

POTENTIAL ROCK EXCAVATION MAY OCCUR. CONTRACTOR TO FIELD VERIFY PRIOR TO EXCAVATION AND UTILITY INSTALLATION. SHOULD ROCK BE ENCOUNTERED, NOTIFY CLAYCO PRIOR TO COMMENCEMENT OF CONSTRUCTION.

STORM SEWER PROFILES
SCALE: HORIZ: 1"=40'
VERT: 1"=10'

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FES #1 - SECTION A-A

FIND DEPTH OF WATER AND WIDTH OF THE CHANNEL:

INPUT:
Top of bank Elevation = 539.47
Bot. Elevation = 537.47
Stream Slope = 0.01 (ft/ft)
Side Slope = 3
n = 0.04
Horizontal (H) = 3
Vertical (V) = 1
W (Bottom width) = 2 (ft)

OUTPUT:
Depth = 0.93 (ft)
Velocity = 2.55 (ft/sec)
Water Surface Elev. = 538.49
Free Board = 1.07 (ft)

Water Surface Width = 7.56 (ft)
R² = 0.68
Perimeter = 7.86 (ft)
Cross section Area = 4.43 (ft²)

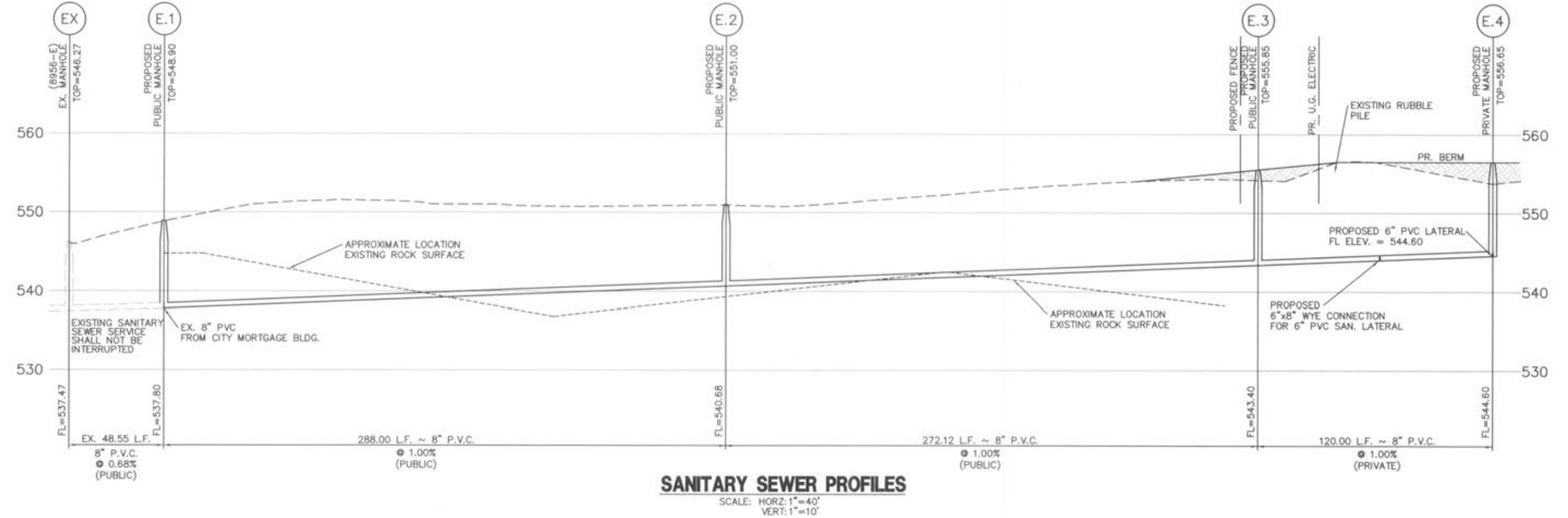
FES #6 - SECTION A-A

FIND DEPTH OF WATER AND WIDTH OF THE CHANNEL:

INPUT:
Top of bank Elevation = 538.47
Bot. Elevation = 537.47
Stream Slope = 0.01 (ft/ft)
Side Slope = 3
n = 0.04
Horizontal (H) = 3
Vertical (V) = 1
W (Bottom width) = 2 (ft)

OUTPUT:
Depth = 0.42 (ft)
Velocity = 1.65 (ft/sec)
Water Surface Elev. = 537.89
Free Board = 0.59 (ft)

Water Surface Width = 4.49 (ft)
R² = 0.44
Perimeter = 4.63 (ft)
Cross section Area = 1.39 (ft²)



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SANITARY SEWER PROFILES
SCALE: HORIZ: 1"=40'
VERT: 1"=10'

LINETYPE LEGEND

- EXISTING GRADE: - - - - -
- PROPOSED GRADE: - . - . - . -
- HYDRAULIC GRADE: - - - - -
- PROPOSED PAVEMENT: [hatched pattern]
- GRANULAR BACKFILL: [stippled pattern]
- COMPACTED FILL: [cross-hatched pattern]

STORM SEWER NOTE

ALL DETAILS SHOWN ON THIS SHEET ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE DETAILS ARE TO BE VERIFIED PER METROPOLITAN ST. LOUIS SEWER DISTRICT STANDARDS FOR STORM SEWERS, & CITY OF OFALLON CONSTRUCTION SPECIFICATIONS. ALL METHODS, MEANS AND MATERIALS SHALL CONFORM TO M.S.D. CURRENT STANDARD CONSTRUCTION SPECIFICATIONS.

SANITARY SEWER NOTE

ALL DETAILS SHOWN ON THIS SHEET ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE DETAILS ARE TO BE VERIFIED PER DUCKETT CREEK SANITARY SEWER DISTRICT STANDARDS FOR SANITARY SEWERS, & CITY OF OFALLON CONSTRUCTION SPECIFICATIONS. ALL METHODS, MEANS AND MATERIALS SHALL CONFORM TO D.C.S.D. CURRENT STANDARD CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION NOTES:

- ALL R.C.P. SHALL BE CLASS III UNLESS NOTED OTHERWISE.
- ALL P.V.C. SHALL BE SDR 35 UNLESS NOTED OTHERWISE.

ALL SEWERS SHOWN ARE PRIVATE, UNLESS OTHERWISE NOTED. ENGINEER APPROVED SHOP DRAWINGS MUST BE SUBMITTED TO THE CITY OF OFALLON AND/OR DUCKETT CREEK SANITARY SEWER DISTRICT.

Project name:		Centene Data Center		Calculated By:		J.M.B.																					
Project number:		209-4511		Checked By:		G.M.S.																					
Project Location:		O'Fallon, Missouri		Date:		5/24/2010																					
LINE		FLOW LINE		Bend Coefficients:		Revisions:																					
ELEVATIONS																											
Structure Number	Upper structure	Lower structure	Upper structure	Lower structure	Length (ft)	Flowline Grade (ft/ft)	Pipe Size (in.)	Full Flow Cap. (cfs)	Total (Q) (cfs)	Mean Full Flow Vel (V) (ft/s)	Bend Coef.	Curve Coef.	Velocity Head (V _h) (ft)	QV _h (ft ³ /s)	Pipe Coef. (n)	H _f (ft)	Junction (ft)	Bend (ft)	Curve (ft)	Total H _{tot} (ft)	Upper F.L. + Dia. (ft)	Lower H.L. + H _f (ft)	Lower H.L. (ft)	Structure H.L. + H _{tot} (ft)	TOP Structure Elevation	Free Board	Structure Number
8	8	7	543.50	543.19	15.53	0.0200	12	5.05	2.22	2.83	0.00	0.00	0.12	0.28	0.013	0.06	0.17	0.17	0.00	0.34	544.50	544.25	544.19	544.84	548.00	3.16	8
7	7	6	538.73	538.00	36.66	0.0199	12	5.04	2.22	2.83	0.40	0.00	0.12	0.28	0.013	0.14	0.00	0.05	0.05	0.00	0.05	539.14	539.00	539.78	547.50	7.72	7
6	6		538.00																								6
ASSUME TOP OF PIPE =																											
4	4	3	542.59	540.10	249.01	0.0100	18	10.53	6.66	3.77	0.00	0.00	0.22	1.47	0.013	1.00	0.29	0.31	0.00	0.60	544.09	542.60	541.60	544.69	551.25	6.56	4
3	3	2	539.90	538.87	103.07	0.0100	21	15.88	11.14	4.63	0.00	0.00	0.33	3.71	0.013	0.51	0.27	0.47	0.00	0.73	541.65	541.13	540.62	542.38	548.00	5.62	3
2	2	1	538.67	537.47	120.16	0.0100	21	15.88	11.29	4.69	0.30	0.00	0.34	3.86	0.013	0.61	0.02	0.10	0.00	0.12	540.42	540.00	539.39	540.54	550.17	9.63	2
1	1		537.47																								1
ASSUME 100 YR POND HGL =																											
5	5	3	541.00	540.10	27.29	0.0330	12	6.49	4.48	5.70	0.70	0.00	0.51	2.26	0.013	0.43	0.67	0.35	0.00	1.03	542.00	542.81	542.38	543.84	548.42	4.58	5
3	3		540.10																								3
STRUCTURE #3 =																											

MEAN FULL FLOW VELOCITY = Q_{ACT} / A_{PIPE}

FRICITION LOSS (H_f): $H_f = 2.87 n^2 (L V^n / d^{4.75})$

VELOCITY HEAD: $V_h = V^2 / 2g$

JUNCTION LOSSES (JUNC.) = $[Q_{out} V_{h,out} - \sum (Q_{in} V_{h,in})] \times 1.33 / [Q_{out}]$

BEND LOSSES (BEND) = $(V^n) \times \text{ANGLE COEFFICIENT}$

CURVE LOSS = $V_h \times \text{CURVE COEFFICIENT}$

- Note:
- IF MORE THAN ONE INCOMING LINE, CALC. EACH BEND LOSS AND ADD TOGETHER.
 - NO STRUCTURE LOSSES TO BE CALCULATED AT A DROP
 - IF $QV_{(min)} > QV_{(out)}$, NO JUNCTION LOSSES TO BE CALCULATED.

- 5 2010-11-03 FOR PERMIT
- 4 2010-07-21 REVISED PER CITY & PWS COMMENTS
- 3 2010-06-30 REVISED PER CITY COMMENTS
- 2 2010-16-09 PROGRESS PRINTING #2
- 1 2010-05-24 REVISED PER SEWER DISTRICT COMMENTS



SEWER PROFILES
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NOV. 3, 2010

GEORGE M. STOCK E-25116
CIVIL ENGINEER
CERTIFICATE OF AUTHORITY
NUMBER: 000996

DRAWN BY: J.M.B. DATE: 05/07/10
CHECKED BY: G.M.S. DATE: 05/07/10
JOB NUMBER: 209-4511
SHEET: C11 of 21