ISSUE REMARKS/DATE
1 1-9-13 REVISED PER CITY COMMENTS
2 2-7-13 REVISED PER CITY COMMENTS
3 3-20-13 REVISED PER CITY COMMENTS
4 4-9-13 REVISED PER CITY COMMENTS

15 YEAR HYDRAULICS

15 YEAR, 20 MINUTE HYDRAULICS — Rim-Hw = Freeboard for Upper (Right) Structure from LineID Column

LineNo.	LineID	FlowRate	LineSize	InvertDn	InvertUp	LineSlope	LineLength	HGLDn	HGLUp	n-valuePipe	Grnd/RimElev Dn	Grnd/RimElev Up	Rim-Hw	EGLDn	EGLUp	CriticalDepth	CapacityFull	DnStrmLine No.	EnergyLoss	KnownQ	VelDn	VelHd Up	VelAve	VelHd Dn	Inlet Capacity
		(cfs)	(in)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		(ft)	(cfs)	(ft/s)	(ft)	(ft/s)	(ft)	(cfs)
1	FES-17 to AI-18	7.93	18	522.00	523.14	1.5	76	526.08	526.51	0.01	525.50	529.00	2.36	526.39	526.83	1.07	12.86	Outfall	0.43	0.3	4.49	0.31	4.49	0.31	4
2	AI-18 to AI-19	7.63	18	523.34	524.20	1.51	57.04	526.67	526.97	0.01	529.00	529.70	2.56	526.96	527.26	1.05	12.89	1.00	0.30	0.4	4.32	0.29	4.32	0.29	4
3	AI-19 to AI-20	7.23	18	524.40	526.30	1.72	110.5	527.17	527.63	0.01	529.70	531.70	3.77	527.43	527.93	1.03	13.77	2.00	0.50	0.23	4.09	0.29	4.22	0.26	4
4	AI-20 to GI-25	2.26	15	526.50	530.79	4	107.22	528.17	531.39 j	0.01	531.70	537.43	6.04	528.22	531.62	0.60	12.92	3.00	0.37	1.17	1.84	0.23	2.85	0.05	1.44
5	GI-25 to GI-26	1.09	15	532.79	533.01	1	22	533.14	533.43	0.01	537.43	537.43	3.86	533.38	533.57	0.42	6.46	4.00	0.16	1.09	3.91	0.14	3.46	0.24	1.44
6	AI-20 to AI-20.1	4.74	15	526.50	528.88	3.5	68	527.99	529.75 j	0.01	531.70	534.00	4.25	528.22	530.17	0.87	12.08	3.00	0.45	0.69	3.86	0.42	4.53	0.23	4
7	AI-20.1 to AI-21	4.05	15	529.08	541.27	7	174.16	530	542.08 j	0.01	534.00	547.70	5.62	530.27	542.44	0.81	17.08	6.00	1.04	1.4	4.18	0.36	4.51	0.27	4
8	AI-21 to GI-22	2.65	15	542.72	543.86	1	114	543.28	544.51	0.01	547.70	549.91	5.40	543.67	544.77	0.65	6.46	7.00	0.90	1.06	5	0.26	4.55	0.39	1.42
9	GI-22 to GI-23	1.59	15	544.06	544.28	1	22	544.75	544.78 j	0.01	549.91	549.91	5.13	544.83	544.97	0.50	6.46	8.00	0.08	1.12	2.3	0.18	2.86	0.08	1.42
10	GI-23 to AI-24	0.47	12	544.48	544.98	1	50	544.96	545.27 j	0.01	549.91	549.60	4.33	544.99	545.37	0.29	3.56	9.00	0.15	0.47	1.26	0.10	1.87	0.02	4
11	FES-9 to MH-9.1	7.72	18	524.00	524.35	1	35	526.08	526.27	0.01	525.50	534.00	7.69	526.38	526.57	1.06	10.50	Outfall	0.19	0	4.37	0.30	4.37	0.30	
12	MH-9.1 to GI-10	7.72	15	526.82	528.32	3	50	527.58	529.50	0.01	534.00	534.27	4.67	529.09	530.14	1.10	11.18	11.00	1.06	2.06	9.83	0.64	8.13	1.50	2.5
13	GI-10 to GI-11	5.66	15	528.52	528.74	1	22	529.86	529.99	0.01	534.27	534.27	4.15	530.19	530.32	0.95	6.46	12.00	0.17	1.61	4.61	0.33	4.61	0.33	2.5
14	GI-11 to MH-12	4.05	15	528.94	529.38	1	44	530.29	530.41	0.01	534.27	535.70	5.16	530.46	530.63	0.81	6.46	13.00	0.17	0	3.3	0.22	3.52	0.17	
15	MH-12 to AI-13	4.05	15	529.58	530.45	1	87	530.59	531.26 j	0.01	535.70	534.70	3.44	530.82	531.62	0.81	6.46	14.00	0.48	1.56	3.82	0.36	4.33	0.23	4
16	AI-13 to AI-14	1.43	12	530.65	532.21	2	78	531.57	532.72 j	0.01	534.70	537.70	4.98	531.62	532.92	0.51	5.04	15.00	0.29	0.92	1.89	0.20	2.73	0.06	4
17	AI-14 to AI-15	0.51	12	532.41	538.31	5	118	532.91	538.61 j	0.01	537.70	544.20	5.59	532.94	538.71	0.30	7.96	16.00	0.35	0.51	1.3	0.10	1.92	0.03	4
18	AI-13 to AI-16	1.06	12	530.65	534.34	4.5	82	531.59	534.78 j	0.01	534.70	539.40	4.62	531.62	534.94	0.44	7.55	15.00	0.26	1.06	1.38	0.16	2.30	0.03	4
19	FES-4 to AI-5	3.37	15	524.00	524.24	1	24	526.08	526.15	0.01	525.25	529.00	2.78	526.20	526.26	0.73	6.46	Outfall	0.07	0.31	2.75	0.12	2.75	0.12	4
20	AI-5 to AI-6	3.06	15	524.44	529.72	6	88	526.24	530.42 j	0.01	529.00	535.70	5.28	526.34	530.71	0.70	15.82	19.00	0.37	0.4	2.49	0.29	3.41	0.10	4
21	AI-6 to GI-7	2.66	15	529.92	536.28	6	106	530.64	536.93 j	0.01	535.70	541.24	4.31	530.84	537.19	0.65	15.82	20.00	0.54	1.52	3.65	0.26	3.87	0.21	1.42
22	GI-7 to GI-8	1.14	15	536.48	536.92	1.99	22.06	537.18	537.35 j	0.01	541.24	541.11	3.76	537.22	537.49	0.43	9.12	21.00	0.06	1.14	1.61	0.15	2.34	0.04	1.42
23	FES-1 to MH-2	20.26	24	517.5	517.7	1	20	519.5	519.64	0.01	519.50	523.00	2.91	520.15	520.30	1.59	22.62	Outfall	0.15	0	6.45	0.66	6.48	0.65	
24	MH-2 to OS-3	20.26	24	517.9	518.5	1.2	50	520.11	520.50	0.01	523.00	526.62	5.48	520.75	521.14	1.59	24.78	23.00	0.39	20.26	6.45	0.65	6.45	0.65	

EMERGENCY RELIEF SWALE – HYDRAULIC CALCULATIONS

EMERGENCY RELIEF SWALE BETWEEN LOTS 19 & 20
15 YEAR, 20 MINUTE HYDRAULIC CALCULATION

FLOWLINE OF 4' WIDE FLAT BOTTOM SWALE WITH 5:1 SIDE SLOPES – 535.2

Given Input Data:
- Flowrate ..... 7.72 cfs
- Slope ..... 0.0100 ft/ft
- Manning's n 0.03
- Bottom width ..... 48.00 in
- Left slope 5:1
- Right slope 5:1

Computed Results:
- Depth ..... 5.85 in OR 0.49 ft
- Velocity ..... 2.46 fps
- Flow area 3.14 ft2
- Wetted perimeter ..... 8.97 ft
- Top width ..... 8.88 ft

15 YR. 20 MIN. HIGHWATER = 535.2 + 0.49 = 535.69

EMERGENCY RELIEF SWALE BETWEEN LOTS 44 & 45
15 YEAR, 20 MINUTE HYDRAULIC CALCULATION

FLOWLINE OF 4' WIDE FLAT BOTTOM SWALE WITH 5:1 SIDE SLOPES – 535.6

Given Input Data:
- Flowrate ..... 4.05 cfs
- Slope ..... 0.0100 ft/ft
- Manning's n 0.03
- Bottom width ..... 48.00 in
- Left slope 5:1
- Right slope 5:1

Computed Results:
- Depth ..... 4.16 in OR 0.35 ft
- Velocity ..... 2.04 fps
- Flow area 1.99 ft2
- Wetted perimeter ..... 7.54 ft
- Top width ..... 7.47 ft

15 YR. 20 MIN. HIGHWATER = 535.6 + 0.35 = 535.95

EMERGENCY RELIEF SWALE BY LOT 55
15 YEAR, 20 MINUTE HYDRAULIC CALCULATION

FLOWLINE OF 2' WIDE FLAT BOTTOM SWALE WITH 5:1 SIDE SLOPES – 549.6

Given Input Data:
- Flowrate ..... 0.47 cfs
- Slope ..... 0.0100 ft/ft
- Manning's n 0.03
- Bottom width ..... 24.00 in
- Left slope 5:1
- Right slope 5:1

Computed Results:
- Depth ..... 1.76 in OR 0.15 ft
- Velocity ..... 1.17 fps
- Flow area 0.40 ft2
- Wetted perimeter ..... 3.50 ft
- Top width ..... 3.47 ft

15 YR. 20 MIN. HIGHWATER = 549.6 + 0.15 = 549.75

RETAINING WALL SWALE – HYDRAULIC CALCULATION

SWALE BEHIND RETAINING WALLS
15 YEAR, 20 MINUTE HYDRAULIC CALCULATION

V-BOTTOM SWALE WITH 3:1 SIDE SLOPES

Given Input Data:
- Flowrate ..... 0.50 cfs (max. flow rate)
- Slope ..... 0.0200 ft/ft
- Manning's n 0.03
- Bottom width ..... 0.00 in
- Left slope 3:1
- Right slope 3:1

Computed Results:
- Depth ..... 3.56 in OR 0.30 ft
- Velocity ..... 1.89 fps
- Flow area 0.26 ft2
- Wetted perimeter ..... 22.5 in
- Top width ..... 21.4 in

PROJECT TITLE
WEATHERBY LANDING
O'FALLON, MISSOURI

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HYDRAULIC CALCULATIONS

P+Z No. 1305.05
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Date: 11/12/2012
Job No. 12-05-127

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