ATTACHMENT 6

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September 29, 2011

North Atlantic Towers
1001 3rd Avenue West, Suite 420
Bradenton, FL 34205

RE: Stormwater Management for CT1182 – Route 198, Woodstock, CT
Proposed Telecommunication Facility

Dear Dan Shriver,

Attached is information related to the management of stormwater runoff from the proposed gravel access drive and wireless facility at the above referenced site. Included are a HydroCAD report for drainage culvert sizing and a watershed map delineating the contributing drainage areas to each pipe. The proposed culverts have been located to maintain existing drainage patterns currently on the site.

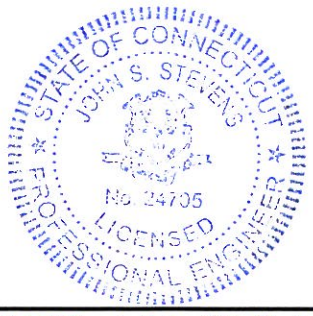
Since the project will involve construction of a private access drive on private land, it is not required to satisfy the Connecticut Department of Transportation (ConnDOT) design standards. However, Infinigy Engineering has utilized the ConnDOT Drainage Manual, October 2000 version, as a reference and our design satisfies the standard for minor structures as defined in section 9.3.3 (p. 9.3-2) of the ConnDOT Drainage Manual. Minimum culvert sizing criteria, design rainfall return frequency/depths, as well as freeboard are from Table 8-4 in Chapter 8 and Appendix B in Chapter 6, respectively, of the ConnDOT Drainage Manual.

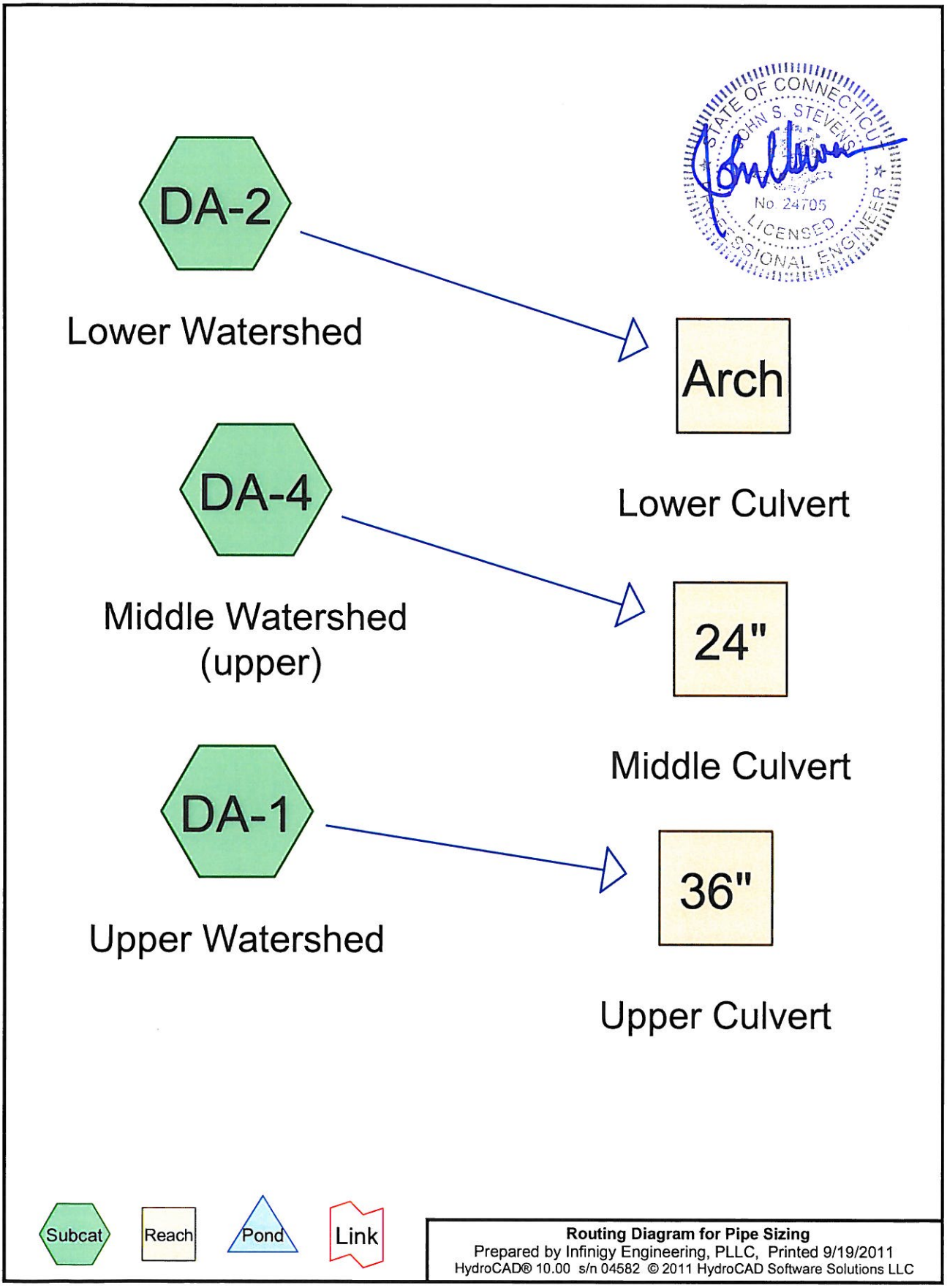
The proposed culverts provide passage of the 25-year 24-hour storm event as required by the ConnDOT.

Please let us know if you have any questions regarding this submittal.

Regards,

John S. Stevens, PE





Routing Diagram for Pipe Sizing
Prepared by Infinigy Engineering, PLLC, Printed 9/19/2011

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
84.102	55	Woods, Good, HSG B (DA-1, DA-2, DA-4)
174.444	70	Woods, Good, HSG C (DA-1, DA-2, DA-4)
73.155	77	Woods, Good, HSG D (DA-1, DA-2)

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
84.102	HSG B	DA-1, DA-2, DA-4
174.444	HSG C	DA-1, DA-2, DA-4
73.155	HSG D	DA-1, DA-2
0.000	Other	

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	84.102	174.444	73.155	0.000	331.701	Woods, Good	DA-1, DA-2, DA-4

Pipe Listing (selected 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	24"	0.00	-1.00	40.0	0.0250	0.020	24.0	0.0	6.0
2	36"	0.00	-1.00	50.0	0.0200	0.020	36.0	0.0	12.0
3	Arch	0.00	-0.40	40.0	0.0100	0.012	88.0	54.0	6.0

Summary for Subcatchment DA-1: Upper Watershed

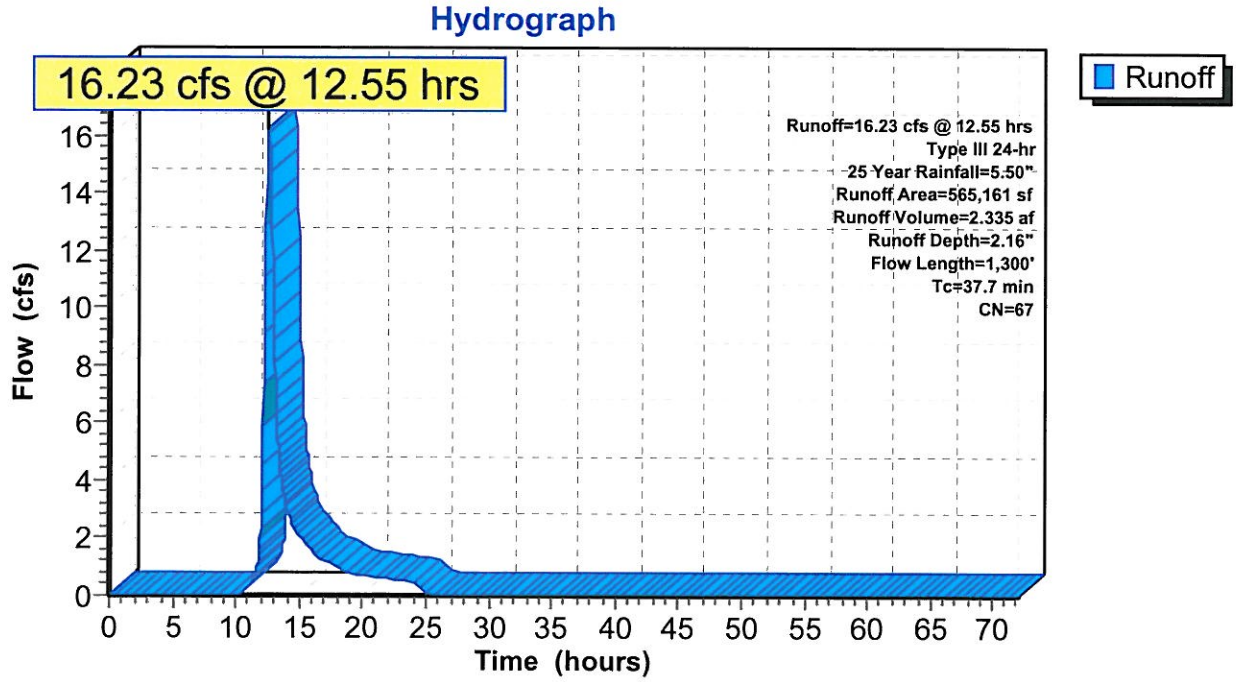
Runoff = 16.23 cfs @ 12.55 hrs, Volume= 2.335 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
173,604	55	Woods, Good, HSG B
291,055	70	Woods, Good, HSG C
100,502	77	Woods, Good, HSG D
565,161	67	Weighted Average
565,161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
22.1	1,150	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.7	1,300	Total			

Subcatchment DA-1: Upper Watershed



Summary for Subcatchment DA-2: Lower Watershed

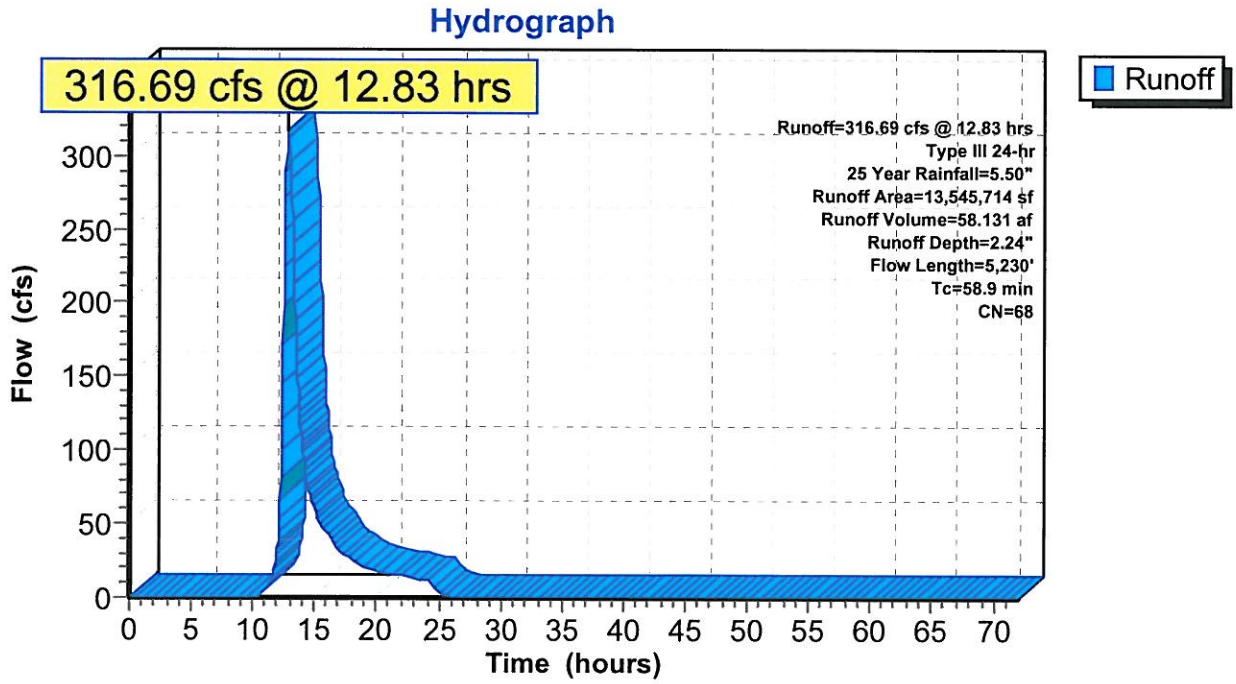
Runoff = 316.69 cfs @ 12.83 hrs, Volume= 58.131 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
3,251,865	55	Woods, Good, HSG B
7,207,707	70	Woods, Good, HSG C
3,086,142	77	Woods, Good, HSG D
13,545,714	68	Weighted Average
13,545,714		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.2	150	0.0100	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
11.0	1,280	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.7	3,800	0.0200	7.25	57.99	**Channel Flow,** Area= 8.0 sf Perim= 7.6' r= 1.05' n= 0.030 Stream, clean & straight
58.9	5,230	Total			

Subcatchment DA-2: Lower Watershed



Summary for Subcatchment DA-4: Middle Watershed (upper)

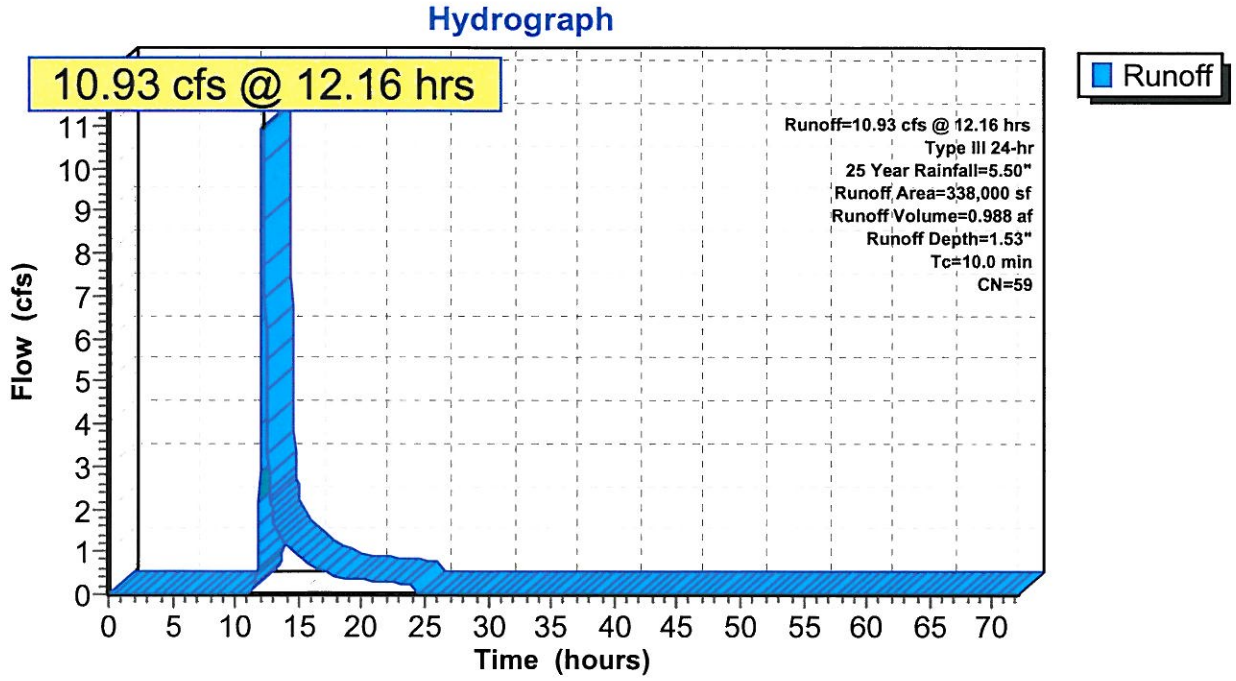
Runoff = 10.93 cfs @ 12.16 hrs, Volume= 0.988 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
100,000	70	Woods, Good, HSG C
238,000	55	Woods, Good, HSG B
338,000	59	Weighted Average
338,000		100.00% Pervious Area

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

Subcatchment DA-4: Middle Watershed (upper)



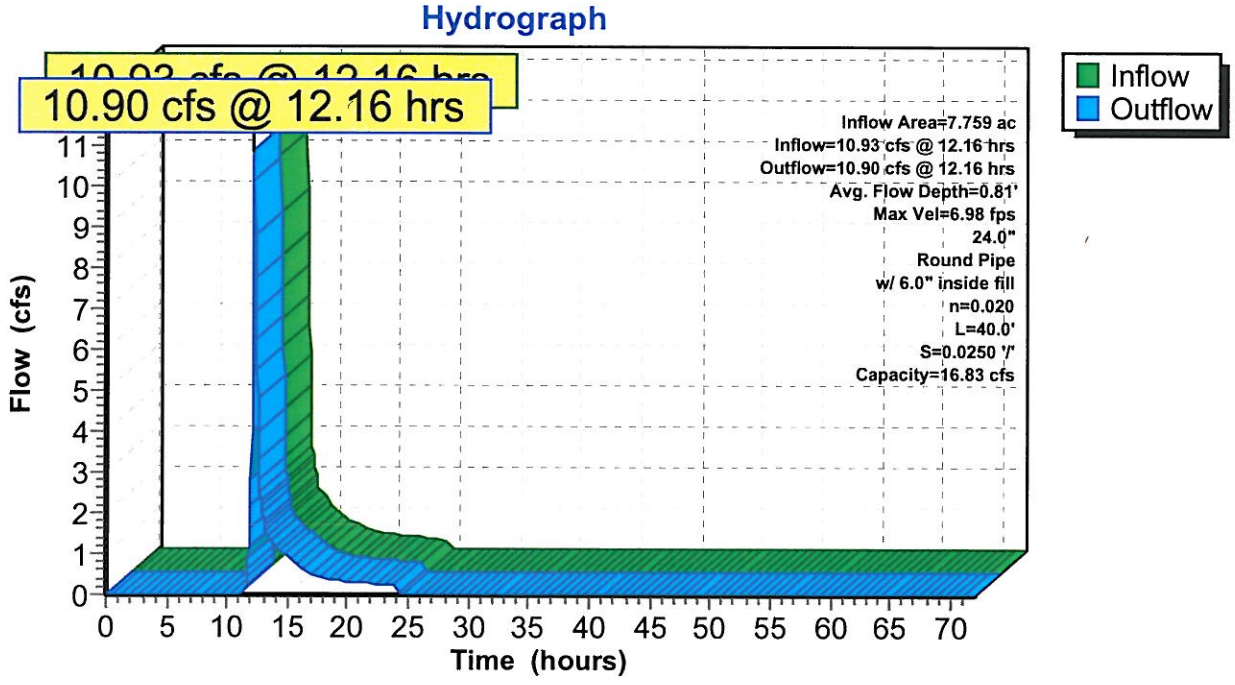
Summary for Reach 24": Middle Culvert

Inflow Area = 7.759 ac, 0.00% Impervious, Inflow Depth = 1.53" for 25 Year event
Inflow = 10.93 cfs @ 12.16 hrs, Volume= 0.988 af
Outflow = 10.90 cfs @ 12.16 hrs, Volume= 0.988 af, Atten= 0%, Lag= 0.0 min

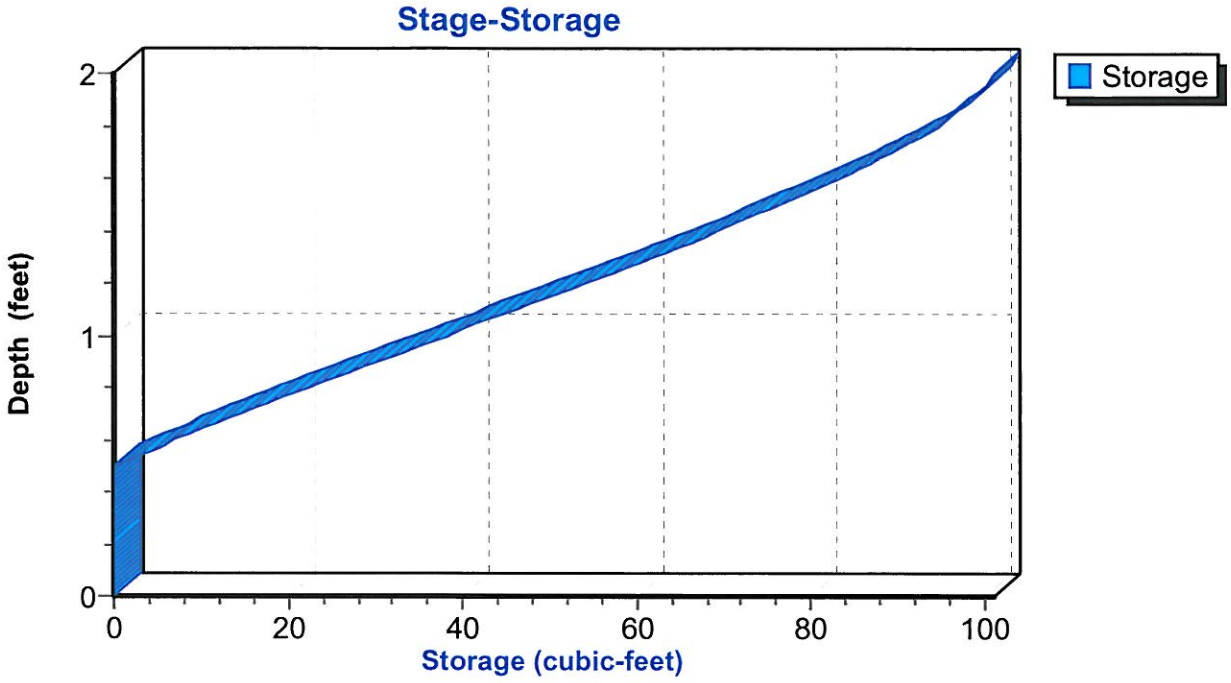
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 6.98 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 0.3 min

Peak Storage= 62 cf @ 12.16 hrs
Average Depth at Peak Storage= 1.31' above invert (0.81' above fill)
Bank-Full Depth= 2.00' above invert (1.50' above fill) Flow Area= 2.5 sf, Capacity= 16.83 cfs

24.0" Round Pipe w/ 6.0" inside fill
n= 0.020 Corrugated PE, corrugated interior
Length= 40.0' Slope= 0.0250 '/'
Inlet Invert= 0.00', Outlet Invert= -1.00'



Reach 24": Middle Culvert



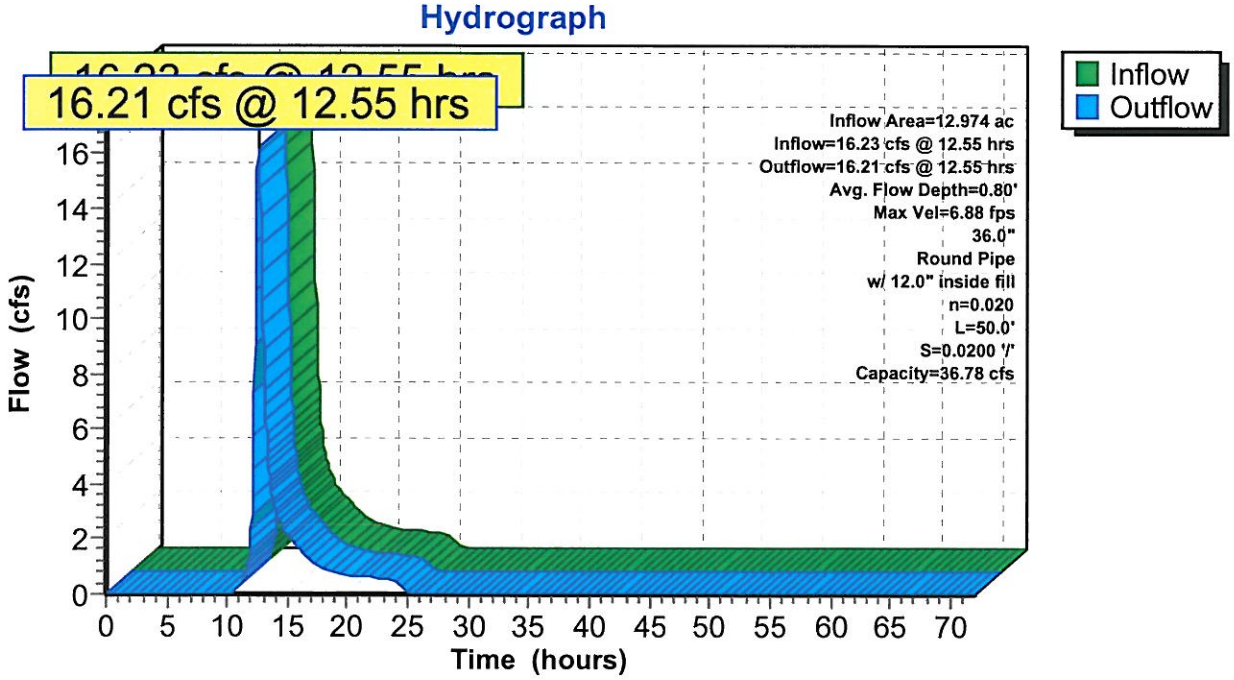
Summary for Reach 36": Upper Culvert

Inflow Area = 12.974 ac, 0.00% Impervious, Inflow Depth = 2.16" for 25 Year event
Inflow = 16.23 cfs @ 12.55 hrs, Volume= 2.335 af
Outflow = 16.21 cfs @ 12.55 hrs, Volume= 2.335 af, Atten= 0%, Lag= 0.1 min

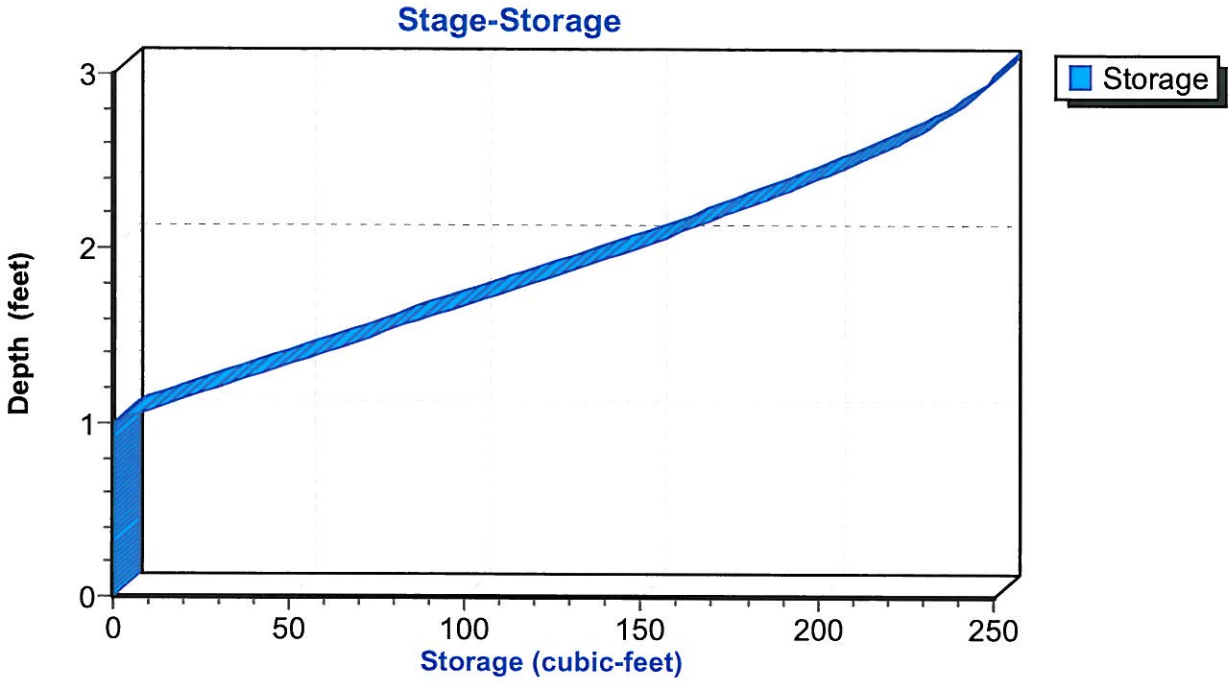
Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 6.88 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.63 fps, Avg. Travel Time= 0.3 min

Peak Storage= 118 cf @ 12.55 hrs
Average Depth at Peak Storage= 1.80' above invert (0.80' above fill)
Bank-Full Depth= 3.00' above invert (2.00' above fill) Flow Area= 5.0 sf, Capacity= 36.78 cfs

36.0" Round Pipe w/ 12.0" inside fill
n= 0.020 Corrugated PE, corrugated interior
Length= 50.0' Slope= 0.0200 '/' (101 Elevation Intervals)
Inlet Invert= 0.00', Outlet Invert= -1.00'



Reach 36": Upper Culvert



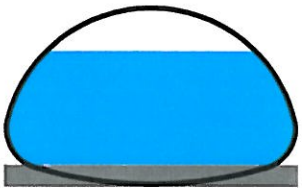
Summary for Reach Arch: Lower Culvert

Inflow Area = 310.967 ac, 0.00% Impervious, Inflow Depth = 2.24" for 25 Year event
Inflow = 316.69 cfs @ 12.83 hrs, Volume= 58.131 af
Outflow = 316.53 cfs @ 12.83 hrs, Volume= 58.132 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 16.22 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 6.78 fps, Avg. Travel Time= 0.1 min

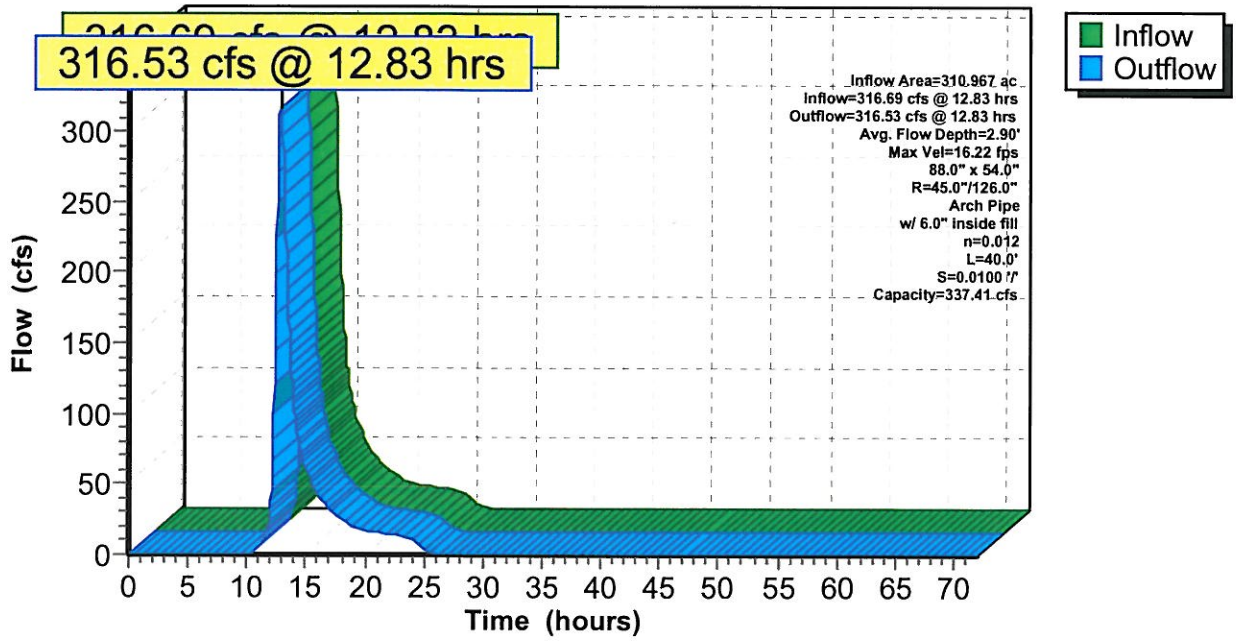
Peak Storage= 781 cf @ 12.83 hrs
Average Depth at Peak Storage= 3.40' above invert (2.90' above fill)
Bank-Full Depth= 4.50' above invert (4.00' above fill) Flow Area= 23.5 sf, Capacity= 337.41 cfs

88.0" W x 54.0" H, R=45.0"/126.0" Arch Pipe w/ 6.0" inside fill
n= 0.012 Concrete pipe, finished
Length= 40.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -0.40'

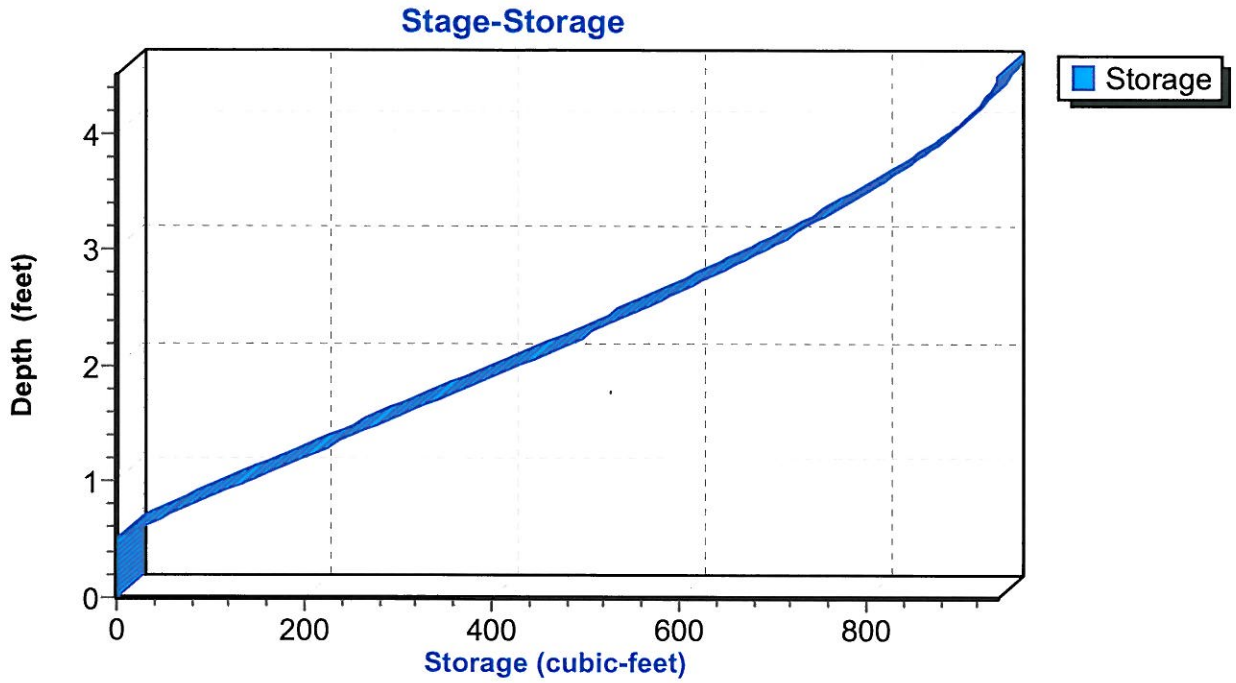


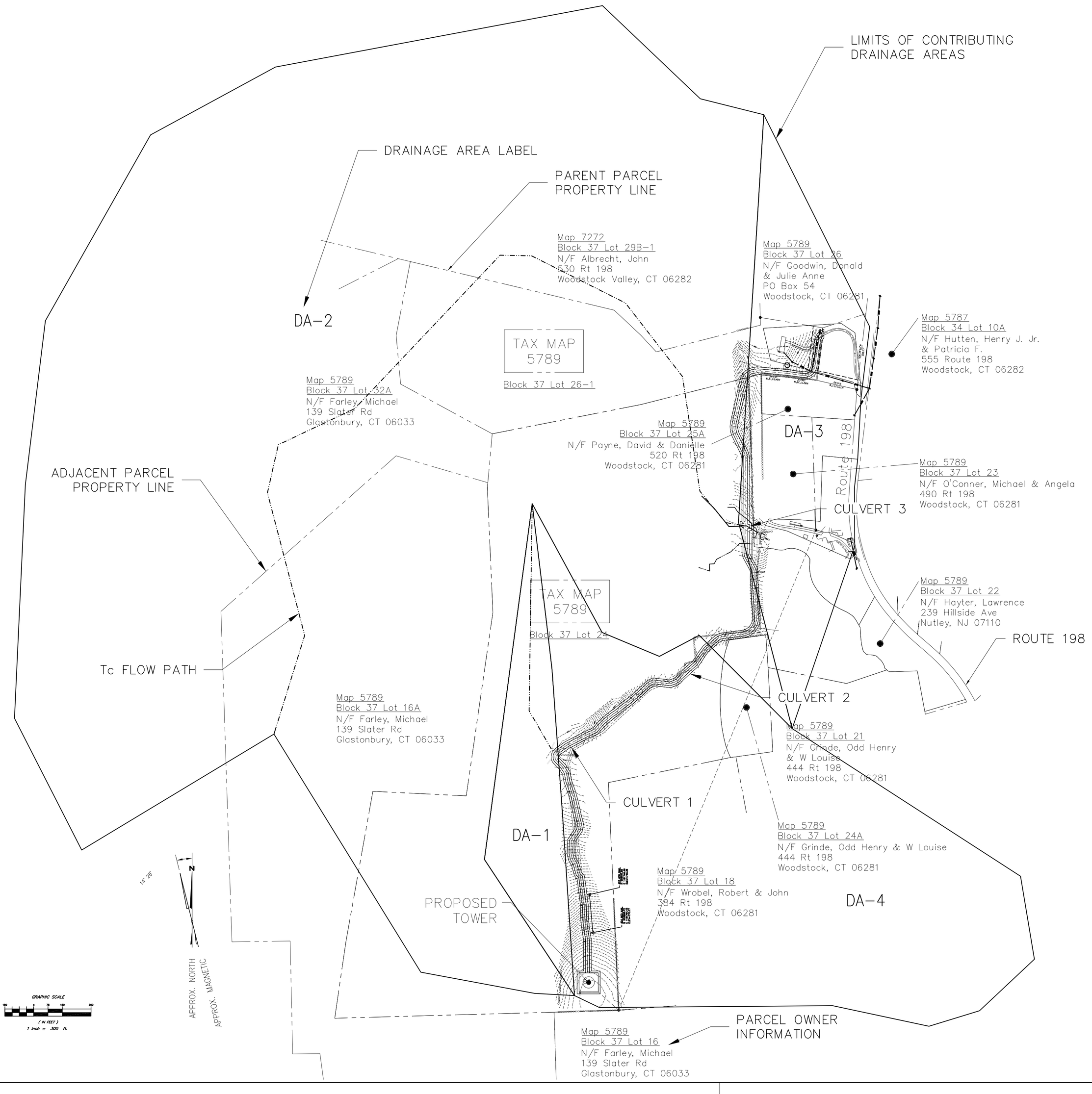
Reach Arch: Lower Culvert

Hydrograph



Reach Arch: Lower Culvert





WATERSHED DRAINAGE AREAS

DA-1 (UPPER WATERSHED)

Area (sf)	*CN*	*Description*
173,604	55	Woods, Good, HSG B
291,055	70	Woods, Good, HSG C
100,502	77	Woods, Good, HSG D
565,161	*67*	*Weighted Average*

DA-4 (MIDDLE WATERSHED)

Area (sf)	*CN*	*Description*
100,000	70	Woods, Good, HSG C
238,000	55	Woods, Good, HSG B
338,000	*59*	*Weighted Average*

DA-2 (LOWER WATERSHED)

Area (sf)	*CN*	*Description*
3,251,865	55	Woods, Good, HSG B
7,207,707	70	Woods, Good, HSG C
3,086,142	77	Woods, Good, HSG D
13,545,714	*68*	*Weighted Average*

CULVERT ROAD CROSSINGS

DA-1 (UPPER WATERSHED)

25-year Storm Event Peak Discharge = 20.38 cfs
36" Corrugated Culvert @ 0.02 ft/ft slope
50 feet in length and embedded 12" below existing invert

DA-4 (MIDDLE WATERSHED)

25-year Storm Event Peak Discharge = 14.55 cfs
24" Corrugated Culvert @ 0.025 ft/ft slope
40 feet in length and embedded 6" below existing invert

DA-2 (LOWER WATERSHED)

25-year Storm Event Peak Discharge = 396.14 cfs
48" high by 88" wide Bottomless Arch Culvert @ 0.01 ft/ft slope
40 feet in length on footing per manufacture specifications

DRAINAGE AREA WATERSHED MAP

FLORIDA TOWER PARTNERS - WOODSTOCK Site ID: CT1182

Route 198 — Woodstock, CT 06282

BASEMAPPING PREPARED FROM INFORMATION OBTAINED AT A SITE WALK BY INFINIGY ENGINEERING ON 06/09/10, AND INFORMATION PROVIDED BY NORTH ATLANTIC TOWERS AND AN ACTUAL FIELD SURVEY BY VS LAND DATA WAS DONE ON 9/20/10.

Designed by:	JWC
Checked by:	MBT
Scale:	1" = 300'
Date:	2011-09-19
North:	As Shown
Project #:	226-056

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