



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 (3:1 Slopes)

Designer : SJD

Rainfall Area : A

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type 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 (ft.)	IN WIDTH (ft.)	BACK SLOPE (ft./ft.)	GRADE SLOPE (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	3.00	3.00	0.0025	0.52	0.52	0.56	0.29	Seed	3.50	5	0.030	16.04	0.98	0.05	1.02	0.34	4.06
												Seed	4.03	10	0.040	16.23	0.83	0.07	1.17	0.43	4.58
550+04	552+06	L	203.00	2.00	3.00	3.00	0.0025	0.10	0.62	0.59	0.35	Seed	3.18	5	0.030	19.32	1.01	0.06	1.11	0.36	4.16
												Seed	3.57	10	0.040	20.10	0.85	0.07	1.25	0.44	4.66
552+06	557+67	L	554.00	2.00	3.00	3.00	0.0025	0.56	1.18	0.59	0.68	Seed	2.62	5	0.030	26.94	1.15	0.07	1.78	0.46	4.76
												Seed	2.84	10	0.040	29.19	0.96	0.09	1.93	0.55	5.32
557+67	559+50	L	189.00	2.00	3.00	3.00	0.0025	3.17	4.35	0.65	2.74	Seed	2.18	5	0.030	35.53	1.59	0.13	5.96	0.83	7.00
												Seed	2.48	10	0.040	35.91	1.33	0.16	6.79	1.01	8.07
559+50	560+10	L	60.00	2.00	3.00	3.00	0.0025	1.78	6.13	0.65	3.90	Seed	2.15	5	0.030	36.10	1.74	0.15	8.39	0.98	7.87
												Seed	2.44	10	0.040	36.59	1.45	0.18	9.53	1.18	9.09
560+10	560+98	L	88.00	2.00	3.00	3.00	0.0025	8.12	14.25	0.54	8.28	Seed	1.60	5	0.030	53.84	1.96	0.19	13.21	1.20	9.22
												Seed	1.86	10	0.040	53.98	1.64	0.23	15.37	1.46	10.78
560+98	561+51	L	52.00	2.00	3.00	3.00	0.0025	0.19	14.44	0.58	8.39	Seed	1.59	5	0.030	54.28	1.96	0.19	13.30	1.21	9.24



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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	54.51	1.65	0.23	15.46	1.47	10.81
561+51	563+38	L	187.00	2.00	3.00	3.00	0.0025	5.95	20.39	0.53	11.55	Seed	1.55	5	0.030	55.74	2.12	0.22	17.92	1.38	10.28
												Seed	1.80	10	0.040	56.25	1.77	0.26	20.78	1.67	12.03
563+38	564+45	L	107.00	2.00	3.00	3.00	0.0025	0.73	21.12	0.75	12.09	Seed	1.53	5	0.030	56.58	2.13	0.22	18.55	1.40	10.41
												Seed	1.78	10	0.040	57.25	1.79	0.26	21.48	1.70	12.17
564+45	566+53	L	208.00	2.00	3.00	3.00	0.0025	0.21	21.33	0.66	12.23	Seed	1.50	5	0.030	58.20	2.13	0.22	18.34	1.39	10.36
												Seed	1.73	10	0.040	59.18	1.78	0.26	21.20	1.69	12.12
566+53	567+46	L	93.00	2.00	3.00	3.00	0.0025	3.63	24.96	0.59	14.37	Seed	1.48	5	0.030	58.90	2.21	0.23	21.34	1.49	10.94
												Seed	1.71	10	0.040	60.02	1.85	0.28	24.65	1.80	12.80
567+46	570+64	L	318.00	2.00	3.00	3.00	0.0025	1.24	26.20	0.66	15.19	Seed	1.44	5	0.030	61.26	2.23	0.23	21.85	1.51	11.04
												Seed	1.66	10	0.040	62.84	1.86	0.28	25.17	1.82	12.90
570+64	573+82	L	318.00	2.00	3.00	3.00	0.0025	2.49	28.69	0.56	16.59	Seed	1.39	5	0.030	63.59	2.26	0.24	23.13	1.54	11.27
												Seed	1.60	10	0.040	65.62	1.89	0.29	26.60	1.86	13.16
573+82	574+77	L	95.00	2.00	3.00	3.00	0.0025	1.40	30.09	0.59	17.41	Seed	1.38	5	0.030	64.28	2.28	0.25	24.07	1.57	11.43
												Seed	1.59	10	0.040	66.45	1.91	0.30	27.66	1.89	13.35
574+77	576+29	L	152.00	2.00	3.00	3.00	0.0025	0.38	30.47	0.56	17.63	Seed	1.36	5	0.030	65.39	2.28	0.24	24.02	1.57	11.42
												Seed	1.56	10	0.040	67.78	1.91	0.29	27.58	1.89	13.33
576+29	577+06	L	77.00	2.00	3.00	3.00	0.0025	0.44	30.91	0.58	17.88	Seed	1.35	5	0.030	65.95	2.28	0.25	24.20	1.58	11.45
												Seed	1.55	10	0.040	68.45	1.91	0.30	27.77	1.89	13.37
577+06	577+77	L	71.00	2.00	3.00	3.00	0.0025	0.17	31.08	0.62	17.99	Seed	1.34	5	0.030	66.46	2.28	0.25	24.18	1.58	11.45



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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	1.54	10	0.040	69.07	1.91	0.30	27.74	1.89	13.36
577+77	578+50	L	73.00	2.00	3.00	3.00	0.0025	0.16	31.24	0.60	18.08	Seed	1.34	5	0.030	67.00	2.28	0.25	24.15	1.57	11.44
												Seed	1.53	10	0.040	69.71	1.91	0.30	27.70	1.89	13.35
578+50	579+33	L	83.00	2.00	3.00	3.00	0.0025	0.13	31.37	0.62	18.16	Seed	1.33	5	0.030	67.60	2.28	0.25	24.08	1.57	11.43
												Seed	1.52	10	0.040	70.43	1.91	0.29	27.60	1.89	13.34
579+33	579+99	L	66.00	2.00	3.00	3.00	0.0025	0.13	31.50	0.69	18.25	Seed	1.32	5	0.030	68.08	2.28	0.25	24.05	1.57	11.43
												Seed	1.51	10	0.040	71.01	1.90	0.29	27.57	1.89	13.33
579+99	580+79	L	80.00	2.00	3.00	3.00	0.0025	0.19	31.69	0.65	18.38	Seed	1.31	5	0.030	68.67	2.28	0.25	24.04	1.57	11.43
												Seed	1.50	10	0.040	71.71	1.90	0.29	27.55	1.89	13.33
580+79	581+62	L	83.00	2.00	3.00	3.00	0.0025	0.18	31.87	0.69	18.50	Seed	1.30	5	0.030	69.27	2.28	0.24	24.03	1.57	11.42
												Seed	1.49	10	0.040	72.43	1.90	0.29	27.52	1.89	13.32
581+62	583+91	L	229.00	2.00	3.00	3.00	0.0025	0.46	32.33	0.71	18.83	Seed	1.27	5	0.030	70.94	2.28	0.24	23.97	1.57	11.41
												Seed	1.46	10	0.040	74.43	1.90	0.29	27.43	1.88	13.31
583+91	585+54	L	165.00	2.00	3.00	3.00	0.0025	0.30	32.63	0.63	19.02	Seed	1.26	5	0.030	72.14	2.28	0.24	23.87	1.57	11.39
												Seed	1.44	10	0.040	75.87	1.90	0.29	27.30	1.88	13.28
585+54	586+83	L	129.00	2.00	3.00	3.00	0.0025	0.37	33.00	0.62	19.25	Seed	1.24	5	0.030	73.08	2.28	0.24	23.89	1.57	11.40
												Seed	1.42	10	0.040	77.00	1.90	0.29	27.31	1.88	13.29
586+83	587+46	L	63.00	2.00	3.00	3.00	0.0025	0.19	33.19	0.64	19.37	Seed	1.23	5	0.030	73.55	2.28	0.24	23.92	1.57	11.40
												Seed	1.41	10	0.040	77.55	1.90	0.29	27.33	1.88	13.29
587+46	588+36	L	90.00	2.00	3.00	3.00	0.0025	0.10	33.29	0.62	19.43	Seed	1.23	5	0.030	74.20	2.27	0.24	23.81	1.56	11.39



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												Seed	1.40	10	0.040	78.34	1.90	0.29	27.21	1.88	13.27
588+36	589+32	L	96.00	2.00	3.00	3.00	0.0025	0.20	33.49	0.73	19.58	Seed	1.22	5	0.030	74.91	2.27	0.24	23.80	1.56	11.38
												Seed	1.39	10	0.040	79.18	1.90	0.29	27.19	1.88	13.26
589+32	590+75	L	143.00	2.00	3.00	3.00	0.0025	0.28	33.77	0.71	19.77	Seed	1.20	5	0.030	75.95	2.27	0.24	23.76	1.56	11.37
												Seed	1.37	10	0.040	80.43	1.90	0.29	27.13	1.88	13.25
590+75	591+47	L	72.00	2.00	3.00	3.00	0.0069	0.93	34.70	0.58	20.31	Seed	1.20	5	0.030	76.31	3.34	0.54	24.31	1.26	9.56
												Jute Mat	1.20	5	0.040	76.40	2.69	0.62	24.28	1.43	10.59
												Temp. Mat	1.20	5	0.040	76.40	2.69	0.62	24.28	1.43	10.59
												Temp. Mat	1.37	10	0.040	80.86	2.79	0.65	27.76	1.52	11.11
591+47	593+72	L	225.00	2.00	3.00	3.00	0.0057	0.41	35.11	0.84	20.66	Seed	1.18	5	0.030	77.60	3.11	0.47	24.37	1.32	9.90
												Jute Mat	1.18	5	0.040	77.88	2.51	0.53	24.29	1.49	10.96
												Temp. Mat	1.18	5	0.040	77.88	2.51	0.53	24.29	1.49	10.96
												Temp. Mat	1.35	10	0.040	82.30	2.60	0.56	27.84	1.59	11.52
593+72	594+67	L	95.00	2.00	3.00	3.00	0.0057	0.83	35.94	0.64	21.19	Seed	1.17	5	0.030	78.39	3.12	0.47	24.78	1.33	9.96
												Jute Mat	1.17	5	0.040	78.51	2.52	0.54	24.74	1.51	11.04
												Temp. Mat	1.17	5	0.040	78.51	2.52	0.54	24.74	1.51	11.04
												Temp. Mat	1.34	10	0.040	82.91	2.61	0.57	28.40	1.60	11.60
594+67	596+37	L	170.00	2.00	3.00	3.00	0.0059	0.83	36.77	0.64	21.72	Seed	1.16	5	0.030	79.40	3.18	0.49	25.12	1.32	9.95
												Jute Mat	1.15	5	0.040	79.61	2.56	0.55	25.06	1.50	11.02
												Temp. Mat	1.15	5	0.040	79.61	2.56	0.55	25.06	1.50	11.02



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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	1.33	10	0.040	83.97	2.65	0.59	28.82	1.60	11.59
596+37	598+26	L	189.00	2.00	3.00	3.00	0.0059	0.44	37.21	0.74	22.05	Seed	1.14	5	0.030	80.60	3.18	0.49	25.17	1.33	9.95
												Jute Mat	1.14	5	0.040	80.84	2.56	0.55	25.10	1.50	11.03
												Temp. Mat	1.14	5	0.040	80.84	2.56	0.55	25.10	1.50	11.03
												Temp. Mat	1.31	10	0.040	85.16	2.66	0.59	28.93	1.60	11.61
598+26	599+67	L	141.00	2.00	3.00	3.00	0.0059	0.28	37.49	0.63	22.22	Seed	1.13	5	0.030	81.58	3.18	0.49	25.11	1.32	9.94
												Jute Mat	1.13	5	0.040	81.75	2.56	0.55	25.06	1.50	11.02
												Temp. Mat	1.13	5	0.040	81.75	2.56	0.55	25.06	1.50	11.02
												Temp. Mat	1.30	10	0.040	86.04	2.66	0.59	28.93	1.60	11.61
599+67	601+28	L	161.00	2.00	3.00	3.00	0.0059	0.19	37.68	0.72	22.36	Seed	1.12	5	0.030	82.60	3.17	0.49	24.99	1.32	9.93
												Jute Mat	1.12	5	0.040	82.80	2.56	0.55	24.94	1.50	11.00
												Temp. Mat	1.12	5	0.040	82.80	2.56	0.55	24.94	1.50	11.00
												Temp. Mat	1.29	10	0.040	87.05	2.65	0.59	28.85	1.60	11.59