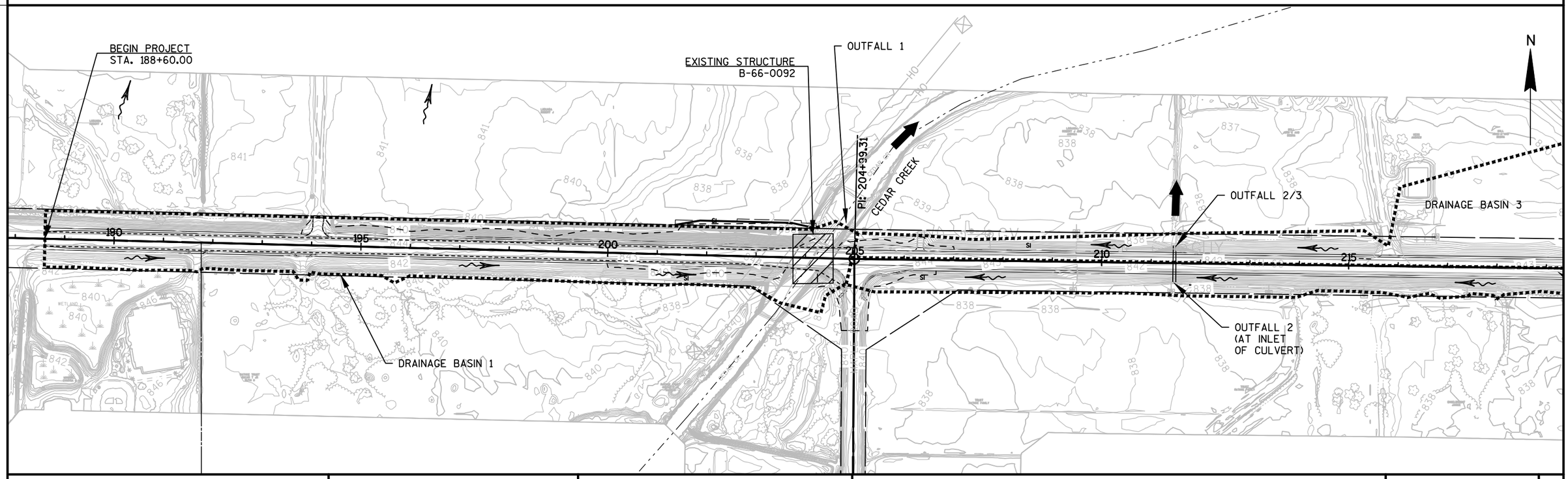
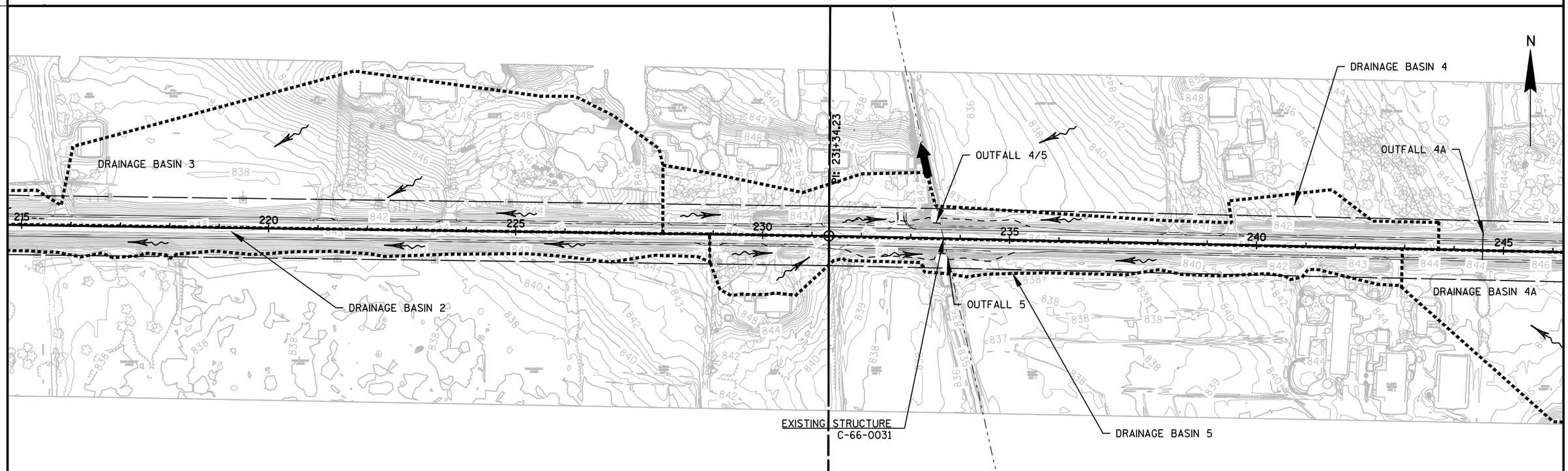
OUTFALL	1	2	2/3
PROPOSED OUTFALL STATION (APPROX.)	204+00	211+50	211+50
PROPOSED STATIONS (APPROX.)	188+60 TO 205+00	205+00 TO 228+93	205+00 TO 228+93
EXISTING DRAINAGE AREA (AC) (APPROX.)	4.49	3.15	11.6
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/CULVERT	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/CULVERT	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH
EXISTING OUTFALL STATION (APPROX.)	204+00	211+50	211+50
EXISTING STATIONS (APPROX.)	188+60 TO 205+00	205+00 TO 228+93	205+00 TO 228+93
PROPOSED LENGTH (FT) (APPROX.)	1640	2393	2393
EXISTING LENGTH (FT) (APPROX.)	1640	2393	2393
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 1 OF 13	E

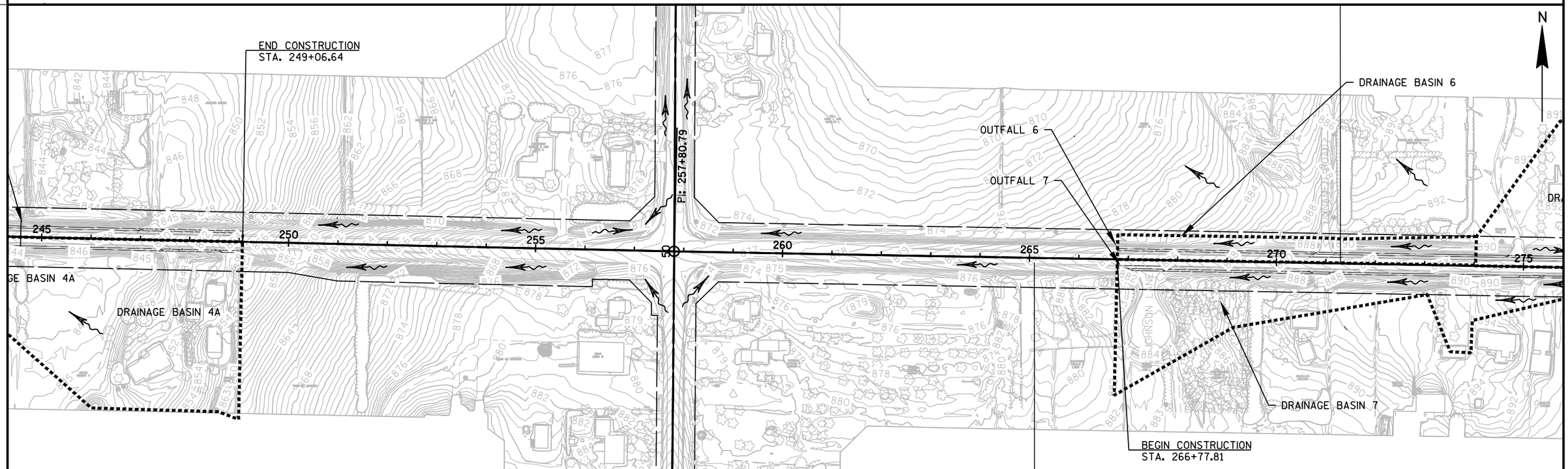
OUTFALL	4/5	4A	5
PROPOSED OUTFALL STATION (APPROX.)	233+53	244+50	233+53
PROPOSED STATIONS (APPROX.)	228+00 TO 243+70	243+00 TO 249+00	228+93 TO 243+00
EXISTING DRAINAGE AREA (AC) (APPROX.)	5.27	3.87	2.27
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	OVERLAND/PAVEMENT RUNOFF/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	OVERLAND/PAVEMENT RUNOFF/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING OUTFALL STATION (APPROX.)	233+53	244+50	233+53
EXISTING STATIONS (APPROX.)	227+98 TO 243+70	243+00 TO 249+00	228+93 TO 243+00
PROPOSED LENGTH (FT) (APPROX.)	1570	600	1407
EXISTING LENGTH (FT) (APPROX.)	1570	600	1407
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 2 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 2
PLOT DATE : 9/15/2016 9:00 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

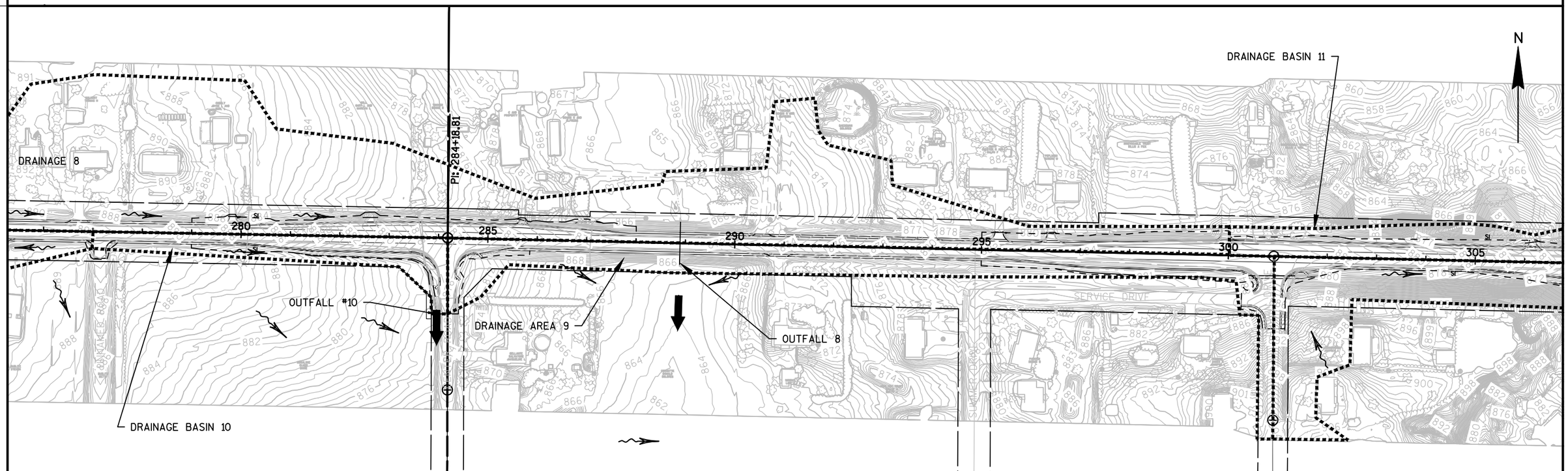
OUTFALL	6	7
PROPOSED OUTFALL STATION (APPROX.)	266+78	266+78
PROPOSED STATIONS (APPROX.)	266+78 TO 274+00	266+78 TO 277+00
EXISTING DRAINAGE AREA (AC) (APPROX.)	0.85	2.8
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH
EXISTING OUTFALL STATION (APPROX.)	266+78	266+78
EXISTING STATIONS (APPROX.)	266+78 TO 274+00	266+78 TO 277+00
PROPOSED LENGTH (FT) (APPROX.)	722	1022
EXISTING LENGTH (FT) (APPROX.)	722	1022
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES	
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES	



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 3 OF 13

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 3
PLOT DATE : 9/15/2016 9:00 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

OUTFALL	8	9	10
PROPOSED OUTFALL STATION (APPROX.)	288+98	288+98	283+53
PROPOSED STATIONS (APPROX.)	274+00 TO 300+01	284+20 TO 300+93	277+00 TO 284+20
EXISTING DRAINAGE AREA (AC) (APPROX.)	9.98	2.54	0.92
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH
EXISTING OUTFALL STATION (APPROX.)	288+98	288+98	283+97
EXISTING STATIONS (APPROX.)	274+00 TO 300+01	284+20 TO 300+93	277+00 TO 284+00
PROPOSED LENGTH (FT) (APPROX.)	2601	1673	720
EXISTING LENGTH (FT) (APPROX.)	2601	1673	720
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		

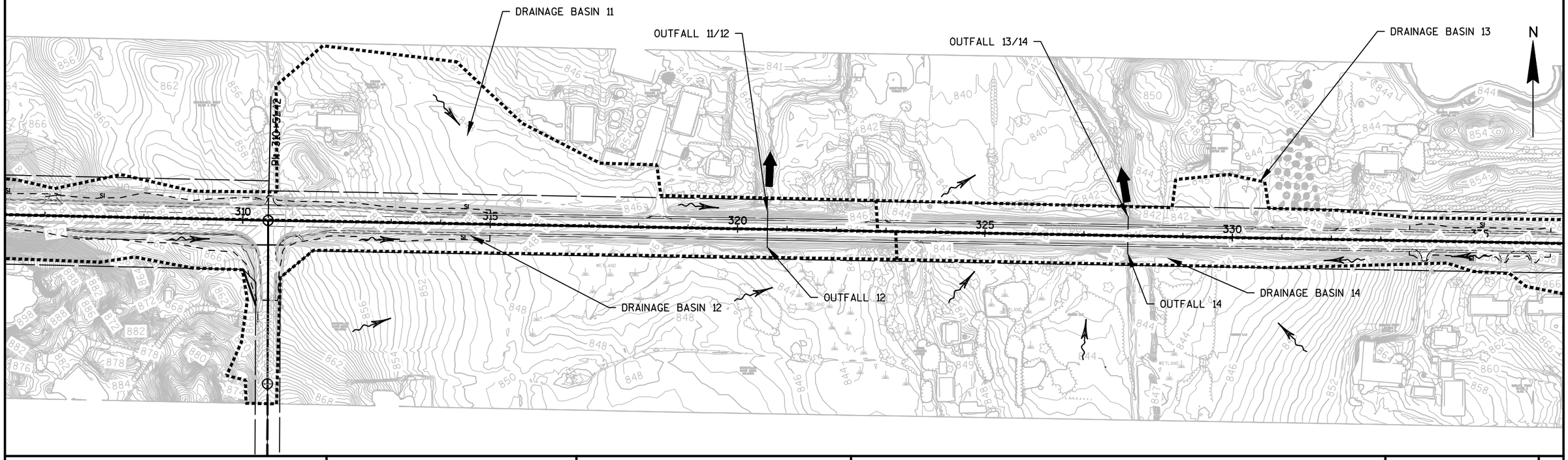


PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 4 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 4
PLOT DATE : 9/15/2016 9:01 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT

OUTFALL	11/12	12	13/14	
PROPOSED OUTFALL STATION (APPROX.)	320+61	320+61	327+65	
PROPOSED STATIONS (APPROX.)	300+01 TO 323+19	300+93 TO 323+19	322+83 TO 350+38	
EXISTING DRAINAGE AREA (AC) (APPROX.)	11.78	5.06	9.16	
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	
EXISTING OUTFALL STATION (APPROX.)	320+61	320+61	327+65	
EXISTING STATIONS (APPROX.)	300+01 TO 323+19	300+93 TO 323+19	322+83 TO 350+38	
PROPOSED LENGTH (FT) (APPROX.)	2318	2226	2755	
EXISTING LENGTH (FT) (APPROX.)	2318	2226	2755	
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			

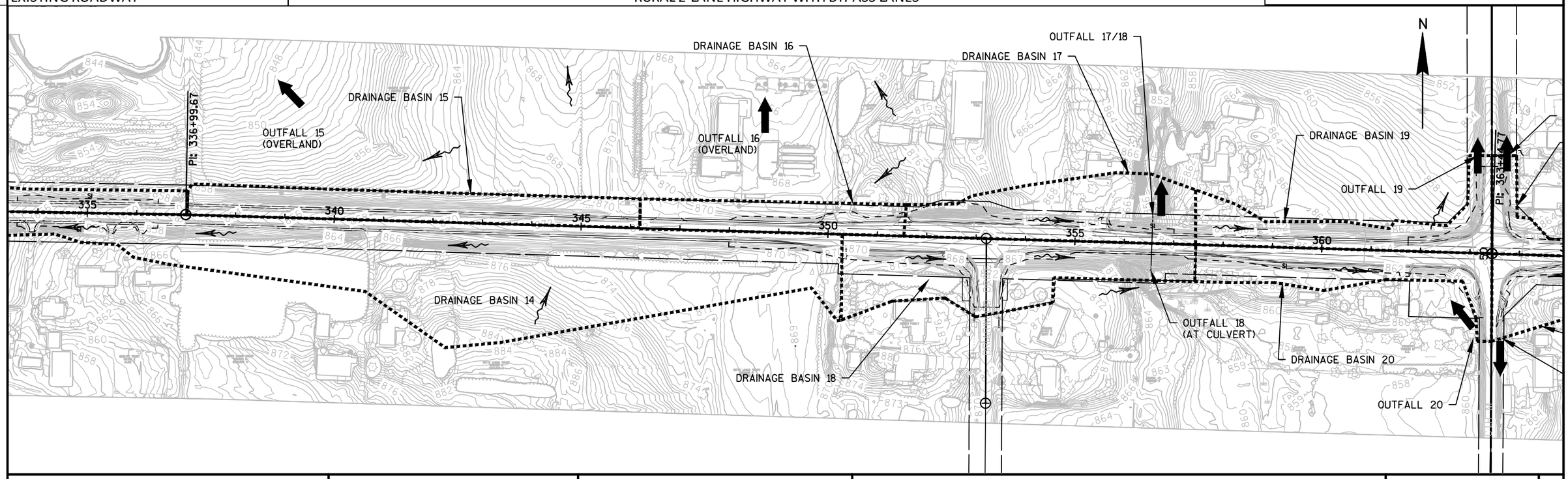
OUTFALL	14
PROPOSED OUTFALL STATION (APPROX.)	327+65
PROPOSED STATIONS (APPROX.)	323+19 TO 350+38
EXISTING DRAINAGE AREA (AC) (APPROX.)	7.06
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/CULVERT
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/CULVERT
EXISTING OUTFALL STATION (APPROX.)	327+65
EXISTING STATIONS (APPROX.)	323+19 TO 350+38
PROPOSED LENGTH (FT) (APPROX.)	2719
EXISTING LENGTH (FT) (APPROX.)	2719
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 5 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 5
PLOT DATE : 9/15/2016 9:12 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

OUTFALL	15	16	17/18	
PROPOSED OUTFALL STATION (APPROX.)	OVERLAND	OVERLAND	356+55	
PROPOSED STATIONS (APPROX.)	337+02 TO 347+19	347+19 TO 351+53	350+28 TO 357+44	
EXISTING DRAINAGE AREA (AC) (APPROX.)	1.27	0.76	3.36	
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF	OVERLAND/PAVEMENT RUNOFF	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF	OVERLAND/PAVEMENT RUNOFF	OVERLAND/PAVEMENT RUNOFF/CULVERT/DITCH	
EXISTING OUTFALL STATION (APPROX.)	OVERLAND	OVERLAND	356+55	
EXISTING STATIONS (APPROX.)	337+02 TO 347+19	347+19 TO 351+53	350+28 TO 357+44	
PROPOSED LENGTH (FT) (APPROX.)	1017	434	716	
EXISTING LENGTH (FT) (APPROX.)	1017	434	716	
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			
OUTFALL	18	19	20	
PROPOSED OUTFALL STATION (APPROX.)	356+55	363+02	363+02	
PROPOSED STATIONS (APPROX.)	350+28 TO 357+40	357+44 TO 363+02	358+29 TO 363+02	
EXISTING DRAINAGE AREA (AC) (APPROX.)	1.89	1.02	1.06	
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH	
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH	
EXISTING OUTFALL STATION (APPROX.)	356+55	363+02	363+02	
EXISTING STATIONS (APPROX.)	350+28 TO 357+40	357+44 TO 363+02	358+29 TO 363+02	
PROPOSED LENGTH (FT) (APPROX.)	712	558	473	
EXISTING LENGTH (FT) (APPROX.)	712	558	473	
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			

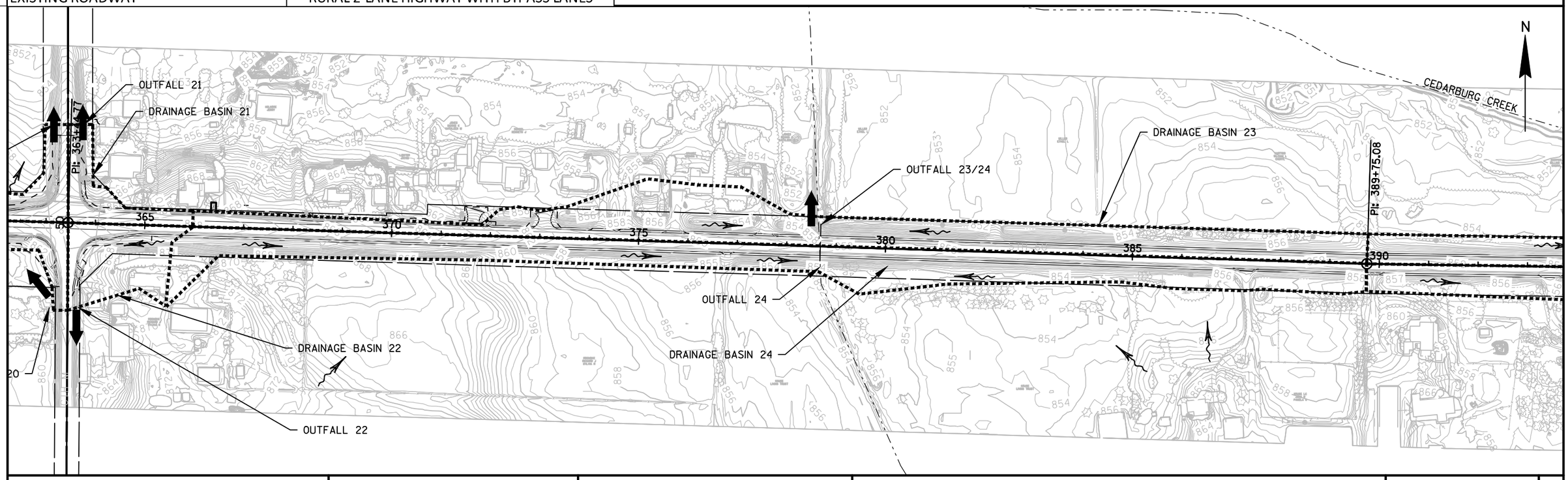


PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 6 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 6
PLOT DATE : 9/15/2016 9:01 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

OUTFALL	21	22	23
PROPOSED OUTFALL STATION (APPROX.)	363+68	363+68	378+47
PROPOSED STATIONS (APPROX.)	363+68 TO 365+99	363+45 TO 365+99	365+99 TO 389+75
EXISTING DRAINAGE AREA (AC) (APPROX.)	0.42	0.74	6.58
PROPOSED CONDITIONS	PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH	PAVEMENT RUNOFF/CULVERT/DITCH
EXISTING CONDITIONS	PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH	PAVEMENT RUNOFF/CULVERT/DITCH
EXISTING OUTFALL STATION (APPROX.)	363+68	363+68	378+47
EXISTING STATIONS (APPROX.)	363+68 TO 365+99	363+45 TO 365+99	365+99 TO 389+75
PROPOSED LENGTH (FT) (APPROX.)	231	254	2376
EXISTING LENGTH (FT) (APPROX.)	231	254	2376
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		

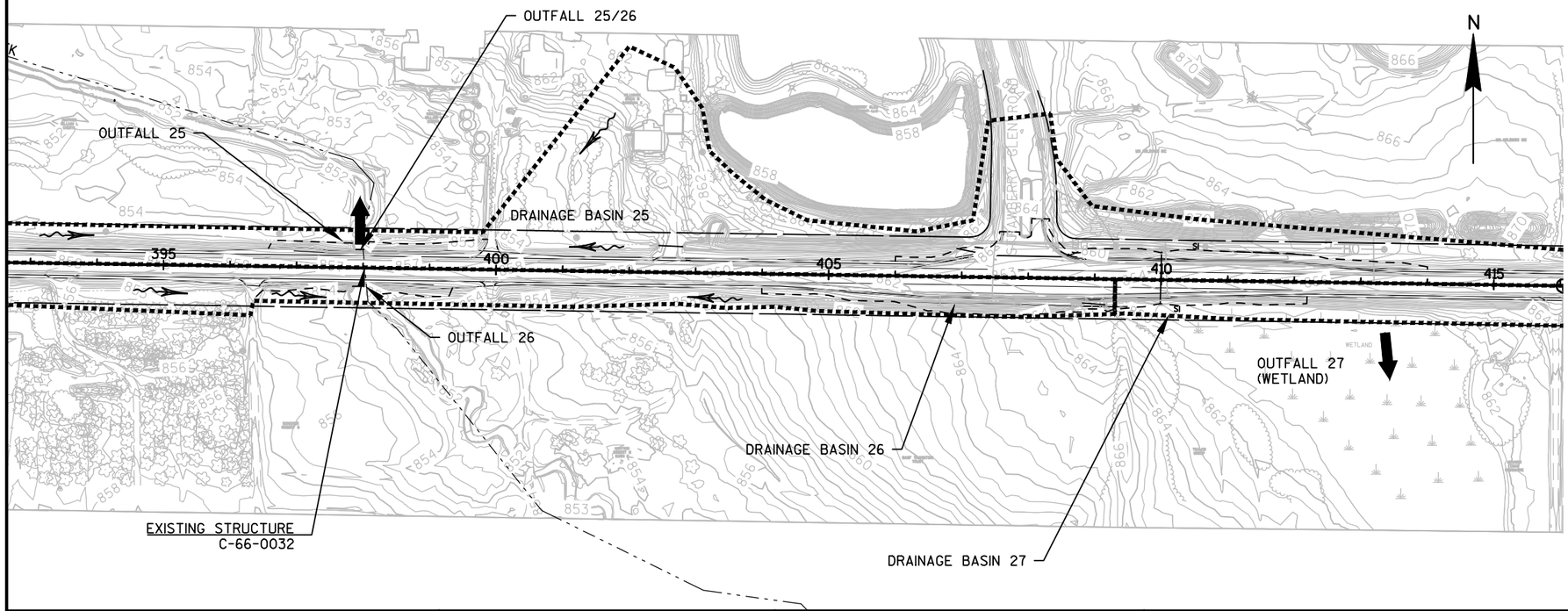
OUTFALL	24
PROPOSED OUTFALL STATION (APPROX.)	378+47
PROPOSED STATIONS (APPROX.)	365+99 TO 389+75
EXISTING DRAINAGE AREA (AC) (APPROX.)	3.3
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING OUTFALL STATION (APPROX.)	378+47
EXISTING STATIONS (APPROX.)	365+99 TO 389+75
PROPOSED LENGTH (FT) (APPROX.)	2376
EXISTING LENGTH (FT) (APPROX.)	2376
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 7 OF 13	E

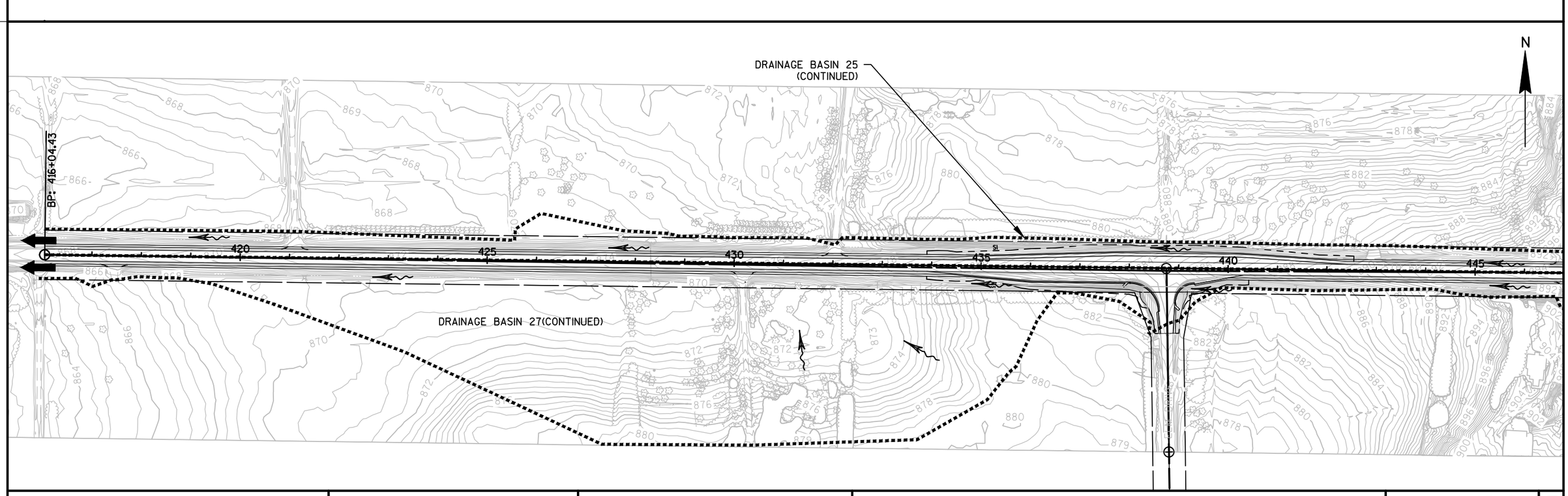
FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 7
PLOT DATE : 9/15/2016 9:01 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

OUTFALL	25/26	26	27
PROPOSED OUTFALL STATION (APPROX.)	397+95	397+95	OVERLAND
PROPOSED STATIONS (APPROX.)	389+75 TO 446+84	389+75 TO 409+31	409+31 TO 446+84
EXISTING DRAINAGE AREA (AC) (APPROX.)	12.7	2.6	13.07
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH/WETLAND
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	OVERLAND/PAVEMENT RUNOFF/DITCH/WETLAND
EXISTING OUTFALL STATION (APPROX.)	397+95	397+95	OVERLAND
EXISTING STATIONS (APPROX.)	389+75 TO 446+84	389+75 TO 409+31	409+31 TO 446+84
PROPOSED LENGTH (FT) (APPROX.)	5709	1956	3753
EXISTING LENGTH (FT) (APPROX.)	5709	1956	3753
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 8 OF 13

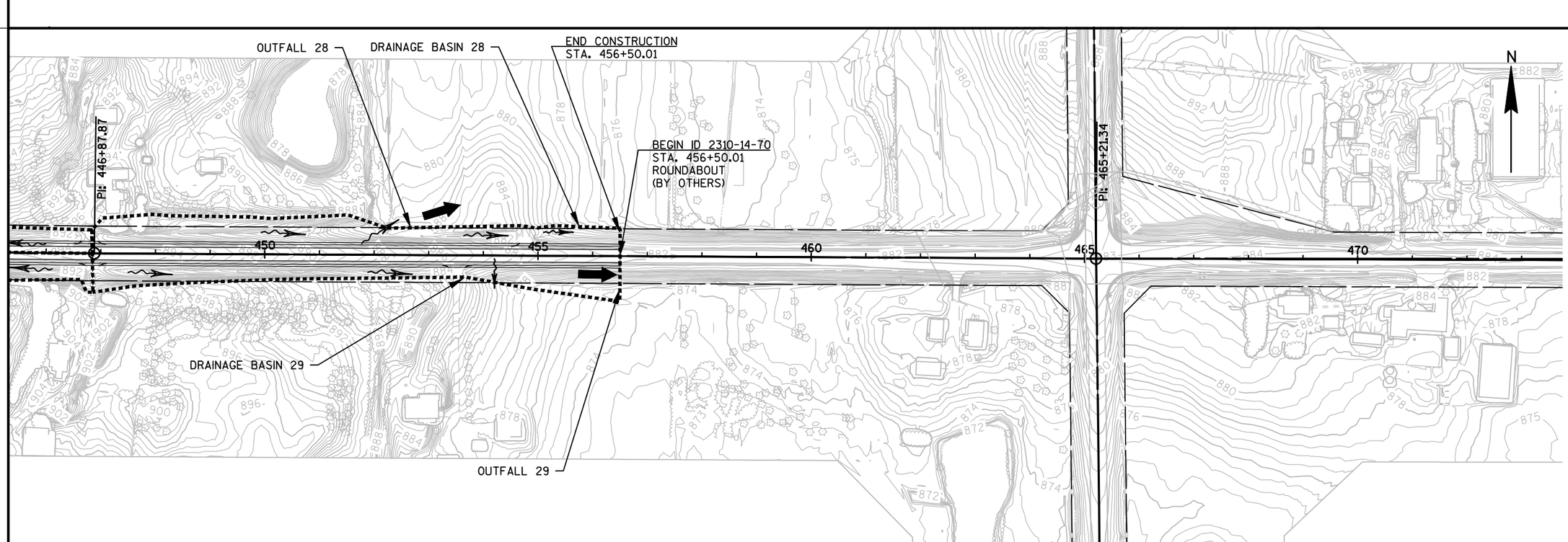
2



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW W/CONTOURS	SHEET 9 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 9
PLOT DATE : 9/15/2016 9:02 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

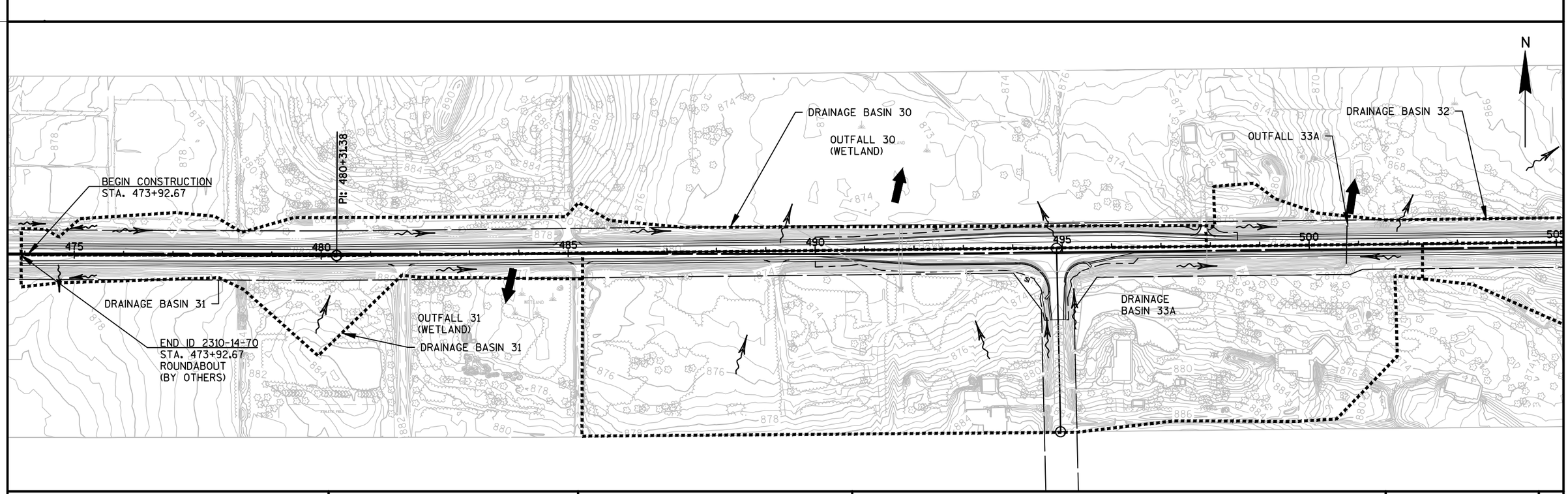
OUTFALL	28	29
PROPOSED OUTFALL STATION (APPROX.)	452+40	456+50
PROPOSED STATIONS (APPROX.)	446+84 TO 456+50	446+84 TO 456+50
EXISTING DRAINAGE AREA (AC) (APPROX.)	1.33	1.33
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH
EXISTING OUTFALL STATION (APPROX.)	452+40	456+50
EXISTING STATIONS (APPROX.)	446+84 TO 456+50	446+84 TO 456+50
PROPOSED LENGTH (FT) (APPROX.)	966	966
EXISTING LENGTH (FT) (APPROX.)	966	966
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES	
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES	



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 10 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 10
PLOT DATE : 9/15/2016 9:02 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

OUTFALL	30	31	33A
PROPOSED OUTFALL STATION (APPROX.)	OVERLAND	483+87	500+76
PROPOSED STATIONS (APPROX.)	474+06 TO 497+91	474+06 TO 485+30	485+30 TO 502+29
EXISTING DRAINAGE AREA (AC) (APPROX.)	3.3	1.88	13.74
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/OVERLAND	OVERLAND/PAVEMENT RUNOFF/DITCH/WETLAND	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/OVERLAND	OVERLAND/PAVEMENT RUNOFF/DITCH/WETLAND	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING OUTFALL STATION (APPROX.)	OVERLAND	483+87	500+76
EXISTING STATIONS (APPROX.)	474+06 TO 497+91	474+06 TO 485+30	485+30 TO 502+29
PROPOSED LENGTH (FT) (APPROX.)	2385	1124	1699
EXISTING LENGTH (FT) (APPROX.)	2385	1124	1699
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES		

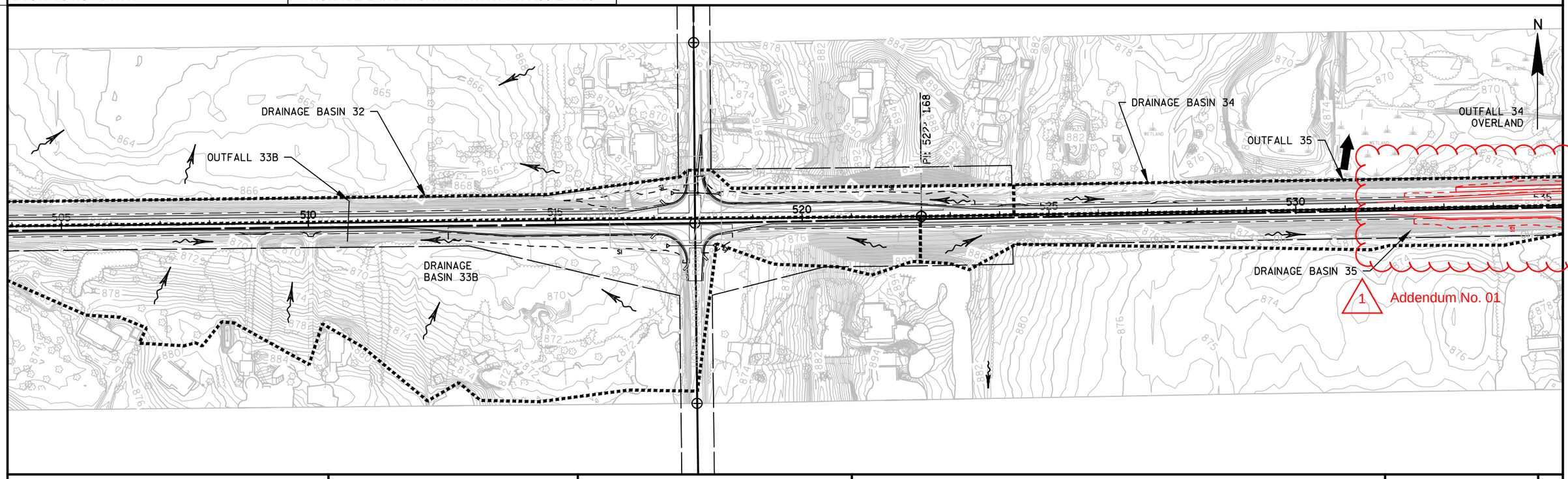


PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 11 OF 13	E

FILE NAME : G:\6906 STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 11
PLOT DATE : 9/15/2016 9:02 AM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

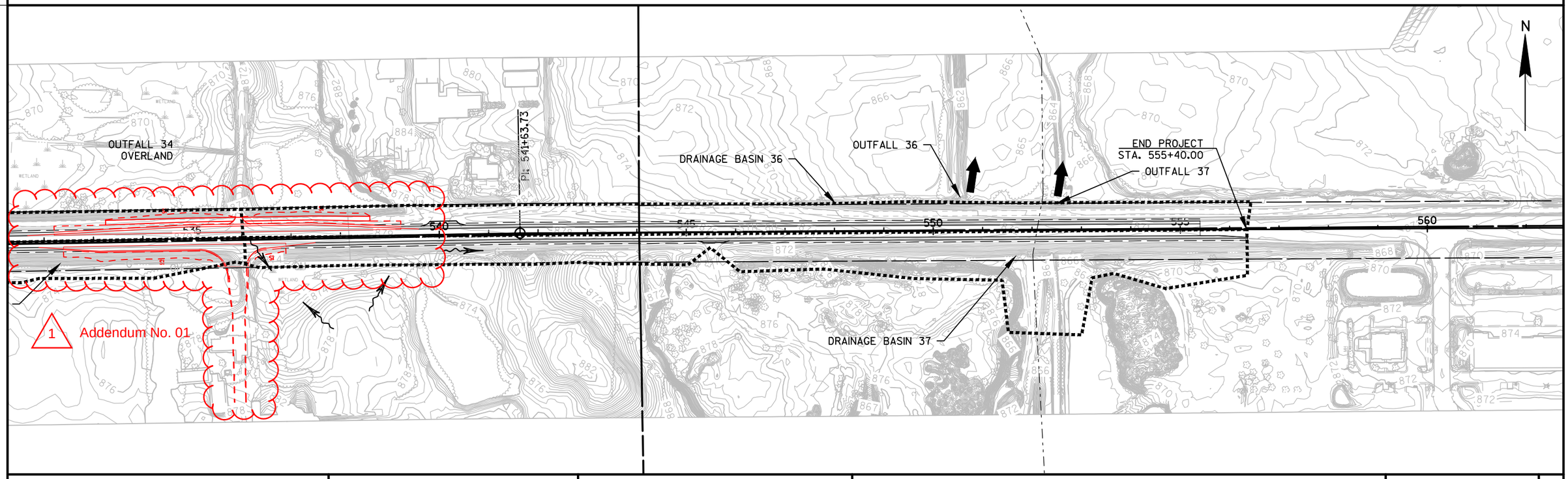
OUTFALL	32	33B	34	
PROPOSED OUTFALL STATION (APPROX.)	510+83	510+83	OVERLAND	
PROPOSED STATIONS (APPROX.)	497+91 TO 524+28	502+29 TO 522+39	524+28 TO 536+00	
EXISTING DRAINAGE AREA (AC) (APPROX.)	3.68	10.18	1.61	
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	PAVEMENT/WETLAND/OVERLAND	
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT	PAVEMENT/WETLAND/OVERLAND	
EXISTING OUTFALL STATION (APPROX.)	510+83	510+83	536+00	
EXISTING STATIONS (APPROX.)	497+91 TO 524+28	502+29 TO 522+39	524+28 TO 536+00	
PROPOSED LENGTH (FT) (APPROX.)	2637	2010	1171	
EXISTING LENGTH (FT) (APPROX.)	2637	2010	1171	
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES			

OUTFALL	35
PROPOSED OUTFALL STATION (APPROX.)	530+97
PROPOSED STATIONS (APPROX.)	522+39 TO 536+00
EXISTING DRAINAGE AREA (AC) (APPROX.)	2.31
PROPOSED CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING CONDITIONS	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING OUTFALL STATION (APPROX.)	530+97
EXISTING STATIONS (APPROX.)	522+39 TO 536+00
PROPOSED LENGTH (FT) (APPROX.)	1361
EXISTING LENGTH (FT) (APPROX.)	1361
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 12 OF 13

OUTFALL	36	37
PROPOSED OUTFALL STATION (APPROX.)	550+50	552+45
PROPOSED STATIONS (APPROX.)	536+00 TO 555+40	536+00 TO 555+40
EXISTING DRAINAGE AREA (AC) (APPROX.)	2.58	3.92
PROPOSED CONDITIONS	PAVEMENT RUNOFF/DITCH/OVERLAND	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING CONDITIONS	PAVEMENT RUNOFF/DITCH/OVERLAND	OVERLAND/PAVEMENT RUNOFF/DITCH/CULVERT
EXISTING OUTFALL STATION (APPROX.)	550+50	552+45
EXISTING STATIONS (APPROX.)	536+00 TO 555+40	536+00 TO 555+40
PROPOSED LENGTH (FT) (APPROX.)	1940	1940
EXISTING LENGTH (FT) (APPROX.)	1940	1940
PROPOSED ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES	
EXISTING ROADWAY	RURAL 2-LANE HIGHWAY WITH BYPASS LANES	



PROJECT NO: 2310-17-00	HWY: STH 60	COUNTY: WASHINGTON & OZAUKEE	PROJECT OVERVIEW - W/CONTOURS	SHEET 13 OF 13	E

FILE NAME : G:\6906 - STH 60\CAD\23101700\SHEETSOTHER\20141223 - DRAINAGE AREA\DRAINAGE BASIN OVERVIEW - WITH CONTOURS.DWG
LAYOUT NAME - DRAINAGE BASIN OVERVIEW - WITH CONTOURS - 13
PLOT DATE : 11/21/2019 1:23 PM PLOT BY : KEVIN WEIGHNER PLOT NAME : PLOT SCALE : 1 IN:200 FT
WISDOT/CADDS SHEET 44

Basic Project Information

Project ID: 2310-17-00
Title: STH 60 - Eagle Drive to STH 181
Designer/Checker: JP/RT
DOT Region/Firm Name: SE/COLLINS ENGINEERS, INC.
Date: 3/5/2015 Updated 11/26/2019

HIGHWAY:	STH 60
LIMITS:	EAGLE DRIVE TO STH 181
COUNTY:	WASHINGTON & OZAUKEE
DESCRIPTION OF WORK:	RESURFACING AND INTERSECTION IMPROVEMENTS
PROJECT MANAGER:	NGUYEN LY
PS&E DATE:	1-Aug-19
DESIGN STAGE	☐ **Planning** ☐ **30%** ☐ **60%** ☐ **90%** ☑ **Final**

Drainage Summary

IS THERE A SIGNIFICANT FLOW INCREASE OR DECREASE WITHIN ANY SUB BASIN OF THE PROJECT? IF YES, DESCRIBE THE CAUSE OF THE CHANGE AND WHY IT IS NECESSARY.

Outfalls 1, 2, 3, 4, 4A, 5, 6, 7, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33A, 33B, 2/3, 4/5, 13/14, and 23/24 have an increase of flow from the entire subbasin area of 5% or less. The increase in these basins is minimal and will no adverse impact to the surrounding areas since the existing ditch, culvert, or overland drainage pattern is not changing as a result of the project improvements. In addition, existing culverts and ditches have been anlyzed to shown no significant increase in headwater in the proposed condition. Drainage Basin 8 has an increase in runoff (7%) due to multiple intersections wihtin the drainage basin. This increase will have no impact as the existing ditch and culvert have been determined to handle the additional capacity. Water beyond the R/W north of Drainage Basin 8 will pond and be contained on private property in minor rain events, but has the potential to overtop a farm access road during larger rain events and reach the R/W ditch. Drainage Basin "8 (Off-Site)" was created to model the event in which the off-site water reaches the R/W ditch. The existing ditch north of STH 60 will be widened to accomodate the potential for additional runoff from off-site. Drainage basin 9 includes intersection improvements with a new ditchline proposed at the intersection and where the majority of the increased impervious area occurs. This new ditch section will deter the peak runoff within the drainage basin. A new ditch and culvert is proposed to control in the increase in peak runoff at Outall 10. The increase runoff in drainage basin 11 will be maintained within the existing roadside ditch. Outfall 18, and 26 occur at existing culverts and have been analyzed to show no significant increase in headwater in the improved condition. Outalls 34 (9% increase) and 36 (10% increase) both sheet flow into large flat wetland areas. No significant change to water surface elevations is anticipated as a result of the increases. Outfalls 35 (11% increase) and 37 (6% increase) both flow into 30" diameter culverts. No significant change to headwater elevation will occur as a result of the increases. Combined outfalls have been analyzed for 11/12 (7% increase), 17/18 (14% increase), and 25/26 (6% increase). 11/12, 17/18, and 25/26 all flow into well defined ditches and will still be maintained within the existing ditch. Furthermore, change in 50-yr storm peak flow for all three combined outfalls is approximately 1 cfs at each location, resulting in no major impacts.

1 Addendum No. 01

IS THERE A SIGNIFICANT IMPERVIOUS AREA CHANGE TO ANY SUB BASIN OF THE PROJECT? IF YES, DESCRIBE THE CAUSE OF THE CHANGE AND WHY IT IS NECESSARY.

No. The scope of the project included widening the asphalt shoulder from 3' to 6' for bicycle accomodations. The right turn and bypass lanes are being widened at the intersections to the latest standards to meet safety and traffic conditions of the roadway.

HAVE THE DRAINAGE SUB BASIN AREAS OR FLOW PATHS CHANGED SIGNIFICANTLY? IF YES, DESCRIBE THE CAUSE OF THE CHANGE AND WHY IT IS NECESSARY.

No. Drainage flow paths remain consistent with existing conditions.

DESCRIBE THE PROPOSED DRAINAGE CONVEYANCE AND CONTROL SYSTEMS FOR THE PROJECT.

The proposed drainage conveyance follows the existing conveyance of roadside ditches and culvert crossings with new intersection culverts where necessary to meet slope intercept and ditch flow lines.

DESCRIBE THE AQUATIC ORGANISM PASSAGE ISSUES FOR THE PROJECT, IF ANY.

N/A.

IF THE DESIGN DOES NOT MEET THE DOT FDM CHAPTER 13 DRAINAGE REQUIREMENTS, EXPLAIN HOW AND WHY.

N/A.

DESCRIBE WDNR COORDINATION. PROVIDE NAME OF WDNR CONTACT AND DATE, AND ATTACH ANY CORRESPONDENCE.

Kristina Betzold, WDNR initial letter of concurrence April 16, 2012. A copy of the letter is attached.

IF THE DRAINAGE DESIGN MEETS LOCAL, MUNICIPAL OR REGIONAL GUIDELINES THAT EXCEED FDM CHAPTER 13 DRAINAGE REQUIREMENTS, EXPLAIN HOW AND WHY.

N/A.

IF A SIGNIFICANT IMPACT TO THE PROJECT OCCURS DUE TO DRAINAGE, PROJECT MANAGER CONCURRENCE IS REQUIRED. (PM SIGN AND DATE)

Drainage Data

Project ID: 2310-17-00
Title: STH 60 - Eagle Drive to STH 181
Designer/Checker: JP/RT
DOT Region/Firm Name:
Date: 3/5/2015 Updated 11/26/2019

OUTFALL INFORMATION

Outfall number	1	2	3	4	4A	5	6	7	8	8 (Off-Site)	9	10	11	12
Outfall discharges to:	Creek	Creek	Creek	Creek	Ditch	Creek	Ditch	Ditch	Overland	Overland	Ditch	Ditch	Ditch	Overland
Waterway crossing type		Culvert			Culvert	Culvert			Culvert	Culvert				Culvert
If discharging to environmentally sensitive area, what kinds of buffers were used at outfall?														
Previous flooding issues or flow restrictions?	No	No See Note 3	No	No	No	No	No	No	No	No	No	No	No	No
Is the drainageway in the DOT ROW a navigable waterway?	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Classify the drainageway in the DOT ROW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

BASIC SUB BASIN DRAINAGE INFORMATION

Outfall number	1	2	3	4	4A	5	6	7	8	8 (Off-Site)	9	10	11	12
Stormwater conveyance type	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale
Outfall station	204+00	211+50	211+50	233+53	244+50	233+53	266+78	266+78	288+98	288+98	288+98	283+53	320+61	320+61
Subbasin starting station	188+60	205+00	205+00	228+00	243+00	228+93	266+78	266+78	274+00	274+00	284+20	277+00	300+01	300+93
Subbasin ending station	205+00	228+93	228+00	243+70	249+00	243+00	274+00	277+00	300+01	300+01	300+93	284+20	322+83	323+19
Proposed roadway length (ft)	1640	2393	2300	1570	600	1407	722	1022	2601	2601	1673	720	2282	2226
Flow conveyance change	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Flood design frequency (yrs)	25	50	25	25	50	50	25	25	50	50	25	25	25	50
Check design frequency (yrs)	50	100	50	50	100	100	50	50	100	100	50	50	50	100
Is the check design storm safely passed?	Yes See Note 2	Yes	Yes See Note 2	Yes See Note 2	Yes	Yes	Yes See Note 2	Yes See Note 2	Yes	Yes	Yes See Note 2	Yes See Note 2	Yes See Note 2	Yes
DOT right-of-way area (acres)	4.49	3.15	3.16	2.16	0.83	1.93	0.85	1.4	3.39	3.39	2.49	0.92	3.18	4.37
Subbasin drainage area (acres)	4.49	3.15	8.45	3	3.87	2.27	0.85	2.8	9.98	25.84	2.54	0.92	6.72	5.06
DOT right-of-way compared to subbasin drainage area (%)	100%	100%	3%	72%	21%	85%	100%	50%	34%	13%	98%	100%	47%	86%
DOT impervious area - existing (acres)	1.38	0.82	0.79	0.72	0.72	0.69	0.25	0.57	1.05	1.05	0.75	0.35	0.90	1.10
DOT impervious area - proposed (acres)	1.74	0.98	0.95	0.87	0.87	0.83	0.30	0.64	1.40	1.40	1.00	0.45	1.20	1.38
Change in impervious area (acres)	0.36	0.16	0.16	0.15	0.15	0.14	0.05	0.07	0.35	0.35	0.25	0.10	0.30	0.28
Percent change in DOT impervious area	26%	20%	20%	21%	21%	20%	20%	12%	33%	33%	33%	29%	33%	25%
Design software used														
Method used to estimate peak flows	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational
Complete lines 36-46 for culverts only														
Existing peak flow (cfs)	8.17	5.61	6.25	5.54	5.88	4.23	2.24	5.64	9.78	19.90	5.72	2.85	7.98	9.19
Proposed peak flow (cfs) (before detention)	8.51	5.74	6.25	5.72	6.07	4.38	2.33	5.80	10.48	20.80	6.48	3.17	8.75	9.67
Proposed peak flow (cfs) (after detention/in-line storage/other)	8.51	5.74	6.25	5.72	6.07	4.38	2.33	5.80	10.48	20.80	6.48	3.17	8.75	9.67
Change in peak flow (cfs)	0.35	0.14	0	0.18	0.18963	0.15	0.10	0.16	0.70	0.90	0.76	0.32	0.77	0.48
Percent change in peak flow	4%	2%	0%	3%	3%	3%	4%	3%	7%	5%	13%	11%	10%	5%
Existing 2-yr peak flow (cfs)	4.22	2.58	3.20	2.87	2.76	2.04	1.18	2.98	4.89	9.95	3.14	1.48	4.12	4.31
Proposed 2-yr peak flow (cfs) (before detention)	4.40	2.65	3.20	2.97	2.85	2.11	1.23	3.07	5.24	10.40	3.56	1.65	4.52	4.53
Proposed 2-yr peak flow (cfs) (after detention/in-line storage/other)	4.40	2.65	3.20	2.97	2.85	2.11	1.23	3.07	5.24	10.40	3.56	1.65	4.52	4.53
Change in 2-yr peak flow (cfs)	0.18	0.06	0.00	0.09	0.09	0.07	0.05	0.08	0.35	0.45	0.42	0.17	0.40	0.23
Percent change in 2-yr peak flow	4%	2%	0%	3%	3%	3%	4%	3%	7%	5%	13%	11%	10%	5%
Existing Tc (min)	25	25	40	10	20	10	12	12	20	20	15	11	26	21
Proposed Tc (min)	25	25	40	10	20	10	12	12	20	20	15	11	26	21
C or CN (existing)	0.47	0.41	0.24	0.31	0.31	0.29	0.47	0.36	0.28	0.22	0.45	0.53	0.31	0.38

Drainage Data

Project ID:	**2310-17-00**
Title:	**STH 60 - Eagle Drive to STH 181**
Designer/Checker:	**JP/RT**
DOT Region/Firm Name:	
Date:	**3/5/2015 Updated 11/26/2019**

C or CN (proposed)	0.49	0.42	0.24	0.32	0.32	0.3	0.49	0.37	0.3	0.23	0.51	0.59	0.34	0.4
Rainfall intensity (in/hr) (rational method only)	3.87	4.34	3.08	5.96	4.9	6.43	5.6	5.6	3.5	3.5	5	5.84	3.83	4.78
Rainfall depth used for design storm, if applicable (in)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CULVERT DESIGN

Existing Culvert

Outfall number	**1**	**2**	**3**	**4**	**4A**	**5**	**6**	**7**	**8**	**8 (Off-Site)**	**9**	**10**	**11**	**12**
Culvert present? (Yes or No)	No	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes
Existing culvert shape		Circular			Circular	Box			Circular	Circular				Circular
Existing culvert material		RCP			RCP	RC			RCP	RCP				RCP
Existing culvert size (ft)		3			2.5	8X6			2	2				3
Existing number of culverts		2			1	2			1	1				1
Existing Manning's n		0.013			0.013	0.013			0.013	0.013				0.013
Inlet entrance type		AEW			AEW	Miter to Slope			AEW	AEW				AEW
Inlet loss coefficient (Ke)		0.5			0.5	0.2			0.5	0.5				0.5
Upstream invert (ft)		835.87			841.47	834.45			864.16	864.16				841.21
Downstream invert (ft)		835.74			841.45	833.81			863.8	863.8				840.42
Length (ft)		72.4			63.6	64			85.9	85.9				72.9
Slope (%)	#DIV/0!	0.18%	#DIV/0!	#DIV/0!	0.03%	1.00%	#DIV/0!	#DIV/0!	0.42%	0.42%	#DIV/0!	#DIV/0!	#DIV/0!	1.08%
Floodplain Management														
Is culvert in a mapped floodplain?		Yes			No	No			No	No				No
Will proposed culvert increase water surface profile?		No			Yes See Note 1	No			Yes See Note 1	Yes See Note 1				Yes See Note 1
Drainage District Issues														
Is culvert in a drainage district?		Yes			No	No			No	No				No
Drainage District Name		Jackson-Germantown												
Will proposed culvert raise the culvert invert or increase water surface profile?		No			Yes See Note 1	No			Yes See Note 1	Yes See Note 1				Yes See Note 1
Has drainage board approved increases?														
Aquatic Organism Passage														
Is aquatic organism passage a concern?		No			No	No			No	No				No
Does WDNR agree with AOP design?		Exist to Remain			Exist to Remain	Exist to Remain			Exist to Remain	Exist to Remain				Exist to Remain
Proposed Culvert Design														
Design ADT		>7500			>7500	>7500			>7500	>7500				>7500
Design flow		5.74			6.07	4.38			10.48	20.80				9.67
Design year frequency		50			50	50			50	50				50
Hydrological method used		Rational			Rational	Rational			Rational	Rational				Rational
Assumed tailwater condition		None			None	None			None	None				None
Maximum allowable headwater														
Maximum allowable headwater design criteria	DDMenu	Top of Subgrade	DDMenu	DDMenu	Top of Subgrade	Top of Subgrade	DDMenu	DDMenu	Top of Subgrade	Top of Subgrade	DDMenu	DDMenu	DDMenu	Top of Subgrade
Proposed culvert shape		Circular	DD Menu	DD Menu	Circular	Box	DD Menu	DD Menu	Circular	Circular		DD Menu	DD Menu	Circular
Proposed culvert material		RCP	DD Menu	DD Menu	RCP	RC	DD Menu	DD Menu	RCP	RCP	RCP	DD Menu	DD Menu	RCP
Proposed culvert size		3			2.5	8X6			2	2				3
Proposed number of culverts		2			1	2			1	1				1
Manning's n		0.013			0.013	0.013			0.013	0.013				0.013
Type of endwalls		AEW	DD Menu	DD Menu	AEW	Miter to Slope	DD Menu	DD Menu	AEW	AEW		DD Menu	DD Menu	AEW

Drainage Data

Project ID: 2310-17-00
Title: STH 60 - Eagle Drive to STH 181
Designer/Checker: JP/RT
DOT Region/Firm Name:
Date: 3/5/2015 Updated 11/26/2019

Inlet loss coefficient (Ke)		0.5			0.5	0.2			0.5	0.5				0.5
Proposed upstream invert (ft)		835.87			841.47	834.45			864.16	864.16				841.21
Proposed downstream invert (ft)		835.74			841.45	833.81			863.8	863.8				840.42
Proposed length (ft)		72.4			63.6	64			85.9	85.9				72.9
Proposed slope (%)	#DIV/0!	0.18%	#DIV/0!	#DIV/0!	0.03%	1.00%	#DIV/0!	#DIV/0!	0.42%		#DIV/0!	#DIV/0!	#DIV/0!	1.08%
Embedment depth (ft)		N/A			N/A	N/A			N/A	N/A				N/A
Embedment material		N/A			N/A	N/A			N/A	N/A				N/A
Discharge velocity (ft/s)		0.65			1.14	0.11			4.13	6.94				1.91
Riprap outfall (Size riprap or None)		None			None	None			None	None				None
Station of lowest subgrade shoulder point in subbasin (0+00)		211+50			249+00	233+53			288+98	288+98				320+61
Elevation of lowest subgrade shoulder point in subbasin (ft)		841.94			846.34	842.63			870.38	870.38				847.29
Headwater distance below subgrade shoulder point (ft)		5.37			3.75	5.75			4.54	3.45				4.75
Headwater to pipe diameter ratio		0.41			0.45	0.4			0.84	1.38				0.44
Design software used		**Hydraflow			Hydraflow	Hydraflow			Hydraflow	Hydraflow				Hydraflow
Proposed tailwater condition		N/A			N/A	N/A			N/A	N/A				N/A
Discharge pipe end submerged?		No			No	No			No	No				No
Assumed tailwater elevation (ft)		835.74			841.45	833.81			863.8	863.8				840.42

Enter Line Number and Note. Add more boxes if necessary

Note 1: Per Hyraflow calculation summary. Water surface increase as follows: 2 - 0.00', 4A - 0.02', 5 - 0.0', 8 - 0.07', 8 (Off-Site) - 0.12', 12 - 0.03', 14 - 0.03', 18 - 0.13', 24 - 0.03', 26 - 0.0', 33A - 0.05', 33B - 0.04', 35 - 0.03', 37 - 0.0'
Note 2: Standard ditch section was evaluated at minimum 1% slope. Two drainage sheds exceeded maximum flow in the minimum slope analysis. Basin 25 contains equivalent drainage shed from east and west and therefore combined flow can be maintained in the existing ditch section either side of the outfall. Basin 33 includes a ditch section near the outfall which exceed 2' in depth and therefore has the additional capacity to handle the increase in peak flow.
Note 3: It was noted in the PIM by adjacent property owner that there is a backup of water in their property (upstream) from this culvert. Department maintenance and inspection reports do not indicate need for repair or replacement. Topo survey identifes the low area is outside the DOT Right of Way and sufficient roadside ditch section is provided directing roadway runoff to the culvert.
**Hydraflow - Civil 3D Add On
Culvert 33 Hw/D ratio exceeds 1.5.
In OPM, Town of Cedarburg indicated a concern with a culvert between Horns Corners and STH 181. They felt it was undersized and therefore the reason for the backup. Per the analysis completed for for two cross culverts at outfall 35 and 37, there does not appear to be a capacity issue in these locations.

Drainage Data

Project ID: 2310-17-00
Title: STH 60 - Eagle Drive to STH 181
Designer/Checker: JP/RT
DOT Region/Firm Name:
Date: 3/5/2015 Updated 11/26/2019

OUTFALL INFORMATION

Outfall number	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Outfall discharges to:	Creek	Creek	Overland	Overland	Creek	Creek	Ditch	Ditch	Ditch	Ditch	Creek	Creek	Creek	Creek
Waterway crossing type		Culvert				Culvert						Culvert		Culvert
If discharging to environmentally sensitive area, what kinds of buffers were used at outfall?														
Previous flooding issues or flow restrictions?	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Is the drainageway in the DOT ROW a navigable waterway?	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Classify the drainageway in the DOT ROW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

BASIC SUB BASIN DRAINAGE INFORMATIO

Outfall number	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Stormwater conveyance type	Ditch/Swale	Ditch/Swale			Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale
Outfall station	327+65	327+65			356+55	356+55	363+02	363+02	363+68	363+68	378+47	378+47	397+95	397+95
Subbasin starting station	322+83	323+19	337+02	347+19	351+53	350+28	357+44	358+29	363+68	363+45	365+99	365+99	389+75	389+75
Subbasin ending station	337+02	350+38	347+19	351+53	357+44	357+40	363+02	363+02	365+99	365+99	389+75	389+75	446+84	409+31
Proposed roadway length (ft)	1419	2719	1017	434	591	712	558	473	231	254	2376	2376	5709	1956
Flow conveyance change	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Flood design frequency (yrs)	25	50	50	50	25	50	25	25	25	25	25	50	25	50
Check design frequency (yrs)	50	100	100	100	50	100	50	50	50	50	50	100	50	100
Is the check design storm safely passed?	Yes See Note 2	Yes See Note 2	N/A	N/A	Yes See Note 2	Yes	Yes See Note 2	Yes See Note 2	Yes See Note 2	Yes See Note 2	Yes See Note 2	Yes	Yes See Note 2	Yes
DOT right-of-way area (acres)	1.85	3.61	1.27	0.74	0.85	1.23	0.96	0.92	0.42	0.42	2.81	3	7.47	2.5
Subbasin drainage area (acres)	2.1	7.06	1.27	0.76	1.47	1.89	1.02	1.06	0.42	0.74	3.28	3.3	10.1	2.6
DOT right-of-way compared to subbasin drainage area (%)	88%	51%	100%	97%	58%	65%	94%	87%	100%	57%	86%	91%	74%	96%
DOT impervious area - existing (acres)	0.49	0.94	0.35	0.28	0.24	0.38	0.34	0.37	0.34	0.17	0.81	0.81	2.30	0.75
DOT impervious area - proposed (acres)	0.59	1.12	0.42	0.31	0.30	0.59	0.37	0.48	0.35	0.52	0.98	0.98	2.80	0.95
Change in impervious area (acres)	0.10	0.18	0.07	0.03	0.06	0.21	0.03	0.11	0.01	0.35	0.17	0.17	0.50	0.20
Percent change in DOT impervious area	20%	19%	20%	11%	25%	55%	9%	30%	3%	206%	21%	21%	22%	27%
Design software used														
Method used to estimate peak flows	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational
Complete lines 36-46 for culverts only														
Existing peak flow (cfs)	4.50	7.45	3.25	2.82	3.41	5.06	2.41	2.84	2.64	2.23	5.90	6.23	13.08	5.40
Proposed peak flow (cfs) (before detention)	4.73	7.71	3.41	2.94	3.51	6.18	2.46	3.12	2.70	2.34	6.19	6.55	13.79	5.78
Proposed peak flow (cfs) (after detention/in-line storage/other)	4.73	7.71	3.41	2.94	3.51	6.18	2.46	3.12	2.70	2.34	6.19	6.55	13.79	5.78
Change in peak flow (cfs)	0.23	0.26	0.15	0.11	0.10	1.12	0.05	0.28	0.06	0.11	0.29	0.32	0.71	0.38
Percent change in peak flow	5%	3%	5%	4%	3%	22%	2%	10%	2%	5%	5%	5%	5%	7%
Existing 2-yr peak flow (cfs)	2.42	3.79	1.59	1.39	1.83	2.33	1.30	1.53	1.45	1.22	3.17	2.92	6.54	2.54
Proposed 2-yr peak flow (cfs) (before detention)	2.54	3.92	1.67	1.45	1.88	2.84	1.33	1.68	1.48	1.28	3.33	3.07	6.89	2.71
Proposed 2-yr peak flow (cfs) (after detention/in-line storage/other)	2.54	3.92	1.67	1.45	1.88	2.84	1.33	1.68	1.48	1.28	3.33	3.07	6.89	2.71
Change in 2-yr peak flow (cfs)	0.12	0.13	0.07	0.06	0.05	0.52	0.03	0.15	0.03	0.06	0.15	0.15	0.35	0.18
Percent change in 2-yr peak flow	5%	3%	5%	4%	3%	22%	2%	10%	2%	5%	5%	5%	5%	7%
Existing Tc (min)	13	28	13	7	7	8	14	13	5	6	19	20	30	20
Proposed Tc (min)	13	28	13	7	7	8	14	13	5	6	19	20	30	20
C or CN (existing)	0.4	0.29	0.43	0.5	0.34	0.36	0.45	0.5	0.84	0.41	0.41	0.39	0.37	0.43

Drainage Data

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C or CN (proposed)	0.42	0.3	0.45	0.52	0.35	0.44	0.46	0.55	0.86	0.43	0.43	0.41	0.39	0.46
Rainfall intensity (in/hr) (rational method only)	5.36	3.64	5.96	7.43	6.82	7.43	5.24	5.36	7.47	7.35	4.39	4.84	3.5	4.83
Rainfall depth used for design storm, if applicable (in)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CULVERT DESIGN

Existing Culvert

Outfall number	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**
Culvert present? (Yes or No)	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No	Yes
Existing culvert shape		Circular		DD Menu		Circular						Circular		Box
Existing culvert material		RCP		DD Menu		RCP						RCP		RC
Existing culvert size (ft)		2				2						3		8X5
Existing number of culverts		1				1						1		2
Existing Manning's n		0.013				0.013						0.013		0.013
Inlet entrance type		AEW		DD Menu		AEW						AEW		Miter to Slope
Inlet loss coefficient (Ke)		0.5				0.5						0.5		0.2
Upstream invert (ft)		840.6				855.91						850.98		850.14
Downstream invert (ft)		839.64				854.8						850.29		849.32
Length (ft)		73.7				109.3						86.9		56
Slope (%)	#DIV/0!	1.30%	#DIV/0!	#DIV/0!	#DIV/0!	1.02%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.79%	#DIV/0!	1.46%
Floodplain Management														
Is culvert in a mapped floodplain?		No				No						No		Yes
Will proposed culvert increase water surface profile?		Yes See Note 1		Yes See Note 1		Yes See Note 1						Yes See Note 1		No
Drainage District Issues														
Is culvert in a drainage district?		No		No		No						No		No
Drainage District Name														
Will proposed culvert raise the culvert invert or increase water surface profile?		Yes See Note 1		Yes See Note 1		Yes See Note 1						Yes See Note 1		No
Has drainage board approved increases?														
Aquatic Organism Passage														
Is aquatic organism passage a concern?		No		No		No						No		No
Does WDNR agree with AOP design?		Exist to Remain		Exist to Remain		Exist to Remain						Exist to Remain		Exist to Remain
Proposed Culvert Design														
Design ADT		>7500		>7500		>7500						>7500		>7500
Design flow		7.71		2.94		6.18						6.55		5.78
Design year frequency		50		50		50						50		50
Hydrological method used		Rational		Rational		Rational						Rational		Rational
Assumed tailwater condition		None		None		None						None		None
Maximum allowable headwater														
Maximum allowable headwater design criteria	DDMenu	Top of Subgrade	DDMenu	DDMenu	DDMenu	Top of Subgrade	DDMenu	DDMenu	DDMenu	DDMenu	DDMenu	Top of Subgrade	DDMenu	Top of Subgrade
Proposed culvert shape	DD Menu	Circular	DD Menu	DD Menu	DD Menu	Circular	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	Circular	DD Menu	Box
Proposed culvert material	DD Menu	RCP	DD Menu	DD Menu	DD Menu	RCP	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	RCP	DD Menu	RC
Proposed culvert size		2				2						3		8X5
Proposed number of culverts		1				1						1		2
Manning's n		0.013				0.013						0.013		0.013
Type of endwalls	DD Menu	AEW	DD Menu	DD Menu	DD Menu	AEW	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	AEW	DD Menu	Miter to Slope

Drainage Data

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Inlet loss coefficient (Ke)		0.5				0.5						0.5		0.2
Proposed upstream invert (ft)		840.6				855.91						850.98		850.14
Proposed downstream invert (ft)		839.64				854.8						850.29		849.32
Proposed length (ft)		73.7				109.3						86.9		56
Proposed slope (%)	#DIV/0!	1.30%	#DIV/0!	#DIV/0!	#DIV/0!	1.02%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.79%	#DIV/0!	1.46%
Embedment depth (ft)		N/A				N/A						N/A		N/A
Embedment material		N/A				N/A						N/A		N/A
Discharge velocity (ft/s)		3.26				2.27						1.36		0.14
Riprap outfall (Size riprap or None)		None				None						None		None
Station of lowest subgrade shoulder point in subbasin (0+00)		327+65				356+55						378+47		397+95
Elevation of lowest subgrade shoulder point in subbasin (ft)		846.05				865.46						858.3		856.6
Headwater distance below subgrade shoulder point (ft)		4.06				8.46						6.24		4.7
Headwater to pipe diameter ratio		0.69				0.55						0.36		0.35
Design software used		Hydraflow				Hydraflow						Hydraflow		Hydraflow
Proposed tailwater condition		N/A				N/A						N/A		N/A
Discharge pipe end submerged?		No				No						No		No
Assumed tailwater elevation (ft)		839.64				854.8						850.29		849.32

Enter Line Number and Note. Add more boxes if necessary

Note 1: Per Hyraflow calculation summary. Water surface increase as foll
35 - 0.03', 37 - 0.0'

Note 2: Standard ditch section was evaluated at minimum 1% slope. Tw
and therefore combined flow can be maintained in the existing ditch sectic
capacity to handle the increase in peak flow.

Note 3: It was noted in the PIM by adjacent property owner that there is a
repair or replacement. Topo survey identifes the low area is outside the D

**Hydraflow - Civil 3D Add On

Culvert 33 Hw/D ratio exceeds 1.5.

In OPM, Town of Cedarburg indicated a concern with a culvert between H
cross culverts at outfall 35 and 37, there does not appear to be a capacity

Drainage Data

Project ID: 2310-17-00
Title: STH 60 - Eagle Drive to STH 181
Designer/Checker: JP/RT
DOT Region/Firm Name:
Date: 3/5/2015 Updated 11/26/2019

OUTFALL INFORMATION															
Outfall number	**27**	**28**	**29**	**30**	**31**	**32**	**33A**	**33B**	**34**	**35**	**36**	**37**	**2/3**	**4/5**
Outfall discharges to:	Wetland	Ditch	Ditch	Wetland	Wetland	Overland	Overland	Overland	Wetland	Wetland	Creek	Creek	Creek	Creek
Waterway crossing type							Culvert	Culvert		Culvert		Culvert		
If discharging to environmentally sensitive area, what kinds of buffers were used at outfall?														
Previous flooding issues or flow restrictions?	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Is the drainageway in the DOT ROW a navigable waterway?	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Classify the drainageway in the DOT ROW	N/A	N/A	N/A	Wetland	Wetland	N/A	N/A	N/A	Wetland	Wetland	N/A	N/A	N/A	N/A

BASIC SUB BASIN DRAINAGE INFORMATIO														
Outfall number	**27**	**28**	**29**	**30**	**31**	**32**	**33A**	**33B**	**34**	**35**	**36**	**37**	**2/3**	**4/5**
Stormwater conveyance type	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Overland	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale
Outfall station		452+40	456+37		483+87	N/A	500+76	510+83	530+97	530+97	550+50	552+45	211+50	233+53
Subbasin starting station	409+31	446+84	446+84	474+06	474+06	497+91	485+30	502+29	524+28	522+39	536+00	536+00	205+00	228+00
Subbasin ending station	446+84	456+50	456+50	497+91	485+30	524+28	502+29	522+39	536+00	536+00	555+40	555+40	228+93	243+70
Proposed roadway length (ft)	3753	966	966	2385	1124	2637	1699	2010	1172	1361	1940	1940	2393	1570
Flow conveyance change	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Flood design frequency (yrs)	25	25	25	25	25	25	50	50	25	50	25	50	25	25
Check design frequency (yrs)	50	50	50	50	50	50	100	100	50	100	50	100	50	50
Is the check design storm safely passed?	Yes See Note 2	Yes See Note 2	Yes See Note 2	Yes See Note 2	Yes See Note 2	N/A	Yes	Yes	Yes See Note 2	Yes	Yes See Note 2	Yes	Yes	Yes
DOT right-of-way area (acres)	4.38	1.09	1.02	2.69	1.22	3.32	3.66	2.72	1.58	2	2.58	2.71	6.31	4.09
Subbasin drainage area (acres)	13.07	1.33	1.33	3.3	1.88	3.68	13.74	10.18	1.61	2.31	2.58	3.92	11.6	5.27
DOT right-of-way compared to subbasin drainage area (%)	34%	82%	77%	82%	65%	90%	27%	27%	98%	87%	100%	69%	54%	78%
DOT impervious area - existing (acres)	1.29	0.33	0.33	0.92	0.39	1.51	1.26	0.94	0.40	0.47	0.96	0.67	1.61	1.41
DOT impervious area - proposed (acres)	1.55	0.39	0.55	1.12	0.46	1.71	1.47	1.09	0.54	0.64	1.21	0.82	1.93	1.70
Change in impervious area (acres)	0.26	0.06	0.22	0.20	0.07	0.20	0.21	0.15	0.14	0.17	0.25	0.15	0.32	0.29
Percent change in DOT impervious area	20%	18%	67%	22%	18%	13%	17%	16%	35%	36%	26%	22%	20%	21%
Design software used														
Method used to estimate peak flows	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational	Rational
Complete lines 36-46 for culverts only														
Existing peak flow (cfs)	10.06	3.02	3.02	8.32	3.15	7.83	15.32	15.39	2.91	4.99	4.88	7.44	10.22	9.47
Proposed peak flow (cfs) (before detention)	10.06	3.18	3.18	8.70	3.23	8.12	15.89	15.96	3.19	5.51	5.35	7.86	10.32	9.78
Proposed peak flow (cfs) (after detention/in-line storage/other)	10.06	3.18	3.18	8.70	3.23	8.12	15.89	15.96	3.19	5.51	5.35	7.86	10.32	9.78
Change in peak flow (cfs)	0.00	0.16	0.16	0.38	0.08	0.28	0.57	0.57	0.27	0.52	0.47	0.42	0.10	0.31
Percent change in peak flow	0%	5%	5%	5%	3%	4%	4%	4%	9%	11%	10%	6%	1%	3%
Existing 2-yr peak flow (cfs)	5.31	1.60	1.60	4.36	1.69	4.05	7.35	7.78	1.55	2.53	2.48	4.01	5.24	4.91
Proposed 2-yr peak flow (cfs) (before detention)	5.31	1.68	1.68	4.55	1.73	4.20	7.62	8.07	1.70	2.79	2.72	4.24	5.29	5.07
Proposed 2-yr peak flow (cfs) (after detention/in-line storage/other)	5.31	1.68	1.68	4.55	1.73	4.20	7.62	8.07	1.70	2.79	2.72	4.24	5.29	5.07
Change in 2-yr peak flow (cfs)	0.00	0.08	0.08	0.20	0.04	0.15	0.27	0.29	0.14	0.27	0.24	0.23	0.05	0.16
Percent change in 2-yr peak flow	0%	5%	5%	5%	3%	4%	4%	4%	9%	11%	10%	6%	1%	3%
Existing Tc (min)	50	10	10	11	20	25	26	14	21	13	28	13	40	10
Proposed Tc (min)	50	10	10	11	20	25	26	14	21	13	28	13	40	10
C or CN (existing)	0.28	0.39	0.39	0.44	0.39	0.55	0.27	0.27	0.43	0.38	0.52	0.35	0.29	0.30

Drainage Data

Project ID:	**2310-17-00**
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C or CN (proposed)	0.28	0.41	0.41	0.46	0.4	0.57	0.28	0.28	0.47	0.42	0.57	0.37	0.29	0.31
Rainfall intensity (in/hr) (rational method only)	2.75	5.83	5.83	5.73	4.3	3.87	4.13	5.6	4.21	5.68	3.64	5.42	3.08	5.96
Rainfall depth used for design storm, if applicable (in)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CULVERT DESIGN

Existing Culvert

Outfall number	**27**	**28**	**29**	**30**	**31**	**32**	**33A**	**33B**	**34**	**35**	**36**	**37**	**2/3**	**4/5**
Culvert present? (Yes or No)	No	No	No	No	No	No	Yes	Yes	No	Yes	No	Yes		
Existing culvert shape							Circular	Circular		Circular		Elliptical		
Existing culvert material							CMP	CMP		CMP		CMP		
Existing culvert size (ft)							2.5	2.5		2.5		3.5X5.5		
Existing number of culverts							1	1		1		1		
Existing Manning's n							0.024	0.024		0.024		0.024		
Inlet entrance type							AEW	AEW		AEW		AEW		
Inlet loss coefficient (Ke)							0.5	0.5		0.5		0.5		
Upstream invert (ft)							869.25	866.65		870.6		863.23		
Downstream invert (ft)							869.04	865.5		870.01		863.13		
Length (ft)							73.6	80		107.3		106.7		
Slope (%)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.29%	1.44%	#DIV/0!	0.55%	#DIV/0!	0.09%	#DIV/0!	#DIV/0!
Floodplain Management														
Is culvert in a mapped floodplain?							No	No		No		No		
Will proposed culvert increase water surface profile?							Yes See Note 1	Yes See Note 1		Yes See Note 1		No		
Drainage District Issues														
Is culvert in a drainage district?							No	No		No		No		
Drainage District Name														
Will proposed culvert raise the culvert invert or increase water surface profile?							Yes See Note 1	Yes See Note 1		Yes See Note 1		No		
Has drainage board approved increases?														
Aquatic Organism Passage														
Is aquatic organism passage a concern?							No	No		No		No		
Does WDNR agree with AOP design?							Exist to Remain	Exist to Remain		Exist to Remain		Exist to Remain		
Proposed Culvert Design														
Design ADT							>7500	>7500		>7500		>7500		
Design flow							15.89	15.96		5.51		7.86		
Design year frequency							50	50		50		50		
Hydrological method used							Rational	Rational		Rational		Rational		
Assumed tailwater condition							None	None		None		None		
Maximum allowable headwater							873.36	870.06		877.26		869.46		
Maximum allowable headwater design criteria	DDMenu	DDMenu	DDMenu	DDMenu	DDMenu	DDMenu	Top of Subgrade	Top of Subgrade	DDMenu	Top of Subgrade	DDMenu	DDMenu		
Proposed culvert shape	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	Circular	Circular	DD Menu	Circular	DD Menu	Elliptical		
Proposed culvert material	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	CMP	CMP	DD Menu	CMP	DD Menu	CMP		
Proposed culvert size							2.5	2.5		2.5		3.5X5.5		
Proposed number of culverts							1	1		1		1		
Manning's n							0.024	0.024		0.024		0.024		
Type of endwalls	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	DD Menu	AEW	AEW	DD Menu	AEW	DD Menu	AEW		

Drainage Data

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Inlet loss coefficient (Ke)							0.5	0.5		0.5		0.5		
Proposed upstream invert (ft)							869.25	866.65		870.6		863.23		
Proposed downstream invert (ft)							869.04	865.5		870.01		863.13		
Proposed length (ft)							73.6	80		107.3		106.7		
Proposed slope (%)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.29%	1.44%	#DIV/0!	0.55%	#DIV/0!	0.09%	#DIV/0!	#DIV/0!
Embedment depth (ft)							N/A	N/A		N/A		N/A		
Embedment material							N/A	N/A		N/A		N/A		
Discharge velocity (ft/s)							3.92	3.94		1.62		0.81		
Riprap outfall (Size riprap or None)							None	None		None		None		
Station of lowest subgrade shoulder point in subbasin (0+00)							500+76	511+10		530+97		552+39		
Elevation of lowest subgrade shoulder point in subbasin (ft)							873.36	870.06		878.21		870.35		
Headwater distance below subgrade shoulder point (ft)							2.08	1.36		5.96		4.66		
Headwater to pipe diameter ratio							0.81	0.82		0.44		0.56		
Design software used							Hydraflow	Hydraflow		Hydraflow		Hydraflow		
Proposed tailwater condition							N/A	N/A		N/A		N/A		
Discharge pipe end submerged?							No	No		No		No		
Assumed tailwater elevation (ft)							869.04	865.5		870.01		863.13		

Enter Line Number and Note. Add more boxes if necessary

Note 1: Per Hyraflow calculation summary. Water surface increase as foll 35 - 0.03', 37 - 0.0'
Note 2: Standard ditch section was evaluated at minimum 1% slope. Tw and therefore combined flow can be maintained in the existing ditch sectic capacity to handle the increase in peak flow.
Note 3: It was noted in the PIM by adjacent property owner that there is a repair or replacement. Topo survey identifes the low area is outside the D
**Hydraflow - Civil 3D Add On
Culvert 33 Hw/D ratio exceeds 1.5.
In OPM, Town of Cedarburg indicated a concern with a culvert between H cross culverts at outfall 35 and 37, there does not appear to be a capacity

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Drainage Data

Project ID: 2310-17-00
Title: STH 60 - Eagle Drive to STH 181
Designer/Checker: JP/RT
DOT Region/Firm Name:
Date: 3/5/2015 Updated 11/26/2019

OUTFALL INFORMATION					
Outfall number	**11/12**	**13/14**	**17/18**	**23/24**	**25/26**
Outfall discharges to:	Ditch	Creek	Creek	Creek	Creek
Waterway crossing type					
If discharging to environmentally sensitive area, what kinds of buffers were used at outfall?					
Previous flooding issues or flow restrictions?	No	No	No	No	No
Is the drainageway in the DOT ROW a navigable waterway?	No	No	No	No	No
Classify the drainageway in the DOT ROW	N/A	N/A	N/A	N/A	N/A

BASIC SUB BASIN DRAINAGE INFORMATIO					
Outfall number	**11/12**	**13/14**	**17/18**	**23/24**	**25/26**
Stormwater conveyance type	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale	Ditch/Swale
Outfall station	320+61	327+65	356+55	378+47	397+95
Subbasin starting station	300+01	322+83	350+28	365+99	389+75
Subbasin ending station	323+19	350+38	357+44	389+75	446+84
Proposed roadway length (ft)	2318	2755	716	2376	5709
Flow conveyance change	None	None	None	None	None
Flood design frequency (yrs)	25	25	25	25	25
Check design frequency (yrs)	50	50	50	50	50
Is the check design storm safely passed?	Yes	Yes	Yes	Yes	Yes
DOT right-of-way area (acres)	7.55	5.46	2.08	5.81	9.97
Subbasin drainage area (acres)	11.78	9.16	3.36	6.58	12.7
DOT right-of-way compared to subbasin drainage area (%)	64%	60%	62%	88%	79%
DOT impervious area - existing (acres)	2.00	1.43	0.72	1.62	3.05
DOT impervious area - proposed (acres)	2.58	1.71	0.96	1.96	3.75
Change in impervious area (acres)	0.58	0.28	0.24	0.34	0.70
Percent change in DOT impervious area	29%	20%	33%	21%	23%
Design software used					
Method used to estimate peak flows	Rational	Rational	Rational	Rational	Rational
Complete lines 36-46 for culverts only					
Existing peak flow (cfs)	15.34	10.51	7.55	11.05	16.99
Proposed peak flow (cfs) (before detention)	16.50	10.92	8.62	11.61	17.97
Proposed peak flow (cfs) (after detention/in-line storage/other)	16.50	10.92	8.62	11.61	17.97
Change in peak flow (cfs)	1.16	0.41	1.06	0.55	0.98
Percent change in peak flow	8%	4%	14%	5%	6%
Existing 2-yr peak flow (cfs)	7.93	5.34	4.04	5.97	8.50
Proposed 2-yr peak flow (cfs) (before detention)	8.53	5.55	4.60	6.27	8.99
Proposed 2-yr peak flow (cfs) (after detention/in-line storage/other)	8.53	5.55	4.60	6.27	8.99
Change in 2-yr peak flow (cfs)	0.60	0.21	0.57	0.30	0.49
Percent change in 2-yr peak flow	8%	4%	14%	5%	6%
Existing Tc (min)	26	28	8	20	30
Proposed Tc (min)	26	28	8	20	30
C or CN (existing)	0.34	0.32	0.35	0.40	0.38

Drainage Data

Project ID:	**2310-17-00**
Title:	**STH 60 - Eagle Drive to STH 181**
Designer/Checker:	**JP/RT**
DOT Region/Firm Name:	
Date:	**3/5/2015 Updated 11/26/2019**

C or CN (proposed)	0.37	0.33	0.40	0.42	0.40
Rainfall intensity (in/hr) (rational method only)	3.83	3.64	6.4	4.2	3.5
Rainfall depth used for design storm, if applicable (in)	N/A	N/A	N/A	N/A	N/A

CULVERT DESIGN **Existing Culvert**					
Outfall number	**11/12**	**13/14**	**17/18**	**23/24**	**25/26**
Culvert present? (Yes or No)					
Existing culvert shape					
Existing culvert material					
Existing culvert size (ft)					
Existing number of culverts					
Existing Manning's n					
Inlet entrance type					
Inlet loss coefficient (Ke)					
Upstream invert (ft)					
Downstream invert (ft)					
Length (ft)					
Slope (%)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Floodplain Management					
Is culvert in a mapped floodplain?					
Will proposed culvert increase water surface profile?					
Drainage District Issues					
Is culvert in a drainage district?					
Drainage District Name					
Will proposed culvert raise the culvert invert or increase water surface profile?					
Has drainage board approved increases?					
Aquatic Organism Passage					
Is aquatic organism passage a concern?					
Does WDNR agree with AOP design?					
Proposed Culvert Design					
Design ADT					
Design flow					
Design year frequency					
Hydrological method used					
Assumed tailwater condition					
Maximum allowable headwater					
Maximum allowable headwater design criteria					
Proposed culvert shape					
Proposed culvert material					
Proposed culvert size					
Proposed number of culverts					
Manning's n					
Type of endwalls					

Drainage Data

Project ID:	**2310-17-00**
Title:	**STH 60 - Eagle Drive to STH 181**
Designer/Checker:	**JP/RT**
DOT Region/Firm Name:	
Date:	**3/5/2015 Updated 11/26/2019**

92	Inlet loss coefficient (Ke)					
93	Proposed upstream invert (ft)					
94	Proposed downstream invert (ft)					
95	Proposed length (ft)					
96	Proposed slope (%)	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
97	Embedment depth (ft)					
98	Embedment material					
99	Discharge velocity (ft/s)					
100	Riprap outfall (Size riprap or None)					
101	Station of lowest subgrade shoulder point in subbasin (0+00)					
102	Elevation of lowest subgrade shoulder point in subbasin (ft)					
103	Headwater distance below subgrade shoulder point (ft)					
104	Headwater to pipe diameter ratio					
105	Design software used					
106	Proposed tailwater condition					
107	Discharge pipe end submerged?					
108	Assumed tailwater elevation (ft)					

Enter Line Number and Note. Add more boxes if necessary

Note 1: Per Hyraflow calculation summary. Water surface increase as foll 35 - 0.03', 37 - 0.0'
Note 2: Standard ditch section was evaluated at minimum 1% slope. Tw and therefore combined flow can be maintained in the existing ditch sectic capacity to handle the increase in peak flow.
Note 3: It was noted in the PIM by adjacent property owner that there is a repair or replacement. Topo survey identifes the low area is outside the D
**Hydraflow - Civil 3D Add On
Culvert 33 Hw/D ratio exceeds 1.5.
In OPM, Town of Cedarburg indicated a concern with a culvert between H cross culverts at outfall 35 and 37, there does not appear to be a capacity

Project Summary

Project ID: 2310-17-00

Title: STH 60 - Eagle Drive to STH 181

Designer/Checker: JP/RT

DOT Region/Firm Name: SE/COLLINS ENGINEERS, INC.

Date: 3/5/2015 Updated 11/26/2019

HIGHWAY:	STH 60
LIMITS:	EAGLE DRIVE TO STH 181
COUNTY:	WASHINGTON & OZAUKEE
DESCRIPTION OF WORK:	RESURFACING AND INTERSECTION IMPROVEMENTS
PROJECT MANAGER:	NGUYEN LY
PS&E DATE:	May 1, 2019
DESIGN STAGE	Final Design Stage

Water Quality Results Discussion

Water Quality Results Summary	**Total Project Drainage Basin Area**	Grass Swales	Filter Strips	Wet Detention Ponds	Catch-basins	Street Cleaning	Biofilters	Other Devices	Untreated Areas
Drainage Area (ac)									
ROW Drainage Area (ac)									
Percent TSS Reduction by Treatement Type									

Project Water Quality Objectives

☑ **THE PROJECT IS EXEMPT FROM TRANS 401 STORMWATER QUALITY REQUIREMENTS AND REQUIRES NO FURTHER WATER QUALITY INFORMATION. DESCRIBE BELOW WHY IT IS EXEMPT.**

The project is considered Minor Reconstruction per TRANS 401.03(3)(f) - No TSS Reduction Required.

DESCRIBE THE STORMWATER QUALITY MANAGEMENT REQUIREMENTS PER TRANS 401 OR THE TMDL WASTELOAD ALLOCATION.

☐ **40 % Reduction** ☐ **80 % Reduction** ☐ **Other Reduction** _____

IF THE PROJECT REQUIRES STORMWATER MANAGEMENT EXPLAIN HOW THE TRANS 401 2-YR PEAK DISCHARGE REQUIREMENT WAS MET.

HAS THE DEPARTMENT AGREED TO MEET ANY LOCAL STORMWATER QUALITY ORDINANCES OR REQUIREMENTS FOR THIS PROJECT? IF SO, DESCRIBE.

IF THE PROJECT REQUIRES STORM WATER MANAGEMENT EXPLAIN HOW THE TOTAL SUSPENDED SOLIDS REDUCTION WAS MET. Refer to Water Quality Results Summary above.

Existing curb and gutter at the intersections is being replaced and extended to the meet the current intersection SDD's. Thus, the drainage pattern is not changing from the existing condition but will continue to drain through the ditch section.

LIST THE POST CONSTRUCTION STORMWATER QUALITY CONTROL TREATMENT MEASURES FOR THE PROJECT.

REGIONAL STORMWATER ENGINEER CONCURRENCE (SIGN AND DATE)

	DRAINAGE AREA CALCULATIONS FOR STH 60 EAGLE TO STH 181 STATE ID 2310-17-00														
Basin	**1**	**2**	**3**	**4**	**4A**	**5**	**6**	**7**	**8**	**8 (Off-Site)**	**9**	**10**	**11**	**12**	**13**
RW Area	4.49	3.15	3.16	2.16	0.83	1.93	0.85	1.4	3.39	3.39	2.49	0.92	3.18	4.37	1.85
Total Area	4.49	3.15	8.45	3	3.87	2.27	0.85	2.8	9.98	25.84	2.54	0.92	6.72	5.06	2.1
Length	1640	2393	2300	1572	600	1407	722	1022	2601	2601	1673	720	2282	2226	1419
EX Paved	1.38	0.82	0.79	0.54	0.21	0.48	0.25	0.57	1.05	1.05	0.75	0.35	0.90	1.10	0.49
EX Gravel	0.53	0.38	0.37	0.25	0.10	0.23	0.12	0.16	0.42	0.42	0.26	0.12	0.37	0.36	0.23
PR Paved	1.74	0.98	0.95	0.65	0.25	0.58	0.30	0.64	1.40	1.40	1.00	0.45	1.20	1.38	0.59
PR Gravel	0.3	0.22	0.21	0.14	0.06	0.13	0.07	0.09	0.24	0.24	0.15	0.08	0.20	0.15	0.13
C Land	0.18	0.14	0.14	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
C Pavement	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
C Gravel	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pre Road	1.38	0.82	0.79	0.54	0.21	0.48	0.25	0.57	1.05	1.05	0.75	0.35	0.90	1.10	0.49
Pre Open Land	2.58	1.95	7.29	2.21	3.57	1.56	0.48	2.07	8.51	24.37	1.53	0.45	5.45	3.60	1.38
Pre Gravel	0.53	0.38	0.37	0.25	0.10	0.23	0.12	0.16	0.42	0.42	0.26	0.12	0.37	0.36	0.23
Post Road	1.63	0.98	0.95	0.65	0.25	0.58	0.30	0.64	1.40	1.40	1.00	0.45	1.30	1.38	0.59
Post Open Land	2.52	1.95	7.29	2.21	3.57	1.56	0.48	2.07	8.34	24.20	1.39	0.39	5.22	3.53	1.38
Post Gravel	0.34	0.22	0.21	0.14	0.06	0.13	0.07	0.09	0.24	0.24	0.15	0.08	0.20	0.15	0.13
CN Existing	0.47	0.41	0.24	0.35	0.23	0.39	0.47	0.36	0.28	0.22	0.45	0.53	0.31	0.38	0.40
CN Proposed	0.49	0.42	0.24	0.37	0.24	0.40	0.49	0.37	0.30	0.23	0.51	0.59	0.34	0.40	0.42
*Time of Concentration	25.0	25.0	40.0	10.0	20.0	10.0	12.0	12.0	20.0	20.0	15.0	11.0	26.0	21.0	13.0

* Time of Concentration determined from FDM 13-10 Attachment 5.3 Time of Concentration of Small Drainage Basins (Nomograph)

	DRAINAGE AREA CALCULATIONS FOR STH 60 EAGLE TO STH 181 STATE ID 2310-17-00														
Basin	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
RW Area	3.61	1.27	0.74	0.85	1.23	0.96	0.92	0.42	0.42	2.81	3	7.47	2.5	4.38	1.09
Total Area	7.06	1.27	0.76	1.47	1.89	1.02	1.06	0.42	0.74	3.28	3.3	10.1	2.6	13.07	1.33
Length	2719	1017	434	591	712	558	473	231	254	2376	2376	5709	1956	3753	966
EX Paved	0.94	0.35	0.28	0.24	0.38	0.34	0.37	0.34	0.17	0.81	0.81	2.30	0.75	1.29	0.33
EX Gravel	0.44	0.16	0.07	0.11	0.13	0.08	0.08	0.04	0.05	0.38	0.38	0.92	0.31	0.60	0.15
PR Paved	1.12	0.42	0.31	0.30	0.59	0.37	0.48	0.35	0.20	0.98	0.98	2.80	0.95	1.55	0.39
PR Gravel	0.25	0.09	0.04	0.06	0.07	0.05	0.05	0.03	0.03	0.22	0.22	0.52	0.15	0.34	0.09
C Land	0.16	0.15	0.18	0.18	0.18	0.15	0.22	0.22	0.22	0.16	0.14	0.14	0.14	0.18	0.14
C Pavement	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
C Gravel	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pre Road	0.94	0.35	0.28	0.24	0.38	0.34	0.37	0.340	0.170	0.810	0.81	2.30	0.75	1.29	0.33
Pre Open Land	5.69	0.76	0.41	1.12	1.38	0.60	0.61	0.043	0.520	2.088	2.11	6.88	1.54	11.17	0.85
Pre Gravel	0.44	0.16	0.07	0.11	0.13	0.08	0.08	0.037	0.050	0.382	0.38	0.92	0.31	0.60	0.15
Post Road	1.12	0.42	0.31	0.30	0.59	0.37	0.45	0.350	0.200	0.980	0.98	2.80	0.95	1.55	0.39
Post Open Land	5.69	0.76	0.41	1.11	1.23	0.60	0.56	0.040	0.510	2.080	2.10	6.78	1.50	11.17	0.85
Post Gravel	0.25	0.09	0.04	0.06	0.07	0.05	0.05	0.030	0.030	0.220	0.22	0.52	0.15	0.34	0.09
CN Existing	0.29	0.43	0.50	0.34	0.36	0.45	0.50	0.84	0.41	0.41	0.39	0.37	0.43	0.28	0.39
CN Proposed	0.30	0.45	0.52	0.35	0.44	0.46	0.55	0.86	0.43	0.43	0.41	0.39	0.46	0.28	0.41
*Time of Concentration	28.0	13.0	7.0	7.0	8.0	14.0	13.0	5.0	6.0	19.0	20.0	30.0	20.0	50.0	10.0

* Time of Concentration deter

	DRAINAGE AREA CALCULATIONS FOR STH 60 EAGLE TO STH 181 STATE ID 2310-17-00									
Basin	**29**	**30**	**31**	**32**	**33A**	**33B**	**34**	**35**	**36**	**37**
RW Area	1.02	2.73	1.22	3.32	3.66	2.72	1.58	2	2.58	2.71
Total Area	1.33	3.3	1.88	3.68	13.74	10.18	1.61	2.31	2.58	3.92
Length	966	2385	1124	2637	1699	2010	1172	1361	1940	1940
EX Paved	0.33	0.92	0.39	1.51	1.26	0.94	0.40	0.47	0.96	0.67
EX Gravel	0.15	0.38	0.18	0.42	0.34	0.26	0.19	0.22	0.31	0.31
PR Paved	0.39	1.12	0.46	1.71	1.47	1.09	0.54	0.64	1.21	0.82
PR Gravel	0.09	0.22	0.10	0.24	0.20	0.14	0.08	0.10	0.16	0.18
C Land	0.14	0.17	0.19	0.19	0.19	0.19	0.2	0.19	0.19	0.19
C Pavement	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
C Gravel	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pre Road	0.330	0.920	0.39	1.510	1.260	0.940	0.40	0.47	0.96	0.67
Pre Open Land	0.85	2.00	1.31	1.75	12.14	8.98	1.02	1.62	1.31	2.94
Pre Gravel	0.150	0.380	0.181	0.420	0.340	0.260	0.19	0.22	0.31	0.31
Post Road	0.39	1.12	0.46	1.71	1.47	1.09	0.54	0.64	1.21	0.82
Post Open Land	0.85	1.96	1.31	1.73	12.07	8.95	0.99	1.57	1.21	2.93
Post Gravel	0.09	0.22	0.10	0.24	0.20	0.14	0.08	0.10	0.18	0.18
CN Existing	0.39	0.44	0.39	0.55	0.27	0.27	0.43	0.38	0.52	0.35
CN Proposed	0.41	0.46	0.40	0.57	0.28	0.28	0.47	0.42	0.57	0.37
*Time of Concentration	10.0	11.0	20.0	25.0	26.0	14.0	21.0	13.0	28.0	13.0

* Time of Concentration deter

1 Addendum No. 01

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Scott Walker, Governor
Cathy Stepp, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

April 16, 2012

Mohammad Hossain
Wisconsin Department of Transportation
141 NW Barstow Street
Waukesha, WI 53187-0798

Subject: Initial Scoping Comments for WisDOT ID: 2310-17-00, State Highway 60 Rehabilitation; Eagle Drive to STH 181, Washington and Ozaukee Counties

Dear Mr. Hossain:

Thank you for the opportunity to provide scoping comments for the State Highway 60 Rehabilitation. It is understood that the Project will include improvements to State Highway 60 from just east of Eagle Drive in the Village of Jackson, Washington County, to State Highway 181 in the Town of Cedarburg, Ozaukee County. Improvements consist of the resurfacing the mainline of STH 60, minor reconstruction of various intersections, beam guard replacement, culvert replacement/extension and shoulder reconstruction with ditch grading. The purpose of the project is to improve the condition of the pavement and safety in the corridor. I have listed Department initial review comments below.

Air

1) DNR recommends that the environmental analysis assess existing and projected air pollutant emissions, health risks; identify sensitive receptors, and alternatives to minimize temporary construction and long term air quality impacts. The State of Wisconsin Implementation Plan for Air Quality http://dnr.wi.gov/org/aw/air/hot/1hrsip_p2.htm establishes emission budgets for mobile sources in Wisconsin.

2) If the project includes structural demolition work a **Notification of Demolition and/or Renovation and Application for Permit Exemption (NR 406, 410, and 447 Wis. Adm. Code)** may be required. Please contact Mark Davis, Asbestos Specialist (414) 263-8674 to request additional information and permit application materials.

Remediation and Redevelopment/Waste and Materials Management

1) Properties having documented soil and groundwater contamination in the right-of-way of WIS 60 exist in the project area. A Hazardous Materials Assessment is recommended as part of the environmental project. Please coordinate with the Department in determining the extent of this contamination and minimizing the risk of encountering hazardous waste during construction. The Department can also assist in removal and disposal of hazardous wastes that cannot be avoided during construction. Please contact me for a list of properties of concern in the project area.

2) Should contaminated soil or groundwater be encountered within the right-of-way either before or during construction, you must notify the appropriate person in the DNR Solid Waste Section at 1-800-943-0003 prior to continuing operations.

Land

1) Primary and Secondary Environmental Corridors and Areas of Isolated Resources exists in the project area. The majority of the primary corridor is along Cedar Creek and Cedarburg Creek, and in the vicinity of the Jackson Swamp. Endangered resources and species habitat may exist in these corridors. See the SEWRPC website for more information on Environmental Corridors at: http://www.sewrpc.org/regionallandinfo/regionalmapping/default.shtm.

2) DNR managed lands exist in the project area. DNR initial review indicates that the acquisition of selected properties was funded by State Stewardship Grants and US Geological Survey Great Lakes Aquatic Gap Analysis Program (USGS GAP). According to Section 6(f) of the federal Land and Water Conservation (L&WC) Act, lands acquired with L&WC funds that are taken by a highway project must be replaced with other property of equal market value and equivalent usefulness and location. Please discuss land conversion requirements with the Department if these properties will be impacted by the WIS 60 project.

3) DNR managed trails intersect STH 60 near Cedar Creek in Washington County, near Horns Corners Road in Ozaukee County, at the Five Corners intersection, and near County Highway O in Grafton. Any construction impacts on the trails shall be replaced at or above current condition.

Water

1) The WIS 60 project area is located in the Cedar Creek Watershed and the Milwaukee River South Watershed. These watersheds are in the Milwaukee River Basin. Detailed basin reports can be found at: http://dnr.wi.gov/water/basin/milw/index.htm

2) The project area crosses Cedar Creek and Cedarburg Creek. In addition, several unnamed tributaries to these creeks also intersect the STH 60 corridor. Existing culverts and/or bridges need to be assessed as well as temporary or permanent alterations to the water crossings that may be necessary due to proposed construction.

3) Channel stability and fish and wildlife passage should be standard design and construction objectives for any bridge or culvert replacements or extensions.

4) Wetlands are present in the project area. DNR initial review finds wetland classifications in the project area to include:

    Southern Messic Forest
    Harwood Swamp
    Southern Hardwood Swamp

5) Wetland impacts should be avoided or minimized. Wetland impacts that can not be avoided should be addressed through the DNR-DOT Cooperative Agreement process and compensatory mitigation plans need to be arranged. A Section 404 permit may be necessary from the U.S. Army Corps of Engineers.

6) Storm water facilities and erosion control best management practices should be designed to meet Trans 401 standards. Coordinate with local municipalities on designing stormwater facilities.

Endangered Resources

1) State endangered species have been observed recently in the project area. Please coordinate with the Department on laws pertaining to these species and to identify the presence of and minimize impacts to these species. An Endangered Resources Incidental Take Authorization permit (Wis. Stats 29.604) may be needed for work in species' habitat. These species include:

Regina septemvittata (Queesnake)
Villosa iris (Rainbow Shell Mussel)
Luxilus chrysocephalus (Striped Shiner Fish)

2) State threatened species are present in the project area. Please coordinate with the Department to identify the presence of and minimize impacts to these species. These species include:

Lythrurus umbratilis (Redfin Shiner Fish)
Moxostoma valenciennesi (Greater Redhorse Fish)
Venustaconcha ellipsiformis (Ellipse Mussel)

1) DNR and DOT should discuss endangered resources occurrences in the large project area and determine if specific field surveys or investigations are needed.

Thanks again for the opportunity to provide scoping comments for the project of the State Highway 60 Rehabilitation Eagle Drive to STH 181, Washington and Ozaukee Counties. I would be glad to speak or meet with you to discuss the Department's comments and provide additional information.

Sincerely,

Kristina Betzold

Kristina Betzold
Environmental Analysis and Review Specialist
(414) 263-8517
kristina.betzold@wiscosin.gov

Cc: Rachel Tranel, Collins Engineering
Karla Leithoff, WDOT
Scott Lee, WDOT

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 2 50 YR Existing

Invert Elev Dn (ft)	=	833.81
Pipe Length (ft)	=	64.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	834.45
Rise (in)	=	72.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

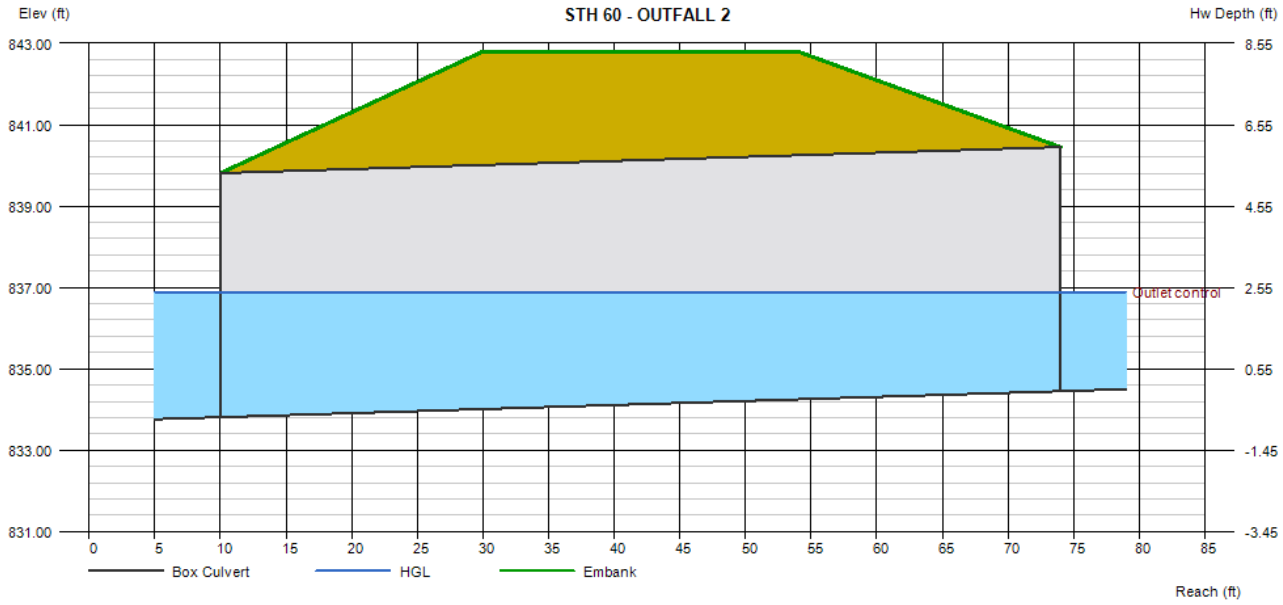
Top Elevation (ft)	=	842.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.61
Qmax (cfs)	=	5.61
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.74
Qpipe (cfs)	=	5.74
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.12
Veloc Up (ft/s)	=	0.15
HGL Dn (ft)	=	836.89
HGL Up (ft)	=	836.89
Hw Elev (ft)	=	836.89
Hw/D (ft)	=	0.41
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 2 50 YR Proposed

Invert Elev Dn (ft)	=	833.81
Pipe Length (ft)	=	64.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	834.45
Rise (in)	=	72.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

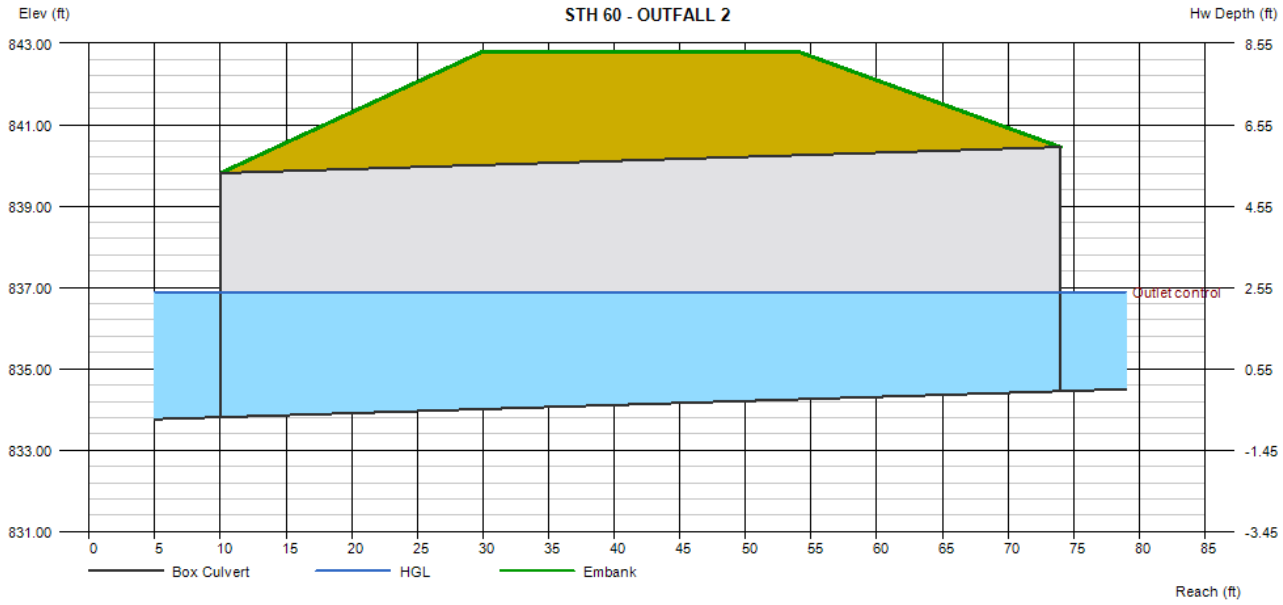
Top Elevation (ft)	=	842.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.74
Qmax (cfs)	=	5.74
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.74
Qpipe (cfs)	=	5.74
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.12
Veloc Up (ft/s)	=	0.15
HGL Dn (ft)	=	836.89
HGL Up (ft)	=	836.89
Hw Elev (ft)	=	836.89
Hw/D (ft)	=	0.41
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 18 2015

STH 60 - OUTFALL 2 - 100yr Proposed

Invert Elev Dn (ft)	=	833.81
Pipe Length (ft)	=	64.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	834.45
Rise (in)	=	72.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

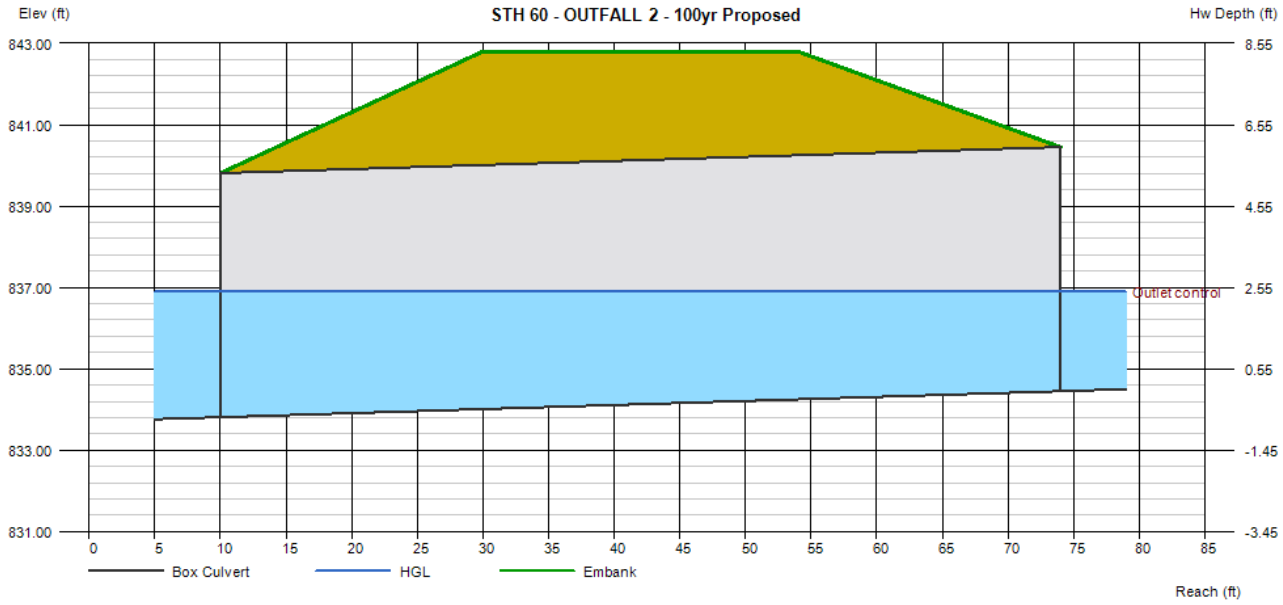
Top Elevation (ft)	=	842.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.13
Qmax (cfs)	=	6.13
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.13
Qpipe (cfs)	=	6.13
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.12
Veloc Up (ft/s)	=	0.16
HGL Dn (ft)	=	836.89
HGL Up (ft)	=	836.89
Hw Elev (ft)	=	836.89
Hw/D (ft)	=	0.41
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 4A - 50 YR Existing

Invert Elev Dn (ft)	=	841.45
Pipe Length (ft)	=	63.60
Slope (%)	=	0.03
Invert Elev Up (ft)	=	841.47
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

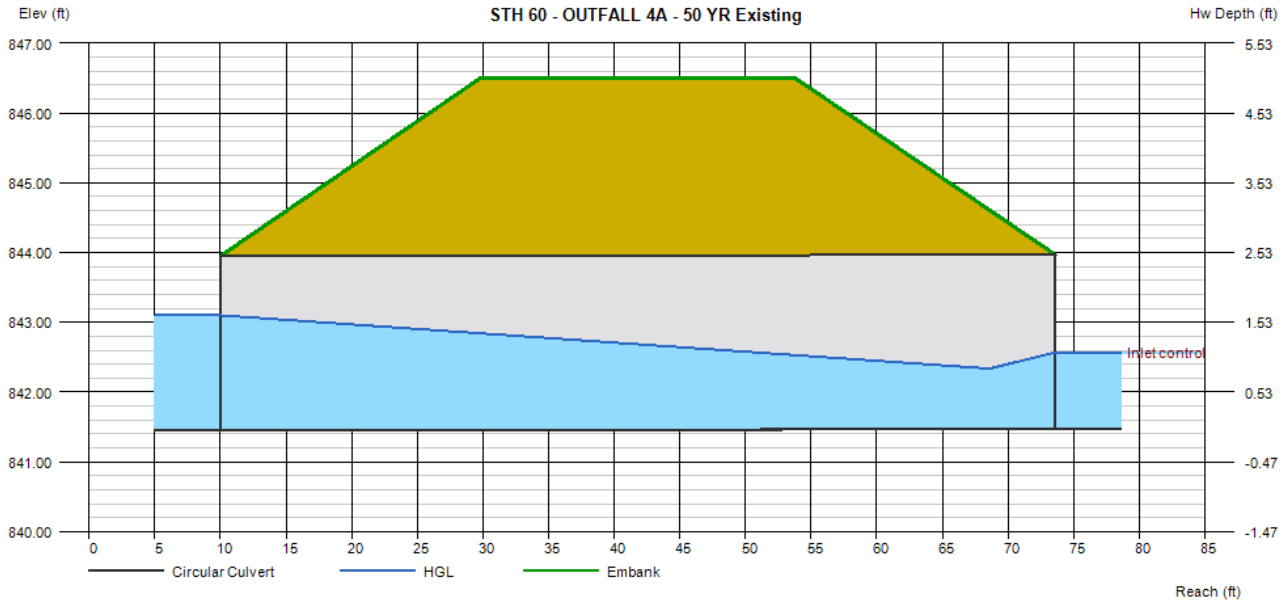
Top Elevation (ft)	=	846.50
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.88
Qmax (cfs)	=	5.88
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.88
Qpipe (cfs)	=	5.88
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.71
Veloc Up (ft/s)	=	4.33
HGL Dn (ft)	=	843.10
HGL Up (ft)	=	842.27
Hw Elev (ft)	=	842.57
Hw/D (ft)	=	0.44
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 4A - 50 YR Proposed

Invert Elev Dn (ft)	=	841.45
Pipe Length (ft)	=	63.60
Slope (%)	=	0.03
Invert Elev Up (ft)	=	841.47
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

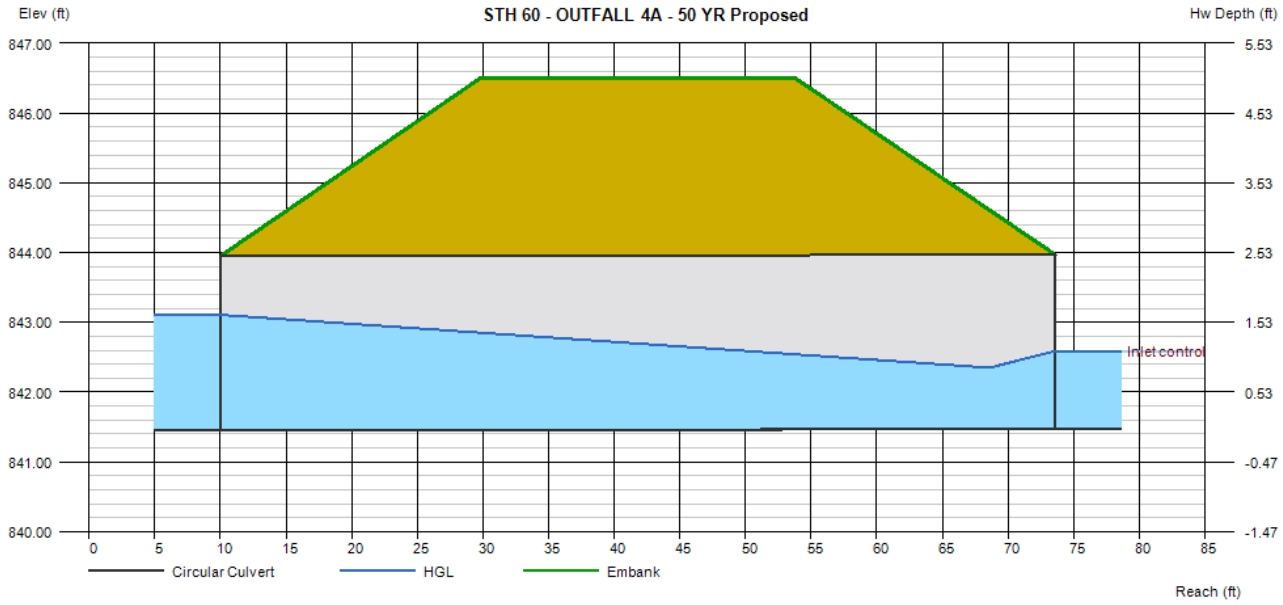
Top Elevation (ft)	=	846.50
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.07
Qmax (cfs)	=	6.07
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.07
Qpipe (cfs)	=	6.07
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.76
Veloc Up (ft/s)	=	4.37
HGL Dn (ft)	=	843.11
HGL Up (ft)	=	842.28
Hw Elev (ft)	=	842.59
Hw/D (ft)	=	0.45
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 4A - 100 YR Proposed

Invert Elev Dn (ft)	=	841.45
Pipe Length (ft)	=	63.60
Slope (%)	=	0.03
Invert Elev Up (ft)	=	841.47
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

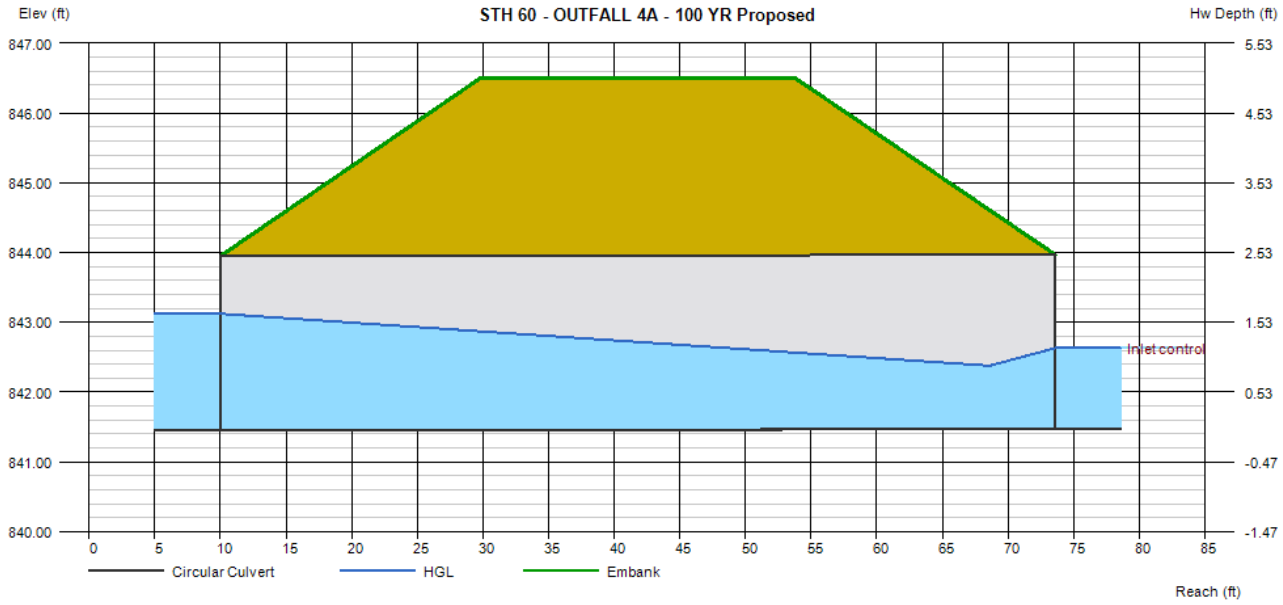
Top Elevation (ft)	=	846.50
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.50
Qmax (cfs)	=	6.50
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.50
Qpipe (cfs)	=	6.50
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.86
Veloc Up (ft/s)	=	4.46
HGL Dn (ft)	=	843.12
HGL Up (ft)	=	842.31
Hw Elev (ft)	=	842.63
Hw/D (ft)	=	0.46
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 5 - 50 YR Existing

Invert Elev Dn (ft)	=	833.81
Pipe Length (ft)	=	64.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	834.45
Rise (in)	=	72.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

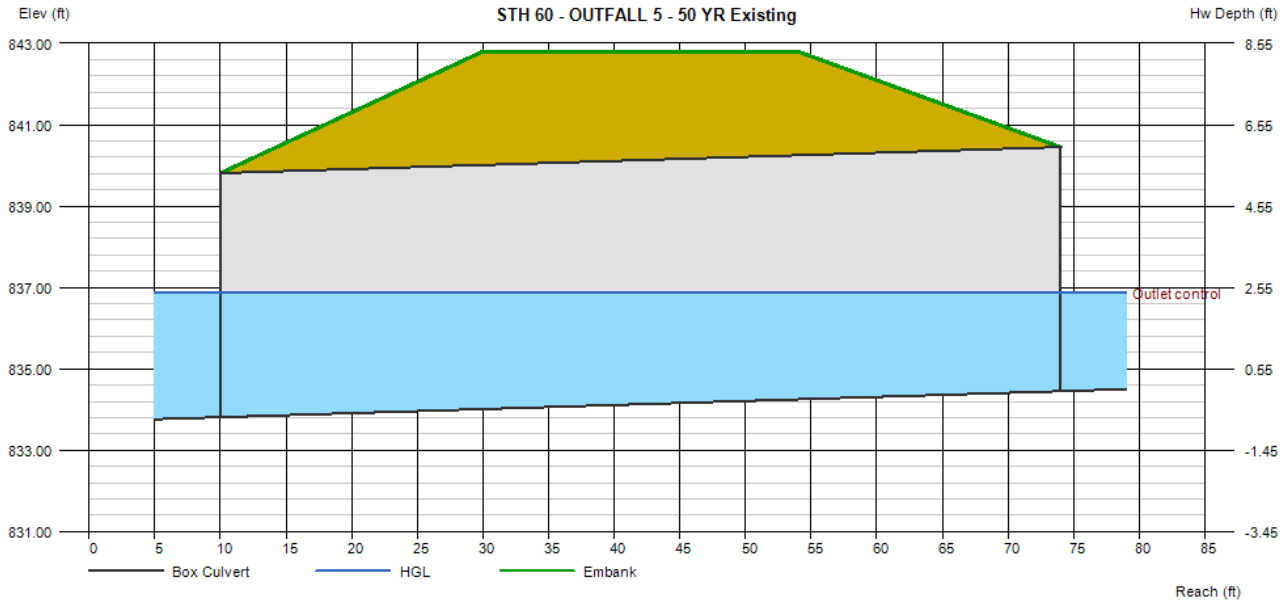
Top Elevation (ft)	=	842.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	4.23
Qmax (cfs)	=	4.23
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	4.23
Qpipe (cfs)	=	4.23
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.09
Veloc Up (ft/s)	=	0.11
HGL Dn (ft)	=	836.87
HGL Up (ft)	=	836.88
Hw Elev (ft)	=	836.88
Hw/D (ft)	=	0.40
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 5 - 50 YR Proposed

Invert Elev Dn (ft)	=	833.81
Pipe Length (ft)	=	64.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	834.45
Rise (in)	=	72.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

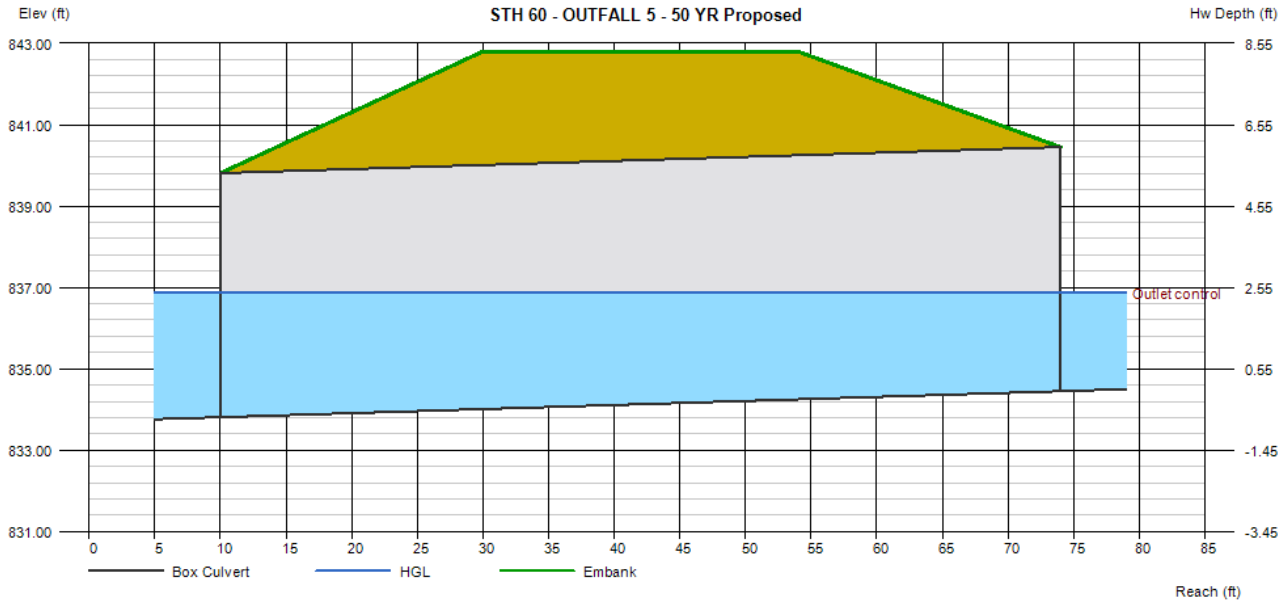
Top Elevation (ft)	=	842.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	4.38
Qmax (cfs)	=	4.38
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	4.38
Qpipe (cfs)	=	4.38
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.09
Veloc Up (ft/s)	=	0.11
HGL Dn (ft)	=	836.88
HGL Up (ft)	=	836.88
Hw Elev (ft)	=	836.88
Hw/D (ft)	=	0.40
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 18 2015

STH 60 - OUTFALL 5 - 100yr Proposed

Invert Elev Dn (ft)	=	833.81
Pipe Length (ft)	=	64.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	834.45
Rise (in)	=	72.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	30D to 75D wingwall flares
Coeff. K,M,c,Y,k	=	0.026, 1, 0.0347, 0.81, 0.4

Embankment

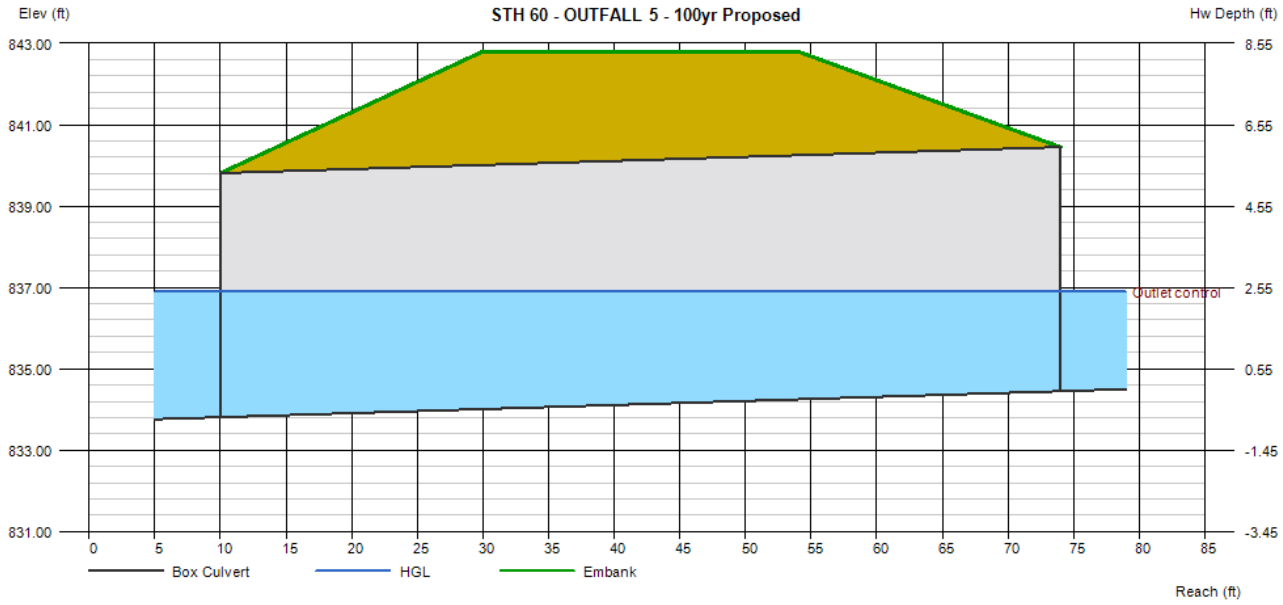
Top Elevation (ft)	=	842.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.15
Qmax (cfs)	=	6.15
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.15
Qpipe (cfs)	=	6.15
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.12
Veloc Up (ft/s)	=	0.16
HGL Dn (ft)	=	836.89
HGL Up (ft)	=	836.89
Hw Elev (ft)	=	836.89
Hw/D (ft)	=	0.41
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 8 - 50 YR Existing

Invert Elev Dn (ft)	=	863.80
Pipe Length (ft)	=	85.90
Slope (%)	=	0.42
Invert Elev Up (ft)	=	864.16
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

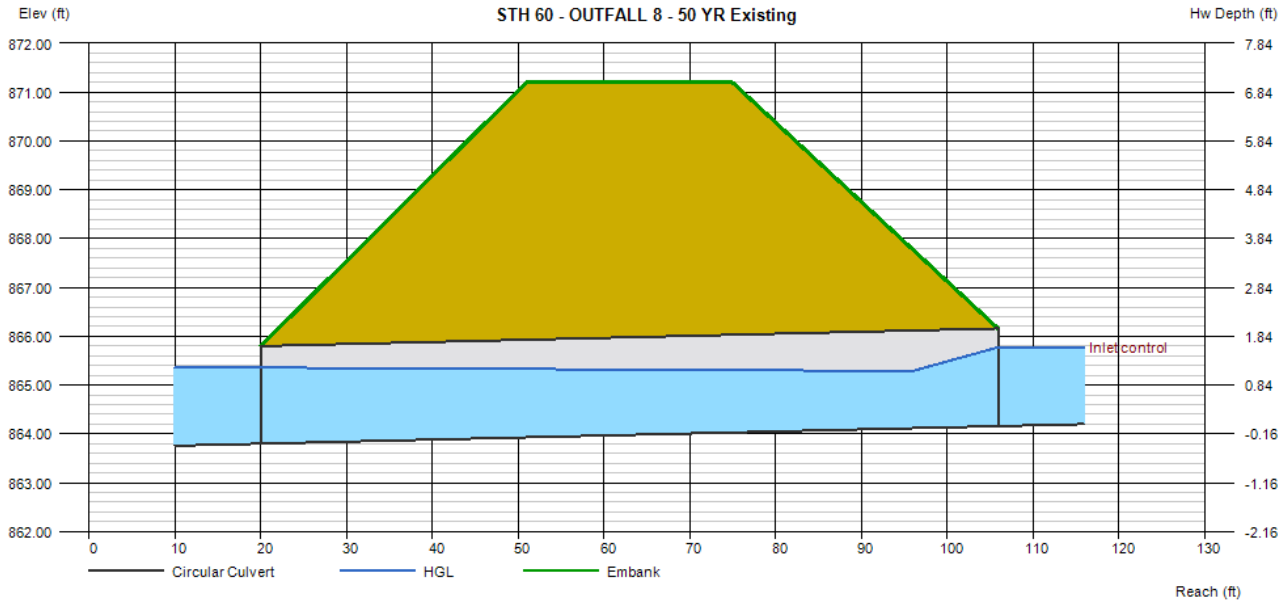
Top Elevation (ft)	=	871.20
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	9.78
Qmax (cfs)	=	9.78
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	9.78
Qpipe (cfs)	=	9.78
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.72
Veloc Up (ft/s)	=	5.42
HGL Dn (ft)	=	865.36
HGL Up (ft)	=	865.28
Hw Elev (ft)	=	865.77
Hw/D (ft)	=	0.81
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 8 - 50 YR Proposed

Invert Elev Dn (ft)	=	863.80
Pipe Length (ft)	=	85.90
Slope (%)	=	0.42
Invert Elev Up (ft)	=	864.16
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

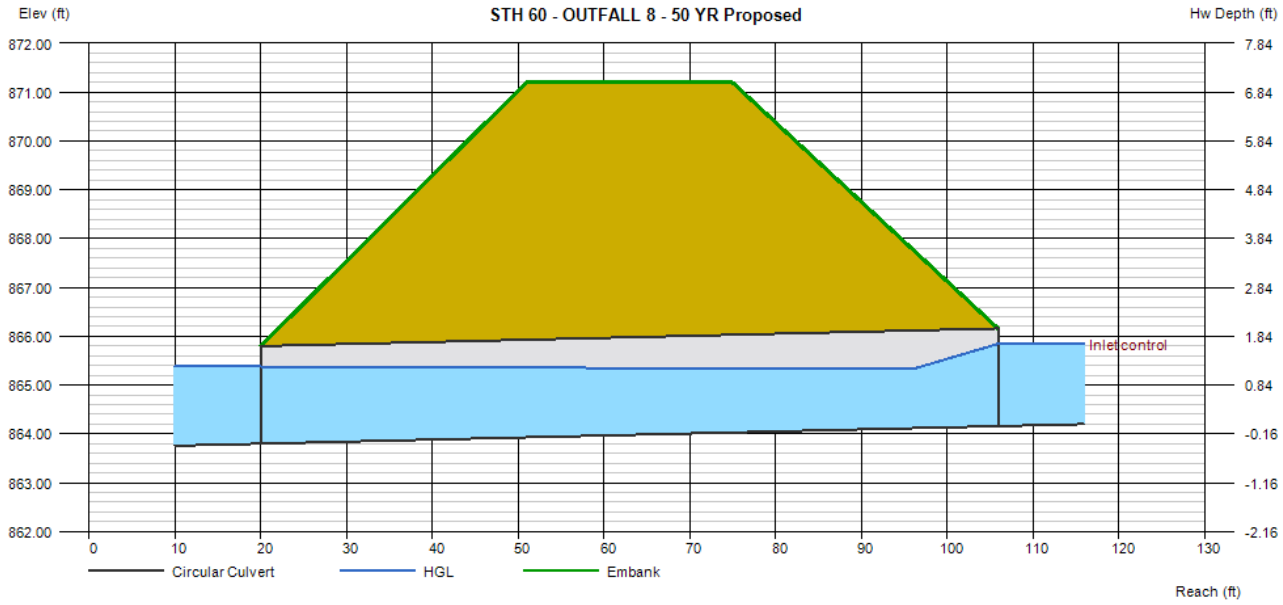
Top Elevation (ft)	=	871.20
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	10.48
Qmax (cfs)	=	10.48
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	10.48
Qpipe (cfs)	=	10.48
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.94
Veloc Up (ft/s)	=	5.56
HGL Dn (ft)	=	865.38
HGL Up (ft)	=	865.32
Hw Elev (ft)	=	865.84
Hw/D (ft)	=	0.84
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 18 2015

STH 60 - OUTFALL 8 - 100yr Proposed

Invert Elev Dn (ft)	=	863.80
Pipe Length (ft)	=	85.90
Slope (%)	=	0.42
Invert Elev Up (ft)	=	864.16
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

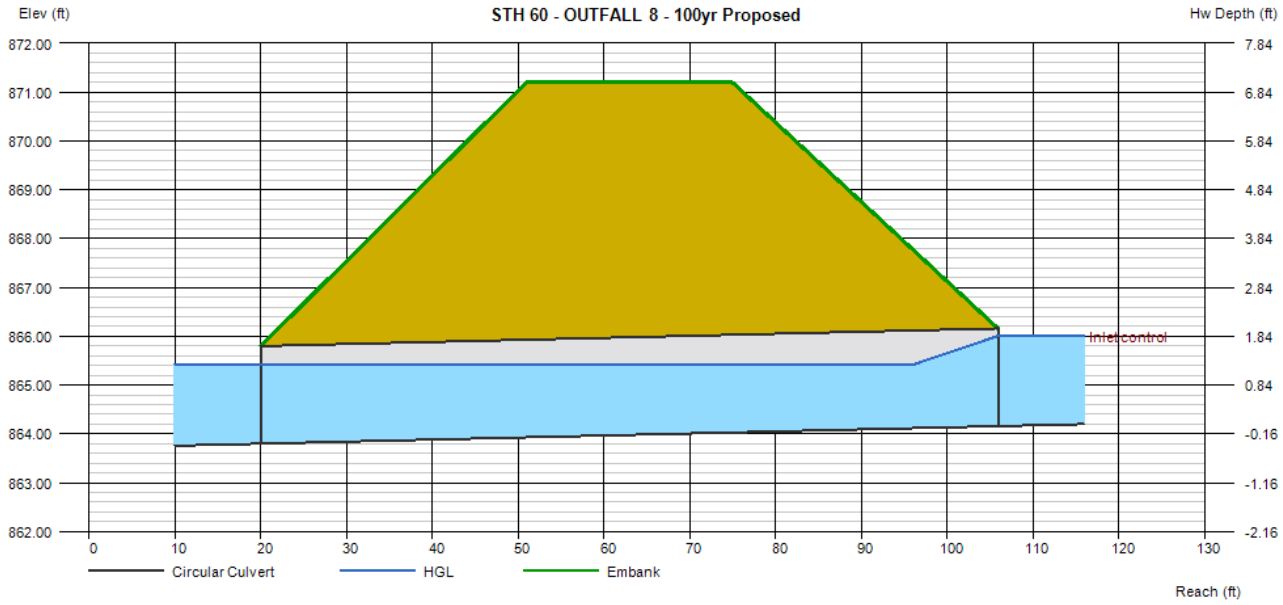
Top Elevation (ft)	=	871.20
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	12.12
Qmax (cfs)	=	12.12
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	12.12
Qpipe (cfs)	=	12.12
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.43
Veloc Up (ft/s)	=	5.87
HGL Dn (ft)	=	865.43
HGL Up (ft)	=	865.41
Hw Elev (ft)	=	866.01
Hw/D (ft)	=	0.92
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 12 - 50 YR Existing

Invert Elev Dn (ft)	=	840.42
Pipe Length (ft)	=	72.90
Slope (%)	=	1.08
Invert Elev Up (ft)	=	841.21
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

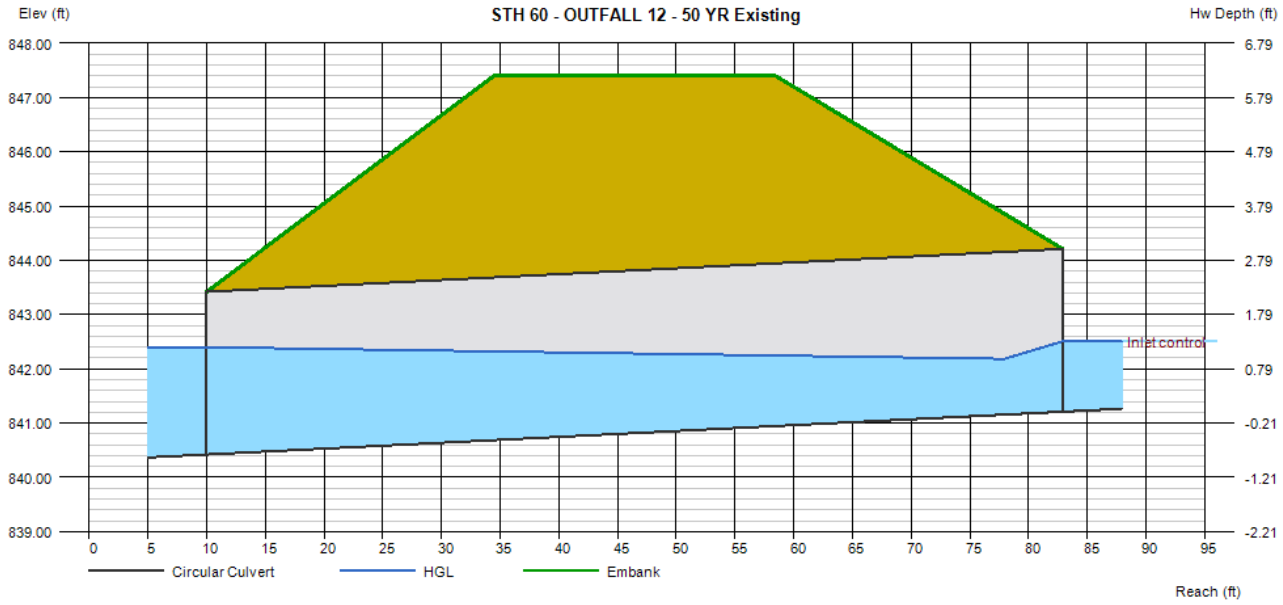
Top Elevation (ft)	=	847.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	9.19
Qmax (cfs)	=	9.19
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	9.19
Qpipe (cfs)	=	9.19
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.86
Veloc Up (ft/s)	=	4.73
HGL Dn (ft)	=	842.40
HGL Up (ft)	=	842.17
Hw Elev (ft)	=	842.51
Hw/D (ft)	=	0.43
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 12 - 50 YR Proposed

Invert Elev Dn (ft)	=	840.42
Pipe Length (ft)	=	72.90
Slope (%)	=	1.08
Invert Elev Up (ft)	=	841.21
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

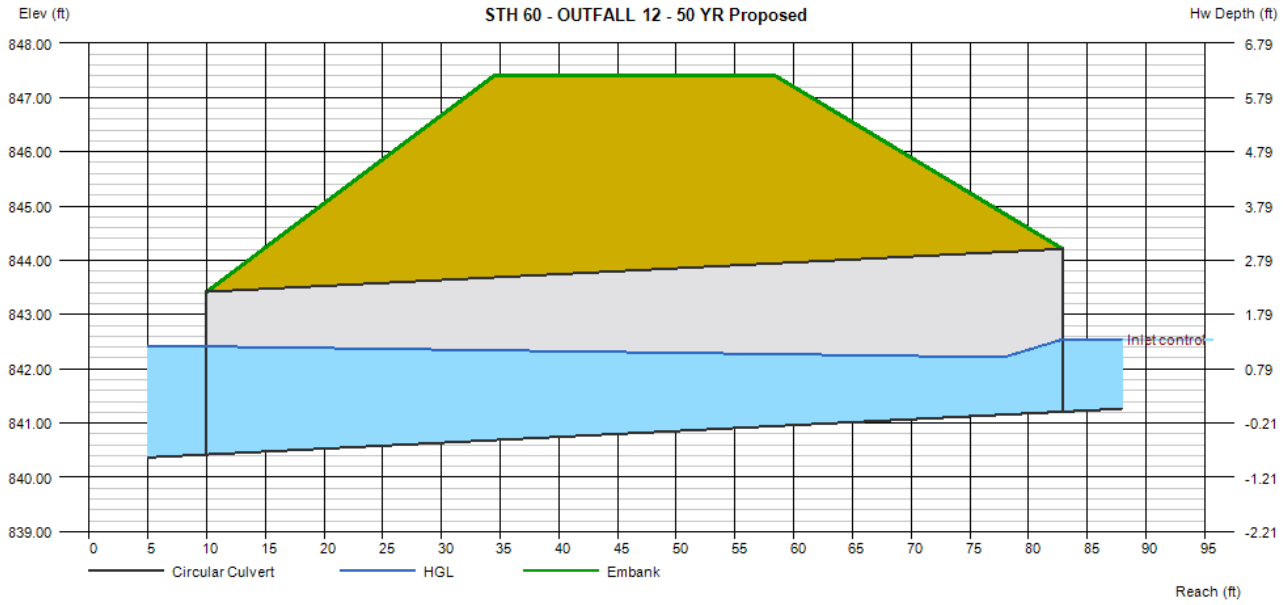
Top Elevation (ft)	=	847.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	9.67
Qmax (cfs)	=	9.67
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	9.67
Qpipe (cfs)	=	9.67
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.94
Veloc Up (ft/s)	=	4.76
HGL Dn (ft)	=	842.41
HGL Up (ft)	=	842.20
Hw Elev (ft)	=	842.54
Hw/D (ft)	=	0.44
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 12 - 100yr Proposed

Invert Elev Dn (ft)	=	840.42
Pipe Length (ft)	=	72.90
Slope (%)	=	1.08
Invert Elev Up (ft)	=	841.21
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

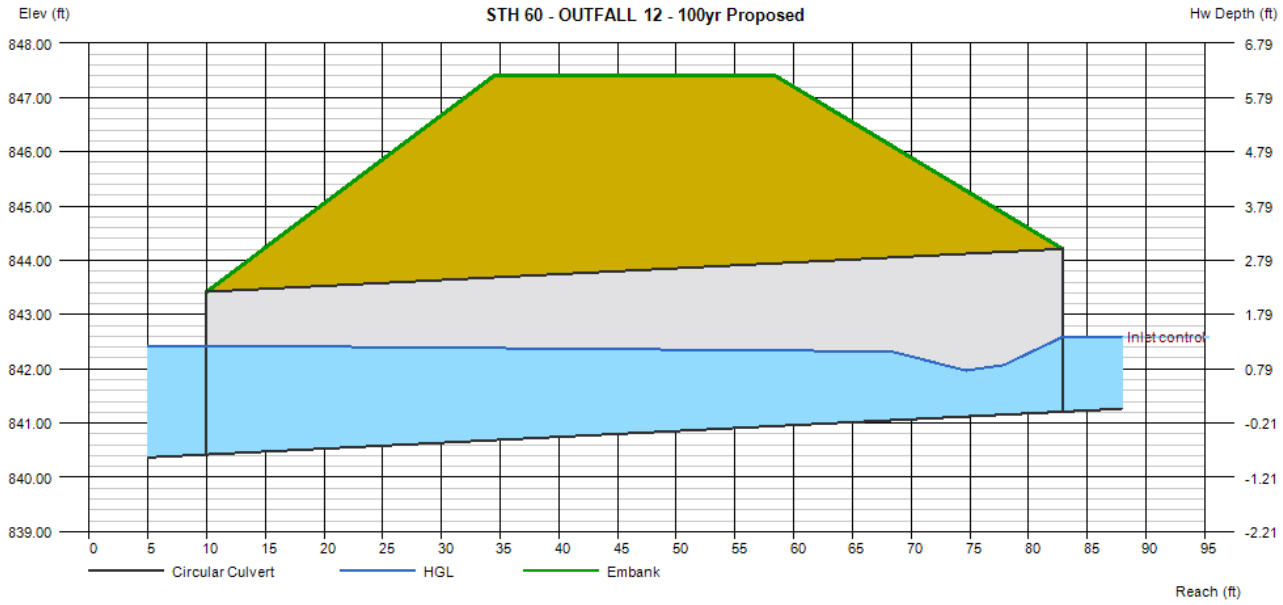
Top Elevation (ft)	=	847.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	10.27
Qmax (cfs)	=	10.27
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	10.27
Qpipe (cfs)	=	10.27
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.04
Veloc Up (ft/s)	=	4.84
HGL Dn (ft)	=	842.43
HGL Up (ft)	=	842.23
Hw Elev (ft)	=	842.59
Hw/D (ft)	=	0.46
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 14 - 50 YR Existing

Invert Elev Dn (ft)	=	839.64
Pipe Length (ft)	=	73.70
Slope (%)	=	1.30
Invert Elev Up (ft)	=	840.60
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

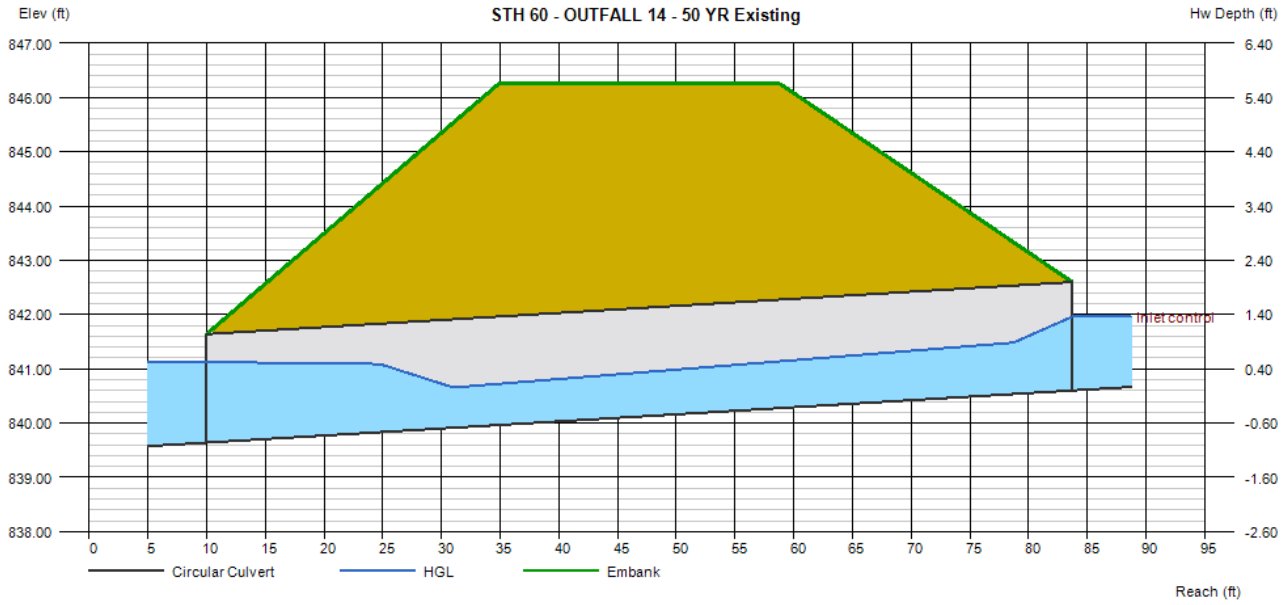
Top Elevation (ft)	=	846.25
Top Width (ft)	=	24.00
Crest Width (ft)	=	73.70

Calculations

Qmin (cfs)	=	7.45
Qmax (cfs)	=	7.45
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	7.45
Qpipe (cfs)	=	7.45
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.98
Veloc Up (ft/s)	=	4.94
HGL Dn (ft)	=	841.12
HGL Up (ft)	=	841.57
Hw Elev (ft)	=	841.96
Hw/D (ft)	=	0.68
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 14 - 50 YR Proposed

Invert Elev Dn (ft)	=	839.64
Pipe Length (ft)	=	73.70
Slope (%)	=	1.30
Invert Elev Up (ft)	=	840.60
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

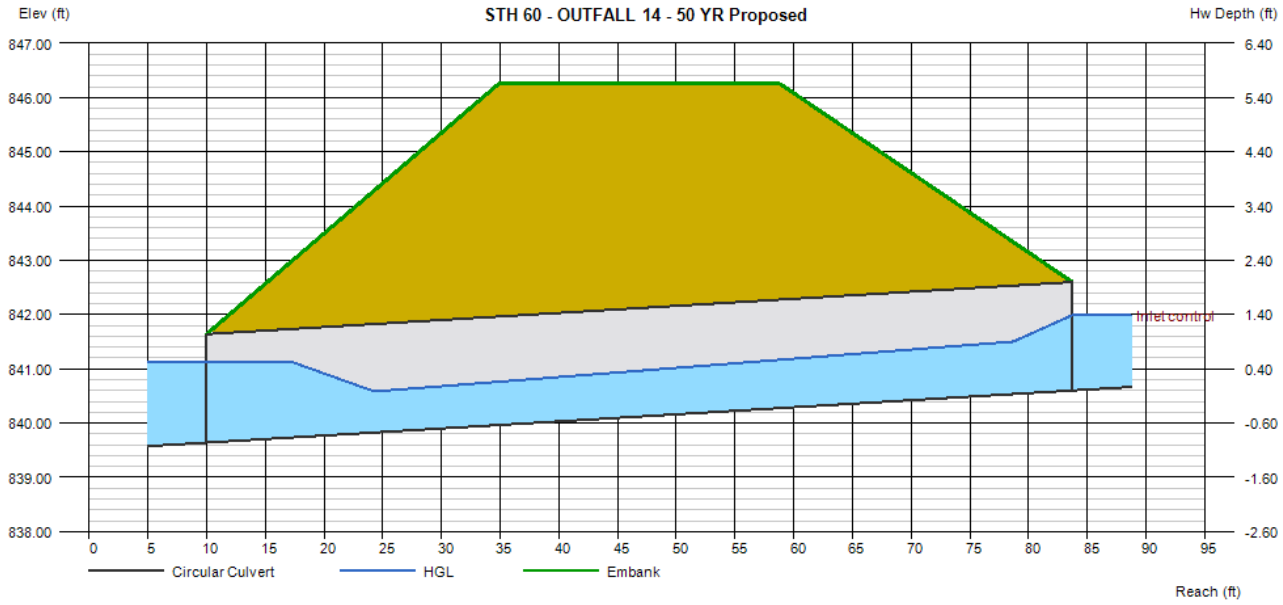
Top Elevation (ft)	=	846.25
Top Width (ft)	=	24.00
Crest Width (ft)	=	73.70

Calculations

Qmin (cfs)	=	7.71
Qmax (cfs)	=	7.71
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	7.71
Qpipe (cfs)	=	7.71
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.06
Veloc Up (ft/s)	=	4.99
HGL Dn (ft)	=	841.13
HGL Up (ft)	=	841.59
Hw Elev (ft)	=	841.99
Hw/D (ft)	=	0.69
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 14 - 100yr Proposed

Invert Elev Dn (ft)	=	839.64
Pipe Length (ft)	=	73.70
Slope (%)	=	1.30
Invert Elev Up (ft)	=	840.60
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

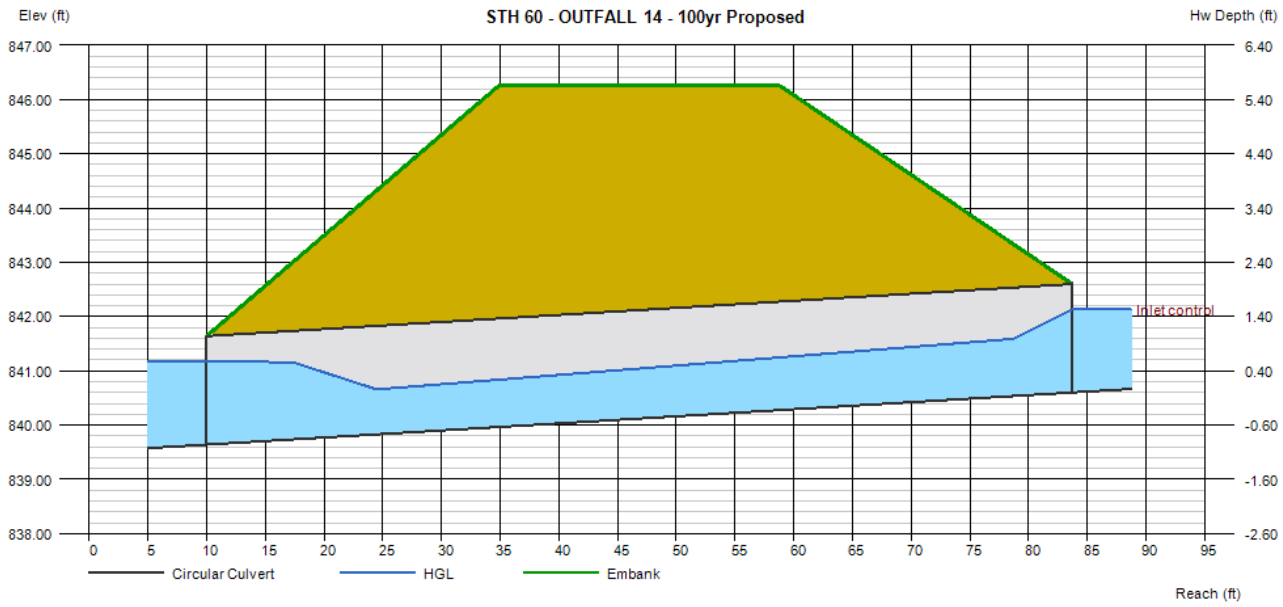
Top Elevation (ft)	=	846.25
Top Width (ft)	=	24.00
Crest Width (ft)	=	73.70

Calculations

Qmin (cfs)	=	9.07
Qmax (cfs)	=	9.07
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	9.07
Qpipe (cfs)	=	9.07
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.50
Veloc Up (ft/s)	=	5.28
HGL Dn (ft)	=	841.18
HGL Up (ft)	=	841.67
Hw Elev (ft)	=	842.13
Hw/D (ft)	=	0.77
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 18 - 50 YR Existing

Invert Elev Dn (ft)	=	854.80
Pipe Length (ft)	=	109.30
Slope (%)	=	1.02
Invert Elev Up (ft)	=	855.91
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

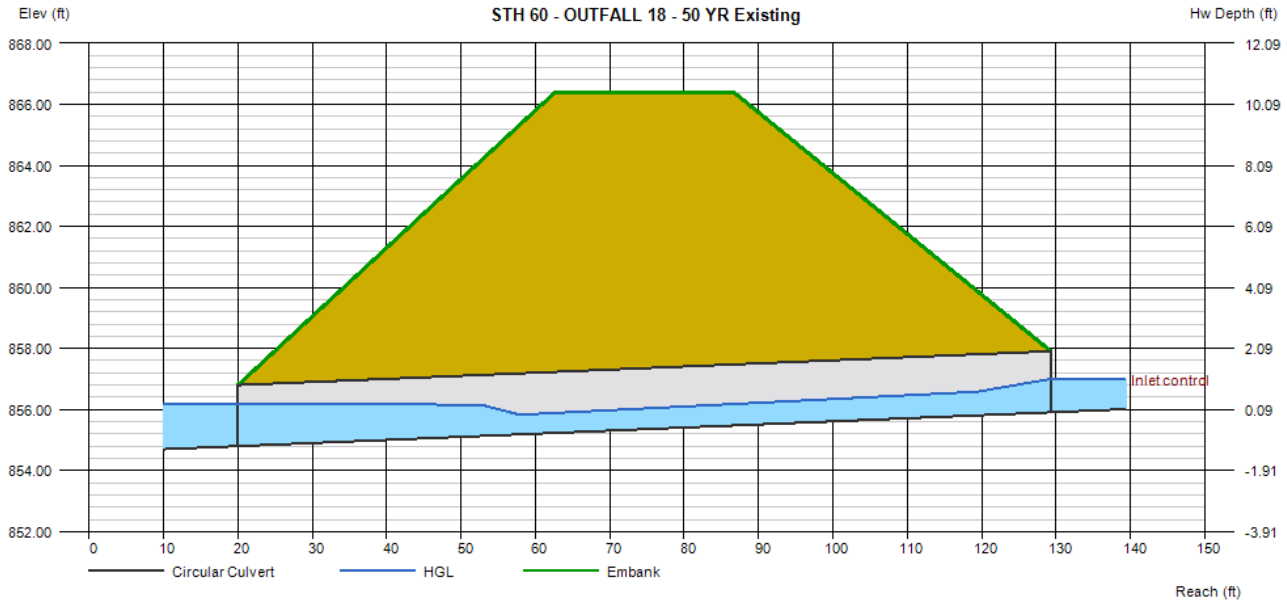
Top Elevation (ft)	=	866.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.06
Qmax (cfs)	=	5.06
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.06
Qpipe (cfs)	=	5.06
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.16
Veloc Up (ft/s)	=	4.37
HGL Dn (ft)	=	856.20
HGL Up (ft)	=	856.70
Hw Elev (ft)	=	857.00
Hw/D (ft)	=	0.55
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 18 - 50 YR Proposed

Invert Elev Dn (ft)	=	854.80
Pipe Length (ft)	=	109.30
Slope (%)	=	1.02
Invert Elev Up (ft)	=	855.91
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

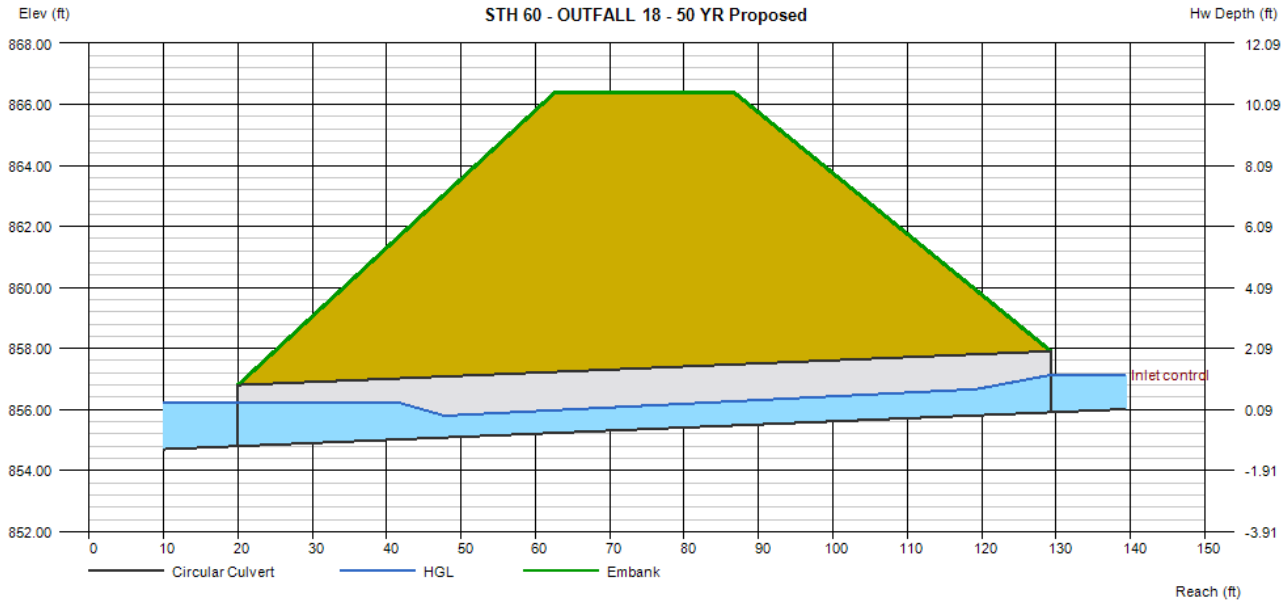
Top Elevation (ft)	=	866.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.18
Qmax (cfs)	=	6.18
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.18
Qpipe (cfs)	=	6.18
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.55
Veloc Up (ft/s)	=	4.65
HGL Dn (ft)	=	856.24
HGL Up (ft)	=	856.79
Hw Elev (ft)	=	857.13
Hw/D (ft)	=	0.61
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 18 2015

STH 60 - OUTFALL 18 - 100yr Proposed

Invert Elev Dn (ft)	=	854.80
Pipe Length (ft)	=	109.30
Slope (%)	=	1.02
Invert Elev Up (ft)	=	855.91
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

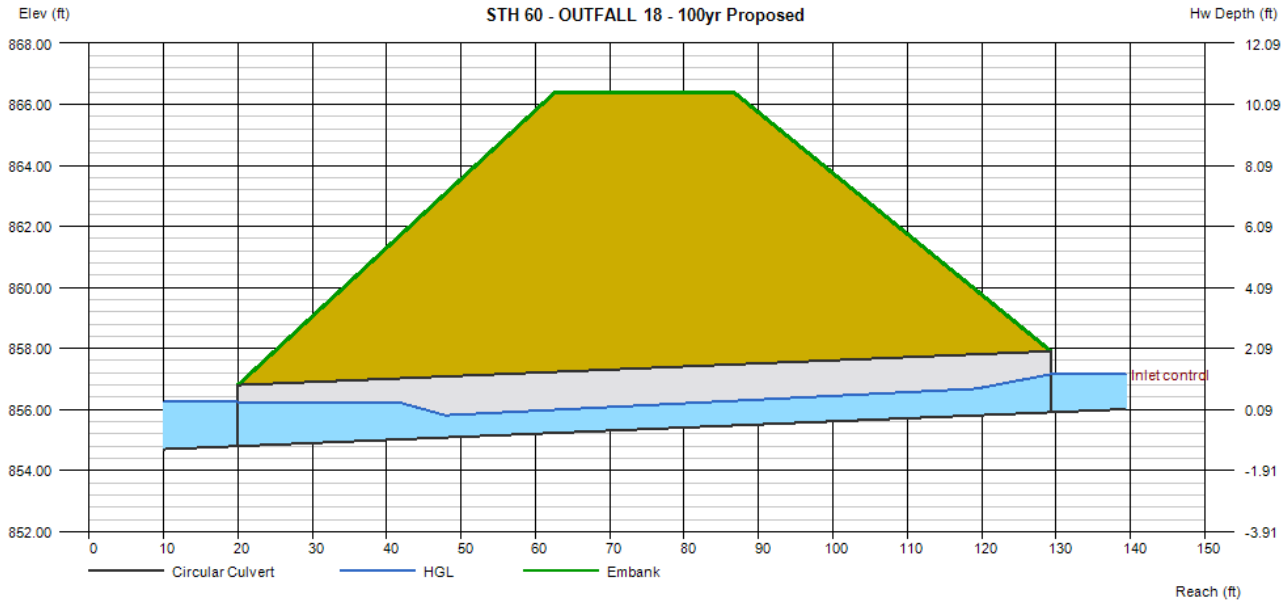
Top Elevation (ft)	=	866.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.40
Qmax (cfs)	=	6.40
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.40
Qpipe (cfs)	=	6.40
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.63
Veloc Up (ft/s)	=	4.70
HGL Dn (ft)	=	856.25
HGL Up (ft)	=	856.80
Hw Elev (ft)	=	857.16
Hw/D (ft)	=	0.62
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 24 - 50 YR Existing

Invert Elev Dn (ft)	=	850.29
Pipe Length (ft)	=	86.90
Slope (%)	=	0.79
Invert Elev Up (ft)	=	850.98
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

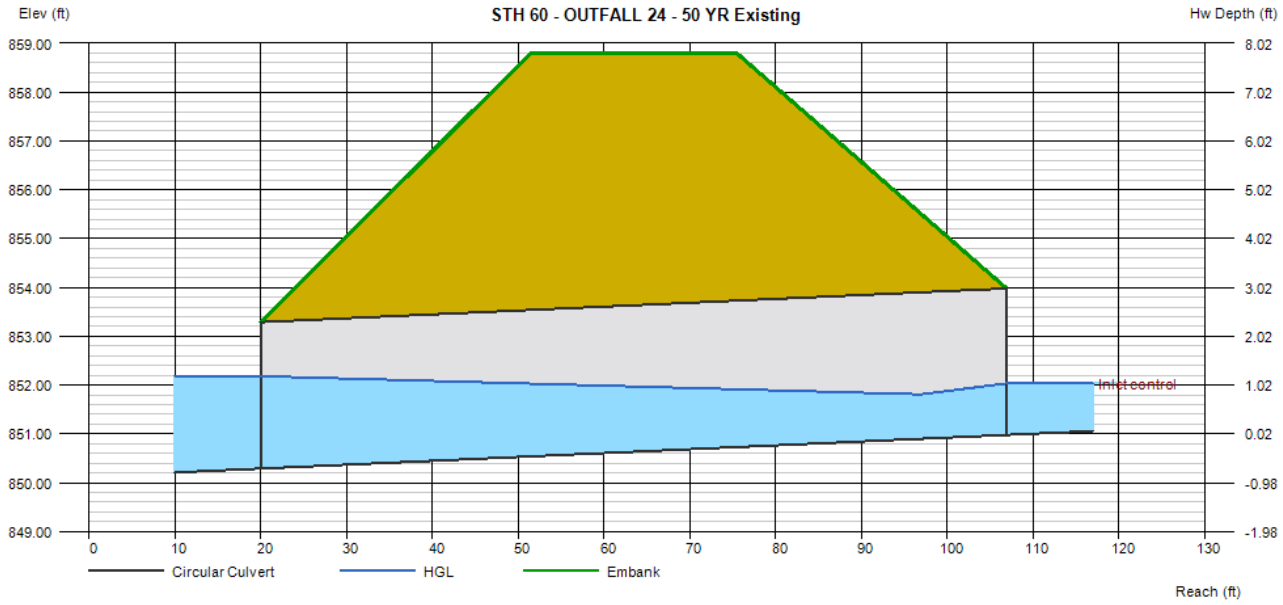
Top Elevation (ft)	=	858.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.23
Qmax (cfs)	=	6.23
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.23
Qpipe (cfs)	=	6.23
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.33
Veloc Up (ft/s)	=	4.24
HGL Dn (ft)	=	852.18
HGL Up (ft)	=	851.76
Hw Elev (ft)	=	852.03
Hw/D (ft)	=	0.35
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 24 - 50 YR Proposed

Invert Elev Dn (ft)	=	850.29
Pipe Length (ft)	=	86.90
Slope (%)	=	0.79
Invert Elev Up (ft)	=	850.98
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

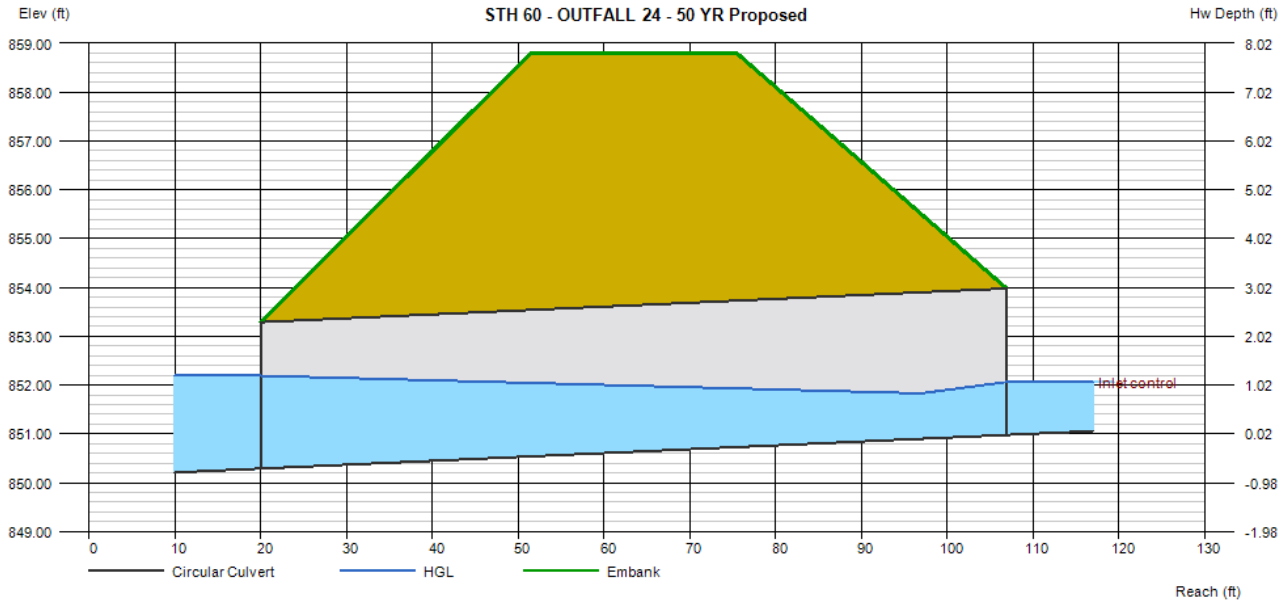
Top Elevation (ft)	=	858.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.55
Qmax (cfs)	=	6.55
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.55
Qpipe (cfs)	=	6.55
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.39
Veloc Up (ft/s)	=	4.30
HGL Dn (ft)	=	852.19
HGL Up (ft)	=	851.78
Hw Elev (ft)	=	852.06
Hw/D (ft)	=	0.36
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 18 2015

STH 60 - OUTFALL 24 - 100yr Proposed

Invert Elev Dn (ft)	=	850.29
Pipe Length (ft)	=	86.90
Slope (%)	=	0.79
Invert Elev Up (ft)	=	850.98
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

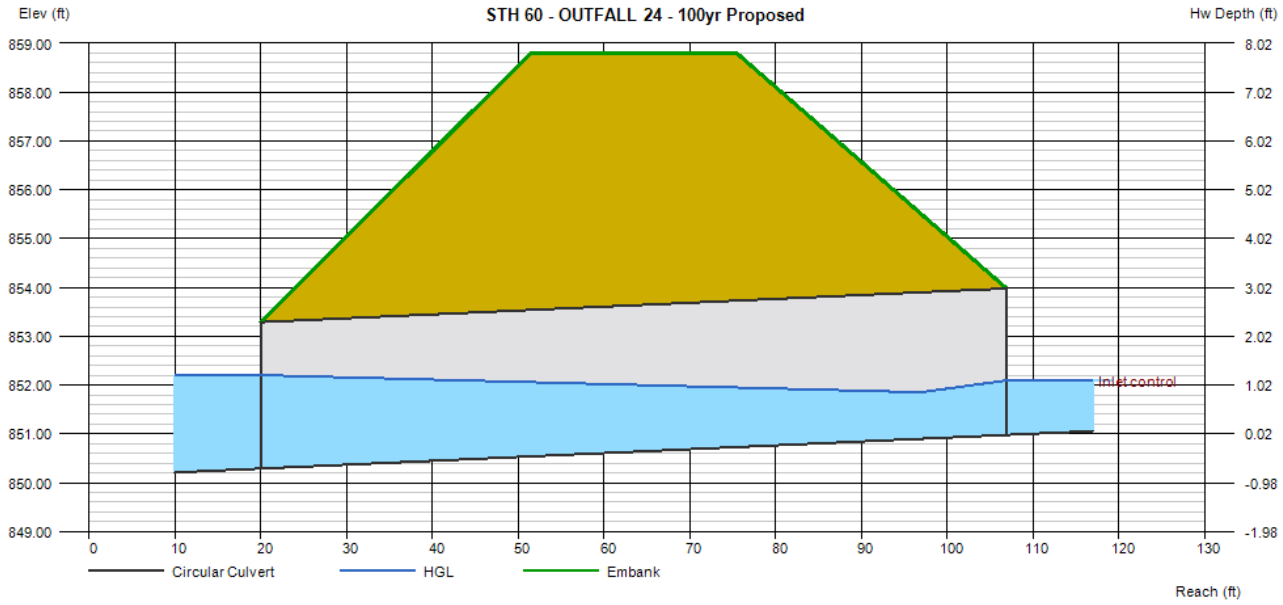
Top Elevation (ft)	=	858.80
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.92
Qmax (cfs)	=	6.92
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.92
Qpipe (cfs)	=	6.92
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.45
Veloc Up (ft/s)	=	4.37
HGL Dn (ft)	=	852.20
HGL Up (ft)	=	851.81
Hw Elev (ft)	=	852.10
Hw/D (ft)	=	0.37
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 26 - 50 YR Existing

Invert Elev Dn (ft)	=	849.32
Pipe Length (ft)	=	56.00
Slope (%)	=	1.46
Invert Elev Up (ft)	=	850.14
Rise (in)	=	60.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	0D wingwall flares
Coeff. K,M,c,Y,k	=	0.061, 0.75, 0.0423, 0.82, 0.7

Embankment

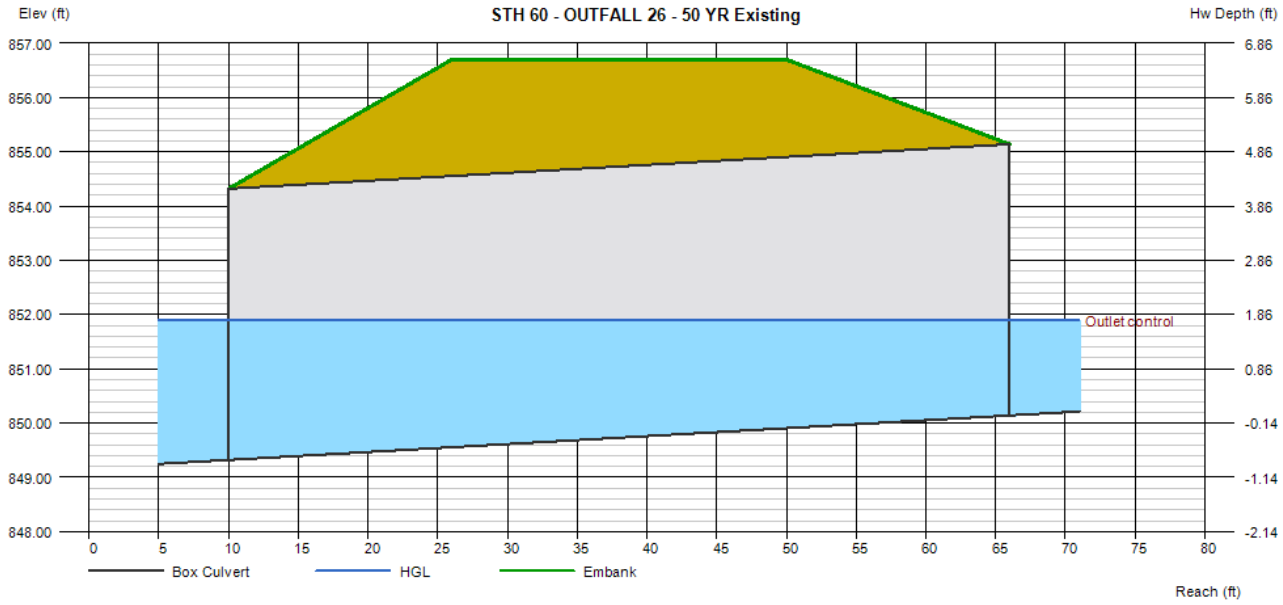
Top Elevation (ft)	=	856.70
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.40
Qmax (cfs)	=	5.40
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.40
Qpipe (cfs)	=	5.40
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.13
Veloc Up (ft/s)	=	0.19
HGL Dn (ft)	=	851.90
HGL Up (ft)	=	851.90
Hw Elev (ft)	=	851.90
Hw/D (ft)	=	0.35
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 26 - 50 YR Proposed

Invert Elev Dn (ft)	=	849.32
Pipe Length (ft)	=	56.00
Slope (%)	=	1.46
Invert Elev Up (ft)	=	850.14
Rise (in)	=	60.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	0D wingwall flares
Coeff. K,M,c,Y,k	=	0.061, 0.75, 0.0423, 0.82, 0.7

Embankment

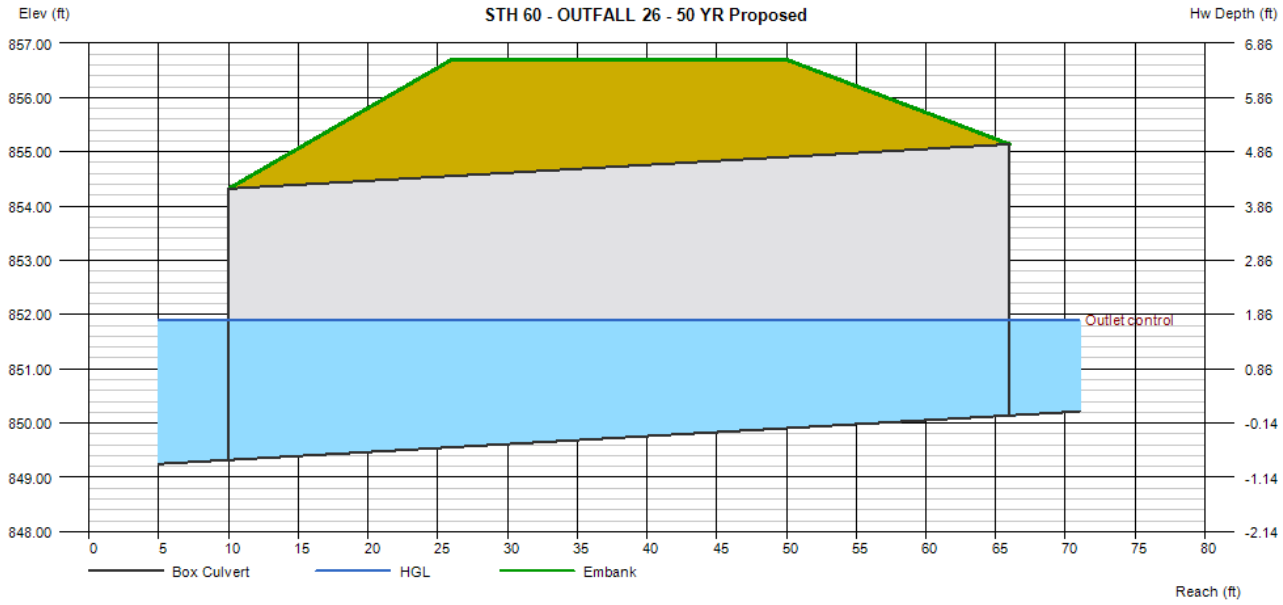
Top Elevation (ft)	=	856.70
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.78
Qmax (cfs)	=	5.78
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.78
Qpipe (cfs)	=	5.78
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.14
Veloc Up (ft/s)	=	0.21
HGL Dn (ft)	=	851.90
HGL Up (ft)	=	851.90
Hw Elev (ft)	=	851.90
Hw/D (ft)	=	0.35
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 18 2015

STH 60 - OUTFALL 26 - 100yr Proposed

Invert Elev Dn (ft)	=	849.32
Pipe Length (ft)	=	56.00
Slope (%)	=	1.46
Invert Elev Up (ft)	=	850.14
Rise (in)	=	60.0
Shape	=	Box
Span (in)	=	96.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Flared Wingwalls
Culvert Entrance	=	0D wingwall flares
Coeff. K,M,c,Y,k	=	0.061, 0.75, 0.0423, 0.82, 0.7

Embankment

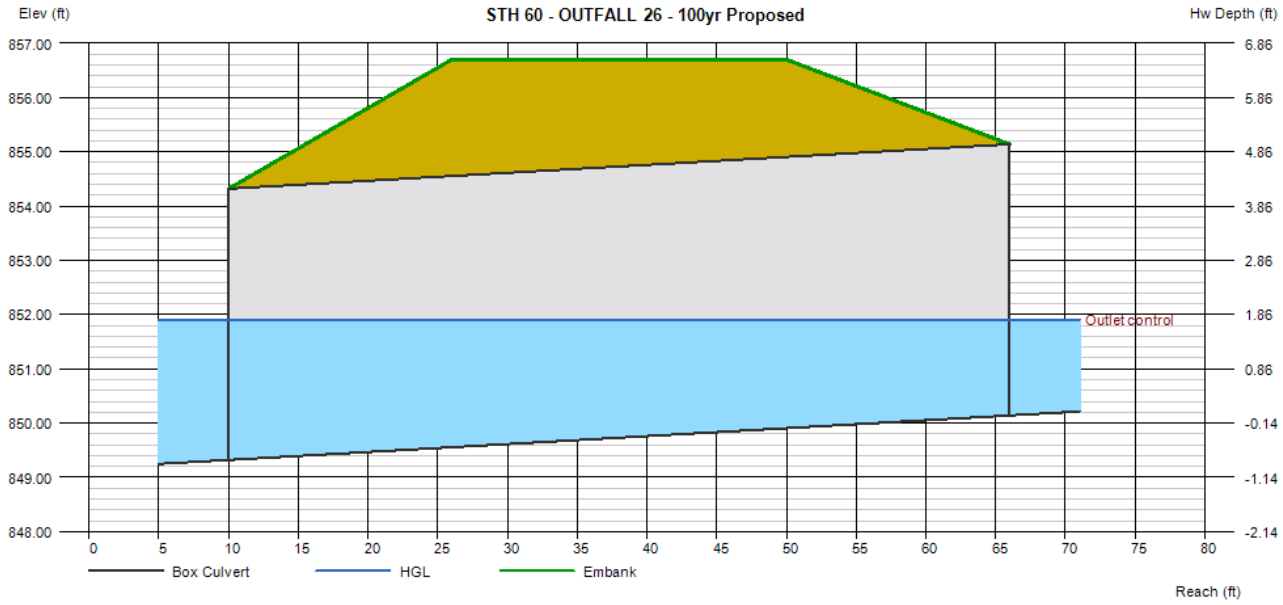
Top Elevation (ft)	=	856.70
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.45
Qmax (cfs)	=	6.45
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.45
Qpipe (cfs)	=	6.45
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.16
Veloc Up (ft/s)	=	0.23
HGL Dn (ft)	=	851.91
HGL Up (ft)	=	851.91
Hw Elev (ft)	=	851.91
Hw/D (ft)	=	0.35
Flow Regime	=	Outlet Control



Culvert Report

STH 60 - OUTFALL 33A - 50 YR Existing

Invert Elev Dn (ft)	=	869.04
Pipe Length (ft)	=	73.60
Slope (%)	=	0.29
Invert Elev Up (ft)	=	869.25
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

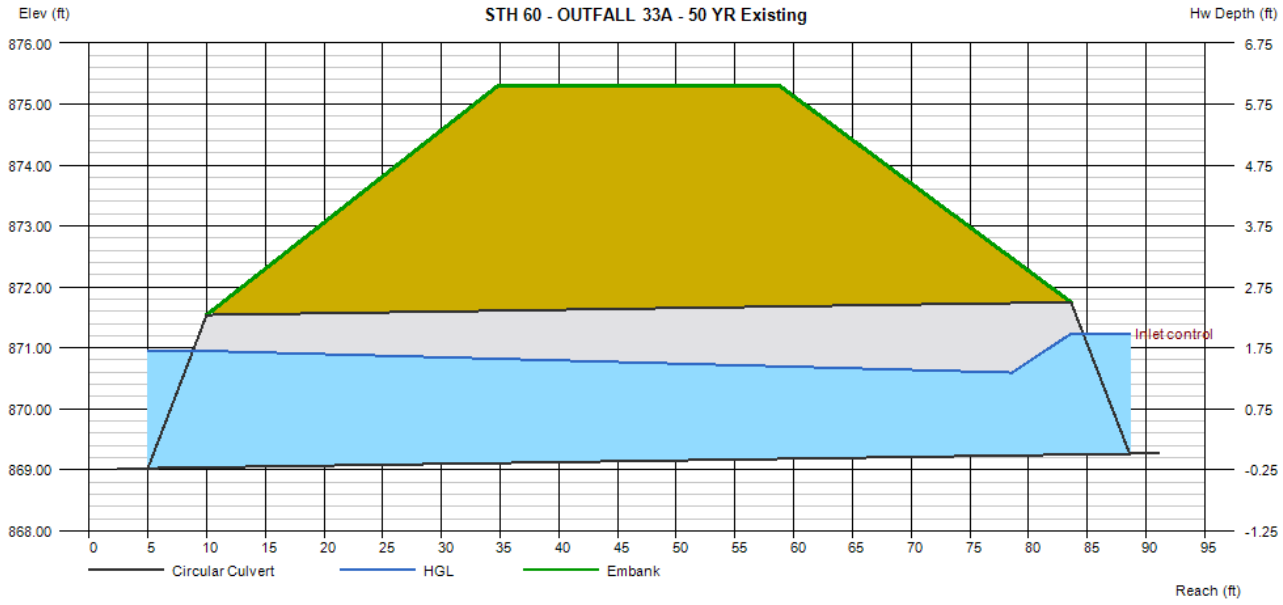
Top Elevation (ft)	=	875.30
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	15.32
Qmax (cfs)	=	15.32
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	15.32
Qpipe (cfs)	=	15.32
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.81
Veloc Up (ft/s)	=	5.83
HGL Dn (ft)	=	870.95
HGL Up (ft)	=	870.57
Hw Elev (ft)	=	871.23
Hw/D (ft)	=	0.79
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Aug 31 2016

STH 60 - OUTFALL 33A - 50 YR Proposed

Invert Elev Dn (ft)	=	869.04
Pipe Length (ft)	=	73.60
Slope (%)	=	0.29
Invert Elev Up (ft)	=	869.25
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

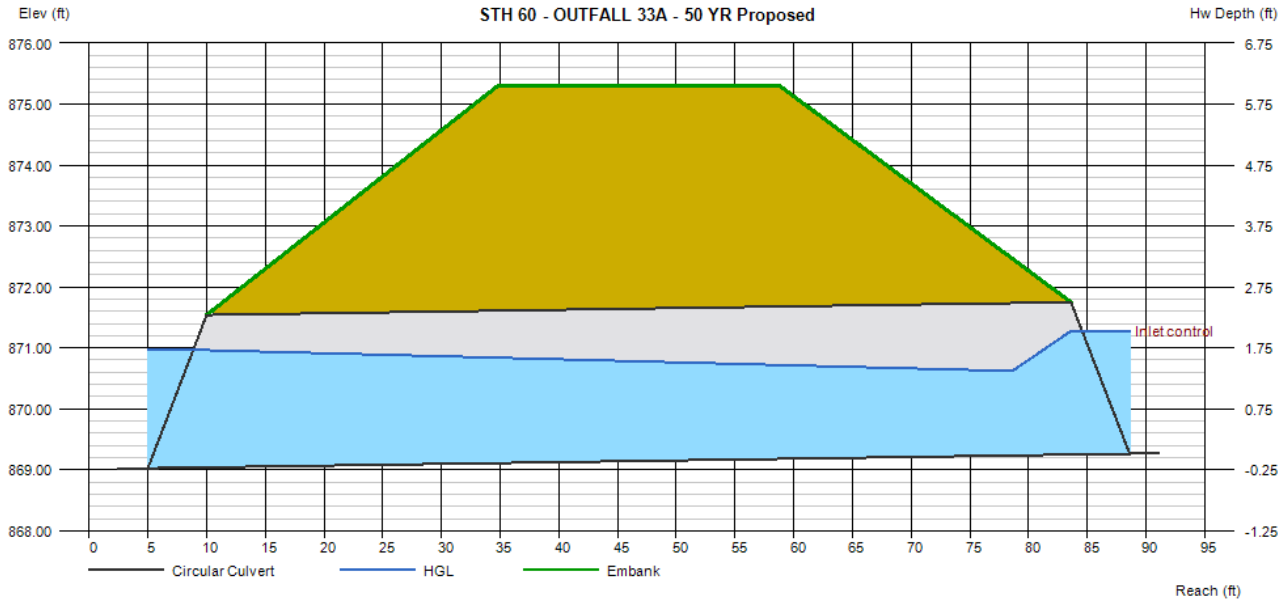
Top Elevation (ft)	=	875.30
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	15.89
Qmax (cfs)	=	15.89
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	15.89
Qpipe (cfs)	=	15.89
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.92
Veloc Up (ft/s)	=	5.90
HGL Dn (ft)	=	870.96
HGL Up (ft)	=	870.60
Hw Elev (ft)	=	871.28
Hw/D (ft)	=	0.81
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Aug 31 2016

STH 60 - OUTFALL 33A - 100 YR Proposed

Invert Elev Dn (ft)	=	869.04
Pipe Length (ft)	=	73.60
Slope (%)	=	0.29
Invert Elev Up (ft)	=	869.25
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

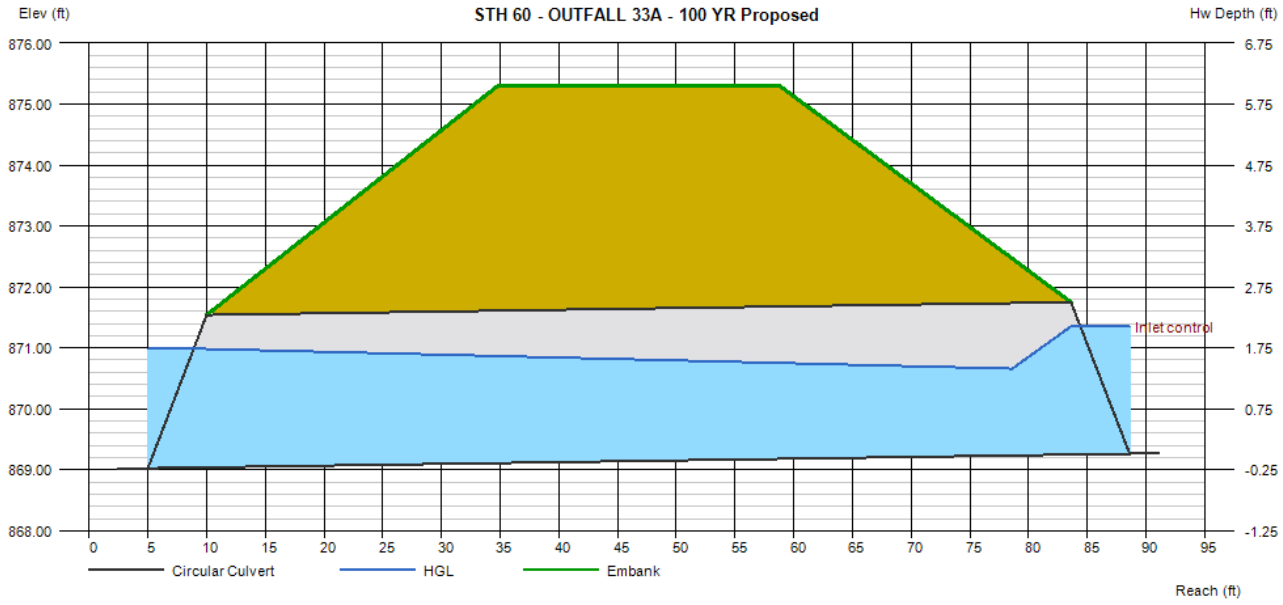
Top Elevation (ft)	=	875.30
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	16.84
Qmax (cfs)	=	16.84
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	16.84
Qpipe (cfs)	=	16.84
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.11
Veloc Up (ft/s)	=	6.03
HGL Dn (ft)	=	870.98
HGL Up (ft)	=	870.64
Hw Elev (ft)	=	871.35
Hw/D (ft)	=	0.84
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Aug 31 2016

STH 60 - OUTFALL 33B - 50 YR Existing

Invert Elev Dn (ft)	=	865.50
Pipe Length (ft)	=	80.00
Slope (%)	=	1.44
Invert Elev Up (ft)	=	866.65
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

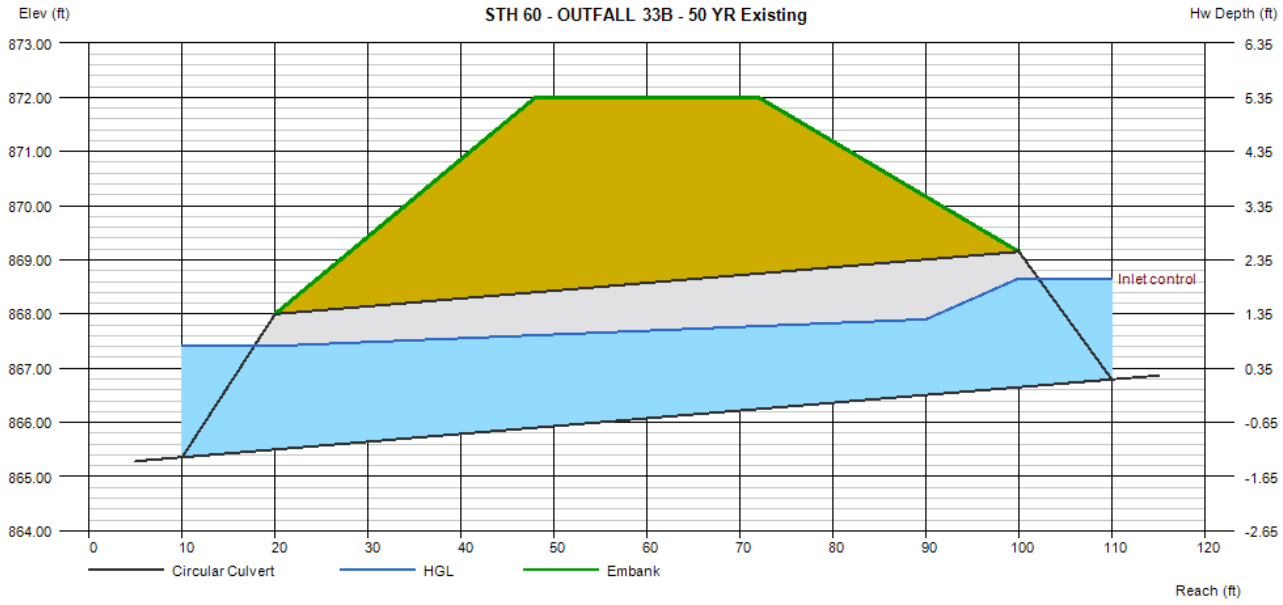
Top Elevation (ft)	=	872.00
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	15.39
Qmax (cfs)	=	15.39
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	15.39
Qpipe (cfs)	=	15.39
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.82
Veloc Up (ft/s)	=	5.84
HGL Dn (ft)	=	867.41
HGL Up (ft)	=	867.97
Hw Elev (ft)	=	868.66
Hw/D (ft)	=	0.80
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 33B - 50 YR Proposed

Invert Elev Dn (ft)	=	865.50
Pipe Length (ft)	=	80.00
Slope (%)	=	1.44
Invert Elev Up (ft)	=	866.65
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

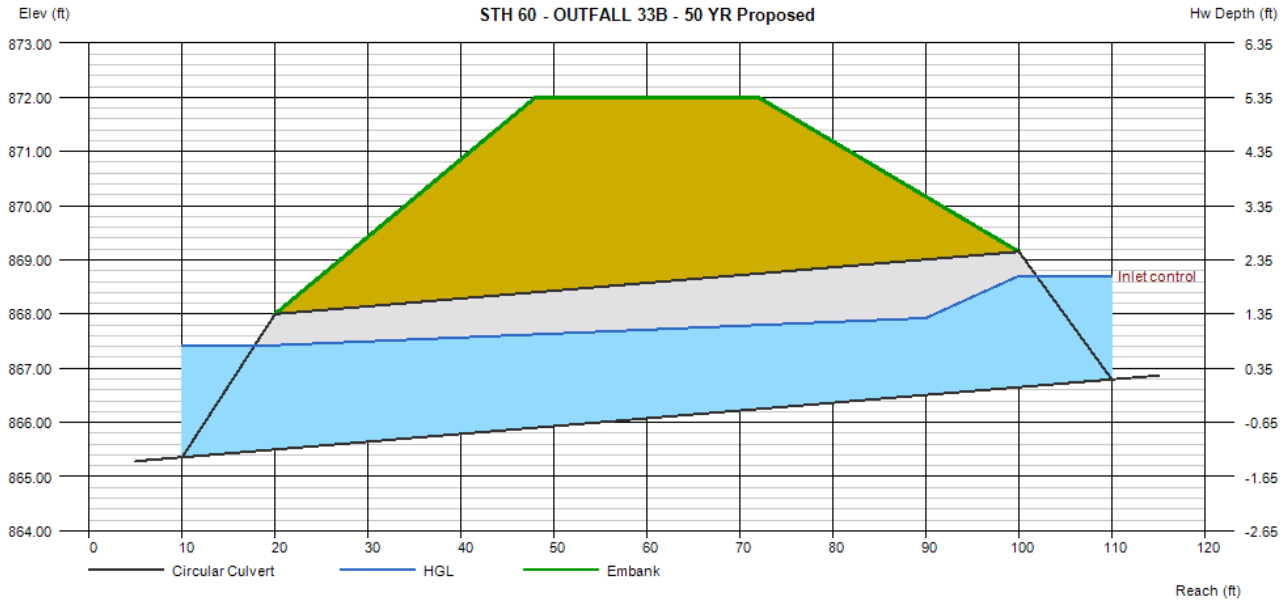
Top Elevation (ft)	=	872.00
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	15.96
Qmax (cfs)	=	15.96
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	15.96
Qpipe (cfs)	=	15.96
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.94
Veloc Up (ft/s)	=	5.92
HGL Dn (ft)	=	867.42
HGL Up (ft)	=	868.00
Hw Elev (ft)	=	868.70
Hw/D (ft)	=	0.82
Flow Regime	=	Inlet Control



Culvert Report

STH 60 - OUTFALL 33B - 100 YR Proposed

Invert Elev Dn (ft)	=	865.50
Pipe Length (ft)	=	80.00
Slope (%)	=	1.44
Invert Elev Up (ft)	=	866.65
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

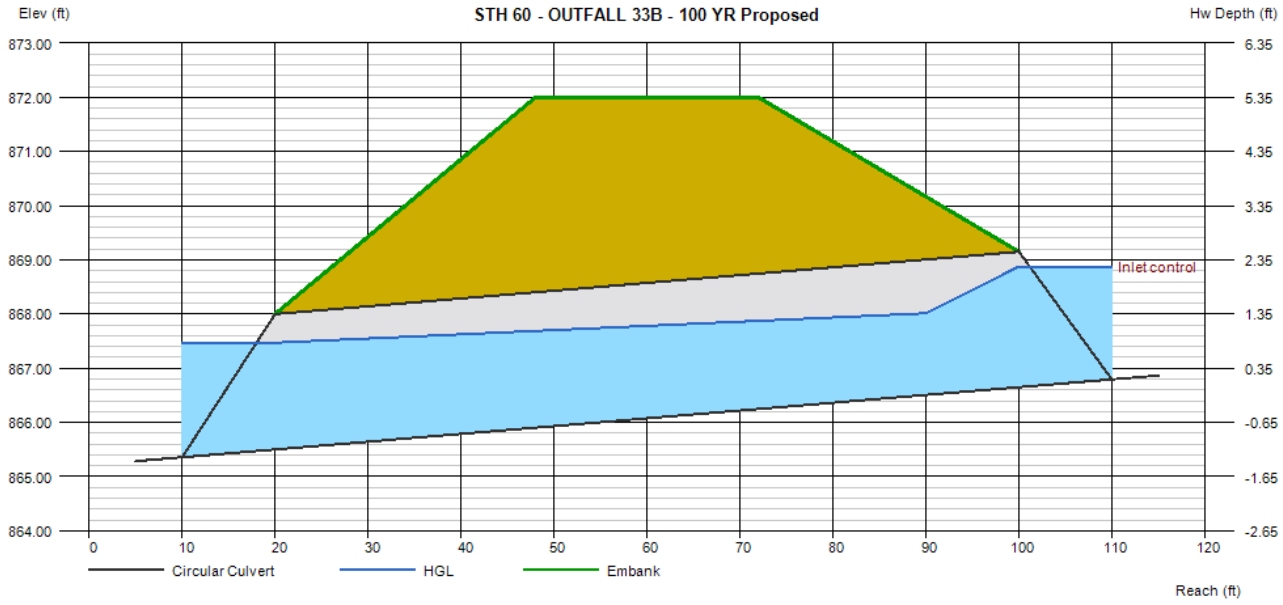
Top Elevation (ft)	=	872.00
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	18.16
Qmax (cfs)	=	18.16
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	18.16
Qpipe (cfs)	=	18.16
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.37
Veloc Up (ft/s)	=	6.19
HGL Dn (ft)	=	867.47
HGL Up (ft)	=	868.09
Hw Elev (ft)	=	868.88
Hw/D (ft)	=	0.89
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 35 - 50 YR Existing

Invert Elev Dn (ft)	=	870.01
Pipe Length (ft)	=	107.30
Slope (%)	=	0.55
Invert Elev Up (ft)	=	870.60
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

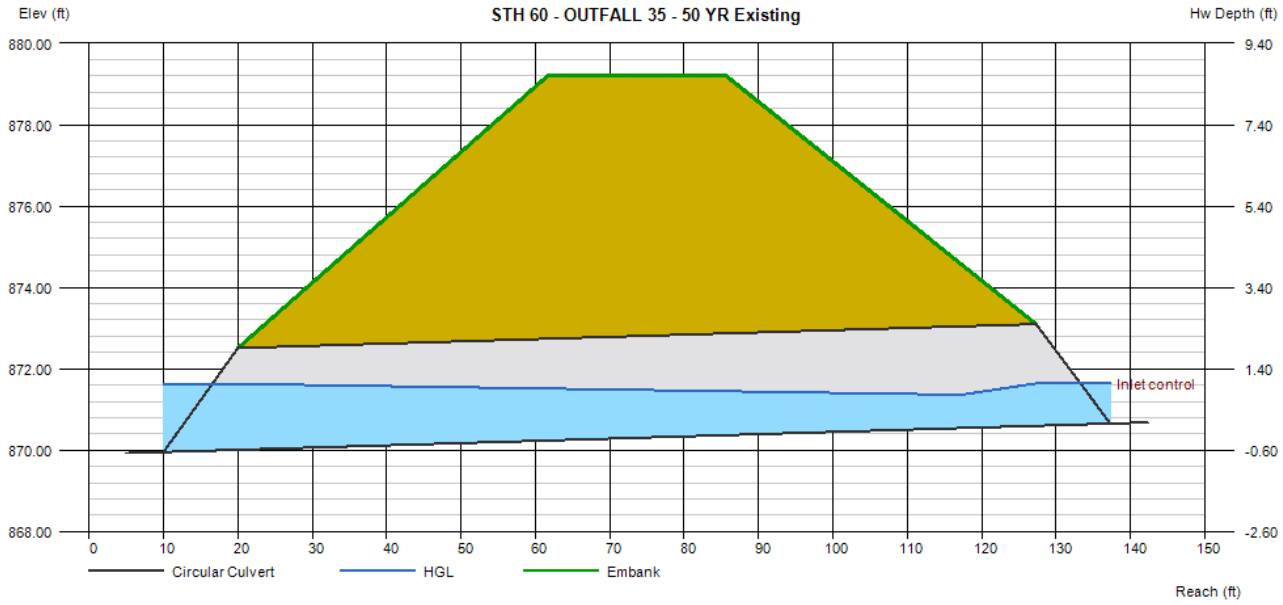
Top Elevation (ft)	=	879.20
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	4.99
Qmax (cfs)	=	4.99
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	4.99
Qpipe (cfs)	=	4.99
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.48
Veloc Up (ft/s)	=	4.14
HGL Dn (ft)	=	871.63
HGL Up (ft)	=	871.34
Hw Elev (ft)	=	871.64
Hw/D (ft)	=	0.42
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Nov 21 2019

STH 60 - OUTFALL 35 - 50 YR Proposed

Invert Elev Dn (ft)	=	870.01
Pipe Length (ft)	=	107.30
Slope (%)	=	0.55
Invert Elev Up (ft)	=	870.60
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

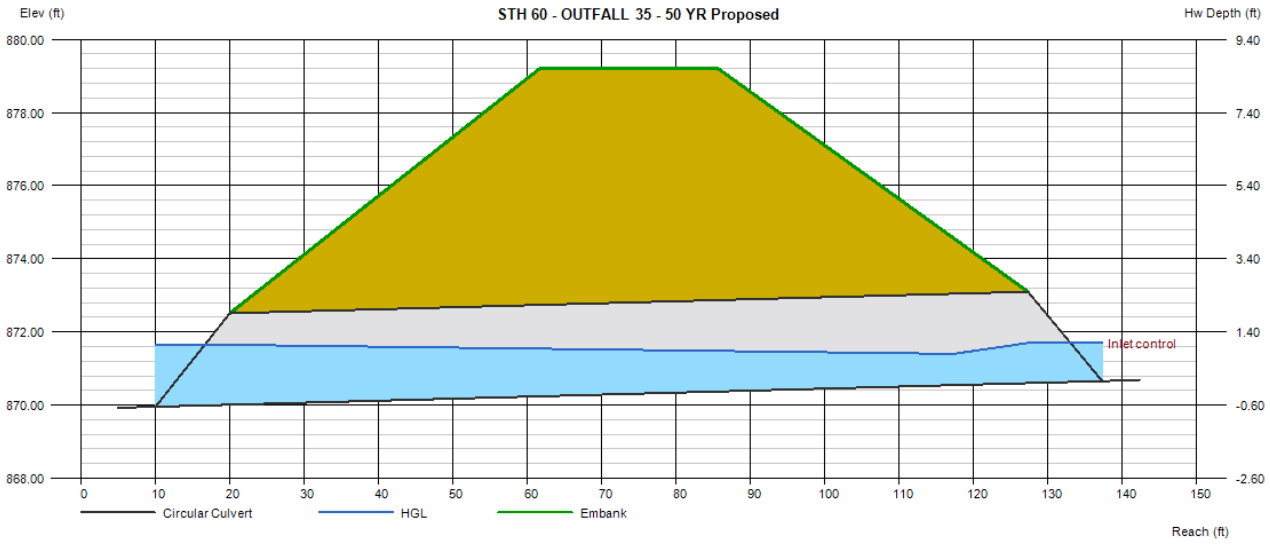
Top Elevation (ft)	=	879.20
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	5.51
Qmax (cfs)	=	5.51
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	5.51
Qpipe (cfs)	=	5.51
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.62
Veloc Up (ft/s)	=	4.25
HGL Dn (ft)	=	871.65
HGL Up (ft)	=	871.38
Hw Elev (ft)	=	871.70
Hw/D (ft)	=	0.44
Flow Regime	=	Inlet Control



1 Addendum No. 01

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 22 2019

STH 60 - OUTFALL 35 - 100 YR Proposed

Invert Elev Dn (ft)	=	870.01
Pipe Length (ft)	=	107.30
Slope (%)	=	0.55
Invert Elev Up (ft)	=	870.60
Rise (in)	=	30.0
Shape	=	Circular
Span (in)	=	30.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

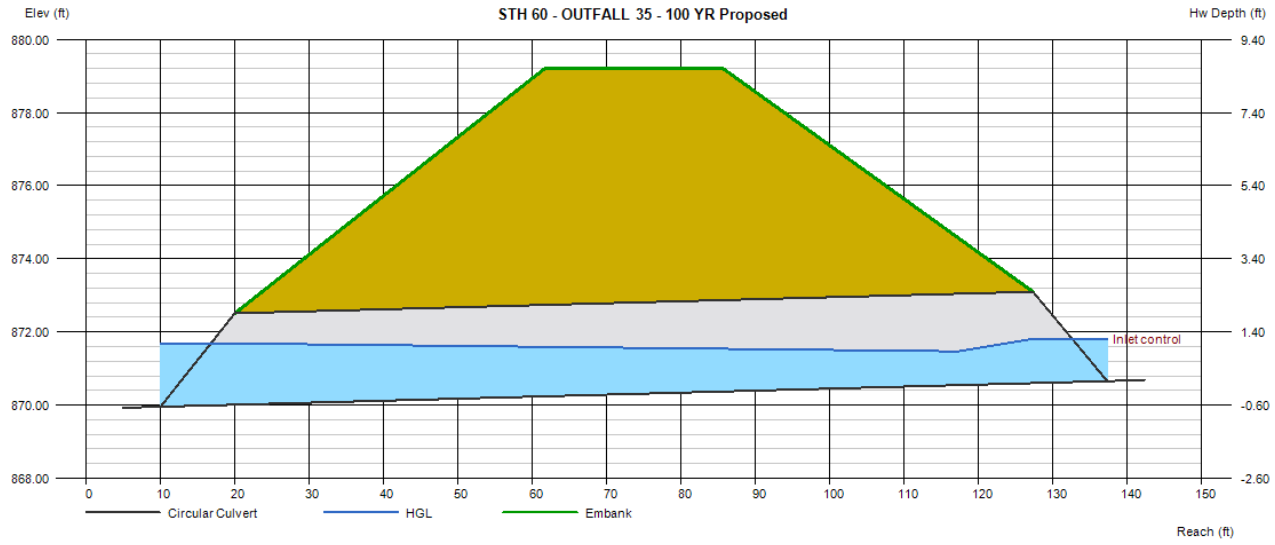
Top Elevation (ft)	=	879.20
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	6.56
Qmax (cfs)	=	6.56
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.56
Qpipe (cfs)	=	6.56
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.88
Veloc Up (ft/s)	=	4.47
HGL Dn (ft)	=	871.68
HGL Up (ft)	=	871.45
Hw Elev (ft)	=	871.81
Hw/D (ft)	=	0.48
Flow Regime	=	Inlet Control



1 Addendum No. 01

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Apr 1 2016

STH 60 - OUTFALL 37 - 50 YR Existing

Invert Elev Dn (ft)	=	863.13
Pipe Length (ft)	=	106.70
Slope (%)	=	0.09
Invert Elev Up (ft)	=	863.23
Rise (in)	=	42.0
Shape	=	Elliptical
Span (in)	=	66.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Horizontal Ellipse Concrete
Culvert Entrance	=	Groove end projecting (H)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

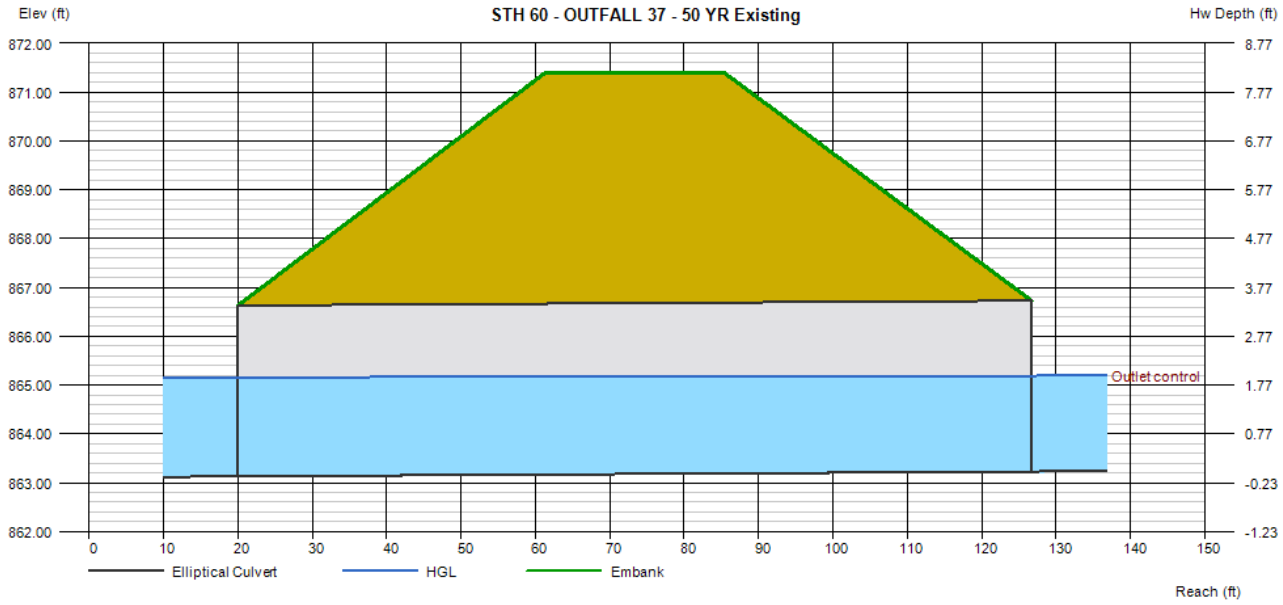
Top Elevation (ft)	=	871.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	7.44
Qmax (cfs)	=	7.44
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	7.44
Qpipe (cfs)	=	7.44
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.76
Veloc Up (ft/s)	=	0.84
HGL Dn (ft)	=	865.16
HGL Up (ft)	=	865.19
Hw Elev (ft)	=	865.20
Hw/D (ft)	=	0.56
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 22 2019

STH 60 - OUTFALL 37 - 50 YR Proposed

Invert Elev Dn (ft)	=	863.13
Pipe Length (ft)	=	106.70
Slope (%)	=	0.09
Invert Elev Up (ft)	=	863.23
Rise (in)	=	42.0
Shape	=	Elliptical
Span (in)	=	66.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Horizontal Ellipse Concrete
Culvert Entrance	=	Groove end projecting (H)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

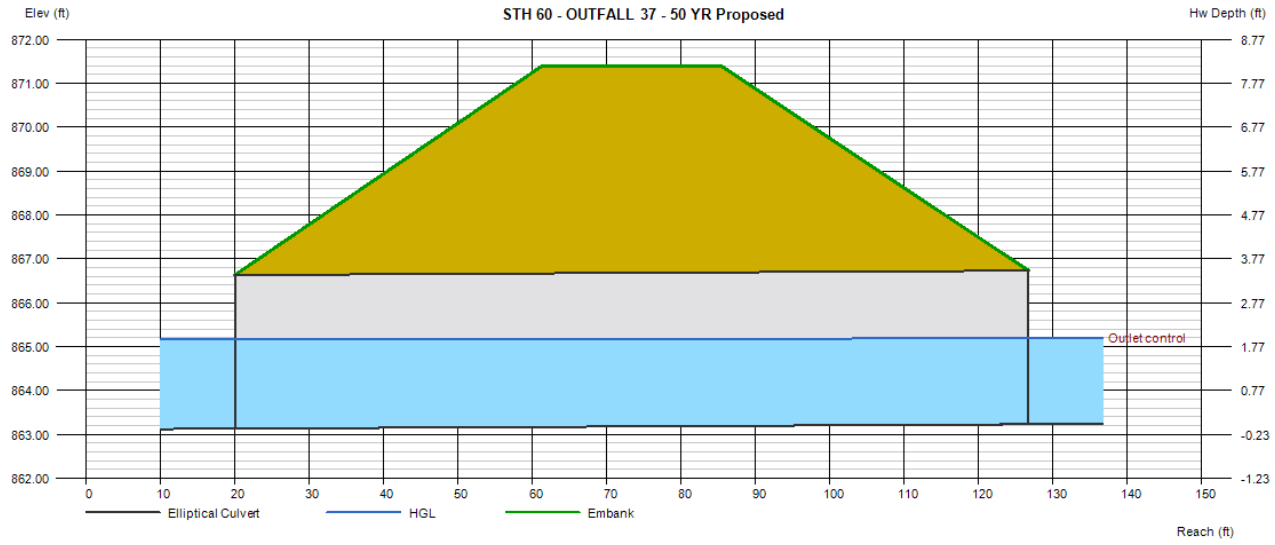
Top Elevation (ft)	=	871.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	7.86
Qmax (cfs)	=	7.86
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	7.86
Qpipe (cfs)	=	7.86
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.81
Veloc Up (ft/s)	=	0.89
HGL Dn (ft)	=	865.16
HGL Up (ft)	=	865.19
Hw Elev (ft)	=	865.20
Hw/D (ft)	=	0.56
Flow Regime	=	Outlet Control



1 Addendum No. 01

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 22 2019

STH 60 - OUTFALL 37 - 100 YR Proposed

Invert Elev Dn (ft)	=	863.13
Pipe Length (ft)	=	106.70
Slope (%)	=	0.09
Invert Elev Up (ft)	=	863.23
Rise (in)	=	42.0
Shape	=	Elliptical
Span (in)	=	66.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Horizontal Ellipse Concrete
Culvert Entrance	=	Groove end projecting (H)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

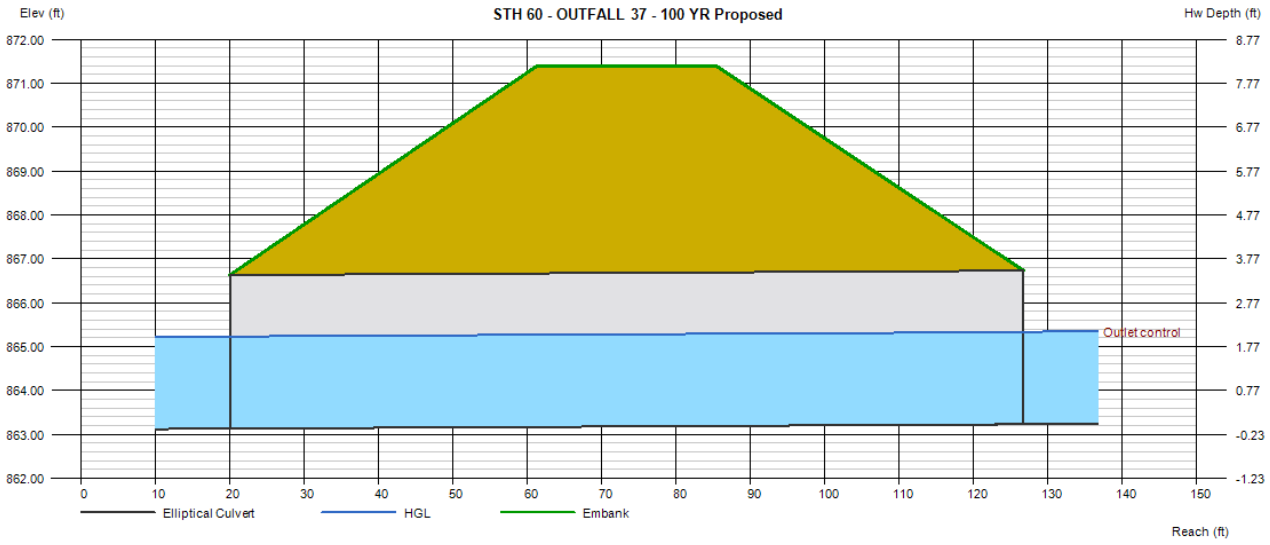
Top Elevation (ft)	=	871.40
Top Width (ft)	=	24.00
Crest Width (ft)	=	20.00

Calculations

Qmin (cfs)	=	9.74
Qmax (cfs)	=	9.74
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	9.74
Qpipe (cfs)	=	9.74
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.00
Veloc Up (ft/s)	=	1.00
HGL Dn (ft)	=	865.23
HGL Up (ft)	=	865.33
Hw Elev (ft)	=	865.35
Hw/D (ft)	=	0.61
Flow Regime	=	Outlet Control



1 Addendum No. 01