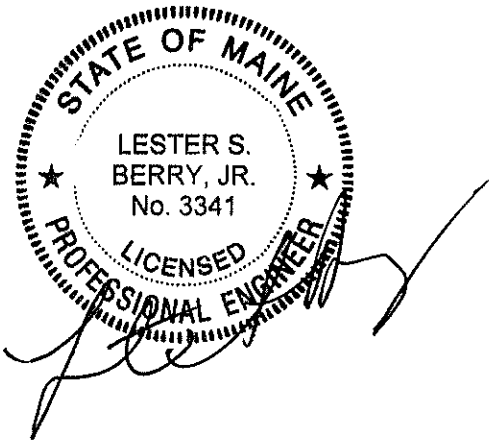
STORMWATER MANAGEMENT REPORT

FOR: THE PARK DANFORTH EXPANSION PROJECT
PORTLAND, MAINE

FOR
MITCHELL & ASSOCIATES
PORTLAND, MAINE

October 2014
Revised November 2014



Prepared By:

Berry Huff McDonald Milligan, Inc.
Engineers Surveyors Planners
28 State Street
Gorham, ME 04038
207-839-2771
FAX 207-839-8250
lberry@bh2m.com

TABLE OF CONTENTS

STORMWATER MANAGEMENT REPORT

FOR: THE PARK DANFORTH
PORTLAND, MAINE

The November 2014 Revisions include changing the drywells proposed in the October 2014 Report to standard catchbasins and leaching galleys.

INTRODUCTION

The Park Danforth is an elderly housing project located between east side of Stevens Avenue, the westside of Forest Avenue, the north side of Poland Street and the south side of Arbor Street. The project was originally approved and constructed in 1983 and underwent a major expansion in 1997. The site currently consists of 4.16 acres of land which includes the Goodwill site and three former house sites. Attached in Appendix A is a USGS Location Map.

The Park Danforth has purchased the Goodwill site which is their abutter to the north. The intention is to demolish the Goodwill facilities and expand the elderly housing building, access drives and parking lots. This will require a Subdivision and Site Plan approval from the City of Portland. The project will also "disturb" and reconstruct more than 1 acre of land so a DEP Stormwater Permit-by-Rule will be required for which the City probably does not have delegated authority. Therefore the purpose of this Report is to present a Stormwater Plan for the project which complies with "Chapter 500" which fortunately is the same standard for both the City of Portland and the Maine DEP. No "Site Law" Permit is required.

EXISTING SITES

For purposes of this Report the "existing site" or "predevelopment conditions" consists of two sites:

1. Existing Park Danforth Site – 2.56 acres
   This site is occupied by the existing elderly housing building and associated pavement/parking.

2. Existing Goodwill Site (and 3 house lots) – 1.60 acres
   This site currently has the old Goodwill building, small one story building (old bank building), 2 houses, and associated pavement/parking.

PROPOSED EXPANSION

The intent is to demolish the Goodwill site and existing houses and add a new building wing and parking/access to the site. The proposed layout is shown on the Post-development Drainage Plan and is detailed in the Project Plans by Mitchell & Associates.

STORMWATER STANDARDS

The total or new site is currently (both sites) a 4.16 acre site with 3.22 acres of existing impervious area. The reconstructed proposed site will be 4.16 acres with 3.05 acres of impervious area. This will represent a decrease from 3.27 acres to 3.05 acres or 0.17 acres. This is good.

The portion of the project (Goodwill site) which will represent the "redevelopment" portion of the work is not counted in the "impervious" calculations since the new use "is not likely to increase stormwater impacts" (Chapter 500, page7). The "disturbed" area does count.

Therefore, the project is not a "Site Law" project and only subject to Stormwater Law Standards for a "Permit-by-Rule". No "General" Standards or "Flooding" Standards apply. However, from a practical perspective, the new stormwater plan needs to fit within the existing capacity of the City drainage systems and treatment is a positive addition if the City adopts the proposed stormwater fees.

1997 STORMWATER REPORT

The City of Portland approved the Park Danforth expansion project in 1997 which included a "Stormwater Report" (copy in Appendix G).

Per the 1997 Stormwater Report most of the site runoff (from the 2.56 acre Park Danforth site) was collected in an on-site stormdrain system and discharged to the municipal stormdrain in Forest Avenue. Calculations were as follows:

Storm	Pre (before 1997)	Post (after 1997)
2 Year	4.26 cfs	3.89 cfs
10 Year	5.99 cfs	5.81 cfs
25 Year	7.01 cfs	6.80 cfs

The "Post" flowrates should be our current "Pre" flowrates.

However, a close inspection of the report calculations are concerning. The calculations were done using HydroCAD but with the "rational" method. It is our opinion that stormwater calculations since 1985 should have been performed by the TR-55 or TR-20 methodology. It is also our opinion that the 1997 report as a result of methodology and technical inputs has

significantly under estimated the peak flow rates based upon using methodologies per accepted engineering practice. Hence, we will not be referring to or using the existing report as a basis for the proposed project.

No reports or calculations were found for the Goodwill site.

SOILS

The Predevelopment Drainage Plan and Post-development Plan have soils plotted per the Cumberland County Medium Intensive Soils Mapping. Soils are:

WmB - Adams – Hydrologic Soils Group A
De - Croghan – Hydrologic Soils Group B

Additional Soils Data is also available.

1. Geotechnical Engineering Services by S.W. Cole, June 18, 2014. This report (Appendix H) confirms that the site is generally consisting of a thin layer of uncontrolled granular fill overlying native outwash sands overlying refusal surfaces (probably bedrock). Groundwater varied in depth from 18 feet to 21 feet. The findings were for the geotechnical design of the new structures but it did lead us to believe "infiltration" may be an option for Stormwater Management (see #2 below).

2. Test Pits by Albert Frick Associates are including in Appendix I. The first report dated September 16, 2014 by James Logan, CSS #213, consisted of hand dug test pits. A restrictive layer was recorded at 21" to 38". These results were not satisfactory so the test pits were redone using a backhoe. See Report dated September 27, 2014. These results indicated that the restrictive layer found initially was a loosely cemented sand layer that was 15" to 18" thick. Below this layer was free draining sand with no further evidence of groundwater. Hence, it was concluded that infiltration is a viable option as long as the infiltration surface is below the cemented sand layer. Using infiltration will require inspection by a CSS to insure all infiltration surface are below the cemented layer.

PRE-DEVELOPMENT DRAINAGE CONDITIONS

The total proposed site (4.16 acres) or one city block is essentially the "top" of a minor hill. All runoff either flows overland to the street or via pipes to city stormdrain in Forest Avenue. It is our understanding that the city stormdrain is a "separated" stormdrain, although the outlet location is unknown. Old plans seem to indicate an 8" or 10" vitrified clay pipe from 1907.

The first week of August 2014, the City had a freak storm that dumped 6+ inches of rain in a short time frame. This exceeded the 25 year design storm, so the question we had for the Park

Danforth staff and City of Portland was "was there any flooding?" The answer has been consistently "no". Our opinion was that the storm overwhelmed the on-site and City stormdrains and runoff then flooded the curb lines and continued downhill. Since the site was at the top of a hill there was no damage or consequences. It is suspected that since most of the rain occurred during the night that nobody was around to observe any flooding.

The Predevelopment Plan shows the existing drainage subareas, roads and ponds. The HydroCAD models (2) have been set-up as follows:

1. "Park Danforth Predevelopment"
   This model includes most of the existing Park Danforth site that drains to the on-site stormdrain system and then discharges to the Forest Avenue municipal stormdrain (AP #1).

2. "Goodwill Site Predevelopment"
   This model includes most of the existing Goodwill site that drains to the on-site stormdrain system and then discharges to the Forest Avenue municipal stormdrain (AP #2).

Both AP's discharge to the same 8" or 10" municipal stormdrain that also receives runoff from Forest Avenue and Poland Street. The municipal stormdrain was not modelled or any of the other downstream pipes. It is our opinion that the municipal pipe is too small to handle the larger design storms. It is suspected that catchbasins flood and some runoff probably just bypasses the system via the curb line flow. If this results in any flooding issues they are all downstream and not at the Park Danforth site or the immediate area.

As noted above, the predevelopment calculations are presented as if they were two separate projects.

PARK DANFORTH PREDEVELOPMENT

The Park Danforth predevelopment calculations are included in Appendix B and the layout is shown on the "Predevelopment Plan".

The total existing Park Danforth site includes 2.56 acres of land and the model includes 2.08 acres. Therefore 0.48 acres of land just drains to the streets and has not been included in the calculations.

The catchbasins have the same structure numbers as the 1997 Stormwater Report. CB #1 starts on the easterly side of the northerly wing and the stormwater system wraps around the building and connects to the Forest Avenue stormdrain. After Reach 1 and the "Reaches/Pipes" were modelled as Ponds since the peak flows exceeded the pipe capacities and caused surcharging. The roof subareas are an estimate of the area that may drain to each roof drain.

DMH1 is a 6' diameter structure with a 6" orifice plate that regulates flow into the municipal stormdrain. Therefore, the structure was modelled as a "Pond" with storage in the 24" inlet pipes to the structure. The CB #7 and CB #8 rims were modelled as overflow weirs.

Results @ DMH#1 (Pond 9)

Storm	Total	To City SD	Discarded*
2 Year	3.73 cfs	2.12 cfs	1.60 cfs
10 Year	5.57 cfs	2.16 cfs	3.40 cfs
25 Year	6.00 cfs	2.17 cfs	3.83 cfs

* Discarded flow is flow to the street curblines via the overflows.

The 6" orifice limits flow to 2+ cfs to the municipal stormdrain but allows the upstream CB's to overflow to the street.

Peak flows to AP #1 include the above peak flow rates plus runoff from the maintenance area.

Results @ AP #1 (Reach 11)

Storm	Peak
2 Year Storm	2.77 cfs
10 Year Storm	3.28 cfs
25 Year Storm	3.52 cfs

The "Total" flows originating on-site are similar to the post-development flows approved in 1997 but the actual flows to the city system are less.

GOODWILL PREDEVELOPMENT

The Goodwill predevelopment calculations are included in Appendix C and the layout is shown on the Predevelopment Plan.

The total existing Goodwill (and house lots) site includes 1.60 acres of land and the model includes 1.42 acres. Therefore, 0.18 acres of land just drains to the streets and may not have been included.

Results @ AP #2 (Pond 31)

Storm	Peak Flowrate to City stormdrain
2 Year	2.94 cfs
10 Year	5.00 cfs
25 Year	5.59 cfs

The model assumes that the municipal stormdrain has plenty of capacity and does not cause a backwater condition. Based upon our field observations after the August storm it appears that CB# 31 could not accept the runoff and surface runoff simply flowed out the parking lot entrance onto Forest Avenue. There was no obvious damage or consequence of the overflow.

PREDEVELOPMENT SUMMARY

The current peak flows for the design storms exceed the on-site and municipal stormdrains capacity. However, this does not appear to result in any negative consequences other than perhaps an increase in flooding in some other downstream part of the City. The goal of the post-development plan should be to devise a plan to reduce peak flow so that flooding can be minimized.

POST-DEVELOPMENT DRAINAGE CONDITIONS

The post-development stormwater is similar to the predevelopment except a new Analysis Point #3 was added.

1. Park Danforth Model I Post – to AP #1
2. Park Danforth Model II– to AP #2
3. Park Danforth Model III – to AP #3

PARK DANFORTH MODEL I POST

This area drains to AP #1 and is identical to the predevelopment model except the following have been deleted or modified

CB #1 – R-1 & SA-1 DELETED
CB #2 – Pond 2 & SA-2 – DELETED
CB #3 – Pond 3 & SA-3 – MODIFIED
CB #9 & #10 – R-10 & R-9 – DELETED and MODIFIED

The areas included in SA-1, SA-2, SA-3 (modified) and SA-9 and SA-10, will now be in the other model to AP #2. This is an opportunity to reduce peak flows to AP #1.

The post-development calculations for The Park Danforth side are include in Appendix D. DMH #1 (Pond 9) is the same as the predevelopment condition.

Results @ DMH #1 (Pond 9)			
Storm	Total	to City SD	Discarded
2 Year Storm	3.35 cfs	2.12 cfs	1.70 cfs
10 Year Storm	5.39 cfs	2.16 cfs	3.30 cfs
25 Year Storm	6.06 cfs	2.17 cfs	3.88 cfs

Reducing some of the upstream subareas had almost no impact.

Peak Flows to AP #1 are as follows:

Results @ AP #1 (Reach 11)		
Storm	Peak	(Pre)
2 Year Storm	2.19 cfs	(2.77 cfs)
10 Year Storm	2.32 cfs	(3.28 cfs)
25 Year Storm	2.39 cfs	(3.32 cfs)

The results show a significant reduction (in percent) of the revised stormwater layout.

PARK DANFORTH MODEL II (OLD GOODWILL SITE)

This model is new since all the old Goodwill site stormwater facilities will be removed. The intent was to provide catchbasins that drain to several leaching galleys for infiltration. Using the DEP Standard of an infiltration rate of 2.41 inches per hour is very slow. Therefore, full infiltration is not possible although is highly probable. Actual infiltration rates would be between 12"- 20" per hour (typical of most sandy sites). The infiltration is primarily for the treatment volume (DEP = 1" per storm). This will be discussed in the "Treatment Section" of this Report. The infiltration slows runoff so that hopefully peak flows at

Results @ AP #2 (Pond 100 – Model II)		
Storm	Peak Flowrate to City stormdrain	(Pre)
2 Year Storm	1.55 cfs	(2.94 cfs)
10 Year Storm	2.33 cfs	(5.00 cfs)
25 Year Storm	2.66 cfs	(5.59 cfs)

The Post peak flow represents a significant decrease in peak flows.

PARK DANFORTH MODEL III (OLD GOODWILL SITE)

This model is new and it represents the portion of the Old Goodwill Site that will be connected to an existing municipal drain manhole located in Arbor Street. This is the newer municipal system that flows down Read Street.

Results @ AP #3 (Pond 112 Model III)	
Storm	Peak Flowrate to City stormdrain
2 Year Storm	2.35 cfs
10 Year Storm	4.04 cfs
25 Year Storm	4.16 cfs

TREATMENT

"Treatment" is not required per the "Chapter 500" standards. However, treatment (infiltration) has been provided for two purposes:

1. The infiltration of the treatment volume reduces peak flow rates at AP #2 and AP #3.

2. In the near future the City of Portland will probably enact a stormwater fee based upon impervious area with a reduction for "treated surfaces".

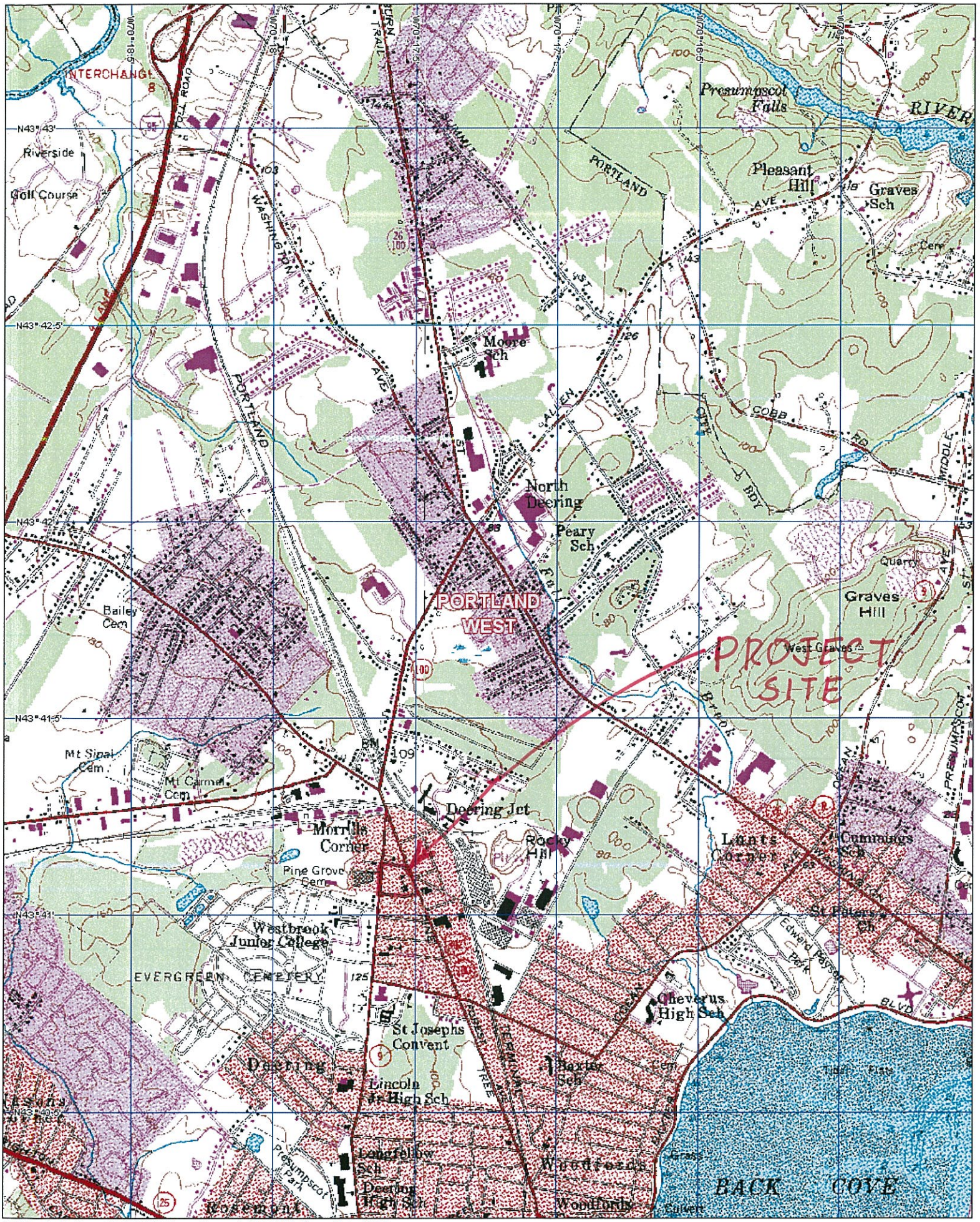
Per Chapter 500, (page 6, (c), Infiltration, the system must infiltrate 1.0" times the impervious area and 0.4" times the landscape area. For calculation purposes a 1" rainstorm was used. The results show all runoff was retained in the system.

The proposed project will have 2.79 acres (121,532 sf). As shown on the "Treatment Plan", the total "treated" impervious area equals 76,237 sf. This will leave 58,351 sf as untreated.

APPENDIX A

MAPS

USGS
SOILS MAP
AERIAL PHOTOGRAPHY



700 ft Scale: 1 : 24,000 Detail: 13-1 Datum: WGS84


N
(Joins sheet 76)
PROJECT SITE
Deering Junction
Morrills Corner
Westbrook Jr College
Rocky Hill
Lunts Corner
Cummings School
East Deering
St Peters Church
EVERGREEN CEMETERY
St Josephs Convent
Cheverus High School
Deering
Lincoln Jr High School
Baxter School
Woodfords
Woodfords Corner
Longfellow School
Deering High School
Rosemont
Highlands
Brighton Corner
PORTLAND TERMINAL
BACK COVE
PORTLAND
(county seat)
UNIVERSITY OF MAINE (PORTLAND)
Oakdale
Bradley Corner
Libbytown
King Jr High School
High School
Staples School
Maine Medical Center
West End
Mercy Hospital
Butler School
GRAVEL PIT
FORE RIVER
Thompson Point
1 Mile
5 000 Feet
Scale 1:20 000
(Joins sheet 81)
465 000 FEET
297 000 FEET
(Joins sheet 86)

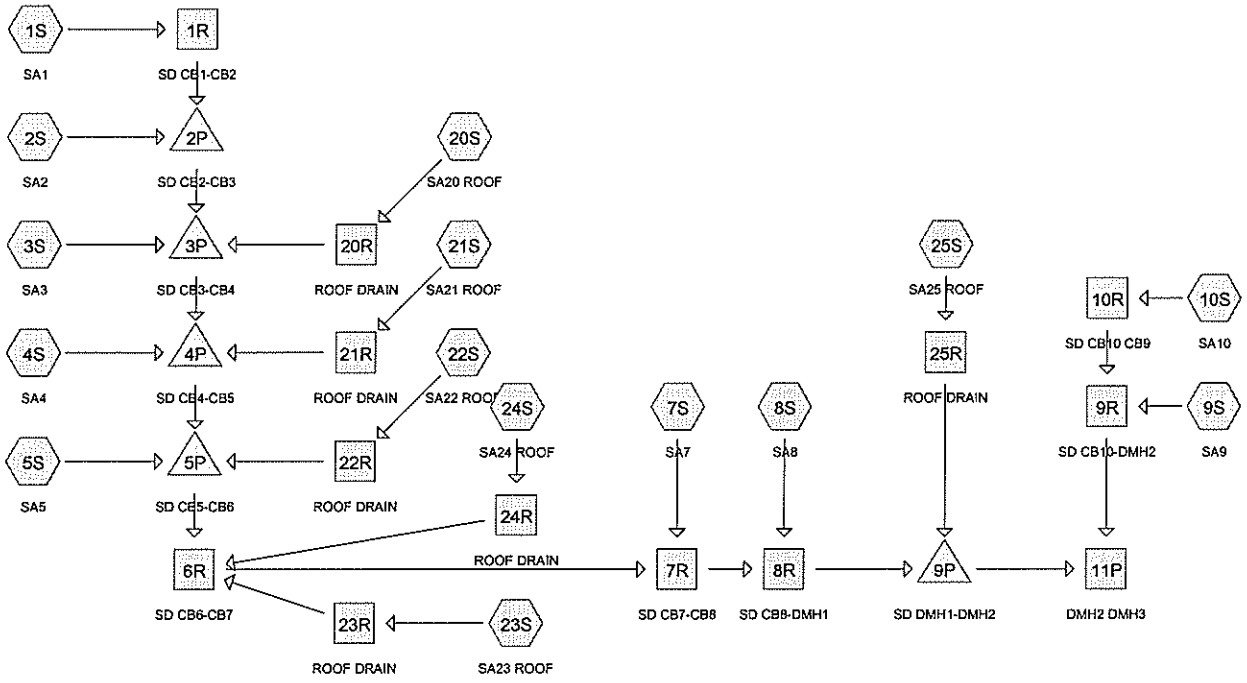
Google earth

feet 400

meters 100

APPENDIX B

PARK DANFORTH PREDEVELOPMENT CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for PARK DANFORTH PREDEVELOPMENT
Prepared by BH2M ENGINEERS, Printed 9/8/2014
HydroCAD® 10.00 s/n 00619 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.022	39	>75% Grass cover, Good, HSG A (3S, 4S)
0.413	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S, 7S, 8S, 9S, 10S)
0.905	98	Paved parking, HSG D (1S, 3S, 4S, 5S, 9S, 10S)
0.715	98	Roofs, HSG D (20S, 21S, 22S, 23S, 24S, 25S)
0.023	98	Unconnected pavement, HSG D (2S)
2.078	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.022	HSG A	3S, 4S
0.413	HSG B	1S, 2S, 3S, 4S, 5S, 7S, 8S, 9S, 10S
0.000	HSG C	
1.643	HSG D	1S, 2S, 3S, 4S, 5S, 9S, 10S, 20S, 21S, 22S, 23S, 24S, 25S
0.000	Other	
2.078		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.022	0.413	0.000	0.000	0.000	0.435	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 7S, 8S, 9S, 10S
0.000	0.000	0.000	0.905	0.000	0.905	Paved parking	1S, 3S, 4S, 5S, 9S, 10S
0.000	0.000	0.000	0.023	0.000	0.023	Unconnected pavement	2S
0.000	0.000	0.000	0.715	0.000	0.715	Roofs	20S, 21S, 22S, 23S, 24S, 25S
0.022	**0.413**	**0.000**	**1.643**	**0.000**	**2.078**	**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	1R	118.60	118.00	110.0	0.0055	0.010	6.0	0.0	0.0
2	6R	116.00	115.10	253.0	0.0036	0.010	15.0	0.0	0.0
3	7R	115.10	115.00	88.0	0.0011	0.010	24.0	0.0	0.0
4	8R	115.00	114.70	35.0	0.0086	0.010	24.0	0.0	0.0
5	9R	115.20	115.00	72.0	0.0028	0.010	12.0	0.0	0.0
6	10R	115.30	115.20	70.0	0.0014	0.010	12.0	0.0	0.0
7	11P	115.00	114.80	24.0	0.0083	0.010	15.0	0.0	0.0
8	20R	0.00	-0.60	60.0	0.0100	0.010	6.0	0.0	0.0
9	21R	0.00	-0.60	60.0	0.0100	0.010	6.0	0.0	0.0
10	22R	0.00	-0.60	60.0	0.0100	0.010	6.0	0.0	0.0
11	23R	0.00	-0.20	20.0	0.0100	0.010	6.0	0.0	0.0
12	24R	0.00	-0.15	15.0	0.0100	0.010	6.0	0.0	0.0
13	25R	0.00	-0.30	30.0	0.0100	0.010	6.0	0.0	0.0
14	2P	118.00	117.60	136.0	0.0029	0.010	8.0	0.0	0.0
15	3P	117.50	117.50	73.0	0.0000	0.010	12.0	0.0	0.0
16	4P	117.40	117.00	54.0	0.0074	0.010	12.0	0.0	0.0
17	5P	116.90	116.00	70.0	0.0129	0.010	12.0	0.0	0.0
18	9P	114.70	114.50	24.0	0.0083	0.010	15.0	0.0	0.0

Summary for Subcatchment 1S: SA1

Runoff = 0.06 cfs @ 12.22 hrs, Volume= 0.006 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
910	98	Paved parking, HSG D
5,562	61	>75% Grass cover, Good, HSG B
6,472	66	Weighted Average
5,562		85.94% Pervious Area
910		14.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	60	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 2S: SA2

Runoff = 0.05 cfs @ 12.20 hrs, Volume= 0.005 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,000	98	Unconnected pavement, HSG D
6,421	61	>75% Grass cover, Good, HSG B
7,421	66	Weighted Average, UI Adjusted CN = 63
6,421		86.52% Pervious Area
1,000		13.48% Impervious Area
1,000		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	60	0.0200	0.10		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 3S: SA3

Runoff = 0.73 cfs @ 12.14 hrs, Volume= 0.059 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
12,414	98	Paved parking, HSG D
1,116	61	>75% Grass cover, Good, HSG B
350	39	>75% Grass cover, Good, HSG A
13,880	94	Weighted Average
1,466		10.56% Pervious Area
12,414		89.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	35	0.0100	0.07		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
1.4	60	0.0050	0.69		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
9.8	95	Total			

Summary for Subcatchment 4S: SA4

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.051 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
800	61	>75% Grass cover, Good, HSG B
600	39	>75% Grass cover, Good, HSG A
11,043	98	Paved parking, HSG D
12,443	93	Weighted Average
1,400		11.25% Pervious Area
11,043		88.75% Impervious Area

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

Summary for Subcatchment 5S: SA5

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
5,100	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
5,400	96	Weighted Average
300		5.56% Pervious Area
5,100		94.44% Impervious Area

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

Summary for Subcatchment 7S: SA7

Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,000	61	>75% Grass cover, Good, HSG B
1,000		100.00% Pervious Area

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

Summary for Subcatchment 8S: SA8

Runoff = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
500	61	>75% Grass cover, Good, HSG B
500		100.00% Pervious Area

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

Summary for Subcatchment 9S: SA9

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 0.007 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,700	98	Paved parking, HSG D
1,690	61	>75% Grass cover, Good, HSG B
3,390	80	Weighted Average
1,690		49.85% Pervious Area
1,700		50.15% Impervious Area

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

Summary for Subcatchment 10S: SA10

Runoff = 0.60 cfs @ 12.04 hrs, Volume= 0.039 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
8,272	98	Paved parking, HSG D
600	61	>75% Grass cover, Good, HSG B
8,872	95	Weighted Average
600		6.76% Pervious Area
8,272		93.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	150	0.0100	1.09		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
0.4	65	0.0200	2.87		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
2.7	215	Total			

Summary for Subcatchment 20S: SA20 ROOF

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
4,060	98	Roofs, HSG D
4,060		100.00% Impervious Area

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

Summary for Subcatchment 21S: SA21 ROOF

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
2,500	98	Roofs, HSG D
2,500		100.00% Impervious Area

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

Summary for Subcatchment 22S: SA22 ROOF

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
3,900	98	Roofs, HSG D
3,900		100.00% Impervious Area

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

Summary for Subcatchment 23S: SA23 ROOF

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
8,020	98	Roofs, HSG D
8,020		100.00% Impervious Area

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

Summary for Subcatchment 24S: SA24 ROOF

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
7,100	98	Roofs, HSG D
7,100		100.00% Impervious Area

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

Summary for Subcatchment 25S: SA25 ROOF

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.028 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
5,550	98	Roofs, HSG D
5,550		100.00% Impervious Area

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

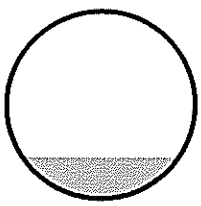
Summary for Reach 1R: SD CB1-CB2

Inflow Area = 0.149 ac, 14.06% Impervious, Inflow Depth > 0.48" for 2 YEAR STORM event
Inflow = 0.06 cfs @ 12.22 hrs, Volume= 0.006 af
Outflow = 0.06 cfs @ 12.26 hrs, Volume= 0.006 af, Atten= 2%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.78 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 1.9 min

Peak Storage= 4 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.54 cfs

6.0" Round Pipe
n= 0.010
Length= 110.0' Slope= 0.0055 '/'
Inlet Invert= 118.60', Outlet Invert= 118.00'



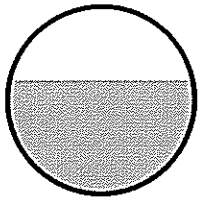
Summary for Reach 6R: SD CB6-CB7

Inflow Area = 1.634 ac, 78.72% Impervious, Inflow Depth > 2.00" for 2 YEAR STORM event
Inflow = 3.45 cfs @ 12.10 hrs, Volume= 0.272 af
Outflow = 3.28 cfs @ 12.13 hrs, Volume= 0.272 af, Atten= 5%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.38 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 2.4 min

Peak Storage= 197 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.01 cfs

15.0" Round Pipe
n= 0.010
Length= 253.0' Slope= 0.0036 '/'
Inlet Invert= 116.00', Outlet Invert= 115.10'



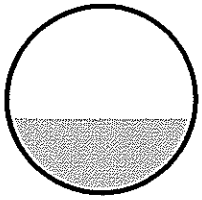
Summary for Reach 7R: SD CB7-CB8

Inflow Area = 1.657 ac, 77.63% Impervious, Inflow Depth > 1.97" for 2 YEAR STORM event
Inflow = 3.29 cfs @ 12.13 hrs, Volume= 0.273 af
Outflow = 3.25 cfs @ 12.15 hrs, Volume= 0.272 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.83 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 1.3 min

Peak Storage= 102 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 9.91 cfs

24.0" Round Pipe
n= 0.010
Length= 88.0' Slope= 0.0011 '/'
Inlet Invert= 115.10', Outlet Invert= 115.00'



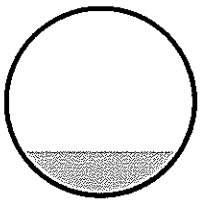
Summary for Reach 8R: SD CB8-DMH1

Inflow Area = 1.669 ac, 77.10% Impervious, Inflow Depth > 1.96" for 2 YEAR STORM event
Inflow = 3.25 cfs @ 12.15 hrs, Volume= 0.273 af
Outflow = 3.24 cfs @ 12.15 hrs, Volume= 0.273 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.84 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.25 fps, Avg. Travel Time= 0.3 min

Peak Storage= 20 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 27.23 cfs

24.0" Round Pipe
n= 0.010
Length= 35.0' Slope= 0.0086 '/'
Inlet Invert= 115.00', Outlet Invert= 114.70'



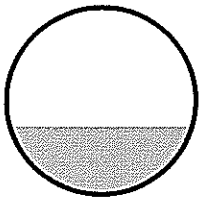
Summary for Reach 9R: SD CB10-DMH2

Inflow Area = 0.281 ac, 81.32% Impervious, Inflow Depth > 1.99" for 2 YEAR STORM event
Inflow = 0.68 cfs @ 12.06 hrs, Volume= 0.047 af
Outflow = 0.65 cfs @ 12.08 hrs, Volume= 0.047 af, Atten= 4%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 1.2 min

Peak Storage= 18 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.44 cfs

12.0" Round Pipe
n= 0.010
Length= 72.0' Slope= 0.0028 '/'
Inlet Invert= 115.20', Outlet Invert= 115.00'



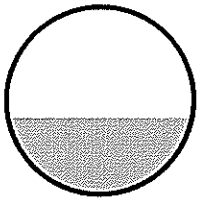
Summary for Reach 10R: SD CB10 CB9

Inflow Area = 0.204 ac, 93.24% Impervious, Inflow Depth > 2.32" for 2 YEAR STORM event
Inflow = 0.60 cfs @ 12.04 hrs, Volume= 0.039 af
Outflow = 0.58 cfs @ 12.06 hrs, Volume= 0.039 af, Atten= 4%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.02 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 1.6 min

Peak Storage= 21 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 1.75 cfs

12.0" Round Pipe
n= 0.010
Length= 70.0' Slope= 0.0014 '/'
Inlet Invert= 115.30', Outlet Invert= 115.20'



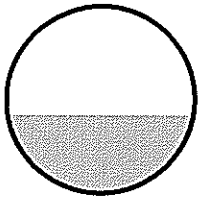
Summary for Reach 11P: DMH2 DMH3

Inflow Area = 2.078 ac, 79.07% Impervious, Inflow Depth > 1.90" for 2 YEAR STORM event
Inflow = 2.76 cfs @ 12.10 hrs, Volume= 0.328 af
Outflow = 2.77 cfs @ 12.10 hrs, Volume= 0.328 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.75 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.54 fps, Avg. Travel Time= 0.2 min

Peak Storage= 12 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.67 cfs

15.0" Round Pipe
n= 0.010
Length= 24.0' Slope= 0.0083 '/'
Inlet Invert= 115.00', Outlet Invert= 114.80'



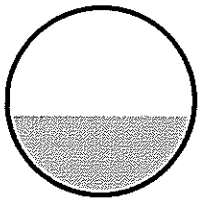
Summary for Reach 20R: ROOF DRAIN

Inflow Area = 0.093 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.42 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



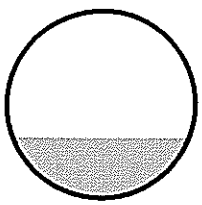
Summary for Reach 21R: ROOF DRAIN

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.16 cfs @ 12.10 hrs, Volume= 0.012 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.99 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 0.9 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



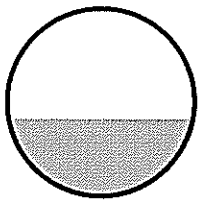
Summary for Reach 22R: ROOF DRAIN

Inflow Area = 0.090 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.38 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



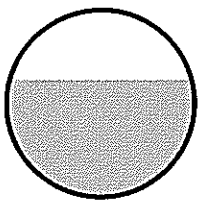
Summary for Reach 23R: ROOF DRAIN

Inflow Area = 0.184 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.20'



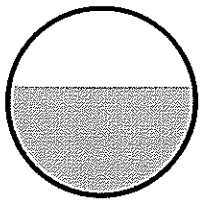
Summary for Reach 24R: ROOF DRAIN

Inflow Area = 0.163 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.15'



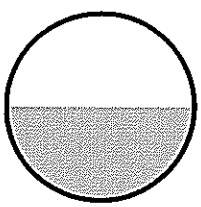
Summary for Reach 25R: ROOF DRAIN

Inflow Area = 0.127 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 0.3 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 2P: SD CB2-CB3

Inflow Area = 0.319 ac, 13.75% Impervious, Inflow Depth > 0.43" for 2 YEAR STORM event
Inflow = 0.10 cfs @ 12.24 hrs, Volume= 0.011 af
Outflow = 0.10 cfs @ 12.24 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.3 min
Primary = 0.10 cfs @ 12.24 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.21' @ 12.24 hrs Surf.Area= 12 sf Storage= 2 cf

Plug-Flow detention time= 0.9 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (854.7 - 854.2)

Volume	Invert	Avail.Storage	Storage Description
#1	118.00'	98 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
118.00	12	0	0
122.60	12	55	55
123.00	200	42	98

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**8.0" Round Culvert** L= 136.0' Ke= 0.500 Inlet / Outlet Invert= 118.00' / 117.60' S= 0.0029 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.10 cfs @ 12.24 hrs HW=118.21' (Free Discharge)
1=Culvert (Barrel Controls 0.10 cfs @ 1.62 fps)

Summary for Pond 3P: SD CB3-CB4

Inflow Area = 0.731 ac, 57.75% Impervious, Inflow Depth > 1.48" for 2 YEAR STORM event
Inflow = 1.04 cfs @ 12.13 hrs, Volume= 0.090 af
Outflow = 1.04 cfs @ 12.13 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.1 min
Primary = 1.04 cfs @ 12.13 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.29' @ 12.13 hrs Surf.Area= 12 sf Storage= 9 cf

Plug-Flow detention time= 0.5 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (769.5 - 769.1)

Volume	Invert	Avail.Storage	Storage Description
#1	117.50'	119 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.50	12	0	0
125.82	12	100	100
126.00	200	19	119

Device	Routing	Invert	Outlet Devices
#1	Primary	117.50'	**12.0" Round Culvert** L= 73.0' Ke= 0.500 Inlet / Outlet Invert= 117.50' / 117.50' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.02 cfs @ 12.13 hrs HW=118.28' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.02 cfs @ 2.15 fps)

Summary for Pond 4P: SD CB4-CB5

Inflow Area = 1.074 ac, 68.26% Impervious, Inflow Depth > 1.71" for 2 YEAR STORM event
Inflow = 1.89 cfs @ 12.11 hrs, Volume= 0.153 af
Outflow = 1.89 cfs @ 12.11 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.1 min
Primary = 1.89 cfs @ 12.11 hrs, Volume= 0.153 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.17' @ 12.11 hrs Surf.Area= 12 sf Storage= 9 cf

Plug-Flow detention time= 0.2 min calculated for 0.153 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (765.5 - 765.4)

Volume	Invert	Avail.Storage	Storage Description
#1	117.40'	350 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.40	12	0	0
125.50	12	97	97
126.00	1,000	253	350

Device	Routing	Invert	Outlet Devices
#1	Primary	117.40'	**12.0" Round Culvert** L= 54.0' Ke= 0.500 Inlet / Outlet Invert= 117.40' / 117.00' S= 0.0074 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.86 cfs @ 12.11 hrs HW=118.17' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.86 cfs @ 3.98 fps)

Summary for Pond 5P: SD CB5-CB6

Inflow Area = 1.287 ac, 72.98% Impervious, Inflow Depth > 1.84" for 2 YEAR STORM event
Inflow = 2.47 cfs @ 12.10 hrs, Volume= 0.198 af
Outflow = 2.47 cfs @ 12.11 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.1 min
Primary = 2.47 cfs @ 12.11 hrs, Volume= 0.197 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.82' @ 12.10 hrs Surf.Area= 12 sf Storage= 11 cf

Plug-Flow detention time= 0.2 min calculated for 0.197 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (761.2 - 761.1)

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	187 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	300	78	187

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.45 cfs @ 12.11 hrs HW=117.82' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.45 cfs @ 3.26 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.796 ac, 78.72% Impervious, Inflow Depth > 2.01" for 2 YEAR STORM event
Inflow = 3.54 cfs @ 12.14 hrs, Volume= 0.300 af
Outflow = 3.73 cfs @ 12.11 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.0 min
Discarded = 1.60 cfs @ 12.11 hrs, Volume= 0.018 af
Primary = 2.12 cfs @ 12.10 hrs, Volume= 0.282 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.98' @ 12.10 hrs Surf.Area= 28 sf Storage= 536 cf

Plug-Flow detention time= 2.6 min calculated for 0.300 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (759.8 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Discarded OutFlow Max=1.38 cfs @ 12.11 hrs HW=119.96' (Free Discharge)
↑—**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.38 cfs @ 1.69 fps)
└—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.12 cfs @ 12.10 hrs HW=119.98' (Free Discharge)
↑—**2=Culvert** (Passes 2.12 cfs of 12.75 cfs potential flow)
↑—**1=Orifice/Grate** (Orifice Controls 2.12 cfs @ 10.80 fps)

Summary for Subcatchment 1S: SA1

Runoff = 0.20 cfs @ 12.20 hrs, Volume= 0.017 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
910	98	Paved parking, HSG D
5,562	61	>75% Grass cover, Good, HSG B
6,472	66	Weighted Average
5,562		85.94% Pervious Area
910		14.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	60	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 2S: SA2

Runoff = 0.21 cfs @ 12.16 hrs, Volume= 0.017 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,000	98	Unconnected pavement, HSG D
6,421	61	>75% Grass cover, Good, HSG B
7,421	66	Weighted Average, UI Adjusted CN = 63
6,421		86.52% Pervious Area
1,000		13.48% Impervious Area
1,000		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	60	0.0200	0.10		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 3S: SA3

Runoff = 1.22 cfs @ 12.13 hrs, Volume= 0.100 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
12,414	98	Paved parking, HSG D
1,116	61	>75% Grass cover, Good, HSG B
350	39	>75% Grass cover, Good, HSG A
13,880	94	Weighted Average
1,466		10.56% Pervious Area
12,414		89.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	35	0.0100	0.07		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
1.4	60	0.0050	0.69		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
9.8	95	Total			

Summary for Subcatchment 4S: SA4

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.088 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
800	61	>75% Grass cover, Good, HSG B
600	39	>75% Grass cover, Good, HSG A
11,043	98	Paved parking, HSG D
12,443	93	Weighted Average
1,400		11.25% Pervious Area
11,043		88.75% Impervious Area

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

Summary for Subcatchment 5S: SA5

Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.041 af, Depth> 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
5,100	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
5,400	96	Weighted Average
300		5.56% Pervious Area
5,100		94.44% Impervious Area

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

Summary for Subcatchment 7S: SA7

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,000	61	>75% Grass cover, Good, HSG B
1,000		100.00% Pervious Area

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

Summary for Subcatchment 8S: SA8

Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
500	61	>75% Grass cover, Good, HSG B
500		100.00% Pervious Area

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

Summary for Subcatchment 9S: SA9

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.016 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,700	98	Paved parking, HSG D
1,690	61	>75% Grass cover, Good, HSG B
3,390	80	Weighted Average
1,690		49.85% Pervious Area
1,700		50.15% Impervious Area

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

Summary for Subcatchment 10S: SA10

Runoff = 0.99 cfs @ 12.04 hrs, Volume= 0.066 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
8,272	98	Paved parking, HSG D
600	61	>75% Grass cover, Good, HSG B
8,872	95	Weighted Average
600		6.76% Pervious Area
8,272		93.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	150	0.0100	1.09		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
0.4	65	0.0200	2.87		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
2.7	215	Total			

Summary for Subcatchment 20S: SA20 ROOF

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
4,060	98	Roofs, HSG D
4,060		100.00% Impervious Area

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

Summary for Subcatchment 21S: SA21 ROOF

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
2,500	98	Roofs, HSG D
2,500		100.00% Impervious Area

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

Summary for Subcatchment 22S: SA22 ROOF

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
3,900	98	Roofs, HSG D
3,900		100.00% Impervious Area

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

Summary for Subcatchment 23S: SA23 ROOF

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.064 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
8,020	98	Roofs, HSG D
8,020		100.00% Impervious Area

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

Summary for Subcatchment 24S: SA24 ROOF

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.056 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
7,100	98	Roofs, HSG D
7,100		100.00% Impervious Area

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

Summary for Subcatchment 25S: SA25 ROOF

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
5,550	98	Roofs, HSG D
5,550		100.00% Impervious Area

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

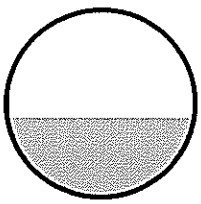
Summary for Reach 1R: SD CB1-CB2

Inflow Area = 0.149 ac, 14.06% Impervious, Inflow Depth > 1.39" for 10 YEAR STORM event
Inflow = 0.20 cfs @ 12.20 hrs, Volume= 0.017 af
Outflow = 0.20 cfs @ 12.22 hrs, Volume= 0.017 af, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 1.5 min

Peak Storage= 9 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.54 cfs

6.0" Round Pipe
n= 0.010
Length= 110.0' Slope= 0.0055 '/'
Inlet Invert= 118.60', Outlet Invert= 118.00'



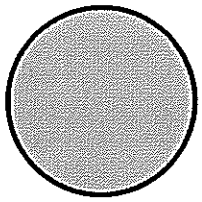
Summary for Reach 6R: SD CB6-CB7

Inflow Area = 1.634 ac, 78.72% Impervious, Inflow Depth > 3.42" for 10 YEAR STORM event
Inflow = 5.71 cfs @ 12.10 hrs, Volume= 0.466 af
Outflow = 5.15 cfs @ 12.18 hrs, Volume= 0.466 af, Atten= 10%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.65 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 2.0 min

Peak Storage= 318 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.25'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.01 cfs

15.0" Round Pipe
n= 0.010
Length= 253.0' Slope= 0.0036 '/'
Inlet Invert= 116.00', Outlet Invert= 115.10'



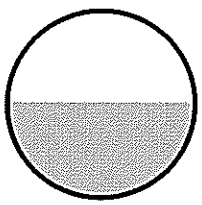
Summary for Reach 7R: SD CB7-CB8

Inflow Area = 1.657 ac, 77.63% Impervious, Inflow Depth > 3.39" for 10 YEAR STORM event
Inflow = 5.17 cfs @ 12.18 hrs, Volume= 0.468 af
Outflow = 5.12 cfs @ 12.18 hrs, Volume= 0.467 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 1.1 min

Peak Storage= 142 cf @ 12.18 hrs
Average Depth at Peak Storage= 1.02'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 9.91 cfs

24.0" Round Pipe
n= 0.010
Length= 88.0' Slope= 0.0011 '/'
Inlet Invert= 115.10', Outlet Invert= 115.00'



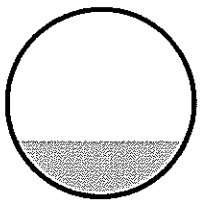
Summary for Reach 8R: SD CB8-DMH1

Inflow Area = 1.669 ac, 77.10% Impervious, Inflow Depth > 3.37" for 10 YEAR STORM event
Inflow = 5.13 cfs @ 12.18 hrs, Volume= 0.469 af
Outflow = 5.12 cfs @ 12.18 hrs, Volume= 0.468 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.63 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 0.2 min

Peak Storage= 27 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 27.23 cfs

24.0" Round Pipe
n= 0.010
Length= 35.0' Slope= 0.0086 '/'
Inlet Invert= 115.00', Outlet Invert= 114.70'



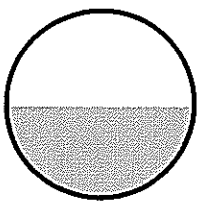
Summary for Reach 9R: SD CB10-DMH2

Inflow Area = 0.281 ac, 81.32% Impervious, Inflow Depth > 3.49" for 10 YEAR STORM event
Inflow = 1.17 cfs @ 12.06 hrs, Volume= 0.082 af
Outflow = 1.13 cfs @ 12.07 hrs, Volume= 0.082 af, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.05 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 1.0 min

Peak Storage= 27 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.44 cfs

12.0" Round Pipe
n= 0.010
Length= 72.0' Slope= 0.0028 '/'
Inlet Invert= 115.20', Outlet Invert= 115.00'



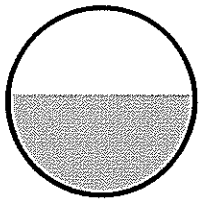
Summary for Reach 10R: SD CB10 CB9

Inflow Area = 0.204 ac, 93.24% Impervious, Inflow Depth > 3.89" for 10 YEAR STORM event
Inflow = 0.99 cfs @ 12.04 hrs, Volume= 0.066 af
Outflow = 0.95 cfs @ 12.06 hrs, Volume= 0.066 af, Atten= 4%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.29 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 1.4 min

Peak Storage= 30 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 1.75 cfs

12.0" Round Pipe
n= 0.010
Length= 70.0' Slope= 0.0014 '/'
Inlet Invert= 115.30', Outlet Invert= 115.20'



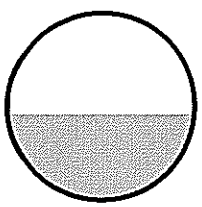
Summary for Reach 11P: DMH2 DMH3

Inflow Area = 2.078 ac, 79.07% Impervious, Inflow Depth > 2.96" for 10 YEAR STORM event
Inflow = 3.27 cfs @ 12.08 hrs, Volume= 0.513 af
Outflow = 3.28 cfs @ 12.07 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.99 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.98 fps, Avg. Travel Time= 0.1 min

Peak Storage= 13 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.67 cfs

15.0" Round Pipe
n= 0.010
Length= 24.0' Slope= 0.0083 '/'
Inlet Invert= 115.00', Outlet Invert= 114.80'



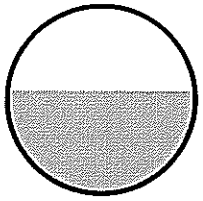
Summary for Reach 20R: ROOF DRAIN

Inflow Area = 0.093 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.42 cfs @ 12.09 hrs, Volume= 0.032 af
Outflow = 0.41 cfs @ 12.09 hrs, Volume= 0.032 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.84 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 0.7 min

Peak Storage= 7 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



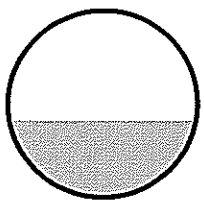
Summary for Reach 21R: ROOF DRAIN

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.39 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



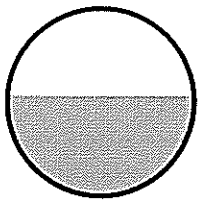
Summary for Reach 22R: ROOF DRAIN

Inflow Area = 0.090 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.80 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



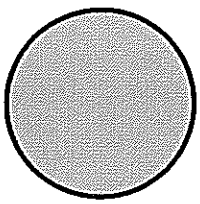
Summary for Reach 23R: ROOF DRAIN

Inflow Area = 0.184 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.75 cfs @ 12.05 hrs, Volume= 0.064 af, Atten= 9%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.20'



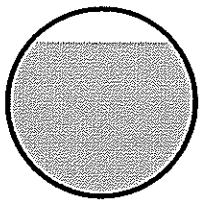
Summary for Reach 24R: ROOF DRAIN

Inflow Area = 0.163 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.056 af
Outflow = 0.73 cfs @ 12.09 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.24 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.15'



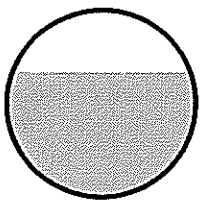
Summary for Reach 25R: ROOF DRAIN

Inflow Area = 0.127 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.11 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 2P: SD CB2-CB3

Inflow Area = 0.319 ac, 13.75% Impervious, Inflow Depth > 1.28" for 10 YEAR STORM event
Inflow = 0.39 cfs @ 12.18 hrs, Volume= 0.034 af
Outflow = 0.39 cfs @ 12.19 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.2 min
Primary = 0.39 cfs @ 12.19 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.43' @ 12.19 hrs Surf.Area= 12 sf Storage= 5 cf

Plug-Flow detention time= 0.5 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (826.5 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	118.00'	98 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
118.00	12	0	0
122.60	12	55	55
123.00	200	42	98

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**8.0" Round Culvert** L= 136.0' Ke= 0.500 Inlet / Outlet Invert= 118.00' / 117.60' S= 0.0029 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.39 cfs @ 12.19 hrs HW=118.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.39 cfs @ 2.33 fps)

Summary for Pond 3P: SD CB3-CB4

Inflow Area = 0.731 ac, 57.75% Impervious, Inflow Depth > 2.74" for 10 YEAR STORM event
Inflow = 1.95 cfs @ 12.13 hrs, Volume= 0.167 af
Outflow = 1.95 cfs @ 12.13 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.1 min
Primary = 1.95 cfs @ 12.13 hrs, Volume= 0.167 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.65' @ 12.13 hrs Surf.Area= 12 sf Storage= 14 cf

Plug-Flow detention time= 0.4 min calculated for 0.167 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (764.7 - 764.4)

Volume	Invert	Avail.Storage	Storage Description
#1	117.50'	119 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.50	12	0	0
125.82	12	100	100
126.00	200	19	119

Device	Routing	Invert	Outlet Devices
#1	Primary	117.50'	**12.0" Round Culvert** L= 73.0' Ke= 0.500 Inlet / Outlet Invert= 117.50' / 117.50' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.92 cfs @ 12.13 hrs HW=118.64' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.92 cfs @ 2.68 fps)

Summary for Pond 4P: SD CB4-CB5

Inflow Area = 1.074 ac, 68.26% Impervious, Inflow Depth > 3.07" for 10 YEAR STORM event
Inflow = 3.34 cfs @ 12.11 hrs, Volume= 0.274 af
Outflow = 3.33 cfs @ 12.11 hrs, Volume= 0.274 af, Atten= 0%, Lag= 0.1 min
Primary = 3.33 cfs @ 12.11 hrs, Volume= 0.274 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.68' @ 12.11 hrs Surf.Area= 12 sf Storage= 15 cf

Plug-Flow detention time= 0.2 min calculated for 0.273 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (758.9 - 758.8)

Volume	Invert	Avail.Storage	Storage Description
#1	117.40'	350 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.40	12	0	0
125.50	12	97	97
126.00	1,000	253	350

Device	Routing	Invert	Outlet Devices
#1	Primary	117.40'	**12.0" Round Culvert** L= 54.0' Ke= 0.500 Inlet / Outlet Invert= 117.40' / 117.00' S= 0.0074 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=3.27 cfs @ 12.11 hrs HW=118.65' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.27 cfs @ 4.17 fps)

Summary for Pond 5P: SD CB5-CB6

Inflow Area = 1.287 ac, 72.98% Impervious, Inflow Depth > 3.23" for 10 YEAR STORM event
Inflow = 4.26 cfs @ 12.11 hrs, Volume= 0.346 af
Outflow = 4.26 cfs @ 12.11 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.1 min
Primary = 4.26 cfs @ 12.11 hrs, Volume= 0.346 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.67' @ 12.11 hrs Surf.Area= 12 sf Storage= 21 cf

Plug-Flow detention time= 0.2 min calculated for 0.345 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (755.1 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	187 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	300	78	187

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=4.20 cfs @ 12.11 hrs HW=118.63' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.20 cfs @ 5.35 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.796 ac, 78.72% Impervious, Inflow Depth > 3.42" for 10 YEAR STORM event
Inflow = 5.47 cfs @ 12.16 hrs, Volume= 0.512 af
Outflow = 5.57 cfs @ 12.15 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min
Discarded = 3.40 cfs @ 12.15 hrs, Volume= 0.081 af
Primary = 2.16 cfs @ 12.15 hrs, Volume= 0.431 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.18' @ 12.15 hrs Surf.Area= 28 sf Storage= 541 cf

Plug-Flow detention time= 2.3 min calculated for 0.512 af (100% of inflow)
Center-of-Mass det. time= 2.1 min (754.5 - 752.4)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Discarded OutFlow Max=3.37 cfs @ 12.15 hrs HW=120.18' (Free Discharge)
└─**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.37 cfs @ 2.28 fps)
└─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.16 cfs @ 12.15 hrs HW=120.18' (Free Discharge)
└─**2=Culvert** (Passes 2.16 cfs of 13.01 cfs potential flow)
└─**1=Orifice/Grate** (Orifice Controls 2.16 cfs @ 11.01 fps)

Summary for Subcatchment 1S: SA1

Runoff = 0.28 cfs @ 12.19 hrs, Volume= 0.024 af, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
910	98	Paved parking, HSG D
5,562	61	>75% Grass cover, Good, HSG B
6,472	66	Weighted Average
5,562		85.94% Pervious Area
910		14.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	60	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 2S: SA2

Runoff = 0.30 cfs @ 12.15 hrs, Volume= 0.024 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,000	98	Unconnected pavement, HSG D
6,421	61	>75% Grass cover, Good, HSG B
7,421	66	Weighted Average, UI Adjusted CN = 63
6,421		86.52% Pervious Area
1,000		13.48% Impervious Area
1,000		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	60	0.0200	0.10		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 3S: SA3

Runoff = 1.44 cfs @ 12.13 hrs, Volume= 0.120 af, Depth> 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
12,414	98	Paved parking, HSG D
1,116	61	>75% Grass cover, Good, HSG B
350	39	>75% Grass cover, Good, HSG A
13,880	94	Weighted Average
1,466		10.56% Pervious Area
12,414		89.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	35	0.0100	0.07		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
1.4	60	0.0050	0.69		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
9.8	95	Total			

Summary for Subcatchment 4S: SA4

Runoff = 1.43 cfs @ 12.09 hrs, Volume= 0.105 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
800	61	>75% Grass cover, Good, HSG B
600	39	>75% Grass cover, Good, HSG A
11,043	98	Paved parking, HSG D
12,443	93	Weighted Average
1,400		11.25% Pervious Area
11,043		88.75% Impervious Area

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

Summary for Subcatchment 5S: SA5

Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.049 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
5,100	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
5,400	96	Weighted Average
300		5.56% Pervious Area
5,100		94.44% Impervious Area

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

Summary for Subcatchment 7S: SA7

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,000	61	>75% Grass cover, Good, HSG B
1,000		100.00% Pervious Area

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

Summary for Subcatchment 8S: SA8

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
500	61	>75% Grass cover, Good, HSG B
500		100.00% Pervious Area

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

Summary for Subcatchment 9S: SA9

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,700	98	Paved parking, HSG D
1,690	61	>75% Grass cover, Good, HSG B
3,390	80	Weighted Average
1,690		49.85% Pervious Area
1,700		50.15% Impervious Area

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

Summary for Subcatchment 10S: SA10

Runoff = 1.16 cfs @ 12.04 hrs, Volume= 0.078 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
8,272	98	Paved parking, HSG D
600	61	>75% Grass cover, Good, HSG B
8,872	95	Weighted Average
600		6.76% Pervious Area
8,272		93.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	150	0.0100	1.09		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
0.4	65	0.0200	2.87		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
2.7	215	Total			

Summary for Subcatchment 20S: SA20 ROOF

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.038 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
4,060	98	Roofs, HSG D
4,060		100.00% Impervious Area

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

Summary for Subcatchment 21S: SA21 ROOF

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
2,500	98	Roofs, HSG D
2,500		100.00% Impervious Area

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

Summary for Subcatchment 22S: SA22 ROOF

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.036 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
3,900	98	Roofs, HSG D
3,900		100.00% Impervious Area

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

Summary for Subcatchment 23S: SA23 ROOF

Runoff = 0.97 cfs @ 12.09 hrs, Volume= 0.075 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
8,020	98	Roofs, HSG D
8,020		100.00% Impervious Area

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

Summary for Subcatchment 24S: SA24 ROOF

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.066 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
7,100	98	Roofs, HSG D
7,100		100.00% Impervious Area

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

Summary for Subcatchment 25S: SA25 ROOF

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
5,550	98	Roofs, HSG D
5,550		100.00% Impervious Area

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

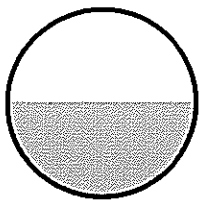
Summary for Reach 1R: SD CB1-CB2

Inflow Area = 0.149 ac, 14.06% Impervious, Inflow Depth > 1.90" for 25YEAR STORM event
Inflow = 0.28 cfs @ 12.19 hrs, Volume= 0.024 af
Outflow = 0.27 cfs @ 12.21 hrs, Volume= 0.024 af, Atten= 1%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 1.4 min

Peak Storage= 11 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.54 cfs

6.0" Round Pipe
n= 0.010
Length= 110.0' Slope= 0.0055 '/'
Inlet Invert= 118.60', Outlet Invert= 118.00'



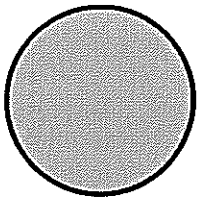
Summary for Reach 6R: SD CB6-CB7

Inflow Area = 1.634 ac, 78.72% Impervious, Inflow Depth > 4.11" for 25YEAR STORM event
Inflow = 6.57 cfs @ 12.11 hrs, Volume= 0.560 af
Outflow = 5.10 cfs @ 12.11 hrs, Volume= 0.559 af, Atten= 22%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.61 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.18 fps, Avg. Travel Time= 1.9 min

Peak Storage= 310 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.25'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.01 cfs

15.0" Round Pipe
n= 0.010
Length= 253.0' Slope= 0.0036 '/'
Inlet Invert= 116.00', Outlet Invert= 115.10'



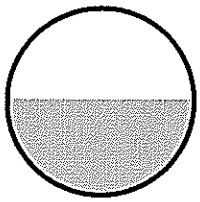
Summary for Reach 7R: SD CB7-CB8

Inflow Area = 1.657 ac, 77.63% Impervious, Inflow Depth > 4.07" for 25YEAR STORM event
Inflow = 5.14 cfs @ 12.11 hrs, Volume= 0.562 af
Outflow = 5.13 cfs @ 12.10 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.19 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 1.1 min

Peak Storage= 144 cf @ 12.11 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 9.91 cfs

24.0" Round Pipe
n= 0.010
Length= 88.0' Slope= 0.0011 '/'
Inlet Invert= 115.10', Outlet Invert= 115.00'



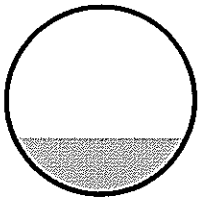
Summary for Reach 8R: SD CB8-DMH1

Inflow Area = 1.669 ac, 77.10% Impervious, Inflow Depth > 4.05" for 25YEAR STORM event
Inflow = 5.20 cfs @ 12.12 hrs, Volume= 0.563 af
Outflow = 5.14 cfs @ 12.10 hrs, Volume= 0.563 af, Atten= 1%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.66 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.82 fps, Avg. Travel Time= 0.2 min

Peak Storage= 27 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 27.23 cfs

24.0" Round Pipe
n= 0.010
Length= 35.0' Slope= 0.0086 '/'
Inlet Invert= 115.00', Outlet Invert= 114.70'



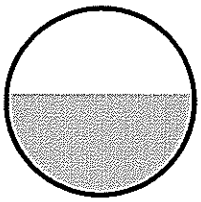
Summary for Reach 9R: SD CB10-DMH2

Inflow Area = 0.281 ac, 81.32% Impervious, Inflow Depth > 4.21" for 25YEAR STORM event
Inflow = 1.40 cfs @ 12.06 hrs, Volume= 0.099 af
Outflow = 1.36 cfs @ 12.07 hrs, Volume= 0.099 af, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.20 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 1.0 min

Peak Storage= 31 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 2.44 cfs

12.0" Round Pipe
n= 0.010
Length= 72.0' Slope= 0.0028 '/'
Inlet Invert= 115.20', Outlet Invert= 115.00'



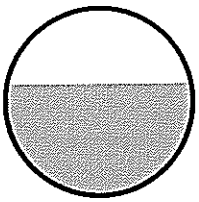
Summary for Reach 10R: SD CB10 CB9

Inflow Area = 0.204 ac, 93.24% Impervious, Inflow Depth > 4.62" for 25YEAR STORM event
Inflow = 1.16 cfs @ 12.04 hrs, Volume= 0.078 af
Outflow = 1.12 cfs @ 12.06 hrs, Volume= 0.078 af, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.38 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 1.3 min

Peak Storage= 34 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 1.75 cfs

12.0" Round Pipe
n= 0.010
Length= 70.0' Slope= 0.0014 '/'
Inlet Invert= 115.30', Outlet Invert= 115.20'



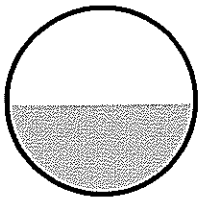
Summary for Reach 11P: DMH2 DMH3

Inflow Area = 2.078 ac, 79.07% Impervious, Inflow Depth > 3.43" for 25YEAR STORM event
Inflow = 3.52 cfs @ 12.07 hrs, Volume= 0.594 af
Outflow = 3.52 cfs @ 12.08 hrs, Volume= 0.594 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.10 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.14 fps, Avg. Travel Time= 0.1 min

Peak Storage= 14 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.67 cfs

15.0" Round Pipe
n= 0.010
Length= 24.0' Slope= 0.0083 '/'
Inlet Invert= 115.00', Outlet Invert= 114.80'



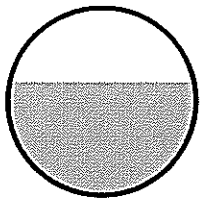
Summary for Reach 20R: ROOF DRAIN

Inflow Area = 0.093 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.038 af
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.98 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 0.6 min

Peak Storage= 7 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



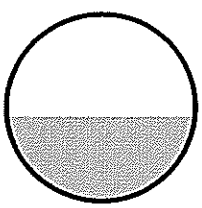
Summary for Reach 21R: ROOF DRAIN

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.54 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.7 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



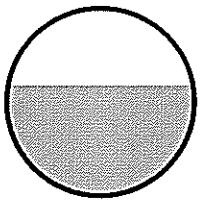
Summary for Reach 22R: ROOF DRAIN

Inflow Area = 0.090 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.036 af
Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.95 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 0.6 min

Peak Storage= 7 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



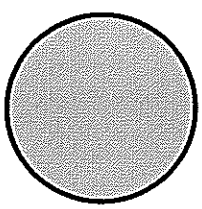
Summary for Reach 23R: ROOF DRAIN

Inflow Area = 0.184 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.97 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 0.73 cfs @ 12.10 hrs, Volume= 0.075 af, Atten= 25%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.20'



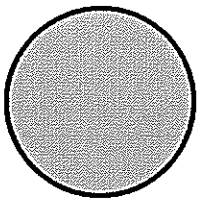
Summary for Reach 24R: ROOF DRAIN

Inflow Area = 0.163 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.066 af
Outflow = 0.73 cfs @ 12.13 hrs, Volume= 0.066 af, Atten= 15%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.89 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.15'



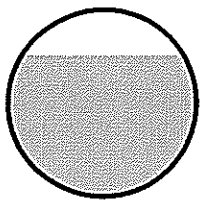
Summary for Reach 25R: ROOF DRAIN

Inflow Area = 0.127 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 2P: SD CB2-CB3

Inflow Area = 0.319 ac, 13.75% Impervious, Inflow Depth > 1.78" for 25YEAR STORM event
Inflow = 0.56 cfs @ 12.17 hrs, Volume= 0.047 af
Outflow = 0.56 cfs @ 12.18 hrs, Volume= 0.047 af, Atten= 1%, Lag= 0.2 min
Primary = 0.56 cfs @ 12.18 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.53' @ 12.18 hrs Surf.Area= 12 sf Storage= 6 cf

Plug-Flow detention time= 0.5 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (819.2 - 818.9)

Volume	Invert	Avail.Storage	Storage Description
#1	118.00'	98 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
118.00	12	0	0
122.60	12	55	55
123.00	200	42	98

Device	Routing	Invert	Outlet Devices
#1	Primary	118.00'	**8.0" Round Culvert** L= 136.0' Ke= 0.500 Inlet / Outlet Invert= 118.00' / 117.60' S= 0.0029 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.55 cfs @ 12.18 hrs HW=118.53' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.55 cfs @ 2.54 fps)

Summary for Pond 3P: SD CB3-CB4

Inflow Area = 0.731 ac, 57.75% Impervious, Inflow Depth > 3.37" for 25YEAR STORM event
Inflow = 2.40 cfs @ 12.13 hrs, Volume= 0.205 af
Outflow = 2.41 cfs @ 12.14 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.2 min
Primary = 2.41 cfs @ 12.14 hrs, Volume= 0.205 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.93' @ 12.13 hrs Surf.Area= 12 sf Storage= 17 cf

Plug-Flow detention time= 0.4 min calculated for 0.205 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (763.1 - 762.9)

Volume	Invert	Avail.Storage	Storage Description
#1	117.50'	119 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.50	12	0	0
125.82	12	100	100
126.00	200	19	119

Device	Routing	Invert	Outlet Devices
#1	Primary	117.50'	**12.0" Round Culvert** L= 73.0' Ke= 0.500 Inlet / Outlet Invert= 117.50' / 117.50' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.37 cfs @ 12.14 hrs HW=118.90' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.37 cfs @ 3.02 fps)

Summary for Pond 4P: SD CB4-CB5

Inflow Area = 1.074 ac, 68.26% Impervious, Inflow Depth > 3.73" for 25YEAR STORM event
Inflow = 4.04 cfs @ 12.11 hrs, Volume= 0.334 af
Outflow = 4.03 cfs @ 12.11 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.1 min
Primary = 4.03 cfs @ 12.11 hrs, Volume= 0.334 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.04' @ 12.11 hrs Surf.Area= 12 sf Storage= 20 cf

Plug-Flow detention time= 0.2 min calculated for 0.334 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (757.0 - 756.9)

Volume	Invert	Avail.Storage	Storage Description
#1	117.40'	350 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.40	12	0	0
125.50	12	97	97
126.00	1,000	253	350

Device	Routing	Invert	Outlet Devices
#1	Primary	117.40'	**12.0" Round Culvert** L= 54.0' Ke= 0.500 Inlet / Outlet Invert= 117.40' / 117.00' S= 0.0074 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=3.96 cfs @ 12.11 hrs HW=118.99' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.96 cfs @ 5.04 fps)

Summary for Pond 5P: SD CB5-CB6

Inflow Area = 1.287 ac, 72.98% Impervious, Inflow Depth > 3.90" for 25YEAR STORM event
Inflow = 5.12 cfs @ 12.11 hrs, Volume= 0.419 af
Outflow = 5.12 cfs @ 12.11 hrs, Volume= 0.419 af, Atten= 0%, Lag= 0.1 min
Primary = 5.12 cfs @ 12.11 hrs, Volume= 0.419 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.23' @ 12.11 hrs Surf.Area= 12 sf Storage= 28 cf

Plug-Flow detention time= 0.2 min calculated for 0.419 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (753.3 - 753.2)

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	187 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	300	78	187

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=5.03 cfs @ 12.11 hrs HW=119.17' (Free Discharge)
↑**1=Culvert** (Inlet Controls 5.03 cfs @ 6.41 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.796 ac, 78.72% Impervious, Inflow Depth > 4.11" for 25YEAR STORM event
Inflow = 5.83 cfs @ 12.11 hrs, Volume= 0.615 af
Outflow = 6.00 cfs @ 12.11 hrs, Volume= 0.615 af, Atten= 0%, Lag= 0.0 min
Discarded = 3.83 cfs @ 12.11 hrs, Volume= 0.119 af
Primary = 2.17 cfs @ 12.11 hrs, Volume= 0.496 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.22' @ 12.11 hrs Surf.Area= 28 sf Storage= 542 cf

Plug-Flow detention time= 2.2 min calculated for 0.613 af (100% of inflow)
Center-of-Mass det. time= 2.1 min (753.3 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	187 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	300	78	187

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=5.03 cfs @ 12.11 hrs HW=119.17' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.03 cfs @ 6.41 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.796 ac, 78.72% Impervious, Inflow Depth > 4.11" for 25YEAR STORM event
Inflow = 5.83 cfs @ 12.11 hrs, Volume= 0.615 af
Outflow = 6.00 cfs @ 12.11 hrs, Volume= 0.615 af, Atten= 0%, Lag= 0.0 min
Discarded = 3.83 cfs @ 12.11 hrs, Volume= 0.119 af
Primary = 2.17 cfs @ 12.11 hrs, Volume= 0.496 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.22' @ 12.11 hrs Surf.Area= 28 sf Storage= 542 cf

Plug-Flow detention time= 2.2 min calculated for 0.613 af (100% of inflow)
Center-of-Mass det. time= 2.1 min (753.3 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

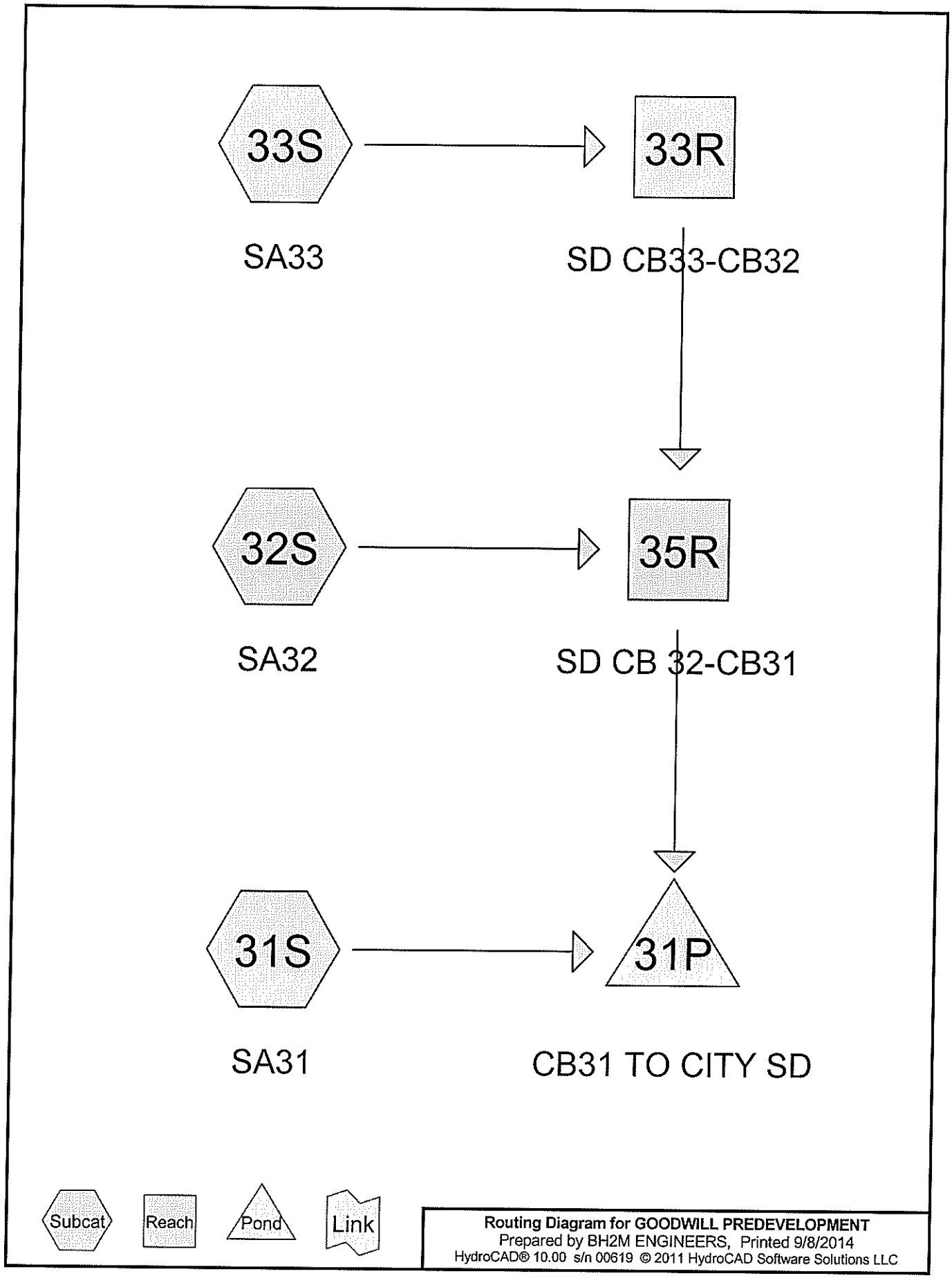
Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Discarded OutFlow Max=3.71 cfs @ 12.11 hrs HW=120.21' (Free Discharge)
└─**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.71 cfs @ 2.36 fps)
└─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.17 cfs @ 12.11 hrs HW=120.21' (Free Discharge)
└─**2=Culvert** (Passes 2.17 cfs of 13.06 cfs potential flow)
└─**1=Orifice/Grate** (Orifice Controls 2.17 cfs @ 11.04 fps)

APPENDIX C

GOODWILL SITE PREDEVELOPMENT CALCULATIONS



Routing Diagram for GOODWILL PREDEVELOPMENT
Prepared by BH2M ENGINEERS, Printed 9/8/2014
HydroCAD® 10.00 s/n 00619 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.091	39	>75% Grass cover, Good, HSG A (33S)
0.140	61	>75% Grass cover, Good, HSG B (31S, 32S, 33S)
0.124	98	Paved parking, HSG D (32S)
1.065	98	Unconnected roofs, HSG D (31S, 33S)
1.421	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.091	HSG A	33S
0.140	HSG B	31S, 32S, 33S
0.000	HSG C	
1.190	HSG D	31S, 32S, 33S
0.000	Other	
1.421		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.091	0.140	0.000	0.000	0.000	0.231	>75% Grass cover, Good	31S, 32S, 33S
0.000	0.000	0.000	0.124	0.000	0.124	Paved parking	32S
0.000	0.000	0.000	1.065	0.000	1.065	Unconnected roofs	31S, 33S
0.091	**0.140**	**0.000**	**1.190**	**0.000**	**1.421**	**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	33R	120.10	117.40	178.0	0.0152	0.010	6.0	0.0	0.0
2	35R	117.10	115.00	140.0	0.0150	0.010	10.0	0.0	0.0
3	31P	115.00	114.00	65.0	0.0154	0.010	10.0	0.0	0.0

Summary for Subcatchment 31S: SA31

Runoff = 2.62 cfs @ 12.06 hrs, Volume= 0.173 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
36,200	98	Unconnected roofs, HSG D
4,550	61	>75% Grass cover, Good, HSG B
40,750	94	Weighted Average
4,550		11.17% Pervious Area
36,200		88.83% Impervious Area
36,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	150	0.0150	1.29		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
1.9	230	0.0100	2.03		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
3.8	380	Total			

Summary for Subcatchment 32S: SA32

Runoff = 0.29 cfs @ 12.18 hrs, Volume= 0.025 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,170	61	>75% Grass cover, Good, HSG B
5,415	98	Paved parking, HSG D
6,585	91	Weighted Average
1,170		17.77% Pervious Area
5,415		82.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	55	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
0.9	160	0.0200	2.87		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
13.0	215	Total			

Summary for Subcatchment 33S: SA33

Runoff = 0.38 cfs @ 12.22 hrs, Volume= 0.034 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
10,200	98	Unconnected roofs, HSG D
400	61	>75% Grass cover, Good, HSG B
3,950	39	>75% Grass cover, Good, HSG A
14,550	81	Weighted Average
4,350		29.90% Pervious Area
10,200		70.10% Impervious Area
10,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	70	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
0.9	105	0.0100	2.03		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
15.5	175	Total			

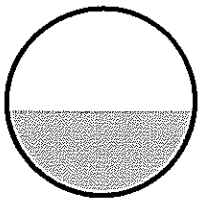
Summary for Reach 33R: SD CB33-CB32

Inflow Area = 0.334 ac, 70.10% Impervious, Inflow Depth > 1.21" for 2 YEAR STORM event
Inflow = 0.38 cfs @ 12.22 hrs, Volume= 0.034 af
Outflow = 0.37 cfs @ 12.25 hrs, Volume= 0.034 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.36 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 1.5 min

Peak Storage= 15 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.90 cfs

6.0" Round Pipe
n= 0.010
Length= 178.0' Slope= 0.0152 '/'
Inlet Invert= 120.10', Outlet Invert= 117.40'



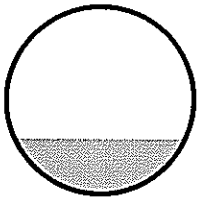
Summary for Reach 35R: SD CB 32-CB31

Inflow Area = 0.485 ac, 73.88% Impervious, Inflow Depth > 1.44" for 2 YEAR STORM event
Inflow = 0.64 cfs @ 12.21 hrs, Volume= 0.058 af
Outflow = 0.64 cfs @ 12.23 hrs, Volume= 0.058 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.87 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 1.3 min

Peak Storage= 18 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 3.49 cfs

10.0" Round Pipe
n= 0.010
Length= 140.0' Slope= 0.0150 '/'
Inlet Invert= 117.10', Outlet Invert= 115.00'



Summary for Pond 31P: CB31 TO CITY SD

Inflow Area = 1.421 ac, 83.73% Impervious, Inflow Depth > 1.95" for 2 YEAR STORM event
Inflow = 2.96 cfs @ 12.06 hrs, Volume= 0.231 af
Outflow = 2.94 cfs @ 12.06 hrs, Volume= 0.231 af, Atten= 1%, Lag= 0.2 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 2.94 cfs @ 12.06 hrs, Volume= 0.231 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 116.67' @ 12.06 hrs Surf.Area= 13 sf Storage= 21 cf

Plug-Flow detention time= 0.2 min calculated for 0.230 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (768.4 - 768.3)

Volume	Invert	Avail.Storage	Storage Description
#1	115.00'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**
#2	119.50'	502 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		558 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	6	0	0
120.00	500	127	127
120.50	1,000	375	502

Device	Routing	Invert	Outlet Devices
#1	Primary	115.00'	**10.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 115.00' / 114.00' S= 0.0154 '/' Cc= 0.900 n= 0.010, Flow Area= 0.55 sf
#2	Discarded	120.00'	**20.0' long x 20.0' 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

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.01' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.85 cfs @ 12.06 hrs HW=116.59' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.85 cfs @ 5.23 fps)

Summary for Subcatchment 31S: SA31

Runoff = 4.34 cfs @ 12.06 hrs, Volume= 0.295 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
36,200	98	Unconnected roofs, HSG D
4,550	61	>75% Grass cover, Good, HSG B
40,750	94	Weighted Average
4,550		11.17% Pervious Area
36,200		88.83% Impervious Area
36,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	150	0.0150	1.29		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
1.9	230	0.0100	2.03		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
3.8	380	Total			

Summary for Subcatchment 32S: SA32

Runoff = 0.50 cfs @ 12.17 hrs, Volume= 0.044 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,170	61	>75% Grass cover, Good, HSG B
5,415	98	Paved parking, HSG D
6,585	91	Weighted Average
1,170		17.77% Pervious Area
5,415		82.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	55	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
0.9	160	0.0200	2.87		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
13.0	215	Total			

Summary for Subcatchment 33S: SA33

Runoff = 0.79 cfs @ 12.21 hrs, Volume= 0.071 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
10,200	98	Unconnected roofs, HSG D
400	61	>75% Grass cover, Good, HSG B
3,950	39	>75% Grass cover, Good, HSG A
14,550	81	Weighted Average
4,350		29.90% Pervious Area
10,200		70.10% Impervious Area
10,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	70	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
0.9	105	0.0100	2.03		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
15.5	175	Total			

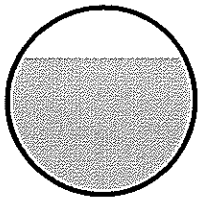
Summary for Reach 33R: SD CB33-CB32

Inflow Area = 0.334 ac, 70.10% Impervious, Inflow Depth > 2.53" for 10 YEAR STORM event
Inflow = 0.79 cfs @ 12.21 hrs, Volume= 0.071 af
Outflow = 0.78 cfs @ 12.23 hrs, Volume= 0.070 af, Atten= 1%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.28 fps, Avg. Travel Time= 1.3 min

Peak Storage= 27 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.90 cfs

6.0" Round Pipe
n= 0.010
Length= 178.0' Slope= 0.0152 '/'
Inlet Invert= 120.10', Outlet Invert= 117.40'



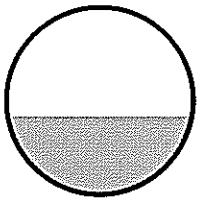
Summary for Reach 35R: SD CB 32-CB31

Inflow Area = 0.485 ac, 73.88% Impervious, Inflow Depth > 2.83" for 10 YEAR STORM event
Inflow = 1.26 cfs @ 12.21 hrs, Volume= 0.114 af
Outflow = 1.25 cfs @ 12.22 hrs, Volume= 0.114 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.87 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.24 fps, Avg. Travel Time= 1.0 min

Peak Storage= 30 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 3.49 cfs

10.0" Round Pipe
n= 0.010
Length= 140.0' Slope= 0.0150 '/'
Inlet Invert= 117.10', Outlet Invert= 115.00'



Summary for Pond 31P: CB31 TO CITY SD

Inflow Area = 1.421 ac, 83.73% Impervious, Inflow Depth > 3.46" for 10 YEAR STORM event
Inflow = 5.05 cfs @ 12.06 hrs, Volume= 0.410 af
Outflow = 5.00 cfs @ 12.07 hrs, Volume= 0.410 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 5.00 cfs @ 12.07 hrs, Volume= 0.410 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.02' @ 12.07 hrs Surf.Area= 13 sf Storage= 50 cf

Plug-Flow detention time= 0.2 min calculated for 0.410 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (758.2 - 758.0)

Volume	Invert	Avail.Storage	Storage Description
#1	115.00'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**
#2	119.50'	502 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		558 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	6	0	0
120.00	500	127	127
120.50	1,000	375	502

Device	Routing	Invert	Outlet Devices
#1	Primary	115.00'	**10.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 115.00' / 114.00' S= 0.0154 '/' Cc= 0.900 n= 0.010, Flow Area= 0.55 sf
#2	Discarded	120.00'	**20.0' long x 20.0' 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

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.06' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=4.84 cfs @ 12.07 hrs HW=118.81' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.84 cfs @ 8.87 fps)

Summary for Subcatchment 31S: SA31

Runoff = 5.15 cfs @ 12.06 hrs, Volume= 0.353 af, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
36,200	98	Unconnected roofs, HSG D
4,550	61	>75% Grass cover, Good, HSG B
40,750	94	Weighted Average
4,550		11.17% Pervious Area
36,200		88.83% Impervious Area
36,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	150	0.0150	1.29		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
1.9	230	0.0100	2.03		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
3.8	380	Total			

Summary for Subcatchment 32S: SA32

Runoff = 0.60 cfs @ 12.17 hrs, Volume= 0.053 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,170	61	>75% Grass cover, Good, HSG B
5,415	98	Paved parking, HSG D
6,585	91	Weighted Average
1,170		17.77% Pervious Area
5,415		82.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	55	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
0.9	160	0.0200	2.87		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
13.0	215	Total			

Summary for Subcatchment 33S: SA33

Runoff = 1.00 cfs @ 12.21 hrs, Volume= 0.089 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
10,200	98	Unconnected roofs, HSG D
400	61	>75% Grass cover, Good, HSG B
3,950	39	>75% Grass cover, Good, HSG A
14,550	81	Weighted Average
4,350		29.90% Pervious Area
10,200		70.10% Impervious Area
10,200		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	70	0.0100	0.08		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
0.9	105	0.0100	2.03		**Shallow Concentrated Flow, PAVEMENT** Paved Kv= 20.3 fps
15.5	175	Total			

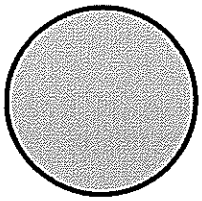
Summary for Reach 33R: SD CB33-CB32

Inflow Area = 0.334 ac, 70.10% Impervious, Inflow Depth > 3.21" for 25YEAR STORM event
Inflow = 1.00 cfs @ 12.21 hrs, Volume= 0.089 af
Outflow = 0.94 cfs @ 12.33 hrs, Volume= 0.089 af, Atten= 6%, Lag= 7.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.21 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 1.3 min

Peak Storage= 35 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.90 cfs

6.0" Round Pipe
n= 0.010
Length= 178.0' Slope= 0.0152 '/'
Inlet Invert= 120.10', Outlet Invert= 117.40'



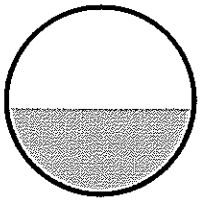
Summary for Reach 35R: SD CB 32-CB31

Inflow Area = 0.485 ac, 73.88% Impervious, Inflow Depth > 3.52" for 25YEAR STORM event
Inflow = 1.48 cfs @ 12.20 hrs, Volume= 0.142 af
Outflow = 1.48 cfs @ 12.21 hrs, Volume= 0.142 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.14 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.42 fps, Avg. Travel Time= 1.0 min

Peak Storage= 34 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 0.83' Flow Area= 0.5 sf, Capacity= 3.49 cfs

10.0" Round Pipe
n= 0.010
Length= 140.0' Slope= 0.0150 '/'
Inlet Invert= 117.10', Outlet Invert= 115.00'



Summary for Pond 31P: CB31 TO CITY SD

Inflow Area = 1.421 ac, 83.73% Impervious, Inflow Depth > 4.18" for 25YEAR STORM event
Inflow = 6.03 cfs @ 12.06 hrs, Volume= 0.495 af
Outflow = 5.59 cfs @ 12.08 hrs, Volume= 0.495 af, Atten= 7%, Lag= 1.2 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 5.59 cfs @ 12.08 hrs, Volume= 0.495 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.94' @ 12.08 hrs Surf.Area= 457 sf Storage= 156 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (755.1 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1	115.00'	57 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder**
#2	119.50'	502 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
		558 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	6	0	0
120.00	500	127	127
120.50	1,000	375	502

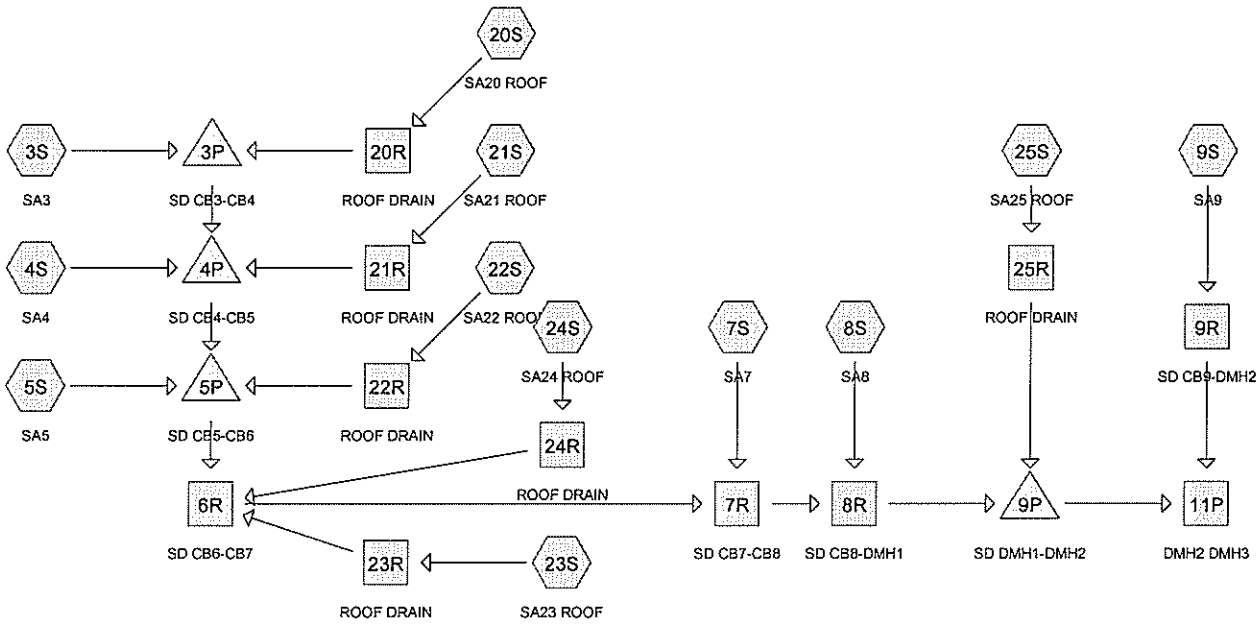
Device	Routing	Invert	Outlet Devices
#1	Primary	115.00'	**10.0" Round Culvert** L= 65.0' Ke= 0.500 Inlet / Outlet Invert= 115.00' / 114.00' S= 0.0154 '/' Cc= 0.900 n= 0.010, Flow Area= 0.55 sf
#2	Discarded	120.00'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 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

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.07' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=5.53 cfs @ 12.08 hrs HW=119.85' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.53 cfs @ 10.14 fps)

APPENDIX D

POST-DEVELOPMENT CALCULATIONS
PARK DANFORTH MODEL I



Subcat Reach Pond Link

Routing Diagram for Park Danforth Post Model I
Prepared by BH2M ENGINEERS, Printed 11/17/2014
HydroCAD® 10.00 s/n 00619 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.022	39	>75% Grass cover, Good, HSG A (3S, 4S)
0.126	61	>75% Grass cover, Good, HSG B (3S, 4S, 5S, 7S, 8S, 9S)
0.523	98	Paved parking, HSG D (3S, 4S, 5S, 9S)
0.696	98	Roofs, HSG D (20S, 21S, 22S, 23S, 24S, 25S)
1.367	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.022	HSG A	3S, 4S
0.126	HSG B	3S, 4S, 5S, 7S, 8S, 9S
0.000	HSG C	
1.219	HSG D	3S, 4S, 5S, 9S, 20S, 21S, 22S, 23S, 24S, 25S
0.000	Other	
1.367		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.022	0.126	0.000	0.000	0.000	0.148	>75% Grass cover, Good	3S, 4S, 5S, 7S, 8S, 9S
0.000	0.000	0.000	0.523	0.000	0.523	Paved parking	3S, 4S, 5S, 9S
0.000	0.000	0.000	0.696	0.000	0.696	Roofs	20S, 21S, 22S, 23S, 24S, 25S
0.022	**0.126**	**0.000**	**1.219**	**0.000**	**1.367**	**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	6R	116.00	115.10	253.0	0.0036	0.010	15.0	0.0	0.0
2	7R	115.10	115.00	88.0	0.0011	0.010	24.0	0.0	0.0
3	8R	115.00	114.70	35.0	0.0086	0.010	24.0	0.0	0.0
4	9R	115.80	115.00	72.0	0.0111	0.010	12.0	0.0	0.0
5	11P	115.00	114.80	24.0	0.0083	0.010	15.0	0.0	0.0
6	20R	0.00	-0.60	60.0	0.0100	0.010	6.0	0.0	0.0
7	21R	0.00	-0.60	60.0	0.0100	0.010	6.0	0.0	0.0
8	22R	0.00	-0.60	60.0	0.0100	0.010	6.0	0.0	0.0
9	23R	0.00	-0.20	20.0	0.0100	0.010	6.0	0.0	0.0
10	24R	0.00	-0.15	15.0	0.0100	0.010	6.0	0.0	0.0
11	25R	0.00	-0.30	30.0	0.0100	0.010	6.0	0.0	0.0
12	3P	117.50	117.50	73.0	0.0000	0.010	12.0	0.0	0.0
13	4P	117.40	117.00	54.0	0.0074	0.010	12.0	0.0	0.0
14	5P	116.90	116.00	70.0	0.0129	0.010	12.0	0.0	0.0
15	9P	114.70	114.50	24.0	0.0083	0.010	15.0	0.0	0.0

Summary for Subcatchment 3S: SA3

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
5,486	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
350	39	>75% Grass cover, Good, HSG A
6,136	93	Weighted Average
650		10.59% Pervious Area
5,486		89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	15	0.0100	0.06		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
1.6	70	0.0050	0.71		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
5.9	85	Total			

Summary for Subcatchment 4S: SA4

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.051 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
800	61	>75% Grass cover, Good, HSG B
600	39	>75% Grass cover, Good, HSG A
11,043	98	Paved parking, HSG D
12,443	93	Weighted Average
1,400		11.25% Pervious Area
11,043		88.75% Impervious Area

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

Summary for Subcatchment 5S: SA5

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
5,100	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
5,400	96	Weighted Average
300		5.56% Pervious Area
5,100		94.44% Impervious Area

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

Summary for Subcatchment 7S: SA7

Runoff = 0.01 cfs @ 12.15 hrs, Volume= 0.001 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,000	61	>75% Grass cover, Good, HSG B
1,000		100.00% Pervious Area

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

Summary for Subcatchment 8S: SA8

Runoff = 0.00 cfs @ 12.15 hrs, Volume= 0.000 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
500	61	>75% Grass cover, Good, HSG B
500		100.00% Pervious Area

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

Summary for Subcatchment 9S: SA9

Runoff = 0.06 cfs @ 12.16 hrs, Volume= 0.005 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
2,600	61	>75% Grass cover, Good, HSG B
1,150	98	Paved parking, HSG D
3,750	72	Weighted Average
2,600		69.33% Pervious Area
1,150		30.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	60	0.0200	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 20S: SA20 ROOF

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
3,236	98	Roofs, HSG D
3,236		100.00% Impervious Area

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

Summary for Subcatchment 21S: SA21 ROOF

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
2,500	98	Roofs, HSG D
2,500		100.00% Impervious Area

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

Summary for Subcatchment 22S: SA22 ROOF

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
3,900	98	Roofs, HSG D
3,900		100.00% Impervious Area

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

Summary for Subcatchment 23S: SA23 ROOF

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
8,020	98	Roofs, HSG D
8,020		100.00% Impervious Area

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

Summary for Subcatchment 24S: SA24 ROOF

Runoff = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
7,100	98	Roofs, HSG D
7,100		100.00% Impervious Area

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

Summary for Subcatchment 25S: SA25 ROOF

Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.028 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
5,550	98	Roofs, HSG D
5,550		100.00% Impervious Area

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

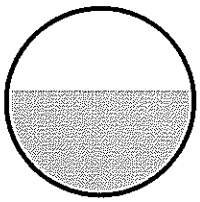
Summary for Reach 6R: SD CB6-CB7

Inflow Area = 1.119 ac, 95.18% Impervious, Inflow Depth > 2.39" for 2 YEAR STORM event
Inflow = 3.03 cfs @ 12.09 hrs, Volume= 0.223 af
Outflow = 3.00 cfs @ 12.10 hrs, Volume= 0.223 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.27 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.65 fps, Avg. Travel Time= 2.5 min

Peak Storage= 178 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.01 cfs

15.0" Round Pipe
n= 0.010
Length= 253.0' Slope= 0.0036 '/'
Inlet Invert= 116.00', Outlet Invert= 115.10'



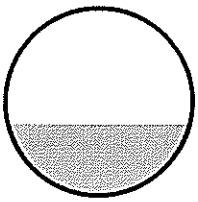
Summary for Reach 7R: SD CB7-CB8

Inflow Area = 1.142 ac, 93.26% Impervious, Inflow Depth > 2.35" for 2 YEAR STORM event
Inflow = 3.01 cfs @ 12.10 hrs, Volume= 0.223 af
Outflow = 2.99 cfs @ 12.11 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.76 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 1.4 min

Peak Storage= 95 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 9.91 cfs

24.0" Round Pipe
n= 0.010
Length= 88.0' Slope= 0.0011 '/'
Inlet Invert= 115.10', Outlet Invert= 115.00'



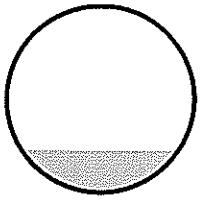
Summary for Reach 8R: SD CB8-DMH1

Inflow Area = 1.153 ac, 92.34% Impervious, Inflow Depth > 2.33" for 2 YEAR STORM event
Inflow = 3.00 cfs @ 12.11 hrs, Volume= 0.224 af
Outflow = 3.00 cfs @ 12.11 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.69 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 0.3 min

Peak Storage= 18 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 27.23 cfs

24.0" Round Pipe
n= 0.010
Length= 35.0' Slope= 0.0086 '/'
Inlet Invert= 115.00', Outlet Invert= 114.70'



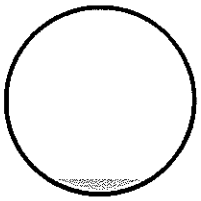
Summary for Reach 9R: SD CB9-DMH2

Inflow Area = 0.086 ac, 30.67% Impervious, Inflow Depth > 0.73" for 2 YEAR STORM event
Inflow = 0.06 cfs @ 12.16 hrs, Volume= 0.005 af
Outflow = 0.06 cfs @ 12.16 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.16 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 1.2 min

Peak Storage= 2 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.88 cfs

12.0" Round Pipe
n= 0.010
Length= 72.0' Slope= 0.0111 '/'
Inlet Invert= 115.80', Outlet Invert= 115.00'



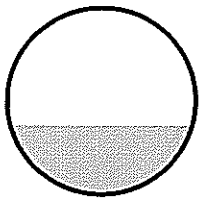
Summary for Reach 11P: DMH2 DMH3

Inflow Area = 1.367 ac, 89.17% Impervious, Inflow Depth > 2.15" for 2 YEAR STORM event
Inflow = 2.18 cfs @ 12.10 hrs, Volume= 0.245 af
Outflow = 2.19 cfs @ 12.10 hrs, Volume= 0.245 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.32 fps, Avg. Travel Time= 0.2 min

Peak Storage= 10 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.67 cfs

15.0" Round Pipe
n= 0.010
Length= 24.0' Slope= 0.0083 '/'
Inlet Invert= 115.00', Outlet Invert= 114.80'



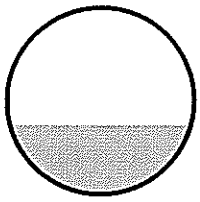
Summary for Reach 20R: ROOF DRAIN

Inflow Area = 0.074 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.21 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 0.8 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



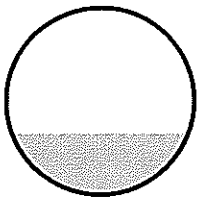
Summary for Reach 21R: ROOF DRAIN

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.99 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 0.9 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



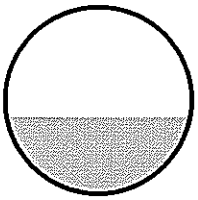
Summary for Reach 22R: ROOF DRAIN

Inflow Area = 0.090 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.38 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



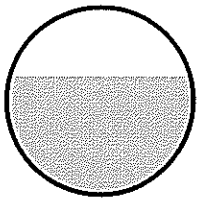
Summary for Reach 23R: ROOF DRAIN

Inflow Area = 0.184 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.20'



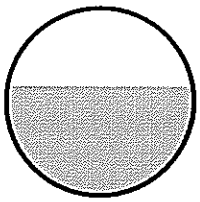
Summary for Reach 24R: ROOF DRAIN

Inflow Area = 0.163 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.46 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.15'



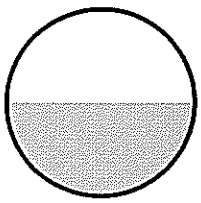
Summary for Reach 25R: ROOF DRAIN

Inflow Area = 0.127 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 0.3 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 3P: SD CB3-CB4

Inflow Area = 0.215 ac, 93.06% Impervious, Inflow Depth > 2.29" for 2 YEAR STORM event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.1 min
Primary = 0.57 cfs @ 12.09 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.08' @ 12.09 hrs Surf.Area= 12 sf Storage= 7 cf

Plug-Flow detention time= 0.8 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (755.2 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	117.50'	119 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.50	12	0	0
125.82	12	100	100
126.00	200	19	119

Device	Routing	Invert	Outlet Devices
#1	Primary	117.50'	**12.0" Round Culvert** L= 73.0' Ke= 0.500 Inlet / Outlet Invert= 117.50' / 117.50' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 12.09 hrs HW=118.07' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.55 cfs @ 1.73 fps)

Summary for Pond 4P: SD CB4-CB5

Inflow Area = 0.558 ac, 91.57% Impervious, Inflow Depth > 2.24" for 2 YEAR STORM event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af
Outflow = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af, Atten= 0%, Lag= 0.1 min
Primary = 1.45 cfs @ 12.09 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.05' @ 12.09 hrs Surf.Area= 12 sf Storage= 8 cf

Plug-Flow detention time= 0.3 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (758.0 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1	117.40'	350 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.40	12	0	0
125.50	12	97	97
126.00	1,000	253	350

Device	Routing	Invert	Outlet Devices
#1	Primary	117.40'	**12.0" Round Culvert** L= 54.0' Ke= 0.500 Inlet / Outlet Invert= 117.40' / 117.00' S= 0.0074 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.42 cfs @ 12.09 hrs HW=118.04' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.42 cfs @ 3.78 fps)

Summary for Pond 5P: SD CB5-CB6

Inflow Area = 0.772 ac, 93.01% Impervious, Inflow Depth > 2.30" for 2 YEAR STORM event
Inflow = 2.04 cfs @ 12.09 hrs, Volume= 0.148 af
Outflow = 2.04 cfs @ 12.09 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.1 min
Primary = 2.04 cfs @ 12.09 hrs, Volume= 0.148 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.70' @ 12.09 hrs Surf.Area= 12 sf Storage= 10 cf

Plug-Flow detention time= 0.2 min calculated for 0.148 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (754.4 - 754.2)

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	262 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	600	153	262

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.00 cfs @ 12.09 hrs HW=117.69' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.00 cfs @ 3.02 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.281 ac, 93.10% Impervious, Inflow Depth > 2.35" for 2 YEAR STORM event
Inflow = 3.35 cfs @ 12.11 hrs, Volume= 0.251 af
Outflow = 3.83 cfs @ 12.11 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min
Discarded = 1.70 cfs @ 12.10 hrs, Volume= 0.012 af
Primary = 2.12 cfs @ 12.10 hrs, Volume= 0.240 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.00' @ 12.10 hrs Surf.Area= 28 sf Storage= 536 cf

Plug-Flow detention time= 2.6 min calculated for 0.251 af (100% of inflow)

Center-of-Mass det. time= 2.4 min (753.3 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Discarded OutFlow Max=1.56 cfs @ 12.10 hrs HW=119.99' (Free Discharge)
↑—**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.56 cfs @ 1.76 fps)
—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.12 cfs @ 12.10 hrs HW=120.00' (Free Discharge)
↑—**2=Culvert** (Passes 2.12 cfs of 12.78 cfs potential flow)
↑—**1=Orifice/Grate** (Orifice Controls 2.12 cfs @ 10.82 fps)

Summary for Subcatchment 3S: SA3

Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
5,486	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
350	39	>75% Grass cover, Good, HSG A
6,136	93	Weighted Average
650		10.59% Pervious Area
5,486		89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	15	0.0100	0.06		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
1.6	70	0.0050	0.71		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
5.9	85	Total			

Summary for Subcatchment 4S: SA4

Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.088 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
800	61	>75% Grass cover, Good, HSG B
600	39	>75% Grass cover, Good, HSG A
11,043	98	Paved parking, HSG D
12,443	93	Weighted Average
1,400		11.25% Pervious Area
11,043		88.75% Impervious Area

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

Summary for Subcatchment 5S: SA5

Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.041 af, Depth> 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
5,100	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
5,400	96	Weighted Average
300		5.56% Pervious Area
5,100		94.44% Impervious Area

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

Summary for Subcatchment 7S: SA7

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,000	61	>75% Grass cover, Good, HSG B
1,000		100.00% Pervious Area

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

Summary for Subcatchment 8S: SA8

Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
500	61	>75% Grass cover, Good, HSG B
500		100.00% Pervious Area

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

Summary for Subcatchment 9S: SA9

Runoff = 0.17 cfs @ 12.15 hrs, Volume= 0.013 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
2,600	61	>75% Grass cover, Good, HSG B
1,150	98	Paved parking, HSG D
3,750	72	Weighted Average
2,600		69.33% Pervious Area
1,150		30.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	60	0.0200	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 20S: SA20 ROOF

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.026 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
3,236	98	Roofs, HSG D
3,236		100.00% Impervious Area

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

Summary for Subcatchment 21S: SA21 ROOF

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
2,500	98	Roofs, HSG D
2,500		100.00% Impervious Area

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

Summary for Subcatchment 22S: SA22 ROOF

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
3,900	98	Roofs, HSG D
3,900		100.00% Impervious Area

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

Summary for Subcatchment 23S: SA23 ROOF

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.064 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
8,020	98	Roofs, HSG D
8,020		100.00% Impervious Area

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

Summary for Subcatchment 24S: SA24 ROOF

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.056 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
7,100	98	Roofs, HSG D
7,100		100.00% Impervious Area

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

Summary for Subcatchment 25S: SA25 ROOF

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
5,550	98	Roofs, HSG D
5,550		100.00% Impervious Area

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

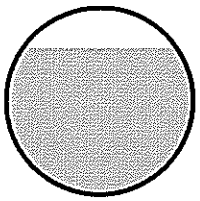
Summary for Reach 6R: SD CB6-CB7

Inflow Area = 1.119 ac, 95.18% Impervious, Inflow Depth > 3.95" for 10 YEAR STORM event
Inflow = 4.81 cfs @ 12.09 hrs, Volume= 0.368 af
Outflow = 4.79 cfs @ 12.10 hrs, Volume= 0.368 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.65 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.94 fps, Avg. Travel Time= 2.2 min

Peak Storage= 261 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.01 cfs

15.0" Round Pipe
n= 0.010
Length= 253.0' Slope= 0.0036 '/'
Inlet Invert= 116.00', Outlet Invert= 115.10'



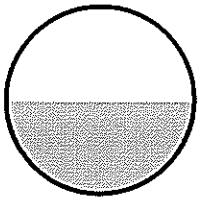
Summary for Reach 7R: SD CB7-CB8

Inflow Area = 1.142 ac, 93.26% Impervious, Inflow Depth > 3.89" for 10 YEAR STORM event
Inflow = 4.82 cfs @ 12.10 hrs, Volume= 0.370 af
Outflow = 4.81 cfs @ 12.11 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.13 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 1.2 min

Peak Storage= 135 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 9.91 cfs

24.0" Round Pipe
n= 0.010
Length= 88.0' Slope= 0.0011 '/'
Inlet Invert= 115.10', Outlet Invert= 115.00'



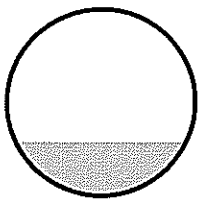
Summary for Reach 8R: SD CB8-DMH1

Inflow Area = 1.153 ac, 92.34% Impervious, Inflow Depth > 3.86" for 10 YEAR STORM event
Inflow = 4.83 cfs @ 12.11 hrs, Volume= 0.371 af
Outflow = 4.83 cfs @ 12.11 hrs, Volume= 0.371 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.49 fps, Avg. Travel Time= 0.2 min

Peak Storage= 26 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 27.23 cfs

24.0" Round Pipe
n= 0.010
Length= 35.0' Slope= 0.0086 '/'
Inlet Invert= 115.00', Outlet Invert= 114.70'



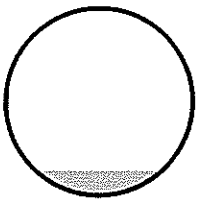
Summary for Reach 9R: SD CB9-DMH2

Inflow Area = 0.086 ac, 30.67% Impervious, Inflow Depth > 1.81" for 10 YEAR STORM event
Inflow = 0.17 cfs @ 12.15 hrs, Volume= 0.013 af
Outflow = 0.17 cfs @ 12.15 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.91 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 1.0 min

Peak Storage= 4 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.88 cfs

12.0" Round Pipe
n= 0.010
Length= 72.0' Slope= 0.0111 '/'
Inlet Invert= 115.80', Outlet Invert= 115.00'



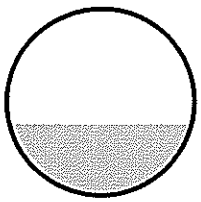
Summary for Reach 11P: DMH2 DMH3

Inflow Area = 1.367 ac, 89.17% Impervious, Inflow Depth > 3.32" for 10 YEAR STORM event
Inflow = 2.32 cfs @ 12.13 hrs, Volume= 0.378 af
Outflow = 2.32 cfs @ 12.14 hrs, Volume= 0.378 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.47 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.71 fps, Avg. Travel Time= 0.1 min

Peak Storage= 10 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.67 cfs

15.0" Round Pipe
n= 0.010
Length= 24.0' Slope= 0.0083 '/'
Inlet Invert= 115.00', Outlet Invert= 114.80'



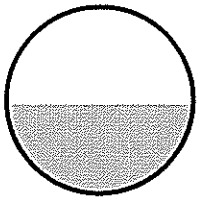
Summary for Reach 20R: ROOF DRAIN

Inflow Area = 0.074 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.33 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.63 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



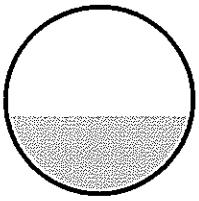
Summary for Reach 21R: ROOF DRAIN

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.39 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 0.8 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



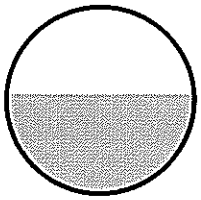
Summary for Reach 22R: ROOF DRAIN

Inflow Area = 0.090 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.80 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



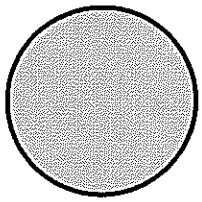
Summary for Reach 23R: ROOF DRAIN

Inflow Area = 0.184 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.78 cfs @ 12.07 hrs, Volume= 0.064 af, Atten= 6%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.20'



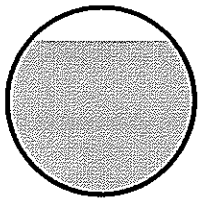
Summary for Reach 24R: ROOF DRAIN

Inflow Area = 0.163 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.056 af
Outflow = 0.73 cfs @ 12.09 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.24 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.15'



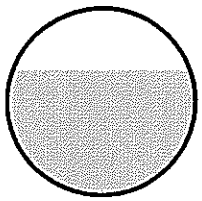
Summary for Reach 25R: ROOF DRAIN

Inflow Area = 0.127 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.57 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.11 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 3P: SD CB3-CB4

Inflow Area = 0.215 ac, 93.06% Impervious, Inflow Depth > 3.85" for 10 YEAR STORM event
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 0.069 af
Outflow = 0.93 cfs @ 12.09 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.1 min
Primary = 0.93 cfs @ 12.09 hrs, Volume= 0.069 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.24' @ 12.09 hrs Surf.Area= 12 sf Storage= 9 cf

Plug-Flow detention time= 0.7 min calculated for 0.069 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (746.9 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1	117.50'	119 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.50	12	0	0
125.82	12	100	100
126.00	200	19	119

Device	Routing	Invert	Outlet Devices
#1	Primary	117.50'	**12.0" Round Culvert** L= 73.0' Ke= 0.500 Inlet / Outlet Invert= 117.50' / 117.50' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=0.91 cfs @ 12.09 hrs HW=118.23' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.91 cfs @ 2.06 fps)

Summary for Pond 4P: SD CB4-CB5

Inflow Area = 0.558 ac, 91.57% Impervious, Inflow Depth > 3.79" for 10 YEAR STORM event
Inflow = 2.39 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.40 cfs @ 12.09 hrs, Volume= 0.176 af, Atten= 0%, Lag= 0.1 min
Primary = 2.40 cfs @ 12.09 hrs, Volume= 0.176 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.31' @ 12.09 hrs Surf.Area= 12 sf Storage= 11 cf

Plug-Flow detention time= 0.2 min calculated for 0.176 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (748.8 - 748.6)

Volume	Invert	Avail.Storage	Storage Description
#1	117.40'	350 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.40	12	0	0
125.50	12	97	97
126.00	1,000	253	350

Device	Routing	Invert	Outlet Devices
#1	Primary	117.40'	**12.0" Round Culvert** L= 54.0' Ke= 0.500 Inlet / Outlet Invert= 117.40' / 117.00' S= 0.0074 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.34 cfs @ 12.09 hrs HW=118.30' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.34 cfs @ 4.17 fps)

Summary for Pond 5P: SD CB5-CB6

Inflow Area = 0.772 ac, 93.01% Impervious, Inflow Depth > 3.86" for 10 YEAR STORM event
Inflow = 3.35 cfs @ 12.09 hrs, Volume= 0.248 af
Outflow = 3.35 cfs @ 12.09 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.1 min
Primary = 3.35 cfs @ 12.09 hrs, Volume= 0.248 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.18' @ 12.09 hrs Surf.Area= 12 sf Storage= 15 cf

Plug-Flow detention time= 0.2 min calculated for 0.248 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (746.3 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	262 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	600	153	262

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=3.28 cfs @ 12.09 hrs HW=118.15' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.28 cfs @ 4.18 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.281 ac, 93.10% Impervious, Inflow Depth > 3.89" for 10 YEAR STORM event
Inflow = 5.39 cfs @ 12.11 hrs, Volume= 0.415 af
Outflow = 5.45 cfs @ 12.11 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min
Discarded = 3.30 cfs @ 12.11 hrs, Volume= 0.050 af
Primary = 2.16 cfs @ 12.11 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.17' @ 12.11 hrs Surf.Area= 28 sf Storage= 541 cf

Plug-Flow detention time= 2.3 min calculated for 0.413 af (100% of inflow)

Center-of-Mass det. time= 2.2 min (746.8 - 744.6)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Discarded OutFlow Max=3.18 cfs @ 12.11 hrs HW=120.16' (Free Discharge)
└─**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.18 cfs @ 2.24 fps)
└─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.16 cfs @ 12.11 hrs HW=120.16' (Free Discharge)
└─**2=Culvert** (Passes 2.16 cfs of 12.99 cfs potential flow)
└─**1=Orifice/Grate** (Orifice Controls 2.16 cfs @ 10.99 fps)

Summary for Subcatchment 3S: SA3

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.052 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
5,486	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
350	39	>75% Grass cover, Good, HSG A
6,136	93	Weighted Average
650		10.59% Pervious Area
5,486		89.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	15	0.0100	0.06		**Sheet Flow, LAWN** Grass: Dense n= 0.240 P2= 3.00"
1.6	70	0.0050	0.71		**Sheet Flow, PAVEMENT** Smooth surfaces n= 0.011 P2= 3.00"
5.9	85	Total			

Summary for Subcatchment 4S: SA4

Runoff = 1.43 cfs @ 12.09 hrs, Volume= 0.105 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
800	61	>75% Grass cover, Good, HSG B
600	39	>75% Grass cover, Good, HSG A
11,043	98	Paved parking, HSG D
12,443	93	Weighted Average
1,400		11.25% Pervious Area
11,043		88.75% Impervious Area

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

Summary for Subcatchment 5S: SA5

Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.049 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
5,100	98	Paved parking, HSG D
300	61	>75% Grass cover, Good, HSG B
5,400	96	Weighted Average
300		5.56% Pervious Area
5,100		94.44% Impervious Area

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

Summary for Subcatchment 7S: SA7

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,000	61	>75% Grass cover, Good, HSG B
1,000		100.00% Pervious Area

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

Summary for Subcatchment 8S: SA8

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
500	61	>75% Grass cover, Good, HSG B
500		100.00% Pervious Area

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

Summary for Subcatchment 9S: SA9

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
2,600	61	>75% Grass cover, Good, HSG B
1,150	98	Paved parking, HSG D
3,750	72	Weighted Average
2,600		69.33% Pervious Area
1,150		30.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	60	0.0200	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 20S: SA20 ROOF

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
3,236	98	Roofs, HSG D
3,236		100.00% Impervious Area

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

Summary for Subcatchment 21S: SA21 ROOF

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
2,500	98	Roofs, HSG D
2,500		100.00% Impervious Area

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

Summary for Subcatchment 22S: SA22 ROOF

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.036 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
3,900	98	Roofs, HSG D
3,900		100.00% Impervious Area

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

Summary for Subcatchment 23S: SA23 ROOF

Runoff = 0.97 cfs @ 12.09 hrs, Volume= 0.075 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
8,020	98	Roofs, HSG D
8,020		100.00% Impervious Area

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

Summary for Subcatchment 24S: SA24 ROOF

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.066 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
7,100	98	Roofs, HSG D
7,100		100.00% Impervious Area

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

Summary for Subcatchment 25S: SA25 ROOF

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
5,550	98	Roofs, HSG D
5,550		100.00% Impervious Area

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

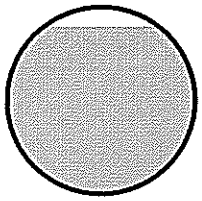
Summary for Reach 6R: SD CB6-CB7

Inflow Area = 1.119 ac, 95.18% Impervious, Inflow Depth > 4.68" for 25YEAR STORM event
Inflow = 5.42 cfs @ 12.09 hrs, Volume= 0.437 af
Outflow = 5.34 cfs @ 12.11 hrs, Volume= 0.436 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.65 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.04 fps, Avg. Travel Time= 2.1 min

Peak Storage= 294 cf @ 12.11 hrs
Average Depth at Peak Storage= 1.12'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.01 cfs

15.0" Round Pipe
n= 0.010
Length= 253.0' Slope= 0.0036 '/'
Inlet Invert= 116.00', Outlet Invert= 115.10'



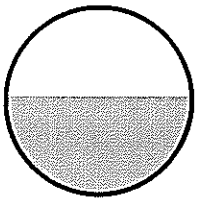
Summary for Reach 7R: SD CB7-CB8

Inflow Area = 1.142 ac, 93.26% Impervious, Inflow Depth > 4.62" for 25YEAR STORM event
Inflow = 5.38 cfs @ 12.11 hrs, Volume= 0.439 af
Outflow = 5.39 cfs @ 12.11 hrs, Volume= 0.439 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.22 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 1.1 min

Peak Storage= 147 cf @ 12.11 hrs
Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 9.91 cfs

24.0" Round Pipe
n= 0.010
Length= 88.0' Slope= 0.0011 '/'
Inlet Invert= 115.10', Outlet Invert= 115.00'



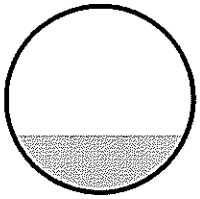
Summary for Reach 8R: SD CB8-DMH1

Inflow Area = 1.153 ac, 92.34% Impervious, Inflow Depth > 4.58" for 25YEAR STORM event
Inflow = 5.41 cfs @ 12.11 hrs, Volume= 0.441 af
Outflow = 5.41 cfs @ 12.11 hrs, Volume= 0.441 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.74 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.62 fps, Avg. Travel Time= 0.2 min

Peak Storage= 28 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 27.23 cfs

24.0" Round Pipe
n= 0.010
Length= 35.0' Slope= 0.0086 '/'
Inlet Invert= 115.00', Outlet Invert= 114.70'



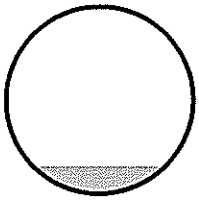
Summary for Reach 9R: SD CB9-DMH2

Inflow Area = 0.086 ac, 30.67% Impervious, Inflow Depth > 2.40" for 25YEAR STORM event
Inflow = 0.23 cfs @ 12.14 hrs, Volume= 0.017 af
Outflow = 0.23 cfs @ 12.15 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 0.9 min

Peak Storage= 5 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.88 cfs

12.0" Round Pipe
n= 0.010
Length= 72.0' Slope= 0.0111 '/'
Inlet Invert= 115.80', Outlet Invert= 115.00'



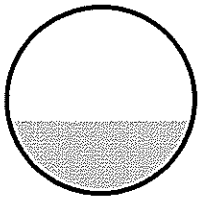
Summary for Reach 11P: DMH2 DMH3

Inflow Area = 1.367 ac, 89.17% Impervious, Inflow Depth > 3.82" for 25YEAR STORM event
Inflow = 2.39 cfs @ 12.14 hrs, Volume= 0.435 af
Outflow = 2.39 cfs @ 12.14 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.52 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.85 fps, Avg. Travel Time= 0.1 min

Peak Storage= 10 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.67 cfs

15.0" Round Pipe
n= 0.010
Length= 24.0' Slope= 0.0083 '/'
Inlet Invert= 115.00', Outlet Invert= 114.80'



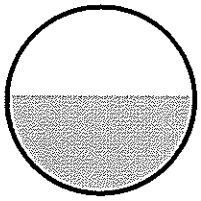
Summary for Reach 20R: ROOF DRAIN

Inflow Area = 0.074 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.78 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



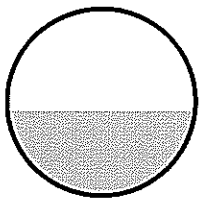
Summary for Reach 21R: ROOF DRAIN

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.54 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.7 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



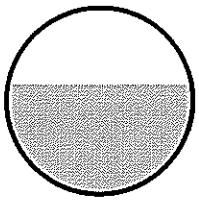
Summary for Reach 22R: ROOF DRAIN

Inflow Area = 0.090 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.036 af
Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.95 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 0.6 min

Peak Storage= 7 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 60.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.60'



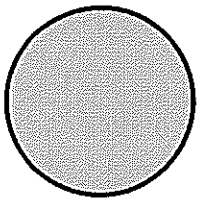
Summary for Reach 23R: ROOF DRAIN

Inflow Area = 0.184 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.97 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 0.73 cfs @ 12.05 hrs, Volume= 0.075 af, Atten= 25%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.20'



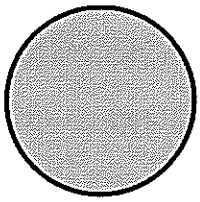
Summary for Reach 24R: ROOF DRAIN

Inflow Area = 0.163 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.066 af
Outflow = 0.73 cfs @ 12.05 hrs, Volume= 0.066 af, Atten= 15%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.89 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.15'



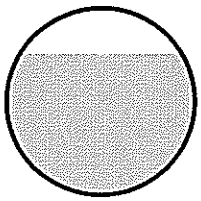
Summary for Reach 25R: ROOF DRAIN

Inflow Area = 0.127 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.73 cfs

6.0" Round Pipe
n= 0.010
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 3P: SD CB3-CB4

Inflow Area = 0.215 ac, 93.06% Impervious, Inflow Depth > 4.58" for 25YEAR STORM event
Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.082 af
Outflow = 1.10 cfs @ 12.09 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.1 min
Primary = 1.10 cfs @ 12.09 hrs, Volume= 0.082 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.31' @ 12.09 hrs Surf.Area= 12 sf Storage= 10 cf

Plug-Flow detention time= 0.6 min calculated for 0.082 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (744.6 - 744.2)

Volume	Invert	Avail.Storage	Storage Description
#1	117.50'	119 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.50	12	0	0
125.82	12	100	100
126.00	200	19	119

Device	Routing	Invert	Outlet Devices
#1	Primary	117.50'	**12.0" Round Culvert** L= 73.0' Ke= 0.500 Inlet / Outlet Invert= 117.50' / 117.50' S= 0.0000 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=1.07 cfs @ 12.09 hrs HW=118.30' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.07 cfs @ 2.19 fps)

Summary for Pond 4P: SD CB4-CB5

Inflow Area = 0.558 ac, 91.57% Impervious, Inflow Depth > 4.53" for 25YEAR STORM event
Inflow = 2.84 cfs @ 12.09 hrs, Volume= 0.211 af
Outflow = 2.84 cfs @ 12.09 hrs, Volume= 0.211 af, Atten= 0%, Lag= 0.1 min
Primary = 2.84 cfs @ 12.09 hrs, Volume= 0.211 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.46' @ 12.09 hrs Surf.Area= 12 sf Storage= 13 cf

Plug-Flow detention time= 0.2 min calculated for 0.210 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (746.2 - 746.0)

Volume	Invert	Avail.Storage	Storage Description
#1	117.40'	350 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.40	12	0	0
125.50	12	97	97
126.00	1,000	253	350

Device	Routing	Invert	Outlet Devices
#1	Primary	117.40'	**12.0" Round Culvert** L= 54.0' Ke= 0.500 Inlet / Outlet Invert= 117.40' / 117.00' S= 0.0074 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=2.78 cfs @ 12.09 hrs HW=118.44' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.78 cfs @ 3.53 fps)

Summary for Pond 5P: SD CB5-CB6

Inflow Area = 0.772 ac, 93.01% Impervious, Inflow Depth > 4.60" for 25YEAR STORM event
Inflow = 3.95 cfs @ 12.09 hrs, Volume= 0.296 af
Outflow = 3.96 cfs @ 12.09 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.1 min
Primary = 3.96 cfs @ 12.09 hrs, Volume= 0.296 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.49' @ 12.09 hrs Surf.Area= 12 sf Storage= 19 cf

Plug-Flow detention time= 0.2 min calculated for 0.295 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (744.0 - 743.9)

Volume	Invert	Avail.Storage	Storage Description
#1	116.90'	262 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.90	12	0	0
126.00	12	109	109
126.50	600	153	262

Device	Routing	Invert	Outlet Devices
#1	Primary	116.90'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 116.90' / 116.00' S= 0.0129 '/' Cc= 0.900 n= 0.010, Flow Area= 0.79 sf

Primary OutFlow Max=3.88 cfs @ 12.09 hrs HW=118.45' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.88 cfs @ 4.94 fps)

Summary for Pond 9P: SD DMH1-DMH2

Inflow Area = 1.281 ac, 93.10% Impervious, Inflow Depth > 4.61" for 25YEAR STORM event
Inflow = 6.06 cfs @ 12.11 hrs, Volume= 0.492 af
Outflow = 6.05 cfs @ 12.11 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.1 min
Discarded = 3.88 cfs @ 12.11 hrs, Volume= 0.074 af
Primary = 2.17 cfs @ 12.11 hrs, Volume= 0.418 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.22' @ 12.11 hrs Surf.Area= 28 sf Storage= 543 cf

Plug-Flow detention time= 2.3 min calculated for 0.492 af (100% of inflow)

Center-of-Mass det. time= 2.1 min (745.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1	114.70'	273 cf	**6.00'D x 9.66'H Vertical Cone/Cylinder**
#2	114.70'	110 cf	**24.0" D x 35.0'L Pipe Storage S= 0.0030 '/'**
#3	115.00'	276 cf	**24.0" D x 88.0'L Pipe Storage**
		660 cf	Total Available Storage

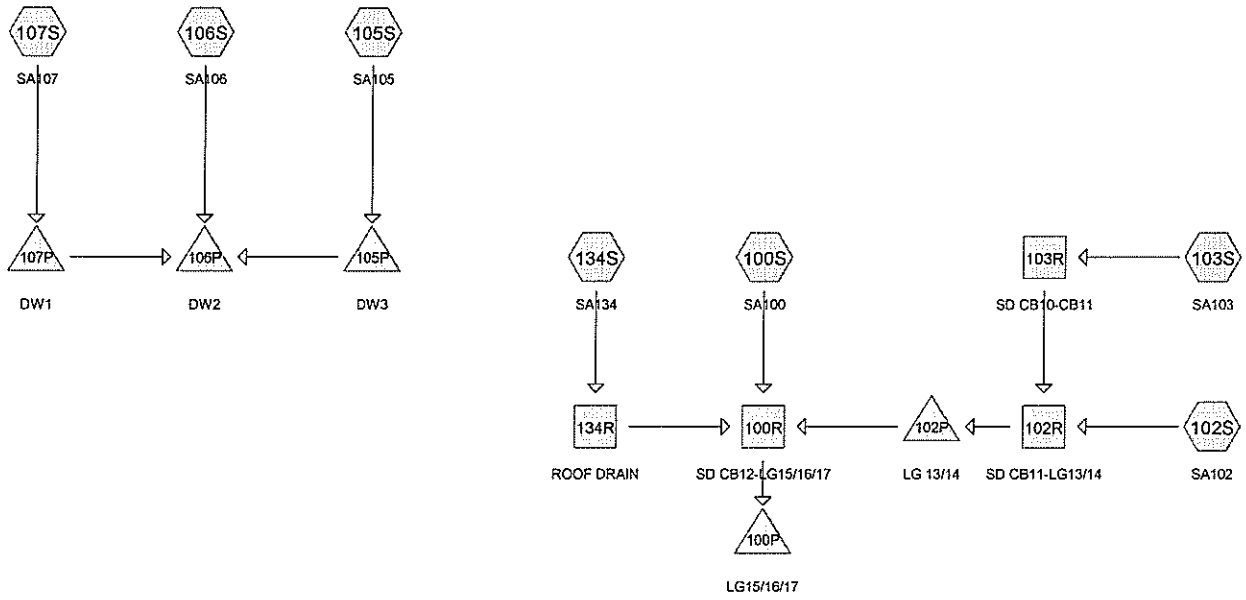
Device	Routing	Invert	Outlet Devices
#1	Device 2	114.70'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	114.70'	**15.0" Round Culvert** L= 24.0' Ke= 0.500 Inlet / Outlet Invert= 114.70' / 114.50' S= 0.0083 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#3	Discarded	119.70'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 5.0' Crest Height
#4	Discarded	121.00'	**3.1' long x 1.00' rise Sharp-Crested Rectangular Weir** 0 End Contraction(s) 7.0' Crest Height

Discarded OutFlow Max=3.77 cfs @ 12.11 hrs HW=120.21' (Free Discharge)
↑—**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.77 cfs @ 2.37 fps)
↑—**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=2.17 cfs @ 12.11 hrs HW=120.21' (Free Discharge)
↑—**2=Culvert** (Passes 2.17 cfs of 13.06 cfs potential flow)
↑—**1=Orifice/Grate** (Orifice Controls 2.17 cfs @ 11.05 fps)

APPENDIX E

GOODWILL SITE POST-DEVELOPMENT CALCULATIONS
PARK DANFORTH MODELS II & III



Subcat Reach Pond Link

Routing Diagram for PARK DANFORTH MODEL II POST
Prepared by BH2M ENGINEERS, Printed 11/17/2014
HydroCAD® 10.00 s/n 00619 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.327	61	>75% Grass cover, Good, HSG B (102S, 103S, 105S, 106S, 107S)
0.369	98	Paved parking, HSG D (100S, 102S, 103S)
0.192	98	Roofs, HSG D (134S)
0.033	98	Unconnected pavement, HSG D (106S, 107S)
0.025	98	Unconnected roofs, HSG D (105S)
0.946	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.327	HSG B	102S, 103S, 105S, 106S, 107S
0.000	HSG C	
0.619	HSG D	100S, 102S, 103S, 105S, 106S, 107S, 134S
0.000	Other	
0.946		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.327	0.000	0.000	0.000	0.327	>75% Grass cover, Good	102S, 103S, 105S, 106S, 107S
0.000	0.000	0.000	0.369	0.000	0.369	Paved parking	100S, 102S, 103S
0.000	0.000	0.000	0.033	0.000	0.033	Unconnected pavement	106S, 107S
0.000	0.000	0.000	0.192	0.000	0.192	Roofs	134S
0.000	0.000	0.000	0.025	0.000	0.025	Unconnected roofs	105S
0.000	**0.327**	**0.000**	**0.619**	**0.000**	**0.946**	**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	100R	115.12	115.08	4.0	0.0100	0.012	12.0	0.0	0.0
2	102R	115.68	115.53	15.0	0.0100	0.012	12.0	0.0	0.0
3	103R	116.25	115.78	47.0	0.0100	0.012	12.0	0.0	0.0
4	134R	0.00	-0.30	30.0	0.0100	0.012	6.0	0.0	0.0
5	100P	115.08	114.96	12.0	0.0100	0.012	12.0	0.0	0.0
6	102P	115.53	115.22	31.0	0.0100	0.012	12.0	0.0	0.0
7	105P	123.90	123.90	28.0	0.0000	0.012	6.0	0.0	0.0
8	107P	123.90	123.90	34.0	0.0000	0.012	6.0	0.0	0.0

Summary for Subcatchment 100S: SA100

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
6,877	98	Paved parking, HSG D
6,877		100.00% Impervious Area

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

Summary for Subcatchment 102S: SA102

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,495	61	>75% Grass cover, Good, HSG B
2,508	98	Paved parking, HSG D
4,003	84	Weighted Average
1,495		37.35% Pervious Area
2,508		62.65% Impervious Area

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

Summary for Subcatchment 103S: SA103

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,344	61	>75% Grass cover, Good, HSG B
6,677	98	Paved parking, HSG D
8,021	92	Weighted Average
1,344		16.76% Pervious Area
6,677		83.24% Impervious Area

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

Summary for Subcatchment 105S: SA105

Runoff = 0.04 cfs @ 12.29 hrs, Volume= 0.005 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,080	98	Unconnected roofs, HSG D
4,513	61	>75% Grass cover, Good, HSG B
5,593	68	Weighted Average, UI Adjusted CN = 65
4,513		80.69% Pervious Area
1,080		19.31% Impervious Area
1,080		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	110	0.0200	0.12		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 106S: SA106

Runoff = 0.02 cfs @ 12.32 hrs, Volume= 0.003 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
4,300	61	>75% Grass cover, Good, HSG B
360	98	Unconnected pavement, HSG D
4,660	64	Weighted Average, UI Adjusted CN = 62
4,300		92.27% Pervious Area
360		7.73% Impervious Area
360		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	90	0.0150	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 107S: SA107

Runoff = 0.03 cfs @ 12.20 hrs, Volume= 0.003 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,088	98	Unconnected pavement, HSG D
2,594	61	>75% Grass cover, Good, HSG B
3,682	72	Weighted Average, UI Adjusted CN = 66
2,594		70.45% Pervious Area
1,088		29.55% Impervious Area
1,088		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	90	0.0300	0.13		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 134S: SA134

Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.041 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
8,370	98	Roofs, HSG D
8,370		100.00% Impervious Area

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

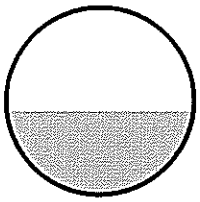
Summary for Reach 100R: SD CB12-LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 1.89" for 2 YEAR STORM event
Inflow = 1.57 cfs @ 12.09 hrs, Volume= 0.098 af
Outflow = 1.57 cfs @ 12.10 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.66 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.64 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 4.0' Slope= 0.0100 '/'
Inlet Invert= 115.12', Outlet Invert= 115.08'



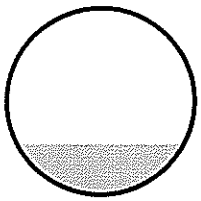
Summary for Reach 102R: SD CB11-LG13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 1.83" for 2 YEAR STORM event
Inflow = 0.60 cfs @ 12.10 hrs, Volume= 0.042 af
Outflow = 0.60 cfs @ 12.10 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 115.68', Outlet Invert= 115.53'



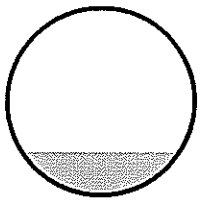
Summary for Reach 103R: SD CB10-CB11

Inflow Area = 0.184 ac, 83.24% Impervious, Inflow Depth > 2.04" for 2 YEAR STORM event
Inflow = 0.45 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.44 cfs @ 12.10 hrs, Volume= 0.031 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.28 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 0.7 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 47.0' Slope= 0.0100 '/'
Inlet Invert= 116.25', Outlet Invert= 115.78'



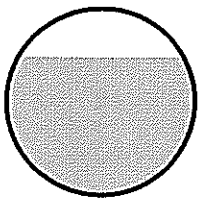
Summary for Reach 134R: ROOF DRAIN

Inflow Area = 0.192 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.54 cfs @ 12.09 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 100P: LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 1.89" for 2 YEAR STORM event
Inflow = 1.57 cfs @ 12.10 hrs, Volume= 0.098 af
Outflow = 1.58 cfs @ 12.10 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 0.024 af
Primary = 1.55 cfs @ 12.10 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.84' @ 12.10 hrs Surf.Area= 162 sf Storage= 541 cf

Plug-Flow detention time= 54.6 min calculated for 0.089 af (90% of inflow)

Center-of-Mass det. time= 26.5 min (770.3 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1	109.00'	412 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,228 cf Overall - 198 cf Embedded = 1,030 cf x 40.0% Voids
#2	112.46'	198 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		610 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
109.00	162	0	0	162
116.58	162	1,228	1,228	504

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.46	48	0	0
116.58	48	198	198

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.00'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.08'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 115.08' / 114.96' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.10 hrs HW=115.84' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.53 cfs @ 12.10 hrs HW=115.84' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 1.53 cfs @ 3.33 fps)

Summary for Pond 102P: LG 13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 1.83" for 2 YEAR STORM event
Inflow = 0.60 cfs @ 12.10 hrs, Volume= 0.042 af
Outflow = 0.60 cfs @ 12.10 hrs, Volume= 0.037 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.014 af
Primary = 0.58 cfs @ 12.10 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.92' @ 12.10 hrs Surf.Area= 117 sf Storage= 296 cf

Plug-Flow detention time= 66.1 min calculated for 0.037 af (88% of inflow)
Center-of-Mass det. time= 27.4 min (803.6 - 776.2)

Volume	Invert	Avail.Storage	Storage Description
#1	110.86'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	112.86'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
110.86	117	0	0	117
117.03	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.86	32	0	0
117.03	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	110.86'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.53'	**12.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 115.53' / 115.22' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=115.92' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.57 cfs @ 12.10 hrs HW=115.92' (Free Discharge)
↑**2=Culvert** (Barrel Controls 0.57 cfs @ 3.00 fps)

Summary for Pond 105P: DW3

Inflow Area = 0.128 ac, 19.31% Impervious, Inflow Depth > 0.44" for 2 YEAR STORM event
Inflow = 0.04 cfs @ 12.29 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 13.72 hrs, Volume= 0.005 af, Atten= 80%, Lag= 85.7 min
Discarded = 0.01 cfs @ 13.72 hrs, Volume= 0.005 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.84' @ 13.72 hrs Surf.Area= 81 sf Storage= 68 cf

Plug-Flow detention time= 104.7 min calculated for 0.005 af (96% of inflow)
Center-of-Mass det. time= 92.0 min (946.7 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Device	Routing	Invert	Outlet Devices
#1	Primary	123.90'	**6.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.01 cfs @ 13.72 hrs HW=119.84' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 106P: DW2

Inflow Area = 0.320 ac, 18.14% Impervious, Inflow Depth > 0.12" for 2 YEAR STORM event
Inflow = 0.02 cfs @ 12.32 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 13.30 hrs, Volume= 0.003 af, Atten= 72%, Lag= 58.6 min
Discarded = 0.01 cfs @ 13.30 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.77' @ 13.30 hrs Surf.Area= 81 sf Storage= 33 cf

Plug-Flow detention time= 56.5 min calculated for 0.003 af (99% of inflow)
Center-of-Mass det. time= 54.5 min (919.9 - 865.5)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
#3	122.90'	762 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,904 cf Overall x 40.0% Voids
#4	123.90'	12 cf	**6.0" D x 62.0'L Pipe Storage**
		1,046 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.90	952	0	0	952
124.90	952	1,904	1,904	1,171

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.01 cfs @ 13.30 hrs HW=118.77' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond 107P: DW1

Inflow Area = 0.085 ac, 29.55% Impervious, Inflow Depth > 0.48" for 2 YEAR STORM event
Inflow = 0.03 cfs @ 12.20 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 13.11 hrs, Volume= 0.003 af, Atten= 79%, Lag= 54.5 min
Discarded = 0.01 cfs @ 13.11 hrs, Volume= 0.003 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.12' @ 13.11 hrs Surf.Area= 81 sf Storage= 45 cf

Plug-Flow detention time= 70.4 min calculated for 0.003 af (99% of inflow)
Center-of-Mass det. time= 68.5 min (916.7 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	206 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 64 cf Embedded = 516 cf x 40.0% Voids
#2	120.74'	64 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		270 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.74	16	64	64

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	123.90'	**6.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 13.11 hrs HW=119.12' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Subcatchment 100S: SA100

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.055 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
6,877	98	Paved parking, HSG D
6,877		100.00% Impervious Area

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

Summary for Subcatchment 102S: SA102

Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,495	61	>75% Grass cover, Good, HSG B
2,508	98	Paved parking, HSG D
4,003	84	Weighted Average
1,495		37.35% Pervious Area
2,508		62.65% Impervious Area

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

Summary for Subcatchment 103S: SA103

Runoff = 0.76 cfs @ 12.09 hrs, Volume= 0.055 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,344	61	>75% Grass cover, Good, HSG B
6,677	98	Paved parking, HSG D
8,021	92	Weighted Average
1,344		16.76% Pervious Area
6,677		83.24% Impervious Area

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

Summary for Subcatchment 105S: SA105

Runoff = 0.15 cfs @ 12.24 hrs, Volume= 0.014 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,080	98	Unconnected roofs, HSG D
4,513	61	>75% Grass cover, Good, HSG B
5,593	68	Weighted Average, UI Adjusted CN = 65
4,513		80.69% Pervious Area
1,080		19.31% Impervious Area
1,080		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	110	0.0200	0.12		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 106S: SA106

Runoff = 0.11 cfs @ 12.24 hrs, Volume= 0.010 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
4,300	61	>75% Grass cover, Good, HSG B
360	98	Unconnected pavement, HSG D
4,660	64	Weighted Average, UI Adjusted CN = 62
4,300		92.27% Pervious Area
360		7.73% Impervious Area
360		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	90	0.0150	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 107S: SA107

Runoff = 0.12 cfs @ 12.17 hrs, Volume= 0.010 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,088	98	Unconnected pavement, HSG D
2,594	61	>75% Grass cover, Good, HSG B
3,682	72	Weighted Average, UI Adjusted CN = 66
2,594		70.45% Pervious Area
1,088		29.55% Impervious Area
1,088		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	90	0.0300	0.13		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 134S: SA134

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.066 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
8,370	98	Roofs, HSG D
8,370		100.00% Impervious Area

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

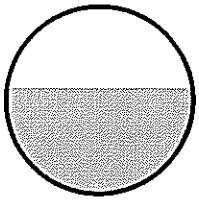
Summary for Reach 100R: SD CB12-LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 3.35" for 10 YEAR STORM event
Inflow = 2.37 cfs @ 12.10 hrs, Volume= 0.175 af
Outflow = 2.36 cfs @ 12.10 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.0 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 4.0' Slope= 0.0100 '/'
Inlet Invert= 115.12', Outlet Invert= 115.08'



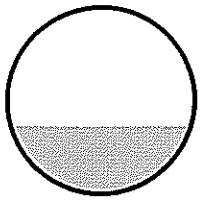
Summary for Reach 102R: SD CB11-LG13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 3.33" for 10 YEAR STORM event
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.077 af
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 115.68', Outlet Invert= 115.53'



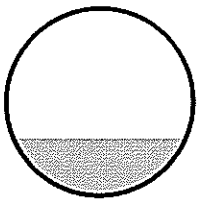
Summary for Reach 103R: SD CB10-CB11

Inflow Area = 0.184 ac, 83.24% Impervious, Inflow Depth > 3.59" for 10 YEAR STORM event
Inflow = 0.76 cfs @ 12.09 hrs, Volume= 0.055 af
Outflow = 0.76 cfs @ 12.09 hrs, Volume= 0.055 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.82 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 0.6 min

Peak Storage= 9 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 47.0' Slope= 0.0100 '/'
Inlet Invert= 116.25', Outlet Invert= 115.78'



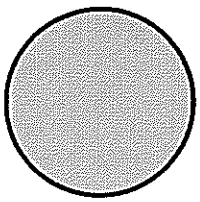
Summary for Reach 134R: ROOF DRAIN

Inflow Area = 0.192 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.066 af
Outflow = 0.61 cfs @ 12.10 hrs, Volume= 0.066 af, Atten= 29%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.51 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 0.3 min

Peak Storage= 6 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 100P: LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 3.35" for 10 YEAR STORM event
Inflow = 2.36 cfs @ 12.10 hrs, Volume= 0.175 af
Outflow = 2.36 cfs @ 12.10 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 0.026 af
Primary = 2.33 cfs @ 12.10 hrs, Volume= 0.138 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 116.08' @ 12.10 hrs Surf.Area= 162 sf Storage= 563 cf

Plug-Flow detention time= 38.4 min calculated for 0.164 af (94% of inflow)

Center-of-Mass det. time= 17.2 min (761.2 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1	109.00'	412 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,228 cf Overall - 198 cf Embedded = 1,030 cf x 40.0% Voids
#2	112.46'	198 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		610 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
109.00	162	0	0	162
116.58	162	1,228	1,228	504

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.46	48	0	0
116.58	48	198	198

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.00'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.08'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 115.08' / 114.96' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.10 hrs HW=116.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.31 cfs @ 12.10 hrs HW=116.07' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 2.31 cfs @ 3.68 fps)

Summary for Pond 102P: LG 13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 3.33" for 10 YEAR STORM event
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.077 af
Outflow = 1.07 cfs @ 12.10 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 1.05 cfs @ 12.10 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 116.08' @ 12.10 hrs Surf.Area= 117 sf Storage= 306 cf

Plug-Flow detention time= 43.4 min calculated for 0.070 af (92% of inflow)
Center-of-Mass det. time= 15.7 min (779.0 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1	110.86'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	112.86'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
110.86	117	0	0	117
117.03	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.86	32	0	0
117.03	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	110.86'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.53'	**12.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 115.53' / 115.22' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=116.08' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.05 cfs @ 12.10 hrs HW=116.08' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 1.05 cfs @ 3.41 fps)

Summary for Pond 105P: DW3

Inflow Area = 0.128 ac, 19.31% Impervious, Inflow Depth > 1.32" for 10 YEAR STORM event
Inflow = 0.15 cfs @ 12.24 hrs, Volume= 0.014 af
Outflow = 0.06 cfs @ 12.68 hrs, Volume= 0.011 af, Atten= 61%, Lag= 26.0 min
Discarded = 0.02 cfs @ 12.68 hrs, Volume= 0.010 af
Primary = 0.04 cfs @ 12.68 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 124.10' @ 12.68 hrs Surf.Area= 81 sf Storage= 238 cf

Plug-Flow detention time= 150.2 min calculated for 0.011 af (79% of inflow)
Center-of-Mass det. time= 94.9 min (922.8 - 827.8)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Device	Routing	Invert	Outlet Devices
#1	Primary	123.90'	**6.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.02 cfs @ 12.68 hrs HW=124.10' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.04 cfs @ 12.68 hrs HW=124.10' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.04 cfs @ 0.82 fps)

Summary for Pond 106P: DW2

Inflow Area = 0.320 ac, 18.14% Impervious, Inflow Depth > 0.44" for 10 YEAR STORM event
Inflow = 0.11 cfs @ 12.24 hrs, Volume= 0.012 af
Outflow = 0.07 cfs @ 12.82 hrs, Volume= 0.010 af, Atten= 33%, Lag= 35.1 min
Discarded = 0.07 cfs @ 12.82 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 122.90' @ 12.80 hrs Surf.Area= 1,033 sf Storage= 190 cf

Plug-Flow detention time= 137.5 min calculated for 0.010 af (83% of inflow)
Center-of-Mass det. time= 92.9 min (920.0 - 827.1)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
#3	122.90'	762 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,904 cf Overall x 40.0% Voids
#4	123.90'	12 cf	**6.0" D x 62.0'L Pipe Storage**
		1,046 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.90	952	0	0	952
124.90	952	1,904	1,904	1,171

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.07 cfs @ 12.82 hrs HW=122.90' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 107P: DW1

Inflow Area = 0.085 ac, 29.55% Impervious, Inflow Depth > 1.39" for 10 YEAR STORM event
Inflow = 0.12 cfs @ 12.17 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 13.67 hrs, Volume= 0.008 af, Atten= 88%, Lag= 89.7 min
Discarded = 0.01 cfs @ 13.67 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 122.97' @ 13.67 hrs Surf.Area= 81 sf Storage= 191 cf

Plug-Flow detention time= 166.0 min calculated for 0.008 af (82% of inflow)
Center-of-Mass det. time= 117.3 min (939.7 - 822.4)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	206 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 64 cf Embedded = 516 cf x 40.0% Voids
#2	120.74'	64 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		270 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.74	16	64	64

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	123.90'	**6.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 13.67 hrs HW=122.97' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Subcatchment 100S: SA100

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.064 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
6,877	98	Paved parking, HSG D
6,877		100.00% Impervious Area

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

Summary for Subcatchment 102S: SA102

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,495	61	>75% Grass cover, Good, HSG B
2,508	98	Paved parking, HSG D
4,003	84	Weighted Average
1,495		37.35% Pervious Area
2,508		62.65% Impervious Area

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

Summary for Subcatchment 103S: SA103

Runoff = 0.91 cfs @ 12.09 hrs, Volume= 0.066 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,344	61	>75% Grass cover, Good, HSG B
6,677	98	Paved parking, HSG D
8,021	92	Weighted Average
1,344		16.76% Pervious Area
6,677		83.24% Impervious Area

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

Summary for Subcatchment 105S: SA105

Runoff = 0.21 cfs @ 12.23 hrs, Volume= 0.019 af, Depth> 1.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,080	98	Unconnected roofs, HSG D
4,513	61	>75% Grass cover, Good, HSG B
5,593	68	Weighted Average, UI Adjusted CN = 65
4,513		80.69% Pervious Area
1,080		19.31% Impervious Area
1,080		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	110	0.0200	0.12		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 106S: SA106

Runoff = 0.15 cfs @ 12.23 hrs, Volume= 0.014 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
4,300	61	>75% Grass cover, Good, HSG B
360	98	Unconnected pavement, HSG D
4,660	64	Weighted Average, UI Adjusted CN = 62
4,300		92.27% Pervious Area
360		7.73% Impervious Area
360		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	90	0.0150	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 107S: SA107

Runoff = 0.17 cfs @ 12.17 hrs, Volume= 0.013 af, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,088	98	Unconnected pavement, HSG D
2,594	61	>75% Grass cover, Good, HSG B
3,682	72	Weighted Average, UI Adjusted CN = 66
2,594		70.45% Pervious Area
1,088		29.55% Impervious Area
1,088		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	90	0.0300	0.13		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 134S: SA134

Runoff = 1.01 cfs @ 12.09 hrs, Volume= 0.078 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
8,370	98	Roofs, HSG D
8,370		100.00% Impervious Area

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

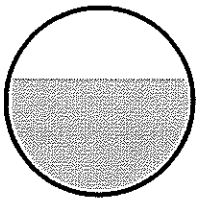
Summary for Reach 100R: SD CB12-LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 4.07" for 25YEAR STORM event
Inflow = 2.71 cfs @ 12.09 hrs, Volume= 0.212 af
Outflow = 2.71 cfs @ 12.09 hrs, Volume= 0.212 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.32 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.0 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 4.0' Slope= 0.0100 '/'
Inlet Invert= 115.12', Outlet Invert= 115.08'



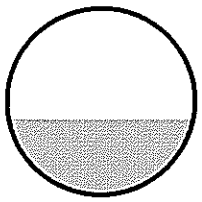
Summary for Reach 102R: SD CB11-LG13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 4.05" for 25YEAR STORM event
Inflow = 1.29 cfs @ 12.09 hrs, Volume= 0.093 af
Outflow = 1.29 cfs @ 12.09 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.43 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 115.68', Outlet Invert= 115.53'



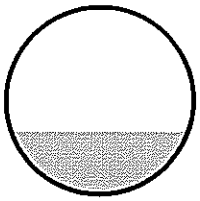
Summary for Reach 103R: SD CB10-CB11

Inflow Area = 0.184 ac, 83.24% Impervious, Inflow Depth > 4.33" for 25YEAR STORM event
Inflow = 0.91 cfs @ 12.09 hrs, Volume= 0.066 af
Outflow = 0.91 cfs @ 12.09 hrs, Volume= 0.066 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.02 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 0.5 min

Peak Storage= 11 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 47.0' Slope= 0.0100 '/'
Inlet Invert= 116.25', Outlet Invert= 115.78'



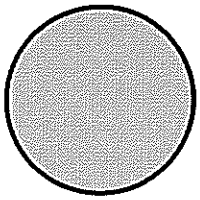
Summary for Reach 134R: ROOF DRAIN

Inflow Area = 0.192 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 1.01 cfs @ 12.09 hrs, Volume= 0.078 af
Outflow = 0.65 cfs @ 12.02 hrs, Volume= 0.078 af, Atten= 36%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 0.3 min

Peak Storage= 6 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.50'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 100P: LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 4.07" for 25YEAR STORM event
Inflow = 2.71 cfs @ 12.09 hrs, Volume= 0.212 af
Outflow = 2.68 cfs @ 12.10 hrs, Volume= 0.201 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 0.027 af
Primary = 2.66 cfs @ 12.10 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 116.18' @ 12.10 hrs Surf.Area= 162 sf Storage= 573 cf

Plug-Flow detention time= 34.1 min calculated for 0.201 af (95% of inflow)

Center-of-Mass det. time= 15.5 min (759.9 - 744.3)

Volume	Invert	Avail.Storage	Storage Description
#1	109.00'	412 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,228 cf Overall - 198 cf Embedded = 1,030 cf x 40.0% Voids
#2	112.46'	198 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		610 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
109.00	162	0	0	162
116.58	162	1,228	1,228	504

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.46	48	0	0
116.58	48	198	198

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.00'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.08'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 115.08' / 114.96' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.10 hrs HW=116.18' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.65 cfs @ 12.10 hrs HW=116.18' (Free Discharge)
↑**2=Culvert** (Barrel Controls 2.65 cfs @ 3.82 fps)

Summary for Pond 102P: LG 13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 4.05" for 25YEAR STORM event
Inflow = 1.29 cfs @ 12.09 hrs, Volume= 0.093 af
Outflow = 1.29 cfs @ 12.10 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.017 af
Primary = 1.28 cfs @ 12.10 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 116.15' @ 12.10 hrs Surf.Area= 117 sf Storage= 311 cf

Plug-Flow detention time= 38.8 min calculated for 0.087 af (93% of inflow)
Center-of-Mass det. time= 15.0 min (774.3 - 759.3)

Volume	Invert	Avail.Storage	Storage Description
#1	110.86'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	112.86'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
110.86	117	0	0	117
117.03	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.86	32	0	0
117.03	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	110.86'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.53'	**12.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 115.53' / 115.22' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=116.15' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.27 cfs @ 12.10 hrs HW=116.15' (Free Discharge)
↑**2=Culvert** (Barrel Controls 1.27 cfs @ 3.55 fps)

Summary for Pond 105P: DW3

Inflow Area = 0.128 ac, 19.31% Impervious, Inflow Depth > 1.82" for 25YEAR STORM event
Inflow = 0.21 cfs @ 12.23 hrs, Volume= 0.019 af
Outflow = 0.19 cfs @ 12.41 hrs, Volume= 0.016 af, Atten= 8%, Lag= 10.7 min
Discarded = 0.02 cfs @ 12.42 hrs, Volume= 0.010 af
Primary = 0.18 cfs @ 12.41 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 124.31' @ 12.42 hrs Surf.Area= 81 sf Storage= 247 cf

Plug-Flow detention time= 112.1 min calculated for 0.016 af (82% of inflow)
Center-of-Mass det. time= 62.2 min (882.9 - 820.7)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Device	Routing	Invert	Outlet Devices
#1	Primary	123.90'	**6.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.02 cfs @ 12.42 hrs HW=124.28' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.16 cfs @ 12.41 hrs HW=124.28' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.16 cfs @ 1.38 fps)

Summary for Pond 106P: DW2

Inflow Area = 0.320 ac, 18.14% Impervious, Inflow Depth > 0.80" for 25YEAR STORM event
Inflow = 0.29 cfs @ 12.41 hrs, Volume= 0.021 af
Outflow = 0.07 cfs @ 12.98 hrs, Volume= 0.019 af, Atten= 76%, Lag= 34.1 min
Discarded = 0.07 cfs @ 12.98 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 123.33' @ 12.98 hrs Surf.Area= 1,033 sf Storage= 370 cf

Plug-Flow detention time= 95.2 min calculated for 0.019 af (88% of inflow)
Center-of-Mass det. time= 62.5 min (872.3 - 809.8)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
#3	122.90'	762 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,904 cf Overall x 40.0% Voids
#4	123.90'	12 cf	**6.0" D x 62.0'L Pipe Storage**
		1,046 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.90	952	0	0	952
124.90	952	1,904	1,904	1,171

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.07 cfs @ 12.98 hrs HW=123.33' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 107P: DW1

Inflow Area = 0.085 ac, 29.55% Impervious, Inflow Depth > 1.90" for 25YEAR STORM event
Inflow = 0.17 cfs @ 12.17 hrs, Volume= 0.013 af
Outflow = 0.06 cfs @ 12.61 hrs, Volume= 0.011 af, Atten= 66%, Lag= 26.1 min
Discarded = 0.02 cfs @ 12.61 hrs, Volume= 0.010 af
Primary = 0.04 cfs @ 12.61 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 124.10' @ 12.61 hrs Surf.Area= 81 sf Storage= 238 cf

Plug-Flow detention time= 153.8 min calculated for 0.011 af (81% of inflow)
Center-of-Mass det. time= 102.0 min (917.4 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	206 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 64 cf Embedded = 516 cf x 40.0% Voids
#2	120.74'	64 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		270 cf	Total Available Storage

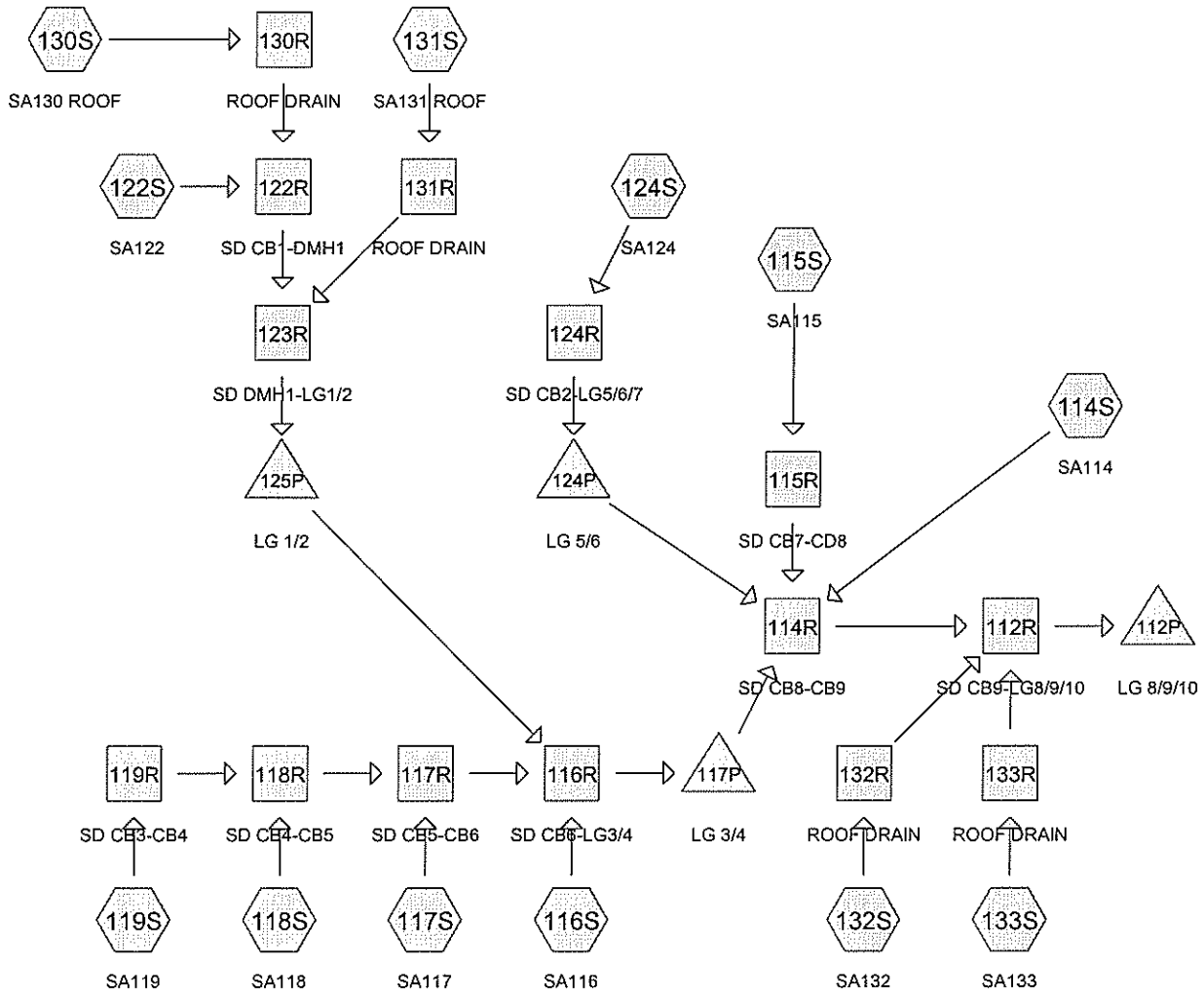
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.74	16	64	64

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	123.90'	**6.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.02 cfs @ 12.61 hrs HW=124.10' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.04 cfs @ 12.61 hrs HW=124.10' (Free Discharge)
└**2=Culvert** (Barrel Controls 0.04 cfs @ 0.77 fps)



Subcat Reach Pond Link

Routing Diagram for PARK DANFORTH MODEL III POST
Prepared by BH2M ENGINEERS, Printed 11/17/2014
HydroCAD® 10.00 s/n 00619 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.023	39	>75% Grass cover, Good, HSG A (124S)
0.080	61	>75% Grass cover, Good, HSG B (116S, 117S, 118S, 119S, 122S)
0.589	98	Paved parking, HSG D (114S, 115S, 116S, 117S, 118S, 119S, 122S, 124S)
0.346	98	Roofs, HSG D (130S, 131S, 132S, 133S)
1.037	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.023	HSG A	124S
0.080	HSG B	116S, 117S, 118S, 119S, 122S
0.000	HSG C	
0.934	HSG D	114S, 115S, 116S, 117S, 118S, 119S, 122S, 124S, 130S, 131S, 132S, 133S
0.000	Other	
1.037		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.023	0.080	0.000	0.000	0.000	0.103	>75% Grass cover, Good	116S, 117S, 118S, 119S, 122S, 124S
0.000	0.000	0.000	0.589	0.000	0.589	Paved parking	114S, 115S, 116S, 117S, 118S, 119S, 122S, 124S
0.000	0.000	0.000	0.346	0.000	0.346	Roofs	130S, 131S, 132S, 133S
0.023	**0.080**	**0.000**	**0.934**	**0.000**	**1.037**	**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	112R	118.50	118.31	19.0	0.0100	0.012	12.0	0.0	0.0
2	114R	119.74	118.60	114.0	0.0100	0.012	12.0	0.0	0.0
3	115R	120.20	119.97	23.0	0.0100	0.012	12.0	0.0	0.0
4	116R	120.03	119.89	14.0	0.0100	0.012	12.0	0.0	0.0
5	117R	120.27	120.13	14.0	0.0100	0.012	12.0	0.0	0.0
6	118R	120.94	120.37	57.0	0.0100	0.012	12.0	0.0	0.0
7	119R	121.15	121.04	11.0	0.0100	0.012	12.0	0.0	0.0
8	122R	121.85	121.21	64.0	0.0100	0.012	12.0	0.0	0.0
9	123R	121.11	120.60	51.0	0.0100	0.012	12.0	0.0	0.0
10	124R	120.90	120.63	27.0	0.0100	0.012	12.0	0.0	0.0
11	130R	0.00	-0.10	10.0	0.0100	0.012	6.0	0.0	0.0
12	131R	0.00	-0.25	25.0	0.0100	0.012	6.0	0.0	0.0
13	132R	0.00	-0.25	25.0	0.0100	0.012	6.0	0.0	0.0
14	133R	0.00	-0.25	25.0	0.0100	0.012	6.0	0.0	0.0
15	112P	118.31	116.40	79.0	0.0242	0.012	12.0	0.0	0.0
16	117P	118.89	118.84	5.0	0.0100	0.012	12.0	0.0	0.0
17	124P	120.63	120.16	47.0	0.0100	0.012	12.0	0.0	0.0
18	125P	120.60	120.41	19.0	0.0100	0.012	12.0	0.0	0.0

Summary for Subcatchment 114S: SA114

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
6,863	98	Paved parking, HSG D
6,863		100.00% Impervious Area

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

Summary for Subcatchment 115S: SA115

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,408	98	Paved parking, HSG D
1,408		100.00% Impervious Area

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

Summary for Subcatchment 116S: SA116

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
3,708	98	Paved parking, HSG D
35	61	>75% Grass cover, Good, HSG B
3,743	98	Weighted Average
35		0.94% Pervious Area
3,708		99.06% Impervious Area

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

Summary for Subcatchment 117S: SA117

Runoff = 0.07 cfs @ 12.10 hrs, Volume= 0.005 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,618	61	>75% Grass cover, Good, HSG B
1,116	98	Paved parking, HSG D
2,734	76	Weighted Average
1,618		59.18% Pervious Area
1,116		40.82% Impervious Area

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

Summary for Subcatchment 118S: SA118

Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,018	61	>75% Grass cover, Good, HSG B
697	98	Paved parking, HSG D
1,715	76	Weighted Average
1,018		59.36% Pervious Area
697		40.64% Impervious Area

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

Summary for Subcatchment 119S: SA119

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.016 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
3,261	98	Paved parking, HSG D
100	61	>75% Grass cover, Good, HSG B
3,361	97	Weighted Average
100		2.98% Pervious Area
3,261		97.02% Impervious Area

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

Summary for Subcatchment 122S: SA122

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
710	61	>75% Grass cover, Good, HSG B
2,135	98	Paved parking, HSG D
2,845	89	Weighted Average
710		24.96% Pervious Area
2,135		75.04% Impervious Area

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

Summary for Subcatchment 124S: SA124

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
1,000	39	>75% Grass cover, Good, HSG A
6,449	98	Paved parking, HSG D
7,449	90	Weighted Average
1,000		13.42% Pervious Area
6,449		86.58% Impervious Area

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

Summary for Subcatchment 130S: SA130 ROOF

Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.015 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
3,082	98	Roofs, HSG D
3,082		100.00% Impervious Area

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

Summary for Subcatchment 131S: SA131 ROOF

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
2,552	98	Roofs, HSG D
2,552		100.00% Impervious Area

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

Summary for Subcatchment 132S: SA132

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
4,394	98	Roofs, HSG D
4,394		100.00% Impervious Area

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

Summary for Subcatchment 133S: SA133

Runoff = 0.33 cfs @ 12.09 hrs, Volume= 0.025 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR STORM Rainfall=3.00"

Area (sf)	CN	Description
5,035	98	Roofs, HSG D
5,035		100.00% Impervious Area

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

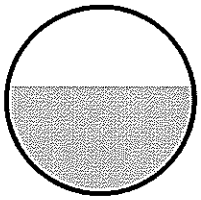
Summary for Reach 112R: SD CB9-LG8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 1.59" for 2 YEAR STORM event
Inflow = 2.42 cfs @ 12.12 hrs, Volume= 0.138 af
Outflow = 2.41 cfs @ 12.12 hrs, Volume= 0.138 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 0.2 min

Peak Storage= 9 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 19.0' Slope= 0.0100 '/'
Inlet Invert= 118.50', Outlet Invert= 118.31'



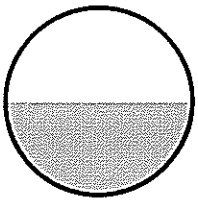
Summary for Reach 114R: SD CB8-CB9

Inflow Area = 0.821 ac, 87.47% Impervious, Inflow Depth > 1.33" for 2 YEAR STORM event
Inflow = 1.93 cfs @ 12.11 hrs, Volume= 0.091 af
Outflow = 1.84 cfs @ 12.12 hrs, Volume= 0.091 af, Atten= 5%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.86 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 1.3 min

Peak Storage= 44 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 114.0' Slope= 0.0100 '/'
Inlet Invert= 119.74', Outlet Invert= 118.60'



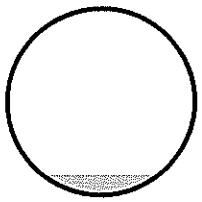
Summary for Reach 115R: SD CB7-CD8

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.09 hrs, Volume= 0.007 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.05 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 23.0' Slope= 0.0100 '/'
Inlet Invert= 120.20', Outlet Invert= 119.97'



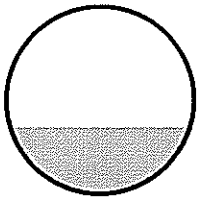
Summary for Reach 116R: SD CB6-LG3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 1.59" for 2 YEAR STORM event
Inflow = 1.05 cfs @ 12.10 hrs, Volume= 0.061 af
Outflow = 1.04 cfs @ 12.10 hrs, Volume= 0.061 af, Atten= 1%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.03', Outlet Invert= 119.89'



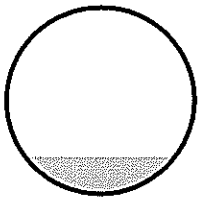
Summary for Reach 117R: SD CB5-CB6

Inflow Area = 0.179 ac, 64.97% Impervious, Inflow Depth > 1.60" for 2 YEAR STORM event
Inflow = 0.33 cfs @ 12.10 hrs, Volume= 0.024 af
Outflow = 0.32 cfs @ 12.10 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.99 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.27', Outlet Invert= 120.13'



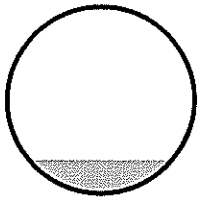
Summary for Reach 118R: SD CB4-CB5

Inflow Area = 0.117 ac, 77.97% Impervious, Inflow Depth > 1.97" for 2 YEAR STORM event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.26 cfs @ 12.10 hrs, Volume= 0.019 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.80 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 0.9 min

Peak Storage= 5 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 57.0' Slope= 0.0100 '/'
Inlet Invert= 120.94', Outlet Invert= 120.37'



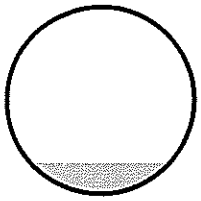
Summary for Reach 119R: SD CB3-CB4

Inflow Area = 0.077 ac, 97.02% Impervious, Inflow Depth > 2.50" for 2 YEAR STORM event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.016 af
Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 11.0' Slope= 0.0100 '/'
Inlet Invert= 121.15', Outlet Invert= 121.04'



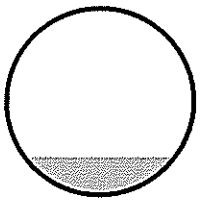
Summary for Reach 122R: SD CB1-DMH1

Inflow Area = 0.136 ac, 88.02% Impervious, Inflow Depth > 2.20" for 2 YEAR STORM event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 1.0 min

Peak Storage= 7 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 64.0' Slope= 0.0100 '/'
Inlet Invert= 121.85', Outlet Invert= 121.21'



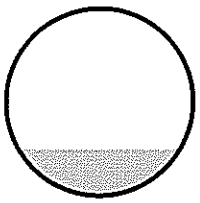
Summary for Reach 123R: SD DMH1-LG1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 2.32" for 2 YEAR STORM event
Inflow = 0.50 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.50 cfs @ 12.10 hrs, Volume= 0.038 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.40 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.7 min

Peak Storage= 8 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 51.0' Slope= 0.0100 '/'
Inlet Invert= 121.11', Outlet Invert= 120.60'



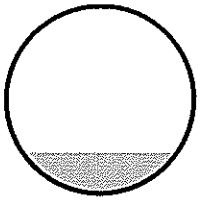
Summary for Reach 124R: SD CB2-LG5/6/7

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 1.86" for 2 YEAR STORM event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.38 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.14 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 0.4 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 27.0' Slope= 0.0100 '/'
Inlet Invert= 120.90', Outlet Invert= 120.63'



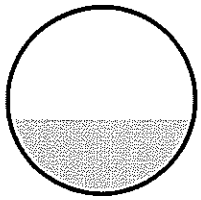
Summary for Reach 130R: ROOF DRAIN

Inflow Area = 0.071 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.20 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.10'



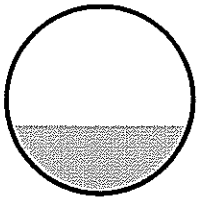
Summary for Reach 131R: ROOF DRAIN

Inflow Area = 0.059 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



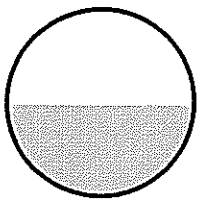
Summary for Reach 132R: ROOF DRAIN

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.05 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



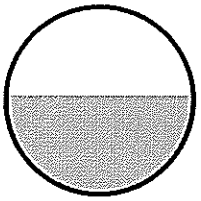
Summary for Reach 133R: ROOF DRAIN

Inflow Area = 0.116 ac,100.00% Impervious, Inflow Depth > 2.59" for 2 YEAR STORM event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.33 cfs @ 12.09 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 0.3 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



Summary for Pond 112P: LG 8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 1.59" for 2 YEAR STORM event
Inflow = 2.41 cfs @ 12.12 hrs, Volume= 0.138 af
Outflow = 2.38 cfs @ 12.13 hrs, Volume= 0.127 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.03 cfs @ 12.13 hrs, Volume= 0.027 af
Primary = 2.35 cfs @ 12.13 hrs, Volume= 0.100 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.19' @ 12.13 hrs Surf.Area= 198 sf Storage= 655 cf

Plug-Flow detention time= 44.2 min calculated for 0.126 af (92% of inflow)
Center-of-Mass det. time= 20.9 min (765.5 - 744.5)

Volume	Invert	Avail.Storage	Storage Description
#1	112.64'	461 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,420 cf Overall - 267 cf Embedded = 1,153 cf x 40.0% Voids
#2	115.64'	267 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		728 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.64	198	0	0	198
119.81	198	1,420	1,420	556

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
115.64	64	0	0
119.81	64	267	267

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.64'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.31'	**12.0" Round Culvert** L= 79.0' Ke= 0.500 Inlet / Outlet Invert= 118.31' / 116.40' S= 0.0242 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.13 hrs HW=119.17' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.28 cfs @ 12.13 hrs HW=119.17' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 2.28 cfs @ 3.16 fps)

Summary for Pond 117P: LG 3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 1.59" for 2 YEAR STORM event
Inflow = 1.04 cfs @ 12.10 hrs, Volume= 0.061 af
Outflow = 1.03 cfs @ 12.11 hrs, Volume= 0.056 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.016 af
Primary = 1.01 cfs @ 12.11 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.51' @ 12.11 hrs Surf.Area= 117 sf Storage= 311 cf

Plug-Flow detention time= 47.1 min calculated for 0.056 af (92% of inflow)
Center-of-Mass det. time= 21.0 min (774.7 - 753.7)

Volume	Invert	Avail.Storage	Storage Description
#1	114.22'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	116.22'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
114.22	117	0	0	117
120.39	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.22	32	0	0
120.39	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	114.22'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.89'	**12.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 118.89' / 118.84' S= 0.0100 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=119.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.99 cfs @ 12.11 hrs HW=119.50' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 0.99 cfs @ 2.82 fps)

Summary for Pond 124P: LG 5/6

Inflow Area =	0.171 ac, 86.58% Impervious, Inflow Depth >	1.86"	for 2 YEAR STORM event	
Inflow =	0.38 cfs @	12.09 hrs, Volume=	0.027 af	
Outflow =	0.42 cfs @	12.12 hrs, Volume=	0.023 af, Atten= 0%, Lag= 1.4 min	
Discarded =	0.02 cfs @	12.12 hrs, Volume=	0.013 af	
Primary =	0.40 cfs @	12.12 hrs, Volume=	0.010 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.98' @ 12.12 hrs Surf.Area= 117 sf Storage= 293 cf

Plug-Flow detention time= 96.2 min calculated for 0.023 af (85% of inflow)
Center-of-Mass det. time= 53.2 min (830.3 - 777.0)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	117.96'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.13	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.96	32	0	0
122.13	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.63'	**12.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 120.63' / 120.16' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.12 hrs HW=120.92' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.35 cfs @ 12.12 hrs HW=120.92' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.35 cfs @ 1.83 fps)

Summary for Pond 125P: LG 1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 2.32" for 2 YEAR STORM event
Inflow = 0.50 cfs @ 12.10 hrs, Volume= 0.038 af
Outflow = 0.50 cfs @ 12.11 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.015 af
Primary = 0.48 cfs @ 12.11 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.97' @ 12.11 hrs Surf.Area= 117 sf Storage= 276 cf

Plug-Flow detention time= 73.0 min calculated for 0.033 af (88% of inflow)
Center-of-Mass det. time= 36.5 min (787.8 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	260 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 718 cf Overall - 69 cf Embedded = 649 cf x 40.0% Voids
#2	117.93'	69 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		329 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.10	117	718	718	352

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.93	32	0	0
120.10	32	69	69

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.60'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 120.60' / 120.41' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=120.96' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.47 cfs @ 12.11 hrs HW=120.96' (Free Discharge)
↑**2=Culvert** (Barrel Controls 0.47 cfs @ 2.72 fps)

Summary for Subcatchment 114S: SA114

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 0.054 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
6,863	98	Paved parking, HSG D
6,863		100.00% Impervious Area

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

Summary for Subcatchment 115S: SA115

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,408	98	Paved parking, HSG D
1,408		100.00% Impervious Area

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

Summary for Subcatchment 116S: SA116

Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.030 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
3,708	98	Paved parking, HSG D
35	61	>75% Grass cover, Good, HSG B
3,743	98	Weighted Average
35		0.94% Pervious Area
3,708		99.06% Impervious Area

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

Summary for Subcatchment 117S: SA117

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,618	61	>75% Grass cover, Good, HSG B
1,116	98	Paved parking, HSG D
2,734	76	Weighted Average
1,618		59.18% Pervious Area
1,116		40.82% Impervious Area

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

Summary for Subcatchment 118S: SA118

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,018	61	>75% Grass cover, Good, HSG B
697	98	Paved parking, HSG D
1,715	76	Weighted Average
1,018		59.36% Pervious Area
697		40.64% Impervious Area

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

Summary for Subcatchment 119S: SA119

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
3,261	98	Paved parking, HSG D
100	61	>75% Grass cover, Good, HSG B
3,361	97	Weighted Average
100		2.98% Pervious Area
3,261		97.02% Impervious Area

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

Summary for Subcatchment 122S: SA122

Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
710	61	>75% Grass cover, Good, HSG B
2,135	98	Paved parking, HSG D
2,845	89	Weighted Average
710		24.96% Pervious Area
2,135		75.04% Impervious Area

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

Summary for Subcatchment 124S: SA124

Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.048 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
1,000	39	>75% Grass cover, Good, HSG A
6,449	98	Paved parking, HSG D
7,449	90	Weighted Average
1,000		13.42% Pervious Area
6,449		86.58% Impervious Area

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

Summary for Subcatchment 130S: SA130 ROOF

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
3,082	98	Roofs, HSG D
3,082		100.00% Impervious Area

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

Summary for Subcatchment 131S: SA131 ROOF

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
2,552	98	Roofs, HSG D
2,552		100.00% Impervious Area

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

Summary for Subcatchment 132S: SA132

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
4,394	98	Roofs, HSG D
4,394		100.00% Impervious Area

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

Summary for Subcatchment 133S: SA133

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR STORM Rainfall=4.70"

Area (sf)	CN	Description
5,035	98	Roofs, HSG D
5,035		100.00% Impervious Area

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

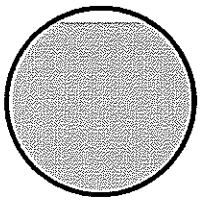
Summary for Reach 112R: SD CB9-LG8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 2.99" for 10 YEAR STORM event
Inflow = 4.16 cfs @ 12.10 hrs, Volume= 0.259 af
Outflow = 4.14 cfs @ 12.11 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.60 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.11 fps, Avg. Travel Time= 0.2 min

Peak Storage= 14 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.92'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 19.0' Slope= 0.0100 '/'
Inlet Invert= 118.50', Outlet Invert= 118.31'



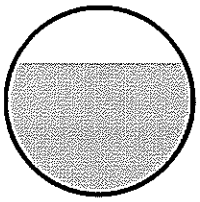
Summary for Reach 114R: SD CB8-CB9

Inflow Area = 0.821 ac, 87.47% Impervious, Inflow Depth > 2.69" for 10 YEAR STORM event
Inflow = 3.27 cfs @ 12.10 hrs, Volume= 0.184 af
Outflow = 3.20 cfs @ 12.11 hrs, Volume= 0.184 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.51 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.81 fps, Avg. Travel Time= 1.0 min

Peak Storage= 67 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 114.0' Slope= 0.0100 '/'
Inlet Invert= 119.74', Outlet Invert= 118.60'



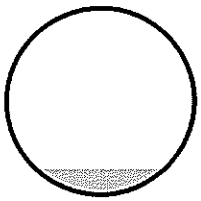
Summary for Reach 115R: SD CB7-CD8

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 0.4 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 23.0' Slope= 0.0100 '/'
Inlet Invert= 120.20', Outlet Invert= 119.97'



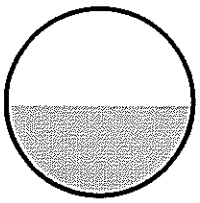
Summary for Reach 116R: SD CB6-LG3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 2.97" for 10 YEAR STORM event
Inflow = 1.79 cfs @ 12.10 hrs, Volume= 0.114 af
Outflow = 1.78 cfs @ 12.10 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.82 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.03', Outlet Invert= 119.89'



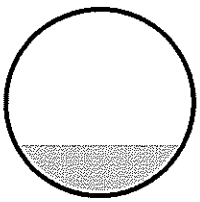
Summary for Reach 117R: SD CB5-CB6

Inflow Area = 0.179 ac, 64.97% Impervious, Inflow Depth > 2.96" for 10 YEAR STORM event
Inflow = 0.61 cfs @ 12.10 hrs, Volume= 0.044 af
Outflow = 0.61 cfs @ 12.10 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.27', Outlet Invert= 120.13'



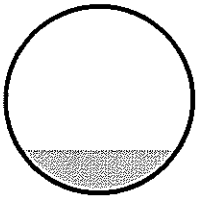
Summary for Reach 118R: SD CB4-CB5

Inflow Area = 0.117 ac, 77.97% Impervious, Inflow Depth > 3.41" for 10 YEAR STORM event
Inflow = 0.45 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.44 cfs @ 12.10 hrs, Volume= 0.033 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.28 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 0.8 min

Peak Storage= 8 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 57.0' Slope= 0.0100 '/'
Inlet Invert= 120.94', Outlet Invert= 120.37'



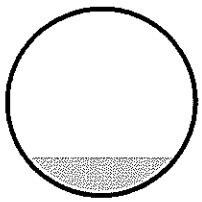
Summary for Reach 119R: SD CB3-CB4

Inflow Area = 0.077 ac, 97.02% Impervious, Inflow Depth > 4.07" for 10 YEAR STORM event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 11.0' Slope= 0.0100 '/'
Inlet Invert= 121.15', Outlet Invert= 121.04'



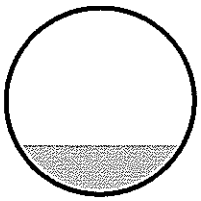
Summary for Reach 122R: SD CB1-DMH1

Inflow Area = 0.136 ac, 88.02% Impervious, Inflow Depth > 3.73" for 10 YEAR STORM event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.042 af
Outflow = 0.57 cfs @ 12.10 hrs, Volume= 0.042 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.52 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 0.8 min

Peak Storage= 10 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 64.0' Slope= 0.0100 '/'
Inlet Invert= 121.85', Outlet Invert= 121.21'



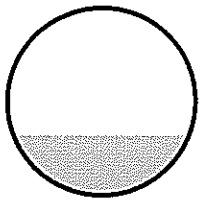
Summary for Reach 123R: SD DMH1-LG1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 3.86" for 10 YEAR STORM event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 0.063 af
Outflow = 0.82 cfs @ 12.10 hrs, Volume= 0.063 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.91 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 0.6 min

Peak Storage= 11 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 51.0' Slope= 0.0100 '/'
Inlet Invert= 121.11', Outlet Invert= 120.60'



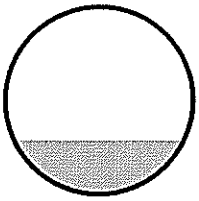
Summary for Reach 124R: SD CB2-LG5/6/7

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 3.39" for 10 YEAR STORM event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.048 af
Outflow = 0.68 cfs @ 12.09 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 27.0' Slope= 0.0100 '/'
Inlet Invert= 120.90', Outlet Invert= 120.63'



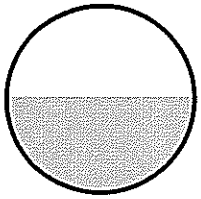
Summary for Reach 130R: ROOF DRAIN

Inflow Area = 0.071 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.10'



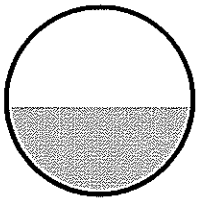
Summary for Reach 131R: ROOF DRAIN

Inflow Area = 0.059 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.98 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



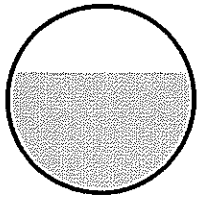
Summary for Reach 132R: ROOF DRAIN

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.45 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.45 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.3 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



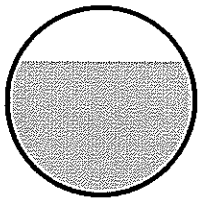
Summary for Reach 133R: ROOF DRAIN

Inflow Area = 0.116 ac,100.00% Impervious, Inflow Depth > 4.15" for 10 YEAR STORM event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.52 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.47 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



Summary for Pond 112P: LG 8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 2.99" for 10 YEAR STORM event
Inflow = 4.14 cfs @ 12.11 hrs, Volume= 0.259 af
Outflow = 4.07 cfs @ 12.12 hrs, Volume= 0.246 af, Atten= 2%, Lag= 0.6 min
Discarded = 0.03 cfs @ 12.13 hrs, Volume= 0.029 af
Primary = 4.04 cfs @ 12.12 hrs, Volume= 0.217 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.95' @ 12.12 hrs Surf.Area= 198 sf Storage= 728 cf

Plug-Flow detention time= 29.4 min calculated for 0.245 af (95% of inflow)
Center-of-Mass det. time= 13.6 min (758.5 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	112.64'	461 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,420 cf Overall - 267 cf Embedded = 1,153 cf x 40.0% Voids
#2	115.64'	267 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		728 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.64	198	0	0	198
119.81	198	1,420	1,420	556

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
115.64	64	0	0
119.81	64	267	267

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.64'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.31'	**12.0" Round Culvert** L= 79.0' Ke= 0.500 Inlet / Outlet Invert= 118.31' / 116.40' S= 0.0242 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.13 hrs HW=119.87' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=3.93 cfs @ 12.12 hrs HW=119.89' (Free Discharge)
↑**2=Culvert** (Inlet Controls 3.93 cfs @ 5.00 fps)

Summary for Pond 117P: LG 3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 2.97" for 10 YEAR STORM event
Inflow = 1.78 cfs @ 12.10 hrs, Volume= 0.114 af
Outflow = 1.78 cfs @ 12.11 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.017 af
Primary = 1.76 cfs @ 12.11 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.76' @ 12.11 hrs Surf.Area= 117 sf Storage= 327 cf

Plug-Flow detention time= 30.5 min calculated for 0.107 af (94% of inflow)
Center-of-Mass det. time= 12.3 min (763.8 - 751.5)

Volume	Invert	Avail.Storage	Storage Description
#1	114.22'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	116.22'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
114.22	117	0	0	117
120.39	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.22	32	0	0
120.39	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	114.22'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.89'	**12.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 118.89' / 118.84' S= 0.0100 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=119.75' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.74 cfs @ 12.11 hrs HW=119.75' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 1.74 cfs @ 3.25 fps)

Summary for Pond 124P: LG 5/6

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 3.39" for 10 YEAR STORM event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.048 af
Outflow = 0.68 cfs @ 12.10 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.015 af
Primary = 0.66 cfs @ 12.10 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.04' @ 12.10 hrs Surf.Area= 117 sf Storage= 297 cf

Plug-Flow detention time= 61.4 min calculated for 0.043 af (89% of inflow)
Center-of-Mass det. time= 25.7 min (788.6 - 762.8)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	117.96'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.13	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.96	32	0	0
122.13	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.63'	**12.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 120.63' / 120.16' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=121.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.66 cfs @ 12.10 hrs HW=121.04' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.66 cfs @ 2.18 fps)

Summary for Pond 125P: LG 1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 3.85" for 10 YEAR STORM event
Inflow = 0.82 cfs @ 12.10 hrs, Volume= 0.063 af
Outflow = 0.82 cfs @ 12.10 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.017 af
Primary = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.09' @ 12.11 hrs Surf.Area= 117 sf Storage= 282 cf

Plug-Flow detention time= 53.3 min calculated for 0.057 af (91% of inflow)
Center-of-Mass det. time= 23.2 min (768.6 - 745.4)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	260 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 718 cf Overall - 69 cf Embedded = 649 cf x 40.0% Voids
#2	117.93'	69 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		329 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.10	117	718	718	352

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.93	32	0	0
120.10	32	69	69

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.60'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 120.60' / 120.41' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=121.09' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.79 cfs @ 12.10 hrs HW=121.09' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 0.79 cfs @ 3.03 fps)

Summary for Subcatchment 114S: SA114

Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.064 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
6,863	98	Paved parking, HSG D
6,863		100.00% Impervious Area

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

Summary for Subcatchment 115S: SA115

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,408	98	Paved parking, HSG D
1,408		100.00% Impervious Area

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

Summary for Subcatchment 116S: SA116

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
3,708	98	Paved parking, HSG D
35	61	>75% Grass cover, Good, HSG B
3,743	98	Weighted Average
35		0.94% Pervious Area
3,708		99.06% Impervious Area

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

Summary for Subcatchment 117S: SA117

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.014 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,618	61	>75% Grass cover, Good, HSG B
1,116	98	Paved parking, HSG D
2,734	76	Weighted Average
1,618		59.18% Pervious Area
1,116		40.82% Impervious Area

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

Summary for Subcatchment 118S: SA118

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.009 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,018	61	>75% Grass cover, Good, HSG B
697	98	Paved parking, HSG D
1,715	76	Weighted Average
1,018		59.36% Pervious Area
697		40.64% Impervious Area

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

Summary for Subcatchment 119S: SA119

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
3,261	98	Paved parking, HSG D
100	61	>75% Grass cover, Good, HSG B
3,361	97	Weighted Average
100		2.98% Pervious Area
3,261		97.02% Impervious Area

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

Summary for Subcatchment 122S: SA122

Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 4.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
710	61	>75% Grass cover, Good, HSG B
2,135	98	Paved parking, HSG D
2,845	89	Weighted Average
710		24.96% Pervious Area
2,135		75.04% Impervious Area

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

Summary for Subcatchment 124S: SA124

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.059 af, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
1,000	39	>75% Grass cover, Good, HSG A
6,449	98	Paved parking, HSG D
7,449	90	Weighted Average
1,000		13.42% Pervious Area
6,449		86.58% Impervious Area

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

Summary for Subcatchment 130S: SA130 ROOF

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
3,082	98	Roofs, HSG D
3,082		100.00% Impervious Area

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

Summary for Subcatchment 131S: SA131 ROOF

Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
2,552	98	Roofs, HSG D
2,552		100.00% Impervious Area

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

Summary for Subcatchment 132S: SA132

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.041 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
4,394	98	Roofs, HSG D
4,394		100.00% Impervious Area

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

Summary for Subcatchment 133S: SA133

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 0.047 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YEAR STORM Rainfall=5.50"

Area (sf)	CN	Description
5,035	98	Roofs, HSG D
5,035		100.00% Impervious Area

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

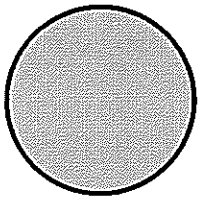
Summary for Reach 112R: SD CB9-LG8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 3.68" for 25YEAR STORM event
Inflow = 4.94 cfs @ 12.10 hrs, Volume= 0.318 af
Outflow = 4.19 cfs @ 12.07 hrs, Volume= 0.318 af, Atten= 15%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.59 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.25 fps, Avg. Travel Time= 0.1 min

Peak Storage= 15 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 19.0' Slope= 0.0100 '/'
Inlet Invert= 118.50', Outlet Invert= 118.31'



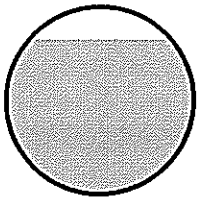
Summary for Reach 114R: SD CB8-CB9

Inflow Area = 0.821 ac, 87.47% Impervious, Inflow Depth > 3.37" for 25YEAR STORM event
Inflow = 3.90 cfs @ 12.10 hrs, Volume= 0.230 af
Outflow = 3.83 cfs @ 12.11 hrs, Volume= 0.230 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.60 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 1.0 min

Peak Storage= 79 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.83'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 114.0' Slope= 0.0100 '/'
Inlet Invert= 119.74', Outlet Invert= 118.60'



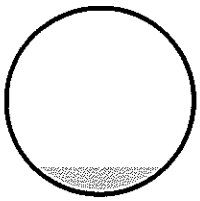
Summary for Reach 115R: SD CB7-CD8

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.46 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 23.0' Slope= 0.0100 '/'
Inlet Invert= 120.20', Outlet Invert= 119.97'



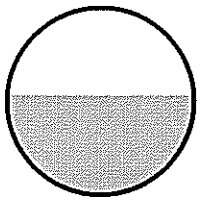
Summary for Reach 116R: SD CB6-LG3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 3.66" for 25YEAR STORM event
Inflow = 2.14 cfs @ 12.10 hrs, Volume= 0.140 af
Outflow = 2.14 cfs @ 12.10 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.04 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.78 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.03', Outlet Invert= 119.89'



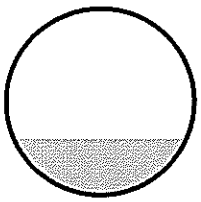
Summary for Reach 117R: SD CB5-CB6

Inflow Area = 0.179 ac, 64.97% Impervious, Inflow Depth > 3.63" for 25YEAR STORM event
Inflow = 0.74 cfs @ 12.10 hrs, Volume= 0.054 af
Outflow = 0.74 cfs @ 12.10 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.80 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.27', Outlet Invert= 120.13'



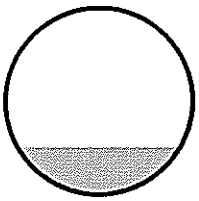
Summary for Reach 118R: SD CB4-CB5

Inflow Area = 0.117 ac, 77.97% Impervious, Inflow Depth > 4.11" for 25YEAR STORM event
Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.53 cfs @ 12.10 hrs, Volume= 0.040 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.46 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 0.7 min

Peak Storage= 9 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 57.0' Slope= 0.0100 '/'
Inlet Invert= 120.94', Outlet Invert= 120.37'



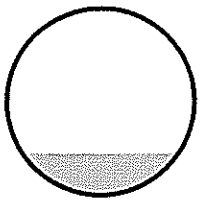
Summary for Reach 119R: SD CB3-CB4

Inflow Area = 0.077 ac, 97.02% Impervious, Inflow Depth > 4.80" for 25YEAR STORM event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.18 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 11.0' Slope= 0.0100 '/'
Inlet Invert= 121.15', Outlet Invert= 121.04'



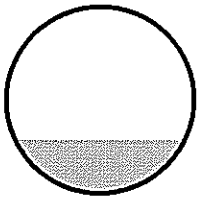
Summary for Reach 122R: SD CB1-DMH1

Inflow Area = 0.136 ac, 88.02% Impervious, Inflow Depth > 4.46" for 25YEAR STORM event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.67 cfs @ 12.10 hrs, Volume= 0.051 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.8 min

Peak Storage= 12 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 64.0' Slope= 0.0100 '/'
Inlet Invert= 121.85', Outlet Invert= 121.21'



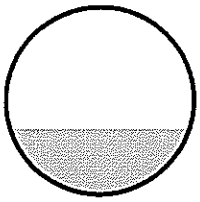
Summary for Reach 123R: SD DMH1-LG1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 4.58" for 25YEAR STORM event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.074 af
Outflow = 0.97 cfs @ 12.10 hrs, Volume= 0.074 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 0.5 min

Peak Storage= 12 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 51.0' Slope= 0.0100 '/'
Inlet Invert= 121.11', Outlet Invert= 120.60'



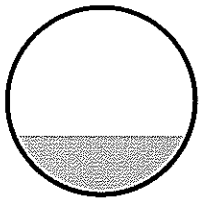
Summary for Reach 124R: SD CB2-LG5/6/7

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 4.12" for 25YEAR STORM event
Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.059 af
Outflow = 0.82 cfs @ 12.09 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.90 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 0.3 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 27.0' Slope= 0.0100 '/'
Inlet Invert= 120.90', Outlet Invert= 120.63'



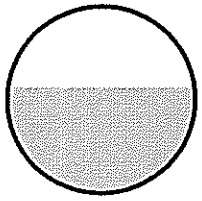
Summary for Reach 130R: ROOF DRAIN

Inflow Area = 0.071 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.37 cfs @ 12.09 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.24 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.10'



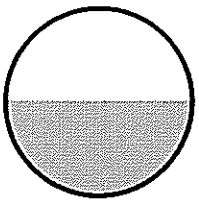
Summary for Reach 131R: ROOF DRAIN

Inflow Area = 0.059 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.10 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



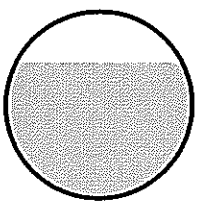
Summary for Reach 132R: ROOF DRAIN

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.041 af
Outflow = 0.53 cfs @ 12.09 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.49 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



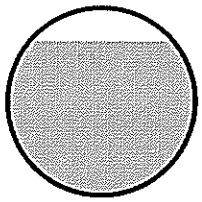
Summary for Reach 133R: ROOF DRAIN

Inflow Area = 0.116 ac,100.00% Impervious, Inflow Depth > 4.87" for 25YEAR STORM event
Inflow = 0.61 cfs @ 12.09 hrs, Volume= 0.047 af
Outflow = 0.61 cfs @ 12.09 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.3 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



Summary for Pond 112P: LG 8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 3.68" for 25YEAR STORM event
Inflow = 4.19 cfs @ 12.07 hrs, Volume= 0.318 af
Outflow = 4.20 cfs @ 12.10 hrs, Volume= 0.305 af, Atten= 0%, Lag= 1.9 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 0.030 af
Primary = 4.16 cfs @ 12.10 hrs, Volume= 0.275 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.02' @ 12.10 hrs Surf.Area= 198 sf Storage= 728 cf

Plug-Flow detention time= 26.4 min calculated for 0.305 af (96% of inflow)
Center-of-Mass det. time= 12.2 min (757.7 - 745.4)

Volume	Invert	Avail.Storage	Storage Description
#1	112.64'	461 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,420 cf Overall - 267 cf Embedded = 1,153 cf x 40.0% Voids
#2	115.64'	267 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		728 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.64	198	0	0	198
119.81	198	1,420	1,420	556

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
115.64	64	0	0
119.81	64	267	267

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.64'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.31'	**12.0" Round Culvert** L= 79.0' Ke= 0.500 Inlet / Outlet Invert= 118.31' / 116.40' S= 0.0242 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 12.10 hrs HW=120.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=4.15 cfs @ 12.10 hrs HW=120.02' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 4.15 cfs @ 5.29 fps)

Summary for Pond 117P: LG 3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 3.66" for 25YEAR STORM event
Inflow = 2.14 cfs @ 12.10 hrs, Volume= 0.140 af
Outflow = 2.13 cfs @ 12.11 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.018 af
Primary = 2.12 cfs @ 12.11 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.87' @ 12.11 hrs Surf.Area= 117 sf Storage= 334 cf

Plug-Flow detention time= 26.9 min calculated for 0.133 af (95% of inflow)
Center-of-Mass det. time= 11.4 min (761.9 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1	114.22'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	116.22'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
114.22	117	0	0	117
120.39	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.22	32	0	0
120.39	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	114.22'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.89'	**12.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 118.89' / 118.84' S= 0.0100 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=119.86' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.09 cfs @ 12.11 hrs HW=119.86' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 2.09 cfs @ 3.42 fps)

Summary for Pond 124P: LG 5/6

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 4.12" for 25YEAR STORM event
Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.059 af
Outflow = 0.82 cfs @ 12.10 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 0.80 cfs @ 12.10 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.09' @ 12.10 hrs Surf.Area= 117 sf Storage= 300 cf

Plug-Flow detention time= 54.0 min calculated for 0.053 af (90% of inflow)
Center-of-Mass det. time= 21.3 min (779.9 - 758.6)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	117.96'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.13	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.96	32	0	0
122.13	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.63'	**12.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 120.63' / 120.16' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=121.08' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.79 cfs @ 12.10 hrs HW=121.08' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 0.79 cfs @ 3.36 fps)

Summary for Pond 125P: LG 1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 4.58" for 25YEAR STORM event
Inflow = 0.97 cfs @ 12.10 hrs, Volume= 0.074 af
Outflow = 0.97 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.018 af
Primary = 0.95 cfs @ 12.10 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.14' @ 12.10 hrs Surf.Area= 117 sf Storage= 284 cf

Plug-Flow detention time= 48.5 min calculated for 0.069 af (92% of inflow)
Center-of-Mass det. time= 20.4 min (764.1 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	260 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 718 cf Overall - 69 cf Embedded = 649 cf x 40.0% Voids
#2	117.93'	69 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		329 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.10	117	718	718	352

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.93	32	0	0
120.10	32	69	69

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.60'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 120.60' / 120.41' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=121.14' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.94 cfs @ 12.10 hrs HW=121.14' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 0.94 cfs @ 3.15 fps)

APPENDIX F

O&M PLAN

OPERATIONS & MAINTENANCE PLAN
FOR STORMWATER FACILITIES
October 2014

For: The Park Danforth
777 Stevens Avenue
Portland, Maine

The applicant, The Park Danforth, will be responsible for all operation and maintenance of the entire site.

Site Description

The Park Danforth is an existing elderly housing project that will be expanded.

Stormwater Overview and Objectives

The Stormwater Plan has two separate systems:

1. The existing on-site stormwater system that discharges to the City stormdrain in Forest Avenue.

2. The new stormwater system that incorporates infiltration for the "First Flush" therefore providing treatment before discharging to the city stormdrain in Forest Avenue.

Contacts:

Design Engineer:	BH2M 28 State Street Gorham, Me. 04038 (207) 839-2771
Developer:	The Park Danforth 777 Stevens Avenue Portland, Me. 04103
Inspector:	_____ _____ _____ _____

Contractors:

Contractor 1 _____
_____
_____
_____

Contractor 2 _____
_____
_____
_____

Purpose

The following O&M Plan provides guidance and schedules for the O&M of the stormwater facility.

Leaching Galleries

1. Inlet Inspections: The inlet of the basin shall be checked periodically to ensure that flows are not blocked by debris. Inspections shall be conducted monthly during wet weather conditions from March to November.

2. Erosion & Instability: The drywell should be inspected annually for erosion, destabilization of side slopes, embankment settling and other signs of structural failure, and loss of storage volume due to sediment accumulation. Corrective action should be taken immediately upon identification of problems.

3. Sediment Removal: Sediment shall be removed from the structure at least annually and from the basin when necessary.

4. Measurement of Sediment Accumulation: Inspect for sediment accumulation. If sediment reaches 1' in depth, the sediment shall be removed.

Storm Drain System Includes Catch Basins & Manholes

1. Inspect catch basin inlets on a monthly basis for debris or conditions which could inhibit flow entry. Remove debris and properly dispose.

2. Inspect the catch basin structures on an annual basis.

    a) Check that rims are securely attached and properly set to optimize flow entry.

b) Measure and record silt accumulation, if any. Sumps shall be cleaned at least on a yearly basis in the spring.

3. Check pipelines on an annual basis to determine silt accumulation, if any. Remove excess silt if found.

City of Portland

The owner is required to comply with the annual reporting requirements contained in Chapter 32 of the City of Portland Code of Ordinances.

Housekeeping

1. Use "Inspection & Maintenance Log" and keep records in three-ring binder.

2. See attached Appendix B "Inspection and Maintenance" from Maine DEP Stormwater Regulations.

3. See attached "Appendix C" from Maine DEP Stormwater Regulations for Performance Standards.

INSPECTION SUMMARY
The Park Danforth

Inspection of	**Schedule ***
• Leaching Galleries	
Inspect	Monthly
Remove Sediment	Yearly
• Storm Drains and Catchbasins	
Inspect	Monthly
Measure Silt & Remove	Yearly

* After significant rainstorm in addition to regular inspections. Inspections shall be within 3 days of significant rainfall.

INSPECTION LOG

The Park Danforth
Stormwater Management
Inspection & Maintenance Log

Date of Inspection:_____

Inspection by:_____

Purpose of Inspection: Monthly, Yearly, Significant Rainfall (circle one)

- **Leaching Galleries**

  Description of Conditions:

  _____
  _____
  _____
  _____
  _____

  Maintenance & Date of Repairs:

  _____
  _____
  _____
  _____
  _____

  Sediment Inspection & Removal:

  _____
  _____
  _____
  _____
  _____

- **Catchbasins**

  Description of Conditions:

  _____
  _____
  _____
  _____
  _____

Maintenance & Date of Repairs:

Sediment Inspection & Removal:

Inspector Signature

Inspector Signature

APPENDIX G

1997 STORMWATER REPORT

May 13, 1997 3042

STORMWATER MANAGEMENT AND EROSION CONTROL REPORT

The Park Danforth
777 Stevens Avenue
Portland, Maine

Land Use Consultants, Inc. is submitting plans and drainage calculations on behalf of The park Danforth for a proposed three (3) story addition to the existing seven (7) story building. The 2.5 acre site is located adjacent to Poland Street between Stevens Avenue and Forest Avenue. The existing seven (7) story brick building includes 106 residential dwelling units and a small detached garage with a main parking lot along Stevens Avenue and a supplementary parking lot in the rear with access from Forest Avenue.

Drainage for the present site is collected with several existing catch basins around the building which discharge into a separated storm drain in Forest Avenue. No stormwater detention methods are implemented for the existing site. Most of the existing storm drain pipes are installed with flat slopes typically less than 0.5% due to the available invert elevation at Forest Avenue. Drainage patterns for the existing site are depicted on the Pre-Development Drainage Sketch Plan showing 11 small drainage subcatchment areas corresponding to each catch basin or sub-drainage area. These subcatchments combine in the existing storm drain system to determine the total discharge from the site at the point where runoff enters the Forest Avenue storm sewer (Reach#11). Due to the small site and subcatchment areas a variation of the "Rational Method" was used to predict peak runoff rates from the site. Runoff calculations were performed with HydroCAD 4.51 software using the "Modified Rational Method".

The proposed site includes a large three (3) story addition to the existing building, thus increasing the number of dwelling units to 161. The existing parking area in the rear of the building will be relocated as shown to account for the new addition. The parking area along Stevens Avenue will be expanded to provide extra parking for the additional units. As a result of the proposed changes, the total impervious area is increased from 1.2 acres to 1.6 acres for the developed site. This increase in impervious surface resulted in a modest (15±%) increase of stormwater peak flow rates from the developed site. Due to the limited amount of large open areas available a conventional detention pond is not feasible for this site. In order to provide adequate flow control for this project we are proposing to install a hydro-brake vortex valve in the new storm drain line. The existing system was evaluated for potential storage capacity for detention volume using the existing structures and pipes. The system was determined to have adequate storage for the 25 year storm. However, a 24 inch diameter storm drain was added at the end of the line to provide additional capacity and to provide immediate and close storage for small storms such as the one or two year storm events.

Proposed drainage patterns for the developed site are similar to the existing conditions. The Post-development Drainage Sketch Plan shows the proposed site divided into 10 subcatchment areas which discharge to the Forest Avenue storm sewer. Reach #11 is the point of comparison to the pre-development calculations since this point represents the total combined flow from the

developed site and includes the resultant peak flow rates after considering the flow attenuation contributed by the in-line hydro brake.

The results of our drainage calculations are indicated in the Summary Table below. With the addition of the on-line hydro brake the peak runoff rate will be slightly reduced to below the existing peak flow rates for the 2, 10 and 25 year storm events. The calculations and supporting material are included in the Appendix. In order to save on paper and reproduction volume a full report and summary was generated for the 25 year storm event only for the pre-developed and post-developed conditions. A brief summary of each of the subcatchments, reaches or structures only will be listed for the 2 year and 10 year storms.

Summary Table

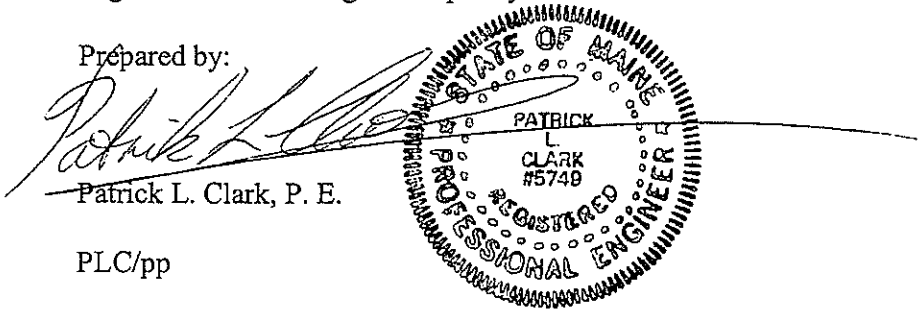
Storm	Existing (cfs)	Developed (cfs)
2 year	4.26	3.89
10 year	5.99	5.81
25 year	7.01	6.80

(The rates indicated above are the combined peak flow rates evaluated at Reach #11)

Erosion Control measures are limited to siltation fencing around the perimeter of the site and hay bale sediment barriers around the catch basins as shown on the Post-development Drainage Sketch.

It is our conclusion that the proposed storm drain and hydro brake system will provide adequate control of stormwater runoff from the site without producing any significant downstream impacts. We feel that the proposed measures, if properly constructed and maintained, will be sufficient to control stormwater runoff and erosion from the proposed site without significant degradation of existing water quality.

Prepared by:



Patrick L. Clark, P. E.

PLC/pp

Enclosure: Pre-Development Drainage Sketch (11 in. x 17 in.)
Post-Development Drainage Sketch (11 in. x 17 in.)
Appendix (with calculations)

APPENDIX

STORMWATER MANAGEMENT
AND
EROSION CONTROL REPORT

The Park Danforth
777 Stevens Avenue
Portland, Maine

Calculation & Worksheets

TABLE 2

Runoff Coefficients
(Values of C in Q=CIA)

Topography and Vegetation	Open Sandy Loam	Clay and Silt Loam	Tight Clay
Woodland			
Flat 0-5% slope	0.10	0.30	0.40
Rolling 5-10% slope	0.25	0.35	0.50
Hilly 10-3% slope	0.30	0.50	0.60
Pasture, Lawn			
Flat	0.10	0.30	0.40
Rolling	0.16	0.36	0.55
Hilly	0.22	0.42	0.60
Cultivated			
Flat	0.30	0.50	0.60
Rolling	0.40	0.60	0.70
Hilly	0.52	0.72	0.82
	30% of area	50% of area	70% of area
Urban Areas, General	impervious	impervious	impervious
Flat	0.40	0.55	0.65
Rolling	0.50	0.65	0.80
	Minimum	Optimum	Maximum
Roofs	0.90	0.95	1.00
Concrete or asphalt roads and pavements	0.85	0.95	1.00
Bituminous macadam roads and pavements	0.60	0.70	0.80
Gravel areas and walks			
Packed		0.70	
Loose		0.30	
Vacant lots, unpaved streets			
Light plant growth		0.60	
No plant growth		0.75	
Parks, lawns and meadows	0.10	0.40	0.60
Farming country	0.10	0.30	0.60
Woodland		0.20	

Taken from: Tourbier, Joachim and Westmacott, Richard, Water Resources Protection Measures in Land Development - A Handbook, University of Delaware, April, 1974.

Regional Rainfall Intensity–Duration Curves

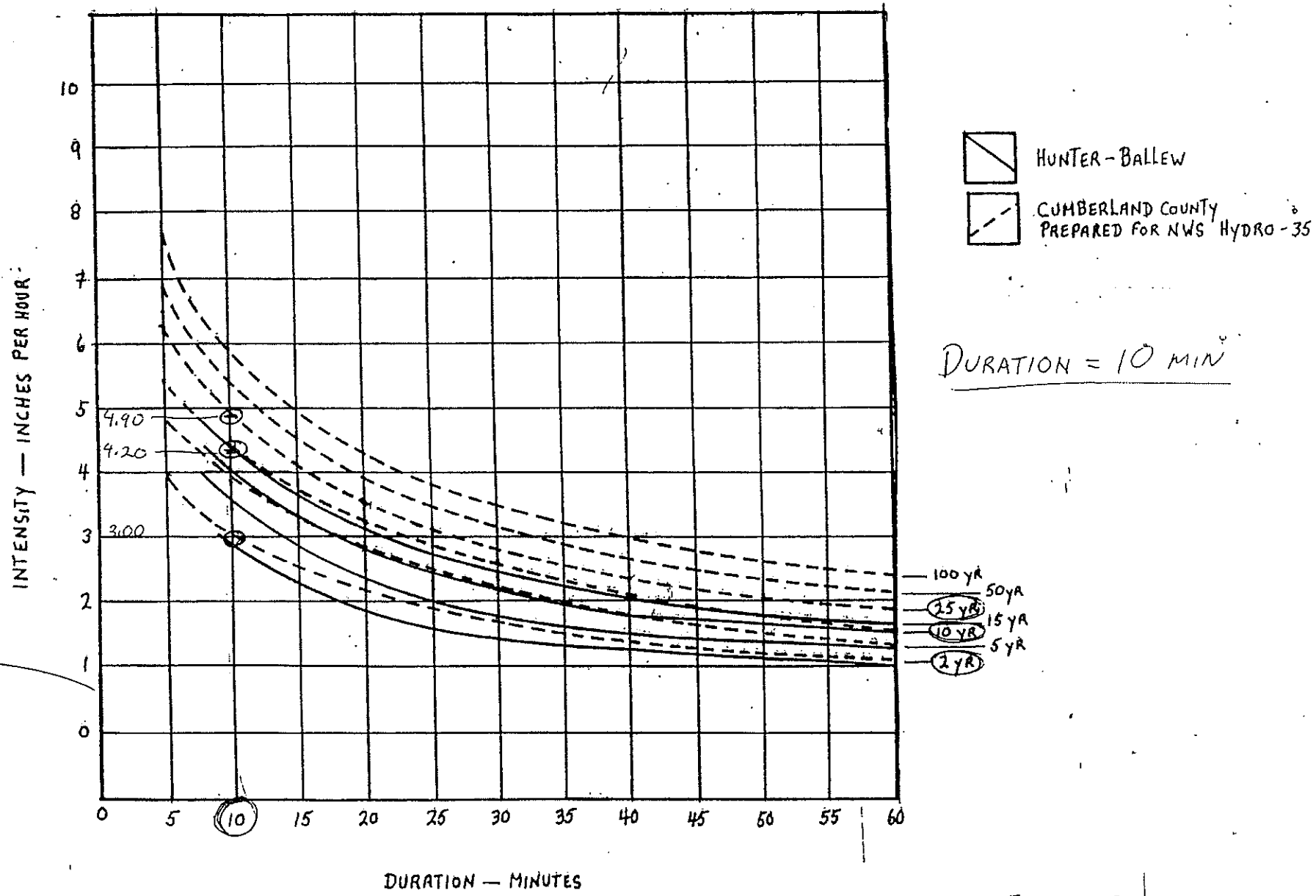


FIGURE 5

Project Park Danforth | Computed By PLC
Job No. 3042 | Checked By
Date | Sheet ___ of ___

Rational Method

Existing Site

80'/SF/grass/S=.025

① CB #1
A= 0.164 ac (7160)

Grass	.137	C= .30	(.041)
Paved	.027	C= .95	(.026)
	.164		Σ (.067)

C= .41

② CB #2
A=0.25 (10880)

Grass C = .30

180'/SF/Grass/S= .025

③ CB #3
A= .377 (16422)

90'/SF/Paved)/S= .008

(9170) Grass	.211	c=.30	(.063)
Paved	.166	c=.95	(.158)
	.377		Σ (.221)

C= .67

④ CB #4
A= .313 (13640 sf)

30'/SF/Grass/.025
50'/SCF/Paved/.008

Grass	.051	.30	(.015)
(3700) Paved	.262	.95	(.249)
	.313		Σ (.264)

C = .84

⑤ CB #5
A= 0.098 (4820)

25'/SF/Grass/.025
65'/SCF/Paved/.008

(800) Grass	.018	.30	(.005)
Paved	.080	.95	(.076)
			Σ (.081)

C= .83

Project PARK DANFORTH Computed By PLC

Job No. 3042 Checked By

Date Sheet ___ of ___

40'/SF/Grass/S = .025

⑥ CB #6

A = .064 (2800)

	Grass	0.054	.30	(.016)
(440)	Paved	0.010	.95	(.010)
			Σ	(.026)

C = .41

✓ ⑦ CB #7

A = 0.281 (12280)

100'/SF/Grass/S = .010

(2300)	Grass	.053	.30	(.016)
	Paved	.229	.95	(.218)
		0.281	Σ	(.234)

C = .83

⑧ CB #8

A = .048 (2080)

80'/SF/Paved/S = .030

(150)	Grass	.003	.30	(.001)
	Paved	.045	.95	(.043)
		.048	Σ	(.044)

C = .92

⑨ CB #9

A = .211 (9200)

Grass C = .30

50'/SF/grass/S = .050

100'/SCF/grass/S = .035

⑩ CB #10

A = .220 (9600)

115'/SF/Paved/S = .030

(575)	Grass	.013	.30	(.004)
	Paved	.207	.95	(.197)
			Σ	(.201)

C = .91

Project Park Danforth | Computed By PJC

Job No. | Checked By

Date | Sheet ___ of ___

(11) NOT USED

(12) To Reach #11 (Forest Ave)

A = 0.124 ac (5400 SF)

C = .95 (paved)

270'/SF/PAVED/S=0.030

Project Park Danforth — Computed By PLC

Job No. 3042 — Checked By

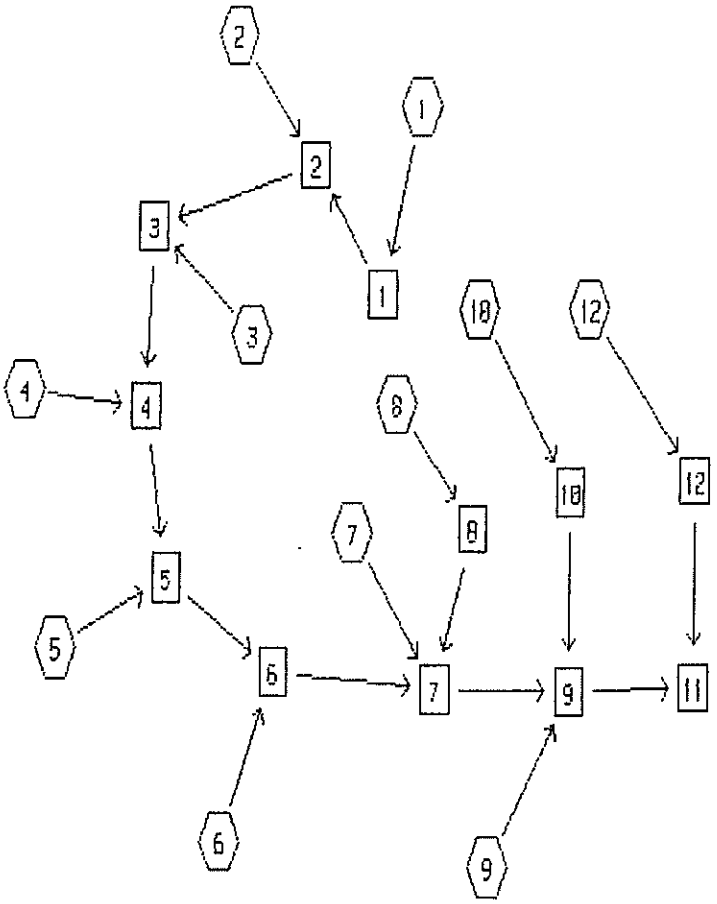
Date — Sheet ___ of ___

EXISTING REACH DESCRIPTION SUMMARY SHEET: WATERSHED # ___

REACH NO.	DESCRIPTION	PIPE DIA. (IN.)	NUMBER PIPES	BOTTOM WIDTH (FT.)	DEPTH (FT.)	SIDE SLOPES (FT./FT.) LEFT	SIDE SLOPES (FT./FT.) RIGHT	MANNINGS "N"	SLOPE (FT./FT.)	LENGTH (FT.)	FLOWS INTO
1	Pipe (CB#1 - CB#2)	6	1	—	—	—	—	.01	.004	115	R2
2	Pipe (CB#2 - CB#3)	8	1					.01	.003	140	R3
3	Pipe (CB#3 - CB#4)	10	1					.01	.0025	80	R4
4	Pipe (CB#4 - CB#5)	12	1					.01	.0100	60	R5
5	Pipe (CB#5 - CB#6)	12	1					.01	.0180	70	R6
6	Pipe (CB#6 - CB#7)	15	1					.01	.003	200	R7
7	Pipe (CB#7 - CB#9)	15	1					.01	.0025	125	R9
8	Pipe (CB#8 - CB#7)	6	1					.01	.065	65	R7
9	Pipe (CB#9 - CB#11)	15	1					.01	.006	95	CB#11
10	Pipe (CB#10 - CB#9)	10	1					.01	.035	60	R9
12	Street gutter	—	—	1	.5	.02	0	.11	.007	100	R16
11	CB Lead	12	1	—	—	—	—	.01	.02	10	→

Data for 3042/PARK-DANFORTH/EXISTING SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

WATERSHED ROUTING ==========



SUBCATCHMENT REACH POND LINK

Data for 3042/PARK-DANFORTH/EXISTING SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

RUNOFF BY M-RATIONAL METHOD: DURATION= 10 MIN INTEN= 3.00 IN/HR

RUNOFF SPAN = 10-13 HRS, dt= .01 HRS, 301 POINTS

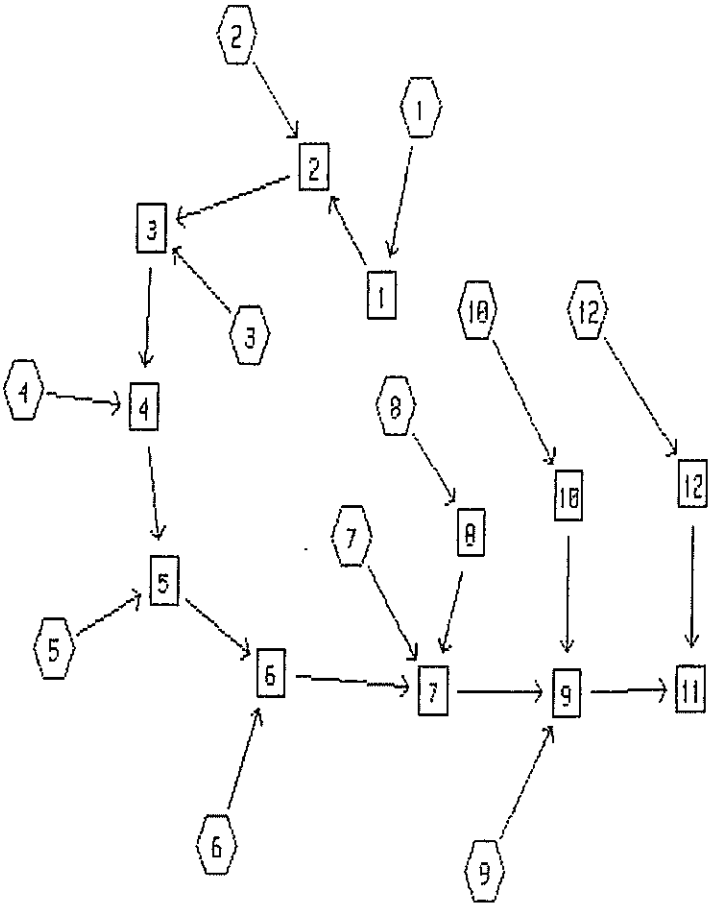
SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--					WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	.16	11.3	-	-	-	-	-		.41	.17	10.17	0.00
2	.25	21.6	-	-	-	-	-		.30	.10	10.17	0.00
3	.38	1.7	-	-	-	-	-		.67	.76	10.03	.01
4	.31	5.6	-	-	-	-	-		.84	.78	10.10	.01
5	.10	5.0	-	-	-	-	-		.83	.25	10.09	0.00
6	.06	6.5	-	-	-	-	-		.41	.07	10.11	0.00
7	.28	19.4	-	-	-	-	-		.83	.36	10.17	.01
8	.05	.9	-	-	-	-	-		.92	.14	10.02	0.00
9	.21	6.5	-	-	-	-	-		.30	.19	10.11	0.00
10	.22	1.2	-	-	-	-	-		.91	.60	10.02	.01
12	.40	2.4	-	-	-	-	-		.95	1.14	10.04	.02

Data for 3042/PARK-DANFORTH/EXISTING SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

REACH ROUTING BY STOR-IND+TRANS METHOD

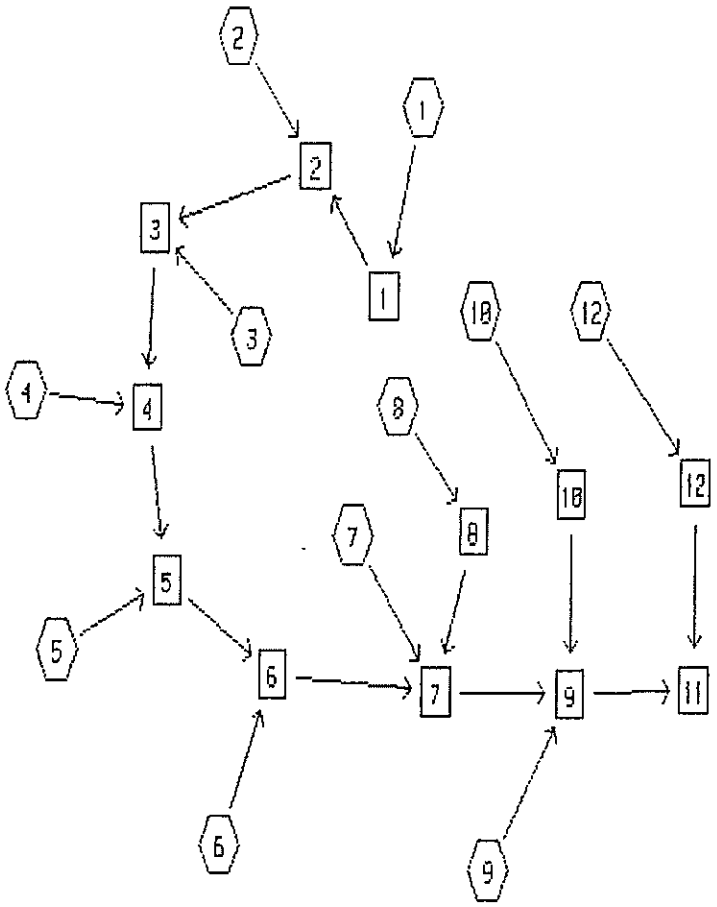
REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	6.0	-	-	-	-	.010	115	.0040	2.2	.9	.17
2	8.0	-	-	-	-	.010	140	.0030	2.2	1.0	.26
3	10.4	-	-	-	-	.010	80	.0025	2.8	.5	.94
4	12.0	-	-	-	-	.010	60	.0100	5.6	.2	1.70
5	12.0	-	-	-	-	.010	70	.0180	7.2	.2	1.95
6	15.0	-	-	-	-	.010	200	.0030	3.7	.9	2.00
7	15.0	-	-	-	-	.010	125	.0025	3.6	.6	2.45
8	6.0	-	-	-	-	.010	65	.0650	5.7	.2	.14
9	15.0	-	-	-	-	.010	95	.0060	5.4	.3	3.14
10	10.0	-	-	-	-	.010	60	.0350	6.6	.2	.61
11	15.5	-	-	-	-	.010	10	.0060	5.8	0.0	4.26
12	-	1.0	.5	.02	-	.110	100	.0500	.7	2.2	1.13

WATERSHED ROUTING ==========



SUBCATCHMENT REACH POND LINK

WATERSHED ROUTING ==========



Data for 3042/PARK-DANFORTH/EXISTING SITE/10 YEAR
DURATION= 10 MIN INTEN= 4.20 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

RUNOFF BY M-RATIONAL METHOD: DURATION= 10 MIN INTEN= 4.20 IN/HR

RUNOFF SPAN = 10-13 HRS, dt= .01 HRS, 301 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--					WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	.16	11.3	-	-	-	-	-		.41	.24	10.17	.01
2	.25	21.6	-	-	-	-	-		.30	.14	10.17	0.00
3	.38	1.7	-	-	-	-	-		.67	1.07	10.03	.02
4	.31	5.6	-	-	-	-	-		.84	1.09	10.10	.02
5	.10	5.0	-	-	-	-	-		.83	.35	10.09	.01
6	.06	6.5	-	-	-	-	-		.41	.10	10.11	0.00
7	.28	19.4	-	-	-	-	-		.83	.50	10.17	.01
8	.05	.9	-	-	-	-	-		.92	.19	10.02	0.00
9	.21	6.5	-	-	-	-	-		.30	.26	10.11	0.00
10	.22	1.2	-	-	-	-	-		.91	.84	10.02	.01
12	.40	2.4	-	-	-	-	-		.95	1.60	10.04	.02

Data for 3042/PARK-DANFORTH/EXISTING SITE/10 YEAR
DURATION= 10 MIN INTEN= 4.20 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	6.0	-	-	-	-	.010	115	.0040	2.4	.8	.23
2	8.0	-	-	-	-	.010	140	.0030	2.4	1.0	.36
3	10.4	-	-	-	-	.010	80	.0025	3.0	.4	1.33
4	12.0	-	-	-	-	.010	60	.0100	6.1	.2	2.40
5	12.0	-	-	-	-	.010	70	.0180	7.9	.1	2.74
6	15.0	-	-	-	-	.010	200	.0030	4.0	.8	2.82
7	15.0	-	-	-	-	.010	125	.0025	3.8	.5	3.45
8	6.0	-	-	-	-	.010	65	.0650	6.2	.2	.19
9	15.0	-	-	-	-	.010	95	.0060	5.8	.3	4.42
10	10.0	-	-	-	-	.010	60	.0350	7.3	.1	.85
11	15.5	-	-	-	-	.010	10	.0060	6.1	0.0	5.99
12	-	1.0	.5	.02	-	.110	100	.0500	.8	2.0	1.58

RUNOFF BY M-RATIONAL METHOD: DURATION= 10 MIN INTEN= 4.90 IN/HR

RUNOFF SPAN = 10-13 HRS, dt= .01 HRS, 301 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--					WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	.16	11.3	-	-	-	-	-		.41	.28	10.17	.01
2	.25	21.6	-	-	-	-	-		.30	.17	10.17	0.00
3	.38	1.7	-	-	-	-	-		.67	1.25	10.03	.02
4	.31	5.6	-	-	-	-	-		.84	1.28	10.10	.02
5	.10	5.0	-	-	-	-	-		.83	.41	10.09	.01
6	.06	6.5	-	-	-	-	-		.41	.12	10.11	0.00
7	.28	19.4	-	-	-	-	-		.83	.58	10.17	.01
8	.05	.9	-	-	-	-	-		.92	.23	10.02	0.00
9	.21	6.5	-	-	-	-	-		.30	.31	10.11	.01
10	.22	1.2	-	-	-	-	-		.91	.98	10.02	.01
12	.40	2.4	-	-	-	-	-		.95	1.86	10.04	.03

Data for 3042/PARK-DANFORTH/EXISTING SITE/25 YEAR
DURATION= 10 MIN INTEN= 4.90 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	6.0	-	-	-	-	.010	115	.0040	2.5	.8	.27
2	8.0	-	-	-	-	.010	140	.0030	2.5	.9	.42
3	10.4	-	-	-	-	.010	80	.0025	3.1	.4	1.55
4	12.0	-	-	-	-	.010	60	.0100	6.3	.2	2.81
5	12.0	-	-	-	-	.010	70	.0180	8.2	.1	3.20
6	15.0	-	-	-	-	.010	200	.0030	4.1	.8	3.30
7	15.0	-	-	-	-	.010	125	.0025	3.9	.5	4.03
8	6.0	-	-	-	-	.010	65	.0650	6.5	.2	.23
9	15.0	-	-	-	-	.010	95	.0060	5.9	.3	5.17
10	10.0	-	-	-	-	.010	60	.0350	7.5	.1	.99
11	15.5	-	-	-	-	.010	10	.0060	6.2	0.0	7.01
12	-	1.0	.5	.02	-	.110	100	.0500	.8	2.0	1.85

SUBCATCHMENT 1

PEAK= .28 CFS @ 10.17 HRS, VOLUME= .01 AF

C= .41
TOTAL AREA = .16 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	11.3
Grass: Dense n=.24 L=80' P2=3 in s=.025 '/'		

SUBCATCHMENT 2

PEAK= .17 CFS @ 10.17 HRS, VOLUME= 0.00 AF

C= .30
TOTAL AREA = .25 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	21.6
Grass: Dense n=.24 L=180' P2=3 in s=.025 '/'		

SUBCATCHMENT 3

PEAK= 1.25 CFS @ 10.03 HRS, VOLUME= .02 AF

C= .67
TOTAL AREA = .38 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	1.7
Smooth surfaces n=.011 L=90' P2=3 in s=.008 '/'		

SUBCATCHMENT 4

PEAK= 1.28 CFS @ 10.10 HRS, VOLUME= .02 AF

C= .84
TOTAL AREA = .31 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	5.1
Grass: Dense n=.24 L=30' P2=3 in s=.025 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:BC	.5
Paved Kv=20.3282 L=50' s=.008 '/' V=1.82 fps		
	Total Length= 80 ft Total Tc=	5.6

SUBCATCHMENT 5

PEAK= .41 CFS @ 10.09 HRS, VOLUME= .01 AF

C= .83
TOTAL AREA = .10 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	4.4
Grass: Dense n=.24 L=25' P2=3 in s=.025 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:BC	.6
Paved Kv=20.3282 L=65' s=.008 '/' V=1.82 fps		
	Total Length= 90 ft Total Tc=	5.0

SUBCATCHMENT 6

PEAK= .12 CFS @ 10.11 HRS, VOLUME= 0.00 AF

C= .41
TOTAL AREA = .06 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	6.5
Grass: Dense n=.24 L=40' P2=3 in s=.025 '/'		

SUBCATCHMENT 7

PEAK= .58 CFS @ 10.17 HRS, VOLUME= .01 AF

C= .83
TOTAL AREA = .28 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	19.4
Grass: Dense n=.24 L=100' P2=3 in s=.01 '/'		

SUBCATCHMENT 8

PEAK= .23 CFS @ 10.02 HRS, VOLUME= 0.00 AF

C= .92
TOTAL AREA = .05 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	.9
Smooth surfaces n=.011 L=80' P2=3 in s=.03 '/'		

SUBCATCHMENT 9

PEAK= .31 CFS @ 10.11 HRS, VOLUME= .01 AF

C= .30
TOTAL AREA = .21 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:AB	5.9
Grass: Dense n=.24 L=50' P2=3 in s=.05 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	Segment ID:BC	.6
Grassed Waterway Kv=15 L=100'	s=.035 '/' V=2.81 fps	
	Total Length= 150 ft Total Tc=	6.5

SUBCATCHMENT 10

PEAK= .98 CFS @ 10.02 HRS, VOLUME= .01 AF

C= .91
TOTAL AREA = .22 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method			Comment		Tc (min)
TR-55 SHEET FLOW			Segment ID:AB		1.2
Smooth surfaces	n=.011	L=115'	P2=3 in	s=.03 '/'	

SUBCATCHMENT 12

PEAK= 1.86 CFS @ 10.04 HRS, VOLUME= .03 AF

C= .95
TOTAL AREA = .40 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method			Comment		Tc (min)
TR-55 SHEET FLOW			Segment ID:AB		2.4
Smooth surfaces	n=.011	L=270'	P2=3 in	s=.03 '/'	

REACH 1 EXISTING PIPE (CB#1-CB#2)

Qin = .28 CFS @ 10.17 HRS, VOLUME= .01 AF
Qout= .27 CFS @ 10.19 HRS, VOLUME= .01 AF, ATTEN= 3%, LAG= 1.4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.01
.1	0.0	.04
.2	0.0	.09
.4	.1	.39
.4	.2	.45
.5	.2	.49
.5	.2	.50
.5	.2	.49
.5	.2	.46

6" PIPE
n= .01
LENGTH= 115 FT
SLOPE= .004 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .27 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .8 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 2 EXISTING PIPE (CB#2-CB#3)

Qin = .43 CFS @ 10.19 HRS, VOLUME= .01 AF
Qout= .42 CFS @ 10.22 HRS, VOLUME= .01 AF, ATTEN= 2%, LAG= 1.7 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.02
.1	0.0	.08
.2	.1	.17
.5	.3	.72
.5	.3	.84
.6	.3	.92
.6	.3	.93
.6	.3	.92
.7	.3	.86

8" PIPE
n= .01
LENGTH= 140 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .32 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .9 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 3 EXISTING 10" PIPE (CB#3-CB#4)

Qin = 1.57 CFS @ 10.16 HRS, VOLUME= .03 AF
Qout= 1.55 CFS @ 10.17 HRS, VOLUME= .03 AF, ATTEN= 1%, LAG= .6 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.03
.2	.1	.14
.3	.1	.31
.6	.4	1.32
.7	.5	1.55
.8	.6	1.69
.8	.6	1.70
.8	.6	1.69
.9	.6	1.58

10.4" PIPE
n= .01
LENGTH= 80 FT
SLOPE= .0025 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .70 FT
PEAK VELOCITY= 3.1 FPS
TRAVEL TIME = .4 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 4 EXISTING PIPE (CB#4-CB#5)

Qin = 2.81 CFS @ 10.16 HRS, VOLUME= .05 AF
Qout= 2.81 CFS @ 10.17 HRS, VOLUME= .05 AF, ATTEN= 0%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.10
.2	.1	.41
.3	.2	.91
.7	.6	3.88
.8	.7	4.53
.9	.7	4.94
.9	.8	4.98
1.0	.8	4.94
1.0	.8	4.63

12" PIPE
n= .01
LENGTH= 60 FT
SLOPE= .01 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .56 FT
PEAK VELOCITY= 6.3 FPS
TRAVEL TIME = .2 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 5 EXISTING PIPE (CB#5-CB#6)

Qin = 3.21 CFS @ 10.17 HRS, VOLUME= .06 AF
Qout= 3.20 CFS @ 10.17 HRS, VOLUME= .06 AF, ATTEN= 0%, LAG= .1 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.13
.2	.1	.54
.3	.2	1.22
.7	.6	5.20
.8	.7	6.07
.9	.7	6.62
.9	.8	6.68
1.0	.8	6.62
1.0	.8	6.21

12" PIPE
n= .01
LENGTH= 70 FT
SLOPE= .018 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .50 FT
PEAK VELOCITY= 8.2 FPS
TRAVEL TIME = .1 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 6 EXISTING PIPE (CB#6-CB#7)

Qin = 3.32 CFS @ 10.17 HRS, VOLUME= .06 AF
Qout= 3.30 CFS @ 10.19 HRS, VOLUME= .06 AF, ATTEN= 1%, LAG= 1.2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	.1	.10
.3	.2	.40
.4	.3	.90
.9	.9	3.85
1.0	1.1	4.50
1.1	1.2	4.90
1.2	1.2	4.95
1.2	1.2	4.90
1.3	1.2	4.60

15" PIPE
n= .01
LENGTH= 200 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .78 FT
PEAK VELOCITY= 4.1 FPS
TRAVEL TIME = .8 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 7 EXISTING PIPE (CB#7-CB#9)

Qin = 4.05 CFS @ 10.17 HRS, VOLUME= .08 AF
Qout= 4.03 CFS @ 10.19 HRS, VOLUME= .08 AF, ATTEN= 1%, LAG= 1.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	.1	.09
.3	.2	.37
.4	.3	.82
.9	.9	3.52
1.0	1.1	4.10
1.1	1.2	4.48
1.2	1.2	4.52
1.2	1.2	4.47
1.3	1.2	4.20

15" PIPE
n= .01
LENGTH= 125 FT
SLOPE= .0025 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .98 FT
PEAK VELOCITY= 3.9 FPS
TRAVEL TIME = .5 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 8 EXISTING PIPE (CB#8-CB#7)

Qin = .23 CFS @ 10.02 HRS, VOLUME= 0.00 AF
Qout= .23 CFS @ 10.03 HRS, VOLUME= 0.00 AF, ATTEN= 0%, LAG= .6 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.04
.1	0.0	.16
.2	0.0	.36
.4	.1	1.56
.4	.2	1.82
.5	.2	1.98
.5	.2	2.00
.5	.2	1.98
.5	.2	1.86

6" PIPE
n= .01
LENGTH= 65 FT
SLOPE= .065 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .12 FT
PEAK VELOCITY= 6.5 FPS
TRAVEL TIME = .2 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 9 EXISTING PIPE (CB#9-CB#11)

Qin = 5.20 CFS @ 10.17 HRS, VOLUME= .09 AF
Qout= 5.17 CFS @ 10.17 HRS, VOLUME= .09 AF, ATTEN= 1%, LAG= .4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	.1	.14
.3	.2	.57
.4	.3	1.27
.9	.9	5.45
1.0	1.1	6.36
1.1	1.2	6.93
1.2	1.2	7.00
1.2	1.2	6.93
1.3	1.2	6.50

15" PIPE
n= .01
LENGTH= 95 FT
SLOPE= .006 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .84 FT
PEAK VELOCITY= 5.9 FPS
TRAVEL TIME = .3 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 10 EXISTING PIPE (CB#10-CB#9)

Qin = .98 CFS @ 10.02 HRS, VOLUME= .01 AF
Qout= .99 CFS @ 10.03 HRS, VOLUME= .01 AF, ATTEN= 0%, LAG= .6 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.11
.2	.1	.47
.3	.1	1.04
.6	.4	4.46
.7	.5	5.21
.8	.5	5.68
.8	.5	5.73
.8	.5	5.68
.8	.5	5.33

10" PIPE
n= .01
LENGTH= 60 FT
SLOPE= .035 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .24 FT
PEAK VELOCITY= 7.5 FPS
TRAVEL TIME = .1 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 11 15" PVC OUTLET TO STORM DRAIN (FOREST AVE)

Qin = 7.00 CFS @ 10.17 HRS, VOLUME= .12 AF
Qout= 7.01 CFS @ 10.18 HRS, VOLUME= .12 AF, ATTEN= 0%, LAG= .1 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	.1	.15
.3	.2	.62
.4	.3	1.39
.9	1.0	5.94
1.0	1.1	6.94
1.2	1.2	7.57
1.2	1.3	7.64
1.3	1.3	7.57
1.3	1.3	7.10

15.5" PIPE
n= .01
LENGTH= 10 FT
SLOPE= .006 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= 1.04 FT
PEAK VELOCITY= 6.2 FPS
TRAVEL TIME = 0.0 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 12 GUTTER FLOW (FOREST AVE)

Qin = 1.86 CFS @ 10.04 HRS, VOLUME= .03 AF
Qout= 1.85 CFS @ 10.19 HRS, VOLUME= .03 AF, ATTEN= 1%, LAG= 9.0 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	.1	.03
.1	.4	.16
.2	.7	.41
.2	1.4	.98
.3	2.6	2.24
.4	4.4	4.63
.5	6.8	8.19

1' x .5' CHANNEL
S/S= .02 & 0 '/'
n= .11
LENGTH= 100 FT
SLOPE= .05 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .27 FT
PEAK VELOCITY= .8 FPS
TRAVEL TIME = 2.0 MIN
SPAN= 10-13 HRS, dt=.01 HRS

Project PARK-DANFORTH Computed By PLC

Job No. 3042 Checked By

Date Sheet of

DEVELOPED SITE

80'/SF/grass/S = .025

① CB #1

A = 0.164 ac (7160 sF)

Grass	.137	C = .30	(.041)
Paved	.027	C = .95	(.026)
	.164		

ΣCA = .067

C = .41

---

② CB #2

180'/SF/grass/S = .025

A = 0.195ac (8476 sF)

Grass	= 0.174	C = .30	(0.052)
Paved	= 0.021	C = .95	(0.020)
	0.195		

0.072

C = .37

---

③ CB #3

90'/SF/Paved/S = .008

A = .444ac (19360 sF)

Grass	= 0.066	C = .30	0.020
Paved	= 0.378	C = .95	0.360
	0.444		

Σ = 0.380

C = .85

Project PARK DANFORTH Computed By PLC
Job No. 3042 Checked By
Date Sheet of

$T_c = 5.6$ min

(4) CB #4

$A = 0.391$ ac (17020 sf)

Grass ~ 0.032	C = .30	(.0096)
Paved ~ 0.359	C = .95	(.341)
		$\Sigma CA = .351$

C = .90

100'/SF/Paved/S = .008

(5) CB #5

$A = 0.091_{ac}$ (3976 sf)

Grass ~ 0.013	C = .30	(.004)
Paved ~ 0.078	C = .95	(.074)
0.091		$\Sigma CA = .0780$

C = 0.86

60'/SF/grass/S = .025

(6) CB #6

$A = 0.062$ ac (2704 sf)

Grass ~ 0.053	C = .30	(0.016)
Paved ~ 0.009	C = .95	(0.009)
0.062		$\Sigma CA = 0.024$

C = .39

Project _____ Computed By _____

Job No. _____ Checked By _____

Date _____ Sheet ____ of _____

$T_c = 20$ min.

(7) (= 8)

$A = 0.720 ac (31,360 sf)$

Grass ~ .207 $C = .30$ (.062)

Paved ~ .513 $C = .95$ (.487)

.720

$\Sigma CA = .549$

$C = .76$

90'/SF/grass/.025

(8) CB #9

$A = 0.082 ac (3548 sf)$

Grass ~ .039 $C = .30$ (.012)

Paved ~ .043 $C = .95$ (.041)

.082

$\Sigma CA = .053$

$C = .65$

(9) CB #10

170'/SF/Paved/S = .025

100'/SCF/Paved/S = .025

$A = 0.195 ac (8495 sf)$

Grass ~ 0.028 $C = 30$ (.008)

paved ~ 0.167 $C = .95$ (.159)

0.195

$\Sigma CA = .167$

$C = .86$

Project _____ Computed By _____

Job No. _____ Checked By _____

Date _____ Sheet ____ of _____

(10) CB # 11

25'/SF/grass/.04
70'/SF/paved/.035

$A = 0.077 ac (3355 sf)$

Grass	.037	C = .30	(.011)
Paved	.040	C = .95	(.038)
	.077		

$\Sigma CA = .049$

$C = 0.64$

Project Park Danforth Computed By PLC

Job No. 3042 Checked By

Date Sheet of

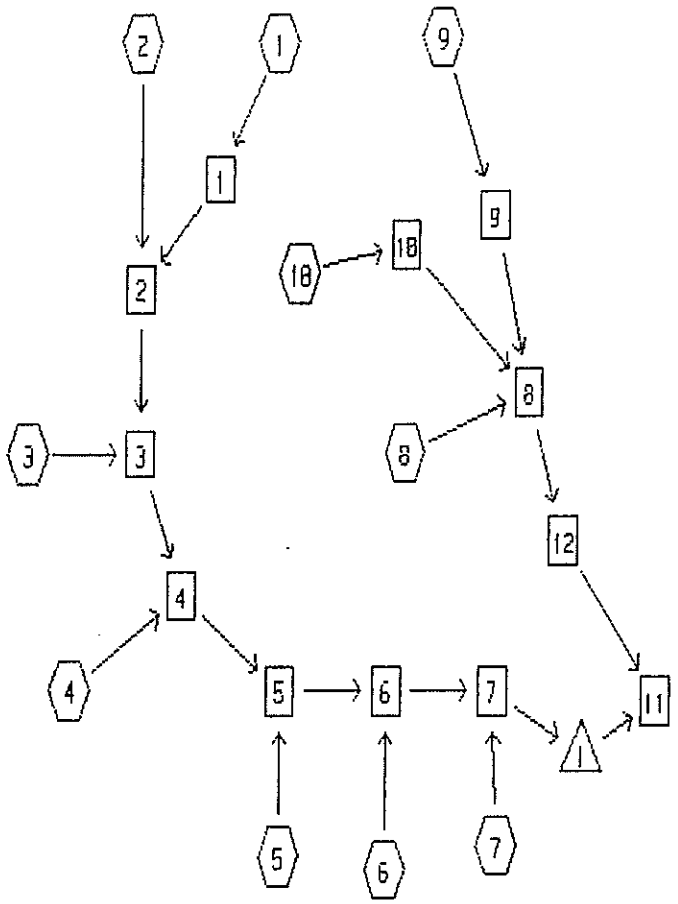
REACH DESCRIPTION SUMMARY SHEET: WATERSHED # ___

REACH NO.	DESCRIPTION (DEVELOPED)	PIPE DIA. (IN.)	NUMBER PIPES	BOTTOM WIDTH (FT.)	DEPTH (FT.)	SIDE SLOPES (FT./FT.) LEFT	SIDE SLOPES (FT./FT.) RIGHT	MANNINGS "N"	SLOPE (FT./FT.)	LENGTH (FT.)	FLOWS INTO
1	Ex. pipe (CB1-CB2)	6	1	–	–	–	–	.01	.004	115	R2
2	Ex. pipe (CB2-CB3)	8	1	–	–	–	–	.01	.003	140	R3
3	Ex pipe (CB3-CB4)	10	1	–	–	–	–	.01	.0025	80	R4
4	Ex pipe (CB4-CB5)	12	1	–	–	–	–	.01	.0100	60	R5
5	Ex. pipe (CB5-CB6)	12	1	–	–	–	–	.01	.018	70	R6
6	Ex. pipe + Extension - CB6-DMH1	15	1	–	–	–	–	.01	.003	260	R7
7	New Pipe (DMH1-DMH2)	15	1	–	–	–	–	.009	.004	150	R11
8	New Pipe (CB8-DMH2)	12	1	–	–	–	–	.009	.003	30	R12
9	New Pipe (CB10-CB9)	12	1	–	–	–	–	.009	.003	45	R8
10	New Pipe (CB11-CB9)	12	1	–	–	–	–	.009	.010	90	R8
11	Ex Pipe (DMH2-DMH3)	15	1	–	–	–	–	.01	.003	20	→
12	New pipe (CB8-DMH2)	12	1	–	–	–	–	.009	.003	50	R11

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR

Prepared by Land Use Consultants, Inc. 12 May 97

WATERSHED ROUTING ==========



SUBCATCHMENT REACH POND LINK

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

RUNOFF BY M-RATIONAL METHOD: DURATION= 10 MIN INTEN= 3.00 IN/HR

RUNOFF SPAN = 10-13 HRS, dt= .01 HRS, 301 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--					WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	.16	11.3	-	-	-	-	-		.41	.17	10.17	0.00
2	.20	21.6	-	-	-	-	-		.37	.10	10.17	0.00
3	.44	1.7	-	-	-	-	-		.85	1.12	10.03	.02
4	.39	5.6	-	-	-	-	-		.90	1.05	10.10	.02
5	.09	1.8	-	-	-	-	-		.86	.23	10.04	0.00
6	.06	9.0	-	-	-	-	-		.39	.07	10.15	0.00
7	.72	5.0	-	-	-	-	-		.76	1.64	10.09	.03
8	.08	12.4	-	-	-	-	-		.65	.12	10.17	0.00
9	.19	2.2	-	-	-	-	-		.86	.49	10.04	.01
10	.08	4.5	-	-	-	-	-		.64	.15	10.08	0.00

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	6.0	-	-	-	-	.010	115	.0040	2.2	.9	.17
2	8.0	-	-	-	-	.010	140	.0030	2.2	1.0	.26
3	11.7	-	-	-	-	.010	80	.0025	3.1	.4	1.29
4	12.0	-	-	-	-	.010	60	.0100	6.1	.2	2.34
5	12.0	-	-	-	-	.010	70	.0180	7.8	.2	2.56
6	15.0	-	-	-	-	.010	260	.0030	3.9	1.1	2.60
7	24.0	-	-	-	-	.009	150	.0040	5.2	.5	4.17
8	12.0	-	-	-	-	.009	30	.0030	3.1	.2	.77
9	12.0	-	-	-	-	.009	45	.0030	2.7	.3	.49
10	12.0	-	-	-	-	.009	90	.0100	3.0	.5	.15
11	17.4	-	-	-	-	.010	20	.0030	4.4	.1	3.89
12	12.0	-	-	-	-	.009	50	.0030	3.1	.3	.76

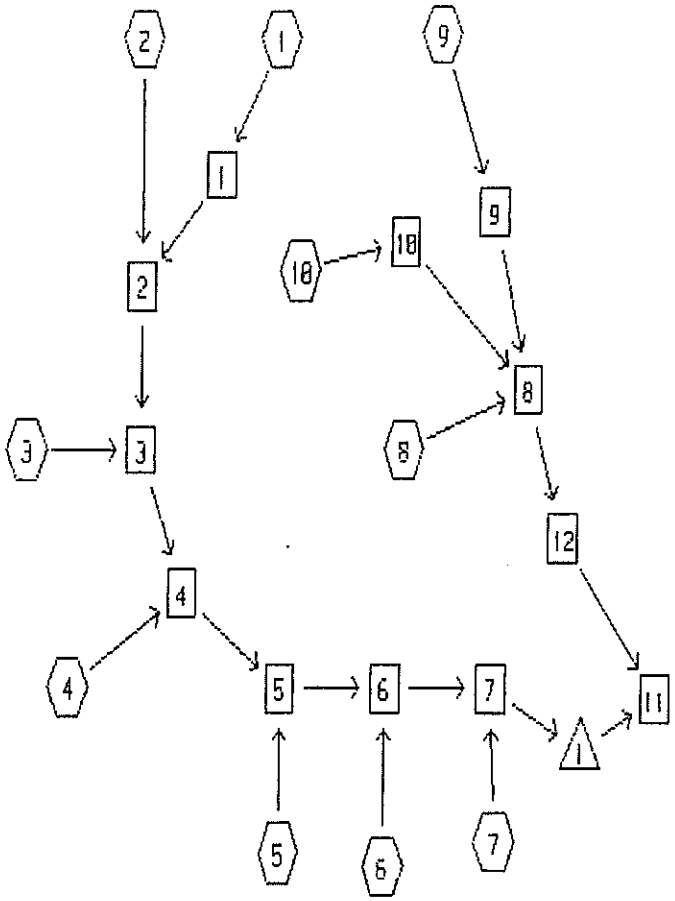
Data for 3042/PARK-DANFORTH/DEVELOPED SITE/2 YEAR
DURATION= 10 MIN INTEN= 3.00 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	PEAK FLOW Qin (CFS)	PEAK FLOW Qout (CFS)	PEAK FLOW Qpri (CFS)	PEAK FLOW Qsec (CFS)	---Qout--- ATTEN. (%)	---Qout--- LAG (MIN)
1	14.7	21.0	16.9	.02	4.17	3.39			19	3.7

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/10 YEAR
DURATION= 10 MIN INTEN= 4.20 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

WATERSHED ROUTING ==========



SUBCATCHMENT REACH POND LINK

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/10 YEAR
DURATION= 10 MIN INTEN= 4.20 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

RUNOFF BY M-RATIONAL METHOD: DURATION= 10 MIN INTEN= 4.20 IN/HR

RUNOFF SPAN = 10-13 HRS, dt= .01 HRS, 301 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--					WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	.16	11.3	-	-	-	-	-		.41	.24	10.17	.01
2	.20	21.6	-	-	-	-	-		.37	.14	10.17	0.00
3	.44	1.7	-	-	-	-	-		.85	1.57	10.03	.02
4	.39	5.6	-	-	-	-	-		.90	1.47	10.10	.03
5	.09	1.8	-	-	-	-	-		.86	.33	10.04	0.00
6	.06	9.0	-	-	-	-	-		.39	.10	10.15	0.00
7	.72	5.0	-	-	-	-	-		.76	2.30	10.09	.04
8	.08	12.4	-	-	-	-	-		.65	.17	10.17	0.00
9	.19	2.2	-	-	-	-	-		.86	.69	10.04	.01
10	.08	4.5	-	-	-	-	-		.64	.22	10.08	0.00

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/10 YEAR
DURATION= 10 MIN INTEN= 4.20 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97

REACH ROUTING BY STOR-IND+TRANS METHOD

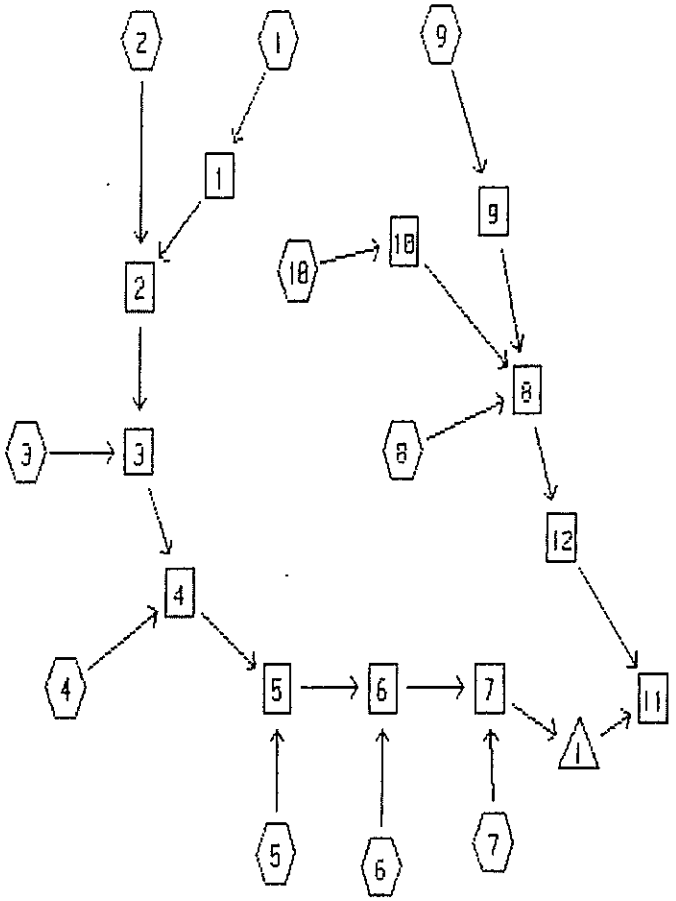
REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	6.0	-	-	-	-	.010	115	.0040	2.4	.8	.23
2	8.0	-	-	-	-	.010	140	.0030	2.4	1.0	.36
3	11.7	-	-	-	-	.010	80	.0025	3.2	.4	1.83
4	12.0	-	-	-	-	.010	60	.0100	6.4	.2	3.29
5	12.0	-	-	-	-	.010	70	.0180	8.4	.1	3.60
6	15.0	-	-	-	-	.010	260	.0030	4.2	1.0	3.66
7	24.0	-	-	-	-	.009	150	.0040	5.8	.4	5.85
8	12.0	-	-	-	-	.009	30	.0030	3.5	.1	1.07
9	12.0	-	-	-	-	.009	45	.0030	3.0	.2	.69
10	12.0	-	-	-	-	.009	90	.0100	3.4	.4	.22
11	17.4	-	-	-	-	.010	20	.0030	4.6	.1	5.81
12	12.0	-	-	-	-	.009	50	.0030	3.5	.2	1.07

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/10 YEAR
DURATION= 10 MIN INTEN= 4.20 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	PEAK FLOW Qin (CFS)	PEAK FLOW Qout (CFS)	PEAK FLOW Qpri (CFS)	PEAK FLOW Qsec (CFS)	Qout ATTEN. (%)	Qout LAG (MIN)
1	14.7	21.0	19.2	.03	5.85	5.07			13	3.1

WATERSHED ROUTING ==========



SUBCATCHMENT REACH POND LINK

RUNOFF BY M-RATIONAL METHOD: DURATION= 10 MIN INTEN= 4.90 IN/HR

RUNOFF SPAN = 10-13 HRS, dt= .01 HRS, 301 POINTS

SUBCAT NUMBER	AREA (ACRE)	Tc (MIN)	--GROUND COVERS (%CN)--					WGT'D CN	C	PEAK (CFS)	Tpeak (HRS)	VOL (AF)
1	.16	11.3	-	-	-	-	-		.41	.28	10.17	.01
2	.20	21.6	-	-	-	-	-		.37	.17	10.17	0.00
3	.44	1.7	-	-	-	-	-		.85	1.83	10.03	.03
4	.39	5.6	-	-	-	-	-		.90	1.72	10.10	.03
5	.09	1.8	-	-	-	-	-		.86	.38	10.04	.01
6	.06	9.0	-	-	-	-	-		.39	.12	10.15	0.00
7	.72	5.0	-	-	-	-	-		.76	2.68	10.09	.05
8	.08	12.4	-	-	-	-	-		.65	.20	10.17	0.00
9	.19	2.2	-	-	-	-	-		.86	.80	10.04	.01
10	.08	4.5	-	-	-	-	-		.64	.25	10.08	0.00

REACH ROUTING BY STOR-IND+TRANS METHOD

REACH NO.	DIAM (IN)	BOTTOM WIDTH (FT)	DEPTH (FT)	SIDE SLOPES (FT/FT)		n	LENGTH (FT)	SLOPE (FT/FT)	PEAK VEL. (FPS)	TRAVEL TIME (MIN)	PEAK Qout (CFS)
1	6.0	-	-	-	-	.010	115	.0040	2.5	.8	.27
2	8.0	-	-	-	-	.010	140	.0030	2.5	.9	.42
3	11.7	-	-	-	-	.010	80	.0025	3.3	.4	2.13
4	12.0	-	-	-	-	.010	60	.0100	6.6	.2	3.84
5	12.0	-	-	-	-	.010	70	.0180	8.6	.1	4.20
6	15.0	-	-	-	-	.010	260	.0030	4.2	1.0	4.27
7	24.0	-	-	-	-	.009	150	.0040	6.1	.4	6.83
8	12.0	-	-	-	-	.009	30	.0030	3.6	.1	1.25
9	12.0	-	-	-	-	.009	45	.0030	3.2	.2	.80
10	12.0	-	-	-	-	.009	90	.0100	3.6	.4	.25
11	17.4	-	-	-	-	.010	20	.0030	4.7	.1	6.80
12	12.0	-	-	-	-	.009	50	.0030	3.6	.2	1.24

POND ROUTING BY STOR-IND METHOD

POND NO.	START ELEV. (FT)	FLOOD ELEV. (FT)	PEAK ELEV. (FT)	PEAK STORAGE (AF)	PEAK FLOW Qin (CFS)	PEAK FLOW Qout (CFS)	PEAK FLOW Qpri (CFS)	PEAK FLOW Qsec (CFS)	Qout ATTEN. (%)	Qout LAG (MIN)
1	14.7	21.0	20.7	.03	6.83	5.95			13	3.0

SUBCATCHMENT 1

PEAK= .28 CFS @ 10.17 HRS, VOLUME= .01 AF

C= .41
TOTAL AREA = .16 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	11.3
Grass: Dense n=.24 L=80' P2=3 in s=.025 '/'		

SUBCATCHMENT 2

PEAK= .17 CFS @ 10.17 HRS, VOLUME= 0.00 AF

C= .37
TOTAL AREA = .20 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	21.6
Grass: Dense n=.24 L=180' P2=3 in s=.025 '/'		

SUBCATCHMENT 3

PEAK= 1.83 CFS @ 10.03 HRS, VOLUME= .03 AF

C= .85
TOTAL AREA = .44 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	1.7
Smooth surfaces n=.011 L=90' P2=3 in s=.008 '/'		

SUBCATCHMENT 4

PEAK= 1.72 CFS @ 10.10 HRS, VOLUME= .03 AF

C= .90
TOTAL AREA = .39 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
DIRECT ENTRY	Segment ID:	5.6

SUBCATCHMENT 5

PEAK= .38 CFS @ 10.04 HRS, VOLUME= .01 AF

C= .86
TOTAL AREA = .09 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	1.8
Smooth surfaces n=.011 L=100' P2=3 in s=.008 '/'		

SUBCATCHMENT 6

PEAK= .12 CFS @ 10.15 HRS, VOLUME= 0.00 AF

C= .39
TOTAL AREA = .06 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	9.0
Grass: Dense n=.24 L=60' P2=3 in s=.025 '/'		

SUBCATCHMENT 7

PEAK= 2.68 CFS @ 10.09 HRS, VOLUME= .05 AF

C= .76
TOTAL AREA = .72 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
DIRECT ENTRY	Segment ID:	5.0

SUBCATCHMENT 8

PEAK= .20 CFS @ 10.17 HRS, VOLUME= 0.00 AF

C= .65
TOTAL AREA = .08 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	Segment ID:	12.4
Grass: Dense n=.24 L=90' P2=3 in s=.025 '/'		

SUBCATCHMENT 9

PEAK= .80 CFS @ 10.04 HRS, VOLUME= .01 AF

C= .86
TOTAL AREA = .19 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	1.7
Smooth surfaces n=.011 L=170' P2=3 in s=.025 '/'		
SHALLOW CONCENTRATED/UPLAND FLOW	**Segment ID:**	.5
Paved Kv=20.3282 L=100' s=.025 '/' V=3.21 fps		
	Total Length= 270 ft Total Tc=	2.2

SUBCATCHMENT 10

PEAK= .25 CFS @ 10.08 HRS, VOLUME= 0.00 AF

C= .64
TOTAL AREA = .08 AC

M-RATIONAL METHOD
DURATION= 10 MIN
INTEN= 4.90 IN/HR
SPAN= 10-13 HRS, dt=.01 HRS

Method	Comment	Tc (min)
TR-55 SHEET FLOW	**Segment ID:**	3.7
Grass: Dense n=.24 L=25' P2=3 in s=.04 '/'		
TR-55 SHEET FLOW	**Segment ID:**	.8
Smooth surfaces n=.011 L=70' P2=3 in s=.035 '/'		
	Total Length= 95 ft Total Tc=	4.5

REACH 1 **EX. PIPE (CB#1-CB#2)**

Qin = .28 CFS @ 10.17 HRS, VOLUME= .01 AF
Qout= .27 CFS @ 10.19 HRS, VOLUME= .01 AF, ATTEN= 3%, LAG= 1.4 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.01
.1	0.0	.04
.2	0.0	.09
.4	.1	.39
.4	.2	.45
.5	.2	.49
.5	.2	.50
.5	.2	.49
.5	.2	.46

6" PIPE

n= .01
LENGTH= 115 FT
SLOPE= .004 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .27 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .8 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 2 **EX. PIPE (CB#2-CB#3)**

Qin = .43 CFS @ 10.19 HRS, VOLUME= .01 AF
Qout= .42 CFS @ 10.22 HRS, VOLUME= .01 AF, ATTEN= 2%, LAG= 1.7 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.02
.1	0.0	.08
.2	.1	.17
.5	.3	.72
.5	.3	.84
.6	.3	.92
.6	.3	.93
.6	.3	.92
.7	.3	.86

8" PIPE

n= .01
LENGTH= 140 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .32 FT
PEAK VELOCITY= 2.5 FPS
TRAVEL TIME = .9 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 3 **EX. PIPE (CB#3-CB#4)**

Qin = 2.15 CFS @ 10.16 HRS, VOLUME= .04 AF
Qout= 2.13 CFS @ 10.17 HRS, VOLUME= .04 AF, ATTEN= 1%, LAG= .5 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.05
.2	.1	.19
.3	.2	.42
.7	.6	1.81
.8	.6	2.12
.9	.7	2.31
.9	.7	2.33
.9	.7	2.31
1.0	.7	2.16

11.7" PIPE

n= .01
LENGTH= 80 FT
SLOPE= .0025 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .79 FT
PEAK VELOCITY= 3.3 FPS
TRAVEL TIME = .4 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 7 NEW PIPE (DMH#1-DMH#2)

Qin = 6.85 CFS @ 10.16 HRS, VOLUME= .12 AF
Qout= 6.83 CFS @ 10.17 HRS, VOLUME= .12 AF, ATTEN= 0%, LAG= .6 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.2	.2	.43
.4	.4	1.81
.6	.8	4.05
1.4	2.3	17.30
1.6	2.7	20.20
1.8	3.0	22.03
1.9	3.1	22.23
1.9	3.1	22.03
2.0	3.1	20.67

24" PIPE

n= .009
LENGTH= 150 FT
SLOPE= .004 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .77 FT
PEAK VELOCITY= 6.1 FPS
TRAVEL TIME = .4 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 8 NEW PIPE (CB#9-CB#8)

Qin = 1.25 CFS @ 10.16 HRS, VOLUME= .02 AF
Qout= 1.25 CFS @ 10.17 HRS, VOLUME= .02 AF, ATTEN= 0%, LAG= .3 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.06
.2	.1	.25
.3	.2	.55
.7	.6	2.36
.8	.7	2.76
.9	.7	3.00
.9	.8	3.03
1.0	.8	3.00
1.0	.8	2.82

12" PIPE

n= .009
LENGTH= 30 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .45 FT
PEAK VELOCITY= 3.6 FPS
TRAVEL TIME = .1 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 9 NEW PIPE (CB#10-CB#9)

Qin = .80 CFS @ 10.04 HRS, VOLUME= .01 AF
Qout= .80 CFS @ 10.06 HRS, VOLUME= .01 AF, ATTEN= 0%, LAG= 1.2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.06
.2	.1	.25
.3	.2	.55
.7	.6	2.36
.8	.7	2.76
.9	.7	3.00
.9	.8	3.03
1.0	.8	3.00
1.0	.8	2.82

12" PIPE

n= .009
LENGTH= 45 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .36 FT
PEAK VELOCITY= 3.2 FPS
TRAVEL TIME = .2 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 10 NEW PIPE (CB#11-CB#9)

Qin = .25 CFS @ 10.08 HRS, VOLUME= 0.00 AF
Qout= .25 CFS @ 10.16 HRS, VOLUME= 0.00 AF, ATTEN= 0%, LAG= 4.8 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.11
.2	.1	.45
.3	.2	1.01
.7	.6	4.31
.8	.7	5.03
.9	.7	5.48
.9	.8	5.54
1.0	.8	5.48
1.0	.8	5.15

12" PIPE

n= .009
LENGTH= 90 FT
SLOPE= .01 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .14 FT
PEAK VELOCITY= 3.6 FPS
TRAVEL TIME = .4 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 11 EX. PIPE (DMH#2-DMH#3)

Qin = 6.81 CFS @ 10.21 HRS, VOLUME= .14 AF
Qout= 6.80 CFS @ 10.21 HRS, VOLUME= .14 AF, ATTEN= 0%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	.1	.14
.3	.2	.60
.4	.4	1.34
1.0	1.2	5.72
1.2	1.4	6.68
1.3	1.6	7.28
1.4	1.6	7.35
1.4	1.6	7.28
1.5	1.7	6.83

17.4" PIPE

n= .01
LENGTH= 20 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= 1.19 FT
PEAK VELOCITY= 4.7 FPS
TRAVEL TIME = .1 MIN
SPAN= 10-13 HRS, dt=.01 HRS

REACH 12 NEW PIPE (CB#8-DMH#2)

Qin = 1.25 CFS @ 10.17 HRS, VOLUME= .02 AF
Qout= 1.24 CFS @ 10.17 HRS, VOLUME= .02 AF, ATTEN= 1%, LAG= .2 MIN

DEPTH (FT)	END AREA (SQ-FT)	DISCH (CFS)
0.0	0.0	0.00
.1	0.0	.06
.2	.1	.25
.3	.2	.55
.7	.6	2.36
.8	.7	2.76
.9	.7	3.00
.9	.8	3.03
1.0	.8	3.00
1.0	.8	2.82

12" PIPE

n= .009
LENGTH= 50 FT
SLOPE= .003 FT/FT

STOR-IND+TRANS METHOD
PEAK DEPTH= .45 FT
PEAK VELOCITY= 3.6 FPS
TRAVEL TIME = .2 MIN
SPAN= 10-13 HRS, dt=.01 HRS

Data for 3042/PARK-DANFORTH/DEVELOPED SITE/25 YEAR
DURATION= 10 MIN INTEN= 4.90 IN/HR
Prepared by Land Use Consultants, Inc. 12 May 97
HydroCAD 4.52 000511 (c) 1986-1996 Applied Microcomputer Systems

POND 1 DMH #2 WITH HYDRO-BRAKE

Qin = 6.83 CFS @ 10.17 HRS, VOLUME= .12 AF
Qout= 5.95 CFS @ 10.23 HRS, VOLUME= .12 AF, ATTEN= 13%, LAG= 3.0 MIN

ELEVATION (FT)	CUM.STOR (CF)
14.7	0
17.0	850
19.0	1115
20.0	1250
21.0	1350

STOR-IND METHOD
PEAK STORAGE = 1317 CF
PEAK ELEVATION= 20.7 FT
FLOOD ELEVATION= 21.0 FT
START ELEVATION= 14.7 FT
SPAN= 10-13 HRS, dt=.01 HRS
Tdet= 4 MIN (.12 AF)

#	ROUTE	INVERT	OUTLET DEVICES
1	P	14.7'	**9.8" ORIFICE/GRATE**
			Q=.6 PI r^2 SQR(2g) SQR(H-r)

APPENDIX H

S.W. COLE GEOTECHNICAL REPORT

REPORT

June 18, 2014
14-0065 S

Geotechnical Engineering Services

Proposed Senior Living Facility
The Park Danforth
Arbor Street & Forest Avenue
Portland, Maine

PREPARED FOR:
The Park Danforth
c/o Mitchell & Associates
Attention: Robert Metcalf
70 Center Street
Portland, Maine 04101

PREPARED BY:
S. W. Cole Engineering, Inc.
286 Portland Road
Gray, Maine 04039
207-657-2866

S.W.COLE ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing*
- *GeoEnvironmental Services*
- *Ecological Services*

www.swcole.com

TABLE OF CONTENTS

14-0065 S

June 18, 2014

The Park Danforth
c/o Mitchell & Associates
Attention: Robert Metcalf
70 Center Street
Portland, Maine 04101

Subject: Geotechnical Engineering Services
Proposed Senior Living Facility
The Park Danforth
Arbor Street and Forest Avenue
Portland, Maine

Dear Bob:

In accordance with our Revised Proposal, dated February 21, 2014, we have performed subsurface explorations for the subject project. This report summarizes our findings and geotechnical recommendations and its contents are subject to the limitations set forth in Attachment A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to develop geotechnical recommendations relative to foundations, earthwork and pavement associated with the proposed construction. Our scope of services included test boring explorations, soils laboratory testing, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Site and Proposed Construction

The site is located southwest of the intersection of Arbor Street and Forest Avenue in Portland, Maine. The site is currently occupied by residential and retail development and improvements associated with the existing Park Danforth facility.

We understand development plans call for demolition of existing improvements and construction of a new on-grade, two to three story apartment building for senior housing. The new apartment building is proposed in the northeast portion of the site in the vicinity of an existing one-story retail building that will be demolished. Development plans also include a one-story, on-grade addition to the northwest wing of the existing Park Danforth building. The proposed type of building construction and structural loading are not available at this time. We anticipate proposed finish floor elevations will be within 1 foot of existing grades. Paved parking and access drive areas are proposed around the north, east, and west peripheries of the site, adjacent to Forest Avenue, Arbor Street, and Stevens Avenue.

Proposed and existing site features are shown on the "Exploration Location Plan" attached as Sheet 1.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Fourteen test borings (B-101 through B-114) were made at the site on May 22 and 23, 2014 by Great Works Test Boring, Inc. of Rollinsford, New Hampshire working under subcontract to S. W. Cole Engineering, Inc. (S.W.COLE). The exploration locations were selected by Mitchell & Associates and established in the field by S.W.COLE based on measurements from existing site features. The exploration program consisted of the following:

- Five test borings (B-104 through B-108) made for the proposed two to three-story building in the northeast portion of the site;
- Three test borings (B-111 through B-114) made for the proposed one-story Park Danforth building addition;
- Six test borings (B-101 through B-103 and B-109 and B-110) made for the proposed paved areas.

The approximate exploration locations are shown on the "Exploration Location Plan" attached as Sheet 1. Logs of the test borings are attached as Sheets 2 through 15. The elevations shown on the logs were estimated based on topographic information shown on Sheet 1. A key to the notes and symbols used on the logs is attached as Sheet 16.

2.2 Testing

The test borings were drilled using a combination of solid stem auger and hollow stem auger drilling techniques. The soils were sampled at 2 to 5 foot intervals using a split spoon sampler and Standard Penetration Testing (SPT) techniques. SPT blow counts are shown on the logs.

Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. Laboratory testing included five gradation tests and five moisture content tests. Results of the gradation testing are attached as Sheets 17 through 21. Results of the moisture content tests are shown on the logs.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Surficial

The site is currently occupied by residential and retail development and associated landscape and pavement areas. The site is an urban site with likely previous development including past structures that are not represented on Sheet 1. The site is relatively level and flat with existing grades generally dropping west to east from about elevation 127 to 120 feet. Existing site features are shown on Sheet 1.

It should be noted that the site is a urban site with likely previous development including past structures that are not represented on Sheet 1.

3.2 Soil and Bedrock

Underlying a surficial layer of topsoil or pavement the borings encountered a subsurface profile generally consisting of a thin layer of uncontrolled granular fill overlying native outwash sands overlying refusal surfaces (probable bedrock). The principal soils encountered at the explorations are summarized below; refer to the attached logs for more detailed descriptions of the subsurface findings.

Uncontrolled Fill: The borings encountered uncontrolled fill consisting of loose to medium dense, brown and dark brown sand with varying portions of silt, gravel, and miscellaneous debris such as coal, porcelain, glass, and brick fragments. Rootlets were observed in the fill at some of the explorations. The fill was penetrated at depths varying from approximately 1.5 to 6 feet at the explorations.

Outwash Sands: Underlying the uncontrolled fill, the borings encountered native outwash sands consisting of stratified medium dense to very dense sand with varying portions of silt and gravel. The borings, with the exception of B-104 through B-108, were terminated in the outwash sands at depths varying from 9 to 21 feet.

Refusal Surfaces: Underlying the outwash sands, borings B-104 through B-108 encountered refusal surfaces (probable bedrock) at depths varying from 22 to 28 feet. A zone of probable bedrock was penetrated by as much as approximately 2 feet by the augers before encountering refusal.

3.3 Groundwater

Free groundwater or saturated soils were encountered at depths varying from about 18 to 21 feet at borings B-105 through B-108. Free water was not encountered at the remainder of the borings. Long term groundwater information is not available. It should be anticipated that seasonal groundwater levels will fluctuate, especially during periods of snowmelt and precipitation.

3.4 Seismic and Frost

The 25-year Air Freezing Index for the Portland, Maine area is about 1,290-Fahrenheit degree-days, which corresponds to a frost penetration depth on the order of 4.5 feet. Based on the subsurface findings, we interpret the site soils to correspond to Seismic Soil Site Class C according to 2009 IBC.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principle geotechnical considerations are as follows:

- The site is an urban site likely with past structures and underground improvements that may not become apparent until construction. An assessment of past site uses including historical structures should be completed during the planning phase of the project to help understand the impact of past site development to the proposed construction.

- A 2 to 6 foot layer of uncontrolled granular fill exists within the proposed apartment building and Park Danforth building addition footprints. The uncontrolled fill should be removed and replaced below foundations and densified below on-grade floor slabs. Areas that become soft after densifying should be removed and replaced prior to installing slab gravels. Provided the building pads are properly prepared, spread footing foundations and on-grade floor slabs appear suitable for the proposed construction.

- Native sand subgrades below foundations and on-grade floor slabs should be densified. Pavement subgrades consisting of uncontrolled fill or native sands should be proof-rolled and soft areas repaired prior to installing pavement gravels.

- Imported Granular Borrow, Structural Fill, and Crushed Stone will be needed for construction. Existing native outwash sands appear suitable for reuse as Granular Borrow.

- We recommend completing a historical mapping and records review of the site to explore the potential for buried structures and foundations which may be encountered during construction. S.W.COLE is available to complete this task.

4.2 Site and Subgrade Preparation

We recommend that site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. As much vegetation as possible should remain outside the construction areas to lessen the potential for erosion and site disturbance. All topsoil and organics should be completely removed from areas of proposed construction. Final cuts to subgrade elevation should be made with a smooth edge bucket to lessen subgrade disturbance. We offer the following

subgrade preparation recommendations for proposed building and paved areas.

Proposed Building Areas: In addition to grubbing all organics, all existing pavement, utilities, foundations, structures, and uncontrolled fill should be completely removed beneath proposed foundations until undisturbed native sands are encountered. The removal of unsuitable materials should extend outward 1 foot laterally from edge of footing for every foot of vertical depth below bottom of footing (1H:1V bearing splay). Overexcavations should be backfilled with compacted Structural Fill. The native sand footing subgrade soils should be densified with 3 to 5 passes of a vibratory plate compactor having a static weight of at least 600 pounds prior to placing new fill or concrete.

Following installation and backfilling of building foundations, we recommend floor slab subgrade be densified with 3 to 5 passes of a vibratory roller having a static weight of at least 5 tons. Floor slab areas that become soft or continue to yield after densifying should be removed and replaced with compacted Structural Fill prior to installing slab gravels.

Proposed Paved Areas: Following grubbing all organics, all pavement and deleterious materials should be removed beneath proposed paved areas. Existing utilities should be removed and existing foundations should be removed to at least 4.5 feet below finish grade and backfilled with compacted Granular Borrow. Pavement subgrades should be proof rolled and densified with 3 to 5 passes of a vibratory roller having a static weight of at least 10 tons. Pavement subgrade areas that become soft or continue to yield should be removed and replaced with compacted Granular Borrow prior to installing pavement gravels.

4.3 Excavation and Dewatering

Excavation work will generally encounter existing uncontrolled granular fill and native outwash sands. Care must be exercised during construction to limit disturbance of the native bearing soils. Earthwork and grading activities should occur during drier Summer and Fall seasons. Final cuts to subgrade should be performed with a smooth-edged bucket to help minimize soil disturbance.

We recommend that the construction documents contain unit pricing for removal and replacement of existing uncontrolled fills, structures, and other unsuitable materials as

described herein.

Groundwater was encountered at the explorations at depths on the order of 20 feet. Sumping and pumping dewatering techniques should be adequate to control groundwater in excavations. Excavations must be properly shored or sloped in accordance with OSHA trenching regulations to prevent sloughing and caving of the sidewalls during construction. Care must be taken to preclude undermining adjacent structures, utilities and roadways. The design and planning of excavations, excavation support systems, and dewatering is the responsibility of the contractor.

4.4 Foundations

We recommend the proposed buildings be supported on spread footings founded on densified native outwash sands or properly compacted Structural Fill overlying densified native outwash sands. As presented herein, it will be necessary to remove and replace existing uncontrolled fills below foundations.

For foundations bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design consideration:

- Design Frost Depth = 4.5 feet
- Net Allowable Soil Bearing Pressure = 4 ksf or less
- Base Friction Factor = 0.30 (concrete to sand)
- Total Unit Weight of Backfill = 125 pcf (compacted Structural Fill)
- At-Rest Lateral Earth Pressure Coefficient = 0.5 (compacted Structural Fill)
- Internal Friction Angle of Backfill = 30° (compacted Structural Fill)
- Seismic Soil Site Class = C (IBC 2009)

4.5 Foundation Drainage

The site soils consist of relatively dry, well-drained sands. However, it is good practice to provide perimeter underdrainage to help reduce the risk of frost heaving of entrance slabs and sidewalks. We recommend an underdrain system be installed along the outside edge the perimeter footings. The underdrain pipe should consist of 4-inch diameter, slotted foundation drain pipe bedded in Underdrain Sand. The underdrain pipe must have a positive gravity outlet protected from freezing, clogging and backflow. Surface grades should be sloped away from the building for positive drainage. General underdrain details

are illustrated on Sheet 22.

4.6 Slab-On-Grade

On-grade floor slabs in heated areas may be designed using a subgrade reaction modulus of 100 pci (pounds per cubic inch) provided the slab is underlain by at least 12-inches of compacted Structural Fill placed over densified native sand subgrades. The structural engineer or concrete consultant must design steel reinforcing and joint spacing appropriate to slab thickness and function.

We recommend a sub-slab vapor retarder particularly in areas of the building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors. The vapor retarder must have a permeance that is less than the floor cover or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-slab base material and construction activity. The vapor retarder material should be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

The floor slab should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed surface treatments, flooring and adhesive materials.

4.7 Entrance Slabs and Sidewalks

Entrance slabs and sidewalks adjacent to the building must be designed to reduce the effects of differential frost action between adjacent pavement, doorways, and entrances. We recommend that non-frost susceptible Structural Fill be provided to a depth of at least 4.5 feet below the top of entrance slabs. This thickness of Structural Fill should extend the full width of the entrance slab and outward at least 4.5 feet, thereafter transitioning up to the bottom of the adjacent sidewalk or pavement gravels at a 3H:1V or flatter slope. General details of this frost transition zone are attached as Sheet 22.

4.8 Backfill and Compaction

We recommend the following fill and backfill materials:

Granular Borrow: Sand or silty sand meeting the gradation requirements of MDOT Standard Specification 703.19 Granular Borrow. Granular Borrow is recommended for use as:

- Fill to raise site grades in proposed paved areas
- Backfill of overexcavations below proposed paved areas

Structural Fill: Clean, non-frost susceptible sand and gravel meeting the gradation requirements for Structural Fill as given below.

Structural Fill	
Sieve Size	**Percent Finer by Weight**
4 inch	100
3 inch	90 to 100
¼ inch	25 to 90
#40	0 to 30
#200	0 to 5

Structural Fill is recommended for use as:

- Backfill for overexcavations below footings and on-grade floor slabs
- Fill to raise grades in building areas
- Backfill against foundations
- Backfill within frost transition zones below entrances and sidewalks

Underdrain Sand: Underdrain Sand used around underdrain pipes should meet the gradation requirements of MDOT Standard Specifications 703.22 "Underdrain Backfill Type B".

Reuse of Site Soils: The existing uncontrolled fills are unsuitable for reuse below proposed building areas, but may be suitable for reused in proposed pavement and landscape areas. The native sands appear suitable for reuse as Granular Borrow. The contractor should anticipate the need to moisture condition soils for reuse.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill activities should not exceed 12 inches. We recommend that fill and backfill in building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557.

4.9 Weather Considerations

Construction activity should be limited during wet and freezing weather and the site soils may require drying before construction activities may continue. The contractor should anticipate the need for water to temper fills in order to facilitate compaction during dry weather. If construction takes place during cold weather, subgrades, foundations and floor slabs must be protected during freezing conditions. Concrete and fill must not be placed on frozen soil; and once placed, the concrete and soil beneath the structure must be protected from freezing.

4.10 Paved Areas

We anticipate paved areas will be subjected primarily to passenger vehicle and light delivery truck traffic. Considering the site soils and proposed usage, we offer the following pavement section for consideration. Materials are based on Maine Department of Transportation Standard Specifications.

- 1 ¼ inches of 9.5 mm Hot Mix Asphalt (50 Gyration Design)
- 2 ¼ inches of 12.5 mm Hot Mix Asphalt (50 Gyration Design)
- 3 inches of MDOT 703.06 Type A, Crushed Aggregate Base
- 15 inches of MDOT 703.06 Type D, Crushed Aggregate Subbase

Pavement subgrades are anticipated to consist of densified existing fills, native sands or compacted Granular Borrow. The base and subbase materials should be compacted to at least 95 percent of their maximum dry density as determined by ASTM D-1557. Hot mix asphalt pavement should be compacted to 92 to 97 percent of its theoretical maximum density as determined by ASTM D-2041. A tack coat should be used between successive lifts of bituminous pavement.

It should be understood that frost penetration can be on the order of 4.5 feet in this area. In the absence of full depth excavation of frost susceptible soils below paved areas and subsequent replacement with non-frost susceptible compacted fill, frost penetration into the subgrade will occur and some heaving and distress of pavement must be anticipated.

4.11 Recommendation for Additional Study

Given the previously developed nature of the site, we recommend performing a historical mapping and records research review of the site. A review will help to establish the location of historical buildings and underground structures which could be encountered during construction. S.W.COLE is available to provide the historical research services.

4.12 Design Review and Construction Testing

S.W.COLE should be retained to review the civil and foundation construction documents to determine that our earthwork, foundation and pavement recommendations have been properly interpreted and implemented.

A soils and concrete testing program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to provide subgrade observations for foundations as well as testing services for soils, concrete, asphalt, steel and spray-applied fireproofing construction materials.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.

Evan M. Walker, P.E.
Geotechnical Engineer

Timothy J. Boyce, P.E.
Senior Geotechnical Engineer

EMW: tjb

Attachment A
Limitations

This report has been prepared for the exclusive use of The Park Danforth and Mitchell & Associates for specific application to the proposed Park Danforth Expansion in Portland, Maine. S.W.COLE has endeavored to conduct the work in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

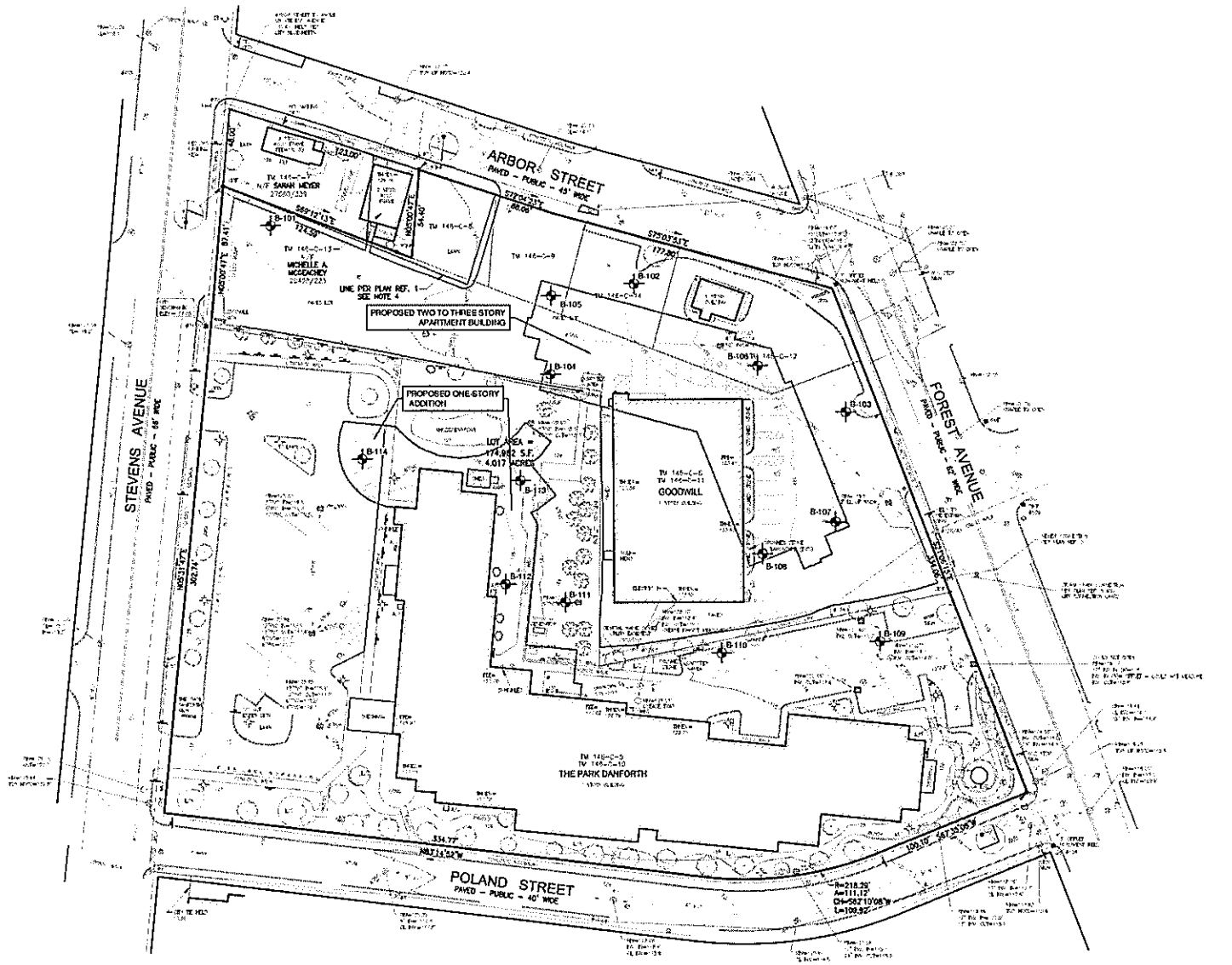
The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of work has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.



LEGEND:

⊕ APPROXIMATE BORING LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN WAS PREPARED FROM A 1"=20' SCALE PLAN OF THE SITE ENTITLED "BOUNDARY & TOPOGRAPHIC SURVEY," PREPARED BY OWEN HASKELL, INC., DATED JANUARY 2, 2014.
2. THE BORINGS WERE LOCATED IN THE FIELD BY TAPED MEASUREMENTS FROM EXISTING SITE FEATURES.
3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

NO	DATE	DESCRIPTION	BY
1	06/16/2014	REPORT SUBMISSION	CEM
–	05/30/2014	PRELIMINARY SUBMISSION	CEM

S.W. COLE ENGINEERING, INC.

THE PARK DANFORTH
C/O MITCHELL & ASSOCIATES

EXPLORATION LOCATION PLAN

PROPOSED SENIOR LIVING FACILITY
ARBOR STREET AND FOREST AVENUE
PORTLAND, MAINE

Job No.:	14-0099	Scale:	1" = 20'
Date:	05/30/2014	Sheet:	1

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-101
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/23/2014
DATE FINISH: 5/23/2014
ELEVATION: 127' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	2 1/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
	1D	24"	18"	2.5'	9	7	5	5		4" ASPHALT DARK BROWN GRAVELLY SAND, SOME SILT WITH ROOTLETS AND BRICK (FILL) ~MEDIUM DENSE TO LOOSE~
	2D	24"	12"	4.5'	4	4	5	4	5.0'	
	3D	24"	18"	7.0'	5	12	24	24		BROWN SAND AND GRAVEL, TRACE SILT ~DENSE~
	4D	24"	16"	9.0'	24	25	18	16		
										BOTTOM OF EXPLORATION AT 9.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-101

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-102
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/23/2014
DATE FINISH: 5/23/2014
ELEVATION: 123' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										3"± ASPHALT
									2.0'	DARK BROWN GRAVELLY SAND, SOME SILT (FILL) ~MEDIUM DENSE~
	1D	24"	20"	2.5'	4	5	7	9		ORANGE-BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT ~MEDIUM DENSE~
	2D	24"	18"	4.5'	7	9	7	7	5.0'	
	3D	24"	18"	7.0'	5	8	16	17		LIGHT BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT ~MEDIUM DENSE TO DENSE~
	4D	24"	19"	9.0'	16	21	22	20		
										BOTTOM OF EXPLORATION AT 9.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-102

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-103
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 121' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										4"± ASPHALT
									1.5'	BROWN SAND SOME GRAVEL, SOME SILT (FILL) ~MEDIUM DENSE~
	1D	24"	16"	2.5'	6	9	7	7	2.5'	ORANGE-BROWN FINE SAND SOME SILT ~MEDIUM DENSE~
	2D	24"	17"	4.5'	6	6	6	7		LIGHT BROWN FINE SAND TRACE SILT
	3D	24"	16"	7.0'	4	6	7	7		~MEDIUM DENSE~
	4D	24"	18"	9.0'	8	7	8	10		
										BOTTOM OF EXPLORATION AT 9.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-103

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-104
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/23/2014
DATE FINISH: 5/23/2014
ELEVATION: 124' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										3"± ASPHALT
										BROWN SAND, SOME GRAVEL, SOME SILT WITH GLASS & WOOD PIECES (FILL)
	1D	24"	16"	2.5'	5	6	5	8	2.0'	~MEDIUM DENSE~
										w = 3.4%
	2D	24"	18"	4.5'	12	16	18	20		BROWN GRAVELLY MEDIUM TO COARSE SAND, TRACE SILT
	3D	24"	17"	7.0'	13	23	25	33		~DENSE TO VERY DENSE~
	4D	18"	16"	8.5'	28	28	31		10.0'	
										w = 4.3%
	5D	24"	18"	12.0'	10	14	16	23		~DENSE~
										BROWN MEDIUM SAND, TRACE GRAVEL, TRACE SILT
	6D	24"	20"	17.0'	12	12	15	21		~MEDIUM DENSE~
									19.5'	
										WEATHERED BEDROCK
										REFUSAL AT 21.8'
										(PROBABLE BEDROCK)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-104

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-105
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/23/2014
DATE FINISH: 5/23/2014
ELEVATION: 124' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS WET AT 21'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										3"± ASPHALT
										BROWN SAND SOME GRAVEL, SOME SILT WITH CONCRETE
	1D	24"	15"	2.5'	5	9	18	8	3.0'	FRAGMENTS (FILL) ~MEDIUM DENSE~
										BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT
	2D	24"	16"	4.5'	5	6	6	8	5.0'	~MEDIUM DENSE~
	3D	24"	17"	7.0'	6	16	22	23		~DENSE~
	4D	24"	19"	9.0'	16	20	22	24		BROWN GRAVELLY MEDIUM TO COARSE SAND, TRACE SILT
	5D	24"	20"	12.0'	15	23	29	49		~VERY DENSE~
	6D	24"	20"	17.0'	16	23	31	38		
									21.0'	
	7D	18"	15"	21.5'	24	34	45			BROWN GRAVELLY FINE TO MEDIUM SAND, TRACE SILT
									23.0'	~VERY DENSE~
										REFUSAL AT 23'
										(PROBABLE BEDROCK)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-105

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-106
SHEET: 1 OF 1
PROJECT NO.: 14-0065
DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 122' ±
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 20'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										2½" ± ASPHALT
										DARK BROWN TO BROWN SAND, SOME GRAVEL, SOME SILT (FILL)
	1D	24"	15"	2.5'	8	9	8	8	3.0'	~MEDIUM DENSE~
	2D	24"	15"	4.5'	9	9	7	3		BROWN FINE TO COARSE SAND, SOME GRAVEL, TRACE SILT
	3D	24"	16"	7.0'	6	12	16	19	7.0'	~MEDIUM DENSE~
	4D	24"	16"	9.0'	12	15	16	16		w = 4.1%
									10.0'	BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT ~DENSE~
	5D	24"	20"	12.0'	15	25	23	25		~DENSE~
	6D	24"	18"	17.0'	15	28	32	40		BROWN GRAVELLY MEDIUM TO COARSE SAND, TRACE SILT
	7D	24"	22"	22.0'	15	17	24	30	21.2'	w = 2.4% ~VERY DENSE~
										w =19.5%
										BROWN FINE TO MEDIUM SAND SOME SILT ~DENSE~
									28.0'	~ DENSE ~
										REFUSAL 28.0'
										(PROBABLE BEDROCK)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-106

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-107
SHEET: 1 OF 1
PROJECT NO.: 14-0065
DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 121' ±
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 18'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										3" ASPHALT
										DARK BROWN SAND, SOME GRAVEL, SOME SILT (FILL)
	1D	24"	14"	2.5'	6	9	9	9	2.5'	~MEDIUM DENSE~
										ORANGE-BROWN SAND SOME SILT
	2D	24"	15"	4.5'	12	8	7	6	4.5'	~MEDIUM DENSE~
	3D	24"	17"	7.0'	5	9	9	10		~MEDIUM DENSE~
	4D	24"	18"	9.0'	12	13	12	12		LIGHT BROWN FINE TO MEDIUM SAND, TRACE SILT WITH OCCASIONAL SILT SEAMS BETWEEN 10-12' AND 10" SAND AND GRAVEL LAYER FROM 15.2-16.0'
	5D	24"	22"	12.0'	8	11	16	23		
	6D	24"	22"	17.0'	12	16	15	18		~DENSE~
	7D	24"	18"	22.0'	4	8	9	22		~MEDIUM DENSE~
									23.0'	
									24.0'	WEATHERED BEDROCK
										REFUSAL AT 24.0' (PROBABLE BEDROCK)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-107

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-108
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 123' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SOILS SATURATED AT 20'

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										2¼" ASPHALT
										BROWN SAND SOME GRAVEL, SOME SILT (FILL)
	1D	24"	14"	2.5'	5	8	7	6	2.5'	
										BROWN MEDIUM TO COARSE SAND
	2D	24"	18"	4.5'	5	4	3	2		TRACE GRAVEL, TRACE SILT, TRACE ROOTLETS ~LOOSE~
									6.0'	(FILL)
	3D	24"	14"	7.0'	2	10	13	20		~MEDIUM DENSE~
	4D	24"	16"	9.0'	10	15	20	16		BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT
									10.0'	
										~MEDIUM DENSE~
	5D	24"	18"	12.0'	10	12	18	25		
										BROWN FINE TO MEDIUM SAND, TRACE GRAVEL, TRACE SILT
	6D	24"	22"	17.0'	10	13	15	16		
									19.0'	
										BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, SOME SILT
	7D	24"	22"	22.0'	13	18	21	18		~MEDIUM DENSE~
										REFUSAL AT 26.5'
										(PROBABLE BEDROCK)

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-108

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-109
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 121' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	2 1/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										2½"± ASPHALT
										BROWN GRAVELLY SAND, SOME SILT (FILL)
	1D	24"	16"	2.5'	7	14	8	8	2.5'	~MEDIUM DENSE~
										BROWN FINE TO MEDIUM SAND, SOME GRAVEL, SOME SILT
	2D	24"	18"	4.5'	8	10	11	8	4.5'	~MEDIUM DENSE~
	3D	24"	18"	7.0'	3	5	5	5		LIGHT BROWN FINE TO MEDIUM SAND, TRACE SILT
	4D	24"	17"	9.0'	6	9	9	12		WITH COARSE SAND LAYERS BETWEEN 8-9'
	5D	24"	16"	12.0'	7	11	14	15		~MEDIUM DENSE~
										BOTTOM OF EXPLORATION AT 12.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-109

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-110
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 125' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	SSA	2 1/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										2½" ASPHALT
	1D	12"	6"	1.5'	19	50				DARK BROWN GRAVELLY SAND, SOME SILT (FILL)
									3.0'	<<BLOW COUNT OVERSTATED - PUSHED GRAVEL>>
										ORANGE-BROWN FINE TO MEDIUM SAND
	2D	24"	15"	5.0'	4	5	5	4	5.0'	TRACE GRAVEL ~LOOSE TO MEDIUM DENSE~
	3D	24"	16"	7.0'	5	4	9	13		~MEDIUM DENSE~
										BROWN FINE TO MEDIUM SAND, SOME GRAVEL, TRACE SILT
	4D	24"	16"	9.0'	17	21	15	14		<<BLOW COUNT OVERSTATED - PUSHED GRAVEL>>
	5D	24"	14"	12.0'	9	10	12	14		~MEDIUM DENSE~
										BOTTOM OF EXPLORATION AT 12.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-110

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-111
SHEET: 1 OF 1
PROJECT NO.: 14-0065
DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 124' ±
SWC REP.: PJO

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.3'	DARK BROWN SAND AND SILT WITH ROOTLETS (TOPSOIL) ~LOOSE~
	1D	24"	18"	2.0'	4	4	5	5	1.5'	DARK BROWN SILTY SAND, SOME GRAVEL (FILL) ~LOOSE~
	2D	24"	18"	4.0'	5	4	8	12	3.5'	ORANGE-BROWN MEDIUM TO COARSE SAND TRACE GRAVEL, TRACE SILT ~MEDIUM DENSE~
	3D	24"	18"	7.0'	4	11	16	19	7.0'	BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT ~MEDIUM DENSE~
	4D	24"	17"	9.0'	17	20	18	24		BROWN GRAVELLY MEDIUM TO COARSE SAND, TRACE SILT ~MEDIUM DENSE~
	5D	24"	20"	12.0'	21	20	23	22	12.0'	
	6D	12"	10"	16.0'	15	50				BROWN SAND AND GRAVEL, TRACE SILT ~DENSE~
										BOTTOM OF EXPLORATION AT 16.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-111

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-112
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/22/2014
DATE FINISH: 5/22/2014
ELEVATION: 126' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
									0.4'	DARK BROWN SAND AND SILT WITH ROOTLETS (TOPSOIL / FILL) ~LOOSE~
	1D	24"	18"	2.0'	2	2	6	8		~LOOSE~
	2D	24"	22"	4.0'	5	7	13	20		DARK BROWN GRAVELLY SILTY SAND WITH BRICK AND COAL FRAGMENTS (FILL)
									5.0'	~MEDIUM DENSE~
	3D	24"	14"	7.0'	7	17	18	17		~DENSE~
	4D	11"	11"	9.0'	26	50/5"				BROWN SAND AND GRAVEL, TRACE SILT
	5D	24"	18"	12.0'	24	29	28	30		~VERY DENSE~
	6D	24"	22"	17.0'	10	26	26	25		BOTTOM OF EXPLORATION AT 17.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-112

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-113
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/23/2014
DATE FINISH: 5/23/2014
ELEVATION: 125' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										GRASS / DARK BROWN SILTY SAND, TRACE GRAVEL
	1D	24"	16"	2.0'	2	6	5	11	2.0'	WITH PORCELAIN AND COAL FRAGMENTS (FILL) ~MEDIUM DENSE~
										BROWN GRAVELLY SAND SOME SILT
	2D	24"	16"	4.0'	19	15	12	14		~MEDIUM DENSE~
									5.0'	
	3D	24"	19"	7.0'	11	17	20	25		~DENSE~
	4D	18"	16"	8.5'	14	19	33			BROWN GRAVELLY MEDIUM TO COARSE SAND, TRACE SILT
	5D	24"	18"	12.0'	11	18	27	30		
	6D	24"	22"	17.0'	19	25	28	37		~VERY DENSE~
										BOTTOM OF EXPLORATION AT 17.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-113

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: B-114
SHEET: 1 OF 1
PROJECT NO.: 14-0065

PROJECT / CLIENT: PROPOSED SENIOR LIVING FACILITY / THE PARK DANFORTH c/o MITCHELL & ASSOCIATES
LOCATION: ARBOR STREET & FOREST AVENUE, PORTLAND, ME
DRILLING CO. : GREAT WORKS TEST BORINGS, INC. DRILLER: JEFF LEE

DATE START: 5/23/2014
DATE FINISH: 5/23/2014
ELEVATION: 126' ±
SWC REP.: PJO

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2 3/4"		
SAMPLER:	SS	1 3/8"	140-LBS	30"
CORE BARREL:				

WATER LEVEL INFORMATION
NO FREE WATER OBSERVED

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA
										3½" ASPHALT
									1.5'	BROWN GRAVELLY SAND, SOME SILT (FILL) ~MEDIUM DENSE~
	1D	24"	16"	2.5'	5	8	8	8	3.0'	BROWN FINE TO MEDIUM SAND, TRACE SILT ~MEDIUM DENSE~
	2D	24"	15"	4.5'	11	20	25	25		~DENSE TO VERY DENSE~
	3D	24"	18"	7.0'	13	23	31	31		
	4D	9"	7"	7.7'	31	50/3"				BROWN SAND AND GRAVEL, TRACE SILT
	5D	22"	17"	11.8'	9	14	21	50/5"		~DENSE~
	6D	24"	16"	17.0'	22	18	25	29		
	7D	12"	10"	21.0'	29	48				~VERY DENSE~
										BOTTOM OF EXPLORATION AT 21.0'

SAMPLES:
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS:
STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B-114

KEY TO THE NOTES & SYMBOLS
Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q_u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S_v	-	field vane shear strength, kips/sq. ft.
L_v	-	lab vane shear strength, kips/sq. ft.
q_p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W_L	-	liquid limit - Atterberg test
W_P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ_T	-	total soil weight
γ_B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%
With	Undifferentiated

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: **Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: **Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

S.W.COLE ENGINEERING, INC.

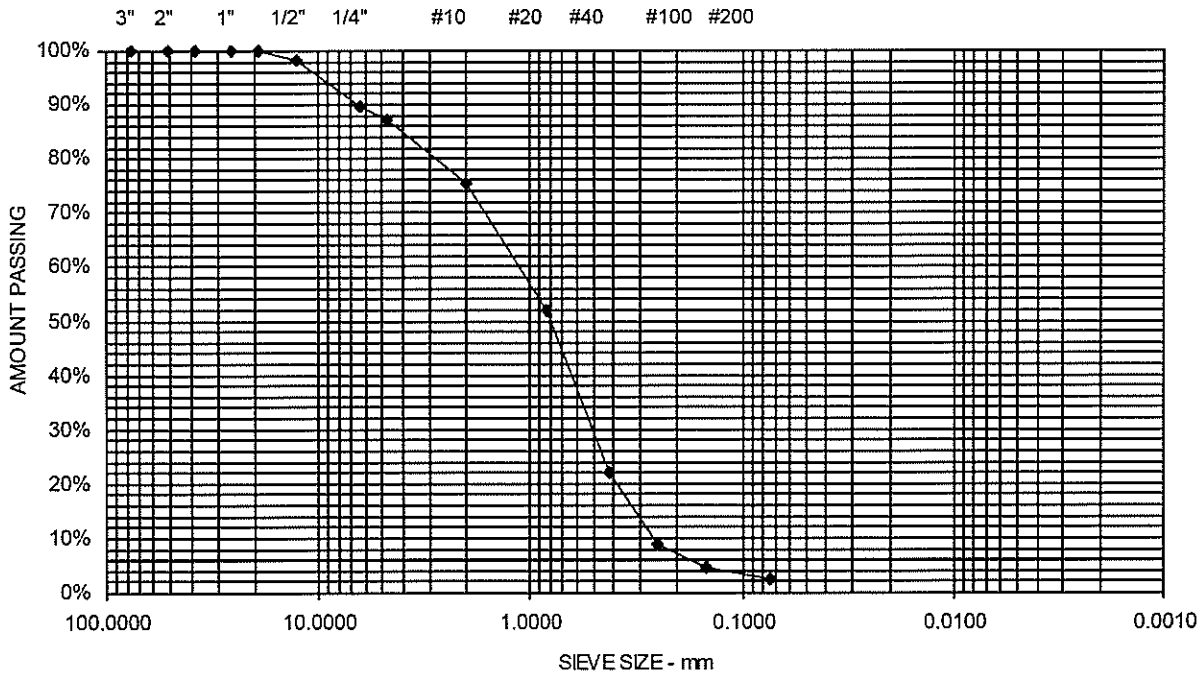
Report of Gradation

ASTM C-117 & C-136

Project Name: PORTLAND ME - PROPOSED SENIOR LIVING - THE PARK DANFORTH - GEOTECHNICAL ENGINEERING SERVICES
Client: THE PARK-DANFORTH
Material Source: B-104 2D 2.5-4.5

Project Number: 14-0065
Lab ID: 18232G
Date Received: 5/28/2014
Date Completed: 5/30/2014
Tested By: JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	98	
6.3 mm	1/4"	90	
4.75 mm	No. 4	87	12.8% Gravel
2.00 mm	No. 10	75	
850 um	No. 20	52	
425 um	No. 40	22	84.8% Sand
250 um	No. 60	9	
150 um	No. 100	5	
75 um	No. 200	2.4	2.4% Fines



Comments: w = 3.4%

S.W.COLE ENGINEERING, INC.

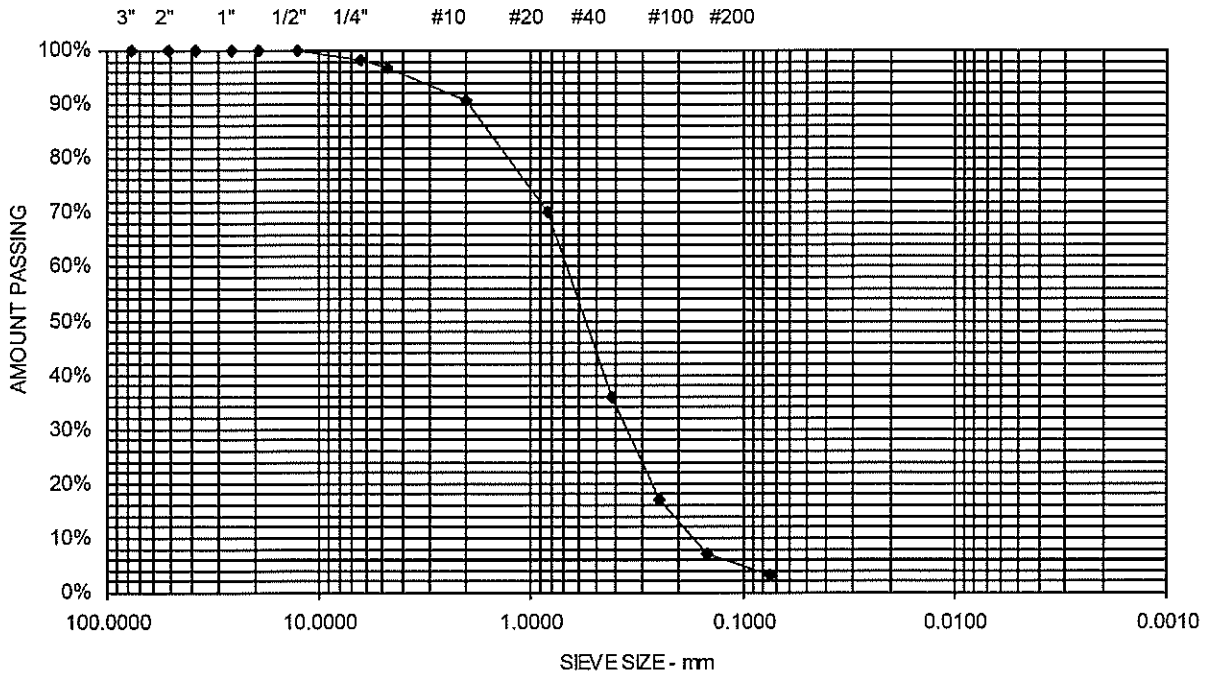
Report of Gradation

ASTM C-117 & C-136

Project Name: PORTLAND ME - PROPOSED SENIOR LIVING - THE PARK DANFORTH - GEOTECHNICAL ENGINEERING SERVICES
Client: THE PARK-DANFORTH
Material Source: B-104 5D 10-12

Project Number: 14-0065
Lab ID: 18233G
Date Received: 5/28/2014
Date Completed: 5/30/2014
Tested By: JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	98	
4.75 mm	No. 4	97	3.2% Gravel
2.00 mm	No. 10	91	
850 um	No. 20	70	
425 um	No. 40	36	93.4% Sand
250 um	No. 60	17	
150 um	No. 100	7	
75 um	No. 200	3.3	3.3% Fines



Comments: w = 4.3%

S.W.COLE ENGINEERING, INC.

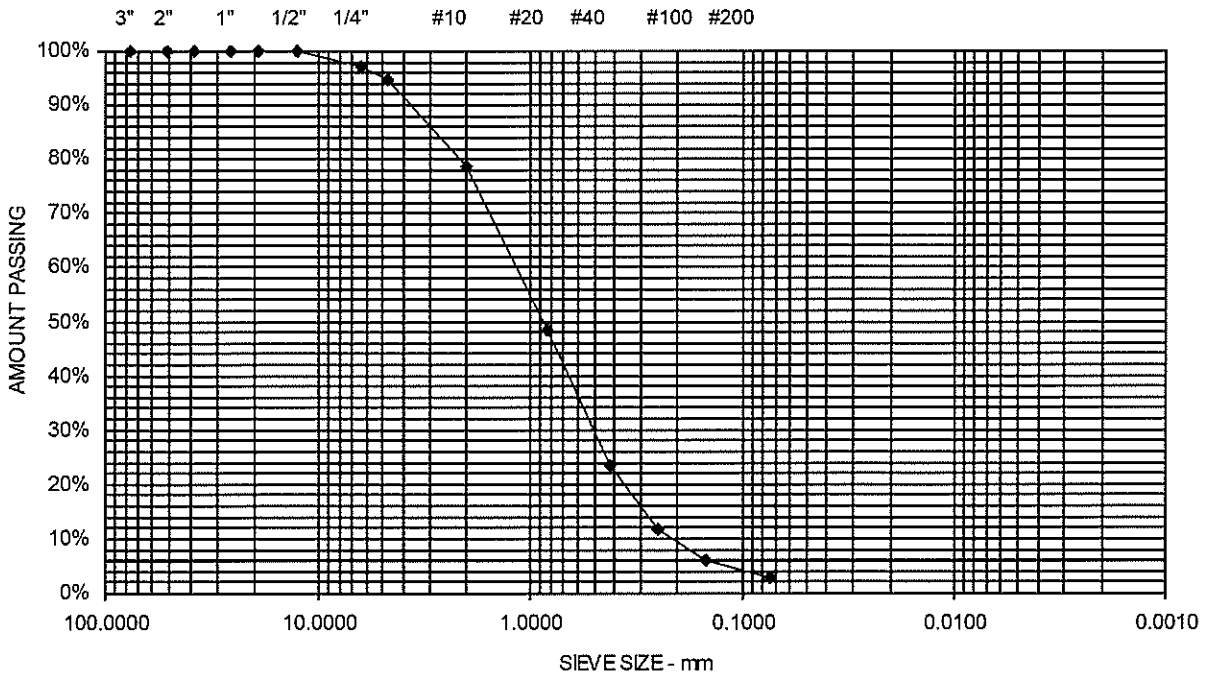
Report of Gradation

ASTM C-117 & C-136

Project Name: PORTLAND ME - PROPOSED SENIOR LIVING - THE PARK DANFORTH - GEOTECHNICAL ENGINEERING SERVICES
Client: THE PARK-DANFORTH
Material Source: B-106 4D 7-9

Project Number: 14-0065
Lab ID: 18234G
Date Received: 5/28/2014
Date Completed: 5/30/2014
Tested By: JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	97	
4.75 mm	No. 4	95	5.4% Gravel
2.00 mm	No. 10	79	
850 um	No. 20	48	
425 um	No. 40	24	91.7% Sand
250 um	No. 60	12	
150 um	No. 100	6	
75 um	No. 200	2.9	2.9% Fines



Comments: w = 4.1%

S.W.COLE ENGINEERING, INC.

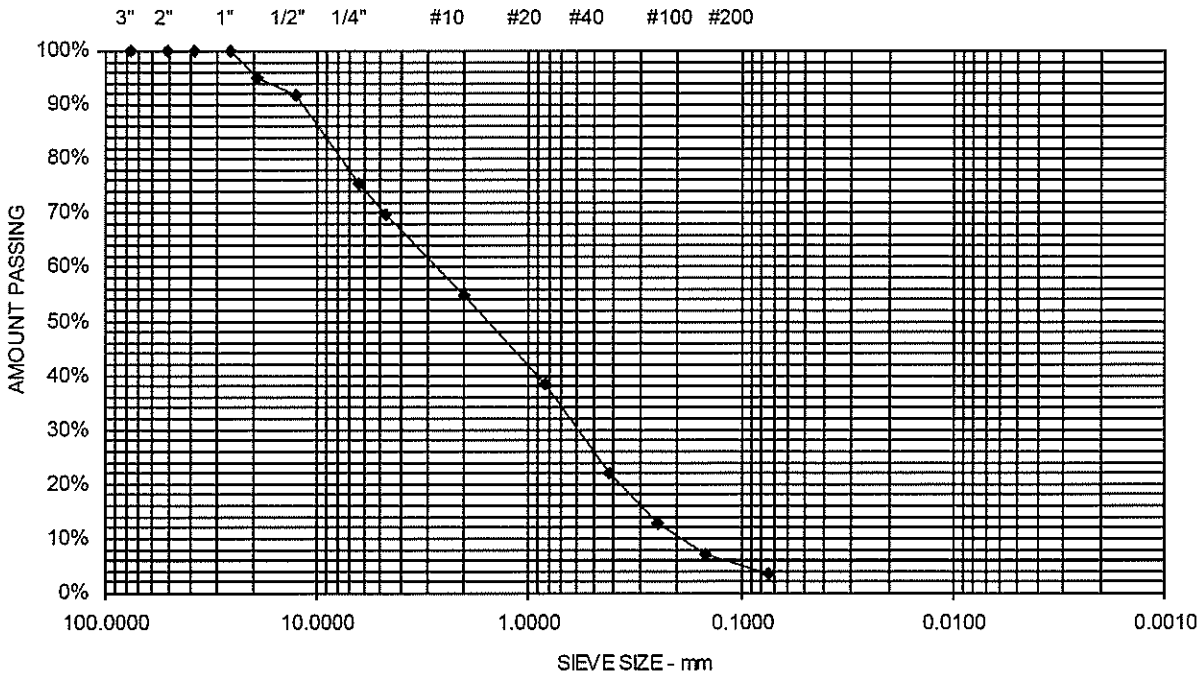
Report of Gradation

ASTM C-117 & C-136

Project Name: PORTLAND ME - PROPOSED SENIOR LIVING - THE PARK DANFORTH - GEOTECHNICAL ENGINEERING SERVICES
Client: THE PARK-DANFORTH
Material Source: B-106 6D 15-17

Project Number: 14-0065
Lab ID: 18235G
Date Received: 5/28/2014
Date Completed: 5/30/2014
Tested By: JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	95	
12.5 mm	1/2"	92	
6.3 mm	1/4"	75	
4.75 mm	No. 4	70	30.3% Gravel
2.00 mm	No. 10	55	
850 um	No. 20	39	
425 um	No. 40	22	66.2% Sand
250 um	No. 60	13	
150 um	No. 100	7	
75 um	No. 200	3.6	3.6% Fines



Comments: w = 2.4%

S.W.COLE ENGINEERING, INC.

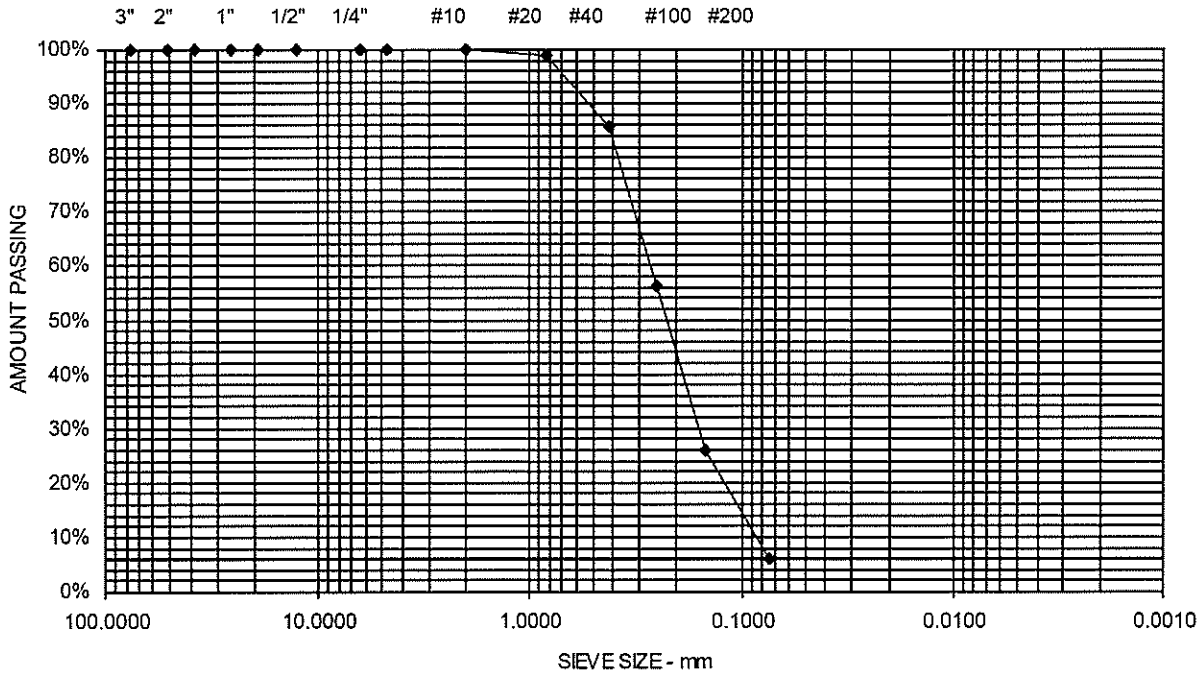
Report of Gradation

ASTM C-117 & C-136

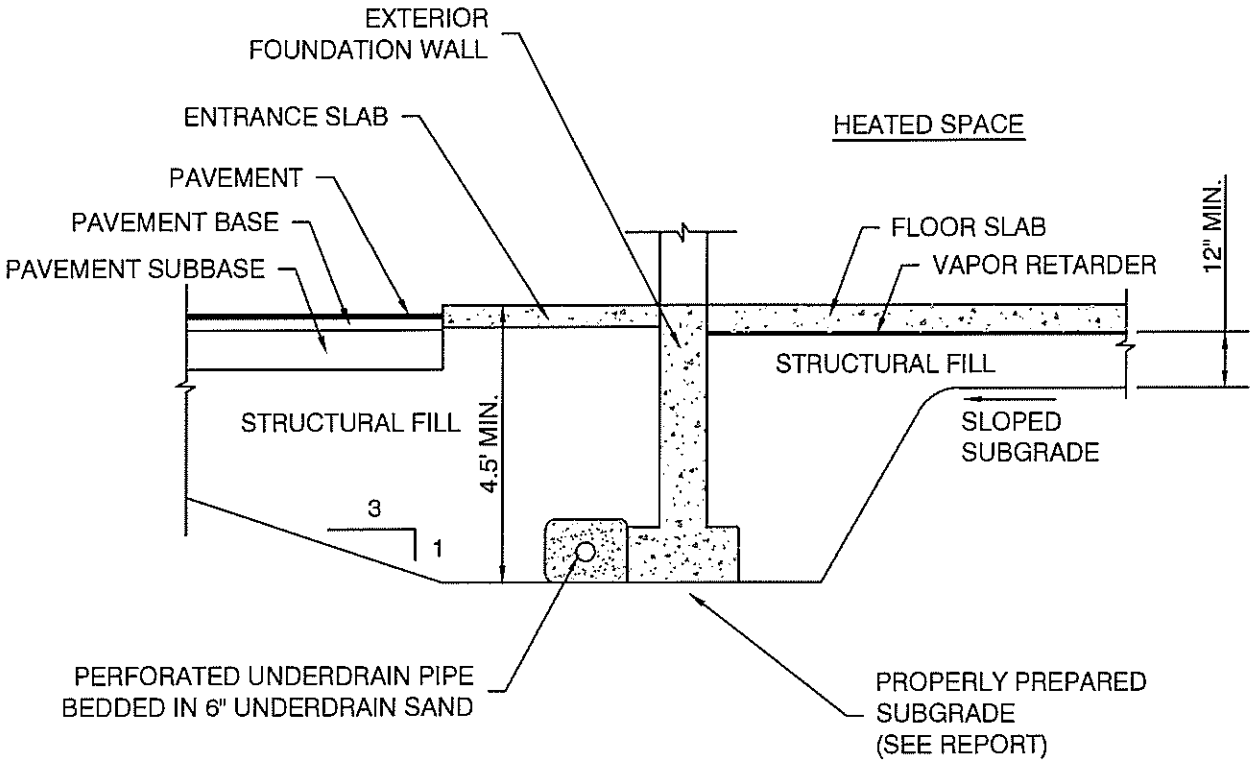
Project Name: PORTLAND ME - PROPOSED SENIOR LIVING - THE PARK DANFORTH - GEOTECHNICAL ENGINEERING SERVICES
Client: THE PARK-DANFORTH
Material Source: B-106 7D 20-22

Project Number: 14-0065
Lab ID: 18236G
Date Received: 5/28/2014
Date Completed: 5/30/2014
Tested By: JUSTIN BISSON

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	6"	100	
125 mm	5"	100	
100 mm	4"	100	
75 mm	3"	100	
50 mm	2"	100	
38.1 mm	1-1/2"	100	
25.0 mm	1"	100	
19.0 mm	3/4"	100	
12.5 mm	1/2"	100	
6.3 mm	1/4"	100	
4.75 mm	No. 4	100	0% Gravel
2.00 mm	No. 10	100	
850 um	No. 20	99	
425 um	No. 40	86	94.1% Sand
250 um	No. 60	56	
150 um	No. 100	26	
75 um	No. 200	5.9	5.9% Fines



Comments: w = 19.5%



NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.

2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.

S.W.COLE ENGINEERING, INC.

THE PARK DANFORTH
C/O MITCHELL & ASSOCIATES

UNDERDRAIN DETAIL

PROPOSED SENIOR LIVING FACILITY
ARBOR STREET AND FOREST AVENUE
PORTLAND, MAINE

Job No.:	14-0065	Scale:	Not to Scale
Date :	06/18/2014	Sheet:	22

APPENDIX I

TEST PITS (2 Reports)
ALBERT FRICK ASSOCIATES INC.

Albert Frick Associates, Inc
Environmental Consultants
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564
www.albertfrick.com info@albertfrick.com

Albert Frick, SS, SE
James Logan, SS, SE
Matthew Logan, SE
Brady Frick, SE
Bryan Jordan, SE
William O'Connor, SE
Noel Dunn, Office Manager

September 16, 2014

Mr. Robert Metcalf
Mitchell Associates
70 Center Street
Portland, ME 04101

Re: The Park at Danforth property, Forest & Stevens Avenue, Portland

Dear Mr. Metcalf:

On September 15, 2014, we evaluated six soil test pits, at locations of your choosing, on the above-referenced property to assist with stormwater design for a project on-site. We excavated these by hand shovel, to minimize damage to landscaping.

Enclosed for your review and use are soil profile classifications for each test pit evaluated, and a generic soil description for the 'nearest fit' series that best matches the filled land conditions of the site.

Soils observed all consist of regraded fill soils of variable gravelly loamy sand and sand textures. These generally become firmer with depth, as the compacted substratum is denser and somewhat resistant to internal drainage. Soils are generally moderately well-drained, with historical seasonal high groundwater generally within 4' of the mineral soil surface for short durations during the wettest seasons.

I trust you will find the enclosed information helpful in the design of a stormwater management plan for the property. Please do not hesitate to call should you have further questions or matters for discussion regarding the site.

Sincerely,

James Logan
Certified Soil Scientist #213
Licensed Site Evaluator #237
Wetland Scientist

The Park at Danforth
Portland, Maine

FILLED LAND
"SKERRY-LIKE"

SETTING

Parent Material:	Loamy glacial till underlain by sandy textured denser till.
Landform:	Drumlins and glaciated uplands.
Position in Landscape:	Usually occupies upper components of landform.
Slope Gradient Ranges:	(B) 3-8% (C) 8-20%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Moderately well-drained, with a perched water table 1.5 to 3.5 feet below the soil surface from November through May.
Typical Profile Description:	**Surface layer:** Light gray fine sandy loam, 0-4" **Subsurface layer:** Dark reddish brown fine sandy loam, 4-20" **Subsoil layer:** Yellowish brown fine sandy loam, 20-25" **Substratum:** Mixed brown and light olive brown fine sandy loam and sand, 25-65"
Hydrologic Group:	Group C
Surface Run Off:	Moderate
Permeability:	Moderate in solum and slow or moderately slow in the compact substratum.
Depth to Bedrock:	Deep, greater than 40".
Hazard to Flooding:	None

INCLUSIONS
(Within Mapping Unit)

Similar:	Adams, Croghan, Made Land, Cut & Fill Land
Dissimilar:	Tunbridge, Lyman (less than 40" to bedrock)

USE AND MANAGEMENT

Stormwater design: Skerry soils are moderately well drained. Soil permeabilities are expected to be 0.6 – 2.0 inches/hour in the upper portions of soil profile, and 0.06 – 0.6 inches/hour in the compact substratum, generally 25" – 65" beneath the soil surface.

Town, City, Plantation	Street, Road Subdivision	Owner's Name
PORTLAND	THE PARK DANFORTH	MITCHELL ASSOCIATES

ALL SOIL TEST PITS EXCAVATED BY HAND SHOVEL

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 1 ■ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0	SANDY LOAM (FILL)		DARK BROWN	
10	LOAMY SAND & GRAVELLY SAND (FILL)	FRIABLE	MIXED OLIVE BROWN	
30		SOMEWHAT FIRM TO FIRM IN PLACE	MIXED GRAYISH BROWN	FEW FAINT
50	LIMIT OF EXCAVATION			

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	25"	☐ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FOR WASTEWATER DISPOSAL →

Soil Series Name	Drainage Class	Hydrologic Group
FILLED LAND "SKERRY-LIKE"		

FOR SOILS MAPPING →

Observation Hole TP 2 ■ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0	SANDY LOAM (FILL)		DARK BROWN	
10	LOAMY SAND (FILL)	FRIABLE	DARK YELLOWISH BROWN	
30			YELLOWISH BROWN	
40	FINE & MEDIUM SAND	SOMEWHAT FIRM TO FIRM IN PLACE	LIGHT OLIVE BROWN	FEW FAINT
50	LIMIT OF EXCAVATION			

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	38"	☐ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name	Drainage Class	Hydrologic Group
FILLED LAND "SKERRY-LIKE"		

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 3 ■ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0	BARK MULCH (FILL)		BLACK	
10	LOAMY SAND & SAND	FRIABLE	OLIVE BROWN	
40		VERY FIRM IN PLACE	OLIVE GRAY	FEW FAINT
50	LIMIT OF EXCAVATION			

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	35"	☐ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FOR WASTEWATER DISPOSAL →

Soil Series Name	Drainage Class	Hydrologic Group
FILLED LAND "SKERRY-LIKE"		

FOR SOILS MAPPING →

Observation Hole TP 4 ■ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0	SANDY LOAM (FILL)		DARK BROWN	
10		FRIABLE		
20	LOAMY SAND & SAND (FILL) W/ BRICK DEBRIS		LIGHT OLIVE BROWN TO OLIVE BROWN	
30		SOMEWHAT FIRM TO FIRM IN PLACE		FEW FAINT
50	LIMIT OF EXCAVATION			

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	28"	☐ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name	Drainage Class	Hydrologic Group
FILLED LAND		

STATE OF MAINE ★ JAMES LOGAN #213 ★ SOIL SCIENTIST

James Logan AFA

Site Evaluator / Soil Scientist Signature

237/213
SE/CSS #

9-15-14
Date

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD GORHAM, MAINE 04038 – (207) 839-5563

Town, City, Plantation	Street, Road Subdivision	Owner's Name
PORTLAND	THE PARK DANFORTH	MITCHELL ASSOCIATES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 5 ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Depth	Texture	Consistency	Color	Mottling
0	SANDY LOAM (FILL)		DARK BROWN	
10	LOAMY SAND & SAND (FILL)	FRIABLE	MIXED DARK YELLOWISH BROWN	
20			OLIVE BROWN	
30	REFUSAL (ON STONE IN COMPACTED FILL)			FEW FAINT
40				
50				

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	31 "	☐ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FOR WASTEWATER DISPOSAL →

FOR SOILS MAPPING →

Soil Series Name:	Drainage Class:	Hydrologic Group:
FILLED LAND "SKERRY-LIKE"		

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 6 ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Depth	Texture	Consistency	Color	Mottling
0	SANDY LOAM (FILL)		DARK BROWN 10YR3/3	
10	LOAMY SAND & SAND (FILL)	FRIABLE	YELLOWISH BROWN	
20				FEW FAINT
30		SOMEWHAT FIRM TO FIRM IN PLACE	OLIVE BROWN	
40		VERY FIRM	OLIVE GRAY	
50		LIMIT OF EXCAVATION		

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	21 "	☐ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name:	Drainage Class:	Hydrologic Group:
FILLED LAND "SKERRY-LIKE"		

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole _____ ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Depth	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	____ "	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FOR WASTEWATER DISPOSAL →

FOR SOILS MAPPING →

Soil Series Name:	Drainage Class:	Hydrologic Group:

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole _____ ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Depth	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

STATE OF MAINE JAMES LOGAN #213 SOIL SCIENTIST

Soil Classification	Slope	Limiting Factor	
Profile ____ Condition ____	____ %	____ "	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name:	Drainage Class:	Hydrologic Group:

James Logan

Site Evaluator / Soil Scientist Signature

237/213

SE/CSS #

9-15-14

Date

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD GORHAM, MAINE 04038 – (207) 839-5563

Albert Frick Associates, Inc
Environmental Consultants
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564
www.albertfrick.com info@albertfrick.com

Albert Frick, SS, SE
James Logan, SS, SE
Matthew Logan, SE
Brady Frick, SE
Bryan Jordan, SE
William O'Connor, SE
Noel Dunn, Office Manager

September 27, 2014

Mr. Mike King
Mitchell Associates
70 Center Street
Portland, ME 04101

Re: The Park at Danforth, Stevens Avenue, Portland

Dear Mr. King:

We have revisited the above-referenced site to re-excavate soil test pits for stormwater design. Previously our test pits were dug by hand shovel and soil auger, and were not sufficiently deep to fully evaluate soil characteristics. Enclosed for your review and use are revised soil profile descriptions for TP1-6, based on excavations with backhoe, at the on-site locations previously identified by others.

Soil profiles observed in backhoe test pits exhibited similar conditions to those described with hand shovel test pits. These consist of fill soils of variable sandy textures, over original soils that are Croghan (Variant) soils, in that they are glacial outwash soils on nearly level to gently sloping landforms. The area has been developed for many years, with more than one project at this site.

A subsurface layer of somewhat firm to firm, very gravelly loamy sand was observed in all test pits, which had evidence of slower internal drainage than those soil layers above and below this slightly cemented zone. Original soil data provided suggested the soils are "Skerry-like", but over –excavation/removal of the somewhat firm to firm subsurface layer would create soil conditions on-site that more closely resemble Croghan (Deeerfield) soil as mapped originally in the USDA Natural Resource Conservation Service Soil Survey of Cumberland County.

While Croghan soils are generally moderately well drained (i.e. seasonal high water tables generally within 4' of the original soil surface), long term development of city streets/infrastructure has likely lowered the traditional water tables in the area. (It is my understanding that soil borings verified static water table levels approaching 20' in depth). A revised generic soil description for fill over Croghan soils is also now enclosed.

I trust you will find this enhanced investigation of soils on the project site will be helpful in redefining parameters and site limiting factors for sound stormwater design.

Otherwise, should you have further questions or matters for discussion regarding the site, please do not hesitate to call.

Sincerely,

James Logan
Certified Soil Scientist #213
Licensed Site Evaluator #237
Wetland Scientist

Cc. Lester Berry, P.E. (BH2M)

CROGHAN (Variant)

SETTING

Parent Material: Derived from outwash or deltaic sand.

Landform: Occupy outwash terraces and sand plains.

Position in Landscape: Usually are found in intermediate positions in the landscape.

Slope Gradient Ranges: (B) 3-8% (C) 8-20%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class: Generally moderately well-drained, with an apparent water table within 4' of the soil surface. On this specific site, city stormwater infrastructure in surrounding streets has likely lowered the water table.

Typical Profile Description:

Surface layer:	Dark brown sand, 0-7"
Subsurface layer:	Strong brown/yellowish brown, brown & pale brown sand with mottles below 13", 7-52"
Substratum:	Grayish brown loose sand, 52-60"

Hydrologic Group: Group B

Surface Run Off: Slow to medium

Permeability: Rapid to very rapid in the lower horizons.

Depth to Bedrock: Moderately deep, 20-40"

Hazard to Flooding: None

INCLUSIONS
(Within Mapping Unit)

Similar: Adams, Duane

Dissimilar: Au Gres, Naumburg, Naskeag

USE AND MANAGEMENT

Development of stormwater management systems: The limiting factor for building site development is wetness due to the presence of a groundwater table. Proper foundation drainage or site modification is recommended. Croghan soils are suitable for creation of stormwater management structures, and permeability is 6"-20"/hr in the upper 7" of soil profile, and in excess of 20"/hr on subsoil.

Town, City, Plantation	Street, Road Subdivision	Owner's Name
PORTLAND	THE PARK DANFORTH	MITCHELL ASSOCIATES

ALL SOIL TEST PITS EXCAVATED BY BACKHOE

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 1 ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
		FRIABLE		
	VARIABLE SANDY LOAM & LOAMY SAND (FILL)		VARIABLE BROWN	
10				
20		SOMEWHAT FIRM IN PLACE		
30	GRAVELLY LOAMY COARSE SAND		MIXED OLIVE BROWN	FEW FAINT
40				
	MEDIUM & COARSE SAND	FRIABLE	LIGHT OLIVE BROWN	
50				
60		LIMIT OF EXCAVATION		
70				
80				
90				
100				

Soil Classification	Slope	Limiting Factor	
Profile _____ Condition _____	____ %	27 "	■ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FILL OVER CROGHAN (VARIANT)

Observation Hole TP 2 ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
	SANDY LOAM & LOAMY SAND (FILL)		BROWN	
10		FRIABLE		NONE EVIDENT
20				
	LOAMY SAND		DARK BROWN	
30				
	MEDIUM & COARSE SAND		YELLOWISH BROWN	
40	COBBLY SAND	SOMEWHAT FIRM IN COBBLES	OLIVE BROWN	FEW FAINT
50				
	GRAVELLY COARSE SAND	FRIABLE	YELLOWISH BROWN	NONE EVIDENT
60				
70		LIMIT OF EXCAVATION		
80				
90				
100				

Soil Classification	Slope	Limiting Factor	
Profile _____ Condition _____	____ %	38 "	■ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FILL OVER CROGHAN (VARIANT)

James Logan (for AFA)
Site Evaluator/Soil Scientist Signature

237/213
SE/CSS *

9-25-14
Date

STATE OF MAINE
JAMES LOGAN #213
SOIL SCIENTIST

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD GORHAM, MAINE 04038 – (207) 839-5563

Town, City, Plantation	Street, Road Subdivision	Owner's Name
PORTLAND	THE PARK DANFORTH	MITCHELL ASSOCIATES

ALL SOIL TEST PITS EXCAVATED BY BACKHOE

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 3 ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–10	BARK MULCH (FILL)		BLACK	
10–20	SANDY LOAM	FRIABLE	DARK BROWN	
20–30	LOAMY SAND		DARK YELLOWISH BROWN	
30–40	MEDIUM & COARSE SAND		YELLOWISH BROWN	
40–50	GRAVELLY LOAMY SAND & SAND	FIRM IN PLACE	OLIVE BROWN	FEW FAINT
50–60	COARSE SAND & GRAVEL		YELLOWISH BROWN	NONE EVIDENT
60–70		LIMIT OF EXCAVATION		
70–80				
80–90				
90–100				

Soil Classification	Slope	Limiting Factor	
Profile _____ Condition _____	____ %	38"	■ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

CROGHAN (VARIANT)

Observation Hole TP 4 ■ Test Pit ☐ Boring

_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0–10	SANDY LOAM & LOAMY SAND (FILL)		BROWN	
10–20		FRIABLE		
20–30	LOAMY SAND		DARK BROWN	
30–40	FINE & MEDIUM SAND		DARK YELLOWISH BROWN	
40–50	LOAMY SAND	FIRM IN PLACE	OLIVE BROWN	FEW FAINT
50–60	FINE SAND	FRIABLE	LIGHT OLIVE BROWN	NONE EVIDENT
60–70		LIMIT OF EXCAVATION		
70–80				
80–90				
90–100				

Soil Classification	Slope	Limiting Factor	
Profile _____ Condition _____	____ %	43"	■ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FILL OVER CROGHAN (VARIANT)

STATE OF MAINE ★ JAMES LOGAN #213 ★ SOIL SCIENTIST

Site Evaluator/Soil Scientist Signature (FOR AGA)

237/213
SE/CSS #

9-25-14
Date

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD GORHAM, MAINE 04038 – (207) 839-5563

Town, City, Plantation	Street, Road Subdivision	Owner's Name
PORTLAND	THE PARK DANFORTH	MITCHELL ASSOCIATES

ALL SOIL TEST PITS EXCAVATED BY BACKHOE

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 5 ■ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
		FRIABLE		
10	SANDY LOAM & LOAMY SAND (FILL)		VARIABLE BROWN	
20	W/ BRICKS	SOMEWHAT FIRM		
30				
40	GRAVELLY LOAMY COARSE SAND	FIRM IN PLACE (SLIGHTLY CEMENTED)	OLIVE BROWN	COMMON FAINT
50				
60				
70		LIMIT OF EXCAVATION		
80				
90				
100				

Soil Classification	Slope	Limiting Factor	
Profile / Condition	____ %	34 "	■ Ground Water ■ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FILL OVER CROGHAN (VARIANT)

Observation Hole TP 6 ■ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

	Texture	Consistency	Color	Mottling
0				
	SANDY LOAM & LOAMY SAND (FILL)		BROWN	
10				
20	LOAMY SAND	FRIABLE	DARK BROWN	
30	GRAVELLY LOAMY COARSE SAND		DARK YELLOWISH BROWN	
40	GRAVELLY COARSE SAND	SOMEWHAT FIRM IN PLACE	MIXED OLIVE BROWN	FEW FAINT
50				
60	MEDIUM & COARSE SAND	FRIABLE	LIGHT OLIVE BROWN	NONE EVIDENT
		LIMIT OF EXCAVATION		
70				
80				
90				
100				

Soil Classification	Slope	Limiting Factor	
Profile / Condition	____ %	36 "	■ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

FILL OVER CROGHAN (VARIANT)

James Logan for AFA
Site Evaluator/Soil Scientist Signature

237/213
SE/CSS *

9-25-14
Date

STATE OF MAINE ★ JAMES LOGAN #213 ★ SOIL SCIENTIST

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD GORHAM, MAINE 04038 – (207) 839-5563

APPENDIX I

TEST PITS BY ALBERT FRICK ASSOCIATES INC.

APPENDIX J

TREATMENT CALCULATIONS

Summary for Subcatchment 100S: SA100

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
6,877	98	Paved parking, HSG D
6,877		100.00% Impervious Area

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

Summary for Subcatchment 102S: SA102

Runoff = 0.01 cfs @ 12.12 hrs, Volume= 0.001 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,495	61	>75% Grass cover, Good, HSG B
2,508	98	Paved parking, HSG D
4,003	84	Weighted Average
1,495		37.35% Pervious Area
2,508		62.65% Impervious Area

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

Summary for Subcatchment 103S: SA103

Runoff = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,344	61	>75% Grass cover, Good, HSG B
6,677	98	Paved parking, HSG D
8,021	92	Weighted Average
1,344		16.76% Pervious Area
6,677		83.24% Impervious Area

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

Summary for Subcatchment 105S: SA105

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

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,080	98	Unconnected roofs, HSG D
4,513	61	>75% Grass cover, Good, HSG B
5,593	68	Weighted Average, UI Adjusted CN = 65
4,513		80.69% Pervious Area
1,080		19.31% Impervious Area
1,080		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	110	0.0200	0.12		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 106S: SA106

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

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
4,300	61	>75% Grass cover, Good, HSG B
360	98	Unconnected pavement, HSG D
4,660	64	Weighted Average, UI Adjusted CN = 62
4,300		92.27% Pervious Area
360		7.73% Impervious Area
360		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.2	90	0.0150	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 107S: SA107

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

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,088	98	Unconnected pavement, HSG D
2,594	61	>75% Grass cover, Good, HSG B
3,682	72	Weighted Average, UI Adjusted CN = 66
2,594		70.45% Pervious Area
1,088		29.55% Impervious Area
1,088		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	90	0.0300	0.13		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment 134S: SA134

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
8,370	98	Roofs, HSG D
8,370		100.00% Impervious Area

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

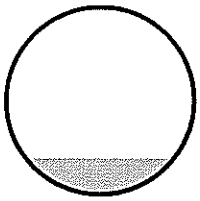
Summary for Reach 100R: SD CB12-LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 0.42" for TREATMENT event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.92 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 4.0' Slope= 0.0100 '/'
Inlet Invert= 115.12', Outlet Invert= 115.08'



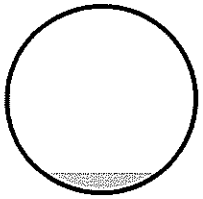
Summary for Reach 102R: SD CB11-LG13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 0.29" for TREATMENT event
Inflow = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.06 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 0.3 min

Peak Storage= 1 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 115.68', Outlet Invert= 115.53'



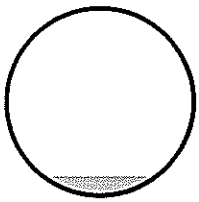
Summary for Reach 103R: SD CB10-CB11

Inflow Area = 0.184 ac, 83.24% Impervious, Inflow Depth > 0.37" for TREATMENT event
Inflow = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.00 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 1.0 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 47.0' Slope= 0.0100 '/'
Inlet Invert= 116.25', Outlet Invert= 115.78'



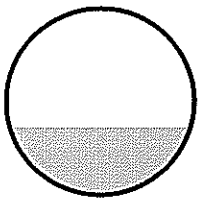
Summary for Reach 134R: ROOF DRAIN

Inflow Area = 0.192 ac,100.00% Impervious, Inflow Depth > 0.75" for TREATMENT event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 0.5 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 30.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.30'



Summary for Pond 100P: LG15/16/17

Inflow Area = 0.626 ac, 89.59% Impervious, Inflow Depth > 0.42" for TREATMENT event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.02 cfs @ 13.15 hrs, Volume= 0.017 af, Atten= 92%, Lag= 63.5 min
Discarded = 0.02 cfs @ 13.15 hrs, Volume= 0.017 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.04' @ 13.15 hrs Surf.Area= 162 sf Storage= 466 cf

Plug-Flow detention time= 174.4 min calculated for 0.017 af (80% of inflow)

Center-of-Mass det. time= 121.4 min (880.2 - 758.9)

Volume	Invert	Avail.Storage	Storage Description
#1	109.00'	412 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,228 cf Overall - 198 cf Embedded = 1,030 cf x 40.0% Voids
#2	112.46'	198 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		610 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
109.00	162	0	0	162
116.58	162	1,228	1,228	504

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.46	48	0	0
116.58	48	198	198

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.00'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.08'	**12.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 115.08' / 114.96' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.02 cfs @ 13.15 hrs HW=115.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=109.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 102P: LG 13/14

Inflow Area = 0.276 ac, 76.39% Impervious, Inflow Depth > 0.29" for TREATMENT event
Inflow = 0.09 cfs @ 12.11 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 13.05 hrs, Volume= 0.007 af, Atten= 88%, Lag= 56.4 min
Discarded = 0.01 cfs @ 13.05 hrs, Volume= 0.007 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 113.16' @ 13.05 hrs Surf.Area= 117 sf Storage= 113 cf

Plug-Flow detention time= 110.1 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 108.2 min (924.0 - 815.8)

Volume	Invert	Avail.Storage	Storage Description
#1	110.86'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	112.86'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
110.86	117	0	0	117
117.03	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.86	32	0	0
117.03	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	110.86'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.53'	**12.0" Round Culvert** L= 31.0' Ke= 0.500 Inlet / Outlet Invert= 115.53' / 115.22' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 13.05 hrs HW=113.16' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=110.86' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 105P: DW3

Inflow Area = 0.128 ac, 19.31% Impervious, Inflow Depth = 0.00" for TREATMENT event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.74' @ 5.00 hrs Surf.Area= 81 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Device	Routing	Invert	Outlet Devices
#1	Primary	123.90'	**6.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**2=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 106P: DW2

Inflow Area = 0.320 ac, 18.14% Impervious, Inflow Depth = 0.00" for TREATMENT event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.74' @ 5.00 hrs Surf.Area= 81 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	205 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 67 cf Embedded = 513 cf x 40.0% Voids
#2	120.74'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
#3	122.90'	762 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,904 cf Overall x 40.0% Voids
#4	123.90'	12 cf	**6.0" D x 62.0'L Pipe Storage**
		1,046 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.90	16	67	67

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.90	952	0	0	952
124.90	952	1,904	1,904	1,171

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Summary for Pond 107P: DW1

Inflow Area = 0.085 ac, 29.55% Impervious, Inflow Depth = 0.00" for TREATMENT event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.74' @ 5.00 hrs Surf.Area= 81 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	117.74'	206 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 580 cf Overall - 64 cf Embedded = 516 cf x 40.0% Voids
#2	120.74'	64 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		270 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
117.74	81	0	0	81
124.90	81	580	580	309

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
120.74	16	0	0
124.74	16	64	64

Device	Routing	Invert	Outlet Devices
#1	Discarded	117.74'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	123.90'	**6.0" Round Culvert** L= 34.0' Ke= 0.500 Inlet / Outlet Invert= 123.90' / 123.90' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=117.74' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Subcatchment 114S: SA114

Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
6,863	98	Paved parking, HSG D
6,863		100.00% Impervious Area

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

Summary for Subcatchment 115S: SA115

Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,408	98	Paved parking, HSG D
1,408		100.00% Impervious Area

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

Summary for Subcatchment 116S: SA116

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
3,708	98	Paved parking, HSG D
35	61	>75% Grass cover, Good, HSG B
3,743	98	Weighted Average
35		0.94% Pervious Area
3,708		99.06% Impervious Area

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

Summary for Subcatchment 117S: SA117

Runoff = 0.00 cfs @ 12.49 hrs, Volume= 0.000 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,618	61	>75% Grass cover, Good, HSG B
1,116	98	Paved parking, HSG D
2,734	76	Weighted Average
1,618		59.18% Pervious Area
1,116		40.82% Impervious Area

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

Summary for Subcatchment 118S: SA118

Runoff = 0.00 cfs @ 12.49 hrs, Volume= 0.000 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,018	61	>75% Grass cover, Good, HSG B
697	98	Paved parking, HSG D
1,715	76	Weighted Average
1,018		59.36% Pervious Area
697		40.64% Impervious Area

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

Summary for Subcatchment 119S: SA119

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
3,261	98	Paved parking, HSG D
100	61	>75% Grass cover, Good, HSG B
3,361	97	Weighted Average
100		2.98% Pervious Area
3,261		97.02% Impervious Area

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

Summary for Subcatchment 122S: SA122

Runoff = 0.02 cfs @ 12.10 hrs, Volume= 0.001 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
710	61	>75% Grass cover, Good, HSG B
2,135	98	Paved parking, HSG D
2,845	89	Weighted Average
710		24.96% Pervious Area
2,135		75.04% Impervious Area

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

Summary for Subcatchment 124S: SA124

Runoff = 0.06 cfs @ 12.10 hrs, Volume= 0.004 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
1,000	39	>75% Grass cover, Good, HSG A
6,449	98	Paved parking, HSG D
7,449	90	Weighted Average
1,000		13.42% Pervious Area
6,449		86.58% Impervious Area

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

Summary for Subcatchment 130S: SA130 ROOF

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
3,082	98	Roofs, HSG D
3,082		100.00% Impervious Area

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

Summary for Subcatchment 131S: SA131 ROOF

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
2,552	98	Roofs, HSG D
2,552		100.00% Impervious Area

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

Summary for Subcatchment 132S: SA132

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
4,394	98	Roofs, HSG D
4,394		100.00% Impervious Area

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

Summary for Subcatchment 133S: SA133

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr TREATMENT Rainfall=1.00"

Area (sf)	CN	Description
5,035	98	Roofs, HSG D
5,035		100.00% Impervious Area

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

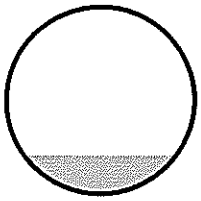
Summary for Reach 112R: SD CB9-LG8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 0.29" for TREATMENT event
Inflow = 0.35 cfs @ 12.10 hrs, Volume= 0.025 af
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.04 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 0.3 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 19.0' Slope= 0.0100 '/'
Inlet Invert= 118.50', Outlet Invert= 118.31'



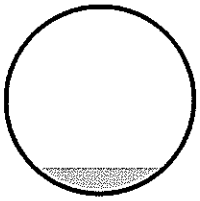
Summary for Reach 114R: SD CB8-CB9

Inflow Area = 0.821 ac, 87.47% Impervious, Inflow Depth > 0.17" for TREATMENT event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.16 cfs @ 12.11 hrs, Volume= 0.012 af, Atten= 3%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.44 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 2.2 min

Peak Storage= 8 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 114.0' Slope= 0.0100 '/'
Inlet Invert= 119.74', Outlet Invert= 118.60'



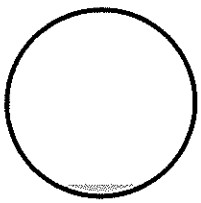
Summary for Reach 115R: SD CB7-CD8

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth > 0.75" for TREATMENT event
Inflow = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af
Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.43 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 0.7 min

Peak Storage= 0 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 23.0' Slope= 0.0100 '/'
Inlet Invert= 120.20', Outlet Invert= 119.97'



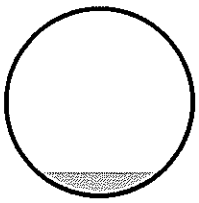
Summary for Reach 116R: SD CB6-LG3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 0.26" for TREATMENT event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af
Outflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.30 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 0.3 min

Peak Storage= 1 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.03', Outlet Invert= 119.89'



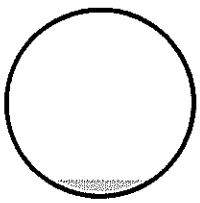
Summary for Reach 117R: SD CB5-CB6

Inflow Area = 0.179 ac, 64.97% Impervious, Inflow Depth > 0.30" for TREATMENT event
Inflow = 0.06 cfs @ 12.11 hrs, Volume= 0.005 af
Outflow = 0.06 cfs @ 12.11 hrs, Volume= 0.005 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.80 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 0.3 min

Peak Storage= 0 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 120.27', Outlet Invert= 120.13'



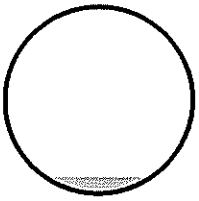
Summary for Reach 118R: SD CB4-CB5

Inflow Area = 0.117 ac, 77.97% Impervious, Inflow Depth > 0.45" for TREATMENT event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.11 hrs, Volume= 0.004 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.82 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 1.4 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 57.0' Slope= 0.0100 '/'
Inlet Invert= 120.94', Outlet Invert= 120.37'



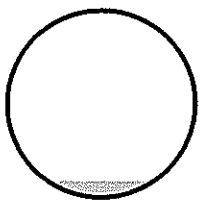
Summary for Reach 119R: SD CB3-CB4

Inflow Area = 0.077 ac, 97.02% Impervious, Inflow Depth > 0.66" for TREATMENT event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.82 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 0.3 min

Peak Storage= 0 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 11.0' Slope= 0.0100 '/'
Inlet Invert= 121.15', Outlet Invert= 121.04'



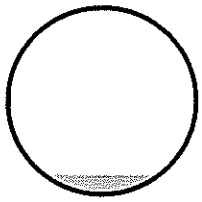
Summary for Reach 122R: SD CB1-DMH1

Inflow Area = 0.136 ac, 88.02% Impervious, Inflow Depth > 0.51" for TREATMENT event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 1.5 min

Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 64.0' Slope= 0.0100 '/'
Inlet Invert= 121.85', Outlet Invert= 121.21'



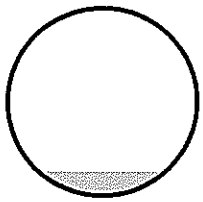
Summary for Reach 123R: SD DMH1-LG1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 0.58" for TREATMENT event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.009 af
Outflow = 0.13 cfs @ 12.11 hrs, Volume= 0.009 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.27 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 1.0 min

Peak Storage= 3 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 51.0' Slope= 0.0100 '/'
Inlet Invert= 121.11', Outlet Invert= 120.60'



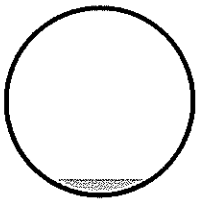
Summary for Reach 124R: SD CB2-LG5/6/7

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 0.29" for TREATMENT event
Inflow = 0.06 cfs @ 12.10 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.11 hrs, Volume= 0.004 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.80 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 0.6 min

Peak Storage= 1 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.86 cfs

12.0" Round Pipe
n= 0.012
Length= 27.0' Slope= 0.0100 '/'
Inlet Invert= 120.90', Outlet Invert= 120.63'



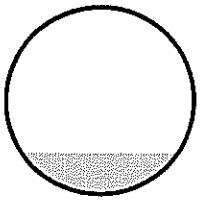
Summary for Reach 130R: ROOF DRAIN

Inflow Area = 0.071 ac,100.00% Impervious, Inflow Depth > 0.75" for TREATMENT event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 0.2 min

Peak Storage= 0 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 10.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.10'



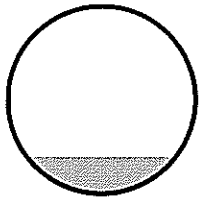
Summary for Reach 131R: ROOF DRAIN

Inflow Area = 0.059 ac,100.00% Impervious, Inflow Depth > 0.75" for TREATMENT event
Inflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.88 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 0.6 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



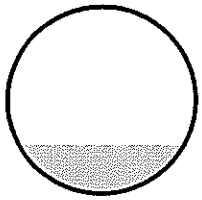
Summary for Reach 132R: ROOF DRAIN

Inflow Area = 0.101 ac,100.00% Impervious, Inflow Depth > 0.75" for TREATMENT event
Inflow = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



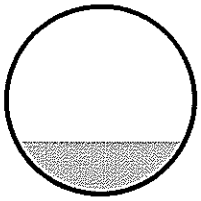
Summary for Reach 133R: ROOF DRAIN

Inflow Area = 0.116 ac,100.00% Impervious, Inflow Depth > 0.75" for TREATMENT event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af
Outflow = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.29 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 0.61 cfs

6.0" Round Pipe
n= 0.012
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.25'



Summary for Pond 112P: LG 8/9/10

Inflow Area = 1.037 ac, 90.08% Impervious, Inflow Depth > 0.29" for TREATMENT event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af
Outflow = 0.03 cfs @ 13.31 hrs, Volume= 0.020 af, Atten= 92%, Lag= 72.6 min
Discarded = 0.03 cfs @ 13.31 hrs, Volume= 0.020 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 118.24' @ 13.31 hrs Surf.Area= 198 sf Storage= 543 cf

Plug-Flow detention time= 176.9 min calculated for 0.020 af (78% of inflow)
Center-of-Mass det. time= 120.2 min (880.2 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1	112.64'	461 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 1,420 cf Overall - 267 cf Embedded = 1,153 cf x 40.0% Voids
#2	115.64'	267 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		728 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
112.64	198	0	0	198
119.81	198	1,420	1,420	556

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
115.64	64	0	0
119.81	64	267	267

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.64'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.31'	**12.0" Round Culvert** L= 79.0' Ke= 0.500 Inlet / Outlet Invert= 118.31' / 116.40' S= 0.0242 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 13.31 hrs HW=118.24' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=112.64' (Free Discharge)
↑**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 117P: LG 3/4

Inflow Area = 0.460 ac, 82.62% Impervious, Inflow Depth > 0.26" for TREATMENT event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 12.97 hrs, Volume= 0.009 af, Atten= 90%, Lag= 52.0 min
Discarded = 0.01 cfs @ 12.97 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.57' @ 12.97 hrs Surf.Area= 117 sf Storage= 183 cf

Plug-Flow detention time= 136.7 min calculated for 0.009 af (93% of inflow)
Center-of-Mass det. time= 112.6 min (881.9 - 769.4)

Volume	Invert	Avail.Storage	Storage Description
#1	114.22'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	116.22'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
114.22	117	0	0	117
120.39	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.22	32	0	0
120.39	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	114.22'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	118.89'	**12.0" Round Culvert** L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 118.89' / 118.84' S= 0.0100 '/' Cc= 0.900

n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.97 hrs HW=117.57' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=114.22' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 124P: LG 5/6

Inflow Area = 0.171 ac, 86.58% Impervious, Inflow Depth > 0.29" for TREATMENT event
Inflow = 0.06 cfs @ 12.11 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.77 hrs, Volume= 0.004 af, Atten= 84%, Lag= 39.7 min
Discarded = 0.01 cfs @ 12.77 hrs, Volume= 0.004 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.29' @ 12.77 hrs Surf.Area= 117 sf Storage= 62 cf

Plug-Flow detention time= 65.1 min calculated for 0.004 af (99% of inflow)
Center-of-Mass det. time= 63.6 min (883.0 - 819.4)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	235 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 722 cf Overall - 133 cf Embedded = 588 cf x 40.0% Voids
#2	117.96'	133 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		369 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.13	117	722	722	354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.96	32	0	0
122.13	32	133	133

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.63'	**12.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 120.63' / 120.16' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.77 hrs HW=117.29' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.96' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 125P: LG 1/2

Inflow Area = 0.195 ac, 91.63% Impervious, Inflow Depth > 0.58" for TREATMENT event
Inflow = 0.13 cfs @ 12.11 hrs, Volume= 0.009 af
Outflow = 0.01 cfs @ 12.99 hrs, Volume= 0.009 af, Atten= 89%, Lag= 52.5 min
Discarded = 0.01 cfs @ 12.99 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.16' @ 12.99 hrs Surf.Area= 117 sf Storage= 174 cf

Plug-Flow detention time= 132.7 min calculated for 0.009 af (94% of inflow)
Center-of-Mass det. time= 112.0 min (882.3 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	115.96'	260 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 718 cf Overall - 69 cf Embedded = 649 cf x 40.0% Voids
#2	117.93'	69 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) Inside #1
		329 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
115.96	117	0	0	117
122.10	117	718	718	352

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
117.93	32	0	0
120.10	32	69	69

Device	Routing	Invert	Outlet Devices
#1	Discarded	115.96'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	120.60'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 120.60' / 120.41' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.99 hrs HW=119.16' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.96' (Free Discharge)
↑**2=Culvert** (Controls 0.00 cfs)