



**SPECK
ENGINEERING**

**8500 BETHEL ROAD
SHAWNEE, OK 74804**

EXHIBIT D

HEC ANALYSIS W/PROPOSED ROAD

HEC-RAS Plan: Road River: Prairie Creek Reach: Reach1

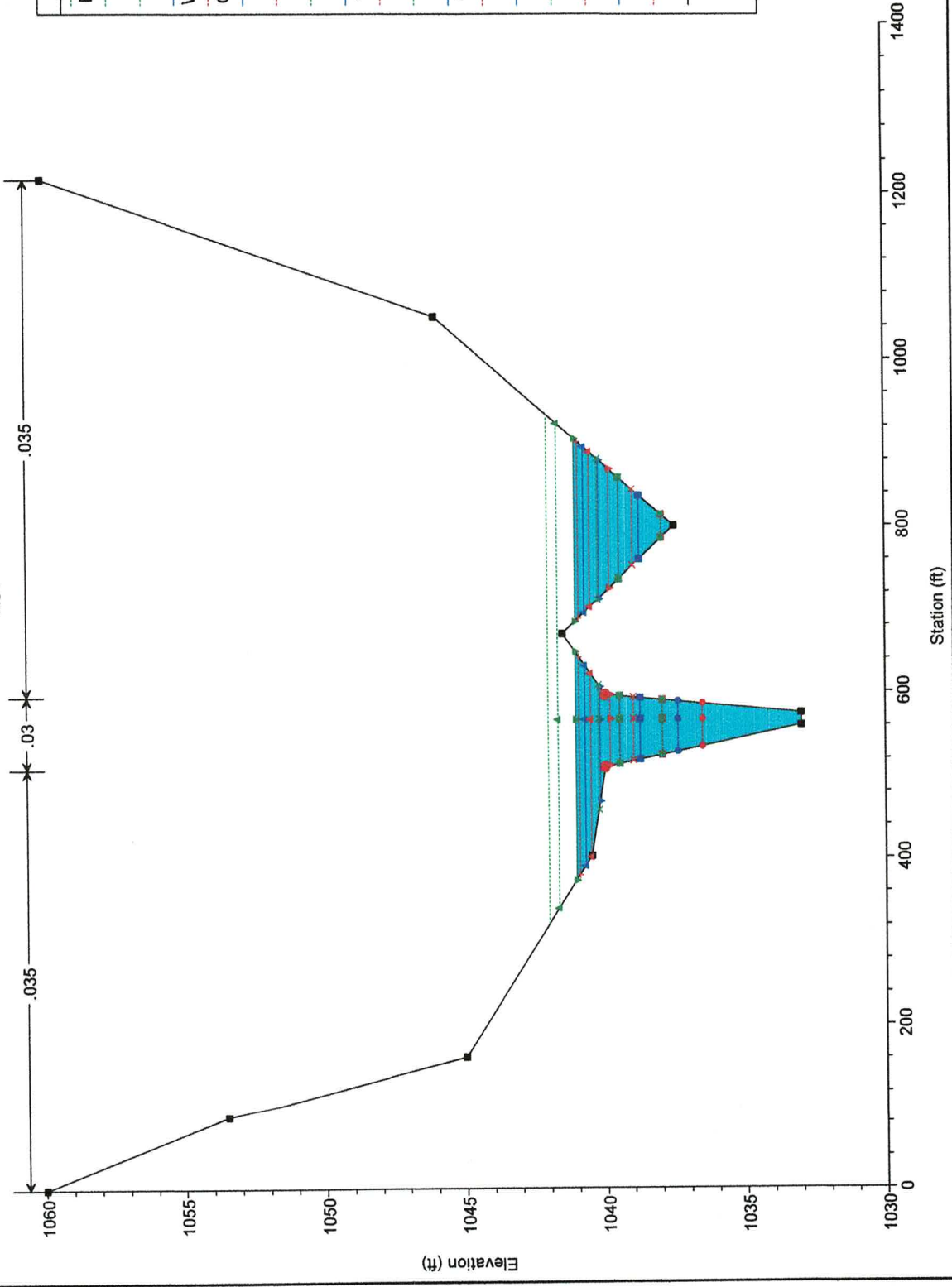
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach1	4383	100 yr	5870.00	1048.00	1056.18		1056.61	0.002928	9.00	1298.19	514.62	0.59
Reach1	4383	50yr	4990.00	1048.00	1055.84	1055.50	1056.29	0.003238	9.17	1125.39	508.56	0.62
Reach1	4383	25 yr	3780.00	1048.00	1055.19	1055.19	1055.85	0.004961	10.62	798.54	496.89	0.75
Reach1	4383	10 yr	2650.00	1048.00	1054.95		1055.40	0.003405	8.56	678.47	455.53	0.62
Reach1	4383	5 yr	1890.00	1048.00	1055.11		1055.30	0.001443	5.67	755.48	495.34	0.40
Reach1	4383	2 yr	1000.00	1048.00	1054.13	1053.75	1054.43	0.002043	6.02	344.03	366.13	0.47
Reach1	3069	100 yr	5870.00	1043.00	1051.58	1051.58	1052.24	0.003764	9.13	1353.11	902.45	0.69
Reach1	3069	50yr	4990.00	1043.00	1051.49	1051.49	1052.05	0.003201	8.32	1268.73	899.90	0.64
Reach1	3069	25 yr	3780.00	1043.00	1051.49	1051.27	1051.81	0.001830	6.29	1270.60	899.95	0.48
Reach1	3069	10 yr	2650.00	1043.00	1050.89	1050.89	1051.43	0.002697	7.06	751.93	774.65	0.57
Reach1	3069	5 yr	1890.00	1043.00	1049.48	1049.48	1051.27	0.009037	10.72	176.35	49.43	1.00
Reach1	3069	2 yr	1000.00	1043.00	1047.88	1047.88	1049.26	0.009834	9.42	106.11	38.47	1.00
Reach1	1858	100 yr	5870.00	1035.00	1047.47	1047.47	1048.39	0.002433	9.26	1221.34	697.03	0.57
Reach1	1858	50yr	4990.00	1035.00	1047.32	1047.32	1048.13	0.002099	8.49	1113.56	693.40	0.53
Reach1	1858	25 yr	3780.00	1035.00	1044.46	1044.46	1047.43	0.008381	13.84	273.14	46.58	1.01
Reach1	1858	10 yr	2650.00	1035.00	1044.16	1042.94	1045.78	0.004735	10.22	259.41	45.49	0.75
Reach1	1858	5 yr	1890.00	1035.00	1043.96		1044.85	0.002649	7.55	250.45	44.78	0.56
Reach1	1858	2 yr	1000.00	1035.00	1043.12		1043.46	0.001131	4.67	214.27	41.74	0.36
Reach1	535	100 yr	5870.00	1033.20	1044.84		1045.00	0.000636	4.77	2416.52	892.00	0.30
Reach1	535	50yr	4990.00	1033.20	1044.55		1044.71	0.000626	4.61	2157.47	882.36	0.30
Reach1	535	25 yr	3780.00	1033.20	1044.14		1044.29	0.000580	4.28	1797.71	868.80	0.28
Reach1	535	10 yr	2650.00	1033.20	1043.73		1043.86	0.000484	3.76	1447.27	855.39	0.25
Reach1	535	5 yr	1890.00	1033.20	1043.36		1043.48	0.000418	3.36	1136.13	843.30	0.23
Reach1	535	2 yr	1000.00	1033.20	1042.85		1042.90	0.000175	2.06	773.25	394.00	0.15
Reach1	370	100 yr	5870.00	1033.70	1044.78	1042.14	1044.91	0.000376	3.96	2521.32	674.21	0.24
Reach1	370	50yr	4990.00	1033.70	1044.50	1041.80	1044.62	0.000330	3.63	2337.94	658.14	0.22
Reach1	370	25 yr	3780.00	1033.70	1044.12	1041.07	1044.20	0.000252	3.08	2088.88	635.66	0.19
Reach1	370	10 yr	2650.00	1033.70	1043.74	1038.80	1043.79	0.000166	2.42	1851.68	606.68	0.15
Reach1	370	5 yr	1890.00	1033.70	1043.39	1037.85	1043.43	0.000112	1.93	1645.06	577.36	0.12
Reach1	370	2 yr	1000.00	1033.70	1042.86	1036.50	1042.87	0.000050	1.22	1350.58	532.79	0.08
Reach1	338		Culvert									
Reach1	313	100 yr	5870.00	1033.00	1042.72	1042.72	1043.65	0.003355	10.27	1116.13	531.50	0.62

HEC-RAS Plan: Road River: Prairie Creek Reach: Reach1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach1	313	50yr	4990.00	1033.00	1042.48	1042.48	1043.37	0.003152	9.76	988.86	508.52	0.60
Reach1	313	25 yr	3780.00	1033.00	1042.08	1042.08	1042.91	0.002822	8.94	794.04	471.18	0.56
Reach1	313	10 yr	2650.00	1033.00	1039.76	1039.76	1042.80	0.010020	13.98	189.60	32.88	1.03
Reach1	313	5 yr	1890.00	1033.00	1038.95	1038.61	1041.04	0.007926	11.58	163.17	32.30	0.91
Reach1	313	2 yr	1000.00	1033.00	1038.04		1038.90	0.004008	7.47	133.81	31.63	0.64
Reach1	100	100 yr	5870.00	1033.00	1041.04	1040.93	1042.02	0.003976	9.20	954.02	492.69	0.71
Reach1	100	50yr	4990.00	1033.00	1040.73	1040.53	1041.67	0.003982	8.82	807.00	440.99	0.71
Reach1	100	25 yr	3780.00	1033.00	1040.19	1039.81	1041.06	0.003976	8.15	602.59	303.79	0.69
Reach1	100	10 yr	2650.00	1033.00	1039.45	1038.97	1040.24	0.003978	7.54	427.79	201.85	0.68
Reach1	100	5 yr	1890.00	1033.00	1038.73	1037.95	1039.47	0.003983	7.05	302.13	150.33	0.67
Reach1	100	2 yr	1000.00	1033.00	1037.39	1036.52	1037.96	0.003979	6.06	165.10	60.18	0.64

City Submittal Plan: 1) Road 12/10/2024

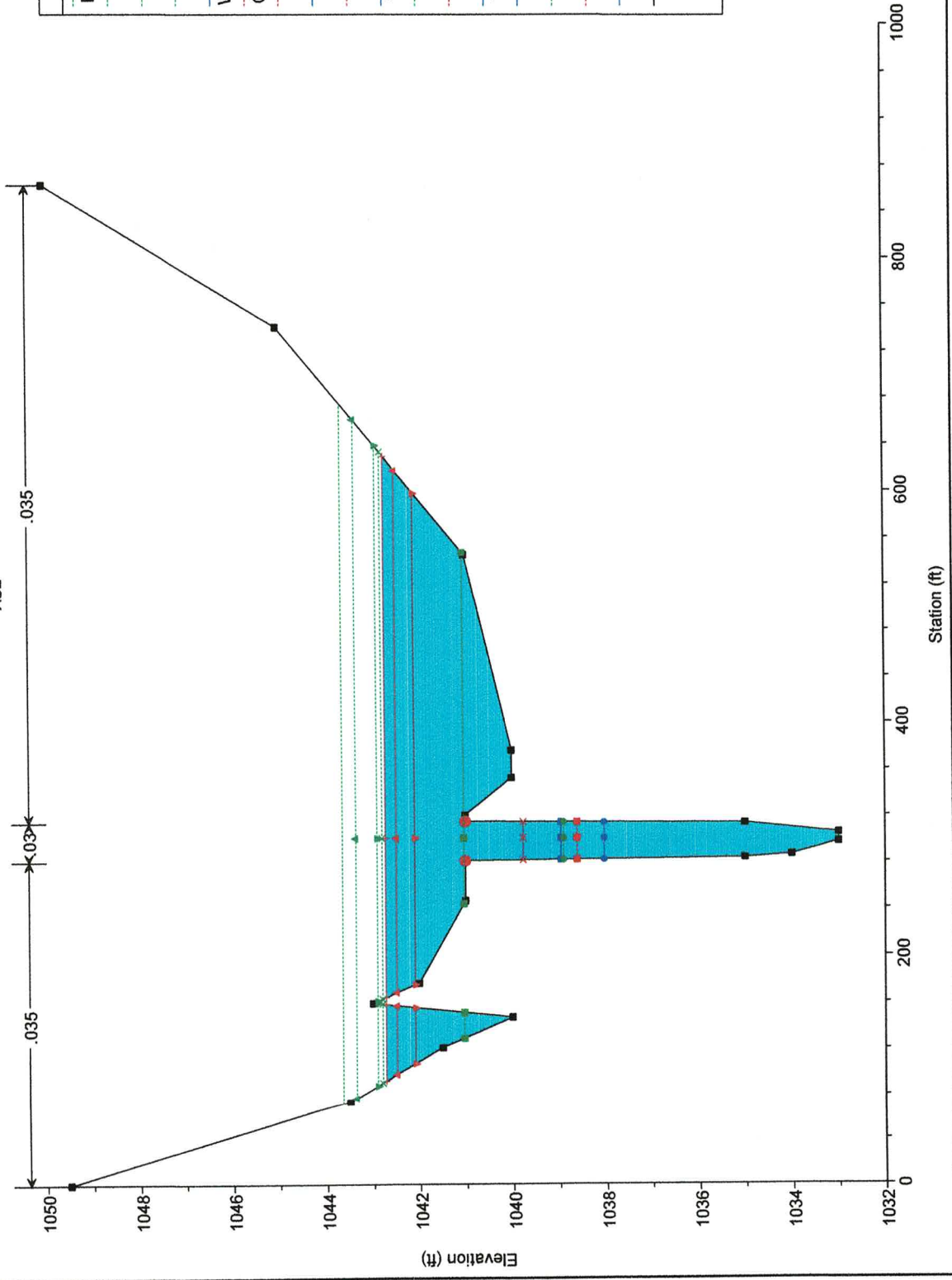
XS1



Legend	
EG 100 yr	▲
EG 50yr	▲
EG 25 yr	▲
WS 100 yr	▲
Crit 100 yr	▲
WS 50yr	▲
Crit 50yr	▲
EG 10 yr	▲
WS 25 yr	▲
Crit 25 yr	▲
EG 5 yr	▲
WS 10 yr	▲
Crit 10 yr	▲
WS 5 yr	▲
EG 2 yr	▲
Crit 5 yr	▲
WS 2 yr	▲
Crit 2 yr	▲
Ground	■
Bank Sta	●

City Submittal Plan: 1) Road 12/10/2024

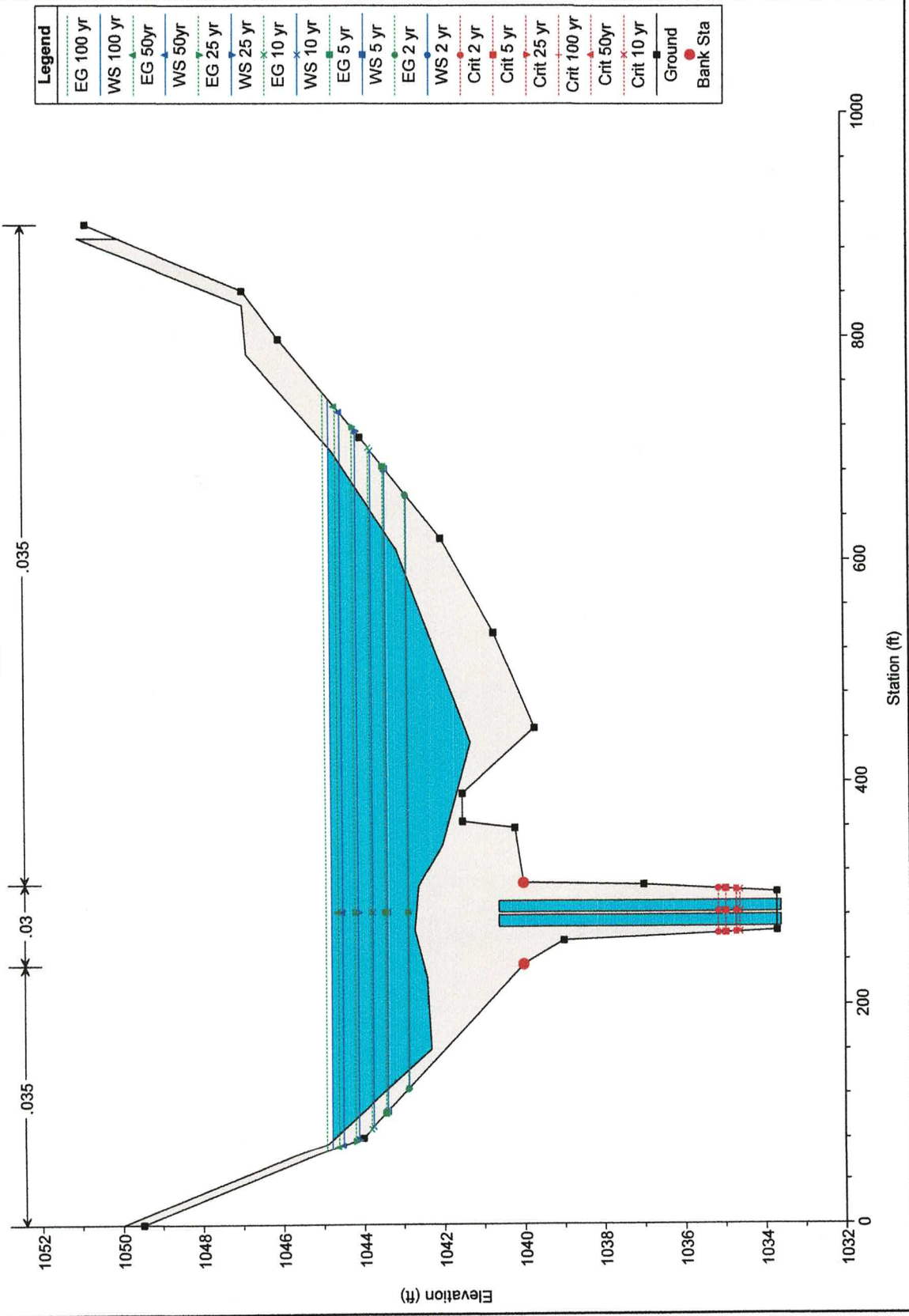
XS2



Legend	
EG 100 yr	▲
EG 50 yr	▲
EG 25 yr	▲
EG 10 yr	▲
WS 100 yr	▲
Crit 100 yr	▲
Crit 50 yr	▲
WS 50 yr	▲
Crit 25 yr	▲
WS 25 yr	▲
EG 5 yr	▲
Crit 10 yr	▲
WS 10 yr	▲
WS 5 yr	▲
EG 2 yr	▲
Crit 5 yr	▲
WS 2 yr	▲
Ground	■
Bank Sta	●

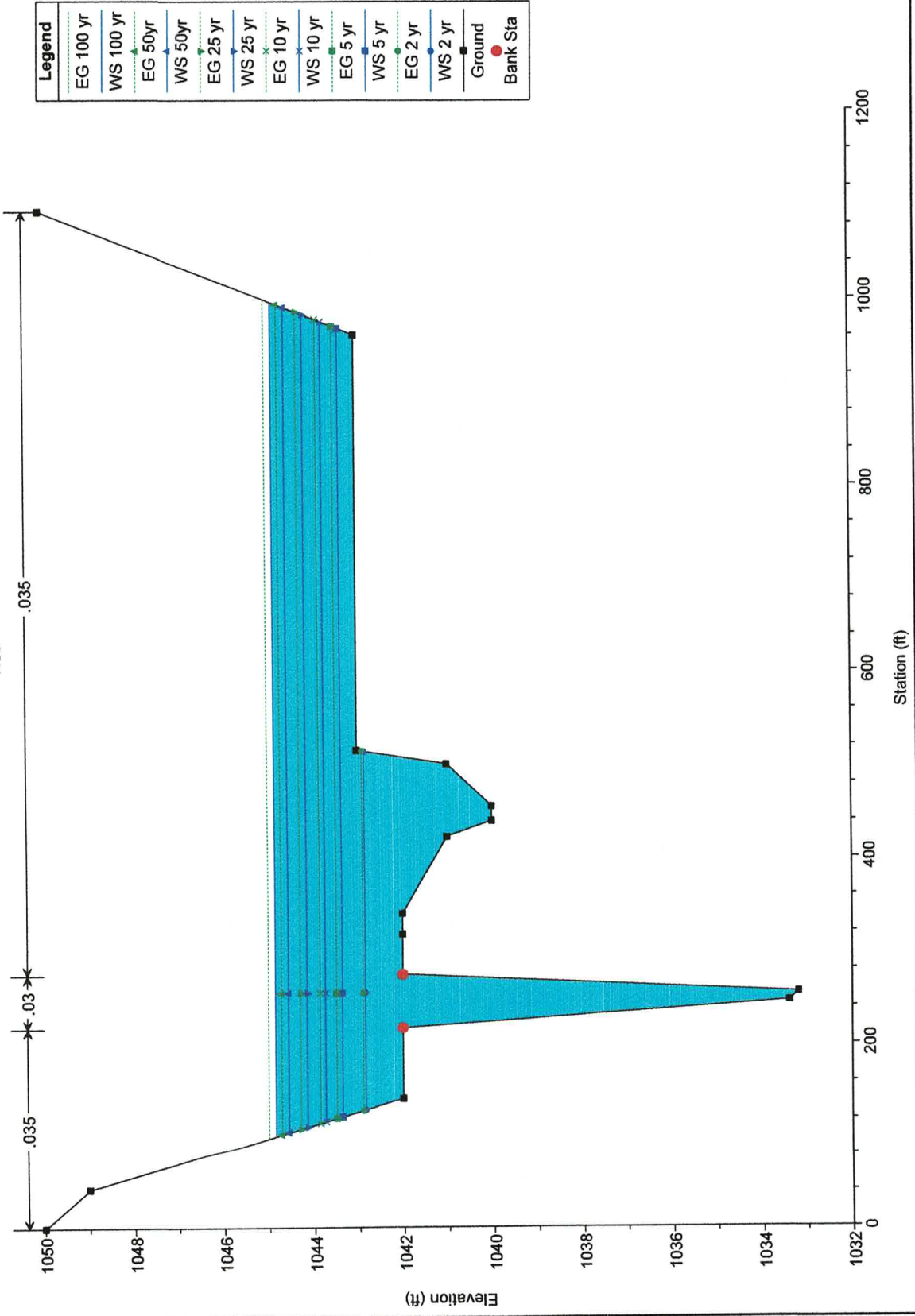
City Submittal Plan: 1) Road 12/10/2024

XS3



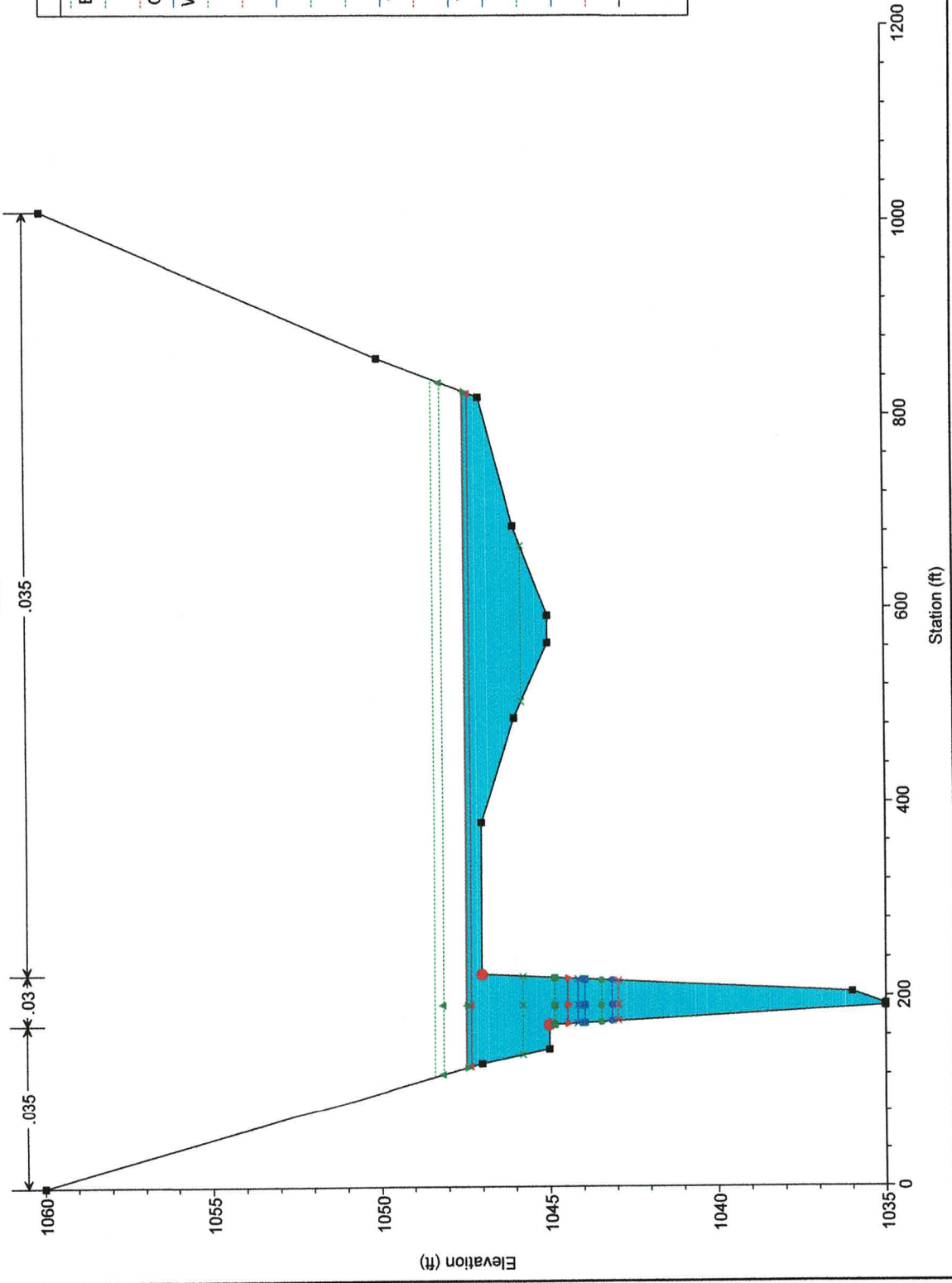
City Submittal Plan: 1) Road 12/10/2024

XS5

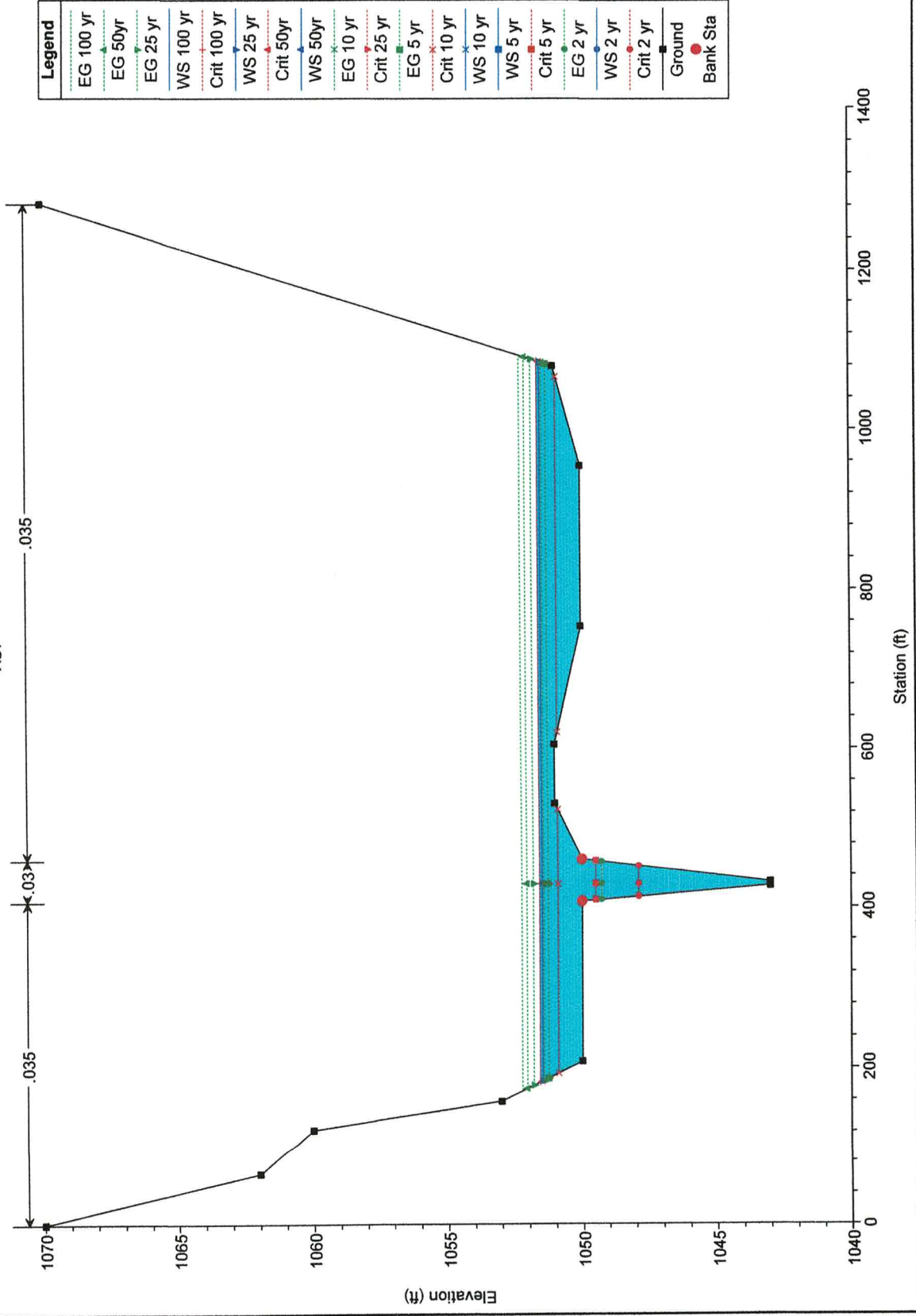


City Submittal Plan: 1) Road 12/10/2024

XS6

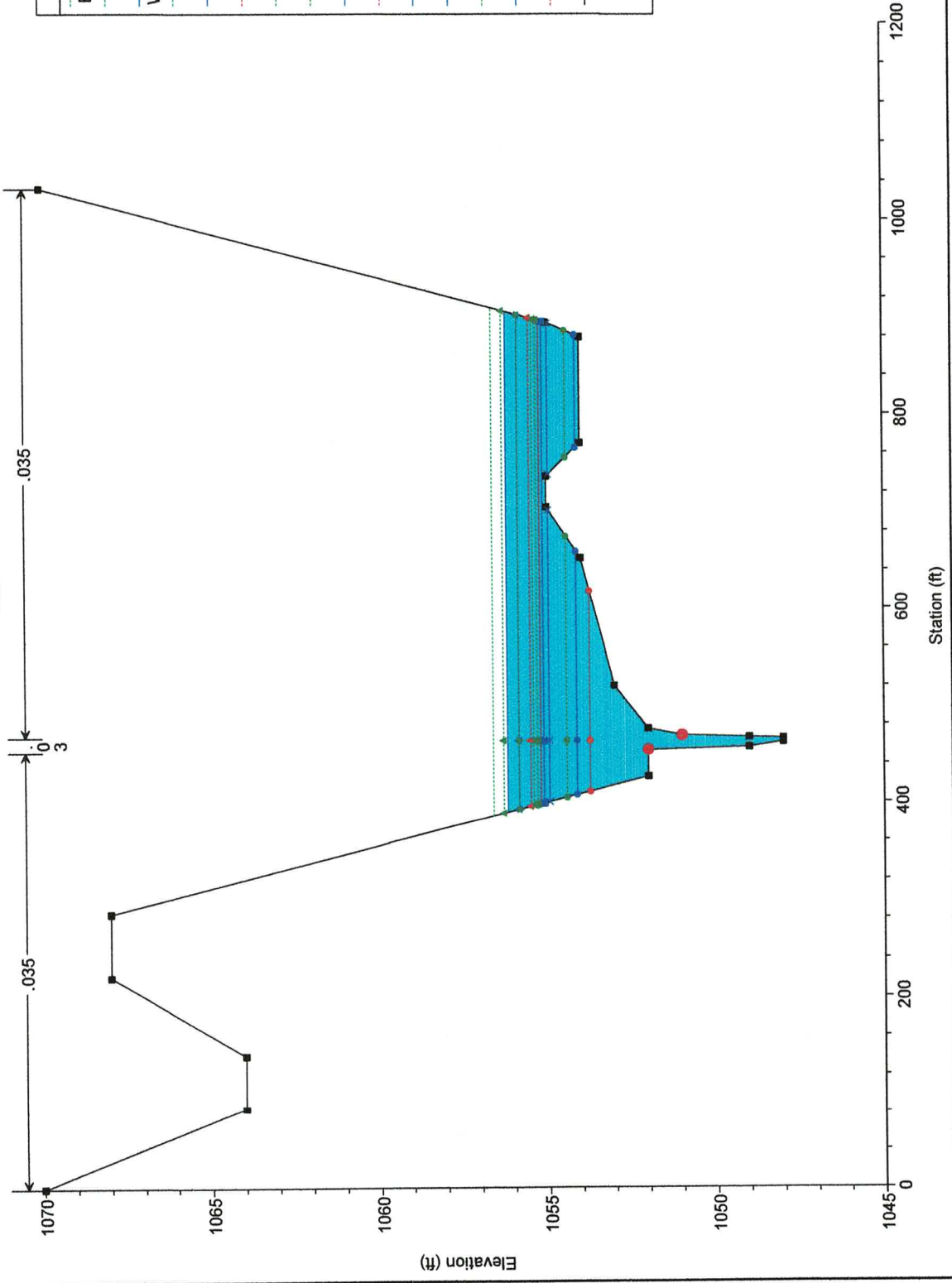


City Submittal Plan: 1) Road XS7 12/10/2024



City Submittal Plan: 1) Road 12/10/2024

XS8



Legend	
EG 100 yr	Blue line with upward-pointing triangle
EG 50 yr	Blue line with downward-pointing triangle
WS 100 yr	Green line with upward-pointing triangle
EG 25 yr	Blue line with downward-pointing triangle
WS 50 yr	Green line with downward-pointing triangle
Crit 50 yr	Red line with upward-pointing triangle
EG 10 yr	Blue line with downward-pointing triangle
EG 5 yr	Blue line with downward-pointing triangle
WS 25 yr	Green line with downward-pointing triangle
Crit 25 yr	Red line with downward-pointing triangle
WS 5 yr	Green line with downward-pointing triangle
WS 10 yr	Green line with downward-pointing triangle
EG 2 yr	Blue line with downward-pointing triangle
WS 2 yr	Green line with downward-pointing triangle
Crit 2 yr	Red line with downward-pointing triangle
Ground	Black line with square
Bank Sta	Red dot