



POLECAT TRIBUTARY 2 DRAINAGE SYSTEM SAPULPA, OKLAHOMA

CITYWIDE MASTER DRAINAGE PLAN

JUNE 2010

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CIVIL & WATER RESOURCE ENGINEERING
GEOGRAPHIC INFORMATION SYSTEMS

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SECTION 12. POLECAT TRIBUTARY 2 DRAINAGE SYSTEM

12.1. EXISTING CONDITIONS HYDROLOGY

The Polecat Tributary 2 Drainage System includes the subbasins that drain into Polecat Tributary 2, Hickory Creek Tributary, and five other small basins (OLT) in the immediate area. This drainage Basin generally lies east of Polecat Creek, south of W. 91st Street, west of S. 49th West Avenue and north of Frontier Road and drains northeasterly into Polecat Creek. The small basins were modeled with Polecat Tributary 2 to address individual stormwater complaints in the area. The basins and their locations are depicted in **FIGURE 12-1**.

The hydrologic soil groups and existing land use for this basin are shown in **FIGURE 12-2** and **FIGURE 12-3** respectively. More information on the hydrologic soil groups can be found in **SECTION 2.1 HYDROLOGIC ANALYSIS**.

The hydrologic coefficients used for input in the HEC-HMS model include the drainage area, the lag time and the soil complex curve number (CN). A summary of hydrologic coefficients is tabulated in **TABLE 12-1** with more detailed data in **APPENDIX 12-A**.

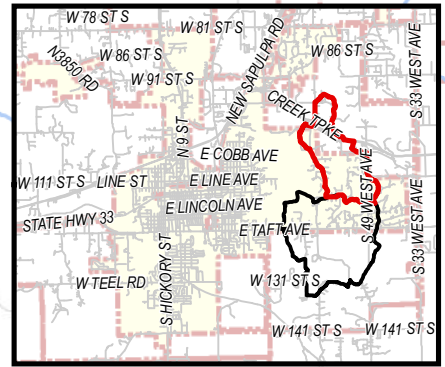
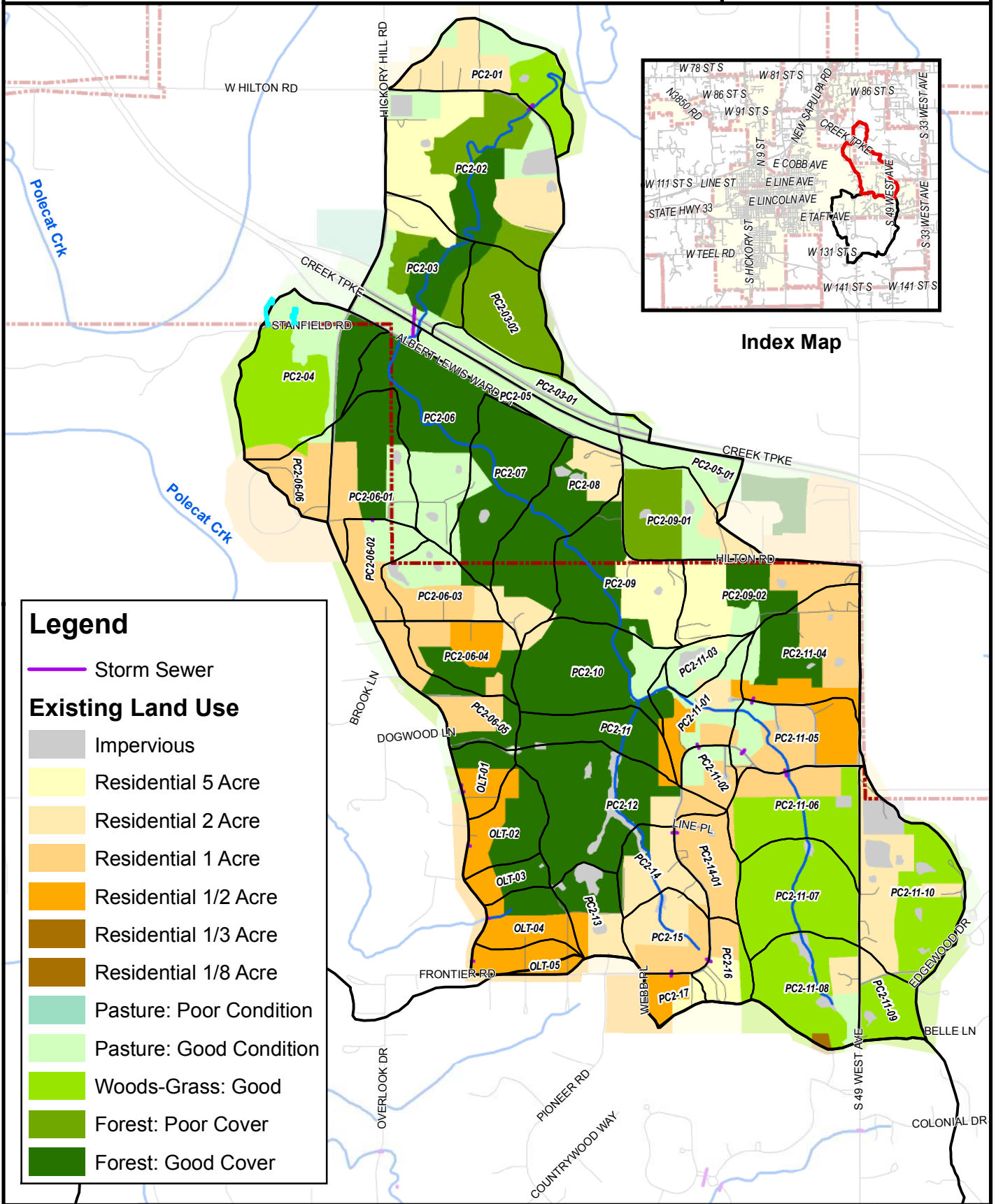
Reach routing data was developed using two methods. In areas without detailed hydraulic analysis, a simple lag routing was developed by calculating the flow length and dividing by an estimated velocity to determine a lag time. In detailed study areas, the Modified Puls method was used to account for floodplain storage. Rating curves were developed for each reach using the hydraulic models discussed in the next section.

The drainage basin was modeled using HEC-HMS. The HEC-HMS schematic used to develop the flow rates for the Polecat Tributary 2 Drainage Basin is located in **APPENDIX 12-B** and a complete list of the flow rates for the existing conditions is listed in **APPENDIX 12-C**. **TABLE 12-2** shows the resulting flow rates at major junctions for this basin.

12.2. EXISTING CONDITIONS HYDRAULICS

There were no major storm sewer systems to analyze in the Polecat Tributary 2 system, but streams were studied and are identified in **FIGURE 12-4**. The open channel detailed study areas were analyzed using HEC-GeoRAS to develop input data for a HEC-RAS model. A field survey was conducted to measure bridges and culverts that were not included in the survey data provided by the City of Sapulpa. The structures were entered into the HEC-RAS model to develop hydraulic models for the existing conditions. Normal depth for the slope of the channel downstream was used as a starting boundary condition. Flow rates from the HEC-HMS model were used to perform a backwater analysis. Once the analysis was complete, floodplains and water surface profiles were created.

The floodplains for Polecat Tributary 2 (Main Channel) and the Hickory Creek Tributary were mapped for the 2-, 10-, 100- and 500-year frequency events and can be viewed in **APPENDIX 12-D**. The resulting water surface profiles for each frequency are presented in **APPENDIX 12-E**.



Index Map

Legend

- Storm Sewer

Existing Land Use

- Impervious
- Residential 5 Acre
- Residential 2 Acre
- Residential 1 Acre
- Residential 1/2 Acre
- Residential 1/3 Acre
- Residential 1/8 Acre
- Pasture: Poor Condition
- Pasture: Good Condition
- Woods-Grass: Good
- Forest: Poor Cover
- Forest: Good Cover

**TABLE 12-1. EAST POLECAT SYSTEMS – POLECAT TRIBUTARY 2 DRAINAGE BASIN
SUMMARY OF HYDROLOGIC COEFFICIENTS FOR EXISTING CONDITIONS**

Sub-Area	Drainage Area, Acres	Lag Time, Minutes	Composite CN
OLT-01	9.3	2.3	75
OLT-02	16.1	3.7	68
OLT-03	6.8	4.6	61
OLT-04	13.0	5.7	65
OLT-05	8.8	5.6	70
PC2-01	28.4	9.1	67
PC2-02	67.4	6.7	73
PC2-03	28.6	4.1	70
PC2-03-01	14.3	9.0	80
PC2-03-02	24.6	5.7	77
PC2-04	44.9	8.9	62
PC2-05	11.4	9.8	79
PC2-05-01	10.4	10.0	77
PC2-06	45.0	8.9	69
PC2-06-01	28.2	9.0	71
PC2-06-02	13.6	5.1	71
PC2-06-03	17.9	4.5	67
PC2-06-04	19.6	5.6	67
PC2-06-05	17.3	8.3	69
PC2-06-06	11.5	3.3	68
PC2-07	32.5	5.5	68
PC2-08	34.4	5.2	69
PC2-09	34.2	4.0	72
PC2-09-01	26.0	4.4	77
PC2-09-02	28.2	7.0	76
PC2-10	34.6	4.6	71
PC2-11	16.1	3.8	71
PC2-11-01	17.4	5.6	77
PC2-11-02	7.8	3.0	75
PC2-11-03	7.9	3.3	77
PC2-11-04	32.6	6.5	77
PC2-11-05	24.1	6.3	80
PC2-11-06	29.7	3.8	75
PC2-11-07	31.4	4.4	73

Sub-Area	Drainage Area, Acres	Lag Time, Minutes	Composite CN
PC2-11-08	28.3	2.5	75
PC2-11-09	11.9	3.7	74
PC2-11-10	43.4	4.7	78
PC2-12	42.7	3.3	69
PC2-13	13.6	2.7	72
PC2-14	14.1	4.4	77
PC2-14-01	13.7	5.4	79
PC2-15	16.7	2.1	79
PC2-16	10.1	2.1	77
PC2-17	6.6	2.3	80

Bridges and structures were studied to determine the likelihood of being overtopped during certain storm frequencies and are depicted in **FIGURE 12-5**. Of three structures in the main channel, two would handle storm frequencies up to a 0.2 % annual chance event while the culvert under W. Hilton Road would overtop with any storm event having a 10% annual chance frequency. The Hickory Creek Tributary has one structure which can handle a 1% annual chance storm event.

**TABLE 12-2. EAST POLECAT CREEK SYSTEMS – POLECAT TRIBUTARY 2 DRAINAGE BASIN
EXISTING FLOW RATES AT MAJOR JUNCTIONS (CFS)**

HMS Junction	Street Intersection	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
JN-OLT-01	453 Hickory Hill Rd.	9	18	32	41	53	62	71	87
JN-OLT-04	110 Hickory Hill Rd.	4	10	24	33	45	56	67	87
JN-OLT-05	Hickory Hill Rd. & Frontier Rd.	5	10	20	27	36	44	51	65
JN-PC2-02	Hilton Rd.	296	604	1382	1865	2448	2928	3438	4153
JN-PC2-06	I-44 Creek Turnpike	295	595	1385	1830	2377	2862	3310	3943
JN-PC2-06-02	Hickory Rd.	28	57	126	172	229	275	319	407
JN-PC2-09-01	96th St. S	29	50	87	111	141	164	187	231
JN-PC2-11-02	S 55 Pl. & S 55 West Ave.	8	14	26	33	43	50	57	71
JN-PC2-11-04	Dogwood Ct.	31	53	95	122	157	184	210	262
JN-PC2-11-06	Dogwood Ln.	51	93	175	268	398	488	568	729
JN-PC2-11-09	49th W Ave. & 55th St. W	11	20	37	48	62	74	84	105
JN-PC2-11-10	49th W Ave. to the South of Dogwood Ln.	51	86	148	188	238	276	314	388
JN-PC2-14-01	55th St. & Line Pl.	16	27	46	58	73	85	96	119
JN-PC2-16	55th St. & Frontier Rd.	12	22	38	48	61	71	81	99
JN PC2-17	Frontier Rd.	9	16	27	34	42	49	55	67

12.3. PROBLEM AREAS

Several drainage problems were identified in the Polecat Tributary 2 Drainage Basin. These locations as well as the location of road overtoppings are shown in **FIGURE 12-5**. A discussion of Problem Areas follows.

A. Problem Area 1: 453 Hickory Hill Road

There is no drainage ditch or culverts on the east side of Hickory Hill Road. The result is standing water in the summer and icy conditions during the winter. This water could cause an accident and is public safety issue.

B. Problem Area 2: 51st and Edgewood

Drainage is poor in this area.

C. Problem Area 3: 110 Hickory Hill Road

Stormwater runoff flows down the street across this driveway. The driveway has been washed out and water gets very close to entering this house.

D. Problem Area 4: Road Overtoppings

Only one road overtopping was identified as a potential problem in this basin. It is located at the bend at which W. Hilton Road crosses the creek and continues southerly. This structure would have adequate capacity to pass a 4% annual chance storm event; however, it would be overtopped during less frequent storm events.

12.4. EVALUATION OF ALTERNATIVES

Alternatives were considered for the identified Problem Areas and are discussed below.

A. Problem Area 1: 453 Hickory Hill Road

The City has addressed this Problem Area, and no additional review was undertaken.

B. Problem Area 2: 51st and Edgewood

Alternative 1 - Clean and line existing drainage ditch and add storm sewer across S. 49th West Avenue. The proposed alternative includes cleaning and lining, with a 4-foot concrete bottom, approximately 342 feet of existing ditch from Edgewood Drive south along the east side of 49th West Avenue.

Approximately 359 feet south from Edgewood Drive (including the driveway culvert), the culvert under 49th West Avenue would be replaced with 49 feet of 36-inch RCP to handle a 10% annual chance storm event. This alternative also includes replacing approximately 17 feet of 18-inch driveway culvert being replaced at the location as shown in **FIGURE 12-6**.

The cost for this alternative is \$55,400 and is shown in **FIGURE 12-6**.

C. Problem Area 3: 110 Hickory Hill Road

This Problem Area has been resolved by the City.

D. Problem Area 4: Road Overtoppings

Based on direction from the City, no replacement alternatives were studied for the overtopped structures in this basin.

*** Problem Areas**

Existing Storm Sewer

Storm Sewer Alternatives

- Storm Sewer
- Ditch



12.4 RECOMMENDED PLAN

Based on prioritization criteria presented in **SECTION 1 INTRODUCTION** and discussions with City staff, the following alternatives were selected for the Polecat Tributary 2 Drainage Basin. In some cases, “No Action” was the selected course. For more details, please refer to **SECTION 12-4, FIGURE 12-6** and **APPENDIX 12-F**.

The Recommended Plan for the Polecat Tributary 2 Drainage Basin is:

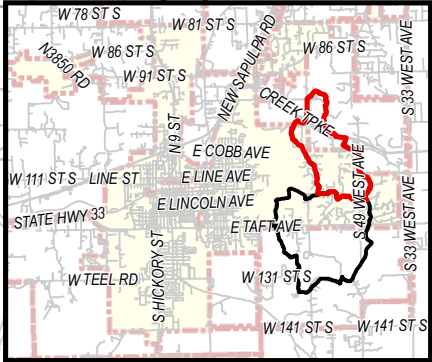
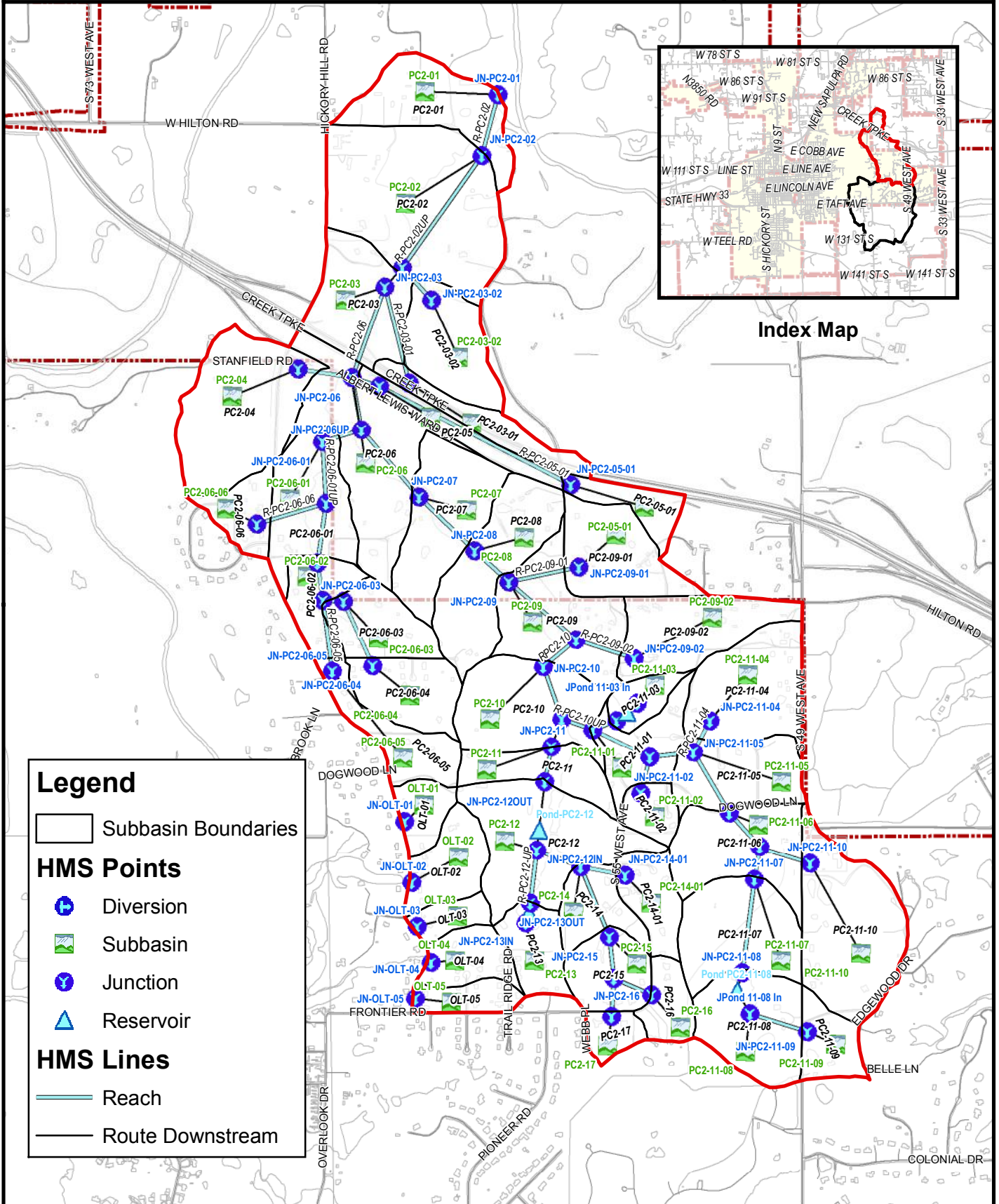
PROBLEM AREA	RECOMMENDED ALTERNATIVE	RATIONALE FOR SELECTION	ESTIMATED COST
Problem Area 1	No Action	This Problem Area has already been addressed by the City and no further action is needed.	-0-
Problem Area 2	Alternative 1	This project would improve localized drainage in the area at an acceptable public cost.	\$55,400
Problem Area 3	No Action	This Problem Area has already been addressed by the City and no further action is needed.	-0-
Problem Area 4	No Action	Based on direction from the City, no replacement alternatives were studied for the overtopped structures in this basin.	-0-
TOTAL COST			\$55,400

Appendix 12-A. East Polecat Systems - Polecat Tributary 2 Drainage System - Hydrologic Coefficients for Existing Conditions

Tributary Subarea	Flow Type	Length (ft)	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)	
										A	B	C	D				
									4400					95.7			
PC2-06-06	Overland	1039	3.82	1.37	1.61			Impervious	2	98	98	98	98	0.0	2.2	0.0	0.0
	Channel (ditch)	133	5.98	3.68	1.83			Pasture: Good Condition	6	39	61	74	80	0.0	5.7	0.0	0.0
	Paved	404	4.40	4.20	1.99			Residential 1 acre	89	51	68	79	84	0.0	89.1	0.0	0.0
	Pipe Stream	502		0.00	0.00	0.00	3.3	0.05	Woods-Grass: Good	3	32	58	72	79	0.0	3.0	0.0
PC2-07	Overland	1920	3.93	1.39	1.66			Forest (good cover)	92	25	55	70	77	0.0	21.6	55.4	14.8
	Channel (ditch)	139	6.71	3.91	5.16			Impervious	1	98	98	98	98	0.0	0.0	1.2	0.0
	Paved	1209		0.00	0.00	0.00		Pasture: Good Condition	7	39	61	74	80	0.0	2.6	4.2	0.0
	Pipe Stream	572	1.01	4.00	2.38	5.5	0.09	Residential 2 acre	0	46	65	77	82	0.0	0.2	0.0	0.0
PC2-08	Overland	1843	4.65	1.51	2.12			Forest (good cover)	65	25	55	70	77	0.0	26.2	35.6	3.2
	Channel (ditch)	192	7.99	4.27	5.11			Impervious	3	98	98	98	98	0.0	0.0	3.2	0.0
	Paved	1310		0.00	0.00	0.00		Residential 2 acre	32	46	65	77	82	0.0	3.2	28.6	0.0
	Pipe Stream	341	0.65	4.00	1.42	5.2	0.09										
PC2-09	Overland	1461	4.85	1.55	1.84			Forest (good cover)	59	25	55	70	77	0.0	10.9	48.2	0.0
	Channel (ditch)	171	13.84	5.66	1.39			Impervious	2	98	98	98	98	0.0	0.0	2.0	0.0
	Paved	473		0.00	0.00	0.00		Pasture: Good Condition	1	39	61	74	80	0.0	0.0	1.0	0.0
	Pipe Stream	817	0.78	4.00	3.40	4.0	0.07	Residential 2 acre	1	46	65	77	82	0.0	0.1	0.8	0.0
PC2-09-01	Overland	1238	6.43	1.78	1.82			Forest (poor cover)	56	45	66	77	83	0.0	0.0	55.7	0.0
	Channel (ditch)	195	4.37	3.14	5.54			Impervious	5	98	98	98	98	0.0	0.0	4.9	0.0
	Paved	1043		0.00	0.00	0.00		Pasture: Good Condition	24	39	61	74	80	0.0	0.0	23.7	0.0
	Pipe Stream			0.00	0.00	0.00	4.4	0.07	Residential 1 acre	0	51	68	79	84	0.0	0.0	0.1
PC2-09-02	Overland	2076	5.03	1.58	2.77			Forest (good cover)	28	25	55	70	77	0.0	0.0	27.9	0.0
	Channel (ditch)	262	5.02	3.37	8.97			Impervious	3	98	98	98	98	0.0	0.6	2.7	0.0
	Paved	1813		0.00	0.00	0.00		Pasture: Good Condition	8	39	61	74	80	0.0	0.0	8.2	0.0
	Pipe Stream			0.00	0.00	0.00	7.0	0.12	Residential 1 acre	24	51	68	79	84	0.0	4.0	19.5
PC2-10	Overland	1772	8.16	2.01	1.00			Forest (good cover)	83	25	55	70	77	0.0	1.6	81.1	0.0
	Channel (ditch)	121	7.80	4.22	4.74			Impervious	14	39	61	74	80	0.0	0.0	13.7	0.0
	Paved	1200		0.00	0.00	0.00		Pasture: Good Condition	1	54	70	80	85	0.0	0.0	0.6	0.0
	Pipe Stream	452	0.80	4.00	1.88	4.6	0.08	Residential 1/2 acre	3	46	65	77	82	0.0	0.0	3.1	0.0

Appendix 12-A. East Polecat Systems - Polecat Tributary 2 Drainage System - Hydrologic Coefficients for Existing Conditions

Tributary Subarea	Flow Type	Length (ft)	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)					
										A	B	C	D	A	B	C	D								
		1460							4400																
OLT-04	Overland	211	4.80	1.54	2.29			Forest (good cover)	31	25	55	70	77	0.0	31.4	0.0	0.0	0.0	65.5	95.7	0.02025				
	Channel (ditch)	1249	3.66	2.87	7.26			Impervious	1	98	98	98	98	0.0	0.6	0.0	0.0	13.0							
	Paved Pipe Stream			0.00	0.00	0.00		Residential 1/2 acre	68	54	70	80	85	0.0	68.0	0.0	0.0								
OLT-05	Overland	283	6.93	1.85	2.55			Residential 1/2 acre	100	54	70	80	85	0.0	100.0	0.0	0.0	70.0	8.8	0.01369					
	Channel (ditch)	1121	3.40	2.76	6.77																				
	Paved Pipe Stream			0.00	0.00	0.00																			



Index Map

Legend

- Subbasin Boundaries
- HMS Points**
- Diversion
- Subbasin
- Junction
- Reservoir
- HMS Lines**
- Reach
- Route Downstream

**Appendix 12-C. East Polecat Systems - Polecat Tributary 2 Drainage System
Existing Flow Rates (CFS)**

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi ²
JN-OLT-01	9	18	32	41	53	62	71	87	0.01446
JN-OLT-02	9	18	38	52	70	85	99	127	0.02519
JN-OLT-03	1	3	10	15	21	27	32	43	0.01070
JN-OLT-04	4	10	24	33	45	56	67	87	0.02025
JN-OLT-05	5	10	20	27	36	44	51	65	0.01369
JN-PC2-01	297	608	1356	1863	2463	2957	3464	4210	1.40293
JN-PC2-02	296	604	1382	1866	2448	2928	3437	4153	1.35858
JN-PC2-02UP	299	606	1392	1867	2437	2929	3400	4046	1.25333
JN-PC2-03	293	595	1369	1836	2399	2886	3350	3994	1.21494
JN-PC2-03-01	16	25	43	54	68	79	89	111	0.02239
JN-PC2-03-02	25	42	75	96	123	144	165	205	0.03839
JN-PC2-04	7	19	56	82	118	149	180	243	0.07019
JN-PC2-05	17	27	49	64	82	96	110	140	0.03413
JN-PC2-05-01	9	15	26	34	43	51	59	74	0.01626
JN-PC2-06	296	595	1385	1830	2377	2862	3309	3942	1.14783
JN-PC2-06-01	44	89	197	268	350	415	478	604	0.16896
JN-PC2-06-01UP	31	64	142	194	258	311	360	466	0.12487
JN-PC2-06-02	28	57	126	173	229	277	322	414	0.10688
JN-PC2-06-02UP	21	45	101	139	189	231	273	356	0.08558
JN-PC2-06-03	14	31	71	98	134	164	194	253	0.05859
JN-PC2-06-04	8	16	38	53	73	89	105	137	0.03059
JN-PC2-06-05	8	15	33	45	61	74	87	113	0.02699
JN-PC2-06-06	6	13	28	37	51	61	72	92	0.01799
JN-PC2-06UP	260	536	1246	1651	2160	2612	3014	3689	0.97320
JN-PC2-07	223	468	1058	1398	1841	2252	2630	3411	0.80424
JN-PC2-08	219	465	1022	1344	1766	2165	2558	3267	0.75340
JN-PC2-09	209	451	973	1277	1674	2057	2413	3081	0.69968
JN-PC2-09-01	29	50	87	111	141	164	187	231	0.04059
JN-PC2-09-02	24	42	77	100	128	151	174	219	0.04408
JN-PC2-09UP1	178	415	867	1135	1486	1836	2147	2732	0.60568
JN-PC2-10	154	376	789	1036	1358	1684	1977	2514	0.56160
JN-PC2-10UP	141	361	733	958	1253	1565	1827	2314	0.50746
JN-PC2-11	28	134	331	437	580	704	819	1042	0.20876
JN-PC2-11-01	132	232	421	543	728	920	1070	1353	0.29870
JN-PC2-11-01UP	114	199	360	464	641	811	942	1191	0.25912
JN-PC2-11-02	8	14	26	33	43	50	57	71	0.01222
JN-PC2-11-04	31	53	95	122	157	184	210	262	0.05100
JN-PC2-11-05	109	190	344	443	618	781	906	1147	0.24690
JN-PC2-11-06	51	93	175	268	398	488	568	729	0.15823

**Appendix 12-C. East Polecat Systems - Polecat Tributary 2 Drainage System
Existing Flow Rates (CFS)**

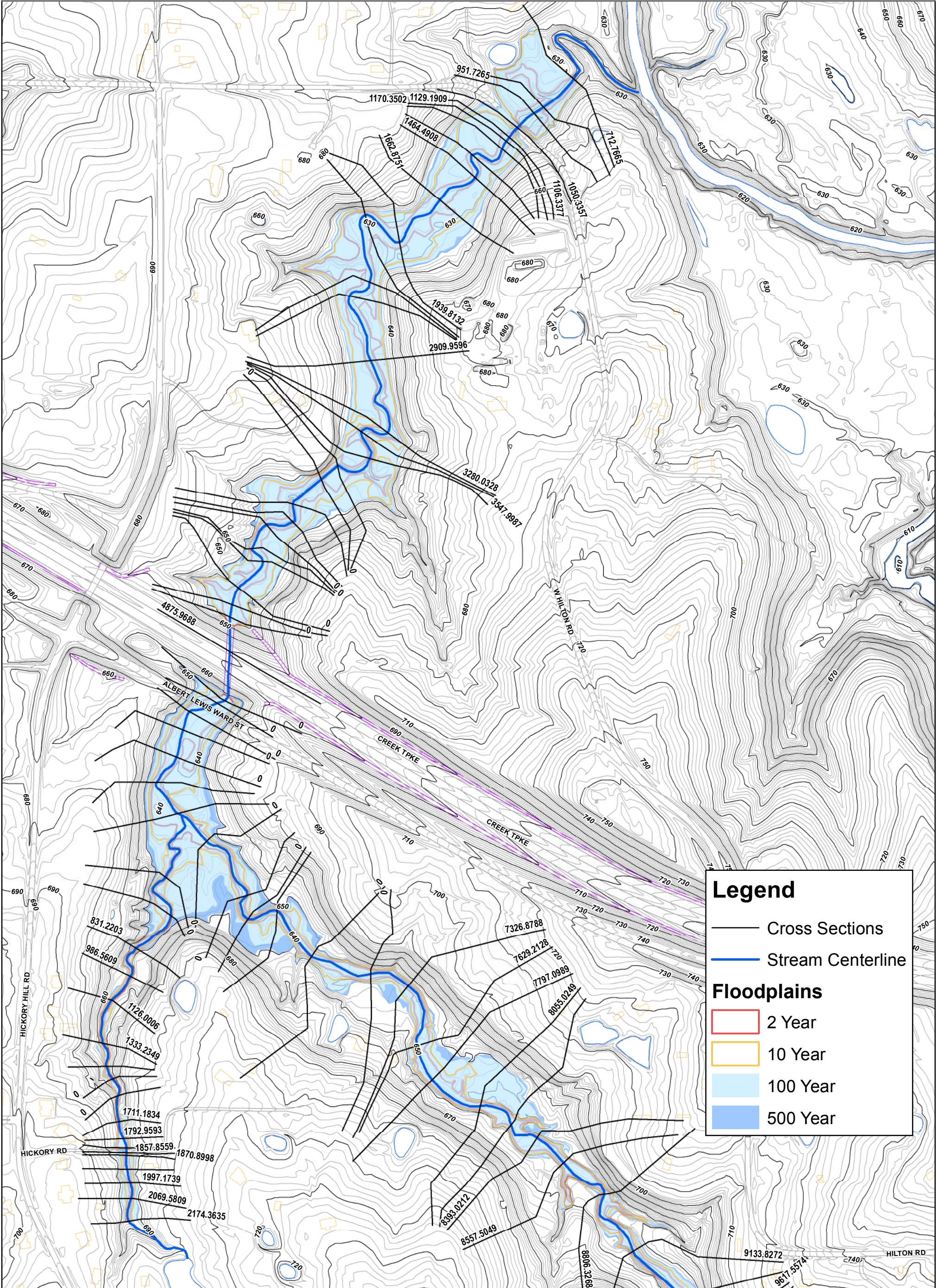
HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi ²
JN-PC2-11-06 UP	24	45	111	203	300	366	425	541	0.11186
JN-PC2-11-07	24	45	111	203	300	366	425	541	0.11186
JN-PC2-11-08	1	3	69	130	191	232	268	337	0.06285
JN-PC2-11-09	11	20	37	48	62	74	84	105	0.01865
JN-PC2-11-10	51	86	148	188	238	276	314	388	0.06779
JN-PC2-12IN	94	169	305	402	537	645	751	952	0.18354
JN-PC2-12OUT	27	135	301	397	529	636	741	939	0.18354
JN-PC2-13IN	11	21	41	54	71	84	97	122	0.02131
JN-PC2-13OUT	1	1	14	27	46	63	78	105	0.02131
JN-PC2-14	72	126	215	272	345	401	456	561	0.09545
JN-PC2-14-01	16	27	46	58	73	85	96	119	0.02144
JN-PC2-15	42	76	127	160	203	235	266	326	0.05205
JN-PC2-15UP	21	39	65	82	104	120	135	166	0.02599
JN-PC2-16	12	22	38	48	61	71	81	99	0.01571
JN PC2-17	9	16	27	34	42	49	55	67	0.01028
JPond 11-03 In	9	16	28	35	45	53	60	74	0.01235
JPond11-03Out	5	11	21	29	37	45	52	66	0.01235
JPond 11-08 In	37	67	123	159	205	241	277	346	0.06285
OLT-01	9	18	32	41	53	62	71	87	0.01446
OLT-02	9	18	38	52	70	85	99	127	0.02519
OLT-03	1	3	10	15	21	27	32	43	0.01070
OLT-04	4	10	24	33	45	56	67	87	0.02025
OLT-05	5	10	20	27	36	44	51	65	0.01369
PC2-01	9	20	47	66	90	111	131	172	0.04435
PC2-02	48	87	168	221	290	345	400	507	0.10525
PC2-03	18	36	73	98	130	155	181	230	0.04472
PC2-03-01	16	25	43	54	68	79	89	111	0.02239
PC2-03-02	25	42	75	96	123	144	165	205	0.03839
PC2-04	7	19	56	82	118	149	180	243	0.07019
PC2-05	11	18	31	40	51	59	67	84	0.01787
PC2-05-01	9	15	26	34	43	51	59	74	0.01626
PC2-06	20	40	86	117	157	190	223	289	0.07031
PC2-06-01	15	28	57	77	102	123	144	186	0.04409
PC2-06-02	9	17	34	45	59	71	83	106	0.02130
PC2-06-03	8	17	38	53	72	87	103	133	0.02800
PC2-06-04	8	16	38	53	73	89	105	137	0.03059
PC2-06-05	8	15	33	45	61	74	87	113	0.02699
PC2-06-06	6	13	28	37	51	61	72	92	0.01799
PC2-07	15	31	68	94	127	154	181	234	0.05084

Appendix 12-C. East Polecat Systems - Polecat Tributary 2 Drainage System
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi ²
PC2-08	18	36	77	105	140	170	199	255	0.05372
PC2-09	25	47	93	122	161	193	224	283	0.05341
PC2-09-01	29	50	87	111	141	164	187	231	0.04059
PC2-09-02	24	42	77	100	128	151	174	219	0.04408
PC2-10	22	43	87	116	154	185	215	274	0.05414
PC2-11	11	21	43	57	76	90	105	133	0.02522
PC2-11-01	18	30	54	69	88	103	118	146	0.02723
PC2-11-02	8	14	26	33	43	50	57	71	0.01222
PC2-11-03	9	16	28	35	45	53	60	74	0.01235
PC2-11-04	31	53	95	122	157	184	210	262	0.05100
PC2-11-05	29	48	80	100	126	146	166	204	0.03767
PC2-11-06	29	52	95	122	158	185	212	264	0.04637
PC2-11-07	24	45	87	114	150	178	206	259	0.04901
PC2-11-08	29	53	97	124	160	188	215	266	0.04420
PC2-11-09	11	20	37	48	62	74	84	105	0.01865
PC2-11-10	51	86	148	188	238	276	314	388	0.06779
PC2-12	24	49	106	144	193	232	271	346	0.06678
PC2-13	11	21	41	54	71	84	97	122	0.02131
PC2-14	15	26	46	59	75	88	100	124	0.02196
PC2-14-01	16	27	46	58	73	85	96	119	0.02144
PC2-15	23	41	67	84	106	122	138	168	0.02606
PC2-16	12	22	38	48	61	71	81	99	0.01571
PC2-17	9	16	27	34	42	49	55	67	0.01028
Pond-PC2-11-03	5	11	21	29	37	45	52	66	0.01235
Pond PC2-11-08	1	3	69	130	191	232	268	337	0.06285
Pond-PC2-12	27	135	301	397	529	636	741	939	0.18354
Pond-PC2-13	1	1	14	27	46	63	78	105	0.02131
R-PC2-02	294	602	1341	1842	2437	2924	3422	4150	1.35858
R-PC2-02UP	286	587	1342	1811	2385	2861	3347	4041	1.25333
R-PC2-03-01	16	25	43	54	68	79	89	111	0.02239
R-PC2-03-02	25	42	75	96	123	144	165	205	0.03839
R-PC2-04	7	19	56	82	118	149	180	243	0.07019
R-PC2-05	17	27	49	64	82	96	110	140	0.03413
R-PC2-05-01	9	15	26	34	43	51	59	74	0.01626
R-PC2-06	279	573	1321	1772	2323	2798	3249	3909	1.14783
R-PC2-06-01	44	89	195	262	340	399	451	546	0.16896
R-PC2-06-01UP	31	63	141	193	255	306	354	453	0.12487
R-PC2-06-02	27	56	125	171	227	274	319	411	0.10688
R-PC2-06-02DN	21	44	100	138	185	225	263	339	0.08558

**Appendix 12-C. East Polecat Systems - Polecat Tributary 2 Drainage System
Existing Flow Rates (CFS)**

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi ²
R-PC2-06-03	14	31	71	98	134	164	194	253	0.05859
R-PC2-06-04	8	16	38	53	73	89	105	137	0.03059
R-PC2-06-05	8	15	33	45	61	74	87	113	0.02699
R-PC2-06-06	6	13	28	37	51	61	72	92	0.01799
R-PC2-06UP	260	531	1225	1618	2113	2554	2960	3596	0.97320
R-PC2-07	221	464	1053	1390	1824	2223	2584	3165	0.80424
R-PC2-08	214	453	1011	1334	1755	2148	2507	3242	0.75340
R-PC2-09	207	446	969	1272	1668	2049	2413	3075	0.69968
R-PC2-09-01	29	50	87	111	141	164	187	231	0.04059
R-PC2-09-02	24	42	77	100	128	151	174	219	0.04408
R-PC2-09UP	175	402	853	1117	1470	1815	2129	2709	0.60568
RPC2-10	154	377	790	1035	1358	1686	1973	2513	0.56160
R-PC2-10DN	139	351	727	951	1248	1555	1816	2307	0.50746
R-PC2-10UP	132	232	421	543	728	920	1070	1353	0.29870
R-PC2-11	25	122	297	392	522	633	737	934	0.18354
R-PC2-11-01UPE	109	190	344	443	618	781	906	1147	0.24690
R-PC2-11-02	8	14	26	33	43	50	57	71	0.01222
R-PC2-11-02DN	114	199	360	464	641	811	942	1191	0.25912
R-PC2-11-03	5	11	21	29	37	45	52	66	0.01235
R-PC2-11-04	31	53	95	122	157	184	210	262	0.05100
R-PC2-11-05UP	51	93	175	268	398	488	568	729	0.15823
R-PC2-11-06	24	45	111	203	300	366	425	541	0.11186
R-PC2-11-06 UP	24	45	111	203	300	366	425	541	0.11186
R-PC2-11-06 UP E	51	86	148	188	238	276	314	388	0.06779
R-PC2-11-07	1	3	69	130	191	232	268	337	0.06285
R-PC2-11-08	11	20	37	48	62	74	84	105	0.01865
R-PC2-12-UP	1	1	14	27	46	63	78	105	0.02131
R-PC2-12-UP-E	72	126	215	272	345	401	456	561	0.09545
R-PC2-14	16	27	46	58	73	85	96	119	0.02144
R-PC2-14S	42	76	127	160	203	235	266	326	0.05205
R-PC2-15DN	21	39	65	82	104	120	135	166	0.02599
R-PC2-15 UP	9	16	27	34	42	49	55	67	0.01028
R-PC2-15UPE	12	22	38	48	61	71	81	99	0.01571

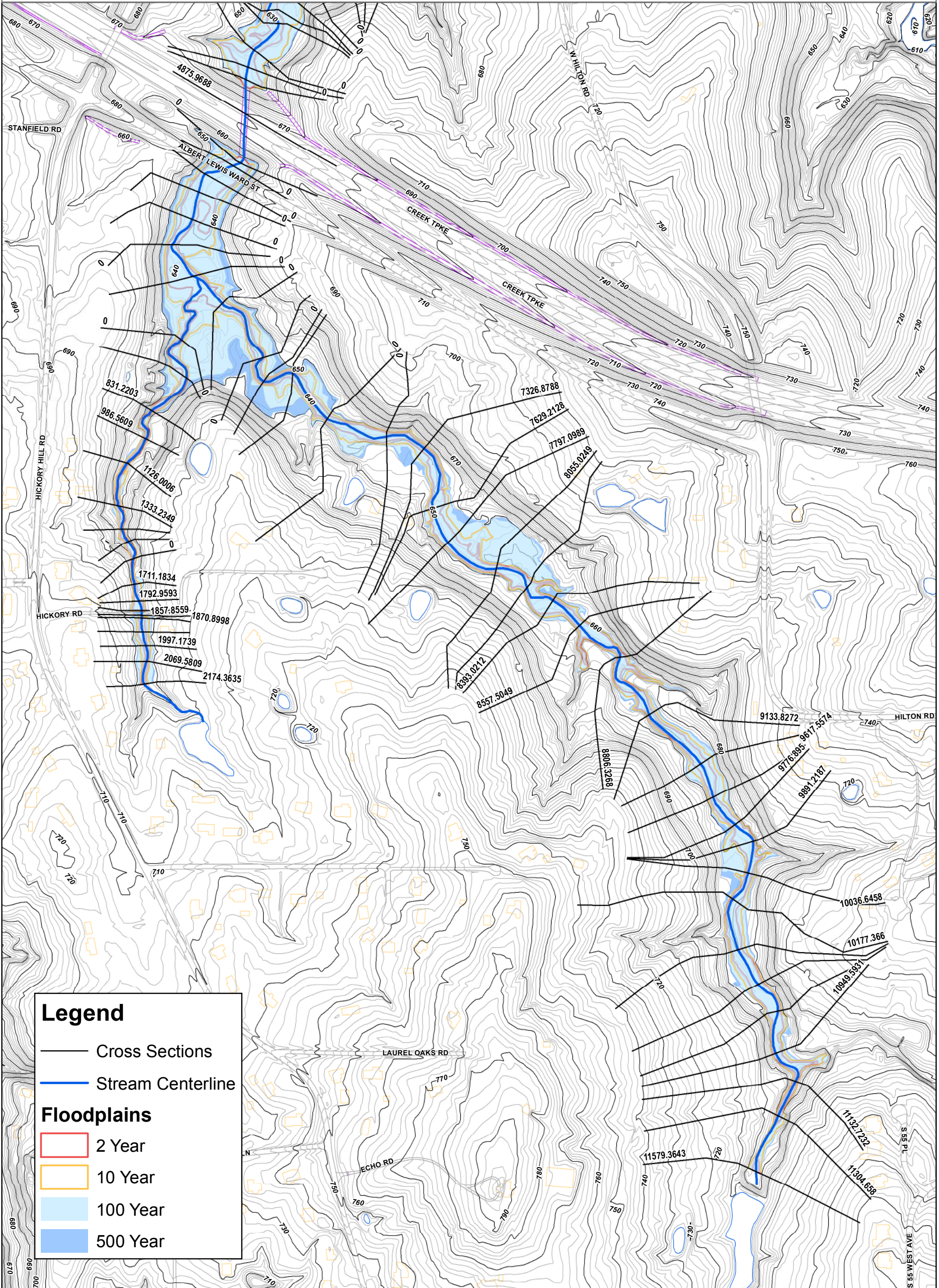


Legend

- Cross Sections
- Stream Centerline

Floodplains

- 2 Year
- 10 Year
- 100 Year
- 500 Year



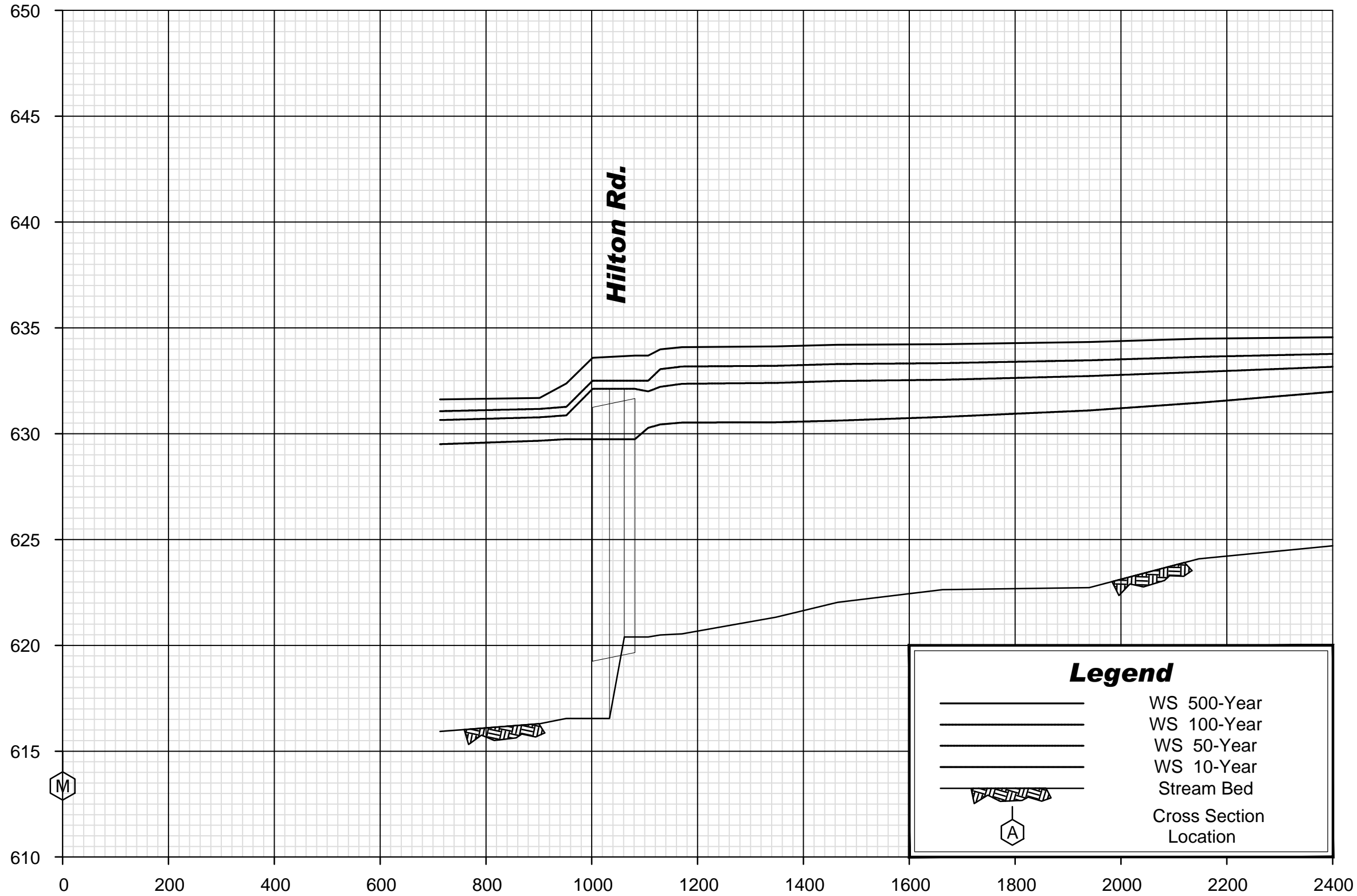
Legend

- Cross Sections
- Stream Centerline

Floodplains

- 2 Year
- 10 Year
- 100 Year
- 500 Year

Elevation
(Feet NAVD '88)



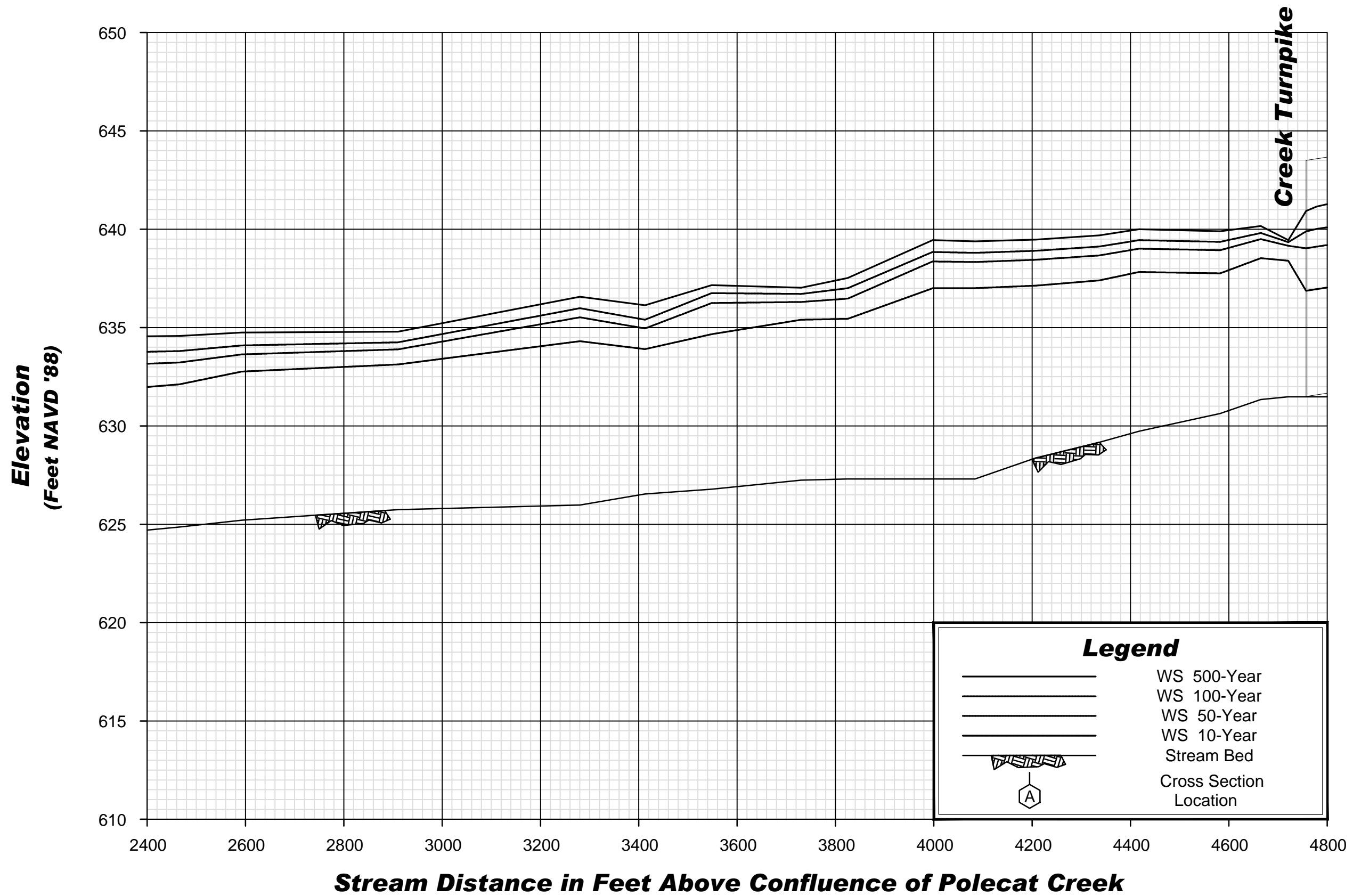
Stream Distance in Feet Above Confluence of Polecat Creek

Legend

- WS 500-Year
- WS 100-Year
- WS 50-Year
- WS 10-Year
- Stream Bed
- Cross Section Location

Appendix 12-E-1
Existing Flood Profiles
Polecat Tributary 2

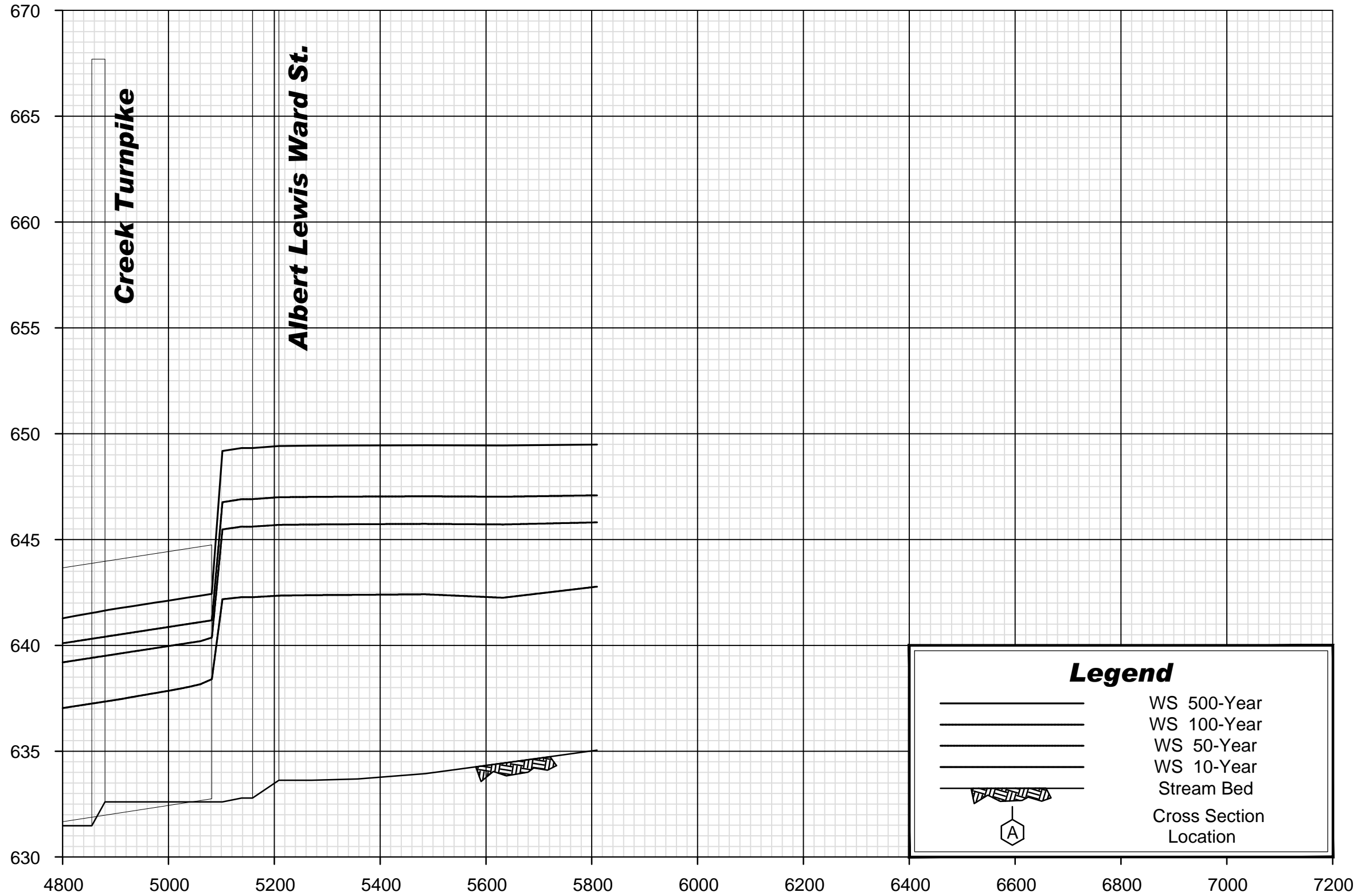
City of Sapulpa, OK
PREPARED BY
Meshek & Associates, PLC.
1437 S. Boulder Ave. - Suite 1080
Tulsa, OK 74119
(918) 392-5620



**Appendix 12-E-2
Existing Flood Profiles
Polecat Tributary 2**

City of Sapulpa, OK
 PREPARED BY
Meshek & Associates, PLC.
 1437 S. Boulder Ave. - Suite 1080
 Tulsa, OK 74119
 (918) 392-5620

Elevation
(Feet NAVD '88)



Legend

- WS 500-Year
- WS 100-Year
- WS 50-Year
- WS 10-Year
- Stream Bed
- Cross Section Location

Appendix 12-E-3
Existing Flood Profiles
Polecat Tributary 2

City of Sapulpa, OK
PREPARED BY
Meshek & Associates, PLC.
1437 S. Boulder Ave. - Suite 1080
Tulsa, OK 74119
(918) 392-5620



**Appendix 12-E-4
Existing Flood Profiles
Polecat Tributary 2
Hickory Hill Creek**

City of Sapulpa, OK
 PREPARED BY
Meshek & Associates, PLC.
 1437 S. Boulder Ave. - Suite 1080
 Tulsa, OK 74119
 (918) 392-5620

City of Sapulpa

Appendix 12-F. Polecat Tibutory 2 Drainage Basin - Problem Area 2 Alternate 1

ITEM	ITEM NO.	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	223.06	TEMPORARY SILT FENCE	LF	816	\$ 2.00	\$ 1,632.00
2	230.06(A)	SOLID SLAB BERMUDA SODDING	SY	363	\$ 2.50	\$ 906.67
3	411.06(A)	PAVEMENT REPLACEMENT	SY	68	\$ 50.00	\$ 3,400.00
4	509.06(E)	CLASS C CONCRETE	CY	44	\$ 300.00	\$ 13,286.04
5	613.06(B)	18" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	17	\$ 90.00	\$ 1,530.00
6	613.06(B)	36" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	49	\$ 120.00	\$ 5,880.00
7	613.06(S)	TRENCH EXCAVATION	CY	76	\$ 8.00	\$ 609.33
8	613.06(T)	STANDARD BEDDING MATERIAL	CY	41	\$ 20.00	\$ 829.14
9	619.06(B)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	\$ 10,000.00	\$ 10,000.00
10	619.06(B)	PAVEMENT REMOVAL	SY	68	\$ 7.00	\$ 476.00
Subtotal						\$ 38,549.18
15% Contingency						\$ 5,782.38
Subtotal						\$ 44,331.55
25% Utility Relocation Contingency						\$ 11,082.89
Total						\$ 55,414.44