FARLAND CORP.

ENGINEERING A BETTER TOMORROW

ENGINEERING | SITE WORK | LAND SURVEYING

June 2, 2017

Mr. Craig Dixon
Chairman
New Bedford Conservation Commission
New Bedford City Hall
133 Williams Street
New Bedford, MA 02744

RE: Response Letter
NWD Trucking – 100 Duchaine Blvd.
New Bedford, Massachusetts

Dear Mr. Nixon,

We have enclosed a response letter, revised HydroCAD calculations, revised Site Plan sheets and accompanying documentation in response to the comment letter prepared by Nitsch Engineering dated April 28, 2017 in regards to their review of the Site Plans and attached documents.

We trust the attachments noted above and included herewith will provide the necessary documentation to address their comments. If you should have any questions, please feel free to contact us.

Very Truly Yours,

FARLAND CORPORATION, INC.

Christian A. Farland

Christian A. Farland , P.E., LEED AP
Principal Engineer and President

Nitsch Engineering Comments

Comment #1:

Test holes were provided at the locations of the infiltration facilities. The test hole performed in the vicinity of the underground infiltration facility indicates seasonal high groundwater at approximately elevation 78.3. This elevation seems consistent with the surrounding wetlands elevations. The calculations and detail show the bottom of the system at elevation 78.5. Per the Standards, 2 feet of separation between the bottom of the infiltration facility and seasonal high groundwater is required.

Farland Corp. has designed this system to meet the maximum extent practical for this project.

Comment #2:

A CDS water quality unit was added to the plans to treat the water generated by the existing parking lot. The Applicant has not provided sizing information for this unit. Also, the unit was placed outside the existing parking lot adjacent to the wetlands pocket on the south side of the site. The unit is well within 25 feet of the wetlands line. A detail of this unit should be added to the plans.

A detail of the CDS water quality unit has been added to the Details Sheet 8 along with a cut sheet of the specific model.

Comment #3:

The proposed discharge from the CDS unit, including rip-rap pads, should be shown on the plans. The current plan does not show a discharge pipe or rip-rap pad.

The CDS unit will be placed along an existing drain line with the slope and inverts of the pipe to remain the same.

Comment #4:

Revised hydrologic calculations were submitted to include the reaches and ponds. With regards to the calculations we have the following comments:

a.) Reach P-1 is modeled as a 20-inch pipe. The pipe is shown as an 18-inch pipe on the existing conditions plans and is full during all existing storms. The pipe should not be improved. However, this restriction will impact the modeling of the system downstream and should be modeled correctly.

b.) Reach P-2 is modeled as a 12-inch culvert although the existing conditions plans show it as an 18-inch culvert.

c.) The existing conditions hydrologic calculations show the pipe flowing from CB-9 surcharged during the 10-year storm in the existing and proposed condition.

d.) In the proposed condition plans, stormwater from drainage areas S-1 and S-2 are directed towards the proposed detention basin on the west side of the parking lot. The calculations should be revised to direct that flow through the detention basin.

e.) It is unclear whether water collected by CB-2 in the calculations (CB-3 in the plans) is routed properly. The calculations show this catch basin being discharged to the southerly wetland, but the culvert that this catch basin is connected to in the existing condition has been removed.

f.) The proposed conditions hydrologic calculations show the pipes in the parking area discharging from catch basins 8 and 9 to be surcharged during the 2-year storm.

g.) There are errors in the hydrologic model associated with the southerly and northerly wetlands, apparently because of the surcharged piping upstream.

a.) Reach P-1 is in fact an 18" corrugated steel pipe and the HydroCAD calculations have been revised to reflect this.

b.) Reach P-2 exists as a 12" pipe and has been revised in the existing conditions plan to reflect this.

c.) The pipe flowing from CB-9 will be upgraded to a size that can handle the expected flow of a 10-yr storm.

d.) Calculations for drainage areas S-1 and S-2 have been re-directed to the correct detention basin.

e.) The catch basin has been re-titled CB-2 in the plans to remain consistent with the calculations. CB-2 connects to an existing 12" corrugated steel pipe that directs the flow to the southerly wetland as described, and will remain as it exists.

f.) The pipes within the parking lot which collect and discharge flow from CB-8 and CB-9 will be upgraded to a size that is appropriate for the post-development conditions.

g.) The surcharged piping upstream has been upgraded and will help clear up any errors found within the modeling.

Comment #5:

It is unclear where the water from CB-3 will be directed under the proposed condition. The existing condition plan shows it connecting to a culvert that appears to be removed. The Applicant should clarify where water captured by this catch basin will be discharged.

CB-2 (formally CB-3 in the plans) currently connects to a 12" steel pipe which will remain, and directs stormwater to water quality basin #2, which then outlets to the southerly wetland as described.

Comment #6:

We recommend that the seasonal high groundwater elevation be added to the infiltration field detail

Seasonal high groundwater has been added to the infiltration field detail.

Comment #7:

We recommend a stone overflow be added from the forebay of water quality basin 1.

A stone overflow has been added as recommended.

Comment #8:

Consistent with the Standards, we recommend that a foot of freeboard be provided between the 100-year storm peak elevation and/or overflow from the basins and the top of berm elevation in the basins.

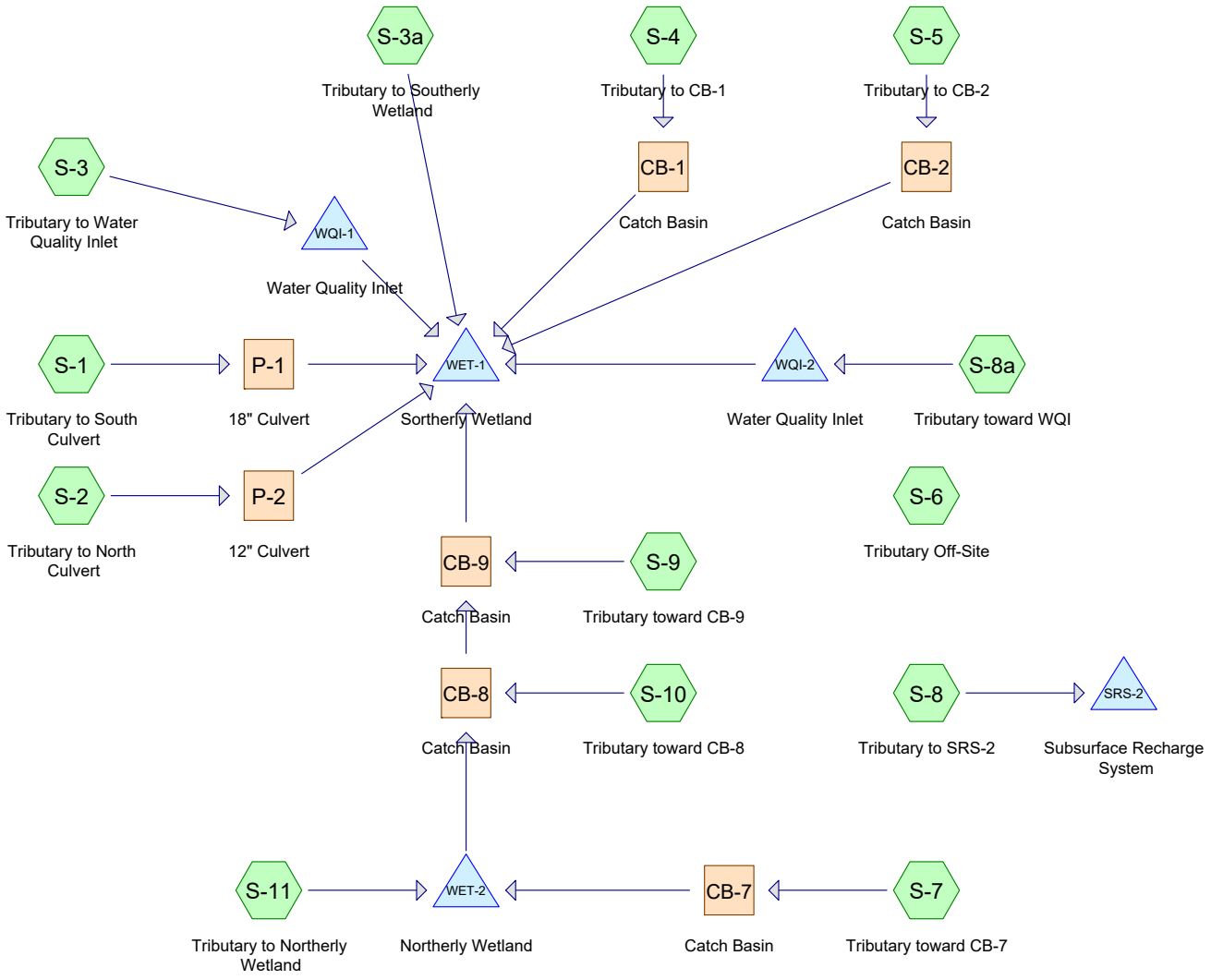
Farland Corp. has designed the top of berm elevations to meet the maximum extent practical for this project.

Comment #9:

Pipe sizing calculations were prepared using the Rational Method. However, the results of these calculations show all pipes flowing freely, which is not consistent with the hydrologic calculations submitted.

HydroCAD calculations have been revised to reflect suitable conditions for stormwater treatment.

If you have any questions or require any further information please contact this office at (508) 717-3479.



Subcat Reach Pond Link

Drainage Diagram for 15500.1POST

Prepared by {enter your company name here}, Printed 6/5/2017

Summary for Subcatchment S-1: Tributary to South Culvert

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 0.064 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
	25,975	70	Woods, Good, HSG C
	3,300	74	>75% Grass cover, Good, HSG C
*	2,300	98	Roadway
	31,575	72	Weighted Average
	29,275		Pervious Area
	2,300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1360	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
3.5	220	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	270	Total			

Summary for Subcatchment S-10: Tributary toward CB-8

Runoff = 2.83 cfs @ 12.08 hrs, Volume= 0.226 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	37,250	98	Paved Parking
	37,250		Impervious Area

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

Summary for Subcatchment S-11: Tributary to Northerly Wetland

Runoff = 1.92 cfs @ 12.09 hrs, Volume= 0.137 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	1,175	98	Roadway
*	15,750	98	Wetland
	27,025	70	Woods, Good, HSG C
	43,950	81	Weighted Average
	27,025		Pervious Area
	16,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	14	0.0200	0.96		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
4.7	36	0.1100	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.1	70	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.0	120	Total			

Summary for Subcatchment S-2: Tributary to North Culvert

Runoff = 0.81 cfs @ 12.12 hrs, Volume= 0.065 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
	24,350	70	Woods, Good, HSG C
	3,875	74	>75% Grass cover, Good, HSG C
*	2,425	98	Roadway
	30,650	73	Weighted Average
	28,225		Pervious Area
	2,425		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1100	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	170	0.0940	1.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	220	Total			

Summary for Subcatchment S-3: Tributary to Water Quality Inlet

Runoff = 2.03 cfs @ 12.09 hrs, Volume= 0.145 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	7,500	98	Water Quality Inlet
*	14,700	98	Roadway
	11,350	70	Woods, Good, HSG C
	33,550	89	Weighted Average
	11,350		Pervious Area
	22,200		Impervious Area

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

Summary for Subcatchment S-3a: Tributary to Southerly Wetland

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.076 af, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	9,465	98	Wetland
*	1,527	98	Roadway
	9,498	70	Woods, Good, HSG C
	20,490	85	Weighted Average
	9,498		Pervious Area
	10,992		Impervious Area

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

Summary for Subcatchment S-4: Tributary to CB-1

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	1,450	98	Roadway
	1,450		Impervious Area

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

Summary for Subcatchment S-5: Tributary to CB-2

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.008 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
1,400	98	Paved parking & roofs
1,400		Impervious Area

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

Summary for Subcatchment S-6: Tributary Off-Site

Runoff = 1.12 cfs @ 12.08 hrs, Volume= 0.087 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	14,625	98	Paved Parking
	335	74	>75% Grass cover, Good, HSG C
	14,960	97	Weighted Average
	335		Pervious Area
	14,625		Impervious Area

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

Summary for Subcatchment S-7: Tributary toward CB-7

Runoff = 1.07 cfs @ 12.08 hrs, Volume= 0.086 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	14,125	98	Paved Parking
	14,125		Impervious Area

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

Summary for Subcatchment S-8: Tributary to SRS-2

Runoff = 2.12 cfs @ 12.08 hrs, Volume= 0.170 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	28,000	98	Rooftop
	28,000		Impervious Area

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

Summary for Subcatchment S-8a: Tributary toward WQI

Runoff = 0.99 cfs @ 12.08 hrs, Volume= 0.076 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	10,000	98	Paved Parking
	940	74	>75% Grass cover, Good, HSG C
*	2,535	98	Water Quality Inlet
	13,475	96	Weighted Average
	940		Pervious Area
	12,535		Impervious Area

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

Summary for Subcatchment S-9: Tributary toward CB-9

Runoff = 3.46 cfs @ 12.08 hrs, Volume= 0.276 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

	Area (sf)	CN	Description
*	45,550	98	Paved Parking
	45,550		Impervious Area

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

Summary for Reach CB-1: Catch Basin

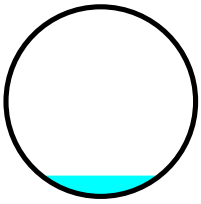
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 3.17" for 2-yr event
Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.009 af
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.52 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 0.5 min

Peak Storage= 1 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 4.41 cfs

15.0" Diameter Pipe, n= 0.013
Length= 15.0' Slope= 0.0047 '/'
Inlet Invert= 76.37', Outlet Invert= 76.30'



Summary for Reach CB-2: Catch Basin

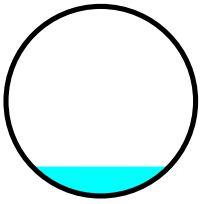
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth = 3.17" for 2-yr event
Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.008 af
Outflow = 0.11 cfs @ 12.09 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.38 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.45 fps, Avg. Travel Time= 1.8 min

Peak Storage= 4 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.05 cfs

12.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 48.0' Slope= 0.0123 '/'
Inlet Invert= 76.09', Outlet Invert= 75.50'



Summary for Reach CB-7: Catch Basin

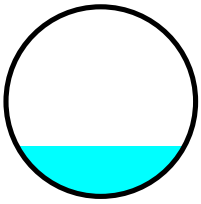
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.324 ac,100.00% Impervious, Inflow Depth = 3.17" for 2-yr event
Inflow = 1.07 cfs @ 12.08 hrs, Volume= 0.086 af
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 6.43 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.10 fps, Avg. Travel Time= 0.5 min

Peak Storage= 11 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 6.98 cfs

12.0" Diameter Pipe, n= 0.013
Length= 66.0' Slope= 0.0383 '/'
Inlet Invert= 78.71', Outlet Invert= 76.18'



Summary for Reach CB-8: Catch Basin

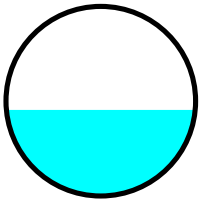
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.188 ac, 71.65% Impervious, Inflow Depth = 2.25" for 2-yr event
Inflow = 3.02 cfs @ 12.09 hrs, Volume= 0.411 af
Outflow = 3.02 cfs @ 12.09 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.89 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.51 fps, Avg. Travel Time= 0.8 min

Peak Storage= 58 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.18 cfs

18.0" Diameter Pipe, n= 0.013
Length= 75.0' Slope= 0.0047 '/'
Inlet Invert= 75.45', Outlet Invert= 75.10'



Summary for Reach CB-9: Catch Basin

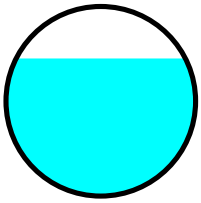
[52] Hint: Inlet/Outlet conditions not evaluated
[63] Warning: Exceeded Reach CB-8 INLET depth by 0.25' @ 12.09 hrs

Inflow Area = 3.234 ac, 80.82% Impervious, Inflow Depth = 2.55" for 2-yr event
Inflow = 6.47 cfs @ 12.09 hrs, Volume= 0.687 af
Outflow = 6.46 cfs @ 12.09 hrs, Volume= 0.687 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.71 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.7 min

Peak Storage= 103 cf @ 12.09 hrs, Average Depth at Peak Storage= 1.09'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.38 cfs

18.0" Diameter Pipe, n= 0.013
Length= 75.0' Slope= 0.0049 '/'
Inlet Invert= 75.29', Outlet Invert= 74.92'



Summary for Reach P-1: 18" Culvert

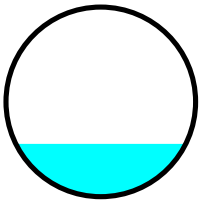
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.725 ac, 7.28% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 0.75 cfs @ 12.14 hrs, Volume= 0.064 af
Outflow = 0.75 cfs @ 12.14 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.89 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 0.8 min

Peak Storage= 15 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 4.49 cfs

18.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 37.0' Slope= 0.0068 '/'
Inlet Invert= 84.57', Outlet Invert= 84.32'



Summary for Reach P-2: 12" Culvert

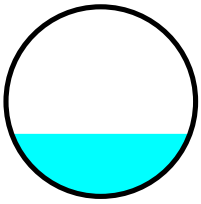
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.704 ac, 7.91% Impervious, Inflow Depth = 1.11" for 2-yr event
Inflow = 0.81 cfs @ 12.12 hrs, Volume= 0.065 af
Outflow = 0.81 cfs @ 12.12 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.62 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.5 min

Peak Storage= 9 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.49 cfs

12.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 42.0' Slope= 0.0355 '/'
Inlet Invert= 84.18', Outlet Invert= 82.69'



Summary for Pond SRS-2: Subsurface Recharge System

Inflow Area = 0.643 ac,100.00% Impervious, Inflow Depth = 3.17" for 2-yr event
Inflow = 2.12 cfs @ 12.08 hrs, Volume= 0.170 af
Outflow = 1.01 cfs @ 12.24 hrs, Volume= 0.108 af, Atten= 52%, Lag= 9.2 min
Discarded = 0.01 cfs @ 5.30 hrs, Volume= 0.030 af
Primary = 1.00 cfs @ 12.24 hrs, Volume= 0.078 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 80.82' @ 12.24 hrs Surf.Area= 2,074 sf Storage= 3,437 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 127.7 min (882.8 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1	78.50'	1,825 cf	**17.00'W x 122.00'L x 3.75'H Prismatoid**
			7,778 cf Overall - 3,215 cf Embedded = 4,562 cf x 40.0% Voids
#2	79.00'	3,215 cf	**52.6"W x 34.0"H x 7.50'L Cultec R-V8** x 48 Inside #1
		5,040 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.50'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	80.50'	**6.0" x 6.0' long Culvert X 5.00**
			CMP, square edge headwall, Ke= 0.500
			Outlet Invert= 80.44' S= 0.0100 '/' Cc= 0.900 n= 0.013

Discarded OutFlow Max=0.01 cfs @ 5.30 hrs HW=78.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.00 cfs @ 12.24 hrs HW=80.82' (Free Discharge)
2=Culvert (Barrel Controls 1.00 cfs @ 2.13 fps)

Summary for Pond WET-1: Sortherly Wetland

[62] Warning: Exceeded Reach CB-2 OUTLET depth by 0.29' @ 12.35 hrs
[62] Warning: Exceeded Reach CB-9 OUTLET depth by 0.35' @ 12.56 hrs

Inflow Area = 6.278 ac, 61.12% Impervious, Inflow Depth = 1.76" for 2-yr event
Inflow = 9.17 cfs @ 12.10 hrs, Volume= 0.919 af
Outflow = 4.66 cfs @ 12.31 hrs, Volume= 0.867 af, Atten= 49%, Lag= 13.0 min
Discarded = 0.05 cfs @ 12.31 hrs, Volume= 0.072 af
Primary = 4.61 cfs @ 12.31 hrs, Volume= 0.795 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 75.88' @ 12.31 hrs Surf.Area= 8,003 sf Storage= 10,551 cf

Plug-Flow detention time= 108.1 min calculated for 0.867 af (94% of inflow)
Center-of-Mass det. time= 77.1 min (870.4 - 793.3)

Volume	Invert	Avail.Storage	Storage Description
#1	74.00'	37,115 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.00	3,200	0	0
76.00	8,300	11,500	11,500
78.00	13,300	21,600	33,100
78.50	2,760	4,015	37,115

Device	Routing	Invert	Outlet Devices
#1	Discarded	74.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	74.57'	**24.0" x 60.0' long Culvert** CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 74.53' S= 0.0007 '/' Cc= 0.900 n= 0.013

Discarded OutFlow Max=0.05 cfs @ 12.31 hrs HW=75.88' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=4.60 cfs @ 12.31 hrs HW=75.88' (Free Discharge)
2=Culvert (Barrel Controls 4.60 cfs @ 2.99 fps)

Summary for Pond WET-2: Northerly Wetland

[87] Warning: Oscillations may require Finer Routing or smaller dt
[62] Warning: Exceeded Reach CB-7 OUTLET depth by 0.02' @ 12.59 hrs

Inflow Area = 1.333 ac, 53.47% Impervious, Inflow Depth = 2.00" for 2-yr event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.222 af
Outflow = 0.93 cfs @ 12.51 hrs, Volume= 0.222 af, Atten= 69%, Lag= 25.5 min
Discarded = 0.06 cfs @ 12.43 hrs, Volume= 0.037 af
Primary = 0.87 cfs @ 12.51 hrs, Volume= 0.185 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 76.32' @ 12.43 hrs Surf.Area= 9,103 sf Storage= 2,793 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 29.7 min (835.0 - 805.4)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	21,600 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.00	8,300	0	0
78.00	13,300	21,600	21,600

Device	Routing	Invert	Outlet Devices
#1	Primary	75.78'	**24.0" x 130.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 75.43' S= 0.0027 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior
#2	Discarded	76.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 12.43 hrs HW=76.32' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.87 cfs @ 12.51 hrs HW=76.32' TW=75.90' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.87 cfs @ 1.93 fps)

Summary for Pond WQI-1: Water Quality Inlet

Inflow Area = 0.770 ac, 66.17% Impervious, Inflow Depth = 2.26" for 2-yr event
Inflow = 2.03 cfs @ 12.09 hrs, Volume= 0.145 af
Outflow = 0.04 cfs @ 18.00 hrs, Volume= 0.068 af, Atten= 98%, Lag= 354.9 min
Discarded = 0.04 cfs @ 18.00 hrs, Volume= 0.068 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.77' @ 18.00 hrs Surf.Area= 6,330 sf Storage= 4,401 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 350.3 min (1,159.0 - 808.7)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	9,440 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
78.00	5,080	0	0
79.00	6,700	5,890	5,890
79.50	7,500	3,550	9,440

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	79.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.04 cfs @ 18.00 hrs HW=78.77' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=78.00' TW=74.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond WQI-2: Water Quality Inlet

Inflow Area = 0.309 ac, 93.02% Impervious, Inflow Depth = 2.95" for 2-yr event
Inflow = 0.99 cfs @ 12.08 hrs, Volume= 0.076 af
Outflow = 0.07 cfs @ 13.23 hrs, Volume= 0.040 af, Atten= 93%, Lag= 68.6 min
Discarded = 0.02 cfs @ 13.23 hrs, Volume= 0.030 af
Primary = 0.06 cfs @ 13.23 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.91' @ 13.23 hrs Surf.Area= 2,478 sf Storage= 1,990 cf

Plug-Flow detention time= 371.9 min calculated for 0.040 af (52% of inflow)
Center-of-Mass det. time= 257.2 min (1,029.6 - 772.3)

Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	3,564 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	1,892	0	0
78.00	2,535	2,214	2,214
78.50	2,866	1,350	3,564

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	77.90'	**20.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 13.23 hrs HW=77.91' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.06 cfs @ 13.23 hrs HW=77.91' TW=75.42' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.06 cfs @ 0.26 fps)

Summary for Subcatchment S-1: Tributary to South Culvert

Runoff = 1.54 cfs @ 12.13 hrs, Volume= 0.124 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
	25,975	70	Woods, Good, HSG C
	3,300	74	>75% Grass cover, Good, HSG C
*	2,300	98	Roadway
	31,575	72	Weighted Average
	29,275		Pervious Area
	2,300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1360	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
3.5	220	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	270	Total			

Summary for Subcatchment S-10: Tributary toward CB-8

Runoff = 4.01 cfs @ 12.08 hrs, Volume= 0.325 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	37,250	98	Paved Parking
	37,250		Impervious Area

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

Summary for Subcatchment S-11: Tributary to Northerly Wetland

Runoff = 3.32 cfs @ 12.09 hrs, Volume= 0.236 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	1,175	98	Roadway
*	15,750	98	Wetland
	27,025	70	Woods, Good, HSG C
	43,950	81	Weighted Average
	27,025		Pervious Area
	16,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	14	0.0200	0.96		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
4.7	36	0.1100	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.1	70	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.0	120	Total			

Summary for Subcatchment S-2: Tributary to North Culvert

Runoff = 1.62 cfs @ 12.12 hrs, Volume= 0.125 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
	24,350	70	Woods, Good, HSG C
	3,875	74	>75% Grass cover, Good, HSG C
*	2,425	98	Roadway
	30,650	73	Weighted Average
	28,225		Pervious Area
	2,425		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1100	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	170	0.0940	1.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	220	Total			

Summary for Subcatchment S-3: Tributary to Water Quality Inlet

Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.230 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	7,500	98	Water Quality Inlet
*	14,700	98	Roadway
	11,350	70	Woods, Good, HSG C
	33,550	89	Weighted Average
	11,350		Pervious Area
	22,200		Impervious Area

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

Summary for Subcatchment S-3a: Tributary to Southerly Wetland

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.125 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	9,465	98	Wetland
*	1,527	98	Roadway
	9,498	70	Woods, Good, HSG C
	20,490	85	Weighted Average
	9,498		Pervious Area
	10,992		Impervious Area

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

Summary for Subcatchment S-4: Tributary to CB-1

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	1,450	98	Roadway
	1,450		Impervious Area

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

Summary for Subcatchment S-5: Tributary to CB-2

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
1,400	98	Paved parking & roofs
1,400		Impervious Area

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

Summary for Subcatchment S-6: Tributary Off-Site

Runoff = 1.60 cfs @ 12.08 hrs, Volume= 0.127 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	14,625	98	Paved Parking
	335	74	>75% Grass cover, Good, HSG C
	14,960	97	Weighted Average
	335		Pervious Area
	14,625		Impervious Area

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

Summary for Subcatchment S-7: Tributary toward CB-7

Runoff = 1.52 cfs @ 12.08 hrs, Volume= 0.123 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	14,125	98	Paved Parking
	14,125		Impervious Area

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

Summary for Subcatchment S-8: Tributary to SRS-2

Runoff = 3.02 cfs @ 12.08 hrs, Volume= 0.244 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	28,000	98	Rooftop
	28,000		Impervious Area

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

Summary for Subcatchment S-8a: Tributary toward WQI

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.112 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	10,000	98	Paved Parking
	940	74	>75% Grass cover, Good, HSG C
*	2,535	98	Water Quality Inlet
	13,475	96	Weighted Average
	940		Pervious Area
	12,535		Impervious Area

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

Summary for Subcatchment S-9: Tributary toward CB-9

Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.398 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	45,550	98	Paved Parking
	45,550		Impervious Area

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

Summary for Reach CB-1: Catch Basin

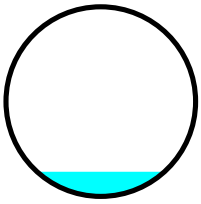
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 4.56" for 10-yr event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af
Outflow = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.69 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 0.4 min

Peak Storage= 1 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 4.41 cfs

15.0" Diameter Pipe, n= 0.013
Length= 15.0' Slope= 0.0047 '/'
Inlet Invert= 76.37', Outlet Invert= 76.30'



Summary for Reach CB-2: Catch Basin

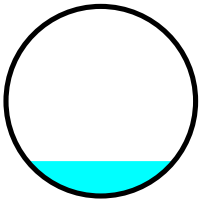
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth = 4.56" for 10-yr event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.53 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.50 fps, Avg. Travel Time= 1.6 min

Peak Storage= 5 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.05 cfs

12.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 48.0' Slope= 0.0123 '/'
Inlet Invert= 76.09', Outlet Invert= 75.50'



Summary for Reach CB-7: Catch Basin

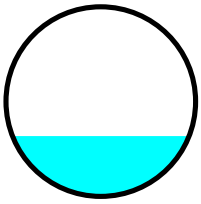
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.324 ac,100.00% Impervious, Inflow Depth = 4.56" for 10-yr event
Inflow = 1.52 cfs @ 12.08 hrs, Volume= 0.123 af
Outflow = 1.52 cfs @ 12.09 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 7.10 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.34 fps, Avg. Travel Time= 0.5 min

Peak Storage= 14 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 6.98 cfs

12.0" Diameter Pipe, n= 0.013
Length= 66.0' Slope= 0.0383 '/'
Inlet Invert= 78.71', Outlet Invert= 76.18'



Summary for Reach CB-8: Catch Basin

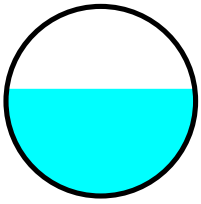
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.188 ac, 71.65% Impervious, Inflow Depth = 3.48" for 10-yr event
Inflow = 4.39 cfs @ 12.09 hrs, Volume= 0.635 af
Outflow = 4.38 cfs @ 12.10 hrs, Volume= 0.635 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.26 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 0.7 min

Peak Storage= 77 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.18 cfs

18.0" Diameter Pipe, n= 0.013
Length= 75.0' Slope= 0.0047 '/'
Inlet Invert= 75.45', Outlet Invert= 75.10'



Summary for Reach CB-9: Catch Basin

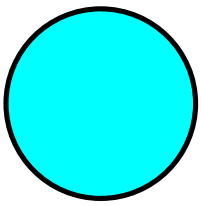
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 126% of Manning's capacity
[76] Warning: Detained 0.012 af (Pond w/culvert advised)
[63] Warning: Exceeded Reach CB-8 INLET depth by 0.64' @ 12.26 hrs

Inflow Area = 3.234 ac, 80.82% Impervious, Inflow Depth = 3.83" for 10-yr event
Inflow = 9.26 cfs @ 12.09 hrs, Volume= 1.033 af
Outflow = 7.67 cfs @ 12.04 hrs, Volume= 1.033 af, Atten= 17%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.76 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 0.6 min

Peak Storage= 133 cf @ 12.05 hrs, Average Depth at Peak Storage= 1.50'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.38 cfs

18.0" Diameter Pipe, n= 0.013
Length= 75.0' Slope= 0.0049 '/'
Inlet Invert= 75.29', Outlet Invert= 74.92'



Summary for Reach P-1: 18" Culvert

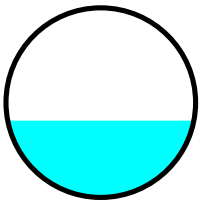
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.725 ac, 7.28% Impervious, Inflow Depth = 2.05" for 10-yr event
Inflow = 1.54 cfs @ 12.13 hrs, Volume= 0.124 af
Outflow = 1.54 cfs @ 12.14 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.30 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 0.7 min

Peak Storage= 25 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 4.49 cfs

18.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 37.0' Slope= 0.0068 '/'
Inlet Invert= 84.57', Outlet Invert= 84.32'



Summary for Reach P-2: 12" Culvert

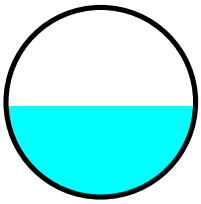
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.704 ac, 7.91% Impervious, Inflow Depth = 2.12" for 10-yr event
Inflow = 1.62 cfs @ 12.12 hrs, Volume= 0.125 af
Outflow = 1.62 cfs @ 12.12 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.36 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 0.4 min

Peak Storage= 16 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.49 cfs

12.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 42.0' Slope= 0.0355 '/'
Inlet Invert= 84.18', Outlet Invert= 82.69'



Summary for Pond SRS-2: Subsurface Recharge System

Inflow Area = 0.643 ac,100.00% Impervious, Inflow Depth = 4.56" for 10-yr event
Inflow = 3.02 cfs @ 12.08 hrs, Volume= 0.244 af
Outflow = 2.47 cfs @ 12.14 hrs, Volume= 0.182 af, Atten= 18%, Lag= 3.3 min
Discarded = 0.01 cfs @ 3.66 hrs, Volume= 0.031 af
Primary = 2.46 cfs @ 12.14 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.09' @ 12.14 hrs Surf.Area= 2,074 sf Storage= 3,834 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 98.2 min (846.9 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1	78.50'	1,825 cf	**17.00'W x 122.00'L x 3.75'H Prismatoid**
			7,778 cf Overall - 3,215 cf Embedded = 4,562 cf x 40.0% Voids
#2	79.00'	3,215 cf	**52.6"W x 34.0"H x 7.50'L Cultec R-V8** x 48 Inside #1
		5,040 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.50'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	80.50'	**6.0" x 6.0' long Culvert X 5.00**
			CMP, square edge headwall, Ke= 0.500
			Outlet Invert= 80.44' S= 0.0100 '/' Cc= 0.900 n= 0.013

Discarded OutFlow Max=0.01 cfs @ 3.66 hrs HW=78.54' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.46 cfs @ 12.14 hrs HW=81.09' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 2.46 cfs @ 2.67 fps)

Summary for Pond WET-1: Sortherly Wetland

[61] Hint: Exceeded Reach CB-1 outlet invert by 0.06' @ 12.32 hrs
[63] Warning: Exceeded Reach CB-2 INLET depth by 0.16' @ 12.34 hrs
[63] Warning: Exceeded Reach CB-9 INLET depth by 0.27' @ 12.55 hrs

Inflow Area = 6.278 ac, 61.12% Impervious, Inflow Depth = 2.89" for 10-yr event
Inflow = 12.52 cfs @ 12.14 hrs, Volume= 1.513 af
Outflow = 8.02 cfs @ 12.32 hrs, Volume= 1.461 af, Atten= 36%, Lag= 10.6 min
Discarded = 0.06 cfs @ 12.32 hrs, Volume= 0.078 af
Primary = 7.96 cfs @ 12.32 hrs, Volume= 1.383 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 76.36' @ 12.32 hrs Surf.Area= 9,211 sf Storage= 14,690 cf

Plug-Flow detention time= 82.1 min calculated for 1.461 af (97% of inflow)
Center-of-Mass det. time= 61.9 min (853.8 - 791.9)

Volume	Invert	Avail.Storage	Storage Description
#1	74.00'	37,115 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.00	3,200	0	0
76.00	8,300	11,500	11,500
78.00	13,300	21,600	33,100
78.50	2,760	4,015	37,115

Device	Routing	Invert	Outlet Devices
#1	Discarded	74.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	74.57'	**24.0" x 60.0' long Culvert** CMP, projecting, no headwall, Ke= 0.900
			Outlet Invert= 74.53' S= 0.0007 '/' Cc= 0.900 n= 0.013

Discarded OutFlow Max=0.06 cfs @ 12.32 hrs HW=76.36' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=7.96 cfs @ 12.32 hrs HW=76.36' (Free Discharge)
2=Culvert (Barrel Controls 7.96 cfs @ 3.54 fps)

Summary for Pond WET-2: Northerly Wetland

[87] Warning: Oscillations may require Finer Routing or smaller dt
[62] Warning: Exceeded Reach CB-7 OUTLET depth by 0.19' @ 12.55 hrs

Inflow Area = 1.333 ac, 53.47% Impervious, Inflow Depth = 3.24" for 10-yr event
Inflow = 4.84 cfs @ 12.09 hrs, Volume= 0.360 af
Outflow = 1.69 cfs @ 12.46 hrs, Volume= 0.360 af, Atten= 65%, Lag= 22.3 min
Discarded = 0.06 cfs @ 12.38 hrs, Volume= 0.049 af
Primary = 1.63 cfs @ 12.46 hrs, Volume= 0.310 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 76.52' @ 12.38 hrs Surf.Area= 9,612 sf Storage= 4,699 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.6 min (829.8 - 796.2)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	21,600 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.00	8,300	0	0
78.00	13,300	21,600	21,600

Device	Routing	Invert	Outlet Devices
#1	Primary	75.78'	**24.0" x 130.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 75.43' S= 0.0027 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior
#2	Discarded	76.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 12.38 hrs HW=76.52' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.63 cfs @ 12.46 hrs HW=76.52' TW=76.08' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.63 cfs @ 2.29 fps)

Summary for Pond WQI-1: Water Quality Inlet

Inflow Area = 0.770 ac, 66.17% Impervious, Inflow Depth = 3.58" for 10-yr event
Inflow = 3.15 cfs @ 12.09 hrs, Volume= 0.230 af
Outflow = 0.21 cfs @ 13.63 hrs, Volume= 0.116 af, Atten= 93%, Lag= 92.6 min
Discarded = 0.04 cfs @ 13.63 hrs, Volume= 0.076 af
Primary = 0.17 cfs @ 13.63 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.04' @ 13.63 hrs Surf.Area= 6,757 sf Storage= 6,129 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 256.9 min (1,052.7 - 795.8)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	9,440 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
78.00	5,080	0	0
79.00	6,700	5,890	5,890
79.50	7,500	3,550	9,440

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	79.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.04 cfs @ 13.63 hrs HW=79.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.17 cfs @ 13.63 hrs HW=79.04' TW=75.51' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.47 fps)

Summary for Pond WQI-2: Water Quality Inlet

Inflow Area = 0.309 ac, 93.02% Impervious, Inflow Depth = 4.33" for 10-yr event
Inflow = 1.43 cfs @ 12.08 hrs, Volume= 0.112 af
Outflow = 0.78 cfs @ 12.20 hrs, Volume= 0.074 af, Atten= 45%, Lag= 7.2 min
Discarded = 0.02 cfs @ 12.20 hrs, Volume= 0.031 af
Primary = 0.76 cfs @ 12.20 hrs, Volume= 0.043 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 77.96' @ 12.20 hrs Surf.Area= 2,510 sf Storage= 2,117 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 147.4 min (910.7 - 763.4)

Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	3,564 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	1,892	0	0
78.00	2,535	2,214	2,214
78.50	2,866	1,350	3,564

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	77.90'	**20.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 12.20 hrs HW=77.96' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.76 cfs @ 12.20 hrs HW=77.96' TW=76.25' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.76 cfs @ 0.62 fps)

Summary for Subcatchment S-1: Tributary to South Culvert

Runoff = 2.93 cfs @ 12.13 hrs, Volume= 0.231 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
	25,975	70	Woods, Good, HSG C
	3,300	74	>75% Grass cover, Good, HSG C
*	2,300	98	Roadway
	31,575	72	Weighted Average
	29,275		Pervious Area
	2,300		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1360	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
3.5	220	0.0430	1.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.1	270	Total			

Summary for Subcatchment S-10: Tributary toward CB-8

Runoff = 5.87 cfs @ 12.08 hrs, Volume= 0.482 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	37,250	98	Paved Parking
	37,250		Impervious Area

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

Summary for Subcatchment S-11: Tributary to Northerly Wetland

Runoff = 5.61 cfs @ 12.09 hrs, Volume= 0.404 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	1,175	98	Roadway
*	15,750	98	Wetland
	27,025	70	Woods, Good, HSG C
	43,950	81	Weighted Average
	27,025		Pervious Area
	16,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	14	0.0200	0.96		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
4.7	36	0.1100	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.1	70	0.0420	1.02		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.0	120	Total			

Summary for Subcatchment S-2: Tributary to North Culvert

Runoff = 3.04 cfs @ 12.11 hrs, Volume= 0.231 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
	24,350	70	Woods, Good, HSG C
	3,875	74	>75% Grass cover, Good, HSG C
*	2,425	98	Roadway
	30,650	73	Weighted Average
	28,225		Pervious Area
	2,425		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1100	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	170	0.0940	1.53		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	220	Total			

Summary for Subcatchment S-3: Tributary to Water Quality Inlet

Runoff = 4.90 cfs @ 12.08 hrs, Volume= 0.366 af, Depth= 5.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	7,500	98	Water Quality Inlet
*	14,700	98	Roadway
	11,350	70	Woods, Good, HSG C
	33,550	89	Weighted Average
	11,350		Pervious Area
	22,200		Impervious Area

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

Summary for Subcatchment S-3a: Tributary to Southerly Wetland

Runoff = 2.82 cfs @ 12.09 hrs, Volume= 0.206 af, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	9,465	98	Wetland
*	1,527	98	Roadway
	9,498	70	Woods, Good, HSG C
	20,490	85	Weighted Average
	9,498		Pervious Area
	10,992		Impervious Area

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

Summary for Subcatchment S-4: Tributary to CB-1

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	1,450	98	Roadway
	1,450		Impervious Area

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

Summary for Subcatchment S-5: Tributary to CB-2

Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.018 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
1,400	98	Paved parking & roofs
1,400		Impervious Area

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

Summary for Subcatchment S-6: Tributary Off-Site

Runoff = 2.35 cfs @ 12.08 hrs, Volume= 0.190 af, Depth= 6.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	14,625	98	Paved Parking
	335	74	>75% Grass cover, Good, HSG C
	14,960	97	Weighted Average
	335		Pervious Area
	14,625		Impervious Area

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

Summary for Subcatchment S-7: Tributary toward CB-7

Runoff = 2.23 cfs @ 12.08 hrs, Volume= 0.183 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	14,125	98	Paved Parking
	14,125		Impervious Area

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

Summary for Subcatchment S-8: Tributary to SRS-2

Runoff = 4.41 cfs @ 12.08 hrs, Volume= 0.362 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	28,000	98	Rooftop
	28,000		Impervious Area

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

Summary for Subcatchment S-8a: Tributary toward WQI

Runoff = 2.11 cfs @ 12.08 hrs, Volume= 0.168 af, Depth= 6.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	10,000	98	Paved Parking
	940	74	>75% Grass cover, Good, HSG C
*	2,535	98	Water Quality Inlet
	13,475	96	Weighted Average
	940		Pervious Area
	12,535		Impervious Area

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

Summary for Subcatchment S-9: Tributary toward CB-9

Runoff = 7.18 cfs @ 12.08 hrs, Volume= 0.589 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.00"

	Area (sf)	CN	Description
*	45,550	98	Paved Parking
	45,550		Impervious Area

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

Summary for Reach CB-1: Catch Basin

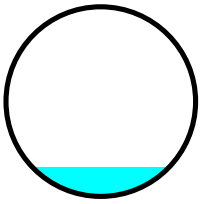
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.89 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 0.4 min

Peak Storage= 2 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 4.41 cfs

15.0" Diameter Pipe, n= 0.013
Length= 15.0' Slope= 0.0047 '/'
Inlet Invert= 76.37', Outlet Invert= 76.30'



Summary for Reach CB-2: Catch Basin

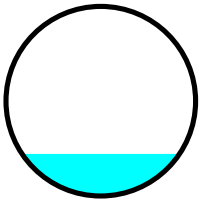
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.032 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 0.018 af
Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.71 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 1.4 min

Peak Storage= 6 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.05 cfs

12.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 48.0' Slope= 0.0123 '/'
Inlet Invert= 76.09', Outlet Invert= 75.50'



Summary for Reach CB-7: Catch Basin

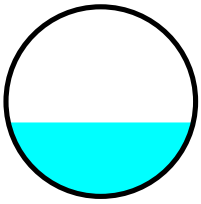
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.324 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 2.23 cfs @ 12.08 hrs, Volume= 0.183 af
Outflow = 2.23 cfs @ 12.08 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 7.89 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.64 fps, Avg. Travel Time= 0.4 min

Peak Storage= 19 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 6.98 cfs

12.0" Diameter Pipe, n= 0.013
Length= 66.0' Slope= 0.0383 '/'
Inlet Invert= 78.71', Outlet Invert= 76.18'



Summary for Reach CB-8: Catch Basin

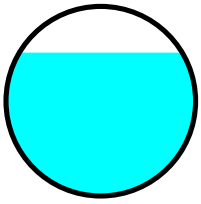
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 2.188 ac, 71.65% Impervious, Inflow Depth = 5.51" for 100-yr event
Inflow = 6.60 cfs @ 12.10 hrs, Volume= 1.005 af
Outflow = 6.60 cfs @ 12.11 hrs, Volume= 1.005 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.61 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.94 fps, Avg. Travel Time= 0.6 min

Peak Storage= 107 cf @ 12.11 hrs, Average Depth at Peak Storage= 1.13'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.18 cfs

18.0" Diameter Pipe, n= 0.013
Length= 75.0' Slope= 0.0047 '/'
Inlet Invert= 75.45', Outlet Invert= 75.10'



Summary for Reach CB-9: Catch Basin

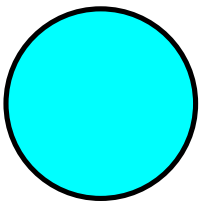
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 186% of Manning's capacity
[76] Warning: Detained 0.088 af (Pond w/culvert advised)
[63] Warning: Exceeded Reach CB-8 INLET depth by 0.69' @ 12.80 hrs

Inflow Area = 3.234 ac, 80.82% Impervious, Inflow Depth = 5.91" for 100-yr event
Inflow = 13.69 cfs @ 12.09 hrs, Volume= 1.594 af
Outflow = 7.89 cfs @ 11.99 hrs, Volume= 1.594 af, Atten= 42%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.76 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.26 fps, Avg. Travel Time= 0.6 min

Peak Storage= 133 cf @ 12.00 hrs, Average Depth at Peak Storage= 1.50'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.38 cfs

18.0" Diameter Pipe, n= 0.013
Length= 75.0' Slope= 0.0049 '/'
Inlet Invert= 75.29', Outlet Invert= 74.92'



Summary for Reach P-1: 18" Culvert

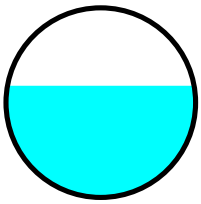
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.725 ac, 7.28% Impervious, Inflow Depth = 3.83" for 100-yr event
Inflow = 2.93 cfs @ 12.13 hrs, Volume= 0.231 af
Outflow = 2.93 cfs @ 12.13 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.71 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 0.6 min

Peak Storage= 40 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.88'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 4.49 cfs

18.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 37.0' Slope= 0.0068 '/'
Inlet Invert= 84.57', Outlet Invert= 84.32'



Summary for Reach P-2: 12" Culvert

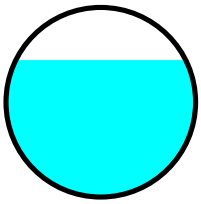
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.704 ac, 7.91% Impervious, Inflow Depth = 3.94" for 100-yr event
Inflow = 3.04 cfs @ 12.11 hrs, Volume= 0.231 af
Outflow = 3.04 cfs @ 12.12 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 5.00 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.91 fps, Avg. Travel Time= 0.4 min

Peak Storage= 26 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.72'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.49 cfs

12.0" Diameter Pipe, n= 0.025 Corrugated metal
Length= 42.0' Slope= 0.0355 '/'
Inlet Invert= 84.18', Outlet Invert= 82.69'



Summary for Pond SRS-2: Subsurface Recharge System

Inflow Area = 0.643 ac,100.00% Impervious, Inflow Depth = 6.76" for 100-yr event
Inflow = 4.41 cfs @ 12.08 hrs, Volume= 0.362 af
Outflow = 3.63 cfs @ 12.14 hrs, Volume= 0.300 af, Atten= 18%, Lag= 3.3 min
Discarded = 0.01 cfs @ 2.31 hrs, Volume= 0.031 af
Primary = 3.62 cfs @ 12.14 hrs, Volume= 0.269 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 81.36' @ 12.14 hrs Surf.Area= 2,074 sf Storage= 4,195 cf

Plug-Flow detention time= 152.6 min calculated for 0.300 af (83% of inflow)
Center-of-Mass det. time= 81.6 min (824.6 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1	78.50'	1,825 cf	**17.00'W x 122.00'L x 3.75'H Prismatoid**
			7,778 cf Overall - 3,215 cf Embedded = 4,562 cf x 40.0% Voids
#2	79.00'	3,215 cf	**52.6"W x 34.0"H x 7.50'L Cultec R-V8** x 48 Inside #1
		5,040 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.50'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	80.50'	**6.0" x 6.0' long Culvert X 5.00**
			CMP, square edge headwall, Ke= 0.500
			Outlet Invert= 80.44' S= 0.0100 '/' Cc= 0.900 n= 0.013

Discarded OutFlow Max=0.01 cfs @ 2.31 hrs HW=78.54' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=3.61 cfs @ 12.14 hrs HW=81.36' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 3.61 cfs @ 3.68 fps)

Summary for Pond WET-1: Sortherly Wetland

[63] Warning: Exceeded Reach CB-1 INLET depth by 0.52' @ 12.51 hrs
[63] Warning: Exceeded Reach CB-2 INLET depth by 0.79' @ 12.52 hrs
[63] Warning: Exceeded Reach CB-9 INLET depth by 0.79' @ 12.83 hrs

Inflow Area = 6.278 ac, 61.12% Impervious, Inflow Depth = 4.90" for 100-yr event
Inflow = 18.59 cfs @ 12.12 hrs, Volume= 2.565 af
Outflow = 12.26 cfs @ 12.47 hrs, Volume= 2.512 af, Atten= 34%, Lag= 20.9 min
Discarded = 0.07 cfs @ 12.47 hrs, Volume= 0.084 af
Primary = 12.19 cfs @ 12.47 hrs, Volume= 2.428 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 76.98' @ 12.47 hrs Surf.Area= 10,761 sf Storage= 20,884 cf

Plug-Flow detention time= 62.6 min calculated for 2.512 af (98% of inflow)
Center-of-Mass det. time= 49.9 min (837.9 - 788.0)

Volume	Invert	Avail.Storage	Storage Description
#1	74.00'	37,115 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
74.00	3,200	0	0
76.00	8,300	11,500	11,500
78.00	13,300	21,600	33,100
78.50	2,760	4,015	37,115

Device	Routing	Invert	Outlet Devices
#1	Discarded	74.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	74.57'	**24.0" x 60.0' long Culvert** CMP, projecting, no headwall, Ke= 0.900
			Outlet Invert= 74.53' S= 0.0007 '/' Cc= 0.900 n= 0.013

Discarded OutFlow Max=0.07 cfs @ 12.47 hrs HW=76.98' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=12.19 cfs @ 12.47 hrs HW=76.98' (Free Discharge)
2=Culvert (Barrel Controls 12.19 cfs @ 4.08 fps)

Summary for Pond WET-2: Northerly Wetland

[87] Warning: Oscillations may require Finer Routing or smaller dt
[62] Warning: Exceeded Reach CB-7 OUTLET depth by 0.44' @ 12.44 hrs

Inflow Area = 1.333 ac, 53.47% Impervious, Inflow Depth = 5.28" for 100-yr event
Inflow = 7.84 cfs @ 12.09 hrs, Volume= 0.587 af
Outflow = 3.13 cfs @ 12.41 hrs, Volume= 0.587 af, Atten= 60%, Lag= 19.3 min
Discarded = 0.06 cfs @ 12.32 hrs, Volume= 0.064 af
Primary = 3.06 cfs @ 12.41 hrs, Volume= 0.523 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 76.83' @ 12.32 hrs Surf.Area= 10,382 sf Storage= 7,781 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.4 min (822.5 - 786.1)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	21,600 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.00	8,300	0	0
78.00	13,300	21,600	21,600

Device	Routing	Invert	Outlet Devices
#1	Primary	75.78'	**24.0" x 130.0' long Culvert** CMP, square edge headwall, Ke= 0.500 Outlet Invert= 75.43' S= 0.0027 '/' Cc= 0.900 n= 0.015 Corrugated PE, smooth interior
#2	Discarded	76.00'	**0.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.06 cfs @ 12.32 hrs HW=76.83' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=3.06 cfs @ 12.41 hrs HW=76.82' TW=76.35' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.06 cfs @ 2.70 fps)

Summary for Pond WQI-1: Water Quality Inlet

Inflow Area = 0.770 ac, 66.17% Impervious, Inflow Depth = 5.71" for 100-yr event
Inflow = 4.90 cfs @ 12.08 hrs, Volume= 0.366 af
Outflow = 1.96 cfs @ 12.30 hrs, Volume= 0.251 af, Atten= 60%, Lag= 13.1 min
Discarded = 0.04 cfs @ 12.30 hrs, Volume= 0.081 af
Primary = 1.91 cfs @ 12.30 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 79.18' @ 12.30 hrs Surf.Area= 6,989 sf Storage= 7,127 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 135.8 min (919.0 - 783.2)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	9,440 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
78.00	5,080	0	0
79.00	6,700	5,890	5,890
79.50	7,500	3,550	9,440

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	79.00'	**10.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.04 cfs @ 12.30 hrs HW=79.18' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.91 cfs @ 12.30 hrs HW=79.18' TW=76.91' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 1.91 cfs @ 1.06 fps)

Summary for Pond WQI-2: Water Quality Inlet

Inflow Area = 0.309 ac, 93.02% Impervious, Inflow Depth = 6.52" for 100-yr event
Inflow = 2.11 cfs @ 12.08 hrs, Volume= 0.168 af
Outflow = 2.00 cfs @ 12.11 hrs, Volume= 0.130 af, Atten= 5%, Lag= 1.6 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.033 af
Primary = 1.99 cfs @ 12.11 hrs, Volume= 0.097 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 78.02' @ 12.11 hrs Surf.Area= 2,546 sf Storage= 2,256 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 101.6 min (856.5 - 755.0)

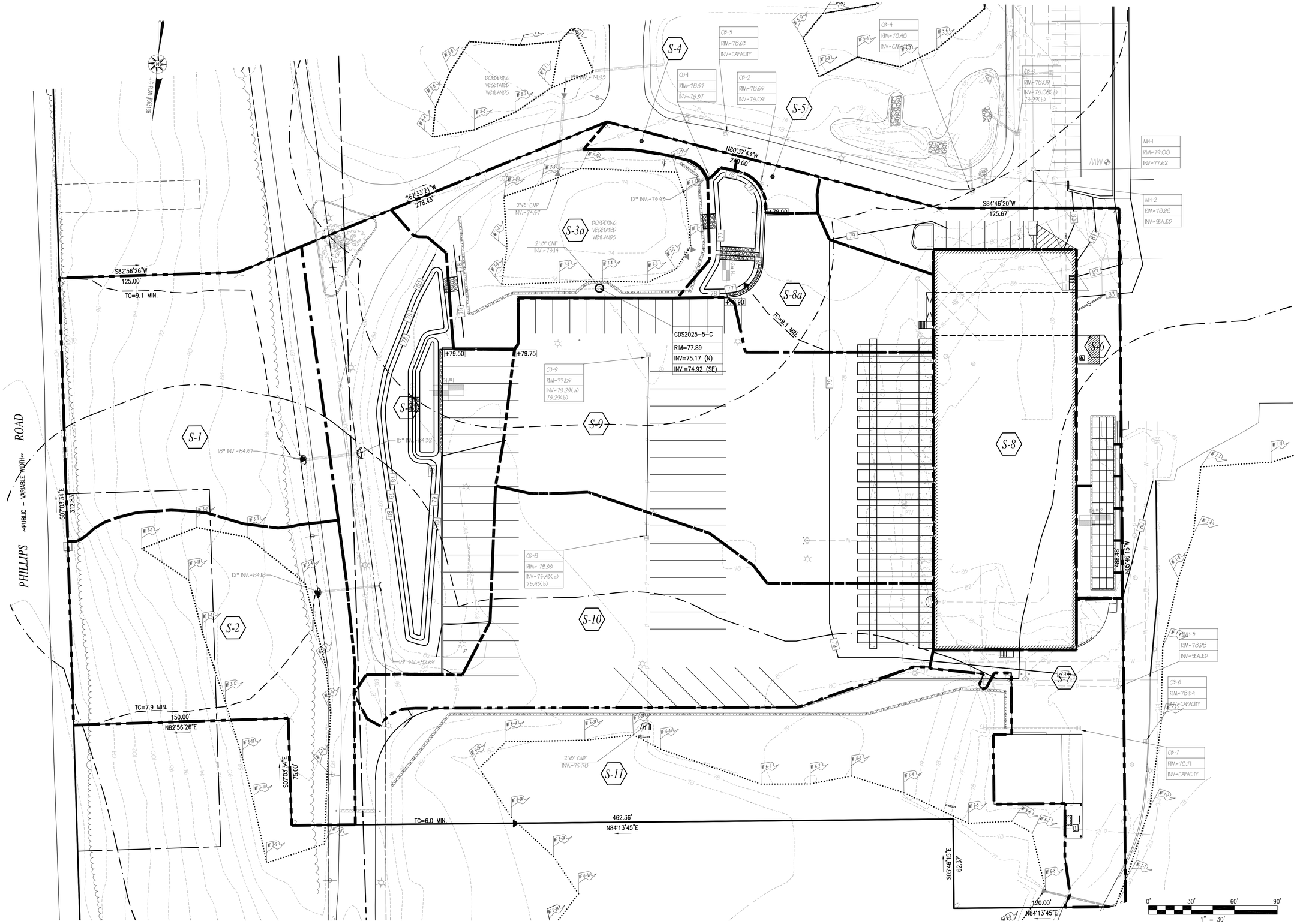
Volume	Invert	Avail.Storage	Storage Description
#1	77.00'	3,564 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
77.00	1,892	0	0
78.00	2,535	2,214	2,214
78.50	2,866	1,350	3,564

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	**0.270 in/hr Exfiltration over Surface area**
#2	Primary	77.90'	**20.0' long x 10.0' 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) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=78.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.99 cfs @ 12.11 hrs HW=78.02' TW=76.48' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.99 cfs @ 0.85 fps)



REVISIONS

1	4/6/17	CONSERVATION COMMISSION

CHRISTIAN ALBERT FARLAND No. 47544 CIVIL COMMONWEALTH OF MASSACHUSETTS

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- WARWICK, RI

DRAWN BY: MJW
DESIGNED BY: CAF
CHECKED BY: CAF

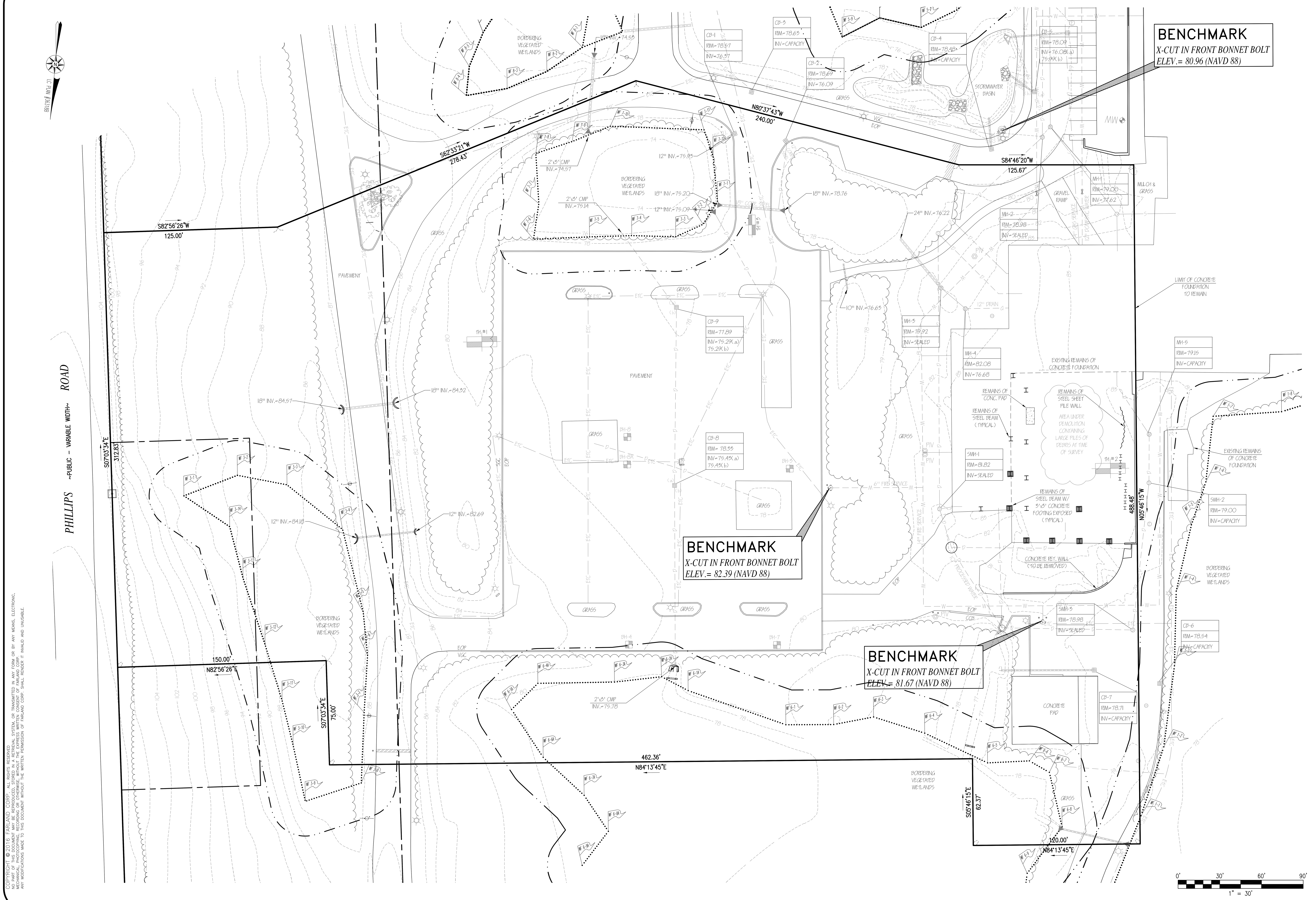
SITE PLAN
100 DUCHAINE BOULEVARD
ASSESSORS MAP 134 LOT 5
NEW BEDFORD, MASSACHUSETTS

PREPARED FOR: PARALLEL PRODUCTS OF NEW ENGLAND
401 INDUSTRY ROAD
LOUISVILLE, KY 40208

FEBRUARY 14, 2017
SCALE: 1"=30'
JOB NO. 15-500.1
LATEST REVISION: APRIL 6, 2017

POST-SUBCATCHMENT

SHEET 5B OF 8



REVISIONS

1	5/4/17	CONSERVATION COMMISSION

COMMONWEALTH OF MASSACHUSETTS
CHRISTIAN ALBERT FARLAND
No. 47544
CIVIL
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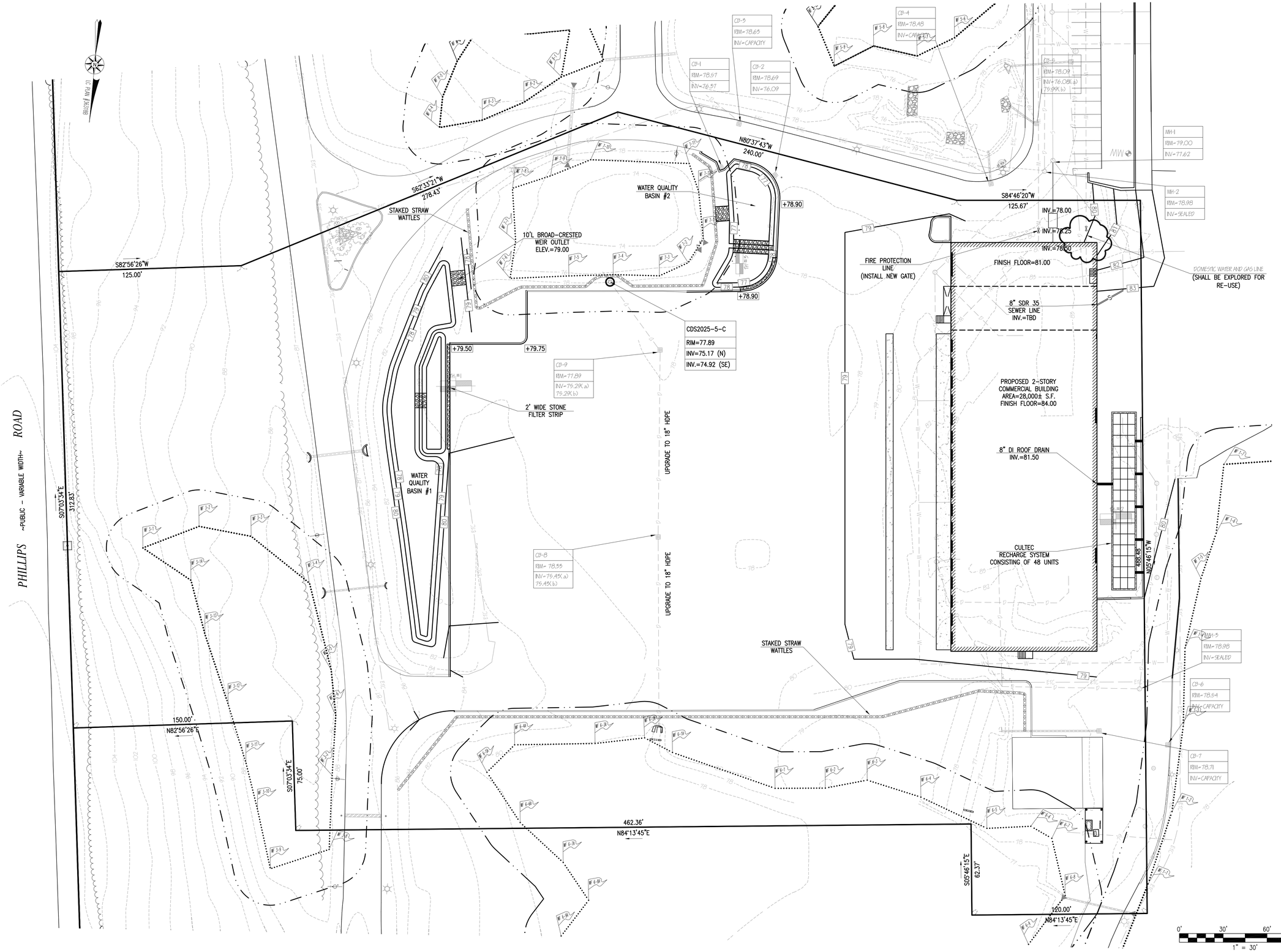
FEBRUARY 14, 2017
SCALE: 1"=30'
JOB NO. 15-500.1
LATEST REVISION: MAY 4, 2017

EXISTING CONDITIONS



REVISIONS

1	4/6/17	CONSERVATION COMMISSION
2	5/4/17	CONSERVATION COMMISSION

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LOUISVILLE, KY 40208

FEBRUARY 14, 2017
SCALE: 1"=30'
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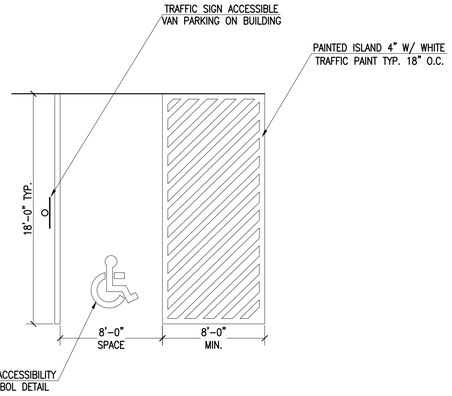
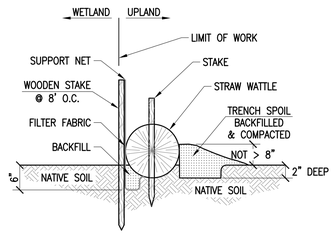
LATEST REVISION: MAY 4, 2017

UTILITIES & GRADING

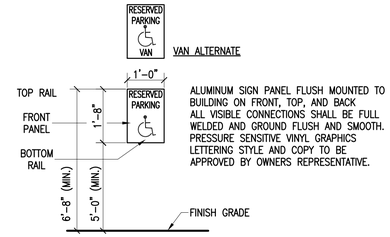
SHEET 5 OF 8



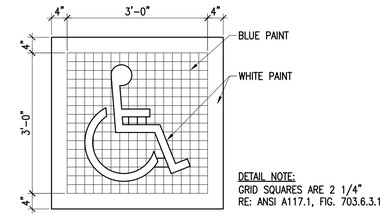
10/8 ACCESSIBLE PARKING LAYOUT
NOT TO SCALE



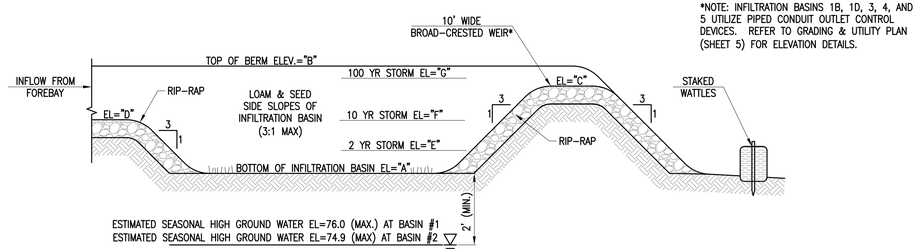
15/8 STAKED STRAW WATTLE WITH SILT FENCE
NOT TO SCALE



12/8 ACCESSIBLE PARKING SIGN
NOT TO SCALE

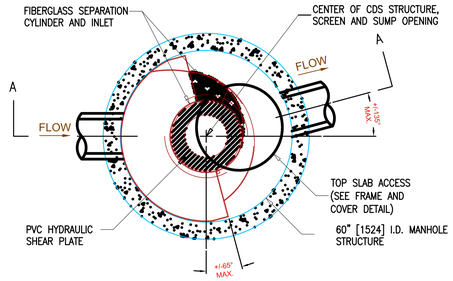


13/8 ACCESSIBLE PARKING SYMBOL
NOT TO SCALE

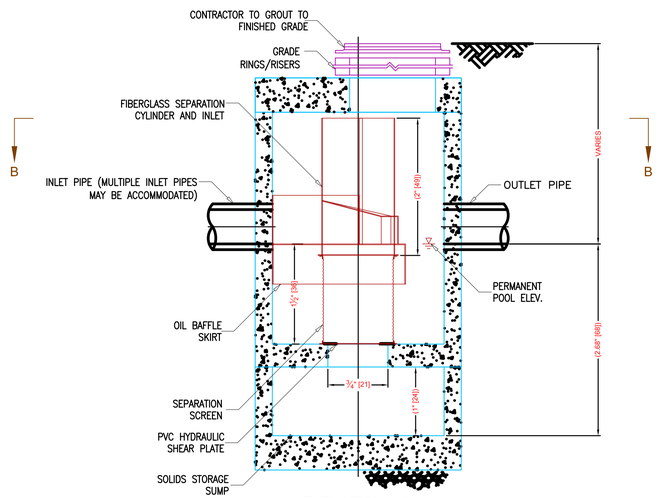


*NOTE: INFILTRATION BASINS 1B, 1D, 3, 4, AND 5 UTILIZE PIPED CONDUIT OUTLET CONTROL DEVICES. REFER TO GRADING & UTILITY PLAN (SHEET 5) FOR ELEVATION DETAILS.

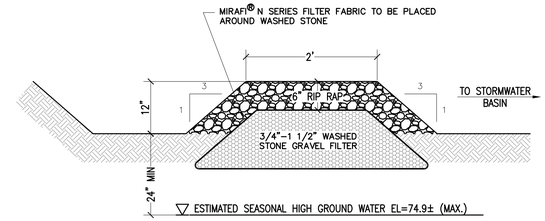
WATER QUALITY BASIN	"A"	"B"	"C"	"D"	"E"	"F"	"G"
1	78.00	79.50	79.00	79.50	78.77	79.04	79.18
2	77.00	78.50	77.90	78.90	77.91	77.96	78.02



PLAN VIEW B-B
N.T.S.

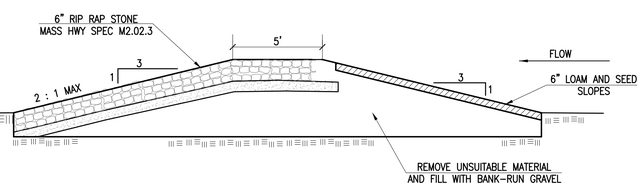


ELEVATION A-A
N.T.S.



16/8 SEDIMENT FOREBAY W/ GRAVEL FILTER
NOT TO SCALE

18/8 DETENTION BASIN
NOT TO SCALE



19/8 OVERFLOW SPILLWAY DETAIL
NOT TO SCALE

20/8 CDS2025-5-C INLINE CDS SEPARATOR
NOT TO SCALE

REVISIONS

1	4/6/17	CONSERVATION COMMISSION
2	5/4/17	CONSERVATION COMMISSION

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FEBRUARY 14, 2017
SCALE: N.T.S.
JOB NO. 15-500.1
LATEST REVISION: MAY 4, 2017

DETAIL