



# DITCH ANALYSIS

**PID :** 95358      **Date :** 04/22/2015      **Project :** LOR-82-Drainage Study      **Location :** Columbia Station, OH

**Description :** Open Ditch LT Side (North) from Columbia Airport to Plum Creek (2:1 Slopes)

**Designer :** SJD

**Rainfall Area :** A

**Allowable Shears**

	<b>Seed:</b>	0.40	<b>Jute Mat:</b>	0.45	<b>Temporary Mat:</b>	1.00
<b>Permanent Mat</b>	<b>Type 1:</b>	2.00	<b>Type 2:</b>	3.00	<b>Type 3:</b>	5.00
<b>RCP</b>	<b>Type B:</b>	6.00				

(\*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
549+41	550+04	L	62.00	2.00	2.00	2.00	0.0025	0.52	0.52	0.56	0.29	Seed	3.51	5	0.030	15.99	1.04	0.06	1.02	0.36	3.44
												Seed	4.04	10	0.040	16.16	0.88	0.07	1.18	0.46	3.83
550+04	552+06	L	203.00	2.00	2.00	2.00	0.0025	0.10	0.62	0.59	0.35	Seed	3.20	5	0.030	19.07	1.06	0.06	1.12	0.38	3.53
												Seed	3.61	10	0.040	19.79	0.91	0.07	1.26	0.47	3.89
552+06	557+67	L	554.00	2.00	2.00	2.00	0.0025	0.56	1.18	0.59	0.68	Seed	2.66	5	0.030	26.21	1.23	0.08	1.81	0.49	3.98
												Seed	2.90	10	0.040	28.28	1.02	0.09	1.97	0.60	4.41
557+67	559+50	L	189.00	2.00	2.00	2.00	0.0025	3.17	4.35	0.65	2.74	Seed	2.18	5	0.030	35.39	1.71	0.14	5.98	0.91	5.65
												Seed	2.48	10	0.040	35.74	1.43	0.17	6.81	1.12	6.48
559+50	560+10	L	60.00	2.00	2.00	2.00	0.0025	1.78	6.13	0.65	3.90	Seed	2.16	5	0.030	35.93	1.87	0.17	8.42	1.08	6.32
												Seed	2.45	10	0.040	36.38	1.56	0.21	9.57	1.32	7.27
560+10	560+98	L	88.00	2.00	2.00	2.00	0.0025	8.12	14.25	0.54	8.28	Seed	1.60	5	0.030	53.78	2.11	0.21	13.22	1.34	7.36
												Seed	1.86	10	0.040	53.92	1.77	0.26	15.38	1.64	8.57
560+98	561+51	L	52.00	2.00	2.00	2.00	0.0025	0.19	14.44	0.58	8.39	Seed	1.59	5	0.030	54.19	2.11	0.21	13.32	1.35	7.38



# DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Seed	1.84	10	0.040	54.41	1.77	0.26	15.48	1.65	8.60
561+51	563+38	L	187.00	2.00	2.00	2.00	0.0025	5.95	20.39	0.53	11.55	Seed	1.56	5	0.030	55.55	2.28	0.24	17.97	1.55	8.19
												Seed	1.80	10	0.040	56.03	1.91	0.29	20.84	1.89	9.55
563+38	564+45	L	107.00	2.00	2.00	2.00	0.0025	0.73	21.12	0.75	12.09	Seed	1.54	5	0.030	56.33	2.30	0.25	18.61	1.57	8.29
												Seed	1.78	10	0.040	56.95	1.93	0.30	21.57	1.92	9.67
564+45	566+53	L	208.00	2.00	2.00	2.00	0.0025	0.21	21.33	0.66	12.23	Seed	1.51	5	0.030	57.83	2.30	0.24	18.43	1.57	8.26
												Seed	1.74	10	0.040	58.74	1.92	0.30	21.32	1.91	9.63
566+53	567+46	L	93.00	2.00	2.00	2.00	0.0025	3.63	24.96	0.59	14.37	Seed	1.49	5	0.030	58.48	2.39	0.26	21.47	1.68	8.71
												Seed	1.73	10	0.040	59.52	2.00	0.32	24.81	2.04	10.16
567+46	570+64	L	318.00	2.00	2.00	2.00	0.0025	1.24	26.20	0.66	15.19	Seed	1.45	5	0.030	60.67	2.40	0.26	22.02	1.70	8.79
												Seed	1.67	10	0.040	62.13	2.01	0.32	25.39	2.06	10.25
570+64	573+82	L	318.00	2.00	2.00	2.00	0.0025	2.49	28.69	0.56	16.59	Seed	1.41	5	0.030	62.82	2.44	0.27	23.37	1.74	8.98
												Seed	1.62	10	0.040	64.71	2.04	0.33	26.88	2.12	10.46
573+82	574+77	L	95.00	2.00	2.00	2.00	0.0025	1.40	30.09	0.59	17.41	Seed	1.40	5	0.030	63.46	2.46	0.28	24.32	1.78	9.11
												Seed	1.61	10	0.040	65.48	2.06	0.34	27.97	2.15	10.61
574+77	576+29	L	152.00	2.00	2.00	2.00	0.0025	0.38	30.47	0.56	17.63	Seed	1.38	5	0.030	64.49	2.46	0.28	24.30	1.78	9.11
												Seed	1.58	10	0.040	66.70	2.06	0.34	27.92	2.15	10.60
576+29	577+06	L	77.00	2.00	2.00	2.00	0.0025	0.44	30.91	0.58	17.88	Seed	1.37	5	0.030	65.01	2.47	0.28	24.49	1.78	9.13
												Seed	1.57	10	0.040	67.32	2.06	0.34	28.12	2.16	10.63
577+06	577+77	L	71.00	2.00	2.00	2.00	0.0025	0.17	31.08	0.62	17.99	Seed	1.36	5	0.030	65.49	2.47	0.28	24.48	1.78	9.13



# DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Seed	1.56	10	0.040	67.90	2.06	0.34	28.11	2.16	10.63
577+77	578+50	L	73.00	2.00	2.00	2.00	0.0025	0.16	31.24	0.60	18.08	Seed	1.35	5	0.030	65.98	2.47	0.28	24.46	1.78	9.13
												Seed	1.55	10	0.040	68.49	2.06	0.34	28.07	2.16	10.63
578+50	579+33	L	83.00	2.00	2.00	2.00	0.0025	0.13	31.37	0.62	18.16	Seed	1.34	5	0.030	66.54	2.47	0.28	24.40	1.78	9.12
												Seed	1.54	10	0.040	69.16	2.06	0.34	27.99	2.15	10.62
579+33	579+99	L	66.00	2.00	2.00	2.00	0.0025	0.13	31.50	0.69	18.25	Seed	1.34	5	0.030	66.99	2.47	0.28	24.38	1.78	9.12
												Seed	1.53	10	0.040	69.69	2.06	0.34	27.96	2.15	10.61
579+99	580+79	L	80.00	2.00	2.00	2.00	0.0025	0.19	31.69	0.65	18.38	Seed	1.33	5	0.030	67.52	2.47	0.28	24.38	1.78	9.12
												Seed	1.52	10	0.040	70.34	2.06	0.34	27.95	2.15	10.61
580+79	581+62	L	83.00	2.00	2.00	2.00	0.0025	0.18	31.87	0.69	18.50	Seed	1.32	5	0.030	68.08	2.47	0.28	24.38	1.78	9.12
												Seed	1.51	10	0.040	71.01	2.06	0.34	27.94	2.15	10.61
581+62	583+91	L	229.00	2.00	2.00	2.00	0.0025	0.46	32.33	0.71	18.83	Seed	1.29	5	0.030	69.63	2.47	0.28	24.35	1.78	9.11
												Seed	1.48	10	0.040	72.85	2.06	0.34	27.88	2.15	10.60
583+91	585+54	L	165.00	2.00	2.00	2.00	0.0025	0.30	32.63	0.63	19.02	Seed	1.28	5	0.030	70.74	2.46	0.28	24.27	1.78	9.10
												Seed	1.46	10	0.040	74.18	2.06	0.33	27.77	2.15	10.59
585+54	586+83	L	129.00	2.00	2.00	2.00	0.0025	0.37	33.00	0.62	19.25	Seed	1.26	5	0.030	71.61	2.46	0.28	24.31	1.78	9.11
												Seed	1.44	10	0.040	75.23	2.06	0.34	27.81	2.15	10.59
586+83	587+46	L	63.00	2.00	2.00	2.00	0.0025	0.19	33.19	0.64	19.37	Seed	1.26	5	0.030	72.03	2.46	0.28	24.34	1.78	9.11
												Seed	1.44	10	0.040	75.74	2.06	0.34	27.84	2.15	10.59
587+46	588+36	L	90.00	2.00	2.00	2.00	0.0025	0.10	33.29	0.62	19.43	Seed	1.25	5	0.030	72.64	2.46	0.28	24.24	1.77	9.10



# DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Seed	1.43	10	0.040	76.47	2.06	0.33	27.72	2.14	10.58
588+36	589+32	L	96.00	2.00	2.00	2.00	0.0025	0.20	33.49	0.73	19.58	Seed	1.24	5	0.030	73.29	2.46	0.28	24.24	1.77	9.10
												Seed	1.42	10	0.040	77.24	2.05	0.33	27.71	2.14	10.58
589+32	590+75	L	143.00	2.00	2.00	2.00	0.0025	0.28	33.77	0.71	19.77	Seed	1.22	5	0.030	74.26	2.46	0.28	24.22	1.77	9.10
												Seed	1.40	10	0.040	78.40	2.05	0.33	27.67	2.14	10.57
590+75	591+47	L	72.00	2.00	2.00	2.00	0.0069	0.93	34.70	0.58	20.31	Seed	1.22	5	0.030	74.59	3.61	0.61	24.78	1.42	7.67
												Jute Mat	1.22	5	0.040	74.67	2.91	0.70	24.76	1.62	8.48
												Temp. Mat	1.22	5	0.040	74.67	2.91	0.70	24.76	1.62	8.48
												Temp. Mat	1.39	10	0.040	78.80	3.02	0.74	28.32	1.72	8.89
591+47	593+72	L	225.00	2.00	2.00	2.00	0.0057	0.41	35.11	0.84	20.66	Seed	1.20	5	0.030	75.78	3.37	0.53	24.87	1.49	7.94
												Jute Mat	1.20	5	0.040	76.04	2.72	0.60	24.79	1.69	8.78
												Temp. Mat	1.20	5	0.040	76.04	2.72	0.60	24.79	1.69	8.78
												Temp. Mat	1.38	10	0.040	80.13	2.81	0.64	28.43	1.80	9.21
593+72	594+67	L	95.00	2.00	2.00	2.00	0.0057	0.83	35.94	0.64	21.19	Seed	1.19	5	0.030	76.51	3.38	0.53	25.30	1.50	7.99
												Jute Mat	1.19	5	0.040	76.62	2.73	0.61	25.27	1.71	8.83
												Temp. Mat	1.19	5	0.040	76.62	2.73	0.61	25.27	1.71	8.83
												Temp. Mat	1.37	10	0.040	80.68	2.83	0.65	29.00	1.82	9.28
594+67	596+37	L	170.00	2.00	2.00	2.00	0.0059	0.83	36.77	0.64	21.72	Seed	1.18	5	0.030	77.44	3.44	0.55	25.66	1.50	7.98
												Jute Mat	1.18	5	0.040	77.64	2.77	0.63	25.61	1.71	8.82
												Temp. Mat	1.18	5	0.040	77.64	2.77	0.63	25.61	1.71	8.82



# DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
												Temp. Mat	1.36	10	0.040	81.67	2.88	0.67	29.45	1.82	9.27
596+37	598+26	L	189.00	2.00	2.00	2.00	0.0059	0.44	37.21	0.74	22.05	Seed	1.17	5	0.030	78.55	3.44	0.55	25.73	1.50	7.99
												Jute Mat	1.16	5	0.040	78.77	2.78	0.63	25.67	1.71	8.83
												Temp. Mat	1.16	5	0.040	78.77	2.78	0.63	25.67	1.71	8.83
												Temp. Mat	1.34	10	0.040	82.76	2.88	0.67	29.58	1.82	9.29
598+26	599+67	L	141.00	2.00	2.00	2.00	0.0059	0.28	37.49	0.63	22.22	Seed	1.16	5	0.030	79.45	3.44	0.55	25.68	1.50	7.98
												Jute Mat	1.15	5	0.040	79.62	2.78	0.63	25.64	1.71	8.83
												Temp. Mat	1.15	5	0.040	79.62	2.78	0.63	25.64	1.71	8.83
												Temp. Mat	1.33	10	0.040	83.57	2.88	0.67	29.59	1.82	9.29
599+67	601+28	L	161.00	2.00	2.00	2.00	0.0059	0.19	37.68	0.72	22.36	Seed	1.14	5	0.030	80.40	3.44	0.55	25.58	1.49	7.97
												Jute Mat	1.14	5	0.040	80.58	2.77	0.63	25.53	1.70	8.81
												Temp. Mat	1.14	5	0.040	80.58	2.77	0.63	25.53	1.70	8.81
												Temp. Mat	1.32	10	0.040	84.51	2.88	0.67	29.52	1.82	9.28