

2006 PRELIMINARY ENGINEERING STUDY

183RD STREET FROM LACKMAN ROAD TO QUIVIRA ROAD

PFLUMM FROM 175TH STREET TO 183RD STREET

PREPARED FOR:



JUNE 2011

PREPARED BY:



EXPERIENCE | Transportation

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KANSAS CITY, MISSOURI 64108

TRANSYSTEMS PROJECT NO. P101060429

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Executive Summary

TranSystems Corporation completed this preliminary engineering study to establish a reasonable horizontal and vertical layout for Pflumm Road from 175th Street to 183rd Street, and for 183rd Street from Lackman Road to Quivira Road. The objective of this study was to complete a preliminary design that minimized impacts to existing development, to serve as a planning tool to guide future development, and to establish a right of way corridor to be preserved as development eventually occurs. The findings of this study were determined 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 183rd Street and Pflumm Road.
- **Develop Preliminary Horizontal/Vertical Alignment** – Develop preliminary horizontal and vertical alignments for 183rd Street and Pflumm Road.
- **Determine Major Drainage Improvements** – Size facilities for major drainage crossings (bridges and culverts).
- **Determine Total Project Cost** – Provide opinion of probable total project cost including construction, utility relocation, right-of-way, administration, legal and engineering costs based upon 2008 construction costs.

The comprehensive solution to meet the objective identified is summarized in the subsequent sections of this report.

183rd Street

Overland Park's standard divided thoroughfare street section, centered on the section line, is used.

Pflumm Road

Overland Park's standard divided thoroughfare street section, centered on the section line, is used with the following exception. The alignment will shift 30 feet to the east just south of 175th Street to connect with the location of Pflumm Road established by the 2003 Pflumm Road preliminary engineering study.

Introduction

TranSystems entered into an agreement with the City of Overland Park, Kansas on December 4, 2006. Part of this agreement was to perform Preliminary Engineering Study for Pflumm Road between 175th Street and 183rd Street and 183rd Street between Lackman Road and Quivira Road. The goal of the agreement was to establish a recommended horizontal and vertical layout for Pflumm Road as well as 183rd Street. Additionally, rights-of-way will be established for preservation as development occurs along these two roadway corridors. The study also documents the following:

- ▶ Documentation of Existing Conditions
- ▶ Median Break Summary
- ▶ Preliminary Design
- ▶ Estimate of Construction Costs

Each of these topics will be discussed in greater detail within this report. The Preliminary Plans are also included in Appendix A to graphically depict the proposed improvements.

Basic Information and Procedures

- ▶ Topographic information was obtained from AIMS mapping, provided by the City of Overland Park.
- ▶ Property Ownerships were provided by the City of Overland Park.
- ▶ Utility companies were contacted via U.S. mail. Cross county gas line companies were contacted by email.
- ▶ Development plans along the corridor were provided by the City of Overland Park and included the following:
 - Price Development Group, LLC, Preliminary Development Plan 179th and Quivira Road.
- ▶ Roadway plans prepared in 1999 by Cook, Flatt and Strobel for 175th and 179th Streets between Lackman Road and Switzer Road were provided by the City for the intersection of 175th Street and Pflumm Road.
- ▶ Traffic volumes and median break information, including turn bay lengths were provided by the City of Overland Park.
- ▶ The Design Criteria was developed in accordance with the current City ordinance. Additionally, the criterion complies with the standards and practices of the Kansas Department of Transportation (KDOT) and the American Association of State Highway and Transportation Officials (AASHTO) publication entitled, "A Policy on Geometric Design of Highways and Streets", dated 2004.
- ▶ The Blue Valley Watershed Study dated 2001; prepared by Camp, Dresser & McKee, Inc. including the 2005 addendum was provided by the City of Overland Park.
- ▶ Field Surveys were performed by TranSystems Corporation to verify stream conditions upstream and downstream of the road crossing.
- ▶ Construction cost estimates were prepared in 2008 dollars.

Existing Conditions

Roadways

183rd Street between Lackman and Quivira Road is an east/west thoroughfare and Pflumm Road between 183rd Street and 175th Street is a north/south thoroughfare serving Overland Park and Johnson County residents. 183rd Street and Pflumm Road are both two-lane paved roadways with no shoulders and open ditches. Throughout the project corridor, 183rd Street includes portions of the roadway that are currently in both Overland Park and Johnson County. Unincorporated Aubrey Township lies west of Lackman and south of 183rd between Lackman Road and Pflumm Road, with the City of Overland Park lying all along the north side of 183rd Street and along the south side between Pflumm Road and Quivira Road. Currently, 183rd Street does not extend eastward beyond Quivira Road.

183rd Street has three intersecting thoroughfares – Lackman Road, Pflumm Road and Quivira Road. There are also 12 intersecting driveways and 5 field entrances along 183rd Street. A private street, Holland Drive also intersects 183rd Street from the south at a point approximately ¼ miles west of Quivira Road. Along Pflumm Road, 5 field entrances are located in the study corridor.

Rights-of-Way

The existing right-of-way is generally 20 feet to 40 feet either side of the section line through undeveloped tracts of land, and 40 feet to 60 feet either side of the section line where subdivisions have been platted. The existing right-of-way is shown on the plan drawings in the Appendix.

Traffic Volumes

Traffic volumes were provided by the City of Overland Park and are Average Daily Traffic (ADT) for the year 2030. The following summarizes the traffic volumes:

Pflumm Road - 175th Street to 183rd Street	25,000 ADT
183rd Street - Lackman Road to Pflumm Road	5,000 ADT
183rd Street - Pflumm Road to Quivira Road	4,000 ADT

Land Uses

The properties adjacent to 183rd Street include primarily large tracts of land. The current zoning of the study corridor includes County RUR zoning district in the unincorporated areas and RURJ for properties in the City of Overland Park. The RUR zoning district is for large tracts to provide for agricultural areas with single-family residential uses that will maintain or enhance the rural character of the area. The RURJ zoning district is the County RUR zoning designation that applies to annexed properties in the City of Overland Park. The property located at the northwest corner of 183rd and Quivira has recently been rezoned to PRN, Planned Residential Neighborhood, which allows for a mixture of residential uses within a single development.

Vertical Profile

According to the AASHTO design criteria, much of the section of 183rd Street between Pflumm road and Quivira Road has limited sight distance. Because the proposed design speed is 50 mph, existing high spots in the profile will need to be cut down and low spots will need to be filled in to meet the new criteria. Much of 183rd Street between Lackman and Pflumm Road is flatter than the required 1% minimum slope.

Drainage

There are currently open ditches adjacent to 183rd Street and Pflumm Road. Eight existing drainage structures cross 183rd Street, and one crosses Pflumm Road. The crossings include 3 major watershed crossings of Wolf Creek tributaries. Avenue. A 10' x 3.5' reinforced concrete box crosses 183rd Street approximately 1000' east of Lackman Road. A double 8'x4' reinforced concrete box crosses 183rd Street approximately 850' west of Pflumm

Road, and a double 7'x7' reinforced concrete box crosses 183rd Street approximately 375' west of Quivira Road. None of these structures can pass a 100-year event, and none of the structures are long enough to accommodate the proposed typical section with adequate clear zone.

Utilities

The major utilities in the study area are telephone, water, power, gas, sanitary sewers and fiber optic, along with petroleum and natural gas transmission pipelines. These utility lines are shown on the plan drawings in the Appendix and are described as follows:

AT&T

AT& T has limited facilities in the project corridor. The AT& T service area ends at Pflumm Road with areas east of Pflumm served by AT& T, and west of Pflumm served by Embarq.

Embarq

Embarq did not respond to our request for information. Based on visual observations it appears that their facilities are primarily aerial, attached to the KCPL pole lines.

Johnson County Wastewater District

The Wastewater District currently has no facilities in the project area.

Water District No. 1 of Johnson County

WaterOne has limited facilities in the project corridor. Currently, a 1-1/2" water main is located on the south side of 183rd Street from Quivira Road to a point approximately 1/2 mile west of Quivira Road. A 36" DIP main is located on the west side of Lackman Road at 183rd Street. An 8" diameter main lies on the west side of Lackman Road north of 183rd Street and on the east side of 183rd Street South of 183rd. A 12" main is situated on the south side of 183rd Street west of Lackman Road. At the intersection of 175th Street and Pflumm Road a 12" and a 36" main are located on the north side of 175th Street.

Kansas City Power & Light

KCP&L has overhead facilities along the south side of 183rd Street from Lackman Road to a point approximately 1/4 mile west of Quivira Road where the line crosses to the north side of the street. There are overhead facilities on the west side of Pflumm Road from 183rd Street to 175th Street, and on the West side of Pflumm Road south of 183rd Street.

Kansas Gas Service

Kansas Gas Service has no facilities within the project limits.

Atmos Energy

Atmos energy has an 8-inch high pressure gas main crossing 183rd Street. Markers are visible on each side of 183rd Street approximately 450 feet west of Pflumm Road which delineate the pipeline crossing the street at this location.

Time Warner Cable

Time Warner Cable reports no facilities within the project limits.

Magellan Pipeline Company

Magellan has 3 petroleum products pipelines, one 8" diameter and two 12" diameter, running generally north-south, and crossing 183rd Street at a point approximately 500' west of Pflumm Road. Magellan facilities also include a valve facility located outside street right of way in private easement.

Conoco Phillips Pipeline Company

Conoco Phillips Pipeline Company has not responded to our request for information; however 2 markers are visible on each side of 183rd Street approximately 400 feet west of Pflumm Road which appear to indicate that Conoco Phillips has a 2 pipeline crossings the street at this location.

Enbridge Pipeline Company

Enbridge Pipeline Company energy has not responded to our request for information; however markers are visible on each side of 183rd Street approximately 450 feet west of Pflumm Road which appear to indicate that Enbridge has a pipeline crossing the street at this location.

Median Breaks and Turn Lane Storage Requirements

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

Location	Northbound	Southbound	Eastbound	Westbound
183rd & Lackman Road	300	300	300	300
183rd & Pflumm Road	300	300	300	300
183rd & Quivira Road	300	300	300	N/A
175th & Pflumm Road	300	N/A	N/A	N/A
1800' West of Quivira Road, Collector Street "B", Price Development Group	N/A	N/A	200* *Assumed- Length to be confirmed with City Traffic Engineer	200* *Assumed- Length to be confirmed with City Traffic Engineer

Preliminary Design

The following design criteria, based on chapter 13.03.080 of the Overland Park Municipal Code and on "A Policy on the Geometric Design of Highways and Streets", 2004 version, were used to develop the preliminary design.

Design Criteria - Roadway

	183rd Street	Pflumm Road
Functional classification	Thoroughfare	Thoroughfare
Design speed	50 mph	50 mph
Posted speed	45mph	45mph
Proposed right-of-way	80 Undivided/120 Divided	80 Undivided/120 Divided
Proposed typical roadway section	12'-2" Inside/13'-0" Outside	12'-2" Inside/13'-0" Outside
Proposed Median Width	N/A Undivided/ 24'-0" Divided	N/A Undivided/ 24'-0" Divided
Proposed curb type	Type D Inside/Type B Outside	Type D Inside/Type B Outside
Proposed sidewalk width	5' Both sides	5' both sides
Proposed Normal Crown	2.08% (1/4" per Foot)	2.08% (1/4" per Foot)

	183rd Street	Pflumm Road
Minimum Radii	1200 Divided/600 Undivided*	1200 Divided/600 Undivided*
Maximum grade	6%	6%
Minimum grade	1%	1%
Minimum stopping sight distance	400 ft	400ft
Sag vertical curve (min. K)	96	96
Crest vertical curve (min. K)	84	84
Maximum Superelevation	4%	4%
Superelevation Runoff	1:200	1:200
Side Slopes	4:1	4:1

Design Criteria – Drainage

The City of Overland Park Municipal has adopted APWA Section 5600, with amendments. The following design criteria is a summary of the applicable standards..

Method of estimating runoff	Rational (less than 200 Acres) Computer modeling over 200 acres
Storm sewer system design storm	10 year
Cross-road culvert design storm	50 year
Cross-road culvert design storm (low point)	100 year
Ditches	25 year
Allowable Spread	10.5' (6' intersections and crosswalks)
Minimum pipe size	15"
Type of pipe	RCP
Minimum pipe velocity	3 ft./sec.
Maximum pipe velocity	20 ft./sec.

Typical Sections

The typical sections for the proposed roadways are shown in the Appendix. All thoroughfare sections have 12" thick asphaltic concrete pavement over a 6" aggregate base course. Page 2 of the plans in the Appendix shows the standard four-lane divided thoroughfare section recommended for 183rd Street & Pflumm Road. The roadway width consists of a 13' outside lane and 12'-2" inside lane. Five-foot sidewalks are located 1-foot inside the proposed right-of-way line on both sides of the street.

Right-of-way

Right-of-way requirements are indicated on the plan drawings in the Appendix and on the typical section on page 2 of the plans in the Appendix. All thoroughfare sections will include a 120' right-of-way corridor, lying 60' on either side of centerline. Permanent drainage easements will be necessary at the ends of the crossroad drainage structures. Temporary construction easements will be necessary along most properties adjacent to construction. Additional permanent utility easements will be necessary to accommodate utility relocations, particularly in the vicinity of the Magellan valve station and pipeline crossings located on the south side of 183rd Street

immediately west of Pflumm Road. While the impacts to the pipeline crossings may be mitigated through the design profile, the surface facilities required for the valve station must be relocated outside the roadway corridor. The final locations of the proposed utility easements should be determined during the project design phase when more accurate utility information is available.

Proposed Horizontal Alignment

The roadway is proposed to be a standard thoroughfare centered on the existing section line from Lackman to just west of Pflumm.

Proposed Vertical Alignments

The minimum design criteria for thoroughfare type roadways is established in the City of Overland Park Municipal Code and the 2004 edition of "A Policy on Geometric Design of Highways and Streets" published by the American Association of State Highway and Transportation Officials. The two main design issues when developing the vertical alignments for these roadways are Stopping Sight Distance (S.S.D.) of a crest vertical curve and the "K" value of a sag vertical curve. The requirements for this project are shown in the Design Criteria section of this report. An exception to the Design Criteria has been

Historical Considerations

The Kansas State Historical Society (KSHS) has indicated there are no known archaeological sites or historic structures within the project area and thus the improvements should have no effect on properties listed on the National Register of Historic Places. However, during final design it is recommended that further investigation be explored. The response from the Kansas State Historical Society is included in the appendix.

Threatened and Endangered Species

We provided an opportunity for the United States Department of the Interior, Fish and Wildlife Service to comment on the preliminary study. Their conclusion was that no federally-protected threatened or endangered species are likely to be present in the project area. The response from the US Fish and Wildlife Service is included in the appendix.

Drainage

New drainage structures beneath 183rd Street and beneath Pflumm Road will be reinforced concrete boxes and reinforced concrete pipe. The major culvert crossings were sized for a 100-year storm. Water surface elevations were obtained from the "Blue River Watershed Study". A one foot freeboard elevation was utilized in the culvert design. For those crossings where the 100-year flow could not be conveyed within a double box structure, a bridge structure was used. During final design it may be necessary to design a storm system that utilizes area inlets to collect the water at the toes of slope where positive drainage cannot be achieved. Temporary interceptor ditches should be utilized in order to keep large areas of off-site drainage from entering the roadway. The temporary interceptor ditches will only be used where development has not yet occurred. Locations of structures are shown on the plan and profile sheets in the Appendix.

Culverts

There are four culvert crossings on 183rd Street between Lackman Road and Quivira Road, and one along Pflumm Road. The data used in analyzing the storm drainage flowing from the adjacent drainage areas is shown in the table below:

Structure Location	Size	Area (acres)	C Value	Time of Conc. (min)	i ₁₀₀ (in/hr)	Q ₁₀₀ (cfs)	Plugged ² WSE ₁₀₀
183rd Sta 48+60	1-10'x3' RCB	28	0.81	19.64	6.7	190	999.20 ³
183rd Sta 55+30	DBL.10'x5' RCB	209.9	CN = 87	41.96	n/a	903 ¹	997.37

Structure Location	Size	Area (acres)	C Value	Time of Conc. (min)	i ₁₀₀ (in/hr)	Q ₁₀₀ (cfs)	Plugged ² WSE ₁₀₀
183rd Sta 65+00	DBL.11'x4' RCB	90.9	0.78	18.29	6.86	610	1001.49
183rd Sta 88+20	DBL.8'x4' RCB	43.4	0.81	9.88	8.63	380	1017.52
Pflumm Rd Sta 215+75	DBL.9'x3' RCB	59.5	0.81	17.25	7.01	422	1019.23

1. Discharge from subarea WC184 (planning conditions) published in Overland Park Blue Valley Watershed Study 200512.
2. 100-year Water Surface Elevation for condition where culvert is 100% plugged – See Appendix B for additional information.
3. Elevation was calculated at 999.17 based on road profile. However, berm needed to convey 100-year storm won't allow overtopping until 999.20.

In addition, hydraulic analysis was performed for proposed roadway improvements on 183rd Street and Pflumm Road assuming the proposed culverts were completely blocked with no storm water conveyance through the structure. Hydraulic analysis was performed using Bentley Pondpack (version 10.1) Software with SCS Type II 24 hour rainfall events and TR-55 storm water runoff methods. Upstream ponding was estimated from GIS and project survey, and the proposed roadway profiles were used to simulate weir flow for the plugged culvert analysis. A summary of results is presented the previous table, with Pondpack output available in Appendix B of this report. It should be noted, the culvert located at Station 48+60 on 183rd Street appears to be hydraulically connected with the adjacent bridge located at Station 46+00 (Tributary 260) as no significant basin divide is present near 183rd Street. A simplified analysis of assuming all discharges for Culvert 48+60 must overtop 183rd Street, and assuming no upstream ponding is available due to ponding from Bridge 46+00 was used for this structure. This method provides a conservative water surface elevation.

Bridges

There are three bridges that will be required throughout the project. The bridges will span Wolf Creek tributaries. The bridge flow information summarized in the table below was obtained from the "Blue River Watershed Study".

Bridge	Station	Proposed Type	Low Chord EL ¹ (ft)	Spans ² (Total)	Drainage Area (ac.)	Q ₁₀₀ (cfs)	EGL ³ (Exist / Prop)
183rd	20+62 (Trib 270)	K4 Prestressed Concrete Girder	999.5	142'	484	2165	999.57 / 999.68
183rd	46+00 (Trib 260)	K4 Prestressed Concrete Girder	997.24	130'	334	1,162	997.39 / 996.62
183rd	112+40 (Trib 220)	K4 Prestressed Concrete Girder	984.84	70'	362	1,639	984.22 / 979.92

1. Low Chord Elevation equal to upstream 100 year water surface elevation (planning conditions).
2. Preliminary bridge span lengths chosen to span the 100 year planning floodway published in the Blue Valley Watershed Study.
3. EGL is for 100-year storm. See Appendix B for additional information.

Locations of bridge structures are shown on the plan and profile sheets in the Appendix.

Existing Lakes and Ponds

A man-made private pond is located on the North side of 183rd Street approximately 600' east of Pflumm Road. The proposed roadway will require removal of the pond.

Permitting

Permits will be required before beginning construction activities on this project. Due to the continually changing nature of permitting requirements, it is recommended the engineer review permitting requirements during the project's preliminary design phase. The following permits may be required and should be investigated:


404 Permit
DWR Permit
National Pollution Discharge Elimination System (NPDES) Permit
City Land Disturbance Permit
City Flood Plain Permit
FEMA
Other

Construction

Construction phasing and maintenance of traffic during construction are not addressed in this study. These items must be considered during preliminary and final design. Estimated project costs are included in the following section.

Estimate of Costs

Approximate quantities have been calculated to determine the approximate project construction cost, including potential utility relocations. The total project cost also includes anticipated costs for design engineering, City administration costs, right-of-way costs, and costs for construction phase services.



SUMMARY OF PRELIMINARY COSTS
183RD STREET - LACKMAN TO QUIVIRA and
PFLUMM ROAD - 175TH TO 183RD
City of Overland Park, Kansas

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	<i>Item</i>	<i>Totals</i>	
1.	Construction Costs	\$ 21,249,065.70	
2.	Engineering/Survey	\$ 1,062,453.29	5% of Construction
3.	Inspection	\$ 2,231,151.90	10.5% of Construction
4.	Material Testing	\$ 318,735.99	1.5% of Construction
5.	Project Administration	\$ 424,981.32	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 106,245.33	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 5,795,563.00	
9.	Utility Relocations	\$ 1,489,680.00	
	TOTAL PROJECT COST	\$ 32,685,126.53	



**SUMMARY OF PRELIMINARY RW ACQUISITION COSTS
183RD STREET - LACKMAN TO QUIVIRA and
PFLUMM ROAD - 175TH TO 183RD
City of Overland Park, Kansas**

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Tract	Easement type	Approx (S.F.)	Approx. Cost
1.	Right of Way	39344	\$ 157,376.00
	Temporary Construction	31149	\$ 31,149.00
	Drainage		\$ -
2.	Right of Way	60336	\$ 241,344.00
	Temporary Construction	31823	\$ 31,823.00
	Drainage		\$ -
3.	Right of Way	82030	\$ 328,120.00
	Temporary Construction	75956	\$ 75,956.00
	Drainage		\$ -
4.	Right of Way	855	\$ 3,420.00
	Temporary Construction		\$ -
	Drainage		\$ -
5.	Right of Way	42895	\$ 171,580.00
	Temporary Construction	21065	\$ 21,065.00
	Drainage		\$ -
6.	Right of Way	210662	\$ 842,648.00
	Temporary Construction	133986	\$ 133,986.00
	Drainage	24045	\$ 24,045.00
7.	Right of Way		\$ -
	Temporary Construction	148682	\$ 148,682.00
	Drainage	1836	\$ 1,836.00
8.	Right of Way	83100	\$ 332,400.00
	Temporary Construction	52989	\$ 52,989.00
	Drainage	4576	\$ 4,576.00
9.	Right of Way	147407	\$ 589,628.00
	Temporary Construction	79067	\$ 79,067.00
	Drainage	48329	\$ 48,329.00
10.	Right of Way	53474	\$ 213,896.00
	Temporary Construction	63586	\$ 63,586.00
	Drainage	1822	\$ 1,822.00
11.	Right of Way	53323	\$ 213,292.00
	Temporary Construction	52779	\$ 52,779.00
	Drainage		\$ -
12.	Right of Way	72014	\$ 288,056.00
	Temporary Construction	74800	\$ 74,800.00
	Drainage		\$ -
13.	Right of Way		\$ -
	Temporary Construction		\$ -
	Drainage		\$ -
14.	Right of Way	291	\$ 1,164.00
	Temporary Construction	42052	\$ 42,052.00
	Drainage	2369	\$ 2,369.00

15.	Right of Way	381	\$ 1,524.00
	Temporary Construction	24853	\$ 24,853.00
	Drainage		\$ -
16.	Right of Way	890	\$ 3,560.00
	Temporary Construction	27225	\$ 27,225.00
	Drainage	1870	\$ 1,870.00
17.	Right of Way	10460	\$ 41,840.00
	Temporary Construction	7971	\$ 7,971.00
	Drainage		\$ -
18.	Right of Way	6512	\$ 26,048.00
	Temporary Construction	4951	\$ 4,951.00
	Drainage		\$ -
19.	Right of Way	19645	\$ 78,580.00
	Temporary Construction	7112	\$ 7,112.00
	Drainage		\$ -
20.	Right of Way	44360	\$ 177,440.00
	Temporary Construction	28039	\$ 28,039.00
	Drainage		\$ -
21.	Right of Way	4785	\$ 19,140.00
	Temporary Construction	7270	\$ 7,270.00
	Drainage		\$ -
22.	Right of Way	12870	\$ 51,480.00
	Temporary Construction	18065	\$ 18,065.00
	Drainage		\$ -
23.	Right of Way	29888	\$ 119,552.00
	Temporary Construction	18190	\$ 18,190.00
	Drainage		\$ -
24.	Right of Way	1733	\$ 6,932.00
	Temporary Construction	664	\$ 664.00
	Drainage		\$ -
25.	Right of Way	3818	\$ 15,272.00
	Temporary Construction	2847	\$ 2,847.00
	Drainage		\$ -
26.	Right of Way		\$ -
	Temporary Construction		\$ -
	Drainage		\$ -
27.	Right of Way	70685	\$ 282,740.00
	Temporary Construction	65844	\$ 65,844.00
	Drainage		\$ -
28.	Right of Way	45321	\$ 181,284.00
	Temporary Construction	26557	\$ 26,557.00
	Drainage		\$ -
29.	Right of Way	59267	\$ 237,068.00
	Temporary Construction	37810	\$ 37,810.00
	Drainage		\$ -
R/W Total			\$ 5,795,563.00



SUMMARY OF PRELIMINARY UTILITY RELOCATION COSTS
183RD STREET - LACKMAN TO QUIVIRA and
PFLUMM ROAD - 175TH TO 183RD
City of Overland Park, Kansas

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	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	1 1/2" Water Line Relocation	2640	L.F.	\$ 20.00	\$ 52,800.00
2.	8" Water Line Relocation	800	L.F.	\$ 67.00	\$ 53,600.00
3.	12" Water Line Relocation	1550	L.F.	\$ 100.00	\$ 155,000.00
4.	36" Water Line Relocation	1600	L.F.	\$ 300.00	\$ 480,000.00
5.	Gas Valve Station Relocation	1	L.S.	\$ 500,000.00	\$ 500,000.00
	Subtotal				\$ 1,241,400.00
	20% Contingency				\$ 248,280.00
	TOTAL				\$ 1,489,680.00



SUMMARY OF PRELIMINARY CONSTRUCTION COSTS
183RD STREET - LACKMAN TO QUIVIRA and
PFLUMM ROAD - 175TH TO 183RD
City of Overland Park, Kansas

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6/22/2011

	<i>Item</i>	<i>All Segments Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>All Segments Price</i>
1.	Mobilization	1	L.S.	\$ 964,000.00	\$ 968,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 120,000.00	\$ 145,000.00
2.	Removal of Improvements	1	L.S.	\$ 150,000.00	\$ 179,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 240,000.00	\$ 287,000.00
4.	Unclassified Excavation	147,544	C.Y.	\$ 5.00	\$ 737,720.00
5.	Compaction of Earthwork	82,108	C.Y.	\$ 2.00	\$ 164,216.00
6.	Erosion Control	1	L.S.	\$ 20,000.00	\$ 255,000.00
7.	Temporary Seeding	14	Acre	\$ 1,000.00	\$ 14,378.70
8.	8" Fly Ash Treated Subgrade	128,201	S.Y.	\$ 5.00	\$ 641,005.00
9.	6" Aggregate Base Course (OP Special)	128,201	S.Y.	\$ 7.00	\$ 897,407.00
10.	8" Asphaltic Concrete Intermediate Course	53,328	Ton	\$ 80.00	\$ 4,266,240.00
11.	2" Asphaltic Concrete Surface Course	12,839	Ton	\$ 80.00	\$ 1,027,120.00
12.	Concrete Approach Pavement	1,430	S.Y.	\$ 50.00	\$ 71,500.00
13.	Curb and Gutter (Type B)	32,639	L.F.	\$ 20.00	\$ 652,780.00
14.	Curb (Type D)	32,088	L.F.	\$ 18.00	\$ 577,584.00
15.	Concrete Median Nose	15	Each	\$ 2,000.00	\$ 30,000.00
16.	Concrete Entrance Pavement	391	S.Y.	\$ 70.00	\$ 27,370.00
17.	4" Concrete Sidewalk	17,911	S.Y.	\$ 40.00	\$ 716,440.00
18.	Sidewalk Ramp	10	Each	\$ 1,000.00	\$ 10,000.00
19.	Underdrain	33,163	L.F.	\$ 18.00	\$ 596,934.00
20.	Curb Inlet	162	Each	\$ 4,500.00	\$ 729,000.00
21.	Junction Box	6	Each	\$ 4,500.00	\$ 27,000.00
22.	Grate Inlet	3	Each	\$ 3,500.00	\$ 10,500.00
23.	Storm Sewer RCP	19,500	L.F.	\$ 70.00	\$ 1,365,000.00
24.	RCP End Section	13	Each	\$ 600.00	\$ 7,800.00
25.	RCB 10'x3'	173	L.F.	\$ 320.00	\$ 55,360.00
26.	RCB 2-9'x3'	190	L.F.	\$ 550.00	\$ 104,500.00
27.	RCB 2-8'x4'	173	L.F.	\$ 540.00	\$ 93,420.00
28.	RCB 2-11'x4'	195	L.F.	\$ 670.00	\$ 130,650.00
29.	RCB 2-10'x5'	319	L.F.	\$ 660.00	\$ 210,540.00
30.	Bridge	27,766	S.F.	\$ 110.00	\$ 3,054,260.00
31.	Fence	37,787	S.F.	\$ 8.00	\$ 302,296.00
32.	Traffic Signal	3	Each	\$ 150,000.00	\$ 450,000.00
33.	Pavement Marking	1	L.S.	\$ 18,000.00	\$ 143,000.00
34.	Signing	1	L.S.	\$ 6,000.00	\$ 53,000.00
35.	Traffic Control	1	L.S.	\$ 21,000.00	\$ 180,000.00
36.	Street Lighting	1	L.S.	\$ 40,000.00	\$ 494,000.00
37.	Sodding	91,214	S.Y.	\$ 6.00	\$ 547,284.00
38.	Seeding	15	Acre	\$ 1,000.00	\$ 14,900.00
	Subtotal				\$ 20,237,204.70
	5% Contingency				\$ 1,011,861.00
	TOTAL				\$ 21,249,065.70



**SUMMARY OF PRELIMINARY COSTS
183RD STREET & LACKMAN RD INTERSECTION
City of Overland Park, Kansas**

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6/22/2011

	Item	Totals	
1.	Construction Costs	\$ 2,346,475.00	
2.	Engineering/Survey	\$ 117,323.75	5% of Construction
3.	Inspection	\$ 246,379.88	10.5% of Construction
4.	Material Testing	\$ 35,197.13	1.5% of Construction
5.	Project Administration	\$ 46,929.50	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 11,732.38	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 687,745.00	
9.	Utility Relocations	\$ 1,330,320.00	
	TOTAL PROJECT COST	\$ 4,829,352.64	



**PRELIMINARY R/W ACQUISITION COSTS
183RD STREET & LACKMAN ROAD
City of Overland Park, Kansas**

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6/22/2011

Tract	Easement type	Approx (S.F.)	Approx. Cost
1.	Right of Way	39344	\$ 157,376.00
	Temporary Construction	31149	\$ 31,149.00
	Drainage		\$ -
2.	Right of Way	60336	\$ 241,344.00
	Temporary Construction	31823	\$ 31,823.00
	Drainage		\$ -
3.	Right of Way	42749	\$ 170,996.00
	Temporary Construction	31269	\$ 31,269.00
	Drainage		\$ -
7.	Right of Way		\$ -
	Temporary Construction	23788	\$ 23,788.00
	Drainage		\$ -
		R/W Total	\$ 687,745.00



**PRELIMINARY UTILITY RELOCATION COSTS
183RD STREET & LACKMAN ROAD
City of Overland Park, Kansas**

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6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	1 1/2" Water Line Relocation	0	L.F.	\$ 20.00	\$ -
2.	8" Water Line Relocation	800	L.F.	\$ 67.00	\$ 53,600.00
3.	12" Water Line Relocation	750	L.F.	\$ 100.00	\$ 75,000.00
4.	36" Water Line Relocation	1600	L.F.	\$ 300.00	\$ 480,000.00
5.	Gas Valve Station Relocation	1	L.S.	\$ 500,000.00	\$ 500,000.00
	Subtotal				\$ 1,108,600.00
	20% Contingency				\$ 221,720.00
	TOTAL				\$ 1,330,320.00



PRELIMINARY CONSTRUCTION COSTS
183RD STREET & LACKMAN RD INTERSECTION
City of Overland Park, Kansas

G:\KC06\0429\CostEstimate\183rd & Lackman Cost Estimate.xls\Sum

6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	Mobilization	1	L.S.	\$ 107,000.00	\$ 107,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 21,000.00	\$ 21,000.00
2.	Removal of Improvements	1	L.S.	\$ 26,000.00	\$ 26,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 42,000.00	\$ 42,000.00
4.	Unclassified Excavation	7,956	C.Y.	\$ 5.00	\$ 39,780.00
5.	Compaction of Earthwork	11,974	C.Y.	\$ 2.00	\$ 23,948.00
6.	Erosion Control	1	L.S.	\$ 20,000.00	\$ 20,000.00
7.	Temporary Seeding	1.0	Acre	\$ 1,000.00	\$ 1,000.00
8.	8" Fly Ash Treated Subgrade	20,220	S.Y.	\$ 5.00	\$ 101,100.00
9.	6" Aggregate Base Course (OP Special)	20,220	S.Y.	\$ 7.00	\$ 141,540.00
10.	8" Asphaltic Concrete Intermediate Course	8,753	Ton	\$ 80.00	\$ 700,240.00
11.	2" Asphaltic Concrete Surface Course	2,119	Ton	\$ 80.00	\$ 169,520.00
12.	Concrete Approach Pavement	0	S.Y.	\$ 50.00	\$ -
13.	Curb and Gutter (Type B)	3,355	L.F.	\$ 20.00	\$ 67,100.00
14.	Curb (Type D)	3,188	L.F.	\$ 18.00	\$ 57,384.00
15.	Concrete Median Nose	7	Each	\$ 2,000.00	\$ 14,000.00
16.	Concrete Entrance Pavement	0	S.Y.	\$ 70.00	\$ -
17.	4" Concrete Sidewalk	1,842	S.Y.	\$ 40.00	\$ 73,680.00
18.	Sidewalk Ramp	4	Each	\$ 1,000.00	\$ 4,000.00
19.	Underdrain	3,601	L.F.	\$ 18.00	\$ 64,818.00
20.	Curb Inlet	18	Each	\$ 4,500.00	\$ 81,000.00
21.	Junction Box	2	Each	\$ 4,500.00	\$ 9,000.00
22.	Grate Inlet	0	Each	\$ 3,500.00	\$ -
23.	Storm Sewer RCP	1,800	L.F.	\$ 70.00	\$ 126,000.00
24.	RCP End Section	3	Each	\$ 600.00	\$ 1,800.00
25.	RCB 10'x3'	0	L.F.	\$ 320.00	\$ -
26.	RCB 2-9'x3'	0	L.F.	\$ 550.00	\$ -
27.	RCB 2-8'x4'	0	L.F.	\$ 540.00	\$ -
28.	RCB 2-11'x4'	0	L.F.	\$ 670.00	\$ -
29.	RCB 2-10'x5'	0	L.F.	\$ 660.00	\$ -
30.	Bridge	0	S.F.	\$ 110.00	\$ -
31.	Fence	5,641	S.F.	\$ 8.00	\$ 45,128.00
32.	Traffic Signal	1	Each	\$ 150,000.00	\$ 150,000.00
33.	Pavement Marking	1	L.S.	\$ 19,000.00	\$ 19,000.00
34.	Signing	1	L.S.	\$ 8,000.00	\$ 8,000.00
35.	Traffic Control	1	L.S.	\$ 26,000.00	\$ 26,000.00
36.	Street Lighting	1	L.S.	\$ 46,000.00	\$ 46,000.00
37.	Sodding	7,650	S.Y.	\$ 6.00	\$ 45,900.00
38.	Seeding	2.8	Acre	\$ 1,000.00	\$ 2,800.00
	Subtotal				\$ 2,234,738.00
	5% Contingency				\$ 111,737.00
	TOTAL				\$ 2,346,475.00



**SUMMARY OF PRELIMINARY COSTS
183RD STREET WEST
City of Overland Park, Kansas**

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6/22/2011

	Item	Totals	
1.	Construction Costs	\$ 6,596,839.75	
2.	Engineering/Survey	\$ 329,841.99	5% of Construction
3.	Inspection	\$ 692,668.18	10.5% of Construction
4.	Material Testing	\$ 98,952.60	1.5% of Construction
5.	Project Administration	\$ 131,936.80	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 32,984.20	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 1,129,579.00	
9.	Utility Relocations	\$ -	
	TOTAL PROJECT COST	\$ 9,020,052.52	



**PRELIMINARY R/W ACQUISITION COSTS
183RD STREET WEST
City of Overland Park, Kansas**

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6/22/2011

Tract	Easement type	Approx (S.F.)	Approx. Cost
3.	Right of Way	39281	\$ 157,124.00
	Temporary Construction	44687	\$ 44,687.00
	Drainage		\$ -
4.	Right of Way	855	\$ 3,420.00
	Temporary Construction		\$ -
	Drainage		\$ -
5.	Right of Way	42895	\$ 171,580.00
	Temporary Construction	21065	\$ 21,065.00
	Drainage		\$ -
6.	Right of Way	88490	\$ 353,960.00
	Temporary Construction	62337	\$ 62,337.00
	Drainage	22075	\$ 22,075.00
7.	Right of Way		\$ -
	Temporary Construction	124894	\$ 124,894.00
	Drainage	1836	\$ 1,836.00
8.	Right of Way	33284	\$ 133,136.00
	Temporary Construction	28889	\$ 28,889.00
	Drainage	4576	\$ 4,576.00
		R/W Total	\$ 1,129,579.00



PRELIMINARY CONSTRUCTION COSTS
183RD STREET WEST
City of Overland Park, Kansas

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6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	Mobilization	1	L.S.	\$ 300,000.00	\$ 300,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 34,000.00	\$ 34,000.00
2.	Removal of Improvements	1	L.S.	\$ 42,000.00	\$ 42,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 67,000.00	\$ 67,000.00
4.	Unclassified Excavation	18,256	C.Y.	\$ 5.00	\$ 91,280.00
5.	Compaction of Earthwork	27,540	C.Y.	\$ 2.00	\$ 55,080.00
6.	Erosion Control	1	L.S.	\$ 75,000.00	\$ 75,000.00
7.	Temporary Seeding	3.7	Acre	\$ 1,000.00	\$ 3,713.75
8.	8" Fly Ash Treated Subgrade	26,921	S.Y.	\$ 5.00	\$ 134,605.00
9.	6" Aggregate Base Course (OP Special)	26,921	S.Y.	\$ 7.00	\$ 188,447.00
10.	8" Asphaltic Concrete Intermediate Course	10,987	Ton	\$ 80.00	\$ 878,960.00
11.	2" Asphaltic Concrete Surface Course	2,584	Ton	\$ 80.00	\$ 206,720.00
12.	Concrete Approach Pavement	854	S.Y.	\$ 50.00	\$ 42,700.00
13.	Curb and Gutter (Type B)	7,940	L.F.	\$ 20.00	\$ 158,800.00
14.	Curb (Type D)	7,940	L.F.	\$ 18.00	\$ 142,920.00
15.	Concrete Median Nose	0	Each	\$ 2,000.00	\$ -
16.	Concrete Entrance Pavement	97	S.Y.	\$ 70.00	\$ 6,790.00
17.	4" Concrete Sidewalk	4,540	S.Y.	\$ 40.00	\$ 181,600.00
18.	Sidewalk Ramp	0	Each	\$ 1,000.00	\$ -
19.	Underdrain	7,940	L.F.	\$ 18.00	\$ 142,920.00
20.	Curb Inlet	38	Each	\$ 4,500.00	\$ 171,000.00
21.	Junction Box	0	Each	\$ 4,500.00	\$ -
22.	Grate Inlet	1	Each	\$ 3,500.00	\$ 3,500.00
23.	Storm Sewer RCP	4,800	L.F.	\$ 70.00	\$ 336,000.00
24.	RCP End Section	3	Each	\$ 600.00	\$ 1,800.00
25.	RCB 10'x3'	173	L.F.	\$ 320.00	\$ 55,360.00
26.	RCB 2-9'x3'	0	L.F.	\$ 550.00	\$ -
27.	RCB 2-8'x4'	0	L.F.	\$ 540.00	\$ -
28.	RCB 2-11'x4'	0	L.F.	\$ 670.00	\$ -
29.	RCB 2-10'x5'	319	L.F.	\$ 660.00	\$ 210,540.00
30.	Bridge	21,081	S.F.	\$ 110.00	\$ 2,318,910.00
31.	Fence	8,690	S.F.	\$ 8.00	\$ 69,520.00
32.	Traffic Signal	0	Each	\$ 150,000.00	\$ -
33.	Pavement Marking	1	L.S.	\$ 34,000.00	\$ 34,000.00
34.	Signing	1	L.S.	\$ 12,000.00	\$ 12,000.00
35.	Traffic Control	1	L.S.	\$ 42,000.00	\$ 42,000.00
36.	Street Lighting	1	L.S.	\$ 132,000.00	\$ 132,000.00
37.	Sodding	23,373	S.Y.	\$ 6.00	\$ 140,238.00
38.	Seeding	3.3	Acre	\$ 1,000.00	\$ 3,300.00
	Subtotal				\$ 6,282,703.75
	5% Contingency				\$ 314,136.00
	TOTAL				\$ 6,596,839.75



**SUMMARY OF PRELIMINARY COSTS
183RD STREET & PFLUMM RD INTERSECTION
City of Overland Park, Kansas**

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6/22/2011

	Item	Totals	
1.	Construction Costs	\$ 2,207,984.04	
2.	Engineering/Survey	\$ 110,399.21	5% of Construction
3.	Inspection	\$ 231,838.33	10.5% of Construction
4.	Material Testing	\$ 33,119.77	1.5% of Construction
5.	Project Administration	\$ 44,159.69	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 11,039.93	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 539,514.00	
9.	Utility Relocations	\$ -	
	TOTAL PROJECT COST	\$ 3,185,304.97	



**PRELIMINARY R/W ACQUISITION COSTS
183RD STREET & PFLUMM ROAD
City of Overland Park, Kansas**

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6/22/2011

Tract	Easement type	Approx (S.F.)	Approx. Cost
6.	Right of Way	26710	\$ 106,840.00
	Temporary Construction	19311	\$ 19,311.00
	Drainage	0	\$ -
8.	Right of Way	49816	\$ 199,264.00
	Temporary Construction	24100	\$ 24,100.00
	Drainage	0	\$ -
9.	Right of Way	34480	\$ 137,920.00
	Temporary Construction	18551	\$ 18,551.00
	Drainage	2174	\$ 2,174.00
14.	Right of Way	173	\$ 692.00
	Temporary Construction	28293	\$ 28,293.00
	Drainage	2369	\$ 2,369.00
		R/W Total	\$ 539,514.00



PRELIMINARY CONSTRUCTION COSTS
183RD STREET & PFLUMM RD INTERSECTION
City of Overland Park, Kansas

G:\KC06\0429\CostEstimate\183rd & Pflumm Cost Estimate.xls Sum

6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	Mobilization	1	L.S.	\$ 101,000.00	\$ 101,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 17,000.00	\$ 17,000.00
2.	Removal of Improvements	1	L.S.	\$ 21,000.00	\$ 21,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 33,000.00	\$ 33,000.00
4.	Unclassified Excavation	8,697	C.Y.	\$ 5.00	\$ 43,485.00
5.	Compaction of Earthwork	4,723	C.Y.	\$ 2.00	\$ 9,446.00
6.	Erosion Control	1	L.S.	\$ 20,000.00	\$ 20,000.00
7.	Temporary Seeding	1.5	Acre	\$ 1,000.00	\$ 1,482.04
8.	8" Fly Ash Treated Subgrade	16,636	S.Y.	\$ 5.00	\$ 83,180.00
9.	6" Aggregate Base Course (OP Special)	16,636	S.Y.	\$ 7.00	\$ 116,452.00
10.	8" Asphaltic Concrete Intermediate Course	7,078	Ton	\$ 80.00	\$ 566,240.00
11.	2" Asphaltic Concrete Surface Course	1,933	Ton	\$ 80.00	\$ 154,640.00
12.	Concrete Approach Pavement	0	S.Y.	\$ 50.00	\$ -
13.	Curb and Gutter (Type B)	3,398	L.F.	\$ 20.00	\$ 67,960.00
14.	Curb (Type D)	3,239	L.F.	\$ 18.00	\$ 58,302.00
15.	Concrete Median Nose	5	Each	\$ 2,000.00	\$ 10,000.00
16.	Concrete Entrance Pavement	0	S.Y.	\$ 70.00	\$ -
17.	4" Concrete Sidewalk	1,870	S.Y.	\$ 40.00	\$ 74,800.00
18.	Sidewalk Ramp	4	Each	\$ 1,000.00	\$ 4,000.00
19.	Underdrain	3,652	L.F.	\$ 18.00	\$ 65,736.00
20.	Curb Inlet	14	Each	\$ 4,500.00	\$ 63,000.00
21.	Junction Box	2	Each	\$ 4,500.00	\$ 9,000.00
22.	Grate Inlet	0	Each	\$ 3,500.00	\$ -
23.	Storm Sewer RCP	1,800	L.F.	\$ 70.00	\$ 126,000.00
24.	RCP End Section	1	Each	\$ 600.00	\$ 600.00
25.	RCB 10'x3'	0	L.F.	\$ 320.00	\$ -
26.	RCB 2-9'x3'	0	L.F.	\$ 550.00	\$ -
27.	RCB 2-8'x4'	0	L.F.	\$ 540.00	\$ -
28.	RCB 2-11'x4'	195	L.F.	\$ 670.00	\$ 130,650.00
29.	RCB 2-10'x5'	0	L.F.	\$ 660.00	\$ -
30.	Bridge	0	S.F.	\$ 110.00	\$ -
31.	Fence	3,984	S.F.	\$ 8.00	\$ 31,872.00
32.	Traffic Signal	1	Each	\$ 150,000.00	\$ 150,000.00
33.	Pavement Marking	1	L.S.	\$ 18,000.00	\$ 18,000.00
34.	Signing	1	L.S.	\$ 6,000.00	\$ 6,000.00
35.	Traffic Control	1	L.S.	\$ 21,000.00	\$ 21,000.00
36.	Street Lighting	1	L.S.	\$ 40,000.00	\$ 40,000.00
37.	Sodding	9,616	S.Y.	\$ 6.00	\$ 57,696.00
38.	Seeding	1.3	Acre	\$ 1,000.00	\$ 1,300.00
	Subtotal				\$ 2,102,841.04
	5% Contingency				\$ 105,143.00
	TOTAL				\$ 2,207,984.04



**SUMMARY OF PRELIMINARY COSTS
183RD STREET EAST
City of Overland Park, Kansas**

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6/22/2011

	<i>Item</i>	<i>Totals</i>	
1.	Construction Costs	\$ 5,360,291.03	
2.	Engineering/Survey	\$ 268,014.56	5% of Construction
3.	Inspection	\$ 562,830.56	10.5% of Construction
4.	Material Testing	\$ 80,404.37	1.5% of Construction
5.	Project Administration	\$ 107,205.83	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 26,801.46	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 1,418,491.00	
9.	Utility Relocations	\$ 63,360.00	
	TOTAL PROJECT COST	\$ 7,894,648.81	



**PRELIMINARY R/W ACQUISITION COSTS
183RD STREET EAST
City of Overland Park, Kansas**

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6/22/2011

Tract	Easement type	Approx (S.F.)	Approx. Cost
9.	Right of Way	33883	\$ 135,532.00
	Temporary Construction	25458	\$ 25,458.00
	Drainage	0	\$ -
10.	Right of Way	53474	\$ 213,896.00
	Temporary Construction	63586	\$ 63,586.00
	Drainage	1822	\$ 1,822.00
11.	Right of Way	53323	\$ 213,292.00
	Temporary Construction	52779	\$ 52,779.00
	Drainage		\$ -
12.	Right of Way	36813	\$ 147,252.00
	Temporary Construction	50180	\$ 50,180.00
	Drainage		\$ -
14.	Right of Way	118	\$ 472.00
	Temporary Construction	13759	\$ 13,759.00
	Drainage	0	\$ -
15.	Right of Way	381	\$ 1,524.00
	Temporary Construction	24853	\$ 24,853.00
	Drainage		\$ -
16.	Right of Way	890	\$ 3,560.00
	Temporary Construction	27225	\$ 27,225.00
	Drainage	1870	\$ 1,870.00
17.	Right of Way	10460	\$ 41,840.00
	Temporary Construction	7971	\$ 7,971.00
	Drainage		\$ -
18.	Right of Way	6512	\$ 26,048.00
	Temporary Construction	4951	\$ 4,951.00
	Drainage		\$ -
19.	Right of Way	19645	\$ 78,580.00
	Temporary Construction	7112	\$ 7,112.00
	Drainage		\$ -
20.	Right of Way	44360	\$ 177,440.00
	Temporary Construction	28039	\$ 28,039.00
	Drainage		\$ -
21.	Right of Way	4785	\$ 19,140.00
	Temporary Construction	7270	\$ 7,270.00
	Drainage		\$ -
22.	Right of Way	6920	\$ 27,680.00
	Temporary Construction	15360	\$ 15,360.00
	Drainage		\$ -
R/W Total			\$ 1,418,491.00



PRELIMINARY CONSTRUCTION COSTS
183RD STREET EAST
City of Overland Park, Kansas

G:\KC06\0429\CostEstimate[183rd East Cost Estimate.xls]Sum

6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	Mobilization	1	L.S.	\$ 244,000.00	\$ 244,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 33,000.00	\$ 33,000.00
2.	Removal of Improvements	1	L.S.	\$ 41,000.00	\$ 41,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 66,000.00	\$ 66,000.00
4.	Unclassified Excavation	58,637	C.Y.	\$ 5.00	\$ 293,185.00
5.	Compaction of Earthwork	21,552	C.Y.	\$ 2.00	\$ 43,104.00
6.	Erosion Control	1	L.S.	\$ 45,000.00	\$ 45,000.00
7.	Temporary Seeding	4.5	Acre	\$ 1,000.00	\$ 4,504.03
8.	8" Fly Ash Treated Subgrade	31,569	S.Y.	\$ 5.00	\$ 157,845.00
9.	6" Aggregate Base Course (OP Special)	31,569	S.Y.	\$ 7.00	\$ 220,983.00
10.	8" Asphaltic Concrete Intermediate Course	12,911	Ton	\$ 80.00	\$ 1,032,880.00
11.	2" Asphaltic Concrete Surface Course	3,031	Ton	\$ 80.00	\$ 242,480.00
12.	Concrete Approach Pavement	576	S.Y.	\$ 50.00	\$ 28,800.00
13.	Curb and Gutter (Type B)	9,226	L.F.	\$ 20.00	\$ 184,520.00
14.	Curb (Type D)	9,225	L.F.	\$ 18.00	\$ 166,050.00
15.	Concrete Median Nose	0	Each	\$ 2,000.00	\$ -
16.	Concrete Entrance Pavement	264	S.Y.	\$ 70.00	\$ 18,480.00
17.	4" Concrete Sidewalk	5,138	S.Y.	\$ 40.00	\$ 205,520.00
18.	Sidewalk Ramp	0	Each	\$ 1,000.00	\$ -
19.	Underdrain	9,224	L.F.	\$ 18.00	\$ 166,032.00
20.	Curb Inlet	48	Each	\$ 4,500.00	\$ 216,000.00
21.	Junction Box	0	Each	\$ 4,500.00	\$ -
22.	Grate Inlet	1	Each	\$ 3,500.00	\$ 3,500.00
23.	Storm Sewer RCP	5,800	L.F.	\$ 70.00	\$ 406,000.00
24.	RCP End Section	2	Each	\$ 600.00	\$ 1,200.00
25.	RCB 10'x3'	0	L.F.	\$ 320.00	\$ -
26.	RCB 2-9'x3'	0	L.F.	\$ 550.00	\$ -
27.	RCB 2-8'x4'	173	L.F.	\$ 540.00	\$ 93,420.00
28.	RCB 2-11'x4'	0	L.F.	\$ 670.00	\$ -
29.	RCB 2-10'x5'	0	L.F.	\$ 660.00	\$ -
30.	Bridge	6,685	S.F.	\$ 110.00	\$ 735,350.00
31.	Fence	9,494	S.F.	\$ 8.00	\$ 75,952.00
32.	Traffic Signal	0	Each	\$ 150,000.00	\$ -
33.	Pavement Marking	1	L.S.	\$ 33,000.00	\$ 33,000.00
34.	Signing	1	L.S.	\$ 12,000.00	\$ 12,000.00
35.	Traffic Control	1	L.S.	\$ 42,000.00	\$ 42,000.00
36.	Street Lighting	1	L.S.	\$ 131,000.00	\$ 131,000.00
37.	Sodding	26,289	S.Y.	\$ 6.00	\$ 157,734.00
38.	Seeding	4.5	Acre	\$ 1,000.00	\$ 4,500.00
	Subtotal				\$ 5,105,039.03
	5% Contingency				\$ 255,252.00
	TOTAL				\$ 5,360,291.03



SUMMARY OF PRELIMINARY COSTS
183RD STREET & QUIVIRA RD INTERSECTION
City of Overland Park, Kansas

G:\KC06\0429\Cost Estimate\183rd & Quivira Cost Estimate.xls]Sum

6/22/2011

	Item	Totals	
1.	Construction Costs	\$ 1,044,559.22	
2.	Engineering/Survey	\$ 52,227.97	5% of Construction
3.	Inspection	\$ 109,678.72	10.5% of Construction
4.	Material Testing	\$ 15,668.39	1.5% of Construction
5.	Project Administration	\$ 20,891.19	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 5,222.80	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 355,386.00	
9.	Utility Relocations	\$ 96,000.00	
	TOTAL PROJECT COST	\$ 1,706,884.29	



**PRELIMINARY R/W ACQUISITION COSTS
183RD STREET AND QUIVIRA ROAD
City of Overland Park, Kansas**

G:\KC06\0429\Cost Estimate\183rd & Quivira Cost Estimate.xls]Sum

6/22/2011

Tract	Easement type	Approx (S.F.)	Approx. Cost
12.	Right of Way	35201	\$ 140,804.00
	Temporary Construction	24620	\$ 24,620.00
	Drainage		\$ -
22.	Right of Way	5950	\$ 23,800.00
	Temporary Construction	2705	\$ 2,705.00
	Drainage		\$ -
23.	Right of Way	29888	\$ 119,552.00
	Temporary Construction	18190	\$ 18,190.00
	Drainage		\$ -
24.	Right of Way	1733	\$ 6,932.00
	Temporary Construction	664	\$ 664.00
	Drainage		\$ -
25.	Right of Way	3818	\$ 15,272.00
	Temporary Construction	2847	\$ 2,847.00
	Drainage		\$ -
		R/W Total	\$ 355,386.00



**PRELIMINARY UTILITY RELOCATION COSTS
183RD STREET AND QUIVIRA ROAD
City of Overland Park, Kansas**

G:\KC06\0429\CostEstimate\183rd & Quivira Cost Estimate.xls]Sum

6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	1 1/2" Water Line Relocation	0	L.F.	\$ 20.00	\$ -
2.	8" Water Line Relocation	0	L.F.	\$ 67.00	\$ -
3.	12" Water Line Relocation	800	L.F.	\$ 100.00	\$ 80,000.00
4.	36" Water Line Relocation	0	L.F.	\$ 300.00	\$ -
5.	Gas Valve Station Relocation	0	L.S.	\$ 500,000.00	\$ -
	Subtotal				\$ 80,000.00
	20% Contingency				\$ 16,000.00
	TOTAL				\$ 96,000.00



PRELIMINARY CONSTRUCTION COSTS
183RD STREET & QUIVIRA RD INTERSECTION
City of Overland Park, Kansas

G:\KC06\0429\CostEstimate\183rd & Quivira Cost Estimate.xls]Sum

6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	Mobilization	1	L.S.	\$ 48,000.00	\$ 48,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 11,000.00	\$ 11,000.00
2.	Removal of Improvements	1	L.S.	\$ 13,000.00	\$ 13,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 21,000.00	\$ 21,000.00
4.	Unclassified Excavation	18,539	C.Y.	\$ 5.00	\$ 92,695.00
5.	Compaction of Earthwork	181	C.Y.	\$ 2.00	\$ 362.00
6.	Erosion Control	1	L.S.	\$ 20,000.00	\$ 20,000.00
7.	Temporary Seeding	0.6	Acre	\$ 1,000.00	\$ 589.22
8.	8" Fly Ash Treated Subgrade	7,075	S.Y.	\$ 5.00	\$ 35,375.00
9.	6" Aggregate Base Course (OP Special)	7,075	S.Y.	\$ 7.00	\$ 49,525.00
10.	8" Asphaltic Concrete Intermediate Course	3,086	Ton	\$ 80.00	\$ 246,880.00
11.	2" Asphaltic Concrete Surface Course	699	Ton	\$ 80.00	\$ 55,920.00
12.	Concrete Approach Pavement	0	S.Y.	\$ 50.00	\$ -
13.	Curb and Gutter (Type B)	1,113	L.F.	\$ 20.00	\$ 22,260.00
14.	Curb (Type D)	888	L.F.	\$ 18.00	\$ 15,984.00
15.	Concrete Median Nose	3	Each	\$ 2,000.00	\$ 6,000.00
16.	Concrete Entrance Pavement	30	S.Y.	\$ 70.00	\$ 2,100.00
17.	4" Concrete Sidewalk	295	S.Y.	\$ 40.00	\$ 11,800.00
18.	Sidewalk Ramp	2	Each	\$ 1,000.00	\$ 2,000.00
19.	Underdrain	1,139	L.F.	\$ 18.00	\$ 20,502.00
20.	Curb Inlet	6	Each	\$ 4,500.00	\$ 27,000.00
21.	Junction Box	2	Each	\$ 4,500.00	\$ 9,000.00
22.	Grate Inlet	0	Each	\$ 3,500.00	\$ -
23.	Storm Sewer RCP	800	L.F.	\$ 70.00	\$ 56,000.00
24.	RCP End Section	2	Each	\$ 600.00	\$ 1,200.00
25.	RCB 10'x3'	0	L.F.	\$ 320.00	\$ -
26.	RCB 2-9'x3'	0	L.F.	\$ 550.00	\$ -
27.	RCB 2-8'x4'	0	L.F.	\$ 540.00	\$ -
28.	RCB 2-11'x4'	0	L.F.	\$ 670.00	\$ -
29.	RCB 2-10'x5'	0	L.F.	\$ 660.00	\$ -
30.	Bridge	0	S.F.	\$ 110.00	\$ -
31.	Fence	484	S.F.	\$ 8.00	\$ 3,872.00
32.	Traffic Signal	1	Each	\$ 150,000.00	\$ 150,000.00
33.	Pavement Marking	1	L.S.	\$ 10,000.00	\$ 10,000.00
34.	Signing	1	L.S.	\$ 4,000.00	\$ 4,000.00
35.	Traffic Control	1	L.S.	\$ 13,000.00	\$ 13,000.00
36.	Street Lighting	1	L.S.	\$ 31,000.00	\$ 31,000.00
37.	Sodding	2,309	S.Y.	\$ 6.00	\$ 13,854.00
38.	Seeding	0.9	Acre	\$ 1,000.00	\$ 900.00
	Subtotal				\$ 994,818.22
	5% Contingency				\$ 49,741.00
	TOTAL				\$ 1,044,559.22



**SUMMARY OF PRELIMINARY COSTS
PFLUMM ROAD
City of Overland Park, Kansas**

G:\KC06\0429\Cost Estimate\[Pflumm Road Cost Estimate.xls]Sum

6/22/2011

	Item	Totals	
1.	Construction Costs	\$ 3,692,918.66	
2.	Engineering/Survey	\$ 184,645.94	5% of Construction
3.	Inspection	\$ 387,756.46	10.5% of Construction
4.	Material Testing	\$ 55,393.78	1.5% of Construction
5.	Project Administration	\$ 73,858.38	2% of Construction
6.	Legal Publications, Printing, Misc.	\$ 18,464.60	0.5% of Construction
7.	Ownership Certificates/ Title Report	\$ 7,250.00	
8.	R/W Acquisition	\$ 1,664,848.00	
9.	Utility Relocations	\$ -	
	TOTAL PROJECT COST	\$ 6,085,135.82	



**PRELIMINARY R/W ACQUISITION COSTS
PFLUMM ROAD
City of Overland Park, Kansas**

G:\KC06\0429\Cost Estimate\[Pflumm Road Cost Estimate.xls] Sum

6/22/2011

Tract	Easement type	Approx (S.F.)	Approx. Cost
6.	Right of Way	95462	\$ 381,848.00
	Temporary Construction	52338	\$ 52,338.00
	Drainage	1970	\$ 1,970.00
9.	Right of Way	79044	\$ 316,176.00
	Temporary Construction	35058	\$ 35,058.00
	Drainage	46155	\$ 46,155.00
27.	Right of Way	70685	\$ 282,740.00
	Temporary Construction	65844	\$ 65,844.00
	Drainage		\$ -
28.	Right of Way	45321	\$ 181,284.00
	Temporary Construction	26557	\$ 26,557.00
	Drainage		\$ -
29.	Right of Way	59267	\$ 237,068.00
	Temporary Construction	37810	\$ 37,810.00
	Drainage		\$ -
		R/W Total	\$ 1,664,848.00



**PRELIMINARY CONSTRUCTION COSTS
PFLUMM ROAD
City of Overland Park, Kansas**

G:\KC06\10429\CostEstimate\{Pflumm Road Cost Estimate.xls} Sum

6/22/2011

	<i>Item</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Price</i>	<i>Price</i>
1.	Mobilization	1	L.S.	\$ 168,000.00	\$ 168,000.00
1.	Clearing & Grubbing	1	L.S.	\$ 29,000.00	\$ 29,000.00
2.	Removal of Improvements	1	L.S.	\$ 36,000.00	\$ 36,000.00
3.	Contractor Construction Staking	1	L.S.	\$ 58,000.00	\$ 58,000.00
4.	Unclassified Excavation	35,459	C.Y.	\$ 5.00	\$ 177,295.00
5.	Compaction of Earthwork	16,138	C.Y.	\$ 2.00	\$ 32,276.00
6.	Erosion Control	1	L.S.	\$ 75,000.00	\$ 75,000.00
7.	Temporary Seeding	3.1	Acre	\$ 1,000.00	\$ 3,089.66
8.	8" Fly Ash Treated Subgrade	25,780	S.Y.	\$ 5.00	\$ 128,900.00
9.	6" Aggregate Base Course (OP Special)	25,780	S.Y.	\$ 7.00	\$ 180,460.00
10.	8" Asphaltic Concrete Intermediate Course	10,513	Ton	\$ 80.00	\$ 841,040.00
11.	2" Asphaltic Concrete Surface Course	2,473	Ton	\$ 80.00	\$ 197,840.00
12.	Concrete Approach Pavement	0	S.Y.	\$ 50.00	\$ -
13.	Curb and Gutter (Type B)	7,607	L.F.	\$ 20.00	\$ 152,140.00
14.	Curb (Type D)	7,608	L.F.	\$ 18.00	\$ 136,944.00
15.	Concrete Median Nose	0	Each	\$ 2,000.00	\$ -
16.	Concrete Entrance Pavement	0	S.Y.	\$ 70.00	\$ -
17.	4" Concrete Sidewalk	4,226	S.Y.	\$ 40.00	\$ 169,040.00
18.	Sidewalk Ramp	0	Each	\$ 1,000.00	\$ -
19.	Underdrain	7,607	L.F.	\$ 18.00	\$ 136,926.00
20.	Curb Inlet	38	Each	\$ 4,500.00	\$ 171,000.00
21.	Junction Box	0	Each	\$ 4,500.00	\$ -
22.	Grate Inlet	1	Each	\$ 3,500.00	\$ 3,500.00
23.	Storm Sewer RCP	4,500	L.F.	\$ 70.00	\$ 315,000.00
24.	RCP End Section	2	Each	\$ 600.00	\$ 1,200.00
25.	RCB 10'x3'	0	L.F.	\$ 320.00	\$ -
26.	RCB 2-9'x3'	190	L.F.	\$ 550.00	\$ 104,500.00
27.	RCB 2-8'x4'	0	L.F.	\$ 540.00	\$ -
28.	RCB 2-11'x4'	0	L.F.	\$ 670.00	\$ -
29.	RCB 2-10'x5'	0	L.F.	\$ 660.00	\$ -
30.	Bridge	0	S.F.	\$ 110.00	\$ -
31.	Fence	9,494	S.F.	\$ 8.00	\$ 75,952.00
32.	Traffic Signal	0	Each	\$ 150,000.00	\$ -
33.	Pavement Marking	1	L.S.	\$ 29,000.00	\$ 29,000.00
34.	Signing	1	L.S.	\$ 11,000.00	\$ 11,000.00
35.	Traffic Control	1	L.S.	\$ 36,000.00	\$ 36,000.00
36.	Street Lighting	1	L.S.	\$ 114,000.00	\$ 114,000.00
37.	Sodding	21,977	S.Y.	\$ 6.00	\$ 131,862.00
38.	Seeding	2.1	Acre	\$ 1,000.00	\$ 2,100.00
	Subtotal				\$ 3,517,064.66
	5% Contingency				\$ 175,854.00
	TOTAL				\$ 3,692,918.66

Appendix A – Supporting Documents



DEPARTMENT OF WILDLIFE AND PARKS

KATHLEEN SEBELIUS, GOVERNOR

March 25, 2008

Mr. Richard A. Walker
TransSystems
2400 Pershing Road, Suite 400
Kansas City, Missouri 64108

Ref: D2.0202
Johnson
183rd and Pflumm
Track: 20080103

Dear Mr. Walker:

We have reviewed your preliminary submittal for a roadway improvement along 183rd street between Lackman and Quivera Avenues as well as Pflumm Ave from 175th to 183rd. Within Sections 27, 28, 33 and 34 Township 14 South, Range 24 East, in Johnson County. The project was reviewed for potential impacts on crucial wildlife habitats, current state-listed threatened and endangered species and species in need of conservation, and public recreation areas for which this agency has some administrative authority.

We note that a large majority of existing land cover adjacent to all existing roadway margins are either cultivated, non-native materials or improved property. As such, we consider the proposal a low impact in regards to threatened or endangered species impacts. Even so, we would like the consultants to consider replacing existing stream crossings with span type designs or other types to help maintain or improve aquatic organism passage. Otherwise we simply recommend implementing standard erosion control BMP's, temporary weed-free seeding/mulching to protect water quality during construction, minimize any / all further instream construction activities and the use of native grasses and forbs to permanently revegetate all areas disturbed by construction.

Results of our review indicate there will be no significant impacts to crucial wildlife habitats; therefore, no special mitigation measures are recommended. The project will not impact any public recreational areas, nor could we document any potential impacts to currently listed threatened or endangered species or species in need of conservation. No Department of Wildlife and Parks permits or special authorizations will be needed if construction is started within one year, and no design changes are made in the project plans. Since the Department's recreational land obligations and the State's species listings periodically change, if construction has not started within one year of this date, or if design changes are made in the project plans, the project sponsor must contact this office to verify continued applicability of this assessment report. For our purposes, we consider construction started when advertisements for bids are distributed.

Thank you for the opportunity to provide these comments and recommendations.

Sincerely,

Bryan R. Simmons, Ecologist
Environmental Services Section

Pratt Operations Office
512 SE 25th Ave., Pratt, KS 67124-8174
Phone 620-672-5911 Fax 620-672-6020 www.kdwp.state.ks.us



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Ecological Services Field Office
2609 Anderson Avenue
Manhattan, Kansas 66502



March 11, 2008

Richard Walker, P.E. RLS
TranSystems
2400 Pershing Road, Suite 400
Kansas City, MO 64108

RE: TranSystems, 183rd & Pflumm Road, Overland Park FWS Tracking # 2008-B-0309

Dear Mr. Walker:

This is in response to your email dated February 20, 2008, requesting comment on the Preliminary Engineering Studies of 183rd Street and Pflumm Road in the vicinity of the intersection of these two streets. The goal of the project is to establish a reasonable horizontal and vertical layout. The project is located in the Southeast ¼ of Section 28, Township 14, Range 24 East, Johnson County, Kansas.

Based on review of the proposed action and the land uses on site, I conclude that no federally-threatened or endangered species are likely to be present in the project area.

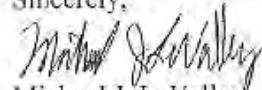
The Migratory Bird Treaty Act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. Takings could result from projects in prairies, wetlands, stream and woodland habitats, and those that occur on bridges and other structures if swallow or phoebe nests are present. While the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Kansas occurs during the period of April 1 to July 15. However, some migratory birds are known to nest earlier than this (e.g., hawks and owls) and some later (e.g., goldfinches). If the proposed project will occur during the nesting season in habitat capable of supporting bird nesting, I recommend a field survey during the nesting season of the affected habitats and structures to determine the presence of active nests. Our office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that you believe cannot be avoided temporally or spatially by the planned activities.

While the MBTA has no provision for allowing unauthorized take, the USFWS realizes that some birds may be killed during project construction and implementation even if all reasonable measures to protect them are used. The USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize their impacts on migratory birds, and by encouraging others to enact such programs.

It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without following recommendations to avoid take.

Thank you for this opportunity to comment on the proposal. If we can be of any further assistance, please call Ms. Michele McNulty, of my staff, at 785-539-3474 ext. 106.

Sincerely,


Michael J. LeValley
Field Supervisor

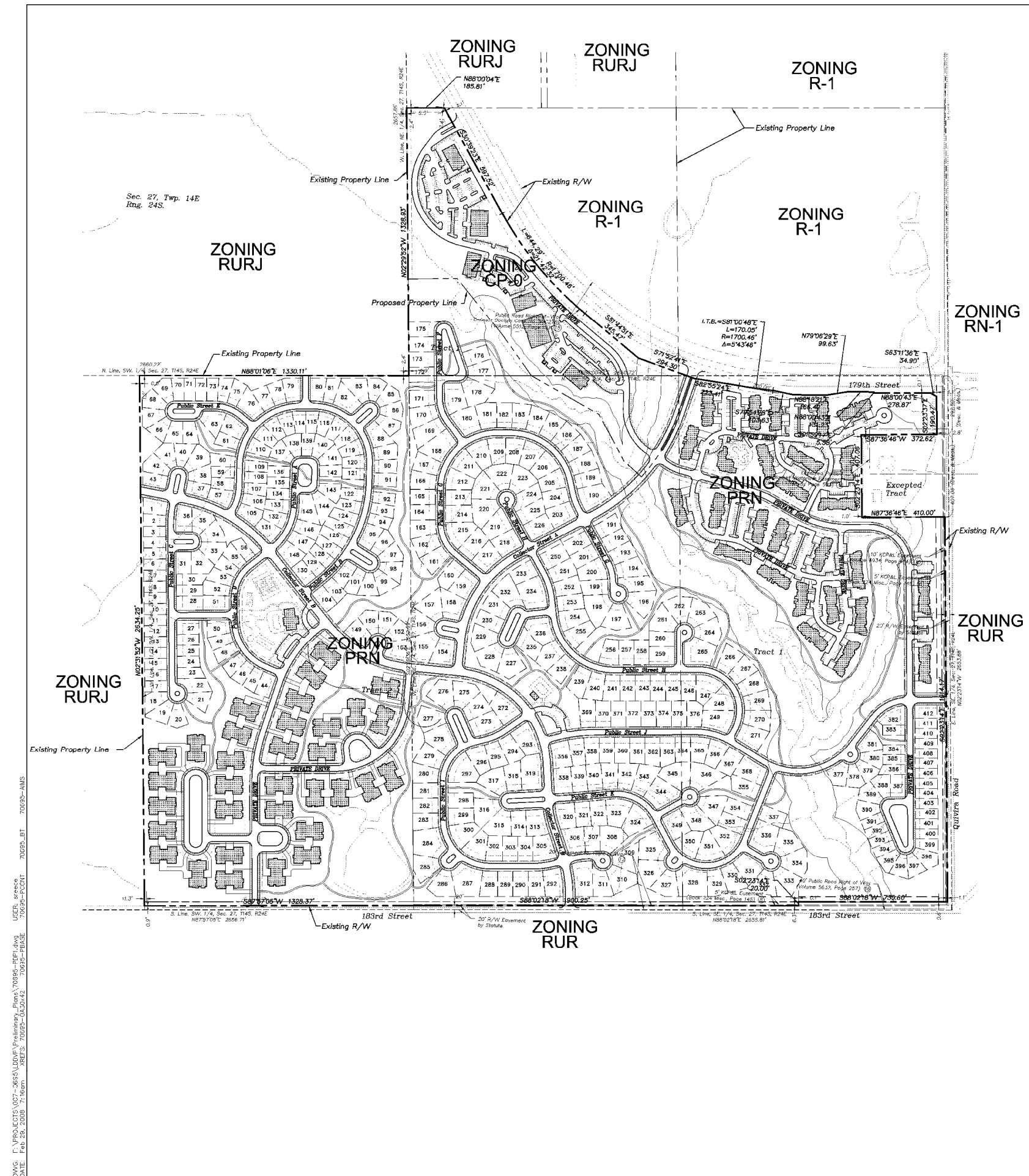
cc: KDWP, Pratt, KS (Environmental Services)

- 2 -

RECEIVED

MAR 12 2008





PROPERTY DESCRIPTION

Tract 1:
 All of the South half (1/2) of the Northeast one-fourth (1/4) of Section twenty seven (27), Township fourteen (14), Range twenty four (24); except any part taken, used or dedicated for roads or public rights of way.
 And
 The East one half (E 1/2) of the Southeast Quarter (SE 1/4) of Section twenty seven (27), Township fourteen (14), of Range twenty four (24), in Johnson County, Kansas, except the following described tract: beginning at a point on the East line of the Southeast 1/4 of Section 27, Township 14, Range 24, Johnson County, Kansas, said point being 292.5 feet South of the Northeast corner of said Southeast 1/4; thence South along said East line of said Southeast 1/4 a distance of 407.06 feet; thence 90° West a distance of 430 feet; thence 90° North a distance of 407.06 feet; thence 90° East a distance of 430 feet to the POINT OF BEGINNING, except any part in streets or roads and/or street right of ways.
 And except
 All that part of the Northeast Quarter of Section 27, Township 14 S, Range 24 E, now in the City of Overland Park, Johnson County, Kansas, more particularly described as follows:
 COMMENCING at the Northwest corner of the Northeast Quarter of said Section 27; thence North 87° 59' 24" East, along the North line of the Northeast Quarter of said Section 27, a distance of 684.94 feet; to the Northeast corner of the West half of the Northwest Quarter of the Northeast Quarter of said Section 27, said point also being the true POINT OF BEGINNING of subject tract; thence continuing North 87° 59' 24" East, along the North line of the Northeast Quarter of said Section 27, a distance of 28.55 feet, to a point on the West line of said East 60 acres of the North half of the Northeast Quarter of said Section 27; thence South 2° 31' 20" East, along the West line of the East 60 acres of the North half of the Northeast Quarter of said Section 27, a distance of 1328.06 feet to a point on the South line of the North half of the Northeast Quarter of said Section 27; thence South 88° 00' 11" West, along the South line of the North half of the Northeast Quarter of said Section 27, a distance of 28.99 feet; to the Southeast corner of the West half of the Northwest Quarter of the Northeast Quarter of said Section 27; thence North 2° 30' 12" West, along the East line of the West half of the Northwest Quarter of the Northeast Quarter of said Section 27, a distance of 1328.05 feet, to the POINT OF BEGINNING of subject tract, subject to that part thereof dedicated for street purposes.
 And further except
 All that part of the South half of the Northeast Quarter, lying North of and East of that part taken for road in condemnation Case no. 98c 2780, recorded in Book 5512 at Page 13 in the Office of the Records and Tax Administration Johnson County, Kansas, all in Section 27, Township 14, Range 24, now in the City of Overland Park, Johnson County, Kansas, all subject to that part thereof dedicated for road purposes.
 Tract 2:
 The East half of the Southwest Quarter and the West half of the Southeast Quarter of Section 27, Township 14, Range 24, Johnson County, Kansas, except any part taken, used or dedicated for roads or public right of ways.

DEVELOPMENT DATA

PRN DEVELOPMENT TABLE
 Total Area = 4,233.913 acres (10,189,257 s.f.)

Description	Units	Avg. Lot Size	Front Yd. Building Line Setback	Side Yd. Setback Corner Lots
Villa Lots (Lots 1-153)	153	55'/65'x110'	30' or 20' (See Plans)	15' or 10' (See Plans)
Single Family (Lots 154-376)	223	75'/85'x125'	30'	15' or 10' (See Plans)
Ranch Homes (Lots 377-412)	36	50'x110'	20'	15' or 10' (See Plans)
4 Plex	132	N/A	25'	15'
Total Units/Lots	544			

361 Total Units	Units	Parking Required	Parking Provided
1 Bedrooms	217	(1.5 Per Unit) = 326	
2 Bedrooms	92	(1.6 Per Unit) = 147	(165 Garage) (Surface 440)
3 Bedrooms	52	(2 Per Unit) = 104	
Total Units/Lots	361	576	605

PRN Density = 905 units/lots (3.87 units/acre)
 Open Space Provided = 2,116,584 s.f. (20.8%) (See Sheet L1 for a diagram of this area)
 Open Space Required (15%) = 1,528,388 s.f.

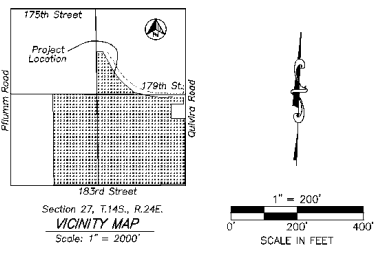
CP-0 DEVELOPMENT TABLE
 Total Area = 118,363 acres (795,897 s.f.)

Description	Bldg S.F.	Parking Required	Parking Provided	Accessible Stalls Required & Provided
Office A (2 Story)	16,000 s.f.	61 (3.8/1000)	61	3
Office B (2 Story)	22,000 s.f.	84 (3.8/1000)	84	4
Office C (1 Story)	8,000 s.f.	30 (3.8/1000)	30	2
Office D (2 Story)	14,000 s.f.	53 (3.8/1000)	53	3
Office E (2 Story)	30,000 s.f.	114 (3.8/1000)	114	5
Office F (2 Story)	16,000 s.f.	61 (3.8/1000)	61	3
Totals	106,000 s.f.	403	403	20

Land Use Intensity = 0.13
 Open Space Provided = 443,496 s.f.

OWNER/DEVELOPER:
 Price Development Group, LLC
 Monte Wendler
 507 Walnut
 Kansas City, MO. 64016
 Telephone (816) 268-5880

ZONING
 Existing Zoning = RURJ
 Proposed Zoning = PRN & CP-0



DWG: C:\PROJECTS\087-3685\DDVP\Preliminary_Plans\709185--PFI.dwg
 DATE: Feb 25, 2009 7:10am XREFS: 709185-0A,04,2
 USER: sreece
 709185-PCONT
 709185-BT
 709185-ANIS

OLSSON ASSOCIATES

17th & 31st St. Suite 200
 Overland Park, KS 66204-1520
 TEL: 816.381.1170
 FAX: 816.381.1174
 www.olsoneng.com

REVISIONS

REV	DATE	DESCRIPTION

GENERAL SITE LAYOUT PLAN
 PRELIMINARY DEVELOPMENT PLAN
 179TH STREET & QUIVIRA ROAD
 OVERLAND PARK, KANSAS

2008

drawn by: TBC
 checked by: TBC
 approved by: SBB
 DWGNO: SBB
 project no: 007.0886
 drawing no: 02-2008
 date: 02-25-09

SHEET
 C1

Appendix B – Hydrologic and Hydraulic Computations

- ▀ HY-8 Computations for Culverts (8 pages)
- ▀ Analysis for 100% Plugged Culverts (3 pages)
- ▀ HEC-RAS analysis for Bridges (3 pages)

HY-8 Computations

- ▣ Culvert @ 48+60
- ▣ Culvert @ 55+30
- ▣ Culvert @ 65+00
- ▣ Culvert @ 88+20
- ▣ Culvert @ 215+75

Table 1 - Summary of Culvert Flows at Crossing: St 48+60

Headwater Elevation (ft)	Total Discharge (cfs)	(1) 10' x 3' RCBs Discharge (cfs)	Roadway Discharge (cfs)	Iterations
994.57	50.00	50.00	0.00	1
994.95	70.00	70.00	0.00	1
995.30	90.00	90.00	0.00	1
995.62	110.00	110.00	0.00	1
995.94	130.00	130.00	0.00	1
996.26	150.00	150.00	0.00	1
996.58	170.00	170.00	0.00	1
996.93	190.00	190.00	0.00	1
997.30	210.00	210.00	0.00	1
997.57	230.00	223.98	5.81	11
997.67	250.00	228.76	21.04	6

Rating Curve Plot for Crossing: St 48+60

Total Rating Curve
Crossing: St 48+60

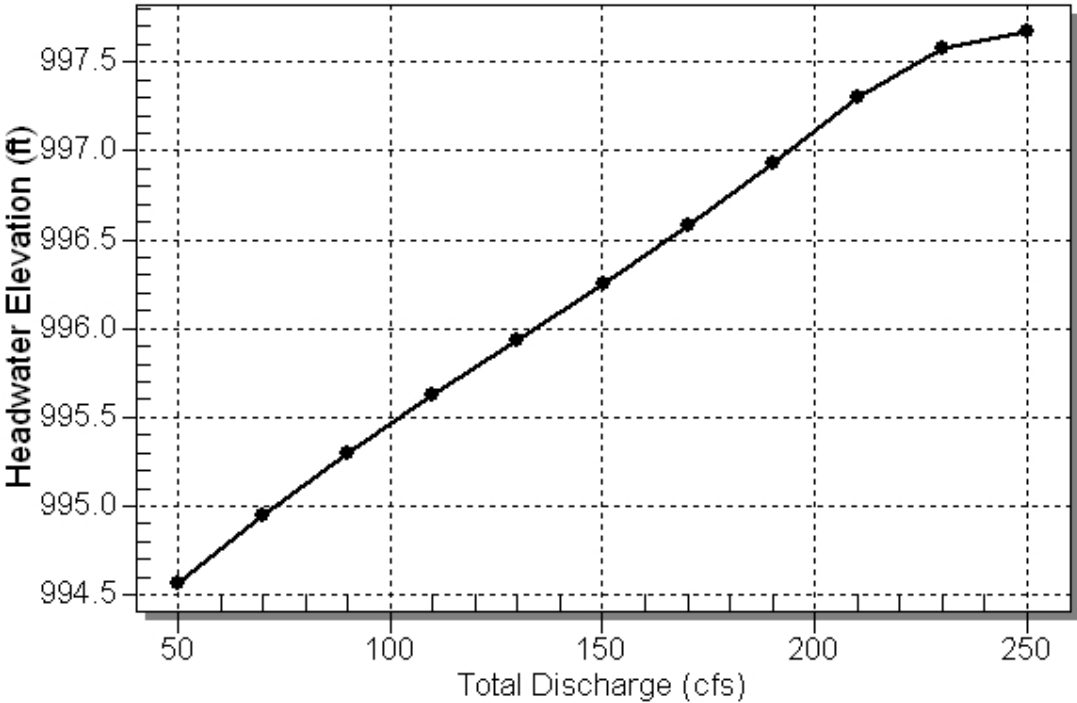


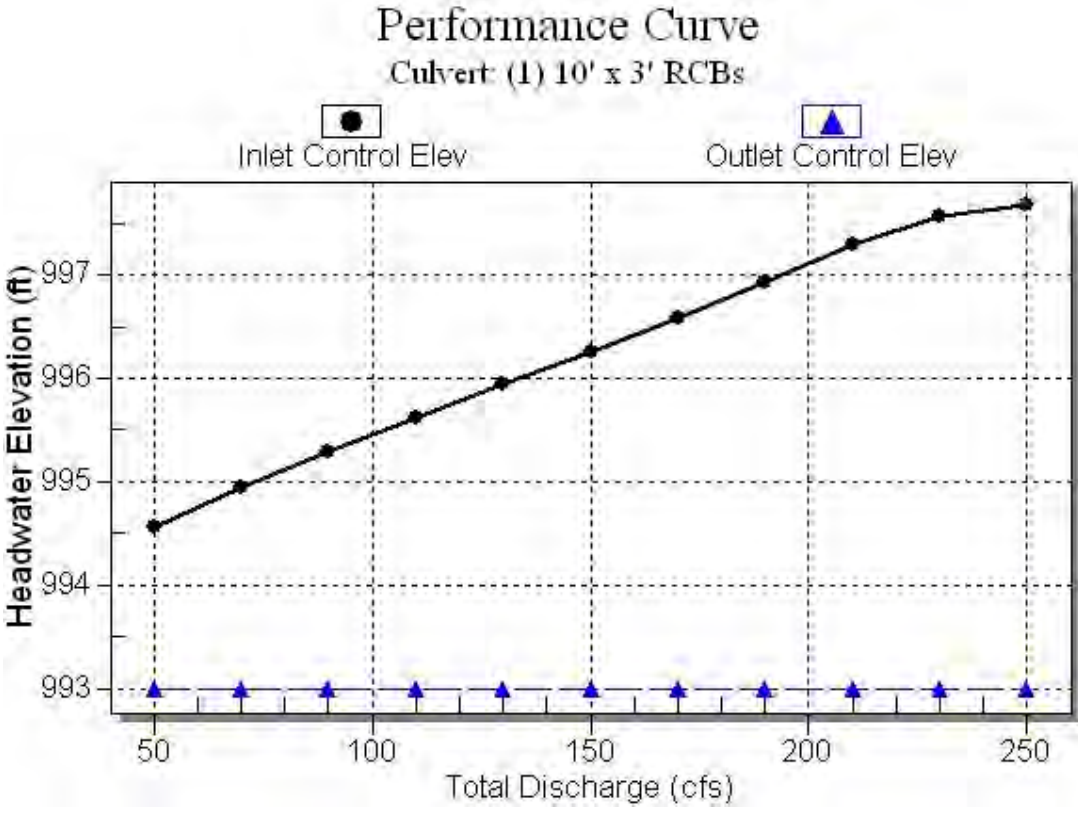
Table 2 - Culvert Summary Table: (1) 10' x 3' RCBs

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50.00	50.00	994.57	1.567	0.000	1-S2n	0.715	0.921	0.720	0.485	6.944	3.554
70.00	70.00	994.95	1.949	0.000	1-S2n	0.895	1.153	0.896	0.589	7.815	3.990
90.00	90.00	995.30	2.296	0.000	1-S2n	1.047	1.363	1.053	0.681	8.548	4.340
110.00	110.00	995.62	2.622	0.000	1-S2n	1.198	1.558	1.199	0.764	9.174	4.635
130.00	130.00	995.94	2.939	0.000	1-S2n	1.333	1.742	1.363	0.840	9.535	4.890
150.00	150.00	996.26	3.257	0.000	5-S2n	1.467	1.916	1.469	0.911	10.212	5.116
170.00	170.00	996.58	3.585	0.000	5-S2n	1.593	2.083	1.599	0.978	10.630	5.319
190.00	190.00	996.93	3.930	0.000	5-S2n	1.715	2.243	1.773	1.041	10.717	5.510
210.00	210.00	997.30	4.299	0.000	5-S2n	1.836	2.398	1.898	1.100	11.066	5.687
230.00	223.98	997.57	4.573	0.000	5-S2n	1.916	2.503	1.924	1.156	11.640	5.850
250.00	228.76	997.67	4.671	0.000	5-S2n	1.944	2.538	1.952	1.211	11.718	6.002

Inlet Elevation (invert): 993.00 ft, Outlet Elevation (invert): 992.07 ft

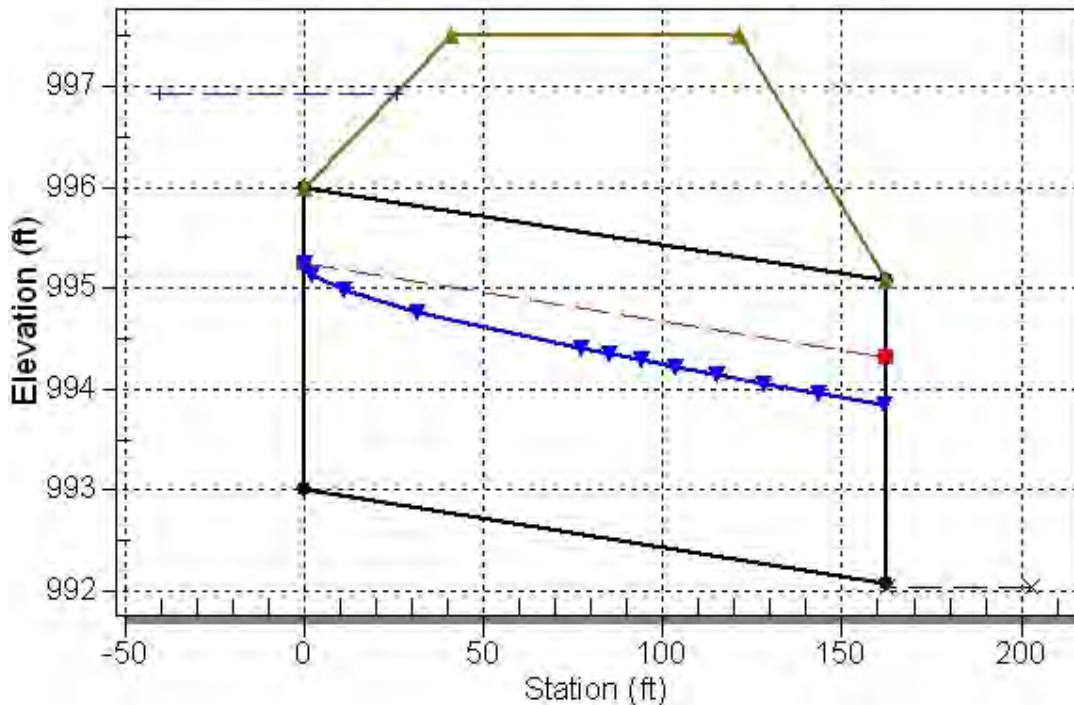
Culvert Length: 162.40 ft, Culvert Slope: 0.0057

Culvert Performance Curve Plot: (1) 10' x 3' RCBs



Water Surface Profile Plot for Culvert: (1) 10' x 3' RCBs

Crossing - St 48+60 , Design Discharge - 190.0 cfs
Culvert - (1) 10' x 3' RCBs, Culvert Discharge - 190.0 cfs



Site Data - (1) 10' x 3' RCBs

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 993.00 ft

Outlet Station: 162.40 ft

Outlet Elevation: 992.07 ft

Number of Barrels: 1

Culvert Data Summary - (1) 10' x 3' RCBs

Barrel Shape: Concrete Box

Barrel Span: 10.00 ft

Barrel Rise: 3.00 ft

Barrel Material:

Barrel Manning's n: 0.0120

Inlet Type:

Inlet Edge Condition:

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: St 48+60)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
50.00	991.48	0.48	3.55	0.48	0.95
70.00	991.59	0.59	3.99	0.59	0.98
90.00	991.68	0.68	4.34	0.68	1.00
110.00	991.76	0.76	4.63	0.76	1.02
130.00	991.84	0.84	4.89	0.84	1.03
150.00	991.91	0.91	5.12	0.91	1.04
170.00	991.98	0.98	5.32	0.98	1.05
190.00	992.04	1.04	5.51	1.04	1.06
210.00	992.10	1.10	5.69	1.10	1.07
230.00	992.16	1.16	5.85	1.15	1.07
250.00	992.21	1.21	6.00	1.21	1.08

Tailwater Channel Data - St 48+60

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0160

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	998.51	0.0500
2	20.87	998.00	0.0500
3	41.86	997.30	0.0500
4	50.13	997.00	0.0500
5	56.51	996.75	0.0500
6	66.32	996.32	0.0500
7	71.55	996.10	0.0500
8	73.49	996.00	0.0500
9	76.62	995.81	0.0500
10	80.66	995.59	0.0500
11	91.43	995.00	0.0500
12	120.99	993.00	0.0500
13	121.11	993.00	0.0500
14	183.40	993.00	0.0500
15	190.71	992.03	0.0500
16	191.02	992.00	0.0500
17	197.65	991.13	0.0500
18	198.69	991.00	0.0500
19	199.11	991.00	0.0500
20	199.26	991.00	0.0300
21	224.02	991.00	0.0500
22	226.18	991.29	0.0500
23	226.42	991.32	0.0500
24	226.96	991.40	0.0500
25	231.25	992.00	0.0500
26	232.94	992.25	0.0500
27	237.63	993.00	0.0500
28	294.60	993.00	0.0000

Roadway Data for Crossing: St 48+60

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 997.50 ft

Roadway Surface: Paved

Roadway Top Width: 80.00 ft

Table 4 - Summary of Culvert Flows at Crossing: St 55+30

Headwater Elevation (ft)	Total Discharge (cfs)	(2) 10' x 5' Discharge (cfs)	Roadway Discharge (cfs)	Iterations
998.50	813.00	813.00	0.00	1
998.63	831.70	831.70	0.00	1
998.76	850.40	850.40	0.00	1
998.89	869.10	869.10	0.00	1
999.03	887.80	887.80	0.00	1
999.14	903.00	903.00	0.00	1
999.30	925.20	925.20	0.00	1
999.45	943.90	943.90	0.00	1
999.59	962.60	962.60	0.00	1
999.74	981.30	981.30	0.00	1
999.89	1000.00	1000.00	0.00	1

Rating Curve Plot for Crossing: St 55+30

Total Rating Curve
Crossing: St 55+30

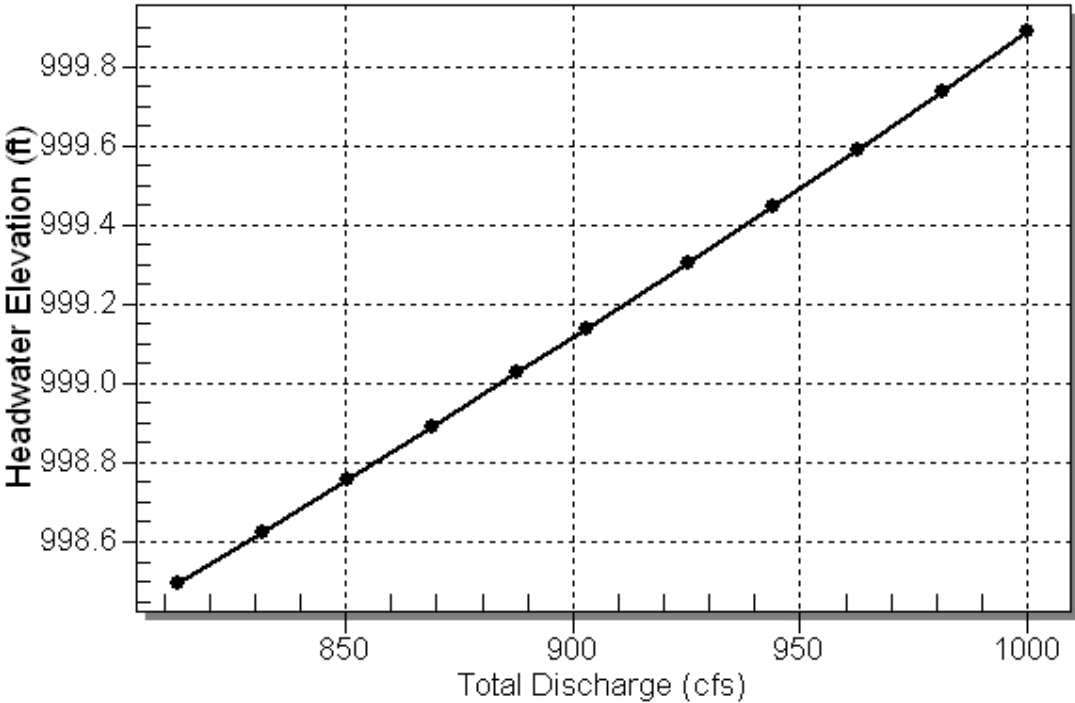


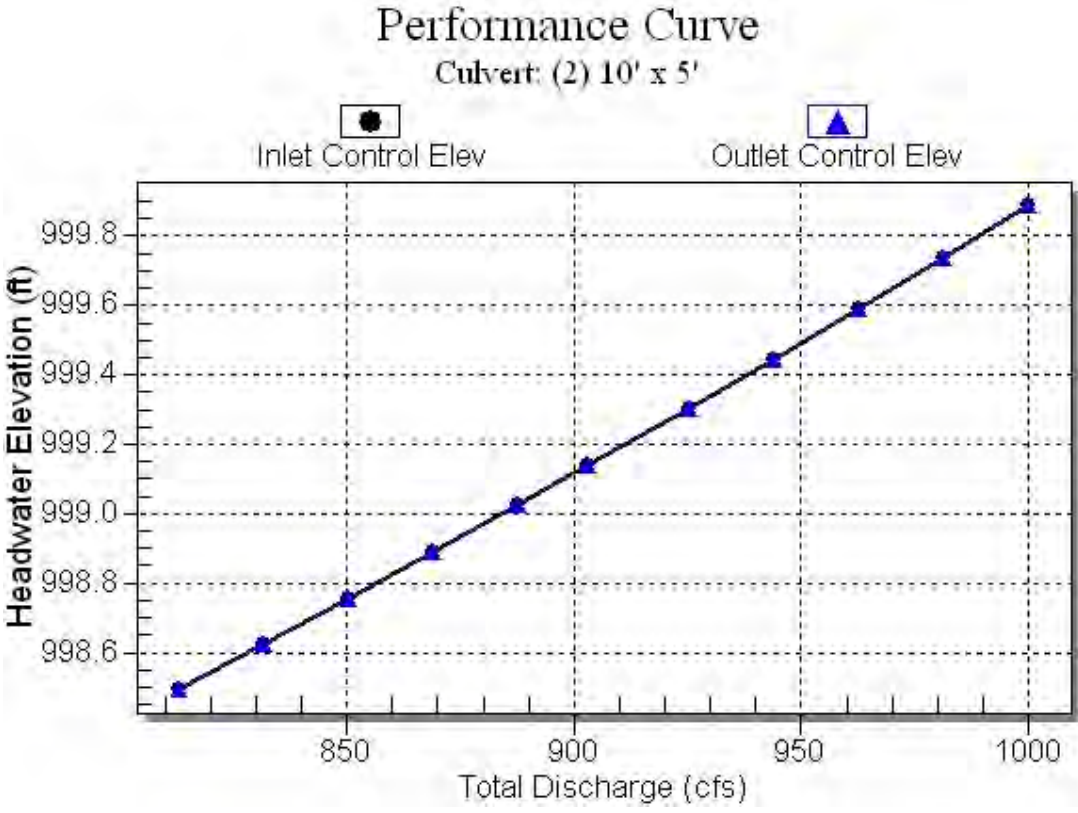
Table 5 - Culvert Summary Table: (2) 10' x 5'

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
813.00	813.00	998.50	6.496	6.496	5-S1f	2.093	3.724	3.724	5.643	10.915	6.256
831.70	831.70	998.63	6.626	6.626	5-S1f	2.125	3.781	3.781	5.687	10.999	6.272
850.40	850.40	998.76	6.757	6.757	5-S1f	2.157	3.837	3.837	5.731	11.080	6.289
869.10	869.10	998.89	6.890	6.890	5-S1f	2.189	3.893	3.893	5.774	11.161	6.305
887.80	887.80	999.03	7.026	7.026	5-S1f	2.221	3.949	3.949	5.817	11.240	6.321
903.00	903.00	999.14	7.138	7.138	5-S1f	2.248	3.994	3.994	5.851	11.304	6.335
925.20	925.20	999.30	7.304	7.304	5-S1f	2.285	4.059	4.059	5.900	11.396	6.355
943.90	943.90	999.45	7.446	7.446	5-S1f	2.317	4.114	4.114	5.940	11.472	6.373
962.60	962.60	999.59	7.591	7.591	5-S1f	2.349	4.168	4.168	5.979	11.548	6.390
981.30	981.30	999.74	7.738	7.738	5-S1f	2.381	4.222	4.222	6.018	11.622	6.409
1000.00	1000.00	999.89	7.888	7.888	5-S1f	2.413	4.275	4.275	6.056	11.695	6.428

Inlet Elevation (invert): 992.00 ft, Outlet Elevation (invert): 987.38 ft

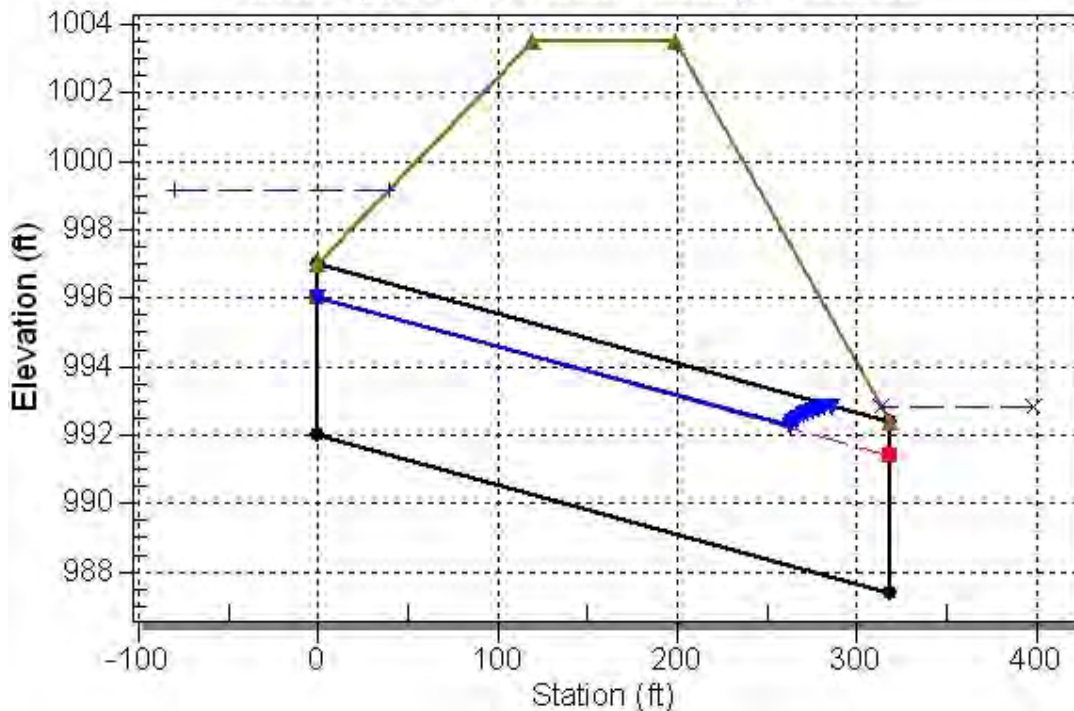
Culvert Length: 318.43 ft, Culvert Slope: 0.0145

Culvert Performance Curve Plot: (2) 10' x 5'



Water Surface Profile Plot for Culvert: (2) 10' x 5'

Crossing - St 55+30, Design Discharge - 903.0 cfs
Culvert - (2) 10' x 5', Culvert Discharge - 903.0 cfs



Site Data - (2) 10' x 5'

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 992.00 ft

Outlet Station: 318.40 ft

Outlet Elevation: 987.38 ft

Number of Barrels: 2

Culvert Data Summary - (2) 10' x 5'

Barrel Shape: Concrete Box

Barrel Span: 10.00 ft

Barrel Rise: 5.00 ft

Barrel Material:

Barrel Manning's n: 0.0120

Inlet Type:

Inlet Edge Condition:

Inlet Depression: None

Table 6 - Downstream Channel Rating Curve (Crossing: St 55+30)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
813.00	992.64	5.64	6.26	3.01	0.74
831.70	992.69	5.69	6.27	3.03	0.74
850.40	992.73	5.73	6.29	3.06	0.74
869.10	992.77	5.77	6.31	3.08	0.74
887.80	992.82	5.82	6.32	3.10	0.74
903.00	992.85	5.85	6.33	3.12	0.74
925.20	992.90	5.90	6.35	3.15	0.73
943.90	992.94	5.94	6.37	3.17	0.73
962.60	992.98	5.98	6.39	3.19	0.73
981.30	993.02	6.02	6.41	3.21	0.73
1000.00	993.06	6.06	6.43	3.23	0.74

Tailwater Channel Data - St 55+30

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0086

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	995.10	0.0400
2	6.17	995.00	0.0400
3	6.56	995.00	0.0400
4	46.85	994.00	0.0400
5	64.13	993.00	0.0400
6	64.95	992.88	0.0600
7	77.12	991.00	0.0600
8	85.67	990.40	0.0600
9	92.64	990.00	0.0600
10	98.83	989.24	0.0600
11	100.23	989.00	0.0600
12	100.85	988.62	0.0300
13	101.90	988.00	0.0300
14	102.24	987.79	0.0300
15	103.56	987.00	0.0300
16	104.32	987.00	0.0300
17	104.48	987.00	0.0300
18	105.19	987.32	0.0300
19	106.67	988.00	0.0300
20	108.36	988.84	0.0600
21	110.72	990.00	0.0600
22	111.52	990.17	0.0600
23	114.45	991.00	0.0600
24	128.09	993.00	0.0600
25	134.93	993.59	0.0400
26	140.55	994.00	0.0400
27	145.86	994.00	0.0400
28	150.47	994.18	0.0400
29	166.48	994.66	0.0400
30	210.39	995.71	0.0000

Roadway Data for Crossing: St 55+30

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 1003.50 ft

Roadway Surface: Paved

Roadway Top Width: 80.00 ft

Table 7 - Summary of Culvert Flows at Crossing: St 65+00

Headwater Elevation (ft)	Total Discharge (cfs)	(2) 11' x 4' Discharge (cfs)	Roadway Discharge (cfs)	Iterations
999.54	541.00	541.00	0.00	1
999.71	566.90	566.90	0.00	1
999.88	592.80	592.80	0.00	1
1000.00	610.00	610.00	0.00	1
1000.24	644.60	644.60	0.00	1
1000.42	670.50	670.50	0.00	1
1000.57	696.40	690.67	5.36	7
1000.66	722.30	702.89	18.95	5
1000.74	748.20	713.32	34.66	5
1000.81	774.10	722.54	51.10	4
1000.87	800.00	731.06	68.56	4

Rating Curve Plot for Crossing: St 65+00

Total Rating Curve
Crossing: St 65+00

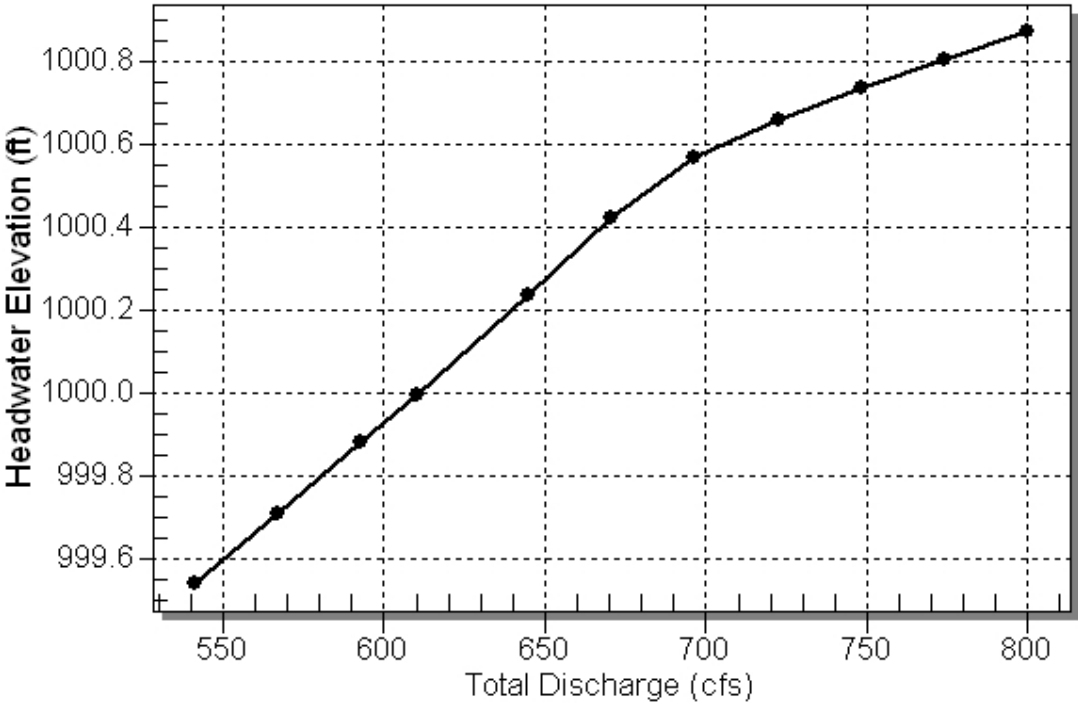


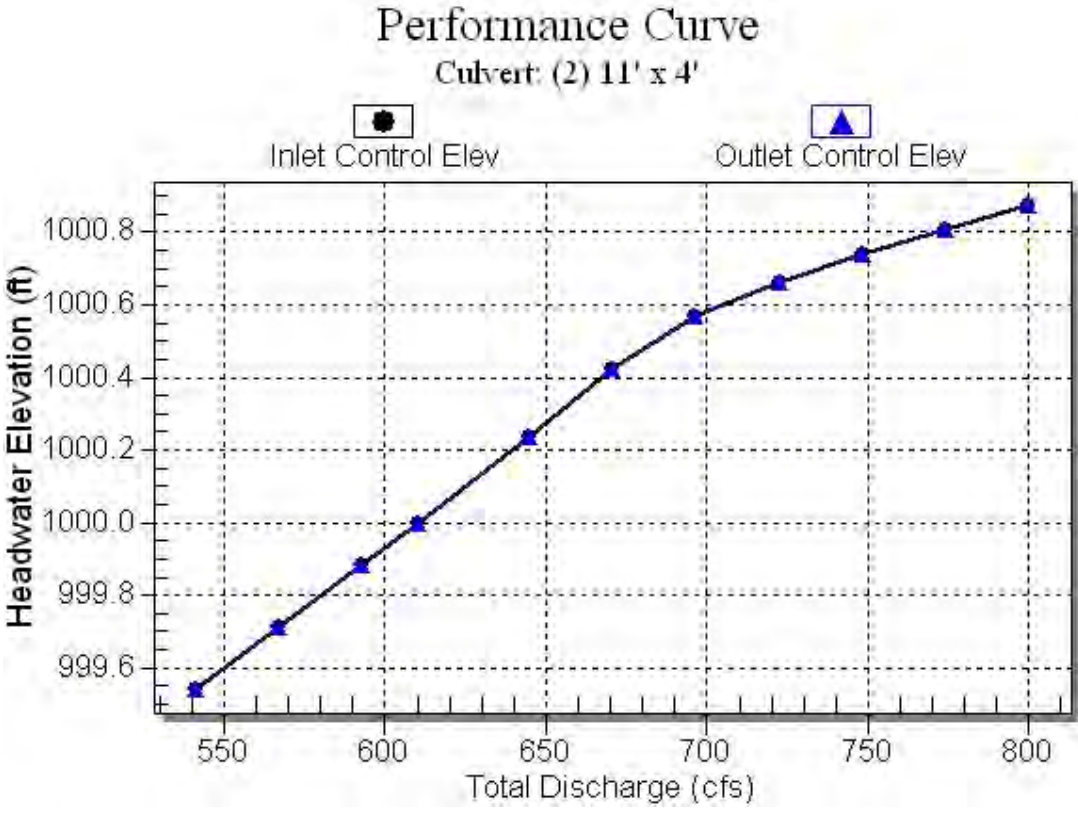
Table 8 - Culvert Summary Table: (2) 11' x 4'

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
541.00	541.00	999.54	4.543	4.543	5-S2n	1.658	2.664	1.783	4.067	13.794	7.345
566.90	566.90	999.71	4.712	4.712	5-S2n	1.709	2.748	1.843	4.138	13.981	7.319
592.80	592.80	999.88	4.883	4.883	5-S2n	1.760	2.831	1.905	4.206	14.143	7.279
610.00	610.00	1000.00	4.999	4.999	5-S2n	1.794	2.886	1.946	4.249	14.251	7.247
644.60	644.60	1000.24	5.238	5.238	5-S2n	1.862	2.994	2.028	4.334	14.449	7.176
670.50	670.50	1000.42	5.422	5.422	5-S2n	1.913	3.073	2.087	4.394	14.600	7.120
696.40	690.67	1000.57	5.569	5.569	5-S2n	1.952	3.135	2.133	4.451	14.720	7.063
722.30	702.89	1000.66	5.660	5.660	5-S2n	1.976	3.172	2.161	4.507	14.787	7.007
748.20	713.32	1000.74	5.738	5.738	5-S2n	1.997	3.203	2.183	4.561	14.853	6.952
774.10	722.54	1000.81	5.808	5.808	5-S2n	2.014	3.231	2.206	4.613	14.891	6.899
800.00	731.06	1000.87	5.873	5.873	5-S2n	2.029	3.256	2.225	4.662	14.936	6.851

Inlet Elevation (invert): 995.00 ft, Outlet Elevation (invert): 993.00 ft

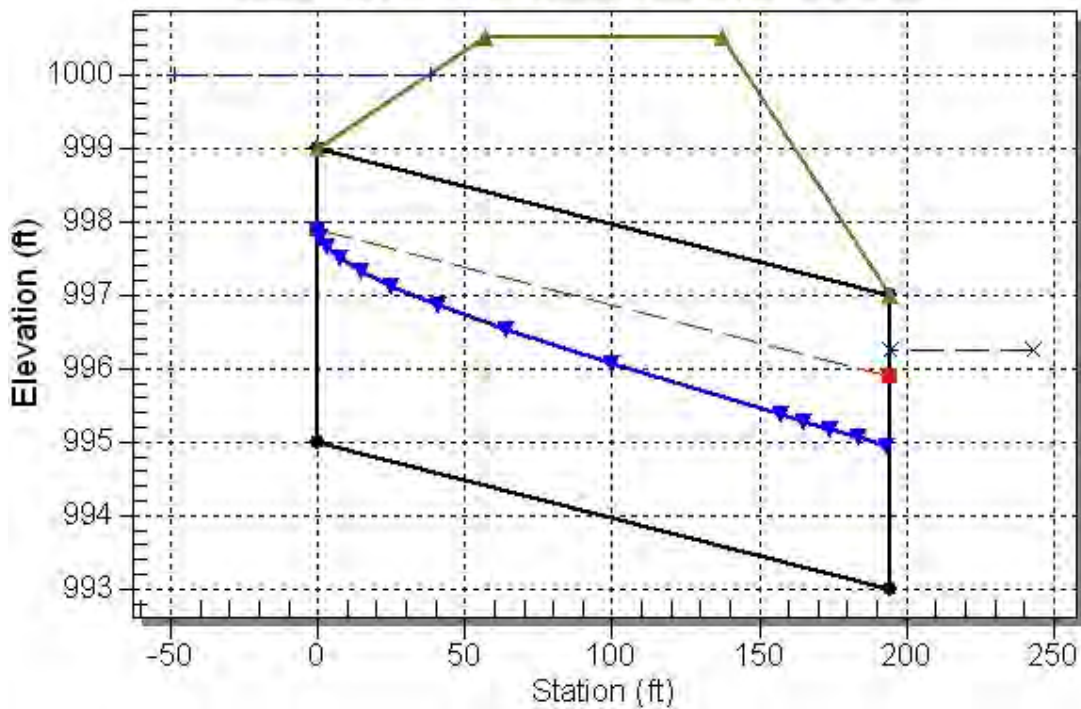
Culvert Length: 194.31 ft, Culvert Slope: 0.0103

Culvert Performance Curve Plot: (2) 11' x 4'



Water Surface Profile Plot for Culvert: (2) 11' x 4'

Crossing - St 65+00, Design Discharge - 610.0 cfs
Culvert - (2) 11' x 4', Culvert Discharge - 610.0 cfs



Site Data - (2) 11' x 4'

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 995.00 ft

Outlet Station: 194.30 ft

Outlet Elevation: 993.00 ft

Number of Barrels: 2

Culvert Data Summary - (2) 11' x 4'

Barrel Shape: Concrete Box

Barrel Span: 11.00 ft

Barrel Rise: 4.00 ft

Barrel Material:

Barrel Manning's n: 0.0120

Inlet Type:

Inlet Edge Condition:

Inlet Depression: None

Table 9 - Downstream Channel Rating Curve (Crossing: St 65+00)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
541.00	996.07	4.07	7.35	3.22	1.08
566.90	996.14	4.14	7.32	3.28	1.10
592.80	996.21	4.21	7.28	3.33	1.11
610.00	996.25	4.25	7.25	3.37	1.11
644.60	996.33	4.33	7.18	3.43	1.12
670.50	996.39	4.39	7.12	3.48	1.12
696.40	996.45	4.45	7.06	3.53	1.11
722.30	996.51	4.51	7.01	3.57	1.11
748.20	996.56	4.56	6.95	3.61	1.10
774.10	996.61	4.61	6.90	3.66	1.09
800.00	996.66	4.66	6.85	3.69	1.10

Tailwater Channel Data - St 65+00

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0127

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	45.07	998.00	0.0600
2	50.76	997.00	0.0600
3	51.17	996.95	0.0600
4	58.39	996.10	0.0600
5	59.20	996.00	0.0600
6	70.19	995.00	0.0600
7	73.65	994.78	0.0600
8	85.74	994.00	0.0600
9	88.48	992.69	0.0300
10	90.07	992.00	0.0300
11	93.08	992.00	0.0300
12	93.60	992.26	0.0300
13	95.13	993.00	0.0300
14	96.91	993.90	0.0600
15	97.22	994.06	0.0600
16	99.91	995.42	0.0600
17	102.51	996.00	0.0600
18	105.43	996.00	0.0600
19	105.44	996.00	0.0600
20	145.40	996.63	0.0600
21	155.15	996.69	0.0600
22	161.33	996.71	0.0600

Roadway Data for Crossing: St 65+00

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 1000.50 ft

Roadway Surface: Paved

Roadway Top Width: 80.00 ft

Table 10 - Summary of Culvert Flows at Crossing: St 88+20

Headwater Elevation (ft)	Total Discharge (cfs)	(2) 8' x 4' RCBs Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1009.83	100.00	100.00	0.00	1
1010.28	140.00	140.00	0.00	1
1010.68	180.00	180.00	0.00	1
1011.05	220.00	220.00	0.00	1
1011.41	260.00	260.00	0.00	1
1011.75	300.00	300.00	0.00	1
1012.09	340.00	340.00	0.00	1
1012.44	380.00	380.00	0.00	1
1012.80	420.00	420.00	0.00	1
1013.17	460.00	460.00	0.00	1
1013.56	500.00	500.00	0.00	1

Rating Curve Plot for Crossing: St 88+20

Total Rating Curve
Crossing: St 88+20

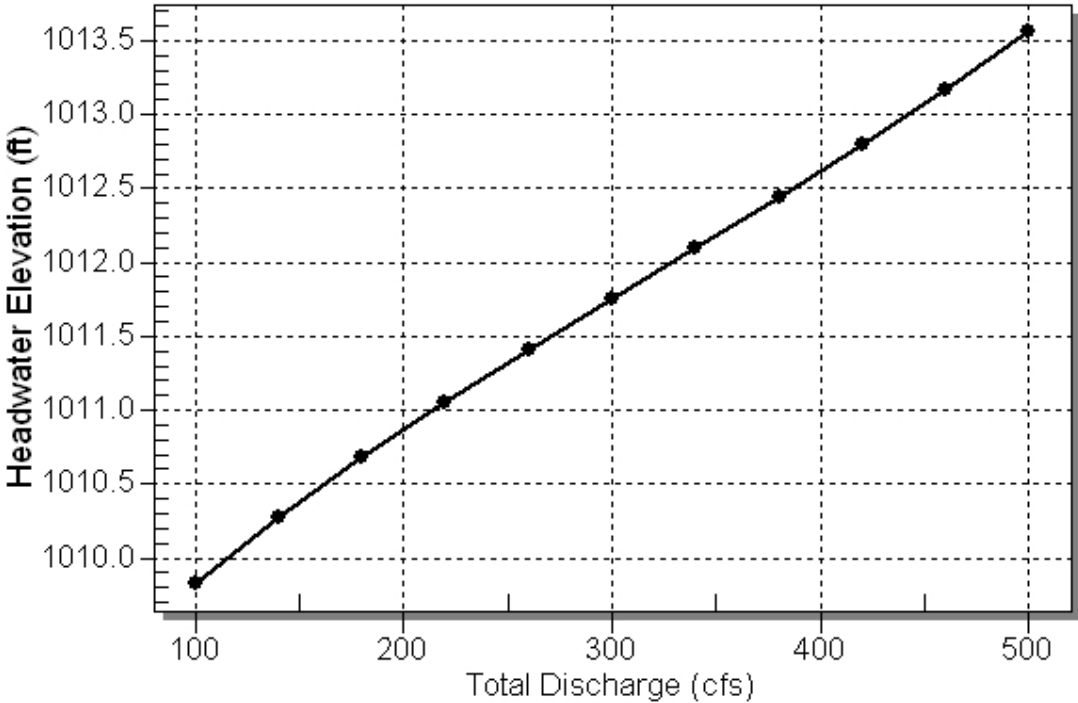
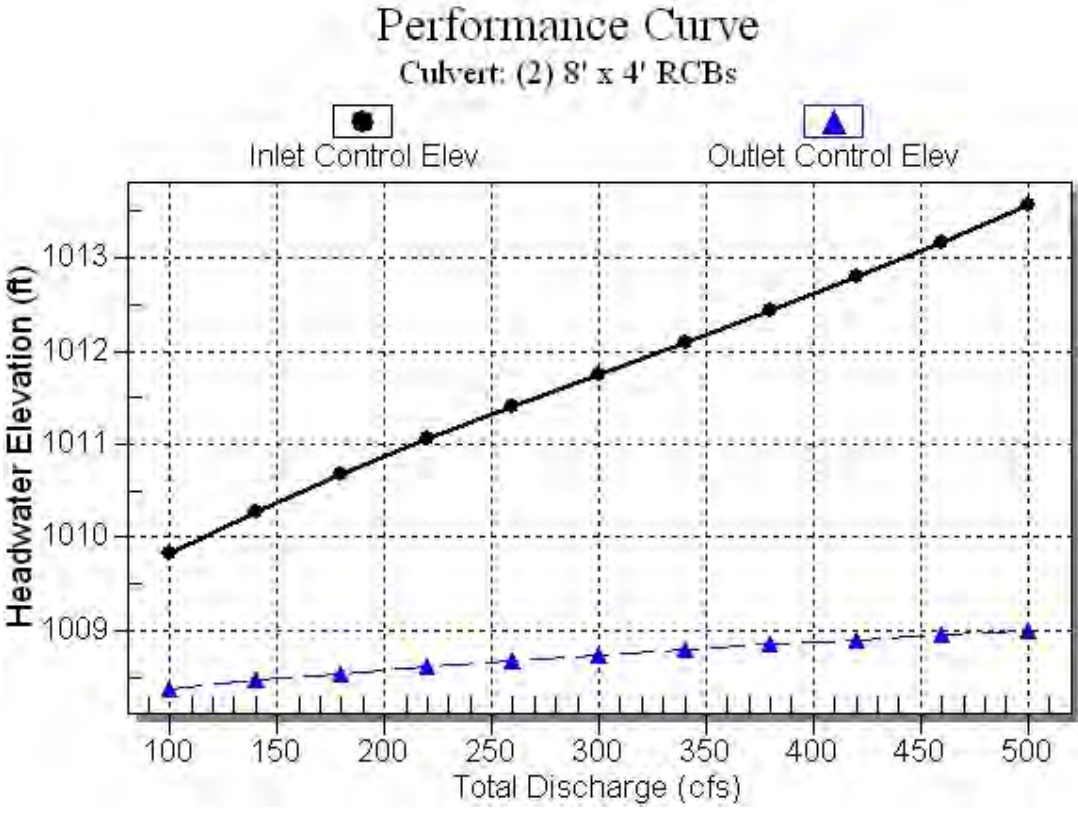


Table 11 - Culvert Summary Table: (2) 8' x 4' RCBs

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
100.00	100.00	1009.83	1.831	0.378	1-S2n	1.021	1.069	1.028	0.428	6.081	3.421
140.00	140.00	1010.28	2.275	0.465	1-S2n	1.281	1.338	1.287	0.515	6.801	3.880
180.00	180.00	1010.68	2.677	0.542	1-S2n	1.517	1.582	1.521	0.592	7.399	4.258
220.00	220.00	1011.05	3.051	0.612	1-S2n	1.739	1.808	1.747	0.662	7.871	4.583
260.00	260.00	1011.41	3.406	0.676	1-S2n	1.953	2.021	1.960	0.726	8.291	4.871
300.00	300.00	1011.75	3.750	0.737	1-S2n	2.156	2.223	2.162	0.787	8.672	5.129
340.00	340.00	1012.09	4.092	0.794	5-S2n	2.356	2.417	2.357	0.844	9.017	5.364
380.00	380.00	1012.44	4.439	0.848	5-S2n	2.548	2.603	2.552	0.898	9.308	5.581
420.00	420.00	1012.80	4.796	0.900	5-S2n	2.738	2.782	2.741	0.950	9.576	5.782
460.00	460.00	1013.17	5.168	0.950	5-S2n	2.922	2.956	2.925	1.000	9.828	5.970
500.00	500.00	1013.56	5.560	0.997	5-S2n	3.105	3.125	3.105	1.047	10.064	6.147

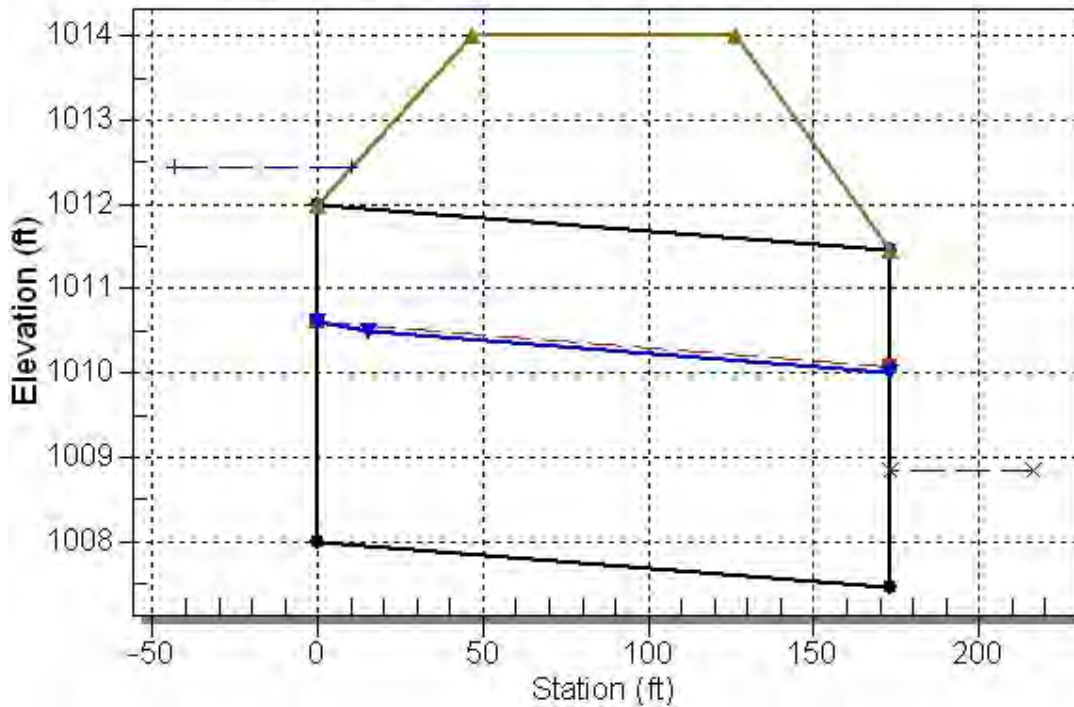
 Inlet Elevation (invert): 1008.00 ft, Outlet Elevation (invert): 1007.46 ft
 Culvert Length: 173.00 ft, Culvert Slope: 0.0031

Culvert Performance Curve Plot: (2) 8' x 4' RCBs



Water Surface Profile Plot for Culvert: (2) 8' x 4' RCBs

Crossing - St 88+20, Design Discharge - 380.0 cfs
 Culvert - (2) 8' x 4' RCBs, Culvert Discharge - 380.0 cfs



Site Data - (2) 8' x 4' RCBs

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1008.00 ft

Outlet Station: 173.00 ft

Outlet Elevation: 1007.46 ft

Number of Barrels: 2

Culvert Data Summary - (2) 8' x 4' RCBs

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: Square Edge (90°) Headwall

Inlet Depression: None

Table 12 - Downstream Channel Rating Curve (Crossing: St 88+20)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
100.00	1008.38	0.43	3.42	0.55	0.99
140.00	1008.46	0.51	3.88	0.66	1.02
180.00	1008.54	0.59	4.26	0.76	1.04
220.00	1008.61	0.66	4.58	0.85	1.06
260.00	1008.68	0.73	4.87	0.93	1.08
300.00	1008.74	0.79	5.13	1.01	1.09
340.00	1008.79	0.84	5.36	1.08	1.10
380.00	1008.85	0.90	5.58	1.15	1.11
420.00	1008.90	0.95	5.78	1.22	1.12
460.00	1008.95	1.00	5.97	1.28	1.13
500.00	1009.00	1.05	6.15	1.34	1.14

Tailwater Channel Data - St 88+20

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0205

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	196.61	1016.00	0.0300
2	218.77	1015.38	0.0300
3	222.50	1015.29	0.0300
4	258.01	1014.52	0.0300
5	270.60	1014.00	0.0300
6	286.72	1014.00	0.0300
7	419.03	1010.40	0.0300
8	445.70	1010.70	0.0300
9	466.84	1011.32	0.0600
10	476.36	1011.17	0.0600
11	503.67	1010.29	0.0600
12	506.04	1010.25	0.0600
13	506.30	1010.26	0.0600
14	515.72	1010.22	0.0600
15	516.05	1010.23	0.0600
16	516.96	1010.30	0.0600
17	532.28	1011.01	0.0600
18	534.33	1010.93	0.0400
19	573.53	1008.05	0.0400
20	574.14	1008.00	0.0400
21	599.60	1008.00	0.0300
22	644.11	1007.95	0.0300
23	644.16	1007.95	0.0300
24	644.26	1007.95	0.0300
25	644.90	1008.00	0.0300
26	645.61	1008.13	0.0600
27	656.89	1010.00	0.0600
28	665.79	1011.43	0.0600
29	670.50	1011.67	0.0600
30	694.16	1011.48	0.0600
31	700.73	1011.54	0.0600
32	719.31	1012.00	0.0000

Roadway Data for Crossing: St 88+20

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 1014.00 ft

Roadway Surface: Paved

Roadway Top Width: 80.00 ft

Table 13 - Summary of Culvert Flows at Crossing: St 215+75

Headwater Elevation (ft)	Total Discharge (cfs)	(2) 9' x 3' RCBs Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1017.14	363.00	363.00	0.00	1
1017.29	376.70	376.70	0.00	1
1017.43	390.40	390.40	0.00	1
1017.59	404.10	404.10	0.00	1
1017.74	417.80	417.80	0.00	1
1017.79	422.00	422.00	0.00	1
1018.07	445.20	445.20	0.00	1
1018.24	458.90	458.90	0.00	1
1018.42	472.60	472.60	0.00	1
1018.60	486.30	486.30	0.00	1
1018.77	500.00	498.95	0.78	13

Rating Curve Plot for Crossing: St 215+75

Total Rating Curve

Crossing: St 215+75

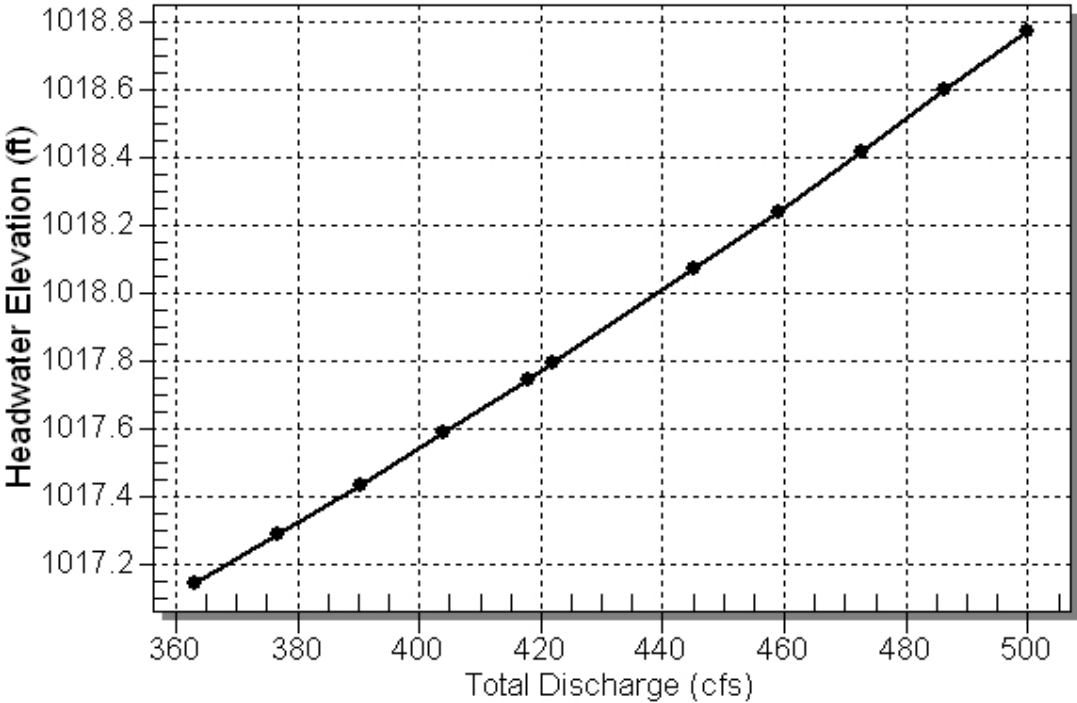
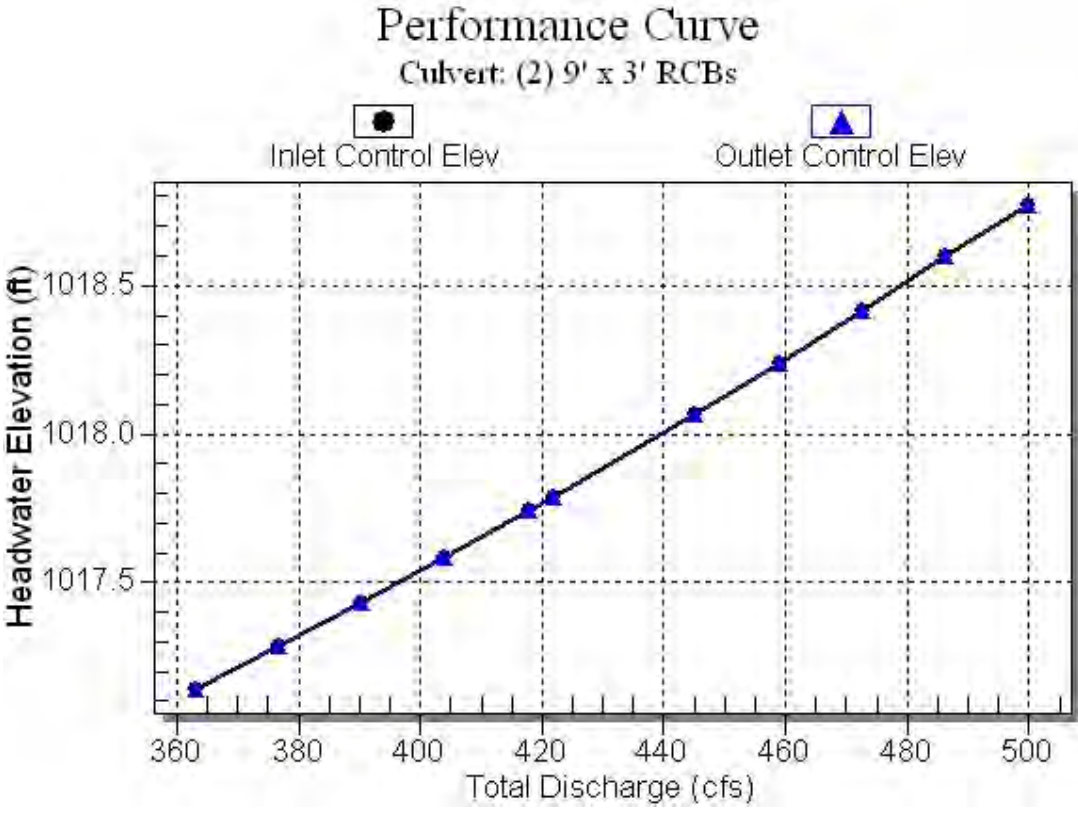


Table 14 - Culvert Summary Table: (2) 9' x 3' RCBs

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
363.00	363.00	1017.14	4.143	4.143	5-S2n	1.901	2.334	1.903	2.672	10.598	4.696
376.70	376.70	1017.29	4.286	4.286	5-S2n	1.950	2.392	1.955	2.698	10.707	4.715
390.40	390.40	1017.43	4.434	4.434	5-S2n	1.998	2.450	2.003	2.723	10.826	4.735
404.10	404.10	1017.59	4.585	4.585	5-S2n	2.047	2.507	2.050	2.748	10.952	4.755
417.80	417.80	1017.74	4.741	4.741	5-S2n	2.095	2.563	2.097	2.772	11.068	4.776
422.00	422.00	1017.79	4.790	4.790	5-S2n	2.110	2.580	2.114	2.779	11.090	4.783
445.20	445.20	1018.07	5.068	5.068	5-S2n	2.188	2.674	2.193	2.819	11.278	4.819
458.90	458.90	1018.24	5.239	5.239	5-S2n	2.234	2.729	2.241	2.841	11.378	4.841
472.60	472.60	1018.42	5.415	5.415	5-S2n	2.280	2.783	2.327	2.864	11.285	4.863
486.30	486.30	1018.60	5.597	5.597	5-S2n	2.326	2.836	2.375	2.885	11.376	4.885
500.00	498.95	1018.77	5.769	5.769	5-S2n	2.369	2.885	2.419	2.907	11.460	4.908

 Inlet Elevation (invert): 1013.00 ft, Outlet Elevation (invert): 1012.06 ft
 Culvert Length: 190.00 ft, Culvert Slope: 0.0049

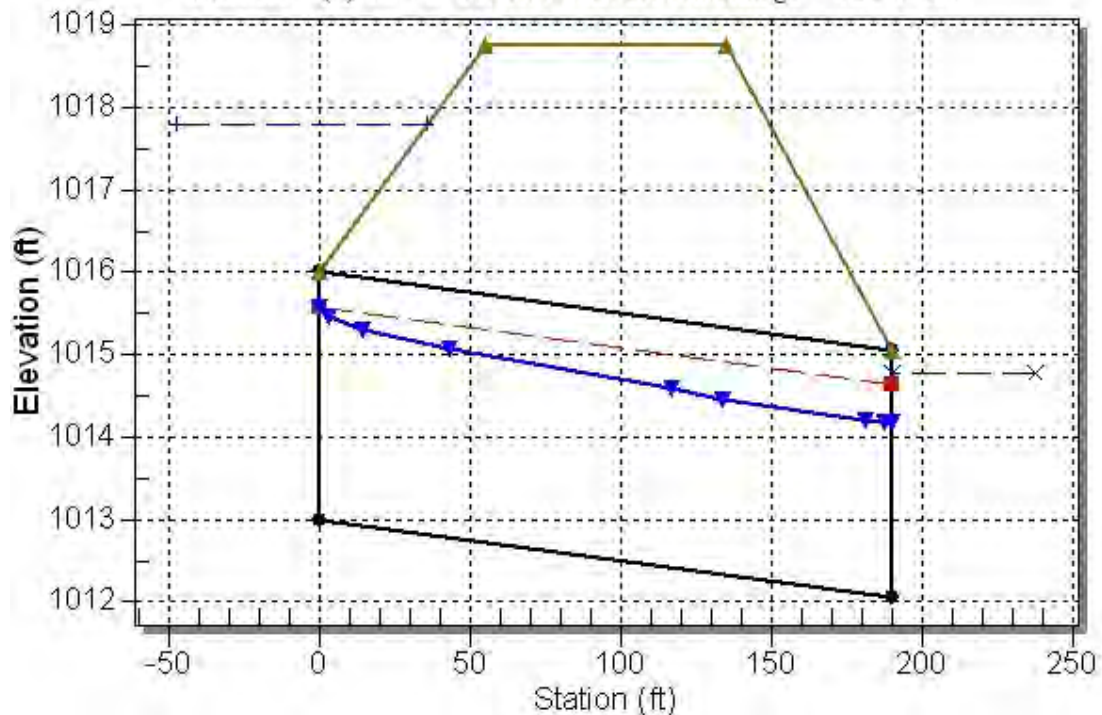
Culvert Performance Curve Plot: (2) 9' x 3' RCBs



Water Surface Profile Plot for Culvert: (2) 9' x 3' RCBs

Crossing - St 215+75, Design Discharge - 422.0 cfs

Culvert - (2) 9' x 3' RCBs, Culvert Discharge - 422.0 cfs



Site Data - (2) 9' x 3' RCBs

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1013.00 ft

Outlet Station: 190.00 ft

Outlet Elevation: 1012.06 ft

Number of Barrels: 2

Culvert Data Summary - (2) 9' x 3' RCBs

Barrel Shape: Concrete Box

Barrel Span: 9.00 ft

Barrel Rise: 3.00 ft

Barrel Material:

Barrel Manning's n: 0.0120

Inlet Type:

Inlet Edge Condition:

Inlet Depression: None

Table 15 - Downstream Channel Rating Curve (Crossing: St 215+75)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
363.00	1014.67	2.67	4.70	2.67	0.94
376.70	1014.70	2.70	4.72	2.69	0.93
390.40	1014.72	2.72	4.74	2.72	0.93
404.10	1014.75	2.75	4.76	2.74	0.92
417.80	1014.77	2.77	4.78	2.77	0.92
422.00	1014.78	2.78	4.78	2.77	0.92
445.20	1014.82	2.82	4.82	2.81	0.91
458.90	1014.84	2.84	4.84	2.84	0.91
472.60	1014.86	2.86	4.86	2.86	0.90
486.30	1014.89	2.89	4.89	2.88	0.90
500.00	1014.91	2.91	4.91	2.90	0.90

Tailwater Channel Data - St 215+75

Tailwater Channel Option: Irregular Channel

Channel Slope: 0.0160

User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	1014.98	0.0500
2	25.49	1014.00	0.0500
3	84.08	1014.00	0.0500
4	84.19	1014.00	0.0500
5	85.09	1013.75	0.0500
6	85.71	1013.59	0.0500
7	91.17	1012.00	0.0300
8	92.72	1012.00	0.0300
9	94.89	1012.00	0.0300
10	96.02	1012.47	0.0500
11	96.83	1012.82	0.0500
12	99.29	1014.00	0.0500
13	119.13	1015.52	0.0500
14	124.98	1016.00	0.0500
15	127.83	1016.00	0.0500
16	128.25	1016.00	0.0500
17	192.64	1017.46	0.0500
18	198.67	1017.59	0.0500
19	213.58	1018.00	0.0500
20	219.62	1018.09	0.0300

Roadway Data for Crossing: St 215+75

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 1018.75 ft

Roadway Surface: Paved

Roadway Top Width: 80.00 ft

MASTER DESIGN STORM SUMMARY

Network Storm Collection: SCS Type II Rain

Return Event	Total Depth in	Rainfall Type	RNF ID	
2	3.6000	Synthetic Curve	TypeII	24hr
10	5.4000	Synthetic Curve	TypeII	24hr
100	7.9000	Synthetic Curve	TypeII	24hr
25	6.3000	Synthetic Curve	TypeII	24hr
50	7.0000	Synthetic Curve	TypeII	24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
48+60	NO VOL IN	POND 2	6.845		12.0500	83.48		
48+60	NO VOL IN	POND 10	10.975		12.0500	130.71		
48+60	NO VOL IN	POND 100	16.762		12.0500	195.46		
48+60	NO VOL IN	POND 25	13.055		12.0500	154.10		
48+60	NO VOL IN	POND 50	14.675		12.0500	172.23		
48+60	NO VOL OUT	POND 2	6.840		12.1000	83.30	997.08	.005
48+60	NO VOL OUT	POND 10	10.970		12.1000	130.21	997.10	.005
48+60	NO VOL OUT	POND 100	16.757		12.1000	194.54	997.13	.005
48+60	NO VOL OUT	POND 25	13.049		12.1000	153.45	997.11	.005
48+60	NO VOL OUT	POND 50	14.670		12.1000	171.46	997.12	.005
CULV 215+75	IN	POND 2	14.532		12.0500	188.97		
CULV 215+75	IN	POND 10	23.300		12.0500	295.24		
CULV 215+75	IN	POND 100	35.584		12.0500	440.96		
CULV 215+75	IN	POND 25	27.714		12.0500	347.89		
CULV 215+75	IN	POND 50	31.154		12.0500	388.68		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
CULV 215+75	OUT	POND 2	14.342		12.1000	184.36	1018.92	.349
CULV 215+75	OUT	POND 10	23.110		12.0500	288.06	1019.06	.401
CULV 215+75	OUT	POND 100	35.394		12.0500	430.75	1019.23	.460
CULV 215+75	OUT	POND 25	27.524		12.0500	339.62	1019.13	.424
CULV 215+75	OUT	POND 50	30.964		12.0500	379.56	1019.17	.440
CULV 88+10	IN	POND 2	9.527		12.0000	150.02		
CULV 88+10	IN	POND 10	15.798		12.0000	241.28		
CULV 88+10	IN	POND 100	24.670		11.9500	367.60		
CULV 88+10	IN	POND 25	18.979		11.9500	286.71		
CULV 88+10	IN	POND 50	21.464		11.9500	322.18		
CULV 88+10	OUT	POND 2	4.519		12.2000	46.94	1017.01	5.291
CULV 88+10	OUT	POND 10	10.790		12.0000	251.03	1017.38	5.663
CULV 88+10	OUT	POND 100	19.662		12.0000	371.23	1017.52	5.806
CULV 88+10	OUT	POND 25	13.971		12.0000	290.09	1017.42	5.713
CULV 88+10	OUT	POND 50	16.456		12.0000	325.64	1017.47	5.755
CULV ST 55+00IN	POND	2	35.441		12.2500	291.25		
CULV ST 55+00IN	POND	10	56.826		12.2500	456.95		
CULV ST 55+00IN	POND	100	86.786		12.2500	684.17		
CULV ST 55+00IN	POND	25	67.591		12.2500	539.05		
CULV ST 55+00IN	POND	50	75.981		12.2500	602.65		
CULV ST 55+00OUT	POND	2	33.836		12.2500	290.75	996.97	1.936
CULV ST 55+00OUT	POND	10	55.221		12.2500	456.47	997.16	2.058
CULV ST 55+00OUT	POND	100	85.181		12.2500	683.73	997.37	2.213
CULV ST 55+00OUT	POND	25	65.986		12.2500	538.55	997.24	2.115
CULV ST 55+00OUT	POND	50	74.377		12.2500	602.14	997.30	2.158
CULV ST 65+00IN	POND	2	21.446		12.0500	273.24		
CULV ST 65+00IN	POND	10	34.773		12.0500	432.23		
CULV ST 65+00IN	POND	100	53.498		12.0500	650.04		
CULV ST 65+00IN	POND	25	41.496		12.0500	510.96		
CULV ST 65+00IN	POND	50	46.741		12.0500	571.93		

Name... Watershed

File... G:\KC06\0429\Hydraulics\Pond Pak\Plugged Culverts2.ppw

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
CULV ST 65+00OUT	POND	2	20.837		12.1000	269.94	1001.08	1.163
CULV ST 65+00OUT	POND	10	34.164		12.0500	427.16	1001.27	1.343
CULV ST 65+00OUT	POND	100	52.889		12.0500	644.01	1001.49	1.563
CULV ST 65+00OUT	POND	25	40.888		12.0500	505.60	1001.36	1.425
CULV ST 65+00OUT	POND	50	46.132		12.0500	566.31	1001.41	1.487
DA 215+75	AREA	2	14.532		12.0500	188.97		
DA 215+75	AREA	10	23.300		12.0500	295.24		
DA 215+75	AREA	100	35.584		12.0500	440.96		
DA 215+75	AREA	25	27.714		12.0500	347.89		
DA 215+75	AREA	50	31.154		12.0500	388.68		
DA 48+60	AREA	2	6.845		12.0500	83.48		
DA 48+60	AREA	10	10.975		12.0500	130.71		
DA 48+60	AREA	100	16.762		12.0500	195.46		
DA 48+60	AREA	25	13.055		12.0500	154.10		
DA 48+60	AREA	50	14.675		12.0500	172.23		
DA 55+00	AREA	2	35.441		12.2500	291.25		
DA 55+00	AREA	10	56.826		12.2500	456.95		
DA 55+00	AREA	100	86.786		12.2500	684.17		
DA 55+00	AREA	25	67.591		12.2500	539.05		
DA 55+00	AREA	50	75.981		12.2500	602.65		
DA 65+00	AREA	2	21.446		12.0500	273.24		
DA 65+00	AREA	10	34.773		12.0500	432.23		
DA 65+00	AREA	100	53.498		12.0500	650.04		
DA 65+00	AREA	25	41.496		12.0500	510.96		
DA 65+00	AREA	50	46.741		12.0500	571.93		
DA 88+10	AREA	2	9.527		12.0000	150.02		
DA 88+10	AREA	10	15.798		12.0000	241.28		
DA 88+10	AREA	100	24.670		11.9500	367.60		
DA 88+10	AREA	25	18.979		11.9500	286.71		
DA 88+10	AREA	50	21.464		11.9500	322.18		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Return Type Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*FREE OUT 215+75	JCT 2	14.342		12.1000	184.36		
*FREE OUT 215+75	JCT 10	23.110		12.0500	288.06		
*FREE OUT 215+75	JCT 100	35.394		12.0500	430.75		
*FREE OUT 215+75	JCT 25	27.524		12.0500	339.62		
*FREE OUT 215+75	JCT 50	30.964		12.0500	379.56		
*FREE OUT 48+60	JCT 2	6.840		12.1000	83.30		
*FREE OUT 48+60	JCT 10	10.970		12.1000	130.21		
*FREE OUT 48+60	JCT 100	16.757		12.1000	194.54		
*FREE OUT 48+60	JCT 25	13.049		12.1000	153.45		
*FREE OUT 48+60	JCT 50	14.670		12.1000	171.46		
*FREE OUT 55+00	JCT 2	33.836		12.2500	290.75		
*FREE OUT 55+00	JCT 10	55.221		12.2500	456.47		
*FREE OUT 55+00	JCT 100	85.181		12.2500	683.73		
*FREE OUT 55+00	JCT 25	65.986		12.2500	538.55		
*FREE OUT 55+00	JCT 50	74.377		12.2500	602.14		
*FREE OUT 65+00	JCT 2	20.837		12.1000	269.94		
*FREE OUT 65+00	JCT 10	34.164		12.0500	427.16		
*FREE OUT 65+00	JCT 100	52.889		12.0500	644.01		
*FREE OUT 65+00	JCT 25	40.888		12.0500	505.60		
*FREE OUT 65+00	JCT 50	46.132		12.0500	566.31		
*FREE OUT 88+10	JCT 2	4.519		12.2000	46.94		
*FREE OUT 88+10	JCT 10	10.790		12.0000	251.03		
*FREE OUT 88+10	JCT 100	19.662		12.0000	371.23		
*FREE OUT 88+10	JCT 25	13.971		12.0000	290.09		
*FREE OUT 88+10	JCT 50	16.456		12.0000	325.64		

HEC-RAS

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
TRIB270	15.735	100yr	WC_T_fldy_TSC_Pr	852.00	1011.90	1017.19		1017.20	0.00002	0.72	1476.76	430.35	0.06
TRIB270	15.735	100yr	WC_T_fldy_TSC_EX	852.00	1011.90	1017.19		1017.20	0.00002	0.72	1476.76	430.35	0.06
TRIB270	15.735	Floodway	WC_T_fldy_TSC_Pr	852.00	1011.90	1017.19		1017.20	0.00002	0.72	1476.76	430.35	0.06
TRIB270	15.735	Floodway	WC_T_fldy_TSC_EX	852.00	1011.90	1017.19		1017.20	0.00002	0.72	1476.76	430.35	0.06
TRIB270	15.609	100yr	WC_T_fldy_TSC_Pr	1337.00	1011.90	1017.18	1012.70	1017.19	0.00001	0.57	2490.87	633.54	0.05
TRIB270	15.609	100yr	WC_T_fldy_TSC_EX	1337.00	1011.90	1017.18	1012.70	1017.19	0.00001	0.57	2490.87	633.54	0.05
TRIB270	15.609	Floodway	WC_T_fldy_TSC_Pr	1337.00	1011.90	1017.18	1012.70	1017.19	0.00001	0.57	2490.87	633.54	0.05
TRIB270	15.609	Floodway	WC_T_fldy_TSC_EX	1337.00	1011.90	1017.18	1012.70	1017.19	0.00001	0.57	2490.87	633.54	0.05
TRIB270	15.550			Inl Struct									
TRIB270	15.510	100yr	WC_T_fldy_TSC_Pr	1337.00	1000.03	1008.08		1008.33	0.00269	4.34	371.19	171.85	0.35
TRIB270	15.510	100yr	WC_T_fldy_TSC_EX	1337.00	1000.03	1008.09		1008.34	0.00266	4.32	372.97	172.29	0.35
TRIB270	15.510	Floodway	WC_T_fldy_TSC_Pr	1337.00	1000.03	1008.06		1008.32	0.00273	4.36	368.84	171.27	0.35
TRIB270	15.510	Floodway	WC_T_fldy_TSC_EX	1337.00	1000.03	1008.09		1008.34	0.00266	4.32	373.02	172.30	0.35
TRIB270	15.355	100yr	WC_T_fldy_TSC_Pr	1337.00	998.60	1005.22	1003.89	1005.40	0.00532	3.56	395.51	207.99	0.37
TRIB270	15.355	100yr	WC_T_fldy_TSC_EX	1337.00	998.60	1005.19	1003.88	1005.38	0.00555	3.61	389.64	206.53	0.38
TRIB270	15.355	Floodway	WC_T_fldy_TSC_Pr	1337.00	998.60	1005.25	1003.89	1005.43	0.00503	3.49	403.21	209.89	0.37
TRIB270	15.355	Floodway	WC_T_fldy_TSC_EX	1337.00	998.60	1005.19	1003.88	1005.38	0.00556	3.61	389.50	206.49	0.38
TRIB270	15.215	100yr	WC_T_fldy_TSC_Pr	1287.00	995.91	1001.13	1000.40	1001.46	0.00590	4.96	293.87	203.73	0.49
TRIB270	15.215	100yr	WC_T_fldy_TSC_EX	1287.00	995.91	1001.18	1000.40	1001.50	0.00549	4.84	302.21	209.55	0.47
TRIB270	15.215	Floodway	WC_T_fldy_TSC_Pr	1287.00	995.91	1001.07	1000.40	1001.42	0.00649	5.14	282.95	195.94	0.51
TRIB270	15.215	Floodway	WC_T_fldy_TSC_EX	1287.00	995.91	1001.18	1000.40	1001.50	0.00548	4.83	302.42	209.69	0.47
TRIB270	15.123	100yr	WC_T_fldy_TSC_Pr	1287.00	994.39	999.63		999.79	0.00229	4.11	499.91	296.01	0.38
TRIB270	15.123	100yr	WC_T_fldy_TSC_EX	1287.00	994.39	999.51		999.71	0.00274	4.39	466.22	292.09	0.42
TRIB270	15.123	Floodway	WC_T_fldy_TSC_Pr	1287.00	994.39	999.79		999.93	0.00179	3.75	550.05	301.74	0.34
TRIB270	15.123	Floodway	WC_T_fldy_TSC_EX	1287.00	994.39	999.51		999.70	0.00275	4.40	465.44	292.00	0.42
TRIB270	15.114	100yr	WC_T_fldy_TSC_Pr	1287.00	994.56	999.56	998.33	999.68	0.00149	3.60	535.19	285.60	0.32
TRIB270	15.114	100yr	WC_T_fldy_TSC_EX	1287.00	994.56	999.43	998.31	999.57	0.00181	3.88	539.15	278.91	0.35
TRIB270	15.114	Floodway	WC_T_fldy_TSC_Pr	1287.00	994.56	999.74	998.33	999.84	0.00120	3.32	575.51	295.10	0.29
TRIB270	15.114	Floodway	WC_T_fldy_TSC_EX	1287.00	994.56	999.43	998.31	999.57	0.00182	3.89	538.39	278.77	0.35
TRIB270	15.100			Bridge									
TRIB270	15.081	100yr	WC_T_fldy_TSC_Pr	1287.00	994.40	998.34	997.50	998.56	0.00837	5.93	404.31	202.93	0.57
TRIB270	15.081	100yr	WC_T_fldy_TSC_EX	1287.00	994.40	998.36	997.50	998.57	0.00851	6.00	423.13	203.38	0.57
TRIB270	15.081	Floodway	WC_T_fldy_TSC_Pr	1287.00	994.40	998.55	997.54	998.88	0.00998	6.75	325.20	113.40	0.62
TRIB270	15.081	Floodway	WC_T_fldy_TSC_EX	1287.00	994.40	998.55	997.54	998.88	0.00998	6.75	325.20	113.40	0.62
TRIB270	15.057	100yr	WC_T_fldy_TSC_Pr	1287.00	994.43	997.18		997.44	0.00966	4.56	338.54	174.59	0.49
TRIB270	15.057	100yr	WC_T_fldy_TSC_EX	1287.00	994.43	997.18		997.44	0.00966	4.56	338.54	174.59	0.49
TRIB270	15.057	Floodway	WC_T_fldy_TSC_Pr	1287.00	994.43	997.20		997.55	0.01157	5.01	280.31	110.80	0.54
TRIB270	15.057	Floodway	WC_T_fldy_TSC_EX	1287.00	994.43	997.20		997.55	0.01157	5.01	280.31	110.80	0.54
TRIB270	15.016	100yr	WC_T_fldy_TSC_Pr	1287.00	992.50	995.79		996.07	0.00431	4.50	307.70	160.45	0.46
TRIB270	15.016	100yr	WC_T_fldy_TSC_EX	1287.00	992.50	995.79		996.07	0.00431	4.50	307.70	160.45	0.46
TRIB270	15.016	Floodway	WC_T_fldy_TSC_Pr	1287.00	992.50	995.77		996.05	0.00436	4.50	302.29	150.00	0.46
TRIB270	15.016	Floodway	WC_T_fldy_TSC_EX	1287.00	992.50	995.77		996.05	0.00436	4.50	302.29	150.00	0.46
TRIB270	14.948	100yr	WC_T_fldy_TSC_Pr	1287.00	992.50	993.42	993.42	993.87	0.00936	5.39	239.35	268.15	1.00
TRIB270	14.948	100yr	WC_T_fldy_TSC_EX	1287.00	992.50	993.42	993.42	993.87	0.00936	5.39	239.35	268.15	1.00
TRIB270	14.948	Floodway	WC_T_fldy_TSC_Pr	1287.00	992.50	993.43	993.42	993.87	0.00902	5.33	241.97	267.00	0.98
TRIB270	14.948	Floodway	WC_T_fldy_TSC_EX	1287.00	992.50	993.43	993.42	993.87	0.00902	5.33	241.97	267.00	0.98
TRIB260	14.946	100yr	WC_T_fldy_TSC_Pr	692.00	1005.45	1011.45		1011.51	0.00221	2.95	442.48	313.77	0.27
TRIB260	14.946	100yr	WC_T_fldy_TSC_EX	692.00	1005.45	1011.45		1011.51	0.00224	2.96	440.51	313.49	0.27
TRIB260	14.946	Floodway	WC_T_fldy_TSC_Pr	692.00	1005.45	1011.45		1011.51	0.00223	2.95	441.58	313.64	0.27
TRIB260	14.946	Floodway	WC_T_fldy_TSC_EX	692.00	1005.45	1011.45		1011.50	0.00225	2.97	439.88	313.40	0.27
TRIB260	14.931	100yr	WC_T_fldy_TSC_Pr	692.00	1005.09	1010.46	1010.46	1011.11	0.01534	7.64	160.05	130.23	0.74
TRIB260	14.931	100yr	WC_T_fldy_TSC_EX	692.00	1005.09	1010.48	1010.46	1011.11	0.01482	7.54	162.67	130.69	0.73
TRIB260	14.931	Floodway	WC_T_fldy_TSC_Pr	692.00	1005.09	1010.46	1010.46	1011.11	0.01534	7.64	160.05	130.23	0.74
TRIB260	14.931	Floodway	WC_T_fldy_TSC_EX	692.00	1005.09	1010.49	1010.46	1011.11	0.01450	7.48	164.35	130.99	0.73
TRIB260	14.796	100yr	WC_T_fldy_TSC_Pr	692.00	1001.38	1006.37		1006.51	0.00331	3.06	232.40	137.99	0.35
TRIB260	14.796	100yr	WC_T_fldy_TSC_EX	692.00	1001.38	1006.30		1006.45	0.00364	3.16	223.46	127.12	0.36
TRIB260	14.796	Floodway	WC_T_fldy_TSC_Pr	692.00	1001.38	1006.34		1006.49	0.00343	3.09	229.24	134.13	0.35
TRIB260	14.796	Floodway	WC_T_fldy_TSC_EX	692.00	1001.38	1006.29		1006.44	0.00370	3.17	221.88	125.22	0.37
TRIB260	14.614	100yr	WC_T_fldy_TSC_Pr	1035.00	995.49	1001.40		1001.81	0.00784	6.26	271.11	194.58	0.56
TRIB260	14.614	100yr	WC_T_fldy_TSC_EX	1035.00	995.49	1001.48		1001.85	0.00689	5.94	287.30	200.16	0.52
TRIB260	14.614	Floodway	WC_T_fldy_TSC_Pr	1035.00	995.49	1001.43		1001.83	0.00748	6.14	276.86	196.58	0.54
TRIB260	14.614	Floodway	WC_T_fldy_TSC_EX	1035.00	995.49	1001.50		1001.86	0.00675	5.90	289.94	201.06	0.52
TRIB260	14.524	100yr	WC_T_fldy_TSC_Pr	1035.00	992.55	999.02	998.22	999.28	0.00417	4.64	361.32	247.71	0.45
TRIB260	14.524	100yr	WC_T_fldy_TSC_EX	1035.00	992.55	998.88	998.22	999.19	0.00516	5.01	326.79	233.23	0.50
TRIB260	14.524	Floodway	WC_T_fldy_TSC_Pr	1035.00	992.55	998.97	998.22	999.25	0.00449	4.77	348.89	242.45	0.46

HEC-RAS (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
TRIB260	14.524	Floodway	WC_T_fldy_TSC_EX	1035.00	992.55	998.85		999.18	0.00534	5.08	321.31	231.07	0.50
TRIB260	14.470	100yr	WC_T_fldy_TSC_Pr	1035.00	991.92	996.81		997.37	0.01286	8.14	251.08	159.78	0.77
TRIB260	14.470	100yr	WC_T_fldy_TSC_EX	1035.00	991.92	997.28		997.58	0.00646	6.28	331.71	188.39	0.56
TRIB260	14.470	Floodway	WC_T_fldy_TSC_Pr	1035.00	991.92	996.95		997.41	0.01029	7.48	274.24	166.49	0.69
TRIB260	14.470	Floodway	WC_T_fldy_TSC_EX	1035.00	991.92	997.98		998.11	0.00265	4.47	504.66	294.92	0.37
TRIB260	14.445	100yr	WC_T_fldy_TSC_Pr	1035.00	991.53	996.53	995.07	996.62	0.00205	3.14	502.87	488.81	0.29
TRIB260	14.445	100yr	WC_T_fldy_TSC_EX	1035.00	991.53	997.38		997.39	0.00032	1.40	1283.45	522.25	0.12
TRIB260	14.445	Floodway	WC_T_fldy_TSC_Pr	1035.00	991.53	996.75	995.07	996.62	0.00157	2.85	548.17	497.99	0.25
TRIB260	14.445	Floodway	WC_T_fldy_TSC_EX	1035.00	991.53	998.01		998.02	0.00016	1.08	1622.42	552.70	0.08
TRIB260	14.427	100yr	WC_T_fldy_TSC_EX	1035.00	990.73	997.17	994.67	997.30	0.00128	3.37	430.85	176.55	0.27
TRIB260	14.427	Floodway	WC_T_fldy_TSC_EX	1035.00	990.73	997.89	994.66	997.97	0.00068	2.68	600.72	288.04	0.20
TRIB260	14.418		Bridge										
TRIB260	14.417	100yr	WC_T_fldy_TSC_EX	1035.00	990.14	994.45	994.45	995.70	0.01561	9.47	117.93	306.88	0.86
TRIB260	14.417	Floodway	WC_T_fldy_TSC_EX	1035.00	990.14	995.69	994.46	996.25	0.00476	6.31	176.93	49.00	0.49
TRIB260	14.404	100yr	WC_T_fldy_TSC_Pr	1035.00	989.41	994.51	993.87	994.91	0.01332	6.34	217.31	396.22	0.63
TRIB260	14.404	100yr	WC_T_fldy_TSC_EX	1035.00	989.41	994.11		994.18	0.00333	2.90	539.23	375.59	0.31
TRIB260	14.404	Floodway	WC_T_fldy_TSC_Pr	1035.00	989.41	995.66	993.87	995.84	0.00376	4.16	318.37	107.70	0.35
TRIB260	14.404	Floodway	WC_T_fldy_TSC_EX	1035.00	989.41	995.80		995.73	0.00300	3.68	372.81	107.70	0.32
TRIB260	14.368	100yr	WC_T_fldy_TSC_Pr	1035.00	988.85	993.42		993.51	0.00413	2.33	444.12	321.97	0.35
TRIB260	14.368	100yr	WC_T_fldy_TSC_EX	1035.00	988.85	993.42		993.51	0.00413	2.33	444.12	321.97	0.35
TRIB260	14.368	Floodway	WC_T_fldy_TSC_Pr	1035.00	988.85	994.76		995.00	0.00552	3.87	267.32	94.70	0.41
TRIB260	14.368	Floodway	WC_T_fldy_TSC_EX	1035.00	988.85	994.76		995.00	0.00552	3.87	267.27	94.70	0.41
TRIB260	14.304	100yr	WC_T_fldy_TSC_Pr	1771.00	985.81	991.92		992.20	0.00477	4.74	432.59	270.21	0.40
TRIB260	14.304	100yr	WC_T_fldy_TSC_EX	1771.00	985.81	991.92		992.20	0.00477	4.74	432.59	270.21	0.40
TRIB260	14.304	Floodway	WC_T_fldy_TSC_Pr	1771.00	985.81	992.80		993.34	0.00570	5.84	301.75	102.00	0.45
TRIB260	14.304	Floodway	WC_T_fldy_TSC_EX	1771.00	985.81	992.80		993.34	0.00569	5.84	301.91	102.00	0.45
TRIB260	14.151	100yr	WC_T_fldy_TSC_Pr	1771.00	981.09	989.14		989.35	0.00383	3.73	487.87	234.42	0.32
TRIB260	14.151	100yr	WC_T_fldy_TSC_EX	1771.00	981.09	989.14		989.35	0.00383	3.73	487.87	234.42	0.32
TRIB260	14.151	Floodway	WC_T_fldy_TSC_Pr	1771.00	981.09	990.01		990.28	0.00349	4.04	423.37	120.00	0.32
TRIB260	14.151	Floodway	WC_T_fldy_TSC_EX	1771.00	981.09	990.00		990.28	0.00350	4.05	422.75	120.00	0.32
TRIB260	13.988	100yr	WC_T_fldy_TSC_Pr	1771.00	979.00	987.09	985.81	987.27	0.00399	4.86	685.99	284.37	0.35
TRIB260	13.988	100yr	WC_T_fldy_TSC_EX	1771.00	979.00	987.09	985.81	987.27	0.00399	4.86	685.99	284.37	0.35
TRIB260	13.988	Floodway	WC_T_fldy_TSC_Pr	1771.00	979.00	988.09	985.64	988.30	0.00371	4.64	548.50	112.40	0.31
TRIB260	13.988	Floodway	WC_T_fldy_TSC_EX	1771.00	979.00	988.09	985.64	988.30	0.00371	4.64	548.50	112.40	0.31
TRIB220	12.514	100yr	WC_T_fldy_TSC_Pr	1262.00	983.72	987.86	987.78	988.57	0.01610	7.07	196.02	126.33	0.78
TRIB220	12.514	100yr	WC_T_fldy_TSC_EX	1262.00	983.72	987.78	987.78	988.57	0.01842	7.40	186.02	121.68	0.82
TRIB220	12.514	Floodway	WC_T_fldy_TSC_Pr	1262.00	983.72	987.86	987.78	988.57	0.01610	7.07	196.02	126.33	0.78
TRIB220	12.514	Floodway	WC_T_fldy_TSC_EX	1262.00	983.72	987.78	987.78	988.57	0.01842	7.40	186.02	121.68	0.82
TRIB220	12.358	100yr	WC_T_fldy_TSC_Pr	1262.00	974.67	979.74		980.46	0.00684	7.29	231.61	152.03	0.66
TRIB220	12.358	100yr	WC_T_fldy_TSC_EX	1262.00	974.67	984.21		984.23	0.00012	1.66	1217.23	274.63	0.10
TRIB220	12.358	Floodway	WC_T_fldy_TSC_Pr	1262.00	974.67	979.74		980.46	0.00684	7.29	231.61	152.03	0.66
TRIB220	12.358	Floodway	WC_T_fldy_TSC_EX	1262.00	974.67	984.21		984.23	0.00012	1.66	1217.23	274.63	0.10
TRIB220	12.342	100yr	WC_T_fldy_TSC_Pr	1234.00	973.61	979.64	978.01	979.92	0.00255	4.47	338.23	183.41	0.41
TRIB220	12.342	100yr	WC_T_fldy_TSC_EX	1234.00	973.61	984.21		984.22	0.00007	1.25	1446.13	296.78	0.08
TRIB220	12.342	Floodway	WC_T_fldy_TSC_Pr	1234.00	973.61	979.64	978.01	979.92	0.00255	4.47	338.23	183.41	0.41
TRIB220	12.342	Floodway	WC_T_fldy_TSC_EX	1234.00	973.61	984.21		984.22	0.00007	1.25	1446.13	296.78	0.08
TRIB220	12.326	100yr	WC_T_fldy_TSC_EX	1234.00	973.61	984.20	978.66	984.22	0.00006	1.11	1241.40	214.85	0.06
TRIB220	12.326	Floodway	WC_T_fldy_TSC_EX	1234.00	973.61	984.20	978.66	984.22	0.00006	1.11	1241.40	214.85	0.06
TRIB220	12.32		Bridge										
TRIB220	12.312	100yr	WC_T_fldy_TSC_EX	1234.00	971.38	975.82	975.75	976.57	0.01406	7.59	180.19	98.00	0.79
TRIB220	12.312	Floodway	WC_T_fldy_TSC_EX	1234.00	971.38	975.82	975.75	976.57	0.01406	7.59	180.19	98.00	0.79
TRIB220	12.302	100yr	WC_T_fldy_TSC_Pr	1234.00	971.39	975.65	975.65	976.56	0.01996	8.07	162.34	180.03	0.94
TRIB220	12.302	100yr	WC_T_fldy_TSC_EX	1234.00	971.39	974.99	974.99	975.58	0.02082	7.05	204.04	167.69	0.94
TRIB220	12.302	Floodway	WC_T_fldy_TSC_Pr	1234.00	971.39	975.65	975.65	976.56	0.01996	8.07	162.34	180.03	0.94
TRIB220	12.302	Floodway	WC_T_fldy_TSC_EX	1234.00	971.39	974.99	974.99	975.58	0.02082	7.05	204.04	167.69	0.94
TRIB220	12.282	100yr	WC_T_fldy_TSC_Pr	1234.00	970.31	973.67		973.89	0.00425	4.73	341.67	193.83	0.50
TRIB220	12.282	100yr	WC_T_fldy_TSC_EX	1234.00	970.31	973.67		973.89	0.00425	4.73	341.67	193.83	0.50
TRIB220	12.282	Floodway	WC_T_fldy_TSC_Pr	1234.00	970.31	973.67		973.89	0.00426	4.73	341.67	193.83	0.50
TRIB220	12.282	Floodway	WC_T_fldy_TSC_EX	1234.00	970.31	973.67		973.89	0.00426	4.73	341.67	193.83	0.50
TRIB220	12.242	100yr	WC_T_fldy_TSC_Pr	1234.00	967.31	973.27		973.42	0.00160	3.75	405.09	135.64	0.30
TRIB220	12.242	100yr	WC_T_fldy_TSC_EX	1234.00	967.31	973.27		973.42	0.00160	3.75	405.09	135.64	0.30
TRIB220	12.242	Floodway	WC_T_fldy_TSC_Pr	1234.00	967.31	973.27		973.42	0.00160	3.75	404.84	135.63	0.30
TRIB220	12.242	Floodway	WC_T_fldy_TSC_EX	1234.00	967.31	973.27		973.42	0.00160	3.75	404.84	135.63	0.30

HEC-RAS (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
TRIB220	12.235	100yr	WC_T_fldy_TSC_Pr	1234.00	967.00	973.18		973.31	0.00100	2.95	433.49	133.08	0.23
TRIB220	12.235	100yr	WC_T_fldy_TSC_EX	1234.00	967.00	973.18		973.31	0.00100	2.95	433.49	133.08	0.23
TRIB220	12.235	Floodway	WC_T_fldy_TSC_Pr	1234.00	967.00	973.18		973.31	0.00101	2.95	433.22	133.06	0.23
TRIB220	12.235	Floodway	WC_T_fldy_TSC_EX	1234.00	967.00	973.18		973.31	0.00101	2.95	433.22	133.06	0.23
TRIB220	12.224	100yr	WC_T_fldy_TSC_Pr	1234.00	965.00	973.19	969.08	973.25	0.00034	2.23	638.72	149.21	0.15
TRIB220	12.224	100yr	WC_T_fldy_TSC_EX	1234.00	965.00	973.19	969.08	973.25	0.00034	2.23	638.72	149.21	0.15
TRIB220	12.224	Floodway	WC_T_fldy_TSC_Pr	1234.00	965.00	973.19	969.08	973.25	0.00034	2.23	638.42	149.19	0.15
TRIB220	12.224	Floodway	WC_T_fldy_TSC_EX	1234.00	965.00	973.19	969.08	973.25	0.00034	2.23	638.42	149.19	0.15
TRIB220	12.205			Culvert									
TRIB220	12.194	100yr	WC_T_fldy_TSC_Pr	1234.00	964.54	968.02	968.00	968.77	0.01583	7.54	182.43	112.38	0.85
TRIB220	12.194	100yr	WC_T_fldy_TSC_EX	1234.00	964.54	968.02	968.00	968.77	0.01583	7.54	182.43	112.38	0.85
TRIB220	12.194	Floodway	WC_T_fldy_TSC_Pr	1234.00	964.54	968.00	968.00	968.77	0.01648	7.64	180.04	112.13	0.86
TRIB220	12.194	Floodway	WC_T_fldy_TSC_EX	1234.00	964.54	968.00	968.00	968.77	0.01648	7.64	180.04	112.13	0.86
TRIB220	12.139	100yr	WC_T_fldy_TSC_Pr	1234.00	957.23	962.11	962.11	963.28	0.02167	10.44	186.85	74.74	1.00
TRIB220	12.139	100yr	WC_T_fldy_TSC_EX	1234.00	957.23	962.11	962.11	963.28	0.02167	10.44	186.85	74.74	1.00
TRIB220	12.139	Floodway	WC_T_fldy_TSC_Pr	1234.00	957.23	962.44		963.34	0.01496	9.23	211.61	75.33	0.85
TRIB220	12.139	Floodway	WC_T_fldy_TSC_EX	1234.00	957.23	962.44		963.34	0.01496	9.23	211.61	75.33	0.85
TRIB220	12.000	100yr	WC_T_fldy_TSC_Pr	1234.00	944.26	948.93		949.74	0.01032	8.32	251.54	123.09	0.74
TRIB220	12.000	100yr	WC_T_fldy_TSC_EX	1234.00	944.26	948.93		949.74	0.01032	8.32	251.54	123.09	0.74
TRIB220	12.000	Floodway	WC_T_fldy_TSC_Pr	1234.00	944.26	948.94	948.94	950.93	0.01906	11.34	109.02	27.40	1.00
TRIB220	12.000	Floodway	WC_T_fldy_TSC_EX	1234.00	944.26	948.94	948.94	950.93	0.01906	11.34	109.02	27.40	1.00
TRIB220	11.933	100yr	WC_T_fldy_TSC_Pr	1234.00	939.00	943.61	943.59	945.13	0.01869	9.97	126.86	43.50	0.96
TRIB220	11.933	100yr	WC_T_fldy_TSC_EX	1234.00	939.00	943.61	943.59	945.13	0.01869	9.97	126.86	43.50	0.96
TRIB220	11.933	Floodway	WC_T_fldy_TSC_Pr	1234.00	939.00	944.61	943.56	945.57	0.00898	7.87	156.95	36.20	0.67
TRIB220	11.933	Floodway	WC_T_fldy_TSC_EX	1234.00	939.00	944.61	943.56	945.57	0.00898	7.87	156.95	36.20	0.67

Appendix C – Preliminary Plans

Preliminary plans are provided as a separately bound set of 11 x 17" plans.