



# LUKER AND VALLEY RIDGE DRAINAGE SYSTEM

# SAPULPA CITYWIDE MASTER DRAINAGE PLAN

JUNE 2010

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CIVIL & WATER RESOURCE ENGINEERING  
GEOGRAPHIC INFORMATION SYSTEMS

**TABLE OF CONTENTS**

**SECTION 10. LUKER AND VALLEY RIDGE DRAINAGE SYSTEM ..... 1**

    10.1.    EXISTING CONDITIONS HYDROLOGY..... 1

    10.2    EXISTING CONDITIONS HYDRAULICS..... 5

    10.3.    PROBLEM AREAS..... 9

    10.4    EVALUATION OF ALTERNATIVES..... 10

    10.5    RECOMMENDED PLAN..... 17

**LIST OF APPENDICES**

<u>NUMBER</u>	<u>TITLE</u>
APPENDIX 10-A	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - DRAINAGE BASIN HYDROLOGIC COEFFICIENTS
APPENDIX 10-B	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - HEC-HMS SCHEMATIC
APPENDIX 10-C	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - EXISTING FLOW RATES
APPENDIX 10-D	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM – FLOODPLAINS EXISTING CONDITIONS
APPENDIX 10-E	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM – EXISTING FLOOD PROFILES
APPENDIX 10-F	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM – ALTERNATIVE COST ESTIMATES

**LIST OF TABLES**

10-1	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM – SUMMARY OF HYDROLOGIC COEFFICIENTS EXISTING CONDITIONS ..... 1
10-2	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - EXISTING FLOW RATES AT MAJOR JUNCTIONS (CFS) ..... 5

**LIST OF FIGURES**

<u>NUMBER</u>	<u>TITLE</u>
10-1	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - DRAINAGE BASIN..... 2

10-2	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - HYDROLOGIC SOIL GROUPS.....	3
10-3	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - EXISTING LAND USE.....	4
10-4	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM –STUDIED SYSTEMS AND CAPACITY.....	6
10-5	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - PROBLEM AREAS AND ROAD OVERTOPPINGS .....	8
10-6	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM – PROBLEM AREA 2 ALTERNATIVE 1 .....	11
10-7	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - PROBLEM AREA 3 ALTERNATIVE 1 .....	12
10-8	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - PROBLEM AREA 3 ALTERNATIVE 2 .....	13
10-9	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM- PROBLEM AREA 4 ALTERNATIVE 1 .....	15
10-10	LUKER AND VALLEY RIDGE DRAINAGE SYSTEM - PROBLEM AREA 4 ALTERNATIVE 2 .....	16

## SECTION 10. LUKER AND VALLEY RIDGE DRAINAGE SYSTEM

### 10.1. EXISTING CONDITIONS HYDROLOGY

The Luker (LB) and Valley Ridge (VR) Drainage System is composed of two small independent basins which drain to South Polecat Creek. The basins and their location are depicted in **FIGURE 10-1**. The size and proximity of these basins lent themselves to a single model for the purpose of the hydrologic analysis. In general, this basin is bordered by Brenner Road on the east, Woodland Road on the south, Maybelle Drive on the west and Cleveland Avenue on the north.

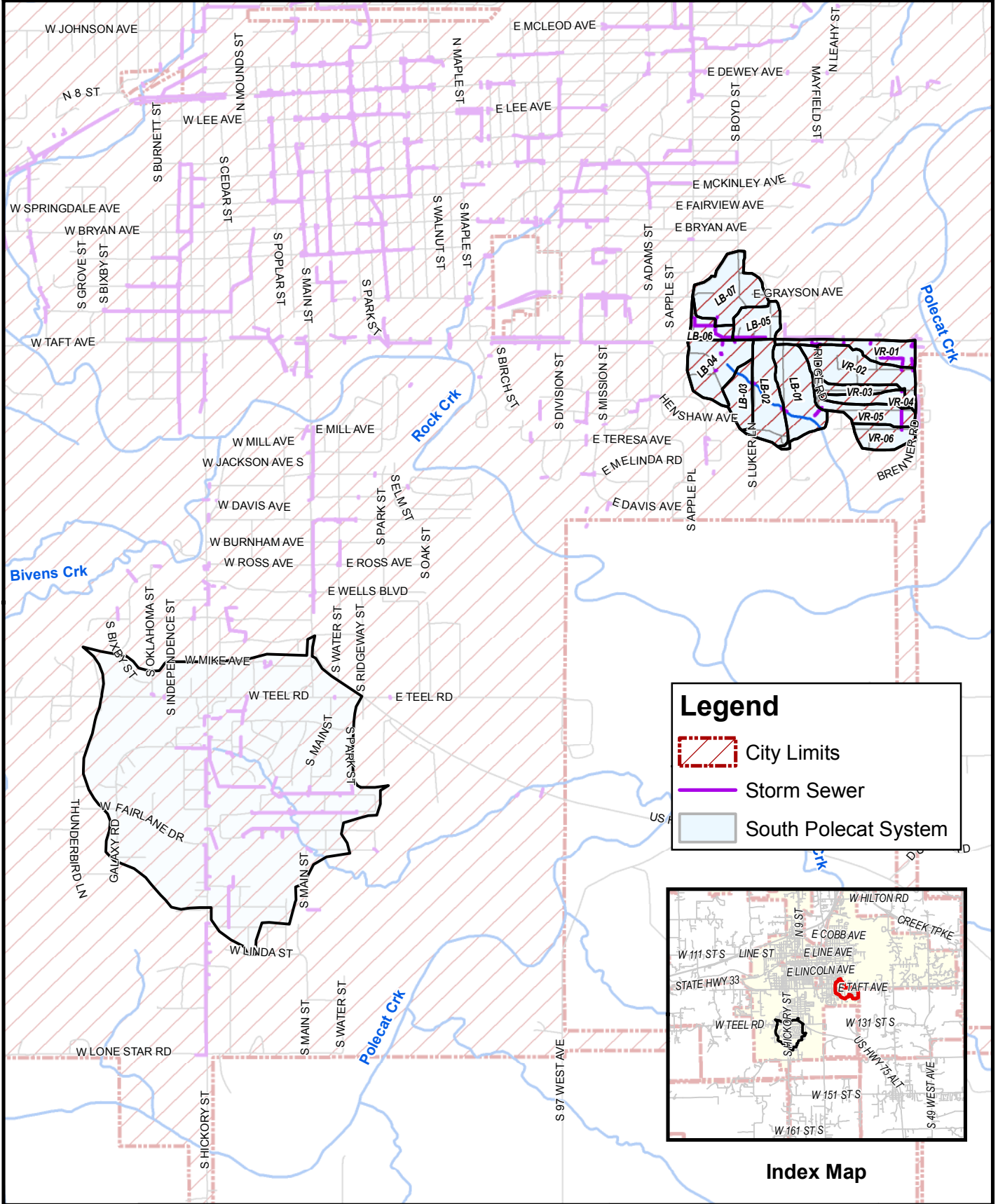
The hydrologic soil groups and existing land use for this system is depicted in **FIGURE 10-2** and **FIGURE 10-3** respectively. More information on the hydrologic soil groups can be found in **SECTION 2.1 HYDROLOGIC ANALYSIS**. This drainage basin is primarily residential development with a large area of commercial development on the north side of W. Taft Avenue. There are also some areas still being used as pasture land or held as forest land.

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 presented in **TABLE 10-1** below. More detailed data is available in **APPENDIX 10-A**.

**TABLE 10-1. SOUTH POLECAT CREEK SYSTEMS – LUKER AND VALLEY RIDGE DRAINAGE SYSTEM  
SUMMARY OF HYDROLOGIC COEFFICIENTS FOR EXISTING CONDITIONS**

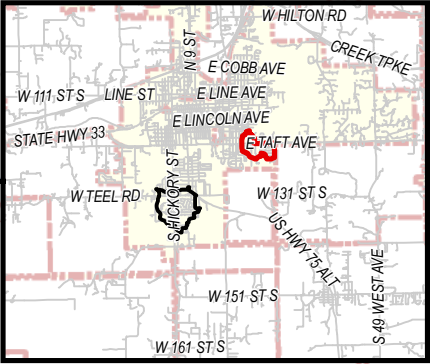
Sub-Area	Drainage Area, Acres	Lag Time, Minutes	Composite CN
LB-01	16.3	3.90	78
LB-02	14.5	4.00	74
LB-03	7.0	2.70	72
LB-04	15.0	2.80	81
LB-05	7.5	3.30	82
LB-06	4.4	3.40	84
LB-07	16.6	5.50	68
VR-01	9.0	4.50	82
VR-02	15.4	3.60	81
VR-03	5.9	6.10	82
VR-04	4.6	4.60	80
VR-05	8.3	3.40	80
VR-06	6.6	6.20	78

The drainage basin was modeled using HEC-HMS. The HEC-HMS schematic to develop the flow rates for the Luker and Valley Ridge Drainage System can be found in **APPENDIX 10-B**, and a complete list of the flow rates for the existing conditions is located in **APPENDIX 10-C**. **TABLE 10-2** on a following page shows the resulting flow rates at major junctions for this drainage system.

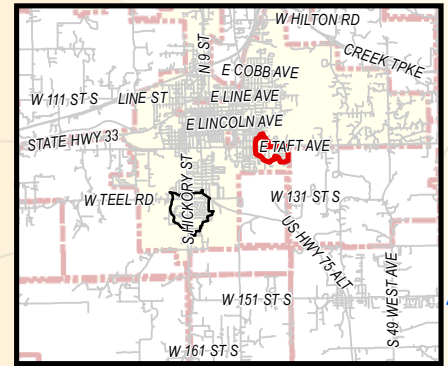


**Legend**

- City Limits
- Storm Sewer
- South Polecat System



Index Map



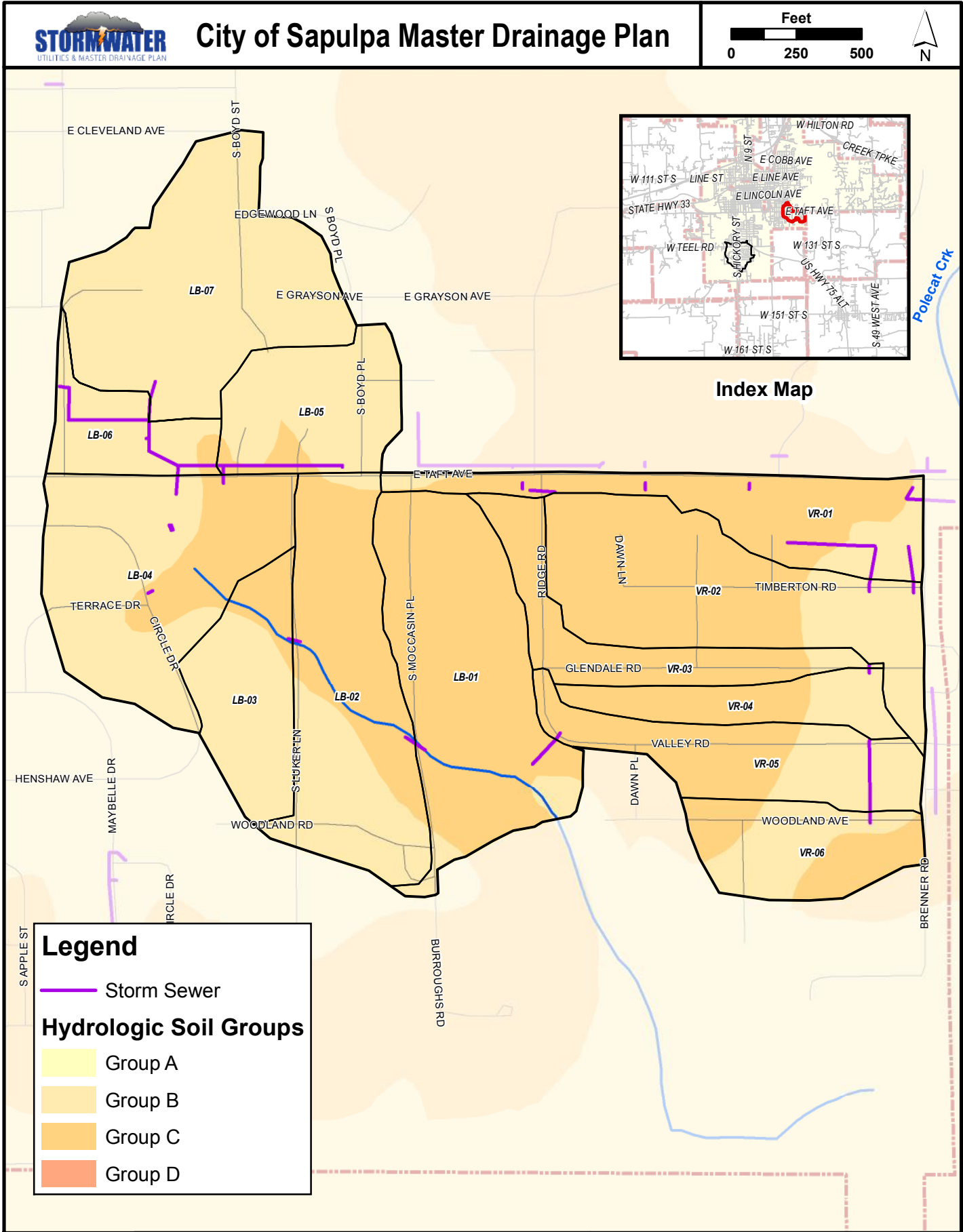
**Index Map**

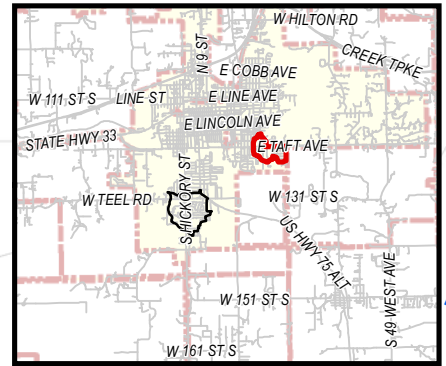
**Legend**

- Storm Sewer

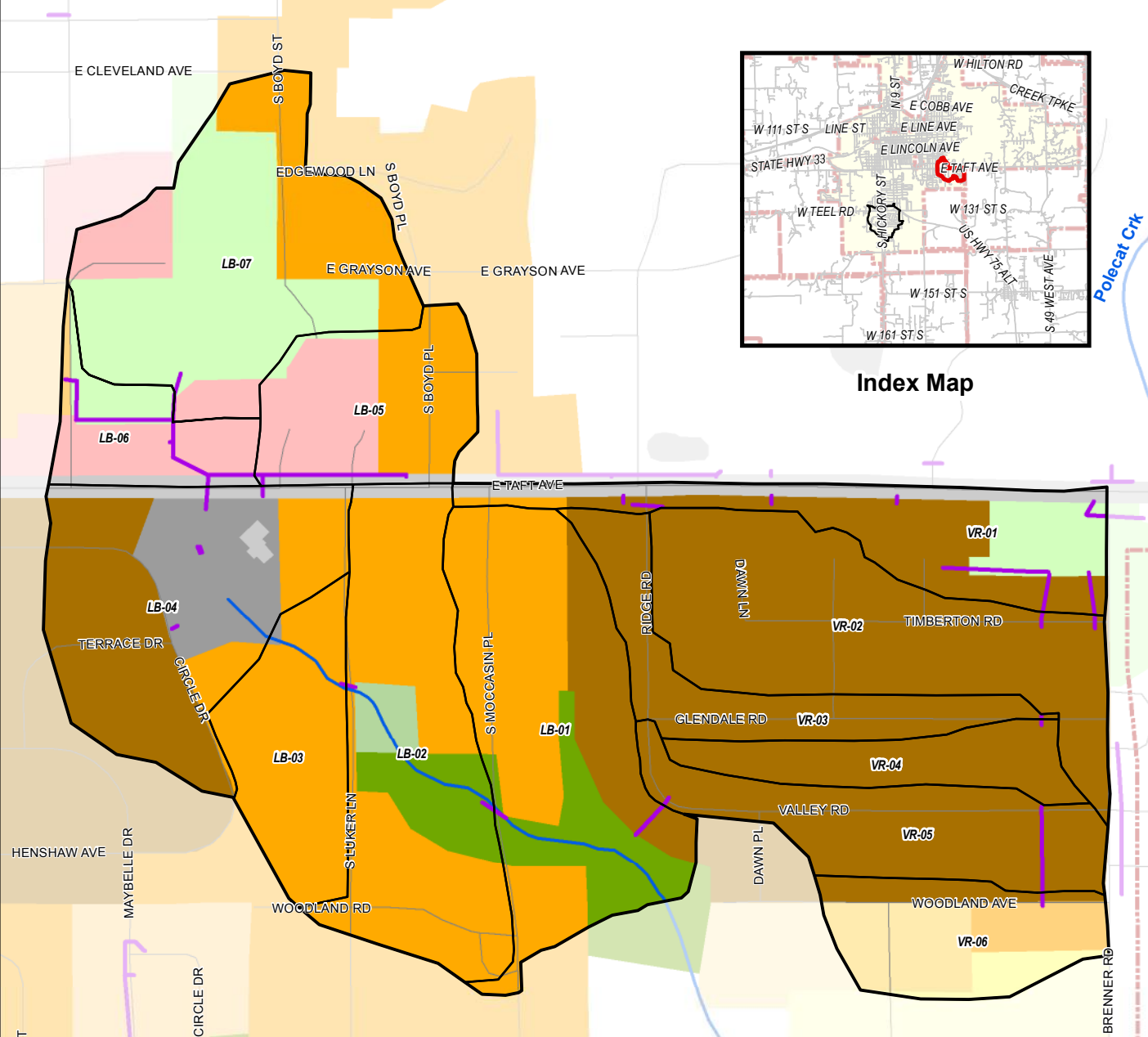
**Hydrologic Soil Groups**

- Group A
- Group B
- Group C
- Group D





Index Map



## Legend

— Storm Sewer

### Existing Land Use

Commercial

Industrial

Graded Development Areas

Impervious

Residential 2 Acre

Residential 1 Acre

Residential 1/3 Acre

Residential 1/2 Acre

Residential 1/4 Acre

Pasture: Poor Condition

Pasture: Fair Condition

Pasture: Good Condition

Forest: Poor Cover

Forest: Good Cover

SAPPLE ST

HENSHAW AVE

MAYBELLE DR

CIRCLE DR

TERRACE DR

CIRCLE DR

LB-06

LB-04

LB-03

WOODLAND RD

CIRCLE DR

LB-07

S BOYD ST

EDGEWOOD LN

S BOYD PL

S BOYD PL

E TAFT AVE

S MOCCASIN PL

SLUKER LN

WOODLAND RD

E GRAYSON AVE

E GRAYSON AVE

LB-05

E TAFT AVE

LB-01

LB-02

LB-03

WOODLAND RD

RIDGE RD

GLLENDALE RD

VALLEY RD

WOODLAND AVE

DAWN LN

VR-03

DAWN PL

WOODLAND AVE

VR-01

VR-02

VR-04

VR-05

VR-06

VR-02

VR-03

VR-04

VR-05

VR-06

VR-06

BRENNER RD

**TABLE 10-2. SOUTH POLECAT CREEK SYSTEM – LUKER AND VALLEY RIDGE DRAINAGE SYSTEM  
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
J_LB-01	Woodland Ave	43	61	109	153	261	343	420	561
J_LB-02	Moccasin Pl	41	62	108	167	265	325	396	503
J_LB-03	Luker Ln	48	82	141	176	225	265	305	391
J_LB-06	Taft Ave	24	43	79	103	133	157	181	227
J_VR-01	Taft Ave & Brenner St	49	74	122	152	186	206	226	270
J_VR-02	Timberton Rd	45	69	108	133	157	176	199	240
J_VR-03	DS of Glendale Rd	27	40	60	98	135	156	176	215
J_VR-04	US of Glendale Rd	19	28	43	73	101	117	132	161
J_VR-05	Valley Rd	17	29	49	62	78	88	98	120
J_VR-06	Woodland Ave	7	12	21	26	33	39	44	55

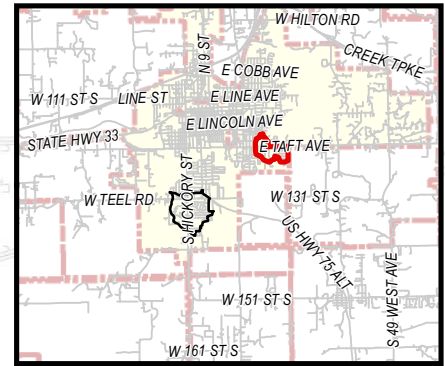
## 10.2. EXISTING CONDITIONS HYDRAULICS

Existing conveyance systems, including floodplains and storm sewers, for the Luker and Valley Ridge Drainage System were studied and can be seen in **FIGURE 10-4**. In general, this drainage system consists of a small number of storm sewers varying in size and type from a few 18-inch CMPs and RCPs to one 48-inch RCP and one - 3 X 3-foot RCB as well as some street culverts. The most extensive storm sewer is located along State Highway 117 from approximately S. Boyd Place westward to Circle Drive at which point it turns northward and then continues to S. Watchorn Street.

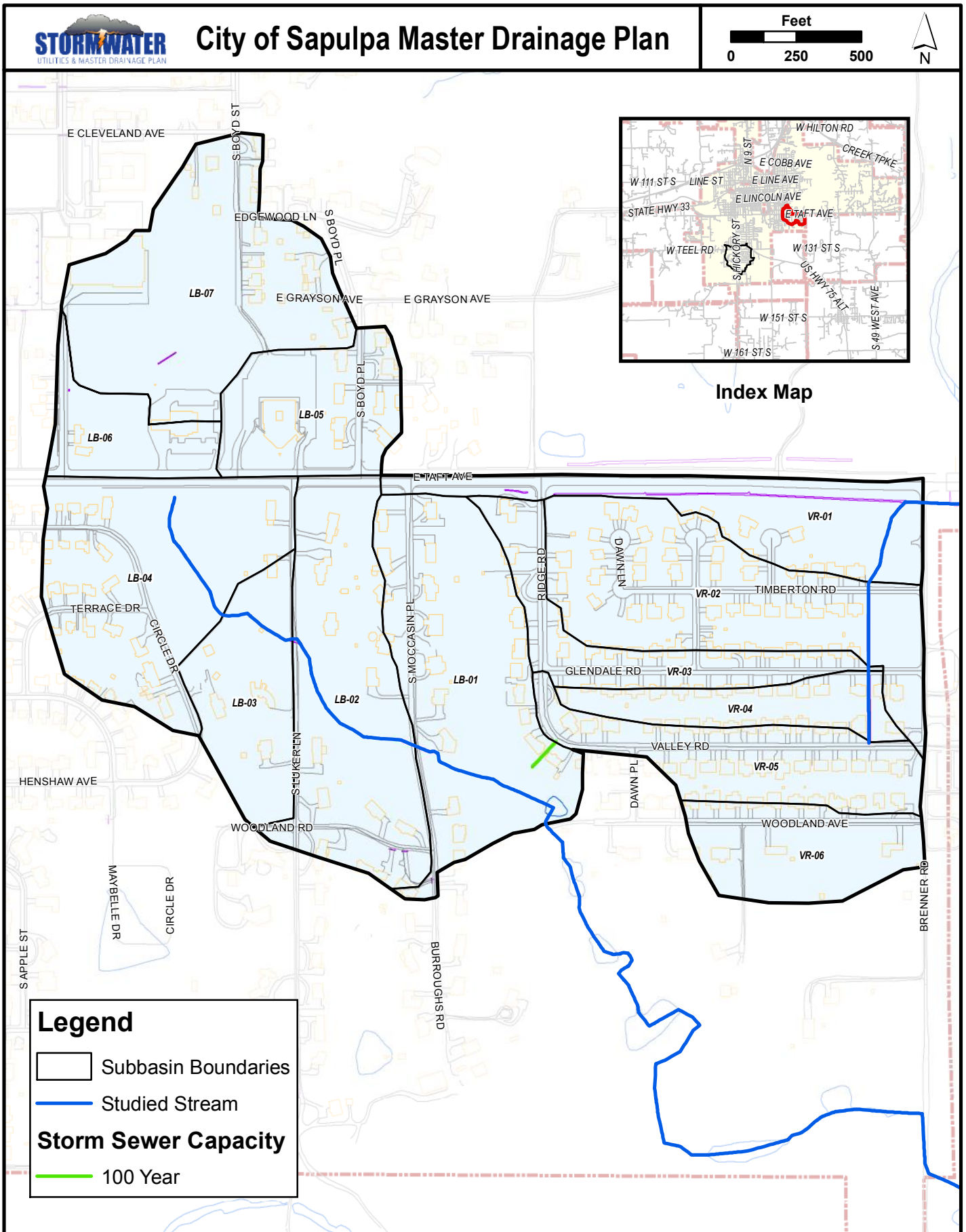
A StormCAD model was used to analyze the flow through the storm sewer system. The pipe capacities from the StormCAD model were compared with the 1 – 500-year HMS flow rates to determine the existing capacities of each pipe in the system. Tables with flow rates and capacities are included in **APPENDIX 10-C**.

The floodplains in this drainage system were mapped for the 2-, 10-, 100- and 500-year frequency events. The general location of the floodplains studied is shown in **FIGURE 10-4** with detailed floodplain maps found in **APPENDIX 10-D**. Buildings located within the floodplain are also shown. The resulting water surface profiles for each frequency are presented in **APPENDIX 10-E**.





Index Map



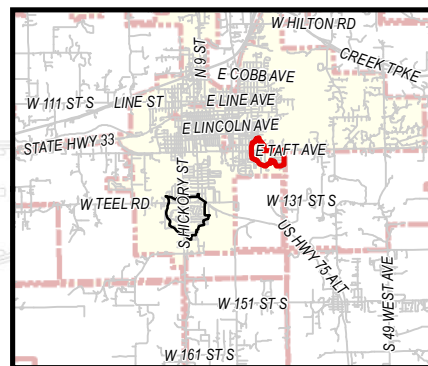
**Legend**

- Subbasin Boundaries
- Studied Stream

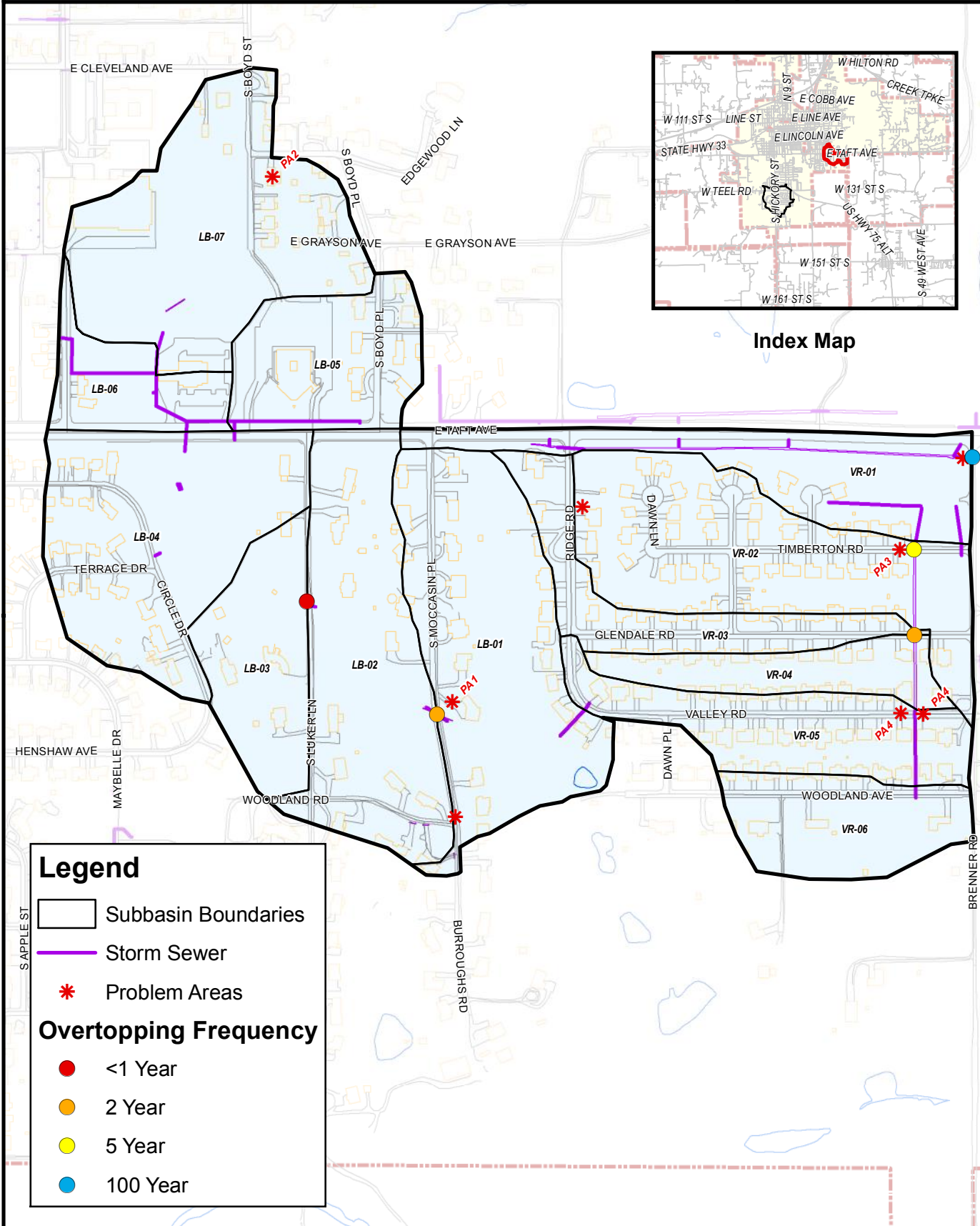
**Storm Sewer Capacity**

- 100 Year

Finally, bridges and culverts were studied to determine the likelihood of being overtopped during certain storm frequencies and are depicted in **FIGURE 10-5**. Five structure overtoppings occur in this drainage basin; all are located south of Taft Avenue between Brenner Road and Luker Lane. Only one of the five structures, the one on Taft Avenue and Brenner Road, is adequate to carry a storm frequency of a magnitude greater than a 20% annual chance event.



**Index Map**



**Legend**

- Subbasin Boundaries
- Storm Sewer
- Problem Areas

**Overtopping Frequency**

- <1 Year
- 2 Year
- 5 Year
- 100 Year

### 10.3. PROBLEM AREAS

Problem Areas in the Luker and Valley Ridge Drainage System were provided by the City of Sapulpa or were obtained from citizens at a 2008 Public Meeting. Both basins have only a few Problem Areas which are discussed below and shown in **FIGURE 10-5**.

The following is a summary of the Problem Areas identified in the **Luker Drainage Basin**.

A. **Problem Area 1: 1013 S. Moccasin Place**

This house is located at one of the lower points on S. Moccasin Road and is between the north and south ridges for Luker Basin. Stormwater from Highway 117 and Woodland Road also drain to this area. This results in erosion problems for the property as well as endangering the residence.

Just south of this property, a 36-inch RCP crosses S. Moccasin Place at its lowest point to catch the stormwater and drain it to two low areas on each side of the street. A tree in front of the storm drain may also be an obstacle preventing some water from entering the pipe.

B. **Problem Area 2: 1410 Edgewood Lane**

According to the individual submitting this problem, the street was raised at Edgewood Lane and S. Boyd Street and has resulted in water backing up into this garage and yard. In addition, the curb no longer is able to divert the water away from this property.

A summary of the two Problem Areas identified in the **Valley Ridge Drainage Basin** follow.

A. **Problem Area 3: 1924 Timberton Road**

The southern outlet for the 7 X 2-foot RCB at Glendale Road is slightly higher than northern end of the box structure. This results in standing water in the drainage ditch between Timberton Road and Glendale. According to the individual, the drainage ditch has become a habitat and breeding ground for snakes, turtles, mosquitoes and overgrown weeds. Water has also reportedly gotten close to the dwelling at 1924 Timberton Road, and an adjacent neighbor has had water up to the foundation of his home.

B. **Problem Area 4: 1928 Valley Road and 1934 Valley Road**

A 30-inch CMP runs between these two properties and 1928 Valley Road has developed a sinkhole. The individual wants the current condition of the pipe to be determined.

#### 10.4. EVALUATION OF ALTERNATIVES

Alternatives for the Problem Areas in the Luker Drainage Basin were considered. These alternatives follow:

A. Problem Area 1: 1013 S. Moccasin Place

This problem was addressed by the City of Sapulpa, so no alternatives were considered.

B. Problem Area 2: 1410 Edgewood Lane

Alternative 1 - Construct drainage ditch (10% annual chance storm event). Starting 80 feet west of the intersection at Edgewood Lane and Boyd Street, this alternative calls for the excavation of an open, natural drainage ditch west to the intersection. At Boyd Street, the system would be enclosed with approximately 50 feet of 18-inch RCP with an outfall on the west side of Boyd Street. From Boyd Street, the open ditch would continue another 50 feet west. This system would convey a 10% annual chance storm frequency.

The cost for this alternative is \$18,000 and is detailed in **FIGURE 10-6**.

Alternatives were also considered for the Valley Ridge Drainage Basin. They are:

A. Problem Area 3: 1924 Timberton Road

Alternative 1 - Construct new storm sewer system with inlets (10% annual chance). This alternative proposes the construction of a new storm sewer system starting at the intersection of Timberton Road and Regency Road and extending approximately 290 feet east and then north approximately 370 feet to the outfall. The storm sewer constructed along Timberton Road would be a 24-inch RCP. The north leg of the pipe extending to the outfall would be sized as a 42-inch RCP.

This alternative would also construct a total of six 4-foot Shawnee steel inlets as well. Three of the inlets would be added to the intersection at Regency and Timberton Roads, two at the intersection of Shadow Lane and Timberton Road, and the last one on the east side of the cul de sac at Shadow Lane. In total, these inlets would be connected by 54 feet of 18-inch RCP and 70 feet of 12-inch RCP.

The cost for this alternative is \$187,500 and is shown in **FIGURE 10-7**.

Alternative 2 - Construct new storm sewer system with inlets (1% annual chance). This alternative is similar to that of Alternative 1 with larger pipe sizes and inlet sizes. The pipe would follow the same alignment and would be constructed to handle a storm frequency of a 1% annual chance. Six Shawnee steel inlets would also be constructed in the same locations.

The pipe extending east from the intersection at Regency Road and Timberton Road would be sized as 289 feet of 30-inch RCP and the pipe proceeding north from Timberton Road to the outfall would be sized as 369 feet a 4 x 3-foot RCB.

The cost for this alternative is \$321,900 and is shown in **FIGURE 10-8**.



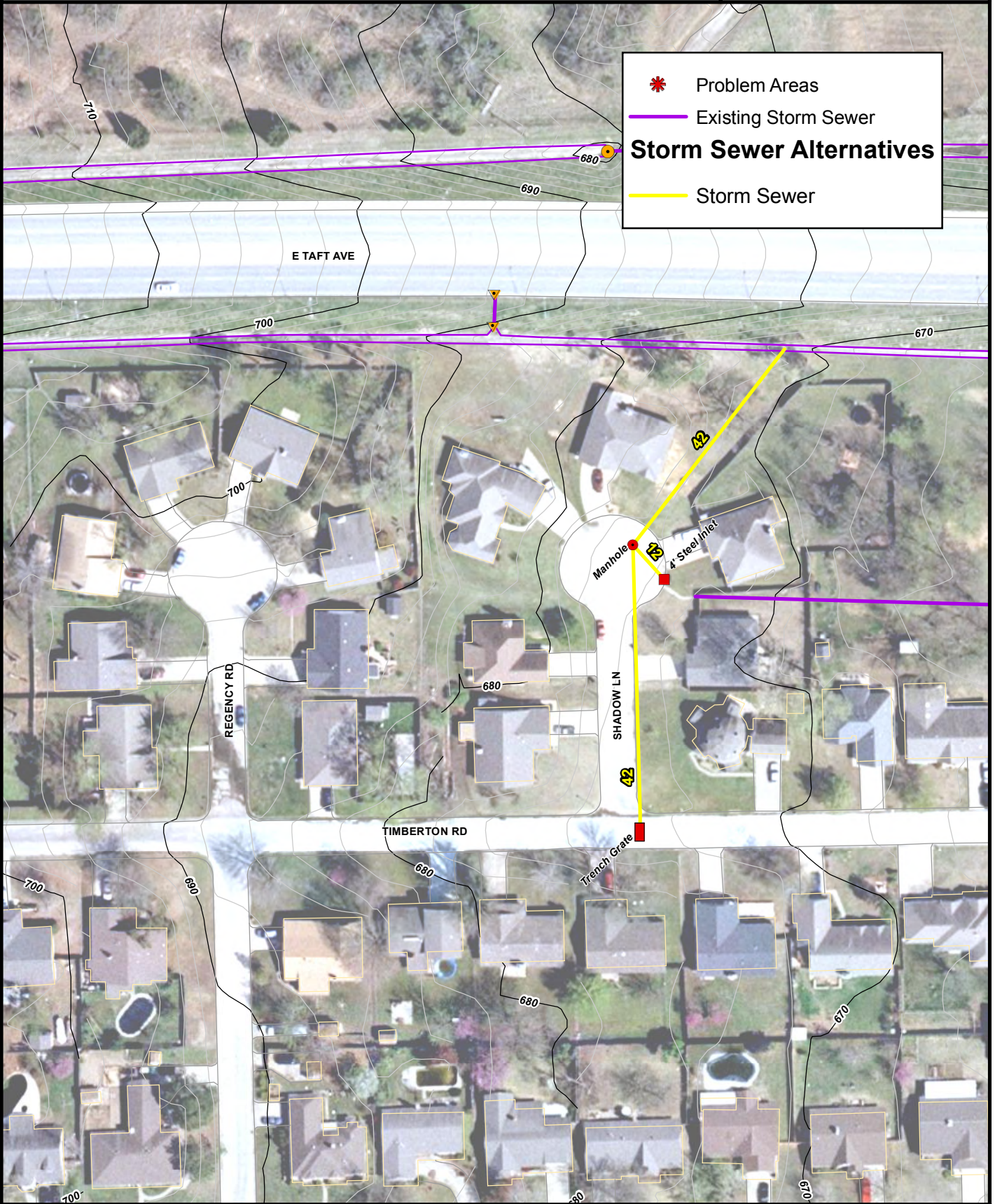
- \* Problem Areas
- Existing Storm Sewer

**Storm Sewer Alternatives**

- = Culvert
- - - Concrete Lined Ditch

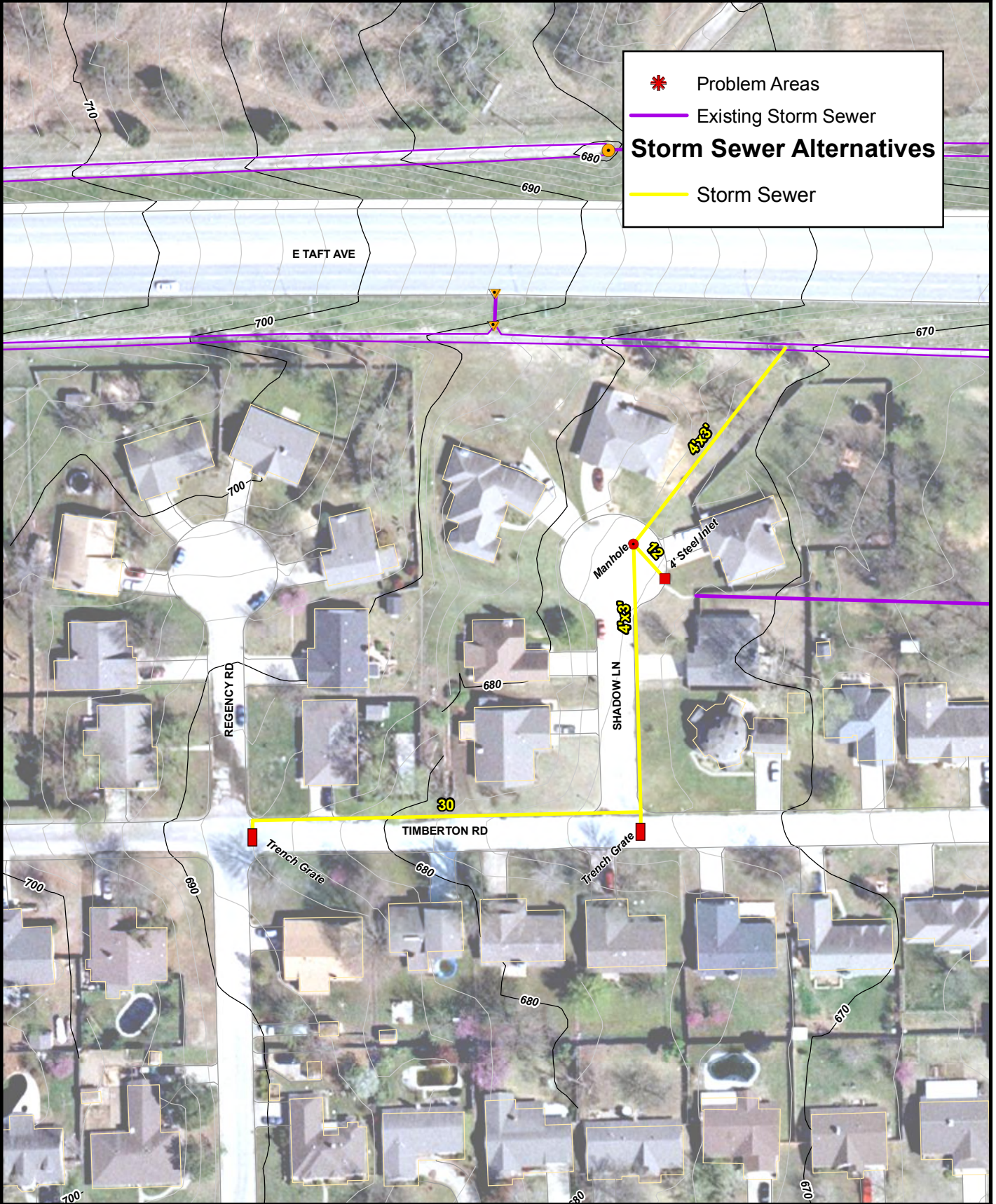
**Storm Sewer Alternatives**

- \* Problem Areas
- Existing Storm Sewer
- Storm Sewer



**Storm Sewer Alternatives**

- \* Problem Areas
- Existing Storm Sewer
- Storm Sewer





B. Problem Area 4: 1928 Valley Road and 1934 Valley Road

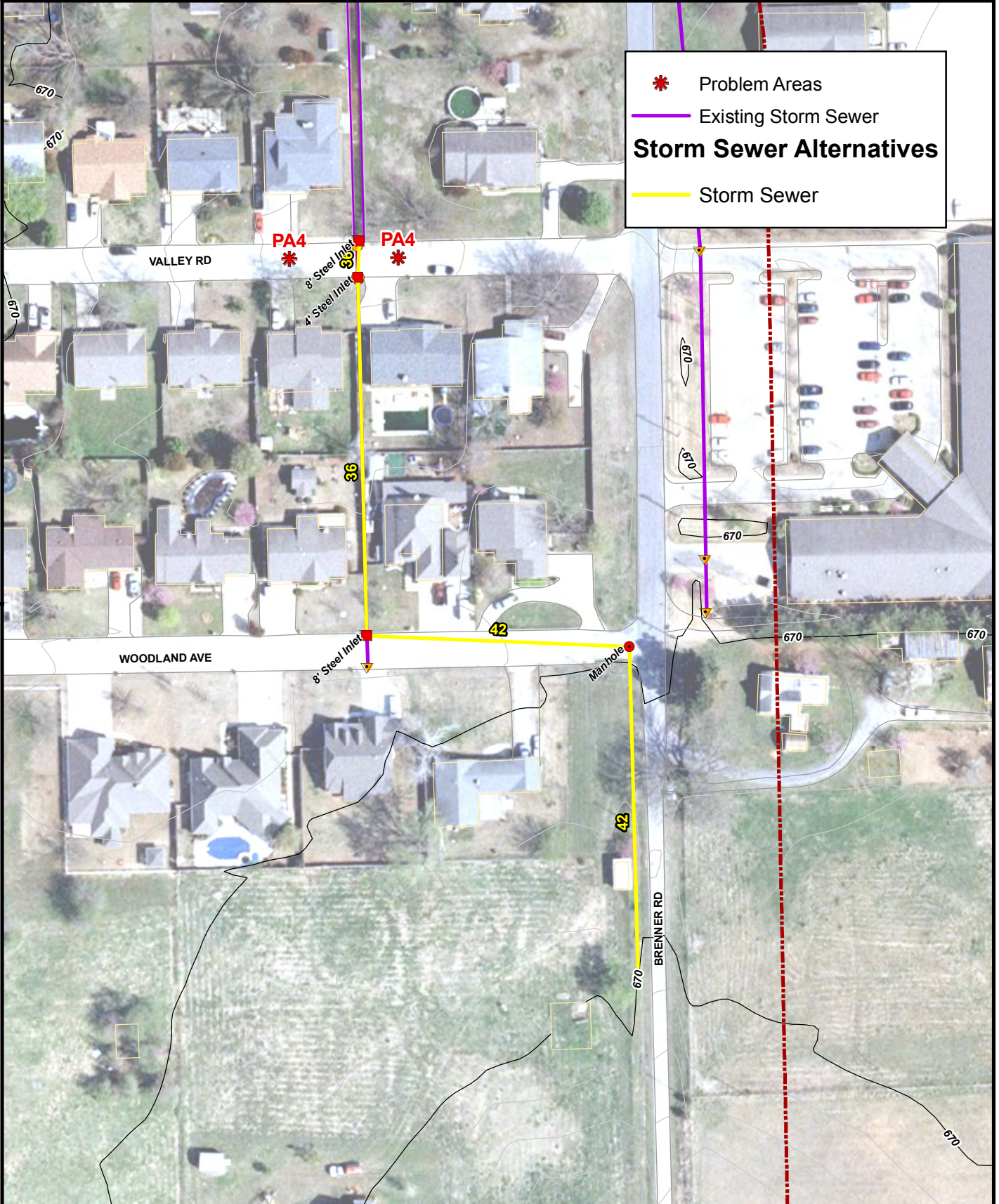
Alternative 1 - Construct a new storm sewer to handle a 10% annual chance storm event. Alternative 1 would construct a new storm sewer system to handle a 10% annual chance event. The new storm sewer system would begin at Valley Road 200 west of Brenner Road with one 8-foot Shawnee steel inlet on the north side of Valley Road and one 4-foot Shawnee steel inlet on the south side of Valley Road. Approximately 290 feet of 36-inch RCP would be constructed from this point south to Woodland Avenue. On the north side of Woodland Avenue, an 8-foot Shawnee steel inlet would then collect the stormwater and direct it into 196 feet of 42-inch RCP. The 42-inch pipe would then be redirected south for 736 feet to the outfall.

This alternative is estimated to cost \$500,000 and is depicted in **FIGURE 10-9**.

Alternative 2 - Construct a new storm sewer system with inlets (1% annual chance). Alternative 2 follows the same alignment as Alternative 1 and would handle a 1% annual chance storm event. Beginning at Valley Road 200 west of Brenner Road, one 8-foot Shawnee steel inlet would be installed on the north side of Valley Road and another on the south side of Valley Road. From there, 292 feet of 42-inch RCP would be constructed to Woodland Avenue. Along the north side of Woodland Avenue, an 8-foot Shawnee steel inlet would collect water and then be directed east in 196 feet of 54-inch RCP. At that point, the pipe size would change to a 54-inch pipe south for 750 feet to the outfall.

Alternative 2 would cost approximately is \$660,000 and is pictured in **FIGURE 10-10**.

\* Problem Areas  
 — Existing Storm Sewer  
**Storm Sewer Alternatives**  
 — Storm Sewer

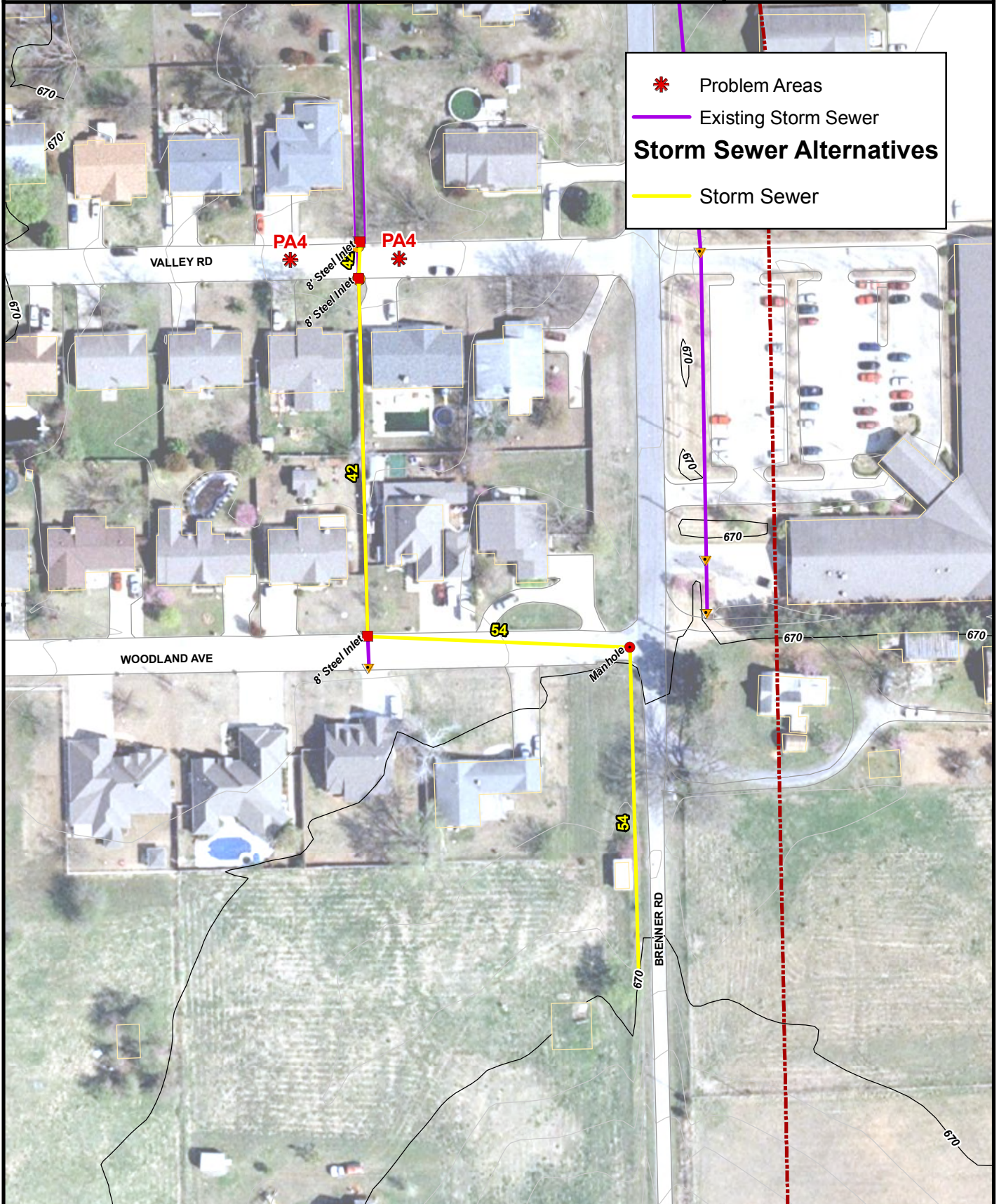


\* Problem Areas

— Existing Storm Sewer

**Storm Sewer Alternatives**

— Storm Sewer



10.5. RECOMMENDED PLAN

Using the prioritization criteria from **SECTION 1 INTRODUCTION** and discussions with City staff, the following alternatives were selected for the Luker and Valley Ridge Drainage System. In some cases in which the City had addressed the problem, no further action was needed. For more details, please refer to the text and exhibits in **SECTION 10-4 EVALUATION OF ALTERNATIVES** and **APPENDIX 10-F**.

The Recommended Plan for the Luker and Valley Ridge Drainage System is:

<b>PROBLEM AREA</b>	<b>RECOMMENDED ALTERNATIVE</b>	<b>RATIONALE FOR SELECTION</b>	<b>ESTIMATED COST</b>
Problem Area 1	No Action	The City has addressed this problem.	-0-
Problem Area 2	No Action	The City has addressed this problem.	-0-
Problem Area 3	Alternative 2	Alternatives 1 and 2 are similar except Alternative 2 provides a greater protection to the public at a cost that could be funded with the annual stormwater fee.	\$321,900
Problem Area 4	Alternative 1	Alternative 1 would provide protection for storm events having a 10% annual chance and could be funded with the stormwater utility fee. It would also improve an existing system in poor condition.	\$500,000
		<b>TOTAL COST</b>	<b>\$821,900</b>

**Appendix 10-A. South Polecat Systems - Luker and Valley Ridge Drainage System - Hydrologic Coefficients for Existing Conditions**

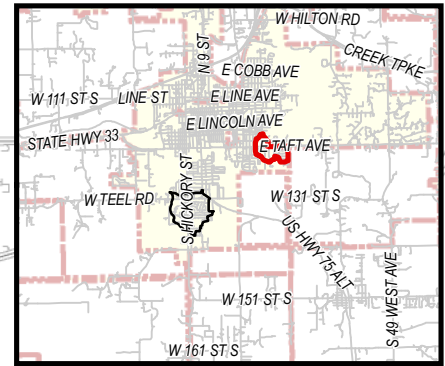
Tributary Subarea	Flow Type	Length (ft)	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)																									
										A	B	C	D	A	B	C	D																												
LB-01	Overland Channel (ditch) Paved Pipe Stream	1696	5.74	1.68	0.99	0.00	0.06	Forest (good cover) Residential 1/2 acre Residential 1/4 acre	22 54 24	25	55	70	77	0.0	3.3	19.0	0.0	0.0	77.7	16.3	0.02549																								
																						7.81	4.22	2.37	7	49	69	79	84	0.0	0.3	6.6	0.0												
																																		2.48	3.14	1.71	2	98	98	98	98	0.0	1.5	0.8	0.0
LB-02	Overland Channel (ditch) Paved Pipe Stream	1529	7.30	4.08	2.77	0.00	0.07	Residential 1/2 acre Graded Development Areas	99 1	54	70	80	85	0.0	80.0	19.2	0.0	72.1	7.0	0.01101																									
																					5.11	1.59	1.70	7	77	86	91	94	0.0	0.0	0.7	0.0													
																																	7.30	4.00	0.00	0	98	98	98	98	0.0	0.0	0.0		
																																												7.30	4.00
LB-03	Overland Channel (ditch) Paved Pipe Stream	841	6.47	1.28	1.94	0.00	0.04	Graded Development Areas Impervious Paved Road: Curb and Residential 1/2 acre Residential 1/4 acre	28 1 6 16 49	77	86	91	94	0.0	13.3	14.6	0.0	80.9	15.0	0.02348																									
																					3.32	3.26	0.02	6	98	98	98	98	0.0	0.0	1.2	0.0													
																																	829.06	58.79	0.00	16	54	70	80	85	0.0	4.9	11.3	0.0	
																																													6.47
LB-04	Overland Channel (ditch) Paved Pipe Stream	1066	3.72	1.46	1.44	0.00	0.06	Commercial Pasture: Good Condition Paved Road: Curb and Residential 1/2 acre	46 3 6 45	89	92	94	95	0.0	39.1	6.5	0.0	81.7	7.5	0.01178																									
																					4.32	0.00	0.00	3	39	61	74	80	0.0	2.9	0.0	0.0													
																																	3.72	3.86	4.06	6	98	98	98	98	0.0	2.5	4.0	0.0	
																																													3.72
LB-05	Overland Channel (ditch) Paved Pipe Stream	1007	2.17	0.00	0.00	3.4	0.06	Commercial Paved Road: Curb and Storm Sewer Pasture: Good Condition Residential 1/3 acre	57 12 26 4	89	92	94	95	0.0	52.0	4.9	0.0	83.7	4.4	0.00692																									
																					0.85	0.00	0.00	12	98	98	98	98	0.0	10.7	1.5	0.0													
																																	2.17	1.84	2.66	26	39	61	74	80	0.0	26.5	0.0	0.0	
																																													2.17

**Appendix 10-A. South Polecat Systems - Luker and Valley Ridge Drainage System - Hydrologic Coefficients for Existing Conditions**

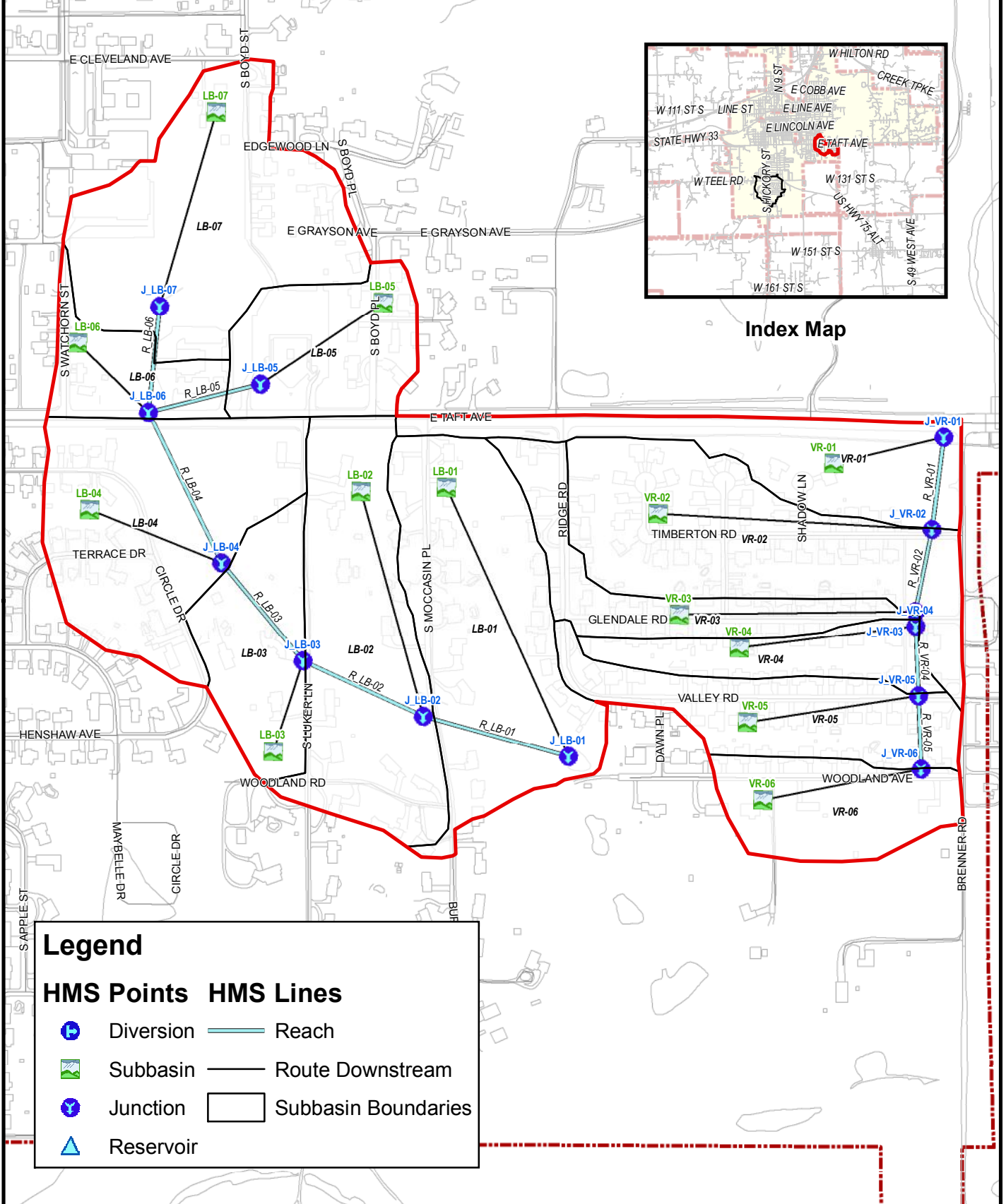
Tributary Subarea	Flow Type	Length (ft)	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)		
										A	B	C	D	A	B	C	D					
LB-07	Overland Channel (ditch) Paved Pipe Stream	924 153 645 126	1.39 2.32 0.64	0.83 2.27 1.58 0.00 0.00	3.09 4.74 1.33 0.00 0.00				Commercial Pasture: Good Condition Residential 1/3 acre Residential 1/2 acre	14 58 0 28	89	92	94	95	0.0	13.9	0.0	0.0	67.8	16.6	0.02599	
											39	61	74	80	0.0	58.0	0.0	0.0				
											57	72	81	86	0.0	0.0	0.0	0.0				
											54	70	80	85	0.0	28.1	0.0	0.0				
VR-01	Overland Channel (ditch) Paved Pipe Stream	2026 85 1941	5.19 6.00	1.60 0.00 4.91 0.00 0.00	0.88 0.00 6.59 0.00 0.00			Paved Road: Curb and Storm Sewer Pasture: Good Condition Residential 1/2 acre Residential 1/4 acre	22 23 3 52	98	98	98	98	0.0	3.2	18.7	0.0	81.8	9.0	0.01404		
										39	61	74	80	0.0	10.5	12.9	0.0					
										54	70	80	85	0.0	0.8	2.1	0.0					
										61	75	83	87	0.0	11.0	40.8	0.0					
VR-02	Overland Channel (ditch) Paved Pipe Stream	1517 338 1179	9.46 4.22	0.00 4.66 4.11 0.00 0.00	0.00 1.21 4.78 0.00 0.00			Residential 1/4 acre	100	61	75	83	87	0.0	28.8	71.2	0.0	80.7	15.4	0.02403		
VR-03	Overland Channel (ditch) Paved Pipe Stream	2066 231 1835	6.23 6.37	1.76 3.80 0.00 0.00 0.00	2.20 8.04 0.00 0.00 0.00			Residential 1/2 acre Residential 1/4 acre	0 100	54	70	80	85	0.0	0.0	0.2	0.0	82.4	5.9	0.00922		
										61	75	83	87	0.0	7.2	92.7	0.0					
VR-04	Overland Channel (ditch) Paved Pipe Stream	1330 137 1061 133	9.73 4.70 0.75	2.20 3.26 1.73 0.00 0.00	1.04 5.43 1.28 0.00 0.00			Residential 1/4 acre	100	61	75	83	87	0.0	36.0	64.0	0.0	80.1	4.6	0.00720		
VR-05	Overland Channel (ditch) Paved Pipe Stream	1480 1480	4.72	0.00 0.00 4.35 0.00 0.00	0.00 0.00 5.67 0.00 0.00			Residential 1/4 acre	100	61	75	83	87	0.0	42.7	57.3	0.0	79.6	8.3	0.01302		

**Appendix 10-A. South Polecat Systems - Luker and Valley Ridge 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			
VR-06	Overland Channel (ditch) Paved Pipe Stream	591	1.85	0.00	0.00	0.00	0.00	Impervious Residential 1 acre Residential 1/3 acre Residential 1/4 acre	16	98	98	98	98	0.0	1.5	14.7	0.0	78.3	6.6	0.01034
				2.02	2.80	2.80	2.80		0.0	31.3	10.5	0.0								
				0.56	7.55	7.55	7.55		0.0	8.6	15.1	0.0								
				0.00	0.00	0.00	0.00		0.0	10.1	8.2	0.0								
				0.00	0.00	6.2	0.10		18	61	75	83	87							



**Index Map**



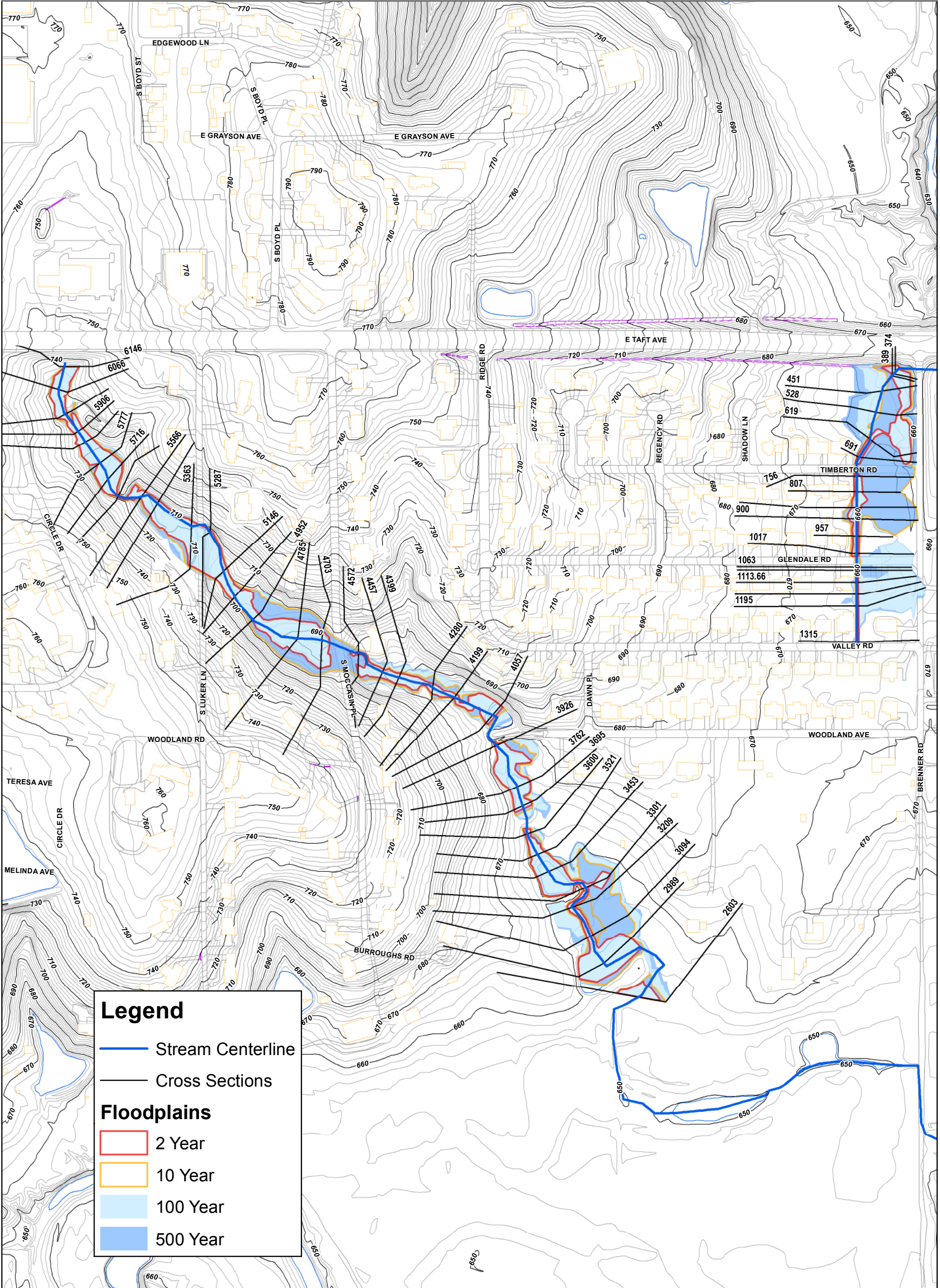
**Legend**

	Diversion		Reach
	Subbasin		Route Downstream
	Junction		Subbasin Boundaries
	Reservoir		



**Appendix 10-C. South Polecat Systems - Luker and Valley Ridge 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 <sup>2</sup>
J_LB-01	43	61	109	153	261	343	420	561	0.127
J_LB-02	41	62	108	167	265	325	396	503	0.102
J_LB-03	48	82	141	176	225	265	305	391	0.079
J_LB-04	43	73	122	151	194	227	264	335	0.068
J_LB-05	11	20	31	38	48	55	61	74	0.012
J_LB-06	24	43	79	103	133	157	181	227	0.045
J_LB-07	7	15	34	47	64	78	92	119	0.026
J_VR-01	49	74	122	152	186	206	226	270	0.078
J_VR-02	45	69	108	133	157	176	199	240	0.064
J_VR-03	27	40	60	98	135	156	176	215	0.040
J_VR-04	19	28	43	73	101	117	132	161	0.031
J_VR-05	17	29	49	62	78	88	98	120	0.023
J_VR-06	7	12	21	26	33	39	44	55	0.010
LB-01	19	33	57	72	92	107	121	150	0.026
LB-02	13	24	44	57	74	87	100	126	0.023
LB-03	6	11	21	28	36	43	50	62	0.011
LB-04	22	38	62	77	97	111	125	151	0.024
LB-05	11	20	31	38	48	55	61	74	0.012
LB-06	7	13	19	24	29	33	37	45	0.007
LB-07	7	15	34	47	64	78	92	119	0.026
R_LB-01	40	58	104	137	229	295	357	473	0.102
R_LB-02	37	56	97	138	214	258	304	392	0.079
R_LB-03	43	72	122	151	194	227	264	335	0.068
R_LB-04	24	41	74	96	125	148	173	219	0.045
R_LB-05	11	20	31	38	48	55	61	74	0.012
R_LB-06	7	15	34	47	64	78	92	119	0.026
R_VR-01	41	61	98	120	146	161	177	215	0.064
R_VR-02	27	40	59	86	106	119	129	161	0.040
R_VR-04	16	23	35	56	77	87	98	120	0.023
R_VR-05	7	12	20	26	32	36	40	50	0.010
VR-01	13	22	35	43	54	62	69	84	0.014
VR-02	21	37	60	74	93	107	120	147	0.024
VR-03	9	14	22	27	34	39	44	54	0.010
VR-04	6	10	17	21	26	30	34	42	0.007
VR-05	11	19	32	40	50	58	65	80	0.013
VR-06	7	12	21	26	33	39	44	55	0.010



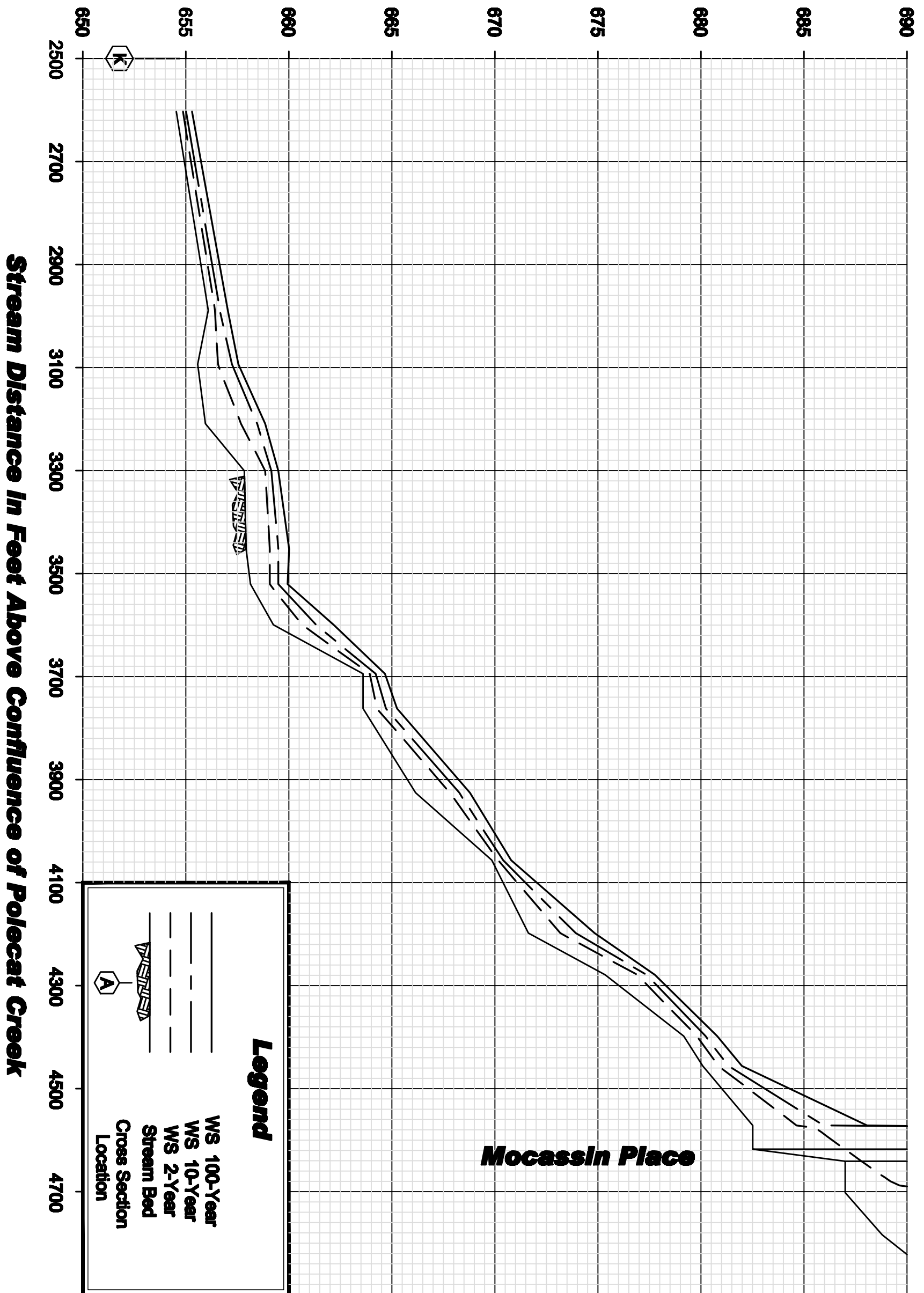
**Legend**

- Stream Centerline
- Cross Sections

**Floodplains**

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

**Elevation  
(Feet NAVD '88)**



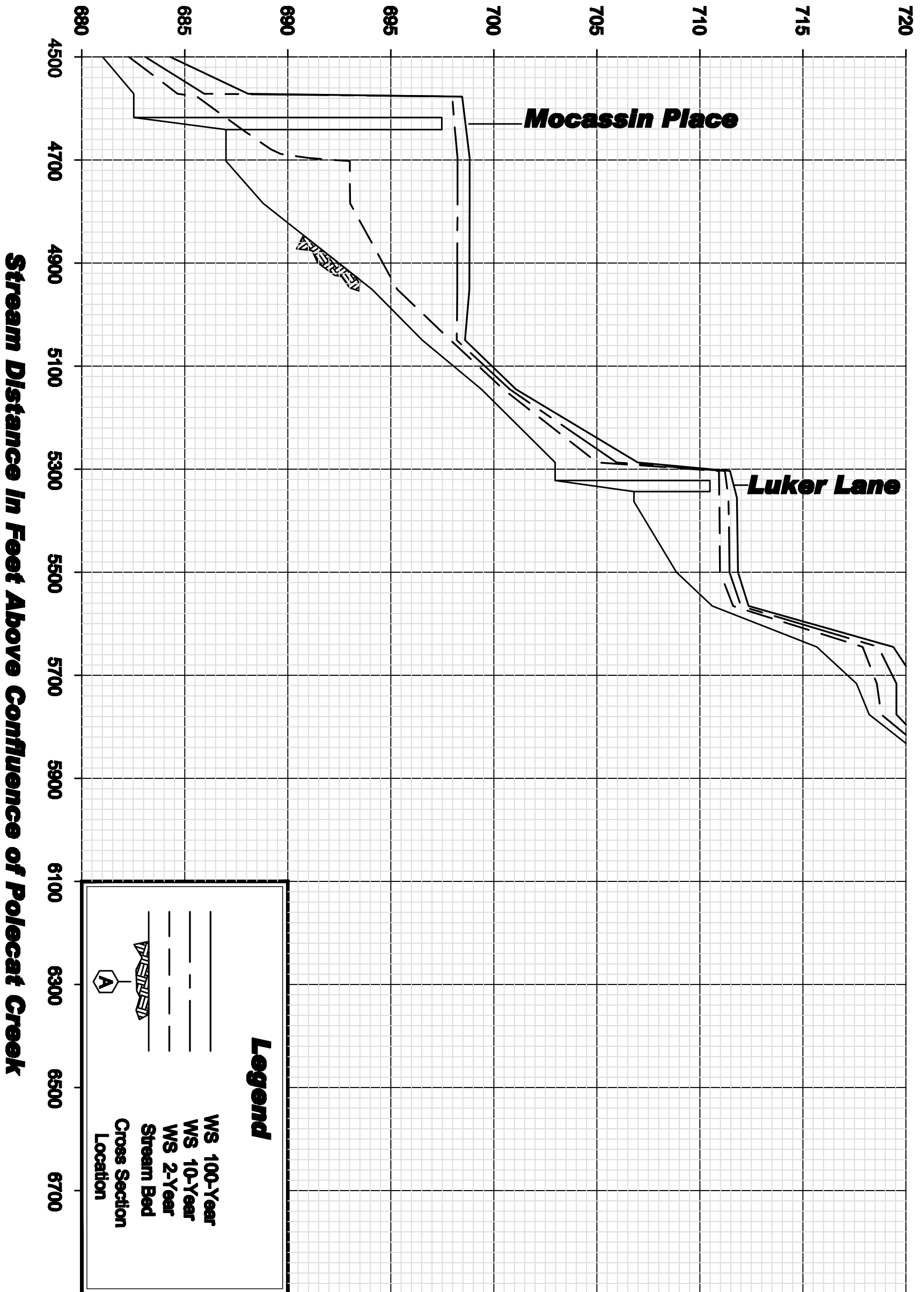
**City of Sapulpa, OK**

PREPARED BY  
**Meshek & Associates, PLC.**

1437 S. Boulder Ave. - Suite 1080  
Tulsa, OK 74119  
(918) 392-5820

**Appendix 10-E-1  
Existing Flood Profiles  
Polecat Creek  
Luker Basin**

**Elevation**  
**(Feet NAVD '88)**



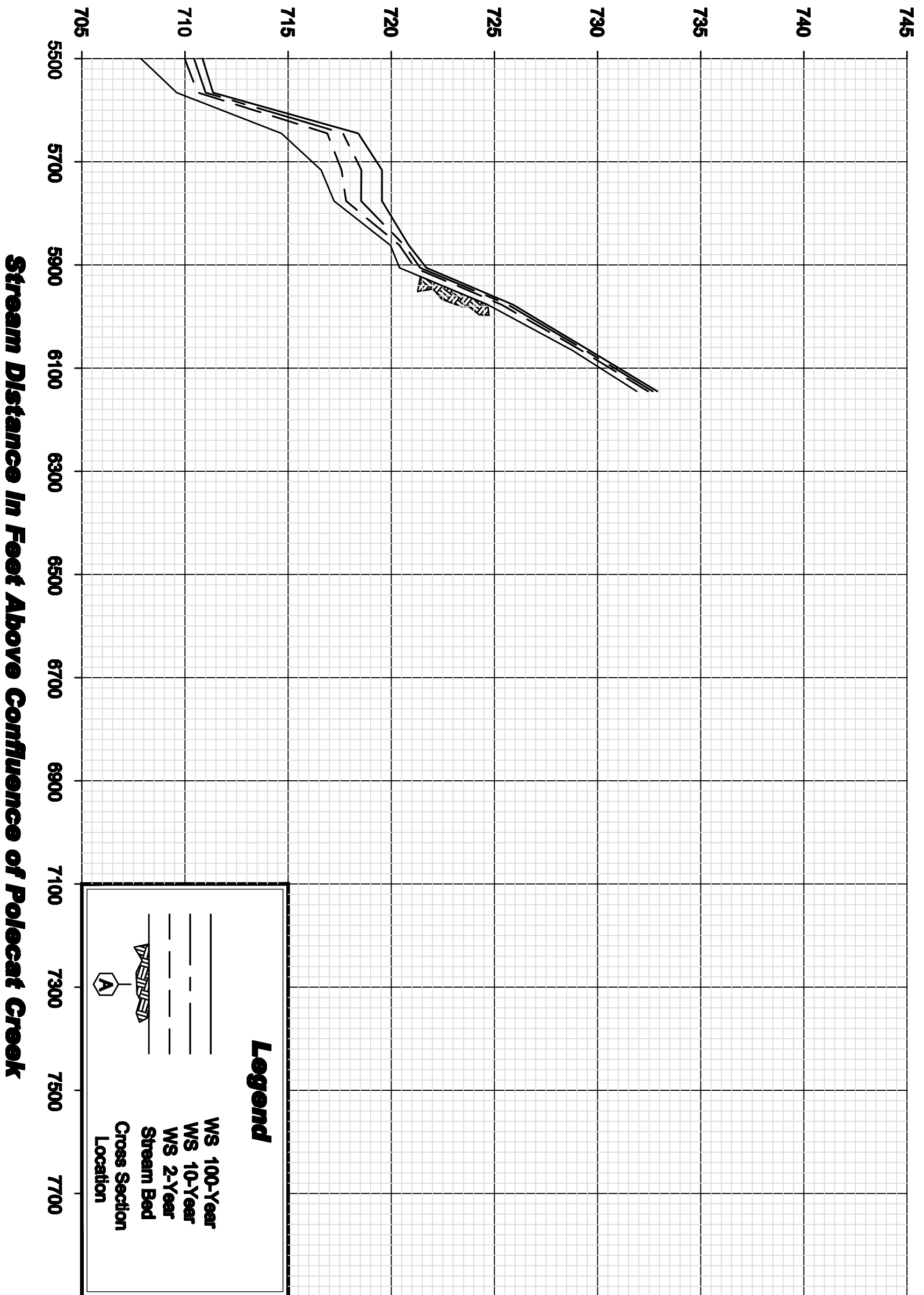
**City of Sapulpa, OK**

PREPARED BY  
**Meshek & Associates, PLC.**

1437 S. Boulder Ave. - Suite 1080  
Tulsa, OK 74119  
(918) 392-5820

**Appendix 10-E-2**  
**Existing Flood Profiles**  
**Polecat Creek**  
**Luker Basin**

**Elevation  
(Feet NAVD '88)**



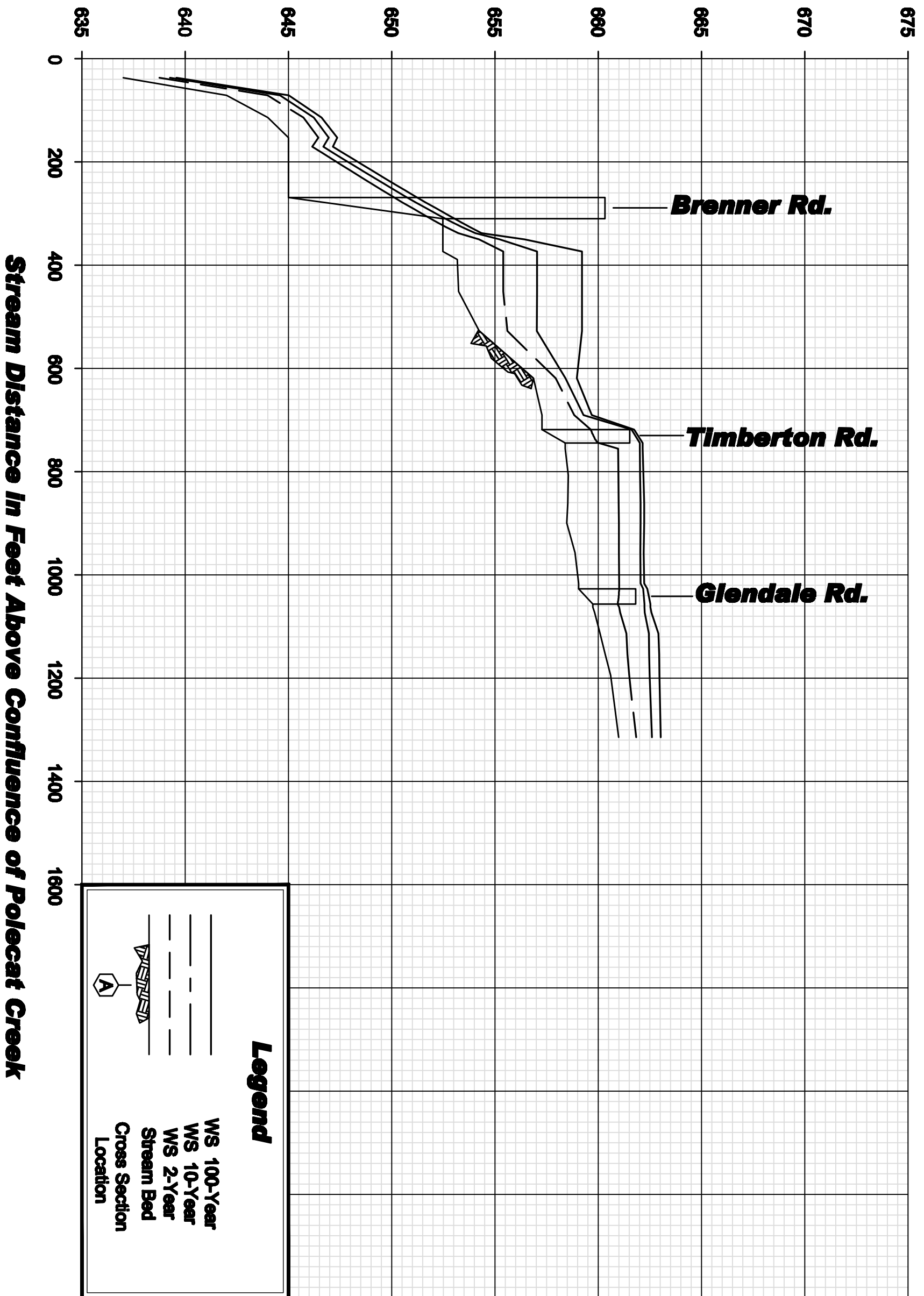
**Legend**

- WS 100-Year
- - - WS 10-Year
- · - WS 2-Year
- ▨ Stream Bed
- ⬠ Cross Section Location

**City of Sapulpa, OK**  
 PREPARED BY  
**Meshek & Associates, PLC.**  
 1437 S. Boulder Ave. - Suite 1080  
 Tulsa, OK 74119  
 (918) 392-5820

**Appendix 10-E-3  
 Existing Flood Profiles  
 Polecat Creek  
 Luker Basin**

**Elevation  
(Feet NAVD '88)**



**Legend**

- WS 100-Year
- - - WS 10-Year
- · · WS 2-Year
- Stream Bed
- Cross Section Location

**City of Sapulpa, OK**

PREPARED BY  
**Meshek & Associates, PLC.**

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(918) 392-5820

**Appendix 10-E-4  
Existing Flood Profiles  
Polecat Creek  
Valley Ridge**

**City of Sapulpa**

**Appendix 10-F. Luker and Valley Ridge Drainage System - Problem Area 2 Alternate 1**

<b>ITEM</b>	<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>TOTAL</b>	<b>UNIT PRICE</b>	<b>TOTAL COST</b>
1	202.06(A)	UNCLASSIFIED EXCAVATION	CY	18	\$ 12.00	\$ 213.33
2	223.06	TEMPORARY SILT FENCE	LF	260	\$ 2.00	\$ 520.00
3	230.06(A)	SOLID SLAB BERMUDA SODDING	SY	53	\$ 2.50	\$ 133.33
4	411.06(A)	PAVEMENT REPLACEMENT	SY	67	\$ 50.00	\$ 3,333.33
5	613.06(B)	18" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	50	\$ 48.00	\$ 2,400.00
6	613.06(S)	TRENCH EXCAVATION	CY	26	\$ 8.00	\$ 211.33
7	613.06(T)	STANDARD BEDDING MATERIAL	CY	14	\$ 20.00	\$ 274.00
8	619.06(B)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	\$ 5,000.00	\$ 5,000.00
9	619.06(B)	PAVEMENT REMOVAL	SY	67	\$ 7.00	\$ 466.67
<b>Subtotal</b>						<b>\$ 12,552.00</b>
<b>15% Contingency</b>						<b>\$ 1,882.80</b>
<b>Subtotal</b>						<b>\$ 14,434.80</b>
<b>25% Utility Relocation Contingency</b>						<b>\$ 3,608.70</b>
<b>Total</b>						<b>\$ 18,043.50</b>

**City of Sapulpa**

**Appendix 10-F. Luker and Valley Ridge Drainage System - Problem Area 3 Alternate 1**

ITEM	ITEM NO.	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	223.06	TEMPORARY SILT FENCE	LF	810	\$ 2.00	\$ 1,620.00
2	230.06(A)	SOLID SLAB BERMUDA SODDING	SY	270	\$ 2.50	\$ 675.00
3	411.06(A)	PAVEMENT REPLACEMENT	SY	540	\$ 50.00	\$ 27,000.00
4	611.06(A)	6' I.D. MANHOLE W/ FRAME AND LID	EA	1	\$ 3,500.00	\$ 3,500.00
5	611.06(K)	TRENCH GRATE	EA	1	\$ 10,000.00	\$ 10,000.00
6	611.06(K)	4'x4' CURB INLET	EA	1	\$ 3,500.00	\$ 3,500.00
7	613.06(B)	12" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	36	\$ 30.00	\$ 1,080.00
8	613.06(B)	42" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	369	\$ 170.00	\$ 62,730.00
9	613.06(S)	TRENCH EXCAVATION	CY	616	\$ 8.00	\$ 4,925.00
10	613.06(T)	STANDARD BEDDING MATERIAL	CY	330	\$ 20.00	\$ 6,600.60
11	619.06(B)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	\$ 5,000.00	\$ 5,000.00
12	619.06(B)	PAVEMENT REMOVAL	SY	540	\$ 7.00	\$ 3,780.00
<b>Subtotal</b>						<b>\$ 130,410.60</b>
<b>15% Contingency</b>						<b>\$ 19,561.59</b>
<b>Subtotal</b>						<b>\$ 149,972.19</b>
<b>25% Utility Relocation Contingency</b>						<b>\$ 37,493.05</b>
<b>Total</b>						<b>\$ 187,465.24</b>



**City of Sapulpa**

**Appendix 10-F. Luker and Valley Ridge Drainage System - Problem Area 3 Alternate 2**

ITEM	ITEM NO.	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	202.06(A)	UNCLASSIFIED EXCAVATION	CY	1148	\$ 12.00	\$ 13,776.00
2	223.06	TEMPORARY SILT FENCE	LF	1388	\$ 2.00	\$ 2,776.00
3	230.06(A)	SOLID SLAB BERMUDA SODDING	SY	463	\$ 2.50	\$ 1,156.67
4	411.06(A)	PAVEMENT REPLACEMENT	SY	925	\$ 50.00	\$ 46,266.67
5	611.06(A)	6' I.D. MANHOLE W/ FRAME AND LID	EA	1	\$ 3,500.00	\$ 3,500.00
6	611.06(K)	TRENCH GRATE	EA	2	\$ 10,000.00	\$ 20,000.00
7	611.06(K)	4'x4' CURB INLET	EA	1	\$ 3,500.00	\$ 3,500.00
8	613.06(B)	12" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	36	\$ 30.00	\$ 1,080.00
9	613.06(B)	30" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	289	\$ 92.00	\$ 26,588.00
10	613.06(X)	4'x3' C850 REINFORCED CONCRETE BOX	LF	369	\$ 240.00	\$ 88,560.00
11	613.06(S)	TRENCH EXCAVATION	CY	286	\$ 8.00	\$ 2,285.01
12	613.06(T)	STANDARD BEDDING MATERIAL	CY	146	\$ 20.00	\$ 2,919.72
13	619.06(B)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	\$ 5,000.00	\$ 5,000.00
14	619.06(B)	PAVEMENT REMOVAL	SY	925	\$ 7.00	\$ 6,477.33
<b>Subtotal</b>						<b>\$ 223,885.40</b>
<b>15% Contingency</b>						<b>\$ 33,582.81</b>
<b>Subtotal</b>						<b>\$ 257,468.21</b>
<b>25% Utility Relocation Contingency</b>						<b>\$ 64,367.05</b>
<b>Total</b>						<b>\$ 321,835.26</b>

**City of Sapulpa**

**Appendix 10-F. Luker and Valley Ridge Drainage System - Problem Area 4 Alternate 1**

ITEM	ITEM NO.	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	223.06	TEMPORARY SILT FENCE	LF	2448	\$ 2.00	\$ 4,896.00
2	230.06(A)	SOLID SLAB BERMUDA SODDING	SY	816	\$ 2.50	\$ 2,040.00
3	411.06(A)	PAVEMENT REPLACEMENT	SY	1632	\$ 50.00	\$ 81,600.00
4	611.06(K)	4'x4' CURB INLET	EA	1	\$ 3,500.00	\$ 3,500.00
5	611.06(K)	8'x4' CURB INLET	EA	2	\$ 5,000.00	\$ 10,000.00
6	613.06(B)	36" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	292	\$ 120.00	\$ 35,040.00
7	613.06(B)	42" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	932	\$ 170.00	\$ 158,440.00
8	613.06(S)	TRENCH EXCAVATION	CY	1915	\$ 8.00	\$ 15,318.92
9	613.06(T)	STANDARD BEDDING MATERIAL	CY	1030	\$ 20.00	\$ 20,602.64
10	619.06(B)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	\$ 5,000.00	\$ 5,000.00
11	619.06(B)	PAVEMENT REMOVAL	SY	1632	\$ 7.00	\$ 11,424.00
<b>Subtotal</b>						<b>\$ 347,861.56</b>
<b>15% Contingency</b>						<b>\$ 52,179.23</b>
<b>Subtotal</b>						<b>\$ 400,040.79</b>
<b>25% Utility Relocation Contingency</b>						<b>\$ 100,010.20</b>
<b>Total</b>						<b>\$ 500,050.99</b>

**City of Sapulpa**

**Appendix 10-F. Luker and Valley Ridge Drainage System - Problem Area 4 Alternate 2**

<b>ITEM</b>	<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>TOTAL</b>	<b>UNIT PRICE</b>	<b>TOTAL COST</b>
1	223.06	TEMPORARY SILT FENCE	LF	2476	\$ 2.00	\$ 4,952.00
2	230.06(A)	SOLID SLAB BERMUDA SODDING	SY	825	\$ 2.50	\$ 2,063.33
3	411.06(A)	PAVEMENT REPLACEMENT	SY	1651	\$ 50.00	\$ 82,533.33
4	611.06(K)	8'x4' CURB INLET	EA	3	\$ 5,000.00	\$ 15,000.00
5	613.06(B)	42" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	292	\$ 170.00	\$ 49,640.00
6	613.06(B)	54" C76 CL IV RCP W/ OMNIFLEX GASKETS	LF	946	\$ 255.00	\$ 241,230.00
7	613.06(S)	TRENCH EXCAVATION	CY	2556	\$ 8.00	\$ 20,445.60
8	613.06(T)	STANDARD BEDDING MATERIAL	CY	1319	\$ 20.00	\$ 26,384.72
9	619.06(B)	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	\$ 5,000.00	\$ 5,000.00
10	619.06(B)	PAVEMENT REMOVAL	SY	1651	\$ 7.00	\$ 11,554.67
<b>Subtotal</b>						<b>\$ 458,803.65</b>
<b>15% Contingency</b>						<b>\$ 68,820.55</b>
<b>Subtotal</b>						<b>\$ 527,624.20</b>
<b>25% Utility Relocation Contingency</b>						<b>\$ 131,906.05</b>
<b>Total</b>						<b>\$ 659,530.25</b>