

# **PRELIMINARY ENGINEERING STUDY**

## **ANTIOCH ROAD FROM 167<sup>TH</sup> STREET TO 179<sup>TH</sup> STREET**

**PREPARED FOR:  
THE CITY OF OVERLAND PARK, KANSAS**

**AUGUST 2006**

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**OA PROJECT No. 2005-0356**

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# 1 EXECUTIVE SUMMARY

This preliminary engineering study presents the results to establish preliminary horizontal and vertical alignments for Antioch Road from 167<sup>th</sup> Street to 179<sup>th</sup> Street. The purpose of this study was to develop a preliminary design, which would minimize impacts to existing development and serve as a planning tool for future development. The findings of this study were established in coordination with the City of Overland Park, Kansas.

The major objectives of this study were as follows:

- **Establish Design Criteria** – Establish design guidelines, typical roadway sections and right-of-way widths for Antioch Road
- **Develop Preliminary Horizontal and Vertical Alignment** – Develop preliminary horizontal and vertical alignments for Antioch Road
- **Determine Total Project Costs** – Estimate the total project cost including right-of-way, utility relocations, engineering and administration, and construction costs.

Antioch Road is classified as a thoroughfare and is designed to meet the City's thoroughfare standards consisting of two through lanes in each direction, a grassed and landscaped median wide enough to accommodate left-turn lanes where appropriate, an enclosed drainage system, sidewalks, street lighting, traffic signals, and other amenities typical of thoroughfare design. This particular project crosses Coffee Creek which will require a significant bridge structure and special attention to flood plain requirements.

The total project cost in 2006 dollars is estimated at \$19.7 million.

# 2 INTRODUCTION

The study presented was authorized in an agreement between the City of Overland Park and Olsson Associates on May 11, 2005. The agreement calls for the preparations of a preliminary engineering study and report, together with preliminary scaled plans and drawings.

The study will establish recommended horizontal and vertical alignments for Antioch Road from 167<sup>th</sup> Street to 179<sup>th</sup> Street, which will minimize impacts to existing development and serve as a planning tool for future development. The intersections with 167<sup>th</sup> Street and with 179<sup>th</sup> Street are included as part of other studies and are not part of this engineering study. Specifically, the study begins at the centerline of pavement at 179<sup>th</sup> Street (Station 10+00) and extends northerly along the section line to a point approximately 1,408 feet south of 167<sup>th</sup> Street (Station 75+49.70) for a total project length of 6,549.7 feet. Although not part of this study, the included plans also show proposed improvements on Antioch Road continuing north to 167<sup>th</sup> Street based on existing 167<sup>th</sup> Street study information provided to Olsson Associates by the Affinis Corporation.

The following items are addressed in this study:

- Recommended typical sections
- Required right-of-way widths
- Plan sheets showing existing and proposed horizontal alignment, existing right-of-way, ownership, utilities, topographic features, and construction limits
- Profile sheets showing existing and proposed vertical alignment and locations of major and minor stream crossings
- Permitting requirements
- Cost estimates

### **3 BASIC INFORMATION AND PROCEDURES**

In the development of the preliminary design study, the following information and procedures were utilized:

Topographic information along Antioch Road from 167<sup>th</sup> Street to 179<sup>th</sup> Street was obtained from AIMS maps in English units at one inch equals 50 feet. The mapping was used to prepare base maps for the plan sheets. The City of Overland Park provided the AIMS maps.

Field surveys were performed to resolve the following items:

- Field locate control points
- Establish horizontal reference points
- Verify accuracy of AIMS mapping
- Ascertain any significant topographic features that may be missing from the AIMS mapping
- Establish hard shots at critical locations
- Establish section line information
- Establish project benchmarks and run bench loop to known Johnson County or other reference benchmarks

City ownership and plat maps were used to determine property owners, existing right-of-way, and property lines.

Utility companies were contacted to determine the location of their lines and easements within the project corridor. The utility information shown on the plan sheets was derived from utility maps provided by the utility companies. The utilities shown on the plans do not represent field-verified locations.

The December 2004 Future Development Plan was obtained from the City of Overland Park. Development plans were considered during the layout of the proposed roadway.

Design criteria is in accordance with current standards and practices for the City of Overland Park, Kansas Department of Transportation, and American Association of

State Highway and Transportation Officials' publication, *A Policy on Geometric Design of Highways and Streets 2004*.

Requirements for median openings and turn bay storage lengths were provided by the City of Overland Park.

Hydraulic information for Coffee Creek was obtained from the City, and it is part of the Blue River Watershed Study currently being completed in coordination with Johnson County and several cities.

Preliminary cost estimates are in 2006 dollar figures. Recent bid tabs and other historical cost information were utilized to establish the 2006 unit prices.

## **4 EXISTING CONDITIONS AND FUTURE PLANNING**

### **4.1 Existing Roadways**

Antioch Road is a north-south thoroughfare serving Overland Park and Johnson County residents. Antioch Road is a two lane paved roadway with open ditches and no shoulders. Existing Antioch Road is not a through street as it presently does not cross the Coffee Creek Valley. The Coffee Creek Valley is designated on the City's Greenway Linkage Plan as proposed greenway land with a Type 1 greenway linkage trail within the valley. Antioch Road south of 175<sup>th</sup> Street is designated as an Arboretum Entrance Corridor.

There are three intersecting side streets: at 175<sup>th</sup>, 172<sup>nd</sup> Terrace, and 170<sup>th</sup> Street. All three are currently T intersections. The study assumes that all three will ultimately be four-way intersections. The City's Future Development Plan also shows a proposed collector roadway at a future 171<sup>st</sup> Street location. This future collector is not included as part of this study. The existing location of the 175<sup>th</sup> Street intersection may need to be relocated to the south to achieve appropriate intersection sight distance and to increase the distance between the side street intersection and the proposed bridge over Coffee Creek. Both the existing and proposed locations of 175<sup>th</sup> Street are shown on the plans.

There are 16 intersecting private drive entrances and two intersecting field entrances within the study limits.

### **4.2 Existing Right-of-Way**

The existing right-of-way along Antioch Road varies from 20 feet to 50 feet left and right of the section line throughout the project.

The existing right-of-way is shown on the plan drawings in the appendix.

### **4.3 Traffic Counts**

Traffic data from the City of Overland Park indicate 650 Average Daily Traffic (ADT) along Antioch Road for the year 2005. Projected counts of 17,000 ADT are anticipated for the year 2030.

### **4.4 Land Use**

The properties adjacent to Antioch Road include small subdivisions and small and large tracts of land. The current planned zoning for the majority of the roadway in this study is for “low density” residential use. There is one area along 172<sup>nd</sup> Terrace designated as “very low density” residential use.

### **4.5 Existing Vertical Alignments**

The existing vertical alignment closely follows the rolling terrain of the project area. Limited stopping sight distance and intersection sight distance is provided under existing conditions.

### **4.6 Existing Drainage**

There are currently open ditches along both sides of Antioch Road. There are three existing drainage structures crossing under Antioch Road. Four proposed crossroad drainage structures are shown on the plans. Antioch Road once spanned Coffee Creek via a bridge, but the bridge no longer exists. A new bridge spanning the Coffee Creek flood plain is proposed and shown on the plans.

### **4.7 Existing Utilities**

The underground utilities in the study area are telephone, water, power, gas, and cable TV. No sanitary sewer lines exist within the study limits. These utility lines and their respective sizes are shown on the plan drawings located in the appendix and are described in the following paragraphs. Note that all utility line locations are approximate and are not guaranteed to be correct.

#### ***Southwestern Bell Telephone***

SWBT has buried cable facilities along the easterly edge of Antioch Road in public right-of-way from about 600 feet north of 172<sup>nd</sup> Terrace to the northerly project limits. The remainder of the telephone lines are aerial and located on the power line poles. The aerial lines will be relocated with the power poles. The buried lines will require relocation at the utility company's expense.

### ***Time Warner Cable***

Cable TV lines are located overhead on power poles along the west edge of Antioch Road from the north side of Coffee Creek to the northerly project limits. Buried Cable TV lines are located along both the north and south sides of 172<sup>nd</sup> Terrace and along the south side of 170<sup>th</sup> Street. Two or three un-verified underground Cable TV crossings of Antioch road may also be located within the project limits. Aerial lines will relocate with the Kansas City Power and Light poles

### ***Kansas City Power and Light***

Overhead power lines exist throughout the project limits. Overhead power lines (7.2kv) are located parallel with and along the north side of 179<sup>th</sup> Street; parallel with and along the west side of Antioch Road from 179<sup>th</sup> to 175<sup>th</sup>; and from 550 feet south of 172<sup>nd</sup> Terrace to the easterly study limits. Service lines and service line poles also exist throughout the study area. The majority of this pole line will require relocation at the utility company's expense. The relocation will impact the project schedule.

About 650 feet north of 170<sup>th</sup> Street a 169kv transmission line crosses Antioch Road. This line is not directly impacted by the proposed improvement.

### ***Kansas Gas Service***

A four-inch gas line is located in private easement along the easterly side of Antioch Road from about 500 feet south of 172<sup>nd</sup> Terrace to about 400 feet south of 170<sup>th</sup> Street where it reduces to a two-inch gas line and continues north to the project limits. The gas line will require relocation and upgrade to a six-inch main. The relocation is a project cost; the upgrade is the utility company's cost.

### ***Water District Number 1 of Johnson County***

A twelve-inch water line is located in private easement throughout the length of the project. It is located generally 70 feet west of the centerline of Antioch from 179<sup>th</sup> Street to 175<sup>th</sup> Street and generally 65 feet east of the centerline of Antioch from 175<sup>th</sup> to 167<sup>th</sup> Street. Associated valves and fire hydrants also exist in the corridor. The majority of the twelve-inch water line will require relocation or adjustment as a project cost.

An eight -inch water line is located in private easement from 35 to 45 feet west of the centerline of Antioch Road from about 330 feet south of 172<sup>nd</sup> Terrace to 170<sup>th</sup> Street. The majority of the eight-inch water line will require relocation as a project cost.

A six-inch water line is located in private easement along the south side of 172<sup>nd</sup> Terrace and will require relocation as a project cost.

A six-inch water line is located in public right-of-way along the south side of 170<sup>th</sup> Street and will require relocation at the utility company's expense.

## 5 PRELIMINARY DESIGN

The following design criteria were utilized when developing the preliminary design:

### 5.1 Design Criteria

#### **5.1.1 CROSS SECTIONS**

Roadway Section	80'-0" Back to Back Total Roadway consisting of two 28'-0" Back to Back roadways and a 24'-0" Back to Back raised median. The 28 foot roadways includes a 12'-2" (inside lane), a 13'-0" (outside lane), a 2'-0" Curb and Gutter on the outside and a 10" Curb inside. The 24 foot median allows for the addition of an 11'-0" left-turn lane where required.
Parking Lane	None
Normal Crown	¼" per foot

#### **5.1.2 SIDE SLOPES**

Maximum	4:1
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#### **5.1.3 GEOMETRICS**

Design Speed	50 mph
Posted Speed	45 mph
Intersection Sight Distance	480 feet
Vertical Alignment	
Maximum Grade	6%
Minimum Grade	1%
Stopping Site Distance	425 feet
K Values	96 minimum for sag curves (headlight control) 54 minimum for sag vertical curves (comfort control) 84 minimum for crest vertical curves (sight distance control)

### 5.1.4 DRAINAGE

Storm Sewer (on street) designed for the 10% chance storm  
Drainage Structures (Culverts) 1% chance storm with no roadway overtopping

### 5.1.5 BRIDGES

Design criteria for the new bridge over Coffee Creek will adhere to current design standards and criteria established by the City of Overland Park, Kansas Department of Transportation (KDOT) and the American Association of State Highway and Transportation Officials (AASHTO). The design live load for the new bridges will be AASHTO HL-93 as defined in Section 3.6 of the current LRFD Standard Specifications.

## 5.2 Typical Sections

The typical roadway cross section is a standard four-lane divided thoroughfare section. This section includes 80'-0" Back to Back total roadway width centered within 120 foot-wide right-of way. The roadway section consists of two 28'-0" Back to Back roadways and a 24'-0" Back to Back raised median. The 28 foot roadways include a 12'-2" inside lane, a 13'-0" outside lane, a 2'-0" Curb and Gutter on the outside and a 10" Curb inside. The 24 foot median allows for the addition of an 11'-0" left-turn lane where required. Shoulder width (back of curb to hinge point) is 20'-0" each side. The shoulder areas include a 5'-0" wide sidewalk or a 10'-0" wide trail as shown on the plans.

## 5.3 Median Breaks and Turn Lane Storage Requirements

The City provided the following recommendations for the proposed median break locations and full-width turn-lane storage requirements (excluding tapers):

### Antioch Road

INTERSECTION LOCATION	NORTHBOUND	SOUTHBOUND
170 <sup>th</sup> Street	150' left	150' left
172 <sup>nd</sup> Terrace	150' left	150' left
175 <sup>th</sup> Street	200' left	150' left
179 <sup>th</sup> Street	NA	200' rt., 300' lt.

## **5.4 Right-of-Way**

Proposed right-of-way requirements are shown on the plan drawings located in the appendix. The thoroughfare roadway section requires a 120-foot right-of-way corridor. Permanent drainage easements will be required at cross road drainage structures. Temporary construction easements will be required throughout the project to allow for construction. Existing permanent utility easements are shown on the drawings. Additional permanent utility easements will be required to accommodate utility relocations and will be determined during the project design phase.

## **5.5 Proposed Horizontal Alignments**

The proposed centerline of Antioch Road follows the section line for the entire length of the study limits from the 179<sup>th</sup> Street intersection to a point approximately ¼ mile south of 167<sup>th</sup> Street. As part of the 167<sup>th</sup> Street study the centerline of Antioch Road then shifts 20 feet east of the section line up to the 167<sup>th</sup> Street intersection. The offset will reduce the adverse impacts to homes along the west side of Antioch Road.

## **5.6 Proposed Vertical Alignments**

The minimum design criteria for thoroughfare type roadways are established by the City of Overland Park Municipal Code and the current edition of the AASHTO *A Policy on Geometric Design of Highways and Streets 2004*. The project design speed is 50 mph.

In order to provide the required Stopping Sight Distance (S.S.D.) for crest vertical curves, a minimum “K” value of 84 is required. The minimum “K” for sag curves based on headlight sight distance is 96. The minimum “K” for sag curves based on comfort control is 54.

Comfort control criteria are utilized at two locations. One location is at the Antioch Road approach to 179<sup>th</sup> Street to reduce the depth of the cut and to reduce impacts to adjacent properties. Although the intersection design at 179<sup>th</sup> Street is not part of this study, it is assumed that 179<sup>th</sup> Street will eventually be a thoroughfare roadway section identical to that of Antioch Road. To further facilitate the Antioch Road grade at the approach to 179<sup>th</sup> Street, it is assumed that the cross slope on 179<sup>th</sup> Street will be tilted up at 2% within the area of the intersection. The second location where the comfort control criteria are utilized is at the crossing of Coffee Creek to significantly reduce the amount of fill required in the valley.

Intersection sight distance is calculated at 480 feet based on a passenger car entering onto Antioch Road from a side street. The left turn maneuver is assumed to occur in two stages, one to cross to the median gore area and the second to

complete the turn. Appropriate intersection sight distance was achieved at all side streets except at 175<sup>th</sup> Street. It is proposed to shift the location of this intersection approximately 200 feet south of its present location in order to gain the necessary intersection sight distance and to increase the separation of the intersection from the proposed Coffee Creek Bridge.

## **5.7 Drainage**

The existing ditches and cross-road pipes will be replaced with a street storm sewer system including curb inlets and underground piping to collect and convey stormwater. The system will be designed to collect and convey runoff from the 10% chance storm, and cross-road pipes conveying street runoff will be designed to convey runoff from the 4% chance storm. The maximum depth of ponding in a 1% chance storm will be limited to 7 inches in the roadway. The street storm sewer system is not shown in the plans, but a conceptual design was utilized for developing a cost estimate. Included in the plans is the design information and location of cross-road culverts necessary to convey flows from a 1% chance storm without overtopping the roadway.

## **5.8 Bridge Design**

Twin structures are proposed for construction over Coffee Creek. The five span integral bridges will each have a 26'-7" clear roadway width, with one 5'-0" clear sidewalk on the east side and a 10'-0' clear trail on the west side. A 2'-8" barrier curb will be located on each side of the roadway and a chain link fence with a height of 4'-6" minimum will be located on the exterior side of the sidewalk and trail. A handrail will be attached to the top of the barrier curb for a total height from the sidewalk of 4'-6" minimum. The northbound structure will have an Out-to-Out width of 35'-3" and the southbound structure will have an Out-to-Out width of 40'-3". The bridges will cross Coffee Creek at a 0 degree skew with span lengths of 72'-0"--100'-0"-- 100'-0"-- 100'-0"--72'-0" with a total End to End of Wearing Surface of 447'-0". The proposed bridge length was sized so that no roadway approach fill was placed in the Coffee Creek floodway. It is likely that hydraulic analysis during final design will show that the bridge length can be shortened without adversely impacting flood elevations on Coffee Creek.

The spans will be constructed with Type K-6 P/S Concrete Beams with composite slab. The northbound structure will have four girders and the southbound structure will have five girders. Foundation investigations were developed using USGS soil survey information. Based on the anticipated rock elevations, drilled shafts will be the most efficient foundation type for these structures. This was the preliminary foundation type used for construction cost estimating purposes, but should not be used for construction until a geotechnical investigation is done to confirm foundation type and depths. Concrete approach slabs will be constructed at the bridge approaches and will be based on current KDOT design standards for concrete approach slabs.

## **5.9 Retaining Walls**

No retaining walls are shown on the plans. It is probable that preliminary and final design will require some retaining walls on the project, thus a nominal quantity for retaining walls has been included in the cost estimate.

## **5.10 Existing lakes and ponds**

Roadway embankment will encroach on two ponds within the project limits located left of Station 49+00 and left of Station 79+50.

The pond at 49+00 is approximately 0.5 acre in size. Roadway embankment will cover 5-10% of the pond area and will necessitate relocation of the existing spillway and modification of the dam embankment. The modifications to the dam and change in the stage storage relationship will require bringing the whole dam up to current Division of Water Resources standards for dam construction, including additional freeboard and appropriate outlet design and erosion protection. Due to improvements that will likely be necessary, it is recommended that the dam be breached and a natural stream restored that will convey water to the Coffee Creek Floodplain.

The pond left of Station 79+50 is utilized as a storm drainage outlet location and will incur only minor impacts due to roadway construction. Proper erosion and sediment control will be necessary during construction to ensure that sediment does not migrate off-site and negatively impact the pond.

## **5.11 Existing wells**

Existing wells at Station 57+80 right and Station 61+56 right are within the roadway construction limits. These wells are abandoned and will be backfilled in accordance with state and local regulations by the Contractor.

## **5.12 Permitting**

Permits will be required before beginning construction activities on this project. Due to constantly changing permitting requirements, further investigations for permitting requirements will be required during preliminary design phase. The following permits may be required and should be investigated:

- 404/401 Permit
- DWR Permit
- FEMA Floodplain Permit
- National Pollution Discharge Elimination System (NPDES) Permit

### **5.13 Construction**

Construction phasing options and construction traffic control are not addressed in this study, but will be determined during preliminary and final design. Estimated costs are included in the project cost estimate.

## **6 COST ESTIMATES**

Approximate quantities have been calculated to determine an approximate project construction cost including potential utility relocations. Design engineering, City administration costs, costs for right-of-way, and cost for construction phase services are also included in the total project cost. Recent bid tabs from other Overland Park thoroughfare projects, such as 151<sup>st</sup> Street, as well as other historical cost information, were utilized to establish the unit costs shown in the following cost estimates.

## 6.1 Total Project Cost Summary

**Preliminary Engineering Study  
Antioch Road (167th to 179th) Overland Park, Kansas  
Project Cost Estimate Summary**

	<u>Project Totals</u>	
Contractor Bid	\$12,313,651	
Estimated Change Orders (5% Of Contractor Bid)	\$615,683	5% of bid
Engineering		
<i>Final Design</i>	\$1,477,638	used 12% of bid
<i>Consultant EDC</i>	\$123,137	used 1% of bid
City Inspection (if Federal/CARS/SMAC/Other Cities Eligible)	\$1,292,933	used 10.5% of bid
Material Testing	\$184,705	used 1.5% of bid
Project Administration	\$246,273	used 2% of bid
Legal Publications, Blueprinting, Miscellaneous	\$61,568	used 0.5% of bid
Ownership Certificates/Title Report	\$8,000	
R/W & Easement Acquisition	\$2,760,350	property and acquisition
Utility Relocations	<u>\$617,400</u>	utility estimate plus 20%
<b><u>Total Project Cost</u></b>	<b><u>\$19,701,338</u></b>	

## 6.2 Detailed Total Project Costs

### Detailed Total Project Cost City of Overland Park, Kansas

Antioch Road from 167th Street to 179th Street				Engineer's Estimate	
Item No.	Item Description	Unit	Approx. Quantity	Unit Price	Total
1	Clearing and Grubbing	LS	1	\$150,000.00	\$150,000.00
2	Removal of Existing Structures	LS	1	\$150,000.00	\$150,000.00
3	Unclassified Excavation	CY	115275	\$11.00	\$1,268,025.00
4	Contractor Furnished Borrow	CY	11486	\$12.00	\$137,832.00
5	Compaction of Earthwork (All Types)	CY	104347	\$3.00	\$313,041.00
6	Northbound Bridge	SF	15757	\$109.00	\$1,717,513.00
7	Southbound Bridge	SF	17992	\$109.00	\$1,961,128.00
8	Guard Fence	LF	525	\$110.00	\$57,750.00
9	Fly Ash	TON	2936	\$30.00	\$88,080.00
10	Manipulation for Fly Ash Treated Subgrade (8")	SY	48938	\$3.00	\$146,814.00
11	Aggregate Base Course (OP Special) (6")	SY	50503	\$6.00	\$303,018.00
12	Asphaltic Concrete Intermediate Course	TON	20860	\$47.00	\$980,420.00
13	Asphaltic Concrete Surface Course	TON	3646	\$48.00	\$175,008.00
14	Concrete Pavement (10" Uniform)	SY	500	\$45.00	\$22,500.00
15	Temporary Surfacing Material (AB-3)	TON	2000	\$15.00	\$30,000.00
16	Concrete Median Nose	Each	7	\$1,000.00	\$7,000.00
17	Curb & Gutter, Combined (Type "B") (AE)	LF	14290	\$11.00	\$157,190.00
18	Curb (Type "D") (AE)	LF	11264	\$6.50	\$73,216.00
19	Sidewalk Construction	SF	41869	\$4.00	\$167,476.00
19	Bike Trail Construction	SF	31199	\$5.00	\$155,995.00
20	Sidewalk Ramp (6")	SF	928	\$10.00	\$9,280.00
21	Concrete Entrance Pavement	SF	21525	\$8.00	\$172,200.00
22	Street Lighting Installation / Modification	LS	1	\$250,000.00	\$250,000.00
23	Construction Phasing and Traffic Control	LS	1	\$50,000.00	\$50,000.00
24	Permanent Pavement Marking & Signing	LS	1	\$30,000.00	\$30,000.00
25	Fencing	LF	4000	\$30.00	\$120,000.00
26	Lawn Sprinkler System	Each	4	\$9,000.00	\$36,000.00
27	Sodding	SY	15555	\$4.00	\$62,220.00
28	Natural Seed Mix	Acre	17	\$8,000.00	\$136,000.00
28	Buffalo Grass Seed	Acre	2.7	\$9,000.00	\$24,300.00
29	Tree Replacement	Each	75	\$300.00	\$22,500.00
30	Landscape Replacement	LS	1	\$50,000.00	\$50,000.00
31	Temporary Water Pollution Control	LS	1	\$40,000.00	\$40,000.00
32	Project Sign	EA	4	\$500.00	\$2,000.00
33	Contractor Construction Staking	LS	1	\$200,000.00	\$200,000.00
34	DELETED	LS	0	\$0.00	\$0.00

**Detailed Total Project Cost**  
**City of Overland Park, Kansas**

Antioch Road from 167th Street to 179th Street				Engineer's Estimate	
Item No.	Item Description	Unit	Approx. Quantity	Unit Price	Total
35	15" RCP (Class III)	LF	2518	\$55.00	\$138,490.00
36	18" RCP (Class III)	LF	2031	\$60.00	\$121,860.00
37	24" RCP (Class III)	LF	1761	\$70.00	\$123,270.00
38	30" RCP (Class III)	LF	799	\$80.00	\$63,920.00
39	36" RCP (Class III)	LF	684	\$90.00	\$61,560.00
40	42" RCP (Class III)	LF	293	\$110.00	\$32,230.00
41	54" RCP (Class III)	LF	505	\$180.00	\$90,900.00
42	60" RCP (Class III)	LF	355	\$210.00	\$74,550.00
43	6' X 4' Std. Curb Inlet	EA	58	\$4,000.00	\$232,000.00
44	6' X 5' Std. Curb Inlet	EA	2	\$4,500.00	\$9,000.00
45	8' X 4' Area Inlet (10" Throat)	EA	1	\$6,000.00	\$6,000.00
46	4' X 4' Area Inlet (10" Throat)	EA	1	\$3,500.00	\$3,500.00
47	18" End Section	EA	1	\$500.00	\$500.00
48	24" End Section	EA	3	\$620.00	\$1,860.00
49	30" End Section	EA	2	\$700.00	\$1,400.00
50	36" End Section	EA	1	\$1,030.00	\$1,030.00
51	42" End Section	EA	2	\$1,100.00	\$2,200.00
52	54" End Section	EA	2	\$1,750.00	\$3,500.00
53	60" End Section	EA	2	\$2,000.00	\$4,000.00
54	Riprap	SY	330	\$70.00	\$23,100.00
	<b>Total Raw Construction Cost</b>				<b>\$10,261,376.00</b>
56	Contingency at 20%				\$2,052,275.20
	<b>TOTAL CONSTRUCTION COST</b>				<b>\$12,313,651.20</b>
57	Allowance for change orders at 5%				\$615,682.56
58	Ownership Certificates/Title Reports per tract	EA	32	\$250.00	\$8,000.00
59	Right-of-Way Acquisition Costs per tract	EA	32	\$2,000.00	\$64,000.00
60	Right-of-Way Property Costs				\$2,696,350.00
61	Design Engineering at 12%				\$1,477,638.14
62	Design Engineering During Construction at 1%				\$123,136.51
63	Owner Administration Costs at 2%				\$246,273.02
64	Construction Administration Costs at 1.5%				\$184,704.77
65	Construction Observation Costs at 9.0%				\$1,108,228.61
66	Construction Testing Costs at 1.5%				\$184,704.77
67	Utility Relocations	LS	1	\$617,400.00	\$617,400.00
68	Legal, Printing, Miscellaneous at 0.5%				\$61,568.26
	<b>TOTAL PROJECT COST</b>				<b>\$19,701,337.84</b>

## 6.3 Utility Relocation Costs

### Utility Relocation Costs

City of Overland Park, Kansas

Antioch Road from 167th Street to 179th Street				Engineer's Estimate	
Item No.	Item Description	Unit	Approx. Quantity	Unit Price	Total
1	12" water line complete	LF	5500	\$50.00	\$275,000.00
2	8" water line complete	LF	1700	\$45.00	\$76,500.00
3	6" water line complete	LF	200	\$45.00	\$9,000.00
4	6" gas line complete	LF	4000	\$30.00	\$120,000.00
5	misc valves, meters, service lines	LS	1	\$25,000.00	\$25,000.00
	<b>Total Utility Relocation Cost</b>				<b>\$505,500.00</b>
	<b>Total with 20% Contingencies</b>				<b>\$606,600.00</b>

## 6.4 Right-of-Way Costs

<b>Right-of-Way Costs</b>			
<b>City of Overland Park, Kansas</b>			
<b>Antioch Road 167th Street to 179th Street</b>			
<b>Tract Number</b>	<b>Easement Type</b>	<b>Approximate Area (S.F.)</b>	<b>Approximate Cost</b>
1	<i>Right-of-Way</i>	51739	\$206,956
	<i>Temporary Construction</i>	51892	\$51,892
	<i>Drainage</i>	1761	\$3,522
2	<i>Right-of-Way</i>	3906	\$15,624
	<i>Temporary Construction</i>	16052	\$16,052
	<i>Drainage</i>	0	\$0
3	<i>Right-of-Way</i>	3000	\$12,000
	<i>Temporary Construction</i>	11751	\$11,751
	<i>Drainage</i>	1147	\$2,294
4	<i>Right-of-Way</i>	55937	\$223,748
	<i>Temporary Construction</i>	60241	\$60,241
	<i>Drainage</i>	0	\$0
5A	<i>Right-of-Way</i>	50576	\$202,304
	<i>Temporary Construction</i>	117142	\$117,142
	<i>Drainage</i>	0	\$0
5	<i>Right-of-Way</i>	52975	\$211,900
	<i>Temporary Construction</i>	50607	\$50,607
	<i>Drainage</i>	1699	\$3,398
6	<i>Right-of-Way</i>	3799	\$15,196
	<i>Temporary Construction</i>	4450	\$4,450
	<i>Drainage</i>	0	\$0
6A	<i>Right-of-Way</i>	4192	\$16,768
	<i>Temporary Construction</i>	8406	\$8,406
	<i>Drainage</i>	0	\$0
7	<i>Right-of-Way</i>	4109	\$16,436
	<i>Temporary Construction</i>	8248	\$8,248
	<i>Drainage</i>	0	\$0

<b>Right-of-Way Costs</b>			
<b>City of Overland Park, Kansas</b>			
<b>Antioch Road 167th Street to 179th Street</b>			
<b>Tract Number</b>	<b>Easement Type</b>	<b>Approximate Area (S.F.)</b>	<b>Approximate Cost</b>
8	<i>Right-of-Way</i>	3901	\$15,604
	<i>Temporary Construction</i>	6019	\$6,019
	<i>Drainage</i>	0	\$0
9	<i>Right-of-Way</i>	5144	\$20,576
	<i>Temporary Construction</i>	14176	\$14,176
	<i>Drainage</i>	1493	\$2,986
10	<i>Right-of-Way</i>	5086	\$20,344
	<i>Temporary Construction</i>	8425	\$8,425
	<i>Drainage</i>	0	\$0
11	<i>Right-of-Way</i>	10546	\$42,184
	<i>Temporary Construction</i>	6475	\$6,475
	<i>Drainage</i>	0	\$0
12	<i>Right-of-Way</i>	11285	\$45,140
	<i>Temporary Construction</i>	6532	\$6,532
	<i>Drainage</i>	0	\$0
13	<i>Right-of-Way</i>	2002	\$8,008
	<i>Temporary Construction</i>	2178	\$2,178
	<i>Drainage</i>	0	\$0
14	<i>Right-of-Way</i>	6606	\$26,424
	<i>Temporary Construction</i>	9142	\$9,142
	<i>Drainage</i>	0	\$0
15	<i>Right-of-Way</i>	6674	\$26,696
	<i>Temporary Construction</i>	19522	\$19,522
	<i>Drainage</i>	0	\$0
15A	<i>Right-of-Way</i>	13273	\$53,092
	<i>Temporary Construction</i>	32191	\$32,191
	<i>Drainage</i>	3770	\$7,540

<b>Right-of-Way Costs</b>			
<b>City of Overland Park, Kansas</b>			
<b>Antioch Road 167th Street to 179th Street</b>			
<b>Tract Number</b>	<b>Easement Type</b>	<b>Approximate Area (S.F.)</b>	<b>Approximate Cost</b>
16	<i>Right-of-Way</i>	15318	\$61,272
	<i>Temporary Construction</i>	12207	\$12,207
	<i>Drainage</i>	0	\$0
17	<i>Right-of-Way</i>	37756	\$151,024
	<i>Temporary Construction</i>	42517	\$42,517
	<i>Drainage</i>	2219	\$4,438
18	<i>Right-of-Way</i>	40174	\$160,696
	<i>Temporary Construction</i>	76156	\$76,156
	<i>Drainage</i>	0	\$0
19	<i>Right-of-Way</i>	2000	\$8,000
	<i>Temporary Construction</i>	6170	\$6,170
	<i>Drainage</i>	0	\$0
20	<i>Right-of-Way</i>	10800	\$43,200
	<i>Temporary Construction</i>	11569	\$11,569
	<i>Drainage</i>	0	\$0
21	<i>Right-of-Way</i>	2999	\$11,996
	<i>Temporary Construction</i>	24187	\$24,187
	<i>Drainage</i>	1	\$2
22	<i>Right-of-Way</i>	6029	\$24,116
	<i>Temporary Construction</i>	26925	\$26,925
	<i>Drainage</i>	0	\$0
23	<i>Right-of-Way</i>	26518	\$106,072
	<i>Temporary Construction</i>	28017	\$28,017
	<i>Drainage</i>	786	\$1,572
24	<i>Right-of-Way</i>	17599	\$70,396
	<i>Temporary Construction</i>	12981	\$12,981
	<i>Drainage</i>	0	\$0

<b>Right-of-Way Costs</b>			
<b>City of Overland Park, Kansas</b>			
<b>Antioch Road 167th Street to 179th Street</b>			
<b>Tract Number</b>	<b>Easement Type</b>	<b>Approximate Area (S.F.)</b>	<b>Approximate Cost</b>
25	<i>Right-of-Way</i>	4800	\$19,200
	<i>Temporary Construction</i>	4804	\$4,804
	<i>Drainage</i>	0	\$0
26	<i>Right-of-Way</i>	4000	\$16,000
	<i>Temporary Construction</i>	4125	\$4,125
	<i>Drainage</i>	0	\$0
27	<i>Right-of-Way</i>	26736	\$106,944
	<i>Temporary Construction</i>	21745	\$21,745
	<i>Drainage</i>	1139	\$2,278
28	<i>Right-of-Way</i>	0	\$0
	<i>Temporary Construction</i>	3697	\$3,697
	<i>Drainage</i>	0	\$0
29	<i>Right-of-Way</i>	401	\$1,604
	<i>Temporary Construction</i>	251	\$251
	<i>Drainage</i>	0	\$0
<b>TOTAL RIGHT-OF-WAY COSTS</b>		<b>\$2,696,350</b>	

## **7 APPENDIX**

The appendix consists of a set of plans, which is bound separately.