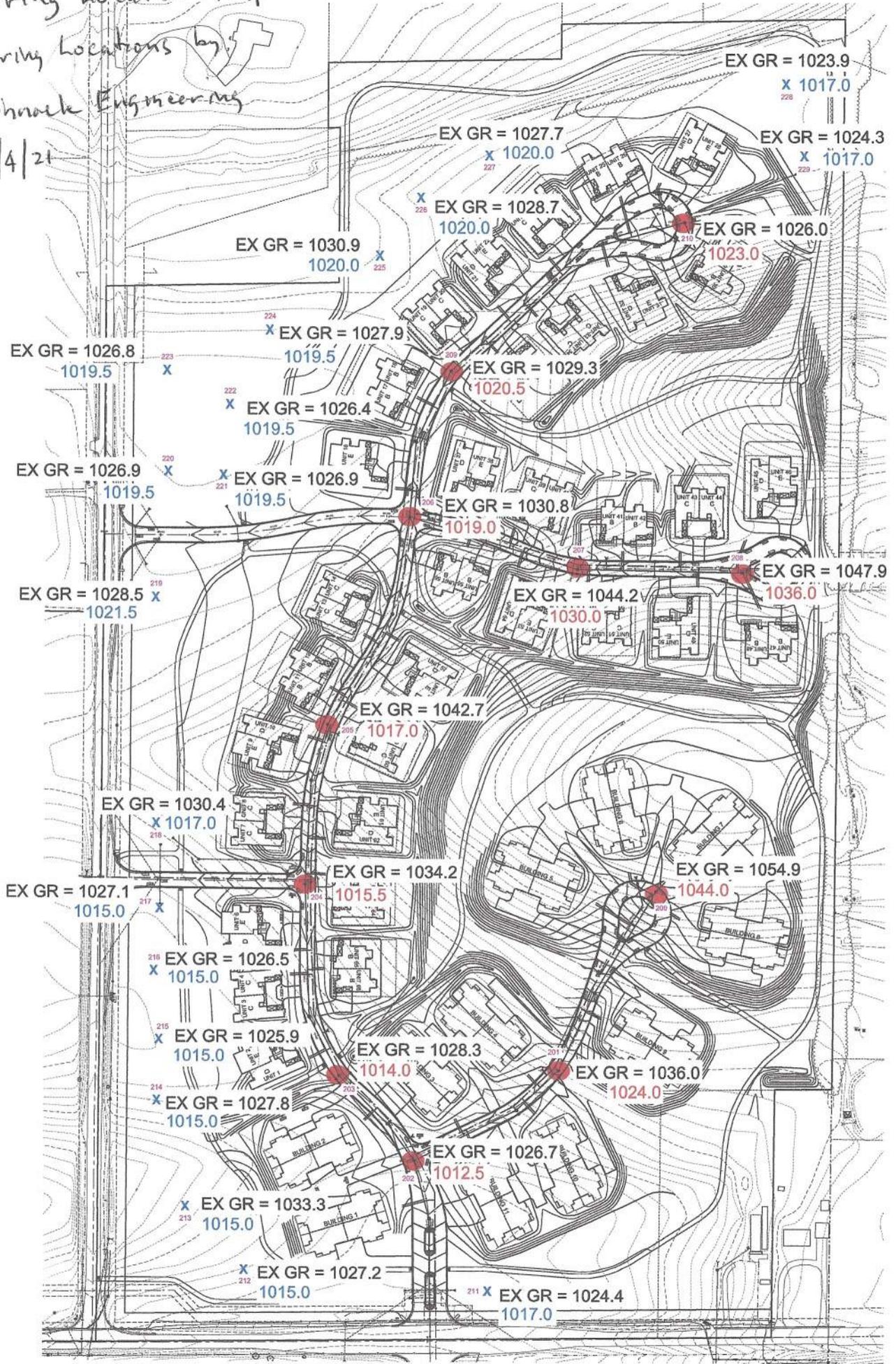
*Effluent #2 = BOD, > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

Boring locator Map

Boring locations by

Pinnacle Engineering

2/4/21

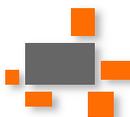


APPENDIX 6

STORMWATER CONVEYANCE

CALCULATIONS

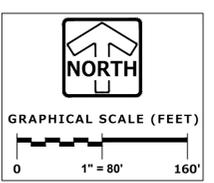
The page contains seven empty rectangular boxes of varying sizes and orientations, arranged in a loose grid. These boxes are intended for the user to perform calculations or draw diagrams related to stormwater conveyance. The boxes are located at approximately the top center, middle left, middle right, bottom left, and bottom right of the page.





Z:\PROJECTS\2016\767-00-WI\CAD\EXHIBITS\DRAINAGE MAP-STORM.DWG 3/31/2021 9:20 AM

LEGEND
 100-YEAR OVERLAND FLOW PATHS



SANDHILL - SWMP - STORMWATER CONVEYANCE

PINNACLE ENGINEERING GROUP

20725 WATERTOWN ROAD | SUITE 100 | BROOKFIELD, WI 53186 | WWW.PINNACLE-ENGR.COM

PLAN | DESIGN | DELIVER

PEGJOB# 767.00

03/31/21

**100-YEAR FLOWS
 FOR
 SANDHILL (SOUTH)**
 VILLAGE OF HARTLAND, WI

Notes	STRUCTURE DATA		DRAINAGE AREA AND FLOW DATA		PIPE DATA				PIPE CAPACITY INFORMATION				ELEVATIONS					
	Upstream Structure	Downstream Structure	Individual Acres A	Individual Coefficient C	Individual Flow Q (cfs)	Cumulative Flow (cfs)	Length (ft)	Diameter (in)	Slope (%)	Manning Coefficient	Required Drop (ft)	Drop (ft)	Full (%)	Actual Velocity (fps)	Max. Capacity (cfs)	Rim/Toc Up	Invert Up	Invert Down
	Design Storm: 100 yr		Storm Duration: 10 min		Flow is determined by Rational Method				Intensity calculated using SEWRPC IDF Equations.				Pipe capacity is determined by Manning's Equation					
	CB 1	CB 2	0.80	0.68	4.27	4.27												
	CB 2	CB 3	1.35	0.67	7.10	7.10												
	CB 3	CB 4	0.22	0.46	0.79	0.79												
	CB 4	CB 5	0.35	0.57	1.57	1.57												
	CB 5	CB 6	0.26	0.54	1.10	1.10												
	CB 6	CB 7	0.29	0.69	1.57	1.57												
	CB 7	CB 9	0.29	0.69	1.57	1.57												
	CB 8	CB 9	0.44	0.62	2.14	2.14												
	CB 9	CB 10	0.44	0.62	2.14	2.14												
	CB 10	CB 16	0.33	0.72	1.87	1.87												
	FI 11	FI 12	1.75	0.36	4.95	4.95												
	FI 12	FI 13	1.62	0.40	5.09	5.09												
	FI 13	CB 14	1.37	0.43	4.62	4.62												
	CB 14	CB 15	0.57	0.61	2.71	2.71												
	CB 15	CB 17	0.57	0.61	2.71	2.71												
	CB 16	CB 17	0.42	0.61	2.01	2.01												
	CB 17	ES 18	0.42	0.61	2.01	2.01												
	ES 19	ES 20	0.48	0.50	1.88	1.88												
	CB 21	CB 22	0.29	0.63	1.43	1.43												
	CB 22	MH 23	0.40	0.70	2.20	2.20												
	MH 23	CB 25	0.00	0.00	0.00	0.00												
	ES 24	CB 25	0.56	0.32	1.41	1.41												
	CB 25	CB 26	0.95	0.47	3.51	3.51												
	CB 26	ES 27	0.33	0.61	1.58	1.58												
	ES 64	CB 65	1.57	0.45	5.55	5.55												
	CB 65	CB 66	0.35	0.67	1.84	1.84												
	CB 66	ES 67	0.29	0.53	1.21	1.21												
	ES 81	ES 82	0.97	0.37	2.82	2.82												

100-YEAR FLOWS
FOR
SANDHILL (NORTH)
VILLAGE OF HARTLAND, WI

County: Waukesha		Design Storm: 100 yr	Storm Duration: 10 min	DESIGN INTENSITY (I): 7.85 in/hr		Intensity calculated using SEWRPC IDF equations.		PIPE CAPACITY INFORMATION				ELEVATIONS				
STRUCTURE DATA		DRAINAGE AREA AND FLOW DATA		PIPE DATA				PIPE CAPACITY INFORMATION				ELEVATIONS				
Notes	Upstream Structure	Downstream Structure	Flow is determined by Rational Method		Length (ft)	Diameter (in)	Slope (%)	Manning Coefficient	Required Drop (ft)	Actual Drop (ft)	Full (%)	Actual Velocity (fps)	Max. Capacity (cfs)	Rim/Toc Up	Invert Up	Invert Down
			Individual Acres A	Individual Coefficient C												
	CB 28	CB 29	0.71	0.61												
	CB 29	CB 31	0.74	0.65												
	CB 30	CB 32	0.19	0.70												
	CB 32	CB 33	0.27	0.63												
	CB 33	CB 35	0.28	0.63												
	CB 34	CB 35	0.49	0.65												
	CB 35	CB 36	0.33	0.62												
	FI 37	FI 38	2.52	0.36												
	FI 38	FI 39	0.76	0.37												
	FI 39	CB 36	0.65	0.43												
	CB 36	CB 40	0.60	0.64												
	CB 40	CB 46	0.54	0.67												
	CB 46	CB 47	0.55	0.68												
	FI 41	FI 42	1.19	0.38												
	FI 42	FI 43	1.56	0.46												
	FI 43	CB 45	0.45	0.47												
	CB 44	CB 45	0.43	0.62												
	CB 45	CB 47	0.43	0.62												
	CB 47	ES 48	0.55	0.68												
	ES 49	ES 50	0.34	0.41												
	CB 51	CB 52	0.57	0.46												
	CB 52	ES 53	0.28	0.48												
	ES 54	ES 55	3.01	0.35												
	CB 56	CB 57	0.17	0.67												
	CB 57	ES 58	0.11	0.67												
	CB 59	CB 60	0.59	0.69												
	CB 60	ES 61	0.59	0.69												
	ES 62	ES 63	1.97	0.32												

STORM SEWER COMPUTATIONS
FOR
SANDHILL (SOUTH)
VILLAGE OF HARTLAND, WI

County: Waukesha		Design Storm: 10 yr	Storm Duration: 10 min	DESIGN INTENSITY (I): 5.28 in/hr		Intensity calculated using SEWRPC IDF equations.		PIPE CAPACITY INFORMATION		ELEVATIONS								
STRUCTURE DATA		DRAINAGE AREA AND FLOW DATA		PIPE DATA		PIPE CAPACITY INFORMATION		PIPE CAPACITY INFORMATION		ELEVATIONS								
Notes	Upstream Structure	Downstream Structure	Individual Acres A	Individual Coefficient C	Individual Flow Q (cfs)	Cumulative Flow (cfs)	Length (ft)	Diameter (in)	Slope (%)	Manning Coefficient	Required Drop (ft)	Actual Drop (ft)	Full Percent (%)	Actual Velocity (fps)	Max Capacity (cfs)	Rim/Toc Up	Invert Up	Invert Down
			Flow is determined by Rational Method Q = CIA									Pipe capacity is determined by Manning's Equation $Q = 1.486/n AR^{2.48} S^{0.54}$						
a,b	CB 1	CB 2	--	--	1.84	1.84	26.00	12	1.00	0.013	0.07	0.26	51%	4.57	3.83	1041.84	1038.25	1037.99
c	CB 2	CB 3	--	--	2.48	4.32	138.49	12	4.50	0.013	2.04	6.23	55%	9.94	8.13	1041.84	1037.99	1031.76
c,d	CB 3	CB 4	--	--	2.00	6.33	26.00	15	1.20	0.013	0.25	0.31	79%	6.52	7.61	1034.75	1031.51	1031.20
a,b,e	CB 4	CB 5	--	--	1.67	7.99	95.61	18	1.50	0.013	0.55	1.43	59%	7.67	13.84	1034.75	1030.95	1029.52
a,e,f	CB 5	CB 6	--	--	1.52	9.51	151.71	18	1.00	0.013	1.24	1.52	80%	6.73	11.30	1033.19	1029.52	1028.00
a,f,n	CB 6	CB 7	--	--	3.21	12.72	8.00	24	1.00	0.013	0.03	0.08	55%	7.41	24.33	1031.77	1027.50	1027.42
a,f,n	CB 7	CB 9	--	--	3.21	15.92	26.00	24	0.60	0.013	0.13	0.16	80%	6.32	18.85	1031.76	1027.42	1027.26
d,n	CB 8	CB 9	--	--	3.17	3.17	8.00	12	1.20	0.013	0.06	0.10	73%	5.54	4.20	1031.77	1028.36	1028.26
d,n	CB 9	CB 10	--	--	3.17	22.26	60.77	24	1.20	0.013	0.59	0.73	79%	8.92	26.66	1031.76	1027.26	1026.53
g	CB 10	CB 17	0.33	0.72	0.77	23.03	156.02	30	0.50	0.013	0.49	0.78	72%	6.56	31.20	1031.92	1026.03	1025.25
i	FI 11	FI 12	1.75	0.36	3.33	3.33	279.88	12	1.25	0.013	2.44	3.50	75%	5.68	4.28	1035.50	1032.60	1029.10
i	FI 12	FI 13	1.62	0.40	3.42	6.75	173.03	18	0.80	0.013	0.71	1.38	66%	5.78	10.11	1032.00	1028.60	1027.22
i	FI 13	CB 14	1.37	0.43	3.11	9.86	26.53	18	1.10	0.013	0.23	0.29	79%	7.05	11.85	1030.80	1027.22	1026.92
i	CB 14	CB 15	0.57	0.61	1.83	11.83	8.00	18	1.60	0.013	0.10	0.13	79%	8.50	14.29	1030.99	1026.92	1026.80
i	CB 15	CB 17	0.57	0.61	1.97	13.80	26.00	18	2.10	0.013	0.45	0.55	80%	9.76	16.37	1030.98	1026.80	1026.25
g	CB 16	CB 17	0.42	0.61	1.59	1.59	8.00	12	1.00	0.013	0.02	0.08	46%	4.41	3.83	1030.99	1027.83	1027.75
g	CB 17	ES 18	0.42	0.61	1.59	40.02	272.04	36	0.64	0.013	0.98	1.75	68%	8.29	57.49	1030.98	1024.75	1023.00
a,h	ES 19	ES 20	--	--	10.85	10.85	39.32	24	0.60	0.013	0.09	0.24	59%	5.87	18.85		1026.24	1026.00
i	CB 21	CB 22	0.29	0.63	0.66	0.66	26.00	12	2.00	0.013	0.01	0.52	19%	4.45	5.42	1034.25	1031.01	1030.49
j	CB 22	MH 23	0.40	0.70	0.88	0.88	180.00	12	2.00	0.013	0.11	3.60	23%	4.82	5.42	1034.25	1030.49	1026.89
j	MH 23	CB 25	0.00	0.00	0.00	0.88	71.98	12	1.50	0.013	0.04	1.08	26%	4.35	4.69	1030.20	1026.89	1025.81
a	ES 24	CB 25	--	--	1.41	1.41	50.00	12	3.00	0.013	0.08	1.50	28%	6.36	6.64		1027.31	1025.81
j	CB 25	CB 26	0.95	0.47	2.96	5.24	26.00	15	1.00	0.013	0.17	0.26	73%	5.86	6.95	1028.95	1025.56	1025.30
j	CB 26	ES 27	0.33	0.61	1.06	6.31	25.00	15	1.20	0.013	0.24	0.30	79%	6.52	7.61	1028.95	1025.30	1025.00
k	ES 64	MH 80	1.57	0.45	4.15	4.15	60.00	18	0.26	0.013	0.09	0.16	70%	3.35	5.76		1023.07	1022.91
i	MH 80	CB 65	0.00	0.00	0.00	17.32	24.91	30	0.26	0.013	0.04	0.07	74%	4.80	22.71	1028.40	1022.91	1022.84
k	CB 65	CB 66	0.35	0.67	0.82	18.14	60.00	30	0.26	0.013	0.12	0.16	77%	4.80	22.50	1027.69	1022.84	1022.68
m	CB 66	ES 67	0.29	0.53	0.62	18.76	109.17	30	0.26	0.013	0.23	0.28	79%	4.82	22.50	1027.69	1022.68	1022.40
a	ES 81	ES 82	--	--	2.82	2.82	88.00	12.00	1.14	0.013	0.55	1.00	68%	5.30	4.09		1039.00	1038.00

a Individual flow was calculated using the 100-year rainfall intensity. (See Sheet 1 of 4 for 100-year flow calculation).
b Calculated individual flow to CB 1 was 4.27 cfs. Individual flow was changed to 1.84 cfs due to inlet capacity calculation. 2.43 cfs bypasses CB 1 and was added to CB 4.
c Calculated individual flow to CB 2 was 7.10 cfs. Individual flow was changed to 2.48 cfs due to inlet capacity calculation. 4.62 cfs bypasses CB 2 and was added to CB 3.
d Calculated individual flow to CB 3 was 5.41 cfs with the 4.62 cfs that bypassed CB 2. Individual flow was changed to 2.00 cfs due to inlet capacity calculation. 3.41 cfs bypasses CB 3 and was split between CB 8 and CB 9.
e Calculated individual flow to CB 4 was 4.00 cfs with the 2.43 cfs that bypassed CB 1. Individual flow was changed to 1.57 cfs due to inlet capacity calculation. 2.33 cfs bypasses CB 4 and was added to CB 5.
f Calculated individual flow to CB 5 was 3.43 cfs with the 2.33 cfs that bypassed CB 4. Individual flow was changed to 1.52 cfs due to inlet capacity calculation. 1.91 cfs bypasses CB 5 and was split between CB 6 and CB 7.
g Calculated individual flow to CB 10 was 1.25 cfs. Individual flow was changed to 0.77 cfs due to inlet capacity calculation. 0.48 cfs bypasses CB 10 and was split between CB 16 and CB 17.
h Individual flow was calculated using the 100-year flow generated from CB 1 through CB 21 on Sheet 1 and subtracting the cumulative flow through the pipe at CB 17 (40.02 cfs) and the flow through the pipe at CB 21 (0.66 cfs).
i Calculated individual flow to CB 21 was 0.96 cfs. Individual flow was changed to 0.66 cfs due to inlet capacity calculation. 0.30 cfs bypasses CB 21 and was split between CB 14 and CB 15.
j Calculated individual flow to CB 22 was 1.48 cfs. Individual flow was changed to 0.88 cfs due to inlet capacity calculation. 0.60 cfs bypasses CB 22 and was added to CB 25.
k Calculated individual flow to CB 65 was 1.24 cfs. Individual flow was changed to 0.82 cfs due to inlet capacity calculation. 0.42 cfs bypasses CB 65 and was added to ES 64.
l 13.17 cfs was added to the cumulative flow from the outlet pipe from the South Dry Pond 61.9 (100-year flow from HydroCAD).
m Calculated individual flow to CB 66 was 0.81 cfs. Individual flow was changed to 0.62 cfs due to inlet capacity calculation.
n Calculated individual flow to CB 8 and CB 9 was 3.65 cfs to each with the 3.41 cfs that bypassed CB 3 and was split between CB 8 and 9. Individual flows to CB 8 and 9 were changed to 3.17 due to inlet capacity calculation. 0.68 cfs was added to both CB 6 and CB 7.

STORM SEWER COMPUTATIONS
FOR
SANDHILL (NORTH)
VILLAGE OF HARTLAND, WI

Notes	Upstream Structure	Downstream Structure	DESIGN DATA				DESIGN INTENSITY (I): 5.28 in/hr				Intensity calculated using SEWRPC IDF equations.							
			Design Storm: 10 yr		Storm Duration: 10 min		PIPE DATA				PIPE CAPACITY INFORMATION							
			Individual Coefficient	Individual Flow Q (cfs)	Individual Flow Q (cfs)	Cumulative Flow Q (cfs)	Length (ft)	Diameter (in)	Slope (%)	Manning Coefficient	Required Drop (ft)	Actual Drop (ft)	Full Percent (%)	Actual Velocity (fps)	Capacity (cfs)	Max. Capacity (cfs)	Rim/Toc Up	Invert Up
a	CB 28	CB 29	0.61	1.16	1.16	1.16	26.00	12	1.00	0.013	0.03	0.26	36%	4.05	3.83	1045.33	1041.86	1041.86
b	CB 29	CB 32	0.65	1.24	2.40	2.40	144.46	12	2.43	0.013	0.65	3.51	45%	6.81	5.97	1045.33	1041.86	1038.35
a,c	CB 30	CB 32	0.70	1.05	1.05	1.05	26.00	12	2.00	0.013	0.02	0.52	26%	5.07	5.42	1042.16	1038.87	1038.35
b,d	CB 32	CB 33	0.63	1.18	4.63	4.63	108.54	12	4.00	0.013	1.83	4.34	61%	9.66	7.66	1042.16	1038.35	1034.01
d,e	CB 33	CB 35	0.28	1.10	5.73	5.73	148.37	15	2.00	0.013	1.17	2.97	59%	7.86	9.83	1037.92	1033.76	1030.79
c,f	CB 34	CB 35	0.49	0.70	0.70	0.70	26.00	12	0.40	0.013	0.01	0.10	35%	2.53	2.42	1034.23	1031.14	1031.04
e,g	CB 35	CB 36	0.62	2.90	9.33	9.33	38.47	18	1.00	0.013	0.30	0.38	79%	6.72	11.30	1034.23	1030.54	1030.16
g	FI 37	FI 38	0.36	4.79	4.79	4.79	158.00	12	3.00	0.013	2.86	4.74	70%	8.68	6.64	1042.40	1039.44	1034.70
h	FI 38	FI 39	0.37	1.48	6.27	6.27	150.00	15	2.00	0.013	1.42	3.00	64%	8.02	9.83	1038.85	1034.45	1031.45
i	FI 39	CB 36	0.65	1.48	7.75	7.75	115.28	18	0.90	0.013	0.63	1.00	70%	6.23	10.72	1034.80	1031.20	1030.16
f	CB 44	CB 45	0.43	2.27	2.27	2.27	8.00	12	1.00	0.013	0.03	0.08	60%	4.81	3.83	1032.83	1029.80	1029.72
f	CB 45	CB 47	0.62	2.27	13.00	13.00	26.00	24	0.46	0.013	0.09	0.12	76%	5.48	16.50	1032.81	1028.72	1028.60
i	CB 47	ES 48	0.68	1.96	36.07	36.07	218.42	36	0.50	0.013	0.64	1.10	69%	7.37	50.93	1032.81	1027.60	1026.50
i,j	ES 49	ES 50	--	16.43	16.43	16.43	28.30	24	1.00	0.013	0.15	0.28	67%	7.85	24.33	1028.78	1028.50	1028.50
h,k	CB 51	CB 52	0.57	1.15	1.15	1.15	26.00	12	0.26	0.013	0.03	0.07	60%	2.45	1.95	1031.46	1028.19	1028.12
i,l	CB 52	ES 53	--	0.68	1.83	1.83	28.52	12	0.43	0.013	0.08	0.12	71%	3.29	2.51	1031.46	1028.12	1028.00
i	ES 54	ES 55	--	8.27	8.27	8.27	81.91	18	0.76	0.013	0.51	0.62	80%	5.87	9.85	1027.62	1027.00	1027.00
k	CB 56	CB 57	0.17	1.72	1.72	1.72	32.12	12	0.30	0.013	0.07	0.10	78%	2.80	2.10	1029.73	1026.91	1026.81
i,l	CB 57	ES 58	--	0.96	2.68	2.68	41.74	15	0.26	0.013	0.07	0.11	73%	2.99	3.54	1029.78	1026.61	1026.50
f	CB 59	CB 60	0.69	2.13	2.13	2.13	8.00	12	0.50	0.013	0.03	0.04	75%	3.60	2.71	1033.92	1030.86	1030.82
g	CB 60	ES 61	0.69	2.13	4.26	4.26	195.19	12	1.70	0.013	2.79	3.32	81%	6.71	5.00	1033.84	1030.82	1027.50
h	ES 62	ES 63	--	4.95	4.95	4.95	31.56	15	0.95	0.013	0.19	0.30	71%	5.68	6.77	1032.40	1032.10	1032.10

a Calculated individual flow to CB 28 was 2.29 cfs. Individual flow was changed to 1.16 cfs due to inlet capacity calculation. 1.13 cfs bypasses CB 28 and was added to CB 30.
b Calculated individual flow to CB 29 was 2.54 cfs. Individual flow was changed to 1.24 cfs due to inlet capacity calculation. 1.30 cfs bypasses CB 29 and was added to CB 32.
c Calculated individual flow to CB 30 was 1.83 cfs with the 1.13 cfs that bypassed CB 28. Individual flow was changed to 1.05 cfs due to inlet capacity calculation. 0.78 cfs bypasses CB 30 and was added to CB 34.
d Calculated individual flow to CB 32 was 2.20 cfs with the 1.30 cfs that bypassed CB 29. Individual flow was changed to 1.18 cfs due to inlet capacity calculation. 1.02 cfs bypasses CB 32 and was added to CB 33.
e Calculated individual flow to CB 33 was 1.95 cfs with the 1.02 cfs that bypassed CB 32. Individual flow was changed to 1.10 cfs due to inlet capacity calculation. 0.85 cfs bypasses CB 33 and was added to CB 35.
f Calculated individual flow to CB 34 was 2.46 cfs with the 0.78 cfs that bypassed CB 30. Individual flow was changed to 0.70 cfs due to inlet capacity calculation. 1.76 cfs bypasses CB 34 and was split between CB 44 and CB 45.
g Calculated individual flow to CB 36 was 2.03 cfs. Individual flow was changed to 1.06 cfs due to inlet capacity calculation. 0.97 cfs bypasses CB 36 and was added to CB 35.
h Calculated individual flow to CB 40 was 1.91 cfs. Individual flow was changed to 1.02 cfs due to inlet capacity calculation. 0.89 cfs bypasses CB 40 and was added to CB 51.
i Individual flow was calculated using the 100-year rainfall intensity. (See Sheet 2 of 4 for 100-year flow calculation).
j Individual flow was calculated using the 100-year flow generated from CB 29 through ES 49 except for CB 40 on Sheet 2, adding the 10-year flow from CB 40 and subtracting the cumulative flow through the pipe at CB 47 (36.07 cfs).
k Calculated individual flow to CB 51 was 2.27 cfs with the 0.89 cfs that bypassed CB 40. Individual flow was changed to 1.15 cfs due to inlet capacity calculation. 1.12 cfs bypasses CB 51 and was added to CB 56.
l Calculated individual flow to CB 52 was 1.06 cfs. Individual flow was changed to 0.68 cfs due to inlet capacity calculation. 0.38 cfs bypasses CB 52 and was added to CB 57.

Inlet Report

CB 1 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 5.63
Gutter n-value	= 0.016

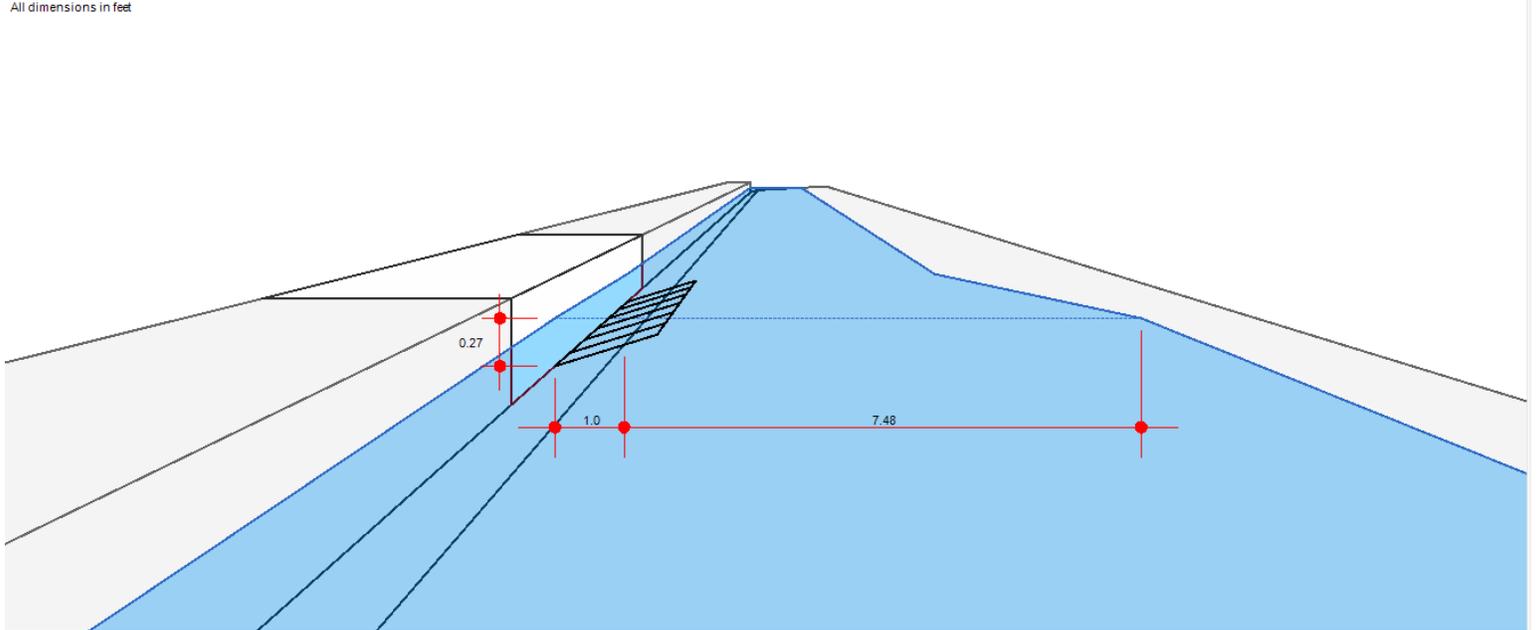
Calculations

Compute by:	Known Q
Q (cfs)	= 4.27

Highlighted

Q Total (cfs)	= 4.27
Q Capt (cfs)	= 1.84
Q Bypass (cfs)	= 2.43
Depth at Inlet (in)	= 3.23
Efficiency (%)	= 43
Gutter Spread (ft)	= 8.48
Gutter Vel (ft/s)	= 5.56
Bypass Spread (ft)	= 6.63
Bypass Depth (in)	= 2.79

All dimensions in feet



Inlet Report

CB 4 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 3.00
Gutter n-value	= 0.016

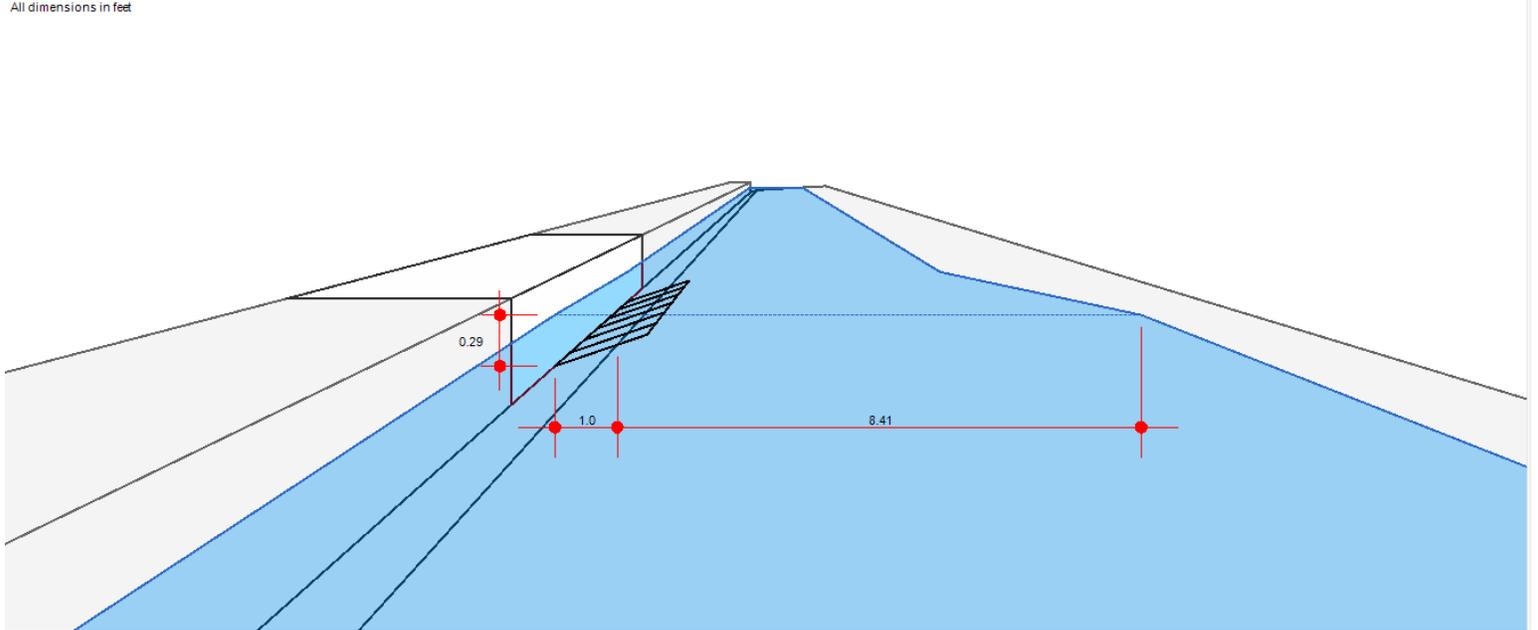
Calculations

Compute by:	Known Q
Q (cfs)	= 4.00

Highlighted

Q Total (cfs)	= 4.00
Q Capt (cfs)	= 1.67
Q Bypass (cfs)	= 2.33
Depth at Inlet (in)	= 3.46
Efficiency (%)	= 42
Gutter Spread (ft)	= 9.41
Gutter Vel (ft/s)	= 4.28
Bypass Spread (ft)	= 7.49
Bypass Depth (in)	= 3.00

All dimensions in feet



Inlet Report

CB 5 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 1.00
Gutter n-value	= 0.016

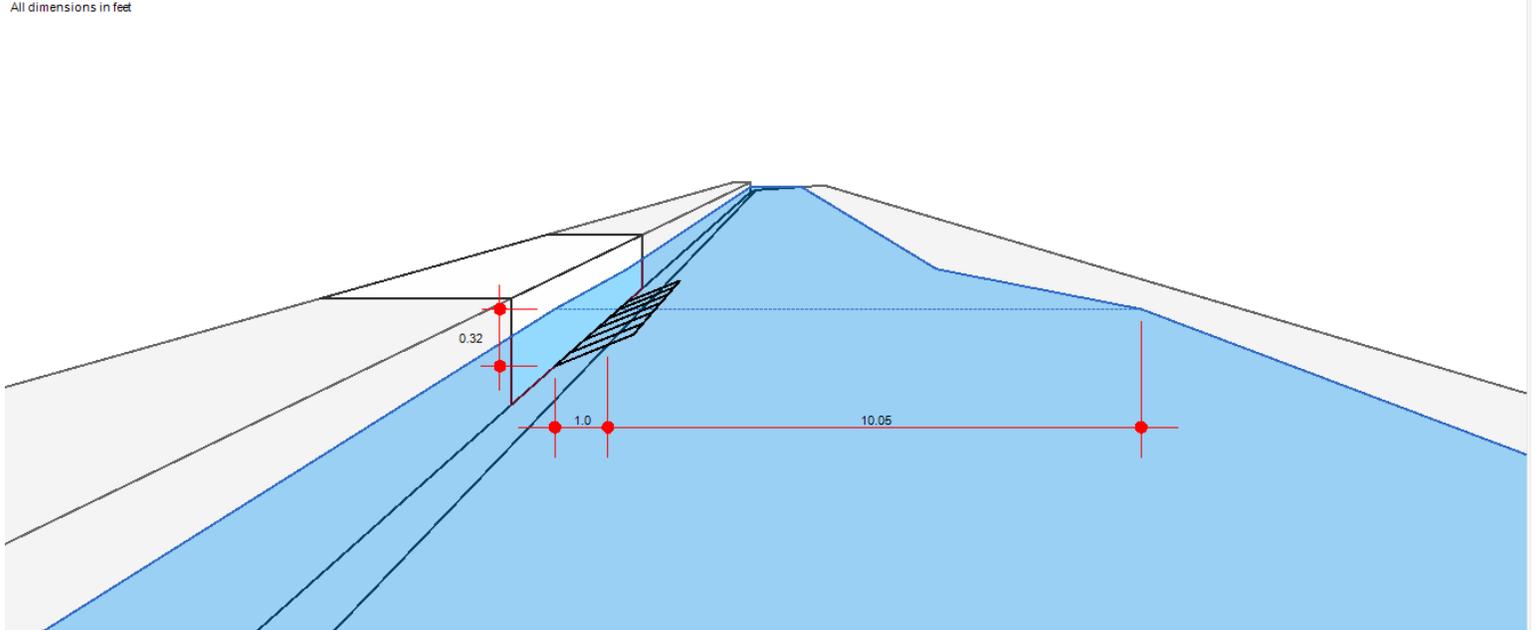
Calculations

Compute by:	Known Q
Q (cfs)	= 3.43

Highlighted

Q Total (cfs)	= 3.43
Q Capt (cfs)	= 1.52
Q Bypass (cfs)	= 1.91
Depth at Inlet (in)	= 3.85
Efficiency (%)	= 44
Gutter Spread (ft)	= 11.05
Gutter Vel (ft/s)	= 2.70
Bypass Spread (ft)	= 8.70
Bypass Depth (in)	= 3.29

All dimensions in feet



Inlet Report

CB 10 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 0.70
Gutter n-value	= 0.016

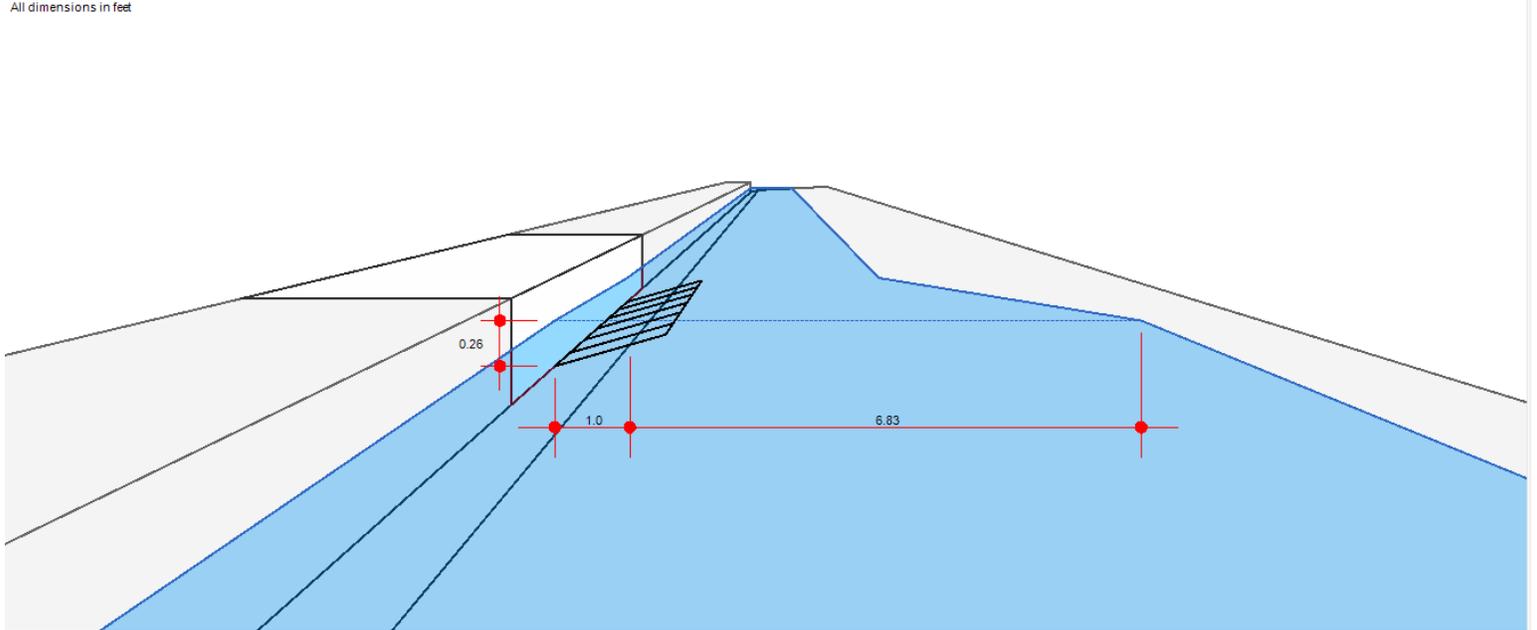
Calculations

Compute by:	Known Q
Q (cfs)	= 1.25

Highlighted

Q Total (cfs)	= 1.25
Q Capt (cfs)	= 0.77
Q Bypass (cfs)	= 0.48
Depth at Inlet (in)	= 3.08
Efficiency (%)	= 62
Gutter Spread (ft)	= 7.83
Gutter Vel (ft/s)	= 1.89
Bypass Spread (ft)	= 5.01
Bypass Depth (in)	= 2.40

All dimensions in feet



Inlet Report

CB 21 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 2.60
Gutter n-value	= 0.016

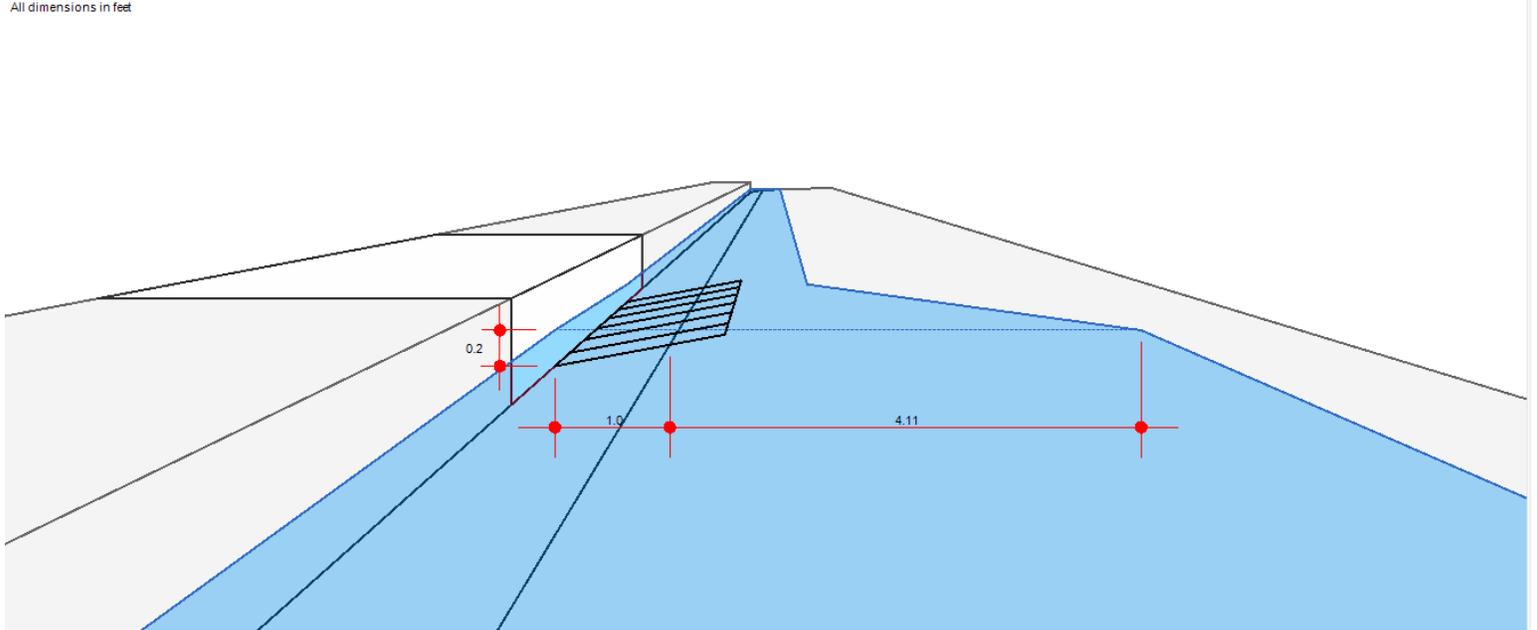
Calculations

Compute by:	Known Q
Q (cfs)	= 0.96

Highlighted

Q Total (cfs)	= 0.96
Q Capt (cfs)	= 0.66
Q Bypass (cfs)	= 0.30
Depth at Inlet (in)	= 2.43
Efficiency (%)	= 69
Gutter Spread (ft)	= 5.11
Gutter Vel (ft/s)	= 3.09
Bypass Spread (ft)	= 2.34
Bypass Depth (in)	= 1.76

All dimensions in feet



Inlet Report

CB 22 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 2.60
Gutter n-value	= 0.016

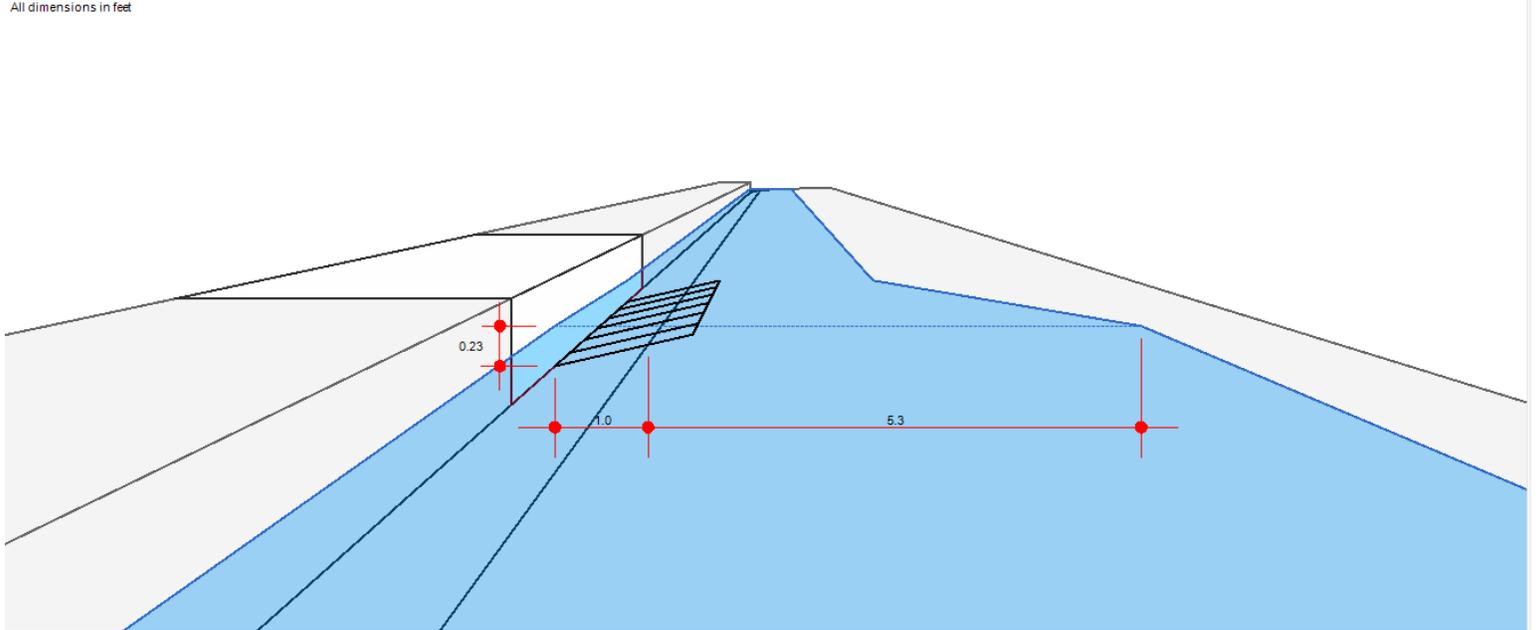
Calculations

Compute by:	Known Q
Q (cfs)	= 1.48

Highlighted

Q Total (cfs)	= 1.48
Q Capt (cfs)	= 0.88
Q Bypass (cfs)	= 0.60
Depth at Inlet (in)	= 2.71
Efficiency (%)	= 60
Gutter Spread (ft)	= 6.30
Gutter Vel (ft/s)	= 3.32
Bypass Spread (ft)	= 3.94
Bypass Depth (in)	= 2.14

All dimensions in feet



Inlet Report

CB 28 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 1.00
Gutter n-value	= 0.016

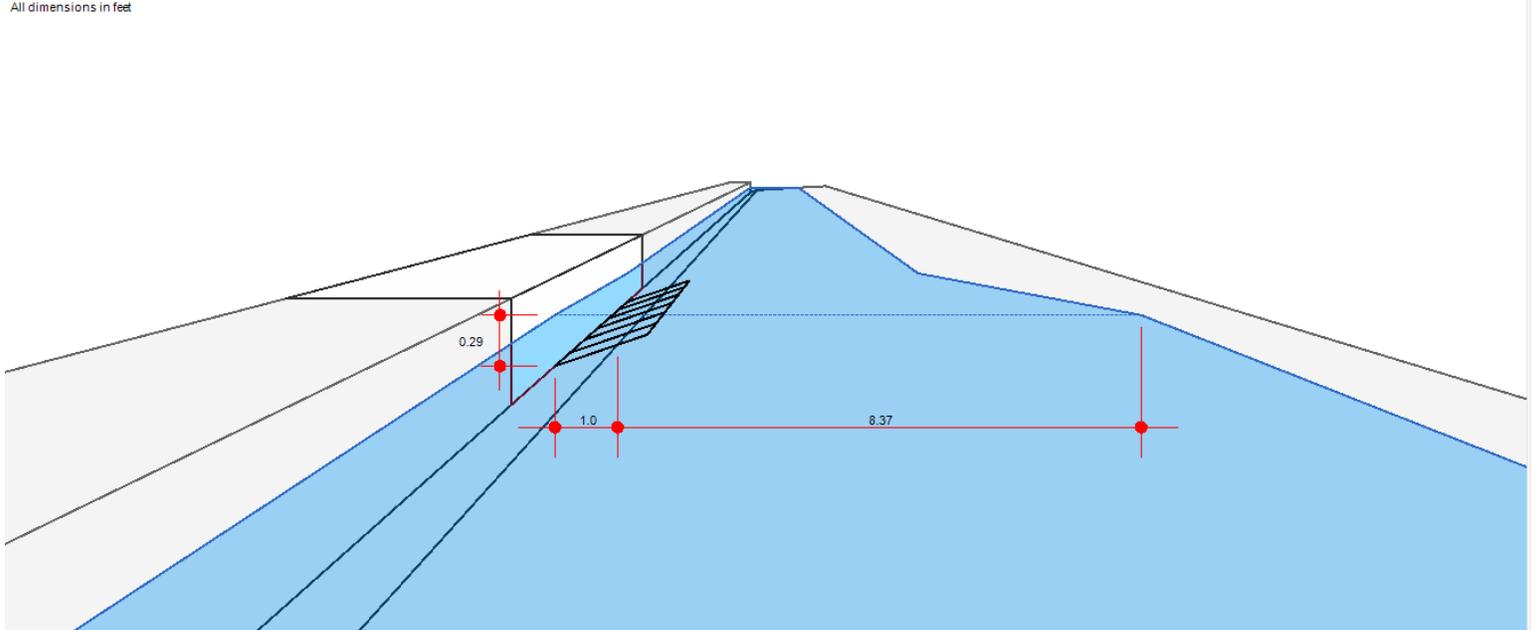
Calculations

Compute by:	Known Q
Q (cfs)	= 2.29

Highlighted

Q Total (cfs)	= 2.29
Q Capt (cfs)	= 1.16
Q Bypass (cfs)	= 1.13
Depth at Inlet (in)	= 3.45
Efficiency (%)	= 50
Gutter Spread (ft)	= 9.37
Gutter Vel (ft/s)	= 2.47
Bypass Spread (ft)	= 6.93
Bypass Depth (in)	= 2.86

All dimensions in feet



Inlet Report

CB 29 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 1.00
Gutter n-value	= 0.016

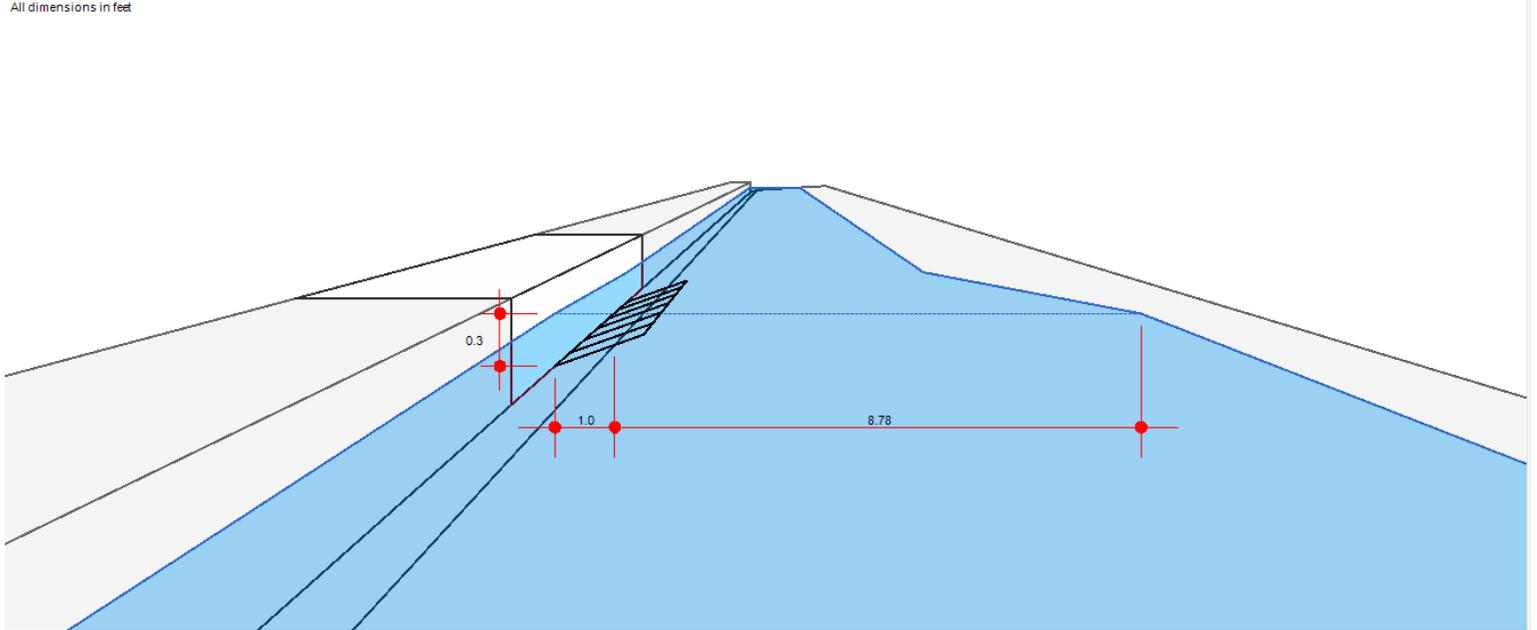
Calculations

Compute by:	Known Q
Q (cfs)	= 2.54

Highlighted

Q Total (cfs)	= 2.54
Q Capt (cfs)	= 1.24
Q Bypass (cfs)	= 1.30
Depth at Inlet (in)	= 3.55
Efficiency (%)	= 49
Gutter Spread (ft)	= 9.78
Gutter Vel (ft/s)	= 2.52
Bypass Spread (ft)	= 7.37
Bypass Depth (in)	= 2.97

All dimensions in feet



Inlet Report

CB 30 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 3.89
Gutter n-value	= 0.016

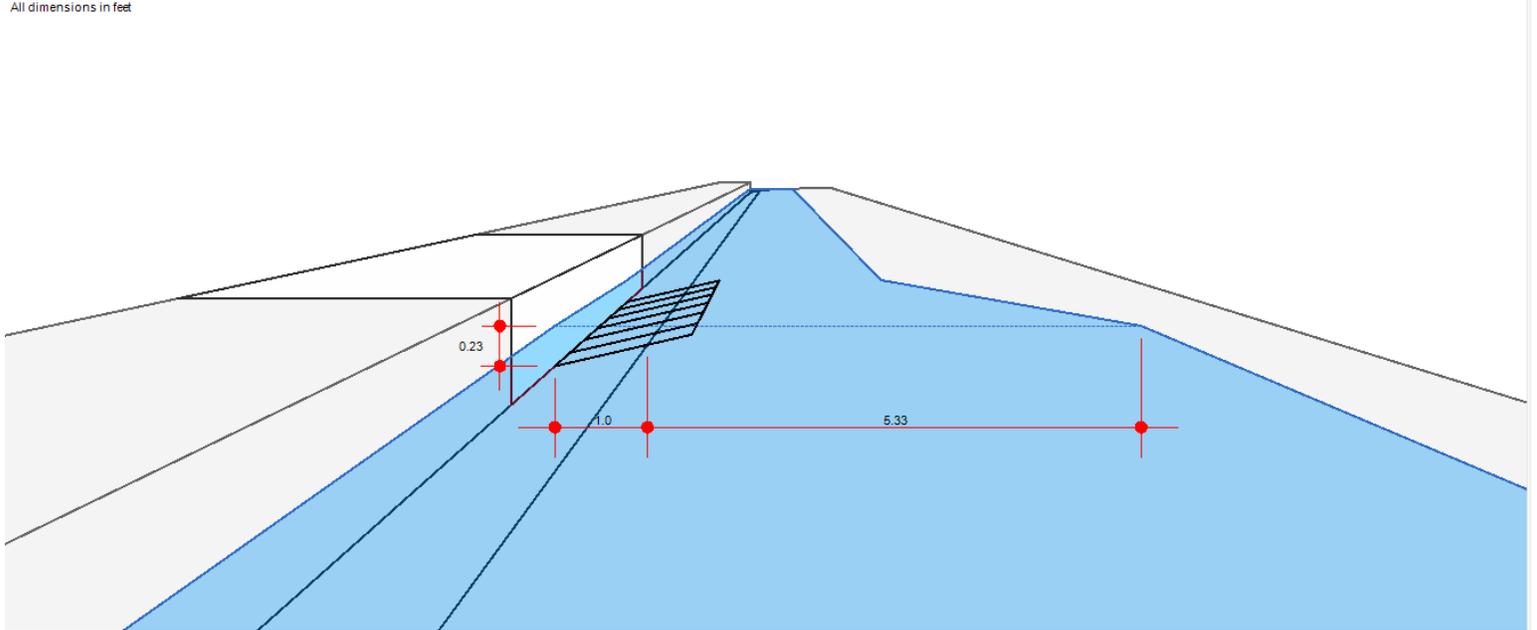
Calculations

Compute by:	Known Q
Q (cfs)	= 1.83

Highlighted

Q Total (cfs)	= 1.83
Q Capt (cfs)	= 1.05
Q Bypass (cfs)	= 0.78
Depth at Inlet (in)	= 2.72
Efficiency (%)	= 57
Gutter Spread (ft)	= 6.33
Gutter Vel (ft/s)	= 4.06
Bypass Spread (ft)	= 4.09
Bypass Depth (in)	= 2.18

All dimensions in feet



Inlet Report

CB 33 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 4.10
Gutter n-value	= 0.016

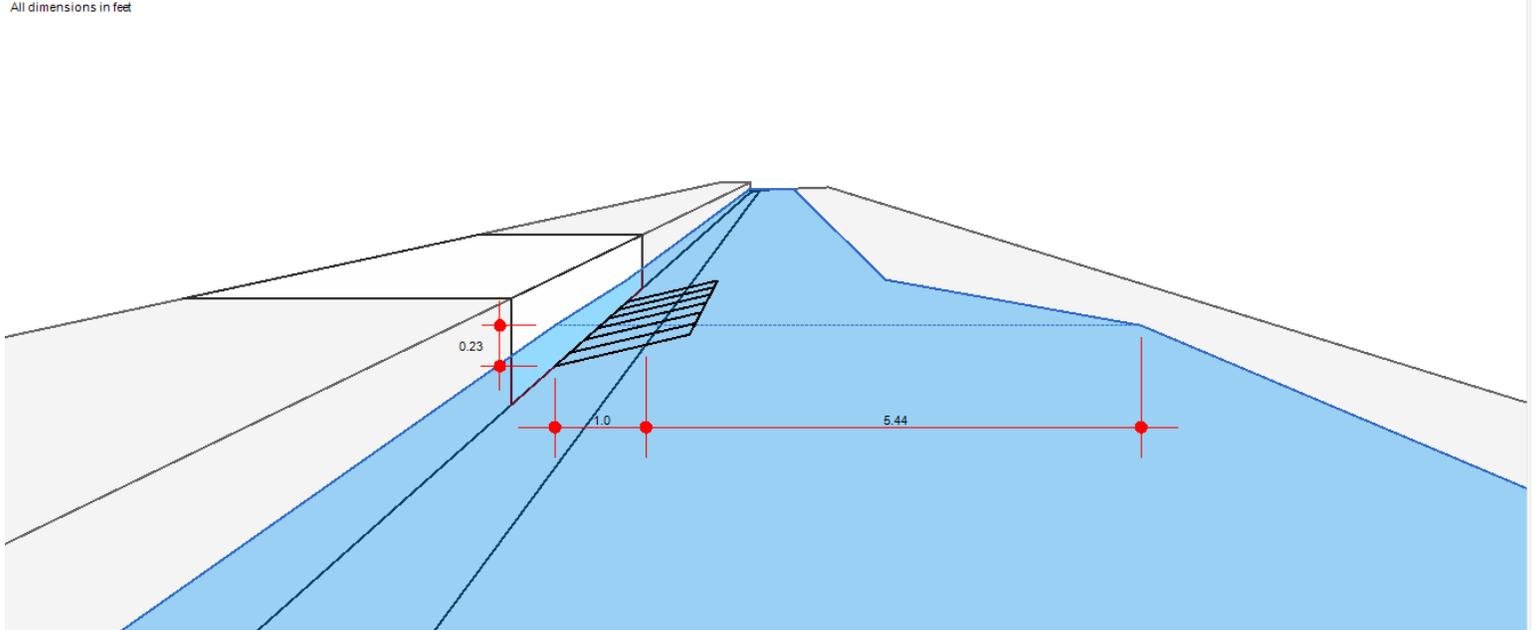
Calculations

Compute by:	Known Q
Q (cfs)	= 1.95

Highlighted

Q Total (cfs)	= 1.95
Q Capt (cfs)	= 1.10
Q Bypass (cfs)	= 0.85
Depth at Inlet (in)	= 2.75
Efficiency (%)	= 56
Gutter Spread (ft)	= 6.44
Gutter Vel (ft/s)	= 4.20
Bypass Spread (ft)	= 4.23
Bypass Depth (in)	= 2.22

All dimensions in feet



Inlet Report

CB 40 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 1.56
Gutter n-value	= 0.016

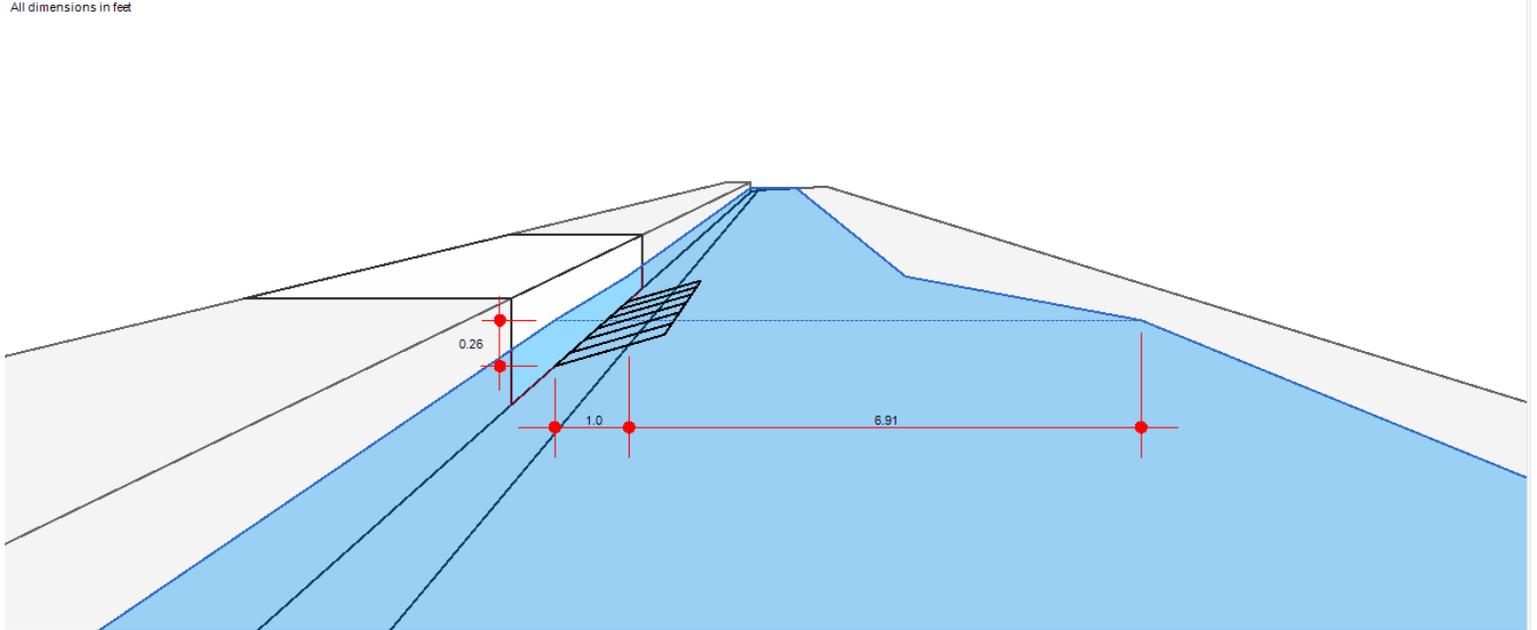
Calculations

Compute by:	Known Q
Q (cfs)	= 1.91

Highlighted

Q Total (cfs)	= 1.91
Q Capt (cfs)	= 1.02
Q Bypass (cfs)	= 0.89
Depth at Inlet (in)	= 3.10
Efficiency (%)	= 53
Gutter Spread (ft)	= 7.91
Gutter Vel (ft/s)	= 2.83
Bypass Spread (ft)	= 5.60
Bypass Depth (in)	= 2.54

All dimensions in feet



Inlet Report

CB 51 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 1.00
Gutter n-value	= 0.016

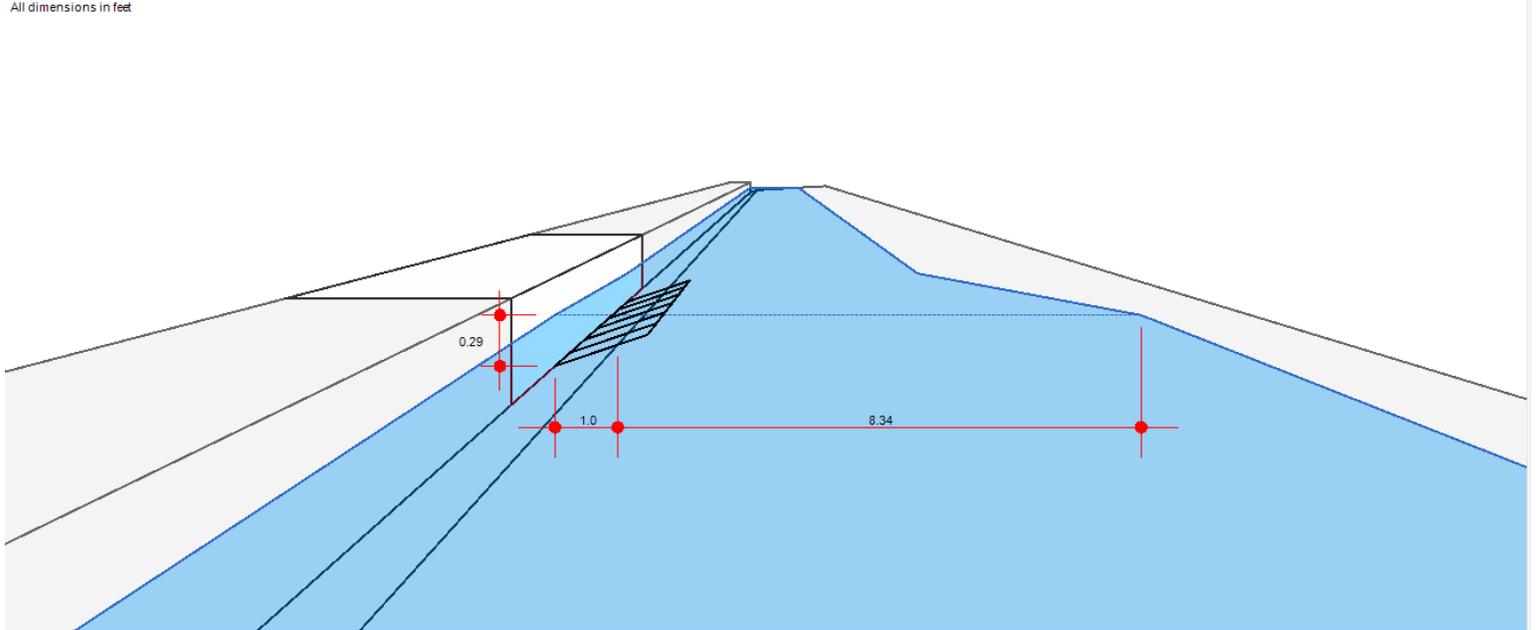
Calculations

Compute by:	Known Q
Q (cfs)	= 2.27

Highlighted

Q Total (cfs)	= 2.27
Q Capt (cfs)	= 1.15
Q Bypass (cfs)	= 1.12
Depth at Inlet (in)	= 3.44
Efficiency (%)	= 51
Gutter Spread (ft)	= 9.34
Gutter Vel (ft/s)	= 2.46
Bypass Spread (ft)	= 6.90
Bypass Depth (in)	= 2.85

All dimensions in feet



Inlet Report

CB 52 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 1.00
Gutter n-value	= 0.016

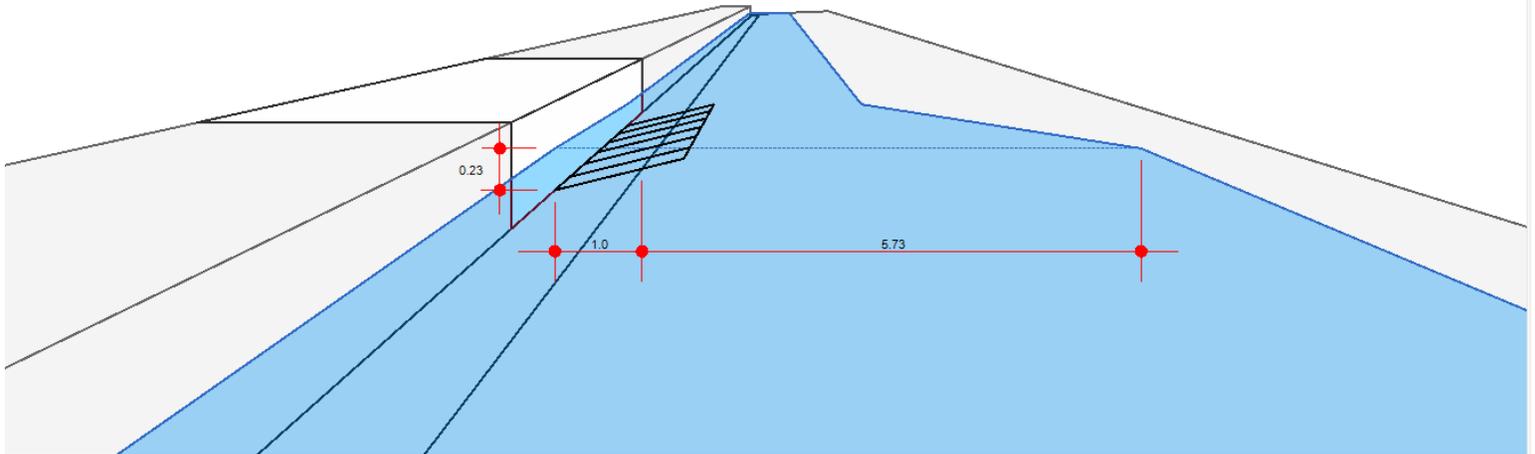
Calculations

Compute by:	Known Q
Q (cfs)	= 1.06

Highlighted

Q Total (cfs)	= 1.06
Q Capt (cfs)	= 0.68
Q Bypass (cfs)	= 0.38
Depth at Inlet (in)	= 2.81
Efficiency (%)	= 64
Gutter Spread (ft)	= 6.73
Gutter Vel (ft/s)	= 2.11
Bypass Spread (ft)	= 4.01
Bypass Depth (in)	= 2.16

All dimensions in feet



Inlet Report

CB 65 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 3.80
Gutter n-value	= 0.016

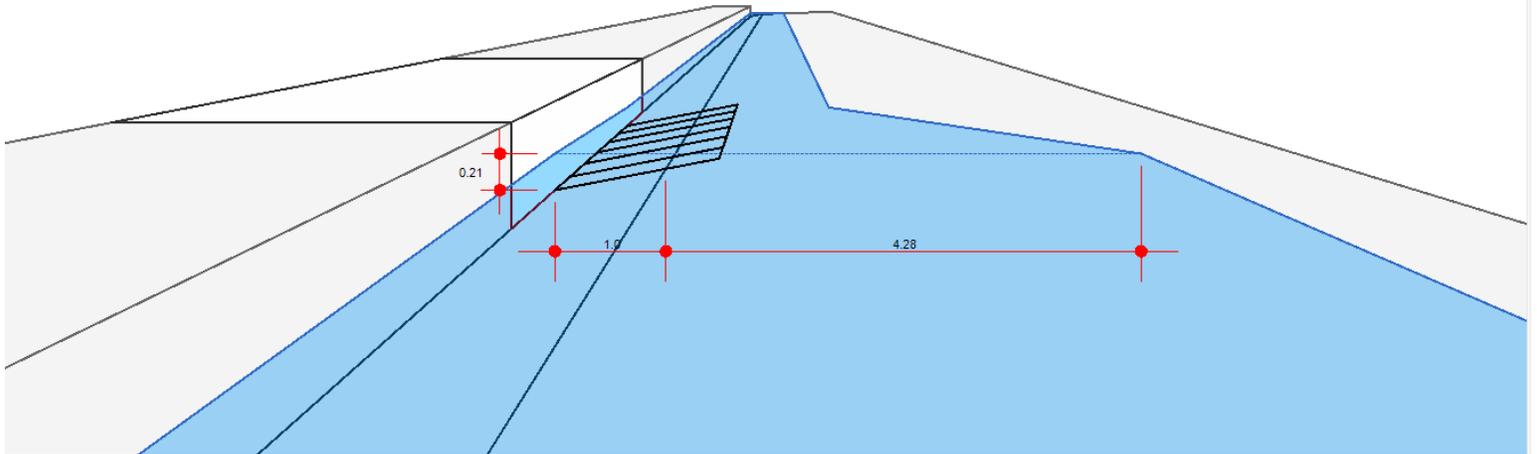
Calculations

Compute by:	Known Q
Q (cfs)	= 1.24

Highlighted

Q Total (cfs)	= 1.24
Q Capt (cfs)	= 0.82
Q Bypass (cfs)	= 0.42
Depth at Inlet (in)	= 2.47
Efficiency (%)	= 66
Gutter Spread (ft)	= 5.28
Gutter Vel (ft/s)	= 3.77
Bypass Spread (ft)	= 2.71
Bypass Depth (in)	= 1.85

All dimensions in feet



Inlet Report

CB 66 (R-3067)

Grate Inlet

Location	= On grade
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= -0-
Grate Width (ft)	= 1.48
Grate Length (ft)	= 2.94

Gutter

Slope, Sw (ft/ft)	= 0.120
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.00
Gutter Slope (%)	= 3.80
Gutter n-value	= 0.016

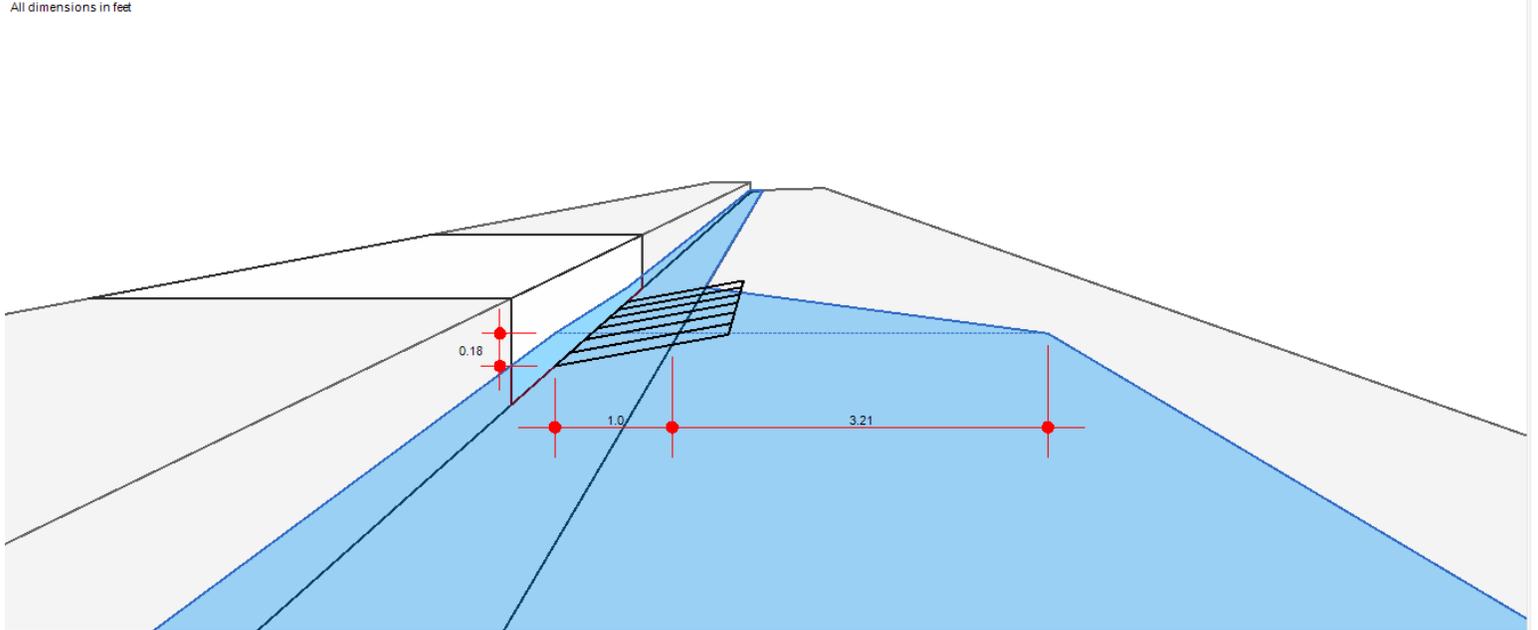
Calculations

Compute by:	Known Q
Q (cfs)	= 0.81

Highlighted

Q Total (cfs)	= 0.81
Q Capt (cfs)	= 0.62
Q Bypass (cfs)	= 0.19
Depth at Inlet (in)	= 2.21
Efficiency (%)	= 76
Gutter Spread (ft)	= 4.21
Gutter Vel (ft/s)	= 3.57
Bypass Spread (ft)	= 0.99
Bypass Depth (in)	= 1.42

All dimensions in feet



INLET CAPACITY - SUMP CONDITION FOR CB 6-7 SANDHILL

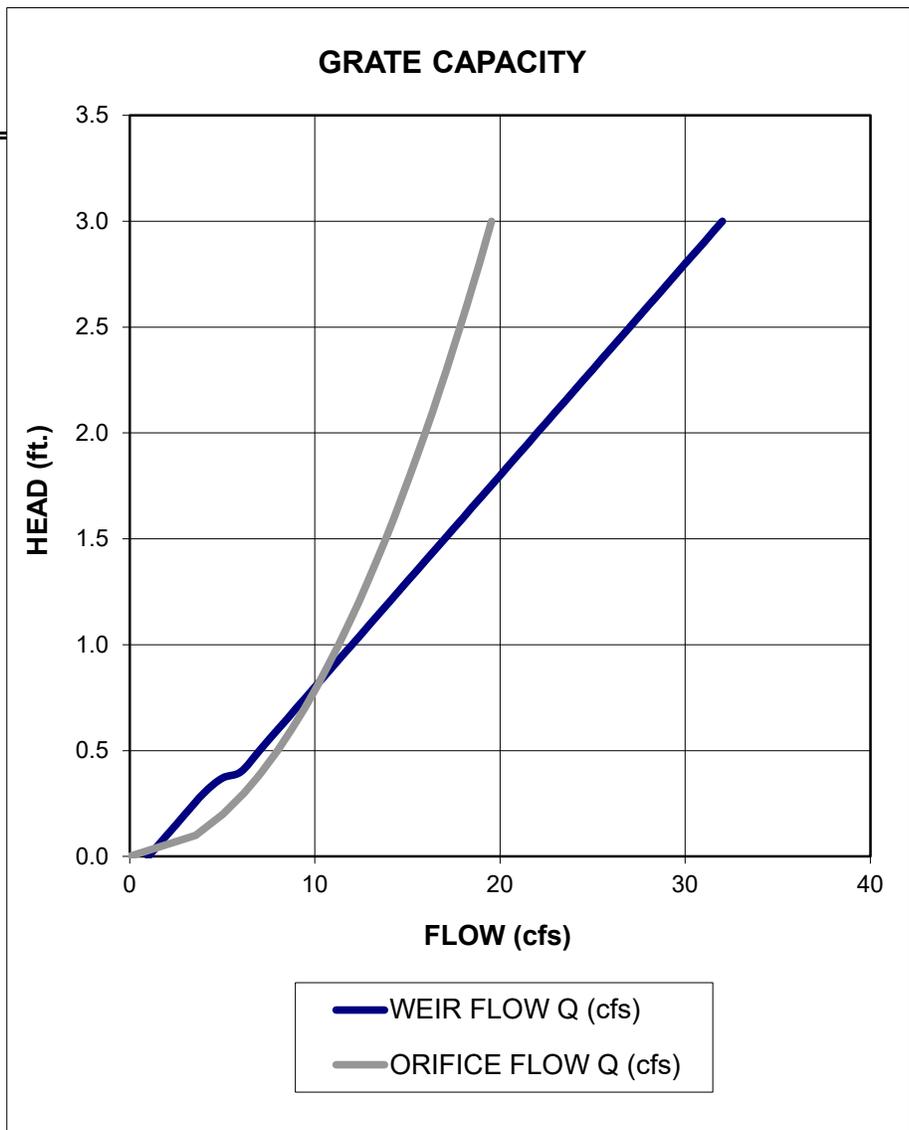
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 3/30/2021

NEENAH GRATE NUMBER: **R-3067-L** LOW POINTS
 INLET LENGTH OR PERIMETER: **5.8** ft.
 GRATE OPEN END AREA: **2.1** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.37	4.35	6.86
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR

CB 8-9 SANDHILL

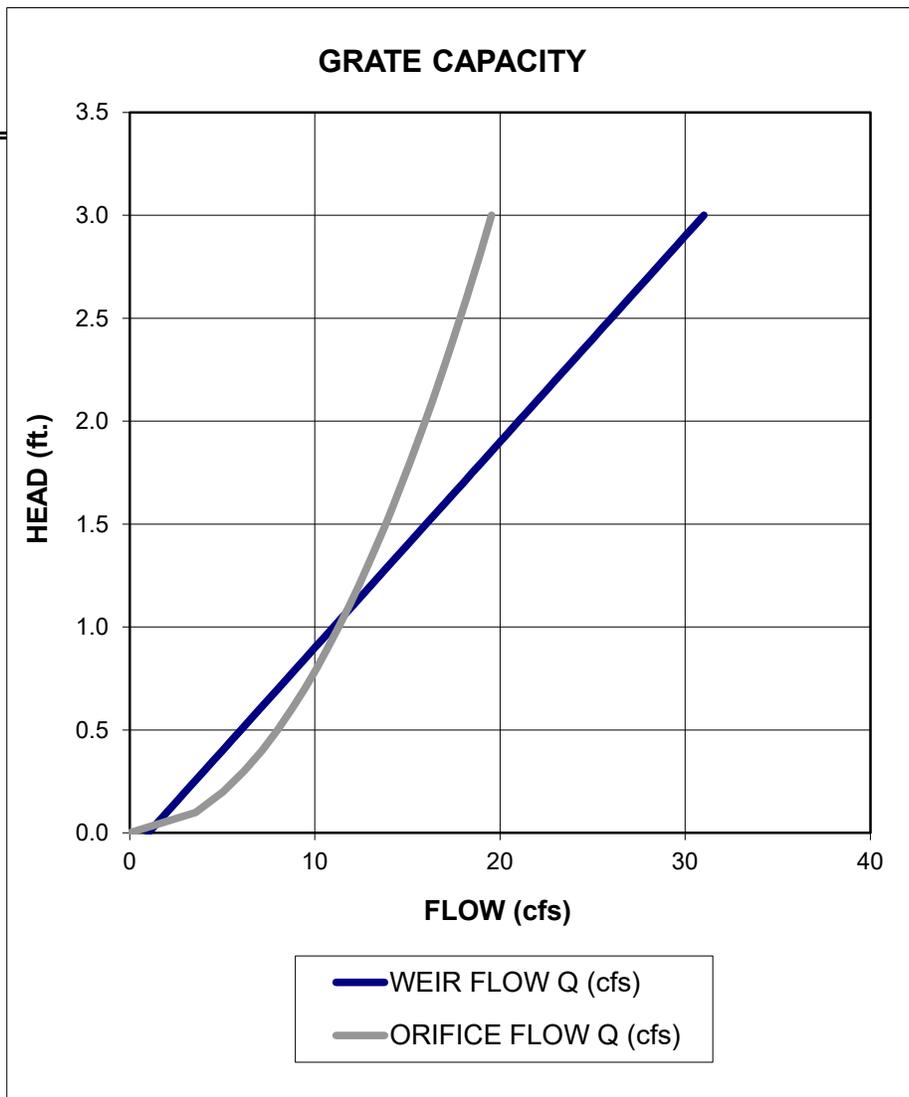
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 3/30/2021

NEENAH GRATE NUMBER: **R-3067-L** LOW POINTS
 INLET LENGTH OR PERIMETER: **5.8** ft.
 GRATE OPEN END AREA: **2.1** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 14 SANDHILL

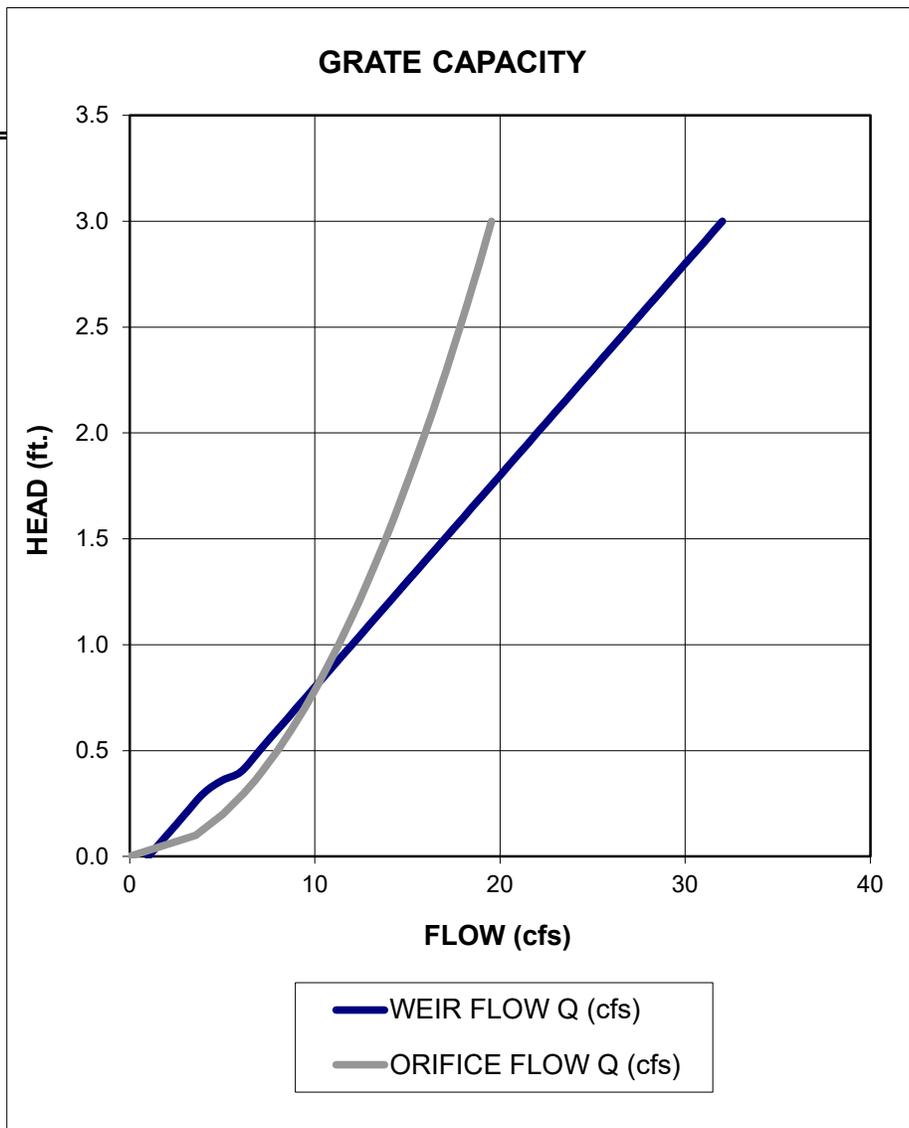
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: R-3067-L **LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.36	4.17	6.77
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 15 SANDHILL

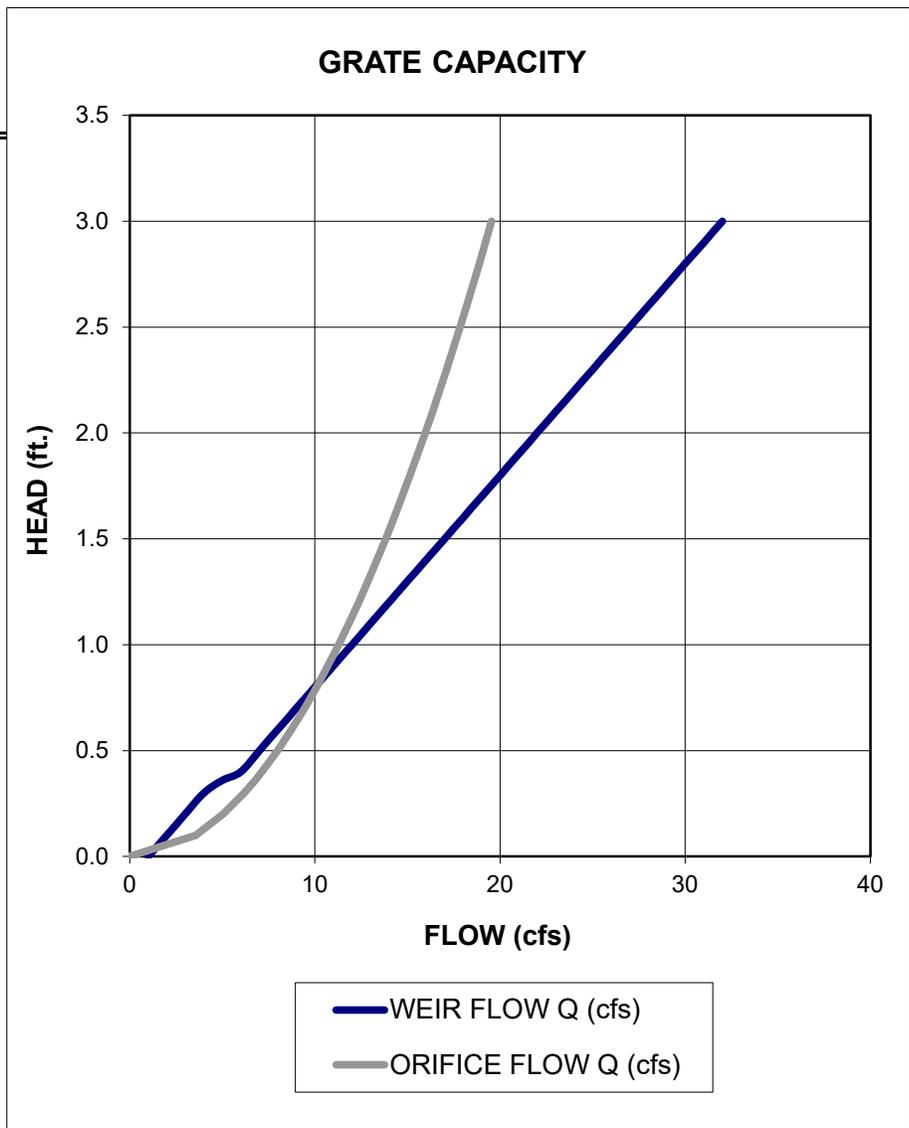
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: R-3067-L **LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.36	4.17	6.77
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR CB 16 SANDHILL

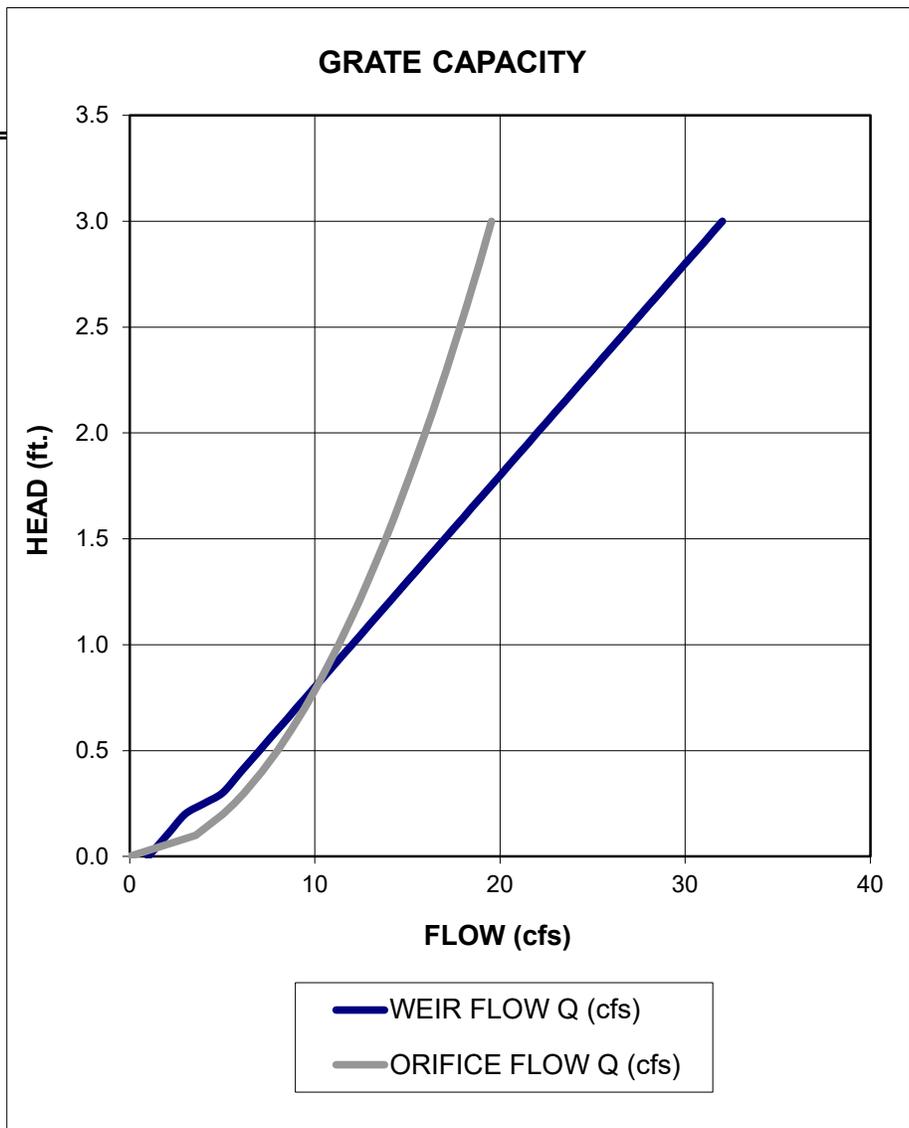
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: R-3067-L **LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.25	2.41	5.64
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 17 SANDHILL

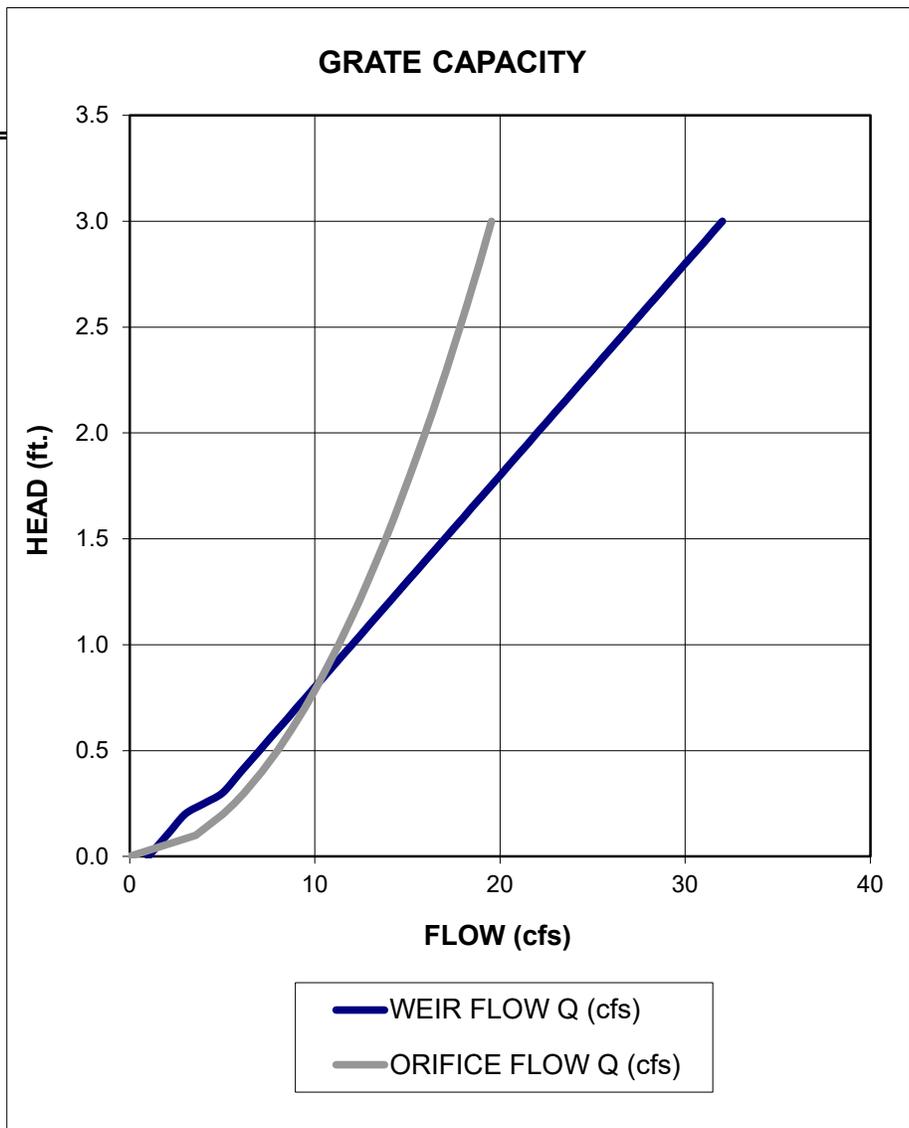
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: R-3067-L **LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.25	2.41	5.64
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 25 SANDHILL

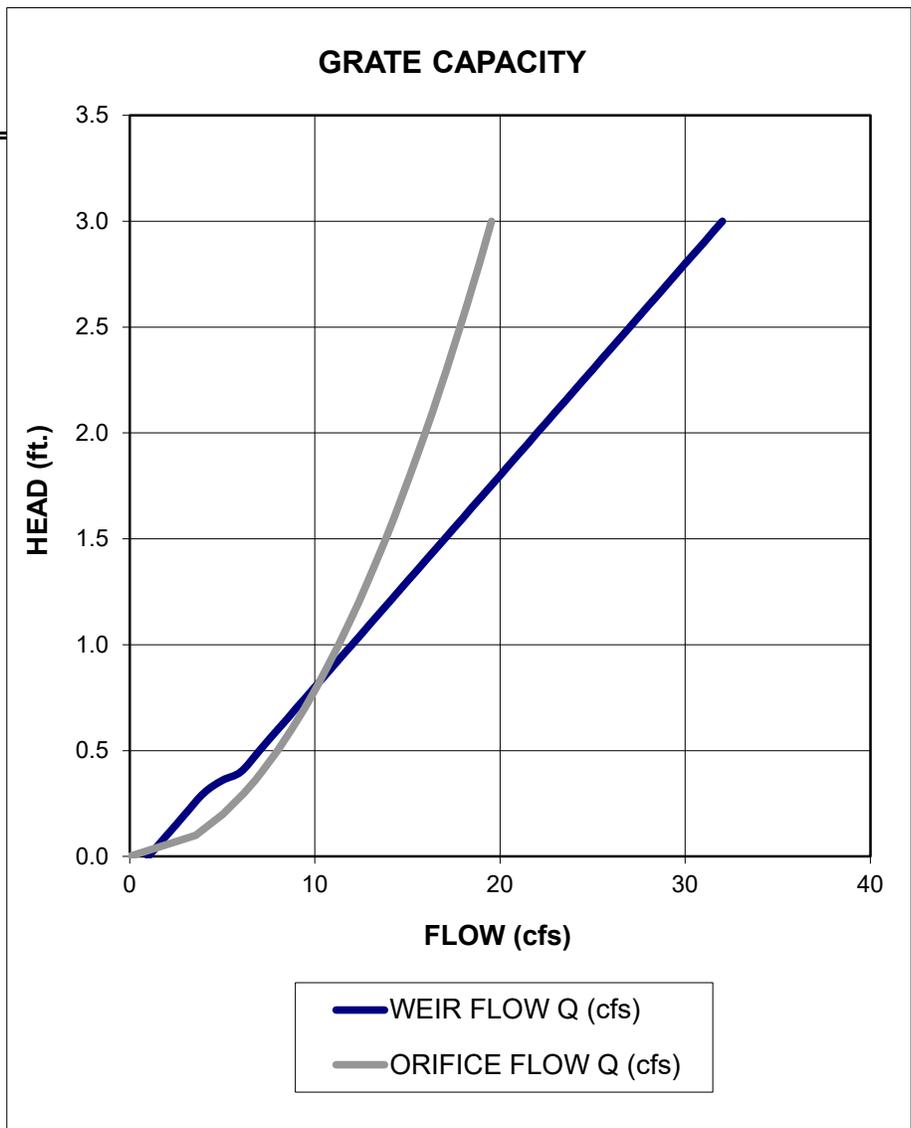
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: R-3067-L **LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.36	4.17	6.77
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR CB 26 SANDHILL

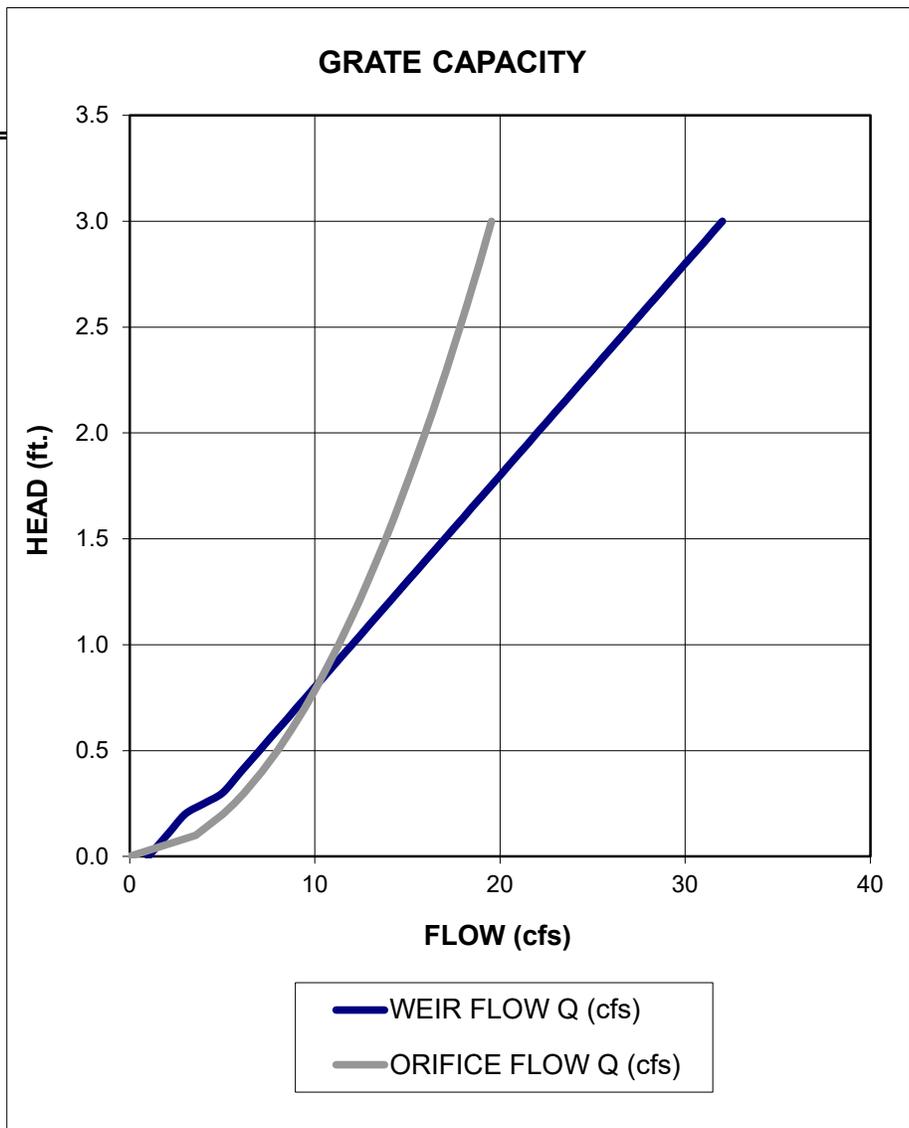
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: R-3067-L **LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.25	2.41	5.64
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 34 SANDHILL

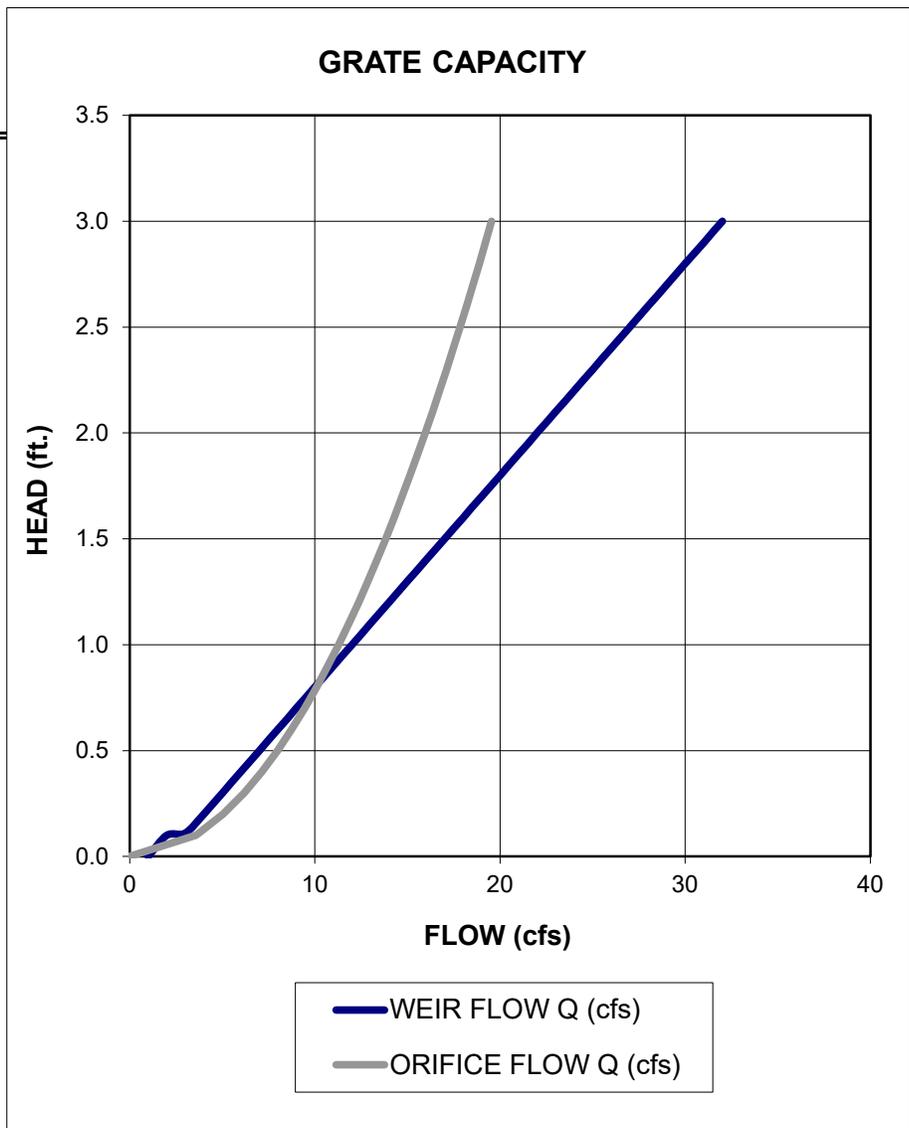
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-3067-L LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.11	0.70	3.74
0.2	1.73	5.05
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 35 SANDHILL

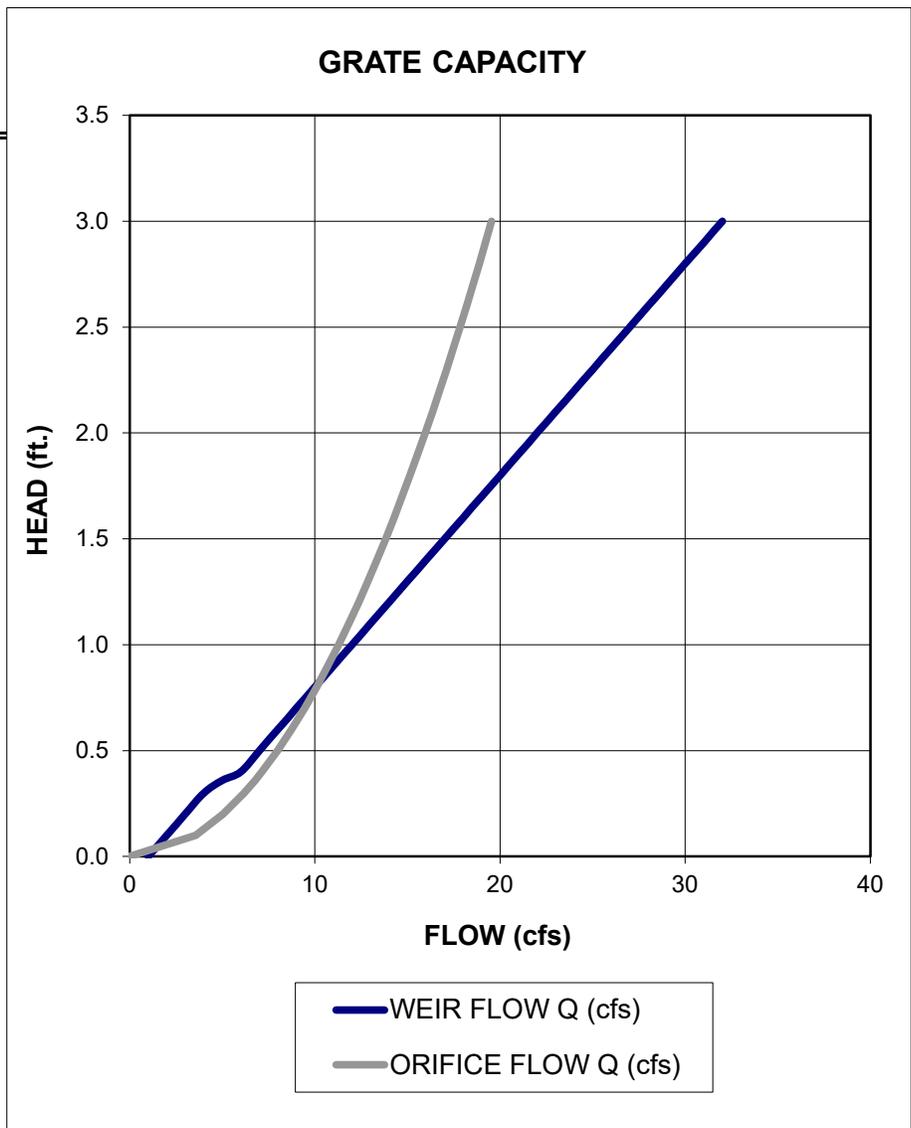
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-3067-L** LOW POINTS
 INLET LENGTH OR PERIMETER: **5.8** ft.
 GRATE OPEN END AREA: **2.1** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.36	4.17	6.77
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 44,45 SANDHILL

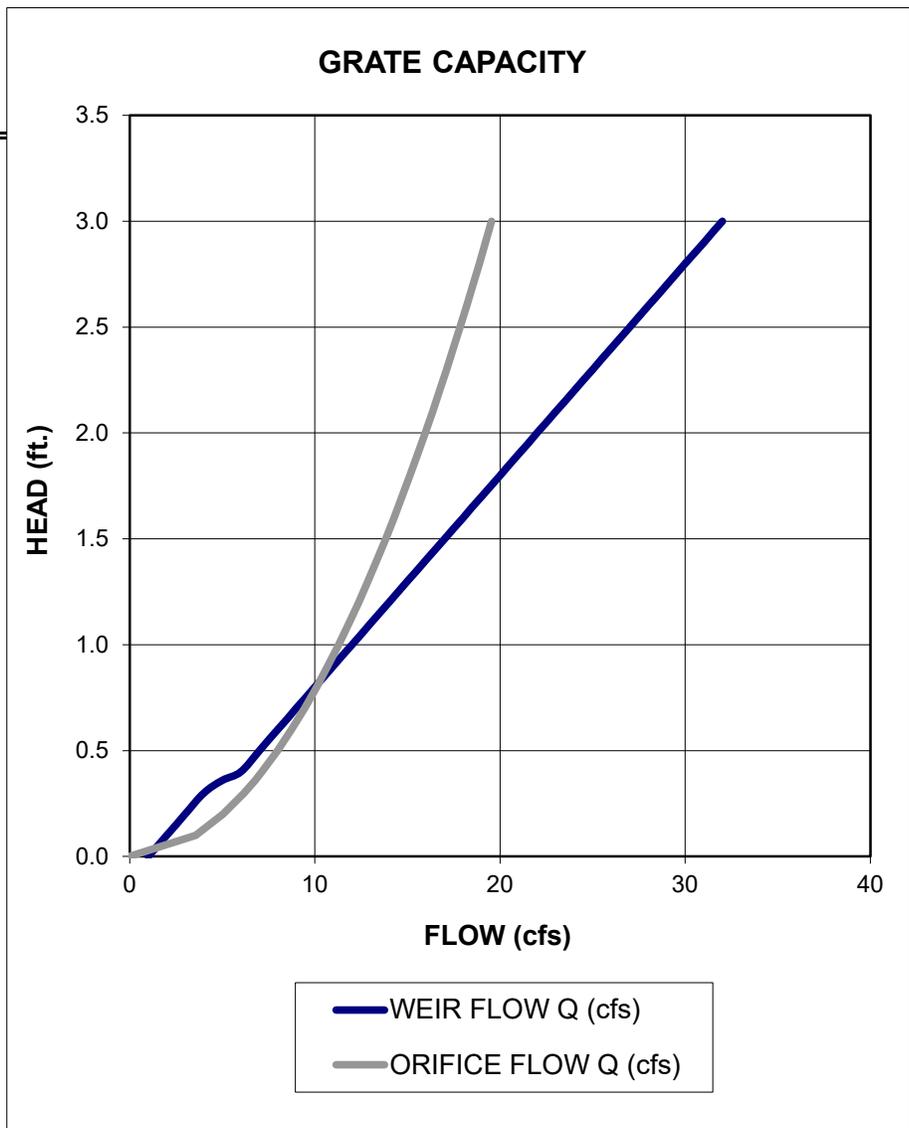
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-3067-L** LOW POINTS
 INLET LENGTH OR PERIMETER: **5.8** ft.
 GRATE OPEN END AREA: **2.1** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.36	4.17	6.77
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 46,47 SANDHILL

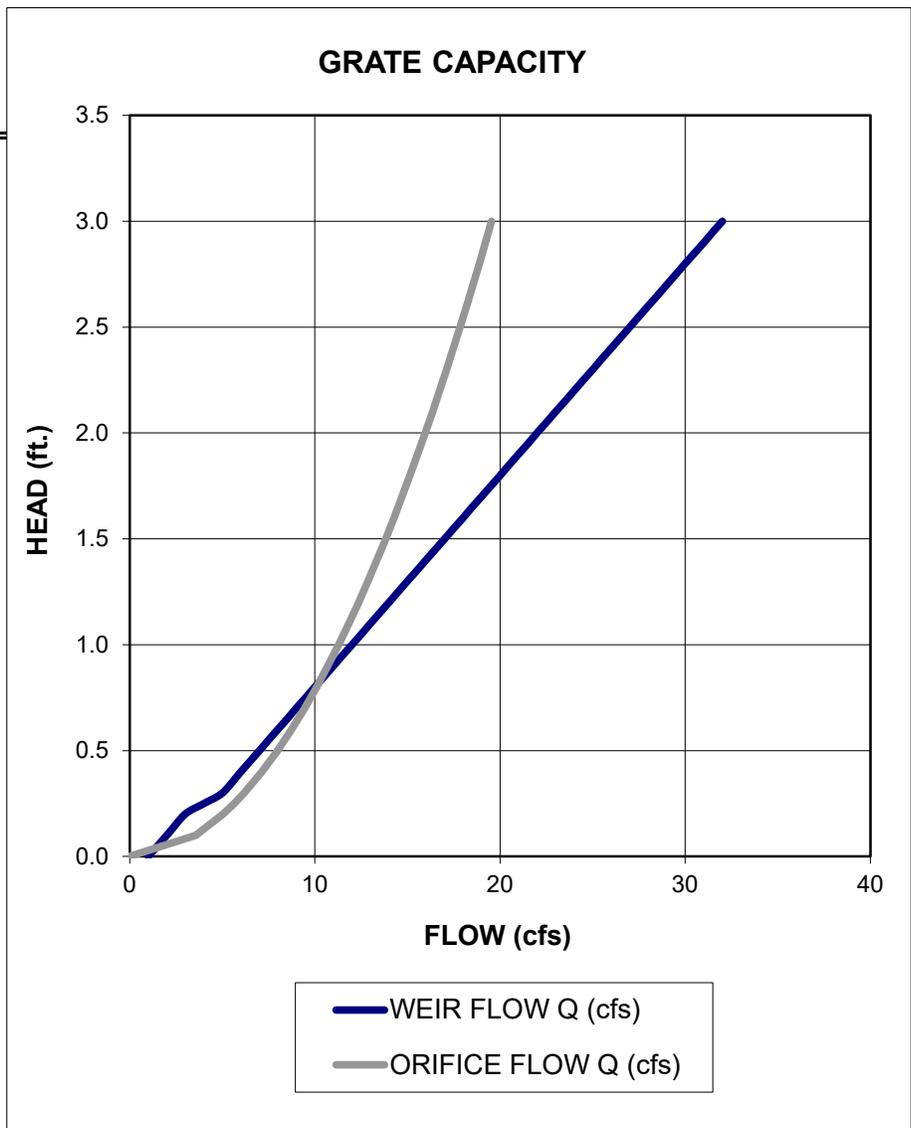
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-3067-L LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.25	2.41	5.64
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 56 SANDHILL

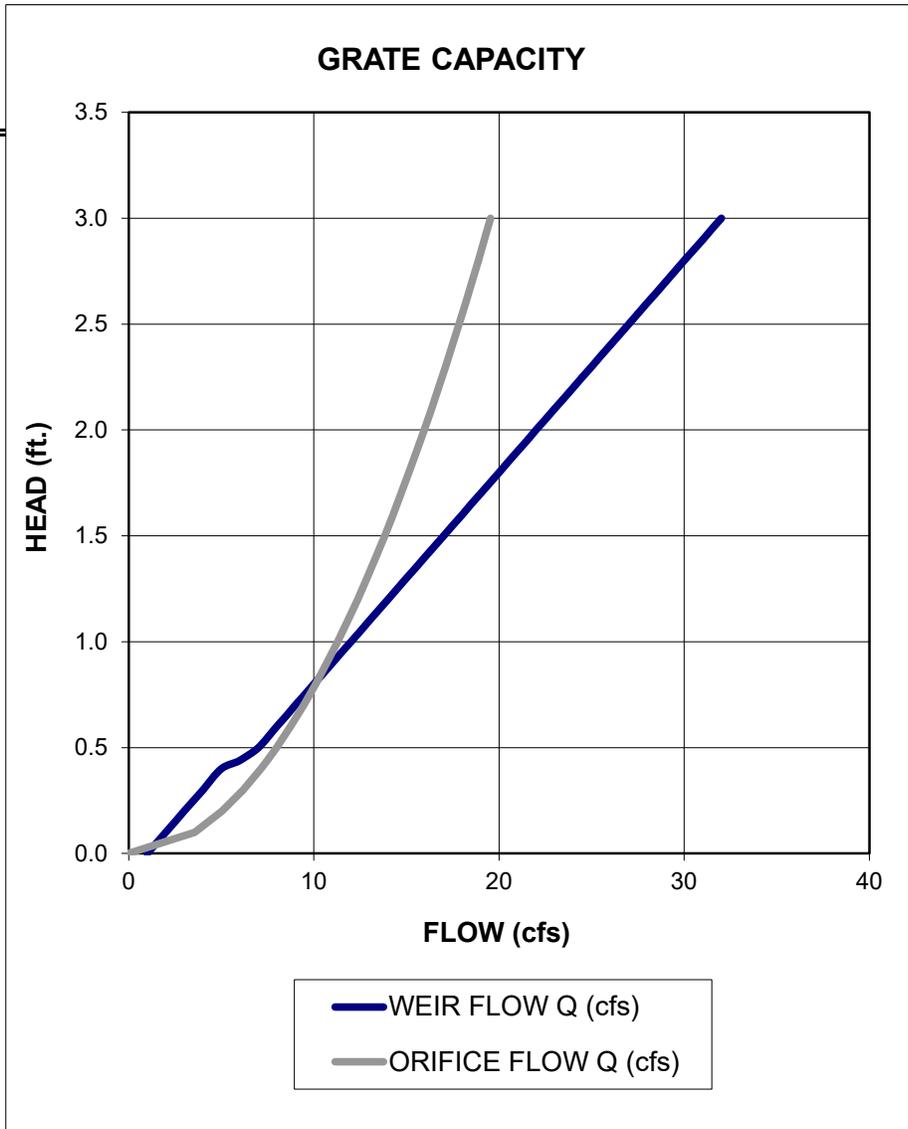
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-3067-L** LOW POINTS
 INLET LENGTH OR PERIMETER: **5.8** ft.
 GRATE OPEN END AREA: **2.1** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.3	3.17	6.18
0.4	4.89	7.14
0.44	5.64	7.49
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR CB 57 SANDHILL

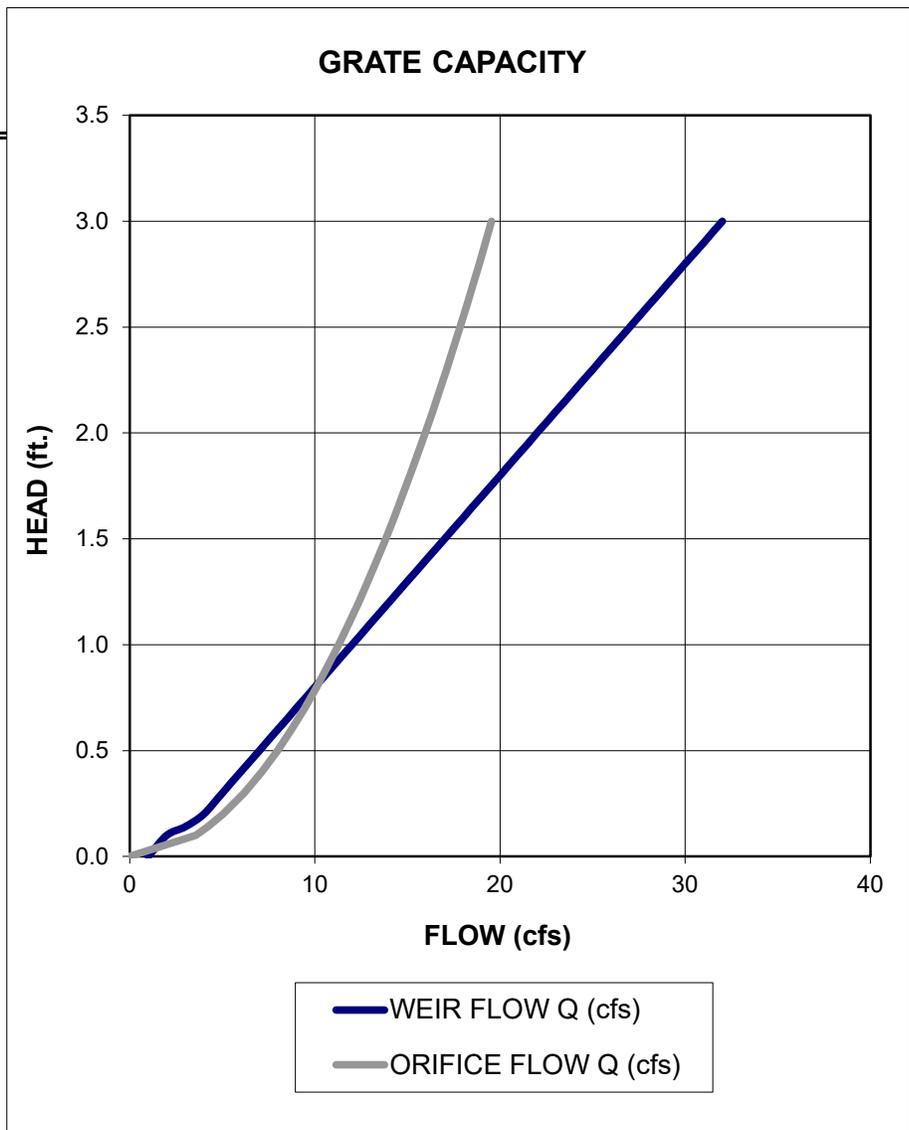
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/16/2021

NEENAH GRATE NUMBER: **R-3067-L LOW POINTS**
 INLET LENGTH OR PERIMETER: **5.8 ft.**
 GRATE OPEN END AREA: **2.1 sf.**

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.14	1.01	4.22
0.2	1.73	5.05
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR

CB 59-60 SANDHILL

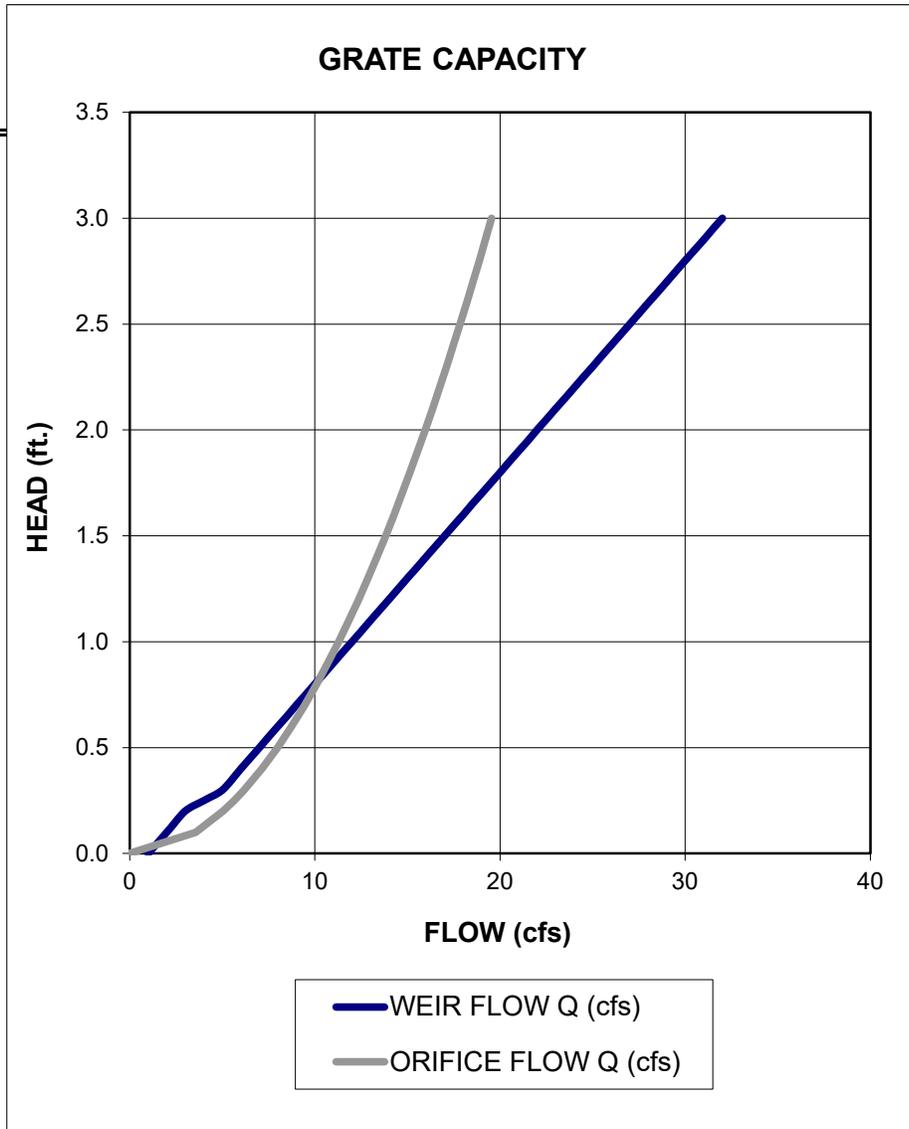
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-3067-L** LOW POINTS
 INLET LENGTH OR PERIMETER: **5.8** ft.
 GRATE OPEN END AREA: **2.1** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.61	3.57
0.2	1.73	5.05
0.25	2.41	5.64
0.3	3.17	6.18
0.4	4.89	7.14
0.5	6.83	7.98
0.6	8.98	8.74
0.7	11.31	9.44
0.8	13.82	10.09
0.9	16.49	10.71
1.0	19.31	11.28
1.1	22.28	11.83
1.2	25.39	12.36
1.3	28.63	12.87
1.4	31.99	13.35
1.5	35.48	13.82
1.6	39.09	14.27
1.7	42.81	14.71
1.8	46.64	15.14
1.9	50.58	15.55
2.0	54.63	15.96
2.1	58.78	16.35
2.2	63.02	16.74
2.3	67.37	17.11
2.4	71.81	17.48
2.5	76.35	17.84
2.6	80.97	18.20
2.7	85.69	18.54
2.8	90.49	18.88
2.9	95.38	19.22
3.0	100.36	19.54



Weir flow controls until a head of 0.584 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION FOR FI 12 SANDHILL

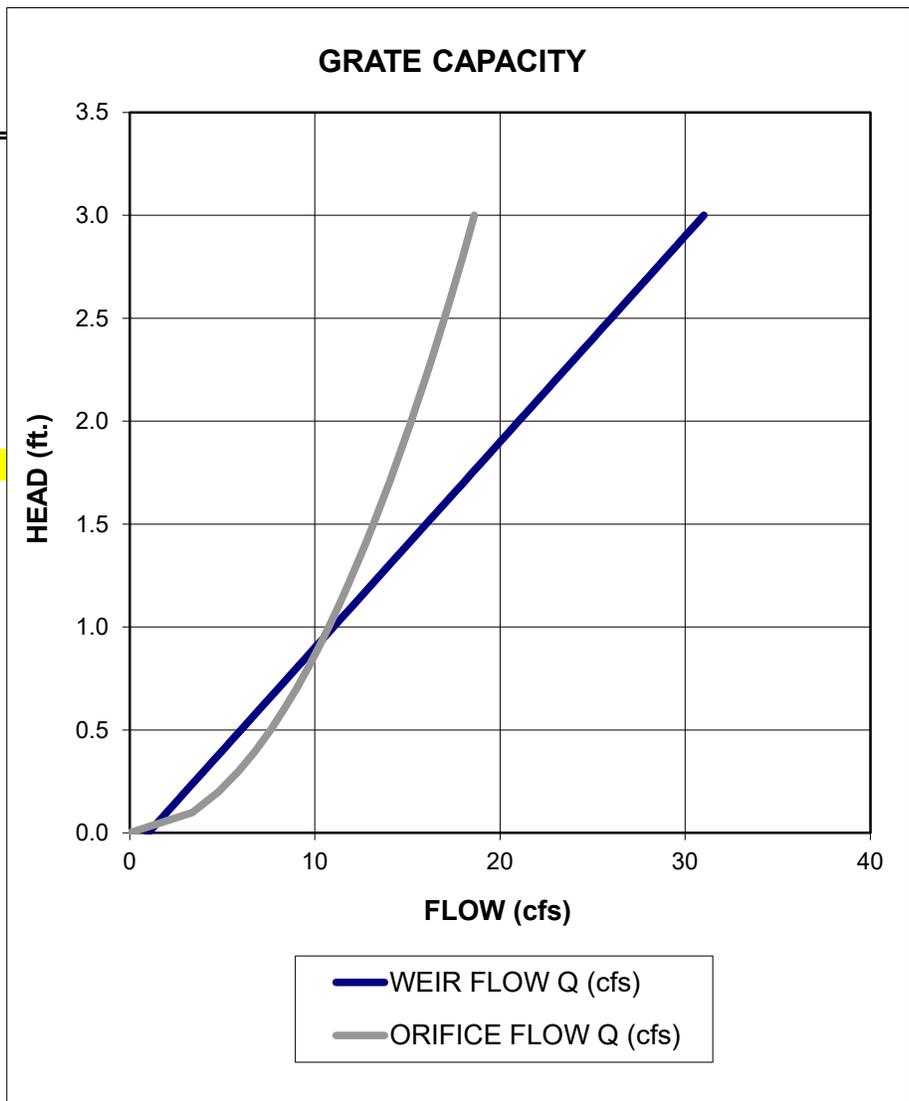
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/1/2021

NEENAH GRATE NUMBER: **R-2561** LOW POINTS
 INLET LENGTH OR PERIMETER: **6.7** ft.
 GRATE OPEN END AREA: **2** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.71	3.40
0.2	2.00	4.81
0.3	3.67	5.89
0.4	5.64	6.80
0.5	7.89	7.60
0.6	10.37	8.32
0.7	13.07	8.99
0.8	15.96	9.61
0.9	19.05	10.20
1.0	22.31	10.75
1.1	25.74	11.27
1.2	29.33	11.77
1.3	33.07	12.25
1.4	36.96	12.72
1.5	40.99	13.16
1.6	45.15	13.59
1.7	49.45	14.01
1.8	53.88	14.42
1.9	58.43	14.81
2.0	63.11	15.20
2.1	67.90	15.57
2.2	72.80	15.94
2.3	77.82	16.30
2.4	82.95	16.65
2.5	88.19	16.99
2.6	93.54	17.33
2.7	98.98	17.66
2.8	104.53	17.98
2.9	110.18	18.30
3.0	115.93	18.61



Weir flow controls until a head of 0.482 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR

FI 13 SANDHILL

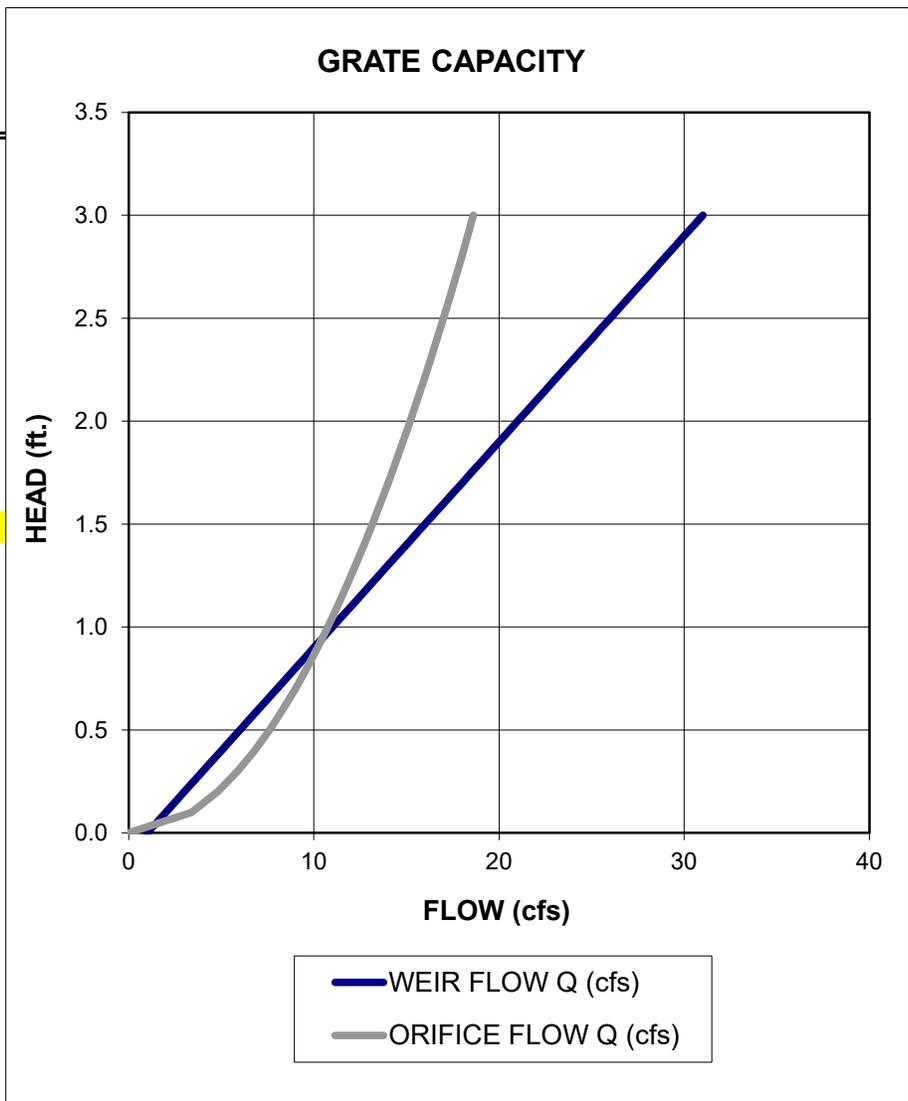
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-2561** LOW POINTS
 INLET LENGTH OR PERIMETER: **6.7** ft.
 GRATE OPEN END AREA: **2** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.71	3.40
0.2	2.00	4.81
0.3	3.67	5.89
0.4	5.64	6.80
0.5	7.89	7.60
0.6	10.37	8.32
0.7	13.07	8.99
0.8	15.96	9.61
0.9	19.05	10.20
1.0	22.31	10.75
1.1	25.74	11.27
1.2	29.33	11.77
1.3	33.07	12.25
1.4	36.96	12.72
1.5	40.99	13.16
1.6	45.15	13.59
1.7	49.45	14.01
1.8	53.88	14.42
1.9	58.43	14.81
2.0	63.11	15.20
2.1	67.90	15.57
2.2	72.80	15.94
2.3	77.82	16.30
2.4	82.95	16.65
2.5	88.19	16.99
2.6	93.54	17.33
2.7	98.98	17.66
2.8	104.53	17.98
2.9	110.18	18.30
3.0	115.93	18.61



Weir flow controls until a head of 0.482 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR

FI 41 SANDHILL

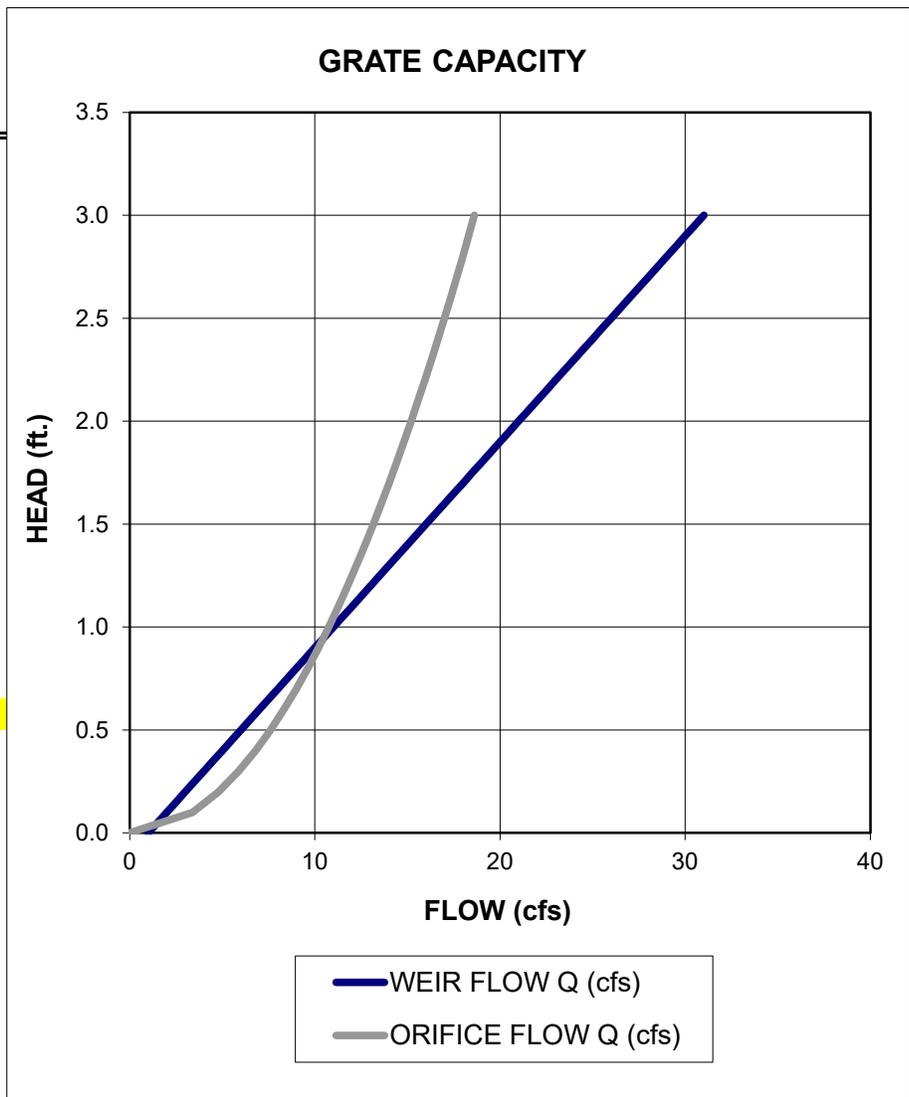
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 3/30/2021

NEENAH GRATE NUMBER: **R-2561** LOW POINTS
 INLET LENGTH OR PERIMETER: **6.7** ft.
 GRATE OPEN END AREA: **2** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.71	3.40
0.2	2.00	4.81
0.3	3.67	5.89
0.4	5.64	6.80
0.5	7.89	7.60
0.6	10.37	8.32
0.7	13.07	8.99
0.8	15.96	9.61
0.9	19.05	10.20
1.0	22.31	10.75
1.1	25.74	11.27
1.2	29.33	11.77
1.3	33.07	12.25
1.4	36.96	12.72
1.5	40.99	13.16
1.6	45.15	13.59
1.7	49.45	14.01
1.8	53.88	14.42
1.9	58.43	14.81
2.0	63.11	15.20
2.1	67.90	15.57
2.2	72.80	15.94
2.3	77.82	16.30
2.4	82.95	16.65
2.5	88.19	16.99
2.6	93.54	17.33
2.7	98.98	17.66
2.8	104.53	17.98
2.9	110.18	18.30
3.0	115.93	18.61



Weir flow controls until a head of 0.482 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

INLET CAPACITY - SUMP CONDITION

FOR

FI 43 SANDHILL

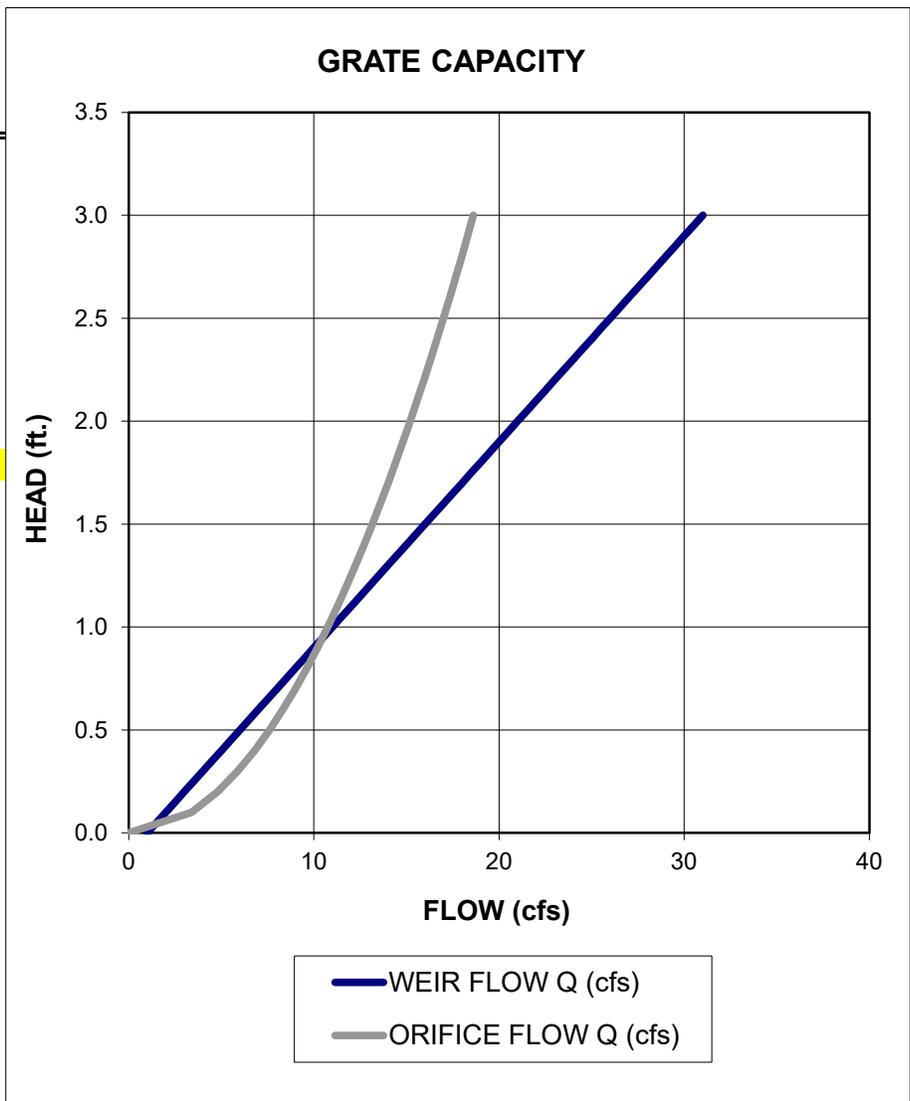
DESIGN BY: EJM

PROJECT NUMBER: 767.00

DATE: 2/4/2021

NEENAH GRATE NUMBER: **R-2561** LOW POINTS
 INLET LENGTH OR PERIMETER: **6.7** ft.
 GRATE OPEN END AREA: **2** sf.

HEAD H (ft.)	WEIR FLOW Q (cfs)	ORIFICE FLOW Q (cfs)
0.0	0.00	0.00
0.1	0.71	3.40
0.2	2.00	4.81
0.3	3.67	5.89
0.4	5.64	6.80
0.5	7.89	7.60
0.6	10.37	8.32
0.7	13.07	8.99
0.8	15.96	9.61
0.9	19.05	10.20
1.0	22.31	10.75
1.1	25.74	11.27
1.2	29.33	11.77
1.3	33.07	12.25
1.4	36.96	12.72
1.5	40.99	13.16
1.6	45.15	13.59
1.7	49.45	14.01
1.8	53.88	14.42
1.9	58.43	14.81
2.0	63.11	15.20
2.1	67.90	15.57
2.2	72.80	15.94
2.3	77.82	16.30
2.4	82.95	16.65
2.5	88.19	16.99
2.6	93.54	17.33
2.7	98.98	17.66
2.8	104.53	17.98
2.9	110.18	18.30
3.0	115.93	18.61



Weir flow controls until a head of 0.482 feet is reached, where orifice flow takes over and controls. The flow at this transition is less efficient than what is indicated by either the weir or orifice flow equations. A flow of 20% less than the equated flow is a conservative estimate.

Weir Report

1 - Overland Flow at FI 12

Trapezoidal Weir

Crest = Sharp
Bottom Length (ft) = 12.00
Total Depth (ft) = 1.00
Side Slope (z:1) = 4.00

Highlighted

Depth (ft) = 0.20
Q (cfs) = 3.290
Area (sqft) = 2.56
Velocity (ft/s) = 1.29
Top Width (ft) = 13.60

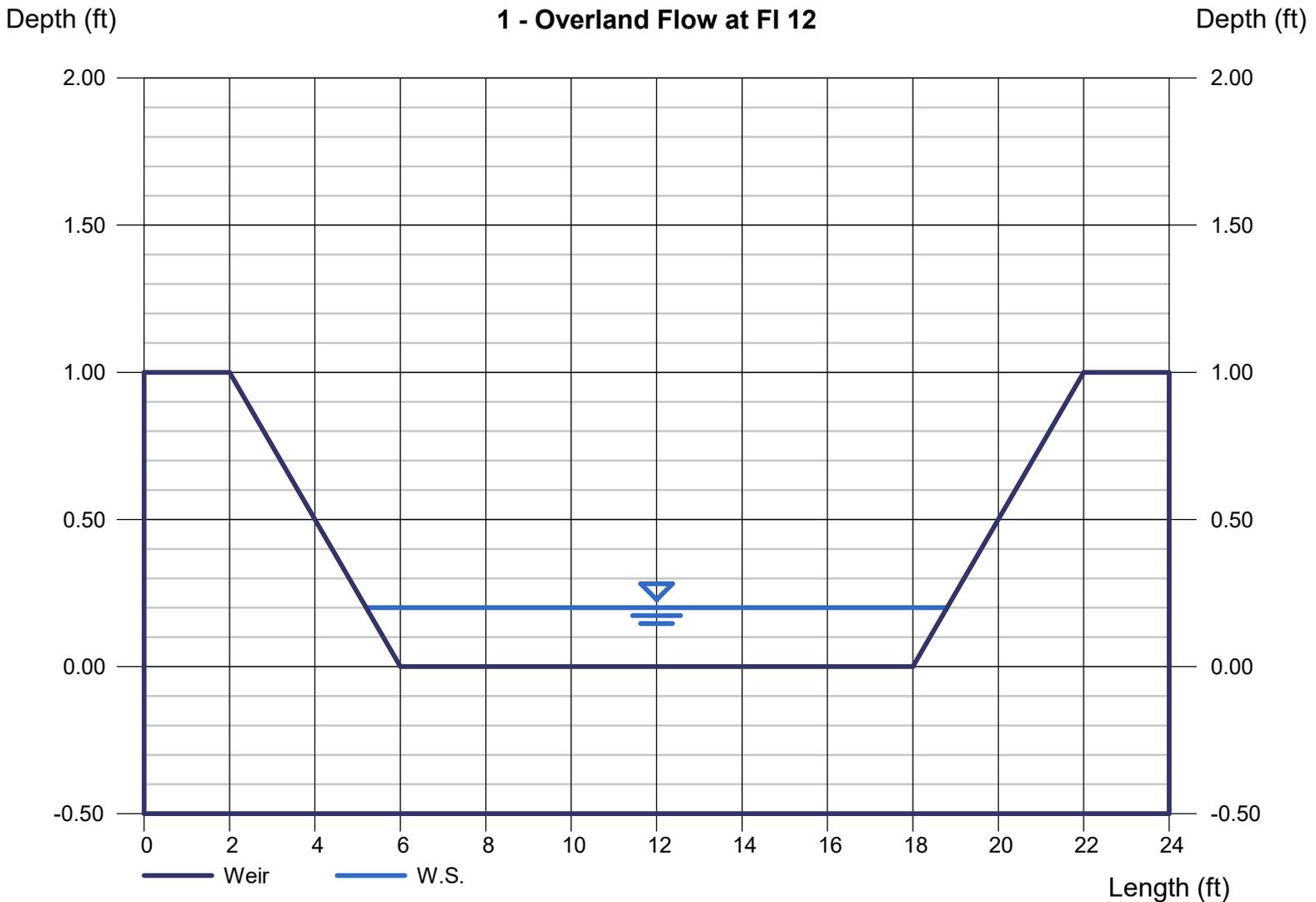
Calculations

Weir Coeff. Cw = 3.10
Compute by: Known Q
Known Q (cfs) = 3.29

100-YR Runoff from FI 11 and FI 12 = 10.04 cfs
Pipe Flow at FI 12 = 6.75 cfs
Overland Flow = 3.29 cfs

Overland Elevation = 1033.30
Peak Water Elevation = 1033.30 + 0.20 = 1033.50

Units 23-24 Yard Grade = 1035.50
Freeboard = 1035.50 - 1033.50 = 2.0 feet



Weir Report

2 - Overland Flow at FI 13

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 30.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.06
Q (cfs) = 1.510
Area (sqft) = 1.83
Velocity (ft/s) = 0.82
Top Width (ft) = 30.00

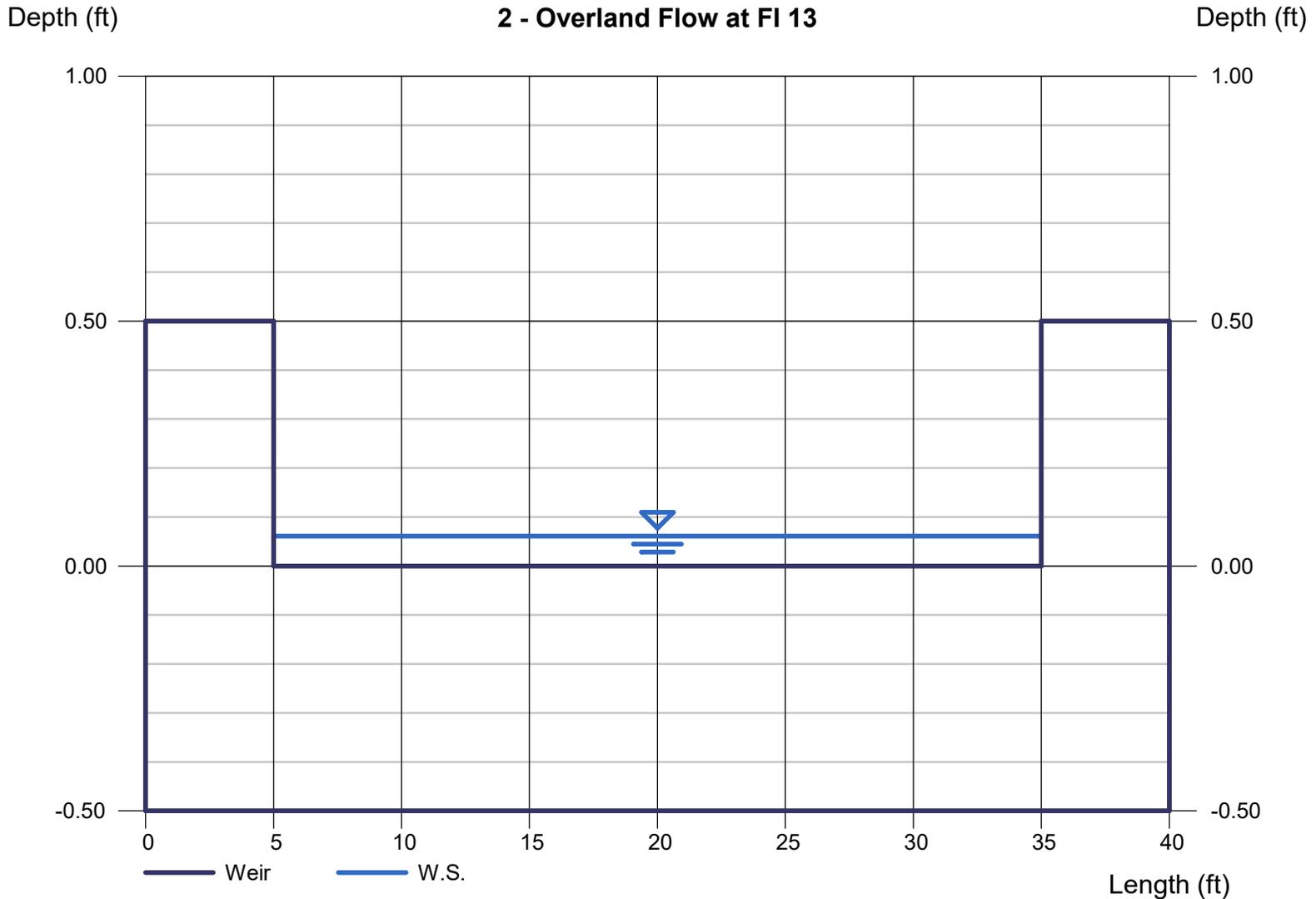
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 1.51

100-YR Runoff from FI 13 = 4.62 cfs
Pipe Flow at FI 13 = 3.11 cfs
Overland Flow = 1.51 cfs

Overland Elevation = 1032.00
Peak Water Elevation = 1032.00 + 0.06 = 1032.06

Units 25-26 Yard Grade = 1035.20
Freeboard = 1035.20 - 1032.06 = 3.14 feet



Weir Report

3 - Overland Flow at CB 17

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 24.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.23
Q (cfs) = 8.960
Area (sqft) = 5.58
Velocity (ft/s) = 1.61
Top Width (ft) = 24.00

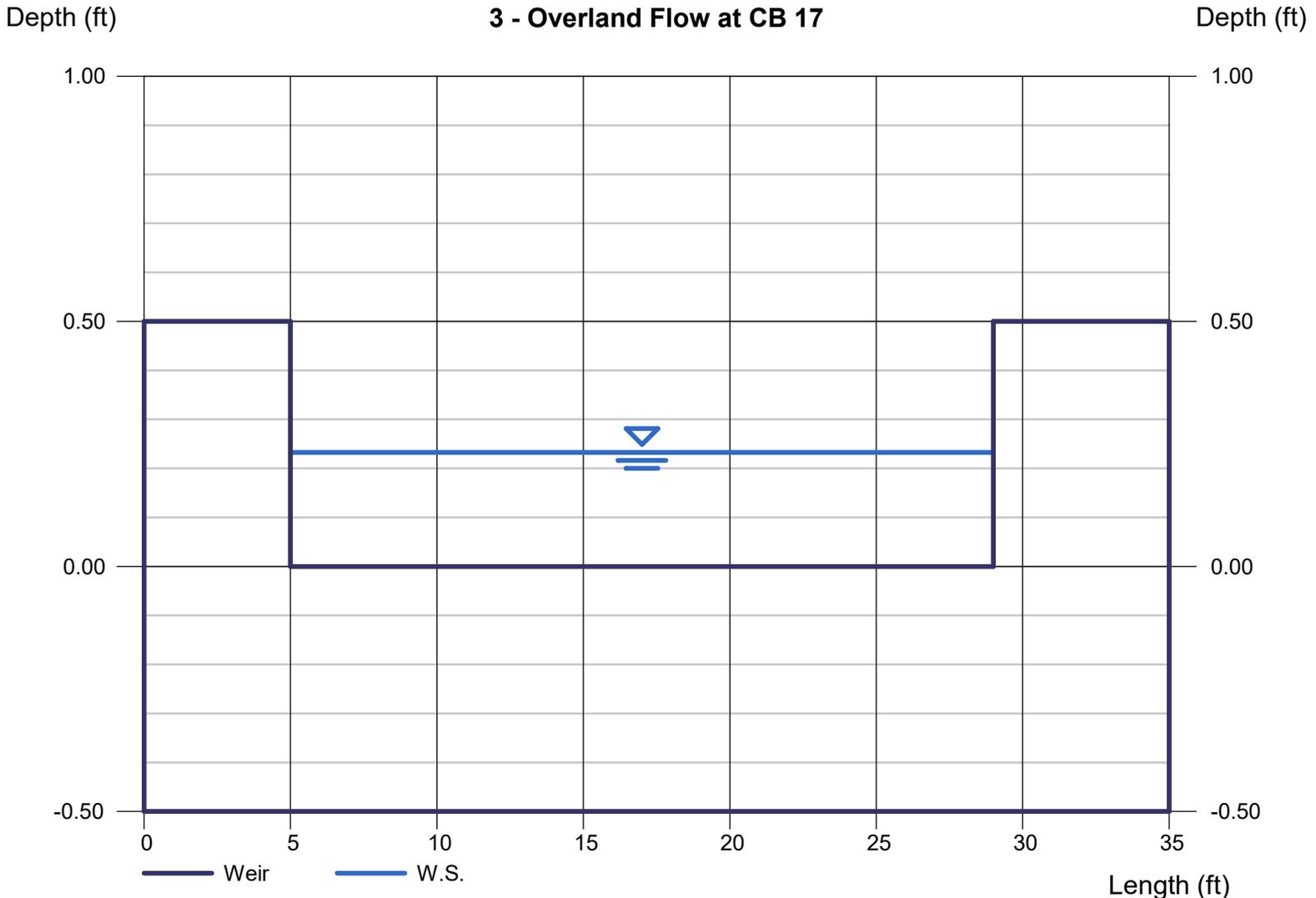
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 8.96

100-YR Runoff from CB 1 to CB 17 with (100-yr
minus pipe flow from CB 21) = 48.98 cfs
Pipe Flow at CB 17 = 40.02 cfs
Overland Flow = 8.96 cfs

Overland Elevation = 1031.25
Peak Water Elevation = 1031.25 + 0.23 = 1031.48

Units 5,8, 9, 10 Yard Grade = 1035.00
Freeboard = 1035.00 - 1031.48 = 3.52 feet



Weir Report

4 - Overland Flow at FI 39

Trapezoidal Weir

Crest = Sharp
Bottom Length (ft) = 16.00
Total Depth (ft) = 1.00
Side Slope (z:1) = 4.00

Highlighted

Depth (ft) = 0.18
Q (cfs) = 3.770
Area (sqft) = 3.01
Velocity (ft/s) = 1.25
Top Width (ft) = 17.44

Calculations

Weir Coeff. Cw = 3.10
Compute by: Known Q
Known Q (cfs) = 3.77

100-YR Runoff from FI 37-39 = 11.52 cfs

Pipe Flow at FI 39 = 7.75 cfs

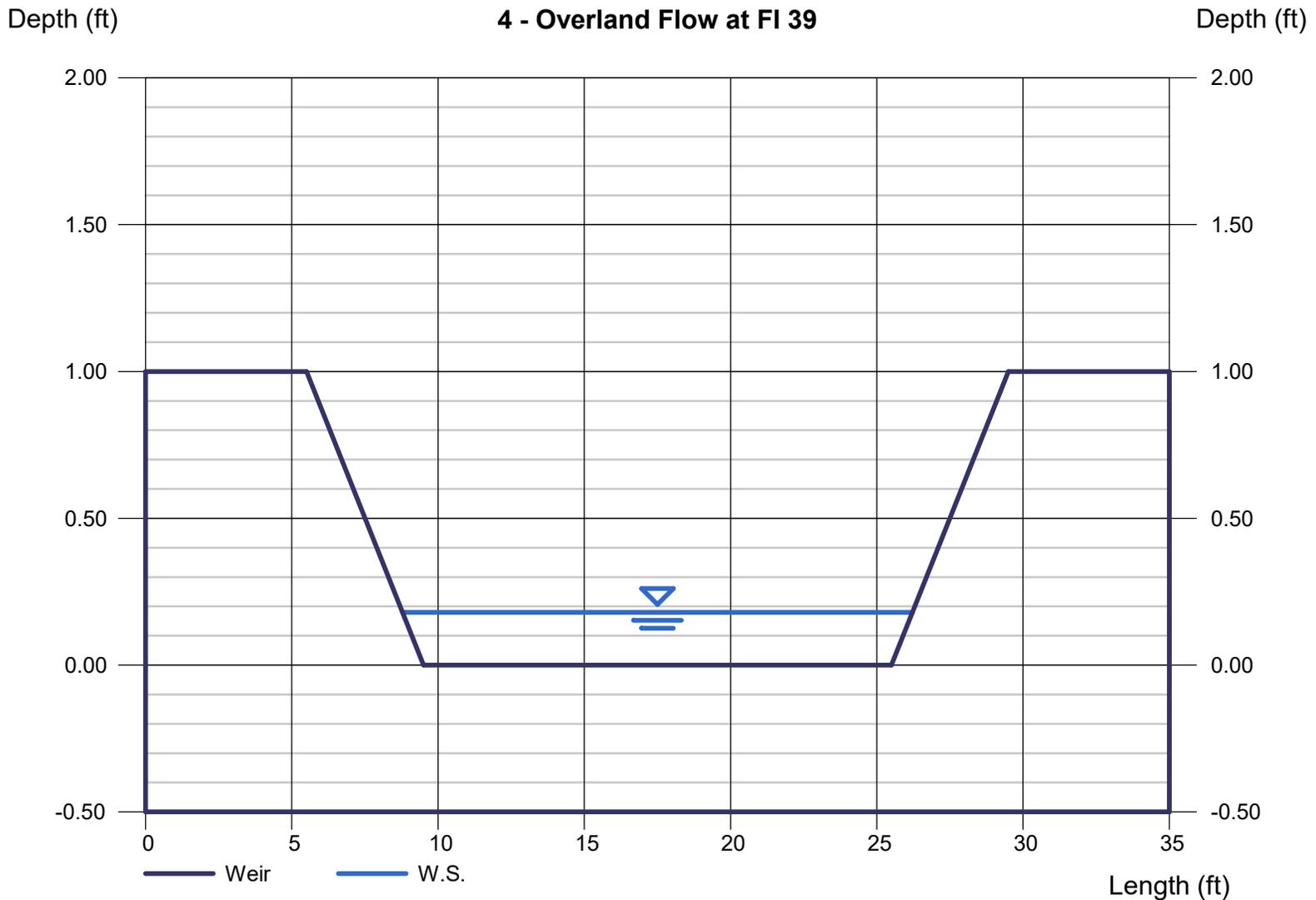
Overland Flow = 3.77 cfs

Overland Elevation = 1036.65

Peak Water Elevation = 1036.65 + 0.18 = 1036.83

Units 69-70 Yard Grade = 1039.00

Freeboard = 1039.00 - 1036.83 = 2.17 feet



Weir Report

5 - Overland Flow at FI 43

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 28.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.09
Q (cfs) = 2.380
Area (sqft) = 2.42
Velocity (ft/s) = 0.98
Top Width (ft) = 28.00

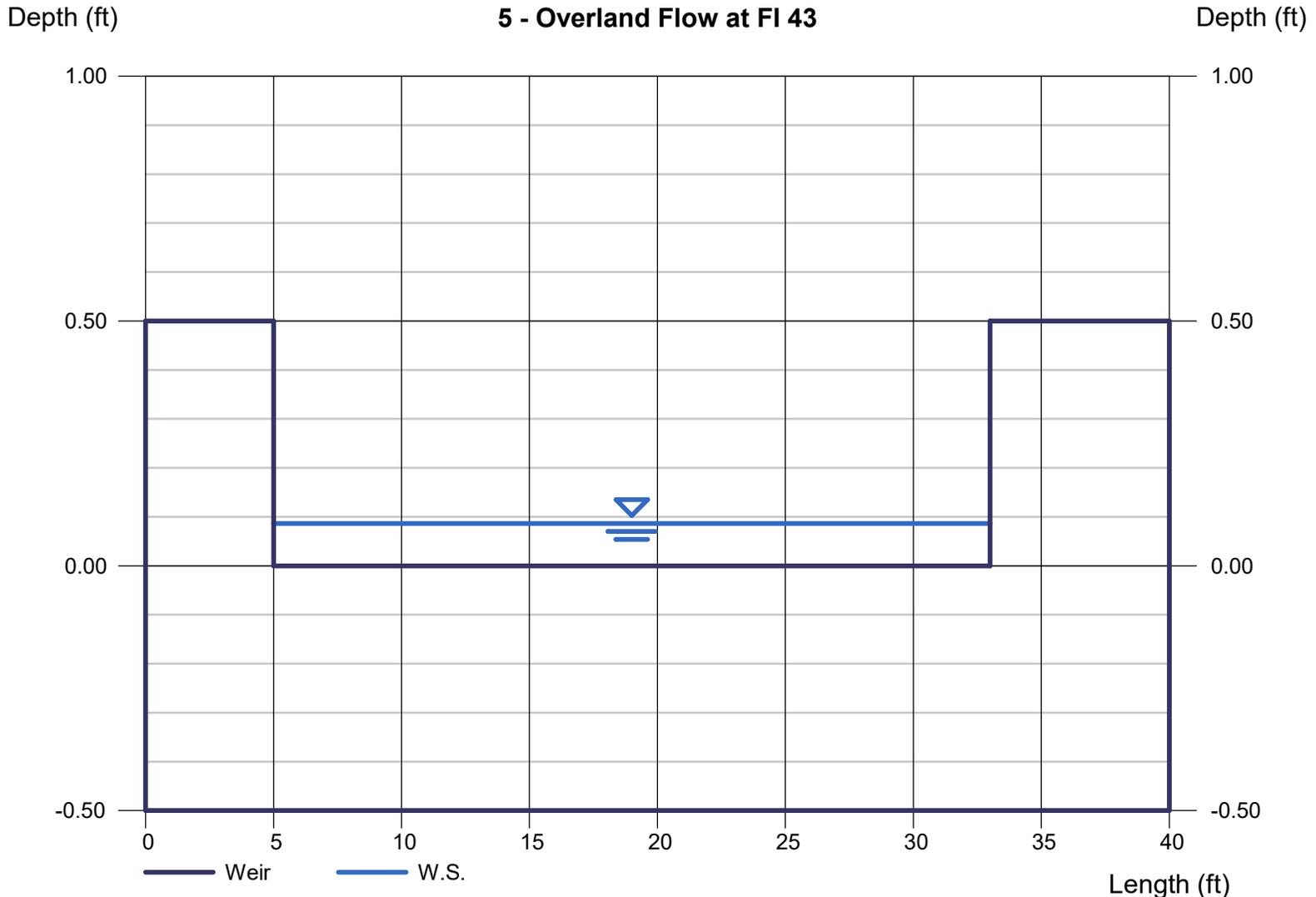
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 2.38

100-YR Runoff from FI 41-43 = 10.84 cfs
Pipe Flow at FI 43 = 8.46 cfs
Overland Flow = 2.38 cfs

Overland Elevation = 1034.00
Peak Water Elevation = 1034.00 + 0.09 = 1034.09

Unit 89 Yard Grade = 1036.70
Freeboard = 1036.70 - 1034.09 = 2.61 feet



Weir Report

6 - Overland Flow at CB 47

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 20.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.38
Q (cfs) = 15.33
Area (sqft) = 7.51
Velocity (ft/s) = 2.04
Top Width (ft) = 20.00

Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 15.33

100-YR Runoff from CB 28-39, 41-47 with only flow through pipe from CB 40 = 51.40 cfs
Pipe Flow at CB 47 = 36.07 cfs
Overland Flow = 15.33 cfs

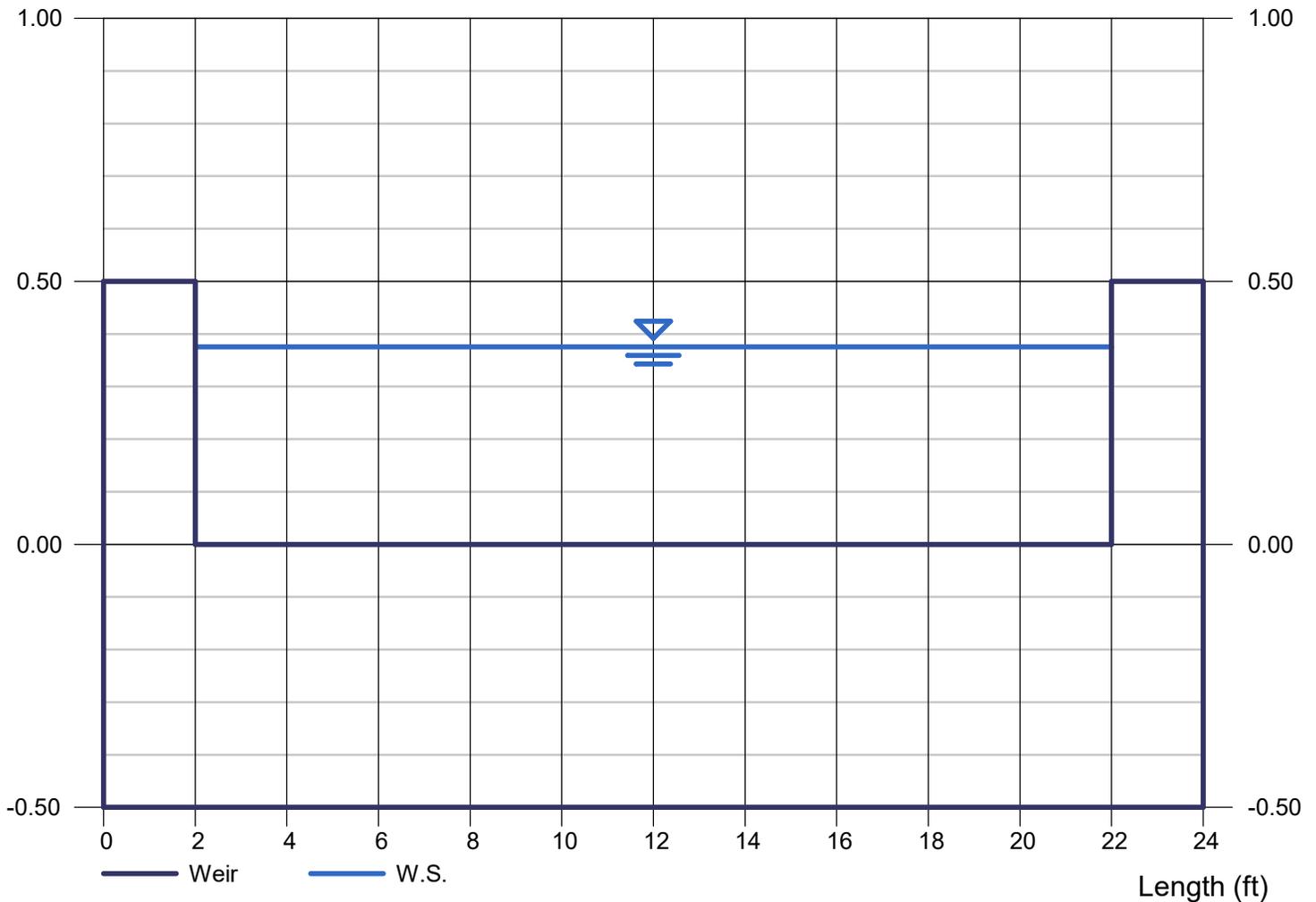
Overland Elevation = 1033.08
Peak Water Elevation = 1033.08 + 0.38 = 1033.46

Units 107-110 Yard Grade = 1035.90
Freeboard = 1035.90 - 1033.46 = 2.44 feet

Depth (ft)

6 - Overland Flow at CB 47

Depth (ft)



Weir Report

7 - Overland Flow at CB 60

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 8.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.18
Q (cfs) = 2.080
Area (sqft) = 1.46
Velocity (ft/s) = 1.42
Top Width (ft) = 8.00

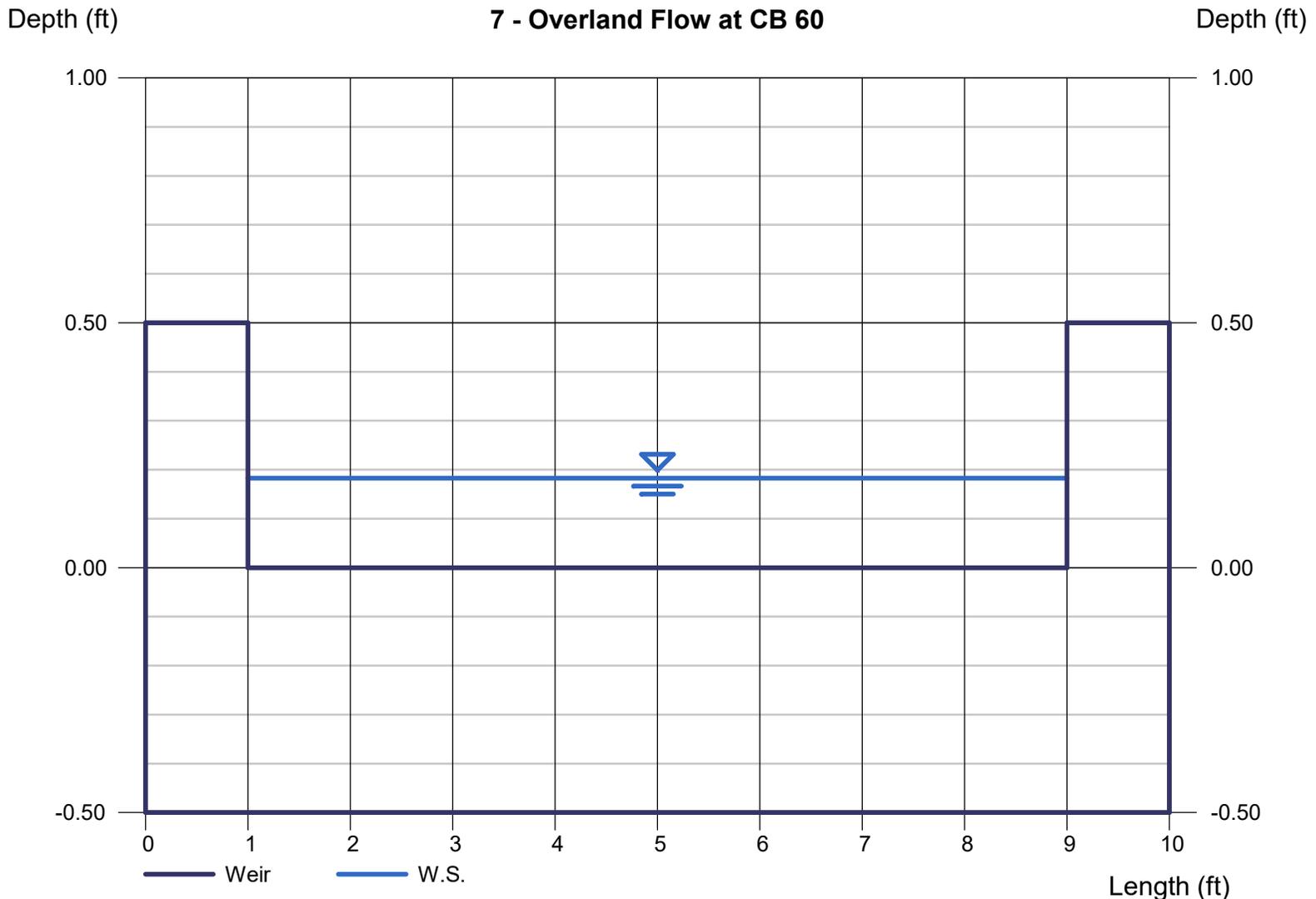
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 2.08

100-YR Runoff from CB 60 = 6.34 cfs
Pipe Flow at CB 60 = 4.26 cfs
Overland Flow = 2.08 cfs

Overland Elevation = 1034.09
Peak Water Elevation = 1034.09 + 0.18 = 1034.27

Unit 96 Yard Grade = 1036.70
Freeboard = 1036.70 - 1034.27 = 2.43 feet



Weir Report

1 - FROZEN OVERLAND FLOW FI 12

Trapezoidal Weir

Crest = Sharp
Bottom Length (ft) = 12.00
Total Depth (ft) = 2.00
Side Slope (z:1) = 4.00

Highlighted

Depth (ft) = 0.55
Q (cfs) = 17.06
Area (sqft) = 7.81
Velocity (ft/s) = 2.18
Top Width (ft) = 16.40

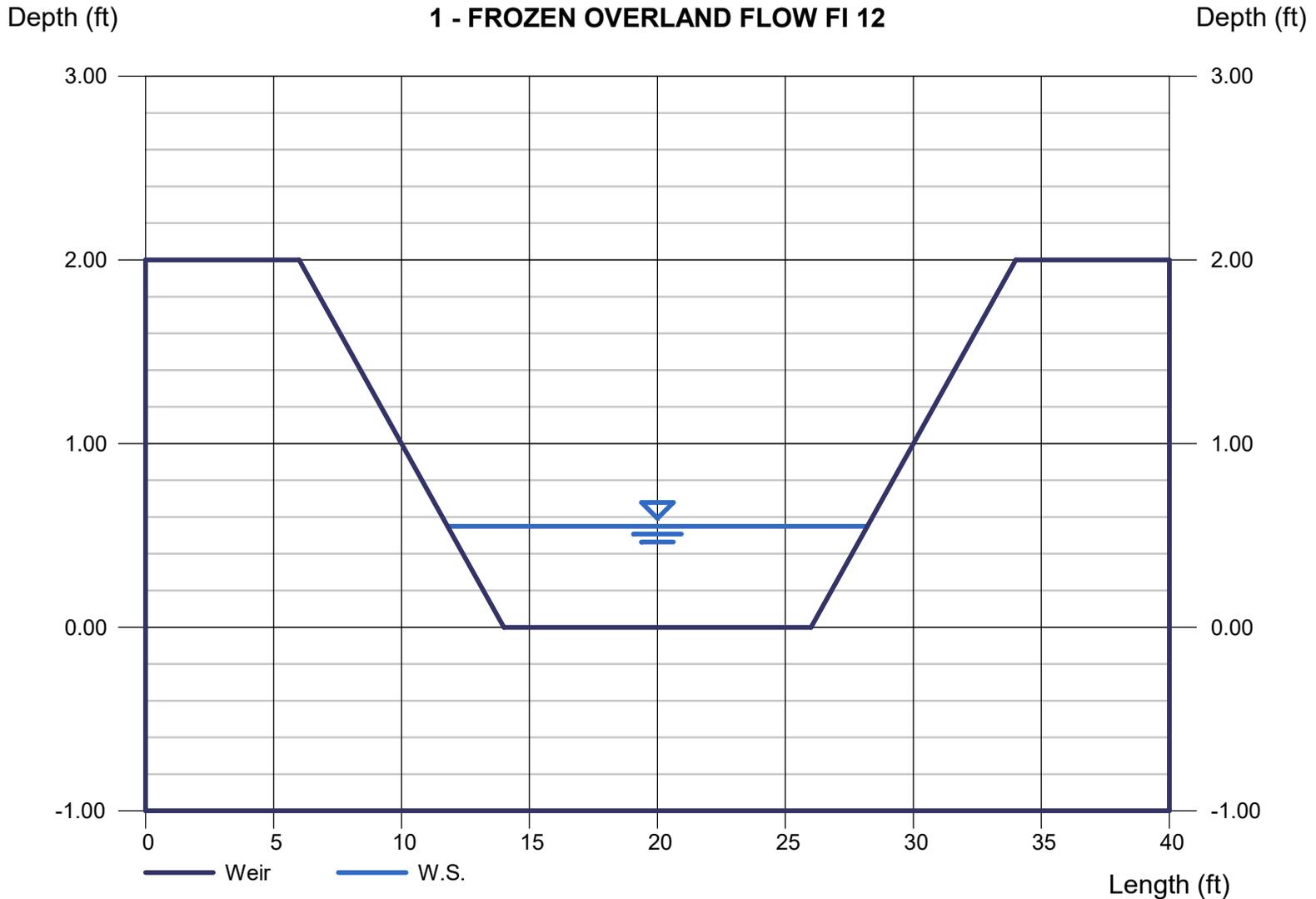
Calculations

Weir Coeff. Cw = 3.10
Compute by: Known Q
Known Q (cfs) = 17.06

100-YR FROZEN Runoff from FI 11 and FI 12 = 23.81 cfs
Pipe Flow at FI 12 = 6.75 cfs
Overland Flow = 17.06 cfs

Overland Elevation = 1033.30
Peak Water Elevation = 1033.30 + 0.55 = 1033.85

Units 23-24 Yard Grade = 1035.50
Frozen Freeboard = 1035.50 - 1033.85 = 1.65 feet



Weir Report

2 - FROZEN OVERLAND FLOW FI 13

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 30.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.16
Q (cfs) = 6.570
Area (sqft) = 4.88
Velocity (ft/s) = 1.35
Top Width (ft) = 30.00

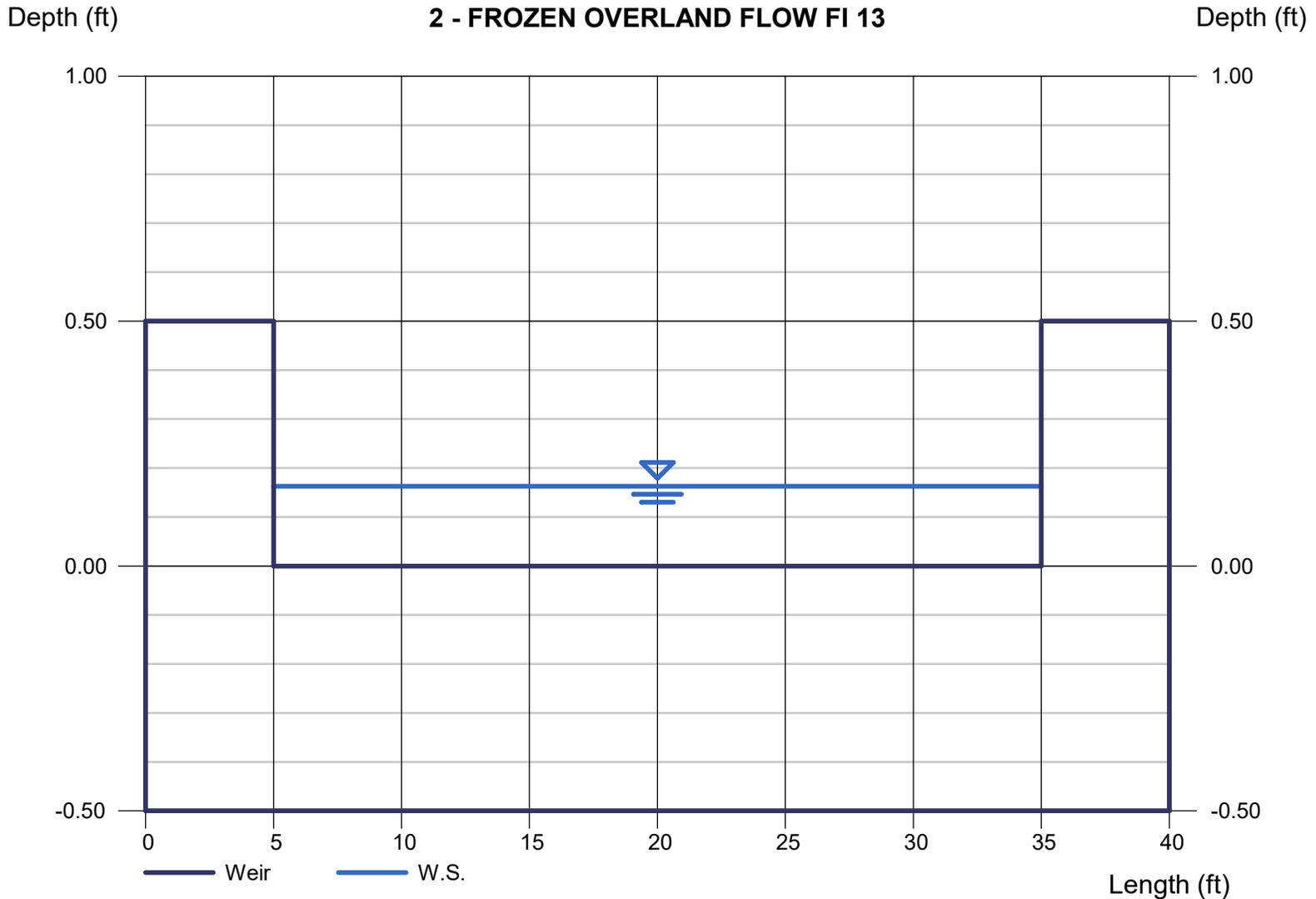
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 6.57

100-YR FROZEN Runoff from FI 13 = 9.68 cfs
Pipe Flow at FI 13 = 3.11 cfs
Overland Flow = 6.57 cfs

Overland Elevation = 1032.00
Peak Water Elevation = 1032.00 + 0.16 = 1032.16

Units 25-26 Yard Grade = 1035.20
FROZEN Freeboard = 1035.20 - 1032.16 = 3.04 feet



Weir Report

3 - FROZEN OVERLAND FLOW CB 17

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 24.00
Total Depth (ft) = 1.00

Highlighted

Depth (ft) = 0.66
Q (cfs) = 42.48
Area (sqft) = 15.74
Velocity (ft/s) = 2.70
Top Width (ft) = 24.00

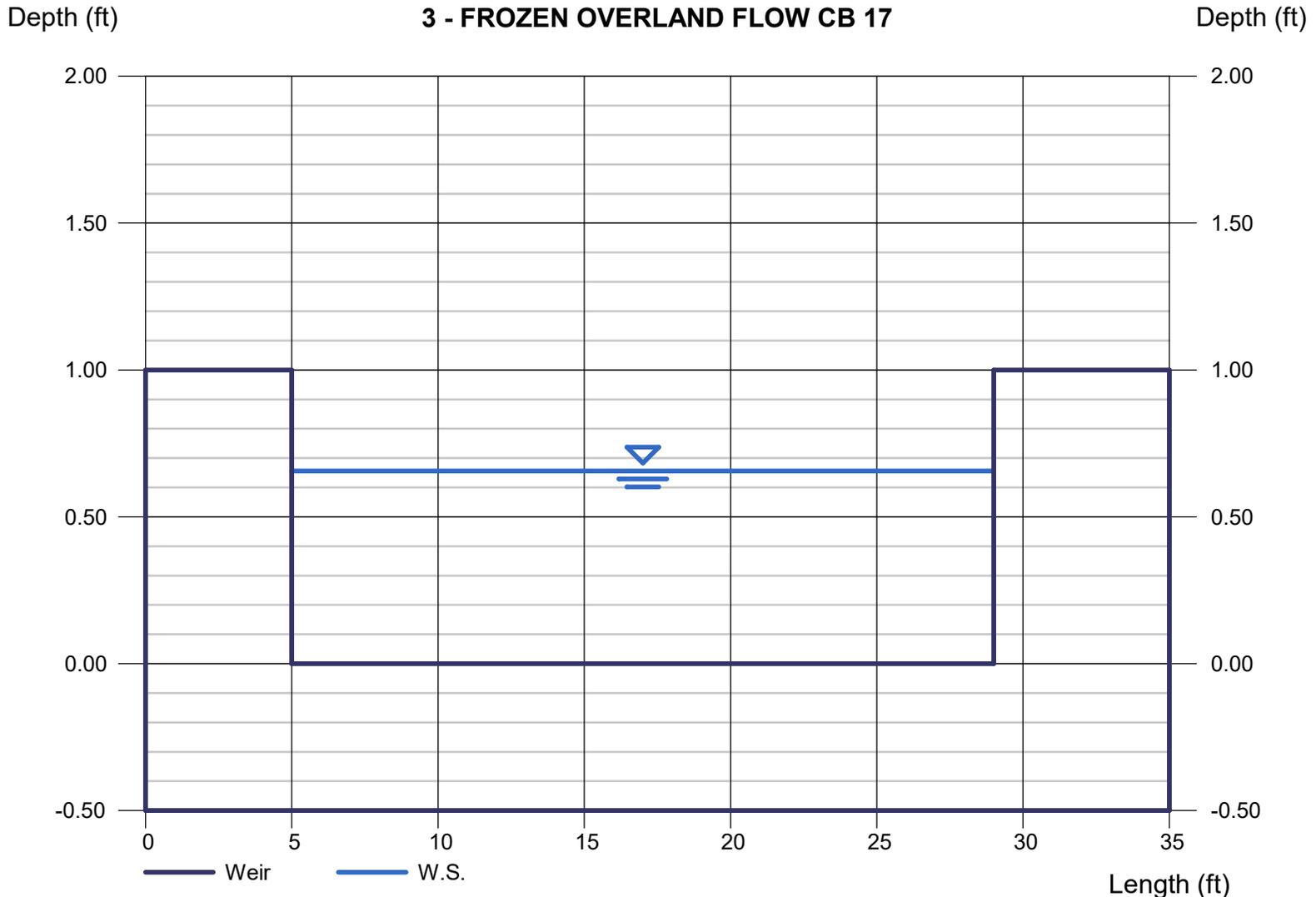
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 42.48

100-YR FROZEN Runoff from CB 1 to CB 17 with
(100-yr minus pipe flow from CB 21) = 82.50 cfs
Pipe Flow at CB 17 = 40.02 cfs
Overland Flow = 42.48 cfs

Overland Elevation = 1031.25
Peak Water Elevation = 1031.25 + 0.66 = 1031.91

Units 5,8, 9, 10 Yard Grade = 1035.00
FROZEN Freeboard = 1035.00 - 1031.91 = 3.09 feet



Weir Report

4 - FROZEN OVERLAND FLOW FI 39

Trapezoidal Weir

Crest = Sharp
Bottom Length (ft) = 16.00
Total Depth (ft) = 1.00
Side Slope (z:1) = 4.00

Highlighted

Depth (ft) = 0.52
Q (cfs) = 20.01
Area (sqft) = 9.40
Velocity (ft/s) = 2.13
Top Width (ft) = 20.16

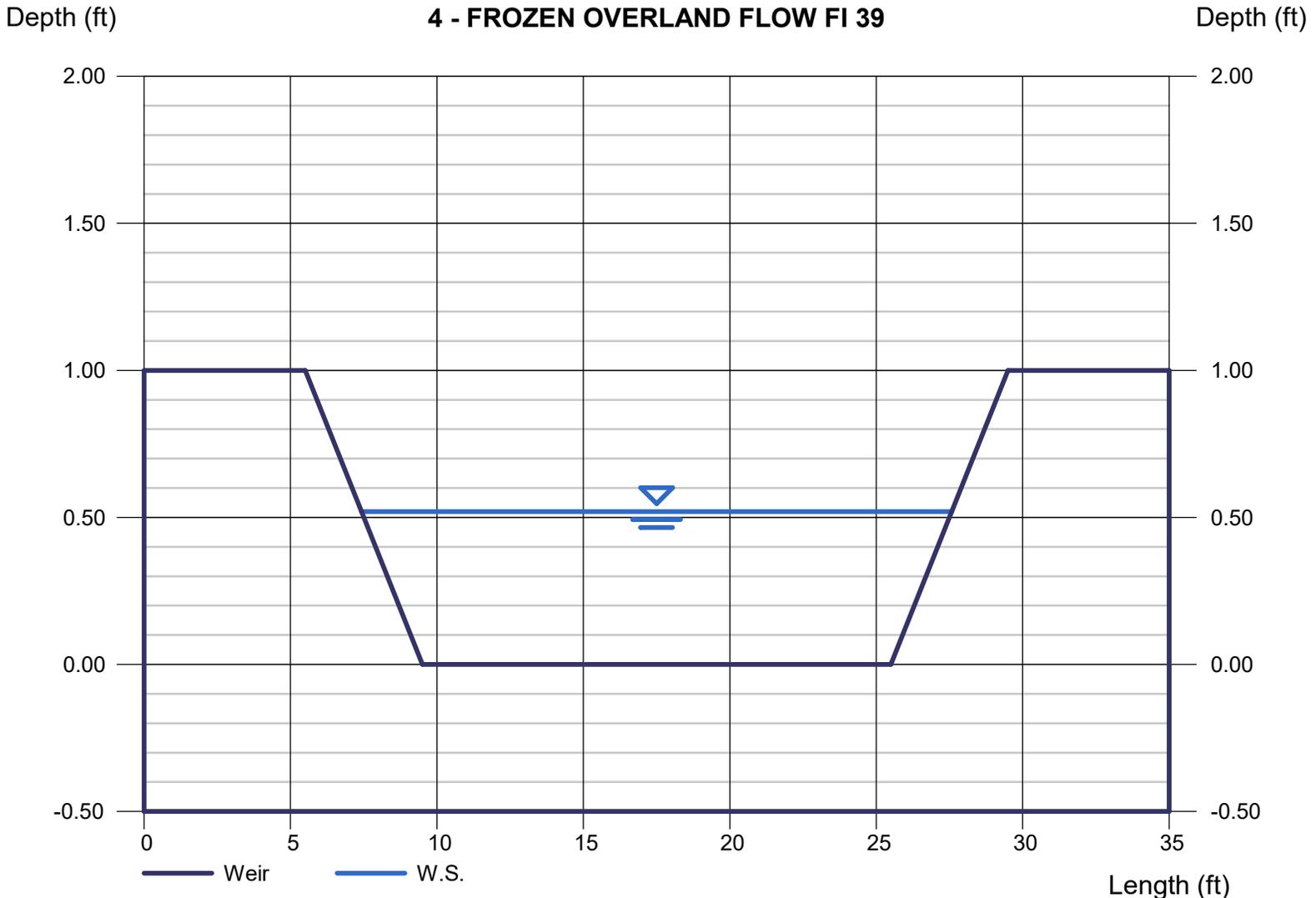
Calculations

Weir Coeff. Cw = 3.10
Compute by: Known Q
Known Q (cfs) = 20.01

100-YR FROZEN Runoff from FI 37-39 = 27.76 cfs
Pipe Flow at FI 39 = 7.75 cfs
Overland Flow = 20.01 cfs

Overland Elevation = 1036.65
Peak Water Elevation = 1036.65 + 0.52 = 1037.17

Units 69-70 Yard Grade = 1039.00
FROZEN Freeboard = 1039.00 - 1037.17 = 1.83 feet



Weir Report

5 - FROZEN OVERLAND FLOW FI 43

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 28.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.28
Q (cfs) = 14.15
Area (sqft) = 7.96
Velocity (ft/s) = 1.78
Top Width (ft) = 28.00

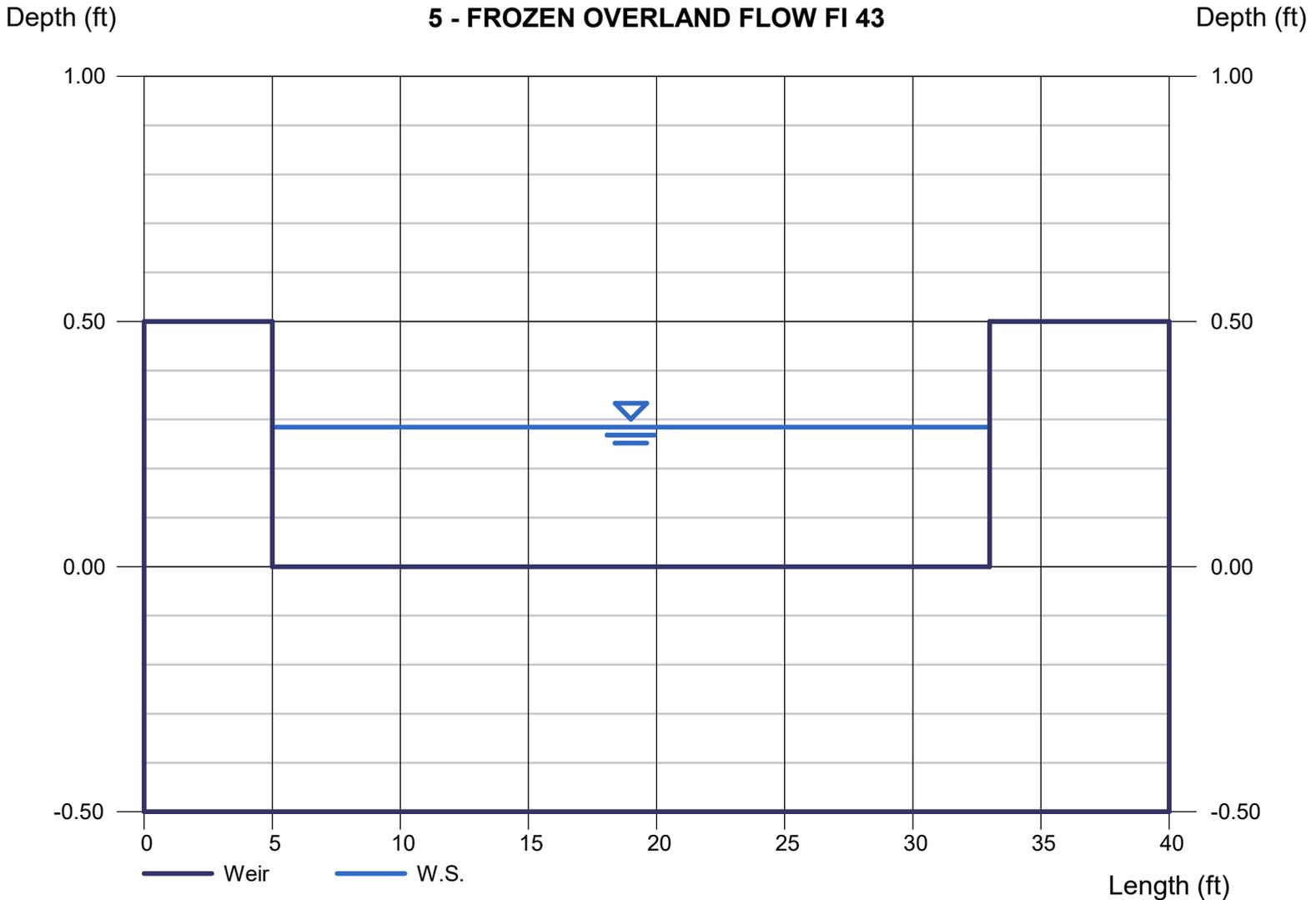
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 14.15

100-YR FROZEN Runoff from FI 41-43 = 22.61 cfs
Pipe Flow at FI 43 = 8.46 cfs
Overland Flow = 14.15 cfs

Overland Elevation = 1034.00
Peak Water Elevation = 1034.00 + 0.28 = 1034.28

Unit 89 Yard Grade = 1036.70
Freeboard = 1036.70 - 1034.28 = 2.42 feet



Weir Report

6 - FROZEN OVERLAND FLOW CB 47

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 20.00
Total Depth (ft) = 1.00

Highlighted

Depth (ft) = 0.88
Q (cfs) = 54.53
Area (sqft) = 17.50
Velocity (ft/s) = 3.12
Top Width (ft) = 20.00

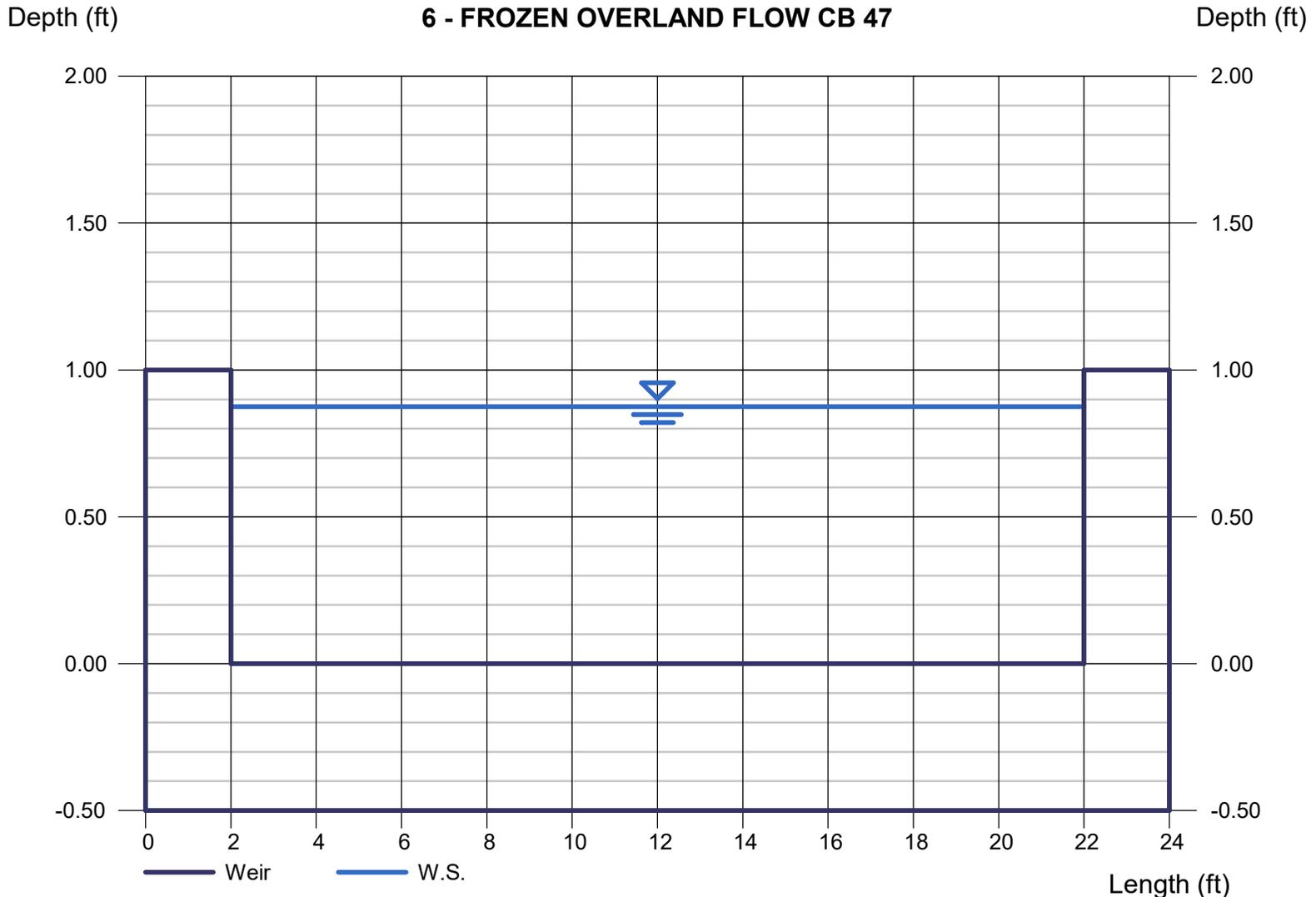
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 54.53

100-YR Runoff from CB 28-39, 41-47 with only flow through pipe from CB 40 = 90.60 cfs
Pipe Flow at CB 47 = 36.07 cfs
Overland Flow = 54.53 cfs

Overland Elevation = 1033.08
Peak Water Elevation = 1033.08 + 0.88 = 1033.96

Units 107-110 Yard Grade = 1035.90
Freeboard = 1035.90 - 1033.96 = 1.94 feet



Weir Report

7 - FROZEN OVERLAND FLOW CB 60

Rectangular Weir

Crest = Sharp
Bottom Length (ft) = 8.00
Total Depth (ft) = 0.50

Highlighted

Depth (ft) = 0.28
Q (cfs) = 4.000
Area (sqft) = 2.26
Velocity (ft/s) = 1.77
Top Width (ft) = 8.00

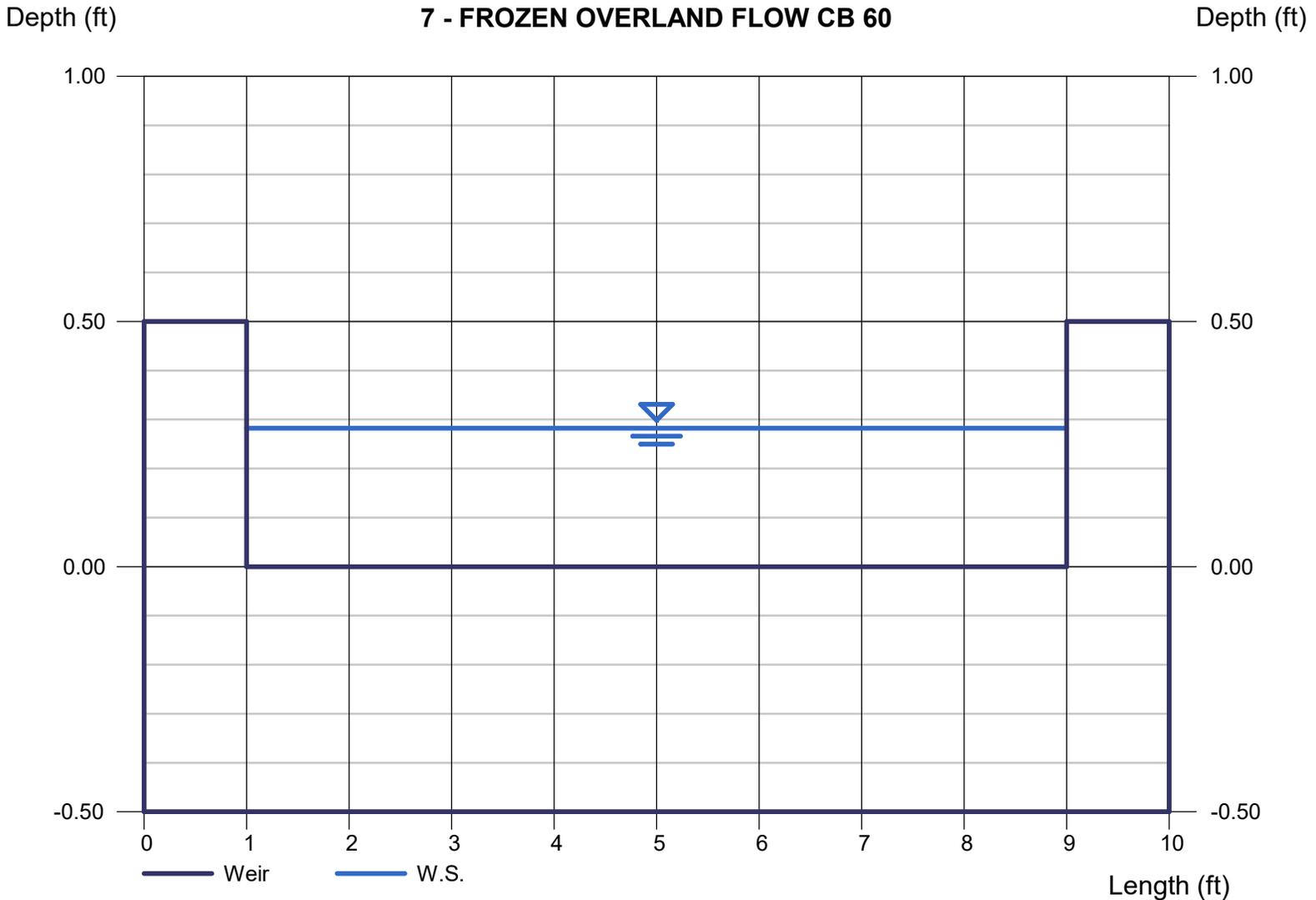
Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 4.00

100-YR FROZEN Runoff from CB 60 = 8.26 cfs
Pipe Flow at CB 60 = 4.26 cfs
Overland Flow = 4.00 cfs

Overland Elevation = 1034.09
Peak Water Elevation = 1034.09 + 0.28 = 1034.37

Unit 96 Yard Grade = 1036.70
FROZEN Freeboard = 1036.70 - 1034.37 = 2.33 feet



Channel Report

Swale 1

Trapezoidal

Bottom Width (ft) = 4.00
Side Slopes (z:1) = 4.00, 4.00
Total Depth (ft) = 2.00
Invert Elev (ft) = 100.00
Slope (%) = 1.00
N-Value = 0.030

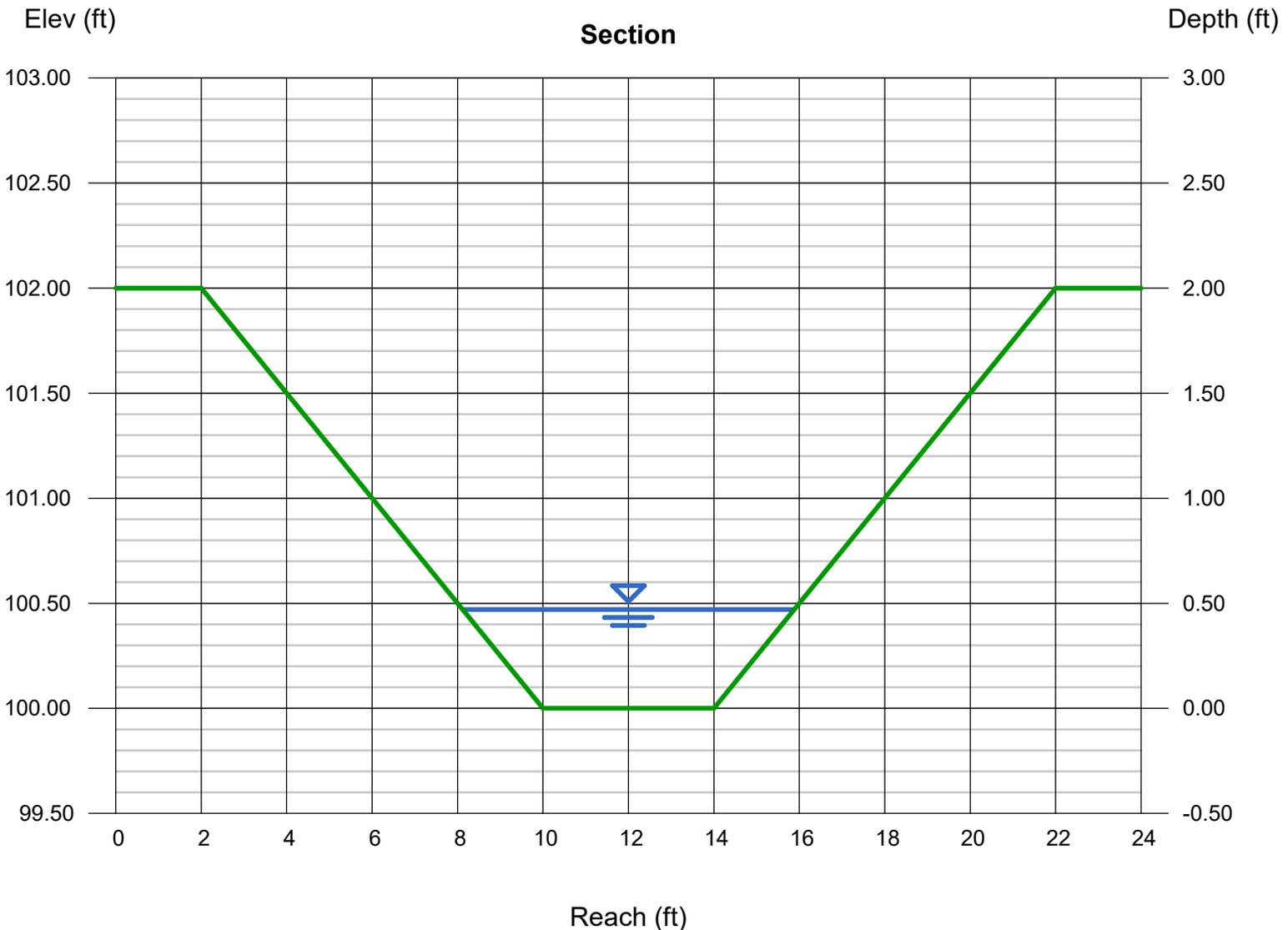
Highlighted

Depth (ft) = 0.47
Q (cfs) = 6.710
Area (sqft) = 2.76
Velocity (ft/s) = 2.43
Wetted Perim (ft) = 7.88
Crit Depth, Yc (ft) = 0.39
Top Width (ft) = 7.76
EGL (ft) = 0.56

Calculations

Compute by: Known Q
Known Q (cfs) = 6.71

100-YR flow from FI 12 = 5.09 cfs
100-YR flow minus pipe flow at FI 11 = 4.95 - 3.33 = 1.62 cfs
Total Ditch Flow = 6.71 cfs



Channel Report

Swale 2

Trapezoidal

Bottom Width (ft) = 4.00
Side Slopes (z:1) = 4.00, 4.00
Total Depth (ft) = 2.00
Invert Elev (ft) = 100.00
Slope (%) = 1.20
N-Value = 0.030

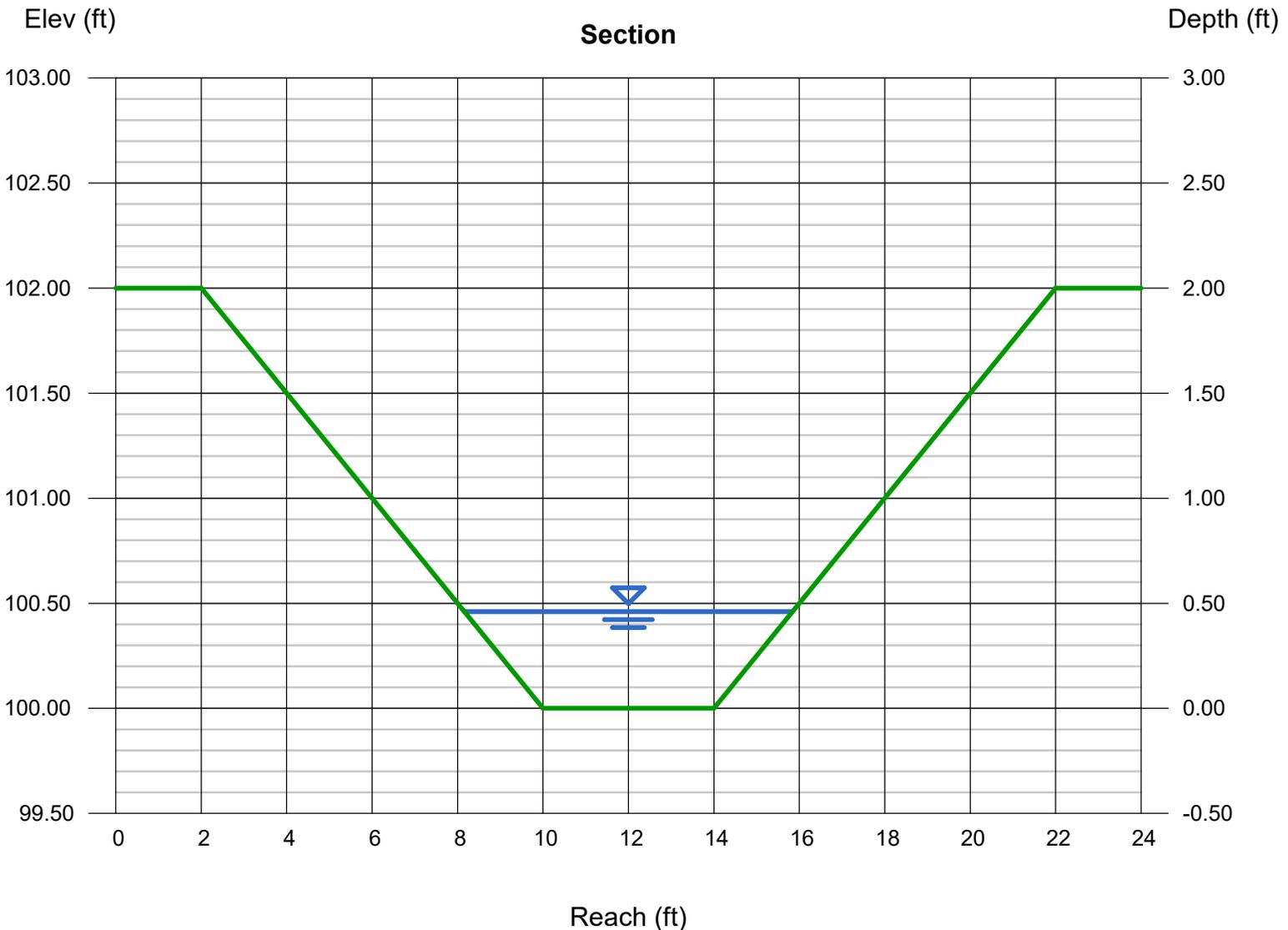
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Depth (ft) = 0.46
Q (cfs) = 7.120
Area (sqft) = 2.69
Velocity (ft/s) = 2.65
Wetted Perim (ft) = 7.79
Crit Depth, Yc (ft) = 0.41
Top Width (ft) = 7.68
EGL (ft) = 0.57

Calculations

Compute by: Known Q
Known Q (cfs) = 7.12

100-YR flow from FI 37 = 7.12 cfs



Channel Report

Swale 3

Trapezoidal

Bottom Width (ft)	= 3.00
Side Slopes (z:1)	= 4.00, 4.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 1.20
N-Value	= 0.030

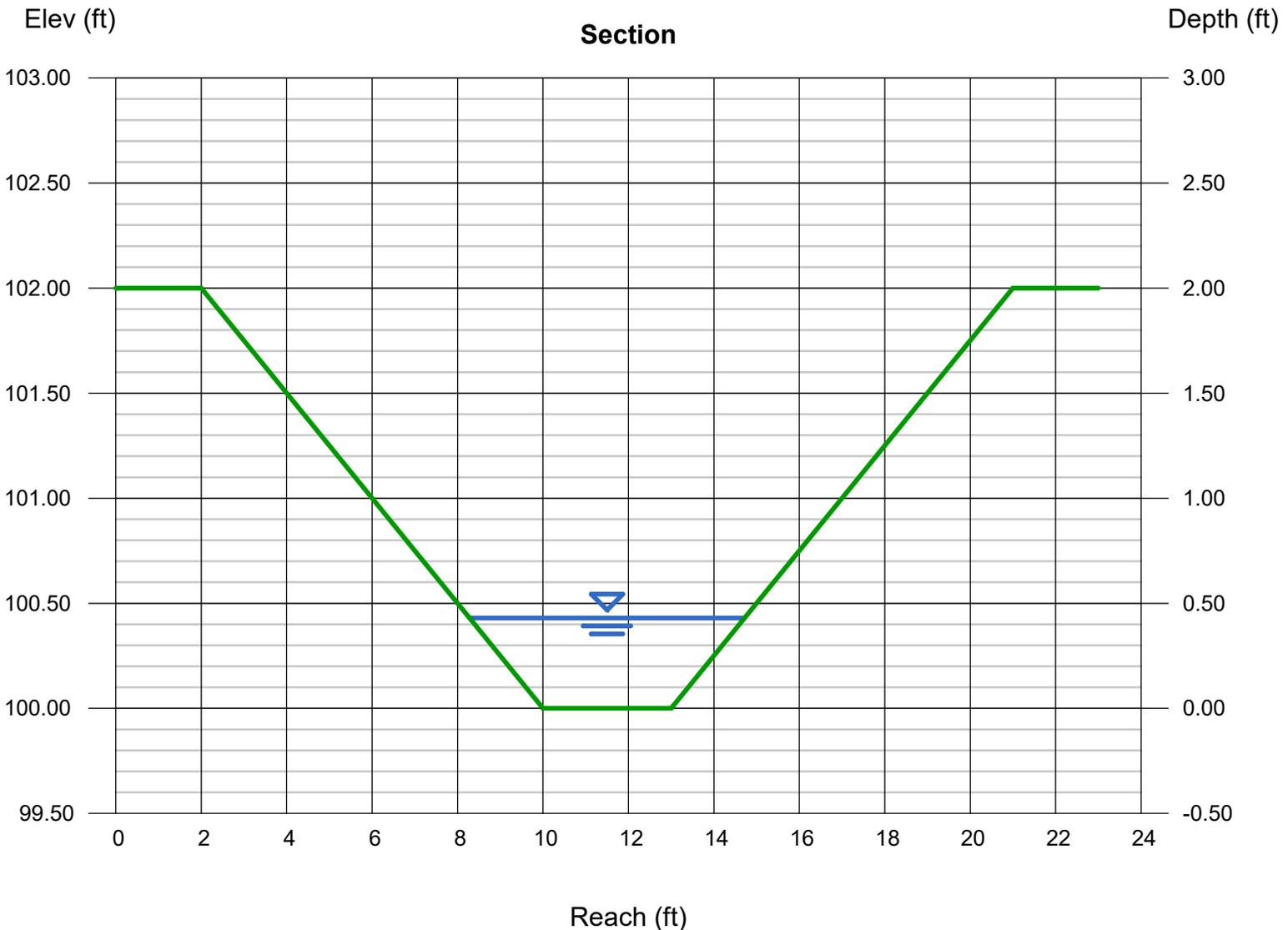
Highlighted

Depth (ft)	= 0.43
Q (cfs)	= 4.950
Area (sqft)	= 2.03
Velocity (ft/s)	= 2.44
Wetted Perim (ft)	= 6.55
Crit Depth, Yc (ft)	= 0.37
Top Width (ft)	= 6.44
EGL (ft)	= 0.52

Calculations

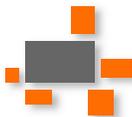
Compute by:	Known Q
Known Q (cfs)	= 4.95

100-YR flow from ES 62 = 4.95 cfs



APPENDIX 7 STORMWATER MAINTENANCE AGREEMENT

This section contains a large, light gray rectangular area that serves as a template for the agreement. It includes several smaller, empty rectangular boxes of various sizes and orientations, positioned to indicate where specific information or signatures should be placed. The boxes are arranged in a roughly central and lower-central layout within the main gray area.



Storm Water Management Practice
Maintenance Agreement

THIS AGREEMENT is made and executed this _____ day of _____, 2021, by and between the Village of Hartland, a Wisconsin municipal corporation (“Village”) and Longmeadow Development LLC (“Owner”).

Whereas, the Owner owns the land described in the attached Exhibit A (the “Property”); and

Whereas, the Owner and the Village wish to set forth certain storm water facilities and maintenance obligations to document the obligations of the Owner; and

Whereas, to assure appropriate and necessary maintenance of the storm water management facilities and system, it is necessary that a maintenance plan and agreement be prepared and that this Agreement, which sets forth that maintenance plan and agreement, be recorded in the office of the Register of Deeds for Waukesha County; and

Whereas, the Owner has agreed to the requirements of this Storm Water Management Facility Maintenance Agreement; and

Whereas, the restrictions set forth in this Agreement are to run with the Property and perpetually bind the Owner and all of its heirs, successors and assigns.

Now, therefore, the undersigned Owner, as fee owner of all affected lands, hereby executes this Agreement imposing the following restrictions on the Property:

1. The real estate to which this Agreement applies is the Property described on Exhibit A attached hereto.
2. The Owner agrees to construct storm water management facilities in accordance with the stormwater management plan set forth in Exhibit B attached and/or referenced hereto and the construction plans set forth in Exhibit C attached and/or reference hereto.
3. The Owner hereby subjects the Property to the minimum storm water practice maintenance requirements set forth on Exhibit E attached hereto, which restrictions and requirements are to run with the land and are to bind Owner and all its heirs, successors and assigns of Owner.
4. The storm water facilities shown on Exhibit D shall be constructed according to the grading elevations shown on Exhibit C attached and/or referenced hereto.
5. The Owner and the respective heirs, successors and assigns of Owner as owners of the Property shall be solely responsible for the perpetual maintenance, upkeep and repair of the storm water management facilities in accordance with the requirements set forth in Exhibit C attached hereto.

Name and Return Address

Village of Hartland
210 Cottonwood Avenue
Hartland, WI 53029

HAV 0388989001

Parcel Identification Number(s) – (PIN)

6. Upon notification to the owner of the Property by the Village of maintenance failures that require correction due to an adverse effect on the Property or the public health, safety or welfare, the then-current Owner shall take the specified corrective action within a reasonable time frame as set forth by the Village.
7. The Village is authorized, but not required, to perform the corrective actions identified in the notice if the owner does not make the required corrections within the specified time. All costs and administrative fees charged to the Owner in accordance with this section may be placed upon the tax rolls by the Village as a special charge in accordance with the Wisconsin Statutes, including Wis. Stat. section 66.0627, as amended from time to time.
8. The Owner shall be responsible for maintenance of the storm water management facilities pursuant to the requirements of Exhibit E attached hereto. Maintenance shall be undertaken consistent with the maintenance requirements of Exhibit E unless more stringent requirements have been enacted by the Village or a State Agency from time to time. The Village is authorized to access the Property to conduct inspections of storm water management facilities as necessary to determine that the facilities are being maintained and operated in accordance with this Agreement. The Owner, as needed (but not less than on an annual basis), shall provide maintenance of each storm water management measure including, but not limited to, removal of debris, maintenance of vegetative areas, maintenance of structural storm water management facilities, and sediment removal. Upon notice to the Owner by the Village of maintenance problems that require correction, the specified corrective actions shall be taken within a reasonable time frame as set by the Village.
9. In the event that maintenance of the storm water management facilities is not undertaken by the Owner, the Village may perform maintenance work on the storm water management facilities if such a failure to maintain:
 - a. Has a material adverse effect on public or private property, or
 - b. Endangers the public health, safety or welfare; provided, however, that before the Village shall have the right to perform any such maintenance pursuant to this section (except in the case of an emergency situation determined by the Village DPW Director), the Village shall provide the Owner with written notice stating what specific maintenance activities the Village deems to be required with respect to the storm water management facilities. The Owner shall have ten (10) calendar days after the date of such written notice to perform such maintenance activities, provided that said 10 days may be extended by the Village if the Owner has commenced required maintenance work within the 10 days and is diligently proceeding to complete the same. In the case of an emergency situation, as determined in the sole discretion of the DPW Director, no notice shall be required prior to the Village performing emergency maintenance and/or repairs.
10. The Village shall have unrestricted access to the Property for purposes of inspection for compliance and for repairs and corrective action
11. The cost of all the inspections or maintenance undertaken by the Village pursuant to the above paragraphs shall be assessed against the Owner in accordance with the provisions of section 66.0627 of the Wisconsin Statutes, as amended from time to time. It is expressly understood and acknowledged that such costs shall be deemed a Special Charge

for current services and may be levied in accordance with the provisions of section 66.0627 of the Wisconsin Statutes, as amended from time to time. Any such assessment that is not paid within sixty (60) calendar days after billing shall be deemed a delinquent Special Charge and shall become a lien upon the parcels against which such Charge has been assessed. Such delinquent charges shall be extended upon the current or next tax roll as a delinquent tax against the parcel(s) for which payment has not been received by the Village and all proceedings in relation to the collection, return and the sale of the property for delinquent real estate taxes shall apply to such Special Charge.

12. Owner may, at any time and in its sole discretion, relocate any or all of the storm water management facilities described in this Agreement to another portion of the Property provided that any such relocated storm water management facilities shall remain subject to this agreement.
13. The validity, meaning and effect of this Agreement shall be determined in accordance with the laws of the State of Wisconsin applicable to contracts made to be performed in Wisconsin.
14. This Agreement constitutes the entire agreement of the parties with respect to the subject matter hereof.

IN WITNESS WHEREOF, the Owner has executed this Agreement on the _____ day of _____, 2021.

By: _____

STATE OF WISCONSIN)
)ss.
COUNTY OF WAUKESHA)

Personally came before me this ____ day of _____, 2021, the above-named _____, to me known to be the _____ of Longmeadow Development LLC, (“Owner”), who executed the foregoing instrument by its authority and on its behalf and acknowledged the same.

Notary Public, State of Wisconsin

My commission expires: _____

EXHIBIT A Legal Description and Property

Project Identifier: Sandhill Development
Tax Key No.: HAV 0388989001

Legal Description:

PART OF THE SOUTHEAST QUARTER (SE $\frac{1}{4}$) OF SECTION 2, TOWN 8 NORTH, RANGE 18 EAST, IN THE VILLAGE OF HARTLAND, WAUKESHA COUNTY, WISCONSIN.



EXHIBIT B
Stormwater Management Plan

Shall be stormwater management plan provided by Pinnacle Engineering Group
dated March 31, 2021 and on file with the Village of Hartland

EXHIBIT C
Construction Plans

Shall be construction plans provided by Pinnacle Engineering Group
dated March 31, 2021 and on file with the Village of Hartland

EXHIBIT D Stormwater Facilities

Stormwater Facilities to be maintained by the Owner:
Northwest Wet Pond, North Dry Pond, Northeast Wet Pond, South dry Pond, South Wet Pond, pond outlet structures and outlet pipes, all storm sewer and all storm sewer structures.



EXHIBIT E

Minimum Storm Water Practice Maintenance Requirements

This exhibit explains the basic function of each of the storm water practices listed in Exhibit A and prescribes the minimum maintenance requirements to remain compliant with this Agreement. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all-inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Any failure of a storm water practice that is caused by a lack of maintenance will subject the Owner(s) to enforcement of the provisions listed on page 1 of this Agreement by the Village of Hartland.

System Description:

There are three wet detention ponds and two dry ponds within the Sandhill development to address the storm water management requirements from the Village of Hartland and the Wisconsin DNR.

The wet detention ponds are labeled as the Northwest Wet Pond, Northeast Wet Pond and South Wet Pond. The dry ponds are labeled as the North Dry Pond and the South Dry Pond.

The wet detention ponds are designed to trap a minimum of 80% of sediment in runoff, and along with the dry ponds, reduce downstream peak flows to required rates. The wet ponds will trap the smaller and finer suspended solids. In order for the ponds to be effective, the pond sizes, water levels and outlet structures must be maintained per the approved plans on file with the Village of Hartland.

The northwest wet pond receives water from 23.45 acres of drainage area. During high rainfall or snow melts, the water level in the pond will temporarily rise and slowly drain down to the elevation of the outlet control structure. The water level is controlled by a 4-inch dewatering hole (elevation 1026.50). The outlet structure is a 30-inch concrete manhole (riser elevation 1029.50) with a 15-inch outlet pipe (elevation 1026.50) directed westerly towards Winkleman Road. There is also a 13.5-inch hole (elevation 1027.60) to allow more discharge during larger rainfall events. The 4-inch hole is protected from clogging by a trash grate that is connected to the outlet structure. The outlet structure also contains an open grate (elevation 1029.50) on top which does not function through a 100-year design storm. An emergency spillway (elevation 1029.50) is also provided in the berm of the pond to allow for an emergency discharge from the pond due to the outlet pipe clogging or storm events above the 100-year design storm. The wet pond will be clay lined (minimum 2' thick) from the bottom of the pond (elevation 1020.50) through the 2-year storm peak elevation (elevation 1027.70). The clay liner from the normal water level (elevation 1026.50) through the bottom of the pond (elevation 1020.50) does not have any material covering it. From the normal water level (elevation 1026.50) to the top of the clay liner (elevation 1027.70) there shall be a minimum of four inches of topsoil to cover the liner and to allow for grass growth.

The north dry pond receives water from 7.05 acres of drainage area. The outlet is a 24-inch storm sewer (elevation 1025.60) directed easterly into the northeast wet pond. A grassed swale allows for overland flow to the northeast pond for storm events above the 100-year design storm.

The northeast wet pond receives water from 15.88 acres of drainage area. During high rainfall or snow melts, the water level in the pond will temporarily rise and slowly drain down to the

elevation of the outlet control structure. The water level is controlled by a 4-inch dewatering hole (elevation 1024.00). The outlet structure is a 36-inch concrete manhole (riser elevation 1026.50) with a 24-inch outlet pipe (elevation 1024.00) directed easterly towards the Walnut Grove Swale. The 4-inch hole is protected from clogging by a trash grate that is connected to the outlet structure. The outlet structure also contains an open grate (elevation 1026.50) on top which does function through a 100-year design storm. An emergency spillway (elevation 1028.00) is also provided in the berm of the pond to allow for an emergency discharge from the pond due to the outlet pipe clogging or storm events above the 100-year design storm. The wet pond will be clay lined (minimum 2' thick) from the bottom of the pond (elevation 1018.00) through the 2-year storm peak elevation (elevation 1026.50). The clay liner from the normal water level (elevation 1024.00) through the bottom of the pond (elevation 1018.00) does not have any material covering it. From the normal water level (elevation 1024.00) to the top of the clay liner (elevation 1026.50) there shall be a minimum of four inches of topsoil to cover the liner and to allow for grass growth.

The south wet pond receives water from 18.78 acres of drainage area. During high rainfall or snow melts, the water level in the pond will temporarily rise and slowly drain down to the elevation of the outlet control structure. The water level is controlled by a 4-inch dewatering hole (elevation 1023.00). The outlet structure is a 60-inch concrete manhole (riser elevation 1026.00) with a 30-inch outlet pipe (elevation 1023.00) directed westerly towards Winkleman Road. The 4-inch hole is protected from clogging by a trash grate that is connected to the outlet structure. There are also four 11.0-inch holes (elevation 1024.25) to allow more discharge during larger rainfall events. The outlet structure also contains an open grate (elevation 1026.00) on top which does not function through a 100-year design storm. An emergency spillway (elevation 1026.00) is also provided in the berm of the pond to allow for an emergency discharge from the pond due to the outlet pipe clogging or storm events above the 100-year design storm. The wet pond will be clay lined (minimum 2' thick) from the bottom of the pond (elevation 1017.00) through the 2-year storm peak elevation (elevation 1024.50). The clay liner from the normal water level (elevation 1023.00) through the bottom of the pond (elevation 1017.00) does not have any material covering it. From the normal water level (elevation 1023.00) to the top of the clay liner (elevation 1024.50) there shall be a minimum of four inches of topsoil to cover the liner and to allow for grass growth.

The south dry pond receives water from 16.62 acres. The outlet is an 18-inch storm sewer (elevation 1023.80) directed westerly towards the existing Lisbon Road culvert. An emergency spillway (elevation 1028.00) is also provided in the berm of the pond to allow for an emergency discharge from the pond due to storm events above the 100-year design storm.

Responsibility. The Owner of the property, and their heirs and assigns, shall be the “responsible party” for the routine, ordinary, and long-term maintenance of all storm water practices, including, but not limited to those improvements shown on the plans.

Minimum Maintenance Requirements

Wet Detention Ponds

I. ROUTINE MAINTENANCE

A. Mowing

1. Side slopes, embankments, and emergency spillways that are not rock lined which have been planted with turf grasses should be mowed at least three (3) times a year to prevent woody growth and control noxious weeds. Recommended mowing times are April, July and October of each year.
2. The Owner may more frequently mow areas adjacent to the entry drive, typically once every week to two weeks during a normal growing season, for aesthetic and allergy control purposes.
3. Native grasses should be mowed to a height of 6” in mid to late summer or after they have achieved a height of 1-1/2 feet during the first growing season. Further mowing in subsequent growing seasons may not be required.
4. A 6 to 8” mowing every 3 to 4 years, may suffice as a substitute management technique. The mowed area should be raked and performed in the spring.

B. Inspections

1. Inspections of the ponds shall be completed on an annual basis or after significant rainfall events.
2. The inspections should be completed during wet weather conditions to determine if the ponds are functioning properly.
3. Inspection priorities shall be as follows:
 - a. Inspect the embankments for subsidence, erosion, cracking and tree growth.
 - b. Inspect the condition of the emergency spillway and overland flow path.
 - c. Inspect the pond for accumulation of sediment.
 - d. Inspect the outlet control structure for clogs, debris and material failures.
 - e. Inspect upstream and downstream channels from an erosion perspective.
 - f. Inspect any modifications that may have been done to the ponds following their initial construction.
 - g. Inspect the side slopes of the pond for erosion, slumping, cracking or woody plant materials.
 - h. NO trees are to be planted or allowed to grow on the earthen berms.
4. As-built plans shall accompany the person responsible for the pond inspections.
5. Documentation of the inspections should be completed and filed. Documentation should include as a minimum:
 - a. Inspectors name, affiliation and professional credentials if applicable.
 - b. Date, time and weather conditions.
 - c. Approximate rainfall total over a 24 hour period if applicable.
 - d. Existing embankment, outlet and inlet conveyance systems and vegetation condition.
 - e. Sediment depth at the outlet control structure and at a minimum one other location.
 - f. Identification of potential structural failures and repair needs.
 - g. Other pond conditions such as vegetation growth, algae growth and

- emergency spillway conditions.
- h. Repair recommendations.
- C. Leaf, Debris and Litter Removal.
 1. Debris, leaf accumulation and litter removal from the pond surface shall be completed at least once a month.
 2. Particular attention should be paid to debris and leaves accumulating around the riser pipe to prevent potential clogging.
- D. Erosion Control.
 1. The pond side slopes, embankments and emergency spillways may suffer from periodic slumpage and erosion.
 2. Corrective measures shall include regrading, filling and revegetation of the eroded or slumping areas.
 3. Permanent geosynthetic erosion matting (or rip rap) at the pond outlet and emergency spillways should be inspected for displacement or undermining. Repairs shall be made upon discovery.
- E. Nuisance Control.
 1. Biological control of algae and mosquitoes is preferred over chemical control. Consultation with local WDNR officials is recommended prior to the introduction of any biological control.
 2. Maintaining the native grass perimeter will aide in the control of geese.
 3. Mechanical controls should be used when feasible.

II. NON-ROUTINE MAINTENANCE

- A. Structural Repairs and Replacement.
 1. The outlets of the pond have been constructed utilizing concrete pipe and concrete materials. The estimate life of these structures is 75 to 100 years. Annual inspection of the structures will disclose any potential structural problems. If structural problems appear, repair or replace the outlet.
 2. Excessive or chronic drawdowns of the ponds may cause leaks or seepage through the embankments. Excessive drawdowns should be avoided and thus corrective measures for leakage and seepage can be avoided.
- B. Sediment Removal.
 1. A sediment clean out cycle of 10 to 15 years is recommended. Sediment removal may be necessary prior to 10 years if there is a substantial amount of land disturbance occurring within the contributory watershed. Annual inspections shall be made to ensure that the design depth of the permanent water pool is maintained.
 2. It is recommended that the sediment be tested to determine if land filling is necessary. Contact the local DNR prior to sediment sampling and testing to ensure compliance with State standards and regulations.
 3. Surveyed depths of the sediment storage area and permanent pool elevations shall be made immediately following the construction of the ponds and recorded on the as-built plans. Annual inspections shall include measure downs to determine sediment elevations in relation to the permanent pool elevation.
- C. Any other repair or maintenance needed to ensure the continued function of the storm water practices or as ordered by the Village of Hartland under the provisions listed within this Agreement.

III. RESPONSIBLE PARTY & FINANCIAL FUNDING

- A. The responsible party for the operation, inspection and maintenance of the wet ponds shall be the homeowners association of the subdivision.
- B. It is recommended that the homeowners association of the subdivision and their heirs and assigns establish or set aside a perpetual maintenance fund to ensure that the ponds are properly inspected, maintained and repaired.

IV. ADDITIONAL CONSIDERATIONS TO IMPROVE POND WATER QUALITY AND REDUCE MAINTENANCE COSTS.

- A. General.
 - 1. Improper disposal of yard wastes will affect the water quality of the wet ponds and may cause clogging of the outlet structure.
 - 2. Improper fertilizer and pesticide application will affect the water quality of the wet ponds and add to algae growth.
 - 3. Excess lawn watering will affect the water quality of the ponds due to increased water runoff that may contain fertilizers and pesticides.
- B. Yard Care.
 - 1. It is recommended to consider routine yard care maintenance that is practical and environmentally sound.
 - 2. Refer to the U.W. Extension's "Rethinking Yard Care" for additional information.
- C. Leaves and Yard Trimmings.
 - 1. It is recommended that leaves and yard trimmings be properly disposed of.
 - 2. Refer to the U.W. Extension's "Managing Leaves and Yard Trimmings" for further information.
- D. Lawn and Garden Fertilizers.
 - 1. It is recommended to control fertilizer applications on lawn and gardens so as not to be detrimental to the water quality of the ponds.
 - 2. Refer to the U.W. Extension's "Lawn and Garden Fertilizers" for further information.
- E. Lawn and Garden Pesticides.
 - 1. Lawn and garden pesticides may pollute surface and ground water.
 - 2. Refer to the U.W. Extension's "Lawn and Garden Pesticides" for further information.
- F. Lawn Watering.
 - 1. Excess lawn watering will wash pollutants into the wet ponds.
 - 2. Refer to the U.W. Extension's "Lawn Watering" for further information.
- G. Lawn Weed Control.
 - 1. Proper turf management will lower the amount of the chemicals that may runoff into the wet ponds during rain events.
 - 2. Refer to the U.W. Extension's "Lawn Weed Control" for further information.

Private Storm Sewer Piping, Catch Basins, Field Inlets & Storm Manholes

- I. Accumulated solids or byproduct removal requirements:
 - A. Inlets are to be cleaned on an annual basis from May to June of each year.
 - B. Inspect and remove leaf and other similar debris from private storm sewer structures from November to December each year.
 - C. Inlets are to be cleaned utilizing vacuum equipment in accordance with Local and State regulations.
- II. Identification of Safety Hazards
 - A. Storm manholes may be considered “confined spaces” and appropriate “confined space entry” requirements must be met in accordance with Local and State regulations.
- III. Cleaning and Inspection Schedule
 - A. Inspect entire system including inlets, grates, manhole covers, and flared end sections on semi-annual basis for deficiencies. Said inspection shall take place in the spring and fall of each year.
 - B. Spring inspection shall be completed prior to each spring-cleaning cycle.
- IV. Inspection and Maintenance Checklist.
 - A. Inspection shall include documenting and/or noting concerns and updates needed or completed.
- V. Start up and Shutdown Procedures.
 - A. Upon stabilization of worksite, all temporary erosion control measures shall be removed.
- VI. Contingency Plan in event of System Failure.
 - A. If stormwater inlets (or catch basins) cease functioning properly, inspect in the following order:
 1. Stormwater Inlets.
 - a. Inspect inlet grate for blockage, clean as required.
 - b. Inspect inlet outfall pipe for blockage, clean as required.
 2. Blockage in mainline storm sewer.
 - a. Perform video inspection of mainline storm sewer.
 - b. Clean and repair as required.