V1 - CID-23-04

PARKER RIDGE SUBDIVISION

REDFORD PLACE DRIVE
Rolesville, NC, 27571

DRAINAGE AND EROSION CONTROL CALCULATIONS

PREPARED FOR:

LENNAR CORPORATION
1100 Perimeter Park Drive, Suite 112
Morrisville, NC 27596

PREPARED BY:

BGE, INC.
5440 Wade Park Boulevard, Suite 102
Raleigh, NC 27607

Initial Submittal: June 1, 2023

NC License #C-4397

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ATTACHMENT 1: DRAINAGE AREA MAPS – SCM 1

#162 and #49- Please show storm pipes and structures and add proposed contour labels.

#49- Please show and label existing contours.

#12- There are several areas where text is overlapping and it is difficult to read.

#164- Label contours so DAs can be verified. It appears as if CB-101A DA will need to be adjusted

#163- why are there two separate DAs going to CB-101A? Should they be combined?

#163- why are there two separate DAs going to CB-102? Should they be combined?

#164- Why is this section of the road not included in a DA? Stormwater should be collected so it doesn't pool up

#165- Verify how roof drainage is being handled. Will it be routed to structures? This comment applies to the entire site

#164- Verify CB-101A DA is correct, it appears to be including some area that is going to CB-101

#164- This area should be included in a drainage area. It appears to go to CB-102A

#164- There are several drainage areas that don't seem to quite match what the contours are showing. A more thorough review can be done once contours are labeled and storm is shown.

#164- Why is this section of the road not included in a DA? Stormwater should be collected so it doesn't pool up

CB-101A 0.381 acres
CB-101A 0.218 acres
CB-101 0.137 acres
CB-102 0.306 acres
CB-102 0.214 acres
CB-102A 0.228 acres
CB-102B 0.134 acres
CB-103 0.106 acres
CB-104 0.153 acres
CB-105A 0.250 acres
CB-105 0.059 acres
CB-108A 0.228 acres
CB-109A 0.030 acres
CB-110A 0.090 acres
CB-110B 0.238 acres
CB-111A 0.075 acres
CB-112 0.380 acres
CB-114 0.368 acres
YI-114C 0.490 acres
DI-119 0.644 acres
DI-120 0.030 acres
DI-121 0.068 acres
DI-122 0.073 acres
DI-123 0.322 acres
DI-124 0.183 acres
DI-125 0.211 acres
DI-126 0.053 acres
DI-127 0.057 acres
DI-241 0.186 acres
CB-241A 0.137 acres

THE VILLAGE AT ROLESVILLE PHASE 1 TRACT 1 BM 2004 PG 199-201

EX-ROW

NORTH

5440 WADE PARK BLVD, SUITE 102
RALEIGH NC 27607
www.bgeinc.com
NC LICENSE #C-4397

SCM 1 DRAINAGE MAP

DATE: 6/1/2023

0 40' 80' 120'

SCALE: 1" = 40'

G:\NCA\Projects\Lennar\8430-03 - Lennar - School Street - Rolesville\04 - Calculations\Storm\StormCAD\Drainage Map.dwg

SCM 1 - 10 YR STORM

SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-109A	0.030	0.026	0.19	0.00	0.19
CB-109	0.012	0.010	0.07	0.00	4.59
CB-110B	0.238	0.151	1.10	0.40	1.10
CB-111A	0.075	0.059	0.43	0.04	0.43
CB-110	0.122	0.089	0.65	0.12	4.39
CB-110A	0.090	0.069	0.50	0.07	1.60
CB-112	0.380	0.216	1.56	0.83	1.56
CB-111	0.045	0.037	0.27	0.01	2.23
CB-108	0.103	0.077	0.56	0.09	5.04
CB-108A	0.228	0.147	1.06	0.38	6.02
DI-127	0.057	0.047	0.34	0.02	0.34
DI-126	0.053	0.046	0.33	0.02	0.66
DI-125	0.211	0.140	1.01	0.34	1.61
CB-113	0.009	0.008	0.06	0.00	14.33
CB-105	0.040	0.034	0.24	0.01	14.41
DI-124	0.183	0.151	1.09	0.40	2.62
CB-116B	0.023	0.020	0.14	0.00	0.14
CB-116A	0.022	0.019	0.14	0.00	0.28
CB-105A	0.250	0.157	1.14	0.44	20.95
CB-116	0.001	0.001	0.01	0.00	4.02
DI-123	0.322	0.218	1.58	0.85	4.01
CB-122	0.073	0.136	0.99	0.32	8.88
YI-114B	0.011	0.009	0.07	0.00	1.95
CB-114	0.368	0.211	1.53	0.79	14.49
CB-104	0.153	0.108	0.78	0.19	0.78
DI-117	0.054	0.044	0.32	0.02	3.79
CB-115	0.272	0.390	2.83	0.00	11.36
DI-121	0.068	0.054	0.39	0.03	0.39
CB-103	0.106	0.119	0.86	0.24	22.21

SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
DI-120	0.030	0.030	0.22	0.00	0.61
CB-101	0.137	0.098	0.71	0.15	27.53
CB-101A	0.598	0.301	2.19	1.59	27.01
DI-118	0.162	0.114	0.82	0.22	3.54
DI-119	0.644	0.318	2.31	1.76	2.81
CB-102B	0.134	0.096	0.70	0.15	0.70
CB-102	0.519	0.286	2.08	1.44	25.50
CB-102A	0.238	0.166	1.20	0.49	1.89
YI-114A	0.015	0.013	0.09	0.00	0.09
YI-114C	0.490	0.261	1.89	1.20	1.89
CB-127A	(N/A)	0.000	0.00	0.00	0.00

SCM1 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (189)	CB-109A	CB-109	15.0	0.020	1.93	2.98	0.19	9.13
Pipe - (185)	CB-110	CB-109	15.0	0.005	4.26	4.95	4.39	4.57
Pipe - (184)	CB-109	CB-108	18.0	0.005	4.42	4.62	4.59	7.43
Pipe - (188)	CB-110B	CB-110A	15.0	0.041	3.11	2.80	1.10	13.05
Pipe - (227)	CB-111A	CB-111	18.0	0.007	2.32	2.09	0.43	8.53
Pipe - (185) (1)	CB-110A	CB-110	15.0	0.010	3.10	1.74	1.60	6.46
Pipe - (187)	CB-111	CB-110	15.0	0.008	3.86	4.30	2.23	5.60
Pipe - (186)	CB-112	CB-111	15.0	0.006	3.45	3.51	1.56	4.83
Pipe - (190)	CB-108	CB-108A	18.0	0.007	4.78	4.29	5.04	8.60
Pipe - (228)	CB-108A	CB-105A	18.0	0.064	5.11	12.18	6.02	26.65
Pipe - (173)	DI-127	DI-126	18.0	0.007	2.18	2.35	0.34	8.56
Pipe - (259)	CB-127A	DI-127	18.0	0.005	0.00	0.00	0.00	7.54
Pipe - (172)	DI-126	DI-125	18.0	0.005	2.59	1.90	0.66	7.40
Pipe - (171)	DI-125	DI-124	18.0	0.011	3.33	3.00	1.61	11.18
Pipe - (210)	CB-114	CB-113	24.0	0.005	5.76	6.31	14.49	15.99
Pipe - (192)	CB-113	CB-105	30.0	0.005	5.69	5.65	14.33	29.13
Pipe - (193)	CB-105	CB-105A	30.0	0.010	5.70	4.39	14.41	40.59
Pipe - (170)	DI-124	DI-123	18.0	0.006	3.85	3.46	2.62	8.04
Pipe - (261)	CB-116B	CB-116A	18.0	0.005	1.64	1.75	0.14	7.43
Pipe - (260)	CB-116A	CB-116	18.0	0.005	2.00	2.06	0.28	7.43
Pipe - (197)	CB-105A	CB-103	30.0	0.005	6.39	6.30	20.95	28.75
Pipe - (174)	CB-116	CB-122	18.0	0.010	4.42	2.99	4.02	10.58
Pipe - (175)	DI-117	CB-116	18.0	0.005	4.16	4.14	3.79	7.27
Pipe - (169)	DI-123	CB-122	18.0	0.008	4.41	5.19	4.01	9.67
Pipe - (168)	CB-122	CB-115	24.0	0.008	5.23	4.09	8.88	19.80
Pipe - (231)	YI-114B	CB-114	15.0	0.058	3.70	1.59	1.95	15.50
Pipe - (246)	YI-114C	YI-114B	18.0	0.044	3.49	7.61	1.89	21.99
Pipe - (181)	CB-115	CB-114	24.0	0.005	5.25	4.52	11.36	15.93

SCM1 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

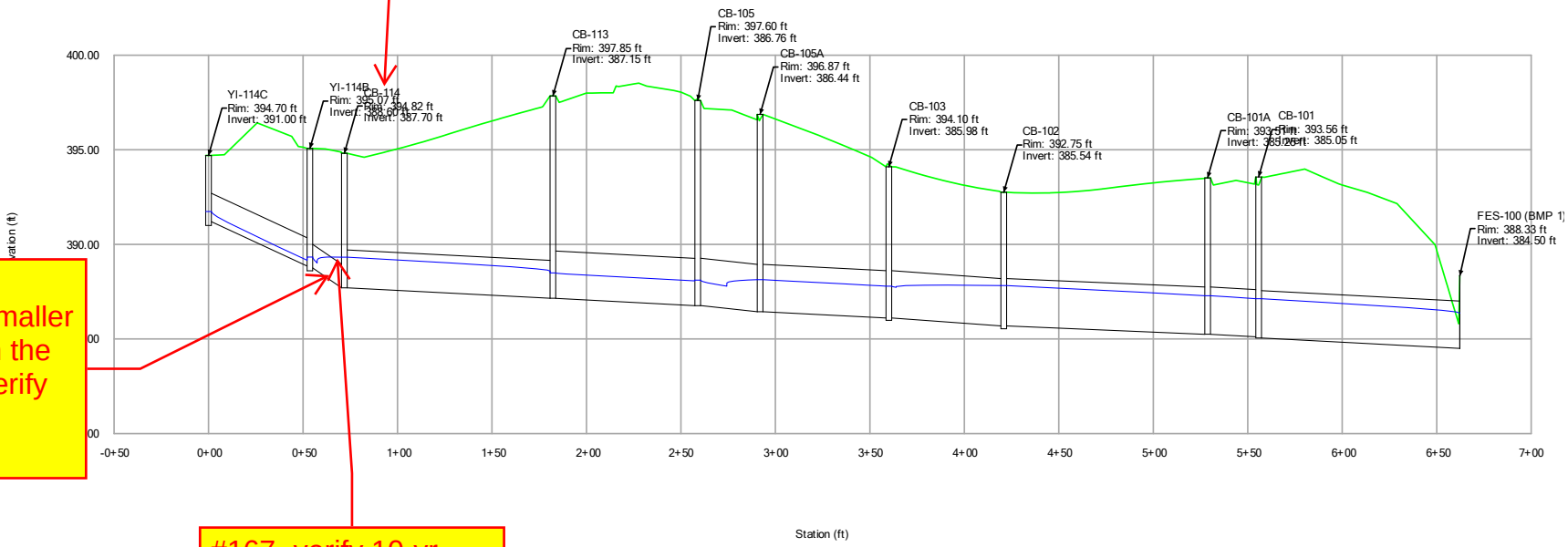
Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (230)	YI-114A	CB-114	15.0	0.027	0.82	0.08	0.09	10.53
Pipe - (198)	CB-104	CB-103	30.0	0.004	0.23	0.21	0.78	27.45
Pipe - (176)	DI-118	DI-117	18.0	0.005	4.16	3.89	3.54	7.43
Pipe - (179)	DI-121	DI-120	15.0	0.005	2.34	1.62	0.39	4.78
Pipe - (199)	CB-103	CB-102	30.0	0.007	6.68	5.39	22.21	33.91
Pipe - (178)	DI-120	DI-119	15.0	0.005	2.54	0.85	0.61	4.45
Pipe - (239)	CB-101A	CB-101	30.0	0.005	6.80	6.92	27.01	29.00
Pipe - (201)	CB-101	FES-100 (BMP 1)	30.0	0.005	6.82	7.32	27.53	29.46
Pipe - (200)	CB-102	CB-101A	30.0	0.004	6.18	6.42	25.50	26.32
Pipe - (177)	DI-119	DI-118	15.0	0.005	3.91	3.78	2.81	4.57
Pipe - (226)	CB-102B	CB-102A	18.0	0.005	2.64	1.71	0.70	7.43
Pipe - (205)	CB-102A	CB-102	18.0	0.083	3.49	1.07	1.89	30.33

#168- Please show all inverts at structures, and specify if it's inv. in or inv. out

Please label pipe material type, diameter, and slope

SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

#12- adjust overlapping text



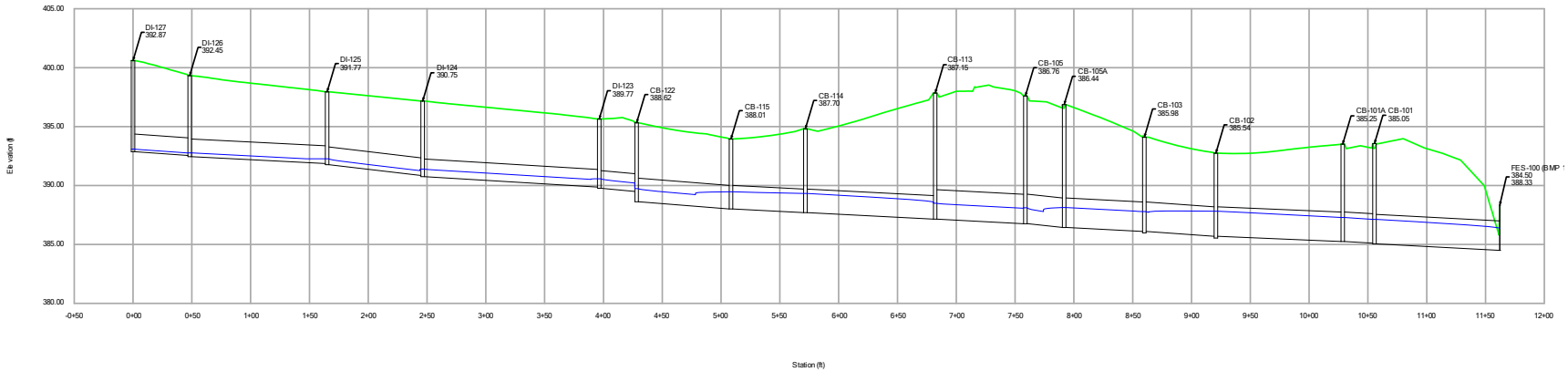
66- This pipe pears to be smaller diameter than the e before it, verify d adjust as eded.

#167- verify 10-yr storm event stays within storm pipes

#168- Please show all rims and inverts at structures, and specify if it's inv. in or inv. out

Please label pipe material type, diameter, and slope

SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

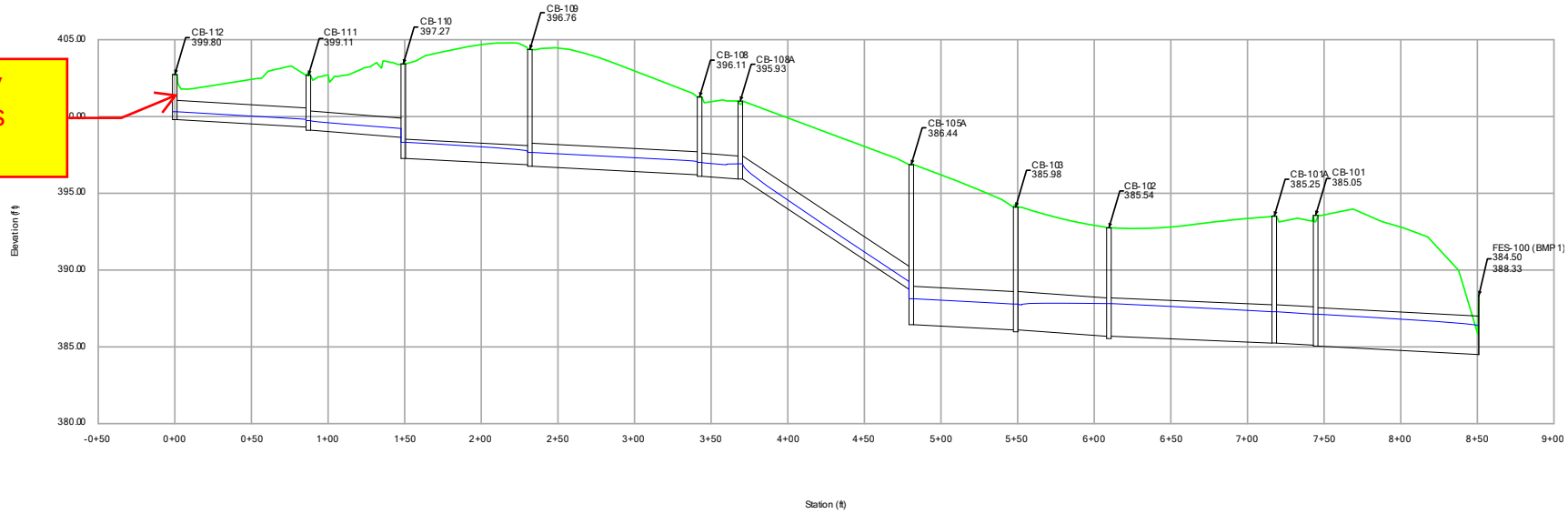


#168- Please show all rims and inverts at structures, and specify if it's inv. in or inv. out

Please label pipe material type, diameter, and slope

SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

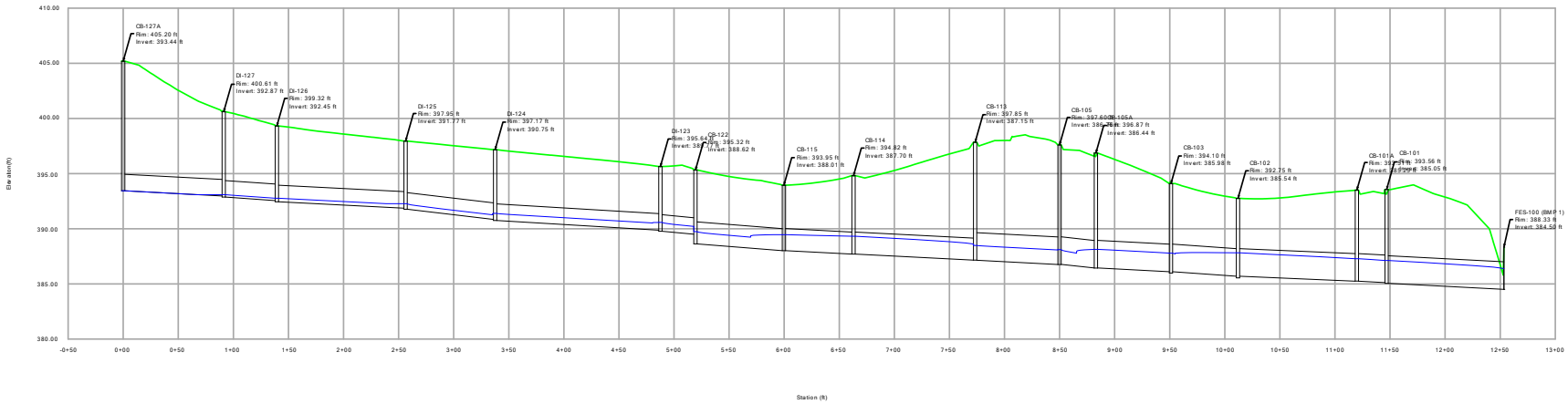
#116- verify min cover is being met



#168- Please show all inverts at structures, and specify if it's inv. in or inv. out

Please label pipe material type, diameter, and slope

SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

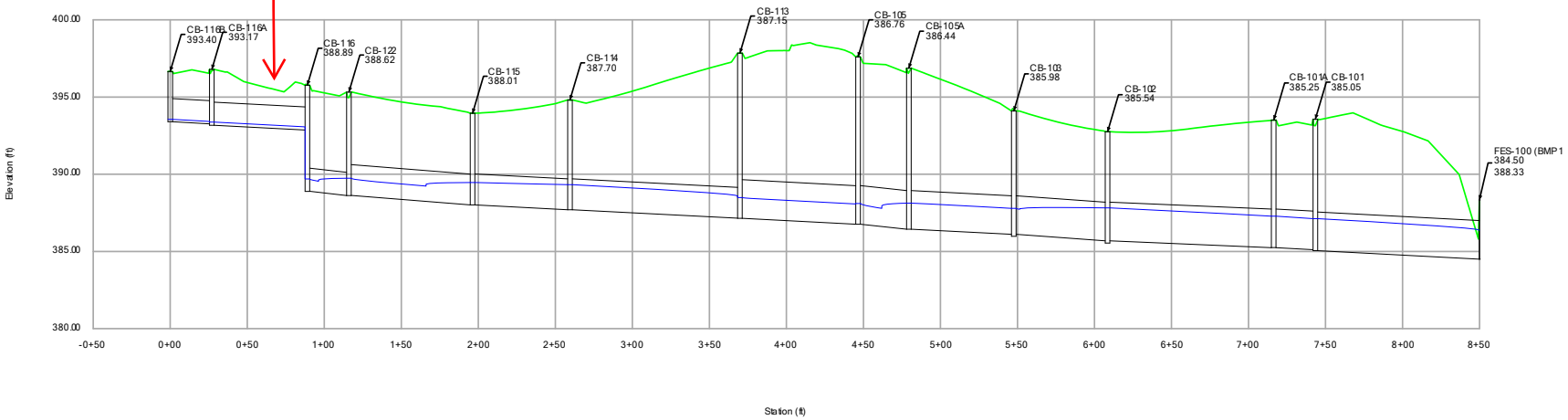


#168- Please show all rims and inverts at structures, and specify if it's inv. in or inv. out

Please label pipe material type, diameter, and slope

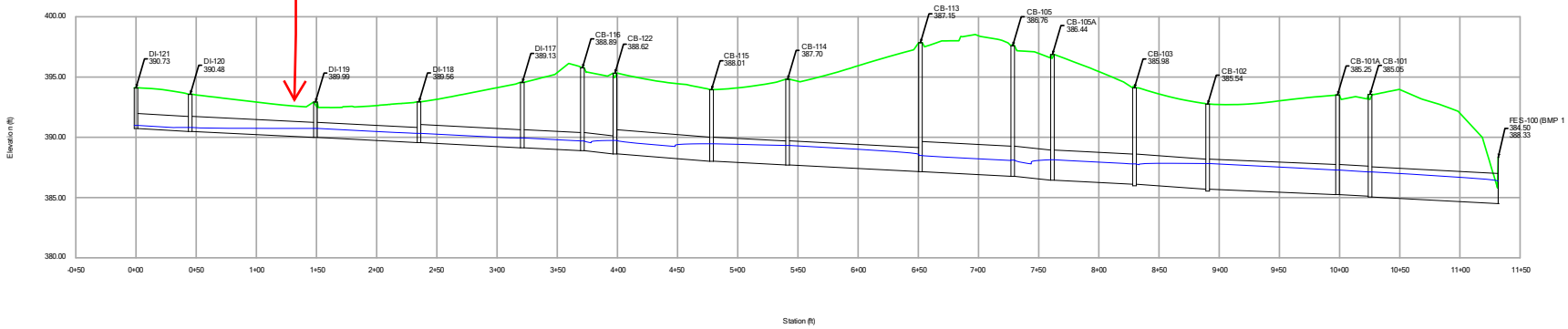
SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

#116- verify minimum cover requirements are being met



SCM1 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

#116- verify minimum cover requirements are being met



#169- There a few pipes and structures routing to SCM 1 that are not being shown in these HGL profiles (CB-102A, CB-102B, CB-104, etc.). Please include all storm being routed to SCM 1

SCM 1 - 25 YR STORM

SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-109A	0.030	0.026	0.21	0.00	0.21
CB-109	0.012	0.010	0.08	0.00	4.99
CB-110B	0.238	0.148	1.19	0.48	1.19
CB-111A	0.075	0.058	0.47	0.06	0.47
CB-110	0.122	0.087	0.70	0.15	4.77
CB-110A	0.090	0.068	0.55	0.08	1.73
CB-112	0.380	0.210	1.69	0.97	1.69
CB-111	0.045	0.037	0.30	0.01	2.42
CB-108	0.103	0.076	0.61	0.11	5.48
CB-108A	0.228	0.143	1.15	0.45	6.54
DI-127	0.057	0.046	0.37	0.03	0.37
DI-126	0.053	0.046	0.37	0.03	0.73
DI-125	0.211	0.137	1.10	0.40	1.76
CB-113	0.009	0.008	0.07	0.00	15.79
CB-105	0.040	0.033	0.27	0.01	15.87
DI-124	0.183	0.149	1.20	0.49	2.87
CB-116B	0.023	0.020	0.16	0.00	0.16
CB-116A	0.022	0.019	0.15	0.00	0.31
CB-105A	0.250	0.153	1.23	0.51	23.00
CB-116	0.001	0.001	0.01	0.00	4.37
DI-123	0.322	0.215	1.73	1.01	4.39
CB-122	0.073	0.138	1.11	0.41	9.73
YI-114B	0.011	0.009	0.08	0.00	2.11
CB-114	0.368	0.205	1.65	0.92	15.96
CB-104	0.153	0.105	0.85	0.23	0.85
DI-117	0.054	0.044	0.35	0.02	4.12
CB-115	0.272	0.403	3.24	0.00	12.58
DI-121	0.068	0.054	0.43	0.04	0.43
CB-103	0.106	0.119	0.95	0.30	24.38

SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
DI-120	0.030	0.031	0.25	0.01	0.67
CB-101	0.137	0.096	0.77	0.19	30.14
CB-101A	0.598	0.293	2.36	1.83	29.58
DI-118	0.162	0.111	0.90	0.26	3.85
DI-119	0.644	0.309	2.49	2.03	3.04
CB-102B	0.134	0.094	0.76	0.18	0.76
CB-102	0.519	0.280	2.25	1.68	27.96
CB-102A	0.238	0.163	1.31	0.58	2.06
YI-114A	0.015	0.013	0.10	0.00	0.10
YI-114C	0.490	0.253	2.04	1.39	2.04
CB-127A	(N/A)	0.000	0.00	0.00	0.00

SCM1 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (189)	CB-109A	CB-109	15.0	0.020	1.98	3.07	0.21	9.13
Pipe - (185)	CB-110	CB-109	15.0	0.005	4.32	5.13	4.77	4.57
Pipe - (184)	CB-109	CB-108	18.0	0.005	4.51	4.76	4.99	7.43
Pipe - (188)	CB-110B	CB-110A	15.0	0.041	3.18	2.30	1.19	13.05
Pipe - (227)	CB-111A	CB-111	18.0	0.007	2.38	1.99	0.47	8.53
Pipe - (185) (1)	CB-110A	CB-110	15.0	0.010	2.70	1.73	1.73	6.46
Pipe - (187)	CB-111	CB-110	15.0	0.008	3.96	4.40	2.42	5.60
Pipe - (186)	CB-112	CB-111	15.0	0.006	3.54	3.59	1.69	4.83
Pipe - (190)	CB-108	CB-108A	18.0	0.007	4.93	4.44	5.48	8.60
Pipe - (228)	CB-108A	CB-105A	18.0	0.064	5.29	12.47	6.54	26.65
Pipe - (173)	DI-127	DI-126	18.0	0.007	2.23	2.42	0.37	8.56
Pipe - (259)	CB-127A	DI-127	18.0	0.005	0.00	0.00	0.00	7.54
Pipe - (172)	DI-126	DI-125	18.0	0.005	2.67	1.93	0.73	7.40
Pipe - (171)	DI-125	DI-124	18.0	0.011	3.42	3.04	1.76	11.18
Pipe - (210)	CB-114	CB-113	24.0	0.005	5.85	6.59	15.96	15.99
Pipe - (192)	CB-113	CB-105	30.0	0.005	5.88	5.85	15.79	29.13
Pipe - (193)	CB-105	CB-105A	30.0	0.010	5.90	4.49	15.87	40.59
Pipe - (170)	DI-124	DI-123	18.0	0.006	3.96	3.53	2.87	8.04
Pipe - (261)	CB-116B	CB-116A	18.0	0.005	1.70	1.79	0.16	7.43
Pipe - (260)	CB-116A	CB-116	18.0	0.005	2.07	2.12	0.31	7.43
Pipe - (197)	CB-105A	CB-103	30.0	0.005	6.51	6.55	23.00	28.75
Pipe - (174)	CB-116	CB-122	18.0	0.010	4.55	3.09	4.37	10.58
Pipe - (175)	DI-117	CB-116	18.0	0.005	4.24	4.26	4.12	7.27
Pipe - (169)	DI-123	CB-122	18.0	0.008	4.55	5.32	4.39	9.67
Pipe - (168)	CB-122	CB-115	24.0	0.008	5.40	3.97	9.73	19.80
Pipe - (231)	YI-114B	CB-114	15.0	0.058	3.79	1.72	2.11	15.50
Pipe - (246)	YI-114C	YI-114B	18.0	0.044	3.57	7.78	2.04	21.99
Pipe - (181)	CB-115	CB-114	24.0	0.005	5.15	4.61	12.58	15.93

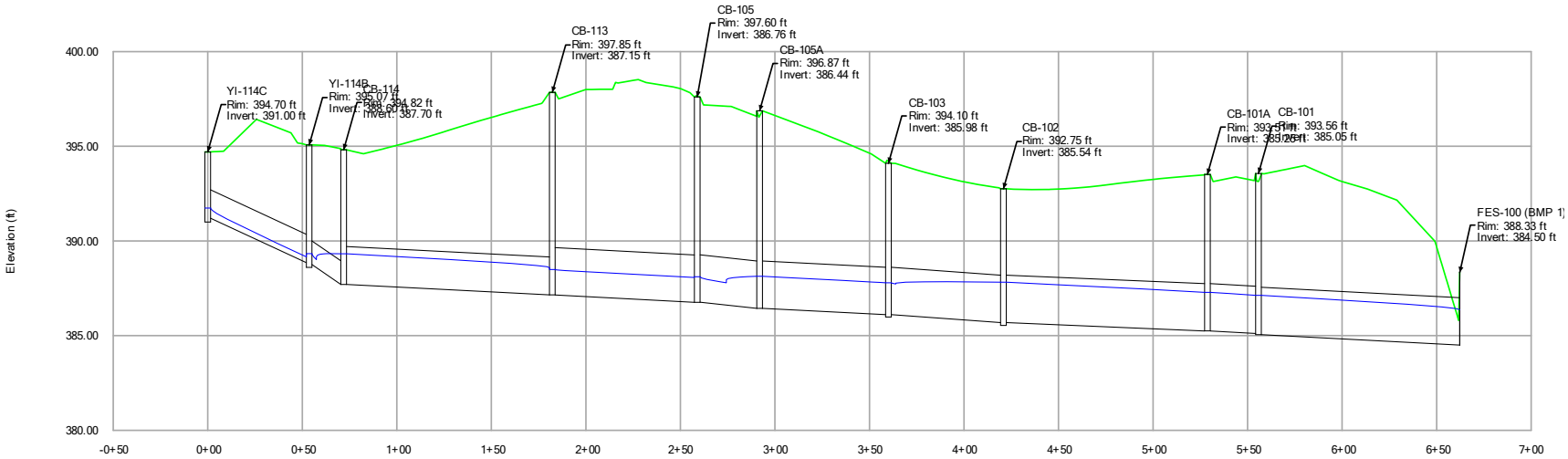
SCM1 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

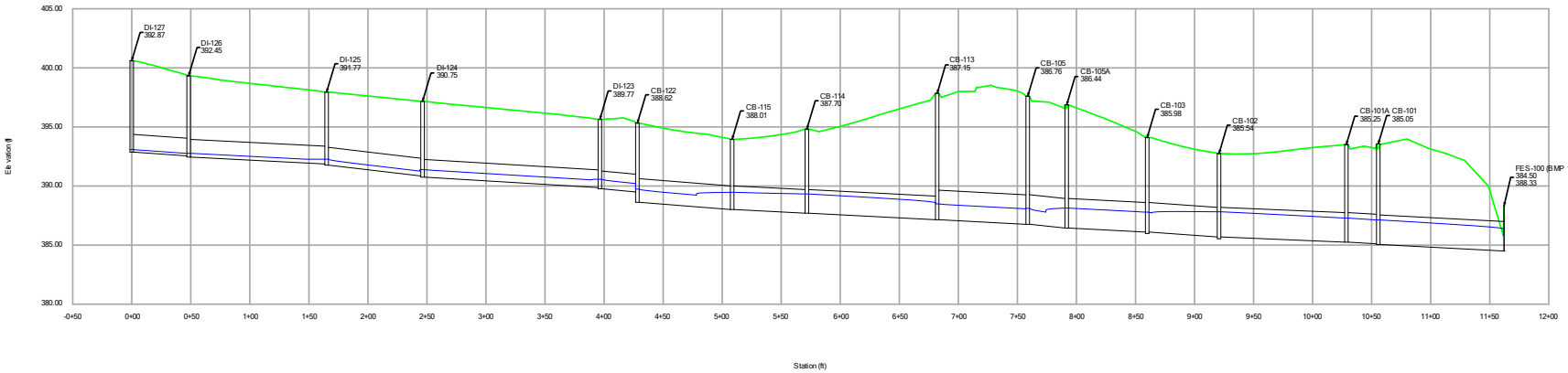
Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (230)	YI-114A	CB-114	15.0	0.027	0.42	0.08	0.10	10.53
Pipe - (198)	CB-104	CB-103	30.0	0.004	0.24	0.22	0.85	27.45
Pipe - (176)	DI-118	DI-117	18.0	0.005	4.24	3.97	3.85	7.43
Pipe - (179)	DI-121	DI-120	15.0	0.005	2.40	1.65	0.43	4.78
Pipe - (199)	CB-103	CB-102	30.0	0.007	6.94	5.47	24.38	33.91
Pipe - (178)	DI-120	DI-119	15.0	0.005	2.61	0.88	0.67	4.45
Pipe - (239)	CB-101A	CB-101	30.0	0.005	6.90	6.98	29.58	29.00
Pipe - (201)	CB-101	FES-100 (BMP 1)	30.0	0.005	6.92	7.65	30.14	29.46
Pipe - (200)	CB-102	CB-101A	30.0	0.004	6.28	6.52	27.96	26.32
Pipe - (177)	DI-119	DI-118	15.0	0.005	3.98	3.87	3.04	4.57
Pipe - (226)	CB-102B	CB-102A	18.0	0.005	2.70	1.73	0.76	7.43
Pipe - (205)	CB-102A	CB-102	18.0	0.083	3.58	1.17	2.06	30.33

SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS

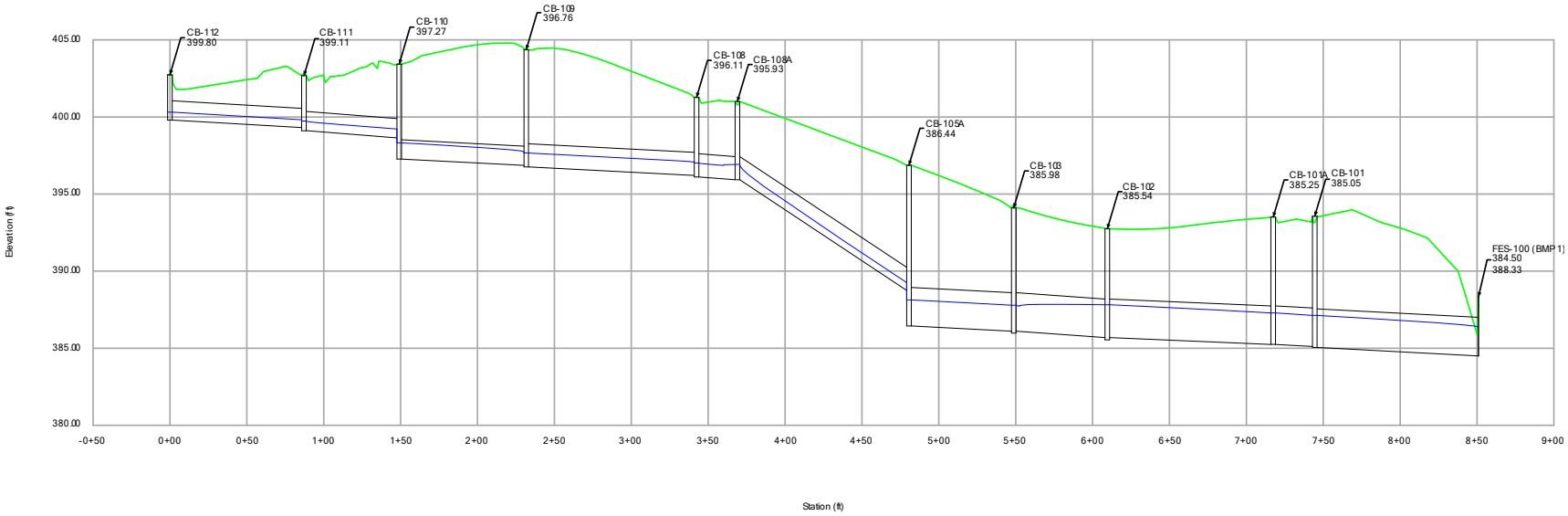


#170- The water elevation appears to be the same as that of the 10-year design storm. Please verify the correct profile is being shown. This applies to all 25-year analysis storm profiles.

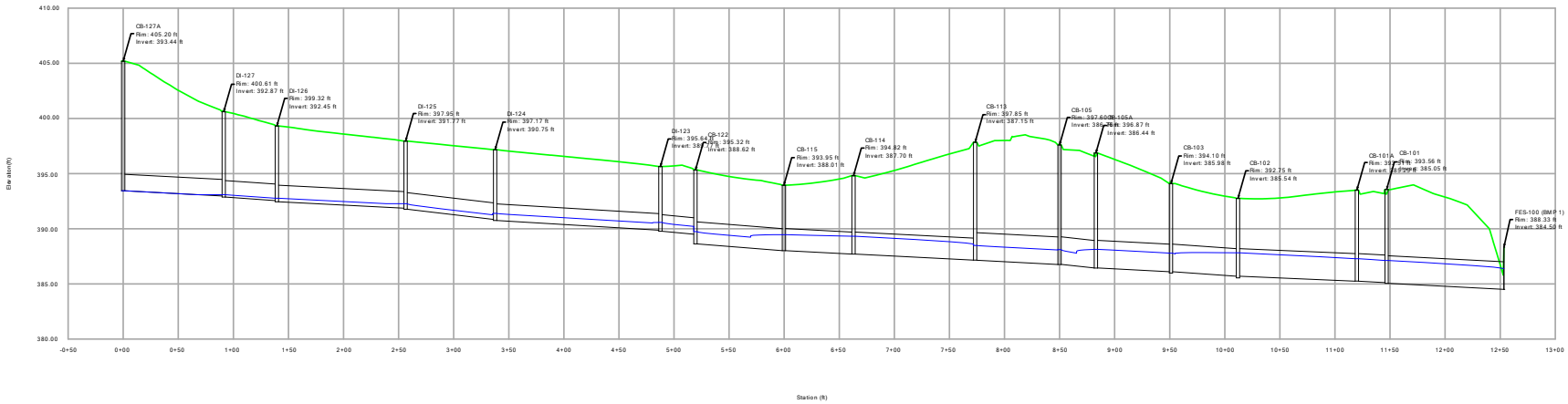
SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



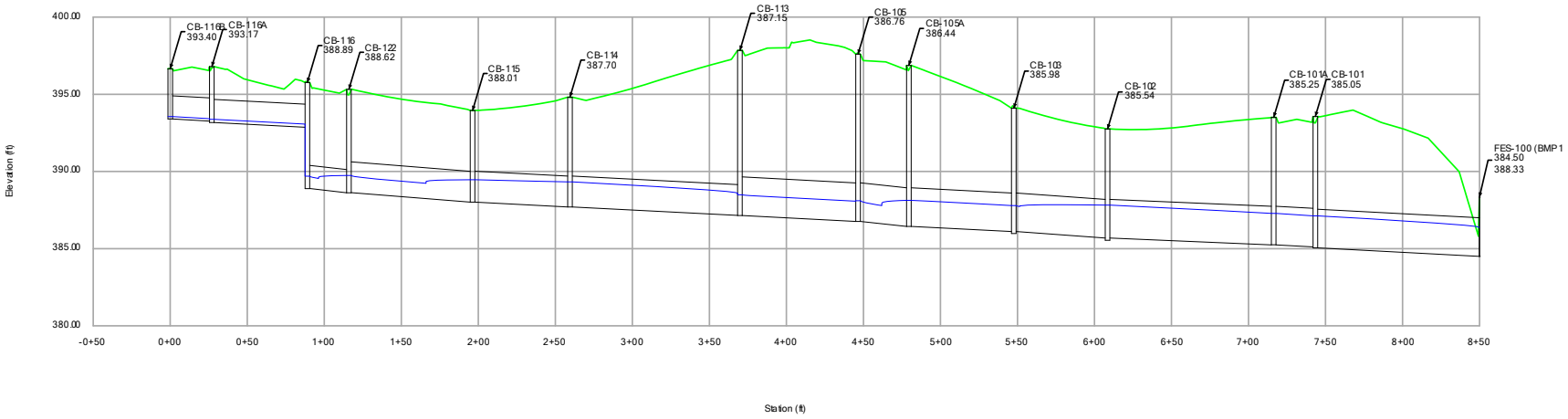
SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



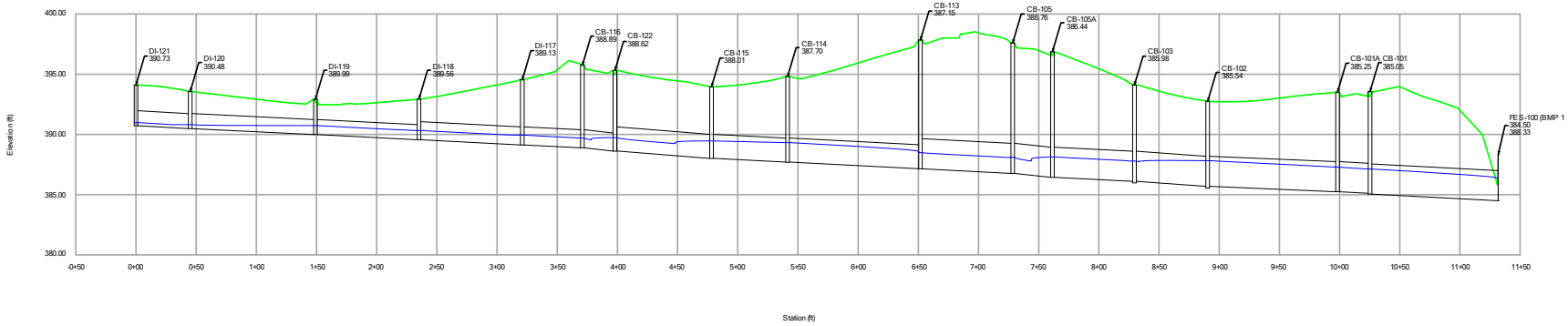
SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM1 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM 1 – INLET SPREAD

SCM1 STORM SEWER ANALYSIS

Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)
CB-109A	0.030	0.026	0.15	0.00	2.9
CB-109	0.012	0.010	0.06	0.00	2.0
CB-110B	0.238	0.160	0.90	0.27	6.2
CB-111A	0.075	0.061	0.35	0.02	4.0
CB-110	0.122	0.093	0.53	0.08	4.8
CB-110A	0.090	0.072	0.41	0.04	4.3
CB-112	0.380	0.229	1.30	0.57	7.4
CB-111	0.045	0.038	0.22	0.00	3.3
CB-108	0.103	0.080	0.45	0.05	4.5
CB-108A	0.228	0.154	0.88	0.25	6.1
DI-127	0.057	0.048	0.27	0.01	3.6
DI-126	0.053	0.046	0.26	0.01	3.6
DI-125	0.211	0.146	0.83	0.22	6.0
CB-113	0.009	0.008	0.05	0.00	1.9
CB-105	0.040	0.034	0.19	0.00	3.2
DI-124	0.183	0.154	0.87	0.25	6.1
CB-116B	0.023	0.020	0.11	0.00	2.6
CB-116A	0.022	0.019	0.11	0.00	2.5
CB-105A	0.250	0.166	0.94	0.29	6.3
CB-116	0.001	0.001	0.00	0.00	0.7
DI-123	0.322	0.226	1.28	0.55	7.4
CB-122	0.073	0.131	0.74	0.17	5.7
YI-114B	0.011	0.009	0.05	0.00	1.9
CB-114	0.368	0.224	1.27	0.55	7.3
CB-104	0.153	0.112	0.64	0.12	5.3
DI-117	0.054	0.045	0.26	0.01	3.6
CB-115	0.272	0.363	2.06	0.00	12.1
DI-121	0.068	0.056	0.32	0.02	3.9
CB-103	0.106	0.119	0.67	0.14	5.4
DI-120	0.030	0.029	0.17	0.00	3.0
CB-101	0.137	0.102	0.58	0.10	5.0

SCM1 STORM SEWER ANALYSIS

Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)
CB-101A	0.598	0.322	1.83	1.12	8.8
DI-118	0.162	0.118	0.67	0.14	5.4
DI-119	0.644	0.340	1.93	1.25	9.0
CB-102B	0.134	0.101	0.57	0.09	5.0
CB-102	0.519	0.302	1.71	0.99	8.5
CB-102A	0.238	0.173	0.98	0.32	6.4
YI-114A	0.015	0.013	0.07	0.00	2.2
YI-114C	0.490	0.278	1.57	0.84	8.1
CB-127A	(N/A)	0.000	0.00	0.00	0.0

ATTACHMENT 2: DRAINAGE AREA MAPS – SCM 2

#172- are these going to SCM 3? Recommend removing drainage areas that aren't going to SCM 2.

#162 and #49- Please show storm pipes and structures and add proposed contour labels.

#49- Please show and label existing contours

#12- There are several areas where text is difficult to read.

#164- There are several drainage areas that don't seem to quite match what the contours are showing. A more thorough review can be done once contours are labeled and storm is shown.

#163- There are several places where the drainage going to a single structure is being split into separate drainage areas. Why is this?

#171- Label SCM 2

NORTH

SCM 2 DRAINAGE MAP

DATE: 6/1/2023

SCALE: 1" = 50'

BGE
5440 WADE PARK BLVD, SUITE 102
RALEIGH NC 27607
www.bgeinc.com
NC LICENSE #C-4397

SCM 2 – 10 YR STORM

10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-244	0.190	0.121	0.88	0.24	1.30
CB-244A	0.081	0.060	0.43	0.04	0.43
CB-241A	0.137	0.093	0.67	0.13	0.67
CB-241	0.109	0.077	0.56	0.08	1.22
CB-228	0.003	0.002	0.02	0.00	0.02
CB-227	0.038	0.030	0.22	0.00	0.23
CB-234	0.174	0.113	0.82	0.20	2.05
CB-234A	0.295	0.171	1.24	0.49	1.24
CB-232C	0.001	0.001	0.01	0.00	0.01
CB-232	0.084	0.083	0.60	0.10	3.89
CB-232A	0.000	0.062	0.45	0.05	1.44
CB-239	0.152	0.109	0.79	0.19	1.94
CB-225	0.002	0.002	0.01	0.00	0.01
CB-232B	0.251	0.151	1.09	0.38	1.03
CB-243	0.420	0.239	1.73	0.97	3.84
CB-243A	0.186	0.123	0.89	0.24	0.89
CB-203A	0.057	0.044	0.32	0.02	0.32
CB-238A	0.162	0.118	0.86	0.23	0.86
CB-238	0.038	0.052	0.38	0.03	3.10
CB-231	0.071	0.064	0.46	0.05	4.29
CB-204A	0.004	0.003	0.02	0.00	0.02
CB-236	(N/A)	0.000	0.00	0.00	19.90
CB-237	(N/A)	0.000	0.00	0.00	3.09
CB-204	0.009	0.007	0.05	0.00	24.16
CB-205	0.029	0.023	0.17	0.00	24.18
CB-224	0.000	0.000	0.00	0.00	0.01
CB-242	0.486	0.527	3.82	0.00	16.94
CB-242A	1.360	1.135	8.23	0.00	9.60
CB-206A	0.633	0.513	3.72	0.00	23.20
CB-206	0.184	0.150	1.08	0.00	24.17
CB-208	0.026	0.021	0.15	0.00	0.15

#173- Verify all structures are included. (For example, DI-242C appears to be missing)

#174- Why are these N/A?

#174- Verify this is correct. There appears as if at least a small drainage area should be draining towards CB-224

10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-203	0.176	0.114	0.83	0.21	25.01
CB-226	0.330	0.187	1.35	0.59	1.91
CB-223	0.078	0.058	0.42	0.04	0.42
CB-209	0.255	0.153	1.11	0.39	2.85
CB-202A	0.095	0.070	0.51	0.07	0.51
CB-220A	0.043	0.034	0.24	0.01	0.24
CB-220	0.089	0.065	0.47	0.05	0.71
CB-230	0.087	0.069	0.50	0.06	5.22
CB-230A	0.100	0.076	0.55	0.08	0.55
CB-210	0.368	0.229	1.66	0.89	11.58
CB-229	0.748	0.341	2.47	1.92	7.45
CB-222	0.075	0.114	0.82	0.21	2.67
CB-211	0.197	0.194	1.41	0.64	12.78
CB-221A	0.070	0.075	0.54	0.08	5.36
CB-221	0.164	0.111	0.80	0.20	0.80
CB-202	0.042	0.058	0.42	0.04	25.69
CB-219	0.196	0.129	0.93	0.27	2.95
CB-219A	0.333	0.188	1.36	0.60	1.36
CB-214A	0.816	0.363	2.63	2.16	4.08
CB-213	0.296	0.217	1.58	0.80	14.06
CB-215	0.092	0.086	0.63	0.11	6.52
CB-216	0.064	0.057	0.41	0.04	11.91
CB-214	0.168	0.267	1.94	1.20	5.94
CB-201	0.417	0.225	1.63	0.86	27.07
CB-217A	0.280	0.222	1.61	0.84	36.02
CB-217	0.149	0.100	0.72	0.15	21.53
CB-218A	0.369	0.497	3.60	0.00	3.60
CB-218	0.466	0.436	3.16	0.00	9.39
CB-201A	0.689	0.322	2.33	1.71	29.09

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (77) (BMP 2)	CB-244	CB-243	15.0	0.047	3.26	1.69	1.30	13.94
Pipe - (82) (BMP 2)	CB-244A	CB-244	15.0	0.010	2.39	1.08	0.43	6.36
Pipe - (249) (BMP 2)	DI-242C	DI-242B	18.0	0.021	2.80	4.68	0.86	15.32
Pipe - (70) (BMP 2)	CB-241A	CB-241	15.0	0.008	2.70	1.77	0.67	5.70
Pipe - (69) (BMP 2)	CB-241	CB-239	15.0	0.009	3.21	3.97	1.22	6.29
Pipe - (206) (BMP 2)	DI-209C	DI-209B	15.0	0.021	2.71	2.58	0.68	9.47
Pipe - (167) (BMP 2)	CB-228	CB-227	15.0	0.036	1.02	0.46	0.02	12.30
Pipe - (39) (BMP 2)	CB-227	CB-226	15.0	0.033	2.02	0.47	0.23	11.77
Pipe - (53) (BMP 2)	CB-234	CB-232	15.0	0.010	3.75	4.66	2.05	6.44
Pipe - (213) (BMP 2)	CB-234A	CB-234	15.0	0.008	3.22	2.27	1.24	5.77
Pipe - (161) (BMP 2)	CB-232C	CB-232B	15.0	0.004	0.26	0.03	0.01	3.93
Pipe - (248) (BMP 2)	DI-242B	CB-242A	18.0	0.013	3.44	3.05	1.78	11.94
Pipe - (250) (BMP 2)	DI-242D	DI-242B	18.0	0.005	0.06	0.03	0.01	7.43
Pipe - (54) (BMP 2)	CB-232	CB-231	18.0	0.033	4.37	8.48	3.89	19.09
Pipe - (59) (BMP 2)	CB-232A	CB-232	15.0	0.008	3.37	1.86	1.44	5.78
Pipe - (162) (BMP 2)	CB-232B	CB-232A	15.0	0.008	3.05	3.55	1.03	5.78

#129- min slope is 0.5%

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (67) (BMP 2)	CB-239	CB-238	18.0	0.020	3.52	2.54	1.94	14.76
Pipe - (163) (BMP 2)	CB-225	CB-224	15.0	0.026	0.94	1.40	0.01	10.37
Pipe - (207) (BMP 2)	DI-209B	DI-209A	15.0	0.035	3.19	6.28	1.21	12.06
Pipe - (74) (BMP 2)	CB-243	CB-242	18.0	0.008	4.35	3.36	3.84	9.66
Pipe - (80) (BMP 2)	CB-243A	CB-243	15.0	0.024	2.93	1.15	0.89	9.98
Pipe - (26) (BMP 2)	CB-203A	CB-203	15.0	0.192	2.20	0.26	0.32	28.32
Pipe - (72) (BMP 2)	CB-238A	CB-238	15.0	0.014	2.90	4.16	0.86	7.76
Pipe - (66) (BMP 2)	CB-238	CB-237	18.0	0.025	4.06	7.08	3.10	16.74
Pipe - (55) (BMP 2)	CB-231	CB-230	18.0	0.041	4.52	9.42	4.29	21.29
Pipe - (28) (BMP 2)	CB-204A	CB-204	15.0	0.157	1.10	0.02	0.02	25.62
Pipe - (218) (BMP 2)	CB-236	CB-206A	30.0	0.006	6.40	6.74	19.90	31.24
Pipe - (65) (BMP 2)	CB-237	CB-236	18.0	0.087	4.05	2.43	3.09	30.93
Pipe - (73) (BMP 2)	CB-242	CB-236	24.0	0.025	6.78	10.97	16.94	35.57
Pipe - (23) (BMP 2)	CB-204	CB-203	30.0	0.007	6.91	6.78	24.16	34.28
Pipe - (24) (BMP 2)	CB-205	CB-204	30.0	0.013	6.92	9.11	24.18	47.60
Pipe - (204) (BMP 2)	DI-213C	DI-212B	15.0	0.051	1.86	0.58	0.17	14.58

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (25) (BMP 2)	CB-206	CB-205	30.0	0.008	6.91	6.91	24.17	36.63
Pipe - (164) (1) (BMP 2)	CB-224	CB-223	15.0	0.118	0.98	0.16	0.01	22.18
Pipe - (78) (BMP 2)	CB-242A	CB-242	24.0	0.015	5.38	3.84	9.60	27.29
Pipe - (211) (BMP 2)	CB-206A	CB-206	30.0	0.017	6.80	6.64	23.20	53.53
Pipe - (62) (1) (BMP 2)	CB-208	CB-209	18.0	0.027	1.78	0.24	0.15	17.27
Pipe - (22) (BMP 2)	CB-203	CB-202	30.0	0.010	7.02	6.91	25.01	41.45
Pipe - (207) (1) (BMP 2)	DI-209A	CB-209	15.0	0.026	3.50	6.20	1.64	10.42
Pipe - (40) (BMP 2)	CB-223	CB-226	15.0	0.006	2.37	1.75	0.42	4.81
Pipe - (42) (BMP 2)	CB-226	CB-222	18.0	0.030	3.51	2.77	1.91	18.31
Pipe - (62) (BMP 2)	CB-209	CB-210	24.0	0.018	3.69	1.42	2.85	30.69
Pipe - (21) (BMP 2)	CB-202A	CB-202	15.0	0.035	2.51	0.71	0.51	12.10
Pipe - (214) (BMP 2)	CB-220A	CB-220	15.0	0.012	2.06	0.95	0.24	7.06
Pipe - (30) (BMP 2)	CB-220	CB-219	15.0	0.046	2.74	1.59	0.71	13.89
Pipe - (56) (BMP 2)	CB-230	CB-229	18.0	0.028	4.84	8.23	5.22	17.50
Pipe - (61) (BMP 2)	CB-230A	CB-230	15.0	0.019	2.56	0.60	0.55	8.80
Pipe - (58) (BMP 2)	CB-210	CB-211	24.0	0.024	5.76	9.79	11.58	35.17

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (57) (BMP 2)	CB-229	CB-210	24.0	0.009	4.93	5.99	7.45	20.94
Pipe - (43) (BMP 2)	CB-222	CB-221A	18.0	0.035	3.88	7.76	2.67	19.61
Pipe - (203) (BMP 2)	DI-212B	DI-212A	15.0	0.050	2.84	1.81	0.80	14.46
Pipe - (52) (BMP 2)	CB-211	CB-213	24.0	0.021	5.99	5.66	12.78	33.12
Pipe - (48) (BMP 2)	CB-221	CB-221A	15.0	0.055	2.84	6.54	0.80	15.12
Pipe - (44) (BMP 2)	CB-221A	CB-216	18.0	0.009	4.89	3.55	5.36	10.11
Pipe - (267) (BMP 2)	DI-221B	CB-221A	18.0	0.005	1.62	1.05	1.56	7.43
Pipe - (20) (BMP 2)	CB-202	CB-201	30.0	0.047	7.10	14.51	25.69	88.48
Pipe - (31) (BMP 2)	CB-219	CB-218	15.0	0.015	4.24	5.98	2.95	7.91
Pipe - (35) (BMP 2)	CB-219A	CB-219	15.0	0.045	3.31	1.96	1.36	13.75
Pipe - (202) (BMP 2)	CB-214A	CB-214	15.0	0.020	4.80	4.12	4.08	9.06
Pipe - (202) (3) (BMP 2)	DI-212A	CB-214A	15.0	0.080	3.42	1.78	1.52	18.27
Pipe - (229) (BMP 2)	CB-213	CB-217A	24.0	0.023	6.23	5.74	14.06	34.08
Pipe - (50) (BMP 2)	CB-214	CB-215	18.0	0.010	5.09	4.49	5.94	10.76
Pipe - (45) (BMP 2)	CB-215	CB-216	18.0	0.005	4.44	4.28	6.52	7.43
Pipe - (46) (BMP 2)	CB-216	CB-217	18.0	0.027	7.27	9.92	11.91	17.13

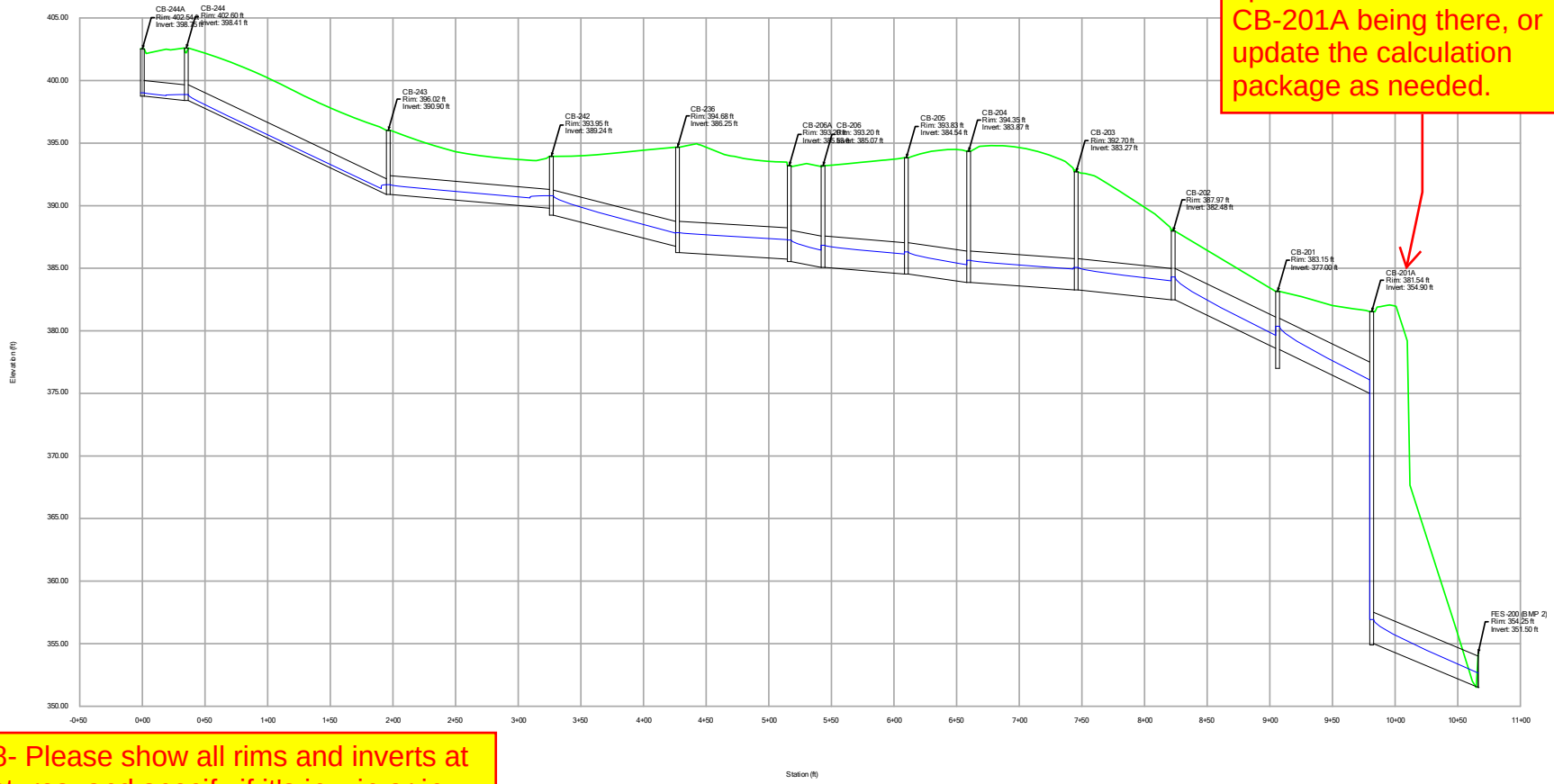
10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (222) (BMP 2)	CB-217	CB-217A	30.0	0.005	5.56	5.29	21.53	29.00
Pipe - (222) (1) (BMP 2)	CB-217A	DI-217B	30.0	0.048	8.41	16.66	36.02	89.66
Pipe - (32) (BMP 2)	CB-218	CB-217	24.0	0.010	4.75	3.25	9.39	22.39
Pipe - (36) (BMP 2)	CB-218A	CB-218	24.0	0.010	2.61	1.82	3.60	22.76
Pipe - (223) (BMP 2)	DI-217B	FES-250 (BMP 2)	30.0	0.169	8.39	26.40	35.82	168.44
Pipe - (19) (BMP 2)(1)	CB-201A	FES-200 (BMP 2)	30.0	0.041	7.51	14.27	29.09	83.21
Pipe - (19) (BMP 2)(2)	CB-201	CB-201A	30.0	0.047	7.27	14.43	27.07	88.54

10-YEAR ANALYSIS

#175- CB-201A does not appear to show on the grading sheets. Please update the sheets to reflect CB-201A being there, or update the calculation package as needed.



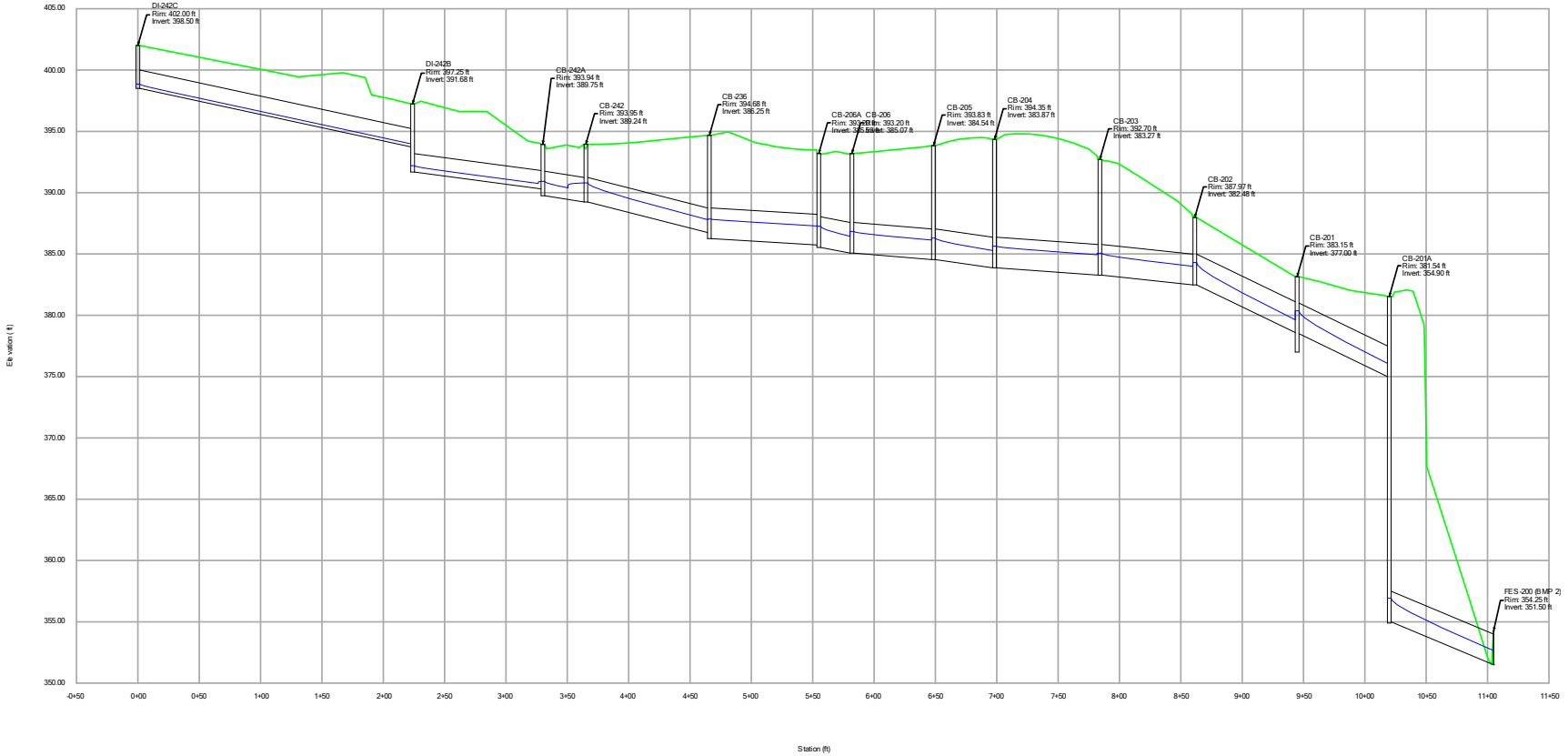
#168- Please show all rims and inverts at structures, and specify if it's inv. in or inv. out

#168- Please label pipe material type, diameter, and slope

#12- Ensure no text is overlapping so it can be clearly read

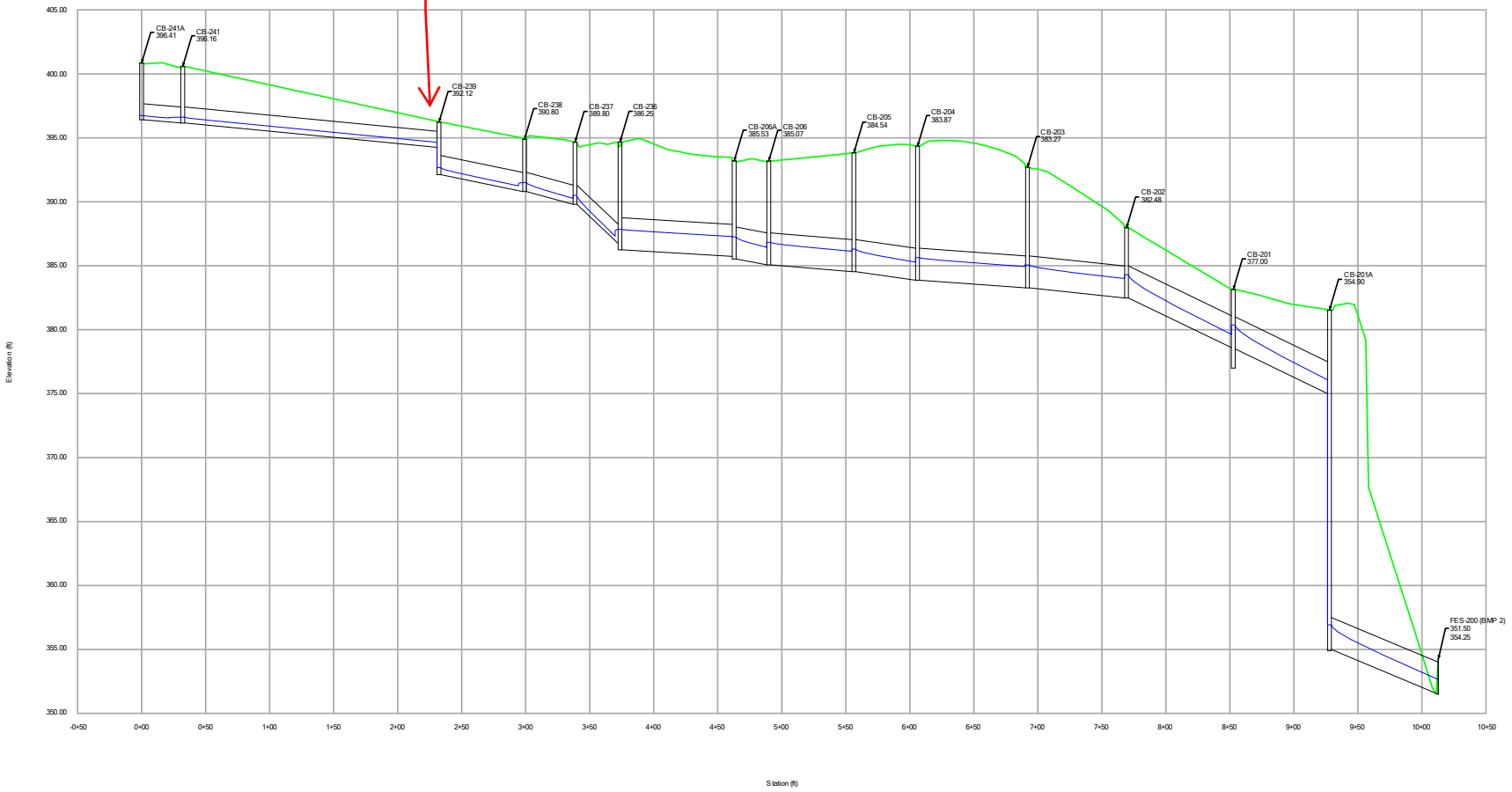
The above comments apply to all storm profiles.

10-YEAR ANALYSIS

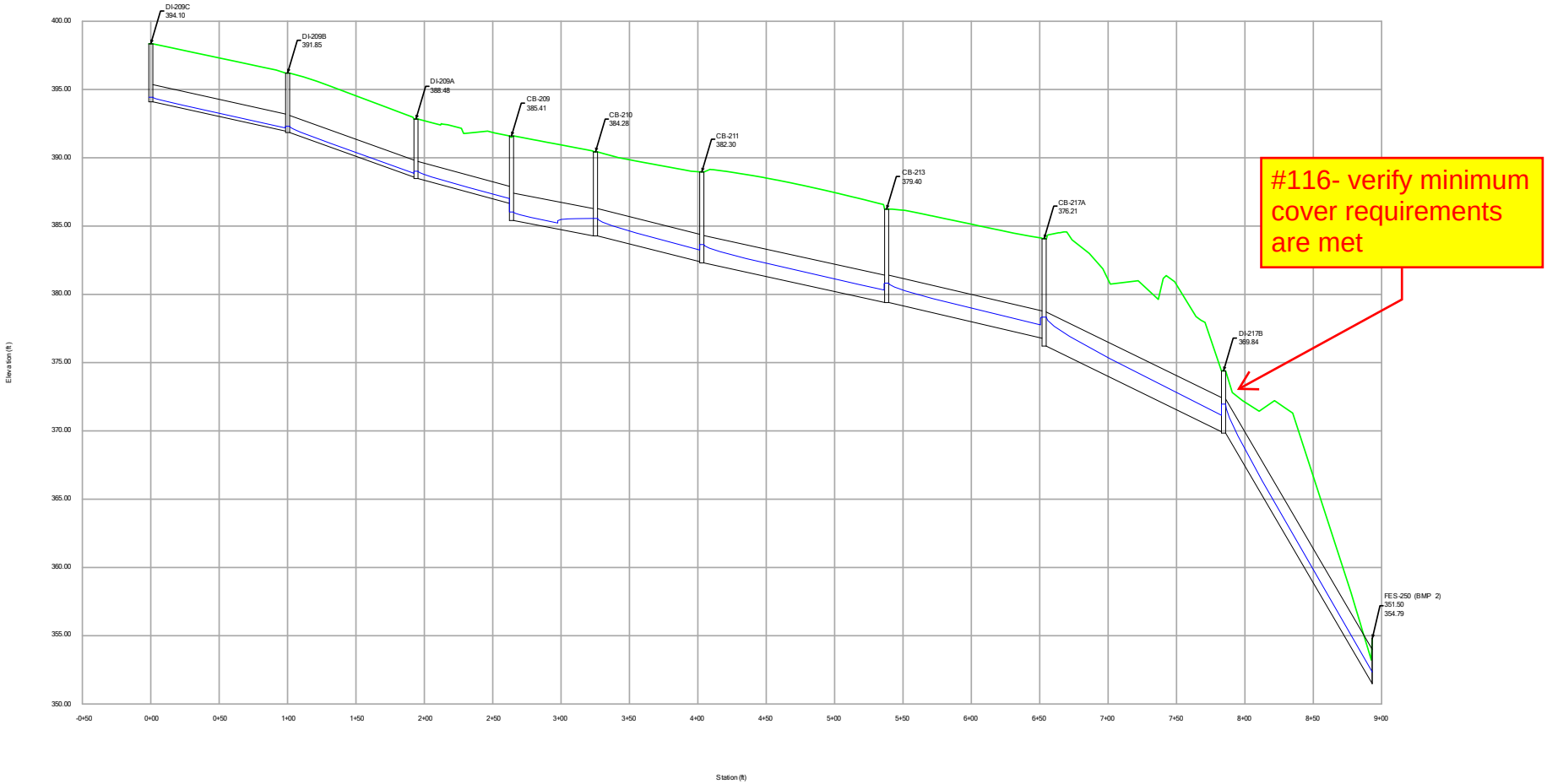


#116- verify minimum cover requirements are met

10-YEAR ANALYSIS

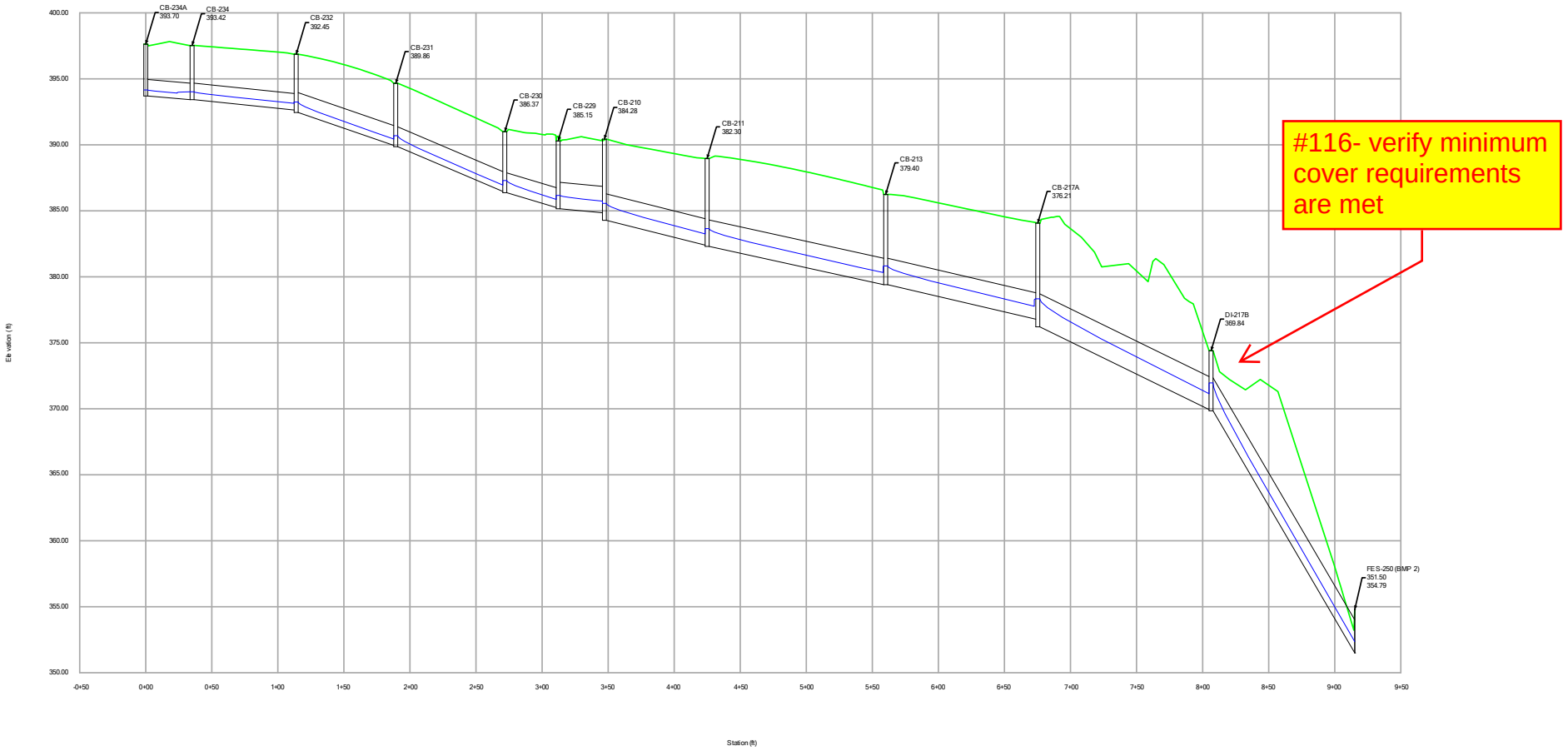


10-YEAR ANALYSIS

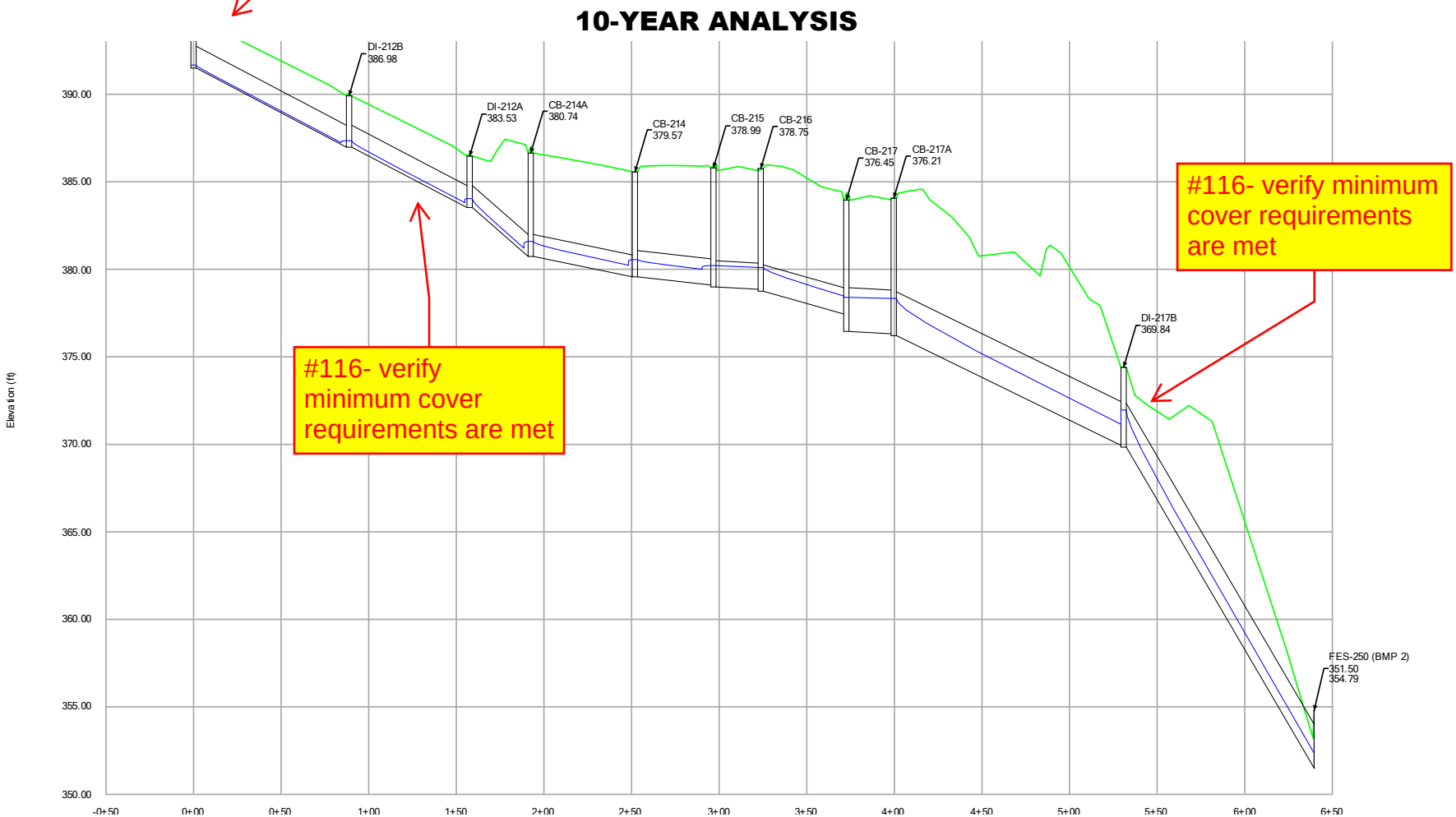


#116- verify minimum cover requirements are met

10-YEAR ANALYSIS



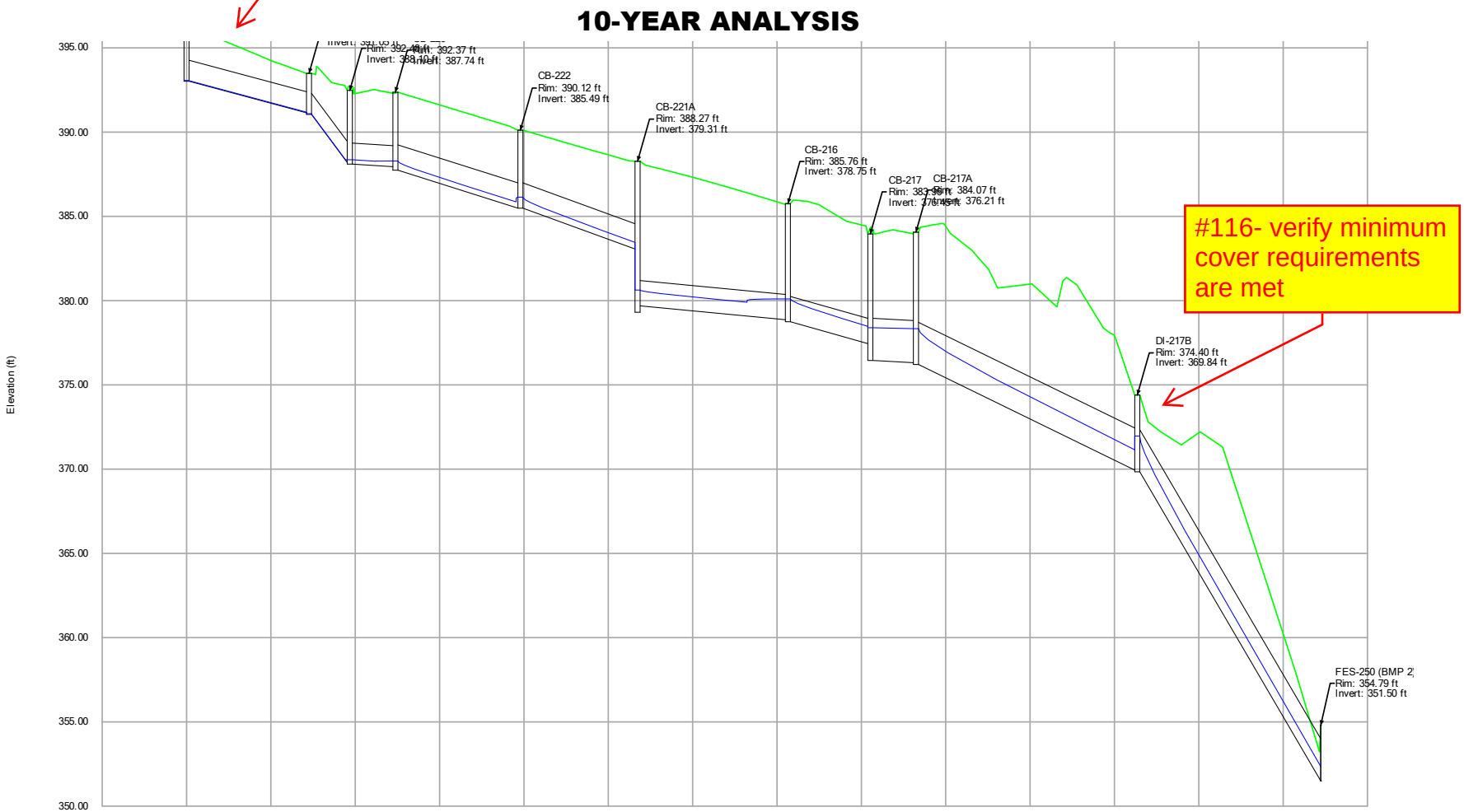
#12- profile is cut off



#116- verify minimum cover requirements are met

#116- verify minimum cover requirements are met

#12- profile is cut off



#116- verify minimum cover requirements are met

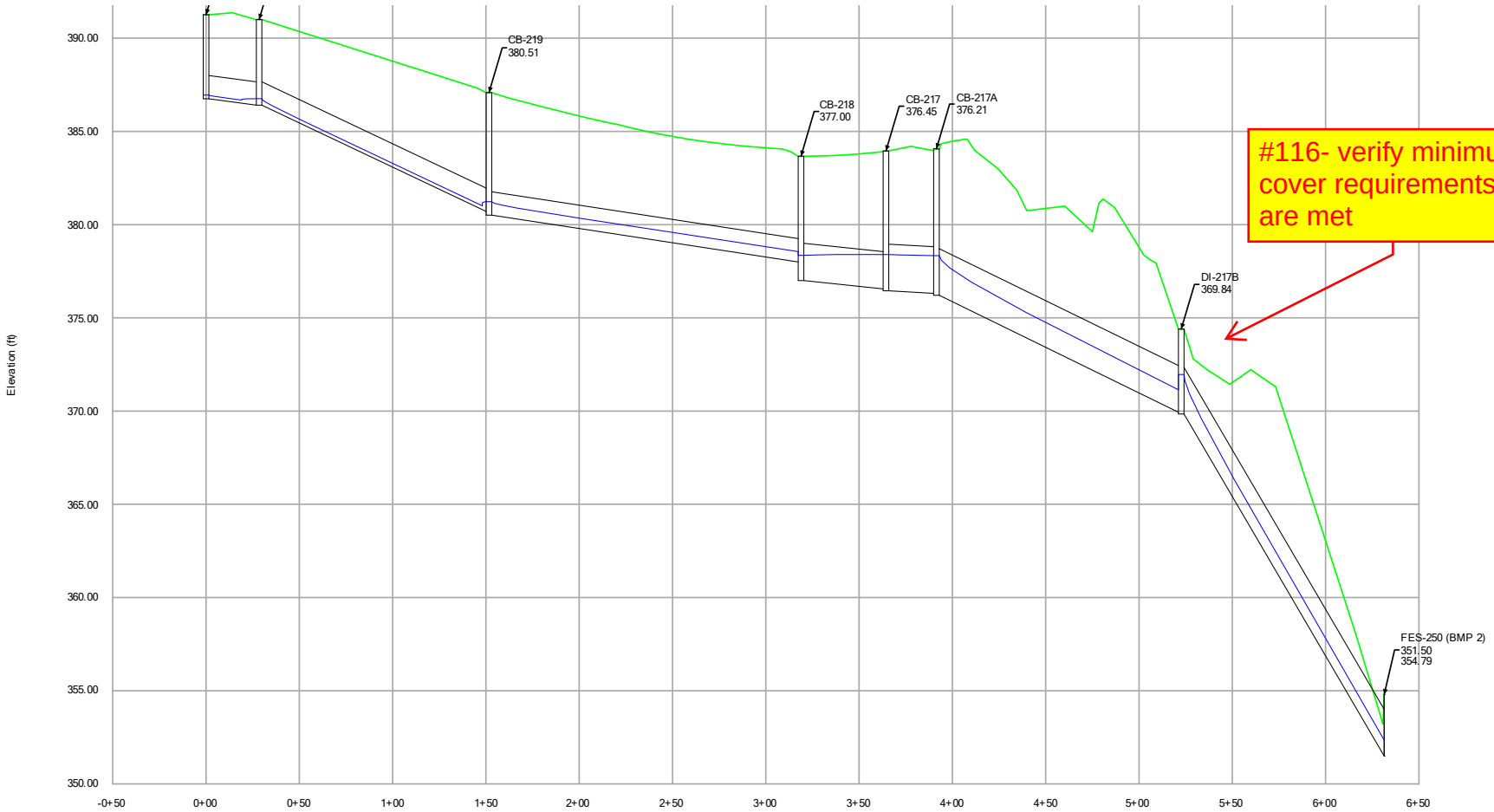
#12- profile is cut off

#116- verify minimum cover requirements are met

#116- verify minimum cover requirements are met

#12- profile is cut off

10-YEAR ANALYSIS



#116- verify minimum cover requirements are met

25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

#169- There a few pipes and structures routing to SCM 2 that are not being shown in these HGL profiles (CB-232A, CB-232B, CB-232C, CB-208 etc.). Please include all storm being routed to SCM 1

SCM 2 – 25 YR STORM

25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-244	0.190	0.119	0.95	0.28	1.42
CB-244A	0.081	0.059	0.47	0.05	0.47
CB-241A	0.137	0.091	0.73	0.16	0.73
CB-241	0.109	0.076	0.61	0.10	1.33
CB-228	0.003	0.002	0.02	0.00	0.02
CB-227	0.038	0.030	0.24	0.01	0.25
CB-234	0.174	0.111	0.89	0.24	2.22
CB-234A	0.295	0.167	1.34	0.58	1.34
CB-232C	0.001	0.001	0.01	0.00	0.01
CB-232	0.084	0.083	0.67	0.13	4.26
CB-232A	0.000	0.064	0.52	0.07	1.59
CB-239	0.152	0.107	0.86	0.23	2.12
CB-225	0.002	0.002	0.01	0.00	0.01
CB-232B	0.251	0.147	1.19	0.45	1.12
CB-243	0.420	0.234	1.88	1.14	4.18
CB-243A	0.186	0.120	0.97	0.29	0.97
CB-203A	0.057	0.043	0.35	0.02	0.35
CB-238A	0.162	0.117	0.94	0.28	0.94
CB-238	0.038	0.054	0.43	0.04	3.41
CB-231	0.071	0.065	0.52	0.07	4.71
CB-204A	0.004	0.003	0.02	0.00	0.02
CB-236	(N/A)	0.000	0.00	0.00	22.04
CB-237	(N/A)	0.000	0.00	0.00	3.40
CB-204	0.009	0.007	0.06	0.00	26.77
CB-205	0.029	0.023	0.19	0.00	26.79
CB-224	0.000	0.000	0.00	0.00	0.01
CB-242	0.486	0.535	4.30	0.00	18.77
CB-242A	1.360	1.138	9.15	0.00	10.64
CB-206A	0.633	0.513	4.12	0.00	25.69
CB-206	0.184	0.150	1.20	0.00	26.77
CB-208	0.026	0.021	0.17	0.00	0.17

25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-203	0.176	0.111	0.90	0.25	27.69
CB-226	0.330	0.182	1.46	0.69	2.08
CB-223	0.078	0.057	0.46	0.05	0.46
CB-209	0.255	0.149	1.20	0.46	3.13
CB-202A	0.095	0.069	0.56	0.08	0.56
CB-220A	0.043	0.033	0.27	0.01	0.27
CB-220	0.089	0.064	0.51	0.07	0.77
CB-230	0.087	0.069	0.55	0.08	5.75
CB-230A	0.100	0.076	0.61	0.10	0.61
CB-210	0.368	0.225	1.81	1.05	12.68
CB-229	0.748	0.332	2.67	2.21	8.15
CB-222	0.075	0.114	0.92	0.26	2.93
CB-211	0.197	0.193	1.55	0.78	14.01
CB-221A	0.070	0.076	0.61	0.10	5.88
CB-221	0.164	0.109	0.88	0.24	0.88
CB-202	0.042	0.059	0.47	0.05	28.46
CB-219	0.196	0.127	1.02	0.33	3.21
CB-219A	0.333	0.184	1.48	0.70	1.48
CB-214A	0.816	0.353	2.84	2.48	4.43
CB-213	0.296	0.216	1.74	0.97	15.42
CB-215	0.092	0.087	0.70	0.14	7.11
CB-216	0.064	0.058	0.47	0.05	13.05
CB-214	0.168	0.265	2.13	1.44	6.47
CB-201	0.417	0.219	1.76	1.00	29.95
CB-217A	0.280	0.221	1.78	1.02	39.74
CB-217	0.149	0.098	0.79	0.19	23.82
CB-218A	0.369	0.513	4.13	0.00	4.13
CB-218	0.466	0.442	3.55	0.00	10.53
CB-201A	0.689	0.313	2.51	1.98	32.13

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (77) (BMP 2)	CB-244	CB-243	15.0	0.047	3.35	1.75	1.42	13.94
Pipe - (82) (BMP 2)	CB-244A	CB-244	15.0	0.010	2.46	1.12	0.47	6.36
Pipe - (249) (BMP 2)	DI-242C	DI-242B	18.0	0.021	2.87	4.80	0.94	15.32
Pipe - (70) (BMP 2)	CB-241A	CB-241	15.0	0.008	2.77	1.81	0.73	5.70
Pipe - (69) (BMP 2)	CB-241	CB-239	15.0	0.009	3.29	4.07	1.33	6.29
Pipe - (206) (BMP 2)	DI-209C	DI-209B	15.0	0.021	2.78	2.57	0.74	9.47
Pipe - (167) (BMP 2)	CB-228	CB-227	15.0	0.036	1.05	0.44	0.02	12.30
Pipe - (39) (BMP 2)	CB-227	CB-226	15.0	0.033	2.08	0.49	0.25	11.77
Pipe - (53) (BMP 2)	CB-234	CB-232	15.0	0.010	3.85	3.77	2.22	6.44
Pipe - (213) (BMP 2)	CB-234A	CB-234	15.0	0.008	3.30	2.33	1.34	5.77
Pipe - (161) (BMP 2)	CB-232C	CB-232B	15.0	0.004	0.21	0.03	0.01	3.93
Pipe - (248) (BMP 2)	DI-242B	CB-242A	18.0	0.013	3.52	2.87	1.94	11.94
Pipe - (250) (BMP 2)	DI-242D	DI-242B	18.0	0.005	0.06	0.03	0.01	7.43
Pipe - (54) (BMP 2)	CB-232	CB-231	18.0	0.033	4.51	8.70	4.26	19.09
Pipe - (59) (BMP 2)	CB-232A	CB-232	15.0	0.008	3.47	1.94	1.59	5.78
Pipe - (162) (BMP 2)	CB-232B	CB-232A	15.0	0.008	3.13	3.64	1.12	5.78

#129- min slope is 0.5%

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (67) (BMP 2)	CB-239	CB-238	18.0	0.020	3.61	2.60	2.12	14.76
Pipe - (163) (BMP 2)	CB-225	CB-224	15.0	0.026	0.98	1.44	0.01	10.37
Pipe - (207) (BMP 2)	DI-209B	DI-209A	15.0	0.035	3.29	6.46	1.32	12.06
Pipe - (74) (BMP 2)	CB-243	CB-242	18.0	0.008	4.48	3.34	4.18	9.66
Pipe - (80) (BMP 2)	CB-243A	CB-243	15.0	0.024	3.00	1.20	0.97	9.98
Pipe - (26) (BMP 2)	CB-203A	CB-203	15.0	0.192	2.26	0.28	0.35	28.32
Pipe - (72) (BMP 2)	CB-238A	CB-238	15.0	0.014	2.97	4.28	0.94	7.76
Pipe - (66) (BMP 2)	CB-238	CB-237	18.0	0.025	4.18	7.24	3.41	16.74
Pipe - (55) (BMP 2)	CB-231	CB-230	18.0	0.041	4.67	9.68	4.71	21.29
Pipe - (28) (BMP 2)	CB-204A	CB-204	15.0	0.157	1.13	0.02	0.02	25.62
Pipe - (218) (BMP 2)	CB-236	CB-206A	30.0	0.006	6.66	6.90	22.04	31.24
Pipe - (65) (BMP 2)	CB-237	CB-236	18.0	0.087	4.18	2.45	3.40	30.93
Pipe - (73) (BMP 2)	CB-242	CB-236	24.0	0.025	7.14	11.21	18.77	35.57
Pipe - (23) (BMP 2)	CB-204	CB-203	30.0	0.007	7.23	7.10	26.77	34.28
Pipe - (24) (BMP 2)	CB-205	CB-204	30.0	0.013	7.23	9.34	26.79	47.60
Pipe - (204) (BMP 2)	DI-213C	DI-212B	15.0	0.051	1.91	0.61	0.18	14.58

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (25) (BMP 2)	CB-206	CB-205	30.0	0.008	7.23	7.23	26.77	36.63
Pipe - (164) (1) (BMP 2)	CB-224	CB-223	15.0	0.118	1.00	0.16	0.01	22.18
Pipe - (78) (BMP 2)	CB-242A	CB-242	24.0	0.015	5.58	4.05	10.64	27.29
Pipe - (211) (BMP 2)	CB-206A	CB-206	30.0	0.017	7.10	6.94	25.69	53.53
Pipe - (62) (1) (BMP 2)	CB-208	CB-209	18.0	0.027	1.82	0.25	0.17	17.27
Pipe - (22) (BMP 2)	CB-203	CB-202	30.0	0.010	7.34	7.24	27.69	41.45
Pipe - (207) (1) (BMP 2)	DI-209A	CB-209	15.0	0.026	3.61	6.37	1.81	10.42
Pipe - (40) (BMP 2)	CB-223	CB-226	15.0	0.006	2.43	1.73	0.46	4.81
Pipe - (42) (BMP 2)	CB-226	CB-222	18.0	0.030	3.59	2.83	2.08	18.31
Pipe - (62) (BMP 2)	CB-209	CB-210	24.0	0.018	3.79	1.47	3.13	30.69
Pipe - (21) (BMP 2)	CB-202A	CB-202	15.0	0.035	2.57	0.67	0.56	12.10
Pipe - (214) (BMP 2)	CB-220A	CB-220	15.0	0.012	2.11	0.97	0.27	7.06
Pipe - (30) (BMP 2)	CB-220	CB-219	15.0	0.046	2.81	1.60	0.77	13.89
Pipe - (56) (BMP 2)	CB-230	CB-229	18.0	0.028	5.02	8.41	5.75	17.50
Pipe - (61) (BMP 2)	CB-230A	CB-230	15.0	0.019	2.64	0.63	0.61	8.80
Pipe - (58) (BMP 2)	CB-210	CB-211	24.0	0.024	5.97	9.99	12.68	35.17

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (57) (BMP 2)	CB-229	CB-210	24.0	0.009	5.08	6.13	8.15	20.94
Pipe - (43) (BMP 2)	CB-222	CB-221A	18.0	0.035	3.99	7.97	2.93	19.61
Pipe - (203) (BMP 2)	DI-212B	DI-212A	15.0	0.050	2.92	1.86	0.88	14.46
Pipe - (52) (BMP 2)	CB-211	CB-213	24.0	0.021	6.22	5.89	14.01	33.12
Pipe - (48) (BMP 2)	CB-221	CB-221A	15.0	0.055	2.92	6.71	0.88	15.12
Pipe - (44) (BMP 2)	CB-221A	CB-216	18.0	0.009	5.07	3.77	5.88	10.11
Pipe - (267) (BMP 2)	DI-221B	CB-221A	18.0	0.005	1.64	1.10	1.68	7.43
Pipe - (20) (BMP 2)	CB-202	CB-201	30.0	0.047	7.44	14.80	28.46	88.48
Pipe - (31) (BMP 2)	CB-219	CB-218	15.0	0.015	4.37	6.11	3.21	7.91
Pipe - (35) (BMP 2)	CB-219A	CB-219	15.0	0.045	3.39	2.01	1.48	13.75
Pipe - (202) (BMP 2)	CB-214A	CB-214	15.0	0.020	4.96	4.27	4.43	9.06
Pipe - (202) (3) (BMP 2)	DI-212A	CB-214A	15.0	0.080	3.52	1.86	1.66	18.27
Pipe - (229) (BMP 2)	CB-213	CB-217A	24.0	0.023	6.49	5.93	15.42	34.08
Pipe - (50) (BMP 2)	CB-214	CB-215	18.0	0.010	5.27	4.60	6.47	10.76
Pipe - (45) (BMP 2)	CB-215	CB-216	18.0	0.005	4.61	4.53	7.11	7.43
Pipe - (46) (BMP 2)	CB-216	CB-217	18.0	0.027	7.78	10.13	13.05	17.13

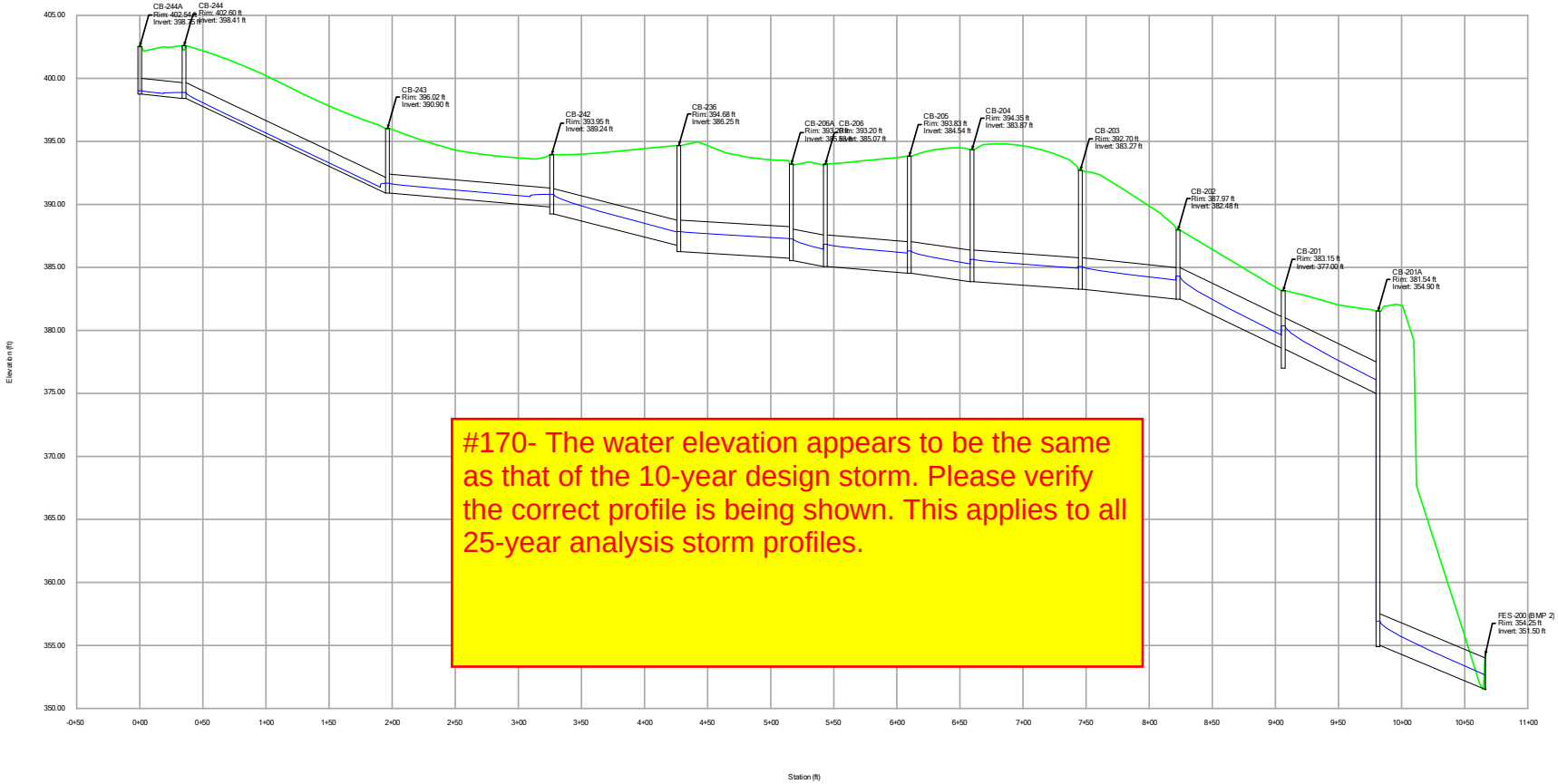
25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (222) (BMP 2)	CB-217	CB-217A	30.0	0.005	5.82	5.61	23.82	29.00
Pipe - (222) (1) (BMP 2)	CB-217A	DI-217B	30.0	0.048	8.94	16.99	39.74	89.66
Pipe - (32) (BMP 2)	CB-218	CB-217	24.0	0.010	4.65	3.48	10.53	22.39
Pipe - (36) (BMP 2)	CB-218A	CB-218	24.0	0.010	2.43	1.82	4.13	
Pipe - (223) (BMP 2)	DI-217B	FES-250 (BMP 2)	30.0	0.169	8.91	26.87	39.52	
Pipe - (19) (BMP 2)(1)	CB-201A	FES-200 (BMP 2)	30.0	0.041	7.90	14.56	32.13	83.21
Pipe - (19) (BMP 2)(2)	CB-201	CB-201A	30.0	0.047	7.62	14.72	29.95	88.54

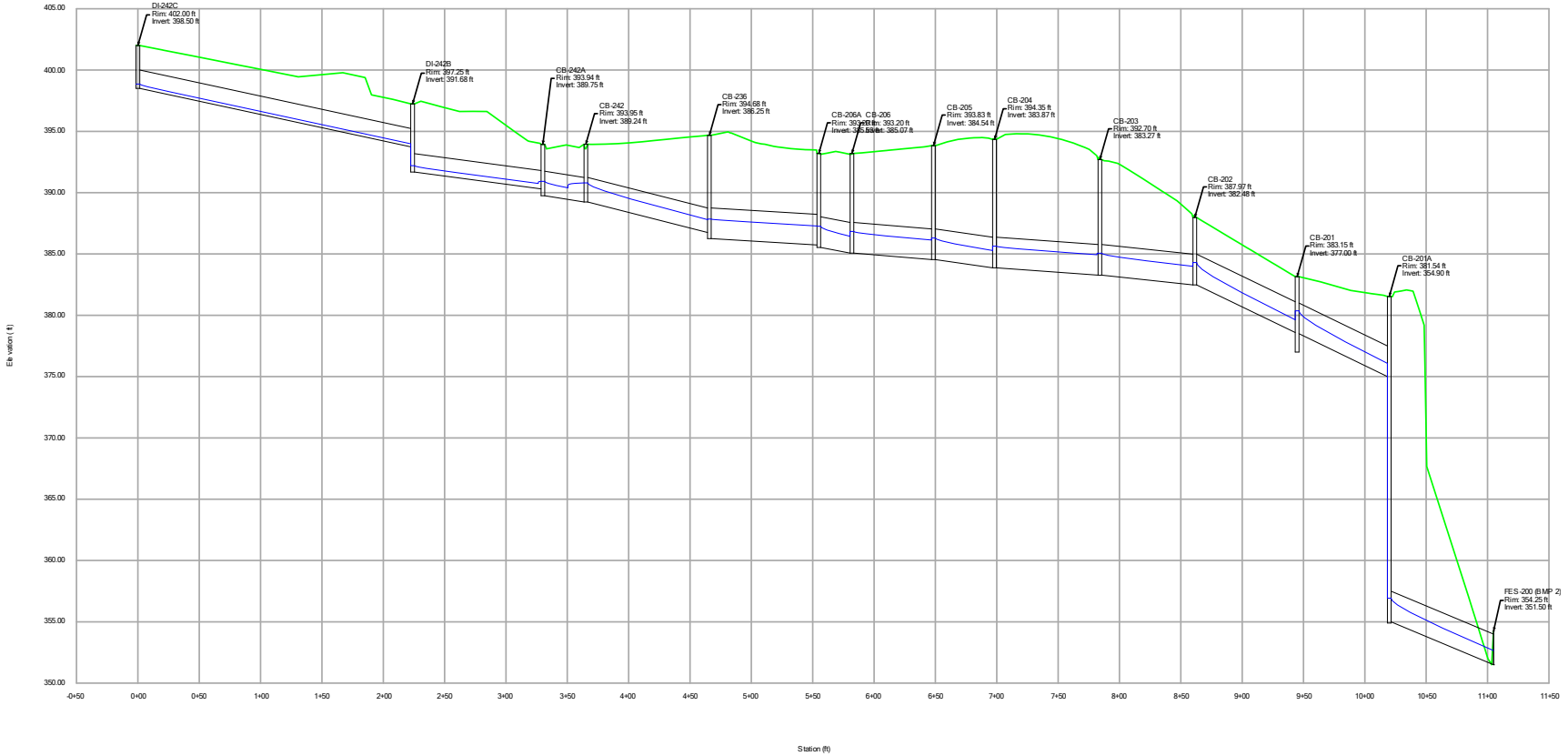
#156- max slope 12%

25-YEAR ANALYSIS

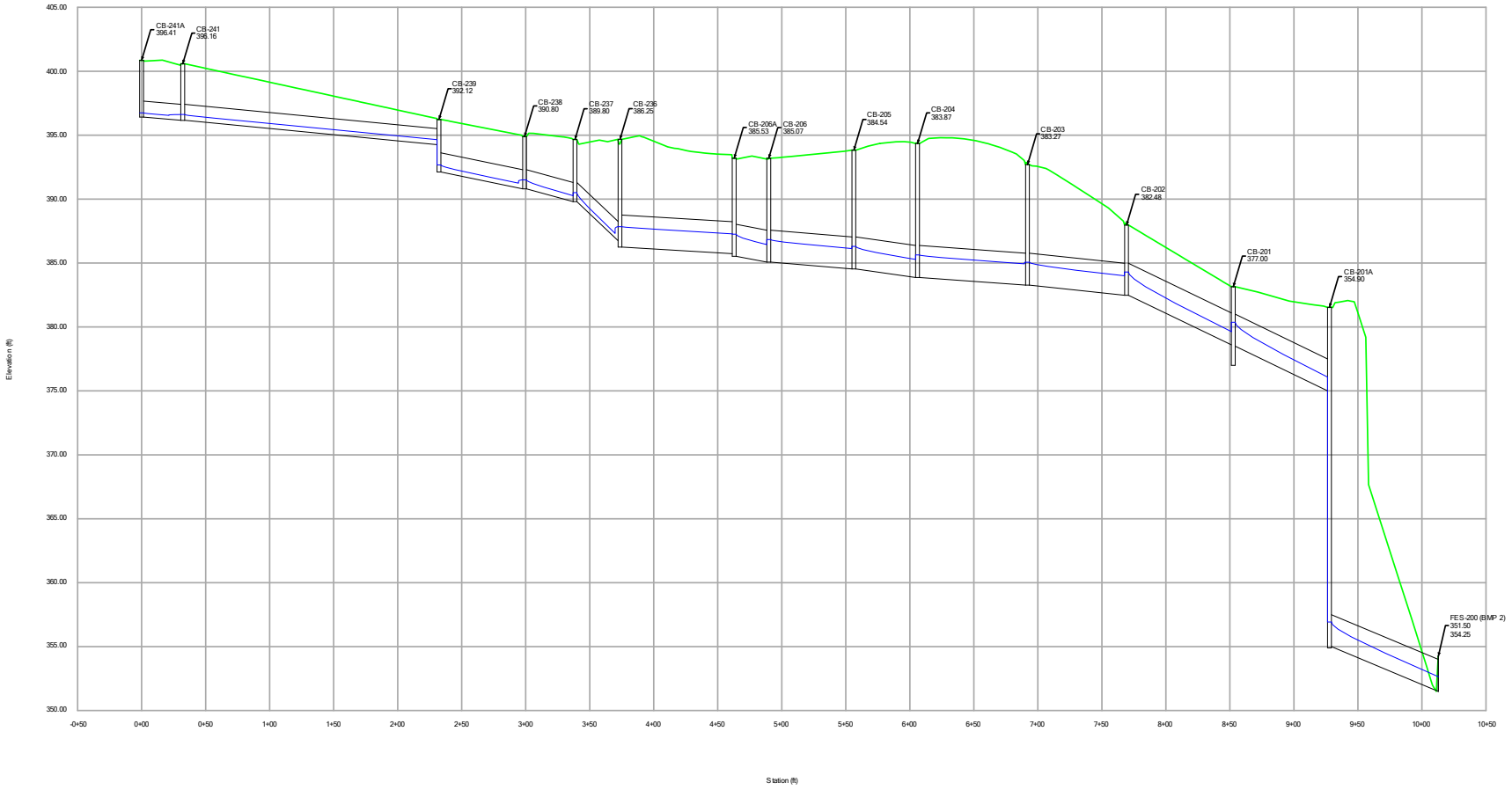


#170- The water elevation appears to be the same as that of the 10-year design storm. Please verify the correct profile is being shown. This applies to all 25-year analysis storm profiles.

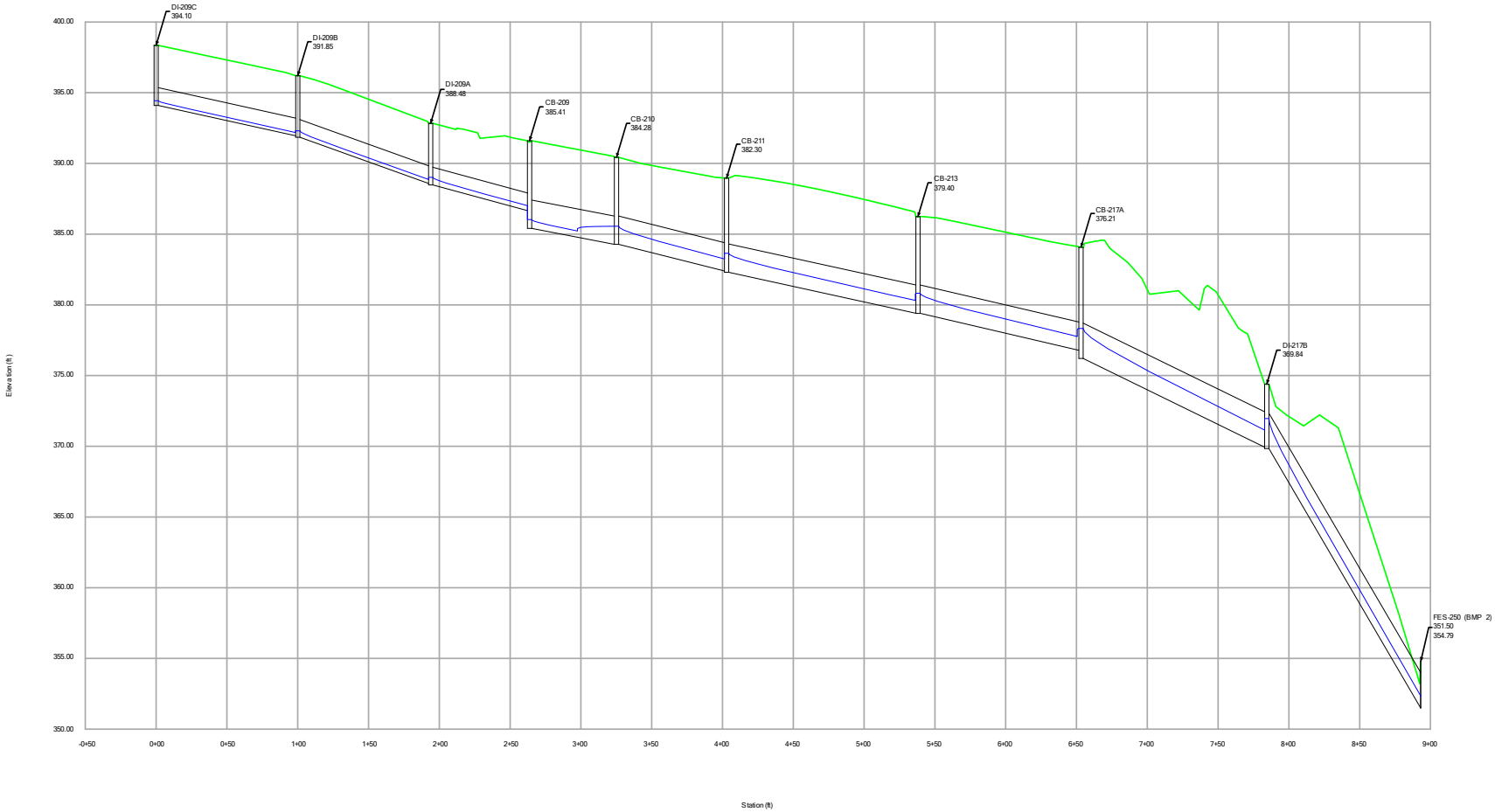
25-YEAR ANALYSIS



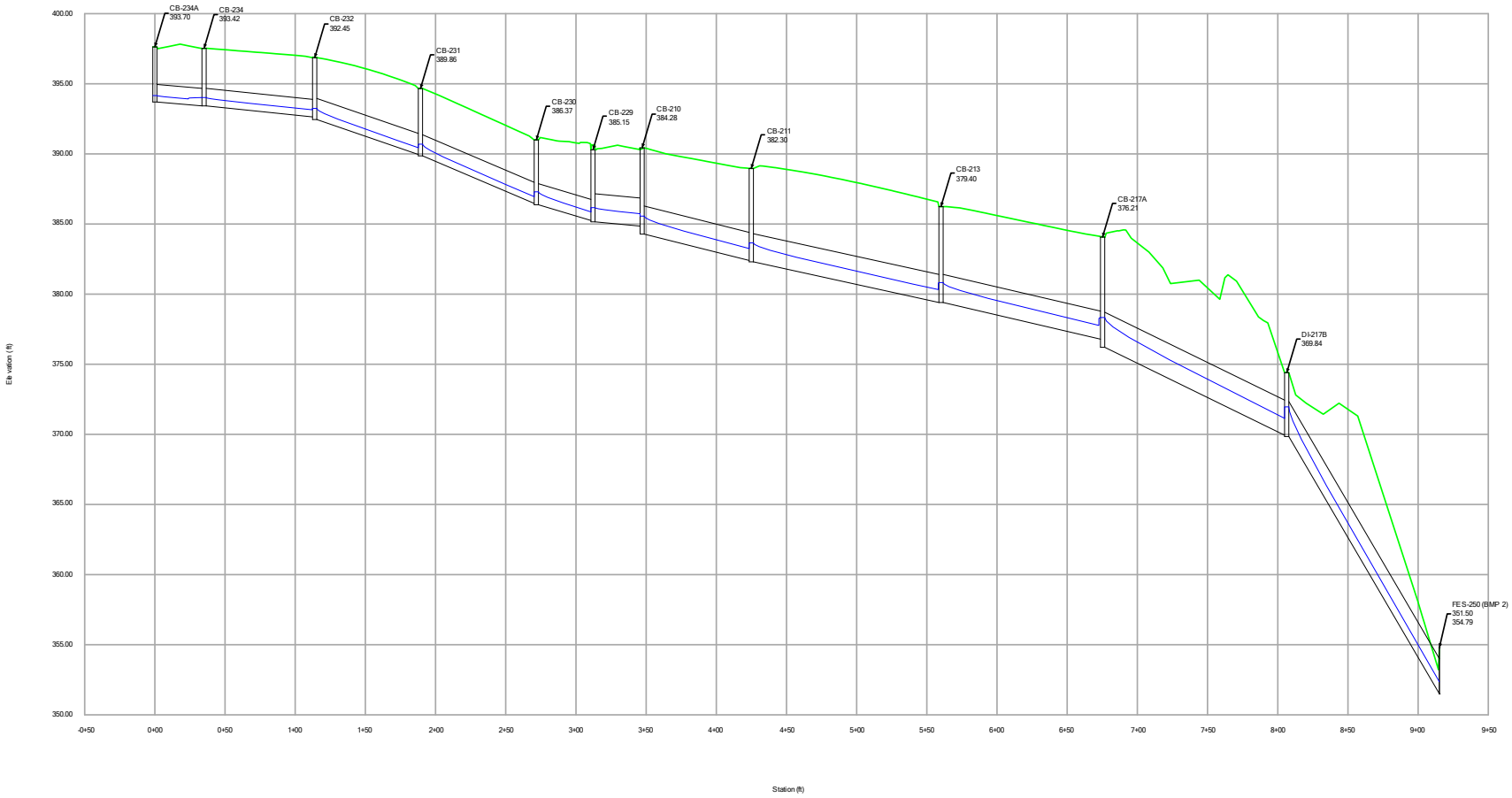
25-YEAR ANALYSIS



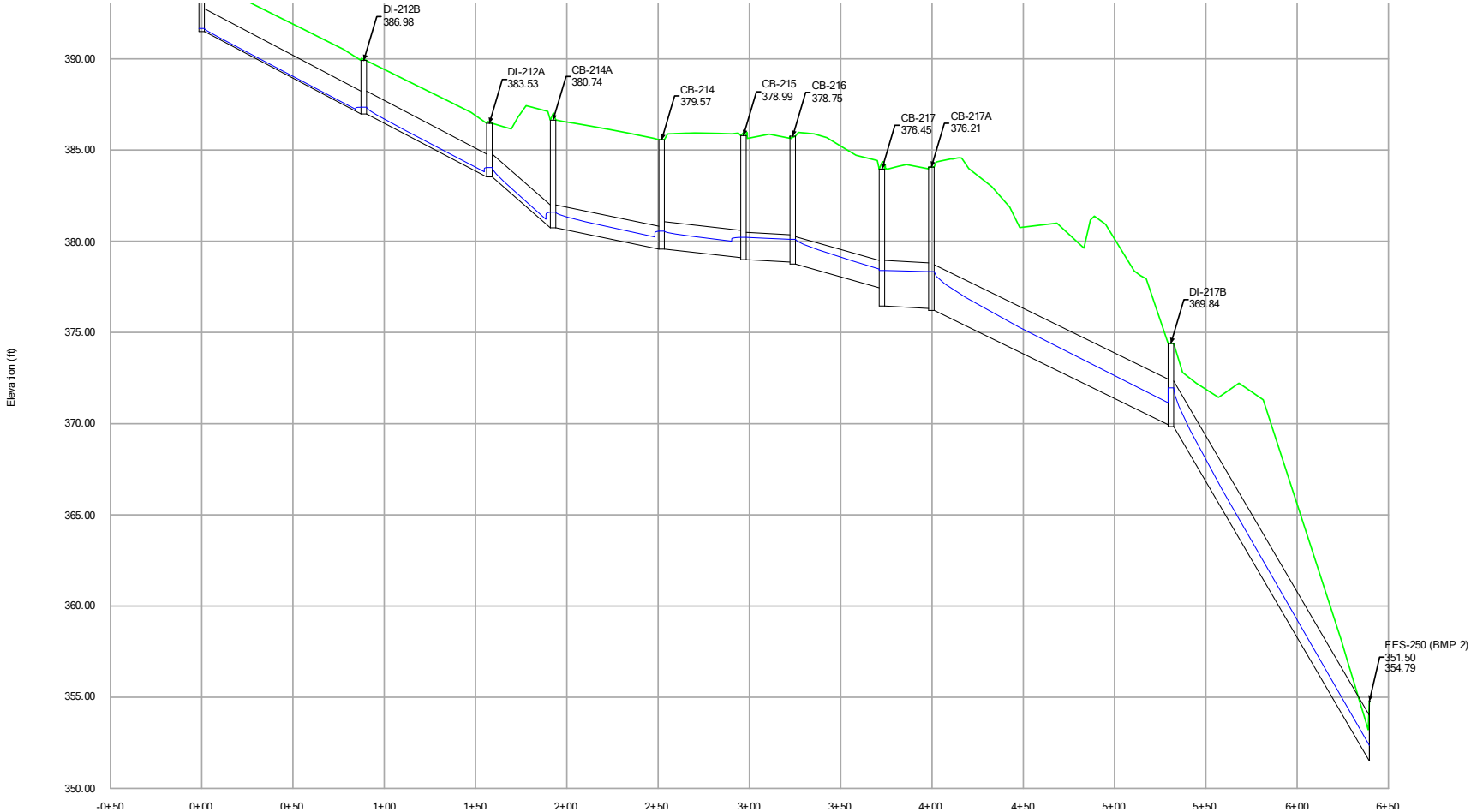
25-YEAR ANALYSIS



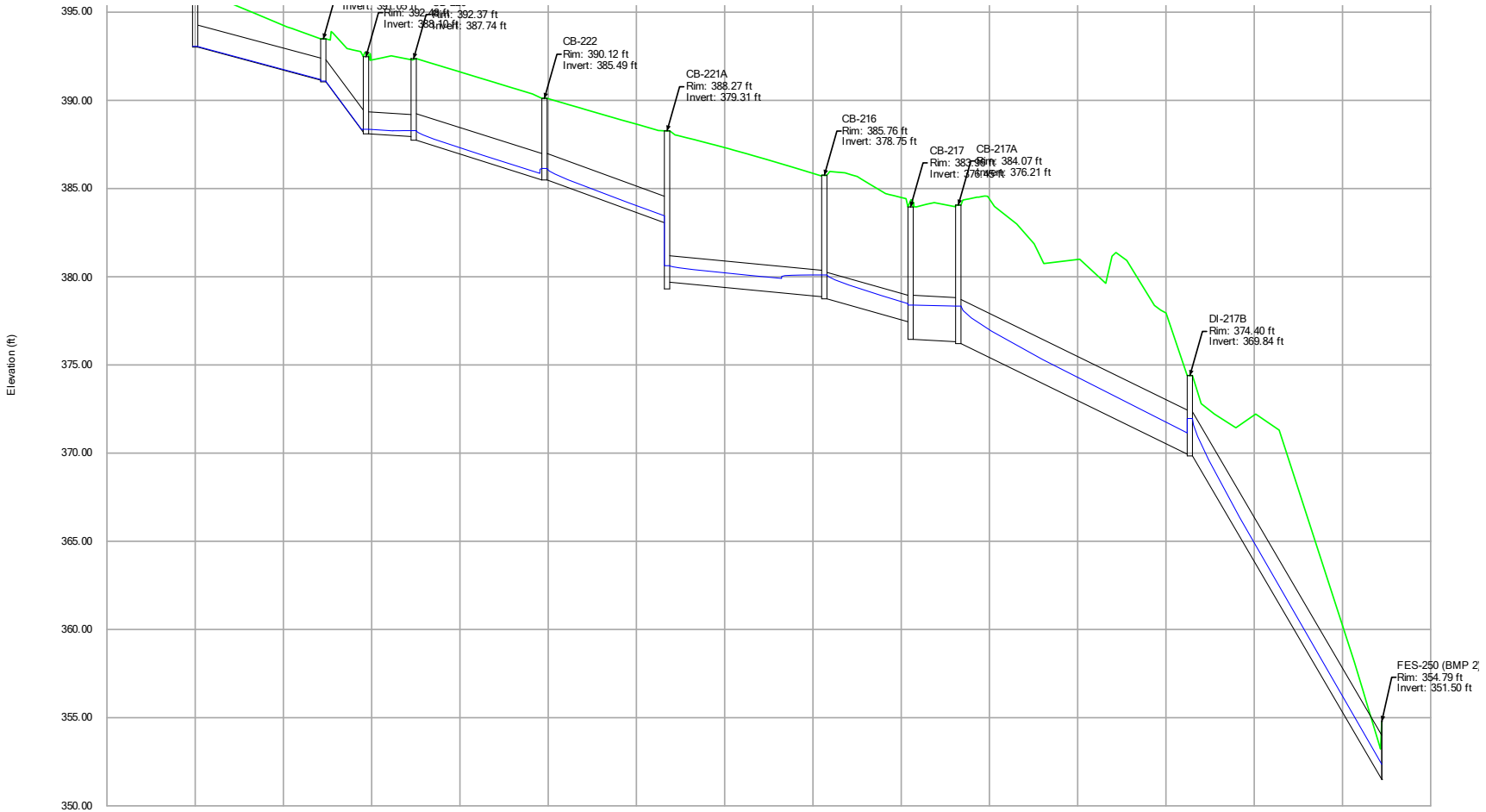
25-YEAR ANALYSIS



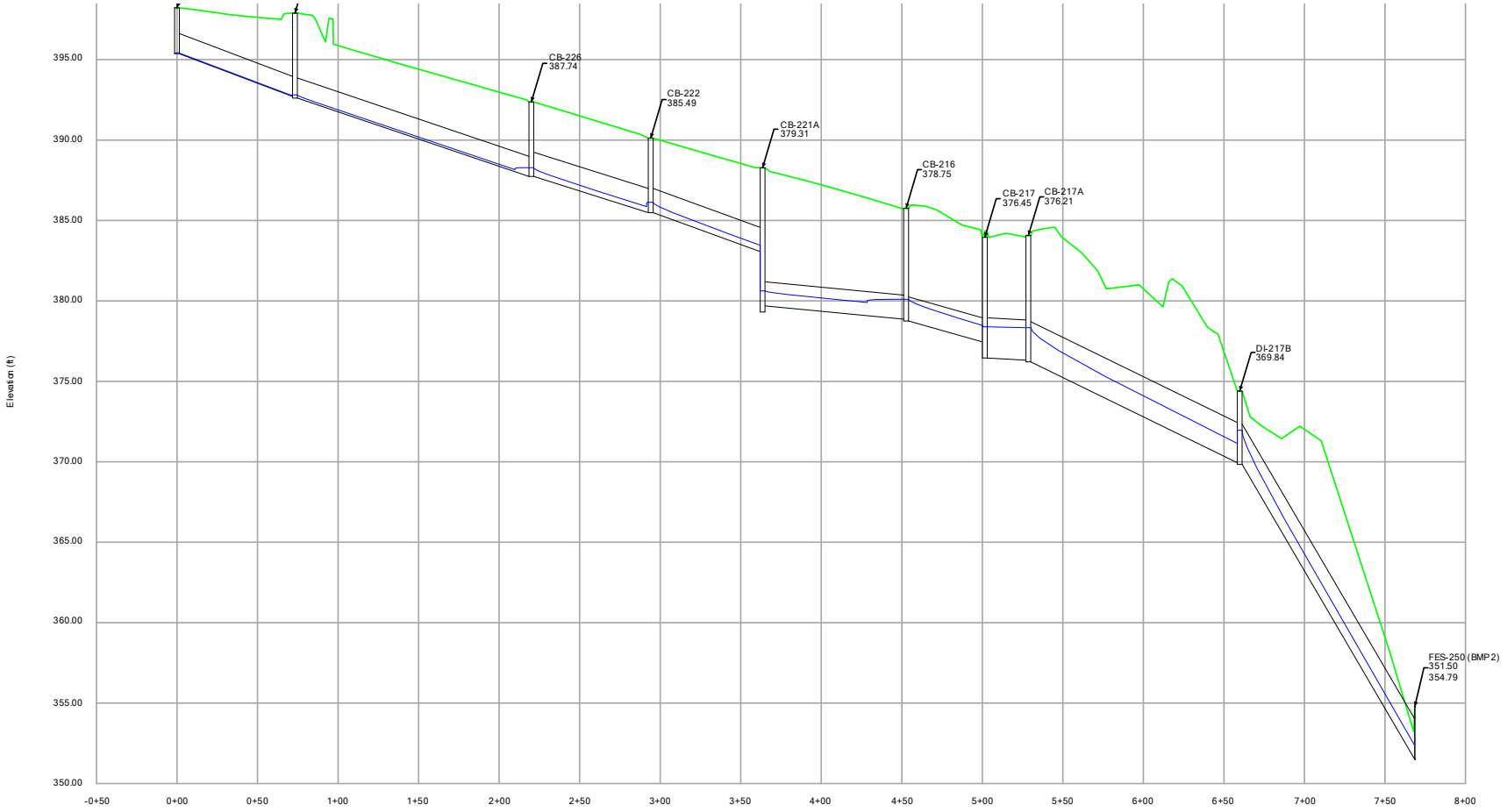
25-YEAR ANALYSIS



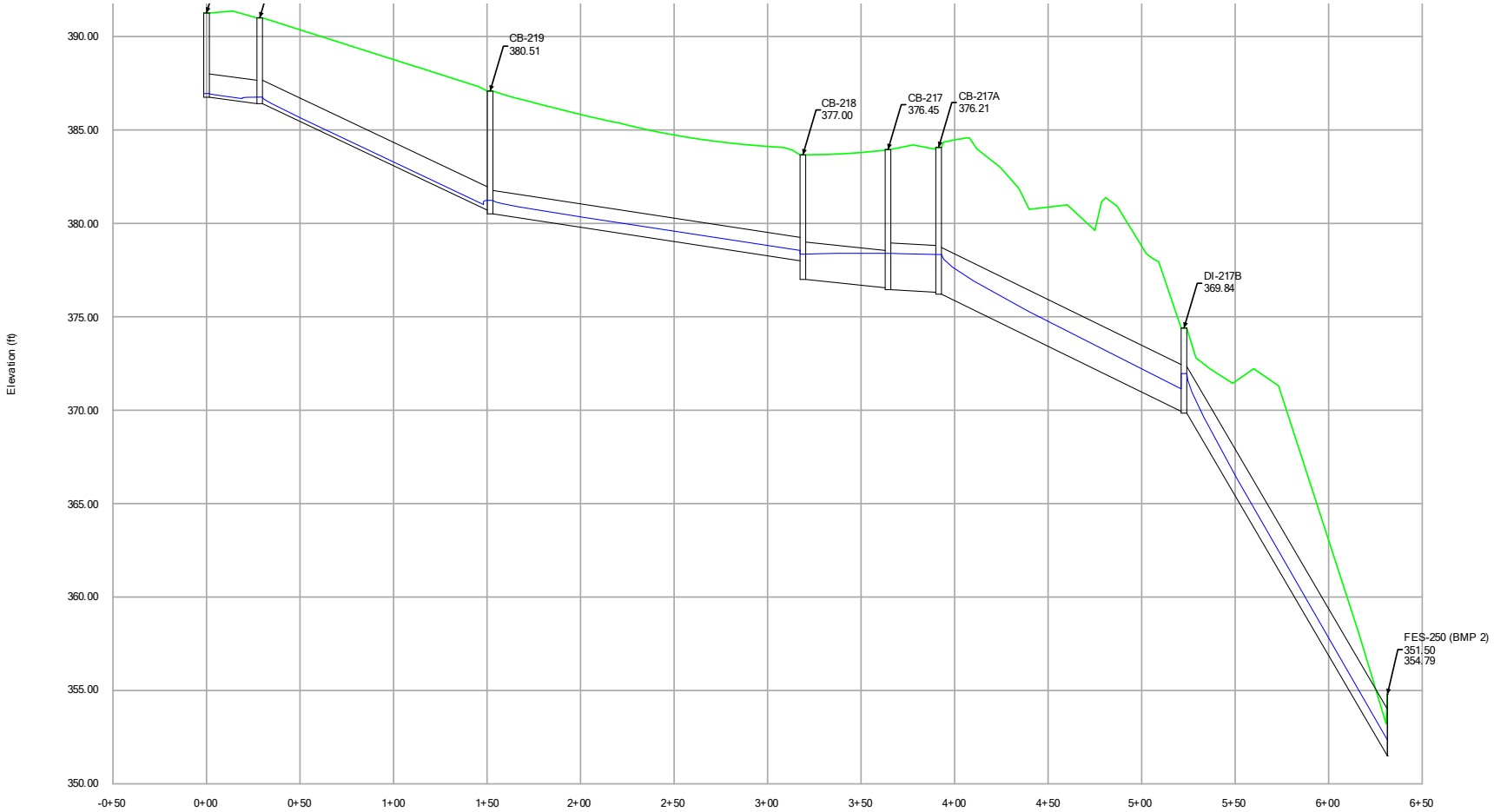
25-YEAR ANALYSIS



25-YEAR ANALYSIS



25-YEAR ANALYSIS



Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)

SCM 2 – INLET SPREAD

Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)
CB-244	0.190	0.127	0.72	0.15	5.6
CB-244A	0.081	0.061	0.35	0.02	4.0
CB-241A	0.137	0.097	0.55	0.08	4.9
CB-241	0.109	0.080	0.45	0.05	4.5
CB-228	0.003	0.002	0.01	0.00	1.1
CB-227	0.038	0.030	0.17	0.00	3.0
CB-234	0.174	0.118	0.67	0.13	5.4
CB-234A	0.295	0.181	1.02	0.33	6.6
CB-232C	0.001	0.001	0.01	0.00	0.8
CB-232	0.084	0.082	0.46	0.05	4.6
CB-232A	0.000	0.056	0.32	0.02	3.9
CB-239	0.152	0.112	0.63	0.11	5.2
CB-225	0.002	0.002	0.01	0.00	1.0
CB-232B	0.251	0.159	0.90	0.25	6.2
CB-243	0.420	0.251	1.42	0.66	7.7
CB-243A	0.186	0.127	0.72	0.15	5.6
CB-203A	0.057	0.045	0.25	0.01	3.5
CB-238A	0.162	0.121	0.69	0.14	5.4
CB-238	0.038	0.048	0.27	0.01	3.7
CB-231	0.071	0.062	0.35	0.02	4.1
CB-204A	0.004	0.003	0.02	0.00	1.3
CB-236	(N/A)	0.000	0.00	0.00	0.0
CB-237	(N/A)	0.000	0.00	0.00	0.0
CB-204	0.009	0.007	0.04	0.00	1.8
CB-205	0.029	0.023	0.13	0.00	2.7
CB-224	0.000	0.000	0.00	0.00	0.5
CB-242	0.486	0.509	2.88	0.00	9.1
CB-242A	1.360	1.128	6.39	0.00	15.4
CB-206A	0.633	0.513	2.90	0.00	9.2
CB-206	0.184	0.149	0.85	0.00	3.9
CB-208	0.026	0.021	0.12	0.00	2.7
CB-203	0.176	0.119	0.68	0.13	5.4

Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)
CB-226	0.330	0.197	1.12	0.40	6.8
CB-223	0.078	0.060	0.34	0.02	4.0
CB-209	0.255	0.161	0.91	0.26	6.2
CB-202A	0.095	0.072	0.41	0.04	4.3
CB-220A	0.043	0.034	0.19	0.00	3.2
CB-220	0.089	0.067	0.38	0.03	4.2
CB-230	0.087	0.069	0.39	0.03	4.2
CB-230A	0.100	0.076	0.43	0.04	4.4
CB-210	0.368	0.239	1.36	0.59	7.5
CB-229	0.748	0.365	2.07	1.36	9.3
CB-222	0.075	0.111	0.63	0.11	5.2
CB-211	0.197	0.195	1.11	0.39	6.8
CB-221A	0.070	0.070	0.40	0.03	4.3
CB-221	0.164	0.115	0.65	0.12	5.3
CB-202	0.042	0.055	0.31	0.02	3.8
CB-219	0.196	0.134	0.76	0.17	5.7
CB-219A	0.333	0.199	1.13	0.40	6.9
CB-214A	0.816	0.389	2.20	1.54	9.6
CB-213	0.296	0.220	1.25	0.50	7.2
CB-215	0.092	0.086	0.49	0.06	4.7
CB-216	0.064	0.055	0.31	0.02	3.8
CB-214	0.168	0.272	1.54	0.77	8.0
CB-201	0.417	0.237	1.34	0.58	7.5
CB-217A	0.280	0.224	1.27	0.52	7.3
CB-217	0.149	0.104	0.59	0.09	5.1
CB-218A	0.369	0.462	2.62	0.00	8.5
CB-218	0.466	0.425	2.41	0.00	8.1
CB-201A	0.689	0.344	1.95	1.22	9.0

ATTACHMENT 3: DRAINAGE AREA MAPS – SCM 3

THE TOWN OF ROLESVILLE
DB 5134 PG 818
BM 1991 PG 1333
PIN# 1758680348

#164- There are several drainage areas that don't seem to quite match what the contours are showing. A more thorough review can be done once contours are labeled and storm is shown.

#162 and #49- Please show storm pipes and structures and add proposed contour labels.

#49- Please show and label existing contours.

#12- There are several areas where text is difficult to read.

#163- There are several places where the drainage going to a single structure is being split into separate drainage areas. Why is this?

NORTH

CB-312 0.018 acres
CB-311A 0.022 acres
CB-311 0.045 acres
CB-305A 0.564 acres
CB-306A 0.398 acres
CB-310 0.111 acres
DCB-314 1.322 acres
CB-307B 0.829 acres
DCB-307A 0.876 acres
CB-305 0.318 acres
CB-305A 0.091 acres
CB-306 0.378 acres
DCB-31A 0.446 acres
0.230 acres DCB-314
0.022 acres CB-315
0.123 acres CB-316A
CB-318B 0.421 acres
CB-318C 0.030 acres
CB-316 0.036 acres
0.092 acres CB-316A
CB-317A 0.074 acres
CB-317 0.047 acres
DI-301 0.354 acres
CB-318A 0.055 acres
CB-318 0.267 acres
CB-316B 0.092 acres
CB-308A 0.330 acres
CB-309A 0.123 acres
CB-308 0.359 acres
CB-309 0.161 acres
CB-309A 0.093 acres
CB-309A 0.050 acres
DCB-307 0.618 acres
CB-244 0.140 acres
CB-244A 0.166 acres
CB-243 0.108 acres
CB-316B 0.162 acres
CB-316A 0.010 acres
WETLAND

#176- Labeled as CB-307 in other locations throughout plans. Make sure naming is consistent

#172- are these going to SCM 2? Recommend removing drainage areas that aren't going to SCM 3.

#171- label SCM

BGE
5440 WADE PARK BLVD, SUITE 102
RALEIGH NC 27607
www.bgeinc.com
NC LICENSE #C-4397

SCM 3 DRAINAGE MAP

DATE: 6/1/2023

0 40' 80' 120'
SCALE: 1" = 40'

G:\NCA\Projects\Lennar\8430-03 - Lennar - School Street - Rolesville\04 - Calculations\Storm\StormCAD\Drainage Map.dwg

SCM 3 – 10 YR STORM

SCM 3 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-312	0.018	0.015	0.11	0.00	0.11
CB-311	0.043	0.034	0.25	0.01	1.45
CB-311A	0.259	0.155	1.12	0.40	1.12
CB-310	0.111	0.078	0.57	0.09	2.00
CB-303	0.091	0.066	0.48	0.06	21.29
CB-315	0.023	0.018	0.13	0.00	25.95
CB-316A	0.023	0.019	0.14	0.00	27.00
CB-316B	0.071	0.053	0.39	0.03	1.32
CB-314A	1.322	0.512	3.71	4.05	3.71
CB-314	0.676	0.317	2.30	1.67	26.06
CB-316	0.029	0.023	0.17	0.00	27.01
CB-316C	0.090	0.065	0.47	0.05	0.95
CB-316D	0.092	0.067	0.49	0.06	0.49
CB-309A	0.123	0.085	0.62	0.10	0.62
CB-309	0.161	0.106	0.77	0.18	1.37
CB-317	0.047	0.037	0.27	0.01	29.70
CB-305A	0.564	0.283	2.05	1.34	2.05
CB-305	0.318	0.185	1.34	0.58	19.30
CB-317A	0.107	0.076	0.55	0.08	0.55
DI-316A	0.000	0.000	0.00	0.00	0.00
CB-308A	0.330	0.194	1.41	0.64	1.41
CB-308	0.359	0.211	1.53	0.75	4.22
CB-306	0.378	0.246	1.78	1.02	16.27
CB-306A	0.396	0.300	2.17	1.49	2.17
CB-307A	0.676	0.432	3.13	2.97	5.69
CB-307	0.618	0.396	2.87	2.53	12.59
DI-307B	0.829	0.368	2.67	2.20	2.67
CB-318A	0.315	0.186	1.35	0.58	1.35
CB-318	0.267	0.159	1.15	0.42	2.49

SCM 3 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
DI-301	0.000	0.000	0.00	0.00	29.07

SCM 3 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (92)	CB-312	CB-311	15.0	0.052	1.66	0.33	0.11	14.78
Pipe - (93)	CB-311	CB-310	15.0	0.005	3.31	3.38	1.45	4.57
Pipe - (251)	CB-311A	CB-311	18.0	0.020	3.01	4.91	1.12	14.71
Pipe - (94)	CB-310	CB-303	18.0	0.028	3.55	6.56	2.00	17.57
Pipe - (95)	CB-303	CB-314	30.0	0.006	6.57	5.77	21.29	31.78
Pipe - (109)	CB-305	CB-303	24.0	0.006	6.53	7.25	19.30	18.09
Pipe - (90)	CB-315	CB-316A	30.0	0.004	6.16	7.13	25.95	25.11
Pipe - (99)	CB-314	CB-315	30.0	0.005	6.66	6.49	26.06	29.00
Pipe - (91)	CB-316A	CB-316	30.0	0.007	7.26	7.00	27.00	34.28
Pipe - (255)	CB-316B	CB-316A	18.0	0.005	3.15	3.17	1.32	7.43
Pipe - (256)	CB-316C	CB-316B	18.0	0.005	2.88	2.28	0.95	7.43
Pipe - (254)	CB-314A	CB-314	18.0	0.237	4.30	16.83	3.71	51.09
Pipe - (89)	CB-316	CB-317	30.0	0.005	6.63	6.45	27.01	29.00
Pipe - (258)	DI-316A	CB-316	18.0	0.239	0.00	0.00	0.00	51.35
Pipe - (257)	CB-316D	CB-316C	18.0	0.038	2.40	4.83	0.49	20.53
Pipe - (103)	CB-309A	CB-309	15.0	0.005	2.60	2.11	0.62	4.57
Pipe - (101)	CB-309	CB-308	15.0	0.029	3.32	2.62	1.37	11.02
Pipe - (86)	CB-317A	CB-317	15.0	0.005	2.49	2.56	0.55	4.53
Pipe - (87)	CB-318	CB-317	15.0	0.004	3.43	4.00	2.49	4.00
Pipe - (85)	CB-317	DI-301	30.0	0.005	6.77	7.26	29.70	29.00
Pipe - (112)	CB-305A	CB-305	15.0	0.010	3.76	4.71	2.05	6.53
Pipe - (107)	CB-306	CB-305	24.0	0.008	6.65	5.79	16.27	19.98
Pipe - (104)	CB-308A	CB-308	15.0	0.005	2.61	1.90	1.41	4.57
Pipe - (102)	CB-308	CB-307	15.0	0.026	4.86	8.02	4.22	10.39
Pipe - (110)	CB-306A	CB-306	15.0	0.049	3.83	1.77	2.17	14.23
Pipe - (106)	CB-307	CB-306	24.0	0.007	5.95	5.56	12.59	19.10
Pipe - (105)	CB-307A	CB-307	18.0	0.005	4.18	3.84	5.69	7.43
Pipe - (253)	DI-307B	CB-307A	18.0	0.005	3.86	2.19	2.67	7.43
Pipe - (88)	CB-318A	CB-318	15.0	0.009	3.30	2.83	1.35	5.97

#129- 0.5% min slope

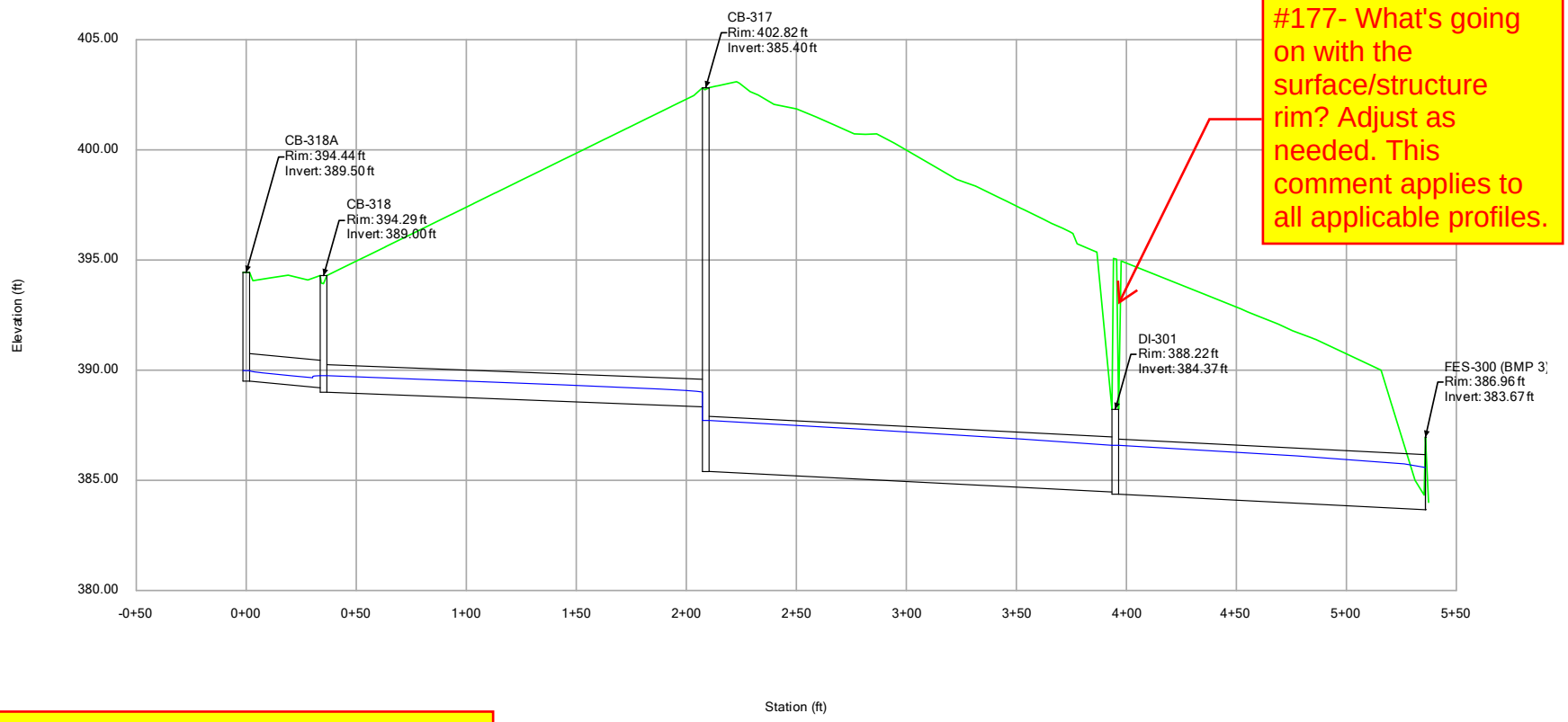
SCM 3 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (84)	DI-301	FES-300 (BMP 3)	30.0	0.005	6.77	7.51	29.07	29.00

SCM 3 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



#177- What's going on with the surface/structure rim? Adjust as needed. This comment applies to all applicable profiles.

#168- Please show all rims and inverts at structures, and specify if it's inv. in or inv. out

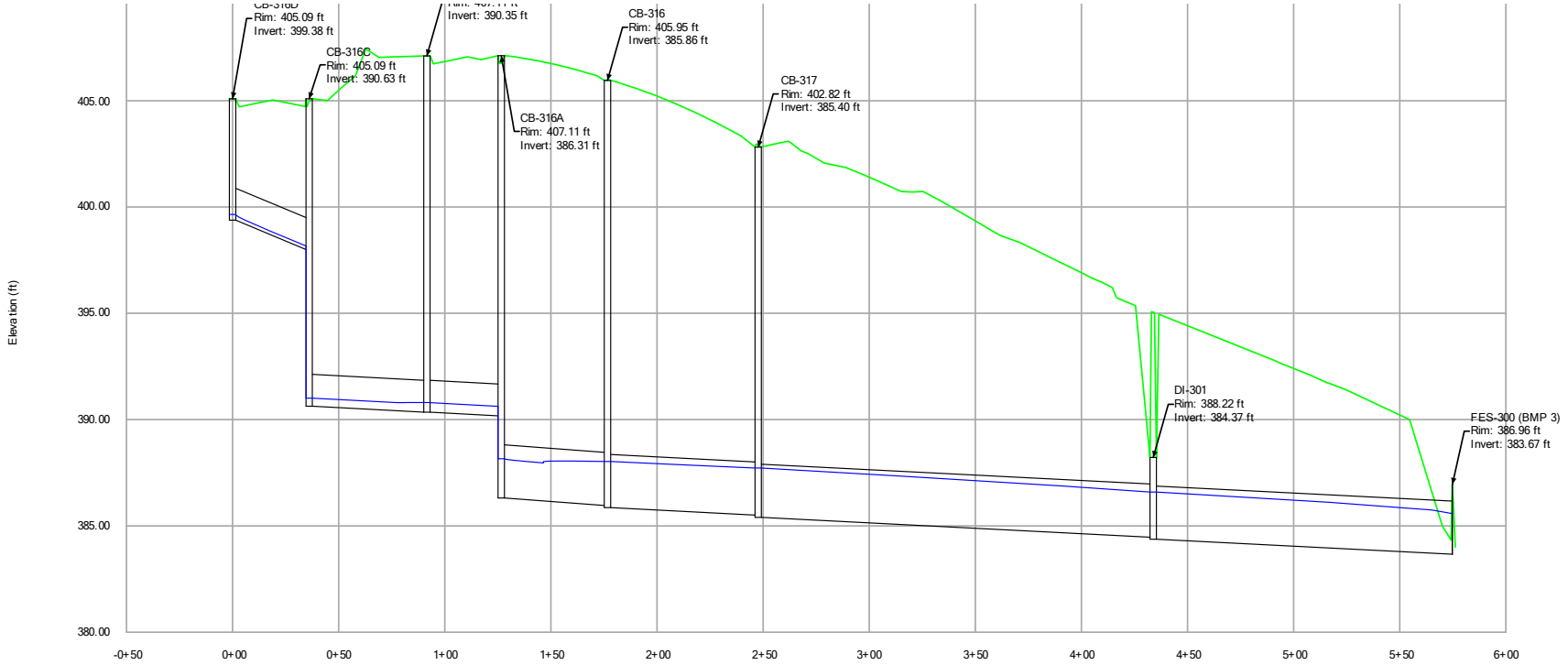
#168- Please label pipe material type, diameter, and slope

#12- Ensure no text is overlapping so it can be clearly read

The above comments apply to all storm profiles.

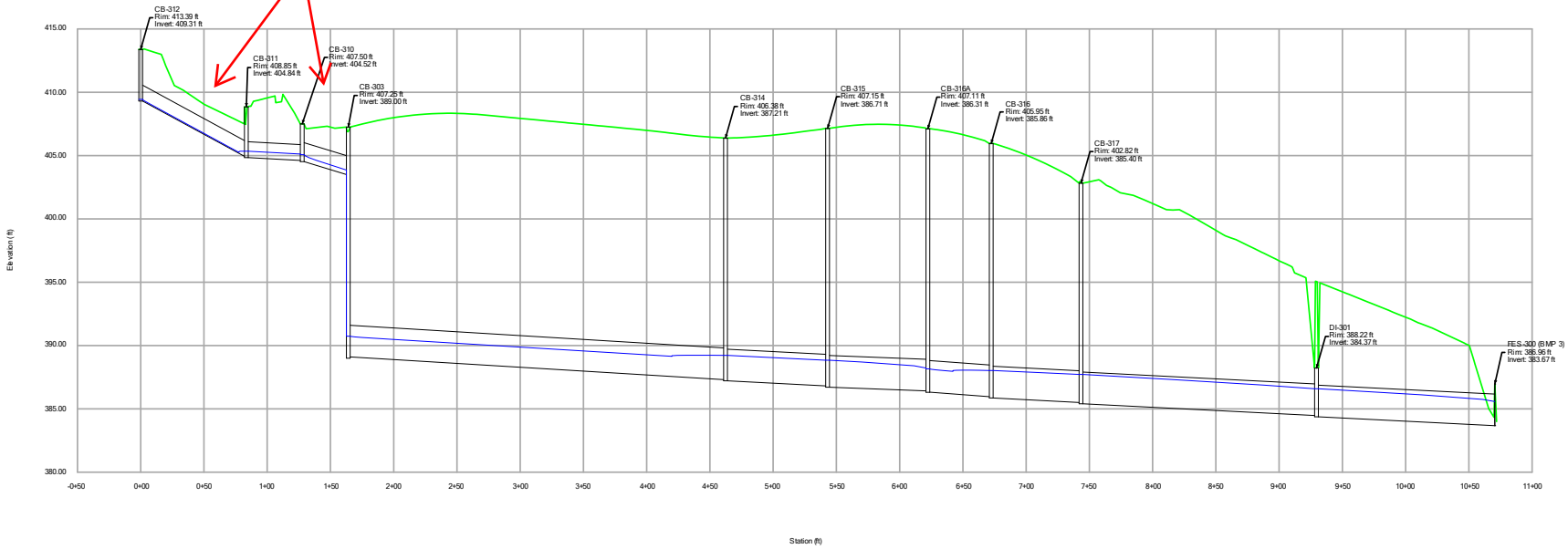
#12- text cut off

SCM 3 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



#116- verify minimum cover requirements are being met

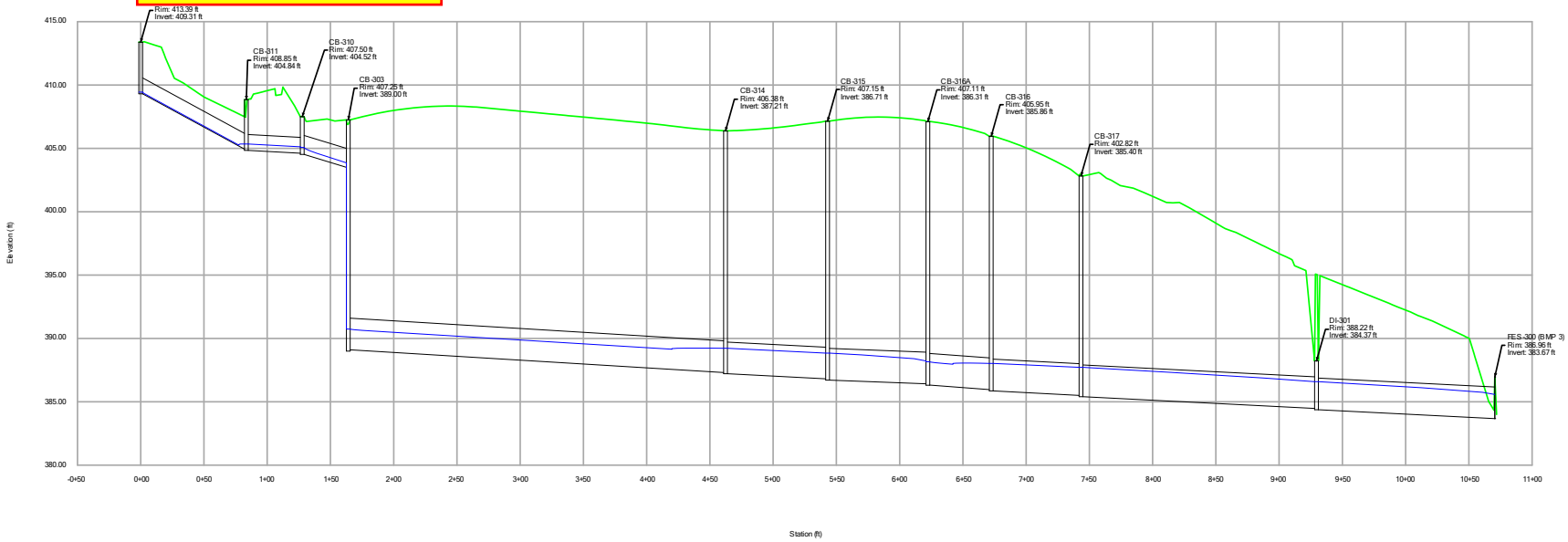
SCM 3 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



SCM 3 STORM SEWER ANALYSIS

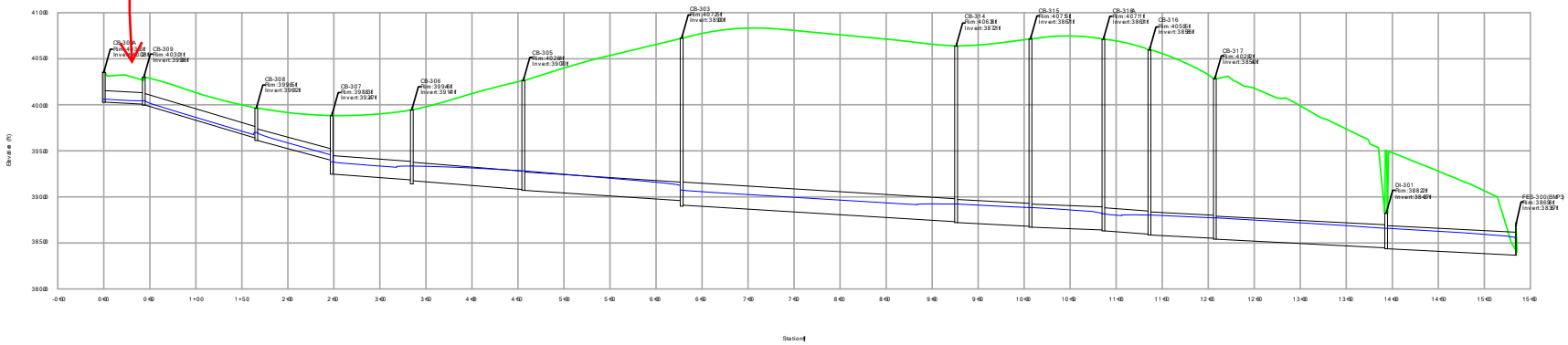
25-YEAR ANALYSIS

#170- This appears to be a duplicate of the previous sheet except for the title.

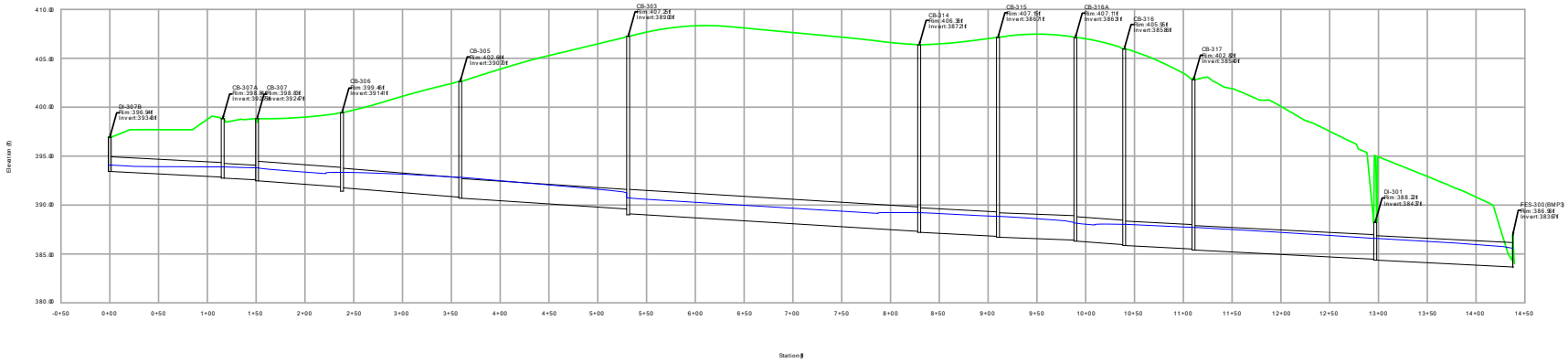


SCM 3 STORM SEWER ANALYSIS
10-YEAR ANALYSIS

#116- verify minimum cover requirements are being met



SCM 3 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-312	0.018	0.015	0.12	0.00	0.12

SCM 3 – 25 YR STORM

SCM 3 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-311	0.043	0.034	0.27	0.01	1.58
CB-311A	0.259	0.151	1.22	0.47	1.22
CB-310	0.111	0.077	0.62	0.11	2.17
CB-303	0.091	0.065	0.52	0.07	23.19
CB-315	0.023	0.018	0.15	0.00	28.20
CB-316A	0.023	0.019	0.15	0.00	29.35
CB-316B	0.071	0.052	0.42	0.04	1.44
CB-314A	1.322	0.496	3.99	4.62	3.99
CB-314	0.676	0.308	2.48	1.92	28.33
CB-316	0.029	0.023	0.19	0.00	29.37
CB-316C	0.090	0.064	0.52	0.07	1.04
CB-316D	0.092	0.066	0.53	0.07	0.53
CB-309A	0.123	0.083	0.67	0.13	0.67
CB-309	0.161	0.104	0.83	0.21	1.49
CB-317	0.047	0.037	0.30	0.01	32.28
CB-305A	0.564	0.276	2.22	1.56	2.22
CB-305	0.318	0.181	1.46	0.69	21.01
CB-317A	0.107	0.074	0.60	0.10	0.60
DI-316A	0.000	0.000	0.00	0.00	0.00
CB-308A	0.330	0.190	1.53	0.75	1.53
CB-308	0.359	0.207	1.66	0.89	4.59
CB-306	0.378	0.241	1.94	1.21	17.73
CB-306A	0.396	0.295	2.37	1.77	2.37
CB-307A	0.676	0.426	3.43	3.50	6.18
CB-307	0.618	0.390	3.14	2.98	13.71
DI-307B	0.829	0.357	2.87	2.53	2.87
CB-318A	0.315	0.182	1.46	0.69	1.46
CB-318	0.267	0.156	1.25	0.50	2.70
DI-301	0.000	0.000	0.00	0.00	31.58

SCM 3 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (92)	CB-312	CB-311	15.0	0.052	1.71	0.34	0.12	14.78
Pipe - (93)	CB-311	CB-310	15.0	0.005	3.38	3.47	1.58	4.57
Pipe - (251)	CB-311A	CB-311	18.0	0.020	3.08	5.01	1.22	14.71
Pipe - (94)	CB-310	CB-303	18.0	0.028	3.64	6.70	2.17	17.57
Pipe - (95)	CB-303	CB-314	30.0	0.006	6.80	5.76	23.19	31.78
Pipe - (109)	CB-305	CB-303	24.0	0.006	6.69	7.61	21.01	18.09
Pipe - (90)	CB-315	CB-316A	30.0	0.004	6.33	7.40	28.20	25.11
Pipe - (99)	CB-314	CB-315	30.0	0.005	6.70	6.63	28.33	29.00
Pipe - (91)	CB-316A	CB-316	30.0	0.007	7.55	6.76	29.35	34.28
Pipe - (255)	CB-316B	CB-316A	18.0	0.005	3.23	3.26	1.44	7.43
Pipe - (256)	CB-316C	CB-316B	18.0	0.005	2.95	2.33	1.04	7.43
Pipe - (254)	CB-314A	CB-314	18.0	0.237	4.41	17.10	3.99	51.09
Pipe - (89)	CB-316	CB-317	30.0	0.005	6.50	6.39	29.37	29.00
Pipe - (258)	DI-316A	CB-316	18.0	0.239	0.00	0.00	0.00	51.35
Pipe - (257)	CB-316D	CB-316C	18.0	0.038	2.45	4.96	0.53	20.53
Pipe - (103)	CB-309A	CB-309	15.0	0.005	2.66	2.12	0.67	4.57
Pipe - (101)	CB-309	CB-308	15.0	0.029	3.40	2.63	1.49	11.02
Pipe - (86)	CB-317A	CB-317	15.0	0.005	2.56	2.62	0.60	4.53
Pipe - (87)	CB-318	CB-317	15.0	0.004	3.50	4.11	2.70	4.00
Pipe - (85)	CB-317	DI-301	30.0	0.005	6.80	7.27	32.28	29.00
Pipe - (112)	CB-305A	CB-305	15.0	0.010	3.85	4.81	2.22	6.53
Pipe - (107)	CB-306	CB-305	24.0	0.008	6.58	5.64	17.73	19.98
Pipe - (104)	CB-308A	CB-308	15.0	0.005	2.61	1.95	1.53	4.57
Pipe - (102)	CB-308	CB-307	15.0	0.026	5.04	8.20	4.59	10.39
Pipe - (110)	CB-306A	CB-306	15.0	0.049	3.94	1.93	2.37	14.23
Pipe - (106)	CB-307	CB-306	24.0	0.007	6.16	5.43	13.71	19.10
Pipe - (105)	CB-307A	CB-307	18.0	0.005	4.25	3.99	6.18	7.43
Pipe - (253)	DI-307B	CB-307A	18.0	0.005	3.93	2.18	2.87	7.43
Pipe - (88)	CB-318A	CB-318	15.0	0.009	3.38	2.79	1.46	5.97

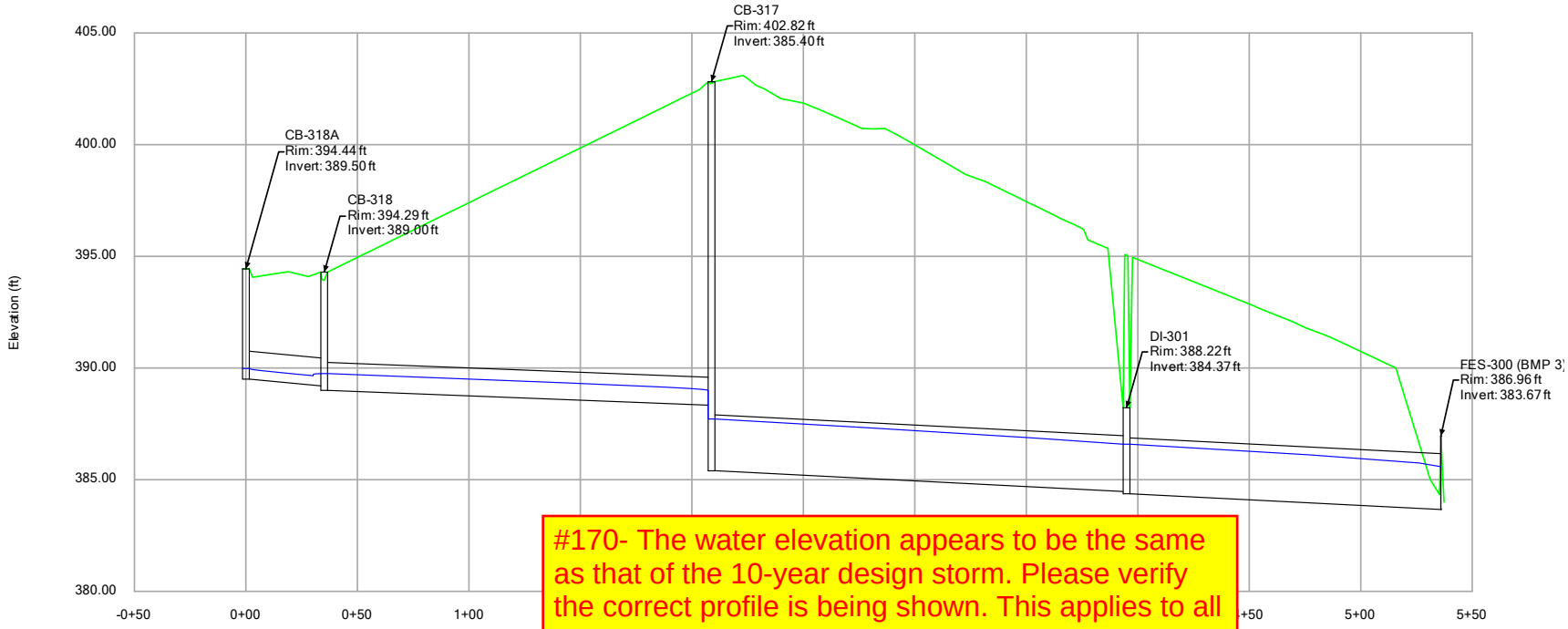
SCM 3 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

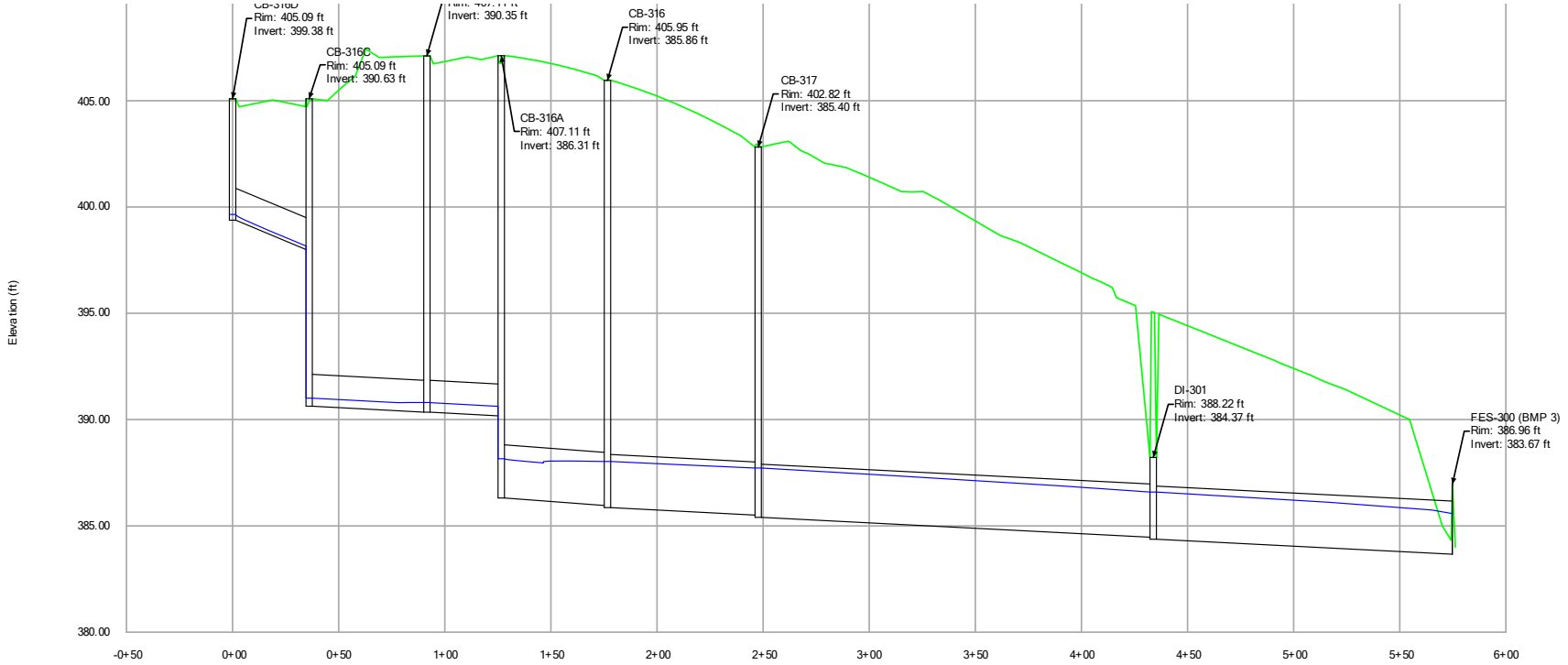
Label	Start Node	Stop Node	Diameter (in)	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (84)	DI-301	FES-300 (BMP 3)	30.0	0.005	6.86	7.83	31.58	29.00

SCM 3 STORM SEWER ANALYSIS
25-YEAR ANALYSIS

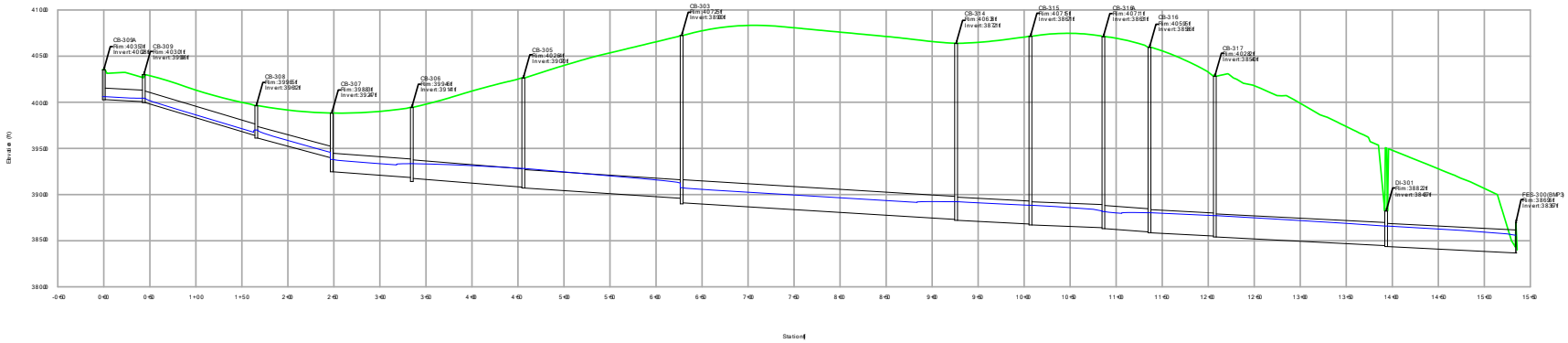


#170- The water elevation appears to be the same as that of the 10-year design storm. Please verify the correct profile is being shown. This applies to all 25-year analysis storm profiles.

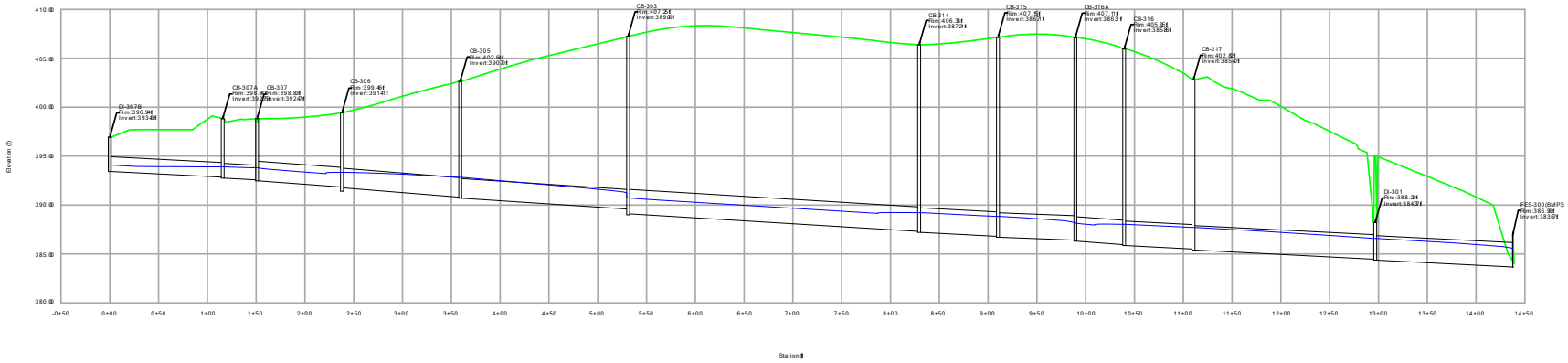
SCM 3 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM 3 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM 3 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)
CB-312	0.018	0.015	0.08	0.00	2.3
CB-311	0.043	0.035	0.20	0.00	3.2
CB-311A	0.259	0.163	0.92	0.27	6.3

SCM 3 – INLET SPREAD

SCM 3 STORM SEWER ANALYSIS

Inlet Spread - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Spread / Top Width (ft)
CB-310	0.111	0.081	0.46	0.05	4.6
CB-303	0.091	0.068	0.39	0.03	4.2
CB-315	0.023	0.018	0.10	0.00	2.5
CB-316A	0.023	0.019	0.11	0.00	2.5
CB-316B	0.071	0.055	0.31	0.02	3.8
CB-314A	1.322	0.551	3.12	2.95	11.5
CB-314	0.676	0.339	1.92	1.18	9.0
CB-316	0.029	0.023	0.13	0.00	2.8
CB-316C	0.090	0.067	0.38	0.03	4.2
CB-316D	0.092	0.069	0.39	0.03	4.2
CB-309A	0.123	0.088	0.50	0.06	4.7
CB-309	0.161	0.111	0.63	0.11	5.2
CB-317	0.047	0.038	0.21	0.00	3.3
CB-305A	0.564	0.301	1.70	0.93	8.4
CB-305	0.318	0.195	1.10	0.39	6.8
CB-317A	0.107	0.078	0.44	0.05	4.5
DI-316A	0.000	0.000	0.00	0.00	0.0
CB-308A	0.330	0.204	1.15	0.42	6.9
CB-308	0.359	0.221	1.25	0.50	7.2
CB-306	0.378	0.255	1.45	0.67	7.8
CB-306A	0.396	0.310	1.76	0.99	8.6
CB-307A	0.676	0.446	2.53	1.99	10.3
CB-307	0.618	0.410	2.32	1.69	9.9
DI-307B	0.829	0.394	2.23	1.57	9.7
CB-318A	0.315	0.195	1.10	0.39	6.8
CB-318	0.267	0.167	0.95	0.28	6.3
DI-301	0.000	0.000	0.00	0.00	0.0

ATTACHMENT 4: DRAINAGE AREA MAPS – SCM 4

#172- are these going to SCM 3? Recommend removing drainage areas that aren't going to SCM 4.

#164- There are several drainage areas that don't seem to quite match what the contours are showing. A more thorough review can be done once contours are labeled and storm is shown.

#162 and #49- Please show storm pipes and structures and add proposed contour labels.

#49- Please show and label existing contours.

#12- There are several areas where text is difficult to read.

#171- label SCM

NORTH

PATSY V. YOUNG ET A
WF 20-E-2369
DB 9301 PG 1320
BM 1935 PG 60
PIN# 1768162148

BGE
5440 WADE PARK BLVD, SUITE 102
RALEIGH NC 27607
www.bgeinc.com
NC LICENSE #C-4397

SCM 4 DRAINAGE MAP

DATE: 6/1/2023

0 50' 100' 150'

SCALE: 1" = 50'

G:\NCA\Projects\Lennar\8430-03 - Lennar - School Street - Rolesville\04 - Calculations\Storm\StormCAD\Drainage Map.dwg

SCM 4 – 10 YR STORM

SCM4 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-418A	0.007	0.007	0.05	0.00	0.05
CB-418	0.008	0.012	0.08	0.00	4.45
CB-417A	0.032	0.026	0.19	0.00	0.19
CB-417	0.050	0.039	0.28	0.01	4.83
CB-419B	0.045	0.035	0.25	0.01	0.25
CB-419A	0.168	0.109	0.79	0.20	1.04
CB-409A	0.072	0.054	0.39	0.03	0.39
CB-420	0.041	0.033	0.24	0.01	3.00
CB-419	0.075	0.056	0.41	0.04	4.38
CB-409	0.076	0.056	0.41	0.04	0.79
DI-414C	0.073	0.055	0.40	0.03	0.40
CB-421	0.023	0.044	0.32	0.02	2.79
CB-408	0.057	0.048	0.35	0.02	1.80
DI-405D	0.075	0.055	0.40	0.04	0.40
CB-415A	0.389	0.209	1.51	0.78	1.51
CB-415	0.295	0.170	1.23	0.51	7.27
CB-408A	0.136	0.095	0.69	0.14	0.69
CB-414A	0.608	0.599	4.34	0.00	4.65
CB-406A	0.103	0.073	0.53	0.08	0.53
CB-407	0.055	0.045	0.33	0.02	2.09
CB-406	0.167	0.108	0.79	0.20	1.30
CB-422A	0.351	0.193	1.40	0.66	1.40
DI-414A	0.000	0.000	0.00	0.00	16.17
DI-405C	0.746	0.336	2.43	1.95	2.78
CB-414B	(N/A)	0.000	0.00	0.00	0.39
CB-414	0.508	0.482	3.49	0.00	16.42
CB-422	0.269	0.159	1.15	0.45	2.53
CB-405B	(N/A)	0.000	0.00	0.00	2.72
CB-405	0.589	0.507	3.67	0.00	15.97

SCM4 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-405A	1.118	0.936	6.78	0.00	9.21
CB-413	0.314	0.177	1.28	0.56	2.09
DI-404	0.700	0.321	2.32	1.79	17.95
CB-413A	0.176	0.113	0.82	0.21	0.82
DI-411	0.176	0.113	0.82	0.21	0.82
CB-412A	0.213	0.190	1.38	0.64	1.38
DI-412C	0.000	0.000	0.00	0.00	2.49
DI-412B	0.063	0.048	0.35	0.02	1.16

Conduit Results - Time: 0.00 hours

Label	Diameter (in)	Start Node	Stop Node	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (150)	15.0	CB-418A	CB-418	0.005	1.21	1.35	0.05	4.57
Pipe - (208)	18.0	CB-418	CB-417	0.005	4.39	4.57	4.45	7.43
Pipe - (149)	18.0	CB-419	CB-418	0.005	4.37	4.55	4.38	7.43
Pipe - (209)	15.0	CB-417A	CB-417	0.005	1.83	1.92	0.19	4.57
Pipe - (208) (1)	18.0	CB-417	CB-415	0.006	4.71	4.89	4.83	8.33
Pipe - (152)	15.0	CB-419B	CB-419A	0.011	2.08	0.75	0.25	6.73
Pipe - (151)	15.0	CB-419A	CB-419	0.128	3.06	1.40	1.04	23.14
Pipe - (158)	15.0	CB-409A	CB-409	0.075	2.33	1.39	0.39	17.70
Pipe - (148)	15.0	CB-420	CB-419	0.005	3.97	4.07	3.00	4.57
Pipe - (147)	15.0	CB-421	CB-420	0.005	3.91	4.16	2.79	4.57
Pipe - (154)	15.0	CB-409	CB-408	0.017	2.83	1.49	0.79	8.51
Pipe - (270)	18.0	DI-414C	CB-414B	0.059	2.27	0.51	0.40	25.43
Pipe - (145)	15.0	CB-422	CB-421	0.005	3.82	4.02	2.53	4.57
Pipe - (159)	15.0	CB-408A	CB-408	0.011	2.72	1.29	0.69	6.90

SCM4 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

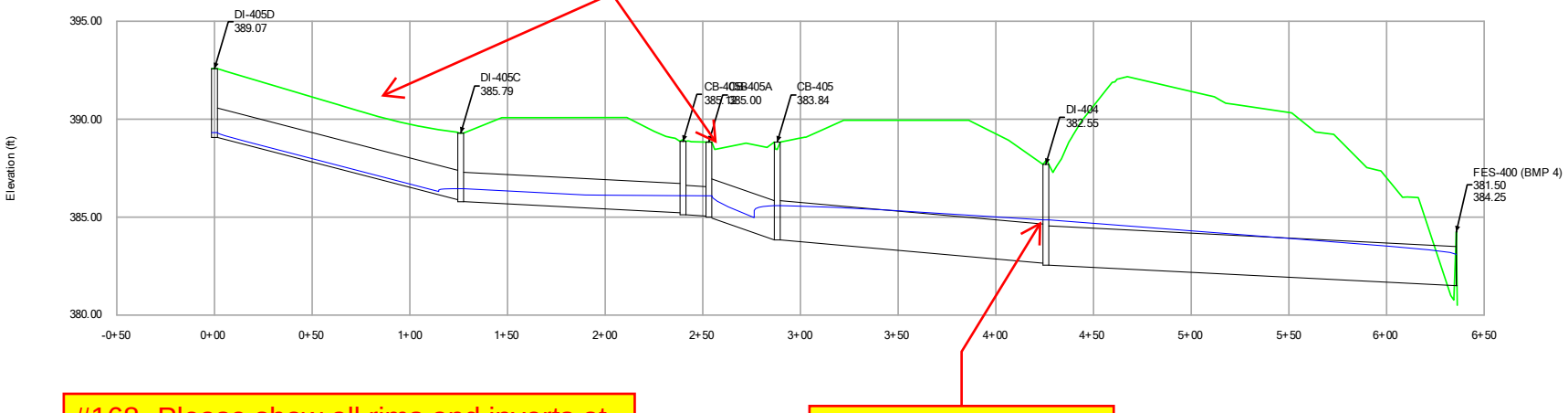
Label	Diameter (in)	Start Node	Stop Node	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (160)	15.0	CB-408	CB-407	0.005	3.39	3.61	1.80	4.37
Pipe - (265)	18.0	DI-405D	DI-405C	0.025	2.28	0.71	0.40	16.68
Pipe - (131)	15.0	CB-415A	CB-415	0.005	3.34	3.42	1.51	4.57
Pipe - (125)	24.0	CB-415	CB-414	0.004	4.48	4.89	7.27	13.93
Pipe - (130)	18.0	CB-414A	CB-414	0.008	4.65	5.27	4.65	9.36
Pipe - (271)	18.0	CB-414B	CB-414A	0.005	0.50	0.46	0.39	7.43
Pipe - (139)	15.0	CB-406A	CB-406	0.008	2.53	1.32	0.53	5.77
Pipe - (137)	15.0	CB-407	CB-405	0.007	3.77	4.22	2.09	5.59
Pipe - (138)	15.0	CB-406	CB-405	0.017	3.27	1.91	1.30	8.46
Pipe - (262)	15.0	CB-422A	CB-422	0.005	3.27	2.61	1.40	4.57
Pipe - (225)	24.0	CB-414	DI-414A	0.007	6.68	6.52	16.42	19.02
Pipe - (225) (1)	24.0	DI-414A	FES-410 (BMP 4)	0.005	6.01	6.63	16.17	16.00
Pipe - (263)	18.0	DI-405C	CB-405B	0.005	3.90	2.82	2.78	7.43
Pipe - (124)	18.0	CB-413	CB-414	0.005	3.60	1.24	2.09	7.54
Pipe - (264)	18.0	CB-405B	CB-405A	0.005	2.40	2.23	2.72	7.43
Pipe - (140)	24.0	CB-405A	CB-405	0.032	5.30	3.80	9.21	40.28
Pipe - (135)	24.0	CB-405	DI-404	0.009	6.59	5.37	15.97	21.04
Pipe - (128)	15.0	CB-413A	CB-413	0.006	2.86	2.09	0.82	5.02
Pipe - (134)	24.0	DI-404	FES-400 (BMP 4)	0.005	5.83	6.98	17.95	16.00
Pipe - (235)	18.0	DI-411	DI-412B	0.091	2.76	7.67	0.82	31.70
Pipe - (244)	18.0	CB-412A	DI-412C	0.309	3.19	13.74	1.38	58.41
Pipe - (244) (1) (1)	24.0	DI-412C	FES-500 (BMP 4)	0.012	3.55	5.11	2.49	25.17
Pipe - (244) (1)	24.0	DI-412B	DI-412C	0.010	2.88	3.71	1.16	22.07

#129- 0.5% min slope

SCM4 STORM SEWER ANALYSIS

10-YEAR ANALYSIS

#116- verify minimum cover requirements are being met



#168- Please show all rims and inverts at structures, and specify if it's inv. in or inv. out

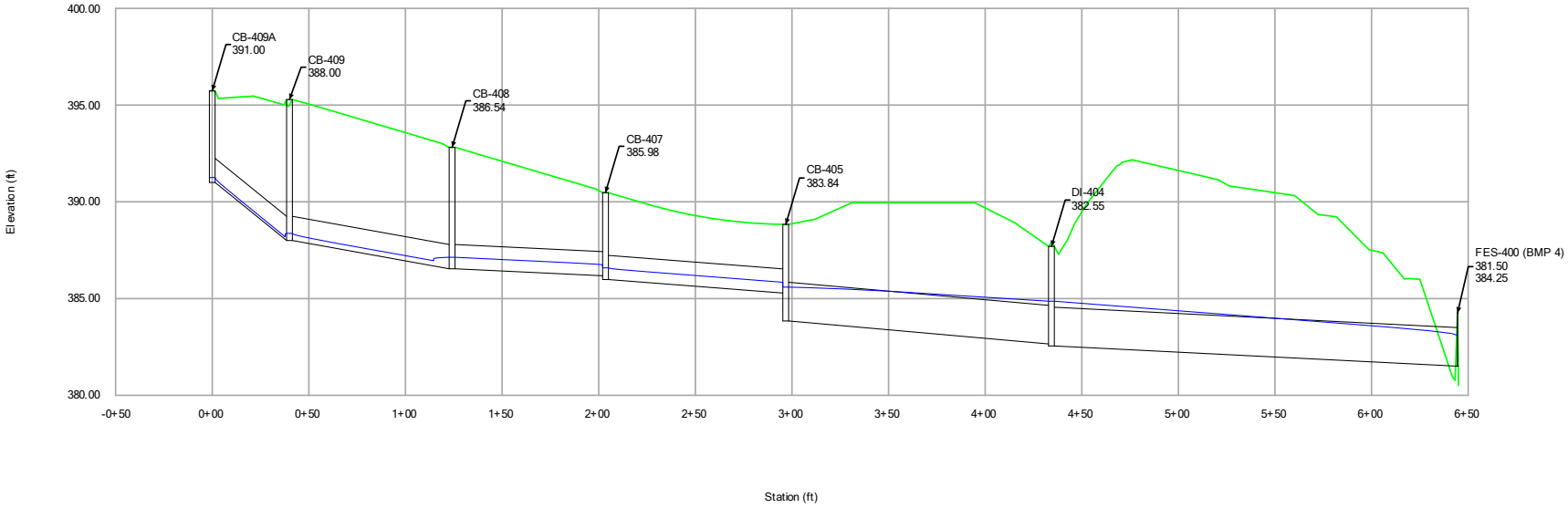
#168- Please label pipe material type, diameter, and slope

#12- Ensure no text is overlapping so it can be clearly read

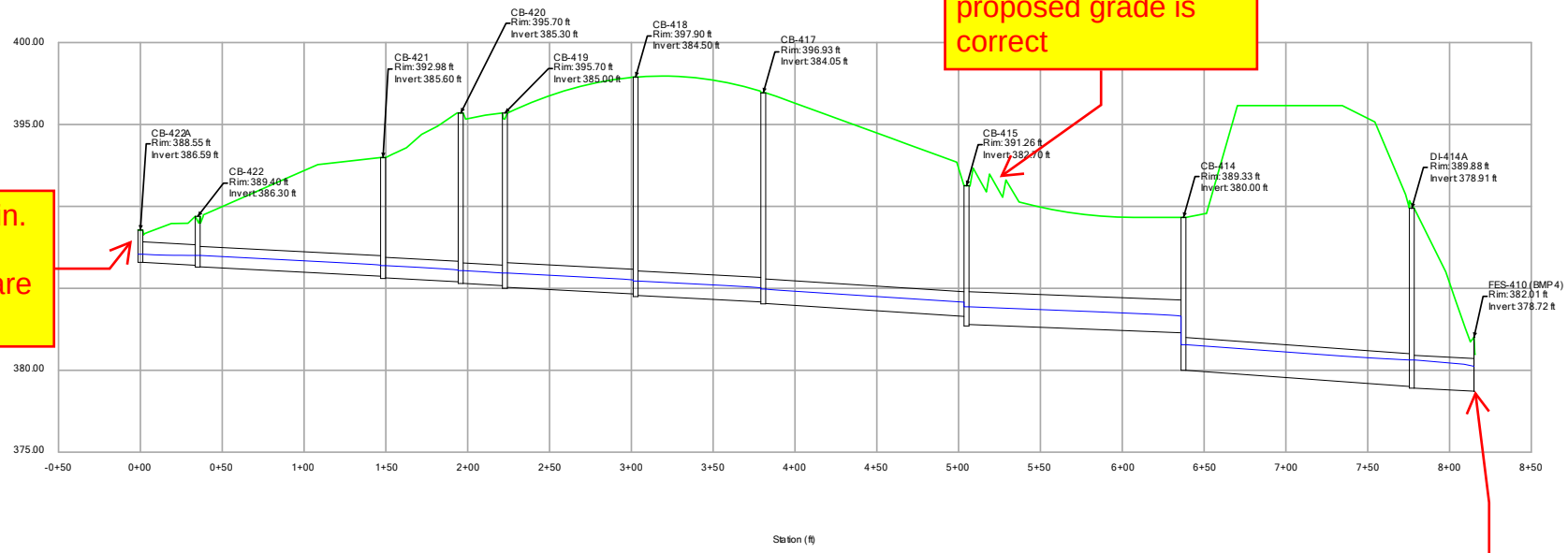
The above comments apply to all storm profiles.

#167- verify water is staying within pipes for 10-year design storm

SCM4 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



SCM4 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



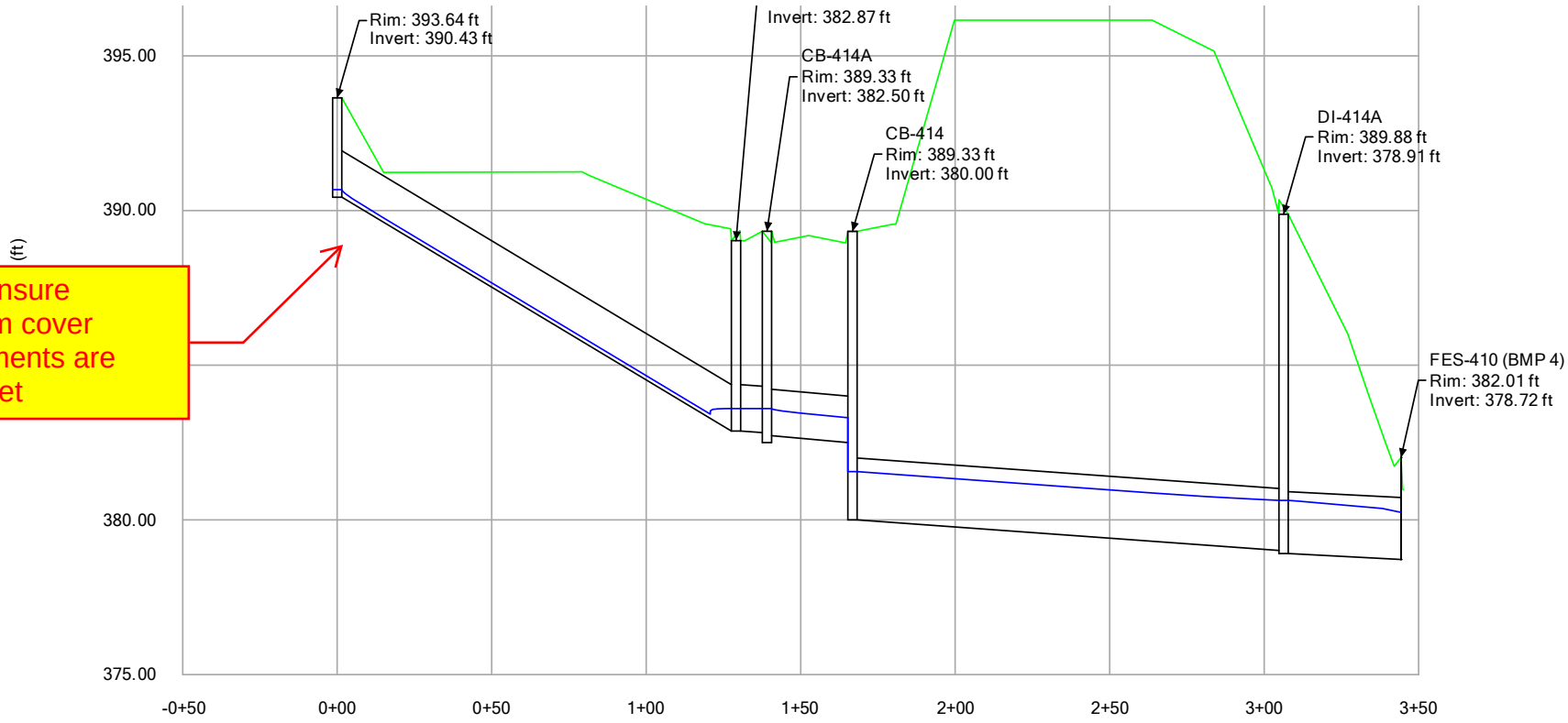
#177- verify proposed grade is correct

#116- verify min. cover requirements are being met

#178- verify invert is correct, normal pool appears to be at 380.5

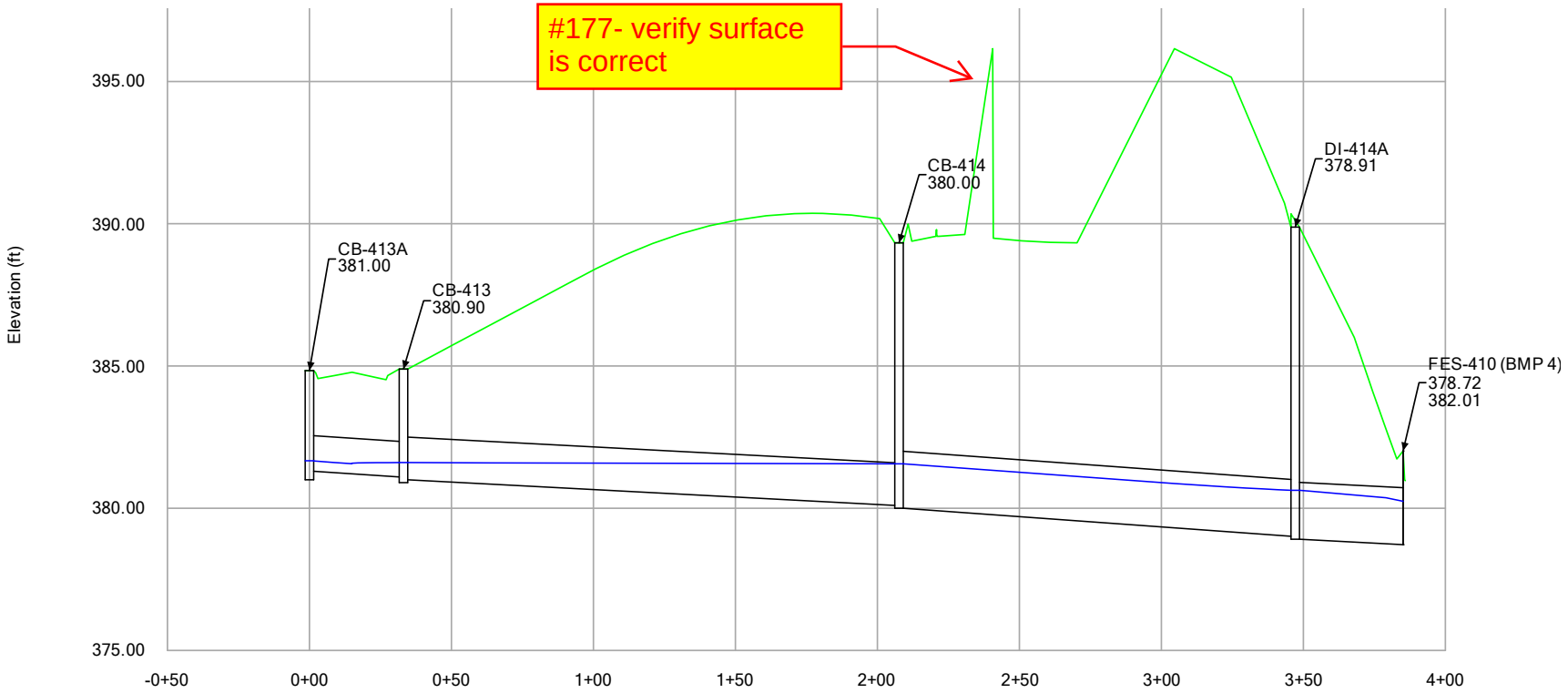
#12- text cut off

#116- Ensure minimum cover requirements are being met

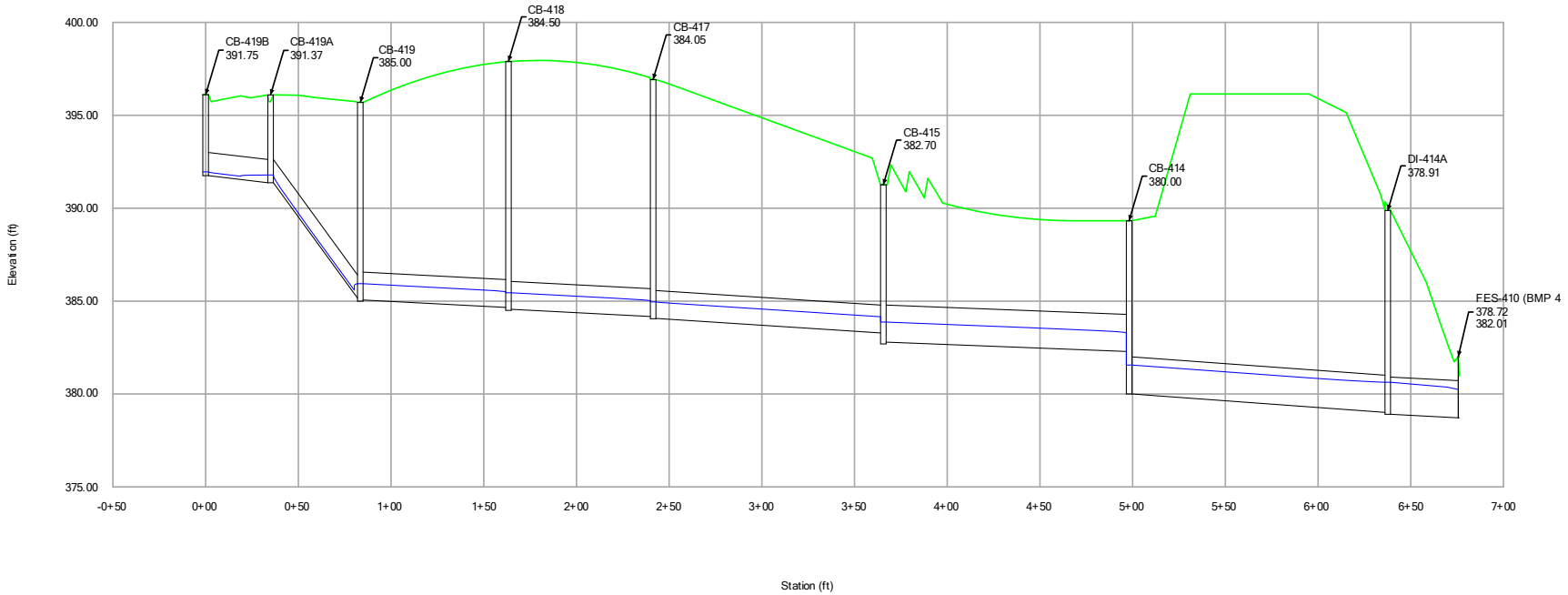


SCM4 STORM SEWER ANALYSIS

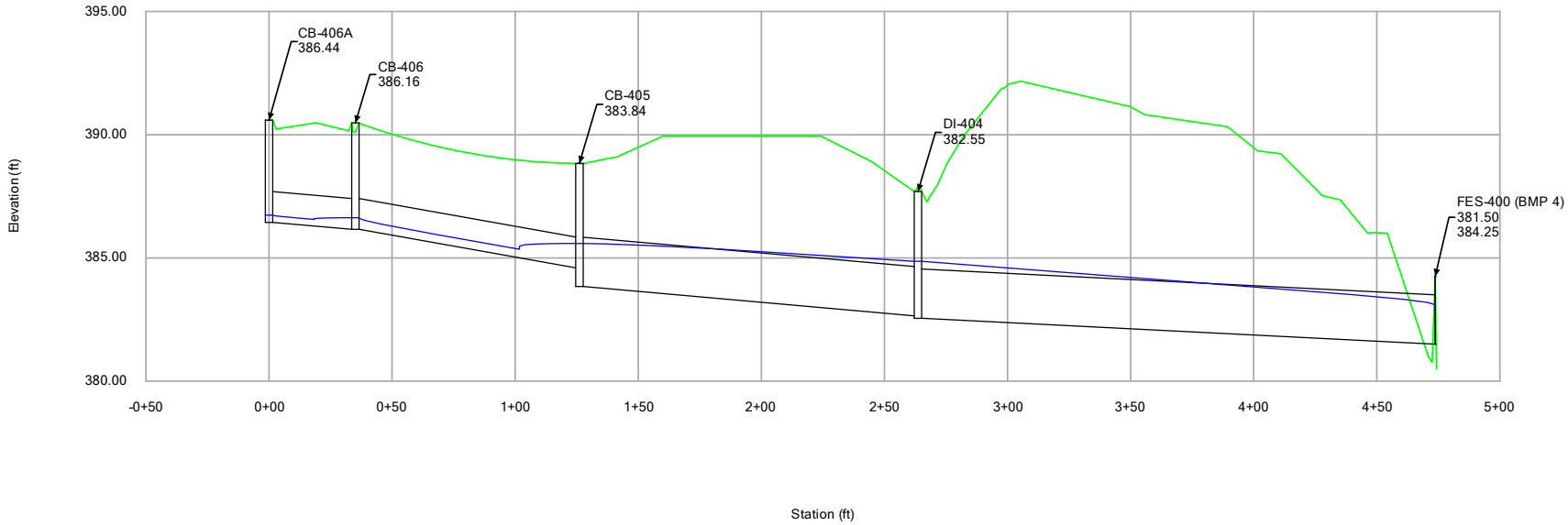
10-YEAR ANALYSIS



SCM4 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



SCM4 STORM SEWER ANALYSIS
10-YEAR ANALYSIS



#169- There a few pipes and structures routing to SCM 4 that are not being shown in these HGL profiles (CB-408A, CB-415A, CB-417A, etc.). Please include all storm being routed to SCM 4

SCM 4 – 25 YR STORM

SCM4 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-418A	0.007	0.007	0.06	0.00	0.06
CB-418	0.008	0.012	0.10	0.00	4.86
CB-417A	0.032	0.026	0.21	0.00	0.21
CB-417	0.050	0.039	0.31	0.02	5.29
CB-419B	0.045	0.035	0.28	0.01	0.28
CB-419A	0.168	0.107	0.86	0.24	1.13
CB-409A	0.072	0.053	0.42	0.04	0.42
CB-420	0.041	0.032	0.26	0.01	3.27
CB-419	0.075	0.055	0.44	0.05	4.78
CB-409	0.076	0.055	0.44	0.05	0.87
DI-414C	0.073	0.054	0.43	0.04	0.43
CB-421	0.023	0.045	0.36	0.03	3.04
CB-408	0.057	0.048	0.39	0.03	1.97
DI-405D	0.075	0.055	0.44	0.05	0.44
CB-415A	0.389	0.203	1.63	0.90	1.63
CB-415	0.295	0.166	1.33	0.60	7.93
CB-408A	0.136	0.093	0.75	0.18	0.75
CB-414A	0.608	0.605	4.87	0.00	5.20
CB-406A	0.103	0.072	0.58	0.09	0.58
CB-407	0.055	0.045	0.36	0.03	2.29
CB-406	0.167	0.106	0.85	0.24	1.42
CB-422A	0.351	0.188	1.51	0.78	1.51
DI-414A	0.000	0.000	0.00	0.00	17.84
DI-405C	0.746	0.326	2.62	2.24	3.00
CB-414B	(N/A)	0.000	0.00	0.00	0.43
CB-414	0.508	0.487	3.91	0.00	18.11
CB-422	0.269	0.155	1.25	0.53	2.74
CB-405B	(N/A)	0.000	0.00	0.00	2.94
CB-405	0.589	0.510	4.10	0.00	17.66

SCM4 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Inlet Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)
CB-405A	1.118	0.939	7.55	0.00	10.17
CB-413	0.314	0.173	1.39	0.65	2.26
DI-404	0.700	0.312	2.51	2.06	19.79
CB-413A	0.176	0.110	0.89	0.26	0.89
DI-411	0.176	0.111	0.89	0.26	0.89
CB-412A	0.213	0.188	1.52	0.78	1.52
DI-412C	0.000	0.000	0.00	0.00	2.73
DI-412B	0.063	0.047	0.38	0.03	1.26

Conduit Results - Time: 0.00 hours

Label	Diameter (in)	Start Node	Stop Node	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (150)	15.0	CB-418A	CB-418	0.005	1.26	1.40	0.06	4.57
Pipe - (208)	18.0	CB-418	CB-417	0.005	4.48	4.72	4.86	7.43
Pipe - (149)	18.0	CB-419	CB-418	0.005	4.46	4.69	4.78	7.43
Pipe - (209)	15.0	CB-417A	CB-417	0.005	1.89	1.97	0.21	4.57
Pipe - (208) (1)	18.0	CB-417	CB-415	0.006	4.87	4.99	5.29	8.33
Pipe - (152)	15.0	CB-419B	CB-419A	0.011	2.14	0.78	0.28	6.73
Pipe - (151)	15.0	CB-419A	CB-419	0.128	3.14	1.41	1.13	23.14
Pipe - (158)	15.0	CB-409A	CB-409	0.075	2.39	1.42	0.42	17.70
Pipe - (148)	15.0	CB-420	CB-419	0.005	4.05	4.12	3.27	4.57
Pipe - (147)	15.0	CB-421	CB-420	0.005	3.98	4.29	3.04	4.57
Pipe - (154)	15.0	CB-409	CB-408	0.017	2.91	1.52	0.87	8.51
Pipe - (270)	18.0	DI-414C	CB-414B	0.059	2.33	0.51	0.43	25.43
Pipe - (145)	15.0	CB-422	CB-421	0.005	3.89	4.14	2.74	4.57
Pipe - (159)	15.0	CB-408A	CB-408	0.011	2.79	1.32	0.75	6.90

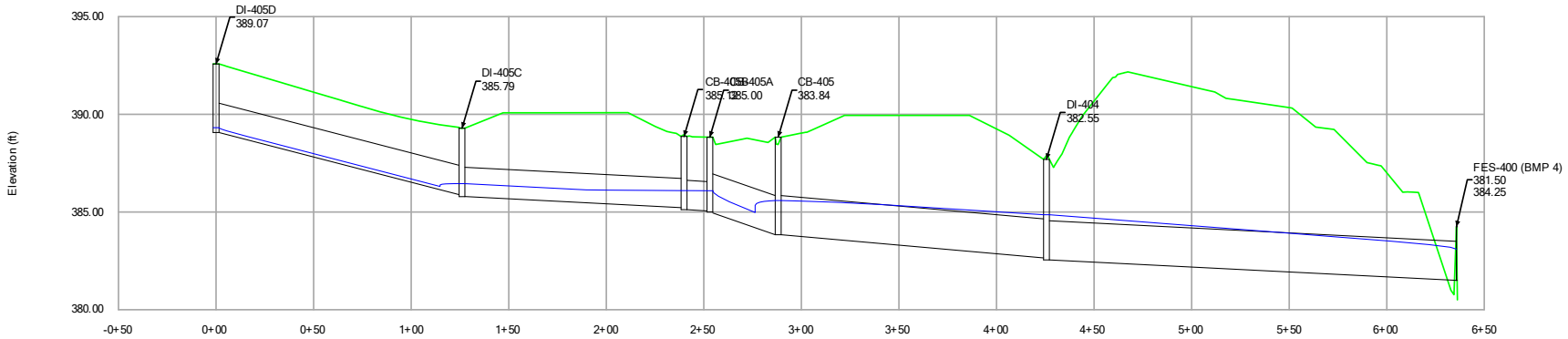
SCM4 STORM SEWER ANALYSIS

25-YEAR ANALYSIS

Conduit Results - Time: 0.00 hours

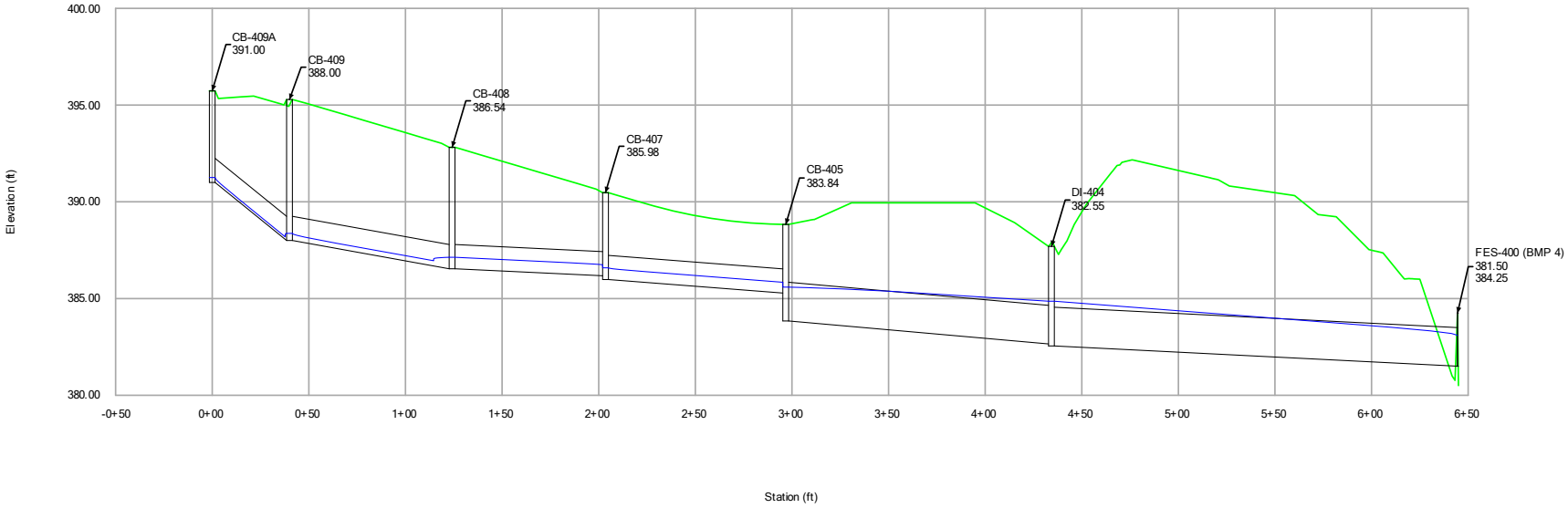
Label	Diameter (in)	Start Node	Stop Node	Slope (Calculated) (ft/ft)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)
Pipe - (160)	15.0	CB-408	CB-407	0.005	3.47	3.71	1.97	4.37
Pipe - (265)	18.0	DI-405D	DI-405C	0.025	2.34	0.72	0.44	16.68
Pipe - (131)	15.0	CB-415A	CB-415	0.005	3.41	3.50	1.63	4.57
Pipe - (125)	24.0	CB-415	CB-414	0.004	4.58	5.03	7.93	13.93
Pipe - (130)	18.0	CB-414A	CB-414	0.008	4.84	5.42	5.20	9.36
Pipe - (271)	18.0	CB-414B	CB-414A	0.005	0.50	0.46	0.43	7.43
Pipe - (139)	15.0	CB-406A	CB-406	0.008	2.59	1.36	0.58	5.77
Pipe - (137)	15.0	CB-407	CB-405	0.007	3.89	4.33	2.29	5.59
Pipe - (138)	15.0	CB-406	CB-405	0.017	3.35	1.36	1.42	8.46
Pipe - (262)	15.0	CB-422A	CB-422	0.005	3.34	2.61	1.51	4.57
Pipe - (225)	24.0	CB-414	DI-414A	0.007	6.89	6.66	18.11	19.02
Pipe - (225) (1)	24.0	DI-414A	FES-410 (BMP 4)	0.005	6.21	6.96	17.84	16.00
Pipe - (263)	18.0	DI-405C	CB-405B	0.005	3.98	2.80	3.00	7.43
Pipe - (124)	18.0	CB-413	CB-414	0.005	3.38	1.29	2.26	7.54
Pipe - (264)	18.0	CB-405B	CB-405A	0.005	2.41	2.25	2.94	7.43
Pipe - (140)	24.0	CB-405A	CB-405	0.032	5.49	3.49	10.17	40.28
Pipe - (135)	24.0	CB-405	DI-404	0.009	6.06	5.62	17.66	21.04
Pipe - (128)	15.0	CB-413A	CB-413	0.006	2.93	1.91	0.89	5.02
Pipe - (134)	24.0	DI-404	FES-400 (BMP 4)	0.005	6.30	7.35	19.79	16.00
Pipe - (235)	18.0	DI-411	DI-412B	0.091	2.82	7.86	0.89	31.70
Pipe - (244)	18.0	CB-412A	DI-412C	0.309	3.28	14.15	1.52	58.41
Pipe - (244) (1) (1)	24.0	DI-412C	FES-500 (BMP 4)	0.012	3.64	5.24	2.73	25.17
Pipe - (244) (1)	24.0	DI-412B	DI-412C	0.010	2.95	3.81	1.26	22.07

SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS

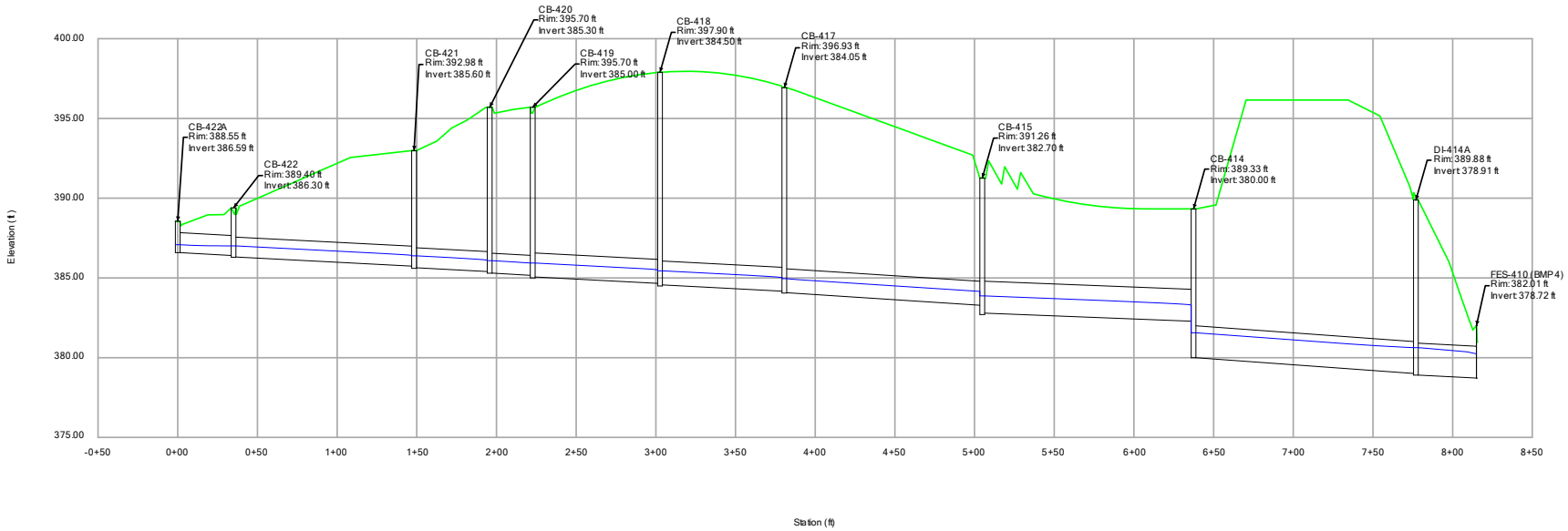


#170- The water elevation appears to be the same as that of the 10-year design storm. Please verify the correct profile is being shown. This applies to all 25-year analysis storm profiles.

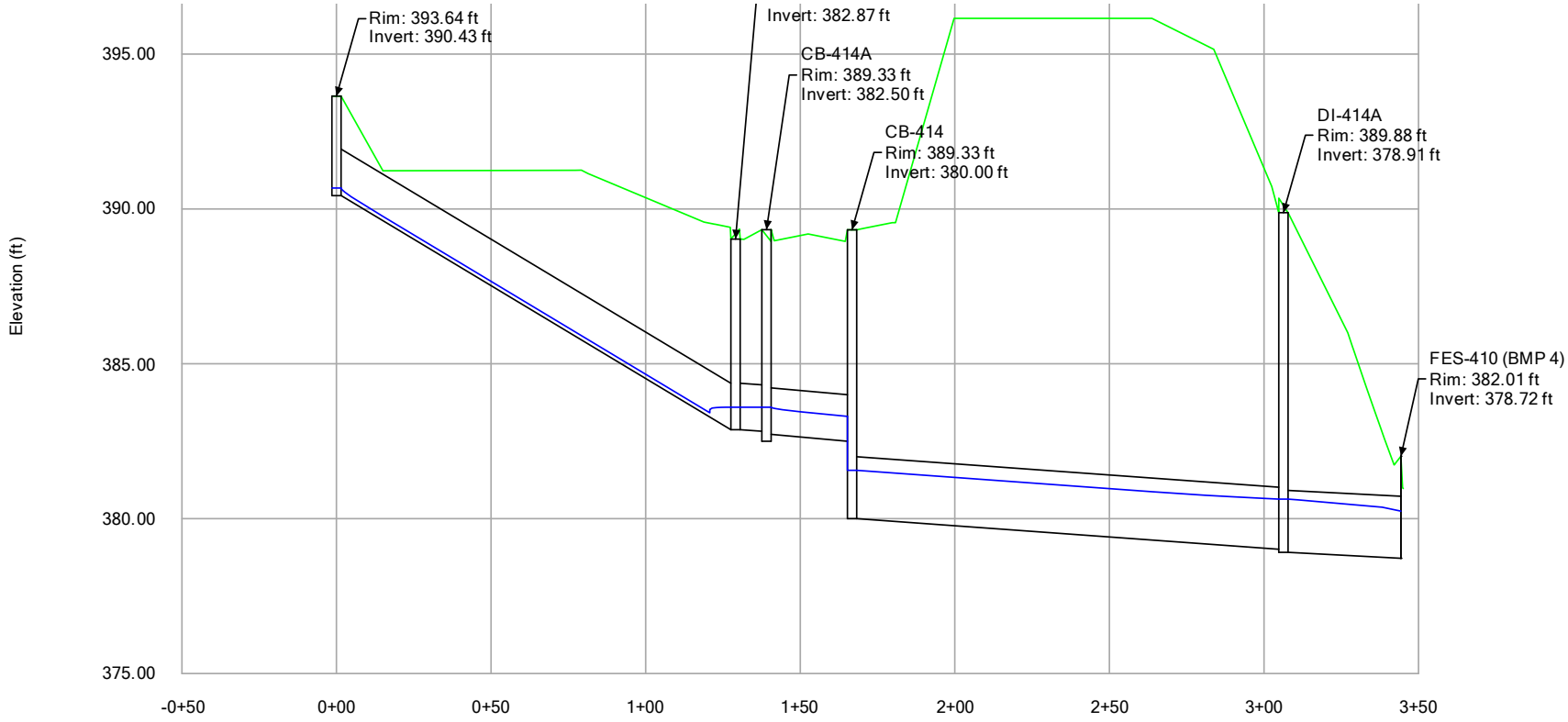
SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



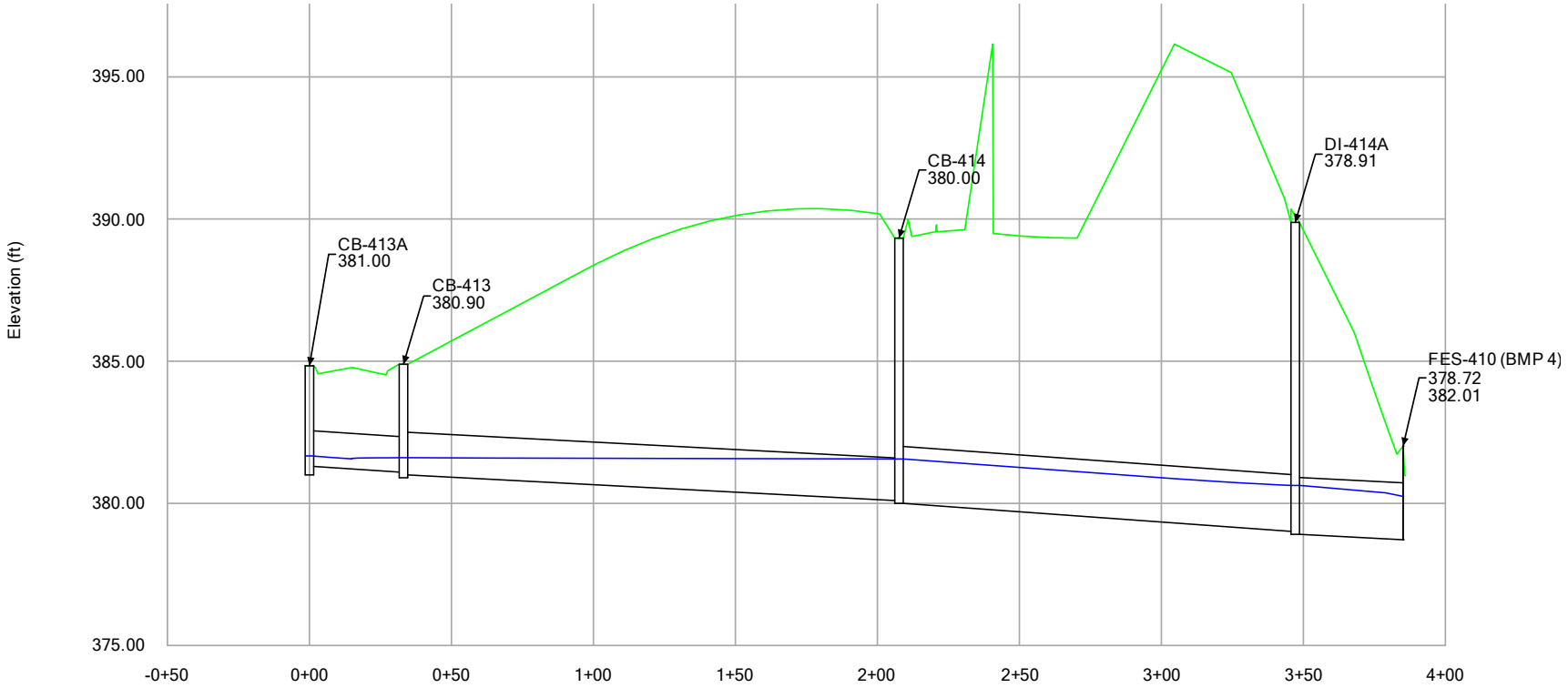
SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



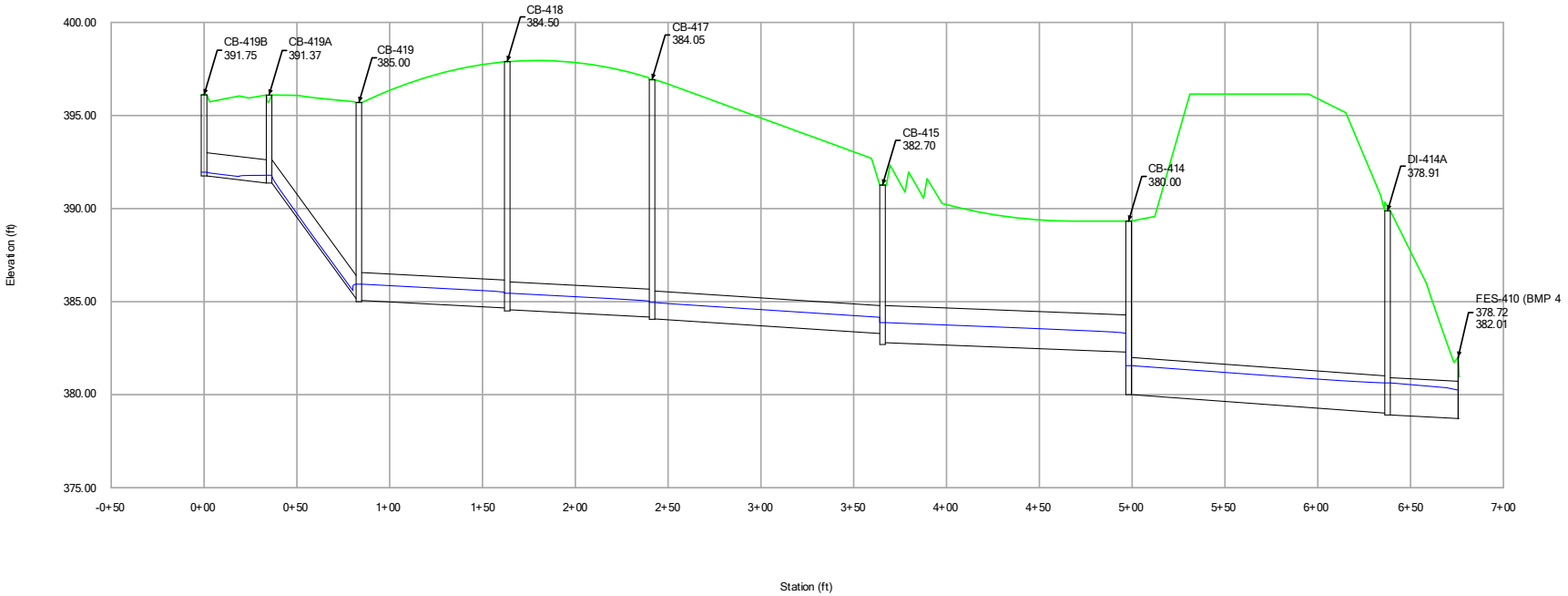
SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



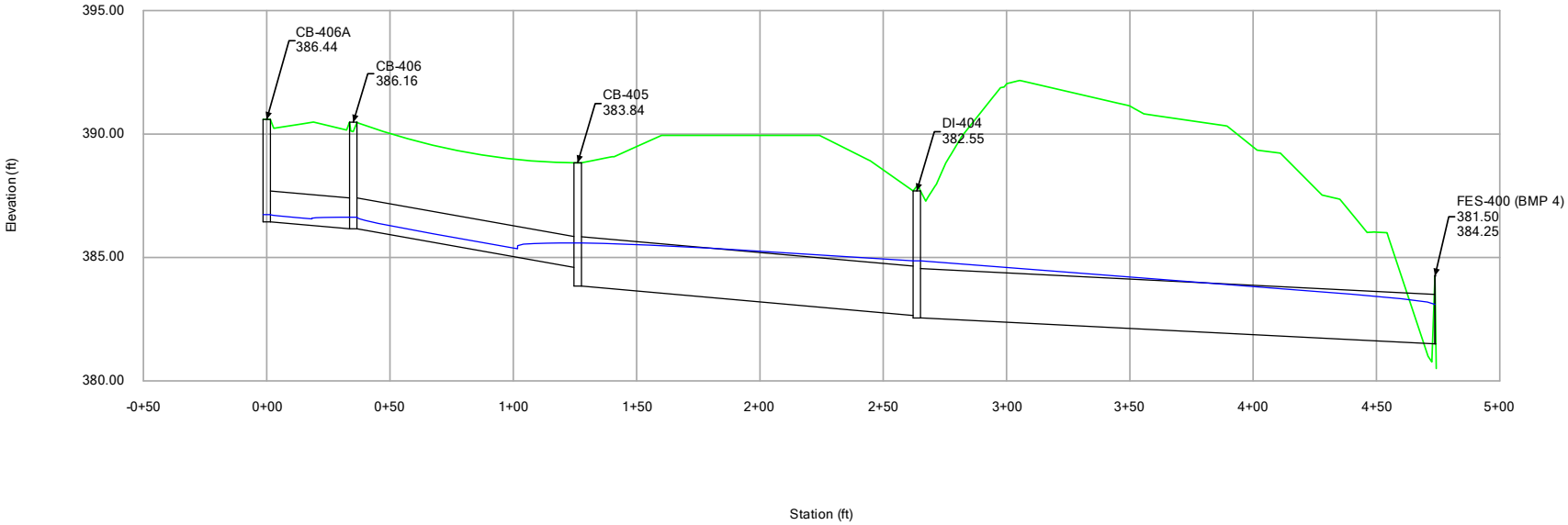
SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM4 STORM SEWER ANALYSIS
25-YEAR ANALYSIS



SCM 4 – INLET SPREAD

SCM4 STORM SEWER ANALYSIS

Inlet Spread Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)	Spread / Top Width (ft)
CB-418A	0.007	0.006	0.03	0.00	0.03	1.7
CB-418	0.008	0.010	0.06	0.00	3.58	2.0
CB-417A	0.032	0.026	0.15	0.00	0.15	2.9
CB-417	0.050	0.040	0.23	0.01	3.88	3.4
CB-419B	0.045	0.036	0.20	0.00	0.20	3.2
CB-419A	0.168	0.114	0.65	0.12	0.84	5.3
CB-409A	0.072	0.055	0.31	0.02	0.31	3.9
CB-420	0.041	0.033	0.19	0.00	2.43	3.1
CB-419	0.075	0.058	0.33	0.02	3.54	3.9
CB-409	0.076	0.058	0.33	0.02	0.64	3.9
DI-414C	0.073	0.056	0.32	0.02	0.32	3.9
CB-421	0.023	0.040	0.23	0.01	2.27	3.4
CB-408	0.057	0.048	0.27	0.01	1.44	3.6
DI-405D	0.075	0.057	0.32	0.02	0.32	3.9
CB-415A	0.389	0.221	1.25	0.53	1.25	7.3
CB-415	0.295	0.179	1.02	0.34	5.89	6.6
CB-408A	0.136	0.098	0.56	0.09	0.56	5.0
CB-414A	0.608	0.586	3.32	0.00	3.57	16.0
CB-406A	0.103	0.076	0.43	0.04	0.43	4.4
CB-407	0.055	0.045	0.25	0.01	1.66	3.5
CB-406	0.167	0.114	0.64	0.12	1.06	5.3
CB-422A	0.351	0.205	1.16	0.45	1.16	7.0
DI-414A	0.000	0.000	0.00	0.00	12.74	0.5
DI-405C	0.746	0.360	2.04	1.39	2.31	9.3
CB-414B	(N/A)	0.000	0.00	0.00	0.31	0.0
CB-414	0.508	0.472	2.67	0.00	12.95	14.0
CB-422	0.269	0.167	0.95	0.29	2.09	6.3
CB-405B	(N/A)	0.000	0.00	0.00	2.26	0.0
CB-405	0.589	0.501	2.84	0.00	12.58	14.5
CB-405A	1.118	0.928	5.26	0.00	7.28	21.1
CB-413	0.314	0.187	1.06	0.38	1.72	6.7

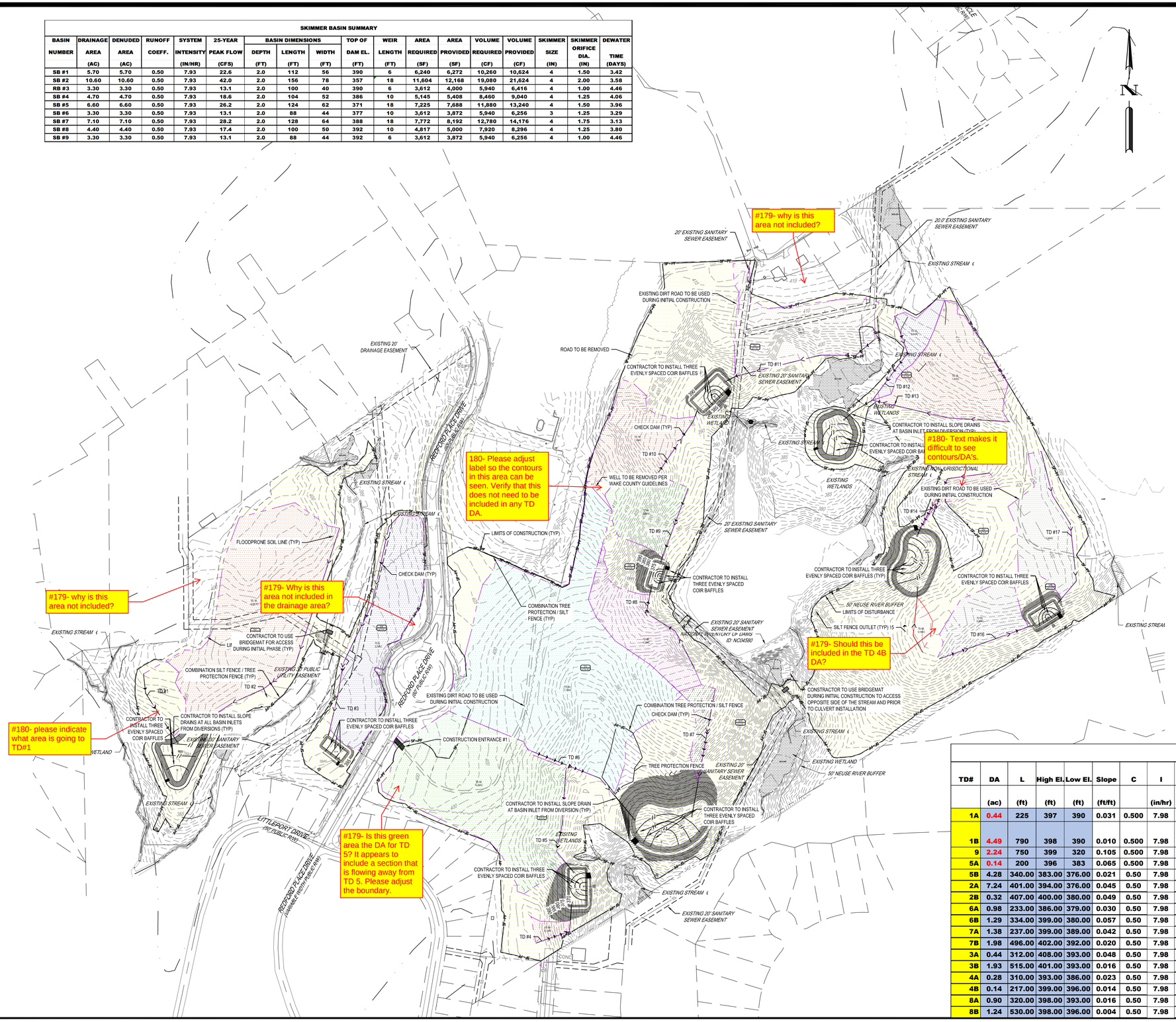
SCM4 STORM SEWER ANALYSIS

Inlet Spread Results - Time: 0.00 hours

Label	Inlet Drainage Area (acres)	Intercepted CA (acres)	Flow (Captured) (cfs)	Flow (Total Bypassed) (cfs)	Flow (Total Out) (cfs)	Spread / Top Width (ft)
DI-404	0.700	0.343	1.94	1.27	14.23	9.1
CB-413A	0.176	0.118	0.67	0.14	0.67	5.4
DI-411	0.176	0.119	0.67	0.14	0.67	5.4
CB-412A	0.213	0.192	1.09	0.40	1.09	6.8
DI-412C	0.000	0.000	0.00	0.00	1.99	0.6
DI-412B	0.063	0.049	0.28	0.01	0.94	3.7

EROSION CONTROL DA MAP

SKIMMER BASIN SUMMARY																	
BASIN NUMBER	DRAINAGE AREA (AC)	DENUDED AREA (AC)	RUNOFF COEFF.	SYSTEM INTENSITY (IN/HR)	25-YEAR PEAK FLOW (CFS)	BASIN DIMENSIONS DEPTH (FT)	LENGTH (FT)	WIDTH (FT)	TOP OF DAM EL. (FT)	WEIR LENGTH (FT)	AREA REQUIRED (SF)	AREA PROVIDED (SF)	VOLUME REQUIRED (CF)	VOLUME PROVIDED (CF)	SKIMMER SIZE (IN)	SKIMMER ORIFICE DIA. (IN)	DEWATER TIME (DAYS)
SB #1	5.70	5.70	0.50	7.93	22.6	2.0	112	56	390	6	6,240	6,272	10,260	10,624	4	1.50	3.42
SB #2	10.60	10.60	0.50	7.93	42.0	2.0	156	78	357	18	11,604	12,168	19,080	21,624	4	2.00	3.58
RB #3	3.30	3.30	0.50	7.93	13.1	2.0	100	40	390	6	3,612	4,000	5,940	6,416	4	1.00	4.46
SB #4	4.70	4.70	0.50	7.93	18.6	2.0	104	52	386	10	5,145	5,408	8,460	9,040	4	1.25	4.06
SB #5	6.60	6.60	0.50	7.93	26.2	2.0	124	62	371	18	7,225	7,688	11,880	13,240	4	1.50	3.96
SB #6	3.30	3.30	0.50	7.93	13.1	2.0	88	44	377	10	3,612	3,872	5,940	6,256	3	1.25	3.29
SB #7	7.10	7.10	0.50	7.93	28.2	2.0	128	64	388	18	7,772	8,192	12,780	14,176	4	1.75	3.13
SB #8	4.40	4.40	0.50	7.93	17.4	2.0	100	50	392	10	4,817	5,000	7,920	8,296	4	1.25	3.80
SB #9	3.30	3.30	0.50	7.93	13.1	2.0	88	44	392	6	3,612	3,872	5,940	6,256	4	1.00	4.46



EROSION CONTROL LEGEND

- PROPERTY LINE
- EXISTING MINOR CONTOUR
- DRAINAGE AREA
- DA# ±X.X AC — DRAINAGE AREA LABEL
- 100.XX / 100.XX — DIRECTION OF OVERLAND FLOW
- RIP RAP APRON
- DRAINAGE AREAS
- LIMITS OF DISTURBANCE
- TEMPORARY DIVERSION DITCH (TD)
- SF — TEMP SILT FENCE WITH OUTLET
- SF-PF — TEMP SILT / TREE PROTECTION FENCE
- 4' — SILT FENCE OUTLET
- CHECK DAM

NORTH

#12 and #21- Several leaders are not pointing to the correct items and multiple text boxes are overlapping. Please clean up annotation so it is clear and easy to read.

#180- What do the yellow areas represent? It's unclear where the drainage area separations between basins are. Drainage areas for all basins and diversion ditches should clearly be shown and labeled.

#181- The TD numbering does not appear to match what is shown on the table. There are also labels in some of the drainage areas that include TD names that do not match the TD labels. Please make sure all labels are consistent so calculations can be followed and reviewed.

TEMPORARY DIVERSION DITCH																		
TD#	DA (ac)	L (ft)	High El. (ft)	Low El. (ft)	Slope (ft/ft)	C	I (in/hr)	Q (25) (cfs)	Bottom W (ft)	Side opes (X:	V (fps)	Normal D (in)	Normal D (ft)	Depth Reqd. (ft)	Shear Stress (lb/sf)	Liner Reqd.	Slope Drain Size & Material	Check Dam Sp. (ft)	# Check Dams
1A	0.44	225	397	390	0.031	0.500	7.98	1.76	2.00	2.00	2.93	2.9	0.24	1	0.5	Grass	18" HDPE	96	2
1B	4.49	790	398	390	0.010	0.500	7.98	17.92	4.00	2.00	3.81	13.4	1.12	1	0.7	Am. Excelsior - 1 net	18" HDPE	296	3
9	2.24	750	399	320	0.105	0.500	7.98	8.94	4.00	2.00	7.37	5.1	0.43	1	2.8	Grass	18" HDPE	28	26
5A	0.14	200	396	383	0.065	0.500	7.98	0.56	4.00	2.00	2.53	1.2	0.10	1	0.4	Grass	18" HDPE	46	4
5B	4.28	340.00	383.00	376.00	0.021	0.50	7.98	17.08	2.00	2.00	4.94	10.90	0.91	0.50	1.17	Grass	12" HDPE	145.71	2.33
2A	7.24	401.00	394.00	376.00	0.045	0.50	7.98	28.89	2.00	2.00	7.51	11.70	0.98	0.50	2.73	Grass	12" HDPE	66.83	6.00
2B	0.32	407.00	400.00	380.00	0.049	0.50	7.98	1.28	2.00	2.00	3.08	2.10	0.18	0.50	0.54	Grass	12" HDPE	61.05	6.67
6A	0.98	233.00	386.00	379.00	0.030	0.50	7.98	3.91	2.00	2.00	3.71	4.60	0.38	0.50	0.72	Grass	12" HDPE	99.86	2.33
6B	1.29	334.00	399.00	380.00	0.057	0.50	7.98	5.15	2.00	2.00	5.04	4.50	0.38	0.50	1.33	Grass	12" HDPE	52.74	6.33
7A	1.38	237.00	399.00	389.00	0.042	0.50	7.98	5.51	2.00	2.00	4.62	5.00	0.42	0.50	1.10	Grass	12" HDPE	71.10	3.33
7B	1.98	496.00	402.00	392.00	0.020	0.50	7.98	7.90	2.00	2.00	3.93	7.40	0.62	0.50	0.78	Grass	12" HDPE	148.80	3.33
3A	0.44	312.00	408.00	393.00	0.048	0.50	7.98	1.76	2.00	2.00	3.40	2.60	0.22	0.50	0.65	Grass	12" HDPE	62.40	5.00
3B	1.93	515.00	401.00	393.00	0.016	0.50	7.98	7.70	2.00	2.00	3.60	7.80	0.65	0.50	0.63	Grass	12" HDPE	193.13	2.67
4A	0.28	310.00	393.00	386.00	0.023	0.50	7.98	1.12	2.00	2.00	2.29	2.40	0.20	0.50	0.28	Grass	12" HDPE	132.86	2.33
4B	0.14	217.00	399.00	396.00	0.014	0.50	7.98	0.56	2.00	2.00	1.54	1.90	0.16	0.50	0.14	Grass	12" HDPE	217.00	1.00
8A	0.90	320.00	398.00	393.00	0.016	0.50	7.98	3.59	2.00	2.00	2.90	5.20	0.43	0.50	0.42	Grass	12" HDPE	192.00	1.67
8B	1.24	530.00	398.00	396.00	0.004	0.50	7.98	4.95	2.00	2.00	1.93	8.90	0.74	0.50	0.17	Grass	12" HDPE	795.00	0.67

BGE
5440 WADE PARK BLVD, SUITE 102
RALEIGH NC 27607
www.bgeinc.com
NC LICENSE #C-4397

TEMPORARY DIVERSION DRAINAGE AREAS

DATE: 6/1/2023

0 ##' ##' ##'

SCALE: 1" = ##'

G:\NCA\Projects\Lennar\8430-03 - Lennar - School Street - Rolesville\04 - Calculations\Erosion Control\TD Drainage Areas.dwg

SKIMMER BASIN CALCULATIONS

DATE: June 1, 2023

DESIGNED DF

SKIMMER BASIN SUMMARY																
BASIN NUMBER	DRAINAGE AREA (AC)	DENUDED AREA (AC)	RUNOFF COEFF.	SYSTEM INTENSITY (IN/HR)	25-YEAR PEAK FLOW (CFS)	BASIN DIMENSIONS			TOP OF DAM EL. (FT)	WEIR LENGTH (FT)	AREA REQUIRED (SF)	AREA PROVIDED (SF)	VOLUME REQUIRED (CF)	VOLUME PROVIDED (CF)	SKIMMER SIZE (IN)	SKIMMER ORIFICE DIA. (IN)	DEWATER TIME (DAYS)
						DEPTH (FT)	LENGTH (FT)	WIDTH (FT)									
SB #1	5.70	5.70	0.50	7.93	22.6	2.0	112	56	390	6	6,240	6,272	10,260	10,624	4	1.50	3.42
SB #2	10.60	10.60	0.50	7.93	42.0	2.0	156	78	357	18	11,604	12,168	19,080	21,624	4	2.00	3.58
RB #3	3.30	3.30	0.50	7.93	13.1	2.0	100	40	390	6	3,612	4,000	5,940	6,416	4	1.00	4.46
SB #4	4.70	4.70	0.50	7.93	18.6	2.0	104	52	386	10	5,145	5,408	8,460	9,040	4	1.25	4.06
SB #5	6.60	6.60	0.50	7.93	26.2	2.0	124	62	371	18	7,225	7,688	11,880	13,240	4	1.50	3.96
SB #6	3.30	3.30	0.50	7.93	13.1	2.0	88	44	377	10	3,612	3,872	5,940	6,256	3	1.25	3.29
SB #7	7.10	7.10	0.50	7.93	28.2	2.0	128	64	388	18	7,772	8,192	12,780	14,176	4	1.75	3.13
SB #8	4.40	4.40	0.50	7.93	17.4	2.0	100	50	392	10	4,817	5,000	7,920	8,296	4	1.25	3.80
SB #9	3.30	3.30	0.50	7.93	13.1	2.0	88	44	392	6	3,612	3,872	5,940	6,256	4	1.00	4.46

NOTES:

1. One foot of free board is provided for all basins.
2. System Intensity calculated for Tc=5 min.
3. Orifice sizes calculated for a 3-5-day drawdown per reference of "Determining Orifice Size for the Faircloth Skimmer, Feb. 2001".

Skimmer Basin 1

Okay

0.35 C
7.19 i

5.7	Drainage Area (Acres)	
14.34	Peak Flow from 10-year Storm (cfs)	
10260	Required Volume (ft^3)	
6240	Required Surface Area (ft^2)	
55.9	Suggested Width (ft)	
111.7	Suggested Length (ft)	
56	Trial Top Width at Spillway Invert (ft)	
112	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
44	Bottom Width (ft)	
100	Bottom Length (ft)	
4400	Bottom Area (ft^2)	
10624	Actual Volume (ft^3)	**Okay**
6272	Actual Surface Area (ft^2)	**Okay**
6	Trial Weir Length (ft)	
1	Suggested Trial Depth of Flow (ft)	
18.0	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1.5	Orifice Size (1/4 inch increments)	
3.42	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

248412 5.702754821

Riser Basin 2

Okay

0.35 C
7.19 i

10.6	Drainage Area (Acres)	
26.67	Peak Flow from 10-year Storm (cfs)	
19080	Required Volume (ft^3)	
11604	Required Surface Area (ft^2)	
76.2	Suggested Width (ft)	
152.3	Suggested Length (ft)	
78	Trial Top Width at Spillway Invert (ft)	
156	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft) (2 to 3.5 feet above grade)	
66	Bottom Width (ft)	
144	Bottom Length (ft)	
9504	Bottom Area (ft^2)	
21624	Actual Volume (ft^3)	**Okay**
12168	Actual Surface Area (ft^2)	**Okay**
18	Trial Weir Length (ft)	
0.75	Suggested Trial Depth of Flow (ft)	
35.1	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
2	Orifice Size (1/4 inch increments)	
3.58	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 3

Okay

0.35 C
7.19 i

3.3	Drainage Area (Acres)	
8.30	Peak Flow from 10-year Storm (cfs)	
5940	Required Volume (ft^3)	
3612	Required Surface Area (ft^2)	
42.5	Suggested Width (ft)	
85.0	Suggested Length (ft)	
40	Trial Top Width at Spillway Invert (ft)	
100	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
28	Bottom Width (ft)	
88	Bottom Length (ft)	
2464	Bottom Area (ft^2)	
6416	Actual Volume (ft^3)	**Okay**
4000	Actual Surface Area (ft^2)	**Okay**
6	Trial Weir Length (ft)	
1	Suggested Trial Depth of Flow (ft)	
18.0	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1	Orifice Size (1/4 inch increments)	
4.46	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 4

Okay

0.35 C
7.19 i

4.7	Drainage Area (Acres)	
11.83	Peak Flow from 10-year Storm (cfs)	
8460	Required Volume (ft^3)	
5145	Required Surface Area (ft^2)	
50.7	Suggested Width (ft)	
101.4	Suggested Length (ft)	
52	Trial Top Width at Spillway Invert (ft)	
104	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
40	Bottom Width (ft)	
92	Bottom Length (ft)	
3680	Bottom Area (ft^2)	
9040	Actual Volume (ft^3)	**Okay**
5408	Actual Surface Area (ft^2)	**Okay**
10	Trial Weir Length (ft)	
1	Suggested Trial Depth of Flow (ft)	
30.0	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1.25	Orifice Size (1/4 inch increments)	
4.06	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 5

Okay

0.35 C
7.19 i

6.6	Drainage Area (Acres)	
16.61	Peak Flow from 10-year Storm (cfs)	
11880	Required Volume (ft^3)	
7225	Required Surface Area (ft^2)	
60.1	Suggested Width (ft)	
120.2	Suggested Length (ft)	
62	Trial Top Width at Spillway Invert (ft)	
124	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
50	Bottom Width (ft)	
112	Bottom Length (ft)	
5600	Bottom Area (ft^2)	
13240	Actual Volume (ft^3)	**Okay**
7688	Actual Surface Area (ft^2)	**Okay**
17.5	Trial Weir Length (ft)	
0.5	Suggested Trial Depth of Flow (ft)	
18.6	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1.5	Orifice Size (1/4 inch increments)	
3.96	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 6

Okay

0.35 C
7.19 i

3.3	Drainage Area (Acres)	
8.30	Peak Flow from 10-year Storm (cfs)	
5940	Required Volume (ft^3)	
3612	Required Surface Area (ft^2)	
42.5	Suggested Width (ft)	
85.0	Suggested Length (ft)	
44	Trial Top Width at Spillway Invert (ft)	
88	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
32	Bottom Width (ft)	
76	Bottom Length (ft)	
2432	Bottom Area (ft^2)	
6256	Actual Volume (ft^3)	**Okay**
3872	Actual Surface Area (ft^2)	**Okay**
10	Trial Weir Length (ft)	
0.5	Suggested Trial Depth of Flow (ft)	
10.6	Spillway Capacity (cfs)	**Okay**
3	Skimmer Size (inches)	
0.25	Head on Skimmer (feet)	
1.25	Orifice Size (1/4 inch increments)	
3.29	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 7

Okay

0.35 C
7.19 i

7.1	Drainage Area (Acres)	
17.87	Peak Flow from 10-year Storm (cfs)	
12780	Required Volume (ft^3)	
7772	Required Surface Area (ft^2)	
62.3	Suggested Width (ft)	
124.7	Suggested Length (ft)	
64	Trial Top Width at Spillway Invert (ft)	
128	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
52	Bottom Width (ft)	
116	Bottom Length (ft)	
6032	Bottom Area (ft^2)	
14176	Actual Volume (ft^3)	**Okay**
8192	Actual Surface Area (ft^2)	**Okay**
17.5	Trial Weir Length (ft)	
0.5	Suggested Trial Depth of Flow (ft)	
18.6	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1.75	Orifice Size (1/4 inch increments)	
3.13	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 8

Okay

0.35 C
7.19 i

4.4	Drainage Area (Acres)	
11.07	Peak Flow from 10-year Storm (cfs)	
7920	Required Volume (ft^3)	
4817	Required Surface Area (ft^2)	
49.1	Suggested Width (ft)	
98.1	Suggested Length (ft)	
50	Trial Top Width at Spillway Invert (ft)	
100	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
38	Bottom Width (ft)	
88	Bottom Length (ft)	
3344	Bottom Area (ft^2)	
8296	Actual Volume (ft^3)	**Okay**
5000	Actual Surface Area (ft^2)	**Okay**
10	Trial Weir Length (ft)	
0.75	Suggested Trial Depth of Flow (ft)	
19.5	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1.25	Orifice Size (1/4 inch increments)	
3.80	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Skimmer Basin 9

Okay

0.35 C
7.19 i

3.3	Drainage Area (Acres)	
8.30	Peak Flow from 10-year Storm (cfs)	
5940	Required Volume (ft^3)	
3612	Required Surface Area (ft^2)	
42.5	Suggested Width (ft)	
85.0	Suggested Length (ft)	
44	Trial Top Width at Spillway Invert (ft)	
88	Trial Top Length at Spillway Invert (ft)	
3	Trial Side Slope Ratio Z:1	
2	Trial Depth (ft)	(2 to 3.5 feet above grade)
32	Bottom Width (ft)	
76	Bottom Length (ft)	
2432	Bottom Area (ft^2)	
6256	Actual Volume (ft^3)	**Okay**
3872	Actual Surface Area (ft^2)	**Okay**
10	Trial Weir Length (ft)	
0.5	Suggested Trial Depth of Flow (ft)	
10.6	Spillway Capacity (cfs)	**Okay**
4	Skimmer Size (inches)	
0.333	Head on Skimmer (feet)	
1	Orifice Size (1/4 inch increments)	
4.46	Dewatering Time (days)	

Required 3 to 5 days for Wake County

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

TEMPORARY DIVERSIONS

TEMPORARY DIVERSION DITCH

TD#	DA (ac)	L (ft)	High El. (ft)	Low El. (ft)	Slope (ft/ft)	C	I (in/hr)	Q (25) (cfs)	Bottom W (ft)	Side opes (X:	V (fps)	Normal D (in)	Normal D (ft)	Depth Reqd. (ft)	Shear Stress (lb/sf)	Liner Reqd.	Slope Drain Size & Material	Check Dam Sp. (ft)	# Check Dams
1A	0.44	225	397	390	0.031	0.500	7.98	1.76	2.00	2.00	2.93	2.9	0.24	1	0.5	Grass	18" HDPE	96	2
1B	4.49	790	398	390	0.010	0.500	7.98	17.92	4.00	2.00	3.81	13.4	1.12	1	0.7	Am. Excelsior - 1 net	18" HDPE	296	3
9	2.24	750	399	320	0.105	0.500	7.98	8.94	4.00	2.00	7.37	5.1	0.43	1	2.8	Grass	18" HDPE	28	26
5A	0.14	200	396	383	0.065	0.500	7.98	0.56	4.00	2.00	2.53	1.2	0.10	1	0.4	Grass	18" HDPE	46	4
5B	4.28	340.00	383.00	376.00	0.021	0.50	7.98	17.08	2.00	2.00	4.94	10.90	0.91	0.50	1.17	Grass	12" HDPE	145.71	2.33
2A	7.24	401.00	394.00	376.00	0.045	0.50	7.98	28.89	2.00	2.00	7.51	11.70	0.98	0.50	2.73	Grass	12" HDPE	66.83	6.00
2B	0.32	407.00	400.00	380.00	0.049	0.50	7.98	1.28	2.00	2.00	3.08	2.10	0.18	0.50	0.54	Grass	12" HDPE	61.05	6.67
6A	0.98	233.00	386.00	379.00	0.030	0.50	7.98	3.91	2.00	2.00	3.71	4.60	0.38	0.50	0.72	Grass	12" HDPE	99.86	2.33
6B	1.29	334.00	399.00	380.00	0.057	0.50	7.98	5.15	2.00	2.00	5.04	4.50	0.38	0.50	1.33	Grass	12" HDPE	52.74	6.33
7A	1.38	237.00	399.00	389.00	0.042	0.50	7.98	5.51	2.00	2.00	4.62	5.00	0.42	0.50	1.10	Grass	12" HDPE	71.10	3.33
7B	1.98	496.00	402.00	392.00	0.020	0.50	7.98	7.90	2.00	2.00	3.93	7.40	0.62	0.50	0.78	Grass	12" HDPE	148.80	3.33
3A	0.44	312.00	408.00	393.00	0.048	0.50	7.98	1.76	2.00	2.00	3.40	2.60	0.22	0.50	0.65	Grass	12" HDPE	62.40	5.00
3B	1.93	515.00	401.00	393.00	0.016	0.50	7.98	7.70	2.00	2.00	3.60	7.80	0.65	0.50	0.63	Grass	12" HDPE	193.13	2.67
4A	0.28	310.00	393.00	386.00	0.023	0.50	7.98	1.12	2.00	2.00	2.29	2.40	0.20	0.50	0.28	Grass	12" HDPE	132.86	2.33
4B	0.14	217.00	399.00	396.00	0.014	0.50	7.98	0.56	2.00	2.00	1.54	1.90	0.16	0.50	0.14	Grass	12" HDPE	217.00	1.00
8A	0.90	320.00	398.00	393.00	0.016	0.50	7.98	3.59	2.00	2.00	2.90	5.20	0.43	0.50	0.42	Grass	12" HDPE	192.00	1.67
8B	1.24	530.00	398.00	396.00	0.004	0.50	7.98	4.95	2.00	2.00	1.93	8.90	0.74	0.50	0.17	Grass	12" HDPE	795.00	0.67

User Input
Flowmaster Results

If <0.5, make 1; if over, go up to the next 0.5'

Am. Excel Co; Straw; 2nets <= 4.5 ft/s
Am. Excel; Curlex II.98; 2nets <= 8.5

#182- Ensure permissible velocities are met if using established grass lining (see North Carolina's Erosion and Sediment Control Planning and Design Manual)

If design velocity is greater than 2.0 ft/sec, a temporary lining may be required to stabilize the channel until vegetation is established

Worksheet for 1A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.031 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	1.76 cfs

Results	
Normal Depth	2.9 in
Flow Area	0.6 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	2.3 in
Top Width	2.97 ft
Critical Depth	3.2 in
Critical Slope	0.023 ft/ft
Velocity	2.93 ft/s
Velocity Head	0.13 ft
Specific Energy	0.38 ft
Froude Number	1.149
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.9 in
Critical Depth	3.2 in
Channel Slope	0.031 ft/ft
Critical Slope	0.023 ft/ft

Worksheet for 1B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.010 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	17.92 cfs

Results	
Normal Depth	13.4 in
Flow Area	4.7 ft²
Wetted Perimeter	7.0 ft
Hydraulic Radius	8.1 in
Top Width	6.45 ft
Critical Depth	11.8 in
Critical Slope	0.017 ft/ft
Velocity	3.81 ft/s
Velocity Head	0.23 ft
Specific Energy	1.34 ft
Froude Number	0.786
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	13.4 in
Critical Depth	11.8 in
Channel Slope	0.010 ft/ft
Critical Slope	0.017 ft/ft

Worksheet for 2A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.045 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	28.89 cfs

Results	
Normal Depth	11.7 in
Flow Area	3.8 ft²
Wetted Perimeter	6.4 ft
Hydraulic Radius	7.3 in
Top Width	5.90 ft
Critical Depth	15.1 in
Critical Slope	0.016 ft/ft
Velocity	7.51 ft/s
Velocity Head	0.88 ft
Specific Energy	1.85 ft
Froude Number	1.640
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.7 in
Critical Depth	15.1 in
Channel Slope	0.045 ft/ft
Critical Slope	0.016 ft/ft

Worksheet for 2B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.049 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	1.28 cfs

Results	
Normal Depth	2.1 in
Flow Area	0.4 ft²
Wetted Perimeter	2.8 ft
Hydraulic Radius	1.8 in
Top Width	2.71 ft
Critical Depth	2.6 in
Critical Slope	0.024 ft/ft
Velocity	3.08 ft/s
Velocity Head	0.15 ft
Specific Energy	0.32 ft
Froude Number	1.387
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.1 in
Critical Depth	2.6 in
Channel Slope	0.049 ft/ft
Critical Slope	0.024 ft/ft

Worksheet for 3A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.048 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	1.76 cfs

Results	
Normal Depth	2.6 in
Flow Area	0.5 ft²
Wetted Perimeter	3.0 ft
Hydraulic Radius	2.1 in
Top Width	2.85 ft
Critical Depth	3.2 in
Critical Slope	0.023 ft/ft
Velocity	3.40 ft/s
Velocity Head	0.18 ft
Specific Energy	0.39 ft
Froude Number	1.407
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	2.6 in
Critical Depth	3.2 in
Channel Slope	0.048 ft/ft
Critical Slope	0.023 ft/ft

Worksheet for 3B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.016 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	7.70 cfs

Results	
Normal Depth	7.8 in
Flow Area	2.1 ft²
Wetted Perimeter	4.9 ft
Hydraulic Radius	5.2 in
Top Width	4.59 ft
Critical Depth	7.5 in
Critical Slope	0.019 ft/ft
Velocity	3.60 ft/s
Velocity Head	0.20 ft
Specific Energy	0.85 ft
Froude Number	0.932
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.8 in
Critical Depth	7.5 in
Channel Slope	0.016 ft/ft
Critical Slope	0.019 ft/ft

Worksheet for 4A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.023 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	1.12 cfs

Results	
Normal Depth	2.4 in
Flow Area	0.5 ft²
Wetted Perimeter	2.9 ft
Hydraulic Radius	2.0 in
Top Width	2.81 ft
Critical Depth	2.4 in
Critical Slope	0.025 ft/ft
Velocity	2.29 ft/s
Velocity Head	0.08 ft
Specific Energy	0.28 ft
Froude Number	0.966
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	2.4 in
Critical Depth	2.4 in
Channel Slope	0.023 ft/ft
Critical Slope	0.025 ft/ft

Worksheet for 4B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.014 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	0.56 cfs

Results	
Normal Depth	1.9 in
Flow Area	0.4 ft²
Wetted Perimeter	2.7 ft
Hydraulic Radius	1.6 in
Top Width	2.63 ft
Critical Depth	1.5 in
Critical Slope	0.028 ft/ft
Velocity	1.54 ft/s
Velocity Head	0.04 ft
Specific Energy	0.19 ft
Froude Number	0.729
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	1.9 in
Critical Depth	1.5 in
Channel Slope	0.014 ft/ft
Critical Slope	0.028 ft/ft

Worksheet for 5A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.065 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	0.56 cfs

Results	
Normal Depth	1.2 in
Flow Area	0.2 ft²
Wetted Perimeter	2.4 ft
Hydraulic Radius	1.1 in
Top Width	2.40 ft
Critical Depth	1.5 in
Critical Slope	0.028 ft/ft
Velocity	2.53 ft/s
Velocity Head	0.10 ft
Specific Energy	0.20 ft
Froude Number	1.471
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.2 in
Critical Depth	1.5 in
Channel Slope	0.065 ft/ft
Critical Slope	0.028 ft/ft

Worksheet for 5B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.021 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	17.08 cfs

Results	
Normal Depth	10.9 in
Flow Area	3.5 ft²
Wetted Perimeter	6.1 ft
Hydraulic Radius	6.9 in
Top Width	5.63 ft
Critical Depth	11.5 in
Critical Slope	0.017 ft/ft
Velocity	4.94 ft/s
Velocity Head	0.38 ft
Specific Energy	1.29 ft
Froude Number	1.112
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	10.9 in
Critical Depth	11.5 in
Channel Slope	0.021 ft/ft
Critical Slope	0.017 ft/ft

Worksheet for 6A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.030 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	3.91 cfs

Results	
Normal Depth	4.6 in
Flow Area	1.1 ft²
Wetted Perimeter	3.7 ft
Hydraulic Radius	3.4 in
Top Width	3.53 ft
Critical Depth	5.1 in
Critical Slope	0.020 ft/ft
Velocity	3.71 ft/s
Velocity Head	0.21 ft
Specific Energy	0.60 ft
Froude Number	1.196
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.6 in
Critical Depth	5.1 in
Channel Slope	0.030 ft/ft
Critical Slope	0.020 ft/ft

Worksheet for 6B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.057 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	5.15 cfs

Results	
Normal Depth	4.5 in
Flow Area	1.0 ft²
Wetted Perimeter	3.7 ft
Hydraulic Radius	3.3 in
Top Width	3.49 ft
Critical Depth	6.0 in
Critical Slope	0.020 ft/ft
Velocity	5.04 ft/s
Velocity Head	0.40 ft
Specific Energy	0.77 ft
Froude Number	1.644
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.5 in
Critical Depth	6.0 in
Channel Slope	0.057 ft/ft
Critical Slope	0.020 ft/ft

Worksheet for 7A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.042 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	5.51 cfs

Results	
Normal Depth	5.0 in
Flow Area	1.2 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	3.7 in
Top Width	3.68 ft
Critical Depth	6.2 in
Critical Slope	0.019 ft/ft
Velocity	4.62 ft/s
Velocity Head	0.33 ft
Specific Energy	0.75 ft
Froude Number	1.432
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.0 in
Critical Depth	6.2 in
Channel Slope	0.042 ft/ft
Critical Slope	0.019 ft/ft

Worksheet for 7B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.020 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	7.90 cfs

Results	
Normal Depth	7.4 in
Flow Area	2.0 ft²
Wetted Perimeter	4.8 ft
Hydraulic Radius	5.1 in
Top Width	4.48 ft
Critical Depth	7.6 in
Critical Slope	0.019 ft/ft
Velocity	3.93 ft/s
Velocity Head	0.24 ft
Specific Energy	0.86 ft
Froude Number	1.036
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	7.4 in
Critical Depth	7.6 in
Channel Slope	0.020 ft/ft
Critical Slope	0.019 ft/ft

Worksheet for 8A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.016 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	3.59 cfs

Results	
Normal Depth	5.2 in
Flow Area	1.2 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	3.8 in
Top Width	3.73 ft
Critical Depth	4.8 in
Critical Slope	0.021 ft/ft
Velocity	2.90 ft/s
Velocity Head	0.13 ft
Specific Energy	0.56 ft
Froude Number	0.887
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	5.2 in
Critical Depth	4.8 in
Channel Slope	0.016 ft/ft
Critical Slope	0.021 ft/ft

Worksheet for 8B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.004 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	4.95 cfs

Results	
Normal Depth	8.9 in
Flow Area	2.6 ft²
Wetted Perimeter	5.3 ft
Hydraulic Radius	5.8 in
Top Width	4.95 ft
Critical Depth	5.8 in
Critical Slope	0.020 ft/ft
Velocity	1.93 ft/s
Velocity Head	0.06 ft
Specific Energy	0.80 ft
Froude Number	0.473
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	8.9 in
Critical Depth	5.8 in
Channel Slope	0.004 ft/ft
Critical Slope	0.020 ft/ft

Worksheet for 9

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.105 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	2.00 ft
Discharge	8.94 cfs

Results	
Normal Depth	5.1 in
Flow Area	1.2 ft²
Wetted Perimeter	3.9 ft
Hydraulic Radius	3.7 in
Top Width	3.70 ft
Critical Depth	8.1 in
Critical Slope	0.018 ft/ft
Velocity	7.37 ft/s
Velocity Head	0.84 ft
Specific Energy	1.27 ft
Froude Number	2.268
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.1 in
Critical Depth	8.1 in
Channel Slope	0.105 ft/ft
Critical Slope	0.018 ft/ft

DISSIPATORS

DESIGN OF RIPRAP OUTLET PROTECTION

User Input Data
Calculated Value
Reference Data

Designed By:	JWM	**Date:**	3/21/2022
Checked By:		**Date:**	
Company:	BGE		
Project Name:	PARKER RIDGE		
Project No.:	8430-03		

Site Location (City/Town)	Raleigh
Culvert Id.	101
Total Drainage Area (acres)	

Step 1. Determine the tailwater depth from channel characteristics below the pipe outlet for the design capacity of the pipe. If the tailwater depth is less than half the outlet pipe diameter, it is classified minimum tailwater condition. If it is greater than half the pipe diameter, it is classified maximum condition. Pipes that outlet onto wide flat areas with no defined channel are assumed to have a minimum tailwater condition unless reliable flood stage elevations show otherwise.

Outlet pipe diameter, D_o (in.)	36
Tailwater depth (in.)	7
Minimum/Maximum tailwater?	Min TW (Fig. 8.06a)
Discharge (cfs)	27.02
Velocity (ft./s)	7

Step 2. Based on the tailwater conditions determined in step 1, enter Figure 8.06a or Figure 8.06b, and determine d_{50} riprap size and minimum apron length (L_a). The d_{50} size is the median stone size in a well-graded riprap apron.

Step 3. Determine apron width at the pipe outlet, the apron shape, and the apron width at the outlet end from the same figure used in Step 2.

	Minimum TW	Maximum TW
	Figure 8.06a	Figure 8.06b
Riprap d_{50}, (ft.)	0.6	
Minimum apron length, L_a (ft.)	19	
Apron width at pipe outlet (ft.)	9	9
Apron shape		
Apron width at outlet end (ft.)	22	3

Step 4. Determine the maximum stone diameter:

$$d_{max} = 1.5 \times d_{50}$$

	Minimum TW	Maximum TW
Max Stone Diameter, dmax (ft.)	0.9	0

Step 5. Determine the apron thickness:

$$\text{Apron thickness} = 1.5 \times d_{max}$$

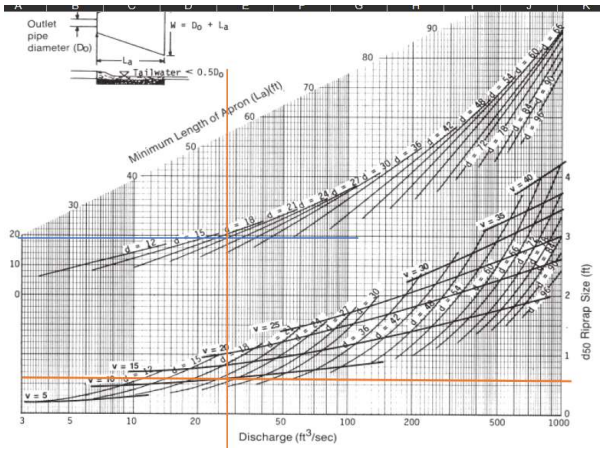
	Minimum TW	Maximum TW
Apron Thickness(ft.)	1.35	0

Step 6. Fit the riprap apron to the site by making it level for the minimum length, L_a, from Figure 8.06a or Figure 8.06b. Extend the apron farther downstream and along channel banks until stability is assured. Keep the apron as straight as possible and align it with the flow of the receiving stream. Make any necessary alignment bends near the pipe outlet so that the entrance into the receiving stream is straight.

Some locations may require lining of the entire channel cross section to assure stability.

It may be necessary to increase the size of riprap where protection of the channel side slopes is necessary (*Appendix 8.05*). Where overfalls exist at pipe outlets or flows are excessive, a plunge pool should be considered, see page 8.06.8.

#183- It is unclear what location/FES on the plans these riprap calculations apply to. Please add labels so riprap sizing can be easily followed. Consider adding riprap sizing information to the plan sheets.



DESIGN OF RIPRAP OUTLET PROTECTION

User Input Data
Calculated Value
Reference Data

Designed By:	JWM	**Date:**	3/21/2022
Checked By:		**Date:**	
Company:	BGE		
Project Name:	PARKER RIDGE		
Project No.:	8430-03		

Site Location (City/Town)	Raleigh
Culvert Id.	101
Total Drainage Area (acres)	

Step 1. Determine the tailwater depth from channel characteristics below the pipe outlet for the design capacity of the pipe. If the tailwater depth is less than half the outlet pipe diameter, it is classified minimum tailwater condition. If it is greater than half the pipe diameter, it is classified maximum condition. Pipes that outlet onto wide flat areas with no defined channel are assumed to have a minimum tailwater condition unless reliable flood stage elevations show otherwise.

Outlet pipe diameter, D_o (in.)	36
Tailwater depth (in.)	14.2
Minimum/Maximum tailwater?	Min TW (Fig. 8.06a)
Discharge (cfs)	37.81
Velocity (ft./s)	7.6

Step 2. Based on the tailwater conditions determined in step 1, enter Figure 8.06a or Figure 8.06b, and determine d_{50} riprap size and minimum apron length (L_a). The d_{50} size is the median stone size in a well-graded riprap apron.

Step 3. Determine apron width at the pipe outlet, the apron shape, and the apron width at the outlet end from the same figure used in Step 2.

	Minimum TW	Maximum TW
	Figure 8.06a	Figure 8.06b
Riprap d_{50}, (ft.)	0.85	
Minimum apron length, L_a (ft.)	19	
Apron width at pipe outlet (ft.)	9	9
Apron shape		
Apron width at outlet end (ft.)	22	3

Step 4. Determine the maximum stone diameter:

$$d_{max} = 1.5 \times d_{50}$$

	Minimum TW	Maximum TW
Max Stone Diameter, dmax (ft.)	1.275	0

Step 5. Determine the apron thickness:

$$\text{Apron thickness} = 1.5 \times d_{max}$$

	Minimum TW	Maximum TW
Apron Thickness(ft.)	1.9125	0

Step 6. Fit the riprap apron to the site by making it level for the minimum length, L_a, from Figure 8.06a or Figure 8.06b. Extend the apron farther downstream and along channel banks until stability is assured. Keep the apron as straight as possible and align it with the flow of the receiving stream. Make any necessary alignment bends near the pipe outlet so that the entrance into the receiving stream is straight.

Some locations may require lining of the entire channel cross section to assure stability.

It may be necessary to increase the size of riprap where protection of the channel side slopes is necessary (*Appendix 8.05*). Where overfalls exist at pipe outlets or flows are excessive, a plunge pool should be considered, see page 8.06.8.

DESIGN OF RIPRAP OUTLET PROTECTION

User Input Data
Calculated Value
Reference Data

Designed By:	JWM	**Date:**	3/21/2022
Checked By:		**Date:**	
Company:	BGE		
Project Name:	PARKER RIDGE		
Project No.:	8430-03		

Site Location (City/Town)	Raleigh
Culvert Id.	101
Total Drainage Area (acres)	

Step 1. Determine the tailwater depth from channel characteristics below the pipe outlet for the design capacity of the pipe. If the tailwater depth is less than half the outlet pipe diameter, it is classified minimum tailwater condition. If it is greater than half the pipe diameter, it is classified maximum condition. Pipes that outlet onto wide flat areas with no defined channel are assumed to have a minimum tailwater condition unless reliable flood stage elevations show otherwise.

Outlet pipe diameter, D_o (in.)	36
Tailwater depth (in.)	14.2
Minimum/Maximum tailwater?	Min TW (Fig. 8.06a)
Discharge (cfs)	37.81
Velocity (ft./s)	7.6

Step 2. Based on the tailwater conditions determined in step 1, enter Figure 8.06a or Figure 8.06b, and determine d_{50} riprap size and minimum apron length (L_a). The d_{50} size is the median stone size in a well-graded riprap apron.

Step 3. Determine apron width at the pipe outlet, the apron shape, and the apron width at the outlet end from the same figure used in Step 2.

	Minimum TW	Maximum TW
	Figure 8.06a	Figure 8.06b
Riprap d_{50}, (ft.)	0.85	
Minimum apron length, L_a (ft.)	19	
Apron width at pipe outlet (ft.)	9	9
Apron shape		
Apron width at outlet end (ft.)	22	3

Step 4. Determine the maximum stone diameter:

$$d_{max} = 1.5 \times d_{50}$$

	Minimum TW	Maximum TW
Max Stone Diameter, dmax (ft.)	1.275	0

Step 5. Determine the apron thickness:

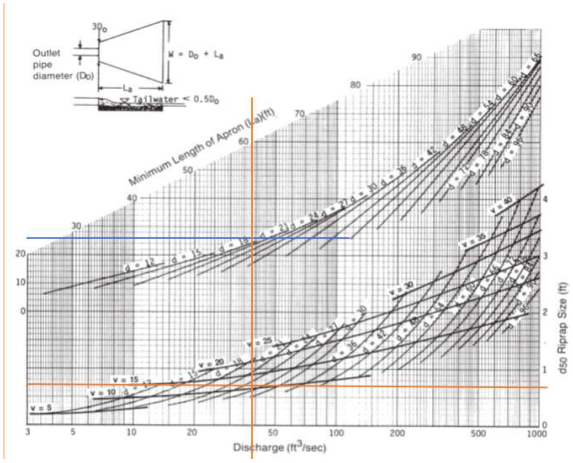
$$\text{Apron thickness} = 1.5 \times d_{max}$$

	Minimum TW	Maximum TW
Apron Thickness(ft.)	1.9125	0

Step 6. Fit the riprap apron to the site by making it level for the minimum length, L_a, from Figure 8.06a or Figure 8.06b. Extend the apron farther downstream and along channel banks until stability is assured. Keep the apron as straight as possible and align it with the flow of the receiving stream. Make any necessary alignment bends near the pipe outlet so that the entrance into the receiving stream is straight.

Some locations may require lining of the entire channel cross section to assure stability.

It may be necessary to increase the size of riprap where protection of the channel side slopes is necessary (*Appendix 8.05*). Where overfalls exist at pipe outlets or flows are excessive, a plunge pool should be considered, see page 8.06.8.



DESIGN OF RIPRAP OUTLET PROTECTION

User Input Data
Calculated Value
Reference Data

Designed By:	JWM	**Date:**	3/21/2022
Checked By:		**Date:**	
Company:	BGE		
Project Name:	PARKER RIDGE		
Project No.:	8430-03		

Site Location (City/Town)	Raleigh
Culvert Id.	101
Total Drainage Area (acres)	

Step 1. Determine the tailwater depth from channel characteristics below the pipe outlet for the design capacity of the pipe. If the tailwater depth is less than half the outlet pipe diameter, it is classified minimum tailwater condition. If it is greater than half the pipe diameter, it is classified maximum condition. Pipes that outlet onto wide flat areas with no defined channel are assumed to have a minimum tailwater condition unless reliable flood stage elevations show otherwise.

Outlet pipe diameter, D_o (in.)	24
Tailwater depth (in.)	0
Minimum/Maximum tailwater?	Min TW (Fig. 8.06a)
Discharge (cfs)	16.52
Velocity (ft./s)	6.78

Step 2. Based on the tailwater conditions determined in step 1, enter Figure 8.06a or Figure 8.06b, and determine d_{50} riprap size and minimum apron length (L_a). The d_{50} size is the median stone size in a well-graded riprap apron.

Step 3. Determine apron width at the pipe outlet, the apron shape, and the apron width at the outlet end from the same figure used in Step 2.

	Minimum TW	Maximum TW
	Figure 8.06a	Figure 8.06b
Riprap d_{50}, (ft.)	0.55	
Minimum apron length, L_a (ft.)	11	
Apron width at pipe outlet (ft.)	6	6
Apron shape		
Apron width at outlet end (ft.)	13	2

Step 4. Determine the maximum stone diameter:

$$d_{max} = 1.5 \times d_{50}$$

	Minimum TW	Maximum TW
Max Stone Diameter, dmax (ft.)	0.825	0

Step 5. Determine the apron thickness:

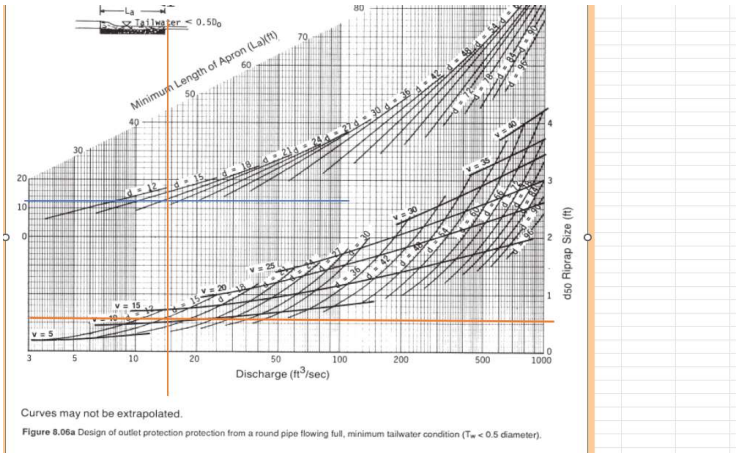
$$\text{Apron thickness} = 1.5 \times d_{max}$$

	Minimum TW	Maximum TW
Apron Thickness(ft.)	1.2375	0

Step 6. Fit the riprap apron to the site by making it level for the minimum length, L_a, from Figure 8.06a or Figure 8.06b. Extend the apron farther downstream and along channel banks until stability is assured. Keep the apron as straight as possible and align it with the flow of the receiving stream. Make any necessary alignment bends near the pipe outlet so that the entrance into the receiving stream is straight.

Some locations may require lining of the entire channel cross section to assure stability.

It may be necessary to increase the size of riprap where protection of the channel side slopes is necessary (*Appendix 8.05*). Where overfalls exist at pipe outlets or flows are excessive, a plunge pool should be considered, see page 8.06.8.



Curves may not be extrapolated.

Figure 8.06a Design of outlet protection protection from a round pipe flowing full, minimum tailwater condition (T_w < 0.5 diameter).

DESIGN OF RIPRAP OUTLET PROTECTION

User Input Data
Calculated Value
Reference Data

Designed By:	JWM	**Date:**	3/21/2022
Checked By:		**Date:**	
Company:	BGE		
Project Name:	PARKER RIDGE		
Project No.:	8430-03		

Site Location (City/Town)	Raleigh
Culvert Id.	101
Total Drainage Area (acres)	

Step 1. Determine the tailwater depth from channel characteristics below the pipe outlet for the design capacity of the pipe. If the tailwater depth is less than half the outlet pipe diameter, it is classified minimum tailwater condition. If it is greater than half the pipe diameter, it is classified maximum condition. Pipes that outlet onto wide flat areas with no defined channel are assumed to have a minimum tailwater condition unless reliable flood stage elevations show otherwise.

Outlet pipe diameter, D_o (in.)	30
Tailwater depth (in.)	0
Minimum/Maximum tailwater?	Min TW (Fig. 8.06a)
Discharge (cfs)	16.46
Velocity (ft./s)	12.75

Step 2. Based on the tailwater conditions determined in step 1, enter Figure 8.06a or Figure 8.06b, and determine d_{50} riprap size and minimum apron length (L_a). The d_{50} size is the median stone size in a well-graded riprap apron.

Step 3. Determine apron width at the pipe outlet, the apron shape, and the apron width at the outlet end from the same figure used in Step 2.

	Minimum TW	Maximum TW
	Figure 8.06a	Figure 8.06b
Riprap d_{50}, (ft.)	0.85	
Minimum apron length, L_a (ft.)	16	
Apron width at pipe outlet (ft.)	7.5	7.5
Apron shape		
Apron width at outlet end (ft.)	18.5	2.5

Step 4. Determine the maximum stone diameter:

$$d_{max} = 1.5 \times d_{50}$$

	Minimum TW	Maximum TW
Max Stone Diameter, dmax (ft.)	1.275	0

Step 5. Determine the apron thickness:

$$\text{Apron thickness} = 1.5 \times d_{max}$$

	Minimum TW	Maximum TW
Apron Thickness(ft.)	1.9125	0

Step 6. Fit the riprap apron to the site by making it level for the minimum length, L_a, from Figure 8.06a or Figure 8.06b. Extend the apron farther downstream and along channel banks until stability is assured. Keep the apron as straight as possible and align it with the flow of the receiving stream. Make any necessary alignment bends near the pipe outlet so that the entrance into the receiving stream is straight.

Some locations may require lining of the entire channel cross section to assure stability.

It may be necessary to increase the size of riprap where protection of the channel side slopes is necessary (*Appendix 8.05*). Where overfalls exist at pipe outlets or flows are excessive, a plunge pool should be considered, see page 8.06.8.