

City of Ottawa, Kansas Stormwater Master Plan

April 30, 2007

Leon J. Staab, P.E.

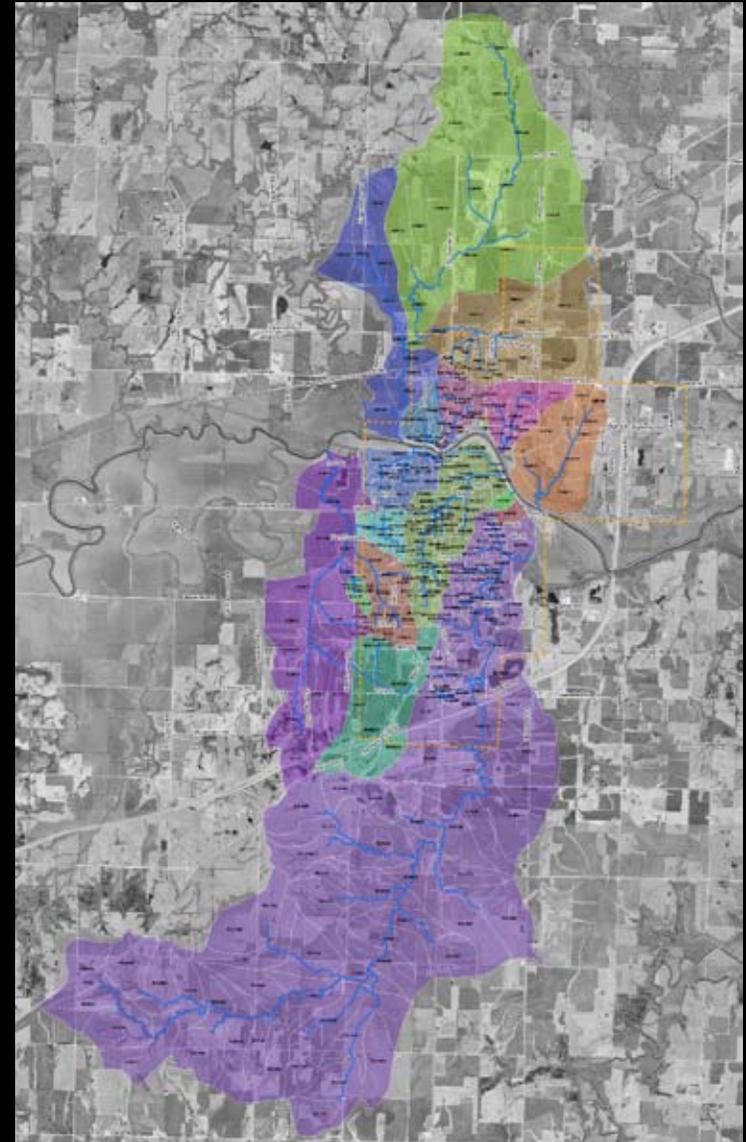
Burns & McDonnell Engineering Company



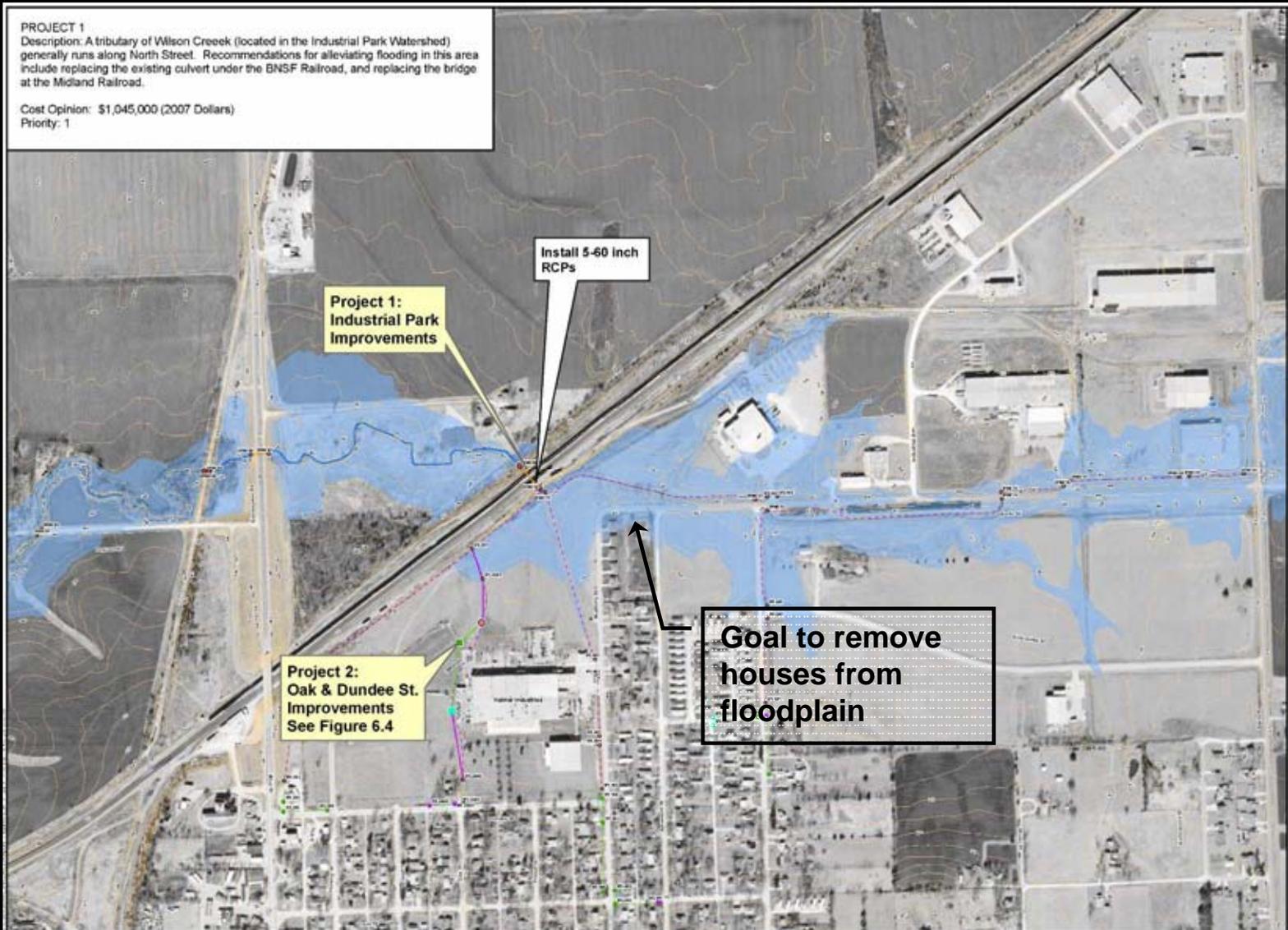
- Purpose
 - Identify, Evaluate & Correct Existing Deficiencies
 - Contend with Growth of City

Scope of Services

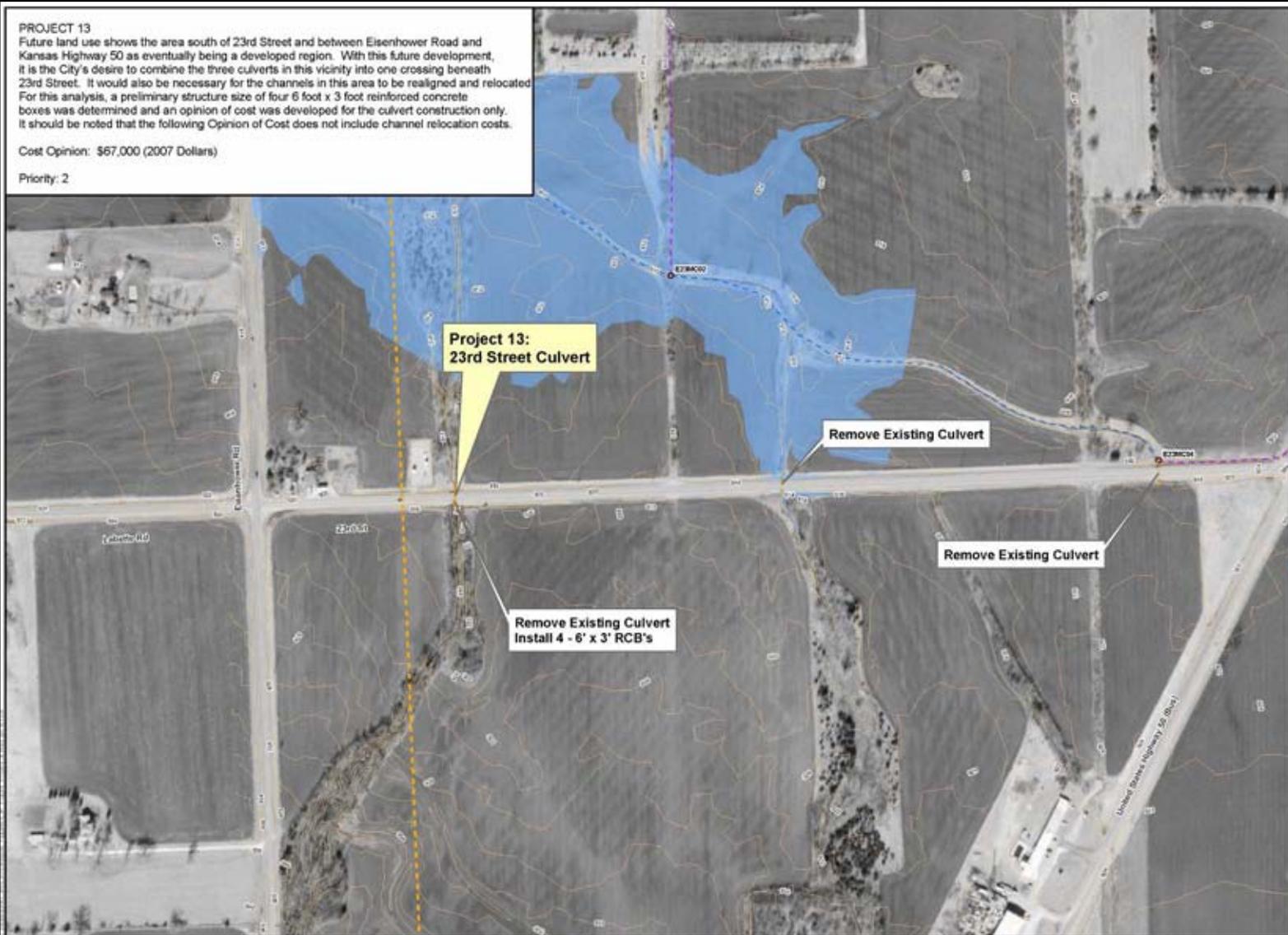
- Assemble & Review Existing Data
- Surveys & Field Reconnaissance
- Hydrologic & Hydraulic Analysis
- Evaluation of Existing System
- Develop Capital Improvements Plan



Project 1 – Industrial Park Improvements



Project 13 – 23 Street Culverts



Project 12 – Eisenhower Road Improvements

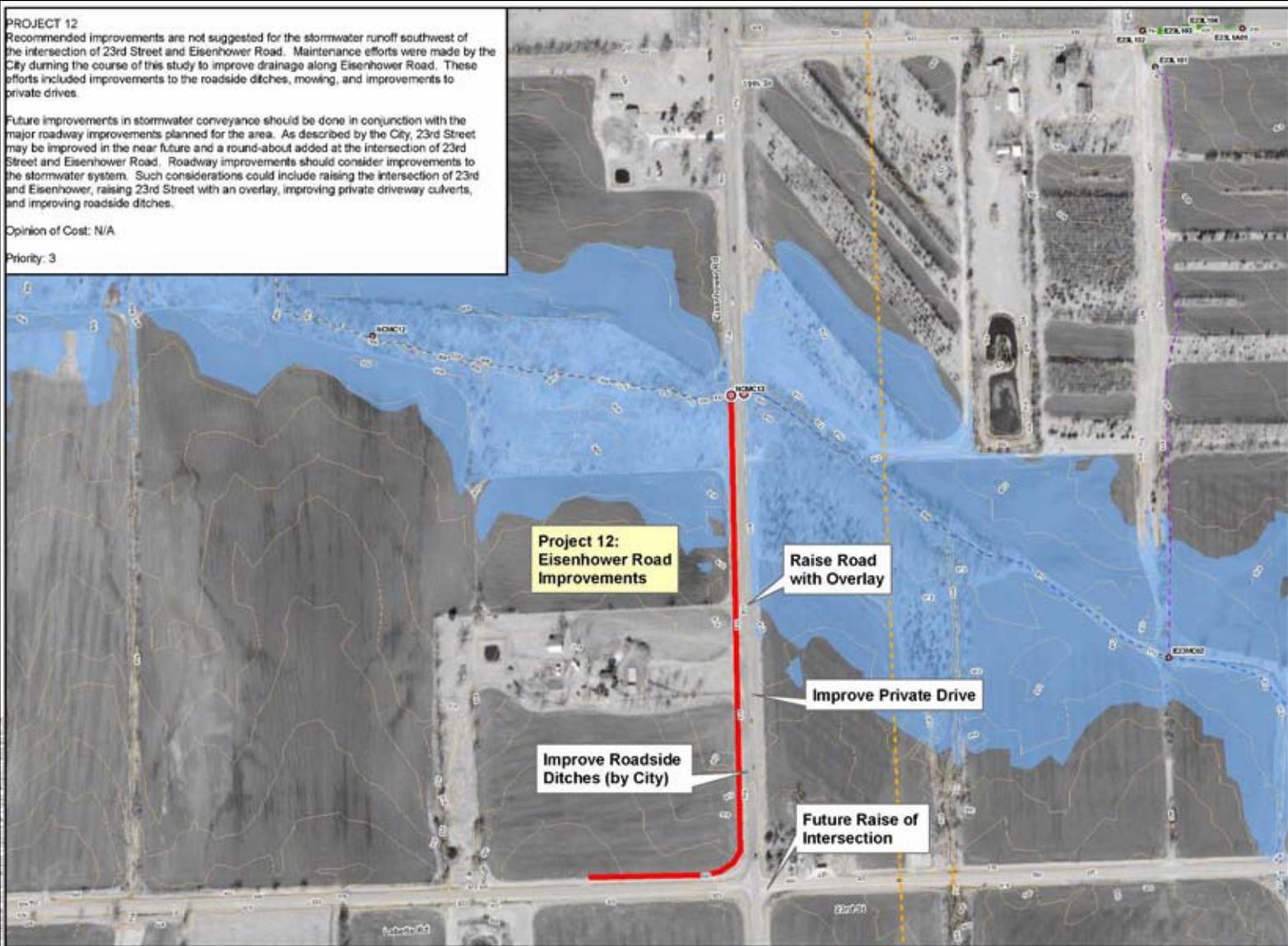
PROJECT 12

Recommended improvements are not suggested for the stormwater runoff southwest of the intersection of 23rd Street and Eisenhower Road. Maintenance efforts were made by the City during the course of this study to improve drainage along Eisenhower Road. These efforts included improvements to the roadside ditches, mowing, and improvements to private drives.

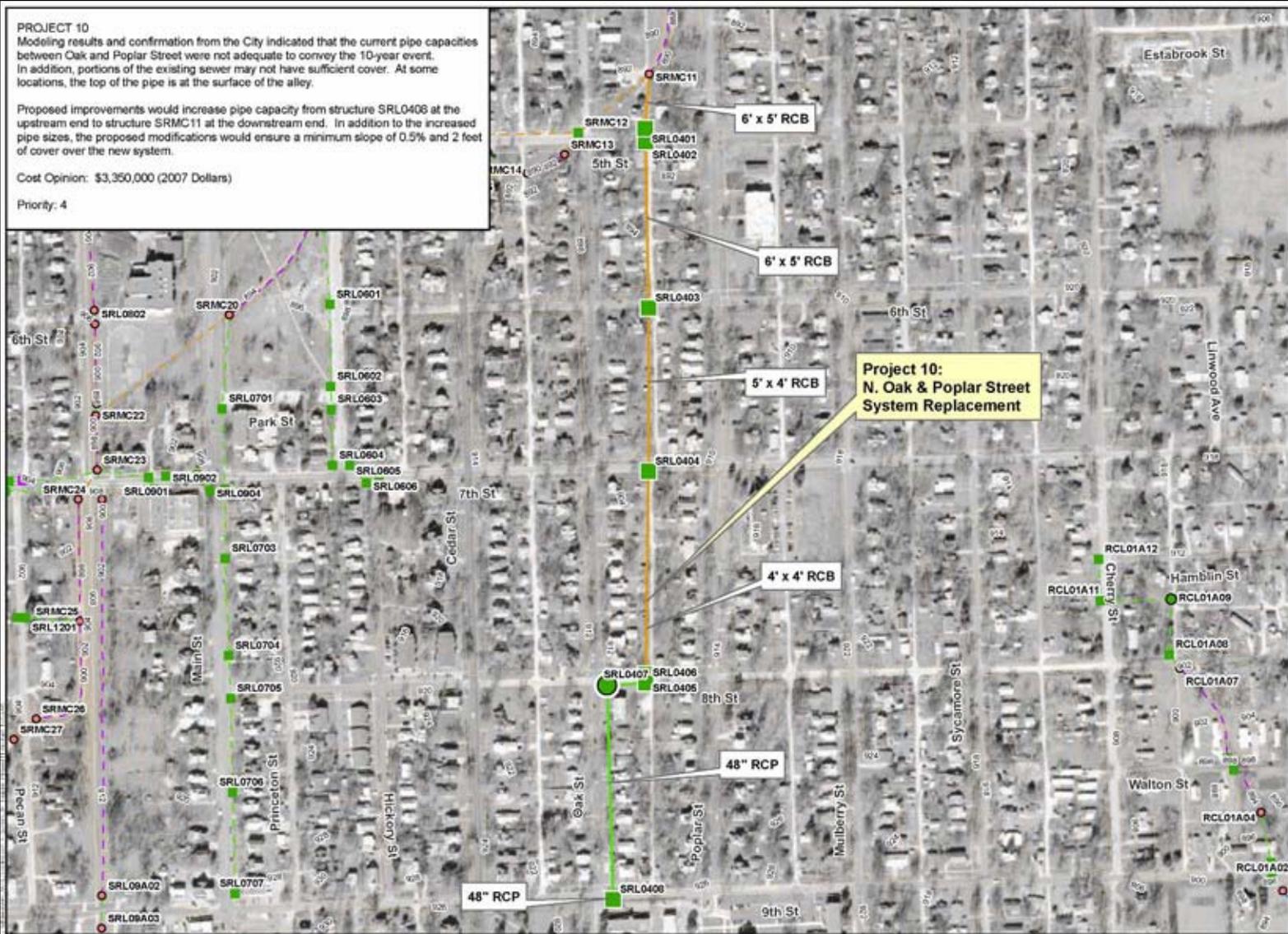
Future improvements in stormwater conveyance should be done in conjunction with the major roadway improvements planned for the area. As described by the City, 23rd Street may be improved in the near future and a round-about added at the intersection of 23rd Street and Eisenhower Road. Roadway improvements should consider improvements to the stormwater system. Such considerations could include raising the intersection of 23rd and Eisenhower, raising 23rd Street with an overlay, improving private driveway culverts, and improving roadside ditches.

Opinion of Cost: N/A

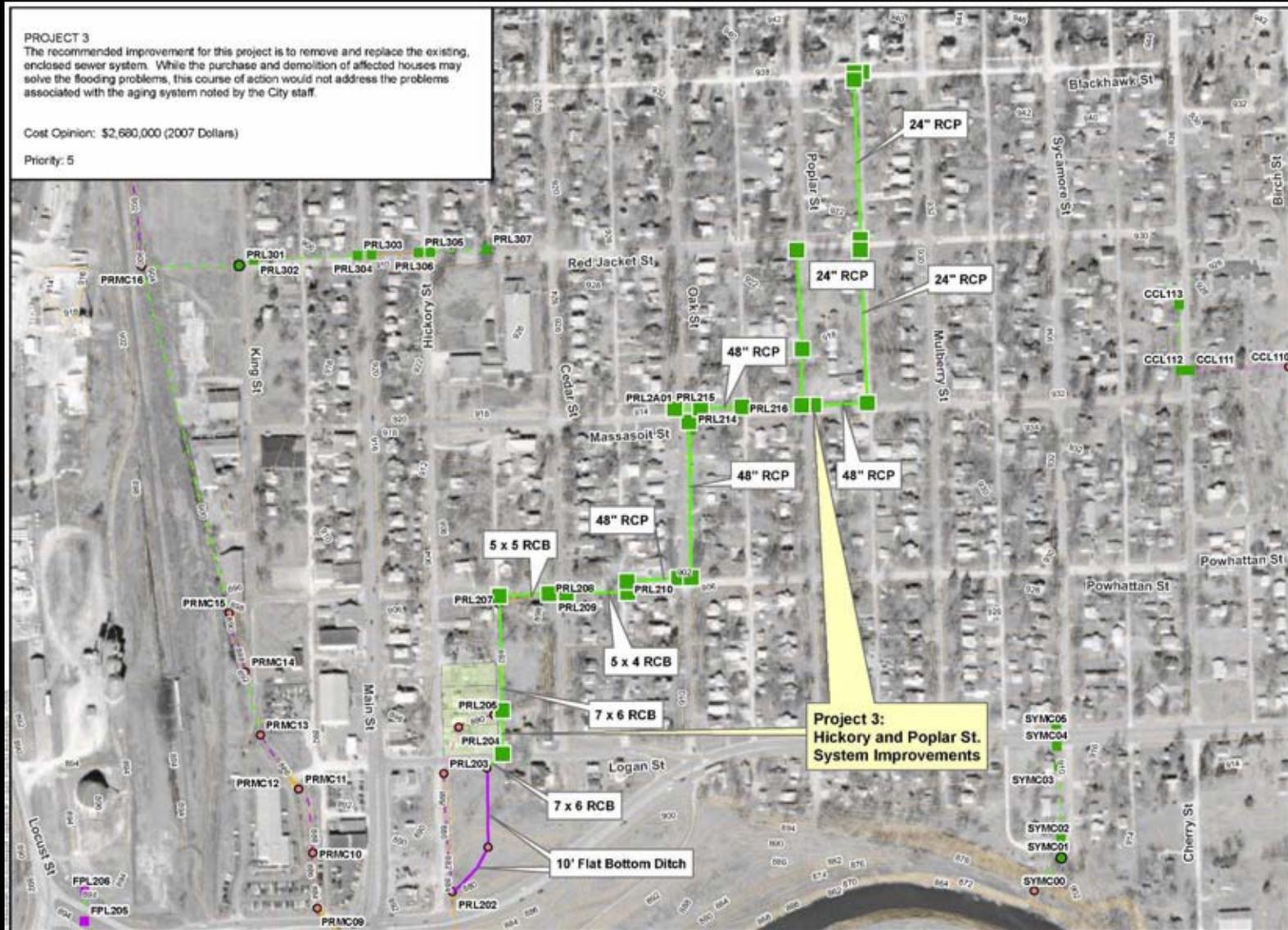
Priority: 3



Project 10 – S. Oak & Poplar Street System Replacement



Project 3 – N. Hickory & Poplar Street Improvements



Project 6 – Skunk Run Improvements

PROJECT 6

Urbanization of the Skunk Run Watershed may have caused a decrease in the level of services afforded by the existing outfall system. Currently, runoff from the watershed is conveyed to the Marais Des Cygnes River by gravity through a 10 foot x 10 foot reinforced concrete box culvert during low stages of the river. At higher stages of the Marais Des Cygnes River (elevation 885.00 and above) the culvert is bypassed and drainage from the storage pond is removed by pumps. The capacity of the detention pond and/or the capacity of the pumps may no longer be sufficient to handle current flow conditions as compared to the original design.

Based on the topography shown on this figure, and maximum ponding elevation of 885.00 is desired to prevent houses from flooding. To accomplish this goal, additional storage capacity for the existing ponding area and/or additional pumping capacity may need to be added to the system. Approximately 29 acre-feet (2.23 acres) of additional storage area located north of 2nd Street and between Mulberry and Sycamore Street could be incorporated into the overall outfall system.

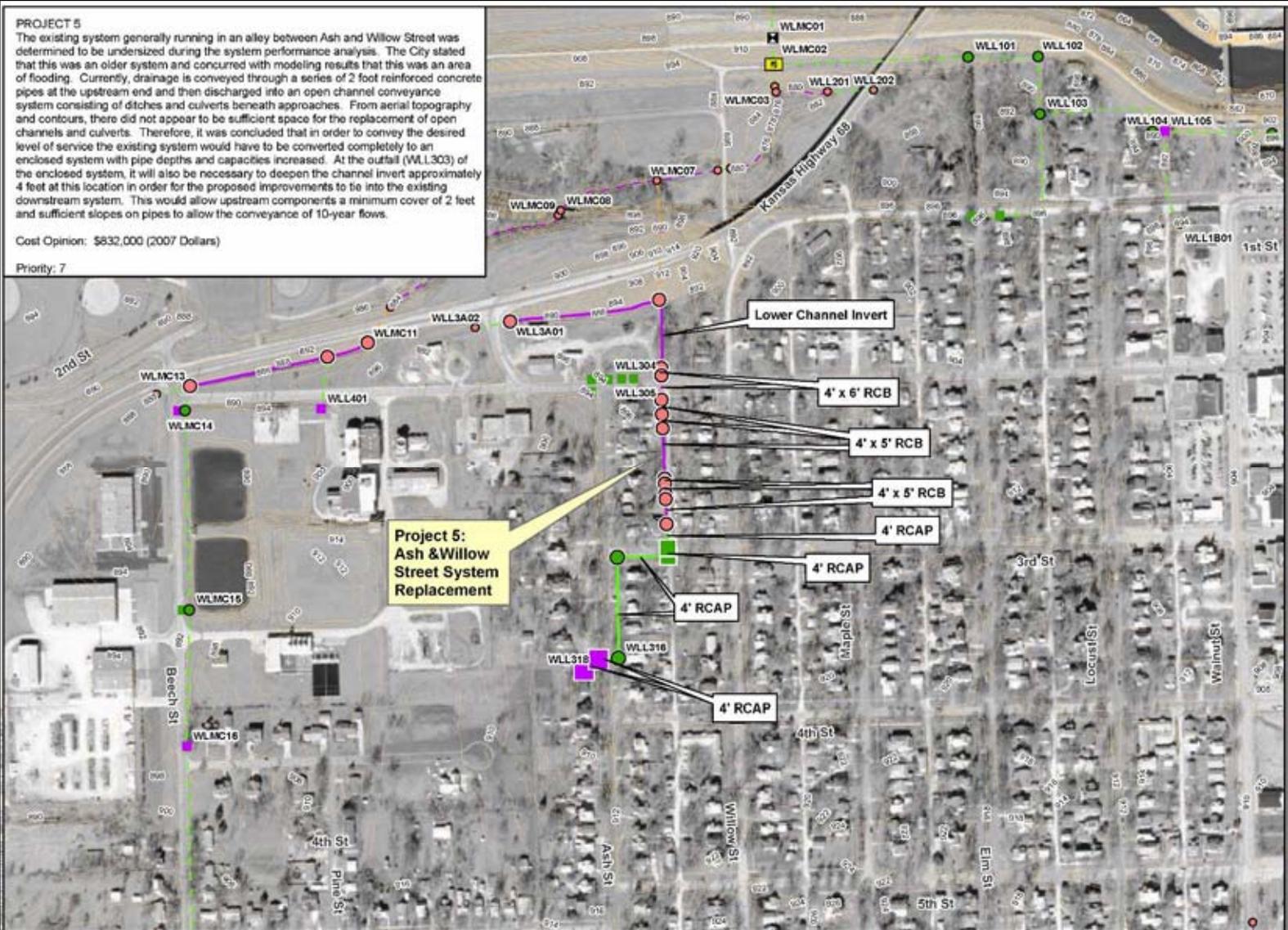
Pumping capacity could also be increased from 75 cfs (both existing pumps) to 262 cfs. Modeling results predict a maximum ponding elevation of 885.5 feet for the 25-year with the added storage and pump capacity.

Cost Opinion: \$4,873,000 (2007 Dollars)

Priority: 6



Project 5 – Ash & Willow Street Replacement



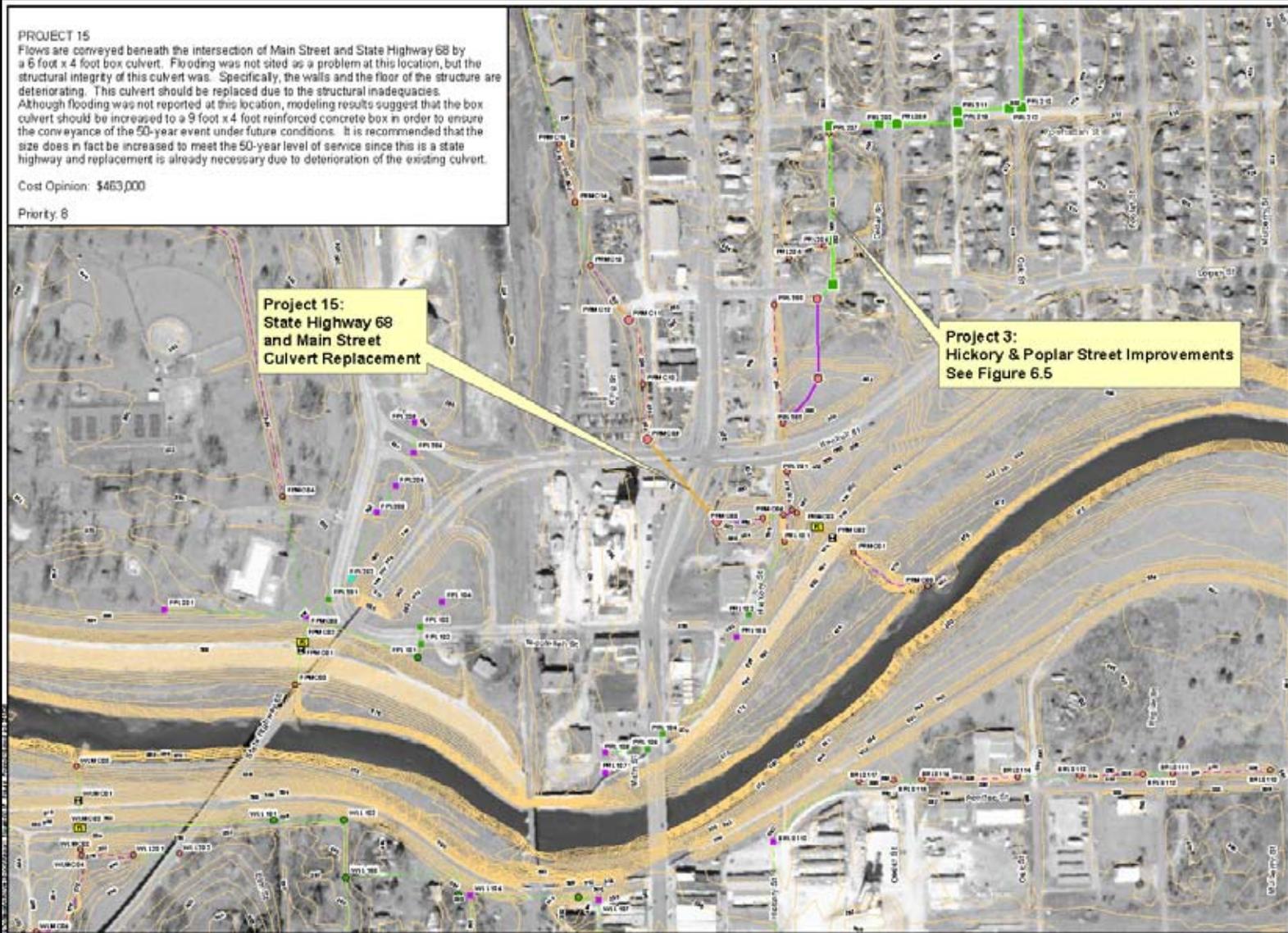
Project 15 – Kansas Highway 68 & Main Street Culvert Replacement

PROJECT 15

Flows are conveyed beneath the intersection of Main Street and State Highway 68 by a 6 foot x 4 foot box culvert. Flooding was not sited as a problem at this location, but the structural integrity of this culvert was. Specifically, the walls and the floor of the structure are deteriorating. This culvert should be replaced due to the structural inadequacies. Although flooding was not reported at this location, modeling results suggest that the box culvert should be increased to a 9 foot x 4 foot reinforced concrete box in order to ensure the conveyance of the 50-year event under future conditions. It is recommended that the size does in fact be increased to meet the 50-year level of service since this is a state highway and replacement is already necessary due to deterioration of the existing culvert.

Cost Opinion: \$463,000

Priority: 6



Project 11 – Osage Drive Channel Improvements

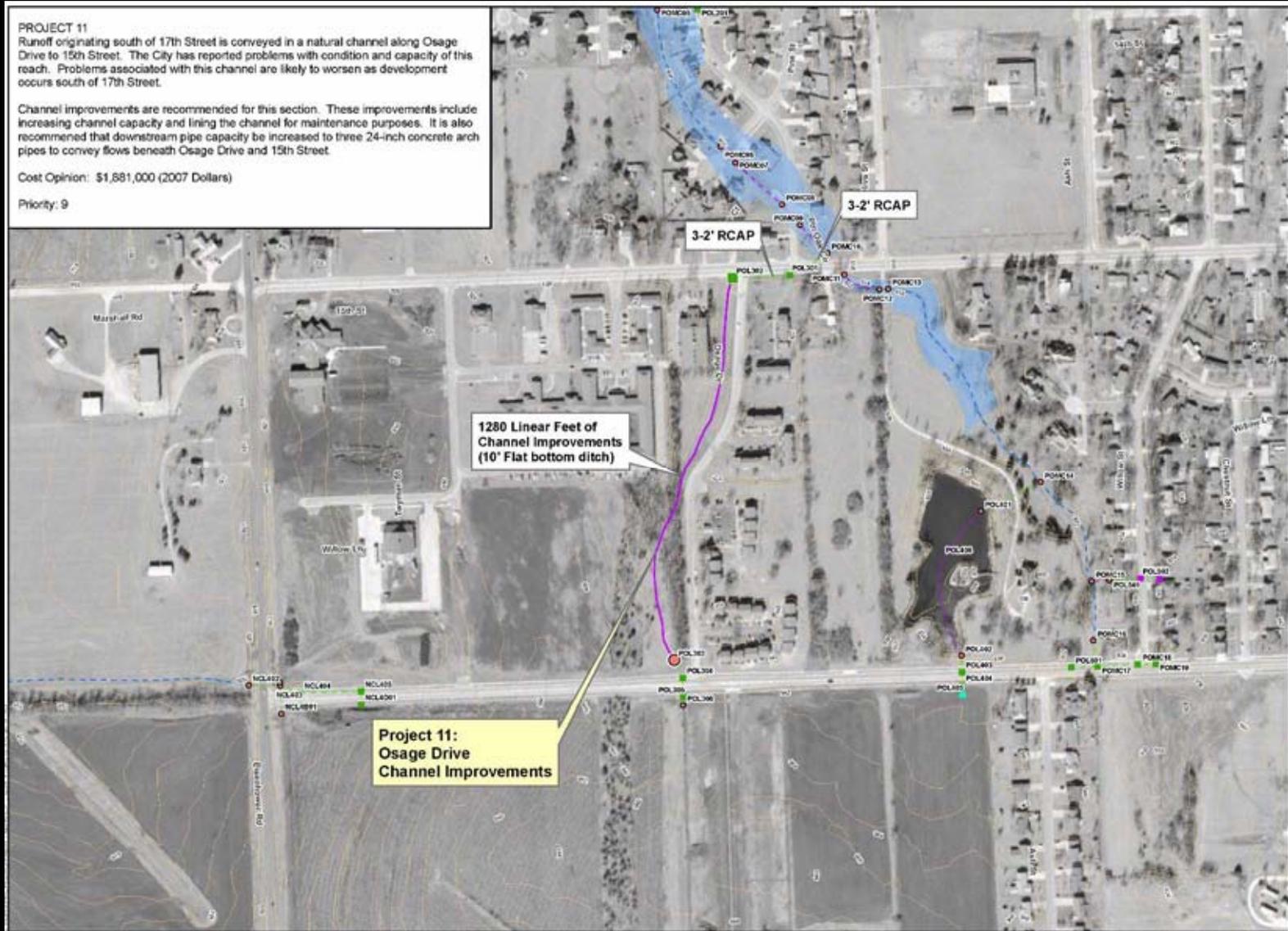
PROJECT 11

Runoff originating south of 17th Street is conveyed in a natural channel along Osage Drive to 15th Street. The City has reported problems with condition and capacity of this reach. Problems associated with this channel are likely to worsen as development occurs south of 17th Street.

Channel improvements are recommended for this section. These improvements include increasing channel capacity and lining the channel for maintenance purposes. It is also recommended that downstream pipe capacity be increased to three 24-inch concrete arch pipes to convey flows beneath Osage Drive and 15th Street.

Cost Opinion: \$1,881,000 (2007 Dollars)

Priority: 9



Project 7 – Country Club Lake Principal Spillway

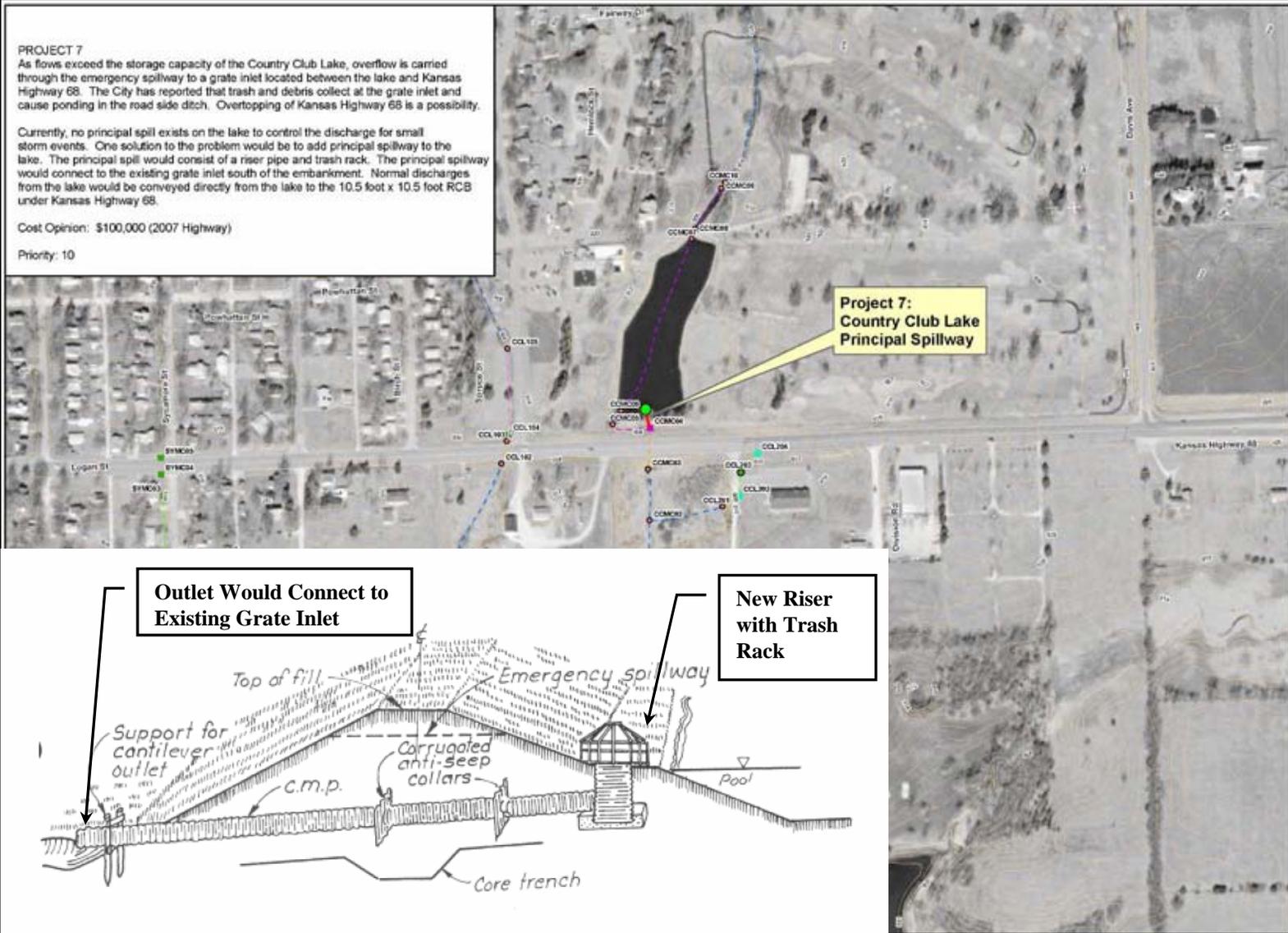
PROJECT 7

As flows exceed the storage capacity of the Country Club Lake, overflow is carried through the emergency spillway to a grate inlet located between the lake and Kansas Highway 68. The City has reported that trash and debris collect at the grate inlet and cause ponding in the road side ditch. Overtopping of Kansas Highway 68 is a possibility.

Currently, no principal spill exists on the lake to control the discharge for small storm events. One solution to the problem would be to add principal spillway to the lake. The principal spill would consist of a riser pipe and trash rack. The principal spillway would connect to the existing grate inlet south of the embankment. Normal discharges from the lake would be conveyed directly from the lake to the 10.5 foot x 10.5 foot RCB under Kansas Highway 68.

Cost Opinion: \$100,000 (2007 Highway)

Priority: 10



Project 8 – Expanding Detention for Visitor Center

PROJECT 8

According to the City's Comprehensive Plan, it is anticipated that the Visitor Center Watershed will see growth in commercial, industrial and residential developments. Left unregulated, development would likely increase peak runoff rates. Over time, the existing infrastructure would provide a lower level of service than originally designed and an increase of downstream flooding occurrences could be realized.

There are four locations where detention currently exists. Existing basins appear to be used for agriculture purposes, and some work may need to be performed to improve embankments or increase storage capacity. Construction of detention facilities can be undertaken by the City or can be the responsibility of the developer as part of his approach to on-site stormwater management.

The opinion of cost associated with this project assumes that the Detention Basins 1 and 2 will be converted to regional detention facilities by the City.

Cost Option: \$1,300,000 (2007 Dollars)

Priority: 11



Project 9 – Kansas Highway 68 Culverts

PROJECT 9

Future development is expected in the northern portion of the Visitor Center watershed. The purpose of Project 10 was to analyze the two existing 6.8 foot x 4 foot reinforced box culverts located at Kansas Highway 68 to determine if the culvert capacity was adequate to convey future flows. Because the roadway is a state highway, a 50-year level of service is desired. Assuming no upstream detention, the existing culverts could be replaced with two 9 foot x 4 foot reinforced box culverts, which would allow future flows to pass through the culverts without overtopping.

Cost Opinion: \$494,000 (2007 Dollars)

Priority: 12



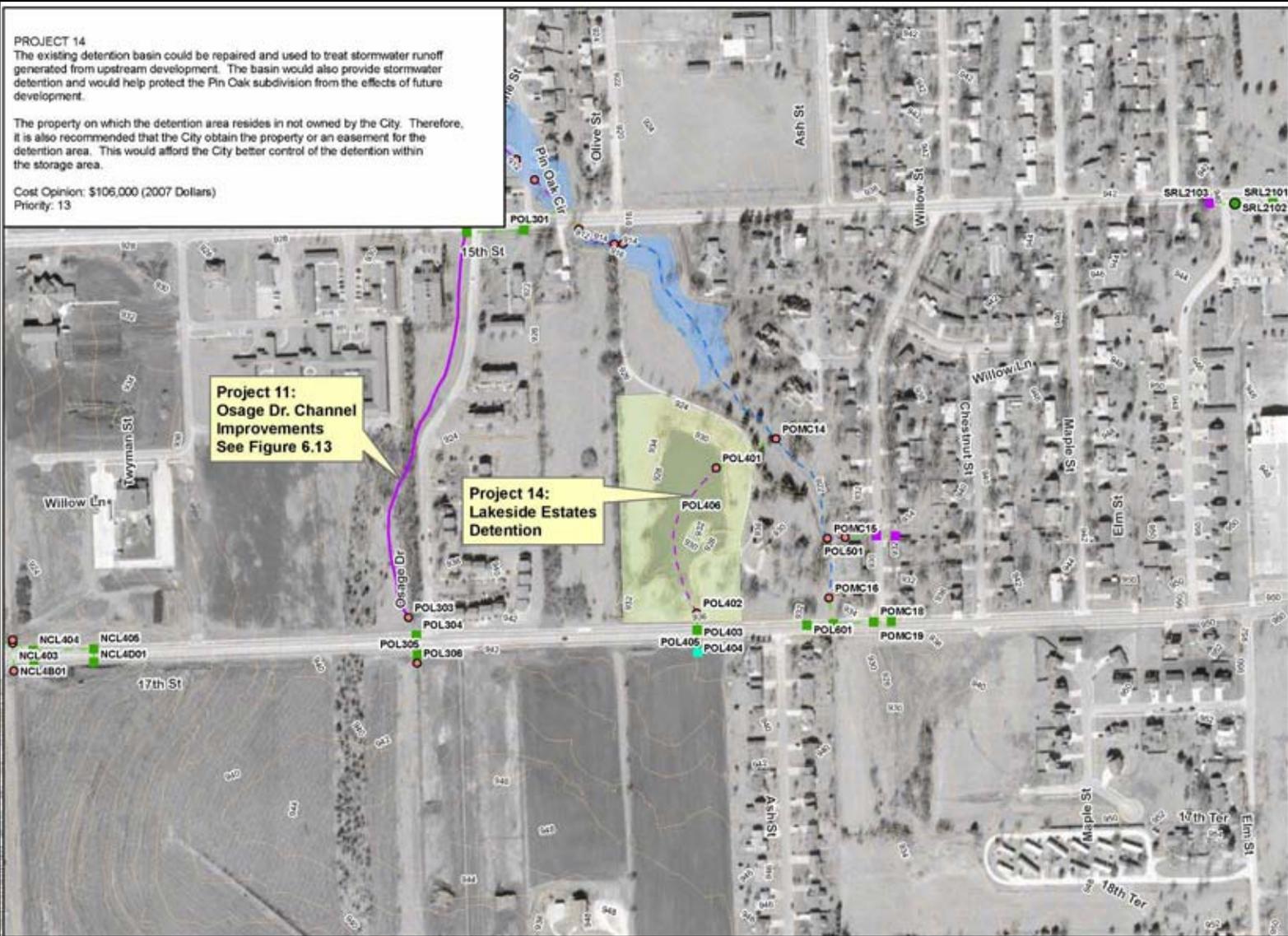
Project 14 - Lakeside Estates Detention

PROJECT 14

The existing detention basin could be repaired and used to treat stormwater runoff generated from upstream development. The basin would also provide stormwater detention and would help protect the Pin Oak subdivision from the effects of future development.

The property on which the detention area resides is not owned by the City. Therefore, it is also recommended that the City obtain the property or an easement for the detention area. This would afford the City better control of the detention within the storage area.

Cost Opinion: \$106,000 (2007 Dollars)
Priority: 13



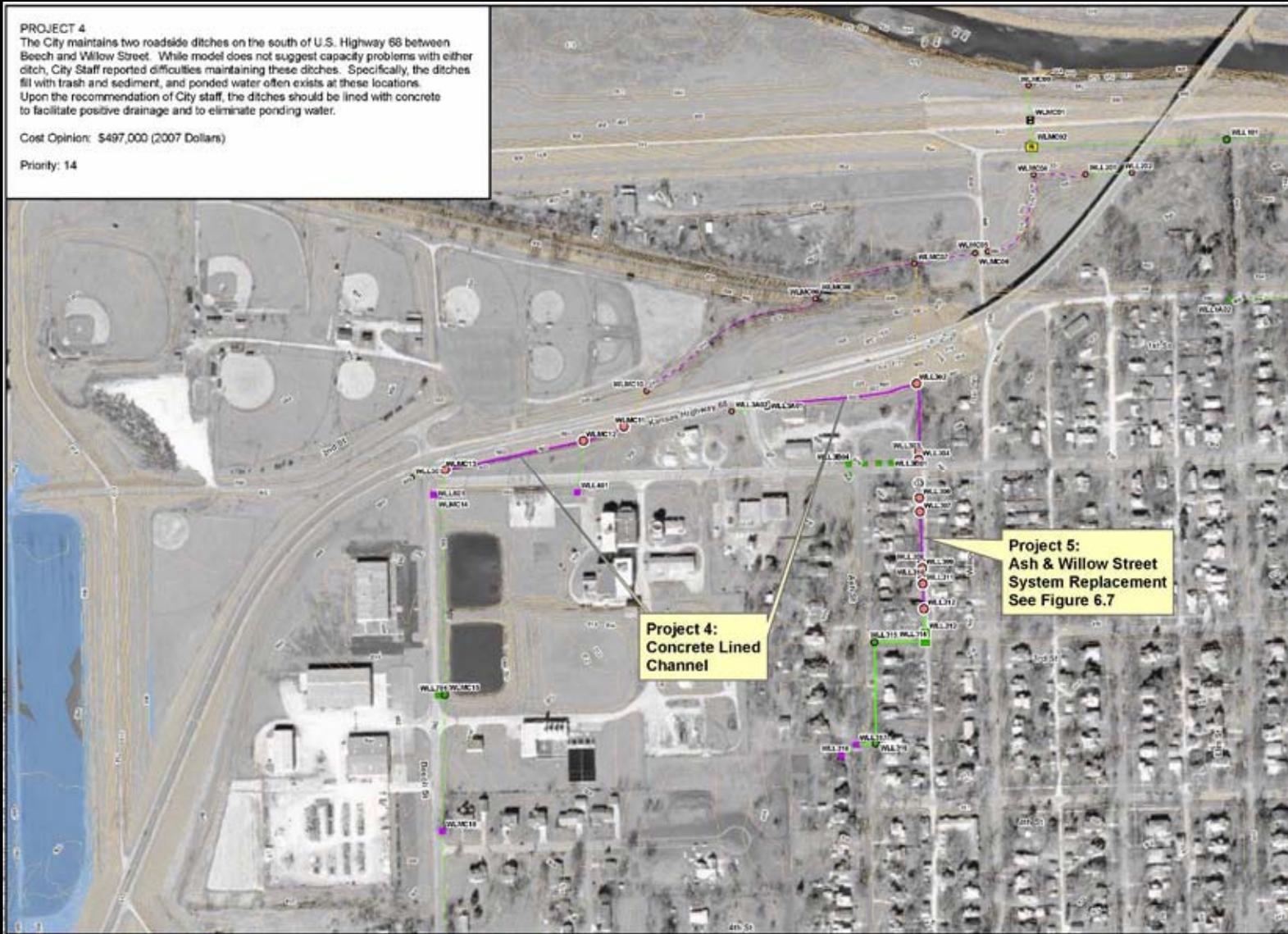
Project 4 – Concrete Lined Channel (Beach to Willow)

PROJECT 4

The City maintains two roadside ditches on the south of U.S. Highway 68 between Beach and Willow Street. While model does not suggest capacity problems with either ditch, City Staff reported difficulties maintaining these ditches. Specifically, the ditches fill with trash and sediment, and ponded water often exists at these locations. Upon the recommendation of City staff, the ditches should be lined with concrete to facilitate positive drainage and to eliminate ponding water.

Cost Opinion: \$497,000 (2007 Dollars)

Priority: 14



Project 2 – N. Oak & Dundee Street Improvements





Summary of Projects

Project No.	Priority	Project Name	Opinion of Cost (Thousands)		
			Construction	Engineering	Total
1	1	Industrial Park Improvements	\$804	\$241	\$1,045
13	2	23 rd Street Culverts	\$52	\$15	\$67
12	3	Eisenhower Road Improvements	N/A	N/A	N/A
10	4	Oak & Poplar Street System Replacement	\$2,576	\$773	\$3,350
3	5	Hickory & Poplar Street Improvements	\$2,061	\$618	\$2,680
6	6	Skunk Run Outfall Improvements	\$4,430	\$443	\$4,873
5	7	Ash & Willow Street System Replacement	\$640	\$191	\$832
15	8	Kansas Highway 68 & Main Street Culvert Replacement	\$392	\$118	\$509
11	9	Osage Drive Channel Improvements	\$1,447	\$435	\$1,881
7	10	Country Club Lake Principal Spillway	\$77	\$23	\$100
8	11	Expanding Detention for Visitor Center	\$790	\$213	\$1,003
9	12	Kansas Highway 68 Culverts	\$380	\$114	\$494
14	13	Lakeside Estates Detention	\$89	\$17	\$106
4	14	Concrete Line Channel (K-68, Beech to Willow)	\$383	\$114	\$497
2	15	Oak & Dundee Street System Improvements	\$398	\$119	\$517
TOTAL			\$14,518	\$3,435	\$17,953

** Estimated 2007 Dollars

Discussion
