RECLAMATION

Managing Water in the West

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Predecisional

Technical Memorandum No. PUB-8140-APP-2012-02
Appraisal Design Report
Supplemental Data - Revised Comanche South

Arkansas Valley Conduit

Fryingpan-Arkansas Project, Colorado
Great Plains Region

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U.S. Department of the Interior
Bureau of Reclamation

August 2012

Mission Statements

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Cover photo: Photo looking upstream at Pueblo Dam. Fish hatchery is in foreground, and Fountain Valley Authority Pump Station is at right.

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Arkansas Valley Conduit Appraisal Design Report

Supplemental Data - Revised Comanche South
Fryingpan-Arkansas Project, Colorado
Great Plains Region

Attached is a set of engineering support data for the Arkansas Valley Conduit Revised Comanche South alignment prepared by the Bureau of Reclamation's Technical Service Center (TSC). The engineering data supplement and support the Final Appraisal Design Report. This predecisional data packet is being provided as support documentation for the Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract Draft Environmental Impact Statement (EIS). The data package includes a brief description of the alignment and engineering support data (i.e., large- and small-scale maps, facility drawings, hydraulic analysis calculations and profile sheets, pump data sheets, conduit segment outline, and cost estimate sheets).

This Final Appraisal Design Report supplemental data packet was prepared by the U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Denver, Colorado.

Steven Robertson PE — 8/14/12

Technical Approval: Steven Robertson, P.E. — Date
Civil Engineer, Water Conveyance Group, 86-68140

R Barthel, P.E. — 8-14-12

TSC Team Lead: Rodney Barthel, P.E. — Date
Structural Engineer, Plant Structures Group, 86-68120

David C Edwards — 8/14/12

Peer Review: David Edwards, P.E. — Date
Civil Engineer, Water Conveyance Group, 86-68140

REVISIONS					
Date	Description	Prepared	Checked	Administrative Approval	Peer Review

Attachment A

1. Purpose and Background

The purpose of the proposed Arkansas Valley Conduit (AVC) is to deliver a bulk water supply via pipeline to meet existing and future municipal and industrial water demands of the AVC participants. The study area includes participating entities located in six Colorado counties in the Lower Arkansas River Basin: Pueblo, Crowley, Otero, Bent, Prowers, and Kiowa.

To perform engineering support for the National Environmental Policy Act (NEPA) process, a Final Appraisal Design Report (Bureau of Reclamation, 2012a) was prepared by the Bureau of Reclamation's Technical Service Center (TSC), Denver, Colorado. The Final Appraisal Design Report will be included in the AVC and Long-Term Excess Capacity Master Contract Draft Environmental Impact Statement (EIS) (Bureau of Reclamation, 2012b) as a supporting document. The Final Appraisal Design Report identified five technically feasible construction action alternatives along with cost estimates. The Final Appraisal Design Report is a stepping stone in the planning process into the feasibility level design.

Generally speaking, the AVC will consist of a main pipeline and spurs to convey Pueblo Reservoir water to communities along the Arkansas River corridor east of Pueblo to Lamar, Colorado. The revised Comanche South water treatment plant (WTP) site is located near the Pueblo Dam and Reservoir, which directly influences the requirement for pumping plants. The sites proposed for on-line storage tanks are located in the Fowler and La Junta community areas. The maximum daily flow rate would be approximately 20 million gallons per day (mgd). The approximate pipeline size may range between 36 inches and 16 inches in diameter, with several smaller diameter spurs. The combined main pipeline and spur length would be approximately 231 miles.

The following sections contain brief descriptions of facility components included in the Revised Comanche South alignment. The engineering support data (i.e., large and small scale maps, facility drawings, hydraulic analysis calculations and profile sheets, pump data sheets, conduit segment outline, and cost estimating sheets) included in this brief writeup were prepared by the Bureau of Reclamation's TSC, Denver, Colorado. These data supplement the Final Appraisal Design Report.

Subject to modification during the planning and final design phases, the Revised Comanche South alignment was derived from "mixed and matched" environmental impact considerations, along with direct and indirect construction and operational costs of the various project components of five action alternatives

as presented in the Final Appraisal Design Report. This supplemental engineering data packet only includes items required to describe Revised Comanche South and its associated costs. Therefore, refer to the Final Appraisal Design Report for more descriptions of specific topics related to the AVC action alternatives.

2. Facility Components and Options

Specific components and screening criteria were developed as part of the process by an AVC EIS team. Several short-listed options were identified that should be considered during the feasibility level planning phase, including but not limited to the different types of water treatment filtration, use of abandoned railroad right-of-way (ROW), participant delivery locations, individual versus combined spurs, pipeline alignment based on future U.S. Highway 50 corridor realignment between Avondale and Lamar, other factors that may arise as the planning phase continues and design data is collected, and consideration of comments as a result of the AVC Draft EIS review period. Table 1 shows the Revised Comanche South and the major engineering components and options.

Table 1. AVC EIS Revised Comanche South, Major Components and Options

	Components					
Length of Pipe	**Intake/Through Pueblo, then East**	**Water Treatment Plant Location**	**Water Treatment Level**	**Pumping Plant Location**	**St. Charles Mesa Water**	**Pueblo Reservoir North/South Interconnect**
231 miles	Dam/Comanche Powerplant raw water line route, then southern route	Reclamation property near Pueblo Dam	Filtered	Pueblo Dam, low lift (55 feet) and WTP exit high lift (480 feet)	Raw	Yes

2.1 Revised Comanche South Description

The following supplemental engineering data are attached to support the AVC Draft EIS Revised Comanche South:

Attachment B – Large and Small Scale Maps

Attachment C – Facility Drawings

Attachment D – Hydraulic Calculations and Profile Sheets

Attachment E – Pump Data Sheets

Attachment F – Conduit Segment Description

Attachment G – Cost Estimate Sheets

The Revised Comanche South alignment generally follows the existing Comanche Powerplant (Public Service Company of Colorado, an Xcel Energy Company) Raw Water Line route west and south of the City of Pueblo and then follows U.S. Highway 50 south of the Arkansas River from Pueblo to Lamar. The alignment would parallel U.S. Highway 50 to Fowler, east of Pueblo. The alignment would then parallel Highway 96 to a storage tank site north of Fowler. From the storage tank site, the alignment would join back with U.S. Highway 50 and parallel U.S. Highway 50 to east of Manzanola. Then, the alignment would zigzag on county roads (CR) until reaching the south side of Rocky Ford. From Rocky Ford, the alignment would be south along Highway 71 to Highway 10, then east to La Junta. A second storage tank site would be located in eastern La Junta. From La Junta, the alignment would parallel U.S. Highway 50 through Las Animas to near the intersection of U.S. Highway 50 and U.S. Highway 287. From this intersection, the alignment would travel cross country to Lamar's participant tie-in on the south side of Lamar.

Three primary spurs would be the Highway 96 spur, the Eads spur, and the spur loop from Rocky Ford northeast along Highway 266 and then back south along Highway 109 to La Junta.

A high lift pumping plant, located near Pueblo Dam, after the WTP clearwell, would be required to raise the water over high ground up to approximate elevation (El.) 5100 on the southwest edge of the Pueblo route. A regulating tank would be required near the high ground along the route. A booster pumping plant located north of U.S. Highway 50 along CR 34, near the intersection with CR Ss, would be needed to service the Eads spur and May Valley.

The Revised Comanche South alignment would convey filtered water to AVC participants along the route. This alignment would include an Interconnect between the north outlet works and south outlet works at Pueblo Reservoir (attachment C, drawing PA-1).

2.2 Overview of Design Criteria

This section presents additional detail on the design criteria for the selected components and their options including pipeline hydraulics and design requirements, pipeline appurtenances, pipeline surge, pumping plants and associated facilities, water treatment facilities, and on-line storage facilities.

2.2.1 Typical Pipeline Crossings

Typical pipeline crossings of gravel roads, paved roads, major roads, interstates and highways, railroads, and streams were itemized along the route.

Table 2 provides a listing of anticipated crossings, based on available information.

Table 2. Number of Crossings

Type of Crossing	Revised Comanche South
Divided highway (interstate highway)	32 (1)
Major road	26
Paved road (Pueblo streets)	238 (4)
Gravel road	18
Railroad	12
Major river/stream	7
Minor creek/stream (costs are included in design contingencies)	36
Irrigation ditch or small drainage (costs are included in design contingencies)	85

2.2.2 Plants and Associated Facilities

Issues to consider when determining the desirability of a particular site for facilities development include soils, availability of overhead and underground utilities, zoning and nearby land uses, access, and proximity to AVC alignment.

2.2.2.1 Pumping and Booster Plants

Pumping Plant 1 (attachment C, drawing PA-2) would be sited near the base of Pueblo Dam to lift water to the nearby WTP (attachment C, drawings PA-9 and PA-10). Pumping Plant 2 (attachment C, drawing PA-3) would lift filtered water from the WTP over high grounds southwest of Pueblo. Ground near the dam site for Pumping Plant 1 is approximately El. 4755, and ground near the site for Pumping Plant 2 is approximately El. 4810.

Pumping Plant 1 would be of the open sump style, which means that the reservoir water pressure would be reduced to a constant sump water elevation by an inlet altitude pressure reducing valve. The valve pressure drop would vary between approximately 50 feet and 160 feet with Pueblo Reservoir at low and high water surface elevations, respectively. The pumping plant could have bypass piping included, which would be used during periods of medium to high reservoir levels.

During these times, there would be sufficient pressure to directly deliver the water to the WTP facilities. The pumping plant would consist of four vertical turbine type pumps, each rated at 8.310 cubic feet per second (ft^3/s) (3,730 gallons per minute [gal/min]) and 105 feet of total dynamic head. The pumping units would be driven by 125-horsepower, weather protected Type I, vertical induction electric motors operating at 1,180 revolutions per minute, 480 volts, 3 phase, 60 hertz.

In lieu of vertical turbine type pumps, Pumping Plant 1 could be configured to take advantage of the existing driving/suction head, and a horizontal centrifugal type pumping plant could be considered similar to the existing Fountain Valley Authority Pump Station located near the base of Pueblo Dam.

Pumping Plant 1 pump discharge would deliver water to the beginning of the WTP process train located on higher ground south of the existing fish hatchery site. This site is congested with transmission line alignments that would require coordination and clearance restrictions. WTP inlet basin water surface would be at approximately El. 4820. The WTP basin water level would be used for the pump regulation in lieu of a regulating tank. Filtered water would be pumped from the WTP clearwell, over high ground southwest of City of Pueblo, to the Fowler North water storage tank (attachment C, drawing PA-6).

Pumping Plant 2 would consist of four vertical turbine type pumps, each rated at 7.687 ft^3/s (3,450 gal/min) and 380 feet of total dynamic head. The pumping units would be driven by 450-horsepower, weather protected Type I, vertical induction electric motors operating at 1,770 revolutions per minute, 4,160 volts, 3 phase, 60 hertz. Pumping Plant 2 could be integrally designed and constructed with the WTP.

The AVC alignment routes around the southwestern edge of Pueblo, with a high point of approximately El. 5100. A regulating tank (attachment C, drawing PA-5) would be located downstream of the WTP and Pumping Plant 2, near the high ground the pipeline is crossing. The Fowler North water storage tank site would be located at approximate ground El. 4525. The La Junta South water storage tank site would be located in eastern La Junta (attachment C, drawing PA-7).

The Eads and May Valley booster plant (attachment C, drawing PA-4) would provide additional pressure necessary to deliver water to the Eads community. The plant would deliver filtered water to the local community for distribution. The booster plant would consist of two units: one operating unit and an additional installed spare unit to maintain system reliability. The pumps would be vertical turbine "can" type pumps, each rated at 1.125 ft^3/s (505 gal/min) and 317 feet of total dynamic head. The pump can or barrel would act like a sump for providing adequate submergence for the first-stage impeller/bowl assembly of the pump. Each pumping unit would be powered by a 60-horsepower, totally enclosed,

fan-cooled, vertical induction electric motor operating at 1,770 revolutions per minute, 460 volts, 3 phase, 60 hertz.

Pumping Plant 1 and Pumping Plant 2 would include a shallow reinforced concrete "bathtub" type clearwell substructure, and the booster plant would consist of a thickened edge slab-on-grade; plants would include a preengineered metal superstructure. Since no provision is made for overhead cranes, removable roof hatches would be provided to gain access to pumping units for installation and removal purposes.

The layout of the pumping and booster plant service yards would be based on the existing site topography, the submergence requirements of the pumping units, the alignment of the steel pipe, equipment space requirements for the pumps, and access into and around the plants for maintenance vehicles. The pumping and booster plant sites would be surrounded by a perimeter chain link fence and would have gravel surfaced finished grade. Vaults, air chambers, and outdoor type electrical equipment (i.e., breakers, unit substations, transformers) would be located within the fenced perimeter. Since the fenced area would be offset from existing roadways, the construction of an access road would be required.

2.2.3 Water Treatment Plant

The project would be delivering filtered (nonpotable) water, which would be treated at a centralized project facility, to 40 AVC participants. Filtered water meets all requirements of the Surface Water Treatment Rules, except that a disinfectant residual is not provided. If residual disinfection with free-chlorine is provided in a long pipeline, disinfection byproduct standards may be exceeded.

AVC participants would be responsible for adding a disinfectant residual (likely free-chlorine) at the entry point(s) to their distribution system(s). Operation, maintenance, and replacement (OM&R) of AVC turnout disinfection stations would be the responsibility of pertinent AVC participants. Based on conversations thus far with the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD), many of the testing requirements for treated surface water would be performed at the WTP, and the participants would be responsible for distribution system monitoring and reporting requirements for water received from the AVC. The legal framework for testing requirements needs to be fully developed at the time of distribution once the WTP is constructed and operational. Each AVC participant would still be responsible for all monitoring and reporting requirements for other water supplies that were used in addition to their AVC supply per CDPHE *Colorado Primary Drinking Water Regulations* (CPDWR) (CDPHE, 2011a) and project-specific guidance from Mr. Ron Falco, CDPHE Safe Drinking Water Program Manager (CDPHE, 2011b).

Water would be metered at each participant delivery vault (attachment C, drawing PA-8). In addition to the AVC turnout disinfection stations (if required), each AVC participant delivery location would require a pressure reducing/control valve, flowmeter, and isolation valves. The pressure reducing/control valve would be needed to limit the pressure of water delivered to the participant and to control the flow. The flowmeter would be used to measure the rate of flow and quantity of flow. The rate and quantity of flow would be communicated to a supervisory control and data acquisition central control center, which would likely be located at the AVC WTP. The location of the WTP site is shown in attachment C, drawing PA-10.

For further in-depth discussion of a filtered WTP process, technologies, and components, see pertinent sections of the Final Appraisal Design Report.

3. Cost Summary

This section briefly summarizes the appraisal level construction costs and OM&R costs for the Revised Comanche South that will be provided to the AVC EIS team with a consistent level of information. For details regarding construction and OM&R cost estimating, see the Final Appraisal Design Report. Table 3 summarizes total construction costs and present worth OM&R cost for the AVC Draft EIS Revised Comanche South.

Table 3. Summary of Total Construction and Present Worth OM&R Costs (January 2011 Dollars) for Revised Comanche South

Cost Description	Revised Comanche South
Total construction cost	$505,000,000
Present worth total OM&R costs (less WTP OM&R costs)	$54,000,000
Present worth total WTP OM&R costs	$43,000,000
Total costs (50-year period)	**$602,000,000**

Data and information provided in this section regarding the WTP feature were provided by Black & Veatch Corporation, located in Centennial, Colorado. The data and information regarding the remaining facilities were prepared by the Reclamation TSC engineering team.

3.1 Project Cost Summary

Costs prepared are those associated with the delivery of maximum day demands. Table 4 summarizes contract cost, field cost, and total construction cost by reach for the AVC Draft EIS Revised Comanche South.

Table 4. Summary of Total Construction Costs for Revised Comanche South

	Components	
	AVC Intake	Pueblo Dam
	Route through Pueblo	South of Pueblo
	Route East of Pueblo	U.S. Highway 50
	Water Treatment	Near Pueblo Reservoir
	Dam Outlet Works Interconnect	Yes
Reach 1 and 2 pipeline, pumping plant(s), and WTP between intake and Fowler		$76,368,872
Reach 3 pipeline and storage tanks between Fowler and La Junta Reach 2		$57,314,945
Reach 4 pipeline between La Junta and Lamar		$35,543,705
Highway 96 spur pipeline		$6,669,930
Eads spur (includes May Valley) pipeline and booster plant		$9,409,890
Loop pipeline between Rocky Ford and La Junta		$6,587,309
Roadway, railroad, and stream/drainage crossings		$26,410,000
Dewatering of soil for construction		$3,710,000
Dust abatement during construction		$4,000,000
Dam outlet works interconnect		$4,171,227
WTP[1]		$25,924,061
Subtotal		$256,109,939
Mobilization (±5%)		$13,000,000
Design contingencies (±12%)		$30,890,061
Contract Cost		$300,000,000
Construction contingencies (±25%)		$80,000,000
Field Cost		$380,000,000
Noncontract costs[2]		$125,000,000
Total Construction Cost		$505,000,000

[1] Costs provided to TSC on April 16, 2012, from subconsultant Black & Veatch.

[2] Noncontract costs were produced and supplied by a joint effort between the Bureau of Reclamation's Eastern Colorado Area Office and Great Plains Region, with input from the TSC.

3.2 Operations, Maintenance and Replacement Costs

OM&R for both present worth and annual costs, along with energy costs, are discussed below.

3.2.1 Present Worth and Annual Costs of OM&R Expenses

Estimates include the computation of the total dollar present worth cost of OM&R of a feature(s) over a 50-year timeframe (attachment G includes these cost estimates). OM&R cost estimates are presented in present worth dollars at a January 2011 price level. OM&R periodic costs, which include replacement equipment costs, are calculated in present worth dollars (see table 5).

Table 5. Summary of OM&R Present Worth Costs (January 2011 Dollars) for 50-Year Life Cycle (assuming a discount rate of 4.125%)

Cost Description	Revised Comanche South
Present worth of all future periodic (replacement) costs (less WTP)	$21,000,000
Present worth of all future WTP periodic (replacement) costs	Included in annual O&M costs below
Present worth of all future annual (O&M) costs (less WTP)	$33,000,000
Present worth of all future WTP annual (O&M) costs	$43,000,000
Total OM&R present worth costs[1]	**$97,000,000**

[1] These life cycle costs do not include overhead expenses (office space, administration, etc.) incurred by the managing authority. These life cycle costs assume that the pipeline operators are based in the WTP building.

OM&R annual costs include daily operational costs and routine maintenance costs. The annual costs are calculated as uniform series present worth costs. Daily operational costs include costs to operate the facility, such as operator wages and benefits, utilities, chemicals, power consumption, etc. (see table 6).

Table 6. Summary of Annualized OM&R Costs[1]

Cost Description	Revised Comanche South
Annual OM&R costs (less annual WTP OM&R costs)	$2,550,000
Annual WTP OM&R costs	$2,000,000
Total annual OM&R costs	**$4,550,000**

[1] These life cycle costs do not include overhead expenses (office space, administration, etc.) incurred by the managing authority. These life cycle costs assume that the pipeline operators are based in the WTP building.

3.2.2 Energy Cost

Energy supply for pumping plants and the WTP, and other appurtenants in the Pueblo area, would be provided by Black Hills Energy. Southeast Colorado Power Association would provide power for the Eads and May Valley booster plant and anything east of La Junta. Rate analyses were performed by the TSC based on the information provided by the two aforementioned power supply companies.

Based on the information from the two power supply companies, table 7 presents the annual energy costs for operation of the pumping plants and booster plant in the Revised Comanche South. The energy costs are for operations of a typical WTP for the year 2010.

Table 7. Annual Plant Energy Costs

	Location	Energy Costs
Revised Comanche South	Dam to WTP (Pumping Plant 1)	$90,000
	WTP Clearwell (Pumping Plant 2)	$700,000
	Eads Booster Pumping Plant	$3,500

4. References

Bureau of Reclamation, 2012a. *Final Appraisal Design Report,* Bureau of Reclamation , Civil Engineering Support Division, Technical Service Center, Denver, Colorado, August 7, 2012.

Bureau of Reclamation, 2012b. *Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract Draft Environmental Impact Statement,* U.S. Department of the Interior, Bureau of Reclamation, Great Plains Region, Eastern Colorado Area Office, August 23, 2012.

CDPHE, 2011a. *Colorado Primary Drinking Water Regulations,* Colorado Department of Public Health and Environment, Water Quality Control Division, 5 CCR 1003-1, effective November 30, 2011.

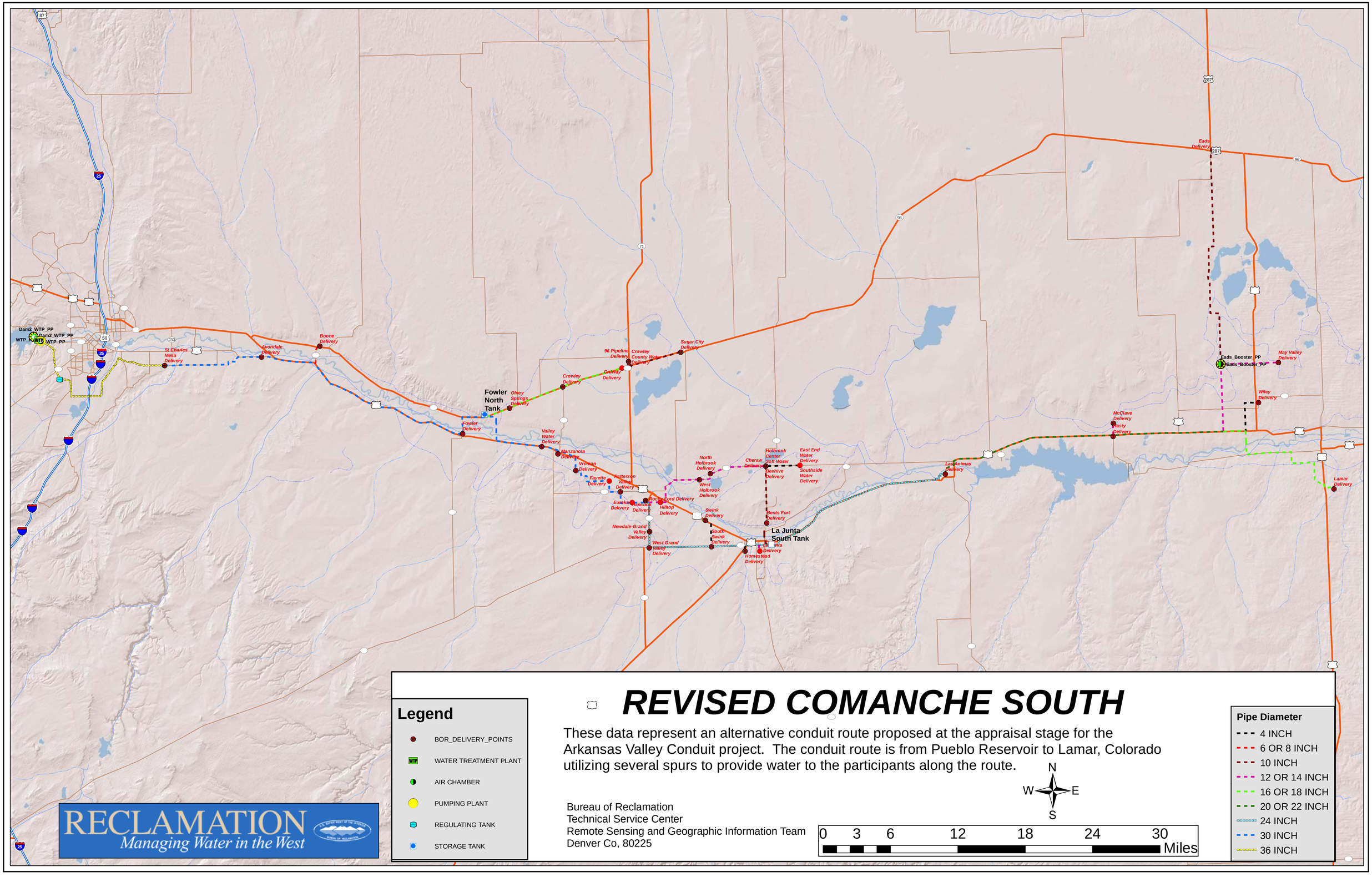
CDPHE, 2011b. Letter from Mr. Ron Falco, CDPHE Safe Drinking Water Program Manager, to Mr. Michael P. Collins, Area Manager, U.S. Department of Interior, Bureau of Reclamation, December 12, 2011.

ATTACHMENT B

REVISED COMANCHE SOUTH ENGINEERING SUPPORT DATA

CONTENTS –

Large and Small Scale Maps



REVISED COMANCHE SOUTH

These data represent an alternative conduit route proposed at the appraisal stage for the Arkansas Valley Conduit project. The conduit route is from Pueblo Reservoir to Lamar, Colorado utilizing several spurs to provide water to the participants along the route.

Legend

- BOR_DELIVERY_POINTS
- WATER TREATMENT PLANT
- AIR CHAMBER
- PUMPING PLANT
- REGULATING TANK
- STORAGE TANK

Pipe Diameter

- 4 INCH
- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

N W E S

0 3 6 12 18 24 30 Miles

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Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225

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REVISED COMANCHE SOUTH

SHEET #1

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Legend

- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrain Way
- Railroads (Local)
- Perennial Stream
- Intermittent Stream
- Intermittent Canal

Facility Legend

- TAP & DELIVERY POINTS
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- Counties

Pipe Diameter

- 4 INCH
- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

N W E S

4 2 0 4 Miles

RECLAMATION
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REVISED COMANCHE SOUTH

SHEET #2

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Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225

Boone Delivery
Fowler North Tank
Olney Springs Delivery
Crowley Deli
Fowler Delivery
Valley Water Delivery
Manzanola Delivery
Vroman Delivery
Boone
Olney Springs
Crowley
Fowler
Manzanola
2C (spur)
2E
2F1
2F2
2G
2G1
3A
3B1
3B2
3E1
3E2
3G
3H
6A
209
50
96
207
202

Legend
- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrain Way
- Railroads (Local)
- Perennial Stream
- Intermittent Stream
- Intermittent Canal

Facility Legend
- **TAP & DELIVERY POINTS**
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- **Counties**

Pipe Diameter
- 4 INCH
- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

N W E S

4 2 0 4 Miles

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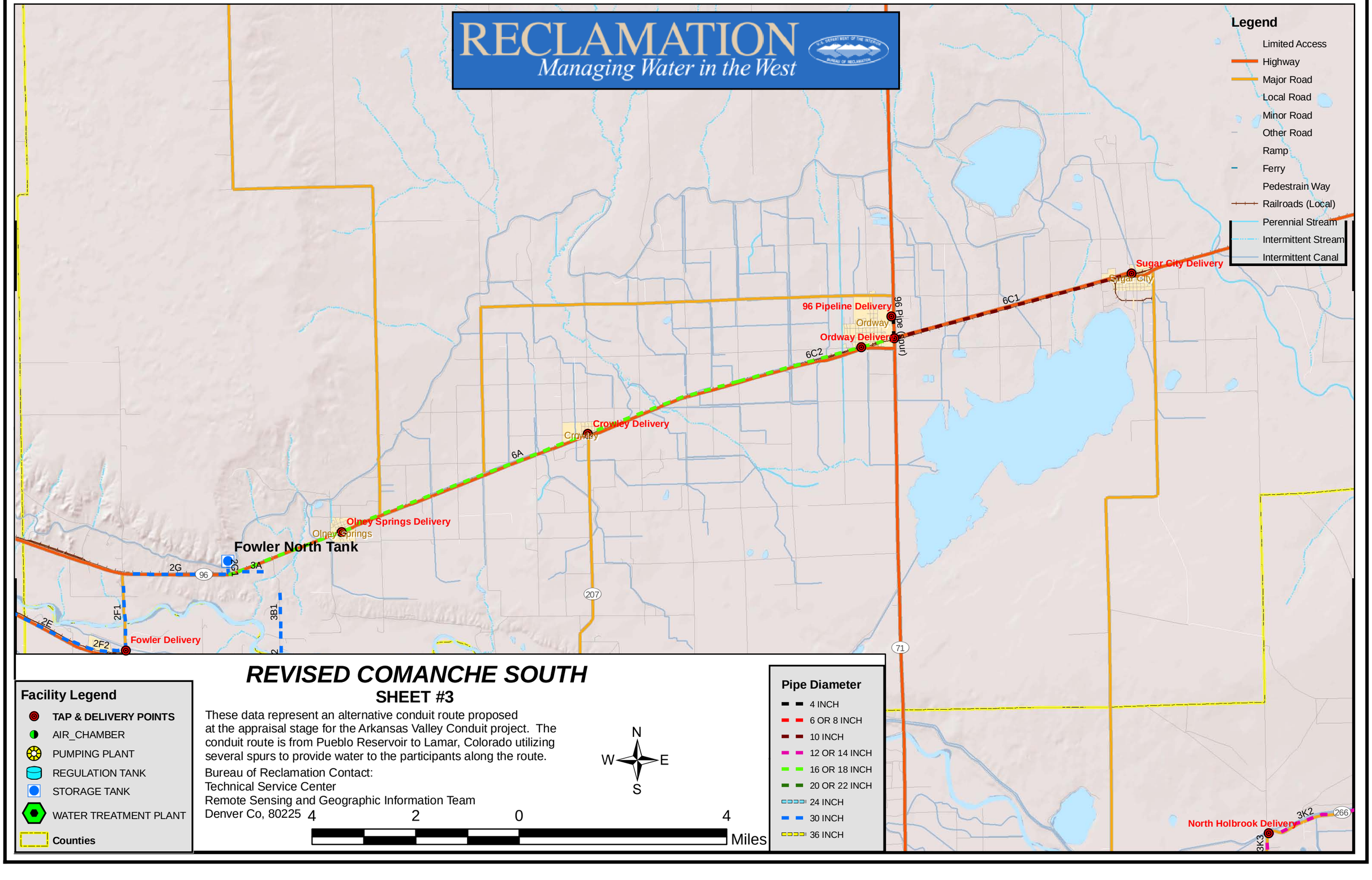
Managing Water in the West



REVISED COMANCHE SOUTH

SHEET #3

These data represent an alternative conduit route proposed at the appraisal stage for the Arkansas Valley Conduit project. The conduit route is from Pueblo Reservoir to Lamar, Colorado utilizing several spurs to provide water to the participants along the route.

Bureau of Reclamation Contact:
Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225

N W E S

4 2 0 4 Miles

Facility Legend

- TAP & DELIVERY POINTS
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- Counties

Pipe Diameter

- 4 INCH
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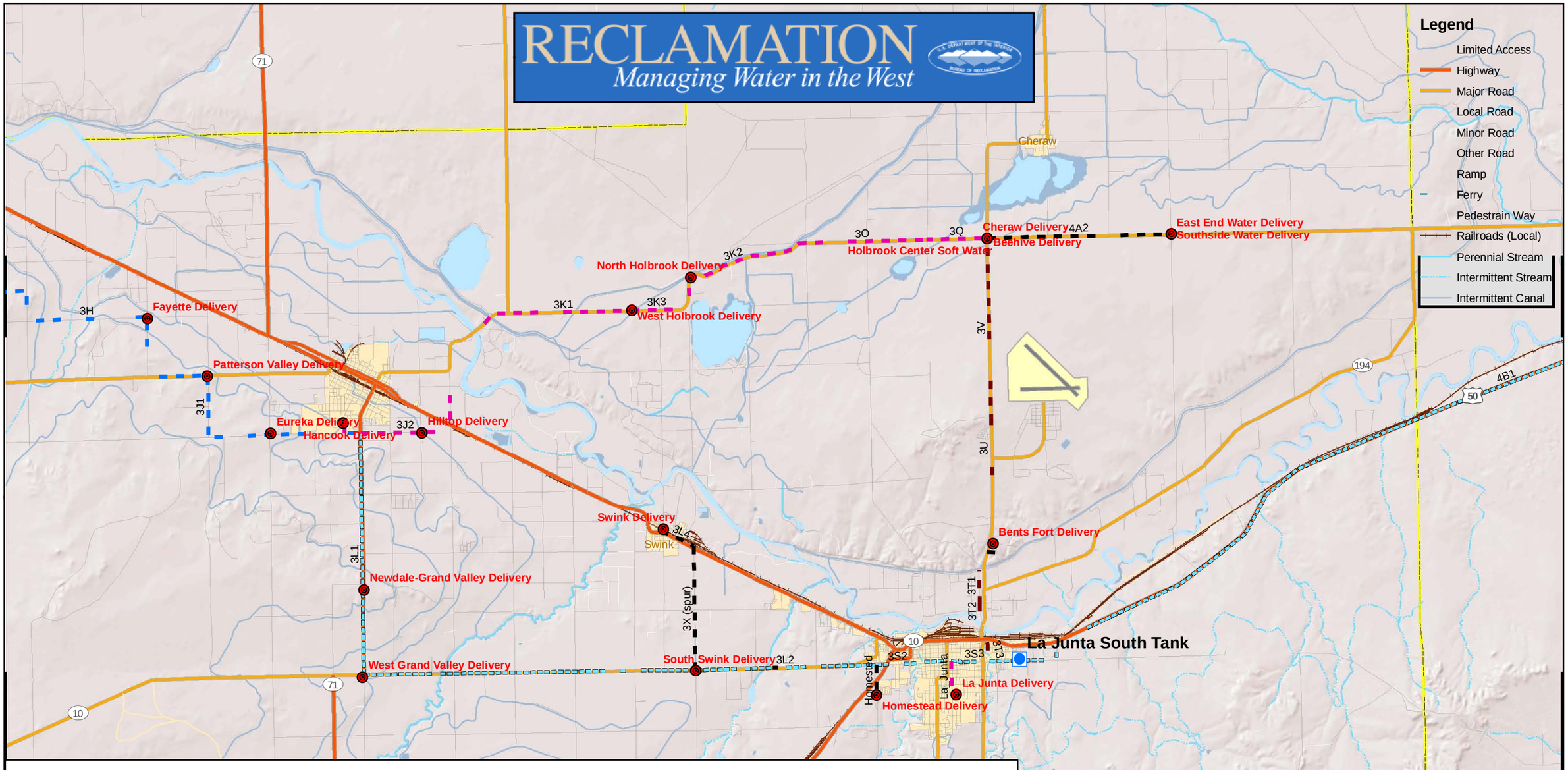
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

RECLAMATION
Managing Water in the West



REVISED COMANCHE SOUTH

SHEET #4

These data represent an alternative conduit route proposed at the appraisal stage for the Arkansas Valley Conduit project. The conduit route is from Pueblo Reservoir to Lamar, Colorado utilizing several spurs to provide water to the participants along the route.

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Denver Co, 80225

N
W E
S

4 2 0 4
Miles

Facility Legend

- TAP & DELIVERY POINTS
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- Counties

Pipe Diameter

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- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

RECLAMATION
Managing Water in the West

Legend

- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrain Way
- Railroads (Local)
- Perennial Stream
- Intermittent Stream
- Intermittent Canal

McClave Delive

Hasty Delivery

Las Animas Delivery

5C

5B

4B2

4B1

5D (spur)

50

183

194

REVISED COMANCHE SOUTH

SHEET #5

These data represent an alternative conduit route proposed at the appraisal stage for the Arkansas Valley Conduit project. The conduit route is from Pueblo Reservoir to Lamar, Colorado utilizing several spurs to provide water to the participants along the route.

Bureau of Reclamation Contact:
Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225

N
W E
S

4 2 0 4
Miles

Facility Legend

- **TAP & DELIVERY POINTS**
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- **Counties**

Pipe Diameter

- 4 INCH
- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

RECLAMATION
Managing Water in the West

REVISED COMANCHE SOUTH

SHEET #6

These data represent an alternative conduit route proposed at the appraisal stage for the Arkansas Valley Conduit project. The conduit route is from Pueblo Reservoir to Lamar, Colorado utilizing several spurs to provide water to the participants along the route.

Bureau of Reclamation Contact:
Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225

Legend

- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrain Way
- Railroads (Local)
- Perennial Stream
- Intermittent Stream
- Intermittent Canal

Facility Legend

- TAP & DELIVERY POINTS
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- Counties

Pipe Diameter

- 4 INCH
- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

N W E S

4 2 0 4 Miles

Eads_Booster_PP
May Valley
May Valley Delivery
Wiley
Wiley Delivery
McClave Delivery
Hasty Delivery
Lamar Delivery
7A
7B
5C
5D (spur)
5F
5G (spur)
5H1
5H2
5H3
50
196
385
287

RECLAMATION
Managing Water in the West

REVISED COMANCHE SOUTH

SHEET #7

These data represent an alternative conduit route proposed at the appraisal stage for the Arkansas Valley Conduit project. The conduit route is from Pueblo Reservoir to Lamar, Colorado utilizing several spurs to provide water to the participants along the route.

Bureau of Reclamation Contact:
Technical Service Center
Remote Sensing and Geographic Information Team
Denver Co, 80225

Haswell
Eads **Eads Delivery**
96
287
7A

Legend
- Limited Access
- Highway
- Major Road
- Local Road
- Minor Road
- Other Road
- Ramp
- Ferry
- Pedestrain Way
- Railroads (Local)
- Perennial Stream
- Intermittent Stream
- Intermittent Canal

Facility Legend
- **TAP & DELIVERY POINTS**
- AIR_CHAMBER
- PUMPING PLANT
- REGULATION TANK
- STORAGE TANK
- WATER TREATMENT PLANT
- **Counties**

Pipe Diameter
- 4 INCH
- 6 OR 8 INCH
- 10 INCH
- 12 OR 14 INCH
- 16 OR 18 INCH
- 20 OR 22 INCH
- 24 INCH
- 30 INCH
- 36 INCH

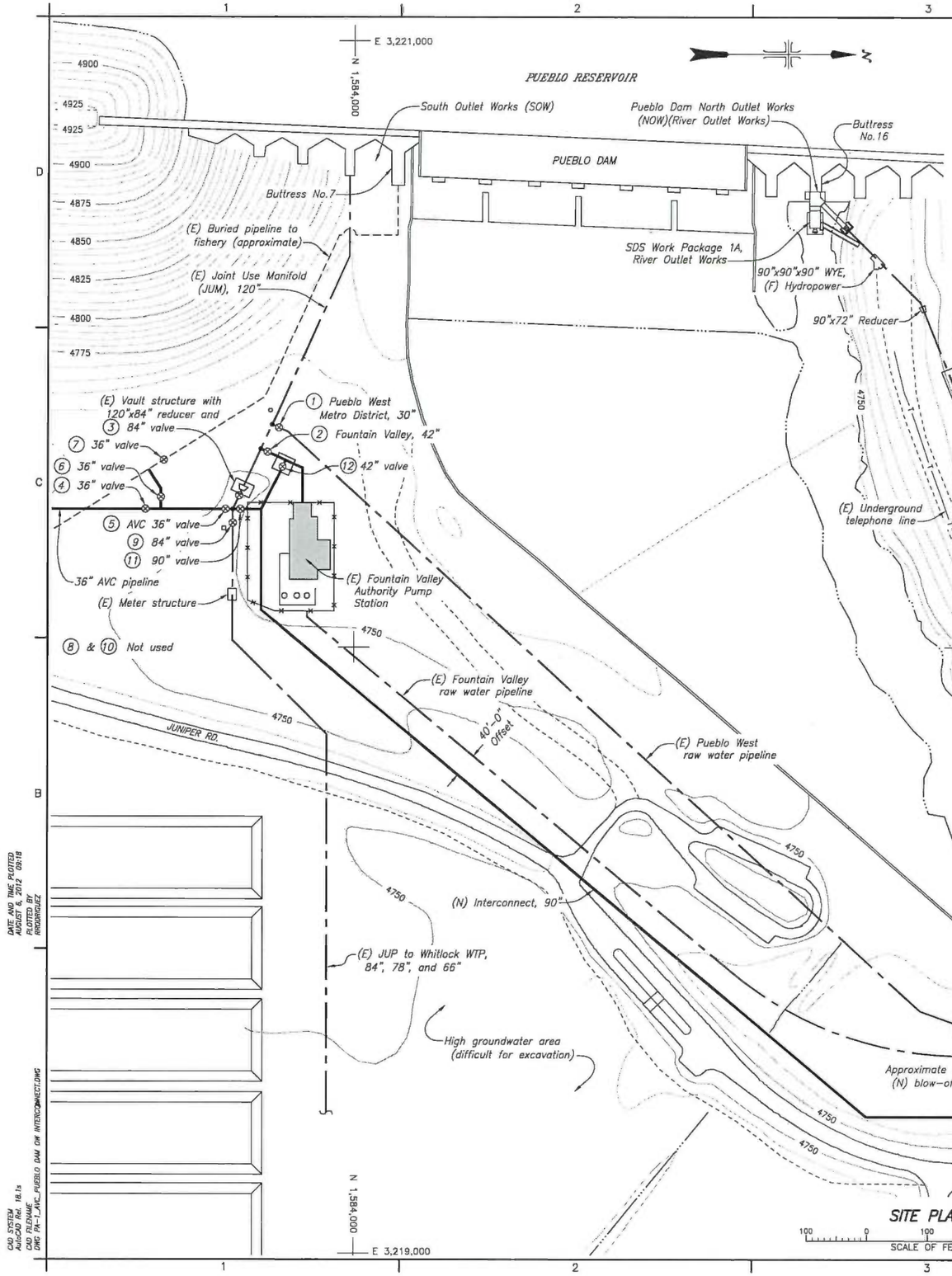
N W E S

4 2 0 4 Miles

ATTACHMENT C

REVISED COMANCHE SOUTH ENGINEERING SUPPORT DATA

CONTENTS –



VALVES

No.	Name	Existing /New	Size	Short Description	Operations			Operations			Operations		
					Normal	Q (mgd)	V (fps)	South	Q (mgd)	V (fps)	North	Q (mgd)	V (fps)
1	PW_S	E	30	Delivery from JUM to PW PP	0	12.2	3.85	0	12.2	3.85	C		
2	FV_S	E	42	Delivery from JUM to FV PP	0	19.8	3.19	0	10	1.61	C		
3	JUM/JUP–Iso	E	84	Isolate JUM from JUP	0	200	8.06	0	221.7	8.93	C		
4	AVC_S	N	36	Deliver from JUM to AVC	0	20	3.22	0	20	3.22	0	20	3.22
5	AVC/Hatchery–Bypass–Inter	N	36	Bypass Interconnect around JUM to AVC/Hatchery	0	20	2.47	0	45.7	5.64	0	45.7	5.64
6	Hatchery–Inter	N	36	Hatchery Interconnect	C			0	25.7	5.64	0	25.7	5.64
7	Hatchery–Iso	N	36	Hatchery Reservoir Isolation	0	25.7	5.64	C			C		
8	(Not used)												
9	JUP Iso	N	84	Isolate JUP from Interconnect	0	180	7.25	C			0	80	3.22
10	(Not used)												
11	Inter–JUM–Bypass	N	90	Isolate Interconnect from JUM Bypass	C			0	96	3.37	0	125.7	4.41
12	Inter–FV	N	42	Interconnect to FV PP Isolation	C			C			0	10	1.61
13	(Not used)												
14	N Outlet–SDS–Iso	N	90	Isolate SDS from North Outlet Works	0	96	3.37	C			0	165.9	5.82
15	(Not used)												
16	Iso–North–Inter	N	90	Isolate North Outlet Works from Interconnect	C			0	96	3.37	0	135.7	4.76
17	Iso–North–SDS	N	90	Isolate SDS from North Outlet Works and or Interconnect	0	78	2.74	0	78	2.74	C		
18	PW_Future	N	36	Delivery to future PW PP	0	18	3.95	0	18	3.95	0	30.2	6.62

Outlet Works	Name	Normal Operations		South OW Operations		North OW Operations		
		(mgd)	(cfs)	(mgd)	(cfs)	(mgd)	(cfs)	
Hatchery	Fish Hatchery	25.7	40	25.7	40	25.7	40	Assume Hatchery requirement emergency
South	AVC	20	31	20	31	20	31	
	PW	12.2	18.91	12.2	18.91	12.2	18.91	
	FV	19.8	30.7	10	15.5	10	15.5	(Some entities have other sources)
	PBWW (Reserve Site)	40	62	40	62	40	62	
	PBWW	140	217	40	62	40	62	PBWW starts river div PP during emergency
	TOTAL	232	360	122.2	189	122.2	189	
North	River Outlet	32	49.6	32	49.6	32	49.6	
	Hydro Power	164	254.2	164	254.2	164	254.2	
	PW (future)	18	27.9	18	27.9	18	27.9	
	SDS	78	120.9	78	120.9	0	0	(Zero when Operations North only)
	TOTAL	292	452.6	292	452.6	214	331.7	

The flows shown for North OW Operations are based upon a short term emergency during peak flow times. These rates may be less than participants have legal rights for.
An Operations Board will allocate flows during scheduled and unscheduled emergency operations of the interconnect.

NOTES

SDS – Southern Delivery System
OW – Outlet Works
PW – Pueblo West
AVC – Arkansas Valley Conduit
FV – Fountain Valley
BWWP – Board of Water Works of Pueblo
JUM – Joint Use Manifold
JUP – Joint Use Pipeline
(E) – Existing
(F) – Future SDS
(N) – New or Proposed

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FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT
APPRAISAL LEVEL
REVISED COMANCHE SOUTH
OUTLET WORKS INTERCONNECT
SITE PLAN

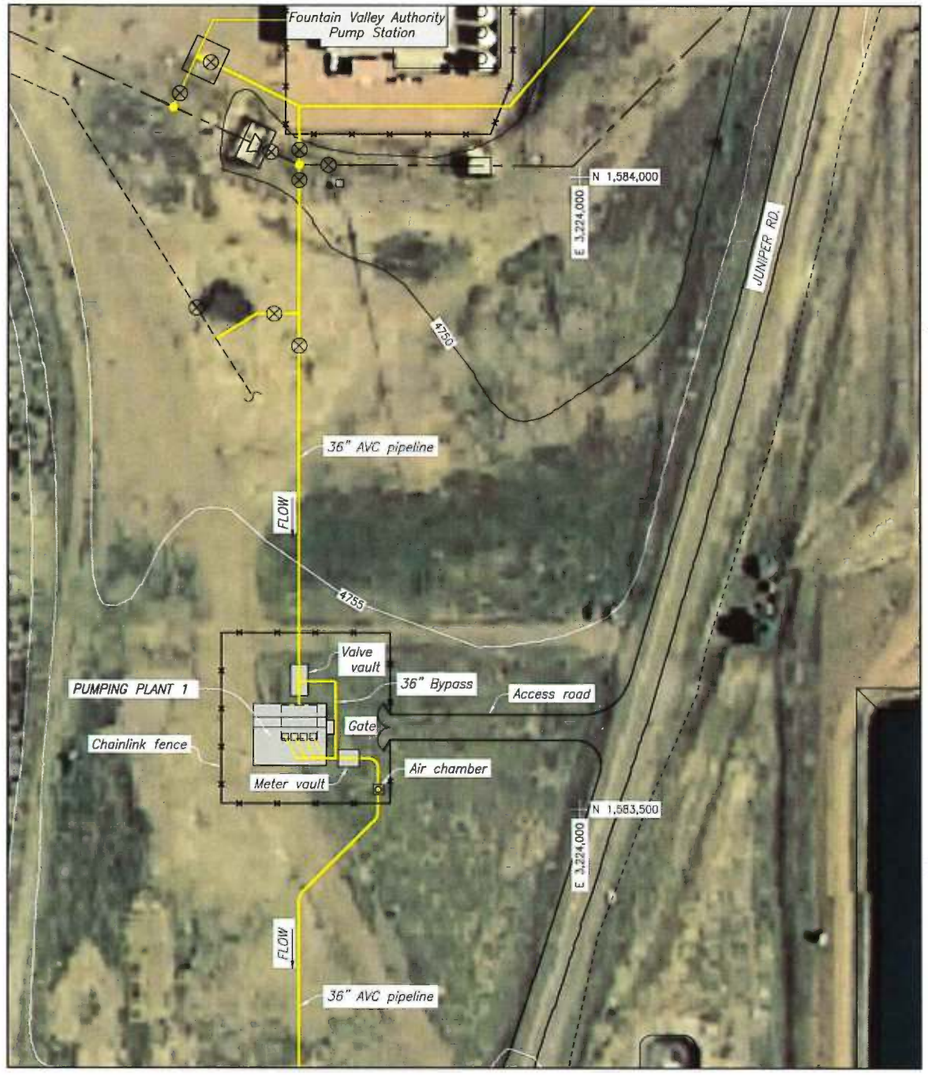
DESIGNED
REVIEWED
DAVID EDWARDS, P.E. – WATER CONVEYANCE GROUP
DENVER, COLORADO 2012-04-15

REVISED COMANCHE SOUTH OUTLET WORKS INTERCONNECT SITE PLAN

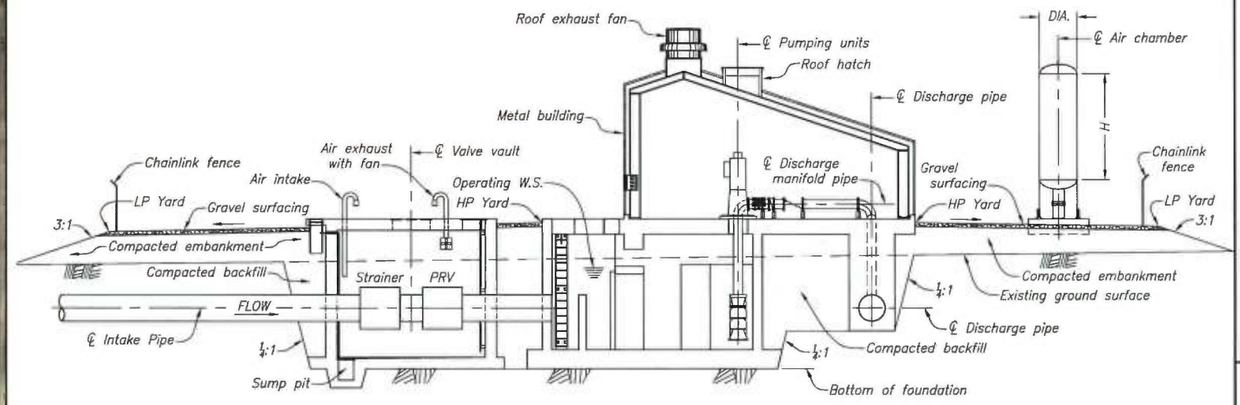
DRAWING PA-1
SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 10, 2012 08:18
PLOTTED BY
RRODRIGUEZ

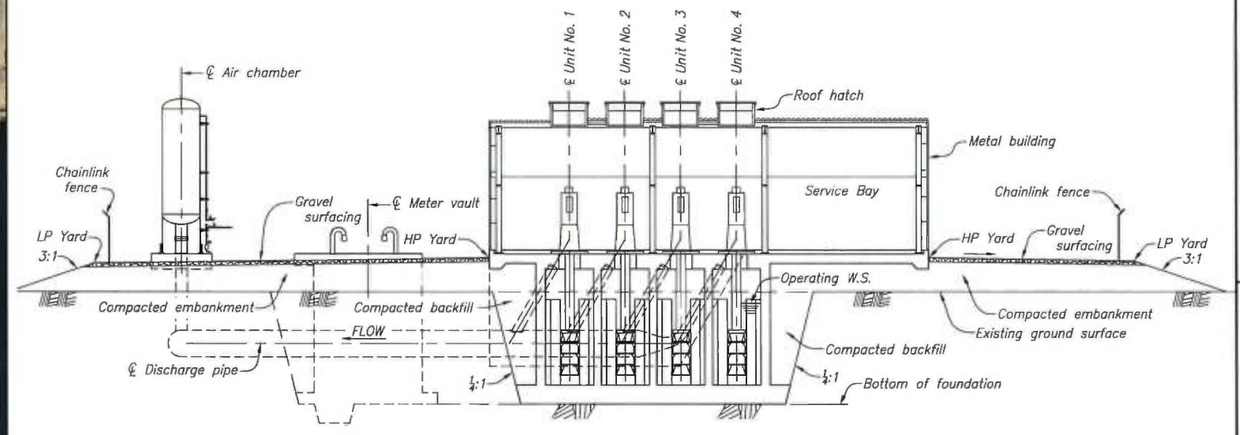
CAD SYSTEM
AutoCAD Rel. 18.1s
CAD FILENAME
DWG PA-1_AVC_PUEBLO DAM OW INTERCONNECT.DWG



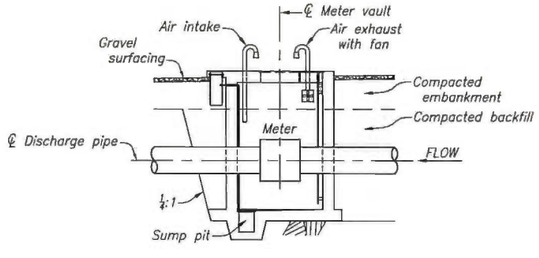
SITE PLAN



TRANSVERSE SECTION



LONGITUDINAL SECTION



METER VAULT

PUMP DATA				AIR CHAMBER		
PUMP NUMBER	RATED CAPACITY* (CFS)	NO. STAGES (EA.)	RATED HEAD (FT.)	CYLINDER DIA. (FT.)	CYLINDER H (FT.)	VOLUME (CU FT.)
1 Thru 4	8.31 ea.	2	105	7	14	629
Total	33.24	–	–	–	–	–

* Includes 3% wear factor since pumping raw water at this point.

60 0 60 120 180
SCALE OF FEET
SITE PLAN

10 0 10 20 30
SCALE OF FEET
SECTIONS AND METER VAULT

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Managing Water in the West

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BUREAU OF RECLAMATION

FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT

APPRAISAL LEVEL

REVISED COMANCHE SOUTH
PUMPING PLANT 1
SITE PLAN AND SECTIONS

DESIGNED

REVIEWED
ALFRED L. BERNSTEIN, P.E. – PLANT STRUCTURES GROUP

DENVER, COLORADO 2012-04-15

REVISED COMANCHE SOUTH
PUMPING PLANT 1
SITE PLAN & SECTIONS

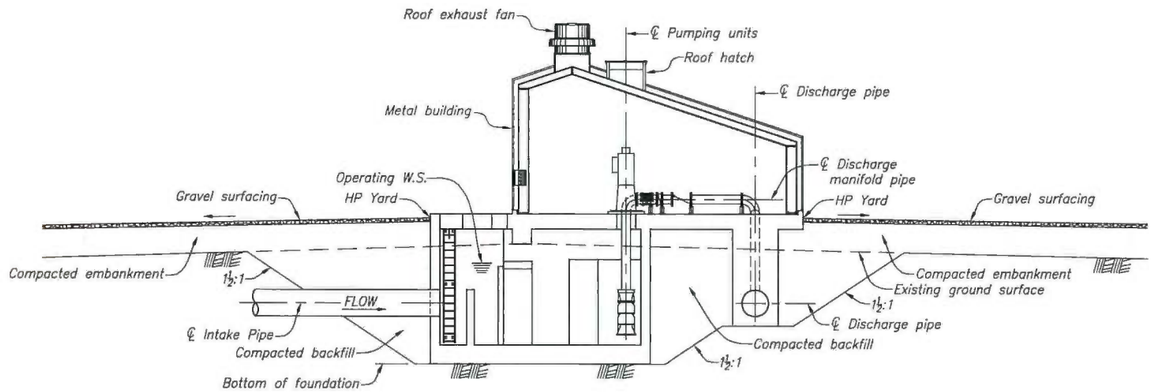
DRAWING PA–2

SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 6, 2012 0939
PLOTTED BY
RRODRIGUEZ

CAD SYSTEM
AutoCAD Rel. 18.1s
CAD FILENAME
DWG PA-2_AVC_PP1.DWG

SITE PLAN



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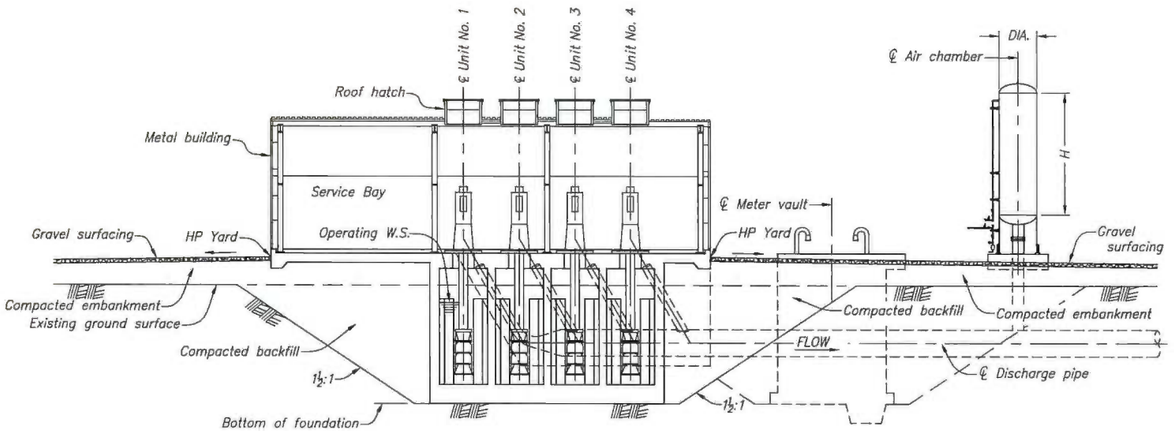

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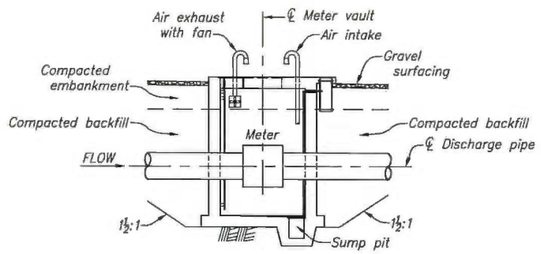

METER VAULT

PUMP DATA				AIR CHAMBER		
PUMP NUMBER	RATED CAPACITY * (CFS)	NO. STAGES (EA.)	RATED HEAD (FT.)	CYLINDER DIA. (FT.)	CYLINDER H (FT.)	VOLUME (CU FT.)
1 Thru 4	7.69 ea.	4	380	9	16	1209
Total	30.76	–	–	–	–	–

* Includes 0% wear factor since pumping filtered water at this point.

60 0 60 120 180
SCALE OF FEET
SITE PLAN

10 0 10 20 30
SCALE OF FEET
SECTIONS AND METER VAULT

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FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT
APPRAISAL LEVEL
REVISED COMANCHE SOUTH
PUMPING PLANT 2
SITE PLAN AND SECTIONS

DESIGNED

REVIEWED
ALFRED I. BERNSTEIN, P.E. – PLANT STRUCTURES GROUP

DENVER, COLORADO 2013-04-15

REVISED COMANCHE SOUTH
PUMPING PLANT 2
SITE PLAN & SECTIONS

DRAWING PA–3

SHEET 1 OF 1

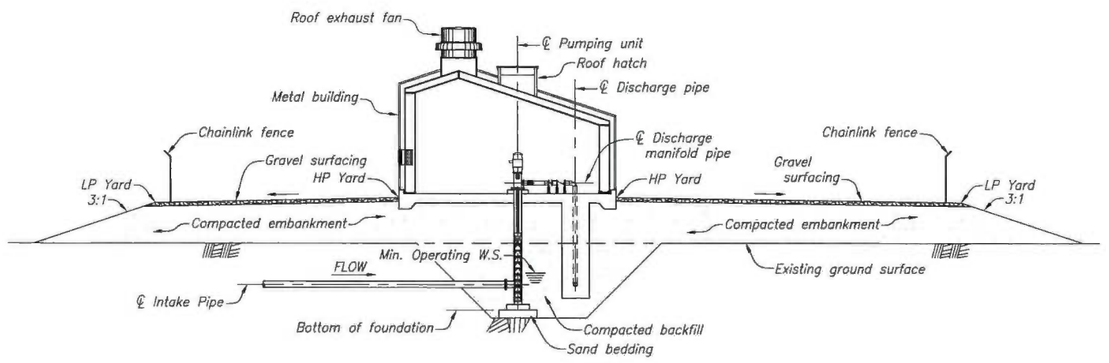
DATE AND TIME PLOTTED
AUGUST 6, 2012 09:11
PLOTTED BY
RRODRIGUEZ

CAD SYSTEM
AutoCAD Rel. 18.1s
CAD FILENAME
DWG PA-3_AVC_PPZ.DWG

SITE PLAN

PUMP DATA				AIR CHAMBER		
PUMP NUMBER *	RATED CAPACITY (CFS)	NO. STAGES	RATED HEAD (FT.)	CYLINDER DIA. (FT.)	CYLINDER H (FT.)	VOLUME (CU FT.)
1	1.125 ea.**	7	317	5	6.5	238

* Pumping plant includes a spare canned type pump assembly in addition to number of pumps indicated in table.
** Includes 0% wear factor since pumping filtered water at this time.



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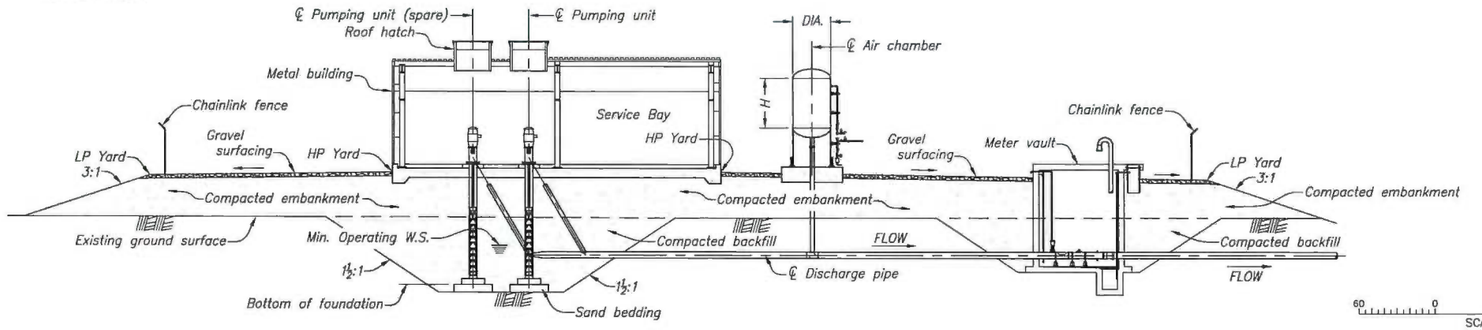

LONGITUDINAL SECTION

60 0 60 120 180
SCALE OF FEET
SITE PLAN

10 0 10 20 30
SCALE OF FEET
SECTIONS

RECLAMATION
Managing Water in the West

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT

APPRAISAL LEVEL

REVISED COMANCHE SOUTH
EADS & MAY VALLEY BOOSTER PUMPING PLANT
SITE PLAN AND SECTIONS

DESIGNED

REVIEWED
ALFRED L. BERNSTEIN, P.E. – PLANT STRUCTURES GROUP

DENVER, COLORADO 2012-04-15

REVISED COMANCHE SOUTH
EADS & MAY VALLEY
BOOSTER PUMPING PLANT
SITE PLAN & SECTIONS

DRAWING PA–4

SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 6, 2012 09:13
PLOTTED BY
RRODRIGUEZ

CAD SYSTEM
AutoCAD Rel. 18.1s
CAD FILENAME
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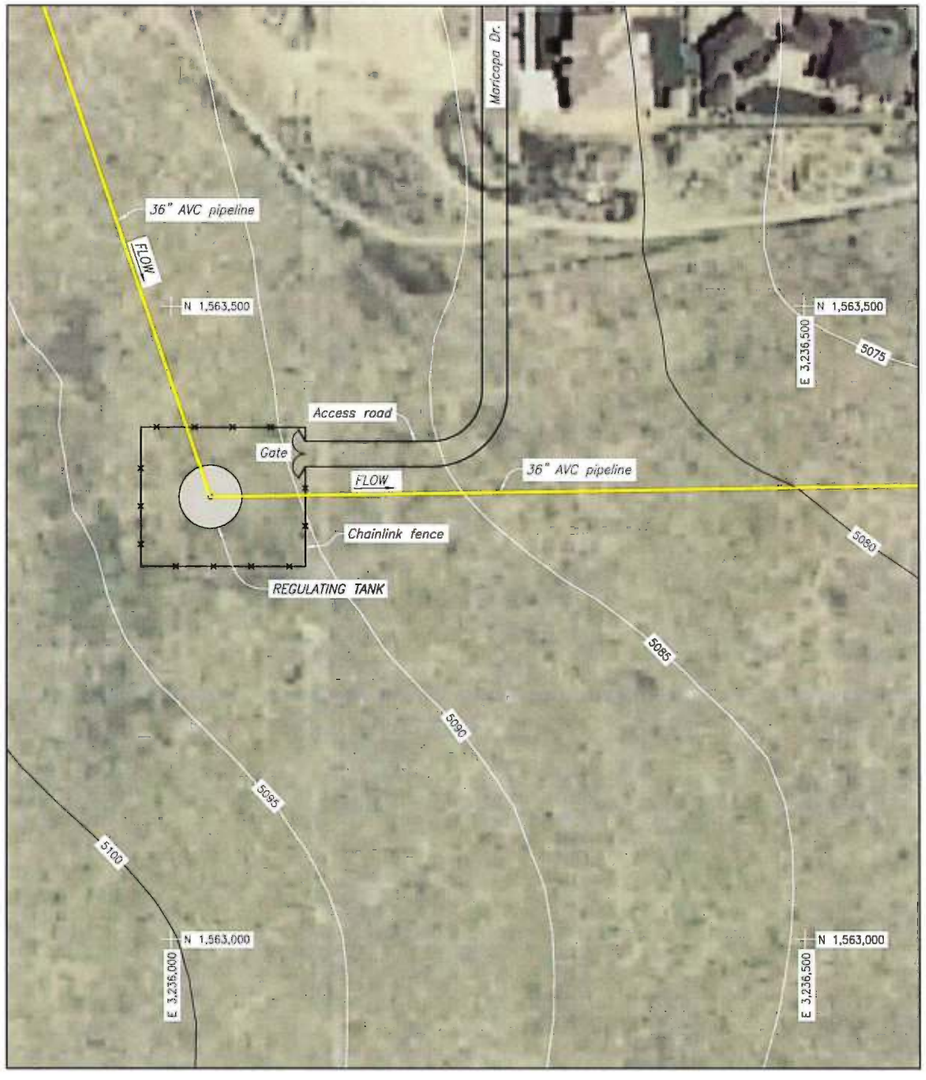
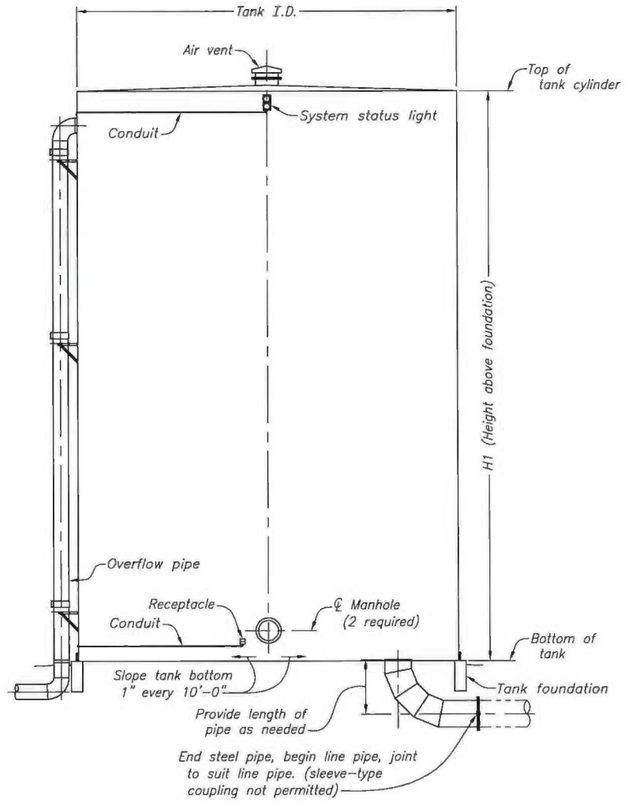
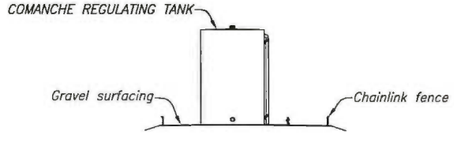


SITE PLAN



ELEVATION
WATER REGULATING TANK

REGULATING TANK					
NUMBER OF TANKS	TANK CAPACITY (GAL.)	TANK I.D. (FT.)	HEIGHT ABOVE FOUNDATION– H1 (FT.)	NORTHING	EASTING
1	1,100,000	50	75	1,563,349	3,236,031



LONGITUDINAL SECTION THRU SERVICE YARD

SCALE OF FEET
SITE PLAN AND LONGITUDINAL SECTION
SCALE OF FEET
ELEVATION

RECLAMATION
Managing Water in the West

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FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT
APPRAISAL LEVEL
REVISED COMANCHE SOUTH
REGULATING TANK
SITE PLAN, ELEVATION, AND SECTION

DESIGNED

REVIEWED
K.R. SMITH, P.E. – HYDRAULIC EQUIPMENT GROUP

DENVER, COLORADO 2012-04-15

REVISED COMANCHE SOUTH
REGULATING TANK
SITE PLAN, ELEVATION, AND SECTION

DRAWING PA-5

SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 6, 2012 09:20
PLOTTED BY
RRODRIGUEZ

CAD SYSTEM
AutoCAD Rel. 18.1s
CAD FILENAME
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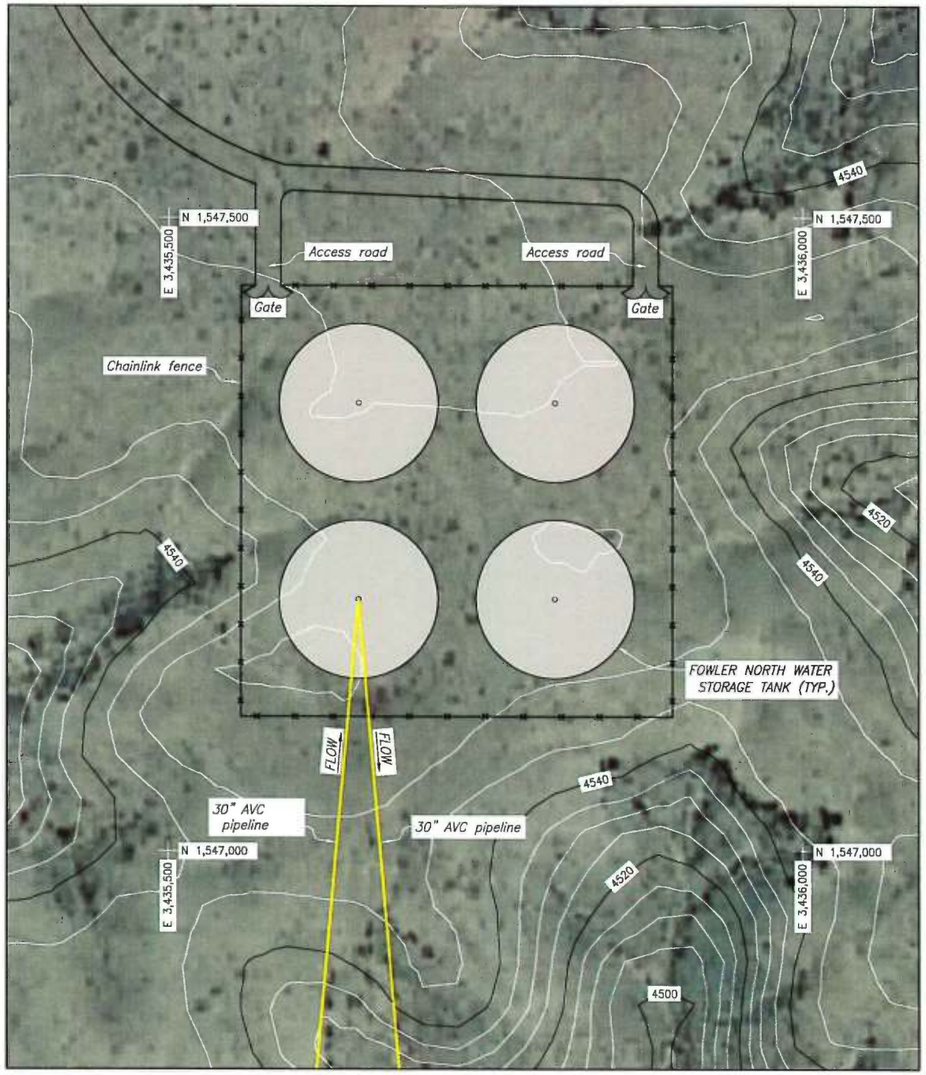
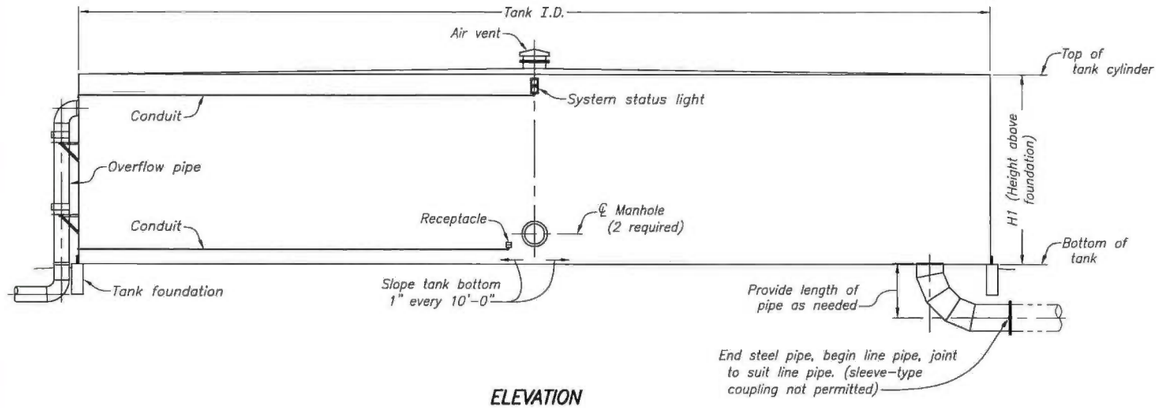
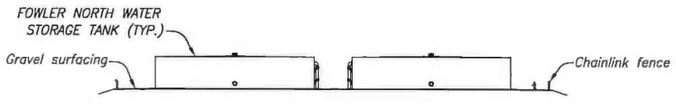


SITE PLAN



ELEVATION
WATER STORAGE TANK

WATER STORAGE TANK						
ALTERNATIVE	NUMBER OF TANKS	EACH TANK CAPACITY (GAL.)	TANK I.D. (FT.)	HEIGHT ABOVE FOUNDATION – H1 (FT.)	NORTHING	EASTING
Preferred	4	2,295,000	125	25	1,547,276	3,435,727



LONGITUDINAL SECTION THRU SERVICE YARD

60 0 60 120 180
SCALE OF FEET
SITE PLAN AND LONGITUDINAL SECTION

10 0 10 20 30
SCALE OF FEET
ELEVATION

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FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT
APPRAISAL LEVEL

REVISED COMANCHE SOUTH
FOWLER NORTH WATER STORAGE TANK
SITE PLAN, ELEVATION, AND SECTION

DESIGNED

REVIEWED
K.R. SMITH, P.E. – HYDRAULIC EQUIPMENT GROUP

DENVER, COLORADO 2012-04-15

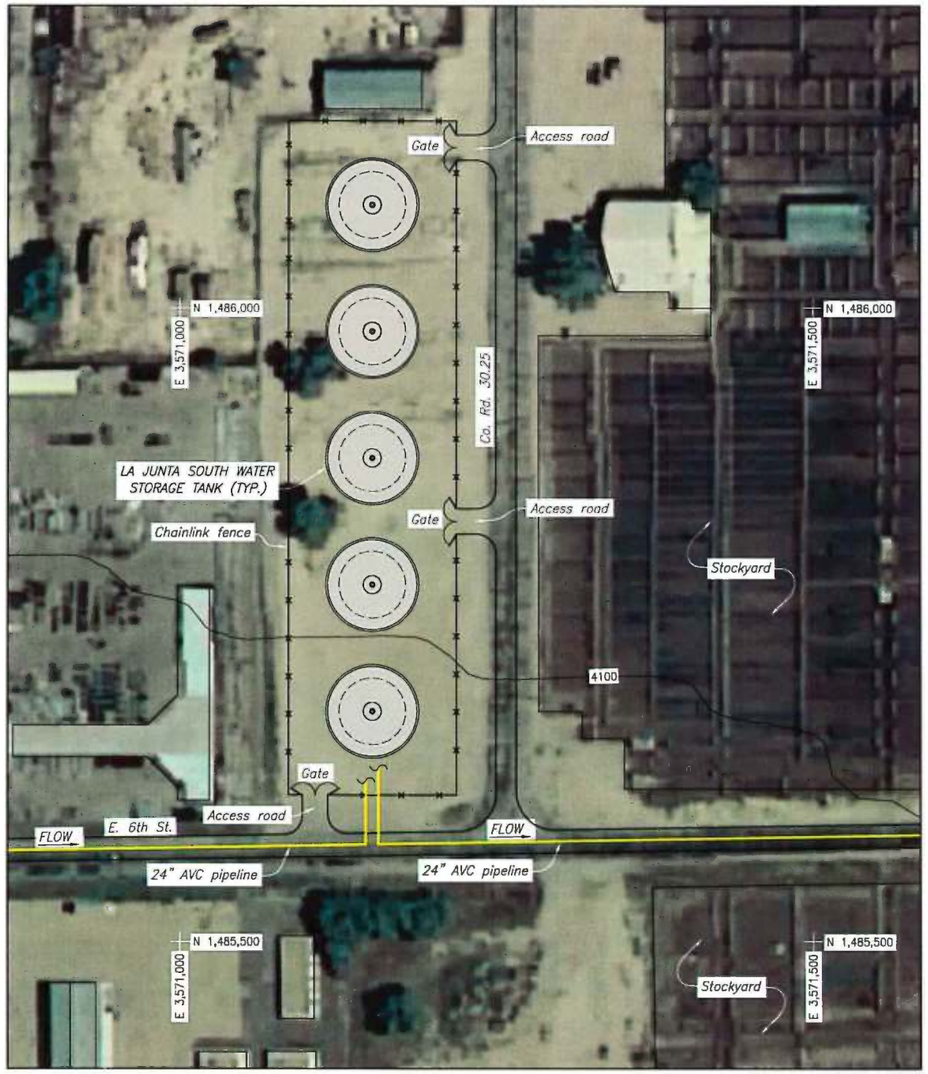
REVISED COMANCHE SOUTH
FOWLER NORTH
WATER STORAGE TANK
SITE PLAN, ELEVATION, AND SECTION

DRAWING PA–6

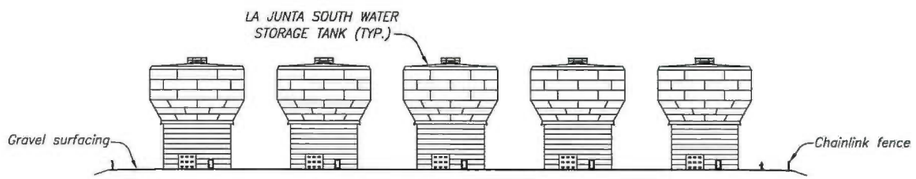
SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 6, 2012 - 09:21
PLOTTED BY
RRODRIGUEZ

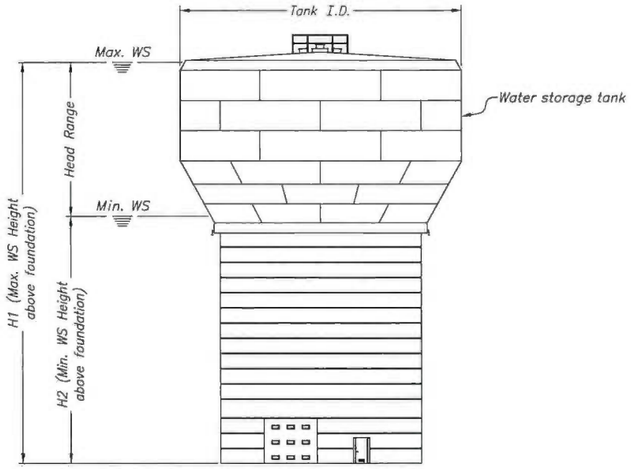
CAD SYSTEM
AutoCAD (tm) 18.1s
CAD FILENAME
DWG PA-6_AVC_FOWLER NORTH TANK.DWG



SITE PLAN



LONGITUDINAL SECTION THRU SERVICE YARD



ELEVATION
WATER STORAGE TANK

WATER STORAGE TANK						
NUMBER OF TANKS	EACH TANK CAPACITY (GAL.)	TANK I.D. (FT.)	MAX. WS HEIGHT ABOVE FOUNDATION – H1 (FT.)	MIN. WS HEIGHT ABOVE FOUNDATION – H2 (FT.)	NORTHING	EASTING
5	1,000,000	80	90	65	1,485,880	3,571,152

SCALE OF FEET
SITE PLAN AND LONGITUDINAL SECTION
60 0 60 120 180

SCALE OF FEET
ELEVATION
20 0 20 40 60

RECLAMATION
Managing Water in the West

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT
APPRAISAL DESIGN REPORT

REVISED COMANCHE SOUTH
LA JUNTA SOUTH WATER STORAGE TANK
SITE PLAN, ELEVATION, AND SECTION

DESIGNED

REVIEWED
K.R. SMITH, P.E. – HYDRAULIC EQUIPMENT GROUP

DENVER, COLORADO 2012-04-15

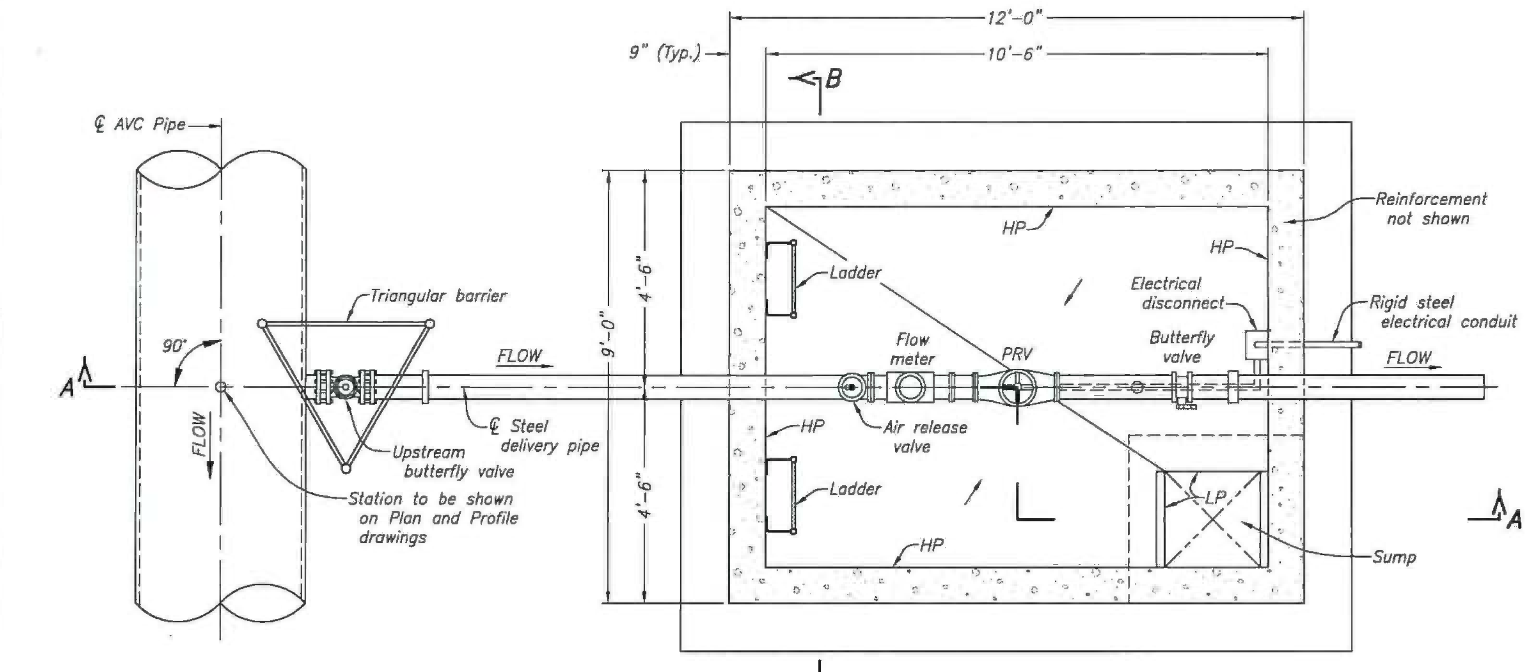
REVISED COMANCHE SOUTH
LA JUNTA SOUTH
WATER STORAGE TANK
SITE PLAN, ELEVATION, AND SECTION

DRAWING PA–7

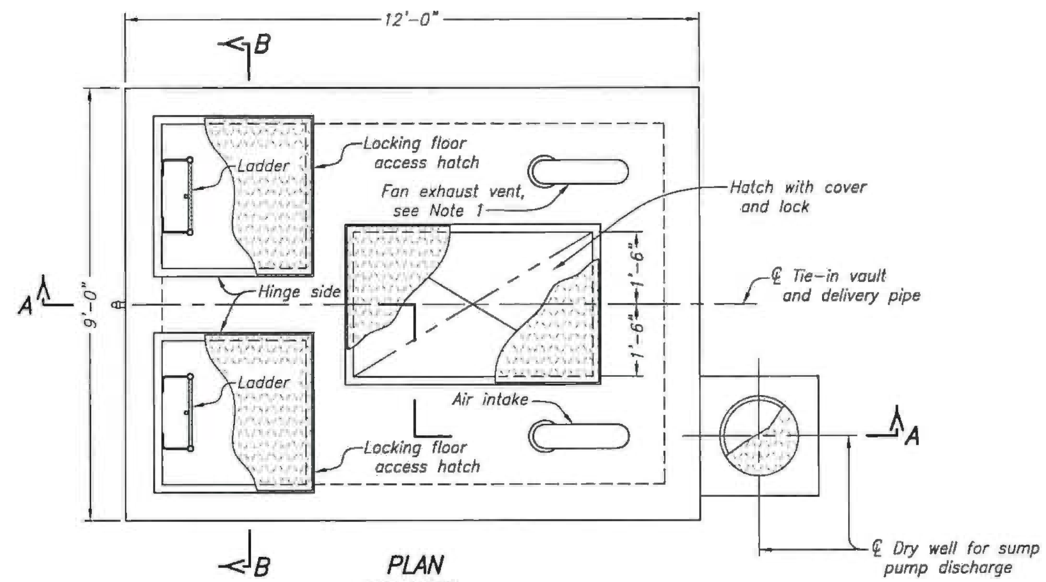
SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 6, 2012 08:23
PLOTTED BY
RRODRIGUEZ

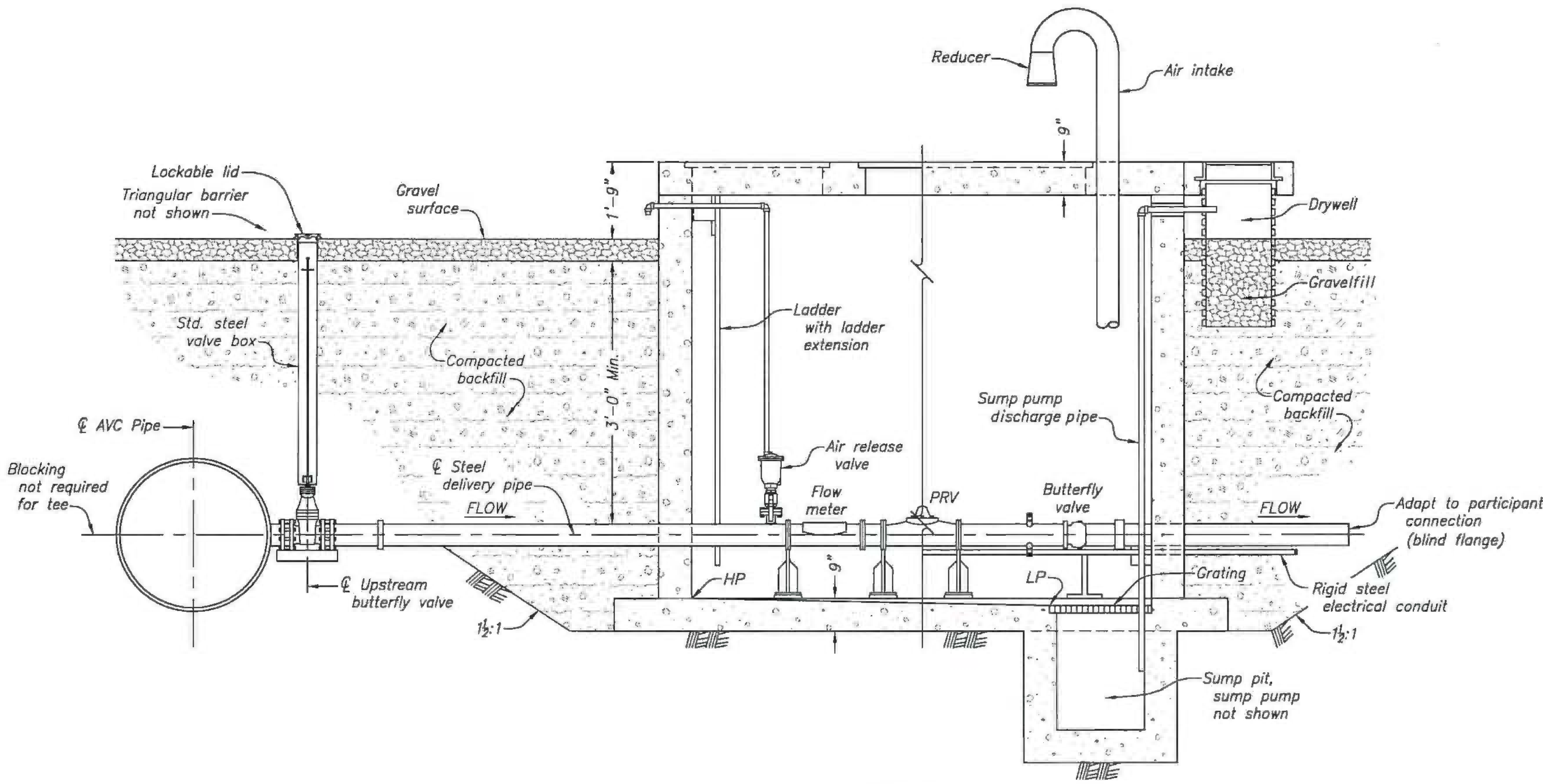
CAD SYSTEM
AUTOCAD R14
CAD FILENAME
DWG PA-7_AVC_LAJUNTA SOUTH TANK.DWG



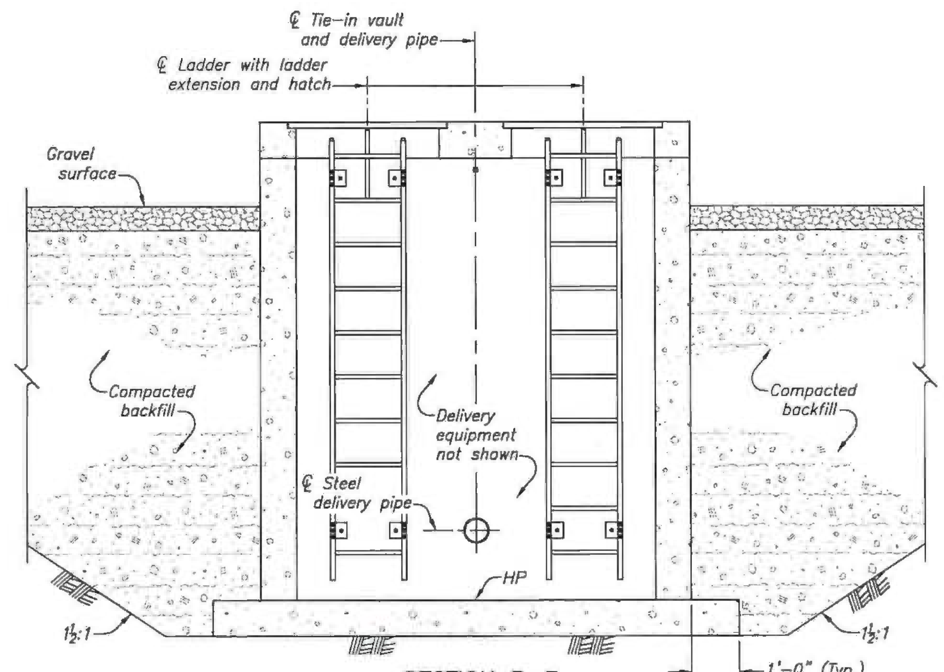
PLAN



PLAN
TOP COVER



SECTION A–A



SECTION B–B

NOTE

1. Mount fan on wall support and duct exhaust from less than 24" above floor. Min. 8" dia. inlet to duct.

1 0 1 2 3 4 5
SCALE OF FEET

RECLAMATION
Managing Water in the West

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
FRYINGPAN–ARKANSAS PROJECT – COLORADO
ARKANSAS VALLEY CONDUIT
APPRAISAL LEVEL
REVISED COMANCHE SOUTH
PARTICIPANT DELIVERY VAULT
PLANS AND SECTIONS

[illegible]
DESIGNED

[illegible]
REVIEWED
S.J. ROBERTSON, P.E. – WATER CONVEYANCE GROUP

DENVER, COLORADO 2012-04-15

REVISED COMANCHE SOUTH
PARTICIPANT DELIVERY VAULT
PLANS & SECTIONS

DRAWING PA–8
SHEET 1 OF 1

DATE AND TIME PLOTTED
AUGUST 6, 2012 09:25
PLOTTED BY
RRODRIGUEZ

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AutoCAD Rel. 18.1s
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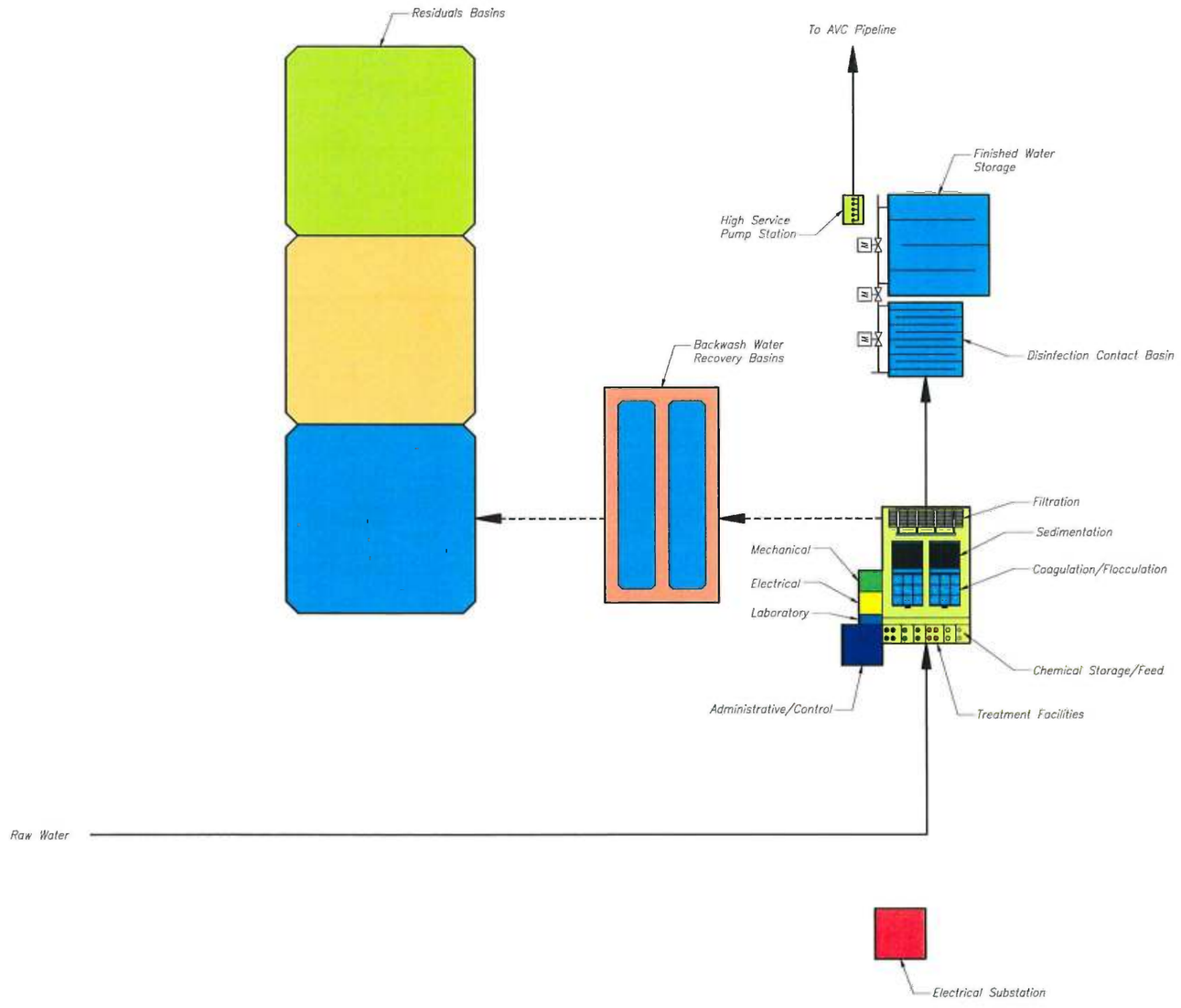

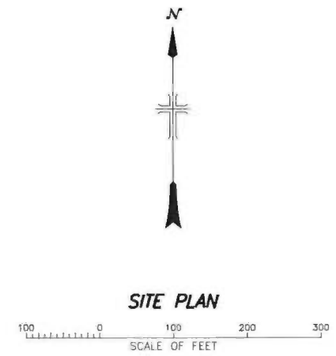

LEGEND

- AVC Pipeline
- Fence
- OHE — Overhead Electric Line
- Water Flow Direction
- Residuals Flow Direction

RECLAMATION
Managing Water in the West

B&V Project No. 174625

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FRYINGPAN–ARKANSAS PROJECT – COLORADO

ARKANSAS VALLEY CONDUIT

APPRAISAL LEVEL DESIGN

REVISED COMANCHE SOUTH - WATER TREATMENT FACILITIES

LEGEND

DRAWN BJW

ACCEPTED RSH LEBLANC, P.E. PLANT STRUCTURES GROUP

DENVER, COLORADO 2012-04-15

WATER TREATMENT FACILITIES LEGEND

DRAWING PA-9

SHEET 1 OF 1

DATE AND TIME PLOTTED
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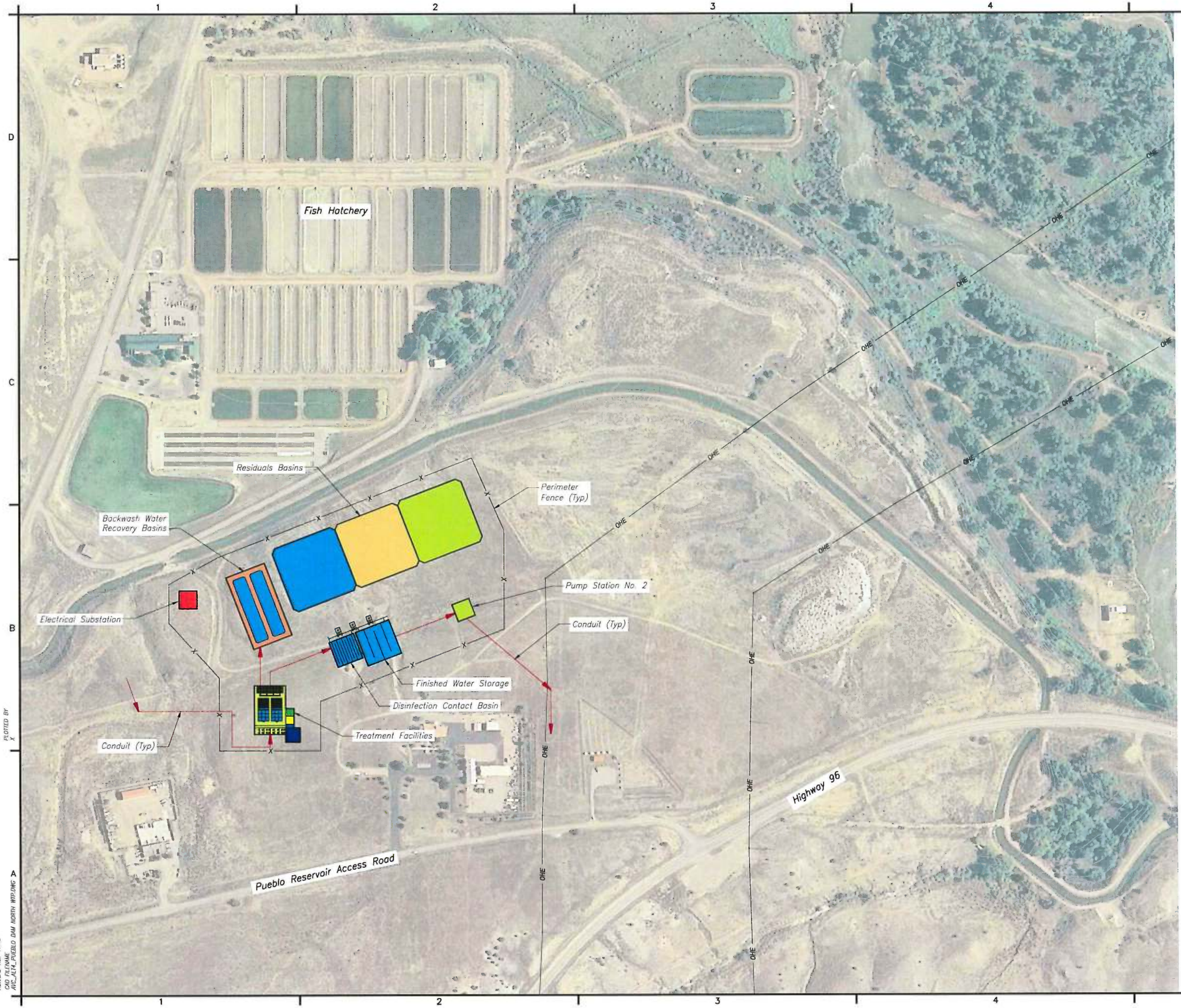

N

SITE PLAN

200 0 200 400 600
SCALE OF FEET

LEGEND

- Conduit
- Fence
- OHE — Overhead Electric Line

RECLAMATION
Managing Water in the West

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FRYINGPAN-ARKANSAS PROJECT - COLORADO

ARKANSAS VALLEY CONDUIT
APPRAISAL LEVEL DESIGN
REVISED COMANCHE SOUTH - WATER TREATMENT PLANT
SITE PLAN

DRAWN B&V
ACCEPTED
RON LEBLANC, P.E.
PLANT STRUCTURES GROUP

DENVER, COLORADO 2012-05-2

REVISED COMANCHE SOUTH - WATER TREATMENT PLANT
SITE PLAN

DRAWING PA-10
SHEET 1 OF 1

DATE AND TIME PLOTTED
X
PLOTTED BY
X

CAD SYSTEM
AutoCAD Rel. 17.1s
CAD FILENAME
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ATTACHMENT D

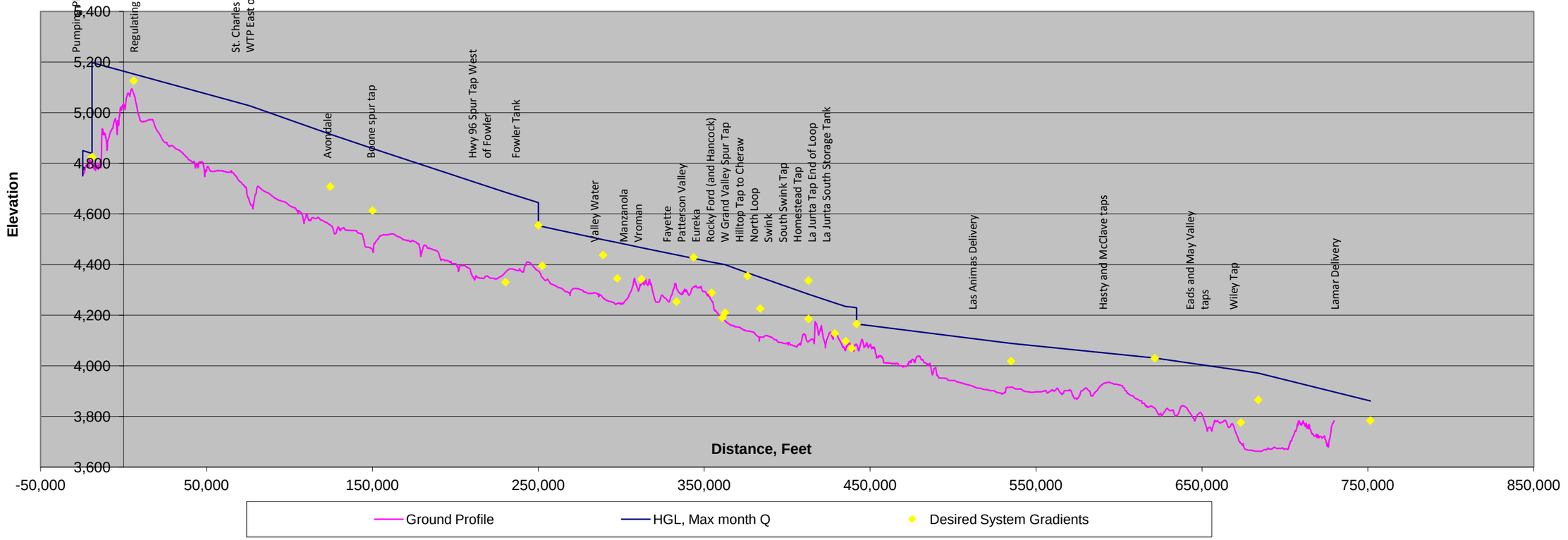
REVISED COMANCHE SOUTH ENGINEERING SUPPORT DATA

CONTENTS –

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1	**Arkansas Valley Conduit**						= See comments								Condition 1 -	Minimum Pueblo Reservoir, Max Month Demands						Participants Being Provided Max Day Demands Due to Radionuclides (Condition 5)							May 29, 2012
2	Environmental Impact Statement / Aprasial Level Study			Dam N/S Interconnect			= Forced Cell								Condition 2 -	Maximum Pueblo Reservoir, Max Month Demands						East End Water	Manzanola	Valley Water					
3				Intake, PP, WTP, PP near Pueblo Dam			= Input								Condition 3 -	Maximum Pueblo Reservoir, Min Day Demands						Eureka Water Co	May Valley	Vroman					
4				Comanche Power Plant Pipeline route		4796	Pueblo Reservoir Min Water Surface (Top of Inactive Pool)								Condition 4 -	Minimum Pueblo Reservoir, Max Day Demands						Fayette Water	Patterson Valley	Wiley					
5	Hydraulic Analysis			St Charles Mesa gets filtered water		4880	Pueblo Reservoir Max Water Surface (Top of Active Conservation Pool)								Condition 5 -	Minimum Pueblo Reservoir, Max Month Demands (Except Radionuclides						Hancock	South Swink						
6				Southern Route w/ Fowler North and La	Junta South	4750	WS El in PP Sump @ bottom of Dam site				4823.04	WTP Clearwell Elev.			Participants Being Provided Max Day)							Holbrook Center Soft Water							
7	**Revised Comanche South**			storage tanks		100	Low Pump lift to local WTP				375	Pumping lift @ WTP	Condition 4 -		Selected Condition							Homestead Improvement							
8						4850	HGL beginning of pipe to WTP, after Pump				5198.04	Starting HGL From WTP																		
9			Description		Station		Length	Total Flow, Q			Inside Pipe Diameter	Inside Pipe Area	Velocity		Friction Headloss	Friction Headloss	Minor Headloss		Total Headloss			Participant Flow		Actual Tap Pressure, psi	Desired System Pressure psi	Pressure Met?	Desired System Gradient		
10	Overall Pipe Segment	Individual Pipe Segment	Starting Point	Ending Point	Starting Station	Ending Station	ft	mgd	cfs	gpm	in	ft^2	ft/s	C Value	ft	ft/1000 ft	Loss/ft	Minor H_L, ft	ft	Begin HGL	End HGL	Participant Tap/ Delivey	mgd	Maximum Ground Elev					Comments
12	Main	1	Pueblo Reservoir	WTP Inlet @ Pueblo Dam	-246+05	-189+67	5,638	20.817	32.20	14,456	36	7.07	4.56	120	11.05	1.960	9.1287E-06	0.05	11.10	4850.00	4838.90	WTP @ near Dam	0.000	4,825	10.82	0		4825.00	Tie in at WTP.
13	Main	1a	WTP Inlet @ Pueblo Dam	High Point S of Pueblo Reservoir	-189+67	60+84	25,051	19.82533	30.67	13,768	36	7.07	4.34	120	44.87	1.791	9.1287E-06	0.23	45.10	5198.04	5152.94	NA		5106	20.32			5126.00	WTP PP Reg Tank
14	Main	1b	High Point S of Pueblo Reservoir	St. Charles Mesa	60+84	758+82	69,798	19.825	30.67	13,768	36	7.07	4.34	120	125.01	1.791	9.1287E-06	0.64	125.65	5152.94	5027.30	St. Charles Mesa	5.781	4664	157.25	0		4664.05	St. Charles Mesa
15	Main	3	St. Charles Mesa	Avondale	758+82	1245+46	48,664	14.045	21.73	9,753	30	4.91	4.43	120	111.86	2.299	9.1287E-06	0.44	112.30	5027.30	4914.99	Avondale	0.296	4558	154.66	65		4707.87	
16	Main	4	Avondale	Boone spur tap	1245+46	1500+37	25,491	13.749	21.27	9,548	30	4.91	4.33	120	56.33	2.210	9.1287E-06	0.23	56.56	4914.99	4858.43	Boone spur	0.201	4463	171.18	65		4613.15	
17	Main	5	Boone spur tap	Fowler Delivery	1500+37	2301+76	80,139	13.548	20.96	9,408	30	4.91	4.27	120	172.31	2.150	9.1287E-06	0.73	173.04	4858.43	4685.39	Fowler	0.304	4330	153.69	0		4330.37	
18	Main	6	Fowler Delivery	North Fowler Tank	2301+76	2500+09	19,833	13.243	20.49	9,197	30	4.91	4.17	120	40.89	2.062	9.1287E-06	0.18	41.07	4685.39	4644.32	(Fowler North Tank)	0.000	4555	38.67	0		4555.00	Ground Elev 4555, top of tank elev 4580.
19	Main	7	North Fowler Tank	Hwy 96 spur tap E. of Fowler Tank	2500+09	2523+49	2,340	13.243	20.49	9,197	30	4.91	4.17	120	4.82	2.062	9.1287E-06	0.02	4.84	4555.00	4550.16	Hwy 96 spur (Total)	2.500	4395	67.17	0		4395.00	
20	Main	8	Hwy 96 spur tap E. of Fowler Tank	Valley Water	2523+49	2890+33	36,684	10.743	16.62	7,460	30	4.91	3.39	120	51.33	1.399	9.1287E-06	0.33	51.67	4550.16	4498.49	Valley Water	0.084	4288	91.33	65		4437.66	PRV?
21	Main	9	Valley Water	Manzanola spur tap	2890+33	2975+41	8,508	10.659	16.49	7,402	30	4.91	3.36	120	11.73	1.379	9.1287E-06	0.08	11.81	4498.49	4486.68	Manzanola spur	0.079	4255	100.29	39		4345.09	Tank Spill El. 4375.
22	Main	10	Manzanola spur tap	Vroman	2975+41	3121+88	14,647	10.580	16.37	7,347	30	4.91	3.33	120	19.92	1.360	9.1287E-06	0.13	20.06	4486.68	4466.62	Vroman	0.079	4342	53.77	0		4342.42	
23	Main	11	Vroman	Fayette	3121+88	3332+24	21,036	10.501	16.24	7,292	30	4.91	3.31	120	28.22	1.341	9.1287E-06	0.19	28.41	4466.62	4438.21	Fayette	0.030	4253	80.02	0		4253.36	
24	Main	12	Fayette	Patterson Valley	3332+24	3436+07	10,383	10.471	16.20	7,271	30	4.91	3.30	120	13.85	1.334	9.1287E-06	0.09	13.95	4438.21	4424.26	Patterson Valley	0.036	4294	56.19	58	-1.8	4428.44	Tank spill El 4435
25	Main	13	Patterson Valley	Eureka	3436+07	3544+48	10,841	10.434	16.14	7,246	30	4.91	3.29	120	14.37	1.326	9.1287E-06	0.10	14.47	4424.26	4409.79	Eureka	0.184	4289	52.48	0		4288.56	
26	Main	14	Eureka	Rocky Ford & Hancock spur tap	3544+48	3608+93	6,445	10.250	15.86	7,118	30	4.91	3.23	120	8.27	1.283	9.1287E-06	0.06	8.33	4409.79	4401.46	Rocky Ford & Hancock spur	1.273	4190	91.54	0		4190.00	
27	Main	15	Rocky Ford & Hancock spur tap	North Loop tap	3608+93	3625+41	1,648	8.977	13.89	6,234	30	4.91	2.83	120	1.65	1.003	9.1287E-06	0.02	1.67	4401.46	4399.79	(Start of North Loop)	0.375	4210	82.16	0		4210.00	
28	Main	16	North Loop tap	Newdale-Grand Valley	3625+41	3760+66	13,525	7.957	12.31	5,526	24	3.14	3.92	120	32.18	2.379	9.1287E-06	0.12	32.30	4399.79	4367.49	Newdale-Grand Valley	0.129	4355	5.41	0		4355.00	Highpoint El. 4355 @ delivery from GIS
29	Main	17	Newdale-Grand Valley	West Grand Valley	3760+66	3837+22	7,656	7.829	12.11	5,436	24	3.14	3.85	120	17.67	2.308	9.1287E-06	0.07	17.74	4367.49	4349.75	West Grand Valley	0.032	4226	53.55	0		4226.05	
30	Main	18	West Grand Valley	Swink spur tap	3837+22	4128+34	29,112	7.796	12.06	5,414	24	3.14	3.84	120	66.69	2.291	9.1287E-06	0.27	66.96	4349.75	4282.79	Swink spur	0.064	4185	42.33	0		4185.00	
31	Main	19	Swink spur tap	South Swink	4128+34	4128+35	1	7.732	11.96	5,370	24	3.14	3.81	120	0.00	2.256	9.1287E-06	0.00	0.00	4282.79	4282.79	South Swink	0.189	4187	41.67	65	-23.3	4336.69	
32	Main	20	South Swink	Homestead spur tap	4128+35	4286+52	15,818	7.544	11.67	5,239	24	3.14	3.71	120	34.09	2.155	9.1287E-06	0.14	34.23	4282.79	4248.56	Homestead spur	0.015	4128	52.19	0		4128.00	
33	Main	21	Homestead spur tap	La Junta spur tap	4286+52	4352+80	6,628	7.529	11.65	5,228	24	3.14	3.71	120	14.23	2.147	9.1287E-06	0.06	14.29	4248.56	4234.26	La Junta spur	3.717	4097	59.42	0		4097.00	At La Junta WTP 4374 is max system water elev.
34	Main	22	La Junta spur tap	End of North Loop	4352+80	4387+81	3,501	3.811	5.90	2,647	24	3.14	1.88	120	2.13	0.609	9.1287E-06	0.03	2.16	4234.26	4232.10	(End of North Loop)	0.000	4070	70.17	0		4070.00	
35	Main	23	End of North Loop	La Junta South Storage Tank	4387+81	4418+44	3,063	4.457	6.89	3,095	24	3.14	2.19	120	2.49	0.813	9.1287E-06	0.03	2.52	4232.10	4229.58	(La Junta South Tank)	0.000	4100	56.10	0		4100.00	
36	Main	24	La Junta South Storage Tank	Las Animas Delivery	4418+44	5348+80	93,036	4.457	6.89	3,095	24	3.14	2.19	120	75.65	0.813	9.1287E-06	0.85	76.50	4165.00	4088.50	Las Animas	1.294	3903	80.28	50		4018.56	65' surface tank, La Junta South Tank
37	Main	25	Las Animas Delivery	Hasty and McClave spur tap	5348+80	6215+37	86,656	3.162	4.89	2,196	22	2.64	1.85	120	57.03	0.658	9.1287E-06	0.79	57.82	4088.50	4030.68	Hasty & McClave spurs	0.174	3880	65.23	65		4030.15	
38	Main	26	Hasty and McClave spur tap	Eads and May Valley spur tap	6215+37	6734+11	51,875	2.989	4.62	2,076	20	2.18	2.12	120	48.91	0.943	9.1287E-06	0.47	49.39	4030.68	3981.29	Eads & May Valley spurs	0.724	3776	88.87	0		3776.00	
39	Main	27	Eads and May Valley spur tap	Wiley spur tap	6734+11	6839+30	10,519	2.265	3.50	1,573	18	1.77	1.98	120	9.91	0.942	9.1287E-06	0.10	10.01	3981.29	3971.28	Wiley spur	0.034	3715	110.95	65		3865.15	
40	Main	28	Wiley spur tap	Lamar Delivery	6839+30	7514+41	67,510	2.230	3.45	1,549	16	1.40	2.47	120	109.74	1.626	9.1287E-06	0.62	110.36	3971.28	3860.93	Lamar	2.230	3784	33.36	0		3783.86	Spill El. of tanks = 3819.3
41			**Totals**																				**19.825**						
42																													
43	Hwy 96	29	Hwy 96 spur tap E. of Fowler Tank	Olney Springs Delivery	0+00	113+68	11,368	2.500	3.87	1,736	18	1.77	2.19	120	12.87	1.132	9.1287E-06	0.10	12.97	4550.16	4537.18	Olney Springs	0.129	4381	67.55	0		4381.14	Tank spill elev of 4486
44	Hwy 96	30	Olney Springs Delivery	Crowley Delivery	113+68	384+09	27,041	2.372	3.67	1,647	18	1.77	2.08	120	27.76	1.026	9.1287E-06	0.25	28.00	4537.18	4509.18	Crowley	0.122	4352	67.87	65		4502.55	System pressure unknown.
45	Hwy 96	31	Crowley Delivery	Ordway Delivery	384+09	677+05	29,296	2.250	3.48	1,562	16	1.40	2.49	120	48.39	1.652	9.1287E-06	0.27	48.65	4509.18	4460.53	Ordway	0.604	4307	66.47	65		4457.14	
46	Hwy 96	32	Ordway Delivery	96 Pipeline Co. spur tap	677+05	711+47	3,442	1.646	2.55	1,143	16	1.40	1.82	120	3.19	0.925	9.1287E-06	0.03	3.22	4460.53	4457.31	96 Pipeline Co. spur	0.049	4303	66.80	0		4303.00	
47	Hwy 96	33	96 Pipeline Co. spur tap	Crowley County Water Assoc.	711+47	712+13	66	1.596	2.47	1,108	10	0.55	4.53	120	0.57	8.629	9.1287E-06	0.00	0.57	4457.31	4456.74	CCWA	1.322	4303	66.40	65		4453.51	
48	Hwy 96	34	Crowley County Water Assoc.	Sugar City Delivery	712+13	963+10	25,097	0.274	0.42	190	10	0.55	0.78	120	8.30	0.331	9.1287E-06	0.23	8.53	4456.74	4448.21	Sugar City	0.274	4307	61.07	65	-3.9	4457.30	
49			**Totals**																				**2.500**						
50																													
51																													
52	N. Loop	35	North Loop tap	Hilltop	0+00	54+16	5,416	1.020	1.58	709	12	0.79	2.01	120	8.40	1.550	9.1287E-06	0.05	8.45	4399.79	4391.35	Hilltop	0.071	4178	92.36	38		4265.78	Tank Elev 4266. 72 psi high pressure
53	N. Loop	36	Hilltop	West Holbrook	54+16	325+33	27,117	0.950	1.47	659	12	0.79	1.87	120	36.81	1.357	9.1287E-06	0.25	37.05	4391.35	4354.29	West Holbrook	0.019	4192	70.26	0		4192.00	
54	N. Loop	37	West Holbrook	North Holbrook	325+33	399+20	7,387	0.930	1.44	646	12	0.79	1.83	120	9.65	1.307	9.1287E-06	0.07	9.72	4354.29	4344.57	North Holbrook	0.015	4187	68.21	0		4187.00	
55	N. Loop	38	North Holbrook	Holbrook Center Soft Water, Cheraw	399+20	667+52	26,832	0.915	1.42	636	12	0.79	1.80	120	34.02	1.268	9.1287E-06	0.24	34.27	4344.57	4310.30	HCSW, Cheraw	0.101	4139	74.16	14		4171.34	
56	N. Loop	39	Holbrook Center Soft Water, Cheraw	Southside & East End spur tap	667+52	667+52	0	0.815	1.26	566	10	0.55	2.31	120	0.00	2.483	9.1287E-06	0.00	0.00	4310.30	4310.30	Southside & East End spurs	0.039	4139	74.16	0		4139.00	
57	N. Loop	40	Southside & East End spur tap	Beehive	667+52	667+53	1	0.776	1.20	539	10	0.55	2.20	120	0.00	2.270	9.1287E-06	0.00	0.00	4310.30	4310.30	Beehive	0.013	4139	74.16	0		4139.00	
58	N. Loop	41	Beehive	Bent's Fort spur tap	667+53	943+09	27,556	0.763	1.18	530	10	0.55	2.16	120	60.64	2.201	9.1287E-06	0.25	60.89	4310.30	4249.41	Bent's Fort spur	0.118	4096	66.41	0		4096.00	Highpoint El near airport is 4270+/-
59	N. Loop	42	Bent's Fort spur tap	End of North Loop	943+09	1049+78	10,669	0.645	1.00	448	10	0.55	1.83	120	17.21	1.613	9.1287E-06	0.10	17.31	4249.41	4232.10	(End of North Loop)	0.000	4070	70.17	0		4070.00	
60			**Totals**																				**0.375**						
61																													
62	Spur	43	Main Line Tap	May Valley & Eads Booster plant	0+00	316+33	31,633	0.724	1.12	503	12	0.79	1.43	120	25.99	0.822	9.1287E-06	0.29	26.28	3981.29	3955.01	May Valley & Eads @ Booster Plant	0.724	3927	12.23	0		3926.76	
63	Spur	44	May Valley & Eads Booster plant	Eads	0+00	1083+38	108,338	0.249	0.38	173	10	0.55	0.70	120	29.85	0.275	9.1287E-06	0.99	30.84	4272.01	4241.18	Eads	0.249	4215	11.26	10		4238.27	4215 is tie-in at tank, 4225' max elev@hill
64	Spur	45	May Valley & Eads Booster plant	May Valley	0+00	270+56	27,056	0.476	0.74	330	12	0.79	0.94	120	10.21	0.377	9.1287E-06	0.25	10.45	4272.01	4261.56	May Valley	0.476	3927	144.93	65		4076.91	
65	Spur	46	Main Line Tap	Boone	0+00	91+54	9,154	0.201	0.31	140	6	0.20	1.59	120	20.56	2.246	9.1287E-06	0.08	20.64	4858.43	4837.79	Boone	0.201	4473	157.92	65		4623.15	
66	Spur	47	Main Line Tap	Manzanola	0+00	16+36	1,636	0.079	0.12	55	4	0.09	1.41	120	4.71	2.878	9.1287E-06	0.01	4.72	4486.68	4481.95	Manzanola	0.079	4277	88.94	39		4366.59	Manzanola max ground elev is 4285. Tank Spill El 4375.
67	Spur	48	Main Line Tap	Rocky Ford WTP & Hancock	0+00	9+60	960	1.273	1.97	884	12	0.79	2.51	120	2.24	2.334	9.1287E-06	0.01	2.25	4401.46	4399.21	Rocky Ford & Hancock	1.273	4221	77.07	0		4221.17	
68	Spur	49	Hwy 96 Spur tap	96 Pipeline Co.	0+00	23+95	2,395	0.049	0.08	34	4	0.09	0.87	120	2.86	1.193	9.1287E-06	0.02	2.88	4457.31	4454.43	96 Pipeline Co.	0.049	4317	59.32	0		4317.41	
69																													
70	Spur	50	Main Line Tap	Homestead	0+00	26+26	2,626	0.015	0.02	10	4	0.09	0.27	120	0.35	0.132	9.1287E-06	0.02	0.37	4248.56	4248.19	Homestead	0.015	4134	49.36	0		4134.17	
71	Spur	51	Main Line Tap	La Junta WTP	0+00	31+54	3,154	3.717	5.75	2,582	12	0.79	7.32	120	53.60	16.995	9.1287E-06	0.03	53.63	4234.26	4180.64	La Junta	3.717	4150	13.26	0		4150.00	La Junta WTP 4374 = max system water elev
72	Spur	52	Main Line Tap	Bents Fort Tank	0+00	7+15	715	0.118	0.18	82	4	0.09	2.09	120	4.28	5.996	9.1287E-06	0.01	4.29	4249.41	4245.12	Bent's Fort	0.118	4132	48.78	0		4132.44	
73	Spur	53	Main Line Tap	East End & South Side	0+00	161+42	16,142	0.039	0.06	27	4	0.09	0.68	120	12.23	0.757	9.1287E-06	0.15	12.37	4310.30	4297.93	East End & South Side	0.039	4158	60.39	0		4158.44	
74	Spur	54	Main Line Tap	Swink	0+00	141+09	14,109	0.064	0.10	45	4	0.09	1.14	120	27.53	1.952	9.1287E-06	0.13	27.66	4282.79	4255.13	Swink	0.064	4119	59.02	0		4118.80	
75	Spur	55	Main Line Tap	McClave	0+00	54+84	5,484	0.105	0.16	73	6	0.20	0.83	120	3.69	0.672	9.1287E-06	0.05	3.74	4030.68	4026.94	McClave	0.105	3919	46.83	65	-18.2	4068.92	
76	Spur	56	Main Line Tap	Hasty	0+00	6+26	626	0.069	0.11	48	4	0.09	1.22	120	1.38	2.199	9.1287E-06	0.01	1.38	4030.68	4029.30	Hasty	0.069	3877	65.98	65		4027.03	
77	Spur	57	Main Line Tap	Wiley	0+00	197+50	19,750	0.034	0.05	24	4	0.09	0.61	120	12.03	0.609	9.1287E-06	0.18	12.21	3971.28	3959.07	Wiley	0.034	3734	97.63	65		3883.71	
78																													

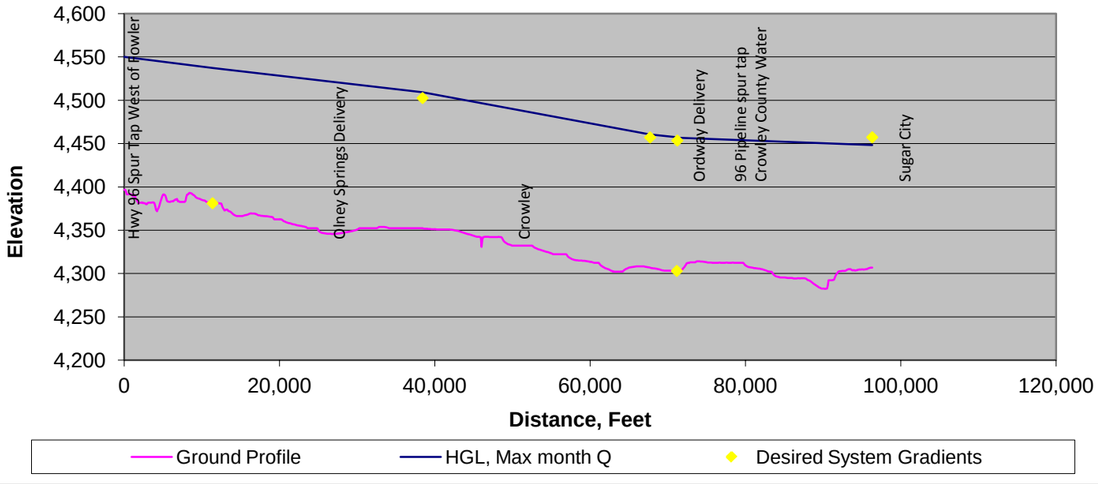
Hydraulic Profile - Main Conduit, Revised Comanche South

Max Day Demands



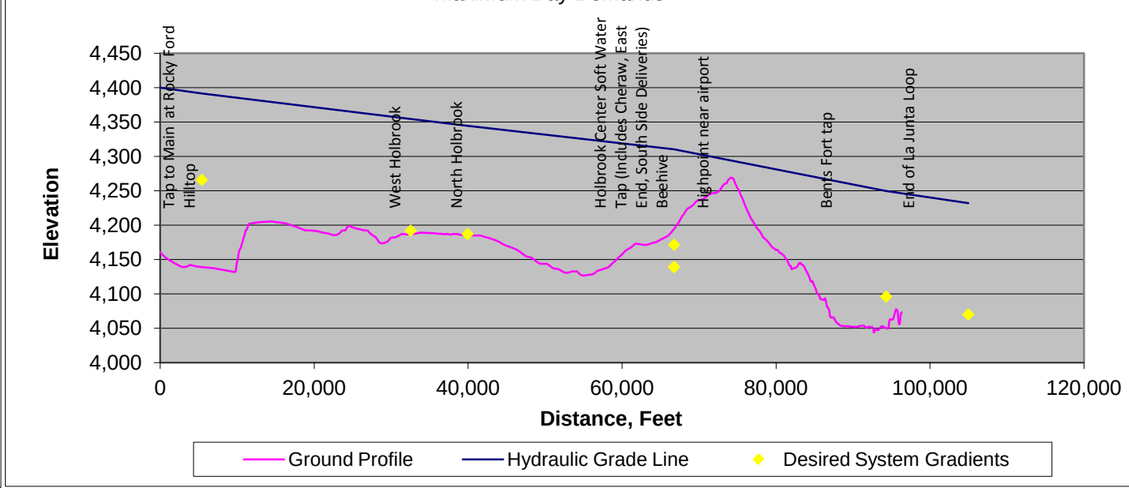
Hydraulic Profile - Hwy 96, Revised Comanche South

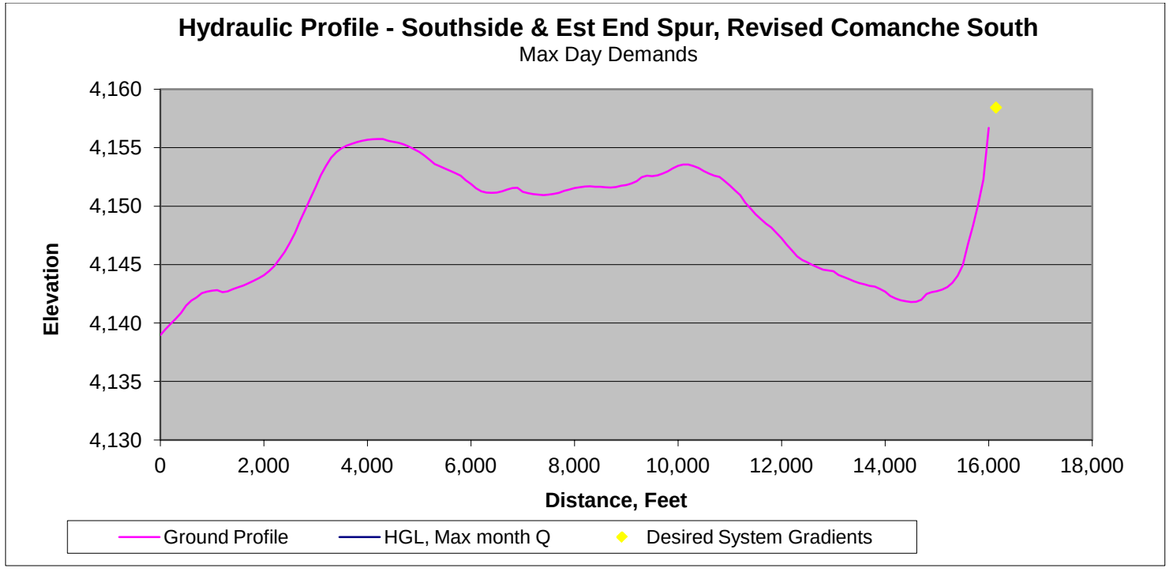
Max Day Demands

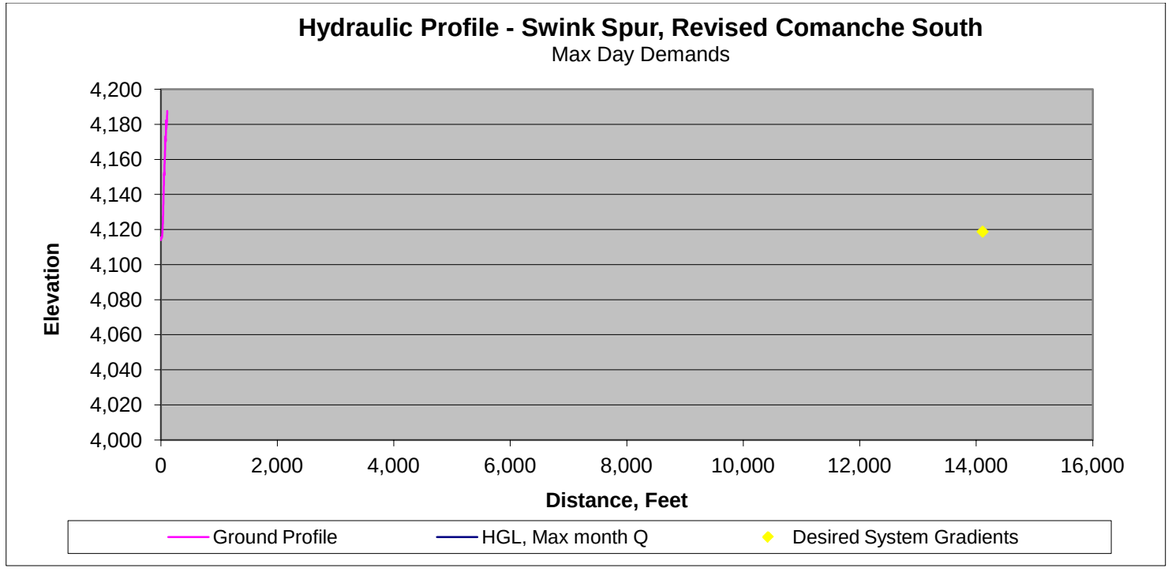


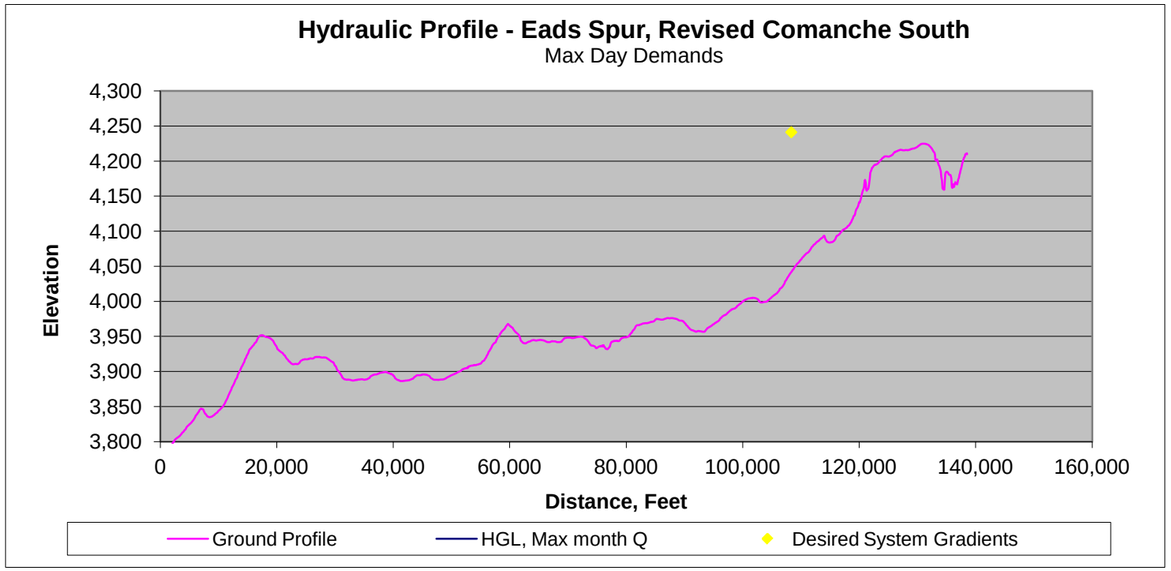
Hydraulic Profile - Loop, Revised Comanche South

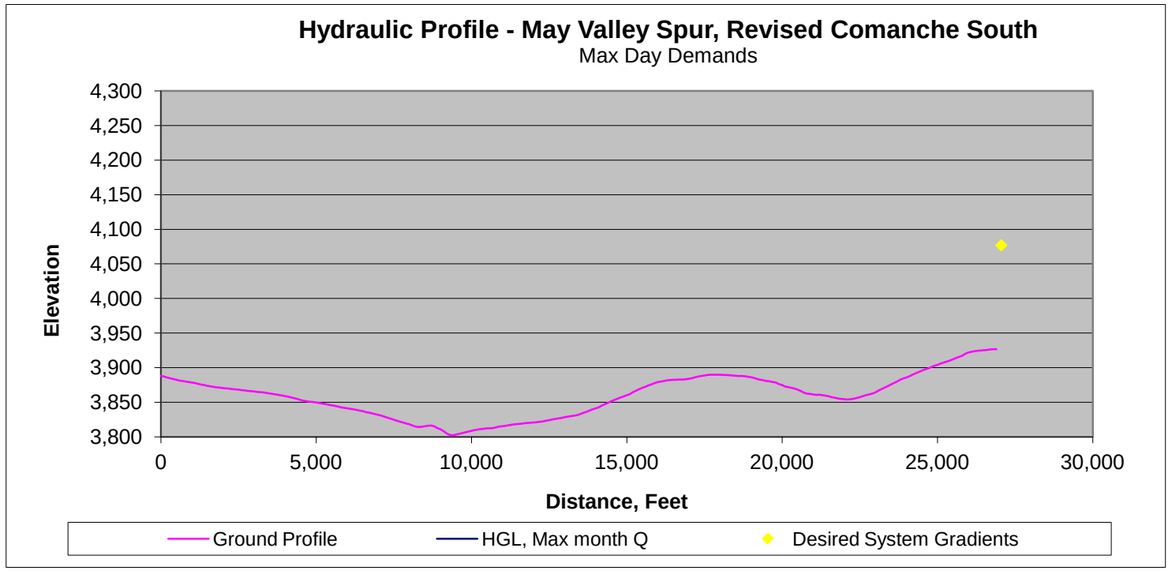
Maximum Day Demands




Hydraulic Profile - Southside & Est End Spur, Revised Comanche South
Max Day Demands
Elevation
4,160
4,155
4,150
4,145
4,140
4,135
4,130
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Distance, Feet
Ground Profile
HGL, Max month Q
Desired System Gradients


Hydraulic Profile - Swink Spur, Revised Comanche South
Max Day Demands
Elevation
4,200
4,180
4,160
4,140
4,120
4,100
4,080
4,060
4,040
4,020
4,000
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Distance, Feet
Ground Profile
HGL, Max month Q
Desired System Gradients

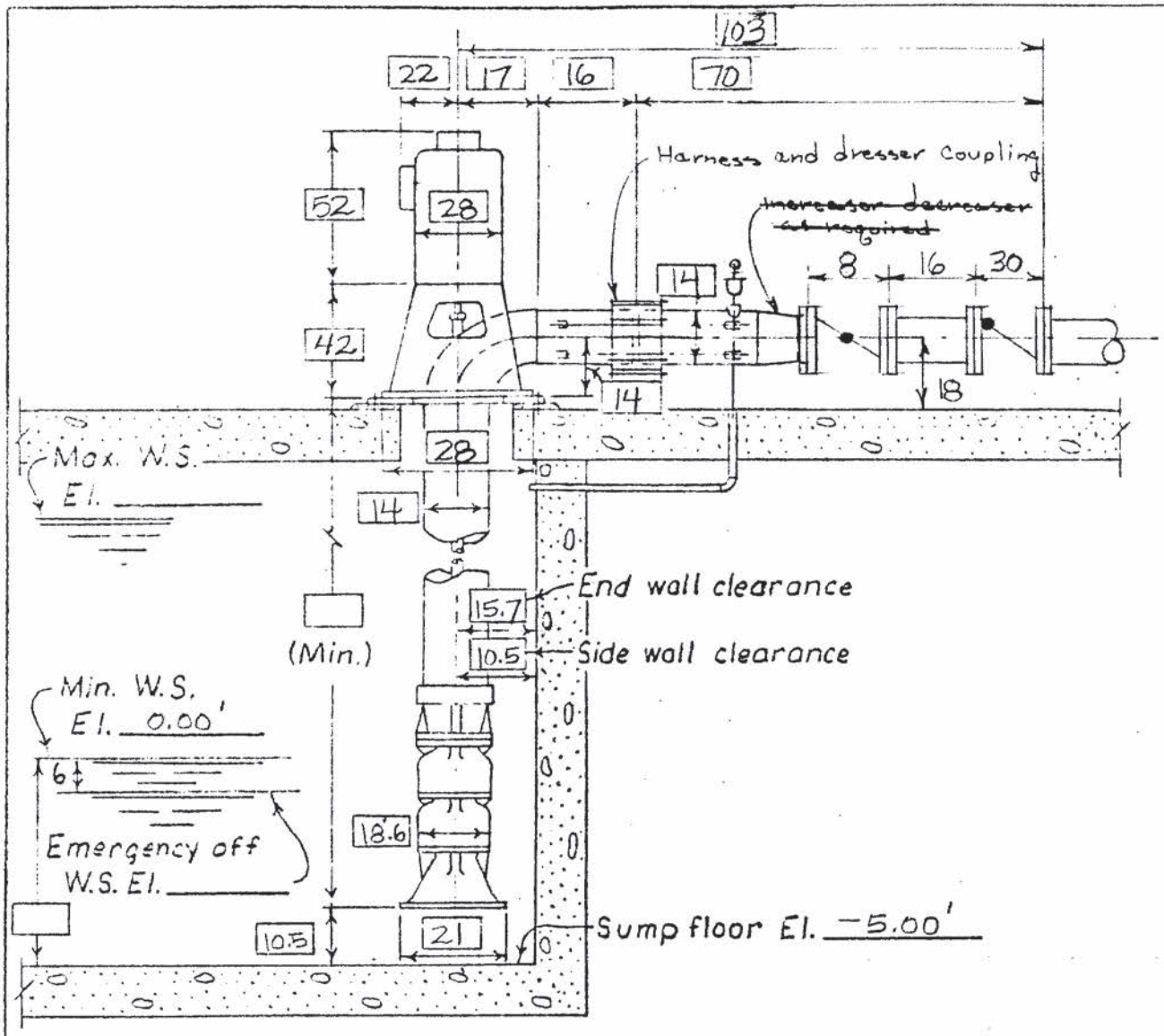

Hydraulic Profile - Eads Spur, Revised Comanche South
Max Day Demands
Elevation
4,300
4,250
4,200
4,150
4,100
4,050
4,000
3,950
3,900
3,850
3,800
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
160,000
Distance, Feet
Ground Profile
HGL, Max month Q
Desired System Gradients


Hydraulic Profile - May Valley Spur, Revised Comanche South
Max Day Demands
Elevation
4,300
4,250
4,200
4,150
4,100
4,050
4,000
3,950
3,900
3,850
3,800
0
5,000
10,000
15,000
20,000
25,000
30,000
Distance, Feet
Ground Profile
HGL, Max month Q
Desired System Gradients

ATTACHMENT E

REVISED COMANCHE SOUTH ENGINEERING SUPPORT DATA

CONTENTS –

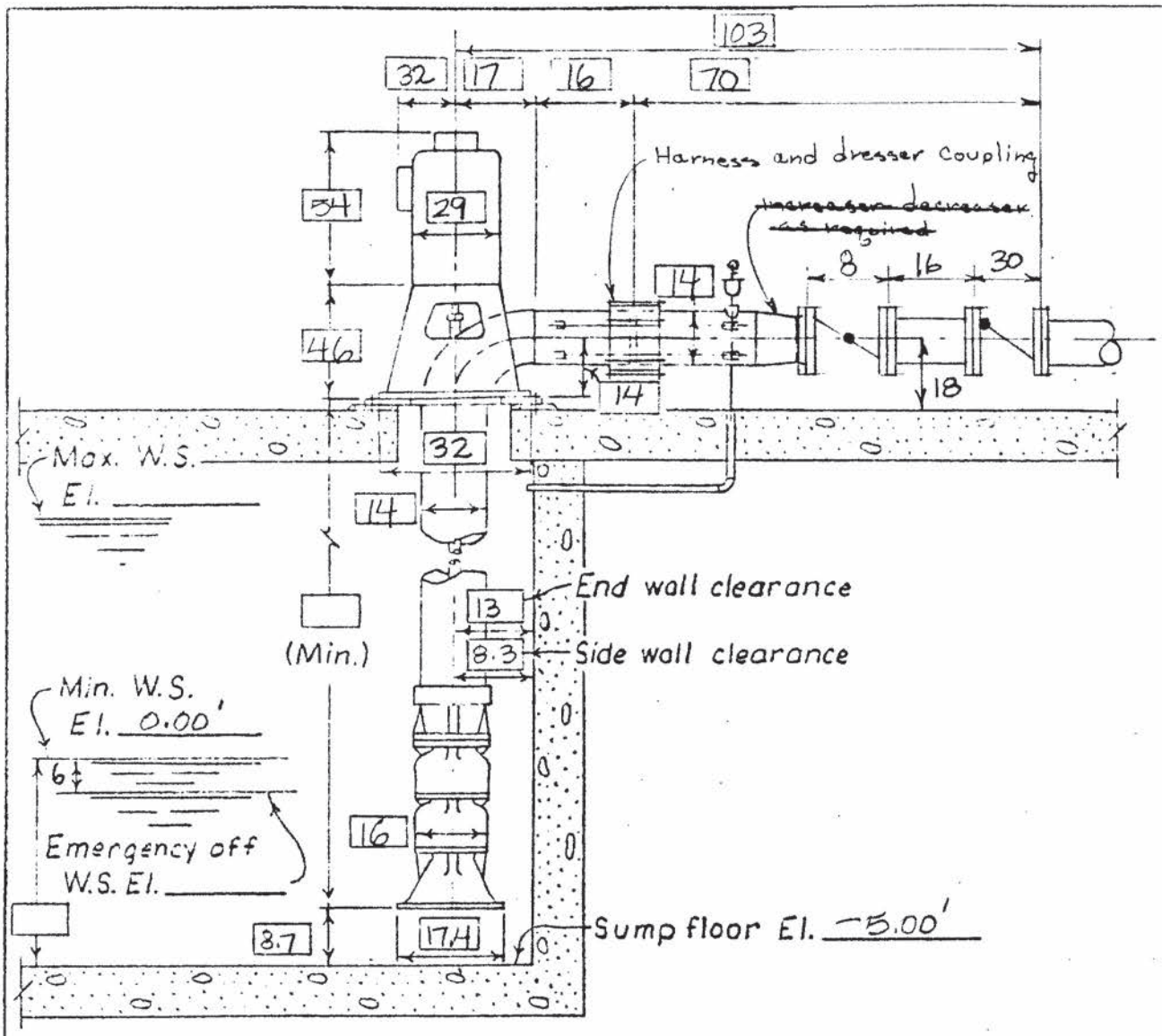


VALVE DATA:
Weir-Floway Model 13FKH, 1180 rpm
WPI Motor, 16.5" BD, L445VP frame, VSS

PUMP DATA:
Unit No. 1-4
Discharge (3730gpm) 8.31 c.f.s.
Total head 105 ft.
No. of stages 2
Shut off head 144 ft.
R.P.M. 1200 (Max.)
B.H.P. 117.0
Weight 3,600 lbs.
MOTOR DATA @ 480 volts
Rated H.P. 125
Weight 2,370 lbs.
UNIT DATA:
Weight 5,970 lbs.

REVISED COMANCHE SOUTH

PUMP SETTING DIMENSIONS
Arkansas Valley Conduit Project
Booster (PP1) Pmp. Plant
(Est. dimensions, inches, not to scale)
Est. by R. Zelenka Chkd. _____
Denver, Colorado _____

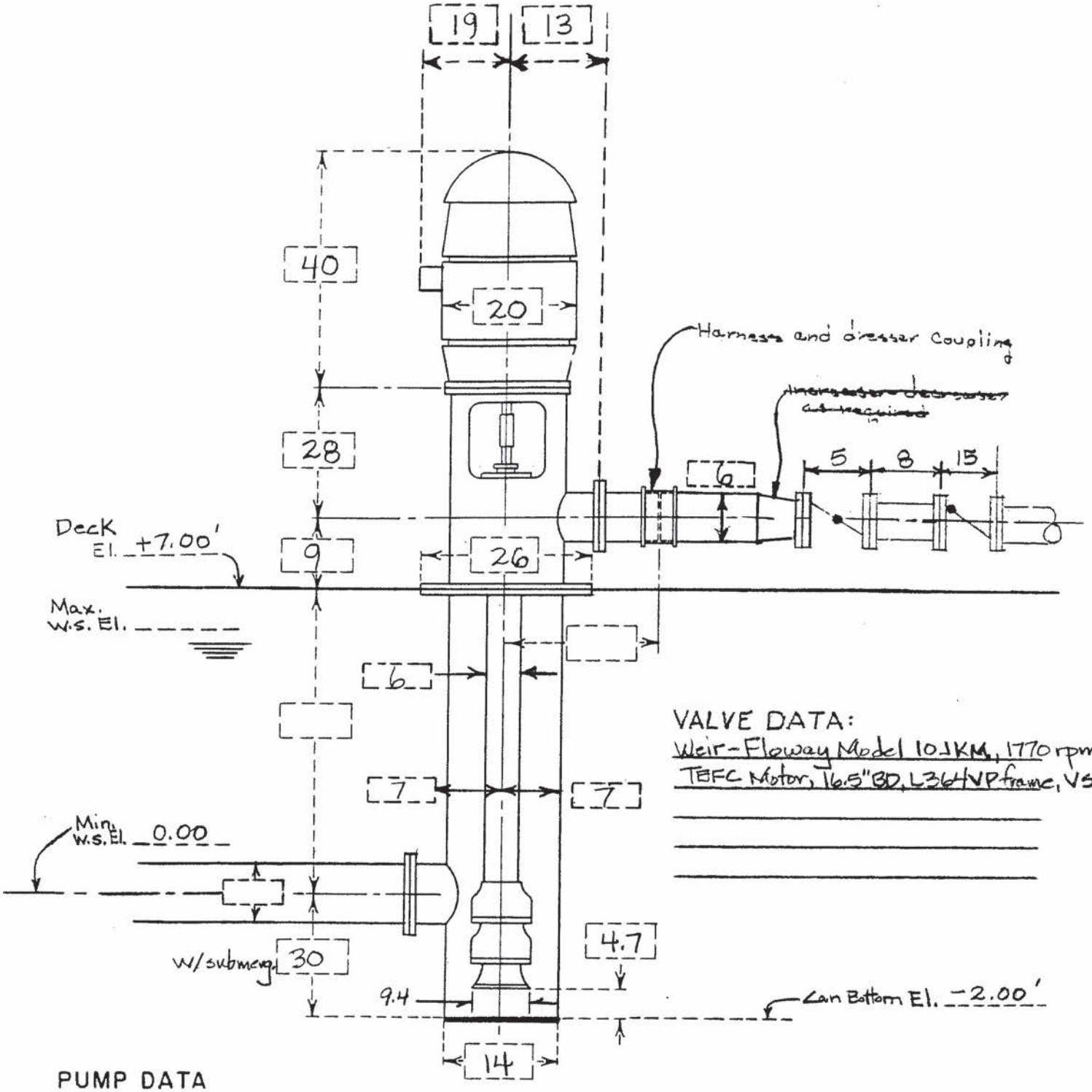


VALVE DATA:
Weir-Floway Model 16DKH, 1770rpm
WPI Motor, 24.5" BD, L509VP frame, VSS

PUMP DATA:
Unit No. 1-4
Discharge (3450gpm) 7.69 c.f.s.
Total head 380 ft.
No. of stages 4
Shut off head 580 ft.
R.P.M. 1880 (Max.)
B.H.P. 402.7
Weight 3,200 lbs.
MOTOR DATA @ 4160 volts
Rated H.P. 450
Weight 3,470 lbs.
UNIT DATA:
Weight 6,670 lbs.

REVISED COMANCHE SOUTH

PUMP SETTING DIMENSIONS
Arkansas Valley Conduit Project
WTP Clearwell (PPZ) Pmc. Plant
(Est. dimensions, inches, not to scale)
Est. by R. Zelenka Cnkd.
Denver, Colorado



VALVE DATA:
Weir-Floway Model 10JKM, 1770 rpm
TEFC Motor, 16.5" BD, L364VP frame, VSS

PUMP DATA

Total head 317 ft. (7stgs)
Discharge (500 gpm) 1.125 c.f.s.
S.O.H. (max.) 420 ft.
RPM 1800 (Max.)
BHP 50.L
Weight 2,100 lbs.

MOTOR DATA

Rated HP 60
Weight 1,000 lbs.

UNIT DATA

Weight 3,100 lbs.

REVISED COMANCHE SOUTH

Arkansas Valley Conduit PROJECT
Eads/May Valley Booster PMP. PLT.
PUMP SETTING DIMENSIONS
(PRELIMINARY-NOT TO SCALE)

Denver, Colorado
Drawn B. Zelenka Chkd.

ATTACHMENT F

REVISED COMANCHE SOUTH ENGINEERING SUPPORT DATA

CONTENTS –

Arkansas Valley Conduit - Revised Comanche South
Reach Summary Descriptions and
Corridor Widths for EIS / Apprasial Level Design

August 6, 2012

Length	Reach	Beginning Point	Ending Point	Corridor Basic Description	Corridor Width, ft	Summary
	1	**Pueblo Reservoir**	**Avondale**			
2,103	Interconnect	Pueblo Dam North Outletworks, Southern Delivery System intake line	Pueblo Dam South Outlet Works, Joint Use Pipeline	Reclamation ROW	200	Dam Outlet works inteconnect
7,666	1Aa	Pueblo Reservoir South Outlet Works	WTP on Reclamation property	Grass/Gravel	200	Alignment is east and south of hatchery
65,783	1G	Junction with Pueblo South Route (Approx. 3,000 feet downstream of Bessemer Ditch (stay on Bessmer) and Hwy 96 Intersection)	Intersection of Bessmer Ditch and South Road	Grass/Gravel	400	Pueblo South Route and adjacent to Comanche pipeline.
18,169	1P.2	Intersection of South Road and Harlem	Intersection of 28th Ln and South Road	Grass/Gravel and Asphalt/Concrete	300	Alignment follows Bessemer Ditch and South Road
4,576	1S.2	Intersection South Road and 28th Ln	St Charles Mesa Delivery	Gravel Road	200	Alignment follows South Road, Grant Road, and Hwy 50 Business
47,995	1S.1	St Charles Mesa Delivery	Intersection of Avondale St and Hwy 50 (Business) in Avondale	Gravel Road	200	Alignment follows South Road, Grant Road, and Hwy 50 Business
8,822	1V	Intersection of Avondale St and Hwy 50 (Business) in Avondale	Intersection of Hwy 50 and Hwy 50 (Business) east of Avondale	Gravel Road	200	Alignment follows Hwy 50 Business
	2	**Avondale**	**Fowler**			
17,338	2A	Intersection of Hwy 50 and Hwy 50 (Business) east of Avondale	Intersection of Hwy 50 and Hwy 209 (South of Boone)		600	Alignment is adjacent to Hwy 50
9,154	2C Spur	Intersection of Hwy 50 and Hwy 209 (South of Boone)	Baker Ave and Railroad Street in Boone	Grass/Gravel	600	Spur from Hwy 50 to Boone. Alignment is adjacent to Hwy 209, crosses Arkansas River, and crosses a canal/ditch.
74,386	2E	Intersection of Hwy 50 and Hwy 209 (South of Boone)	Intersection of Hwy 50 and CR 2 (approx. 1 mile west of Fowler)	Grass/Gravel	600	Alignment is adjacent to Hwy 50.
5,753	2F.2	Intersection of Hwy 50 and CR 2 (approx. 1 mile west of Fowler)	Intersection of Cr Ll 5 and Hwy 167 north of Fowler.	Grass/Gravel	600	Alignment is adjacent to railroad to Fowler, then follows Ll 5 to Hwy 167, Folwer delivery point
7,765	2F.1	Intersection of Cr Ll 5 and Hwy 167 north of Fowler.	Intersection of Hwy 96 and Hwy 167 north of Fowler.	Grass/Gravel	600	Alignment follows 167 north and crosses a canal and the Arkansas River.
10,734	2G	Intersection of Hwy 96 and Hwy 167 north of Fowler.	Near storage tank north of Fowler on the Main Conduit.	Grass/Gravel	600	Alignment follows Hwy 96 to spur to tank north of Fowler on the bluff.
1,005	2G2 *	Near storage tank north of Fowler on the Main Conduit.	Intersection of Hwy 96 and and the Main Conduit	Grass/Gravel	600	Alignment follows Hwy 96 from spur from tank north of Fowler on the bluff to Hwy 96 spur.
39,275	2H	Intersection of Hwy 50 and CR 2 (approx. 1 mile west of Fowler)	Intersection of CR 6 and Highway 50 (east of Fowler).	Gravel Road	600	Alignment goes straight south to Road Jj 5/10, then east to the tank south of Fowler, north to Road Kk 5/10 (between CR 5 and CR 6), east to CR 6, and north to Hwy 50.
	3	**Fowler**	**La Junta**			
6,088	3A	Near tank North of Fowler and at intersection of Hwy 96 Spur and the Main Conduit.	Approx 3,800 feet south of Hwy 96 on CR Ln	Prairie	600	Alignment goes straight east and then south.

* Route revised at EIS meeting held at TSC on July 26, 2011. Project hydraulics, ground profiles and cost impacts are minor and were not revised.

Arkansas Valley Conduit - Revised Comanche South
Reach Summary Descriptions and
Corridor Widths for EIS / Apprasial Level Design

August 6, 2012

Length	Reach	Beginning Point	Ending Point	Corridor Basic Description	Corridor Width, ft	Summary
3,952	3B.1	Approx 3,800 feet south of Hwy 96 on CR Ln	Half mile north of Arkansas River	Prairie	600	Alignment is due south on CR 6
5,266	3B.2	Half mile north of Arkansas River	Intersection of CR 6 and Highway 50 (east of Fowler).	Prairie	600	Alignment is due south on CR 6 and crosses Arkansas River to Hwy 50.
21,379	3E.1	Intersection of CR 6 and Highway 50 (east of Fowler).	Valley Water Delivery	Grass/Gravel	600	Alignment is adjacent to Hwy 50.
8,508	3E.2	Valley Water Delivery	Center of Manzanola	Grass/Gravel	600	Alignment is adjacent to Hwy 50.
1,636	Manzanola spur	Center of Manzanola	Manzanola Delivery	Grass/Gravel	100	Installed in South St.
8,445	3G	Center of Manzanola	Intersection of Hwy 50 and CR 13 (east of Manzanola)	Grass/Gravel	600	Alignment is adjacent to railroad north of Hwy 50 and then crosses Hwy 50.
27,238	3H	Intersection of Hwy 50 and CR 13 (east of Manzanola)	Intersection of CR 16 and CR Gg (3,500 feet south of Hwy 50).	Grass/Gravel	400	Alignment follows CR 13, CR Hh, CR 135, CR 14, and CR Gg.
29,317	3J.1	Intersection of CR 16 and CR Gg (3,500 feet south of Hwy 50).	Intersection of CR Ee and Hwy 71 (south of Rocky Ford).	Grass/Gravel	400	Alignment follows CR 16, Hwy 202, CR 17, CR Ee straight east to Intersection of Hwy 71
960	RF Spur	Main Line	Rocky Ford delivey box	Asphalt and/or Concrete	200	Spur to WTP
8,594	3J.2	Intersection of CR Ee and Hwy 71 (south of Rocky Ford).	Intersection of Hwy 50 and CR 21 (east of Rocky Ford).	Grass/Gravel	400	Alignment follows CR Ee from Intersection of Hwy 71 straight east to CR 21, north on CR 21 to Hwy 50 (RR and Hwy 50 crossing).
23,939	3K.1	Intersection of Hwy 50 and CR 21 (east of Rocky Ford).	Intersection of Hwy 266 and Ft Lyons Storage Canal	Grass/Gravel	400	Alignment follows CR 21 to Hwy 266 and is then adjacent to Hwy 266. (Alignment crosses 4 canals.)
7,387	3K.3	Intersection of Hwy 266 and Ft Lyons Storage Canal	Intersection of CR 25 and Hwy 266	Grass/Gravel	400	Alignment follows adjacent to Hwy 266. (Alignment crosses 1 canal.)
10,256	3K.2	Intersection of CR 25 and Hwy 266	Approx 700 feet West of Intersection of CR 27 and Hwy 266	Grass/Gravel	400	Alignment follows CR 21 to Hwy 266 and is then adjacent to Hwy 266.
21,181	3L.1	Intersection of CR Ee and Hwy 71 (south of Rocky Ford).	Intersection of Hwy 71 and Hwy 10	Grass/Gravel	200	Alignment is adjacent to Hwy 71.
44,931	3L.2	Intersection of Hwy 50 and CR 21 (east of Rocky Ford).	West Side of La Junta near Intersection of Hwy 10 and Hwy 50	Grass/Gravel	200	Alignment is adjacent to Hwy 50.
3,191	3L.4	Swink Delivery	Intersection of Hwy 50 and CR 25	Grass/Gravel	600	Alignment is adjacent to CR 25. South Swink Delivery
11,244	3O	Approx 700 feet West of Intersection of CR 27 and Hwy 266	Intersection of CR 29 and Hwy 266	Grass/Gravel	400	Alignment is adjacent to Hwy 266.
5,332	3Q	Intersection of CR 29 and Hwy 266	Intersection of Hwy 109 and Hwy 266	Grass/Gravel	400	Alignment is adjacent to Hwy 266.
6,628	3S.2	Intersection of CR 28 and 6th St	Intersection of 6th St and Raton	Asphalt and/or Concrete	100	Alignment goes east on 6th St and stops at Raton.
2,626	Homested Spur	Intersection of CR 28 and 6th St	Homested Delivery	Asphalt and/or Concrete	200	Alignment goes south on Raton and stops at La Junta WTP Storage tank.
3,154	La Junta Spur	Intersection of 6th St and Raton	La Junta WTP Storage tank	Asphalt and/or Concrete	100	Alignment goes south on Raton and stops at La Junta WTP Storage tank.
3,501	3S.3	Intersection of 6th St and Raton	La Junta WTP	Asphalt and/or Concrete	100	Alignment goes east on 6th St, crosses RR, and stops at La Junta WTP.
2,031	3T.3	La Junta WTP	King Arroyo to 300 feet south of Hwy 50	Grass/Gravel and Asphalt/Concrete	600	Alignment follows King Arroyo north of WTP to 300 feet south of Hwy 50

Length	Reach	Beginning Point	Ending Point	Corridor Basic Description	Corridor Width, ft	Summary
3,847	3T.2	300 feet south of Hwy 50	Intersection of Elm St and Chalmers St in north La Junta	Grass/Gravel and Asphalt/Concrete	600	Alignment crosses Hwy 50, RR, and Arkansas River, and then follows Elm St to Intersection with Chalmers St
2,919	3T.1	Intersection of Elm St and Chalmers St in north La Junta	Intersection of Canal Rd and Elm St in north La Junta	Grass/Gravel and Asphalt/Concrete	100	Alignment follows Elm St
13,753	3U	Intersection of Canal Rd and Elm St in north La Junta	Intersection of Hwy 109 and CR Ee. Top of hill and west of airport	Prairie	400	Alignment crosses a canal and is adjacent to Hwy 109
15,675	3V	Intersection of Hwy 109 and CR Ee. Top of hill and west of airport	Intersection of Hwy 109 and CR Ee	Prairie	400	Alignment is adjacent to Hwy 109.
10,919	3X Swink Spur	Intersection of Hwy 50 and CR 25 (0.5 miles east of Swink)	Intersection of CR 25 and Hwy 10.	Grass/Gravel	200	Alignment is parallel to CR 25 and is straight south of Hwy 50. This is the spur to South Swink.
715	Bents Fort Spur	Alignment is adjacent to Hwy 109, north for 1500 feet from Canal St	Bents Fort Spur to storage tanks.	Prairie	400	Alignment is adjacent to Hwy 109, north for 1500 feet from Canal St. .Bents Fort Spur to storage tanks.
	4	**La Junta**	**Las Animas**			
16,142	4A.2	Intersection of Hwy 109 and Hwy 266	Intersection of CR Hh and Cr 33	Grass/Gravel	600	Alignment is east on CR Hh, to CR 33, Southside Delivery
96,100	4B.1	La Junta WTP	Las Animas Delivery	Grass/Gravel	600	Alignment goes east on 6th St, east on CR Aa, north on CR 31, follows Hwy 50 to Las Animas, crosses a canal and the RR, north on Hurd Ave, east on 6th St, north on Peck Ave, east to 4th and Lois, delivery point.
9,004	4B.2	Las Animas Delivery	Intersection of Hwy 194 and Hwy 50 North of Las Animas	Grass/Gravel	600	Alignment goes from delivery point at east to 4th and Lois, north on Lois Ave, northeast (north of Las Animas) to Hwy 50, north on Hwy 50, and crosses Arkansas River. Flow is in reverse direction for Alternatives 3, 4 and 5, when this becomes the Las Animus Spur.
	5	**Las Animas**	**Lamar**			
42,020	5A	On Exist Railroad Approx 2700 feet north of Intersection of Hwy 194 and Hwy 50 North of Las Animas.	Near Intersection of CR Kk and Hwy 50	Railroad Grade	600	Alignment follows existing railroad grade (RR is abandoned and tracks removed).
39,208	5B	Intersection of Hwy 194 and Hwy 50 North of Las Animas	Near Intersection of CR Kk and Hwy 50	Grass/Gravel	600	Alignment is adjacent to Hwy 50.
90,320	5C	Near Intersection of CR Kk and Hwy 50	Eads Spur at Intersection of Hwy 50 and CR 34	Grass/Gravel	600	Alignment is adjacent to Hwy 50.
5,484	5D Spur	Near Intersection of CR 24 and Hwy 50 in Hasty	McClave Tie-In at Intersection of CR 24 and CR Ll (approx. 1 mile north of Hasty)	Grass/Gravel	600	Mc Clave Spur alignment is adjacent to CR 24.
626	5E Spur	Near Intersection of CR 24 and Hwy 50 in Hasty	Hasty Tie-In Approx. 1 block south of Hwy 50	Asphalt and/or Concrete	100	Hasty Spur alignment follows CR 24 south to Hasty tie-in.
10,519	5F	Eads Spur at Intersection of Hwy 50 and CR 34	Intersection of CR 1 and Hwy 50 (1 mile west of intersection of Hwy 287 and Hwy 50)	Grass/Gravel	600	Alignment is adjacent to Hwy 50.

Arkansas Valley Conduit - Revised Comanche South
Reach Summary Descriptions and
Corridor Widths for EIS / Apprasial Level Design

August 6, 2012

Length	Reach	Beginning Point	Ending Point	Corridor Basic Description	Corridor Width, ft	Summary
19,750	5G Spur	Intersection of CR 1 and Hwy 50 (1 mile west of intersection of Hwy 287 and Hwy 50)	South Side of Wiley	Agriculture	400	Wiley Spur alignment is north on CR 1, and then east across an agricultural field to the south side of Wiley.
4,833	5H.1	Intersection of CR 1 and Hwy 50 (1 mile west of intersection of Hwy 287 and Hwy 50)	Arkansas River crossing	Prairie	600	Alignment goes south to Arkansas River crossing
31,354	5H.2	Arkansas River crossing, north side	Arkansas River crossing, south side	Prairie	600	Alignment goes south and crosses Arkansas River, east on CR Hh, south on CR 5 to 1000 ft south of CR Gg 5 and canal crossing.
31,323	5H.3	Arkansas River crossing, south side	Lamar Tanks south of Lamar	Prairie	600	Alignment goes south on CR 5 from 1000 ft south of CR Gg 5, east on Prairie Dr, south on CR 7, and southeast to Lamar's tanks (route is south of golf course).
	6	**Fowler**	**Sugar City**			
54,706	6A	Near tank North of Fowler and at intersection of Hwy 96 Spur and the Main Conduit.	Intersection of Hwy 96 and County Line (14,000 feet southwest of Ordway along Hwy 96)	Grass/Gravel	400	Alignment is adjacent to Hwy 96.
16,441	6C.2	Intersection of Hwy 96 and County Line (14,000 feet southwest of Ordway along Hwy 96)	Intersection of Hwy 96 and Hwy 71, east of Ordway	Grass/Gravel	400	Alignment is adjacent to Hwy 96.
25,163	6C.1	Intersection of Hwy 96 and Hwy 71, east of Ordway	Sugar City	Grass/Gravel	400	Alignment is adjacent to Hwy 96.
2,395	96 Pipeline Co Spur	Intersection of Hwy 96 and Hwy 71, east of Ordway	96 Pipeline Co delivery	Grass/Gravel	200	Alignment is adjacent to Hwy 71.
	7	**Intersection of Hwy 50 and CR 34**	**Eads**			
31,633	7B	Eads Spur at Intersection of Hwy 50 and CR 34	Intersection of CR 34 and CR Ss	Grass/Gravel	400	Alignment is north on CR 34 to CR Ss
27,056	May Valley Spur	Intersection of CR 34 and CR Ss	May Valley Delivery	Grass/Gravel	200	Alignment is east on CR Ss to May Valley Deliver near existing storage tank to the south
108,338	7A	Intersection of CR 34 and CR Ss	Eads	Grass/Gravel	400	Alignment is north on CR 34, west on CR Ww, north on CR 40 to Eads, east on Lowell Ave, and north on Maine St.

ATTACHMENT G

REVISED COMANCHE SOUTH ENGINEERING SUPPORT DATA

CONTENTS –

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Revised Comanche South

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Reach 1					**$8,775,202**
		Reach 1 Pipeline					$1,349,400
		Pumping Plant (PP1 before WTP)					$1,500,000
		Pumping Plant (PP2 after WTP)					$2,900,000
		Regulating Tank (Sum of Civil Sheet + Hydraulic Sheet)					$1,561,362
		Air Chamber PP1 before WTP (Sum of Civil Sheet + Hydraulic Sheet)					$121,300
		Air Chamber PP2 after WTP (Sum of Civil Sheet + Hydraulic Sheet)					$181,500
		Valve Vault PP1 before WTP (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$464,350
		Meter Vault PP1 before WTP (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$430,995
		Meter Vault PP2 after WTP (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$196,995
		Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$69,300
		Reach 2					**$67,593,670**
		Reach 2 Pipeline					$67,001,870
		Boone Spur Pipeline					$459,200
		Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$132,600
		Reach 3					**$57,314,945**
		Reach 3 Pipeline					$35,221,330
		Manzanola Spur Pipeline					$101,245
		S. Swink Spur Pipeline					$567,450
		Homestead Spur Pipeline					$146,600
		LaJunta Spur Pipeline					$468,640
		LaJunta Water Storage Tank (Sum of Civil Sheet + Hydraulic Sheet)					$10,302,475
		Fowler Water Storage Tank (Sum of Civil Sheet + Hydraulic Sheet)					$8,800,605
		Fowler North Tank Access Road					$693,100
		Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$1,013,500
		Reach 4					**$35,543,705**
		Reach 4 Pipeline					$33,940,500
		Hasty Spur Pipeline					$56,665
		McClave Spur Pipeline					$310,790
		Wiley Spur					$773,650
		Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$462,100
		Highway 96 Spur					**$6,669,930**
		Hwy 96 Spur Pipeline					$6,053,300
		96 Pipeline Co. Spur Pipeline					$137,530
		Participant Tie-In Vaults (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$479,100

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
TSC Design Team	TSC Design Team	TSC Estimating Team	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
April-12	TSC Design Team	05/31/12	6/4/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Revised Comanche South Summary Sheet

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Eads Spur (Includes May Valley)					**$9,409,890**
		Eads Spur Pipeline					$4,954,600
		Eads and May Valley Spur Pipeline					$1,974,400
		May Valley Spur Pipeline					$1,836,450
		Eads Booster Plant					$340,000
		Eads and May Valley Air Chamber (Sum of Civil Sheet and Hydraulic Sheet)					$90,600
		Eads and May Valley Meter Vault (Sum of Civil Sheet + Mechanical Sheet + Hydraulic Sheet)					$213,840
		Loop					**$6,587,309**
		North Loop Pipeline					$5,256,650
		South Side and East End Spur					$635,300
		Bent's Fort Spur Pipeline					$60,608
		Rocky Ford and Hancock Spur Pipeline					$96,351
		Participant Tie-In Vaults					$538,400
		Crossings					**$26,410,000**
		Dewatering					**$3,710,000**
		Dust Abatement					**$4,000,000**
		Interconnect (Sum of Pipe & Valve Sheets + Civil Sheets + Cofferdam Sheet)					**$4,171,227**
		Water Treatment Plant*					**$25,924,061**
		* Costs include April 16, 2012 costs from sub-consultant B&V (Estimate sheets dated 12-01-2011).					

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
TSC Design Team	TSC Design Team	TSC Estimating Team	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
April-12	TSC Design Team	05/31/12	6/6/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:			
Arkansas Valley Conduit Revised Comanche South Summary Sheet	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Subtotal 1					$256,109,939.00
		Mobilization	5%	+/-			$13,000,000.00
		Subtotal 1 with Mobilization					**$269,109,939.00**
		Design Contingencies	12%	+/-			$30,890,061.00
		Allowance for Procurement Strategies (APS)	0.0%	+/-			$0.00
		Type of solicitation assumed is: Full and open sealed bid competition					
		CONTRACT COST					**$300,000,000.00**
		Construction Contingencies	25%	+/-			$80,000,000.00
		FIELD COST					**$380,000,000.00**
		Non-Contract Costs*					$125,000,000.00
		CONSTRUCTION COST					**$505,000,000.00**

* Non-Contract Costs were produced and supplied by a joint effort of Eastern Colorado Area Office and Great Plains Region with input from the Technical Service Center.

Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.

QUANTITIES		PRICES	
BY TSC Design Team	CHECKED TSC Design Team	BY TSC Estimating Team	CHECKED 5/31/12
DATE PREPARED April-12	PEER REVIEW / DATE TSC Design Team	DATE PREPARED 05/31/12	PEER REVIEW / DATE 6-4-12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _1_ OF _3_

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South,Max Day Condition 4
Reach 1 from Pueblo Res. to WTP
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	11	acre	$1,000.00	$11,000.00
		Grubbing	8140	1.1	acre	$2,500.00	$2,750.00
		Stripping (6" thick)	8140	8,900	cy	$4.00	$35,600.00
		Seeding	8140	11	acre	$1,500.00	$16,500.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	25,000	cy	$6.00	$150,000.00
		Rock Excavation (0.25:1) outside urban area	8140	1,650	cy	$35.00	$57,750.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	450	cy	$50.00	$22,500.00
		Embedment & Cover Backfill	8140	24,000	cy	$5.00	$120,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	3,000	cy	$14.00	$42,000.00
		SUBTOTAL THIS SHEET					**$458,100.00**

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/24/12	Steven J. Robertson, PE	05/11/12	5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _2_ OF _3_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 Reach 1 from Pueblo Res. to WTP Civil	Fryingpan-Arkansas Project - Arkansas Valley Conduit	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		36" dia. steel, 0.1501" thick (60 #/ft)-mortar lined	8140	5,600	lin ft	$140.00	$784,000.00
		epoxy tape coated, rubber gaskets, HC=125					
		338,280 lbs total steel					
		Isolation Valves (Manual operation):					
		36" class 150 (psig) butterfly valve with operator	8140	1	ea	$17,000.00	$17,000.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric					
		ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$808,000.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline
Revised Comanche South, Max Day Condition 4
Reach 1 from Pueblo Res. to WTP
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$12,000.00	$12,000.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 6" Combination Air Valve (1ea)	8140	1	ea		
		- 6" Butterfly Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Manholes-Buried: (to include)		2.00	ea	$11,500.00	$23,000.00
		-36" pipe outlet (1 ea)	8140	2	ea		
		-36" blind flange (1 ea)	8140	2	ea		
		Cathodic Protection	8140	1	ls	$40,000.00	$40,000.00
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$83,300.00**
		SUBTOTAL REACH 1					**$1,349,400.00**

QUANTITIES		PRICES	
BY: Jeremy Lorberau	CHECKED: W. Chris Duke, PE	BY: Jeff Morris	CHECKED: 5/31/12
DATE PREPARED: 04/24/12	PEER REVIEW / DATE: Steven J. Robertson, PE	DATE PREPARED: 05/11/12	PEER REVIEW / DATE: 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Pumping Plant (PP1 before WTP)
Revised Comanche South
Reach 1: Pueblo Reservoir to WTP

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural/Electrical/Mechanical:					
		Booster P.P. Below Dam (untreated water)					
	1	Pumping Plant PP1 (Total Q = 33.24 cfs w/ 3% wf)	86-66420	1	LS	$1,500,000.00	$1,500,000.00
		Using pumping plant program					
		Plant PP1 - 8.31 cfs each; 105 feet TDH;					
		Unit Brake HP: 117.0 hp; Motors: 125 hp each @ 480 volts					
		4 pumps; vertical; supply voltage (69 kV)					
		Structures And Improvements					
		Waterways					
		Pumps and Motors					
		Accessory Electrical					
		Miscellaneous Equipment					
		Switchyards					
		SUBTOTAL PUMPING PLANT (PP1 BEFORE WTP)					**$1,500,000.00**

QUANTITIES		PRICES	
BY: Bob Zelenka	REVIEWED: Toby Turnage	BY: Jeff Morris	CHECKED: 5/31/12
DATE PREPARED: 4/19/2012	PEER REVIEW / DATE: Toby Turnage 4.20.12	DATE PREPARED: 05/11/12	PEER REVIEW / DATE: 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Pumping Plant (PP2 after WTP)
Revised Comanche South
Reach 1: Pueblo Reservoir to WTP

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural/Electrical/Mechanical:					
		WTP Clearwell P.P. (treated water)					
	1	Pumping Plant PP2 (Total Q = 30.76 cfs w/ 0% wf)	86-68420	1	LS	$2,900,000.00	$2,900,000.00
		Using pumping plant program					
		Pumping Plant PP2 - 7.69 cfs each; 380 feet TDH;					
		Unit Brake HP: 412.8 hp; Motors: 450 hp each @ 4160 volts					
		4 pumps; vertical; supply voltage (69 kV)					
		Structures And Improvements					
		Waterways					
		Pumps and Motors					
		Accessory Electrical					
		Miscellaneous Equipment					
		Switchyards					
		SUBTOTAL PUMPING PLANT (PP2 AFTER WTP)					$2,900,000.00

QUANTITIES		PRICES	
BY Bob Zelenka	**REVIEWED** Toby Turnage	**BY** Jeff Morris	**CHECKED** 5/31/12
DATE PREPARED 4/19/2012	**PEER REVIEW / DATE** Toby Turnage 4.20.12	**DATE PREPARED** 05/11/12	**PEER REVIEW / DATE** 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:
Arkansas Valley Conduit Regulating Tank Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION: GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard	86-68120	265	yd^3	$6.00	$1,590.00
		Access Roads	86-68120	37	yd^3	$6.00	$222.00
		Excavation (tank foundation)	86-68120	105	yd^3	$25.00	$2,625.00
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill (tank foundatio	86-68120	85	yd^3	$25.00	$2,125.00
		Gravel Surfacing (6 inches thick)					
		Service Yard	86-68120	228	yd^3	$40.00	$9,120.00
		Access Roads	86-68120	37	yd^3	$40.00	$1,480.00
		Chain Link Fence	86-68120	480	lin ft	$40.00	$19,200.00
		8.0' High fence - 7.0' fabric with 3 strands of barbed wire on top. One 20' wide double swing gate					
		Reinforced Concrete for Pad & Stem Foundation	86-68120	1	ls	$25,000.00	$25,000.00
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 20 miles					
		Concrete: 27 yd3					
		Reinforcement (Assume 135 lb/yd3): 3535 lbs					
		Cement (Assume: 0.282 ton/yd3): 7.5 tons					
		SUBTOTAL THIS SHEET					$61,362.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/16/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:			
Arkansas Valley Conduit Regulating Tank Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Frylngton-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic Equipment/Mechanical					
		Steel regulating tank					
		1 - 1,250,000-gallon steel regulating tank	86-68420	1	ls	$1,500,000.00	$1,500,000.00
		AWWA D100 compliance					
		tank height 85 feet					
		Inside diameter 50 feet					
		SUBTOTAL THIS SHEET					**$1,500,000.00**

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Lucas Adams	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/15/2012	PEER REVIEW / DATE Nathan Nakamato 5/1/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Air Chamber (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Foundation	86-68120	1	ls	$4,300.00	$4,300.00
		(slab-on-grade foundation type)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 20 miles					
		Concrete: 3.7 yd3					
		Reinforcement (Assume 135 lb/yd3): 510 lbs					
		Cement (Assume: 0.282 ton/yd3): 1.1 tons					
		SUBTOTAL THIS SHEET					$4,300.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/16/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Air Chamber (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic equipment/Mechanical					
		Air Chamber	86-68420	1	ls	$117,000.00	$117,000.00
		4,702-gallon (629 cubic feet)					
		steel air chamber					
		cylinder height 14 feet					
		cylinder diameter 7 feet					
		air chamber weight 11,700 pounds					
		mounted air compressor 5 horsepower					
		SUBTOTAL THIS SHEET					$117,000.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/16/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Air Chamber (PP2 after WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Foundation	86-68120	1	ls	$6,500.00	$6,500.00
		(slab-on-grade foundation type)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 20 miles					
		Concrete: 5.6 yd3					
		Reinforcement (Assume 135 lb/yd3): 760 lbs					
		Cement (Assume: 0.282 ton/yd3): 1.6 tons					
		SUBTOTAL THIS SHEET					$6,500.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/16/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Air Chamber (PP2 after WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic equipment/Mechanical					
		Air Chamber	86-68420	1	ls	$175,000.00	$175,000.00
		9,042-gallon (1,209 cubic feet)					
		steel air chamber					
		cylinder height 16 feet					
		cylinder diameter 9 feet					
		air chamber weight 17,300 pounds					
		mounted air compressor 52 horsepower					
		SUBTOTAL THIS SHEET					**$175,000.00**

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED NN 5/31/12
DATE PREPARED 4/4/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE DD 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Valve Vault (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Vaults	86-68120	1	ls	$100,000.00	$100,000.00
		(Assumed: 14' W x 23' L x 20' D)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 20 miles					
		Concrete: 110 yd3					
		Reinforcement (Assume 135 lb/yd3): 14,790 lbs					
		Cement (Assume: 0.282 ton/yd3): 31 tons					
		Access & Service Hatches	86-68120	1	ls	$36,000.00	$36,000.00
		Access hatch two 3' x3'					
		(The Bilco Co Type Q single leaf)					
		Service hatch two 5' x 10'					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork	86-68120	350	lbs	$13.00	$4,550.00
		(40-D-6601, Ladder Type 2)					
		SUBTOTAL THIS SHEET					$140,550.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/18/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Valve Vault (PP1 before WTP)
Revised Comanche South
Reach 1: Pueblo Reservoir to WTP
Mechanical Equipment

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume valve vault size=14'x23'x20'd					
		assume 1 vault @ PP 1					
	1	Valve vault ventilation equipment	86-68410	1	ls	$8,700.00	$8,700.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 1000 cfm @ 0.25" w.g.s.p., 1/2 Hp					
		(16 ft)-12" diam, 16 ga., galv. steel duct					
		(2)-12" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-12"x16" reducer, sch 20, galv. steel pipe					
		(4)-16" diam, stainless steel bird screens					
		(2)-12"x16" reducer, 16 ga, galv. steel duct					
		(2)-12" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/2 Hp					
		(1)-fan wall switch and box					
	2	Valve vault heater	86-68410	2	ea	$800.00	$1,600.00
		3 kW unit heater					
		thermostatically controlled					
	3	In-line plate strainer	86-68410	1	ea	$65,000.00	$65,000.00
		Bolted cover design					
		Stainless steel, w/ 1/2" holes					
		flanged for 36" pipe					
		SUBTOTAL THIS SHEET					$75,300.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/11/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Valve Vault (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic equipment/Mechanical					
		Valve Vault	86-68420				
		36-inch pressure reducing valve		1	ea	$200,000.00	$200,000.00
		1 valve					
		Cla-Val 150-pound					
		36-inch manually-operated butterfly valve		2	ea	$17,000.00	$34,000.00
		2 valves, 3,425 lbs each					
		AWWA Class 150-B					
		30-inch manually-operated butterfly valve		1	ea	$14,500.00	$14,500.00
		1 valve					
		AWWA Class 150-B					
						SUBTOTAL THIS SHEET	$248,500.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Meter Vault (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Frylngton-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Vaults	86-68120	1	ls	$70,000.00	$70,000.00
		(Assumed: 14' W x 17' L x 18' D)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 20 miles					
		Concrete: 80 yd3					
		Reinforcement (Assume 135 lb/yd3): 10,900 lbs					
		Cement (Assume: 0.282 ton/yd3): 23 tons					
		Access & Service Hatches	86-68120	1	ls	$36,000.00	$36,000.00
		Access hatch two 3' x3'					
		(The Bilco Co Type Q single leaf)					
		Service hatch two 5' x 10'					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork	86-68120	315	lbs	$13.00	$4,095.00
		(40-D-6601, Ladder Type 2)					
		SUBTOTAL THIS SHEET					**$110,095.00**

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/17/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _3_

FEATURE:	PROJECT:			
Arkansas Valley Conduit Meter Vault (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP Mechanical Equipment	Fryington-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume meter vault size=11.25'x11.25'x16.7'd					
		assume 1 vault @ Pueblo PP 1					
	1	Meter vault ventilation equipment	86-68410	1	ls	$6,600.00	$6,600.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 450 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(16 ft)-8" diam, 16 ga., galv. steel duct					
		(2)-8" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-8"x12" reducer, sch 20, galv. steel pipe					
		(4)-12" diam, stainless steel bird screens					
		(2)-8"x12" reducer, 16 ga, galv. steel duct					
		(2)-8" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	1	ea	$800.00	$800.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter	86-68410	1	ea	$65,000.00	$65,000.00
		8-path ultrasonic, 36" diam					
		16 transducers with cables and 1 transmitter console					
		SUBTOTAL THIS SHEET					$72,400.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/11/12
DATE PREPARED 4/17/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Meter Vault (PP1 before WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic equipment/Mechanical					
		Meter Vault	86-68420				
		36-inch pressure reducing valve		1	ea	$200,000.00	$200,000.00
		1 valve					
		Cla-Val 150-pound					
		36-inch manually-operated butterfly valve		2	ea	$17,000.00	$34,000.00
		2 valves, 3,425 lbs each					
		AWWA Class 150-B					
		30-inch manually-operated butterfly valve		1	ea	$14,500.00	$14,500.00
		1 valve					
		AWWA Class 150-B					
		SUBTOTAL THIS SHEET					$248,500.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/17/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Meter Vault (PP2 after WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Vaults	86-68120	1	ls	$70,000.00	$70,000.00
		(Assumed: 14' W x 17' L x 18' D)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 20 miles					
		Concrete: 80 yd3					
		Reinforcement (Assume 135 lb/yd3): 10,900 lbs					
		Cement (Assume: 0.282 ton/yd3): 23 tons					
		Access & Service Hatches	86-68120	1	ls	$36,000.00	$36,000.00
		Access hatch two 3' x3'					
		(The Bilco Co Type Q single leaf)					
		Service hatch two 5' x 10'					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork	86-68120	315	lbs	$13.00	$4,095.00
		(40-D-6601, Ladder Type 2)					
		SUBTOTAL THIS SHEET					$110,095.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/17/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:			
Arkansas Valley Conduit Meter Vault (PP2 after WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP Mechanical Equipment	Fryington-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume meter vault size=11.25'x11.25'x16.7'd					
		assume 1 vault @ Pueblo PP 2					
	1	Meter vault ventilation equipment	86-68410	1	ls	$6,600.00	$6,600.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 450 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(16 ft)-8" diam, 16 ga., galv. steel duct					
		(2)-8" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-8"x12" reducer, sch 20, galv. steel pipe					
		(4)-12" diam, stainless steel bird screens					
		(2)-8"x12" reducer, 16 ga, galv. steel duct					
		(2)-8" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	1	ea	$800.00	$800.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter	86-68410	1	ea	$65,000.00	$65,000.00
		8-path ultrasonic, 36" diam					
		16 transducers with cables and 1 transmitter console					
		SUBTOTAL THIS SHEET					$72,400.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/17/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:
Arkansas Valley Conduit Pueblo Meter Vault (PP2 after WTP) Revised Comanche South Reach 1: Pueblo Reservoir to WTP	Fryington-Arkansas Project
WOID: AF523	ESTIMATE LEVEL: Appraisal
REGION: GP	UNIT PRICE LEVEL: 1 2011
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic equipment/Mechanical					
		Meter Vault	86-68420				
		30-inch manually-operated butterfly valve		1	ea	$14,500.00	$14,500.00
		1 valve					
		AWWA Class 150-B					
		SUBTOTAL THIS SHEET					$14,500.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED A.J. Quiniones	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/23/2012	PEER REVIEW / DATE Rick Frisz 4-23-12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 1: Pueblo Res. To WTP	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Participant Tie-In Vaults	86-68120	1	ea	$35,000.00	$35,000.00
		Reinforced Concrete for Vaults					
		(Assumed: 12' W x 9' L x 10'-8" D)					
		(Assume: f'_c=4,500 psi)					
		Source: 50 miles					
		Concrete: 17.5 yd3					
		Reinforcement (Assume 135 lb/yd3): 2,360 lbs					
		Cement (Assume: 0.282 ton/yd3): 5 tons					
		Access & Service Hatches					
		Access hatch 3' x3': 2 ea					
		(The Bilco Co Type Q single leaf)					
		Service hatch 3' x 5': 1 ea					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork					
		Steel (ASTM A36): 150 lbs					
		(Ref. 40-D-6601, Ladder Type 2)					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard: 12 yd3					
		Excavation: 195 yd3					
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill: 155 yd3					
		Gravel Surfacing (6 inches thick)					
		Service Yard: 10 yd3					
		SUBTOTAL THIS SHEET					$35,000.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti,	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/18/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 1: Pueblo Res. To WTP Mechanical Equipment	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume participant tie-in vault size=12' W x 9' L x 10'-8" D					
	1	Meter vault ventilation equipment	86-68410	1	ls	$5,600.00	$5,600.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 200 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(12 ft)-6" diam, 16 ga., galv. steel duct					
		(2)-6" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-6"x8" reducer, sch 20, galv. steel pipe					
		(4)-8" diam, stainless steel bird screens					
		(2)-6"x8" reducer, 16 ga, galv. steel duct					
		(2)-6" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	1	ea	$800.00	$800.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter system	86-68410	1	ea	$13,000.00	$13,000.00
		6" diameter, microprocessor-based,					
		flanged electro-magnetic flowmeter with					
		remote wall-mounted transmitter					
		weight= approx 85 lbs					
		120 Volt AC					
		SUBTOTAL THIS SHEET					$19,400.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCO 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 1: Pueblo Res. To WTP

PROJECT:
Fryington-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVEL:**	**Jan-11**
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical/Hydraulic equipment					
		Participant Tie-In Vaults (1 vault)	86-68420				
		6-inch pressure reducing valve		1	ea	$7,800.00	$7,800.00
		1 valve, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
		6-Inch manually-operated butterfly valve		1	ea	$2,800.00	$2,800.00
		1 valve, 170 lbs each					
		Henry Pratt Class 350					
		6-inch buried square-nut operated butterfly		1	ea	$3,300.00	$3,300.00
		valve with valve box					
		1 valve, 325 lbs each					
		Henry Pratt Class 350					
		1-inch air valve		1	ea	$1,000.00	$1,000.00
		combination air valve					
		1 air valve, 35 lbs each					
		SUBTOTAL THIS SHEET					**$14,900.00**

QUANTITIES		PRICES	
BY	**REVIEWED**	**BY**	**CHECKED**
Ken Smith	Nathan Nakamoto	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
4/18/2012	Rick Frisz 4/20/12	05/11/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 2 from WTP to Fowler N. Tank
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	500	acre	$800.00	$400,000.00
		Grubbing	8140	50	acre	$2,000.00	$100,000.00
		Stripping (6" thick)	8140	400,000	cy	$2.00	$800,000.00
		Seeding	8140	500	acre	$800.00	$400,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	1,050,000	cy	$4.00	$4,200,000.00
		Rock Excavation (0.25:1) outside urban area	8140	68,000	cy	$25.00	$1,700,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	20,000	cy	$30.00	$600,000.00
		Embedment & Cover Backfill	8140	1,050,000	cy	$3.00	$3,150,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	120,000	cy	$8.00	$960,000.00
		Urban Earthwork Items: (Vertical Trench)					
		Soil Excavation (box w/supports,~10'deep)	8140	6,200	cy	$11.00	$68,200.00
		Pipe Bedding (Select material, 4" thick)	8140	280	cy	$50.00	$14,000.00
		Embedment & Cover Backfill	8140	5,100	cy	$7.00	$35,700.00
		Compacting Embedment Backfill	8140	5,100	cy	$14.00	$71,400.00
		(Urban trench will require traffic control, signage,					
		and detours for duration work)					
		(urban trench length of 4123ft of 30" pipe)					
		Traffic Control/Detours Urban Excavation		1	mo	$15,000.00	$15,000.00
		Pavement & Base/Remove & Replace Urban Excavation		4,123	lin ft	$60.00	$247,380.00
		Utility Relocation & Repair Urban Excavation		4,123	lin ft	$30.00	$123,690.00
		All urban earthwork quantities above are for a straight wall "vertical" trench.					
		SUBTOTAL THIS SHEET					$12,885,370.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCW 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 2 from WTP to Fowler N. Tank
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		36" dia. steel, 0.1501" thick (60 #/ft)-mortar lined	8140	19,000	lin ft	$140.00	$2,660,000.00
		epoxy tape coated, rubber gaskets, HC=125					
		1,123,740 lbs total steel					
		36" dia. steel, 0.250" thick (100 #/ft)-mortar lined	8140	52,000	lin ft	$155.00	$8,060,000.00
		epoxy tape coated, rubber gaskets, HC=500					
		5,227,200 lbs total steel					
		36" dia. steel, 0.3125" thick (125 #/ft)-mortar lined	8140	23,000	lin ft	$175.00	$4,025,000.00
		epoxy tape coated, rubber gaskets, HC=625					
		2,843,125 lbs total steel					
		30" dia. steel, 0.3125" thick (106 #/ft)-mortar lined	8140	66,000	lin ft	$165.00	$10,890,000.00
		epoxy tape coated, rubber gaskets, HC=750					
		6,996,106 lbs total steel					
		30" dia. steel, 0.375" thick (127 #/ft)-mortar lined	8140	9,500	lin ft	$195.00	$1,852,500.00
		epoxy tape coated, rubber gaskets, HC=875					
		1,204,849 lbs total steel					
		30" dia. steel, 0.4375" thick (148 #/ft)-mortar lined	8140	11,000	lin ft	$225.00	$2,475,000.00
		epoxy tape coated, rubber gaskets, HC=1000					
		1,588,632 lbs total steel					
		30" dia. steel, 0.4375" thick (148 #/ft)-mortar lined	8140	88,000	lin ft	$225.00	$19,800,000.00
		epoxy tape coated, rubber gaskets, HC=1125					
		13,009,792 lbs total steel					
		Isolation Valves (Manual operation):					
		36" class 150 (psig) butterfly valve with operator	8140	1	ea	$17,000.00	$17,000.00
		36" class 250 (psig) butterfly valve with operator	8140	2	ea	$29,000.00	$58,000.00
		36" ANSI class 150 (psig) b-fly valve w/ operator	8140	1	ea	$43,000.00	$43,000.00
		30" ANSI class 300 (psig) b-fly valve w/ operator	8140	7	ea	$65,000.00	$455,000.00
		Isolation Valve Manholes (to include):	8140	11	ea	$7,000.00	$77,000.00
		60" I.D. x 6" wall precast flat top with concentric					
		ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		SUBTOTAL THIS SHEET					$50,412,500.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 2 from WTP to Fowler N. Tank
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Isolation Valve Manholes cont'd (to include):					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		Air Valve Structures (to include):		50	ea	$7,500.00	$375,000.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	500	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	200	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	4,750	lbs		
		- 3" Combination Air Valve (1ea)	8140	50	ea		
		- 3" Ball Valves (1 ea)	8140	50	ea		
		Blowoff Structures (to include):		50	ea	$8,300.00	$415,000.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	400	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	59	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	16.5	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	7,150	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	100	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	50	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	500	lin ft		
		- 6" Tee (1 ea)	8140	50	ea		
		- 6" Blind Flange (1 ea)	8140	50	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	4,750	lbs		
		Manholes-Buried: (to include)		36	ea	$11,500.00	$414,000.00
		-36" pipe outlet (1 ea)	8140	36	ea		
		-36" blind flange (1 ea)	8140	36	ea		
		Cathodic Protection	8140	1	ls	$2,500,000.00	$2,500,000.00
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation					
		No. 09SP101729 dated August 2009. Soils are assumed to be similar to those					
		encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$3,704,000.00**
		SUBTOTAL REACH 2					**$67,001,870.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Boone Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	12	acre	$1,000.00	$12,000.00
		Grubbing	8140	1.2	acre	$2,500.00	$3,000.00
		Stripping (6" thick)	8140	9,500	cy	$4.00	$38,000.00
		Seeding	8140	12	acre	$1,500.00	$18,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	16,500	cy	$6.00	$99,000.00
		Rock Excavation (0.25:1) outside urban area	8140	620	cy	$45.00	$27,900.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	330	cy	$50.00	$16,500.00
		Embedment & Cover Backfill	8140	16,500	cy	$5.00	$82,500.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	1,500	cy	$14.00	$21,000.00
		SUBTOTAL THIS SHEET					$317,900.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Boone Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		6" DR14 (CIOD) C900 PVC pipe	8140	9,200	lin ft	$11.00	$101,200.00
		Isolation Valves (Manual operation):					
		6" ANSI class 150 (psig) b-fly valve w/ operator	8140	1	ea	$2,900.00	$2,900.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$111,100.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED WCD 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DJR 5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _3_ OF _3_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 Boone Spur Civil	**PROJECT:** Fryingpan-Arkansas Project - Arkansas Valley Conduit
	WOID: AF523 **ESTIMATE LEVEL:** Appraisal
	REGION GP **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		2	ea	$6,800.00	$13,600.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	20	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	8	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	190	lbs		
		- 2" Combination Air Valve (1ea)	8140	2	ea		
		- 2" Ball Valves (1 ea)	8140	2	ea		
		Blowoff Structures (to include):		2	ea	$8,300.00	$16,600.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	16	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	2.4	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.66	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	290	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	4	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	2.0	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	20	lin ft		
		- 6" Tee (1 ea)	8140	2	ea		
		- 6" Blind Flange (1 ea)	8140	2	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	190	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$30,200.00**
		SUBTOTAL BOONE SPUR					**$459,200.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	**CHECKED** W. Chris Duke, PE	**BY** Jeff Morris	**CHECKED** 5/31/12
DATE PREPARED 04/24/12	**PEER REVIEW / DATE** Steven J. Robertson, PE	**DATE PREPARED** 05/11/12	**PEER REVIEW / DATE** 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 2: WTP to S. Fowler tank	Fryington-Arkansas Project
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION: GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Participant Tie-In Vaults	86-68120	2	ea	$35,000.00	$70,000.00
		Reinforced Concrete for Vaults					
		(Assumed: 12' W x 9' L x 10'-8" D)					
		(Assume: f'_c=4,500 psi)					
		Source: 50 miles					
		Concrete: 17.5 yd3					
		Reinforcement (Assume 135 lb/yd3): 2,360 lbs					
		Cement (Assume: 0.282 ton/yd3): 5 tons					
		Access & Service Hatches					
		Access hatch 3' x3': 2 ea					
		(The Bilco Co Type Q single leaf)					
		Service hatch 3' x 5': 1 ea					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork					
		Steel (ASTM A36): 150 lbs					
		(Ref. 40-D-6601, Ladder Type 2)					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard: 12 yd3					
		Excavation: 195 yd3					
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill: 155 yd3					
		Gravel Surfacing (6 inches thick)					
		Service Yard: 10 yd3					
		SUBTOTAL THIS SHEET					**$70,000.00**

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/18/12	PEER REVIEW / DATE Paul Ruchti, PE 4/18/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 2: WTP to S. Fowler tank
Mechanical Equipment

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume participant tie-in vault size=12' W x 9' L x 10'-8" D					
	1	Meter vault ventilation equipment	86-68410	2	ls	$5,600.00	$11,200.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 200 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(12 ft)-6" diam, 16 ga., galv. steel duct					
		(2)-6" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-6"x8" reducer, sch 20, galv. steel pipe					
		(4)-8" diam, stainless steel bird screens					
		(2)-6"x8" reducer, 16 ga, galv. steel duct					
		(2)-6" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	2	ea	$800.00	$1,600.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter system	86-68410	2	ea	$13,000.00	$26,000.00
		6" diameter, microprocessor-based,					
		flanged electro-magnetic flowmeter with					
		remote wall-mounted transmitter					
		weight= approx 85 lbs					
		120 Volt AC					
		SUBTOTAL THIS SHEET					$38,800.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 2: WTP to S. Fowler tank	Fryington-Arkansas Project
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION: GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical/Hydraulic equipment					
		Participant Tie-In Vaults (2 vaults)	86-68420				
		6-inch pressure reducing valve		2	ea	$7,800.00	$15,600.00
		2 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
		6-inch manually-operated butterfly valve		2	ea	$1,300.00	$2,600.00
		2 valves, 90 lbs each					
		AWWA Class 150-B					
		6-inch buried square-nut operated butterfly		2	ea	$1,800.00	$3,600.00
		valve with valve box					
		2 valves, 245 lbs each					
		AWWA Class 150-B					
		1-inch air valve		2	ea	$1,000.00	$2,000.00
		combination air valve					
		2 air valves, 35 lbs each					
		SUBTOTAL THIS SHEET					**$23,800.00**

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 3 from Fowler N. tank to La Junta S. Tank
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	310	acre	$800.00	$248,000.00
		Grubbing	8140	31	acre	$2,500.00	$77,500.00
		Stripping (6" thick)	8140	250,000	cy	$2.00	$500,000.00
		Seeding	8140	310	acre	$800.00	$248,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	620,000	cy	$4.00	$2,480,000.00
		Rock Excavation (0.25:1) outside urban area	8140	37,000	cy	$25.00	$925,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	11,500	cy	$30.00	$345,000.00
		Embedment & Cover Backfill	8140	610,000	cy	$3.00	$1,830,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	62,000	cy	$8.00	$496,000.00
		Urban Earthwork Items: (Vertical Trench)					
		Soil Excavation (box w/supports,~10'deep)	8140	18,500	cy	$9.00	$166,500.00
		Pipe Bedding (Select material, 4" thick)	8140	900	cy	$50.00	$45,000.00
		Embedment & Cover Backfill	8140	15,500	cy	$5.00	$77,500.00
		Compacting Embedment Backfill	8140	15,500	cy	$10.00	$155,000.00
		(Urban trench will require traffic control, signage,					
		and detours for duration work)					
		(urban trench length of 18247.11ft of 24" pipe)					
		Traffic Control/Detours Urban Excavation		4	mo	$15,000.00	$60,000.00
		Pavement & Base/Remove & Replace Urban Excavation		18,247	lin ft	$60.00	$1,094,820.00
		Utility Relocation & Repair Urban Excavation		18,247	lin ft	$30.00	$547,410.00
		All urban earthwork quantities above are for a straight wall "vertical" trench.					
		SUBTOTAL THIS SHEET					$9,295,730.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/11/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 3 from Fowler N. tank to La Junta S. Tank
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		30" dia. steel, 0.1345" thick (45 #/ft)-mortar lined	8140	8,400	lin ft	$125.00	$1,050,000.00
		epoxy tape coated, rubber gaskets, HC=250					
		379,238.4 lbs total steel					
		30" dia. steel, 0.1428" thick (48 #/ft)-mortar lined	8140	96,000	lin ft	$125.00	$12,000,000.00
		epoxy tape coated, rubber gaskets, HC=375					
		4,608,538.56 lbs total steel					
		30" dia. steel, 0.25" thick (84 #/ft)-mortar lined	8140	8,100	lin ft	$145.00	$1,174,500.00
		epoxy tape coated, rubber gaskets, HC=500					
		679,838.04 lbs total steel					
		24" dia. steel, 0.25" thick (68 #/ft)-mortar lined	8140	29,000	lin ft	$190.00	$5,510,000.00
		epoxy tape coated, rubber gaskets, HC=625					
		1,972,690.2 lbs total steel					
		24" DR25 (CIOD) C905 PVC pipe	8140	13,500	lin ft	$68.00	$918,000.00
		24" DR18 (CIOD) C905 PVC pipe	8140	37,000	lin ft	$90.00	$3,330,000.00
		Isolation Valves (Manual operation):					
		30" class 150 (psig) butterfly valve with operator	8140	4	ea	$14,500.00	$58,000.00
		30" class 250 (psig) butterfly valve with operator	8140	2	ea	$23,000.00	$46,000.00
		24" class 250 (psig) butterfly valve with operator	8140	1	ea	$15,000.00	$15,000.00
		24" ANSI class 150 (psig) b-fly valve w/ operator	8140	1	ea	$27,000.00	$27,000.00
		Isolation Valve Manholes (to include):	8140	8	ea	$7,000.00	$56,000.00
		60" I.D. x 6" wall precast flat top with concentric					
		ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$24,184,500.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 3 from Fowler N. tank to La Junta S. Tank
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		37	ea	$12,000.00	$444,000.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	370	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	150	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	3,500	lbs		
		- 6" Combination Air Valve (1ea)	8140	37	ea		
		- 6" Butterfly Valves (1 ea)	8140	37	ea		
		Blowoff Structures (to include):		37	ea	$8,300.00	$307,100.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	300	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	44	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	12	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew. 143 lbs ea)	8140	5,300	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	74	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	37	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	370	lin ft		
		- 6" Tee (1 ea)	8140	37	ea		
		- 6" Blind Flange (1 ea)	8140	37	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	3,500	lbs		
		Cathodic Protection	8140	1	ls	$990,000.00	$990,000.00
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$1,741,100.00
		SUBTOTAL REACH 3					$35,221,330.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/21/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Manzanola Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	2	acre	$1,000.00	$2,000.00
		Grubbing	8140	0.2	acre	$2,500.00	$500.00
		Stripping (6" thick)	8140	1,650	cy	$4.00	$6,600.00
		Seeding	8140	2	acre	$1,500.00	$3,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	2,750	cy	$9.00	$24,750.00
		Rock Excavation (0.25:1) outside urban area	8140	97	cy	$45.00	$4,365.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	56	cy	$50.00	$2,800.00
		Embedment & Cover Backfill	8140	2,800	cy	$7.00	$19,600.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	200	cy	$16.00	$3,200.00
		SUBTOTAL THIS SHEET					$66,815.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Manzanola Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WO#:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	1,650	lin ft	$6.20	$10,230.00
		Isolation Valves (Manual operation):					
		4" class 250 (psig) butterfly valve with operator	8140	1	ea	$2,100.00	$2,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$19,330.00**

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/21/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/24/12	Steven J. Robertson, PE	05/11/12	DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _3_ OF _3_

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Manzanola Spur
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$15,100.00
		SUBTOTAL MANZANOLA SPUR					$101,245.00

QUANTITIES		PRICES	
BY: Jeremy Lorberau	CHECKED: W. Chris Duke, PE	BY: Jeff Morris	CHECKED: 5/31/12
DATE PREPARED: 04/24/12	PEER REVIEW / DATE: Steven J. Robertson, PE	DATE PREPARED: 05/11/12	PEER REVIEW / DATE: DCA 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Swink Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	17.5	acre	$1,000.00	$17,500.00
		Grubbing	8140	1.8	acre	$2,500.00	$4,500.00
		Stripping (6" thick)	8140	14,000	cy	$2.00	$28,000.00
		Seeding	8140	17.5	acre	$1,500.00	$26,250.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	24,000	cy	$6.00	$144,000.00
		Rock Excavation (0.25:1) outside urban area	8140	840	cy	$45.00	$37,800.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	480	cy	$50.00	$24,000.00
		Embedment & Cover Backfill	8140	24,000	cy	$5.00	$120,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	1,800	cy	$14.00	$25,200.00
		SUBTOTAL THIS SHEET					$427,250.00

QUANTITIES

BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE
DATE PREPARED	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE

PRICES

BY	CHECKED
Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**
05/11/12	DCQ 5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET 2 OF 3

FEATURE:	PROJECT:	
Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 Swink Spur Civil	Fryingpan-Arkansas Project - Arkansas Valley Conduit	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	14,000	lin ft	$6.20	$86,800.00
		Isolation Valves (Manual operation):					
		4" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,100.00	$1,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$94,900.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Swink Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		3	ea	$6,800.00	$20,400.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	30	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	12	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	290	lbs		
		- 2" Combination Air Valve (1ea)	8140	3	ea		
		- 2" Ball Valves (1 ea)	8140	3	ea		
		Blowoff Structures (to include):		3	ea	$8,300.00	$24,900.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	24	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	3.5	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	1	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	430	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	6.0	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	3	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	30	lin ft		
		- 6" Tee (1 ea)	8140	3	ea		
		- 6" Blind Flange (1 ea)	8140	3	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	290	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$45,300.00**
		SUBTOTAL SWINK SPUR					**$567,450.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Homestead Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	3.3	acre	$1,000.00	$3,300.00
		Grubbing	8140	0.33	acre	$2,500.00	$825.00
		Stripping (6" thick)	8140	2,600	cy	$4.00	$10,400.00
		Seeding	8140	3.3	acre	$1,500.00	$4,950.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	4,400	cy	$9.00	$39,600.00
		Rock Excavation (0.25:1) outside urban area	8140	155	cy	$45.00	$6,975.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	89	cy	$50.00	$4,450.00
		Embedment & Cover Backfill	8140	4,500	cy	$7.00	$31,500.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	330	cy	$16.00	$5,280.00
		SUBTOTAL THIS SHEET					$107,280.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/21/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Homestead Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	2,600	lin ft	$6.20	$16,120.00
		Isolation Valves (Manual operation):					
		4" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,100.00	$1,100.00
		Isolation Valve Manholes (to include):					
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$24,220.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Homestead Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8.0	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$15,100.00
		SUBTOTAL HOMESTEAD SPUR					$146,600.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
La Junta Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	1.00	acre	$1,000.00	$1,000.00
		Grubbing	8140	1.000	acre	$2,500.00	$2,500.00
		Stripping (6" thick)	8140	530	cy	$6.00	$3,180.00
		Seeding	8140	1.00	acre	$1,500.00	$1,500.00
		Urban Earthwork Items: (Vertical Trench)					
		Soil Excavation (box w/supports,~10'deep)	8140	2,000	cy	$11.00	$22,000.00
		Pipe Bedding (Select material, 4" thick)	8140	115	cy	$50.00	$5,750.00
		Embedment & Cover Backfill	8140	1,850	cy	$7.00	$12,950.00
		Compacting Embedment Backfill	8140	1,850	cy	$14.00	$25,900.00
		(Urban trench will require traffic control, signage, and detours for duration work) (urban trench length of 3,153.89 ft of 12" pipe)					
		Traffic Control/Detours Urban Excavation		1	mo	$15,000.00	$15,000.00
		Pavement & Base/Remove & Replace Urban Excavation		3,154	lin ft	$60.00	$189,240.00
		Utility Relocation & Repair Urban Excavation		3,154	lin ft	$30.00	$94,620.00
		All urban earthwork quantities above are for a straight wall "vertical" trench.					
		SUBTOTAL THIS SHEET					$373,640.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE DCO 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:	
Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 La Junta Spur Civil	Fryingpan-Arkansas Project - Arkansas Valley Conduit	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		12" DR25 (CIOD) C900 PVC pipe	8140	3,200	lin ft	$22.00	$70,400.00
		Isolation Valves (Manual operation):					
		12" class 150 (psig) butterfly valve with operator	8140	1	ea	$2,500.00	$2,500.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$79,900.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _3_ OF _3_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 La Junta Spur Civil	**PROJECT:** Fryingpan-Arkansas Project - Arkansas Valley Conduit **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1.0	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation					
		No. 09SP101729 dated August 2009. Soils are assumed to be similar to those					
		encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$15,100.00**
		SUBTOTAL LA JUNTA SPUR					**$468,640.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	**CHECKED** W. Chris Duke, PE	**BY** Jeff Morris	**CHECKED** 5/31/12
DATE PREPARED 04/24/12	**PEER REVIEW / DATE** Steven J. Robertson, PE	**DATE PREPARED** 05/11/12	**PEER REVIEW / DATE** 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET 1 OF 1

FEATURE:

Arkansas Valley Conduit
La Junta North Water Storage Tank
Revised Comanche South
Reach 3: Fowler S. Tank to La Junta S. Tank

PROJECT:
Fryington-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVEL:**	**Jan-11**
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard	86-68120	1,450	yd^3	$4.00	$5,800.00
		Access Roads	86-68120	35	yd^3	$6.00	$210.00
		Excavation (tank foundation)	86-68120	2,845	yd^3	$15.00	$42,675.00
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill (tank foundatio	86-68120	2,015	yd^3	$16.00	$32,240.00
		Gravel Surfacing (6 inches thick)					
		Service Yard	86-68120	1,250	yd^3	$35.00	$43,750.00
		Access Roads	86-68120	35	yd^3	$40.00	$1,400.00
		Chain Link Fence	86-68120	1,410	lin ft	$40.00	$56,400.00
		8.0' High fence - 7.0' fabric with 3 strands of barbed wire on top. Three 20' wide double swing gate					
		Reinforced Concrete for Pad & Stem Foundation	86-68120	1	ls	$620,000.00	$620,000.00
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 70 miles					
		Concrete: 876 yd3					
		Reinforcement (Assume 135 lb/yd3): 118,265 lbs					
		Cement (Assume: 0.282 ton/yd3): 247 tons					
		SUBTOTAL THIS SHEET					**$802,475.00**

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/11/12
DATE PREPARED 04/16/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit LaJunta South Water Storage Tank Revised Comanche South Reach 3: S. Fowler Tank to La Junta	Frylngton-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic Equipment/Mechanical					
		Steel water storage tanks					
		5 - 1,000,000-gallon steel water storage tanks	86-68420	1	ls	$9,500,000.00	$9,500,000.00
		(5,000,000 gallons combined capacity)					
		AWWA D100 compliance					
		minimum water surface 65 feet					
		(above foundation)					
		maximum water surface 90 feet					
		(above foundation)					
		diameter 80 feet					
		SUBTOTAL THIS SHEET					$9,500,000.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/16/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCQ 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Fowler North Water Storage Tank Revised Comanche South Reach 3: Fowler S. Tank to La Junta S. Tank	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard	86-68120	2,145	yd^3	$4.00	$8,580.00
		Access Roads	86-68120	75	yd^3	$6.00	$450.00
		Excavation (tank foundation)	86-68120	1,530	yd^3	$15.00	$22,950.00
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill (tank foundatio	86-68120	1,120	yd^3	$25.00	$28,000.00
		Gravel Surfacing (6 inches thick)					
		Service Yard	86-68120	1,235	yd^3	$35.00	$43,225.00
		Access Roads	86-68120	75	yd^3	$40.00	$3,000.00
		Chain Link Fence	86-68120	1,360	lin ft	$40.00	$54,400.00
		8.0' High fence - 7.0' fabric with 3 strands of barbed wire on top. Two 20' wide double swing gate					
		Reinforced Concrete for Pad & Stem Foundation	86-68120	1	ls	$340,000.00	$340,000.00
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 40 miles					
		Concrete: 465 yd3					
		Reinforcement (Assume 135 lb/yd3): 62,835 lbs					
		Cement (Assume: 0.282 ton/yd3): 131 tons					
		SUBTOTAL THIS SHEET					$500,605.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/16/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Fowler North Water Storage Tank Revised Comanche South Reach 3: Fowler S. Tank to La Junta S. Tank	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic Equipment/Mechanical					
		Steel water storage tanks					
		4 - 2,295,000-gallon steel water storage tank	86-68420	1	ls	$8,300,000.00	$8,300,000.00
		(9,180,000 gallons combined capacity)					
		AWWA D100 compliance					
		minimum water surface 0 feet					
		(above foundation)					
		maximum water surface 25 feet					
		(above foundation)					
		diameter 125 feet					
		SUBTOTAL THIS SHEET					$8,300,000.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/16/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Fowler North Tank Access Road
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Road Access (to include):					
		Stripping (6" thick)	86-68140	3,100	cy	$4.00	$12,400.00
		gravel (6" thick)	86-68140	3,100	cy	$35.00	$108,500.00
		(20' wide access, 8,300' long)					
		Access Bridge Items:		1	bridge		
		Concrete bridge (70' Double Span) to include:					
		Abutment excavation (2200 ea)	86-68140	2,200	cy	$25.00	$55,000.00
		Backfill - abutments (2100 ea)	86-68140	2,100	cy	$30.00	$63,000.00
		Compacting backfill (2100 ea)	86-68140	2,100	cy	$30.00	$63,000.00
		Comp. approach ramp embankment (85 ea)	86-68140	85	cy	$40.00	$3,400.00
		Concrete - bridge abutment (85 ea)	86-68140	85	cy	$1,300.00	$110,500.00
		Concrete - bridge deck & girders (90 ea)	86-68140	90	cy	$1,700.00	$153,000.00
		Concrete - pier & footing (35 ea)	86-68140	35	cy	$1,500.00	$52,500.00
		Reinforcement (140 #/cy) (30,000 ea)	86-68140	30,000	lbs	$1.70	$51,000.00
		Cementitious Materials (6 sack mix) (60 ea)	86-68140	60	tons	Included in Concrete Items above.	
		Beam-type guardrail (180 ea)	86-68140	180	lin. ft.	$60.00	$10,800.00
		Detour barricades & signage	86-68140	1	ls	$10,000.00	$10,000.00
						SUBTOTAL THIS SHEET	$693,100.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/11/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 3: S. Fowler tank to La Junta

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Participant Tie-In Vaults	86-68120	15	ea	$35,000.00	$525,000.00
		Reinforced Concrete for Vaults					
		(Assumed: 12' W x 9' L x 10'-8" D)					
		(Assume: f'_c=4,500 psi)					
		Source: 50 miles					
		Concrete: 17.5 yd3					
		Reinforcement (Assume 135 lb/yd3): 2,360 lbs					
		Cement (Assume: 0.282 ton/yd3): 5 tons					
		Access & Service Hatches					
		Access hatch 3' x3': 2 ea					
		(The Bilco Co Type Q single leaf)					
		Service hatch 3' x 5': 1 ea					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork					
		Steel (ASTM A36): 150 lbs					
		(Ref. 40-D-6601, Ladder Type 2)					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard: 12 yd3					
		Excavation: 195 yd3					
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill: 155 yd3					
		Gravel Surfacing (6 inches thick)					
		Service Yard: 10 yd3					
		SUBTOTAL THIS SHEET					$525,000.00

QUANTITIES		PRICES	
BY: R. J. Barthel	REVIEWED: Paul Ruchti, PE	BY: Jeff Morris	CHECKED: 5/31/12
DATE PREPARED: 04/18/12	PEER REVIEW / DATE: Paul Ruchti, PE 4/18/12	DATE PREPARED: 05/12/12	PEER REVIEW / DATE: DCQ 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 3: S. Fowler Tank to La Junta
Mechanical Equipment

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume participant tie-in vault size=12' W x 9' L x 10'-8" D					
	1	Meter vault ventilation equipment	86-68410	15	ls	$5,600.00	$84,000.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 200 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(12 ft)-6" diam, 16 ga., galv. steel duct					
		(2)-6" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-6"x8" reducer, sch 20, galv. steel pipe					
		(4)-8" diam, stainless steel bird screens					
		(2)-6"x8" reducer, 16 ga, galv. steel duct					
		(2)-6" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	15	ea	$800.00	$12,000.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter system	86-68410	15	ea	$13,000.00	$195,000.00
		6" diameter, microprocessor-based,					
		flanged electro-magnetic flowmeter with					
		remote wall-mounted transmitter					
		weight= approx 85 lbs					
		120 Volt AC					
		SUBTOTAL THIS SHEET					**$291,000.00**

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED MA 5/31/12
DATE PREPARED 4/15/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCO 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 3: S. Fowler tank to La Junta	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical/Hydraulic equipment					
		Participant Tie-In Vaults (15 vaults)	86-68420				
		6-inch pressure reducing valve		15	ea	$7,800.00	$117,000.00
		15 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
		6-inch manually-operated butterfly valve					
		13 valves, 90 lbs each		13	ea	$1,300.00	$16,900.00
		AWWA Class 150-B					
		2 valves, 130 lbs each		2	ea	$2,300.00	$4,600.00
		AWWA Class 250-B					
		6-inch buried square-nut operated butterfly					
		valve with valve box					
		13 valves, 245 lbs each		13	ea	$2,800.00	$36,400.00
		AWWA Class 150-B					
		2 valves, 285 lbs each		2	ea	$3,800.00	$7,600.00
		AWWA Class 250-B					
		1-inch air valve					
		combination air valve					
		15 air valves, 35 lbs each		15	ea	$1,000.00	$15,000.00
		SUBTOTAL THIS SHEET					**$197,500.00**

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 4 from La Junta S. Tank to Lamar
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	490	acre	$800.00	$392,000.00
		Grubbing	8140	49	acre	$2,500.00	$122,500.00
		Stripping (6" thick)	8140	390,000	cy	$2.00	$780,000.00
		Seeding	8140	490	acre	$800.00	$392,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	870,000	cy	$4.00	$3,480,000.00
		Rock Excavation (0.25:1) outside urban area	8140	45,000	cy	$25.00	$1,125,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	15,900	cy	$30.00	$477,000.00
		Embedment & Cover Backfill	8140	880,000	cy	$3.00	$2,640,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	65,000	cy	$8.00	$520,000.00
		SUBTOTAL THIS SHEET					$9,928,500.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 4 from La Junta S. Tank to Lamar
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		24" DR25 (CIOD) C905 PVC pipe	8140	93,000	lin ft	$68.00	$6,324,000.00
		22" dia. steel, 0.1345" thick (33 #/ft)-mortar lined	8140	87,000	lin ft	$95.00	$8,265,000.00
		epoxy tape coated, rubber gaskets, HC=375					
		2,859,657.57 lbs total steel					
		18" dia. steel, 0.1442" thick (30 #/ft)-mortar lined	8140	10,500	lin ft	$75.00	$787,500.00
		epoxy tape coated, rubber gaskets, HC=625					
		315,561.3 lbs total steel					
		16" dia. steel, 0.1345" thick (25 #/ft)-mortar lined	8140	36,000	lin ft	$70.00	$2,520,000.00
		epoxy tape coated, rubber gaskets, HC=625					
		904,686.25 lbs total steel					
		20" DR18 (CIOD) C905 PVC pipe	8140	52,000	lin ft	$60.00	$3,120,000.00
		16" DR18 (CIOD) C905 PVC pipe	8140	31,000	lin ft	$40.00	$1,240,000.00
		Isolation Valves (Manual operation):					
		24" class 250 (psig) butterfly valve with operator	8140	4	ea	$15,000.00	$60,000.00
		22" class 250 (psig) butterfly valve with operator	8140	4	ea	$15,000.00	$60,000.00
		20" class 250 (psig) butterfly valve with operator	8140	2	ea	$10,500.00	$21,000.00
		18" ANSI class 150 (psig) b-fly valve w/ operator	8140	1	ea	$12,500.00	$12,500.00
		16" class 250 (psig) butterfly valve with operator	8140	2	ea	$6,200.00	$12,400.00
		16" ANSI class 150 (psig) b-fly valve w/ operator	8140	2	ea	$9,400.00	$18,800.00
		Isolation Valve Manholes (to include):	8140	15	ea	$7,000.00	$105,000.00
		60" I.D. x 6" wall precast flat top with concentric					
		ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$22,546,200.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED WK 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE SJR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Reach 4 from La Junta S. Tank to Lamar
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		58	ea	$6,800.00	$394,400.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	580	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	230	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	5,500	lbs		
		- 2" Combination Air Valve (1ea)	8140	58	ea		
		- 2" Ball Valves (1 ea)	8140	58	ea		
		Blowoff Structures (to include):		58	ea	$8,300.00	$481,400.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	460	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	68	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	19	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	8,300	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	115	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	58	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	580	lin ft		
		- 6" Tee (1 ea)	8140	58	ea		
		- 6" Blind Flange (1 ea)	8140	58	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	5,500	lbs		
		Cathodic Protection	8140	1	ls	$590,000.00	$590,000.00
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$1,465,800.00
		SUBTOTAL REACH 4					$33,940,500.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/21/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Hasty Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	1.00	acre	$1,000.00	$1,000.00
		Grubbing	8140	1.000	acre	$2,500.00	$2,500.00
		Stripping (6" thick)	8140	630	cy	$6.00	$3,780.00
		Seeding	8140	1.00	acre	$1,500.00	$1,500.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	1,050	cy	$9.00	$9,450.00
		Rock Excavation (0.25:1) outside urban area	8140	37.0	cy	$45.00	$1,665.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	21	cy	$50.00	$1,050.00
		Embedment & Cover Backfill	8140	1,050	cy	$7.00	$7,350.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	79	cy	$16.00	$1,264.00
		SUBTOTAL THIS SHEET					$29,559.00

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/24/12	Steven J. Robertson, PE	05/12/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 Hasty Spur Civil	Fryingpan-Arkansas Project - Arkansas Valley Conduit
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	630	lin ft	$6.20	$3,906.00
		Isolation Valves (Manual operation):					
		4" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,100.00	$1,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$12,006.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Hasty Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$15,100.00
		SUBTOTAL HASTY SPUR					**$56,665.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED TA 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCA 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
McClave Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	7.0	acre	$1,000.00	$7,000.00
		Grubbing	8140	1.00	acre	$2,500.00	$2,500.00
		Stripping (6" thick)	8140	5,700	cy	$4.00	$22,800.00
		Seeding	8140	7.0	acre	$1,500.00	$10,500.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	9,900	cy	$9.00	$89,100.00
		Rock Excavation (0.25:1) outside urban area	8140	370	cy	$45.00	$16,650.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	200	cy	$50.00	$10,000.00
		Embedment & Cover Backfill	8140	10,000	cy	$5.00	$50,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	890	cy	$16.00	$14,240.00
		SUBTOTAL THIS SHEET					$222,790.00

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/24/12	Steven J. Robertson, PE	05/12/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
McClave Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		6" DR25 (CIOD) C900 PVC pipe	8140	5,500	lin ft	$9.00	$49,500.00
		Isolation Valves (Manual operation):					
		6" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,300.00	$1,300.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$57,800.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED WCD 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _3_ OF _3_

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
McClave Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		2	ea	$6,800.00	$13,600.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	20	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	8	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	190	lbs		
		- 2" Combination Air Valve (1ea)	8140	2	ea		
		- 2" Ball Valves (1 ea)	8140	2	ea		
		Blowoff Structures (to include):		2	ea	$8,300.00	$16,600.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	16	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	2.4	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.66	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	290	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	4	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	2	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	20	lin ft		
		- 6" Tee (1 ea)	8140	2	ea		
		- 6" Blind Flange (1 ea)	8140	2	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	190	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$30,200.00
		SUBTOTAL McCLAVE SPUR					$310,790.00

QUANTITIES

BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE
DATE PREPARED	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE

PRICES

BY	CHECKED
Jeff Morris	WCD 5/31/12
DATE PREPARED	**PEER REVIEW / DATE**
05/12/12	SJR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Wiley Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	24	acre	$1,000.00	$24,000.00
		Grubbing	8140	3.0	acre	$2,500.00	$7,500.00
		Stripping (6" thick)	8140	19,500	cy	$2.00	$39,000.00
		Seeding	8140	24	acre	$1,500.00	$36,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	33,000	cy	$6.00	$198,000.00
		Rock Excavation (0.25:1) outside urban area	8140	1,150	cy	$35.00	$40,250.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	670	cy	$50.00	$33,500.00
		Embedment & Cover Backfill	8140	34,000	cy	$5.00	$170,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	2,500	cy	$14.00	$35,000.00
		SUBTOTAL THIS SHEET					$583,250.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _2_ OF _3_

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Wiley Spur
Civil

PROJECT:

Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	19,500	lin ft	$6.20	$120,900.00
		Isolation Valves (Manual operation):					
		4" class 250 (psig) butterfly valve with operator	8140	1	ea	$2,100.00	$2,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$130,000.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Wiley Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		4	ea	$6,800.00	$27,200.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	40	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	16	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	380	lbs		
		- 2" Combination Air Valve (1ea)	8140	4	ea		
		- 2" Ball Valves (1 ea)	8140	4	ea		
		Blowoff Structures (to include):		4	ea	$8,300.00	$33,200.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	32	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	4.7	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	1.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	570	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	8	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	4	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	40	lin ft		
		- 6" Tee (1 ea)	8140	4	ea		
		- 6" Blind Flange (1 ea)	8140	4	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	380	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation					
		No. 09SP101729 dated August 2009. Soils are assumed to be similar to those					
		encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$60,400.00
		SUBTOTAL WILEY SPUR					$773,650.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 4: La Junta to Lamar

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Participant Tie-In Vaults	86-68120	7	ea	$35,000.00	$245,000.00
		Reinforced Concrete for Vaults					
		(Assumed: 12' W x 9' L x 10'-8" D)					
		(Assume: f'_c=4,500 psi)					
		Source: 50 miles					
		Concrete: 17.5 yd3					
		Reinforcement (Assume 135 lb/yd3): 2,360 lbs					
		Cement (Assume: 0.282 ton/yd3): 5 tons					
		Access & Service Hatches					
		Access hatch 3' x3': 2 ea					
		(The Bilco Co Type Q single leaf)					
		Service hatch 3' x 5': 1 ea					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork					
		Steel (ASTM A36): 150 lbs					
		(Ref. 40-D-6601, Ladder Type 2)					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard: 12 yd3					
		Excavation: 195 yd3					
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill: 155 yd3					
		Gravel Surfacing (6 inches thick)					
		Service Yard: 10 yd3					
		SUBTOTAL THIS SHEET					**$245,000.00**

QUANTITIES		**PRICES**	
BY	**REVIEWED**	**BY**	**CHECKED**
R. J. Barthel	Paul Ruchti, PE	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
04/18/12	Paul Ruchti, PE 4/18/12	05/12/12	5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 4: La Junta to Lamar Mechanical Equipment	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume participant tie-in vault size=12' W x 9' L x 10'-8" D					
	1	Meter vault ventilation equipment	86-68410	7	ls	$5,600.00	$39,200.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 200 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(12 ft)-6" diam, 16 ga., galv. steel duct					
		(2)-6" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-6"x8" reducer, sch 20, galv. steel pipe					
		(4)-8" diam, stainless steel bird screens					
		(2)-6"x8" reducer, 16 ga, galv. steel duct					
		(2)-6" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	7	ea	$800.00	$5,600.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter system	86-68410	7	ea	$13,000.00	$91,000.00
		6" diameter, microprocessor-based,					
		flanged electro-magnetic flowmeter with					
		remote wall-mounted transmitter					
		weight= approx 85 lbs					
		120 Volt AC					
		SUBTOTAL THIS SHEET					$135,800.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/15/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCH 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South

Reach 4: La Junta to Lamar

PROJECT:
Fryington-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVEL:**	**Jan-11**
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical/Hydraulic equipment					
		Participant Tie-In Vaults (7 vaults)	86-68420				
		6-inch pressure reducing valve		7	ea	$7,800.00	$54,600.00
		7 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
		6-inch manually-operated butterfly valve					
		5 valves, 90 lbs each		5	ea	$1,300.00	$6,500.00
		AWWA Class 150-B					
		2 valves, 130 lbs each		2	ea	$2,300.00	$4,600.00
		AWWA Class 250-B					
		6-inch buried square-nut operated butterfly					
		valve with valve box					
		5 valves, 245 lbs each		5	ea	$1,800.00	$9,000.00
		AWWA Class 150-B					
		2 valves, 285 lbs each		2	ea	$2,800.00	$5,600.00
		AWWA Class 250-B					
		1-inch air valve		1	ea	$1,000.00	$1,000.00
		combination air valve					
		7 air valves, 35 lbs each					
		SUBTOTAL THIS SHEET					**$81,300.00**

QUANTITIES		**PRICES**	
BY	**REVIEWED**	**BY**	**CHECKED**
Ken Smith	Nathan Nakamoto	Jeff Morris	TM 5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
4/18/2012	Rick Frisz 4/20/12	05/12/12	DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _1_ OF _3_

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Highway 96 Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	140	acre	$800.00	$112,000.00
		Grubbing	8140	14	acre	$2,500.00	$35,000.00
		Stripping (6" thick)	8140	115,000	cy	$2.00	$230,000.00
		Seeding	8140	140	acre	$800.00	$112,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	230,000	cy	$4.00	$920,000.00
		Rock Excavation (0.25:1) outside urban area	8140	11,000	cy	$25.00	$275,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	4,500	cy	$40.00	$180,000.00
		Embedment & Cover Backfill	8140	230,000	cy	$3.00	$690,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	17,500	cy	$10.00	$175,000.00
		SUBTOTAL THIS SHEET					$2,729,000.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Highway 96 Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		18" DR25 (CIOD) C905 PVC pipe	8140	38,000	lin ft	$40.00	$1,520,000.00
		16" DR25 (CIOD) C905 PVC pipe	8140	33,000	lin ft	$32.00	$1,056,000.00
		10" DR25 (CIOD) C900 PVC pipe	8140	25,000	lin ft	$16.00	$400,000.00
		Isolation Valves (Manual operation):					
		18" class 150 (psig) butterfly valve with operator	8140	2	ea	$5,500.00	$11,000.00
		16" class 250 (psig) butterfly valve with operator	8140	2	ea	$6,200.00	$12,400.00
		10" class 250 (psig) butterfly valve with operator	8140	1	ea	$3,000.00	$3,000.00
		Isolation Valve Manholes (to include):	8140	5	ea	$7,000.00	$35,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$3,037,400.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Highway 96 Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		19	ea	$6,800.00	$129,200.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	190	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	76	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	1,800	lbs		
		- 2" Combination Air Valve (1ea)	8140	19	ea		
		- 2" Ball Valves (1 ea)	8140	19	ea		
		Blowoff Structures (to include):		19	ea	$8,300.00	$157,700.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	150	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	140	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	6.3	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	2,700	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	38	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	19	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	190	lin ft		
		- 6" Tee (1 ea)	8140	19	ea		
		- 6" Blind Flange (1 ea)	8140	19	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	1,800	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$286,900.00
		SUBTOTAL HWY 96 SPUR					$6,053,300.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
96 Pipeline Co. Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	3	acre	$1,000.00	$3,000.00
		Grubbing	8140	1.0	acre	$2,500.00	$2,500.00
		Stripping (6" thick)	8140	2,400	cy	$4.00	$9,600.00
		Seeding	8140	3	acre	$1,500.00	$4,500.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	4,000	cy	$9.00	$36,000.00
		Rock Excavation (0.25:1) outside urban area	8140	140	cy	$45.00	$6,300.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	81	cy	$50.00	$4,050.00
		Embedment & Cover Backfill	8140	4,100	cy	$7.00	$28,700.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	300	cy	$16.00	$4,800.00
		SUBTOTAL THIS SHEET					$99,450.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
96 Pipeline Co. Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	2,400.0	lin ft	$6.20	$14,880.00
		Isolation Valves (Manual operation):					
		4" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,100.00	$1,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$22,980.00**

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	TA 5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/24/12	Steven J. Robertson, PE	05/12/12	DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
96 Pipeline Co. Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$15,100.00**
		SUBTOTAL 96 PIPELINE COUNTY SPUR					**$137,530.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
HWY 96 Spur

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Participant Tie-In Vaults	86-68120	7	ea	$35,000.00	$245,000.00
		Reinforced Concrete for Vaults					
		(Assumed: 12' W x 9' L x 10'-8" D)					
		(Assume: f'_c=4,500 psi)					
		Source: 50 miles					
		Concrete: 17.5 yd3					
		Reinforcement (Assume 135 lb/yd3): 2,360 lbs					
		Cement (Assume: 0.282 ton/yd3): 5 tons					
		Access & Service Hatches					
		Access hatch 3' x3': 2 ea					
		(The Bilco Co Type Q single leaf)					
		Service hatch 3' x 5': 1 ea					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork					
		Steel (ASTM A36): 150 lbs					
		(Ref. 40-D-6601, Ladder Type 2)					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard: 12 yd3					
		Excavation: 195 yd3					
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill: 155 yd3					
		Gravel Surfacing (6 inches thick)					
		Service Yard: 10 yd3					
		SUBTOTAL THIS SHEET					$245,000.00

QUANTITIES		PRICES	
BY	**REVIEWED**	**BY**	**CHECKED**
R. J. Barthel	Paul Ruchti	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
04/18/12	Paul Ruchti, P.E.	05/12/12	5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South, Max Dry Condition 4
HWY 96 Spur
Mechanical Equipment

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume participant tie-in vault size=12' W x 9' L x 10'-8" D					
	1	Meter vault ventilation equipment	86-68410	7	ls	$5,600.00	$39,200.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 200 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(12 ft)-6" diam, 16 ga., galv. steel duct					
		(2)-6" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-6"x8" reducer, sch 20, galv. steel pipe					
		(4)-8" diam, stainless steel bird screens					
		(2)-6"x8" reducer, 16 ga, galv. steel duct					
		(2)-6" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	7	ea	$800.00	$5,600.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter system	86-68410	7	ea	$13,000.00	$91,000.00
		6" diameter, microprocessor-based,					
		flanged electro-magnetic flowmeter with					
		remote wall-mounted transmitter					
		weight= approx 85 lbs					
		120 Volt AC					
		SUBTOTAL THIS SHEET					$135,800.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/12/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
HWY 96 Spur

PROJECT: Fryington-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical/Hydraulic equipment					
		Participant Tie-In Vaults (7 vaults)	86-68420				
		6-inch pressure reducing valve					
		7 valves, 160 lbs each		7	ea	$7,800.00	$54,600.00
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
		6-inch manually-operated butterfly valve					
		6 valves, 130 lbs each		6	ea	$2,300.00	$13,800.00
		AWWA Class 250-B					
		1 valve, 170 lbs each		1	ea	$2,800.00	$2,800.00
		Henry Pratt Class 350					
		6-inch buried square-nut operated butterfly					
		valve with valve box					
		6 valves, 285 lbs each		6	ea	$2,800.00	$16,800.00
		AWWA Class 250-B					
		1 valve, 325 lbs each		1	ea	$3,300.00	$3,300.00
		Henry Pratt Class 350					
		1-inch air valve					
		combination air valve					
		7 air valves, 35 lbs each		7	ea	$1,000.00	$7,000.00
						SUBTOTAL THIS SHEET	**$98,300.00**

QUANTITIES		PRICES	
BY	**REVIEWED**	**BY**	**CHECKED**
Ken Smith	Rick Frisz, PE	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
4/18/2012	Nathan Nakamoto 4/20/12	05/12/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Eads Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	150	acre	$800.00	$120,000.00
		Grubbing	8140	15	acre	$2,500.00	$37,500.00
		Stripping (6" thick)	8140	120,000	cy	$2.00	$240,000.00
		Seeding	8140	150	acre	$800.00	$120,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	220,000	cy	$4.00	$880,000.00
		Rock Excavation (0.25:1) outside urban area	8140	9,200	cy	$35.00	$322,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	4,300	cy	$40.00	$172,000.00
		Embedment & Cover Backfill	8140	230,000	cy	$3.00	$690,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	26,000	cy	$10.00	$260,000.00
		SUBTOTAL THIS SHEET					$2,841,500.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Eads Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		10" DR25 (CIOD) C900 PVC pipe	8140	110,000	lin ft	$16.00	$1,760,000.00
		Isolation Valves (Manual operation):					
		10" class 150 (psig) butterfly valve with operator	8140	4	ea	$2,000.00	$8,000.00
		Isolation Valve Manholes (to include):	8140	4	ea	$7,000.00	$28,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$1,796,000.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Eads Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		21	ea	$6,800.00	$142,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	210	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	84	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	2,000	lbs		
		- 2" Combination Air Valve (1ea)	8140	21	ea		
		- 2" Ball Valves (1 ea)	8140	21	ea		
		Blowoff Structures (to include):		21	ea	$8,300.00	$174,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	170	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	25	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	7.0	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	3,000	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	42	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	21	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	210	lin ft		
		- 6" Tee (1 ea)	8140	21	ea		
		- 6" Blind Flange (1 ea)	8140	21	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	2,000	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$317,100.00**
		SUBTOTAL EADS SPUR					**$4,954,600.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Eads and May Valley Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	44	acre	$1,000.00	$44,000.00
		Grubbing	8140	4.4	acre	$2,500.00	$11,000.00
		Stripping (6" thick)	8140	36,000	cy	$2.00	$72,000.00
		Seeding	8140	44	acre	$1,500.00	$66,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	69,000	cy	$6.00	$414,000.00
		Rock Excavation (0.25:1) outside urban area	8140	3,000	cy	$35.00	$105,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	1,350	cy	$40.00	$54,000.00
		Embedment & Cover Backfill	8140	70,000	cy	$5.00	$350,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	3,200	cy	$14.00	$44,800.00
		SUBTOTAL THIS SHEET					$1,160,800.00

QUANTITIES

BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE
DATE PREPARED	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE

PRICES

BY	CHECKED
Jeff Morris Jeff Morris	WCD 5/31/12
DATE PREPARED	**PEER REVIEW / DATE**
05/12/12	SJR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Eads and May Valley Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		12" DR25 (CIOD) C900 PVC pipe	8140	32,000	lin ft	$22.00	$704,000.00
		Isolation Valves (Manual operation):					
		12" class 150 (psig) butterfly valve with operator	8140	2	ea	$2,500.00	$5,000.00
		Isolation Valve Manholes (to include):	8140	2	ea	$7,000.00	$14,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$723,000.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Eads and May Valley Spur
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		6	ea	$6,800.00	$40,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	60	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	24	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	570	lbs		
		- 2" Combination Air Valve (1ea)	8140	6	ea		
		- 2" Ball Valves (1 ea)	8140	6.0	ea		
		Blowoff Structures (to include):		6	ea	$8,300.00	$49,800.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	48	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	7.1	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	2	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	860	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	12	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	6	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	60	lin ft		
		- 6" Tee (1 ea)	8140	6	ea		
		- 6" Blind Flange (1 ea)	8140	6	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	570	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation					
		No. 09SP101729 dated August 2009. Soils are assumed to be similar to those					
		encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$90,600.00**
		SUBTOTAL EADS AND MAY VALLEY SPUR					**$1,974,400.00**

QUANTITIES		PRICES	
BY: Jeremy Lorberau	CHECKED: W. Chris Duke, PE	BY: Jeff Morris	CHECKED: 5/31/12
DATE PREPARED: 04/24/12	PEER REVIEW / DATE: Steven J. Robertson, PE	DATE PREPARED: 05/12/12	PEER REVIEW / DATE: DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _1_ OF _3_

FEATURE:

Arkansas Valley Conduit

Pipeline

Revised Comanche South, Max Day Condition 4

May Valley Spur

Civil

PROJECT:

Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	38	acre	$1,000.00	$38,000.00
		Grubbing	8140	4.0	acre	$2,500.00	$10,000.00
		Stripping (6" thick)	8140	31,000	cy	$2.00	$62,000.00
		Seeding	8140	38	acre	$1,500.00	$57,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	59,000	cy	$6.00	$354,000.00
		Rock Excavation (0.25:1) outside urban area	8140	2,550	cy	$35.00	$89,250.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	1,150	cy	$40.00	$46,000.00
		Embedment & Cover Backfill	8140	60,000	cy	$5.00	$300,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	2,700	cy	$14.00	$37,800.00
		SUBTOTAL THIS SHEET					$994,050.00

QUANTITIES

BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE
DATE PREPARED	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE

PRICES

BY	CHECKED
Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**
05/12/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
May Valley Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		12" DR18 (CIOD) C900 PVC pipe	8140	27,000	lin ft	$27.00	$729,000.00
		Isolation Valves (Manual operation):					
		12" class 250 (psig) butterfly valve with operator	8140	2	ea	$4,400.00	$8,800.00
		Isolation Valve Manholes (to include):	8140	2	ea	$7,000.00	$14,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					$751,800.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _3_ OF _3_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 May Valley Spur Civil	**PROJECT:** Fryingpan-Arkansas Project - Arkansas Valley Conduit
	WOID: AF523 — **ESTIMATE LEVEL:** Appraisal
	REGION GP — **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		6	ea	$6,800.00	$40,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	60	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	24	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	570	lbs		
		- 2" Combination Air Valve (1ea)	8140	6	ea		
		- 2" Ball Valves (1 ea)	8140	6	ea		
		Blowoff Structures (to include):		6	ea	$8,300.00	$49,800.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	48	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	7.1	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	2	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	860	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	12	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	6	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	60	lin ft		
		- 6" Tee (1 ea)	8140	6	ea		
		- 6" Blind Flange (1 ea)	8140	6	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	570	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation					
		No. 09SP101729 dated August 2009. Soils are assumed to be similar to those					
		encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$90,600.00**
		SUBTOTAL MAX VALLEY SPUR					**$1,836,450.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	**CHECKED** W. Chris Duke, PE	**BY** Jeff Morris	**CHECKED** 5/31/12
DATE PREPARED 04/24/12	**PEER REVIEW / DATE** Steven J. Robertson, PE	**DATE PREPARED** 05/12/12	**PEER REVIEW / DATE** 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Eads & May Valley Booster Plant - 10-inch Spur Revised Comanche South Eads Spur	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural/Electrical/Mechanical:					
		10- & 12-Inch spur					
		Booster Plant	86-68420	1	LS	$340,000.00	$340,000.00
		Using pumping plant program					
		Booster Plant - 1.125 cfs each, 317 feet TDH;					
		Unit Brake HP: 18.0 hp; Motors: 20 hp each @ 480 volts					
		Booster Plant - (1 + 1 installed spare)					
		2 pumps; vertical can; supply voltage (69 kV)					
		Structures And Improvements					
		Waterways					
		Pumps and Motors					
		Accessory Electrical					
		Miscellaneous Equipment					
		Switchyards					
		SUBTOTAL THIS SHEET					**$340,000.00**

QUANTITIES		PRICES	
BY R. Zelenka	REVIEWED Toby Turnage	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/20/2012	PEER REVIEW / DATE Toby Turnage 4.20.12	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Eads & May Valley Air Chamber
Revised Comanche South
Eads & May Valley Spur

PROJECT: Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Foundation	86-68120	1	ls	$2,600.00	$2,600.00
		(slab-on-grade foundation type)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 85 miles					
		Concrete: 2.3 yd3					
		Reinforcement (Assume 135 lb/yd3): 310 lbs					
		Cement (Assume: 0.282 ton/yd3): 0.6 tons					
		SUBTOTAL THIS SHEET					**$2,600.00**

QUANTITIES		PRICES	
BY: R. J. Barthel	REVIEWED: Paul Ruchti	BY: Jeff Morris	CHECKED: 5/31/12
DATE PREPARED: 04/15/12	PEER REVIEW / DATE: Paul Ruchti, P.E.	DATE PREPARED: 05/12/12	PEER REVIEW / DATE: DCO 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

FEATURE:	PROJECT:
Arkansas Valley Conduit Eads & May Valley Air Chamber Revised Comanche South Eads & May Valley Spur	Fryington-Arkansas Project
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION: GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic equipment/Mechanical					
		Air Chamber	86-68420	1	ls	$88,000.00	$88,000.00
		1,779-gallon (238 cubic feet) steel air chamber cylinder height 6 feet 6 inches cylinder diameter 5 feet air chamber weight 8,800 pounds mounted air compressor 8 horsepower					
		SUBTOTAL THIS SHEET					$88,000.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/4/2011	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION ESTIMATE WORKSHEET SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Eads & May Valley Meter Vault Revised Comanche South Eads & May Valley Spur	Fryingtон-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Reinforced Concrete for Vaults	86-68120	1	ls	$100,000.00	$100,000.00
		(Assumed: two 12' W x 14' L x 16' D)					
		(Assume: f'_c=4,500 psi)					
		Source: Pueblo, CO 85 miles					
		Concrete: 115 yd3					
		Reinforcement (Assume 135 lb/yd3): 15,650 lbs					
		Cement (Assume: 0.282 ton/yd3): 33 tons					
		Access & Service Hatches	86-68120	1	ls	$41,000.00	$41,000.00
		Access hatch four 3' x3'					
		(The Bilco Co Type Q single leaf)					
		Service hatch two 5' x 10'					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork	86-68120	280	lbs	$13.00	$3,640.00
		(40-D-6601, Ladder Type 2)					
		SUBTOTAL THIS SHEET					**$144,640.00**

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/17/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Eads and May Valley Meter Vaults Revised Comanche South Eads and May Valley Spur Mechanical Equipment	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume meter vault size=11.25'x11.25'x16.7'd					
		assume 2 vaults @ Eads					
	1	Meter vault ventilation equipment	86-68410	2	ls	$6,600.00	$13,200.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 450 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(16 ft)-8" diam, 16 ga., galv. steel duct					
		(2)-8" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-8"x12" reducer, sch 20, galv. steel pipe					
		(4)-12" diam, stainless steel bird screens					
		(2)-8"x12" reducer, 16 ga, galv. steel duct					
		(2)-8" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	2	ea	$800.00	$1,600.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter	86-68410	1	ea	$25,000.00	$25,000.00
		Single-path ultrasonic, 12" diam					
		2 transducers with cables and 1 transmitter console					
	4	Flowmeter	86-68410	1	ea	$22,000.00	$22,000.00
		Single-path ultrasonic, 10" diam					
		2 transducers with cables and 1 transmitter console					
		SUBTOTAL THIS SHEET					$61,800.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/17/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:
Arkansas Valley Conduit Eads & May Valley Meter Vault Revised Comanche South Eads & May Valley Spur	Fryington-Arkansas Project
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION: GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Hydraulic Equipment/Mechanical					
		Meter Vault	86-68420				
	1	10-inch manually-operated butterfly valves		1	ea	$3,000.00	$3,000.00
		1 valve, 225 lbs each					
		AWWA Class 250-B					
	2	12-inch manually-operated butterfly valves		1	ea	$4,400.00	$4,400.00
		1 valve, 300 lbs each					
		AWWA Class 250-B					
		SUBTOTAL THIS SHEET					$7,400.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/17/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/12/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
North Loop
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	145	acre	$800.00	$116,000.00
		Grubbing	8140	14.5	acre	$2,500.00	$36,250.00
		Stripping (6" thick)	8140	120,000	cy	$2.00	$240,000.00
		Seeding	8140	145	acre	$800.00	$116,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	220,000	cy	$4.00	$880,000.00
		Rock Excavation (0.25:1) outside urban area	8140	9,600	cy	$35.00	$336,000.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	4,300	cy	$40.00	$172,000.00
		Embedment & Cover Backfill	8140	230,000	cy	$3.00	$690,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	16,000	cy	$10.00	$160,000.00
		SUBTOTAL THIS SHEET					$2,746,250.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
North Loop
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		12" DR25 (CIOD) C900 PVC pipe	8140	40,000	lin ft	$22.00	$880,000.00
		12" DR25 (CIOD) C900 PVC pipe	8140	27,000	lin ft	$22.00	$594,000.00
		10" DR25 (CIOD) C900 PVC pipe	8140	15,500	lin ft	$16.00	$248,000.00
		10" CR18 (CIOD) C900 PVC pipe	8140	23,000	lin ft	$19.00	$437,000.00
		Isolation Valves (Manual operation):					
		12" class 150 (psig) butterfly valve with operator	8140	2	ea	$2,500.00	$5,000.00
		12" class 250 (psig) butterfly valve with operator	8140	1	ea	$4,400.00	$4,400.00
		10" class 150 (psig) butterfly valve with operator	8140	1	ea	$2,000.00	$2,000.00
		10" class 250 (psig) butterfly valve with operator	8140	1	ea	$3,000.00	$3,000.00
		Isolation Valve Manholes (to include):	8140	5	ea	$7,000.00	$35,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$2,208,400.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
North Loop
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		20	ea	$6,800.00	$136,000.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	200	lin ft		
		- 3/4 Inch gravel filter (4cy)	8140	80	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	1,900	lbs		
		- 2" Combination Air Valve (1ea)	8140	20	ea		
		- 2" Ball Valves (1 ea)	8140	20	ea		
		Blowoff Structures (to include):		20	ea	$8,300.00	$166,000.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	160	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	24	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	6.7	tons		
		- Pad Reinf. (1 layer, #5@12" oc. ew, 143 lbs ea)	8140	2,900	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	40	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	20	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	200	lin ft		
		- 6" Tee (1 ea)	8140	20	ea		
		- 6" Blind Flange (1 ea)	8140	20	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	1,900	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					**$302,000.00**
		SUBTOTAL NORTH LOOP					**$5,256,650.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
South Side and East End Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	20.0	acre	$1,000.00	$20,000.00
		Grubbing	8140	2	acre	$2,500.00	$5,000.00
		Stripping (6" thick)	8140	16,000	cy	$2.00	$32,000.00
		Seeding	8140	20	acre	$1,500.00	$30,000.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	27,000	cy	$6.00	$162,000.00
		Rock Excavation (0.25:1) outside urban area	8140	960	cy	$45.00	$43,200.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	550	cy	$50.00	$27,500.00
		Embedment & Cover Backfill	8140	27,000	cy	$5.00	$135,000.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	2,000	cy	$14.00	$28,000.00
		SUBTOTAL THIS SHEET					$482,700.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/21/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _2_ OF _3_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 South Side and East End Spur Civil	**PROJECT:** Fryingpan-Arkansas Project - Arkansas Valley Conduit WOID: AF523 ESTIMATE LEVEL: Appraisal REGION GP UNIT PRICE LEVEL: Jan-11 FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	16,000	lin ft	$6.20	$99,200.00
		Isolation Valves (Manual operation):					
		4" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,100.00	$1,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$107,300.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	**CHECKED** W. Chris Duke, PE	**BY** Jeff Morris	**CHECKED** 5/31/12
DATE PREPARED 04/24/12	**PEER REVIEW / DATE** Steven J. Robertson, PE	**DATE PREPARED** 05/13/12	**PEER REVIEW / DATE** DCO 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 South Side and East End Spur Civil	Fryingpan-Arkansas Project - Arkansas Valley Conduit
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		3	ea	$6,800.00	$20,400.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	30	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	12	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	290	lbs		
		- 2" Combination Air Valve (1ea)	8140	3	ea		
		- 2" Ball Valves (1 ea)	8140	3	ea		
		Blowoff Structures (to include):		3	ea	$8,300.00	$24,900.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	24	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	3.5	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	1	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	430	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	6	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	3	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	30	lin ft		
		- 6" Tee (1 ea)	8140	3	ea		
		- 6" Blind Flange (1 ea)	8140	3	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	290	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$45,300.00
		SUBTOTAL SOUTH SIDE AND EAST END SPUR					$635,300.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Bents Fort Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGIO	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	1.00	acre	$1,000.00	$1,000.00
		Grubbing	8140	1.000	acre	$2,500.00	$2,500.00
		Stripping (6" thick)	8140	710	cy	$6.00	$4,260.00
		Seeding	8140	1.00	acre	$1,500.00	$1,500.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	1,200	cy	$9.00	$10,800.00
		Rock Excavation (0.25:1) outside urban area	8140	42	cy	$45.00	$1,890.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	24	cy	$50.00	$1,200.00
		Embedment & Cover Backfill	8140	1,200	cy	$7.00	$8,400.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	91	cy	$16.00	$1,456.00
		SUBTOTAL THIS SHEET					$33,006.00

QUANTITIES

BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE
DATE PREPARED	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE

PRICES

BY	CHECKED
Jeff Morris	WCD 5/31/12
DATE PREPARED	**PEER REVIEW / DATE**
05/13/12	SJR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South, Max Dry Condition 4 Bents Fort Spur Civil	**PROJECT:** Fryingpan-Arkansas Project - Arkansas Valley Conduit
	WOID: AF523 — **ESTIMATE LEVEL:** Appraisal
	REGIO GP — **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		4" DR25 (CIOD) C900 PVC pipe	8140	710	lin ft	$6.20	$4,402.00
		Isolation Valves (Manual operation):					
		4" class 150 (psig) butterfly valve with operator	8140	1	ea	$1,100.00	$1,100.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$12,502.00**

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE	05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Bents Fort Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGIO	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation No. 09SP101729 dated August 2009. Soils are assumed to be similar to those encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$15,100.00
		SUBTOTAL BENT'S FORT SPUR					$60,608.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Rocky Ford & Hancock Spur
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	1.00	acre	$1,000.00	$1,000.00
		Grubbing	8140	1.000	acre	$2,500.00	$2,500.00
		Stripping (6" thick)	8140	1,100	cy	$4.00	$4,400.00
		Seeding	8140	1.00	acre	$1,500.00	$1,500.00
		Earthwork Items:					
		Soil Excavation (1.5:1) outside urban area	8140	2,100	cy	$9.00	$18,900.00
		Rock Excavation (0.25:1) outside urban area	8140	91	cy	$45.00	$4,095.00
		(20% of length is assumed partial rock exc.)					
		assume rippable material					
		Pipe Bedding (Select material, 4" thick)	8140	40	cy	$50.00	$2,000.00
		Embedment & Cover Backfill	8140	2,100	cy	$7.00	$14,700.00
		(does not include shrink/swell)					
		Compacting Embedment Backfill	8140	96	cy	$16.00	$1,536.00
		SUBTOTAL THIS SHEET					$50,631.00

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/24/12	Steven J. Robertson, PE	05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Rocky Ford & Hancock Spur
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Items:					
		12" DR25 (CIOD) C900 PVC pipe	8140	960	lin ft	$22.00	$21,120.00
		Isolation Valves (Manual operation):					
		12" class 150 (psig) butterfly valve with operator	8140	1	ea	$2,500.00	$2,500.00
		Isolation Valve Manholes (to include):	8140	1	ea	$7,000.00	$7,000.00
		60" I.D. x 6" wall precast flat top with concentric ring, 36" access					
		60" I.D. x 6" wall precast 36" riser					
		60" I.D. precast 72" base shell					
		36" dia. Cast iron manhole cover and ring set					
		SUBTOTAL THIS SHEET					**$30,620.00**

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Rocky Ford & Hancock Spur
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Air Valve Structures (to include):		1	ea	$6,800.00	$6,800.00
		- 48" dia. Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 3/4 inch gravel filter (4cy)	8140	4	cy		
		- 48" diam Alum. Hatch cover (95 lbs ea)	8140	95	lbs		
		- 2" Combination Air Valve (1ea)	8140	1	ea		
		- 2" Ball Valves (1 ea)	8140	1	ea		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft ea)	8140	8	lin ft		
		- 8' x 8' x 6" Concrete Pad (1.18 cy ea)	8140	1.2	cy		
		- Cementitious Materials for Pad (0.33 tons ea)	8140	0.33	tons		
		- Pad Reinf. (1 layer, #5@12" oc, ew, 143 lbs ea)	8140	145	lbs		
		- 6" dia. Discharge stem pipe (2 ft ea)	8140	2	lin ft		
		- 6" Butterfly Valve (1 ea)	8140	1	ea		
		- 48" Diam Concrete Pipe, vertical (10 ft ea)	8140	10	lin ft		
		- 6" Tee (1 ea)	8140	1	ea		
		- 6" Blind Flange (1 ea)	8140	1	ea		
		- 48" diam Alum hatch cover (95 lbs ea)	8140	95	lbs		
		Cathodic Protection	8140	1	ls	Not applicable, no steel pipe.	
		*Assume 5% of cost for all steel items above					
		Note: Percentage used is based on detailed field cost estimates prepared for Solicitation					
		No. 09SP101729 dated August 2009. Soils are assumed to be similar to those					
		encountered at the Weber Siphons and are assumed to have similar corrosion potential.					
		SUBTOTAL THIS SHEET					$15,100.00
		SUBTOTAL ROCKY FORD AND HANCOCK SPUR					$96,351.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED WD 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE DCD 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Loop	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Civil/Structural:					
		Participant Tie-In Vaults	86-68120	8	ea	$35,000.00	$280,000.00
		Reinforced Concrete for Vaults					
		(Assumed: 12' W x 9' L x 10'-8" D)					
		(Assume: f'_c=4,500 psi)					
		Source: 50 miles					
		Concrete: 17.5 yd3					
		Reinforcement (Assume 135 lb/yd3): 2,360 lbs					
		Cement (Assume: 0.282 ton/yd3): 5 tons					
		Access & Service Hatches					
		Access hatch 3' x3': 2 ea					
		(The Bilco Co Type Q single leaf)					
		Service hatch 3' x 5': 1 ea					
		(The Bilco Co Type JD special sizes)					
		Miscellaneous Metalwork					
		Steel (ASTM A36): 150 lbs					
		(Ref. 40-D-6801, Ladder Type 2)					
		Sitework					
		Stripping (6 inch thick layer of soil)					
		Service Yard: 12 yd3					
		Excavation: 195 yd3					
		(Assume: Common, 1-1/2:1 slope)					
		Compacted engineered backfill: 155 yd3					
		Gravel Surfacing (6 inches thick)					
		Service Yard: 10 yd3					
		SUBTOTAL THIS SHEET					$280,000.00

QUANTITIES		PRICES	
BY R. J. Barthel	REVIEWED Paul Ruchti	BY Jeff Morris	CHECKED 5/21/12
DATE PREPARED 04/18/12	PEER REVIEW / DATE Paul Ruchti, P.E.	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Loop Mechanical Equipment	Fryington-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		assume participant tie-in vault size=12' W x 9' L x 10'-8" D					
	1	Meter vault ventilation equipment	86-68410	8	ls	$5,600.00	$44,800.00
		list of equipment per vault:					
		(1)-steel centrifugal fan, 200 cfm @ 0.25" w.g.s.p., 1/6 Hp					
		(12 ft)-6" diam, 16 ga., galv. steel duct					
		(2)-6" diam, sch 20, galv., L.R. 180 deg. steel pipe returns					
		(2)-6"x8" reducer, sch 20, galv. steel pipe					
		(4)-8" diam, stainless steel bird screens					
		(2)-6"x8" reducer, 16 ga, galv. steel duct					
		(2)-6" diam galv steel motor-operated damper					
		(1)-fan motor starter for 1/6 Hp					
		(1)-fan wall switch and box					
	2	Meter vault heater	86-68410	8	ea	$800.00	$6,400.00
		3 kW unit heater					
		thermostatically controlled					
	3	Flowmeter system	86-68410	8	ea	$13,000.00	$104,000.00
		6" diameter, microprocessor-based,					
		flanged electro-magnetic flowmeter with					
		remote wall-mounted transmitter					
		weight= approx 85 lbs					
		120 Volt AC					
		SUBTOTAL THIS SHEET					$155,200.00

QUANTITIES		PRICES	
BY AM Ritt	REVIEWED Paul Schlein	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Dave Hulse	DATE PREPARED 05/13/12	PEER REVIEW / DATE DCO 5/31/12

BUREAU OF RECLAMATION | ESTIMATE WORKSHEET | SHEET _1_ OF _1_

FEATURE:
Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Loop

PROJECT:
Fryington-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Mechanical/Hydraulic equipment					
		Participant Tie-In Vaults (8 vaults)	86-68420				
		6-inch pressure reducing valve		8	ea	$7,800.00	$62,400.00
		8 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
		6-inch manually-operated butterfly valve					
		4 valves, 90 lbs each		4	ea	$1,300.00	$5,200.00
		AWWA Class 150-B					
		4 valves, 130 lbs each		4	ea	$2,300.00	$9,200.00
		AWWA Class 250-B					
		6-inch buried square-nut operated butterfly valve with valve box					
		4 valves, 245 lbs each		4	ea	$1,800.00	$7,200.00
		AWWA Class 150-B					
		4 valves, 285 lbs each		4	ea	$2,800.00	$11,200.00
		AWWA Class 250-B					
		1-inch air valve					
		combination air valve					
		8 air valves, 35 lbs each		8	ea	$1,000.00	$8,000.00
		SUBTOTAL THIS SHEET					$103,200.00

QUANTITIES		PRICES	
BY Ken Smith	REVIEWED Nathan Nakamoto	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 4/18/2012	PEER REVIEW / DATE Rick Frisz 4/20/12	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1_ OF _2_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South, Max Day Condition 4 Roadway, Rail, River Crossings Civil		**PROJECT:** Fryingpan-Arkansas Project - Arkansas Valley Conduit	
		WOID: AF523	**ESTIMATE LEVEL:** Appraisal
		REGION: GP	**UNIT PRICE LEVEL:** Jan-11
		FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Gravel Road Crossings (to include):		16	ea	$10,000.00	$160,000.00
		Compacting backfill for road base (192 cy each)	8140	3,100	cy		
		Aggregate Base Course (6" thick) (22 cy each)	8140	350	cy		
		Gravel surfacing (6" thick) (23 cy each)	8140	370	cy		
		Temporary barricades & signage (1 each)	8140	16	ls		
		(assume req'd for 2 days per crossing)					
		Paved Road Crossings, 2 lane (to include):		214	ea	$25,000.00	$5,350,000.00
		Compacting backfill for road base (194 cy each)	8140	41,500	cy		
		Asphalt base course (6" thick) (23 cy each)	8140	4,900	cy		
		Asphalt surfacing (6" thick) (23 cy each)	8140	4,900	cy		
		Temporary barricades & signage (1 each)	8140	214	ls		
		(assume paved and req'd for 5 days ea)					
		Major Road Crossings, 4 lanes (to include):		27	ea	$60,000.00	$1,620,000.00
		Compacting backfill for road base (341 cy each)	8140	9,200	cy		
		Asphalt base course (6" thick) (39 cy each)	8140	1,050	cy		
		Asphalt surfacing (6" thick) (40 cy each)	8140	1,100	cy		
		Temp. detour, barricades, & signage (1000')	8140	27	ls		
		(assume paved and req'd for 10 days ea)					
		Interstate and Highway Crossings (to include):		32	ea	$300,000.00	$9,600,000.00
		Horizontal Directional Drilling, 36" dia carrier	8140	16,000	lin. ft.		
		pipe, min. cover depth is 20 ft, 500 lin. ft. each					
		48" dia casing pipe, welded steel 1/4" thick	8140	16,000	lin. ft.		
		Grout between borehole & casing pipe (290 cy)	8140	9,300	cy		
		Railroad Crossing (to include):		14	ea	$120,000.00	$1,680,000.00
		Horizontal Directional Drilling, 36" dia carrier	8140	2,100	lin. ft.		
		pipe, min. cover depth is 20 ft, 150 lin. ft. each					
		48" dia casing pipe, welded steel 1/4" thick	8140	2,100	lin. ft.		
		Grout between borehole and casing pipe	8140	1,250	cy		
		SUBTOTAL THIS SHEET					**$18,410,000.00**

QUANTITIES		**PRICES**	
BY Jeremy Lorberau	**CHECKED** W. Chris Duke, PE	**BY** Jeff Morris	**CHECKED** 5/31/12
DATE PREPARED 04/24/12	**PEER REVIEW / DATE** Steven J. Robertson, PE	**DATE PREPARED** 05/13/12	**PEER REVIEW / DATE** 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Pipeline Crossings
Revised Comanche South, Max Day Condition 4
Crossings
Civil

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Major River Crossing (to include):		8	ea	$1,000,000.00	$8,000,000.00
		Horizontal Directional Drilling, 36" dia. Pipe, 48"	8140	8,000	lin ft		
		(1000 lin. ft ea)					
		48" dia. Casing pipe, 1/4" thick (1000 lin. ft ea)	8140	8,000	lin ft		
		average cover depth is 20 ft					
		SUBTOTAL THIS SHEET					**$8,000,000.00**

QUANTITIES		**PRICES**	
BY	**CHECKED**	**BY**	**CHECKED**
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE	05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Dewatering
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Well Set Up (to include):					
		Mobilization/Demobilization					
		Unwatering System- Power for dewatering					
		system shall be sufficient to handle power for					
		unwatering system at the same time					
		Installation of 15' deep wells, Pump 100 gpm					
		8 inch dia. 5 ft long slotted well screens					
		8 inch dia. well casing					
		Install 2 inch dia. monitoring well					
		Well Development					
		Well completion pumping test 4 hr					
		Discharge Piping if no settling pond needed					
		check valves					
		flow meters					
		sampling ports					
		Power					
		All necessary generators, wiring, connections					
		fuel, maintenance, rentals, etc. to provide					
		power to dewatering system					
		Well Removal and Decommissioning					
		Well Set Ups per Reach/Spur:					
		Duration of operation is approximately 2					
		months operating time per well					
		Reaches 1 through 4	8140	720	ea	$3,500.00	$2,520,000.00
		13.57 miles in saturated areas requiring 1 well					
		per 100' of pipe trench					
		Spurs	8140	340	ea	$3,500.00	$1,190,000.00
		6.49 miles in saturated areas requiring 1 well					
		per 100' of pipe trench					
		SUBTOTAL THIS SHEET					$3,710,000.00

QUANTITIES

BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE
DATE PREPARED	**PEER REVIEW / DATE**
04/24/12	Steven J. Robertson, PE

PRICES

BY	CHECKED
Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**
05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _1_ OF _1_

FEATURE:

Arkansas Valley Conduit
Pipeline
Revised Comanche South, Max Day Condition 4
Dust Abatement
Civil

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Dust Abatement (to include):					
		4 Water wagons, 4 drivers, 2-4 passes per day	8140	400,000	Mgal	$10.00	$4,000,000.00
		per driver, 0.0625" application per pass, 5-75 ft					
		width					
		(Duration estimated 6 years using 4 crews)					
		SUBTOTAL THIS SHEET					$4,000,000.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED WCD 5/31/12
DATE PREPARED 04/24/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE SJR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Dam N/S Interconnect
Revised Comanche South, Max Day
Piping
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Clearing (3 times trench width)	8140	6.1	acre	$1,000.00	$6,100.00
		Grubbing (10% of clearing area)	8140	0.61	acre	$2,500.00	$1,525.00
		Unwatering trench (Soil to avg. depth of 6', rock	8140	1	ls	Included in Cofferdam Worksheets	
		from 6' to 15.5', sandstone w/ minor fractures,					
		groundwater el varies from surface to over 15')					
		Water for dust abatement	8140	310	Mgal	$20.00	$6,200.00
		Stripping (3 times width, 6" thick)	8140	1650	cy	$4.00	$6,600.00
		Seeding	8140	6.1	acre	$1,500.00	$9,150.00
		Earthwork Items:					
		Soil excavation (1.5:1 slopes, avg. 6' deep)	8140	15500	cy	$6.00	$93,000.00
		Rock excavation (sandstone, 0.25:1 slopes, 4.4' t	8140	5200	cy	$35.00	$182,000.00
		13' deep, groundwater varies in depth, blast					
		& excavator removal)					
		Pipe Bedding 4" < 54" dia., 6" > 54" dia.)	8140	450	cy	$50.00	$22,500.00
		Backfill	8140	17000	cy	$5.00	$85,000.00
		Compacted Backfill (Embedment)	8140	2600	cy	$14.00	$36,400.00
		Pipe Items:					
		90" ID Steel pipe, 0.375" thick, mortar lined &	8140	770000	lbs	$1.90	$1,463,000.00
		epoxy coated, Class 250 ft, (L=2109.6 ft)					
		48" ID Steel pipe, 0.25" thick, mortar lined &	8140	15500	lbs	$2.30	$35,650.00
		epoxy coated, Class 125 ft, (L=117.6 ft)					
		42" ID Steel pipe, 0.175" thick, mortar lined &	8140	7300	lbs	$2.35	$17,155.00
		epoxy coated, Class 125 ft, (L=90.3 ft)					
		36" ID Steel pipe, 0.1501" thick, mortar lined &	8140	13000	lbs	$2.40	$31,200.00
		epoxy coated, Class 125 ft, (L=215.99 ft)					
		30" ID Steel pipe, 0.1345" thick, mortar lined &	8140	2700	lbs	$2.80	$7,560.00
		epoxy coated, Class 125 ft, (L=60 ft)					
		Cathodic Protection (5% of steel pipe cost)	8140	1	ls	$78,000.00	$78,000.00
		Cofferdam: See Estimate done by 8312	8312				
		SUBTOTAL THIS SHEET					**$2,081,040.00**

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/25/12	Steven J. Robertson, PE	05/13/12	Dan 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Dam N/S Interconnect
Revised Comanche South, Max Day
Pipe Appurtenances
Civil

PROJECT:

Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Pipe Appurtenances:					
		90 x 30 x 90 Tee	8140	1	ea	$9,300.00	$9,300.00
		90 x 36 x 90 Tee	8140	1	ea	$10,500.00	$10,500.00
		30 x 30 x 30 Tee	8140	1	ea	$9,000.00	$9,000.00
		90 x 90 x 90 Tee	8140	1	ea	$52,500.00	$52,500.00
		90 x 90 x 42 Tee	8140	1	ea	$15,750.00	$15,750.00
		42 x 42 x 42 Tee	8140	1	ea	$15,000.00	$15,000.00
		48 x 36 x 42 Tee	8140	1	ea	$28,500.00	$28,500.00
		36 x 36 x 36 Tee	8140	1	ea	$10,950.00	$10,950.00
		84 x 90 x 84 x 42 Cross	8140	1	ea	$135,000.00	$135,000.00
		Isolation Valve Manholes (to include):					
		48" ID x 6" wall precast flat top with concentric	8140	13	ea	$4,500.00	$58,500.00
		ring, 36" access					
		48" ID x 6" wall precast 36" riser					
		48" ID precast 72" base shell					
		36" dia. cast iron manhole cover and ring set					
		Cathodic Protection (5% of steel cost)	8140	1	ls	$14,325.00	$14,325.00
		SUBTOTAL THIS SHEET					**$359,325.00**

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
04/25/12	Steven J. Robertson, PE	05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Dam N/S Interconnect
Revised Comanche South, Max Day
Valve 2 - Civil Items

Civil

PROJECT:

Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Stripping (6" deep)	8140	160.00	cy	$6.00	$960.00
		Seeding (entire disturbed area)	8140	1.00	ac	$1,500.00	$1,500.00
		Dewatering (24-7 operation, water surface at	8140	1	ls	$15,000.00	$15,000.00
		5 feet below grade)					
		Earthwork Items: (rock assumed to be 5 feet below surface)					
		Soil Excavation (2:1 slopes)	8140	230	cy	$25.00	$5,750.00
		Rock Excavation (0.25:1 slopes)	8140	230	cy	$60.00	$13,800.00
		Structural Compacted Backfill	8140	240	cy	$25.00	$6,000.00
		Valve Vault Construction:		1	ea	$80,000.00	$80,000.00
		Concrete (4500 psi min.)	8140	93	cy		
		Rebar (#7 @ 6" o.c.)	8140	12000	lbs		
		Cementitious Materials (6 sacks/cy)	8140	26	tons		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft each)	8140	8	lin ft		
		- 8' x 8' x 6" concrete pad, 4500 psi, 1.18 cy/ea	8140	1	cy		
		- Cementitious materials (0.33 tons each)	8140	0	tons		
		- Pad reinforcement (1 layer, #5 @ 1' o.c., ew,	8140	141	lbs		
		141 lbs/each)					
		- 6" dia. Discharge stem pipe (2 feet each)	8140	2	lin ft		
		- 6" butterfly valve (1 each)	8140	1	ea		
		- 48" dia. Concrete pipe, vertical (10 ft each)	8140	10	lin ft		
		- 6" Tee (1 each)	8140	1	ea		
		- 6" blind flange (1 each)	8140	1	ea		
		- 48" dia. Alum. Hatch cover (95 lbs each)	8140	95	ea		
		SUBTOTAL THIS SHEET					$131,310.00

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
04/25/12	Steven J. Robertson, PE	05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Dam N/S Interconnect
Revised Comanche South, Max Day
Valve 11 and 12 - Civil Items
Civil

PROJECT: Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Stripping (6" deep)	8140	170.00	cy	$6.00	$1,020.00
		Seeding (entire disturbed area)	8140	1.00	ac	$1,500.00	$1,500.00
		Dewatering (24-7 operation, water surface at 5 feet below grade)	8140	1	ls	$15,000.00	$15,000.00
		Earthwork Items: (rock assumed to be 5 feet below surface)					
		Soil Excavation (2:1 slopes)	8140	240	cy	$25.00	$6,000.00
		Rock Excavation (0.25:1 slopes)	8140	240	cy	$60.00	$14,400.00
		Structural Compacted Backfill	8140	240	cy	$25.00	$6,000.00
		Valve Vault Construction:		1	ea	$87,000.00	$87,000.00
		Concrete (4500 psi min.)	8140	99	cy		
		Rebar (#7 @ 6" o.c.)	8140	13000	lbs		
		Cementitious Materials (6 sacks/cy)	8140	28	tons		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft each)	8140	8	lin ft		
		- 8' x 8' x 6" concrete pad, 4500 psi, 1.18 cy/ea	8140	1	cy		
		- Cementitious materials (0.33 tons each)	8140	0	tons		
		- Pad reinforcement (1 layer, #5 @ 1' o.c., ew, 141 lbs/each)	8140	141	lbs		
		- 6" dia. Discharge stem pipe (2 feet each)	8140	2	lin ft		
		- 6" butterfly valve (1 each)	8140	1	ea		
		- 48" dia. Concrete pipe, vertical (10 ft each)	8140	10	lin ft		
		- 6" Tee (1 each)	8140	1	ea		
		- 6" blind flange (1 each)	8140	1	ea		
		- 48" dia. Alum. Hatch cover (95 lbs each)	8140	95	ea		
		SUBTOTAL THIS SHEET					$139,220.00

QUANTITIES		PRICES	
BY Jeremy Lorberau	CHECKED W. Chris Duke, PE	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 04/25/12	PEER REVIEW / DATE Steven J. Robertson, PE	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _3_ OF _3_

FEATURE:

Arkansas Valley Conduit
Dam N/S Interconnect
Revised Comanche South, Max Day
Valves 13 and 14 - Civil Items

Civil

PROJECT:

Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Sitework Items:					
		Stripping (6" deep)	8140	190.00	cy	$6.00	$1,140.00
		Seeding (entire disturbed area)	8140	1.00	ac	$1,500.00	$1,500.00
		Dewatering (24-7 operation, water surface at 5 feet below grade)	8140	1	ls	$15,000.00	$15,000.00
		Earthwork Items: (rock assumed to be 5 feet below surface)					
		Soil Excavation (2:1 slopes)	8140	310	cy	$25.00	$7,750.00
		Rock Excavation (0.25:1 slopes)	8140	330	cy	$60.00	$19,800.00
		Structural Compacted Backfill	8140	270	cy	$25.00	$6,750.00
		Valve Vault Construction:		1	ea	$125,000.00	$125,000.00
		Concrete (4500 psi min.)	8140	144	cy		
		Rebar (#7 @ 6" o.c.)	8140	18500	lbs		
		Cementitious Materials (6 sacks/cy)	8140	41	tons		
		Blowoff Structures (to include):		1	ea	$8,300.00	$8,300.00
		- 6" dia. Steel pipe, vertical (8 ft each)	8140	8	lin ft		
		- 8' x 8' x 6" concrete pad, 4500 psi, 1.18 cy/ea	8140	1	cy		
		- Cementitious materials (0.33 tons each)	8140	0	tons		
		- Pad reinforcement (1 layer, #5 @ 1' o.c., ew, 141 lbs/each)	8140	141	lbs		
		- 6" dia. Discharge stem pipe (2 feet each)	8140	2	lin ft		
		- 6" butterfly valve (1 each)	8140	1	ea		
		- 48" dia. Concrete pipe, vertical (10 ft each)	8140	10	lin ft		
		- 6" Tee (1 each)	8140	1	ea		
		- 6" blind flange (1 each)	8140	1	ea		
		- 48" dia. Alum. Hatch cover (95 lbs each)	8140	95	ea		
		SUBTOTAL THIS SHEET					**$185,240.00**

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jeremy Lorberau	W. Chris Duke, PE	Jeff Morris Jeff Morris	W 5/31/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
04/25/12	Steven J. Robertson, PE	05/13/12	SJR 5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Arkansas Valley Conduit
Dam N/S Interconnect
Revised Comanche South, Max Day

Mechanical

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-2011
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Steel Pipe and Valves:					
		Steel Pipe:					
		8" Sch. 20 steel pipe	8420	35	lin ft	$180.00	$6,300.00
		(23 lb/ft)					
		4" Std. wall steel pipe	8420	56	lin ft	$90.00	$5,040.00
		(11 lb/ft)					
		Flanges					
		90-inch pipe Dia: 8 AWWA class D flanges	8420	14,976	lbs	$4.00	$59,904.00
		1,872 lbs each					
		84-inch pipe Dia: 2 AWWA class D flanges	8420	3,292	lbs	$4.00	$13,168.00
		1,646 lbs each					
		48-inch pipe Dia: 2 AWWA class D flanges	8420	920	lbs	$5.00	$4,600.00
		460 lbs each					
		42-inch pipe Dia: 4 AWWA class D flanges	8420	1,456	lbs	$5.00	$7,280.00
		364 lbs each					
		36-inch pipe Dia: 6 AWWA class D flanges	8420	1,566	lbs	$5.00	$7,830.00
		261 lbs each					
		30-inch pipe Dia: 4 AWWA class D flanges	8420	656	lbs	$5.00	$3,280.00
		164 lbs each					
		8-inch pipe Dia: 10 AWWA class D flanges	8420	150	lbs	$5.00	$750.00
		15 lbs each					
		4-inch pipe Dia: 16 AWWA class D flanges	8420	128	lbs	$5.00	$640.00
		8 lbs each					
		SUBTOTAL THIS SHEET					$108,792.00

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Ken Smith	Lucas Adams	Jeff Morris	5/21/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
4/26/2012	Nathan Nakamoto 4/26/12	05/13/12	5/31/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:

Fryingpan-Arkansas Project
Arkansas Valley Conduit
Intertconnect
Revised Comanche South
Mechanical

PROJECT:
Fryingpan-Arkansas Project - Arkansas Valley Conduit

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-2011
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Valves					
		90" Dia.: AWWA class 150B	8420	4	ea	$150,000.00	$600,000.00
		4 butterfly valves manually-operated					
		19,700 lbs each					
		84" Dia: AWWA class 150B	8420	1	ea	$130,000.00	$130,000.00
		1 butterfly valves manually-operated					
		16,400 lbs each					
		48" Dia. AWWA class 150B	8420	1	ea	$36,000.00	$36,000.00
		1 butterfly valves manually-operated					
		6,925 lbs each					
		42" Dia. AWWA class 150B	8420	2	ea	$26,000.00	$52,000.00
		2 butterfly valves manually-operated					
		4,544 lbs each					
		36" Dia. AWWA class 150B	8420	3	ea	$17,000.00	$51,000.00
		3 butterfly valve manually-operated					
		3,425 lbs each					
		30" Dia. AWWA class 150B	8420	2	ea	$14,500.00	$29,000.00
		2 butterfly valves manually-operated					
		2,435 lbs each					
		8" Dia. AWWA class 150B	8420	5	ea	$1,900.00	$9,500.00
		5 butterfly valves manually-operated					
		125 lbs each					
		4" Dia. AWWA class 150B	8420	8	ea	$1,100.00	$8,800.00
		8 butterfly valves manually-operated					
		71 lbs each					
		SUBTOTAL THIS SHEET					$916,300.00

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Ken Smith	Lucas Adams	Jeff Morris	5/31/12
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
4/26/2012	Nathan Nakamoto 4/26/12	05/13/12	5/31/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _1_ OF _1_

FEATURE:	PROJECT:			
Arkansas Valley Conduit Dam N/S Interconnect **Revised Comanche South, Max Day** Sandbag Cofferdam	Fryingpan-Arkansas Project - Arkansas Valley Conduit			
	WOID:	AF641	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	*	Foundation Preperation		1	LS	$30,000.00	$30,000.00
		remove ~330 yds of river bottom sediment					
	*	Furnish and install 914 - 3.5x3.5x3.5 ft Sandbags		1	LS	$110,000.00	$110,000.00
		Fill sandbags with common excavation soils.		1,460	yd^3	Included in lump sum above	
		Sand is available in the common exe.					
	*	Furnish and install 40 mil PVC membrane as		810	yd^2	Included in furnish and install	
		the sand bags are being erected.(1st half of river excavation)				sand bag item above	
	*	Install and maintain 2 sump pumps for 1 months		1	LS	$35,000.00	$35,000.00
		2 pumps pumping at 20 gpm					
	*	Remove and relocate 910 sandbags		1	LS	$75,000.00	$75,000.00
		to the other side of river					
	*	Furnish and install 40 mil PVC membrane as		810	yd^2	Included in remove and relocate	
		the sand bags are being erected. (2nd half of river excavation)				sand bag item above	
		- assuming 1st half membrane will not be reusable					
		SUBTOTAL THIS SHEET					$250,000.00

QUANTITIES		PRICES	
BY Paul Craig	CHECKED Ryan Davidson	BY Jeff Morris	CHECKED 5/31/12
DATE PREPARED 01/21/11	PEER REVIEW Allen Kiene	DATE PREPARED 05/13/12	PEER REVIEW / DATE 5/31/12

FEATURE:	PROJECT: Fryingpan-Arkansas Project		
Arkansas Valley Conduit	WOID: AF523	ESTIMATE LEVEL:	Appraisal
Revised Comanche South - Interconnect	REGION: GP	UNIT PRICE LEVEL:	Jan-11
OM&R Costs Summary Sheet	FILE:		
(Present Worth Without Escalation to NTP)			

Periodic (Replacement) Costs				P/F Factor	Estimated Periodic Costs	Present Worth Costs (Jan 2011)
Year 5			PW Factor	0.81701	$0	$0
Year 10			PW Factor	0.66750	$0	$0
Year 15			PW Factor	0.54535	$0	$0
Year 20			PW Factor	0.44555	$0	$0
Year 25			PW Factor	0.36402	$0	$0
Year 30			PW Factor	0.29741	$0	$0
Year 35			PW Factor	0.24298	$0	$0
Year 40			PW Factor	0.19852	$0	$0
Year 45			PW Factor	0.16219	$0	$0
Year 50			PW Factor	0.13251	$137,445	$18,213
Subtotal Periodic (Replacement) Costs						**$18,213**
Mobilization (+/- 5%)						$910
Subtotal 1 with Mobilization						$19,123
Escalation to NTP						$0
Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP						$19,123
Design Contingencies (+/- 15%)						$2,877
Contract Cost						$22,000
Construction Contingencies (+/- 25%)						$5,000
Field Cost						$27,000
Non-Contract Costs (+/- 25%)						$7,000
Total Periodic (Replacement) Present Worth Costs Rounded (Jan-2011)						**$34,000**
Annual Periodic (Replacement) Costs Rounded (Jan-2011)						**$1,600**

Annual (Operations and Maintenance) Costs				P/A Factor	Estimated Annual Costs	Present Worth Costs (Jan 2011)
Maintenance Costs			PWA Factor	21.03006	$0	$0
Operations Costs			PWA Factor	21.03006	$0	$0
Energy Costs for Pumping			PWA Factor	21.03006	$0	$0
Other Annual O&M Misc. Costs			PWA Factor	21.03006	$0	$0
Subtotal Annual (Operation and Maintenance) Costs						**$0**
Escalation to NTP						$0
Subtotal 1 with Escalation to NTP						$0
Design Contingencies (+/- 10%)						$0
Subtotal 3 = Subtotal 2 + Design Contingencies						$0
Non-Contract Costs (+/- 10%)						$0
Total (Annual Operation and Maintenance) Present Worth Costs Rounded (Jan-2011)						**$0**
Annual (Operation and Maintenance) Costs Rounded (Jan-2011)						**$0**

- PWA Factor = P/A = ((1+i)^(n - 1))/(i*((1+i)^n) = Uniform Series Present Worth Factor (P/A, 4.125%, 50)
- PW Factor = P/F = 1/(1+ i)^n = Single Payment Present Worth (P/F, 4.125%)

Notes:

These life cycle costs do not include OM&R of the water treatment plant or overhead expenses (office space, administration, etc.) incurred by the managing authority.

These life cycle costs assume that the pipeline operators are based in the WTP building.

Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.

QUANTITIES		PRICES	
BY Jeff Morris	CHECKED TSC Design Team	BY Jeff Morris and Jim Jetton	CHECKED MC 6/19/12
DATE PREPARED 04/01/12	PEER REVIEW / DATE TSC Design Team 4/12	DATE PREPARED 06/19/12	PEER REVIEW / DATE 6/13/12

FEATURE:	PROJECT: Fryingpan-Arkansas Project	
Arkansas Valley Conduit	WOID: AF523	ESTIMATE LEVEL: Appraisal
Revised Comanche South, OM&R Costs Summary Sheet	REGION: GP	UNIT PRICE LEVEL: Jan-11
(Present Worth Without Escalation to NTP)	FILE:	

Periodic (Replacement) Costs			P/F Factor	Estimated Periodic Costs	Present Worth Costs (Jan
Year 5	PW Factor	0.81701	$390,000	$318,634	
Year 10	PW Factor	0.66750	$390,000	$260,325	
Year 15	PW Factor	0.54535	$1,050,000	$572,618	
Year 20	PW Factor	0.44555	$9,500,000	$4,232,725	
Year 25	PW Factor	0.36402	$2,300,000	$837,246	
Year 30	PW Factor	0.29741	$7,000,000	$2,081,870	
Year 35	PW Factor	0.24298	$390,000	$94,762	
Year 40	PW Factor	0.19852	$9,500,000	$1,885,940	
Year 45	PW Factor	0.16219	$1,050,000	$170,300	
Year 50	PW Factor	0.13251	$2,700,000	$357,777	
Subtotal Periodic (Replacement) Costs					**$10,812,196**
Mobilization (+/- 5%)					$540,000
Subtotal 1 with Mobilization					$11,352,196
Escalation to NTP					$0
Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$11,352,196
Design Contingencies (+/- 15%)					$1,647,804
Contract Cost					$13,000,000
Construction Contingencies (+/- 25%)					$3,500,000
Field Cost					$16,500,000
Non-Contract Costs (+/- 25%)					$4,500,000
Total Periodic (Replacement) Present Worth Costs Rounded (Jan-2011)					**$21,000,000**
Annual Periodic (Replacement) Costs Rounded (Jan-2011)					**$1,000,000**

Annual (Operations and Maintenance) Costs		P/A Factor	Estimated Annual Costs	Present Worth Costs (Jan 2011)
Maintenance Costs	PWA Factor	21.03006	$160,000	$3,364,810
Operations Costs	PWA Factor	21.03006	$340,000	$7,150,220
Energy Costs for Pumping	PWA Factor	21.03006	$790,000	$16,613,747
Subtotal Annual (Operation and Maintenance) Costs				**$27,128,777**
Escalation to NTP				$0
Subtotal 1 with Escalation to NTP				$27,128,777
Design Contingencies (+/- 10%)				$2,871,223
Subtotal 3 = Subtotal 2 + Design Contingencies				$30,000,000
Non-Contract Costs (+/- 10%)				$3,000,000
Total (Annual Operation and Maintenance) Present Worth Costs Rounded (Jan-2011)				**$33,000,000**
Annual (Operation and Maintenance) Costs Rounded (Jan-2011)				**$1,550,000**

- FY2011 planning interest rate 4.125% per year for 50 years.
- PWA Factor = P/A = ((1+i)^(n - 1))/(i*((1+i)^n) = Uniform Series Present Worth Factor (P/A, 4.125%, 50)
- PW Factor = P/F = 1/(1+ i)^n = Single Payment Present Worth (P/F, 4.125%)

Notes:

These life cycle costs do not include OM&R of the water treatment plant or overhead expenses (office space, administration, etc.) incurred by the managing authority.

These life cycle costs assume that the pipeline operators are based in the WTP building.

Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jeff Morris	TSC Design Team	Jim Jetton	7/5/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
06/22/12	TSC Design Team 6/12	07/02/12	7/5/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline (ALL)
Revised Comanche South

PROJECT: Fryingpan-Arkansas Project

WOID: AF523 **ESTIMATE LEVEL:** Appraisal

REGION: GP **UNIT PRICE LEVEL** Jan-11

FILE:

Civil OM&R Costs (Estimated Costs)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	PVC Pipe Repair Replace one joint (2 sticks of pipe) Every 50 Years Repair Equivalent to 18" dia. Pipe Alt 1 has 128 miles of PVC Pipe	86-68140	1	Year 50	$10,000.00	$10,000.00
	2	Steel Pipe Repair Replace one joint (2 sticks of pipe) Every 50 Years Repair Equivalent to 36" dia. Pipe Alt 1 has 104 miles of Steel Pipe	86-68140	1	Year 50	$20,000.00	$20,000.00
	3A	Cathodic Protection Annual Costs of Maintenance	86-68140	1	Annual	$76,000.00	$76,000.00
	3B	Cathodic Protection Annual Costs of Operations	86-68140	1	Annual	$27,000.00	$27,000.00
	3C	Cathodic Protection Annual Costs of Energy	86-68140	1	Annual	$610.00	$610.00
	4	Cathodic Protection Replace Vertical Anodes and Rectifiers Once Every 20 years	86-68140	1 1	Year 20 Year 40	$905,000.00 $905,000.00	$905,000.00 $905,000.00
	5	Butterfly Valve (Manually Operated) 15% of all butterfly valve costs for repair and replacement	86-68140	1	Year 50	$324,500.00	$324,500.00
		Subtotal this sheet			Year 20		$905,000.00
					Year 40		$905,000.00
					Year 50		$354,500.00
					Annual		$103,610.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Pipeline Revised Comanche South Entire System Civil OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Maintenance Costs for Consultant Inspections	86-68140	1	Annual	$45,000.00	$45,000.00
		Once Every 5 years (Annualized)		0.2	LS	$45,000.00	$9,000.00
	2	Annual Operations Cost for Operating the System	86-68140	1	Annual	$300,062.34	$300,062.34
		Assume 3 Operators, 2 pickup trucks and 1 mower					
		Full time for entire year					
		Subtotal this sheet			Annual		$309,062.34

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Reach 1 Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Combination Air Valve	86-68140	1	Year 25	$7,500.00	$7,500.00
		Replace Every 25 Years		1	Year 50	$7,500.00	$7,500.00
		Subtotal this sheet			Year 25		$7,500.00
					Year 50		$7,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Reach 2 — Civil — OM&R Costs (Estimated Costs)

PROJECT: Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	3" Combination Air Valve	86-68140	50	Year 25	$3,500.00	$175,000.00
		Replace Every 25 Years		50	Year 50	$3,500.00	$175,000.00
	2	3" Ball Valve	86-68140	50	Year 25	$500.00	$25,000.00
		Replace Every 25 Years		50	Year 50	$500.00	$25,000.00
		Subtotal this sheet			Year 25		$200,000.00
					Year 50		$200,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

SHEET _5_ OF _58_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Reach 2: Boone Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	2	Year 25	$2,875.00	$5,750.00
		Replace Every 25 Years		2	Year 50	$2,875.00	$5,750.00
	2	2" Ball Valve	86-68140	2	Year 25	$375.00	$750.00
		Replace Every 25 Years		2	Year 50	$375.00	$750.00
		Subtotal this sheet			Year 25		$6,500.00
					Year 50		$6,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Reach 3 Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project
	WOID: AF523 — **ESTIMATE LEVEL:** Appraisal
	REGION: GP — **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Combination Air Valve	86-68140	37	Year 25	$7,500.00	$277,500.00
		Replace Every 25 Years		37	Year 50	$7,500.00	$277,500.00
		Subtotal this sheet			Year 25		$277,500.00
					Year 50		$277,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South R3: Manzanola Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South
R3: S. Swink Spur
Civil OM&R Costs (Estimated Costs)

PROJECT: Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	3	Year 25	$2,875.00	$8,625.00
		Replace Every 25 Years		3	Year 50	$2,875.00	$8,625.00
	2	2" Ball Valve	86-68140	3	Year 25	$375.00	$1,125.00
		Replace Every 25 Years		3	Year 50	$375.00	$1,125.00
		Subtotal this sheet			Year 25		$9,750.00
					Year 50		$9,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South R3: Homestead Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South R3: La Junta Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Reach 4 Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project
	WOID: AF523 — **ESTIMATE LEVEL:** Appraisal
	REGION: GP — **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	58	Year 25	$2,875.00	$166,750.00
		Replace Every 25 Years		58	Year 50	$2,875.00	$166,750.00
	2	2" Ball Valve	86-68140	58	Year 25	$375.00	$21,750.00
		Replace Every 25 Years		58	Year 50	$375.00	$21,750.00
		Subtotal this sheet			Year 25		$188,500.00
					Year 50		$188,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South R4: Hasty Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project
	WOID: AF523 — **ESTIMATE LEVEL:** Appraisal
	REGION: GP — **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South
R4: McClave Spur
Civil OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	2	Year 25	$2,875.00	$5,750.00
		Replace Every 25 Years		2	Year 50	$2,875.00	$5,750.00
	2	2" Ball Valve	86-68140	2	Year 25	$375.00	$750.00
		Replace Every 25 Years		2	Year 50	$375.00	$750.00
		Subtotal this sheet			Year 25		$6,500.00
					Year 50		$6,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _14_ OF _58_

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South R4: Wiley Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	4	Year 25	$2,875.00	$11,500.00
		Replace Every 25 Years		4	Year 50	$2,875.00	$11,500.00
	2	2" Ball Valve	86-68140	4	Year 25	$375.00	$1,500.00
		Replace Every 25 Years		4	Year 50	$375.00	$1,500.00
		Subtotal this sheet			Year 25		$13,000.00
					Year 50		$13,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline
Revised Comanche South
HWY 96 Spur
Civil OM&R Costs (Estimated Costs)

PROJECT: Fryingpan-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	19	Year 25	$2,875.00	$54,625.00
		Replace Every 25 Years		19	Year 50	$2,875.00	$54,625.00
	2	2" Ball Valve	86-68140	19	Year 25	$375.00	$7,125.00
		Replace Every 25 Years		19	Year 50	$375.00	$7,125.00
		Subtotal this sheet			Year 25		$61,750.00
					Year 50		$61,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:
Arkansas Valley Conduit
Pipeline
Revised Comanche South
96 Pipline Co. Spur
Civil OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:			
Arkansas Valley Conduit Pipeline Revised Comanche South Eads Spur Pipeline Civil OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	21	Year 25	$2,875.00	$60,375.00
		Replace Every 25 Years		21	Year 50	$2,875.00	$60,375.00
	2	2" Ball Valve	86-68140	21	Year 25	$375.00	$7,875.00
		Replace Every 25 Years		21	Year 50	$375.00	$7,875.00
		Subtotal this sheet			Year 25		$68,250.00
					Year 50		$68,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David Edwards	07/02/12	7/27/12

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Eads & May Valley Spur Pipeline Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	6	Year 25	$2,875.00	$17,250.00
		Replace Every 25 Years		6	Year 50	$2,875.00	$17,250.00
	2	2" Ball Valve	86-68140	6	Year 25	$375.00	$2,250.00
		Replace Every 25 Years		6	Year 50	$375.00	$2,250.00
		Subtotal this sheet			Year 25		$19,500.00
					Year 50		$19,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE:	PROJECT:
Arkansas Valley Conduit Pipeline Revised Comanche South May Valley Spur Civil OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project
	WOID: AF523 — ESTIMATE LEVEL: Appraisal
	REGION: GP — UNIT PRICE LEVEL: Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	6	Year 25	$2,875.00	$17,250.00
		Replace Every 25 Years		6	Year 50	$2,875.00	$17,250.00
	2	2" Ball Valve	86-68140	6	Year 25	$375.00	$2,250.00
		Replace Every 25 Years		6	Year 50	$375.00	$2,250.00
		Subtotal this sheet			Year 25		$19,500.00
					Year 50		$19,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South North Loop Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project
	WOID: AF523 **ESTIMATE LEVEL:** Appraisal
	REGION: GP **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	20	Year 25	$2,875.00	$57,500.00
		Replace Every 25 Years		20	Year 50	$2,875.00	$57,500.00
	2	2" Ball Valve	86-68140	20	Year 25	$375.00	$7,500.00
		Replace Every 25 Years		20	Year 50	$375.00	$7,500.00
		Subtotal this sheet			Year 25		$65,000.00
					Year 50		$65,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South South Side and East End Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	3	Year 25	$2,875.00	$8,625.00
		Replace Every 25 Years		3	Year 50	$2,875.00	$8,625.00
	2	2" Ball Valve	86-68140	3	Year 25	$375.00	$1,125.00
		Replace Every 25 Years		3	Year 50	$375.00	$1,125.00
		Subtotal this sheet			Year 25		$9,750.00
					Year 50		$9,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David Edwards	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David Edwards	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit
Pipeline
Revised Comanche South
Bent's Fort Spur
Civil OM&R Costs (Estimated Costs)

PROJECT: Fryingpan-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David Edwards	07/02/12	7/27/12

BUREAU OF RECLAMATION

ESTIMATE WORKSHEET

FEATURE: Arkansas Valley Conduit Pipeline Revised Comanche South Rocky Ford and Hancock Spur Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project
	WOID: AF523 — **ESTIMATE LEVEL:** Appraisal
	REGION: GP — **UNIT PRICE LEVEL:** Jan-11
	FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	2" Combination Air Valve	86-68140	1	Year 25	$2,875.00	$2,875.00
		Replace Every 25 Years		1	Year 50	$2,875.00	$2,875.00
	2	2" Ball Valve	86-68140	1	Year 25	$375.00	$375.00
		Replace Every 25 Years		1	Year 50	$375.00	$375.00
		Subtotal this sheet			Year 25		$3,250.00
					Year 50		$3,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David Edwards	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David Edwards	07/02/12	7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Revised Comanche South OM&R Costs Summary Sheet 86-68140	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
						Estimated Costs	
		Periodic Costs - Year 5				$0	
		Periodic Costs - Year 10				$0	
		Periodic Costs - Year 15				$0	
		Periodic Costs - Year 20				$905,000	
		Periodic Costs - Year 25				$975,750	
		Periodic Costs - Year 30				$0	
		Periodic Costs - Year 35				$0	
		Periodic Costs - Year 40				$905,000	
		Periodic Costs - Year 45				$0	
		Periodic Costs - Year 50				$1,330,250	
		Annual Costs				$412,672	

QUANTITIES		PRICES	
BY TSC Team	CHECKED TSC Team	BY Jim Jetton	CHECKED
DATE PREPARED Feb-June 2011	PEER REVIEW / DATE TSC Team	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:

Arkansas Valley Conduit
Meter Vault PP1 Before WTP
Revised Comanche South
Reach 1
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL**	Appraisal
REGION:	GP	**UNIT PRICE LEVE**	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	8 - Path Ultrasonic Flowmeter System 36"	86-68410	1	Year 20	$81,250.00	$81,250.00
		16 transducers with cables and 1 transmitter console		1	Year 40	$81,250.00	$81,250.00
		Replace System Every 20 Years					
		Subtotal this sheet			Year 20		$81,250.00
					Year 40		$81,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David O. Hulse	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David O. Hulse	07/02/12	7/27/12

FEATURE:

Arkansas Valley Conduit
Meter Vault PP2 After WTP
Revised Comanche South

Reach 1
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVE**	**Jan-11**

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	8 - Path Ultrasonic Flowmeter System 36"	86-68410	1	Year 20	$81,250.00	$81,250.00
		16 transducers with cables and 1 transmitter console		1	Year 40	$81,250.00	$81,250.00
		Replace System Every 20 Years					
		Subtotal this sheet			Year 20		$81,250.00
					Year 40		$81,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David O. Hulse	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David O. Hulse	07/02/12	7/27/12

FEATURE:

Arkansas Valley Conduit
Eads & May Valley Meter & Valve Vaults
Revised Comanche South
Eads Spur
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Single-Path Ultrasonic Flowmeter System	86-68410	2	Year 20	$29,375.00	$58,750.00
		Replace System Every 20 Years		2	Year 40	$29,375.00	$58,750.00
		Subtotal this sheet			Year 20		$58,750.00
					Year 40		$58,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David O. Hulse	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David O. Hulse	07/02/12	7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 1 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Electro-Magnetic Flowmeter System	86-68410	1	Year 15	$16,250.00	$16,250.00
		Replace Entire System Every 15 Years		1	Year 30	$16,250.00	$16,250.00
		flanged electro-magnetic flowmeter with		1	Year 45	$16,250.00	$16,250.00
		remote wall-mounted transmitter					
		weight= approx 85 lbs 120 Volt AC					
		Subtotal this sheet			Year 15		$16,250.00
					Year 30		$16,250.00
					Year 45		$16,250.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David O. Hulse	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David O. Hulse	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 2 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Electro-Magnetic Flowmeter System	86-68410	2	Year 15	$16,250.00	$32,500.00
		Replace Entire System Every 15 Years		2	Year 30	$16,250.00	$32,500.00
		flanged electro-magnetic flowmeter with		2	Year 45	$16,250.00	$32,500.00
		remote wall-mounted transmitter					
		weight= approx 85 lbs 120 Volt AC					
		Subtotal this sheet			Year 15		$32,500.00
					Year 30		$32,500.00
					Year 45		$32,500.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David O. Hulse	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David O. Hulse	07/02/12	7/27/12

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 3
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Electro-Magnetic Flowmeter System	86-68410	15	Year 15	$16,250.00	$243,750.00
		Replace Entire System Every 15 Years		15	Year 30	$16,250.00	$243,750.00
		flanged electro-magnetic flowmeter with		15	Year 45	$16,250.00	$243,750.00
		remote wall-mounted transmitter					
		weight= approx 85 lbs, 120 Volt AC					
		Subtotal this sheet			Year 15		$243,750.00
					Year 30		$243,750.00
					Year 45		$243,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton / Jeff Morris	David O. Hulse	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	David O. Hulse	07/02/12	7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 4 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Electro-Magnetic Flowmeter System	86-68410	7	Year 15	$16,250.00	$113,750.00
		Replace Entire System Every 15 Years		7	Year 30	$16,250.00	$113,750.00
		flanged electro-magnetic flowmeter with		7	Year 45	$16,250.00	$113,750.00
		remote wall-mounted transmitter					
		weight= approx 85 lbs, 120 Volt AC					
		Subtotal this sheet			Year 15		$113,750.00
					Year 30		$113,750.00
					Year 45		$113,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton / Jeff Morris	David O. Hulse	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	David O. Hulse	07/02/12	7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South HWY 96 Spur OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Electro-Magnetic Flowmeter System	86-68410	7	Year 15	$16,250.00	$113,750.00
		Replace Entire System Every 15 Years		7	Year 30	$16,250.00	$113,750.00
		flanged electro-magnetic flowmeter with		7	Year 45	$16,250.00	$113,750.00
		remote wall-mounted transmitter					
		weight= approx 85 lbs, 120 Volt AC					
		Subtotal this sheet			Year 15		$113,750.00
					Year 30		$113,750.00
					Year 45		$113,750.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David O. Hulse	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David O. Hulse	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Loop OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6" Electro-Magnetic Flowmeter System	86-68410	8	Year 15	$16,250.00	$130,000.00
		Replace Entire System Every 15 Years		8	Year 30	$16,250.00	$130,000.00
		flanged electro-magnetic flowmeter with		8	Year 45	$16,250.00	$130,000.00
		remote wall-mounted transmitter					
		weight= approx 85 lbs, 120 Volt AC					
		Subtotal this sheet			Year 15		$130,000.00
					Year 30		$130,000.00
					Year 45		$130,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton / Jeff Morris	CHECKED David O. Hulse	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE David O. Hulse	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Revised Comanche South OM&R Costs Summary Sheet 86-68410	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
						Estimated Costs	
		Periodic Costs - Year 5				$0	
		Periodic Costs - Year 10				$0	
		Periodic Costs - Year 15				$650,000	
		Periodic Costs - Year 20				$221,250	
		Periodic Costs - Year 25				$0	
		Periodic Costs - Year 30				$650,000	
		Periodic Costs - Year 35				$0	
		Periodic Costs - Year 40				$221,250	
		Periodic Costs - Year 45				$650,000	
		Periodic Costs - Year 50				$0	
		Annual Costs				$0	

QUANTITIES		PRICES	
BY TSC Team	CHECKED TSC Team	BY Jim Jetton	CHECKED
DATE PREPARED Feb-June 2011	PEER REVIEW / DATE TSC Team	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:

Arkansas Valley Conduit
Pumping Plant (PP1 before WTP)
Revised Comanche South
Reach 1
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Pumping Plant PP1 Maintenance & Replacement	86-68420	1	Annual	$22,000.00	$22,000.00
		33.24 cfs capacity; 105 feet TDH; 20 week operation period;					
		Unattended plant					
		Use PMPOM. OUT Program to develop OM&R.					
	2	Pumping Plant PP1 Operations	86-68420	1	Annual	$5,200.00	$5,200.00
		Use PMPOM. OUT Program tp develop OM&R.					
	3	Pumping Plant PP1 Energy Costs	86-68420	1	Annual	$90,000.00	$90,000.00
		Use Black Hills Energy Rate Analysis					
		Subtotal this sheet			Annual		$117,200.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	Dan Drake	07/02/12	7/30/12

FEATURE:	PROJECT:
Arkansas Valley Conduit Pumping Plant (PP2 before WTP) Revised Comanche South Reach 1 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project WOID: AF523 ESTIMATE LEVEL: Appraisal REGION: GP UNIT PRICE LEVEL: Jan-11 FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Pumping Plant PP2 Maintenance & Replacement	86-68420	1	Annual	$52,000.00	$52,000.00
		30.76 cfs capacity; 380 feet TDH; 20 week operation period;					
		Unattended plant					
		Use PMPOM. OUT Program to develop OM&R.					
	2	Pumping Plant PP2 Operations	86-68420	1	Annual	$9,000.00	$9,000.00
		Use PMPOM. OUT Program tp develop OM&R.					
	3	Pumping Plant PP2 Energy Costs	86-68420	1	Annual	$700,000.00	$700,000.00
		Use Black Hills Energy Rate Analysis					
		Subtotal this sheet			Annual		$761,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:

Arkansas Valley Conduit
Eads Booster Plant
Revised Comanche South
Eads Spur
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Eads Booster Maintenance & Replacement	86-68420	1	Annual	$1,270.00	$1,270.00
		1.125 cfs capacity; 317 feet TDH; 22 week operation period;					
		Unattended plant					
		Use PMPOM. OUT Program to develop OM&R.					
	2	Eads Booster Plant Operations	86-68420	1	Annual	$1,710.00	$1,710.00
		Use PMPOM. OUT Program to develop OM&R.					
	3	Eads Booster Plant Energy Costs	86-68420	1	Annual	$3,500.00	$3,500.00
		Use Southeast Colorado Power Association Energy Rate					
		Analysis					
		Subtotal this sheet			Annual		$6,480.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Dan Drake	07/02/12	7/3/12

FEATURE:

Arkansas Valley Conduit
Regulating Tank
Revised Comanche South
Reach 1
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL**	11-Jan
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Regulating Tank Interior Cleaning	86-68180	1	Year 5	$34,600.00	$34,600.00
		Clean once every 5 years (1-Tank) except		1	Year 10	$34,600.00	$34,600.00
		when interior re-coating is performed		1	Year 15	$34,600.00	$34,600.00
		1,250,000 gallons; height = 85 feet;		1	Year 25	$34,600.00	$34,600.00
		Inside diameter = 50 feet		1	Year 30	$34,600.00	$34,600.00
				1	Year 35	$34,600.00	$34,600.00
				1	Year 45	$34,600.00	$34,600.00
				1	Year 50	$34,600.00	$34,600.00
	2	Regulating Tank Exterior Re-Coating	86-68180	1	Year 30	$459,450.00	$459,450.00
		Apply Exterior Coating once every 30 years					
	3	Regulating Tank Interior Re-Coating	86-68180	1	Year 20	$622,800.00	$622,800.00
		Apply Interior Coating once every 20 years		1	Year 40	$622,800.00	$622,800.00
		Subtotal this sheet			Year 5		$34,600.00
					Year 10		$34,600.00
					Year 15		$34,600.00
					Year 20		$622,800.00
					Year 25		$34,600.00
					Year 30		$494,050.00
					Year 35		$34,600.00
					Year 40		$622,800.00
					Year 45		$34,600.00
					Year 50		$34,600.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Daryl Little	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Daryl Little	07/02/12	7/27/12

FEATURE:

Arkansas Valley Conduit
Air Chamber PP1 before WTP
Revised Comanche South

Reach 1
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVE**	**11-Jan**
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Air Chamber Interior Cleaning	86-68180	1	Year 5	$770.00	$770.00
		Clean once every 5 years (1-Tank) except		1	Year 10	$770.00	$770.00
		when interior re-coating is performed		1	Year 15	$770.00	$770.00
		4,702 gallons; height = 14 feet;		1	Year 25	$770.00	$770.00
		Inside diameter = 7 feet		1	Year 30	$770.00	$770.00
				1	Year 35	$770.00	$770.00
				1	Year 45	$770.00	$770.00
				1	Year 50	$770.00	$770.00
	2	Air Chamber Exterior Re-Coating	86-68180	1	Year 30	$17,350.00	$17,350.00
		Apply Exterior Coating once every 30 years					
	3	Air Chamber Interior Re-Coating	86-68180	1	Year 20	$23,100.00	$23,100.00
		Apply Interior Coating once every 20 years		1	Year 40	$23,100.00	$23,100.00
		Subtotal this sheet			Year 5		$770.00
					Year 10		$770.00
					Year 15		$770.00
					Year 20		$23,100.00
					Year 25		$770.00
					Year 30		$18,120.00
					Year 35		$770.00
					Year 40		$23,100.00
					Year 45		$770.00
					Year 50		$770.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Daryl Little	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Daryl Little	07/02/12	7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Air Chamber PP2 after WTP Revised Comanche South Reach 1 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL Appraisal
	REGION: GP	UNIT PRICE LEVE 11-Jan
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Air Chamber Interior Cleaning	86-68180	1	Year 5	$1,160.00	$1,160.00
		Clean once every 5 years (1-Tank) except		1	Year 10	$1,160.00	$1,160.00
		when interior re-coating is performed		1	Year 15	$1,160.00	$1,160.00
		9,042 gallons; height = 16 feet;		1	Year 25	$1,160.00	$1,160.00
		Inside diameter = 9 feet		1	Year 30	$1,160.00	$1,160.00
				1	Year 35	$1,160.00	$1,160.00
				1	Year 45	$1,160.00	$1,160.00
				1	Year 50	$1,160.00	$1,160.00
	2	Air Chamber Exterior Re-Coating	86-68180	1	Year 30	$25,800.00	$25,800.00
		Apply Exterior Coating once every 30 years					
	3	Air Chamber Interior Re-Coating	86-68180	1	Year 20	$34,800.00	$34,800.00
		Apply Interior Coating once every 20 years		1	Year 40	$34,800.00	$34,800.00
		Subtotal this sheet			Year 5		$1,160.00
					Year 10		$1,160.00
					Year 15		$1,160.00
					Year 20		$34,800.00
					Year 25		$1,160.00
					Year 30		$26,960.00
					Year 35		$1,160.00
					Year 40		$34,800.00
					Year 45		$1,160.00
					Year 50		$1,160.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Daryl Little	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Daryl Little	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit LaJunta Water Storage Tank Revised Comanche South Reach 3 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL 11-Jan
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	LaJunta Water Storage Tank Interior Cleaning	86-68180	5	Year 5	$38,000.00	$190,000.00
		Clean once every 5 years except		5	Year 10	$38,000.00	$190,000.00
		when interior re-coating is performed		5	Year 15	$38,000.00	$190,000.00
		(5) - 1,000,000 gallons;		5	Year 25	$38,000.00	$190,000.00
		min water surface elev = 65 feet;		5	Year 30	$38,000.00	$190,000.00
		max water surface elev = 90 feet; Diameter = 80 feet		5	Year 35	$38,000.00	$190,000.00
				5	Year 45	$38,000.00	$190,000.00
				5	Year 50	$38,000.00	$190,000.00
	2	LaJunta Water Storage Tank Exterior Re-Coating	86-68180	5	Year 30	$620,004.00	$3,100,020.00
		Apply Exterior Coating once every 30 years					
	3	LaJunta Water Storage Tank Interior Re-Coating	86-68180	5	Year 20	$653,600.00	$3,268,000.00
		Apply Interior Coating once every 20 years		5	Year 40	$653,600.00	$3,268,000.00
		Subtotal this sheet			Year 5		$190,000.00
					Year 10		$190,000.00
					Year 15		$190,000.00
					Year 20		$3,268,000.00
					Year 25		$190,000.00
					Year 30		$3,290,020.00
					Year 35		$190,000.00
					Year 40		$3,268,000.00
					Year 45		$190,000.00
					Year 50		$190,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Daryl Little	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Daryl Little	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:

Arkansas Valley Conduit
Fowler Water Storage Tank
Revised Comanche South
Reach 3
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVEL:**	**11-Jan**
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Fowler Water Storage Tank Interior Cleaning	86-68180	4	Year 5	$41,500.00	$166,000.00
		Clean once every 5 years except		4	Year 10	$41,500.00	$166,000.00
		when interior re-coating is performed		4	Year 15	$41,500.00	$166,000.00
		(4) - 2,295,000 gallons;		4	Year 25	$41,500.00	$166,000.00
		min water surface elev = 0 feet;		4	Year 30	$41,500.00	$166,000.00
		max water surface elev = 25 feet; Diameter = 125 feet		4	Year 35	$41,500.00	$166,000.00
				4	Year 45	$41,500.00	$166,000.00
				4	Year 50	$41,500.00	$166,000.00
	2	Fowler Water Storage Tank Exterior Re-Coating	86-68180	4	Year 30	$596,700.00	$2,386,800.00
		Apply Exterior Coating once every 30 years					
	3	Fowler Water Storage Tank Interior Re-Coating	86-68180	4	Year 20	$1,100,000.00	$4,400,000.00
		Apply Interior Coating once every 20 years		4	Year 40	$1,100,000.00	$4,400,000.00
		Subtotal this sheet			Year 5		$166,000.00
					Year 10		$166,000.00
					Year 15		$166,000.00
					Year 20		$4,400,000.00
					Year 25		$166,000.00
					Year 30		$2,552,800.00
					Year 35		$166,000.00
					Year 40		$4,400,000.00
					Year 45		$166,000.00
					Year 50		$166,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Daryl Little	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Daryl Little	07/02/12	7/27/12

FEATURE:	PROJECT:
Arkansas Valley Conduit Eads & May Valley Air Chamber Revised Comanche South Eads Spur OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project WOID: AF523 ESTIMATE LEVEL: Appraisal REGION: GP UNIT PRICE LEVEL: 11-Jan FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Eads & May Valley Air Chamber Interior Cleaning	86-68180	4	Year 5	$70.00	$280.00
		Clean once every 5 years except		4	Year 10	$70.00	$280.00
		when interior re-coating is performed		4	Year 15	$70.00	$280.00
		1,200 gallons; Height = 6.5 feet; Diameter = 5 feet		4	Year 25	$70.00	$280.00
				4	Year 30	$70.00	$280.00
				4	Year 35	$70.00	$280.00
				4	Year 45	$70.00	$280.00
				4	Year 50	$70.00	$280.00
	2	Eads & May Valley Air Chamber Exterior Re-Coating	86-68180	4	Year 30	$1,562.50	$6,250.00
		Apply Exterior Coating once every 30 years					
	3	Eads & May Valley Air Chamber Interior Re-Coating	86-68180	4	Year 20	$2,100.00	$8,400.00
		Apply Interior Coating once every 20 years		4	Year 40	$2,100.00	$8,400.00
		Subtotal this sheet			Year 5		$280.00
					Year 10		$280.00
					Year 15		$280.00
					Year 20		$8,400.00
					Year 25		$280.00
					Year 30		$6,530.00
					Year 35		$280.00
					Year 40		$8,400.00
					Year 45		$280.00
					Year 50		$280.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Daryl Little	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Daryl Little	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/07/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Meter & Valve Vaults Revised Comanche South Reach 1 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Meter Vault PP1 Before WTP					
	1	36" Pressure Reducing Valve	86-68420	1	Year 25	$250,000.00	$250,000.00
		Replace Every 25 Years		1	Year 50	$250,000.00	$250,000.00
		Cla-Val class 150					
		Cla-Val distributor estimates 20-30 year life expectancy					
		Meter Vault PP2 After WTP					
	1	No PRV	86-68420			$0.00	$0.00
		Valve Vault					
	1	36" Pressure Reducing Valve	86-68420	1	Year 25	$250,000.00	$250,000.00
		Replace Every 25 Years		1	Year 50	$250,000.00	$250,000.00
		Cla-Val class 150					
		Cla-Val distributor estimates 20-30 year life expectancy					
		Subtotal this sheet			Year 25		$500,000.00
					Year 50		$500,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:

Arkansas Valley Conduit
Meter Vault
Revised Comanche South
Eads and May Valley
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11

FILE:

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Meter Vault					
	1	No PRV	86-68420			$0.00	$0.00
		Subtotal this sheet			Year 25		$0.00
					Year 50		$0.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Dan Drake	07/02/12	7/27/12

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 1
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	**AF523**	**ESTIMATE LEVEL:**	**Appraisal**
REGION:	**GP**	**UNIT PRICE LEVEL:**	**Jan-11**
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6-inch pressure reducing valve	86-68420	1	Year 25	$9,750.00	$9,750.00
		Replace Every 25 Years		1	Year 50	$9,750.00	$9,750.00
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
	2	1-inch air valve	86-68420	1	Year 25	$1,250.00	$1,250.00
		Replace Every 25 Years		1	Year 50	$1,250.00	$1,250.00
		35 lbs					
		Subtotal this sheet			Year 25		$11,000.00
					Year 50		$11,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Dan Drake	07/02/12	7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 2 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6-inch pressure reducing valve	86-68420	2	Year 25	$9,750.00	$19,500.00
		Replace Every 25 Years		2	Year 50	$9,750.00	$19,500.00
		2 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
	2	1-inch air valve	86-68420	2	Year 25	$1,250.00	$2,500.00
		Replace Every 25 Years		2	Year 50	$1,250.00	$2,500.00
		2 air valves, 35lbs each					
		Subtotal this sheet			Year 25		$22,000.00
					Year 50		$22,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Reach 3 OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6-inch pressure reducing valve	86-68420	15	Year 25	$9,750.00	$146,250.00
		Replace Every 25 Years		15	Year 50	$9,750.00	$146,250.00
		15 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
	2	1-inch air valve	86-68420	15	Year 25	$1,250.00	$18,750.00
		Replace Every 25 Years		15	Year 50	$1,250.00	$18,750.00
		15 air valves, 35lbs each					
		Subtotal this sheet			Year 25		$165,000.00
					Year 50		$165,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
Reach 4
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	**ESTIMATE LEVEL:**	Appraisal
REGION:	GP	**UNIT PRICE LEVEL:**	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6-inch pressure reducing valve	86-68420	7	Year 25	$9,750.00	$68,250.00
		Replace Every 25 Years		7	Year 50	$9,750.00	$68,250.00
		7 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
	2	1-inch air valve	86-68420	7	Year 25	$1,250.00	$8,750.00
		Replace Every 25 Years		7	Year 50	$1,250.00	$8,750.00
		7 air valves, 35lbs each					
		Subtotal this sheet			Year 25		$77,000.00
					Year 50		$77,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
6/6/2012	Dan Drake	07/02/12	7/27/12

FEATURE:

Arkansas Valley Conduit
Participant Tie-In Vaults
Revised Comanche South
HWY 96 Spur
OM&R Costs (Estimated Costs)

PROJECT:
Fryingpan-Arkansas Project

WOID:	AF523	ESTIMATE LEVEL:	Appraisal
REGION:	GP	UNIT PRICE LEVEL:	Jan-11
FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6-inch pressure reducing valve	86-68420	7	Year 25	$9,750.00	$68,250.00
		Replace Every 25 Years		7	Year 50	$9,750.00	$68,250.00
		7 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
	2	1-inch air valve	86-68420	7	Year 25	$1,250.00	$8,750.00
		Replace Every 25 Years		7	Year 50	$1,250.00	$8,750.00
		7 air valves, 35lbs each					
		Subtotal this sheet			Year 25		$77,000.00
					Year 50		$77,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	Dan Drake	07/02/12	7/27/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Participant Tie-In Vaults Revised Comanche South Loop OM&R Costs (Estimated Costs)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	6-inch pressure reducing valve	86-68420	8	Year 25	$9,750.00	$78,000.00
		Replace Every 25 Years		8	Year 50	$9,750.00	$78,000.00
		8 valves, 160 lbs each					
		Cla-Val ANSI class 150 steel					
		(285 psi rated)					
	2	1-inch air valve	86-68420	8	Year 25	$1,250.00	$10,000.00
		Replace Every 25 Years		8	Year 50	$1,250.00	$10,000.00
		8 air valves, 35lbs each					
		Subtotal this sheet			Year 25		$88,000.00
					Year 50		$88,000.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _52_ OF _58_

FEATURE: Arkansas Valley Conduit Meter & Valve Vaults (ALL) **Revised Comanche South** Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project		
	WOID: AF523	**ESTIMATE LEVEL:**	Appraisal
	REGION: GP	**UNIT PRICE LEVEL:**	Jan-11
	FILE:		

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Butterfly Valves (Manually Operated)	86-68420	1	Year 50	$10,560.00	$10,560.00
		15% of all butterfly valve costs on Meter & Valve Vaults					
		for repair and replacement					
		Subtotal this sheet			Year 50		$10,560.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _53_ OF _58_

FEATURE:	PROJECT:			
Arkansas Valley Conduit Participant Tie-Ins (ALL) **Revised Comanche South**	Fryingpan-Arkansas Project			
	WOID: AF523	ESTIMATE LEVEL:	Appraisal	
	REGION: GP	UNIT PRICE LEVEL:	Jan-11	
	FILE:			

Civil OM&R Costs (Estimated Costs)

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Butterfly Valves (Manually Operated)	86-68420	1	Year 50	$25,950.00	$25,950.00
		15% of all butterfly valve costs on Participant Tie-Ins					
		for repair and replacement					
		Subtotal this sheet			Year 50		$25,950.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY Jim Jetton/Jeff Morris	CHECKED Dan Drake	BY Jim Jetton	CHECKED
DATE PREPARED 6/6/2012	PEER REVIEW / DATE Dan Drake	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/27/12

BUREAU OF RECLAMATION **ESTIMATE WORKSHEET** SHEET _54_ OF _58_

FEATURE: Arkansas Valley Conduit Pipeline **Revised Comanche South** Interconnect Civil OM&R Costs (Estimated Costs)	**PROJECT:** Fryingpan-Arkansas Project **WOID:** AF523 **ESTIMATE LEVEL:** Appraisal **REGION:** GP **UNIT PRICE LEVEL:** Jan-11 **FILE:**

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	1	Butterfly Valves (Manually Operated)	86-68420	1	Year 50	$137,445.00	$137,445.00
		15% of all butterfly valve costs on Interconnect					
		for repair and replacement					
		Subtotal this sheet			Year 50		$137,445.00

Checked / Peer Review signature indicates that the pay items and descriptions given above appear to be reasonable.

QUANTITIES		PRICES	
BY	CHECKED	BY	CHECKED
Jim Jetton/Jeff Morris	Dan Drake	Jim Jetton	
DATE PREPARED	PEER REVIEW / DATE	DATE PREPARED	PEER REVIEW / DATE
6/6/2012	Dan Drake	07/02/12	7/27/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Revised Comanche South OM&R Costs Summary Sheet 86-68420	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
						Estimated Costs	
		Periodic Costs - Year 5				$392,810	
		Periodic Costs - Year 10				$392,810	
		Periodic Costs - Year 15				$392,810	
		Periodic Costs - Year 20				$8,357,100	
		Periodic Costs - Year 25				$1,332,810	
		Periodic Costs - Year 30				$6,388,480	
		Periodic Costs - Year 35				$392,810	
		Periodic Costs - Year 40				$8,357,100	
		Periodic Costs - Year 45				$392,810	
		Periodic Costs - Year 50 *				$1,332,810	
		Annual Costs				$884,680	
		* These estimated costs do not include Sheet 52, 53, & 54. Sheet 1, Pay Item 5 includes these costs.					

QUANTITIES		PRICES	
BY TSC Team	CHECKED TSC Team	BY Jim Jetton	CHECKED
DATE PREPARED Feb-June 2011	PEER REVIEW / DATE TSC Team	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Revised Comanche South OM&R Costs Summary Sheet	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
						Estimated Costs	Estimated Costs (Rounded)
		Sheet 24 Summary (86-68140)					
		Periodic Costs - Year 5				$0	
		Periodic Costs - Year 10				$0	
		Periodic Costs - Year 15				$0	
		Periodic Costs - Year 20				$905,000	
		Periodic Costs - Year 25				$975,750	
		Periodic Costs - Year 30				$0	
		Periodic Costs - Year 35				$0	
		Periodic Costs - Year 40				$905,000	
		Periodic Costs - Year 45				$0	
		Periodic Costs - Year 50				$1,330,250	
		Annual Costs				$412,672	$410,000
		Sheet 34 Summary (86-68410)					
		Periodic Costs - Year 5				$0	
		Periodic Costs - Year 10				$0	
		Periodic Costs - Year 15				$650,000	
		Periodic Costs - Year 20				$221,250	
		Periodic Costs - Year 25				$0	
		Periodic Costs - Year 30				$650,000	
		Periodic Costs - Year 35				$0	
		Periodic Costs - Year 40				$221,250	
		Periodic Costs - Year 45				$650,000	
		Periodic Costs - Year 50				$0	
		Annual Costs				$0	$0

QUANTITIES		PRICES	
BY TSC Team	CHECKED TSC Team	BY Jim Jetton	CHECKED
DATE PREPARED Feb-June 2011	PEER REVIEW / DATE TSC Team	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:	PROJECT:	
Arkansas Valley Conduit Revised Comanche South OM&R Costs Summary Sheet (Present Worth)	Fryingpan-Arkansas Project	
	WOID: AF523	ESTIMATE LEVEL: Appraisal
	REGION: GP	UNIT PRICE LEVEL: Jan-11
	FILE:	

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
						Estimated Costs	Estimated Costs (Rounded)
		Sheet 55 Summary (86-68420)					
		Periodic Costs - Year 5				$392,810.00	
		Periodic Costs - Year 10				$392,810.00	
		Periodic Costs - Year 15				$392,810.00	
		Periodic Costs - Year 20				$8,357,100.00	
		Periodic Costs - Year 25				$1,332,810.00	
		Periodic Costs - Year 30				$6,388,480.00	
		Periodic Costs - Year 35				$392,810.00	
		Periodic Costs - Year 40				$8,357,100.00	
		Periodic Costs - Year 45				$392,810.00	
		Periodic Costs - Year 50				$1,332,810.00	
		Annual Costs				$884,680.00	$880,000
				P/F Factor		Estimated Costs (Rounded)	Periodic Costs
		Shee 24, 34 & 55 Total Summary					
		Periodic Costs - Year 5		0.81701		$390,000.00	$318,634
		Periodic Costs - Year 10		0.66750		$390,000.00	$260,325
		Periodic Costs - Year 15		0.54535		$1,050,000.00	$572,618
		Periodic Costs - Year 20		0.44555		$9,500,000.00	$4,232,725
		Periodic Costs - Year 25		0.36402		$2,300,000.00	$837,246
		Periodic Costs - Year 30		0.29741		$7,000,000.00	$2,081,870
		Periodic Costs - Year 35		0.24298		$390,000.00	$94,762
		Periodic Costs - Year 40		0.19852		$9,500,000.00	$1,885,940
		Periodic Costs - Year 45		0.16219		$1,050,000.00	$170,300
		Periodic Costs - Year 50		0.13251		$2,700,000.00	$357,777
		Annual Costs		21.03006		$1,290,000.00	$27,128,777
				Subtotal Periodic			$10,812,196
				Subtotal Annual			$27,128,777

QUANTITIES		PRICES	
BY TSC Team	CHECKED TSC Team	BY Jim Jetton	CHECKED
DATE PREPARED Feb-June 2011	PEER REVIEW / DATE TSC Team	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:	PROJECT:			
Arkansas Valley Conduit Revised Comanche South OM&R Costs Summary Sheet (Present Worth)	Fryingpan-Arkansas Project			
	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
	FILE:			

PLANT ACCOUNT	PAY ITEM	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Periodic Costs					
		Subtotal 1					$10,812,196.00
		Mobilization	5%	+/-			$540,000.00
		Subtotal 1 with Mobilization					$11,352,196.00
		Escalation to Notice to Proceed (NTP)					$0.00
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$11,352,196.00
		Design Contingencies	15%	+/-			$1,647,804.00
		CONTRACT COST					$13,000,000.00
		Construction Contingencies	25%	+/-			$3,500,000.00
		FIELD COST					$16,500,000.00
		Non-Contract Costs	25%	+/-			$4,500,000.00
		CONSTRUCTION COST					$21,000,000.00
		Annual Costs					
		Subtotal 1					$27,128,777.00
		Mobilization	0%	+/-			$0.00
		Subtotal 1 with Mobilization					$27,128,777.00
		Escalation to Notice to Proceed (NTP)					$0.00
		Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP					$27,128,777.00
		Design Contingencies	10%	+/-			$2,871,223.00
		CONTRACT COST					$30,000,000.00
		Construction Contingencies	0%	+/-			$0.00
		FIELD COST					$30,000,000.00
		Non-Contract Costs**	10%	+/-			$3,000,000.00
		CONSTRUCTION COST					$33,000,000.00
		Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.					

QUANTITIES		PRICES	
BY TSC Team	CHECKED TSC Team	BY Jim Jetton	CHECKED
DATE PREPARED Feb-June 2011	PEER REVIEW / DATE TSC Team	DATE PREPARED 07/02/12	PEER REVIEW / DATE 7/30/12

FEATURE:	PROJECT:	Fryingpan-Arkansas Project		
Arkansas Valley Conduit	WOID:	AF523	ESTIMATE LEVEL:	Appraisal
Water Treatment Plant OM&R Costs Summary Sheet	REGION:	GP	UNIT PRICE LEVEL:	Jan-11
(Present Worth)	FILE:	H:\D8170\Common\JMorris\Arkansas Valley Conduit Appraisal Estimate\Life Cycle Costs\WTP\[OM&R Calcs-WTP-with escalation.xlsx]Periodic Costs		
Costs Provided by Black & Veatch				

Periodic (Replacement) Costs		P/F Factor	Estimated Periodic Costs	Present Worth Costs
Year 5	PW Factor	0.81701	$0	$0
Year 10	PW Factor	0.66750	$0	$0
Year 15	PW Factor	0.54535	$0	$0
Year 20	PW Factor	0.44555	$0	$0
Year 25	PW Factor	0.36402	$0	$0
Year 30	PW Factor	0.29741	$0	$0
Year 35	PW Factor	0.24298	$0	$0
Year 40	PW Factor	0.19852	$0	$0
Year 45	PW Factor	0.16219	$0	$0
Year 50	PW Factor	0.13251	$0	$0
Subtotal Periodic (Replacement) Costs				**$0**
Mobilization (+/- 5%)				$0
Subtotal 1 with Mobilization				$0
Escalation to NTP				$0
Subtotal 2 = Subtotal 1 with Mobilization + Escalation to NTP				$0
Design Contingencies (+/- 15%)				$0
Contract Cost				$0
Construction Contingencies (+/- 25%)				$0
Field Cost				$0
Non-Contract Costs (+/- 25%)				$0
Total Periodic (Replacement) Present Worth Costs Rounded (Jan-2011)				**$0**
Annual Periodic (Replacement) Costs Rounded (Jan-2011)				**$0**

Annual (Operation and Maintenance) Costs		P/A Factor	Estimated Annual Costs	Present Worth Costs
Maintenance	PWA Factor	21.03006	$63,480	$1,334,988
Operations Costs	PWA Factor	21.03006	$840,000	$17,665,250
Chemical Costs	PWA Factor	21.03006	$535,000	$11,251,082
Residuals Costs	PWA Factor	21.03006	$130,000	$2,733,908
Energy Costs for Pumping	PWA Factor	21.03006	$99,300	$2,088,285
Subtotal Annual (Operation and Maintenance) Costs				**$35,073,513**
Escalation to NTP				$0
Subtotal 1 with Escalation to NTP				$35,073,512
Design Contingencies (+/- 10%)				$3,926,488
Subtotal 3 = Subtotal 2 + Design Contingencies				$39,000,000
Non-Contract Costs (+/- 10%)				$4,000,000
Total Annual (Operation and Maintenance) Present Worth Costs Rounded (Jan-2011)				**$43,000,000**
Annual (Operation and Maintenance) Costs Rounded (Jan-2011)				**$2,000,000**

- FY2011 planning interest rate 4.125% per year for 50 years.
- PWA Factor = P/A = ((1+i)^(n - 1))/(i*((1+i)^n) = Uniform Series Present Worth Factor (P/A, 4.125%, 50)
- PW Factor = P/F = 1/(1+ i)^n = Single Payment Present Worth (P/F, 4.125%)

Notes:

Ref.: For appropriate use and terminology, see Reclamation Manual, Directives and Standards FAC; 09-01, 09-02 and 09-03.

QUANTITIES		PRICES	
BY	**CHECKED**	**BY**	**CHECKED**
Black & Veatch		Black & Veatch; TSC added design contingency and non-contract costs	6/22/12
DATE PREPARED	**PEER REVIEW / DATE**	**DATE PREPARED**	**PEER REVIEW / DATE**
11/18/11		11/18/2011; TSC removed escalation on 6/20/12	6/22/12